Online Help
Rev 2
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AMS Machine Works v1.7.5 User Guide

Online Help

EMERSON

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Version

1.7.5

Contents

1 Introduction

1.1 About this manual

The AMS Machine Works Online Help guides you through using the software after installation.

For information on the installation, see the AMS Machine Works System Guide (MHM-97926). The System Guide includes information on installing the software and performing administrator functions. The System Guide is included with the installation files. Emerson recommends administrators to read the System Guide before attempting installation and before reading the Online Help.

Table 1-1: Referenced Documents

MHM Number	Document name
MHM-97924-PBF	AMS Asset Monitor Operating Manual
MHM-97932-PBF	AMS Machine Works v1.7.5 System Guide

1.2 Symbols

Note
This symbol marks passages that contain important information.

⚠ CAUTION

This symbol marks operations that can lead to malfunctions or faulty measurements, but will not damage the device.

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Phone	Toll free 800.833.8314 (U.S. and Canada) +1.512.832.3774 (Latin America) +63.2 702.1111 (Asia Pacific, Europe, and Middle East)
Email	Guardian.GSC@Emerson.com
Web	http://www.emerson.com/en-us/contact-us

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2 Overview

AMS Machine Works combines predictive maintenance techniques with comprehensive analysis tools to provide easy and accurate assessment of the machinery health in your facility. AMS Machine Works brings together related data and prioritizes assets and alerts based on your configuration.

AMS Machine Works v1.7.5 includes support for AMS Asset Monitor, AMS Wireless Vibration Monitor, and the AMS 9420 Wireless Vibration Transmitter. The new Network Device Module streamlines the process of managing a complex monitoring infrastructure and also boosts performance.

AMS Machine Works provides a group of intuitive dashboards to help keep up with day-to-day activities and machinery health. AMS Machine Works continues to be part of the Plantweb™ Digital Ecosystem offering additional applications and asset sources.

AMS Machine Works applications

Configuration and interaction with the software happens through these applications, which can be launched from a web browser:

- **Asset Explorer** — initiate configuration, access, and manage assets in your plant. See: Asset Explorer
- **Analysis Dashboard** — view the status of your machines, devices, and the software at a glance. See: Analysis Dashboard
- **Network Device Module** — configure data sources, data collections, check device health, and handle store-on-alert functions. See: Network Device Module
- **Event Viewer** — view system generated events. See: Event Viewer
- **Machine Configuration** — configure monitored machines, map measurement locations to device channels. See: Machine Configuration
- **Alerts** — configure the type of alert and the alert levels. See: Alerts
- **Machine Journal** — create journal entries and collaborate on maintenance issues for your plant's machines. See: Machine Journal
- **User Manager** — control and monitor access to various areas of the software. See: User Manager
- **Vibration Analyzer** — analyze data from machines. Vibration Analyzer can be launched from a web browser, which will open the thick client application. However, the vibration analyzer thick client application will have to be installed in the client machine first. See: Vibration Analyzer

Essential system functions are performed by web services. These services may or may not have a user interface. Examples of services include processing measurement data and communicating with monitoring devices.

An OPC UA server is available for sending scalar data from AMS Machine Works to any OPC UA-compliant client system.

Assets

An asset is any physical component such as a device, machine, or equipment being monitored, or the logical representation of a physical asset.

In AMS Machine Works, assets are typically physical pieces of equipment, such as motors, fans, pumps, etc.

Agents

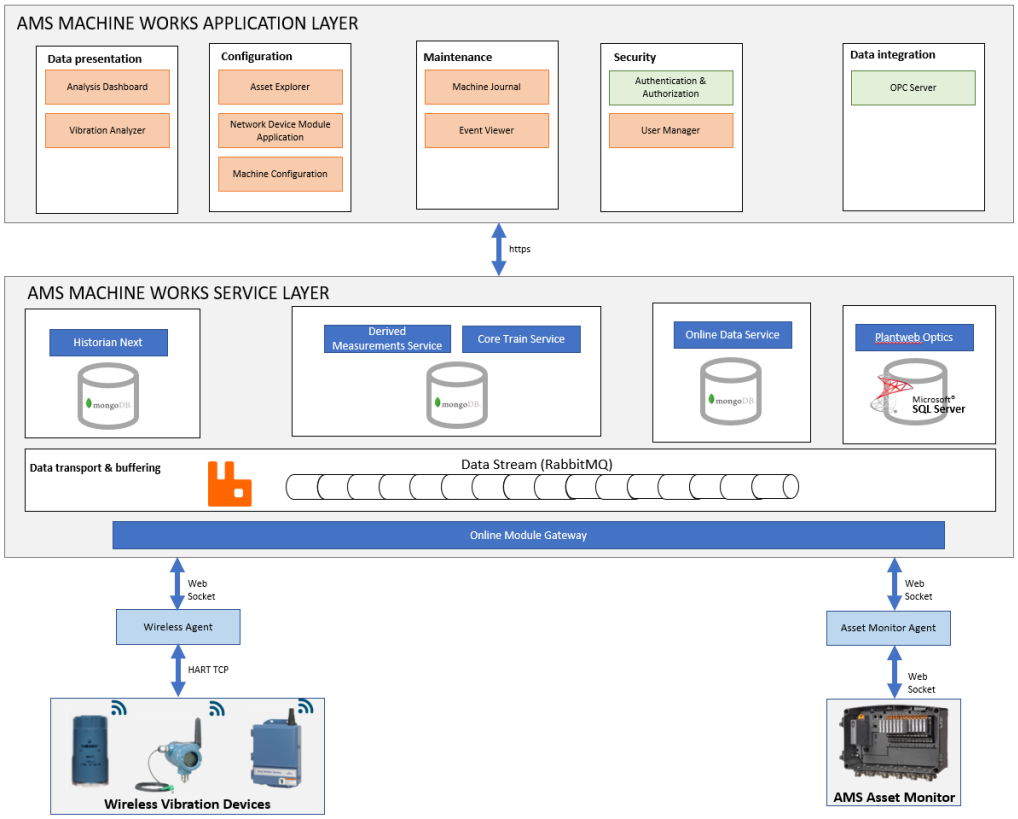
An agent collects data from devices. This includes data about the devices themselves and about the machines they are monitoring.

Examples of agents are the AMS Asset Monitor Agent, and the Emerson Wireless Gateway Agent. The Emerson Wireless Gateway Agent collects data from wireless vibration devices using a HART TCP connection to an Emerson Wireless Gateway.

2.1 AMS Machine Works Architecture

AMS Machine Works has three distinct architecture layers:

Figure 2-1: AMS Machine Works Architecture



A. ***AMS Machine Works Application Layer***— *This layer contains several web applications for data presentation, configuration, maintenance, security, and data integration. Connects to OPC UA Server.*
B. ***AMS Machine Works Service Layer***— *This layer processes the vibration data for health, alerts, aggregation, and calculating derived measurements. Manages machine trains, monitors alerts, and asses the health of assets.*
C. ***Network Device Module Layer***— *This layer connects to monitoring devices and collects vibration data. Native measurements, device health, and status information data is sent to the Core Module.*

2.2 System Components

The system is comprised of many components, described in the table below. Refer to the System Guide for information about where the components are installed.

Table 2-1: System components

Component	Description
AMS Machine Works Web Services	The AMS Machine Works Web Service provides the essential software components and interfaces to the Network Device Module, the Machine Configuration process, the Analysis Dashboard, and the Machine Journal. The AMS Machine Works Web Service also enables you to create machines in Asset Explorer, perform analysis in AMS Machine Works Vibration Analyzer, and log Journal Entries in Machine Journal. It obtains data from various other components, which can be installed on different servers.
Emerson Wireless Gateway Agent	The Emerson Wireless Gateway Agent brings data into AMS Machine Works from wireless devices such as the AMS 9420 Wireless Vibration Transmitter and AMS 9530 Wireless Vibration Monitor.
AMS Asset Monitor Agent	AMS Asset Monitor Agent enables you to bring data into AMS Machine Works from an AMS Asset Monitor.
AMS Machine Works Vibration Analyzer	The AMS Machine Works Vibration Analyzer enables complex analysis of vibration data with predictive analysis tools and a wide array of visualization options.

3 Machine Configuration

You can set up monitored assets, and map monitoring assets to them, in AMS Machine Works through the **Machine Configuration** process.

3.1 Definition of a Machine Train

In AMS Machine Works, to create a machine you create a **Machine Train**. Just like an individual machine, a **Machine Train** is created by using templates for each **Component**.

Note
A **Machine Train** is made up of **Component** elements, which are also known as **Asset** elements. These terms are interchangeable in the context of AMS Machine Works.

Table 3-1: Definition of Machine Train Components

Component	Definition
Driver	A **Driver** component provides the energy to perform some work, for example, a motor or a turbine.
Intermediate	An **Intermediate** component, such as a **Gearbox**, connects a **Driver** component and a **Driven** component.
Driven	A **Driven** component is typically performing some work, such as pumping.
Coupling	Between any two other components in a **Machine Train** there is always a **Coupling**. The default setting for a **Coupling** is **Direct**, and no configuration is necessary. Configurable options include: **Right Angle**, **Chain**, and **Belt**. See: Coupling Components

Note
A **Machine Train** can only have one of each type of **Component**: **Driver**, **Intermediate**, and **Driven**.

The smallest **Machine Train** is made from just one **Component**, e.g., a **Fan**.

The largest **Machine Train** is made from five **Component** elements, e.g., from a **Motor**, a **Coupling**, a **Gearbox**, another **Coupling**, and a **Pump**.

Every type of **Component**, except for **Coupling** elements:

- Has a **Library** associated with it.
- Can have additional elements defined on it such as:
  - **Bearing** elements: which have their own **Library** as well.
  - **Shaft** elements: which can have a maximum of 9 **Bearing** elements per **Shaft**.

— **Measurement Location** elements: There are 2 standard positions, **Inboard** and **Outboard**, but you can define up to 14 more by using the **Add Custom Position** feature to reach a total of 16.

3.2 Initiate the Configuration Process

Prerequisites

To perform Step 3: Channel Mappings, some monitoring assets must first be configured. See: Network Device Module

To create a new **Machine Train**, use the Asset Explorer. See: Add a Machine Train

To edit an existing **Machine Train**, use the Analysis Dashboard, or the Asset Explorer.

Note
You can only configure one **Machine Train** at a time, but you can use **Copy train** to make copies of a **Machine Train** to populate your site with identical **Machine Trains**. See: Copy Machine Train

⚠ CAUTION

Ensure that a **Machine Train** is properly configured before copying it. This will help you avoid replicating errors.

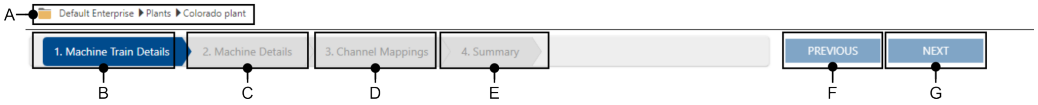
Procedure

1. Open the **Asset Explorer** via the App Switcher.
    a) The **Asset Explorer** can also be launched by a desktop shortcut, or by a browser bookmark.
2. To add a **Machine Train**: Add a Machine Train
3. To edit a **Machine Train**: Edit a Machine Train
    a) Alternatively you can initiate the process to edit a **Machine Train** via the **Machine Config** option available in the Analysis Dashboard Subheader Section.

3.3 Machine Configuration User Interface

Machine Configuration guides you through the process of creating the components of a **Machine Train**.

Figure 3-1: Machine Configuration navigation



A. *This is the **Location** where the new **Machine Train** will be created.*
B. ***Machine Train Details** is the first step in the process, for selecting the machine components, and naming the **Machine Train**.*
C. ***Machine Details** is the second step in the process, for adding information about the components.*
D. ***Channel Mappings** is the third step in the process, for adding information about the location of sensors.*
E. ***Summary** is the fourth step in the process, for reviewing and printing the configuration. Also, you can perform **Copy Train** and **Copy Alerts** actions.*
F. ***Previous** is for navigating backwards in the configuration process.*
G. ***Next** is for navigating forward in the configuration process.*

Note
***Next** changes to **Finish** at the final step.*

To navigate between steps, click **Previous**, or **Next**, or click on any step in the configuration progress indicator. You can only proceed to the next screen after completing all required information on the current screen. You can skip between any screens already completed. If you skip through the steps without configuring the details, the Machine Configuration application will supply default values.

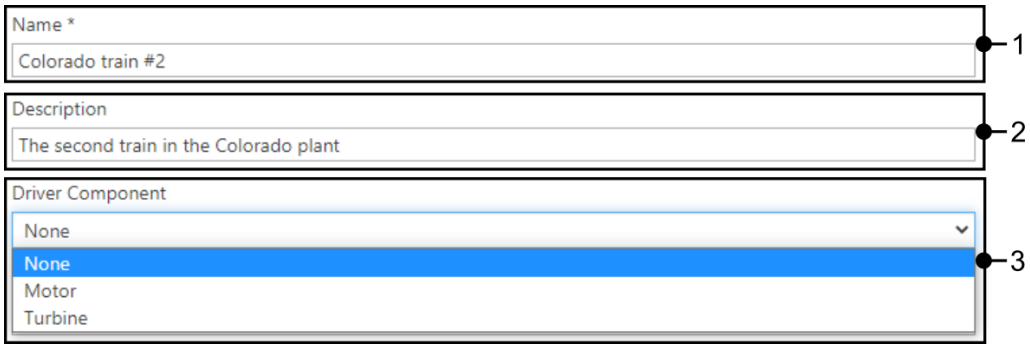
Note
While Machine Configuration will allow you to accept default values for many fields, in order to perform thorough machine analysis, Emerson recommends that you provide as complete and accurate information about your machines as possible.

3.4 Step 1: Add Machine Train Details

In this step you define the basic structure of your **Machine Train**. A **Machine Train** can only have one of each type of component: **Driver**, **Intermediate**, and **Driven**. In between any two of these components the system automatically adds a **Coupling** component. See: Definition of a Machine Train

Note
At least one component must be selected to define a **Machine Train**.

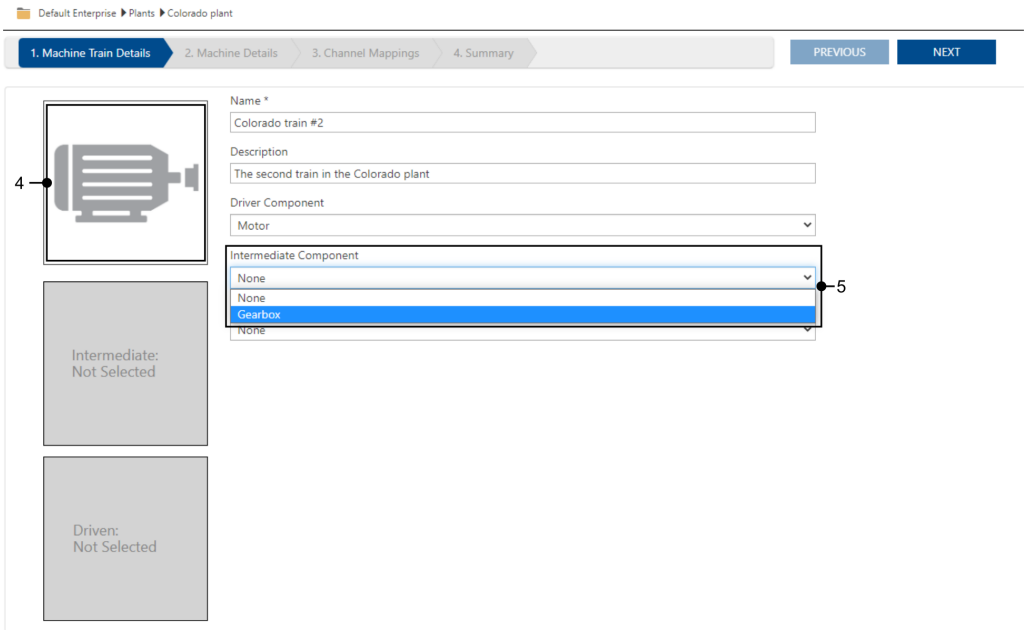
Figure 3-2: Machine Train Details - Driver Component



Procedure

1. Required: **Name**: Enter a name in this field.
2. Optional: **Description**: Add a description of the **Machine Train**.
3. Optional: **Driver Component**, select a type of **Driver** from the dropdown list:
   - **None (default)**: Select this if your **Machine Train** doesn't have a separate **Driver Component**.
   - **Motor**.
   - **Turbine**.

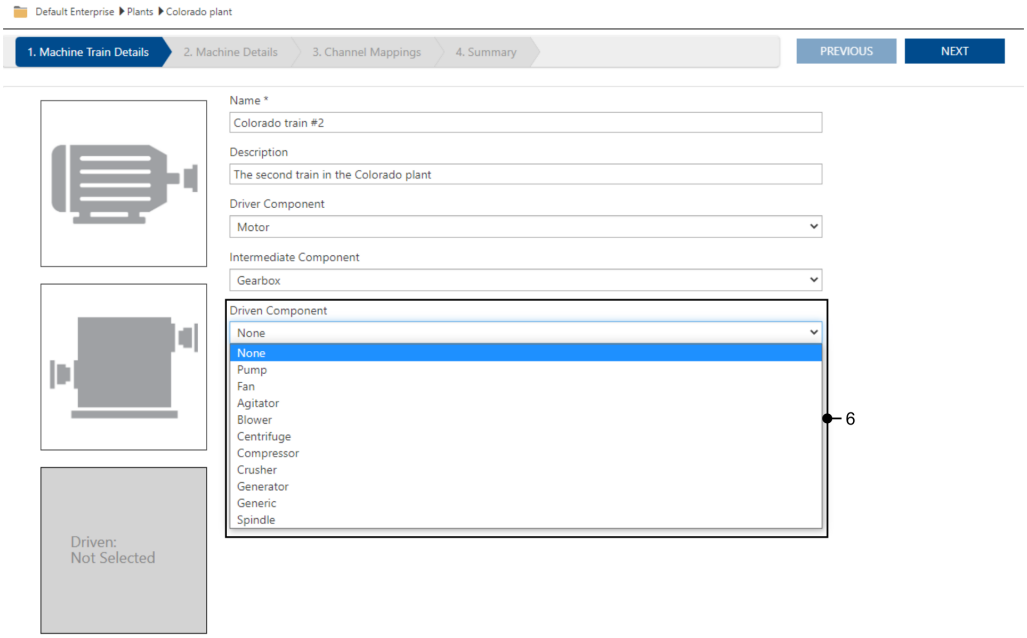
Figure 3-3: Machine Train Details - Intermediate Component



4. **Picture**: When you select a component an image with a generic representation of the component is automatically displayed in the grey box.

5. Optional: **Intermediate Component**, select a type of **Intermediate Component** from the dropdown list:
   - **None (default)**: Select this if your **Machine Train** doesn't have a **Gearbox Component**.
   - **Gearbox**: Select this if your **Machine Train** has a **Gearbox Component**.

Figure 3-4: Machine Train Details - Driven Component



6. Optional: **Driven Component**, select the type of **Driven Component** from the dropdown list.
   - **None (default)**: Select this if your **Machine Train** doesn't have a **Driven Component**.
   - **Pump, Fan, Agitator, Blower, Centrifuge, Compressor, Crusher, Generator, Spindle**: If you have one of these devices, make the appropriate selection.
   - **Generic**: Select this if you have a **Driven Component** which isn't included in the list.
7. Click **Next** to proceed to Step 2: Add Machine Details.

3.5 Step 2: Add Machine Details

In this step, you can set design and performance parameters for every **Component**. You can configure the details for each of the components manually, or by using preconfigured machine component templates stored in a **Library**.

Procedure

1. Fill in the information for every **Component** in your **Machine Train**.

   Note
   Detailed information about every field is found in this chapter.

2. You can click on the **Previous** button at any time to go to the previous step.
3. Once you fill all of the required fields, you can click on the **Next** button, or directly on a **Step Name** at the top of the screen, to change steps.

3.5.1 Using Libraries

Every type of **Component**, except for **Coupling** elements, has a **Library** associated with it. **Bearing** elements also have a **Library**.

Each **Library** is configured to accept parameters which are relevant to that type of element. Two element types, **Motor** components, and **Bearing** elements, have predefined entries in their **Library**.

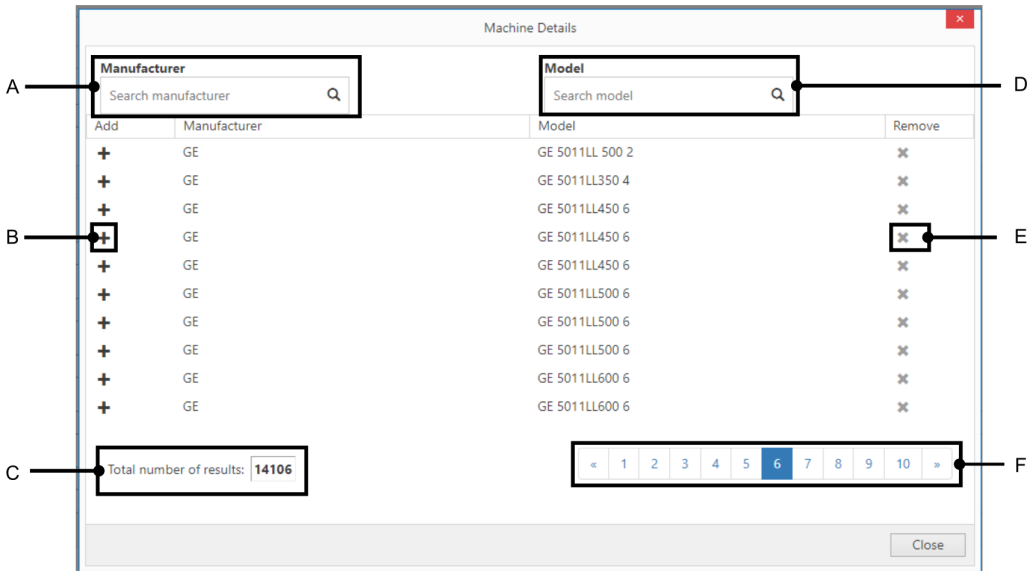
Motor Library

The **Motor Library** has predefined entries for a wide range of manufacturers and models. You can search in the **Motor Library** for a specific **Motor**, see Search the Motor Library. If you do not find an exact match, you can edit or create your own **Motor** definitions, see Add a Motor to the Library.

Search the Motor Library

AMS Machine Works has a predefined **Library** of **Motor** components. You can search this **Library** by **Manufacturer** and **Model** and select a definition for the **Motor** in your **Machine Train**.

Figure 3-5: Motor Library



A. ***Manufacturer*** *— Search by manufacturer name.*
B. ***+*** *— Click plus to use this definition for the* ***Motor*** *component.*
C. *The total number of results which match your search parameters, or the total number of possible items if there are no search terms entered.*
D. ***Model*** *— Search by model name.*
E. ***X*** *— Click X to* ***Remove*** *this definition from the* ***Motor Component Library****. You can only delete user defined* ***Motor*** *components.*

> ***Note***
> *Do not click* ***X*** *unless you are sure you want* ***Remove*** *a definition. There is no undo function, or confirmation dialog, for the* ***Remove*** *function.*

F. *List of pages of results.*

See also: Add a Motor to the Library

Add a Motor to the Library

Adding a **Motor** to the **Library** is similar to adding any other item to the **Library**. The most important points to take into consideration are:

- Double check your configuration.
- Make sure that your combination of **Manufacturer** and **Model** information are unique, so you do not accidentally overwrite a previously configured item.

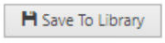
In the bottom right corner of the **Machine Details** screen for the **Motor** is the **Save to Library** button.

Note
This button is in a similar position for all **Component** types except for:

- **Coupling** elements. See: Coupling Components

- **Bearing** elements. See: Add a Bearing to the Library

Figure 3-6: Save to Library Button



Click the **Save to Library** button to save the configuration to the **Library**.

Note
If the combination of **Manufacturer** and **Model** information are not unique then the results of the operation can be unpredictable.

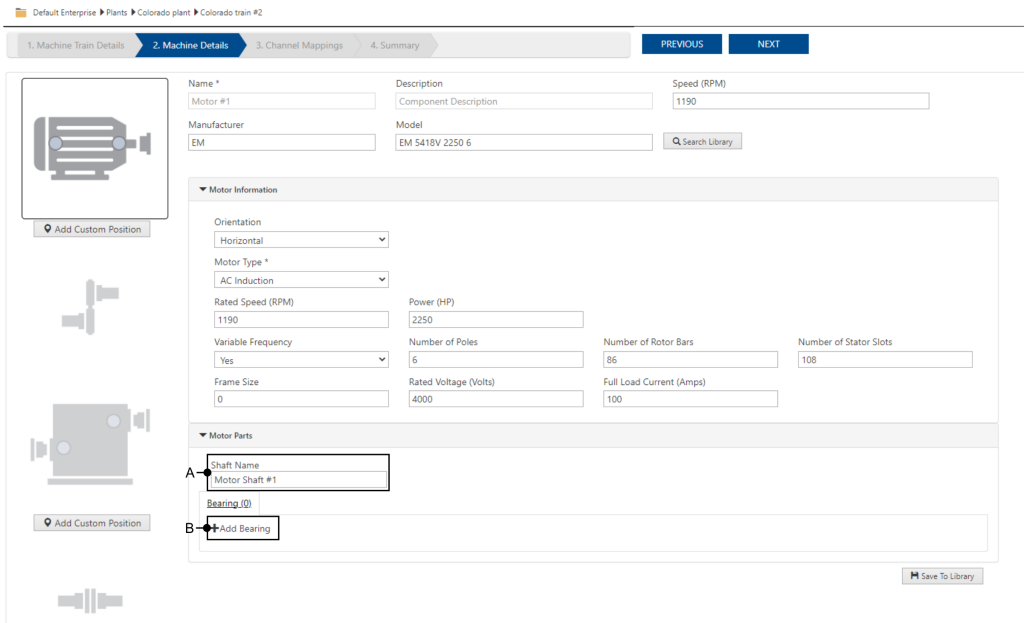
Bearing Library

The **Bearing Library** has predefined entries for a wide range of manufacturers and models. You can search in the **Bearing Library** for a specific **Bearing**, see Add a Bearing. If you do not find an exact match, you can edit or create your own **Bearing** definitions, see Add a Bearing to the Library.

Add a Bearing

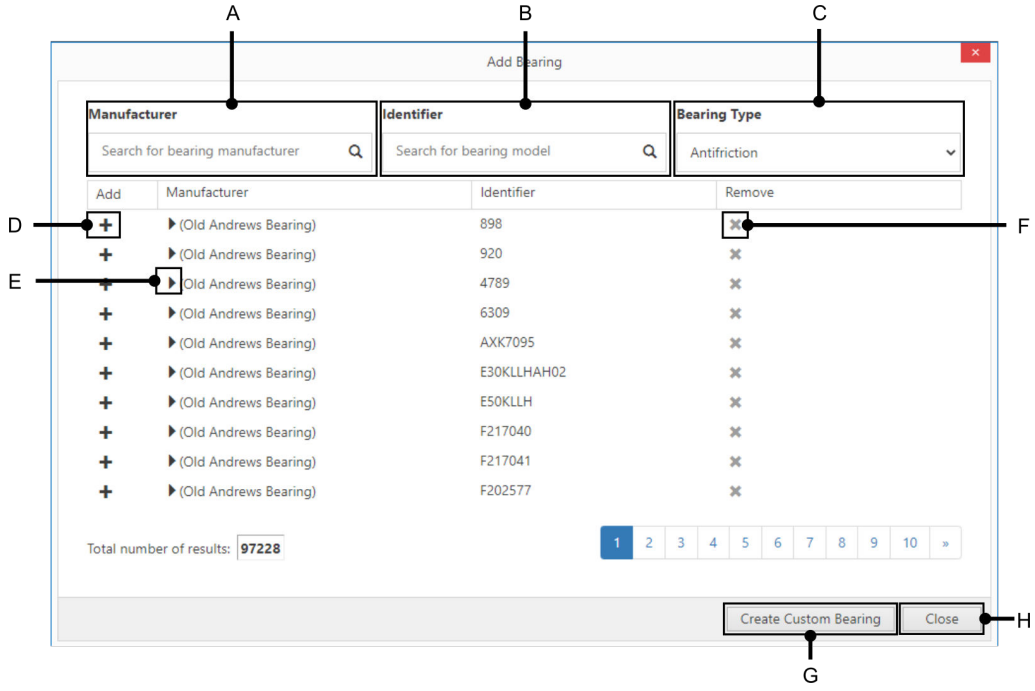
Any **Component** in AMS Machine Works which has a **Shaft** can have a **Bearing** added to that **Shaft**. Each **Shaft** can have a maximum of 9 **Bearing** elements.

Figure 3-7: Add Bearing button in the Machine Parts Section



A. ***Shaft Name*** *– (Required) A 60 character alphanumeric field for the name of the shaft with a default value, "Motor Shaft #" along with the number of the* ***Shaft*** *element. (e.g., "Motor Shaft # 1")*
B. ***Add Bearing*** *button – Click the + button to open the* ***Add Bearing*** *window.*

Figure 3-8: Add Bearing Window



A. ***Manufacturer*** *– Enables the user to search for a* ***Bearing*** *by manufacturer. Enter a search phase, and then either click on the loupe icon, or press the enter key on your keyboard to search.*

B. ***Identifier*** *– Enables the user to search for a* ***Bearing*** *by model. Enter a search phase, and then either click on the loupe icon, or press the enter key on your keyboard to search.*

C. ***Bearing Type*** *– A dropdown list to filter the results with choices for* ***Antifriction***, ***Sleeve***, *and* ***Unknown***.

D. *+ icon - Click plus, '+', to add this type of* ***Bearing*** *to the* ***Shaft***. *You can perform multiple actions without needing to close and reopen this window.*

E. ***Show Details*** *button - Click this triangle to display the detailed parameters of this* ***Bearing*** *definition. This data is read only, to create a custom* ***Bearing*** *press the button marked 'G' on this image,* ***Create Custom Bearing***.

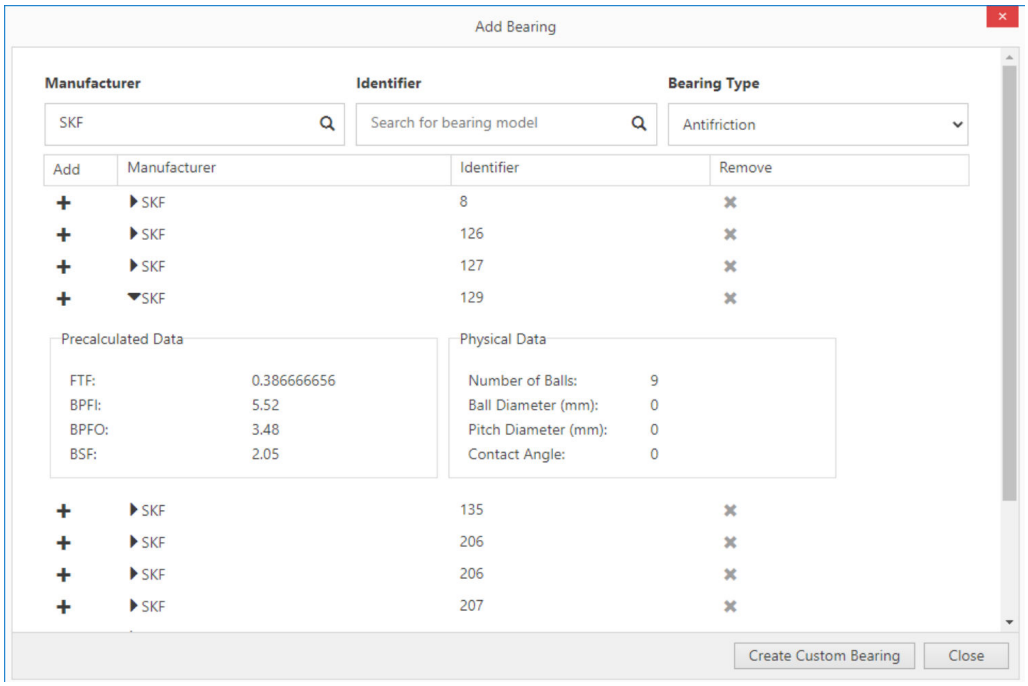
F. ***X*** *button – Click this button to delete a previously defined custom* ***Library*** *entry.*

G. ***Create Custom Bearing*** *button – Click this button to begin the custom bearing configuration process. See: Add a Bearing to the Library*

H. ***Close*** *button – Click this to close the* ***Bearing Library***.

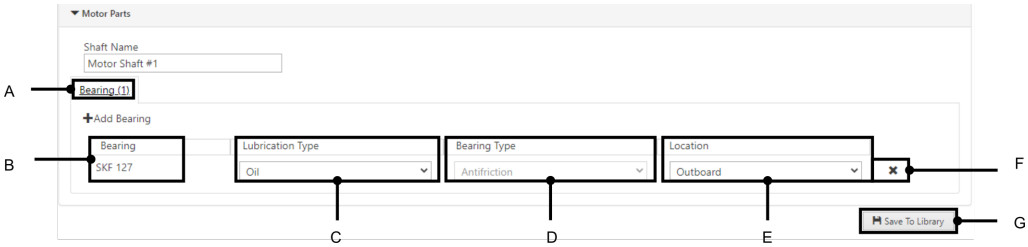
The following image shows **Precalculated Data** and **Physical Data** parameters that are shown when you click the **Show Details** triangle. (The **Show Details** triangle is shown in position 'E' in the image above.)

Figure 3-9: Add Bearing Window - Show Details



For more information about the meanings and possible values of the **Precalculated Data** and **Physical Data** see: Add a Bearing to the Library.

Figure 3-10: List of Defined Bearings



A. *Number of defined bearings – This displays how many **Bearing** elements are mounted on the specific shaft. The maximum is 9.*
B. ***Bearing Identifier** - This is the model number or name of this **Bearing**.*
C. ***Lubrication Type** – A dropdown list, with **Grease** and **Oil** options.*
D. ***Bearing Type** - A read only field which displays information that comes from the **Library**, or the **Create Custom Bearing** process.*
E. ***Location** – A dropdown list with three kinds of locations to choose from: **Inboard**, **Outboard**, and **Custom**. If the user selects **Custom** from the list, the **Custom Bearing Position** creator will be opened. See: Add or Remove a Custom Position*
F. ***X** button – Click 'X' to remove this **Bearing**.*
G. ***Save to Library** button – This button operates on the **Library** for the **Component**, not the **Bearing**. To create a custom **Bearing** see: Add a Bearing to the Library*

Add a Bearing to the Library

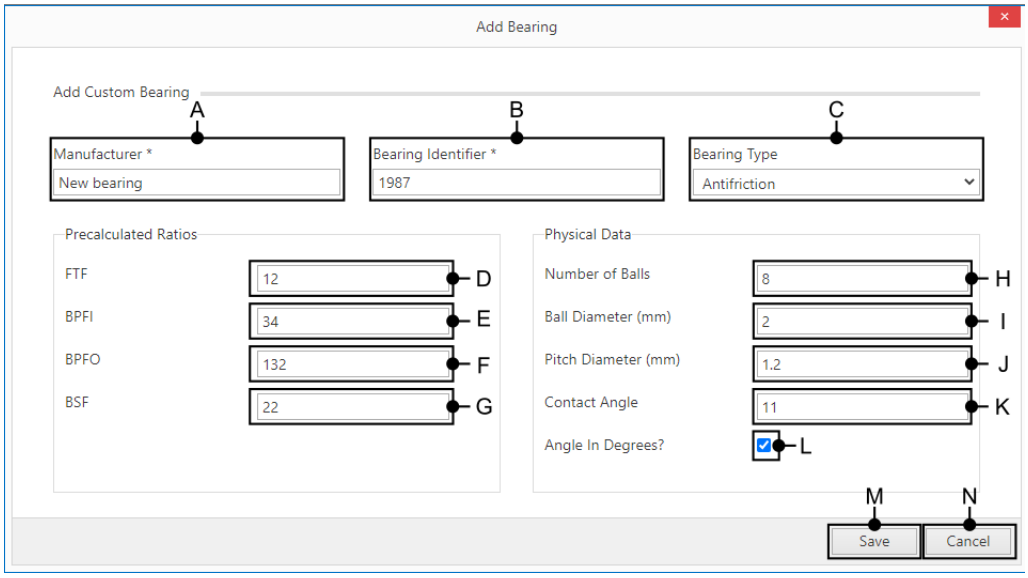
If you cannot find an exact match in the **Bearing Library**, you can edit or create your own **Bearing** definition.

Note
It is important to be as precise as possible with your information when you create a custom **Bearing** definition. Take care not to reuse existing **Manufacturer** and **Bearing Identifier** information combinations, as this could result in confusion and error.

To begin the **Create Custom Bearing** process, start by adding a **Bearing** to a **Shaft**. (See: Add a Bearing) In the **Add Bearing** window click **Create Custom Bearing**.

The **Add Bearing** window will then display the following **Add Custom Bearing** mode.

Figure 3-11: Add Bearing — Add Custom Bearing



A. ***Manufacturer*** *– (Required) The name of the manufacturer.*

B. ***Bearing Identifier*** *– (Required) The id number for your bearing. This number does not need to be unique; the system allows the creation of two bearings with the same identifier but with different manufacturer names.*

> ***Note***
> *The combination of the* ***Manufacturer*** *name and* ***Bearing Identifier*** *must be unique.*

C. ***Bearing Type*** *– (Optional) A dropdown list with* ***Antifriction*** *as the default value. The other options are* ***Sleeve*** *and* ***Unknown****. Fields D, E, F, G, H, I, J, K, and L are only shown when* ***Antifriction*** *is selected.*

D. ***FTF*** *(Fundamental Train Frequency) – (Optional) The default value is 0. This field accepts decimal numeric values between 0 and 1.*

E. ***BPFI*** *(Ball Pass Frequency Inner) – (Optional) The default value 0. This field accepts decimal numeric values between 0 and 999.*

F. ***BPFO*** *(Ball Pass Frequency Outer) – (Optional) The default value 0. This field accepts decimal numeric values between 0 and 999.*

G. ***BSF*** *(Ball Spin Frequency) – (Optional) The default value 0. This field accepts decimal numeric values between 0 and 99999.*

H. ***Number of Balls*** *– (Optional) The default value 0. This field accepts decimal numeric values between 0 and 999.*

I. ***Ball Diameter (mm)*** *– (Optional) The default value 0. This field accepts decimal numeric values between 0 and 9999.*

J. ***Pitch Diameter (mm)*** *– (Optional) The default value 0. This field accepts decimal numeric values between 0 and 9999.*

K. ***Contact Angle*** *– (Optional) The default value 0. This field accepts decimal numeric values between 0 and 90.*

L. ***Angle In Degrees?*** *– (Optional) This checkbox is checked by default.*

M. ***Save*** *button – Click this button to save your custom* ***Bearing*** *in the* ***Bearing Library****.*

*N. **Cancel** button – Click this button to exit without saving your changes.*

Other Libraries

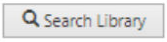
Every **Component** type in AMS Machine Works has a **Library** associated with it. There are two exceptions to this rule:

- **Coupling** elements, do not have an associated **Library**.
- **Bearing** elements, have an associated **Library**. See: Bearing Library

Search a Library

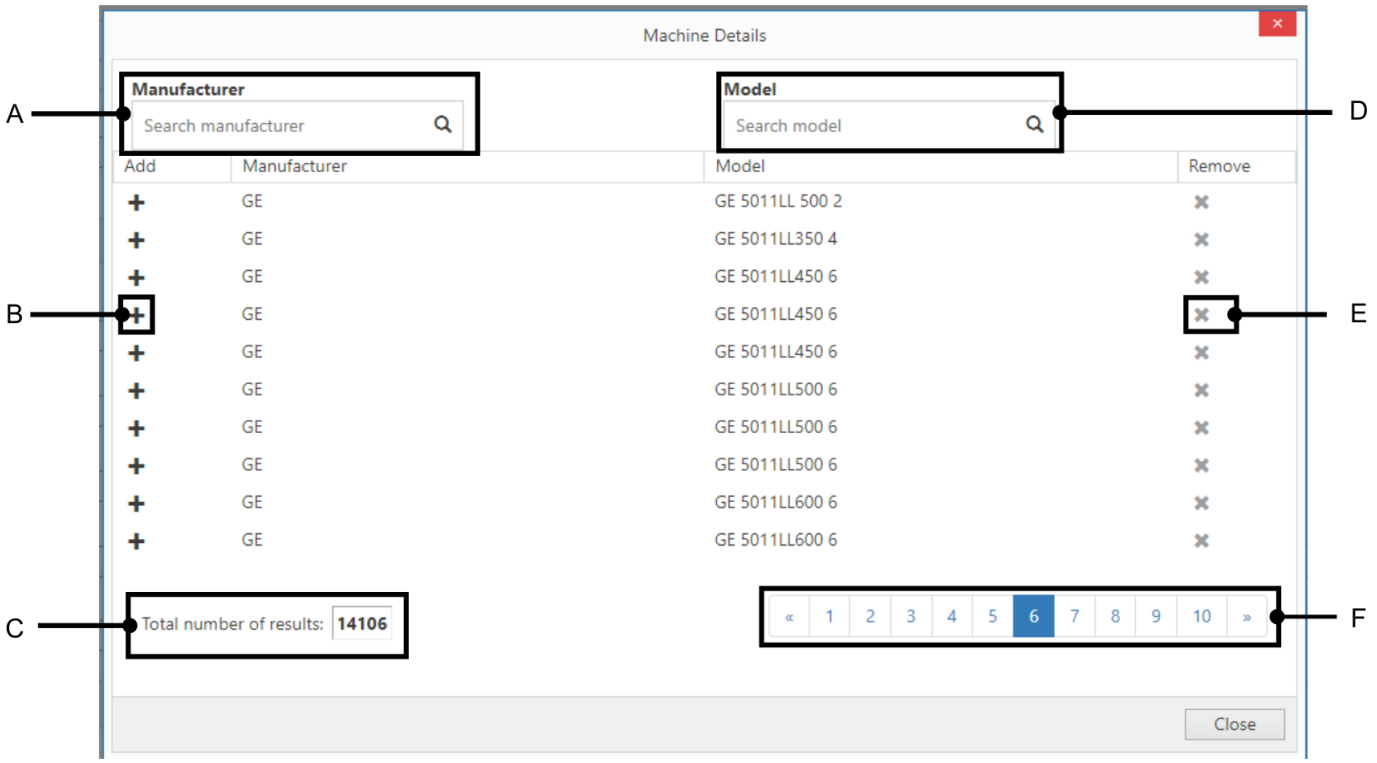
In the top section of the basic description of every **Component** there is a **Search Library** button.

Figure 3-12: Search Library Button



Click **Search Library** button to open the **Machine Details** window.

Figure 3-13: Machine Details Library



A. ***Manufacturer*** — *Search by manufacturer name.*
B. ***+*** — *Click plus to use this definition for the component.*
C. *The total number of results which match your search parameters, or the total number of possible items if there are no search terms entered.*
D. ***Model*** — *Search by model name.*
E. ***X*** — *Click X to* ***Remove*** *this definition from the component* ***Library***.

> ***Note***
> *Do not click* ***X*** *unless you are sure you want* ***Remove*** *a definition. There is no undo function, or confirmation dialog, for the* ***Remove*** *function.*

F. *List of pages of results.*

Add an Item to a Library

Adding any item to a **Library** is similar to adding a **Motor** to the **Library**. The most important points to take into consideration are:

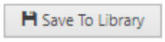
- Double check your configuration.
- Make sure that your combination of **Manufacturer** and **Model** information are unique, so you do not accidentally overwrite a previously configured item.

In the bottom right corner of the **Machine Details** screen for any **Component** is the **Save to Library** button.

Note
This button is in a similar position for all **Component** types except for:

- **Coupling** elements. See: Coupling Components
- **Bearing** elements. See: Add a Bearing to the Library

Figure 3-14: Save to Library Button



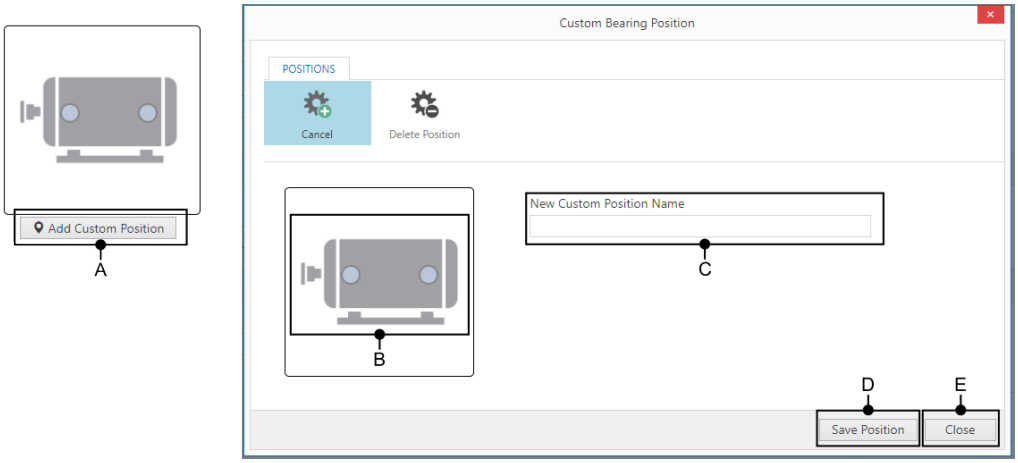
Click the **Save to Library** button to save the configuration to the **Library**.

Note
If the combination of **Manufacturer** and **Model** information are not unique then the results of the operation can be unpredictable.

3.5.2 Add or Remove a Custom Position

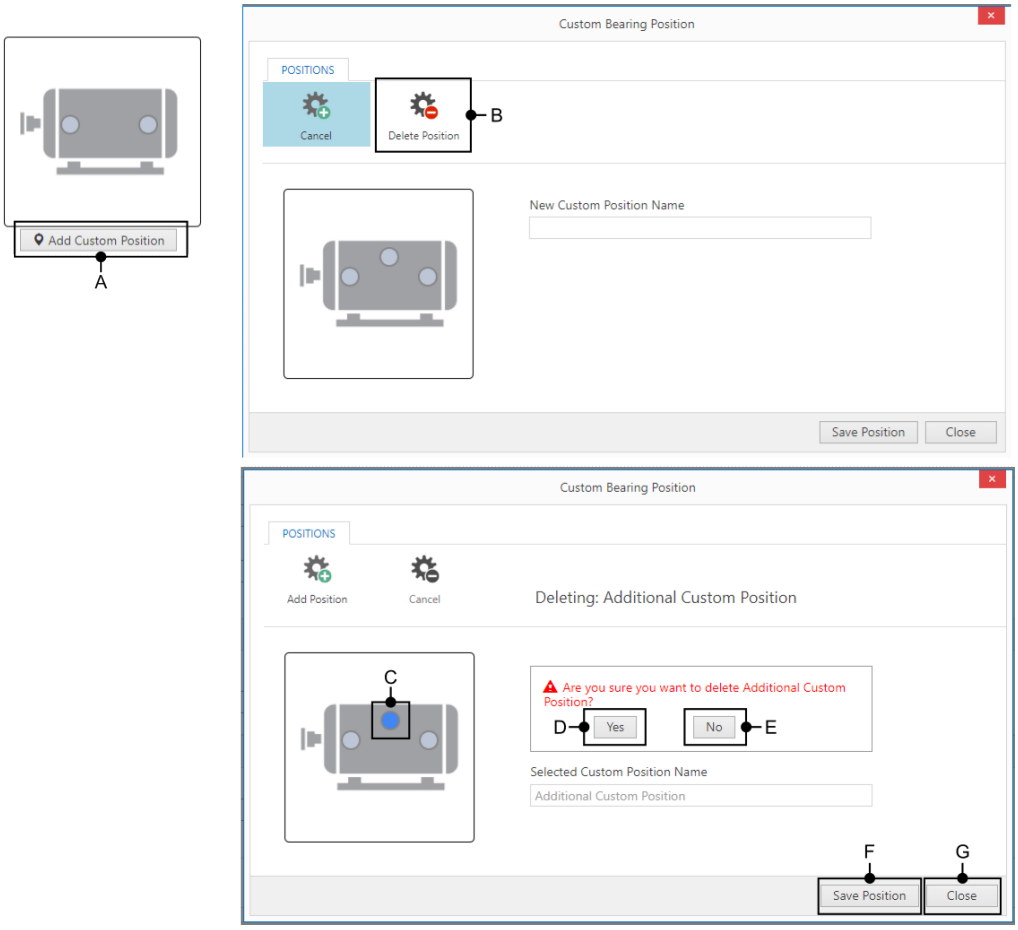
For **Driver**, **Intermediate**, and **Driven** components the user can define an additional **Measurement Location** by clicking the **Add Custom Position** button under the component icon. The system allows you to define a maximum of 14 custom positions. Previously defined custom positions can be deleted through the same process. The two system-defined default locations, **Inboard** and **Outboard**, cannot be deleted.

Figure 3-15: Add Custom Position



A. ***Add Custom Position*** *button – Opens the* ***Custom Bearing Position*** *window.*
B. ***Sketch*** *– Click somewhere on the sketch to add a custom position.*
C. ***New Custom Position Name*** *– This required field must have a name from one to 30 characters long which is unique within the context of the component.*
D. ***Save Position*** *button – Click this to save the custom position.*
E. ***Close*** *– Click this button, or the 'X' in the top right corner, to close the window without saving the changes.*

Figure 3-16: Remove Custom Position



A. ***Add Custom Position*** *button –Opens the 'Custom Bearing Position' window.*
B. ***Delete Position*** *– Chose this option to open the 'delete' mode.*
C. ***Sketch*** *– Click on a custom position on the sketch to delete it.*
D. ***Yes*** *button – Confirm that you want to delete the selected custom position.*
E. ***No*** *button – Cancel the removal process.*
F. ***Save Position*** *button – Save your changes.*
G. ***Close*** *– Click this button, or the 'X' in the top right corner, to close the window without saving the changes.*

3.5.3 Coupling Components

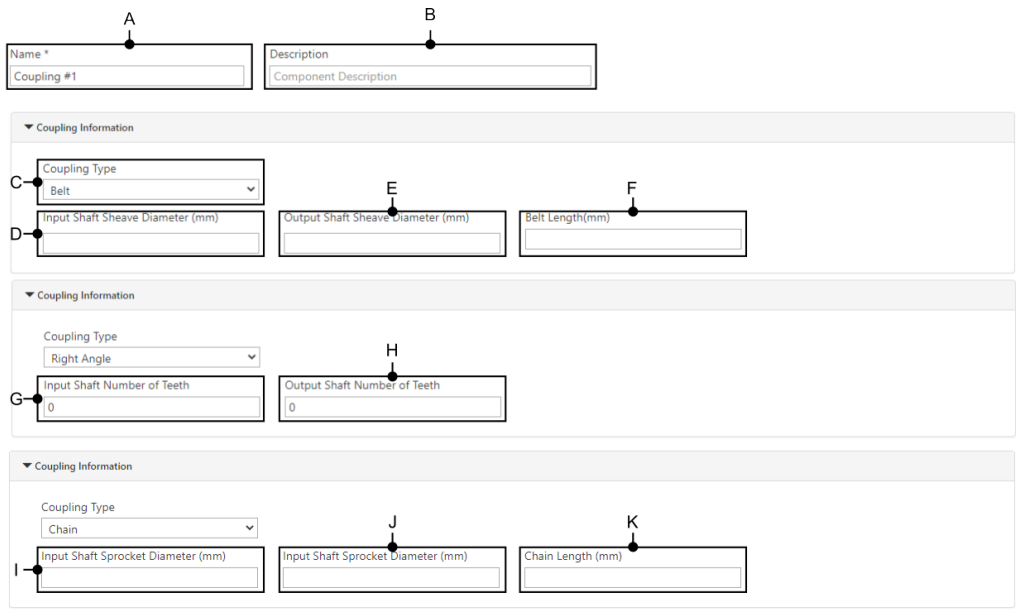
Between any two **Component** elements AMS Machine Works automatically adds a **Coupling** component. By default, the **Coupling Type** is configured as **Direct** and does not affect the output shaft speed. **Coupling** components do not have a **Library** associated with them to store custom configurations.

The **Coupling Type** is represented by the following icons.

Figure 3-17: Coupling Components - Icons

- Left icon: **Direct**
- Middle icon: **Belt** or **Chain**
- Right icon: **Right Angle**

Figure 3-18: Coupling Details



A. ***Name*** *– the name of the* ***Coupling*** *component. This is a required field with a default value of, "Coupling #1", and a maximum length of 60 characters.*
B. ***Description*** *– additional information about the* ***Coupling*** *component. This optional field has a maximum length of 255 characters.*
C. ***Coupling Type*** *– the type of coupling. This field is a drop-down list with* ***Direct*** *as a default value, with options for* ***Belt***, ***Right Angle***, *or* ***Chain***.
D. *If* ***Coupling Type*** *=* ***Belt****:* ***Input Shaft Sheave Diameter (mm)*** *– This optional field accepts decimal numeric values less than or equal to 100000.*
E. *If* ***Coupling Type*** *=* ***Belt****:* ***Output Shaft Sheave Diameter (mm)*** *– This optional field accepts decimal numeric values less than or equal to 100000.*
F. *If* ***Coupling Type*** *=* ***Belt****:*
Belt Length (mm) *– This optional field accepts decimal numeric values less than or equal to 100000, but greater than the minimal belt length X.*
X = π (d1+d2)/2+d1+d2
Where d1 is the ***Input Shaft Sheave Diameter****, and d2 is the* ***Output Shaft Sheave Diameter****.*
G. *If* ***Coupling Type*** *=* ***Right Angle****:* ***Input Shaft Number of Teeth*** *– This is a required field which accepts positive whole numbers from 1 to 100000.*
H. *If* ***Coupling Type*** *=* ***Right Angle****:* ***Output Shaft Number of Teeth*** *– This is a required field which accepts positive whole numbers from 1 to 100000.*
I. *If* ***Coupling Type*** *=* ***Chain****:* ***Input Shaft Sprocket Diameter (mm)*** *– This optional field accepts decimal numeric values less than or equal to 100000.*
J. *If* ***Coupling Type*** *=* ***Chain****:* ***Output Shaft Sprocket Diameter (mm)*** *– This optional field accepts decimal numeric values less than or equal to 100000.*
K. *If* ***Coupling Type*** *=* ***Chain****:*
Chain Length (mm) *-*

This optional field accepts decimal numeric values less than or equal to 100000, but greater than the minimal belt length X.
X = π (d1+d2)/2+d1+d2
Where d1 is the ***Input Shaft Sprocket Diameter****, and d2 is the* ***Output Shaft Sprocket Diameter****.*

3.5.4 Driver Components

A **Machine Train** in AMS Machine Works can have **Driver Component**. There are two kinds of **Driver Component** to choose from:

- **Motor** components. See: Motor Components
- **Turbine** components. See: Turbine Components

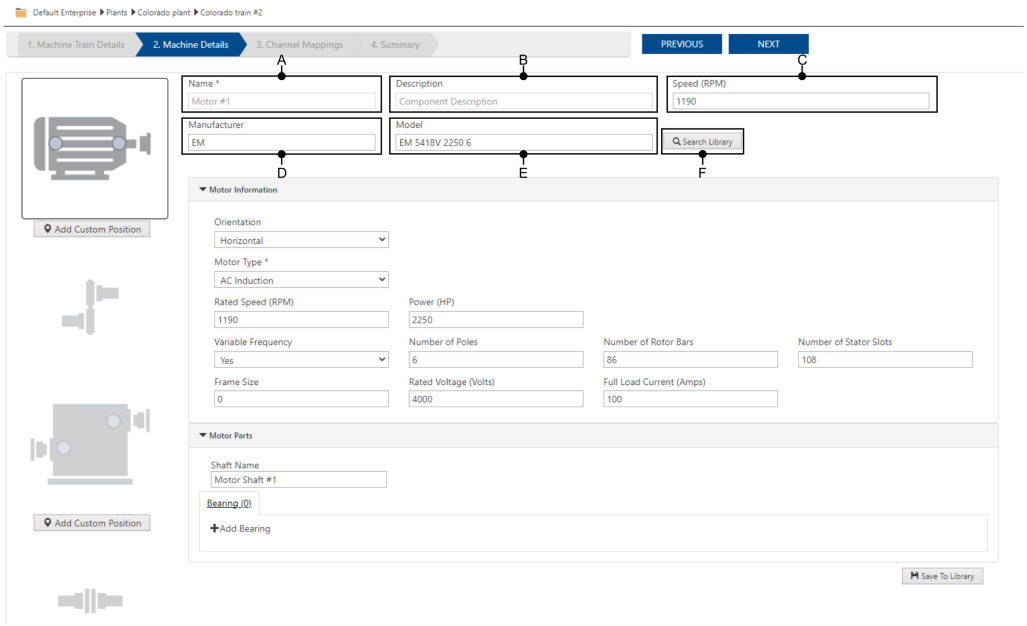
See: Definition of a Machine Train

Motor Components

AMS Machine Works has a predefined **Library** of **Motor** components. These definitions can be used to load a configuration for your **Motor**. If none of these configurations meet your specific needs, you can fill in your own custom configuration. Your custom configurations can be saved to the **Library** for future use. See: Add a Motor to the Library

Basic Information

Figure 3-19: Driver Component Basic information



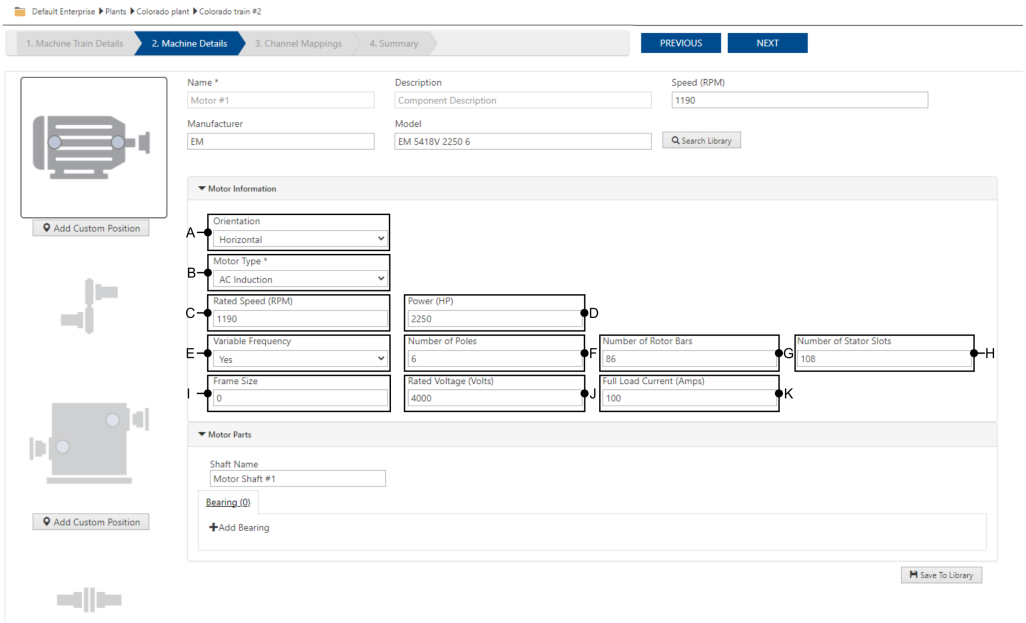
1. **Name** – (Required) The default name is the asset type, #, and the number of this type of asset (for example Motor#1). This is editable if the **Machine Train** has not been saved. Once saved, you can only edit this information in the **Asset Explorer**. See: Renaming Locations, Machine Trains, and Assets

2. **Description** – You have the option to add a custom description of the asset. This is editable if the **Machine Train** has not been saved. Once saved, you can only edit this information in the **Asset Explorer**. See: Properties pane
3. **Speed (RPM)** – You can edit this field at any time. The field has a default value of 3600, and accepts integer values from 1 to 120000. When you select a **Model** from the **Library** this value is overridden.
4. **Manufacturer** – You can edit this field at any time. When you select a **Model** from the **Library** this value is overridden.
5. **Model** – You can edit this field at any time. When you select a **Model** from the **Library** this value is overridden.
6. **Search Library** button – Click this button to open the component library. See: Search the Motor Library

Motor Information

This section details the various fields and settings for **Motor** components.

Figure 3-20: Motor Information



A. ***Orientation*** *– The system allows selection orientation for the component. There are two options available* ***Horizontal****, and* ***Vertical****. When you change the orientation, the graphical representation of the* ***Component*** *also rotates.*

B. ***Motor Type*** *– This dropdown list contains every type of motor:*
   - *AC Induction*
   - *Synchronous*
   - *DC*
   - *Hydraulic*
   - *Others*

   The system displays additional parameters related to the ***Motor Type*** *that is selected.*

C. ***Rated Speed (RPM)*** *– This user editable field is automatically filled in from the* ***Library*** *when you select a* ***Manufacturer*** *and* ***Model****. This field accepts whole number values from 1 to 120000.*

D. ***Power (HP)*** *– This user editable field is automatically filled in from the* ***Library*** *when you select a* ***Manufacturer*** *and* ***Model****. This field accepts whole number values from 0 to 50000.*

E. ***Variable Frequency*** *– This user editable field is only displayed for* ***AC Induction*** *motors. This dropdown list contains two values,* ***Yes*** *and* ***No****. This field is automatically filled in from the* ***Library*** *when you select a* ***Manufacturer*** *and* ***Model****.*

F. ***Number of Poles*** *– This user editable field is only displayed for* ***AC Induction*** *motors. This field is automatically filled in from the* ***Library*** *when you select a* ***Manufacturer*** *and* ***Model****. This field accepts whole number values from 0 to 48.*

G. ***Number of Rotor Bars*** *– This user editable field is only displayed for* ***AC Induction*** *motors. This field is automatically filled in from the* ***Library*** *when you select a* ***Manufacturer*** *and* ***Model****. This field accepts whole number values from 0 to 500.*

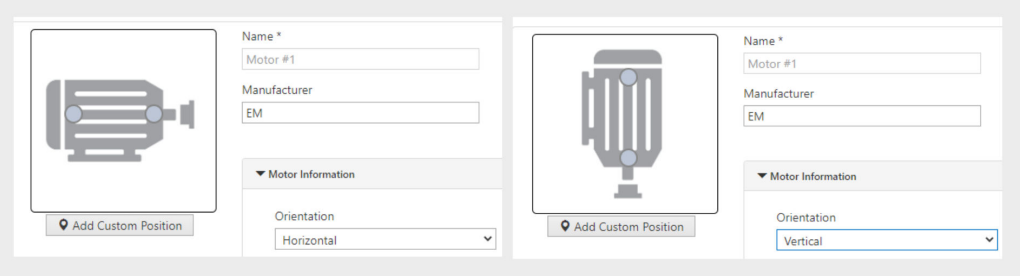
H. ***Number of Stator Slots*** *– This user editable field is only displayed for* ***AC Induction*** *motors. This field is automatically filled in from the* ***Library*** *when you select a* ***Manufacturer*** *and* ***Model****. This field accepts whole number values from 0 to 501.*

I. ***Frame Size*** *– (Optional) This user editable field is automatically filled in from the* ***Library*** *when you select a* ***Manufacturer*** *and* ***Model****. This alphanumeric field can be empty and does not have a character limit.*

J. ***Rated Voltage (Volts)*** *– (Optional) This user editable field is automatically filled in from the* ***Library*** *when you select a* ***Manufacturer*** *and* ***Model****. This field accepts whole number values less than or equal to 20000.*

K. ***Full Load Current (Amps)*** *– (Optional) This user editable field accepts whole number values less than or equal to 1000. By default, this field is empty.*

Figure 3-21: Motor Orientation

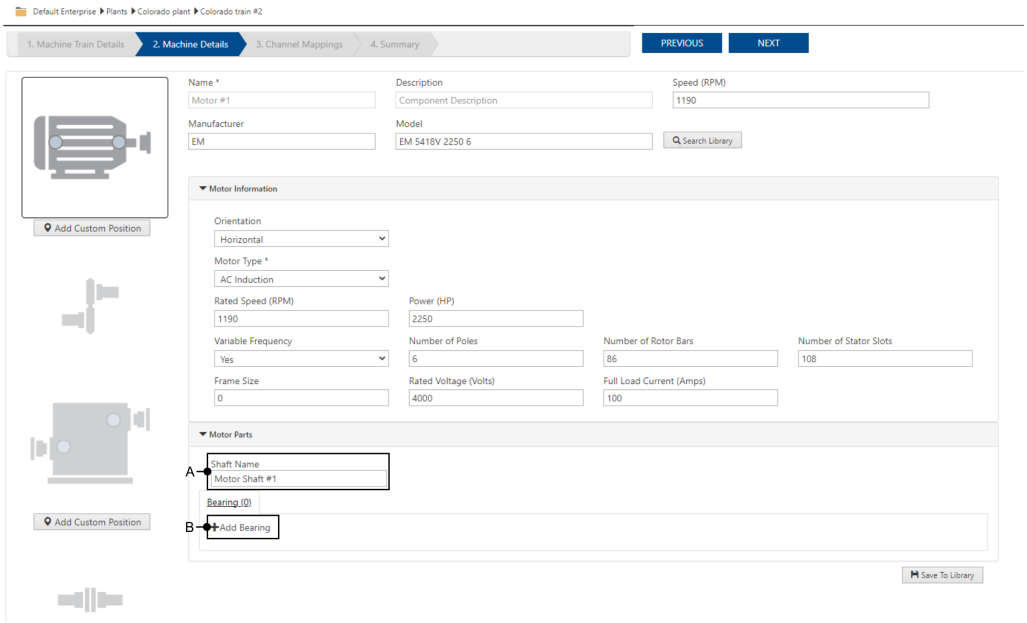


In AMS Machine Works a **Motor** can be configured in either a **Horizontal** or **Vertical** orientation.

Motor Parts

After that you enter the motor parameters, you can configure the parts that make up the **Motor**. You can add a maximum of 9 bearings from the **Library**.

Figure 3-22: Add a Bearing to the Motor Parts



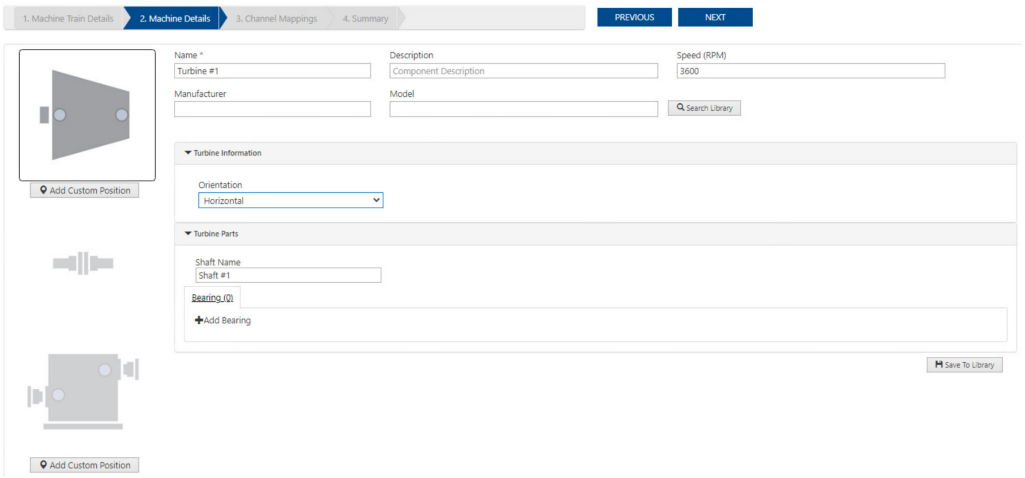
A. ***Shaft Name*** *– This a required field, with a 60 character limit, to name the shaft. It is prefilled with the default name, "Motor Shaft #1".*
B. ***Add Bearing*** *button – Click the + button to display the* ***Add Bearing*** *window. See: Add a Bearing*

Turbine Components

AMS Machine Works can have a **Turbine** as a **Driver Component**. There is no predefined **Library** of **Turbine** components, but you can create your own custom configurations.

To look for a custom configuration of a **Turbine** click **Search Library**. See: Search a Library

Figure 3-23: Turbine Configuration



- **Name** — "Turbine #1" (Default)
- **Speed (RPM)** — 3600 (Default) This field accepts values from 1 to 120000.
- **Orientation** — You can select **Horizontal** (Default), or **Vertical**.
- **Shaft Name** — "Shaft #1" (Default)

For a **Turbine** you can add optional information:

- Add or Remove a Custom Position
- Add a Bearing

Once you have configured a **Turbine** you can click **Save To Library**.

For more information see: Add an Item to a Library.

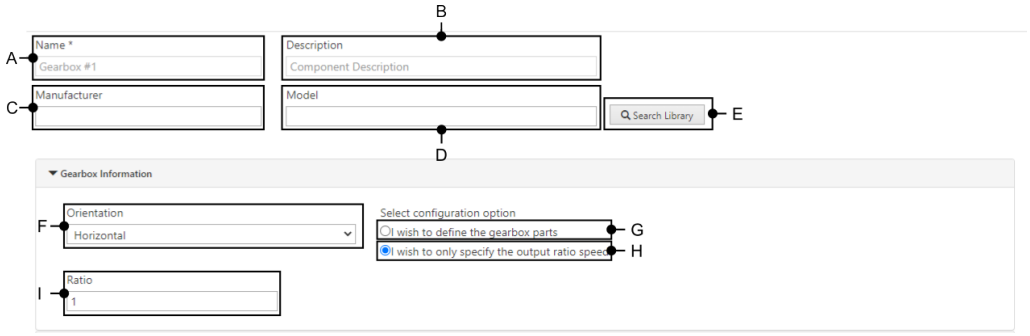
3.5.5 Intermediate Components

AMS Machine Works supports only one kind of **Intermediate Component**, a **Gearbox**. During this step, the user can enter basic information about the gearbox, or load the basic information from a user created library of **Gearbox** components. The user then has a choice:

1. (Default) 'I wish to only specify the output ratio speed' See: Gearbox Configuration — Set Output Ratio
2. 'I wish to define the gearbox parts' See: Gearbox Configuration — Define Gearbox Parts

In either case the user can define gearbox parts such as a **Shaft**, or a **Bearing**.

Figure 3-24: Figure 17: Machine Details - Gearbox Information



A. ***Name*** *— (Required) This alphanumeric field has a maximum length 60 characters, and a default value of "Gearbox # 1".*

B. ***Description*** *— (Optional) This alphanumeric field has a maximum length of 255 characters.*

C. ***Manufacturer*** *— (Optional) This alphanumeric field is filled according to the user's selection in the* ***Library****.*

> ***Note***
> *If you are creating a new* ***Gearbox*** *definition this field is required. See: Add an Item to a Library*

D. ***Model*** *— (Optional) This alphanumeric field is filled according to the user's selection in the* ***Library****.*

> ***Note***
> *If you are creating a new* ***Gearbox*** *definition this field is required. See: Add an Item to a Library*

E. ***Search Library*** *button — Click this button to open the* ***Library****. See: Search a Library*

F. ***Orientation*** *— The component can have either a* ***Horizontal*** *or a* ***Vertical*** *orientation. The graphical representation of the component will reflect its orientation.*

G. ***I wish to define the gearbox parts*** *radio button — This option allows you to define and configure all the gearbox parts manually. When this radio button is selected, more options are visible in the gearbox parts section.*

> ***Note***
> *This option is not recommended due to the potential for error during the gearbox configuration process.*

H. ***I wish to only specify the output ratio speed*** *radio button — This is the default option, and it is highly recommended because it allows you to set the value of the ratio directly rather than go through the complex process of defining all the parameters of a gearbox's parts.*

> ***Note***
> *It is strongly recommended that the user should use this default option.*

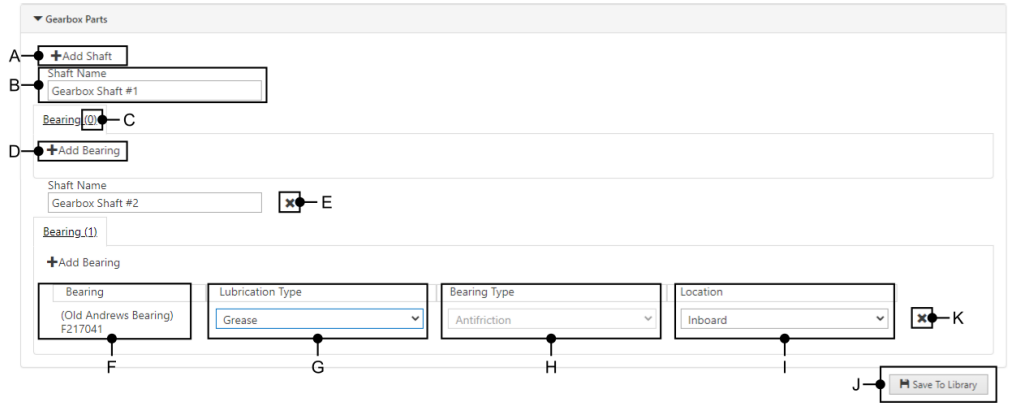
I. ***Ratio*** *— This field is mandatory, but it is only editable when the 'I wish to only specify the output ratio speed' radio button is checked. This field accepts decimal values greater than or equal to 0.01 and less than or equal to 100.*

Gearbox Configuration — Set Output Ratio

During this step, the user can define the number of shafts and bearings. This section is valid only when the user selected the 'I wish to only specify the output ratio speed' radio button in the previous step.

The default configuration has two shafts, and the user can add a third shaft. Each shaft can have up to nine bearings.

Figure 3-25: Gearbox Configuration — Set Output Ratio



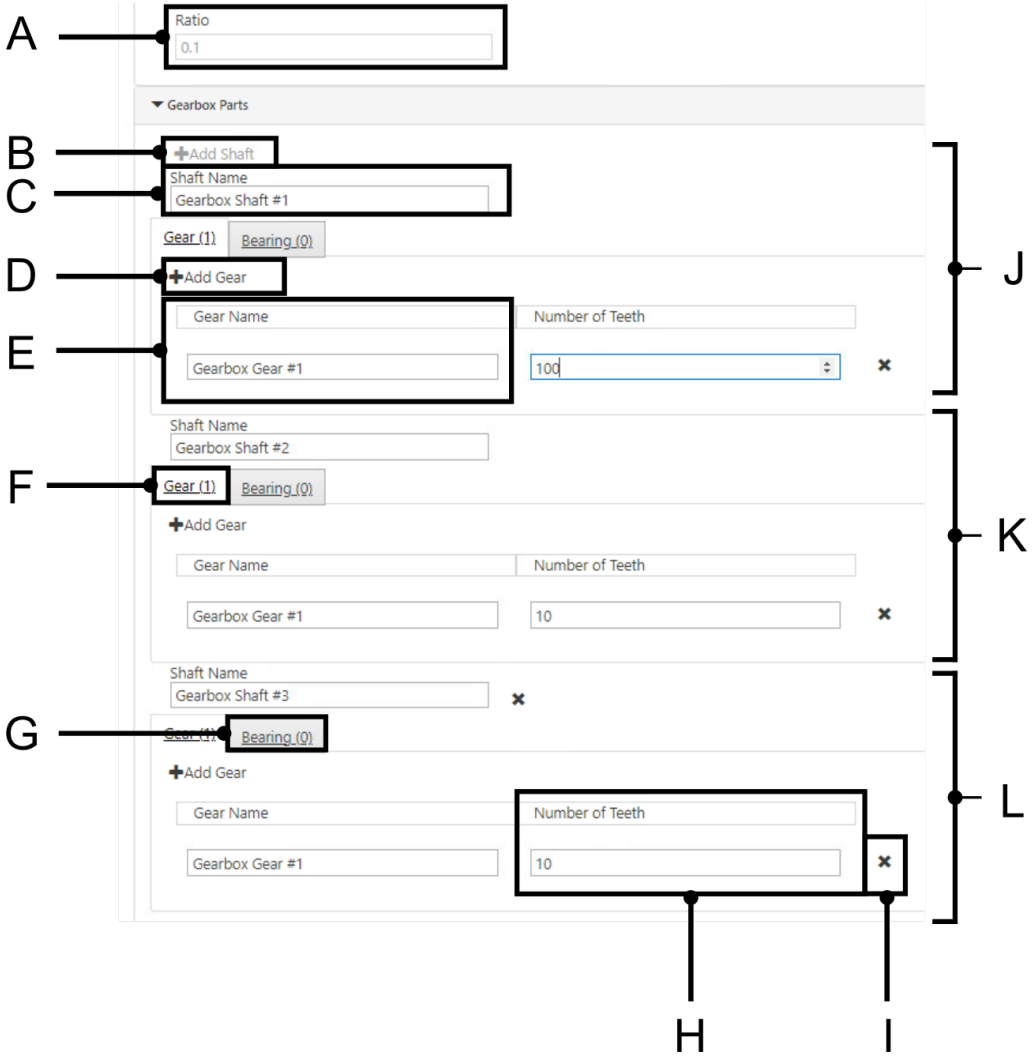
A. ***Add Shaft*** *button — By default a* ***Gearbox*** *has 2 shafts, but you can define one more.*
B. ***Shaft Name*** *— (Required) The user can define the name of the shaft. The system's default value is "Gearbox Shaft #1".*
C. ***Bearing Count*** *— This number displays how many* ***Bearing*** *elements are mounted on this shaft. Values can range from 0 to 9.*
D. ***+ Add Bearing*** *button — when the user clicks this button the bearings library is displayed. See: Add a Bearing*
E. ***Remove Shaft*** *button — If you currently have three shafts defined you can remove one.*
F. ***Bearing Name*** *— The name of the chosen bearing.*
G. ***Lubrication Type*** *— dropdown list with a choice between* ***Grease*** *and* ***Oil****.*
H. ***Bearing Type*** *— a non-editable field displaying information that comes from your selection in the* ***Bearing Library****, or from the* ***Create Custom Bearing*** *process. See: Add a Bearing to the Library*
I. ***Location*** *— A dropdown list where the user can select between three types of* ***Measurement Location****:*
    A. ***Outboard***
    B. ***Inboard***
    C. ***Custom*** *— When the user selects* ***Custom*** *from this list the* ***Custom Bearing Position*** *creator is opened. See: Add or Remove a Custom Position*
J. ***Save To Library*** *button — When the user clicks this button the current parameters of the asset are saved. See: Add an Item to a Library*
K. ***X — Remove Bearing*** *button — Remove this bearing.*

Gearbox Configuration — Define Gearbox Parts

During this step the user can define how many **Shaft**, **Bearing**, and **Gear** elements the **Gearbox** has. To begin this configuration the user must select 'I wish to define the gearbox parts'' radio button shown here: Intermediate Components.

Note
This process is complex and has many interacting variables. It is strongly recommended that the Gearbox Configuration — Set Output Ratio process should be used instead.

Figure 3-26: Define Gearbox Parts



A. ***Ratio*** *— This is calculated based on the number of teeth on the* ***Input Shaft*** *divided by the number of teeth on the* ***Output Shaft****. (e.g., 10/100 = 0.1)*
B. ***Add Shaft*** *button — By default a* ***Gearbox*** *has 2 shafts, but you can define one more.*
C. ***Shaft Name*** *— The default name is 'Gearbox Shaft #' followed by 1,2, or 3. This is a required field.*
D. ***Add Gear*** *button — A* ***Gearbox*** *must have at least one* ***Gear*** *on each shaft. It is not recommended, but you can add up to 9* ***Gear*** *elements per shaft.*

> ***Note***
> *The maximum recommended configuration of* ***Gear*** *elements in a* ***Gearbox*** *is four (4).*

E. ***Gear Name*** *— The default value is equal to 'Gearbox Gear #' followed by a number. This is a required field.*
F. *The number of* ***Gear*** *elements on this specific shaft.*
G. ***Bearing*** *tab — Click on this tab to see the list of* ***Bearing*** *elements and to Add a Bearing.*

H. ***Number of Teeth*** — *The default value is 10. This value of this field must be a whole number greater than or equal to 10. The maximum value of this field is 2000. The* ***Ratio*** *is calculated and updated according to these fields.*
I. ***X*** *button – Click the "X" to remove the* ***Gear***, ***Shaft***, *or* ***Bearing*** *associated with the button.*
J. ***Output Shaft*** — *Recommended configuration: One* ***Gear*** *element.*
K. ***Intermediary Shaft*** — *(Optional) Recommended configuration: Two* ***Gear*** *elements.*

Note
If you are using an ***Intermediary Shaft****, it must have two gears. The gear in the first position meshes with the* ***Gear*** *on the* ***Output Shaft****, and the* ***Gear*** *in the second position meshes with the* ***Input Shaft****.*

Check the automatically calculated ***Ratio*** *marked as 'A' on the figure above to ensure that the configuration is correct.*

L. ***Input Shaft*** — *Recommended configuration: One* ***Gear*** *element.*

3.5.6 Driven Components

In AMS Machine Works there are the following types of **Driven Component**:

- **Pump** — See: Pump Components
- **Fan** — See: Fan Components
- **Other Driven Components** — These **Driven Components** share a similar configuration template.
  - **Agitator** — See: Other Driven Components
  - **Blower** — See: Other Driven Components
  - **Centrifuge** — See: Other Driven Components
  - **Compressor** — See: Other Driven Components
  - **Crusher** — See: Other Driven Components
  - **Generator** — See: Other Driven Components
  - **Spindle** — See: Other Driven Components
  - **Generic** — See: Other Driven Components

Note
Use a **Generic Driven Component** if you do not see the specific type of equipment you want to configure in this list.

Pump Components

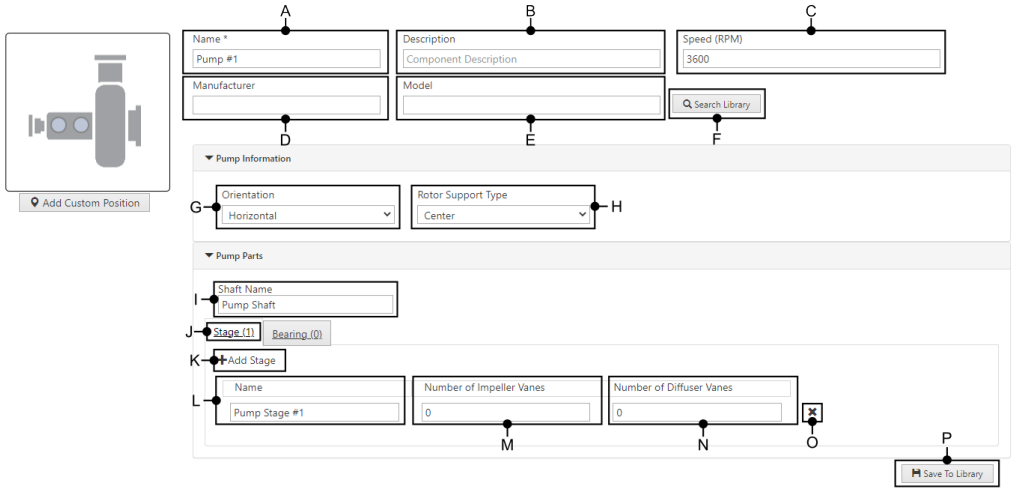
For a **Pump Component** the user can enter and configure basic information about the **Pump** such as its **Speed (RPM)**, **Orientation**, and **Rotor Support Type**.

Further details can be recorded such as how many **Stage** or **Bearing** elements it has.

You can use a combination of **Manufacturer** and **Model** information to search for a particular configuration in the **Library**, or to save the current configuration to the **Library**.

- Search a Library
- Add an Item to a Library

Figure 3-27: Pump Configuration



A. ***Name*** *– (Required) This alphanumeric field contains the name of the* ***Pump****, and has a default value of "Pump #1".*

B. ***Description*** *– (Optional) This alphanumeric field can contain additional information about the asset.*

C. ***Speed (RPM)*** *– (Required) For a full 5 element* ***Machine Train*** *this field is calculated based on the configuration of previous elements in the* ***Machine Train****.*

> ***Note***
> *For other* ***Machine Train*** *configurations, the* ***Driven*** *component has either a calculated value, or a default value of 3600. This field is editable and accepts whole numbers from 1 to 120000.*

D. ***Manufacturer*** *– (Optional) This field is filled when you do a* ***Library*** *search. It is also used to define a new entry in the* ***Library****.*

E. ***Model*** *– (Optional) This field is filled when you do a* ***Library*** *search. It is also used to define a new entry in the* ***Library****.*

F. ***Search Library*** *– Click this button to begin a search of the* ***Library*** *for this* ***Component****. See: Search a Library*

G. ***Orientation*** *– (Optional) This field is a dropdown list with a choice between:*

   A. ***Horizontal*** *(Default)*
   B. ***Vertical***

   The icon representing the ***Component*** *changes its orientation to reflect the selection.*

H. ***Rotor Support Type*** *– This field is a dropdown list with a choice between:*

   A. ***Center*** *(Default)*
   B. ***Over Hung***

I. ***Shaft Name*** *– (Required) This alphanumeric field has a default value of "Pump Shaft".*

J. ***Stage Tab*** *– Contains a list of every defined* ***Stage****. There can be from 0 to 20* ***Stage*** *elements.*

Note
*Click on the **Bearing Tab** to the right of the **Stage Tab** to see the list of **Bearing** elements and to Add a Bearing.*

K. ***Add Stage** button – Click this button to add a **Stage**. (Maximum: 20)*
L. ***Stage Name** – (Required) This alphanumeric field contains the name of the **Stage**, and has a default value of "Pump Stage #" and a number.*
M. ***Number of Impeller Vanes** – (Required) This field accepts a whole number from 0 (default) to 100.*
N. ***Number of Diffuser Vanes** – (Required) This field accepts a whole number from 0 (default) to 100.*
O. ***X** button – Click to remove a **Stage**.*

Note
*If the **Bearing Tab** open, this button will remove a **Bearing**.*

P. ***Save to Library** button – When the user clicks this button, the configuration is saved to the **Library**. See: Add an Item to a Library*

Note
*If this combination of **Manufacturer** and **Model** information for that **Component** are in use, then you will overwrite the previous definition in the **Library**.*

Fan Components

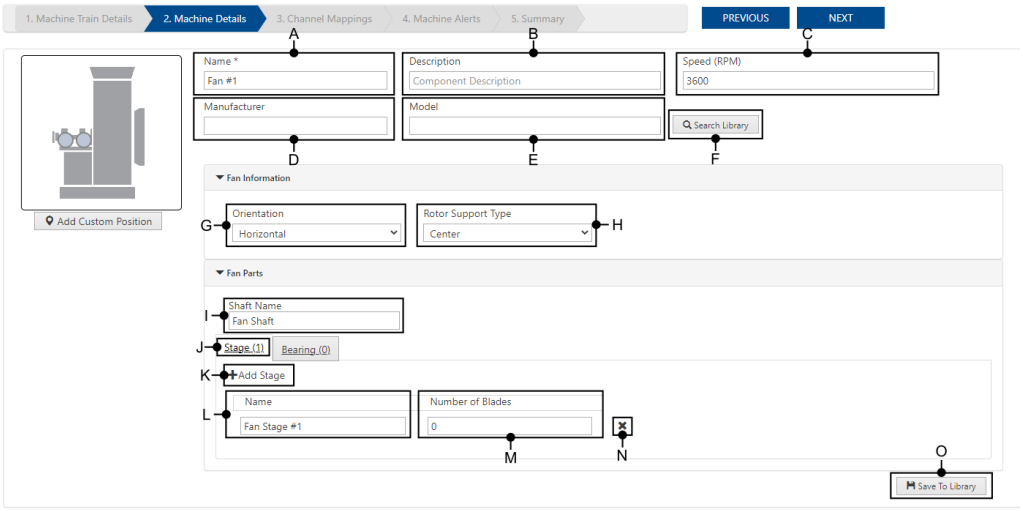
For a **Fan Component** the user can enter and configure basic information about the **Fan** such as its **Speed (RPM)**, **Orientation**, and **Rotor Support Type**.

Further details can be recorded such as how many **Stage** or **Bearing** elements it has.

You can use a combination of **Manufacturer** and **Model** information to search for a particular configuration in the **Library**, or to save the current configuration to the **Library**.

- Search a Library
- Add an Item to a Library

Figure 3-28: Fan Configuration



A. ***Name*** *– (Required) This alphanumeric field contains the name of the* ***Fan****, and has a default value of "Fan #1".*

B. ***Description*** *– (Optional) This alphanumeric field can contain additional information about the asset.*

C. ***Speed (RPM)*** *– (Required) For a full 5 element* ***Machine Train*** *this field is calculated based on the configuration of previous elements in the* ***Machine Train****.*

> ***Note***
> *For other* ***Machine Train*** *configurations, the* ***Driven*** *component has either a calculated value, or a default value of 3600. This field is editable and accepts whole numbers from 1 to 120000.*

D. ***Manufacturer*** *– (Optional) This field is filled when you do a* ***Library*** *search. It is also used to define a new entry in the* ***Library****.*

E. ***Model*** *– (Optional) This field is filled when you do a* ***Library*** *search. It is also used to define a new entry in the* ***Library****.*

F. ***Search Library*** *– Click this button to begin a search of the* ***Library*** *for this* ***Component****.* *See: Search a Library*

G. ***Orientation*** *– This field is a dropdown list with a choice between:*

   A. ***Horizontal*** *(Default)*
   B. ***Vertical***

   The icon representing the ***Component*** *changes its orientation to reflect the selection.*

H. ***Rotor Support Type*** *– This field is a dropdown list with a choice between:*

   A. ***Center*** *(Default)*
   B. ***Over Hung***

I. ***Shaft Name*** *– (Required) This alphanumeric field has a default value of "Fan Shaft".*

J. ***Stage Tab*** *– Contains a list of every defined* ***Stage****. There can be from 0 to 20* ***Stage*** *elements.*

Note
*Click on the **Bearing Tab** to the right of the **Stage Tab** to see the list of **Bearing** elements and to Add a Bearing.*

K. ***Add Stage** button – Click this button to add a **Stage**. (Maximum: 20)*
L. ***Stage Name** – (Required) This alphanumeric field contains the name of the **Stage**, and has a default value of "Fan Stage #" and a number.*
M. ***Number of Blades** – (Required) This field accepts a whole number from 0 (default) to 100.*
N. ***X** button – Click to remove a **Stage**.*

Note
*If the **Bearing Tab** is open, this button will remove a **Bearing**.*

O. ***Save to Library** button – When the user clicks this button, the configuration is saved to the **Library**. See: Add an Item to a Library*

Note
*If this combination of **Manufacturer** and **Model** information for that **Component** are in use, then you will overwrite the previous definition in the **Library**.*

Other Driven Components

For other **Component** types, the user can enter and configure basic information about the **Component Type** such as its **Speed (RPM)**, and **Orientation**.

Further details can be recorded such as the **Shaft** name, or how many **Bearing** elements it has.

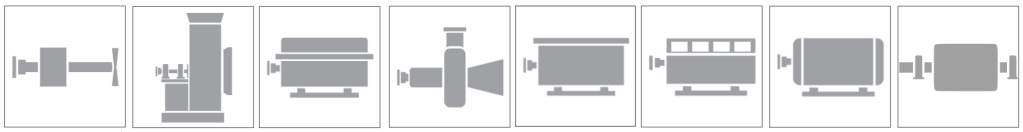
You can use a combination of **Manufacturer** and **Model** information to search for a particular configuration in the **Library**, or to save the current configuration to the **Library**.

- Search a Library
- Add an Item to a Library

In this section there is information about all the remaining **Driven Component** elements. This example uses a **Spindle**, but the configuration is similar for all the remaining **Driven Component** elements.

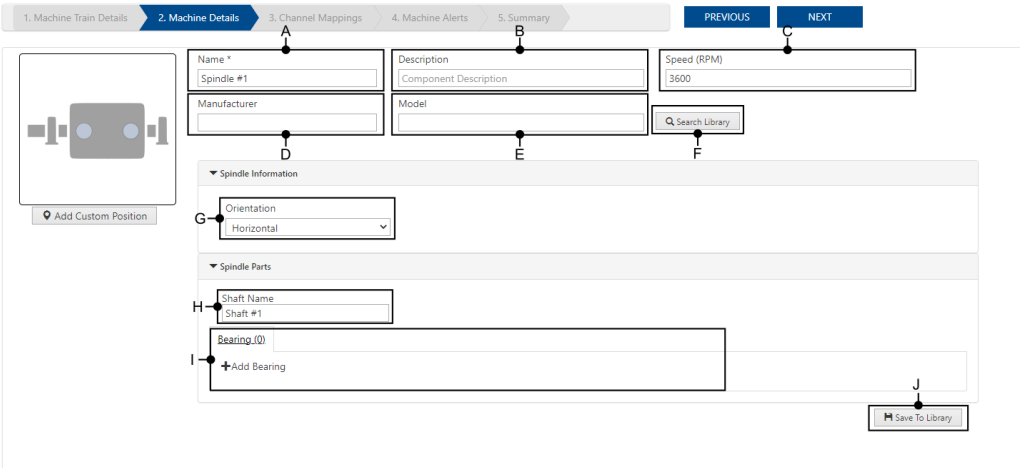
Note
If you have a type of equipment which is not listed here, use the **Generic** component.

Figure 3-29: Icons of the Other Driven Components



From left to right: **Agitator**, **Blower**, **Centrifuge**, **Compressor**, **Crusher**, **Generator**, **Generic**, and **Spindle**.

Figure 3-30: Configuration of Other Driven Components



A. ***Name*** *– (Required) This alphanumeric field contains the name of the* ***Driven Component****, and has a default value of "****Component Type****" + " #1".*

B. ***Description*** *– (Optional) This alphanumeric field can contain additional information about the asset.*

C. ***Speed (RPM)*** *– (Required) For a full 5 element* ***Machine Train*** *this field is calculated based on the configuration of previous elements in the* ***Machine Train****.*

> ***Note***
> *For other* ***Machine Train*** *configurations, the* ***Driven*** *component has either a calculated value, or a default value of 3600. This field is editable and accepts whole numbers from 1 to 120000.*

D. ***Manufacturer*** *– (Optional) This field is filled when you do a* ***Library*** *search. It is also used to define a new entry in the* ***Library****.*

E. ***Model*** *– (Optional) This field is filled when you do a* ***Library*** *search. It is also used to define a new entry in the* ***Library****.*

F. ***Search Library*** *– Click this button to begin a search of the* ***Library*** *for this* ***Component****. See: Search a Library*

G. ***Orientation*** *– This field is a dropdown list with a choice between:*

   A. ***Horizontal*** *(Default)*
   B. ***Vertical***

   The icon representing the ***Component*** *changes its orientation to reflect the selection.*

H. ***Shaft Name*** *– (Required) This alphanumeric field has a default value of "****Component Type*** *" + " Shaft".*

I. ***Bearing Tab*** *– The* ***Bearing Tab*** *has a number from 0 to 9 indicating how many* ***Bearing*** *elements are defined, and lists them. See: Add a Bearing.*

J. ***Save to Library*** *button – When the user clicks this button, the configuration is saved to the* ***Library****. See: Add an Item to a Library*

Note
*If this combination of **Manufacturer** and **Model** information for that **Component** are in use, then you will overwrite the previous definition in the **Library**.*

3.6 Step 3: Channel Mappings

In AMS Machine Works, channels have to be mapped to measurement locations on a machine to which a sensor is mounted. Mapping assigns the sensor channel of the device that is monitoring the asset to a measurement point on the asset.

The **Channel Mapping** process consists of creating a relationship between the sensors defined in the Network Device Module to the **Machine Train** components that you have defined in the previous two **Machine Configuration** steps.

Procedure

1. Fill in the information on the screens in the following sections.
2. Verify the information.
3. Proceed to the final step: Step 4: Summary

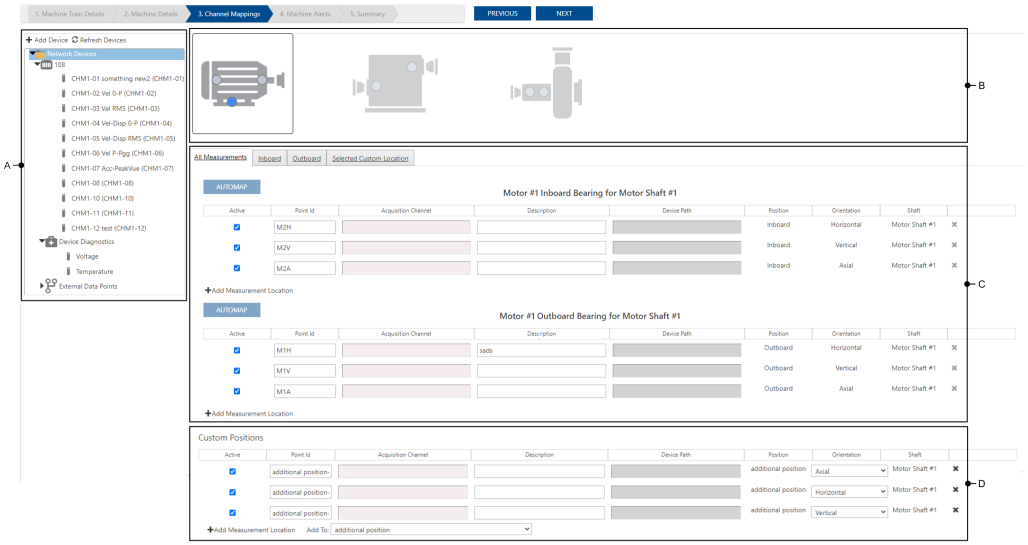
When you proceed to Step 4: Summary the **Machine Train** configuration will be saved.

3.6.1 Channel Mapping Interface

This window is divided into four panes which brings together the information defining the relationship between a **Machine Train** and its **Sensor** data.

The **Network Device Module** provides the functionality for configuring and discovering every **Sensor** which is available on your network. See: Network Device Module

Figure 3-31: Channel Mapping Interface

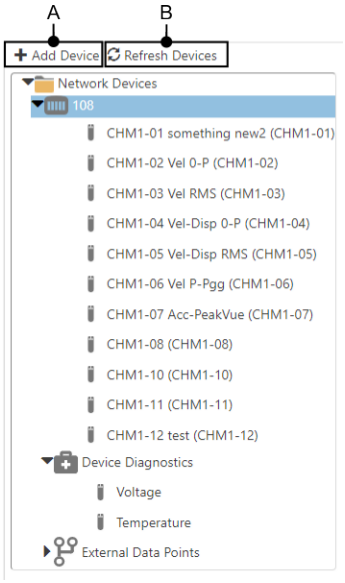


A. Network Device Pane
B. Asset Pane
C. Measurement Pane
D. Custom Position Pane

Network Device Pane

The **Network Device Pane** displays the list of registered and discovered devices that the system currently has access to. AMS Machine Works enables you to manage the **Devices** on this list. **Devices** that are added or removed by the options available in the **Network Device Pane** are still available elsewhere in AMS Machine Works. To make permanent additions and deletions, use the functionality found in the Network Device Module.

Figure 3-32: Network Device Pane

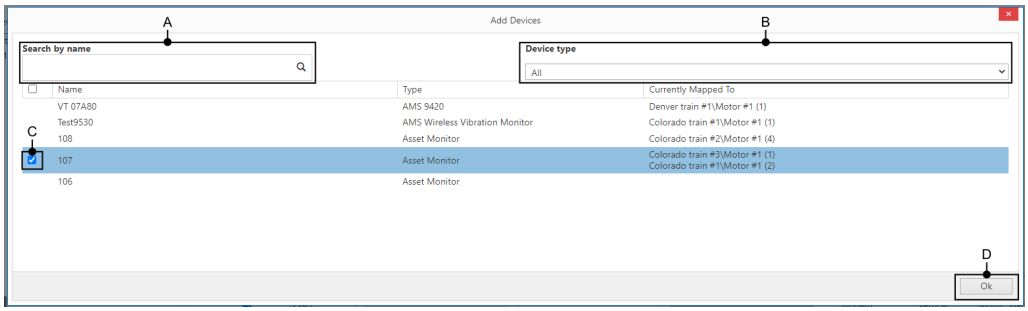


A. ***Add Device*** *– Click this button to choose devices from the list of defined devices. There is no possibility to add a new device to the system using this option.*
B. ***Refresh Devices*** *– Click this button to refresh the list of devices. This is especially useful for wireless devices such as the AMS 9530 Wireless Vibration Monitor, and the AMS 9420 Wireless Transmitter. Wireless device discovery in AMS Machine Works can take several minutes, especially if there are many devices and your network infrastructure is weak.*

> ***Note***
> *If you do not see your device yet, please wait and try refreshing the device list again. You can be sure that a device has completed discovery in AMS Machine Works data becomes visible in the* ***Device Parameters*** *tile in the* ***Device Details*** *screen in the* ***Network Device Module****.*

When you click **Add Device** button in **Network Device Pane** the **Add Device Window** opens.

Figure 3-33: Add Device Window



A. ***Search by name*** *- This field enables you to search by the device name. Type your search term and then press* ***Enter****, or click the magnifying glass icon, to search.*

B. ***Device type*** *– This dropdown list enables the user to narrow their search to one type of device at a time. The list contains the following options:*
   A. *AMS Wireless Vibration Monitor*
   B. *AMS 9420*
   C. *AMS Asset Monitor*
   D. *All*

C. ***Checkbox*** *– Enables you to select a single device, multiple devices, or all devices. To select all devices, click the checkbox at the top of the column.*

> ***Note***
> *Devices which are already present in the* ***Network Device Pane*** *cannot be added a second time, so you cannot click their* ***Checkbox****.*

D. ***Ok*** *button – Click* ***Ok*** *to confirm your choice and close the window.*

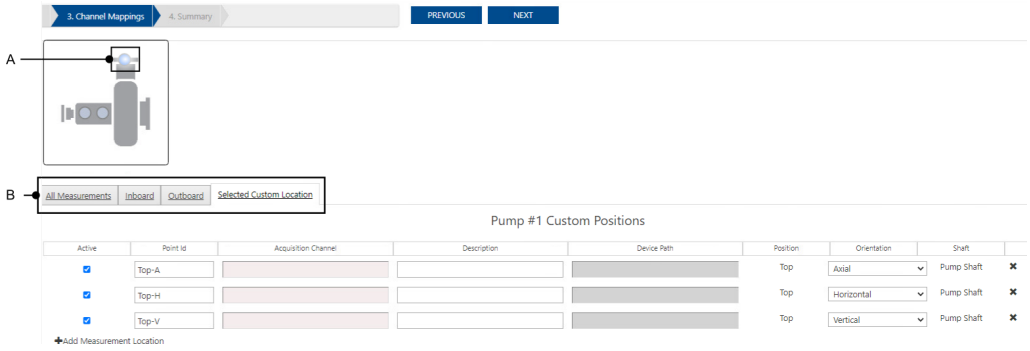
Asset Pane

This pane displays the **Asset**/**Component** elements, except for **Coupling** components, that the **Machine Train** is composed of. See: Definition of a Machine Train.

> **Note**
> In AMS Machine Works the terms **Asset** and **Component** can be used interchangeably.

The user can quickly switch between each **Asset** to check the mappings by clicking on the **Component Icon**. The user can select a specific position (**Inboard**, **Outboard**, or **Custom**) for the given asset – for example, if the user selected the outboard position in the sketch, the list of available locations for this position only should be displayed in the measurements pane.

Figure 3-34: Asset with Custom Position Selected



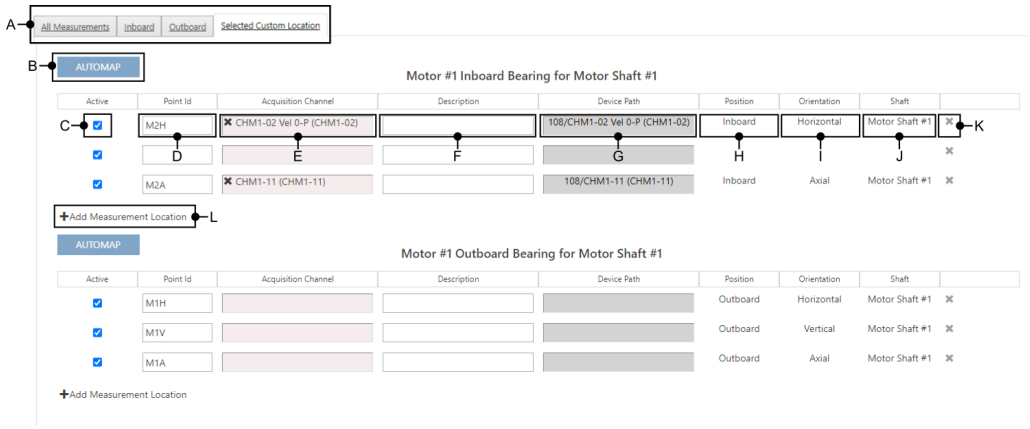
A. ***Custom Position*** *— This* ***Custom Position*** *is currently selected on the* ***Component Icon****.*
B. ***Measurement Tabs*** *— When you click on a tab, a list of the measurement points for that position is displayed. There are four possible tabs:*
    A. ***All Measurements*** *— This tab displays every available* ***Measurement Location*** *for this* ***Machine Train****, including every* ***Custom Position****.*
    B. ***Inboard*** *— Torque enters the* ***Component*** *from this side.*
    C. ***Outboard*** *— Torque exits the* ***Component*** *from this side.*
    D. ***Selected Custom Location*** *— (Optional) If you select a* ***Custom Position*** *that you defined in Add or Remove a Custom Position process in Step 2: Add Machine Details, it will be displayed here.*

> ***Note***
> *When you select any* ***Measurement Location*** *on the* ***Component Icon*** *your view switches to the corresponding* ***Measurement Tab****.*

Measurement Pane

In the **Measurement Pane**, a user can either drag and drop a **Device** to an **Acquisition Channel** field next to the desired **Measurement Location** or simply highlight a **Device** and then click in the **Acquisition Channel** field to map it.

Figure 3-35: Measurement Pane



A. ***Measurement Tabs*** *— When you click on a tab, a list of the measurement points for that position is displayed. There are four possible tabs:*
   - ***All Measurements*** *— This tab displays every available* ***Measurement Location*** *for this* ***Machine Train****, including every* ***Custom Position****.*
   - ***Inboard*** *— Torque enters the* ***Component*** *from this side.*
   - ***Outboard*** *— Torque exits the* ***Component*** *from this side.*
   - ***Selected Custom Location*** *— (Optional) If you select a* ***Custom Position*** *that you defined in Add or Remove a Custom Position process in Step 2: Add Machine Details, it will be displayed here.*

   > ***Note***
   > *When you select any* ***Measurement Location*** *on the* ***Component Icon*** *your view switches to the corresponding* ***Measurement Tab****.*

B. ***AUTOMAP*** *button – This option can automatically assign the three axes of an AMS Wireless Vibration Monitor to the proper acquisition channels of a* ***Measurement Location****.*

   > ***Note***
   > *This option is only available for an AMS Wireless Vibration Monitor which is configured in a vertical position, and a* ***Measurement Location*** *which has no channels mapped.*

C. ***Active*** *– Enables you to mark* ***Measurement Points*** *as active or not.*

D. ***Point Id*** *– (Required) This 30 character alphanumeric field is the name of a* ***Measurement Point****, and must be unique in the context of the* ***Component****. The system will supply a unique default* ***Point Id****, but you can create your own if you require.*

E. ***Acquisition Channel*** *– The name of the sensor or channel mapped to the specific acquisition channel. If you want to map a sensor or channel to the acquisition channel, you need to select a sensor or channel from the Network Devices tree and drag and drop the selected position to the acquisition channel. On the left side of the name of the sensor, you can see a 'check' icon – which means, that the specific sensor or channel is mapped. Also, the user can remove the mapped sensor or channel from the acquisition channel – can do this by pressing the 'x' icon display before the name of the sensor or*

channel. If you want to remap a sensor or a channel that is already mapped, you can do it. The mapped sensor or channel will be unmapped from its previous position and mapped to the new one.

F. ***Description*** *– (Optional) This 60 character alphanumeric field is available for additional description of each point ID.*

G. ***Device Path*** *– Information about how the sensor is accessed. This is composed of the following elements: (**Device Name**, **Charm Name**, **External Point Name**, **Device Parameter Name**) / (**Axis Name**, **Sensor Name**).*

H. ***Position*** *– The position type is **Inboard**, **Outboard**, contains the name of the **Custom Position**.*

I. ***Orientation*** *– For system defined points there are three possible values:*
   A. ***Horizontal***
   B. ***Vertical***
   C. ***Axial***
   D. *Two more options are available for custom measurement locations: **Other** and **Horizontal + Vertical**.*

J. ***Shaft*** *– The name of the **Shaft** element where the bearing is mounted.*

K. ***X*** *button – The 'X' enables you to remove measurement points for custom measurement locations.*

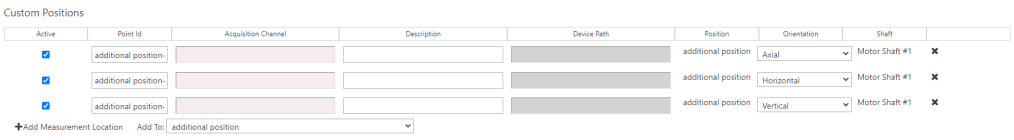
> ***Note***
> *System defined points for **Inboard**, and **Outboard** locations cannot be removed.*

L. ***Add Measurement Location*** *– You can add more custom measurement locations. (Maximum: 41)*

Custom Position Pane

The bottom section of the **Measurement Pane** displays every **Custom Position** that exists. The data for a **Custom Position** is the same as for a standard **Inboard Position** or **Outboard Position** in the **Measurement Pane**. The only difference is that you can remove all previously defined custom positions.

Figure 3-36: Custom Position List



3.7 Step 4: Summary

Prerequisites

Step 3: Channel Mappings must be completed, which saves the **Machine Train**.

During this step, the user can check all the data that they entered during the previous steps:

- Step 1: Add Machine Train Details
- Step 2: Add Machine Details
- Step 3: Channel Mappings

Note
If you are in **Step 4. Summary** because you are creating a new machine train, then the **Machine Alerts** list will be empty.

It is not possible to immediately define an **Alert** for a new **Machine Train**. To begin this process see: Edit Alerts

Procedure

1. Required: Review all the information that you have entered, and all the default values that have been supplied by the system, for both correctness and completeness.
    a) Perform any necessary edits.
    b) Proceed to the next step when your review is complete.
2. Click **Finish**.

Your **Machine Train** configuration is complete.

Note
If this is a new **Machine Train**, there are no **Alerts** defined for it. You can add an **Alert** to this **Machine Train**, with the Edit Alerts process.

Some additional tasks you may want to perform are:

- You can Print a Machine Train Summary for your records, or as part of your review process.
- Edit the **Alerts** for this **Machine Train** with the Edit Alerts process.
- Make multiple copies of this **Machine Train** with the Copy Machine Train process.
- Copy the **Alerts** which are defined for this **Machine Train** to other **Machine Trains** or **Components** with the Copy Alerts process.

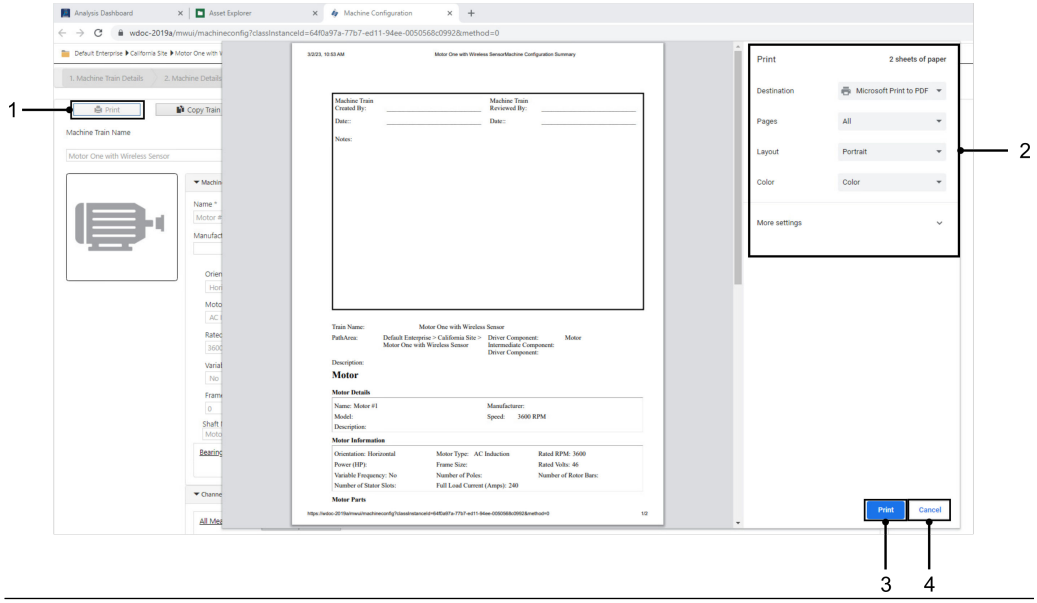
3.7.1 Print a Machine Train Summary

Prerequisites

If you want to print the report as a PDF, ensure that a PDF generator is installed on the computer. Contact your IT department if you do not have a PDF option in your list of printers.

You can print a **Machine Train Summary** for your records or as part of your review process.

Figure 3-37: Print a Machine Train Summary



Procedure

1. In the **Step 4. Summary** of the **Machine Configuration** process click **Print.**

   In the **Print Preview** window that opens:

2. Configure the print options which are available for your printer. Contact your IT department for support when configuring these options.
3. Click **Print**: To print the `Machine Configuration Summary`.
4. Click **Cancel**: To exit without printing.

3.7.2 Copy Machine Train

When you are creating or editing a **Machine Train** the **Copy Train** option is available in the last step of the **Machine Configuration** process. This is the only way to copy a **Machine Train**. You have the option to create an arbitrary (n) number of duplicates of the current **Machine Train** in a specific place in the **Location** hierarchy.

Note

This process will copy all the **Machine Train** details except for the mappings of device channels to machine **Measurement Locations**.

⚠ CAUTION

Ensure that a **Machine Train** is properly configured before copying it. This will help you avoid replicating errors.

Procedure

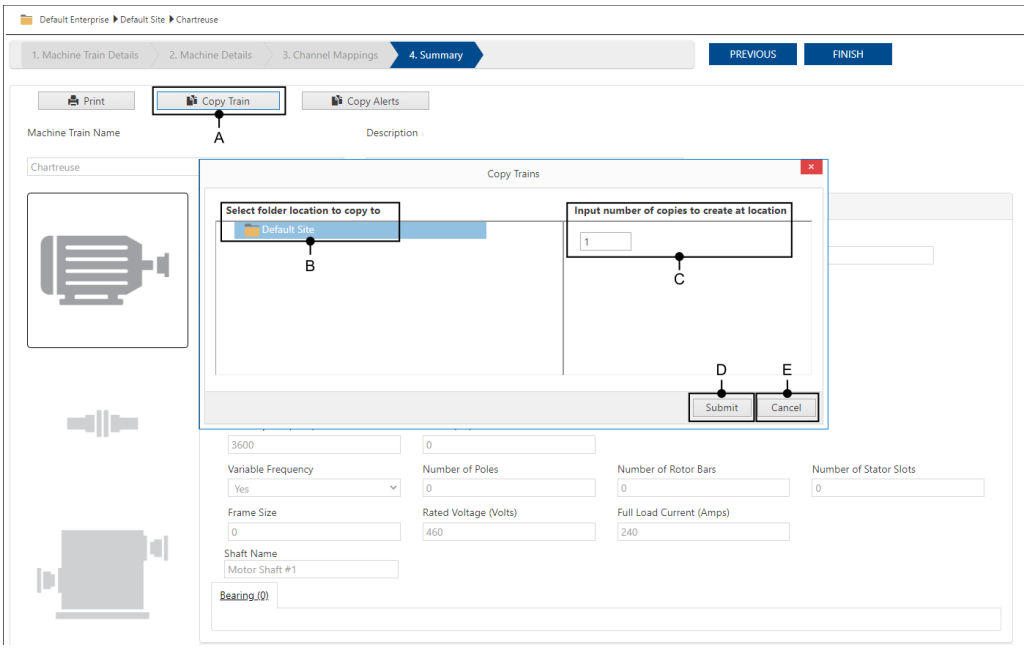
1. From the **Step 4: Summary** in the **Machine Configuration** process, click **Copy Train**. (Marked A)

   The **Copy Trains** dialog appears.

2. In the **Copy Train** window, select the **Location** (Marked B) in the hierarchy where you want to copy the configuration. Enter the number of copies to create (Marked C), and click the **Submit** button (Marked D) to confirm your choices.

   Click the **Close Window** control, or the **Cancel** button (Marked E) to **Cancel** this process.

Figure 3-38: Copy Train dialog



The window closes and your view returns to the **Machine Configuration Step 4: Summary** page. The **Machine Trains** you created are now visible in the **Location** pane of the **Asset Explorer** and other applications that show the **Location** hierarchy.

3.7.3 Copy Alerts

When you are creating or editing a **Machine Train** the **Copy Alerts** option is available in the last step of the **Machine Configuration** process. This is the only way to copy an **Alert**. You may perform a copy operation to a broad mix of **Asset** and **Machine Train** elements simultaneously.

Note
In order to avoid the replication of errors, it is recommended that you verify the items you are about to copy before performing a **Copy Alerts** operation.

Procedure

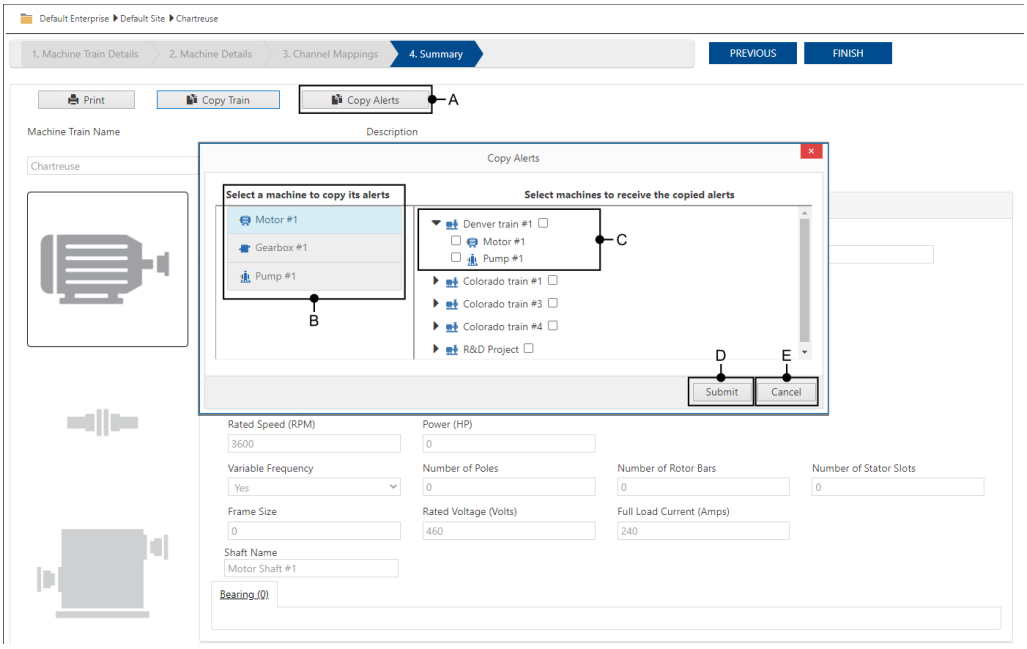
1. From the **Step 4: Summary** in the **Machine Configuration** process, click **Copy Alerts**. (Marked A)

   The **Copy Trains** dialog appears.

2. In the **Copy Alerts** window, select a source **Component** (Marked B) from the **Machine Train** you are editing to be your **Alert** source.
3. Use the checkboxes to select the **Component** and **Machine Train** elements that you want to **Copy Alerts** to. (Marked C)
4. Click the **Submit** button (Marked D) to confirm your choices.

   Click the **Close Window** control, or the **Cancel** button (Marked E) to **Cancel** this process.

Figure 3-39: Copy Train dialog



The window closes and your view returns to the **Machine Configuration Step 4: Summary** page. The **Alerts** have now been copied from the source **Component** to the **Component** and **Machine Train** elements you selected.

4 Alerts

An **Alert** allows you to define how your AMS Machine Works system reacts to the data it collects.

You can define an **Alert** once you have mapped an **Asset Source Channel** to a **Measurement Location**. This mapping is done in Step 3: Channel Mappings of the Machine Configuration process.

Note
Alert Hysteresis is set in the System Settings popup of the Analysis Dashboard.

- See: Analysis Dashboard.
- See: alert hysteresis

There are three **Alert** levels in AMS Machine Works:

1. **Advise**:
2. **Warning**: 
3. **Critical**: 

There are four main types of **Machine Alerts**:

1. **Upper Absolute**: Lower values are acceptable, and the **Alert** levels are defined at progressively higher values. (e.g., 0 to 0.99 are acceptable, and **Advise** is set at 1, **Warning** is set at 2, and **Critical** is set at 3.)
2. **Lower Absolute**: Higher values are acceptable, and the **Alert** levels are defined at progressively lower values. (e.g., Values above 3 are acceptable, and **Advise** is set at 3, **Warning** is set at 2, and **Critical** is set at 1.)
3. **Inside Absolute Window**: A middle value is defined as unacceptable, and the **Alert** levels are defined at values progressively closer to the central value. (e.g., Values close to 3 are unacceptable, so **Advise** is set at 0 and 6, **Warning** is set at 1 and 5, and **Critical** is set at 2 and 4.)
4. **Outside Absolute Window**: A middle value is defined as acceptable, and the **Alert** levels are defined at values progressively further from the central value. (e.g., Values close to 3 are acceptable, so **Advise** is set at 2 and 4, **Warning** is set at 1 and 5, and **Critical** is set at 0 and 6.)

Note
Predefined Device Alerts are currently unsupported in AMS Machine Works.

Note
Predefined Device Alerts are recommended alert settings for a device which are loaded directly from a device, such as an **AMS Wireless Vibration Monitor**, or a **CHARM** located in an AMS Asset Monitor.

Note
AMS Machine Works enables you to set alerts for all available assets. However, any changes to **Predefined Device Alerts** are not downloaded into any specific device. To edit an alert within a specific physical device you must use the configuration application included with that device.

4.1 Edit Alerts

When a **Machine Train** is first created it does not have any **Alerts** defined. There are two ways to add alerts:

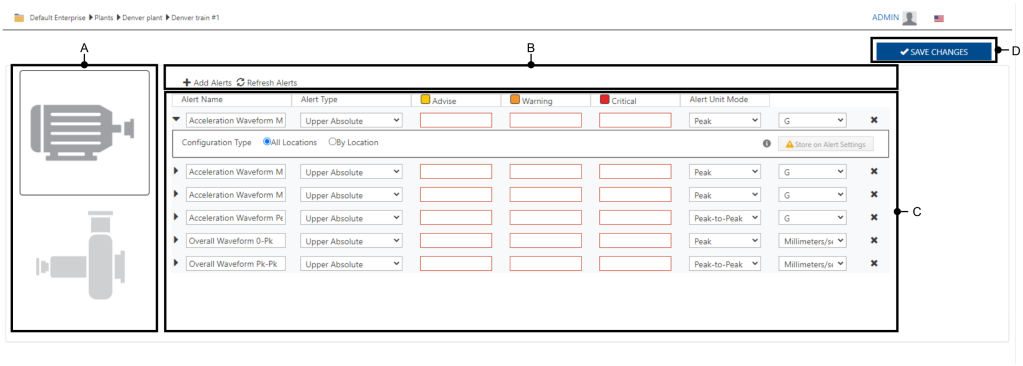
Procedure

1. You can access the **Edit Alert** function through the:
   a) **Asset Explorer**: Edit Alerts
   b) **Analysis Dashboard**: Configure Alerts
2. You can access the **Copy Alerts** function as described in the Copy Alerts section of the Machine Configuration process. This process enables you to copy a single **Alert**, or perform a bulk copy.

4.2 Alert Creator Screen

When you start the Edit Alerts process, your view is switched to a new browser tab with the following screen.

Figure 4-1: Alert Creator Screen



*A. Asset Sketches: Select the icons which represents the **Component** of the **Machine Train** you want to edit.*
*B. Top Menu: There are controls to start the Add Alerts process, or to **Refresh Alerts** for every **Alert** which exists for this **Component**.*
*C. Alert List: A list of every existing **Alert** for this **Component**.*
*D. **SAVE CHANGES** button — You must click this button to save any changes made on this screen or through the Add Alerts process.*

4.2.1 Asset Sketches

This area has a graphical representation of every **Asset** you currently have available to edit or set an **Alert** for.

This list contains every **Asset** defined for this **Machine Train** except the **Coupling** elements.

You can set an **Alert** for a single **Asset** in a **Machine Train** at a time. To do more than one at a time use the Copy Alerts process.

4.2.2 Top Menu

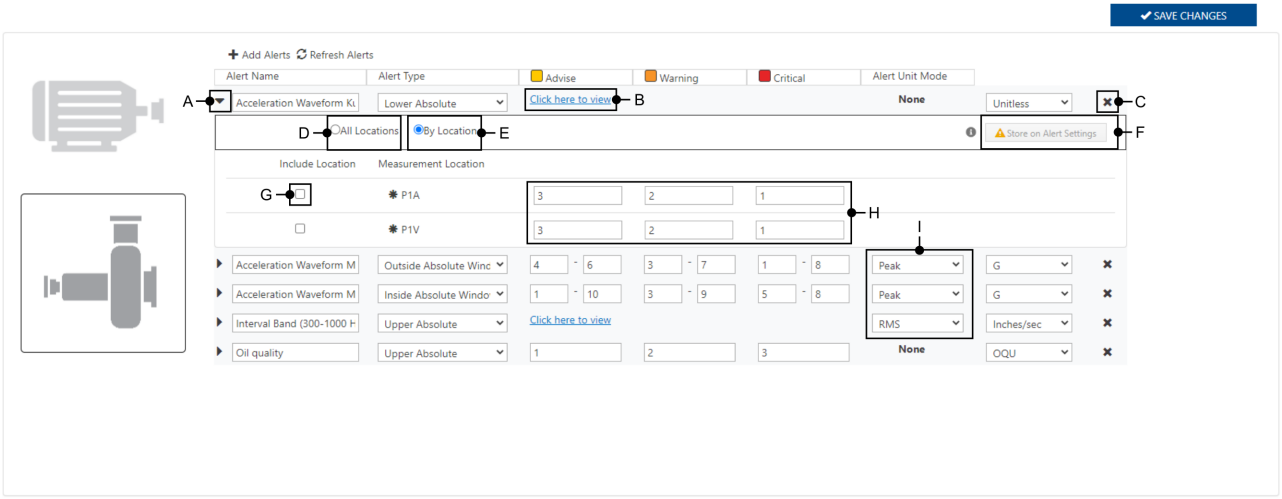
In this area, which is marked **B** on the Alert Creator Screen above, there are two buttons:

- **Add Alerts** — The **Add Alerts** button enables you to open a window with the list of the measurements which are currently available to configure an **Alert** for.
- **Refresh Alerts** — The **Refresh Alerts** button can be used if a user has mapped or re-mapped a channel to a location in another window while the user has had this window open.

4.2.3 Alert List

The **Alert List** is initially empty for a new **Machine Train**.

Figure 4-2: Alert List



A. ***Expand Details*** *icon – Click this triangle to see the* ***Configuration Type***
   - ***All Locations****: (Default) If this setting is selected every* ***Measurement Point*** *on this* ***Asset*** *with this type of* ***Measurement*** *will share the same* ***Alert Type*** *and* ***Alert Levels****.*
   - ***By Location****: If this setting is selected every* ***Measurement Point*** *on this* ***Asset*** *with this type of* ***Measurement*** *and this* ***Alert Type*** *can have different* ***Alert Levels****.*

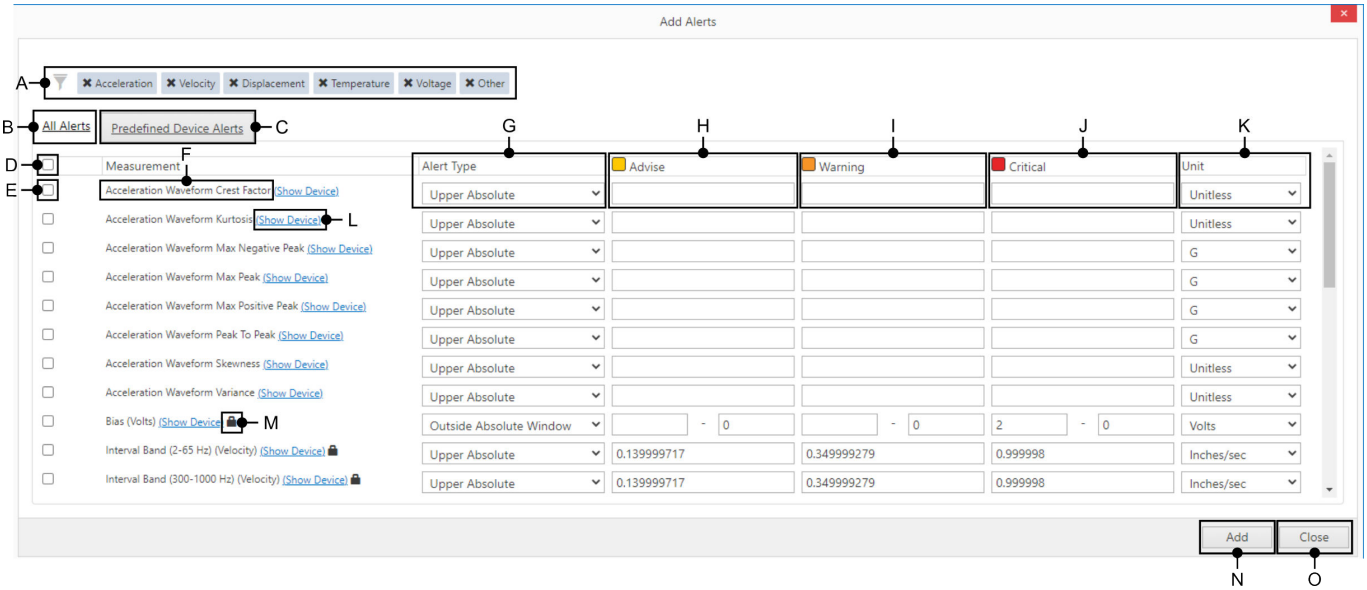
B. ***Click here to view*** *link – Click this link to view and set the* ***Alert Levels****. This link is only available when the* ***Configuration Type*** *is set to* ***By Location****.*
C. ***X*** *control – Click the 'X' to remove the* ***Alert*** *from the list.*
D. ***All Locations*** *radio button – enables you to set the same alert value for all bearing locations. (Default) If this setting is selected every* ***Measurement Point*** *on this* ***Asset*** *with this type of* ***Measurement*** *will share the same* ***Alert Type*** *and* ***Alert Levels****.*
E. ***By Location*** *radio button – If this setting is selected every* ***Measurement Point*** *on this* ***Asset*** *with this type of* ***Measurement*** *and this* ***Alert Type*** *can have different* ***Alert Levels****.*
F. ***Store on Alert Settings*** *– This button is available only for wireless devices such as the AMS Wireless Vibration Monitor and the AMS 9420. See: Store on Alert Settings*
G. ***Include Location*** *checkbox – Include this location in the alerts.*
H. ***Alert Values*** *– You can define different alert values for each measurement location.*
   - ***Upper Absolute*** *and* ***Lower Absolute*** *need 3 values.*
   - ***Inside Absolute Window*** *and* ***Outside Absolute Window****: need 6 values.*

I. ***Alert Unit Mode*** *– For some types of measurement a user can choose the* ***Alert Unit Mode****. This field is a dropdown list that contains the following choices:*
   - *Peak*
   - *Peak-to-Peak*
   - *RMS (Root Mean Squared)*

4.3 Add Alerts

When you click the **Add Alerts** button in the **Top Menu** of the **Alert Creator Screen**, you will see the modal window with a range of configuration options.

Figure 4-3: Add Alerts Window



A. ***Filter*** *– by default all available measurement types are shown.*
   - *You can remove all, and add all, measurement types by clicking on the filter icon,* ▼ .
   - *You can filter out a single measurement type by clicking the 'x' icon on the left side of each filter. Those items are then no longer shown, and the 'x' turns into a '+'.*
   - *Click on a '+' to add a measurement type back.*

B. ***All Alerts*** *– (Currently this tab is not displayed, and* ***All Alerts*** *are displayed by default.) This tab contains all the available measurement types, including* ***Predefined Device Alerts****.*

C. ***Predefined Device Alerts*** *– (Currently unavailable.) This tab contains* ***Predefined Device Alerts*** *for the specific measurement. For the measurement available on this list alert's range values are completed. This tab is visible only if alerts are defined within the device itself. You may choose to reuse these alerts as machine alerts. However, in many cases, you may want to modify, disable, or create entirely new alerts for machines.*

D. ***Select All*** *– Click this box at the top of the column to select all available measurements on the list.*

E. ***Select*** *– Click these boxes to select measurements individually.*

F. ***Measurement*** *– The name of the measurement. All measurements are provided from devices mapped to a channel. To get more measurements, you can re-map your device, or add another mapping.*

G. ***Alert Type*** *– Your selection in this field effects your configuration of* ***Alert Level*** *values. You can select from four types of alerts:*
   - ***Upper Absolute*** *– See: Alerts*
   - ***Lower Absolute*** *– See: Alerts*
   - ***Inside Absolute Window*** *– See: Alerts*

- ***Outside Absolute Window*** *– See: Alerts*

H. ***Advise*** *alert level – The lowest alert level. See: Alerts*
I. ***Warning*** *alert level - The middle alert level. See: Alerts*
J. ***Critical*** *alert level - The highest alert level. See: Alerts*
K. ***Unit*** *– This field is a dropdown list for different measurement types. For some measurements a user can change the default value, for example from G to meters/sec^2.*
L. ***Show Device*** *link – Click the link to see the device and sensor or channel name that provides this measurement.*
M. ***Padlock*** *icon – This icon indicates that the measurement is native to the device. A native measurement can have its* ***Store on Alert*** *settings edited. See: Store on Alert Settings*
N. ***Add*** *button – Click this button to add these changes. See: Alert Creator Screen for the location of the* ***Save*** *button.*
O. ***Close*** *button – Click this button to close the window and return to the Alert Creator Screen.*

4.4 Store on Alert Settings

The **Store on Alert** feature is triggered by data from wireless devices (AMS Wireless Vibration Monitor and AMS 9420), and from data from AMS Asset Monitor (**CHARM** and **External Data Points**).

Each type of device stores different types of **Collection**:

- **AMS Wireless Vibration Monitor** — Three types of **Collection** are stored:
  - **Waveforms** + **Spectra** + **Thumbnails**
- **AMS 9420** — One **Collection** is stored:
  - **Waveforms & Spectra**
- **AMS Asset Monitor** — Every **Collection** is stored except for **Scalars**.

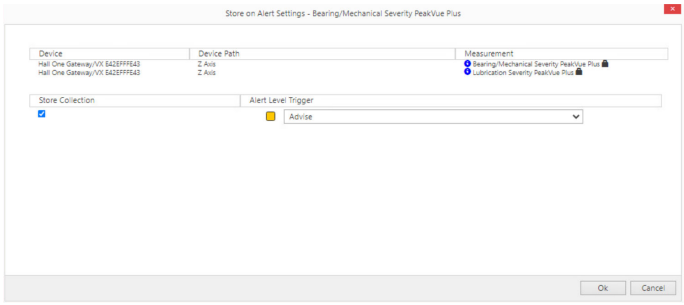
Store on Alert settings can be configured for all devices with native scalar measurements.

All the measurements selected in the device's Collection Details are stored whenever any alert triggers. Data storage continues until the device exits all alert statuses.

The button that begins this configuration process is found in the Alert List.

During this step, you can set the **Alert** trigger level, and choose to store the **Collection** data.

Figure 4-4: Store on Alert Settings



1. **Device** — The **Emerson Wireless Gateway** / **Measuring Device** names.
2. **Device Path** — This is given as an axis that this measurement is aligned to for wireless devices, and it is given as a **CHARM** name for a **Device** located in an AMS Asset Monitor.
3. **Measurement** — The exact types of measurements. A lock symbol here indicates that this is a primary measurement.
4. **Store Collection** — Click this checkbox if you want the data to be stored when the **Alert** is triggered.
5. **Alert Level trigger** — Choose which level of **Alert** triggers the storage of data.
   - **Advise**
   - **Warning**
   - **Critical**
6. **Ok / Cancel** — Click **Ok** to save your changes and exit, or click **Cancel** to exit without saving your changes.

5 Network Device Module

The Network Device Module provides the functionality for discovering and configuring every data source which is available on your network.

Agents

There are two types of **Agent** which enable connections to every kind of **Device**:

- **AMS Asset Monitor Agent**
- **Emerson Wireless Gateway Agent**

See: Modifying Devices

Devices

There are three main types of **Device** which you can connect to:

- **AMS Asset Monitor**
  - Each physical **AMS Asset Monitor** device has slots which hold **CHARMs**.
- **Emerson Wireless Gateway**
  - Each physical **Emerson Wireless Gateway** device is able to give network access to **AMS Wireless** devices within its signal range.
- Each physical **AMS Wireless** device should be appropriately located so that it can return reliable data. There are two types of **AMS Wireless** device:
  - **AMS 9420**
  - **AMS Wireless Vibration Monitor**

Licenses

A **License tag** is required for every data source **Channel**. Each **Channel** consumes one **License tag**, even if it generates more than one **Waveform**.

License tags are not assigned to a specific data source **Channel**, so you must have one for every data source you have configured in order to ensure that data is being collected for every **Channel**.

License tag evaluation is carried out when measurement data arrives. The evaluation checks if the data source **Channel** has a valid **License tag** assigned to it.

In the **User Menu** found in the Header of Network Device Module windows you can check how many **License tags** are still available. If you are an **Administrator** you can also access the License Management Functions available in the User Manager application.

5.1 Network Device Module — Dashboard and Sidebar

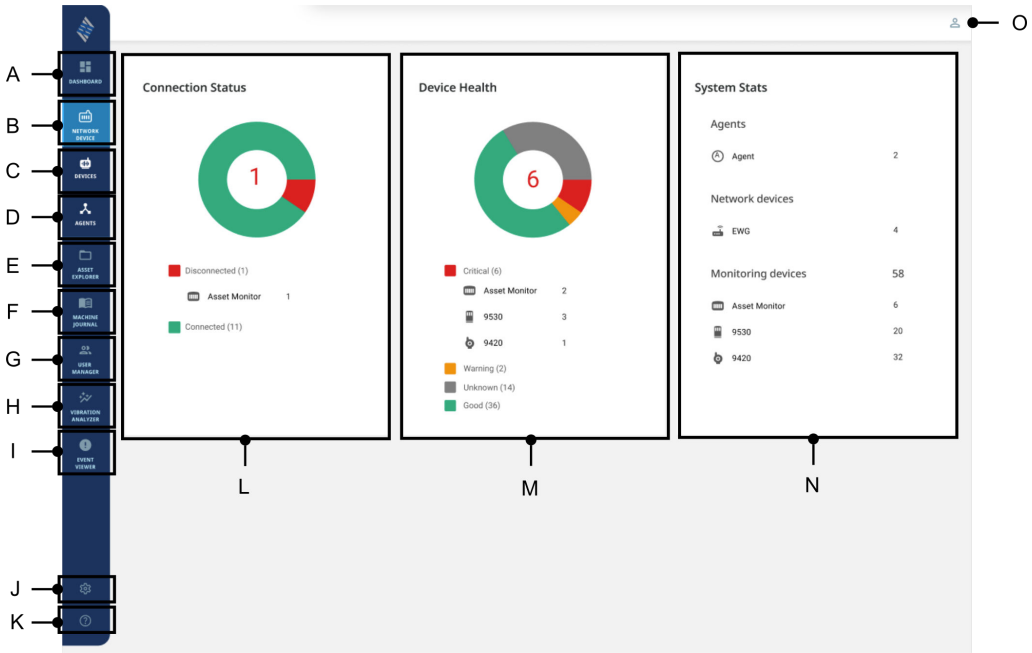
When you start the **Network Device Module** your first view is of the dashboard. This dashboard is initially mostly empty until devices are connected to an **Agent** and configured. The dashboard has a series of links on the left hand side to AMS Machine

Works applications, and to the other two main areas of the **Network Device Module**, **Devices**, and **Agents**.

The dashboard is divided into three main informational sections, **Connection Status**, **Device Health**, and **System Stats**. These sections enable you to quickly find information about all the elements of your monitoring infrastructure.

The doughnut diagrams, and the status lists below them, provide a way for you to quickly find devices which meet your search criteria.

Figure 5-1: Network Device Module - Dashboard and Sidebar

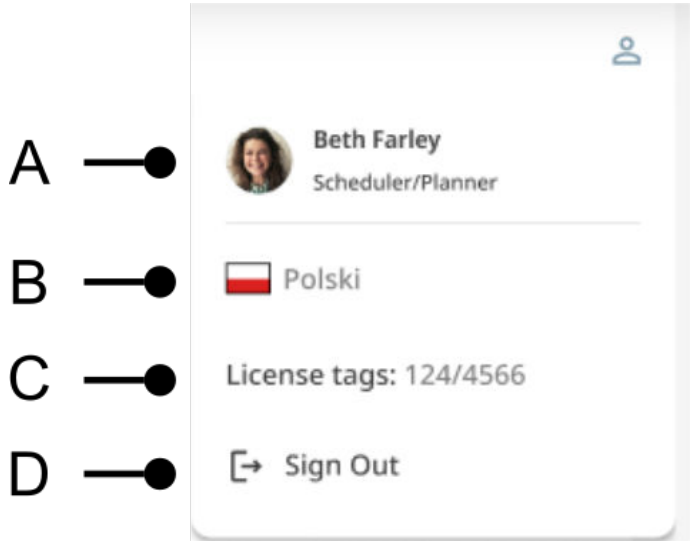


A. ***Analysis Dashboard*** — *Switches to the Analysis Dashboard*
B. ***Network Device Module - Dashboard and Sidebar*** — *The current screen.*
C. ***Network Device Module - Devices*** — *Switches to the Devices view.*
D. ***Network Device Module - Agents*** — *Switches to the Agents view.*
E. ***Asset Explorer*** — *Switches to the Asset Explorer*
F. ***Machine Journal*** — *Switches to the Machine Journal*
G. ***User Manager*** — *Switches to the User Manager*
H. ***Vibration Analyzer*** — *Switches to the Vibration Analyzer*
I. ***Event Viewer*** — *Switches to the Event Viewer*
J. ***Unit Settings*** — *Switches to the Unit Settings view.*
K. ***Online Help*** — *Click the question mark icon to open the online version of this documentation.*
L. ***Connection Status*** — *A doughnut diagram with an overview of the connection status of your devices and agents. See: Connection Status*
M. ***Device Health*** — *A doughnut diagram with an overview of the health status of your devices. See: Device Health*
N. ***System Stats*** — *A general overview of how many elements are currently configured in the system. See: System Stats*
O. ***User Menu*** — *The **User Menu** has functions and information related to the current **User**, **License tags**, and **Language**.*

5.1.1 Header

The header of windows in the Network Device Module contains the **User Menu**.

Figure 5-2: User Menu



A. ***User Info*** *— The name of the current* ***User****.*
B. ***Language*** *— The current language is displayed along with a flag of a country where this language is predominately spoken.*
C. ***License Tags*** *— The proportion of tags in use to the pool of available tags. (e.g., 124/4566 means 124 tags used out of a pool of 4566 tags.)*
D. ***Sign Out*** *— Click* ***Sign Out*** *to exit your user session.*

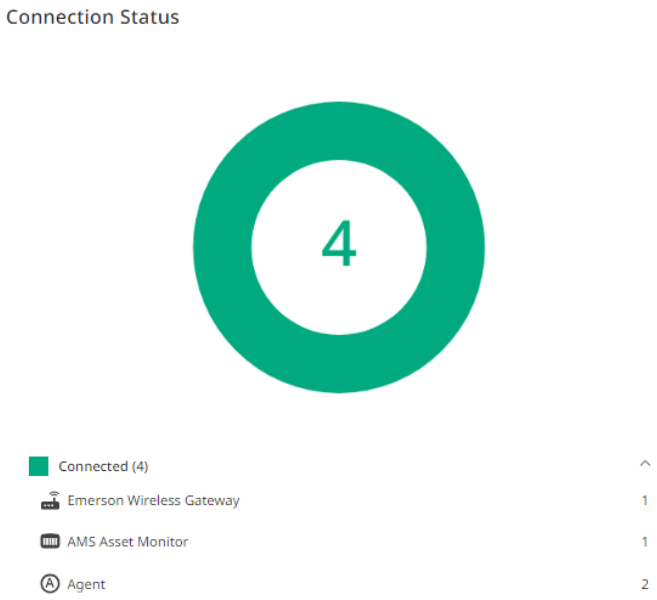
5.1.2 Connection Status

The **Connection Status** panel gives you a quick overview of the current connection status of your monitoring infrastructure devices and agents. You can select devices with a particular status from either the circular display or from the list of statuses below the diagram.

There are three possible **Connection Status** statuses:

- **Disconnected**
- **Connected**
- **Unknown**

Figure 5-3: Connection Status Panel



The **Connection Status Diagram** shows a proportional representation of the number of devices with each connection status. The number in the center indicates how many devices have the currently selected status.

Under each connection status, a list of network devices will appear along with the number of devices. When you click on the network device, you will be directed to the Devices tab.

Statuses with no devices underneath will not be visible.

5.1.3 Device Health

The **Device Health** panel gives you a quick overview of the health of your monitoring infrastructure devices. You can select devices with a particular status from either the doughnut display or from the list of statuses below.

Device Health is given by one of two methods:

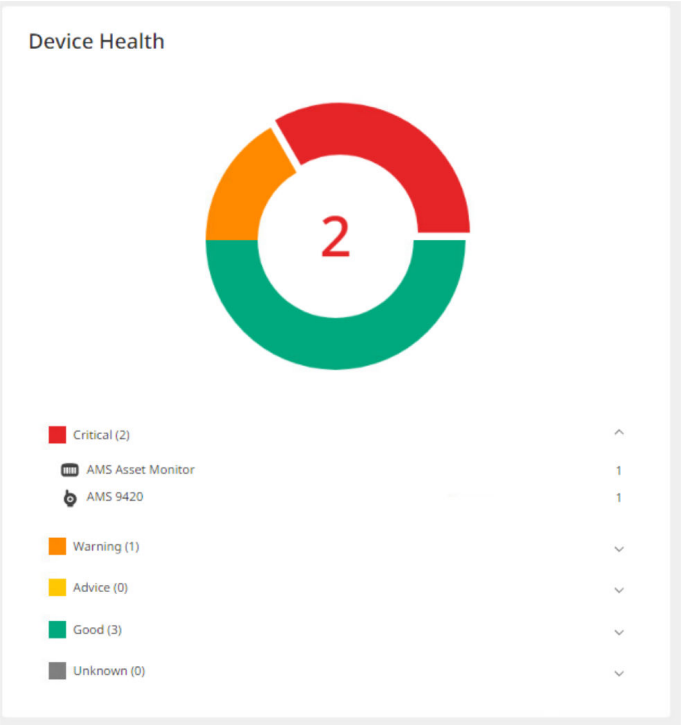
- **Endpoint Health** — This is the health of an endpoint device.
- **Worst Connected Health** — This is set to the lowest heath of a connected endpoint device. For example, with an **Emerson Wireless Gateway**, the worst health of a wireless device connected through that gateway. Or, in the case of an **AMS Asset Monitor**, the worst health of a **CHARM** installed in that **AMS Asset Monitor**.

There are five possible **Device Health** statuses:

- **Critical — Red**
- **Warning — Orange**
- **Advice — Yellow**
- **Good — Green**

- **Unknown** — Grey

Figure 5-4: Device Health Panel

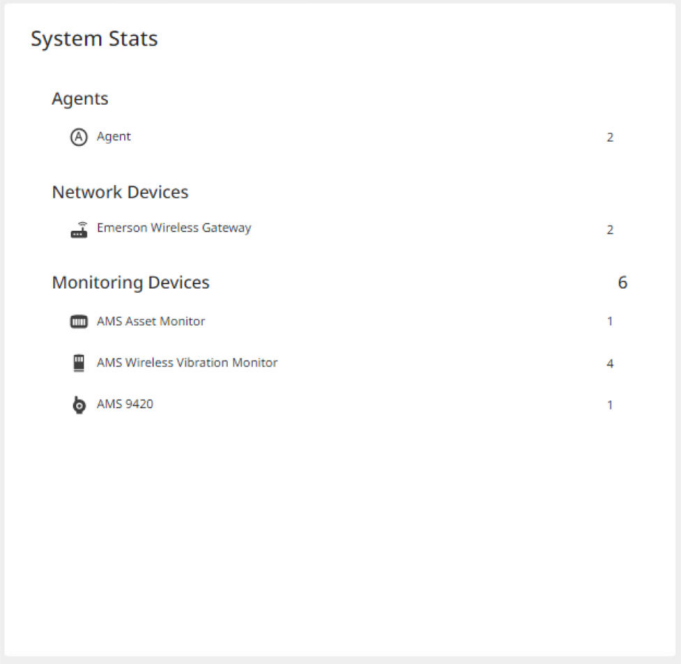


1. **Device Health Diagram** — This doughnut chart shows a proportional representation of the number of devices with each health status. The number in the center indicates how many devices have the currently selected status. **Critical** is selected.
2. **Critical** — This red section is currently selected and expanded, and there are 2 devices with this status.
3. **Warning** — This orange section is not selected, and we can see that there is 1 device with this status.
4. **Advice** — This yellow section is not currently present because there are no devices with this status.
5. **Good** — This green section is not selected and is not expanded. We can see that there are 3 devices with this status.
6. **Unknown** — This grey section is not currently present because there are no devices with this status.

5.1.4 System Stats

The **System Stats** panel has general information about your monitoring infrastructure.

Figure 5-5: System Stats Panel



- **Agents**
- **Network Devices**
  - **Emerson Wireless Gateway**
- **Monitoring Devices**
  - **AMS Asset Monitor**
  - **AMS Wireless Vibration Monitor**
  - **AMS 9420**

Clicking on a specific row redirects to the Devices tab which lists all the devices and the information for each device.

5.2 Devices

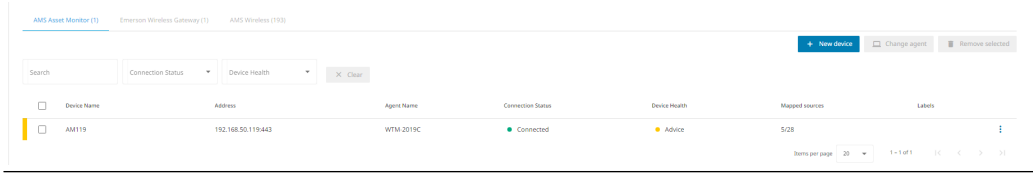
The **Network Device Module** handles the configuration and monitoring of three types of device:

- **AMS Asset Monitor** devices
- **Emerson Wireless Gateway** devices
- **AMS Wireless** devices

Each kind of device has different measurement, self-monitoring, and data collection capabilities that are explained in the following sections.

5.2.1 AMS Asset Monitor Tab

Figure 5-6: AMS Asset Monitor Tab



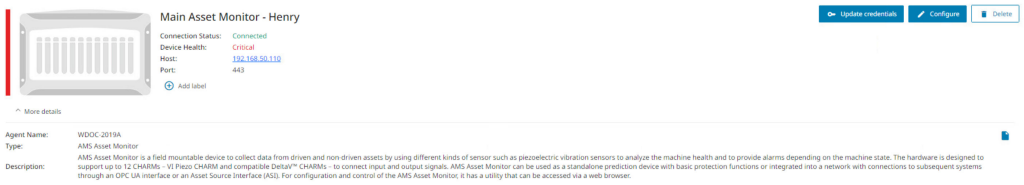
1. **AMS Asset Monitor Tab** — When this tab is underlined with a blue line the **AMS Asset Monitor Tab** is selected.
2. **Search** — Use this field to search for a particular device.
3. **Connection Status** — Filter the device list by **Connection Status**.
4. **Device Health** — Filter the device list by **Device Health**. See: Device Health
5. **Clear** — Clear the filtering parameters.
6. **New Device** — Add a new device. See: Modifying Devices
7. **Change Agent** — Change the agent responsible for handling this device. See: Change Agent
8. **Remove Selected** — Use this to remove a device from the list.
9. **Health Bar** — The color of the vertical **Health Bar** matches the color and description of the **Device Health**. See: Device Health
10. **Checkboxes** — The **Change Agent** function will affect each **Device** which has a checkbox selected. Use the **Checkbox** at the top of the column to select every **Device**.
11. **Device Name** — Name of the device.
12. **Address** — The IP address and port number for accessing this device.
13. **Agent Name** — The name of the agent communicating with the device.
14. **Connection Status** — This field can display **Connected**, **Disconnected**, or **Unknown**.
15. **Device Health** — This displays the health of the monitoring device: **Critical**, **Warning**, **Advice**, **Good**, or **Unknown**. See: Device Health
16. **Mapped Sources** — This displays the number of measurement sources from the total which have been mapped to a point on a **Machine Train**. (e.g., 10/61)
17. **Labels** — Any custom **Label** that is defined for the device is displayed here.
18. **Mini Menu** — Click these three dots to bring up a menu for modifying devices: **Update Credentials**, **Configure**, and **Delete**. See: Modifying Devices

AMS Asset Monitor Details

When you view the details of any device the header of the window displays a breadcrumb path to the device. You can click on any item in the path to navigate between views.

Asset Monitor Details — Main Section

Figure 5-7: Main

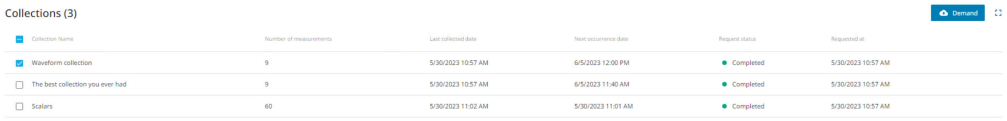


1. **Device Name**
2. **Asset Monitor Icon**
3. **Device Health Bar** — Health is shown by a colored bar. See: Device Health
4. **Connection Status** — See: Connection Status
5. **Device Health** — This health is the same as the health of the **Charm** with the worst health inside this Asset Monitor. The health information is written and color coded to match. See: Device Health
6. **Host** — The IP Address of the Asset Monitor.
7. **Port** — The port used to access the Asset Monitor.
8. **Add Label** — Add a custom label for this Asset Monitor.
9. **Modification Controls** — Click one of these three controls, **Update Credentials**, **Configure**, and **Delete**, to bring up a window for modifying devices. See: Modifying Devices
10. **More Details** — This expandable section contains some contextual information about the device.
    - **Agent Name** — This is the name of which agent is being used to access this device. See: Agents
    - **Type** — The type of device.
    - **Description** — Description of what the device is and what it does.
    - **Advanced Details** — Click this file icon, , to display a .json file with technical details about your device such as the firmware version, serial number, or other technical details.

Collections

For more information about what is included in a **Collection** see: Collection Details

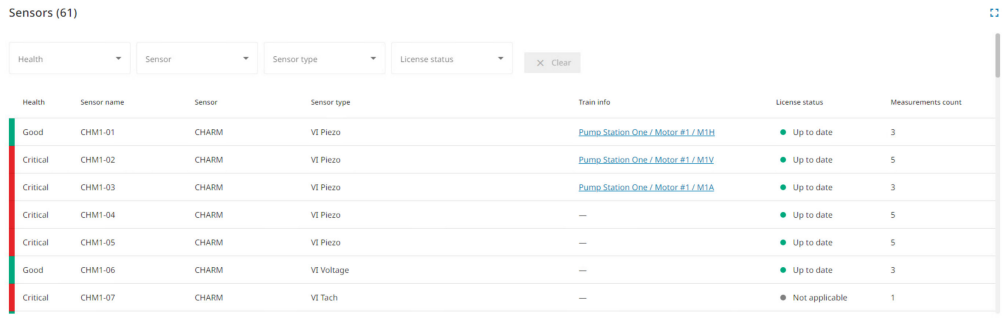
Figure 5-8: Collections



1. **Demand** — When you have one or more **Collection** boxes marked you can use the **Demand** button to refresh the data.
2. **Selection boxes** — Mark the **Collections** you want to **Demand** here.
3. **Collection Name** — The name of the **Collection** is displayed here. The name is defined in the **AMS Asset Monitor** interface, and the instructions for this are described in that product's documentation.
4. **Number of measurements** — This is the number of measurements defined in this **AMS Asset Monitor Collection**.
5. **Last collected date** — The date and time of when data was last gathered.
6. **Next occurrence date** — The date and time of when data will be gathered next.
7. **Demand status** — **Requested** / **Completed** / **Outdated** / **Not requested** / **Failed**. Also shows the progress of the request in percentage.
8. **Demanded at** — This is the date (MM/DD/YYYY) and time (HH:MM AM/PM) the request was made at.

Sensors

Figure 5-9: Sensors



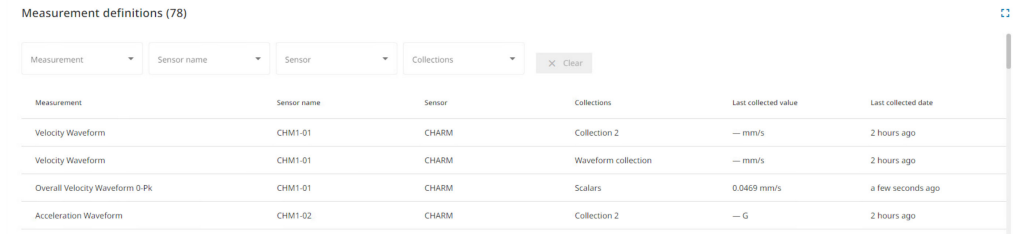
1. **Sensor Filters** — The **Sensors** can be filtered by four characteristics. Only the **Sensors** which meet all of the conditions you apply will be displayed. Click **Clear** to reset the filter.
   - — **Health** — You can select the **Sensors** which have a particular **Health**.
   - — **Sensor** — For an AMS Asset Monitor this is either a **CHARM** or an **External Data Point**.
   - — **Sensor type** — There is a wide range of **Sensor type** available for AMS Asset Monitor.

— **License status** — "Not applicable" / "Out of date" / "Up to date"

2. **Health** — **Health** is displayed by color code and text. See: Device Health
3. **Sensor name** — This name is set within the **AMS Asset Monitor** interfaces and is documented within the **AMS Asset Monitor** documentation.
4. **Sensor** — This can be either **CHARM** or **External Data Point**.
5. **Sensor type** — **CHARM** sensors have a specific type, and **External Data Point** sensors have no entry here.
6. **Train info** — Includes a hyperlink to the train in the Dashboard.
7. **License status** — The three possible statuses are: "Not applicable", "Out of date", and "Up to date".
8. **Measurement count** — This column displays how many measurements the **CHARM** is capable of delivering. An **External Data Point** can only deliver one measurement.

Measurement Definitions

Figure 5-10: Measurement Definitions

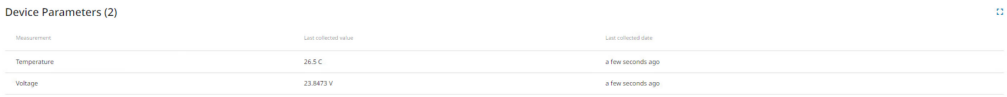


1. **Filter Options** — The **Measurement Definitions** can be filtered by four characteristics. Only the **Measurement Definitions** which meet all of the conditions you apply will be displayed. Click **Clear** to reset the filter.
   - **Measurement** — You can filter for **Measurement Definitions** which have a particular type. (Waveform, Spectrum, Scalar, Interval Band, Thumbnail, Peak List)
   - **Sensor name** — You can filter by **Sensor name**. For an AMS Asset Monitor there can be custom names which are defined in the AMS Asset Monitor interface.
   - **Sensor** — For an AMS Asset Monitor you can filter by **CHARM** or by **External Data Point**.
   - **Collections** — For an AMS Asset Monitor you can filter by the following types of **Collection**: **Scalars**, **Waveforms**, or by a custom **Collection** defined on the AMS Asset Monitor.
2. **Measurement** — A short description of the type of measurement.
3. **Sensor name** — The name of the sensor.
4. **Sensor** — This can be either **CHARM** or **External Data Point**.

5. **Collections** — The name of the **Collection** that this data is gathered in.
6. **Last collected value** — The latest value along with the associated unit for that type of **Measurement**.
7. **Last collected date** — A value along with a unit of time to indicate how long ago the measurement was taken.

Device Parameters

Figure 5-11: Device Parameters

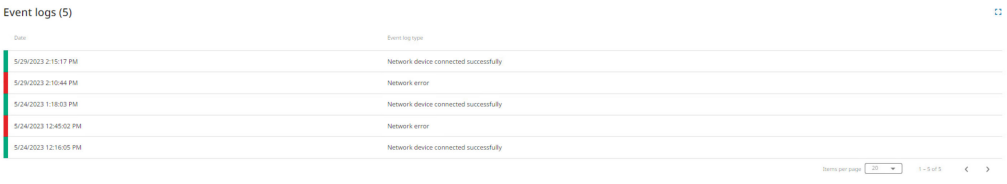


These are measurements of the measuring device itself.

1. **Measurement** — This column lists the type of **Measurement**, e.g., Temperature or Voltage.
2. **Last collected value** — The latest value along with the associated unit for that type of **Measurement**.
3. **Last collected date** — A value along with a unit of time to indicate how long ago the measurement was taken.

Event Logs

Figure 5-12: Event Logs



1. **Event Severity Indicator** — This indicator gives a visual representation of the severity of the **Event**. These match in color and severity to the Device Health scale. For example, **Red** indicates a **Critical Event**, and **Green** indicates a **Good Event**.
2. **Date** — The date of the **Event**.
3. **Event log type** — The type of event, e.g., **Network error** or **Network device connected successfully**.

Event Types

Table 5-1:

Event Message	Severity	Recommended Action
Agent closing	Warning	
Authentication process failed	Critical	Check your credentials.

Table 5-1: *(continued)*

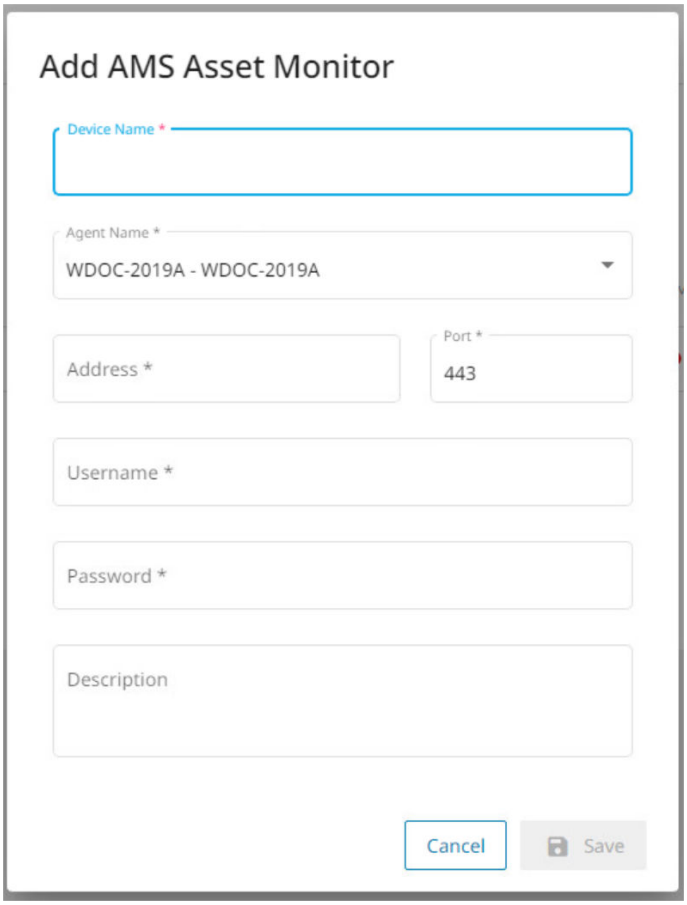
Event Message	Severity	Recommended Action
Network device connected successfully	Good	None.
Connection broken	Critical	Check your network connection to this device.
Network error	Critical	Check your network connection to this device.
Unknown event log	Unknown	

Modifying Devices

The functions described below are available from the **AMS Asset Monitor** tab in the **Devices** section of **Network Device Module** interface.

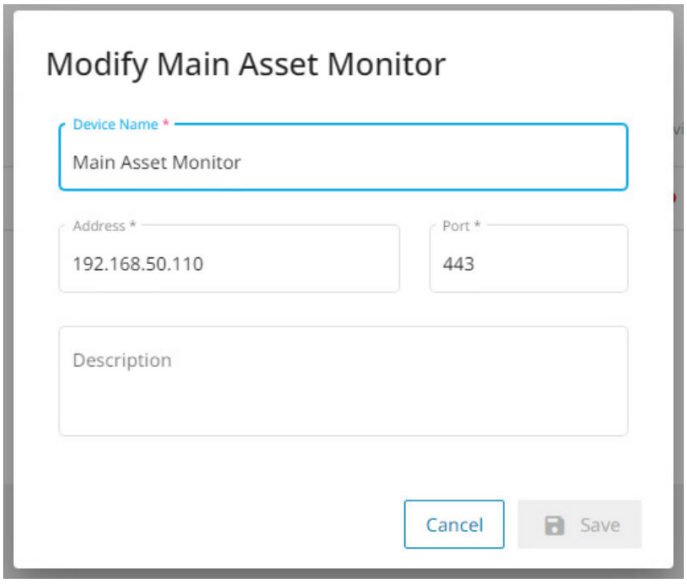
The functions to **Modify**, **Update**, or **Delete** an **AMS Asset Monitor** connection are also available from the **AMS Asset Monitor** details page. See: AMS Asset Monitor Details

Figure 5-13: Add an AMS Asset Monitor



1. **Device Name** — (Required) This is the name that you choose for this device within AMS Machine Works. The maximum length is 100 characters.
2. **Agent Name** — (Required) This the name of the **Agent** which is facilitating the connection. See: Agents
3. **Address** — (Required) This is the IP address where the **AMS Asset Monitor** is located. The maximum length is 250 characters.
4. **Port** — (Required) The standard port is **443**, and this value is filled in by default. In some installations this port could be different. The valid range is from 1 to 65535.
5. **Username** — (Required) This is the **Username** for the **AMS Asset Monitor** account you want to connect to.
6. **Password** — (Required) This is the **Password** associated with the **Username** for the **AMS Asset Monitor** you want to connect to.
7. **Description** — (Optional) You can enter any useful description information or notes here. The maximum length is 500 characters.
8. **Cancel / Save** — Click **Cancel** to exit without making changes, or click **Save** to save your changes and exit

Figure 5-14: Modify an AMS Asset Monitor

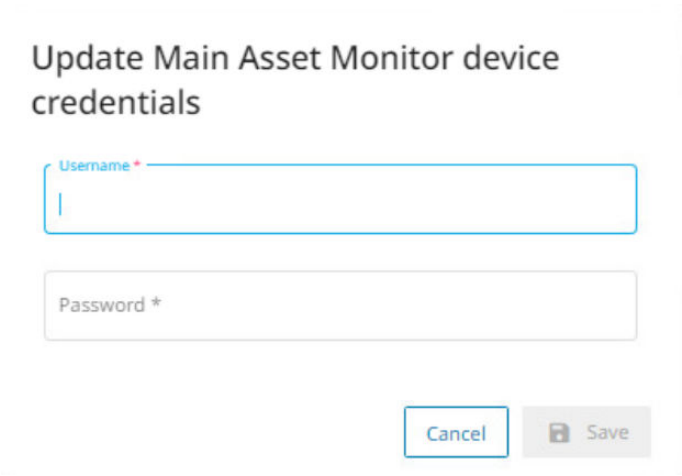


You can edit a previously configured AMS Asset Monitor. All of the fields except for the **Description** are required.

1. **Device Name** — (Required) This is the name that you choose for this device within AMS Machine Works.
2. **Address** — (Required) This is the IP address where the **AMS Asset Monitor** is located.

3. **Port** — (Required) The standard port is **443**, and this value is filled in by default. In some installations this port could be different.
4. **Description** — (Optional) You can enter any useful description information or notes here.

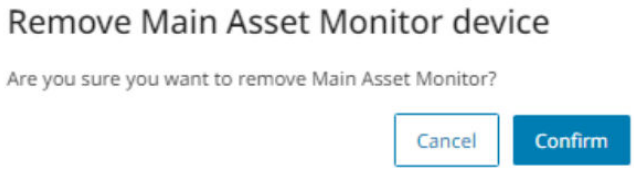
Figure 5-15: Update AMS Asset Monitor Credentials



You can change your access credentials for the AMS Asset Monitor.

1. **Username** — (Required) This is the **Username** for the **AMS Asset Monitor** account you want to connect to.
2. **Password** — (Required) This is the **Password** associated with the **Username** for the **AMS Asset Monitor** you want to connect to.

Figure 5-16: Delete an AMS Asset Monitor



If you want to **Delete** an AMS Asset Monitor device from your AMS Machine Works installation, click **Confirm**. To exit without making any changes, click **Cancel**.

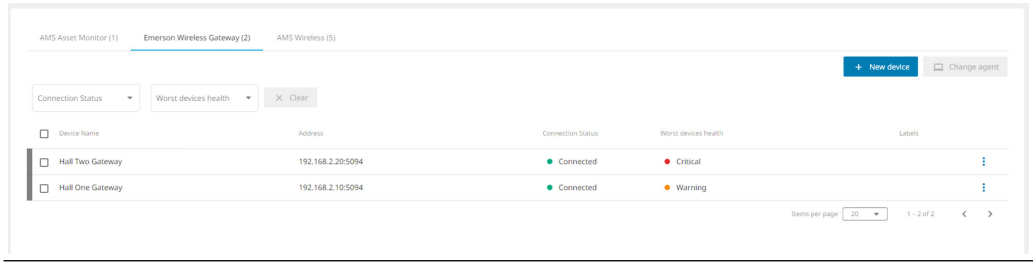
5.2.2 Emerson Wireless Gateway Tab

An **Emerson Wireless Gateway** is a device which enables communication with Emerson wireless sensors, such as the **AMS 9420**, and the **AMS Wireless Vibration Monitor**.

The gateway can connect to all the AMS Wireless devices within range of its signal. The signal strength is dependant on the operating environment and interference factors.

When this tab is selected in the **Devices** area of the **Network Device Module** the following screen is displayed.

Figure 5-17: Emerson Wireless Gateway Tab



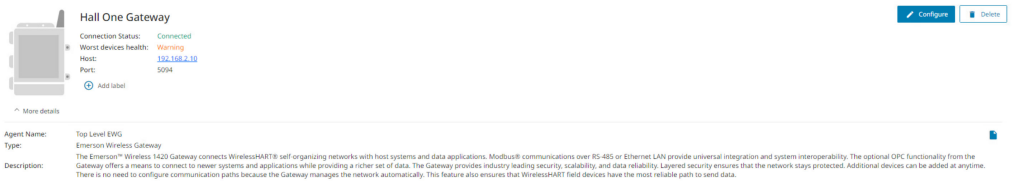
1. **Emerson Wireless Gateway Tab** — When this tab is underlined with a blue line the **Emerson Wireless Gateway Tab** is selected.
2. **Search** — Use this field to search for a particular device.
3. **Connection Status** — Filter the device list by **Connection Status**.
4. **Worst devices health** — Filter the device list by device health.
5. **Clear** — Clear the filter parameters.
6. **Add New Device** — Add a new device. See: Modifying Devices
7. **Change Agent** — Change the agent responsible for handling this device. See: Change Agent
8. **Remove Selected** — Use this to remove a device from the list.
9. **Checkboxes** — Use these checkboxes to select which devices to use the **Change Agent** function on.
10. **Health Bar** — This bar always appears as gray. The gateway does not have health on its own.
11. **Device Name** — Name of the device.
12. **Address** — The IP address and port number for accessing this device.
13. **Agent Name** —
14. **Connection Status** — This field can display **Connected**, **Disconnected**, or **Unknown**.
15. **Worst devices health** — This displays the health of the monitoring device: **Critical**, **Warning**, **Advice**, **Good**, or **Unknown**.
16. **Labels** — Any custom **Label** that is defined for the device is displayed here.
17. **Mini Menu** — Click these three dots to open a menu: **Configure** and **Delete**. See: Modifying Devices

Emerson Wireless Gateway Details

When you view the details of any device the header of the window displays a breadcrumb path to the device. You can click on any item in the path to navigate between views.

EWG Details — Main Section

Figure 5-18: EWG Details



1. **Emerson Wireless Gateway Icon**
2. **Device Name**
3. **Connection Status** — See: Connection Status
4. **Worst devices health** — This health is the same as the health of the device with the worst health connected to this gateway. The health information is written and color coded to match. See: Device Health
5. **Host** — The IP Address of the Emerson Wireless Gateway.
6. **Port** — The port used to access the Emerson Wireless Gateway.
7. **Add Label** — Add a custom label for this Emerson Wireless Gateway.
8. **Modification Controls** — Click one of these controls, **Configure**, and **Delete**, to bring up a window for modifying devices. See: Modifying Devices
9. **More Details** — The information contained here gives some context about the device.
   - **Agent Name** — This is the name of which agent is being used to access this device. See: Agents
   - **Type** — The type of device.
   - **Description** — Description of what the device is and what it does.

Logical Devices

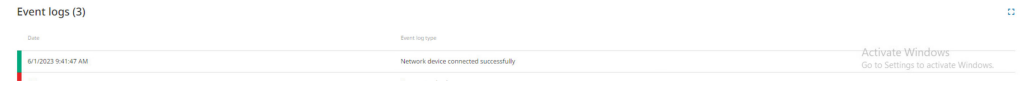
Figure 5-19: Logical Devices

1. **Logical Devices** — This is a list of the devices that have access to your AMS Machine Works installation through this gateway. Click on any device in the list to go to the AMS Wireless Details for that device.
   - **Search** — Use this field to search for a particular device.
   - **Type** — The type of the device connected through this gateway. (i.e., AMS Wireless Vibration Monitor, or AMS 9420)

- **Device Health** — This is the health of this particular sensor. Given in written form and color coded to match. See: Device Health
- **Device Name** — The name of the device connected to through this gateway.
- **Last Seen** — The time the device was last in contact with the network. (e.g., a minute ago)
- **Labels** — Any custom label you have defined and given to the device.
- **Mapped Sources**
- **Mini Menu** — Click here to open a menu: **Bulk Configuration**, **Configure**, and **Delete**.

Event Logs

Figure 5-20: Event Logs



1. **Event Severity Indicator** — This indicator gives a visual representation of the severity of the **Event**. These match in color and severity to the Device Health scale. For example, **Red** indicates a **Critical Event**, and **Green** indicates a **Good Event**.
2. **Date** — The date of the **Event**.
3. **Event log type** — The type of event, e.g., **Network error** or **Network device connected successfully**.

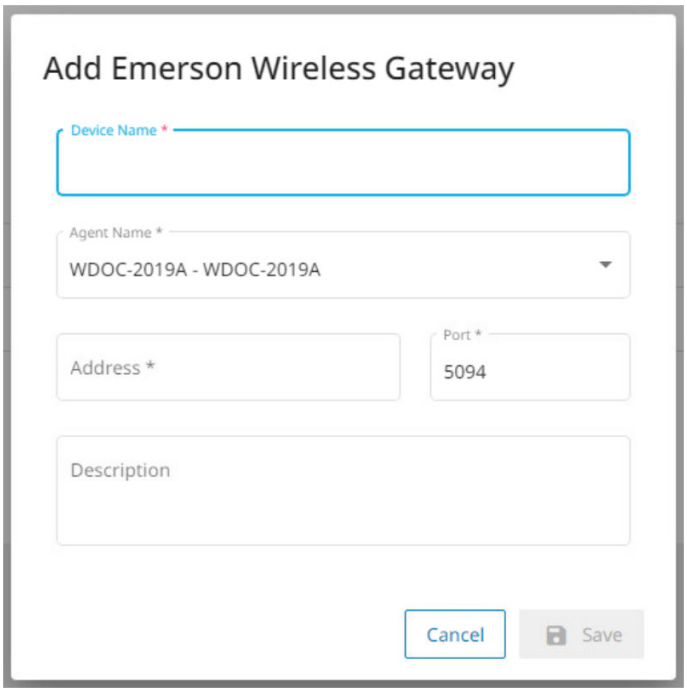
Event Types

Table 5-2:

Event Message	Severity	Recommended Action
Agent closing	Warning	
Network device connected successfully	Good	None.
Connection broken	Critical	Check your network connection to this device.
Network error	Critical	Check your network connection to this device.
Unknown event log	Unknown	

Modifying Devices

Figure 5-21: Add an Emerson Wireless Gateway



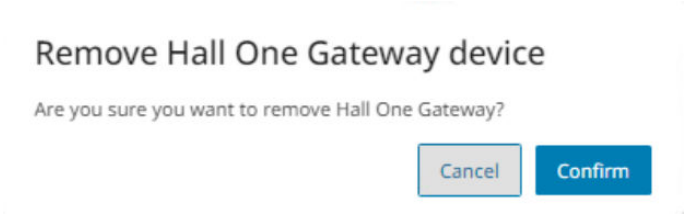
A. ***Device Name*** *— (Required) This is the name that you choose for this device within AMS Machine Works. The maximum length is 100 characters.*
B. ***Agent Name*** *— (Required) This the name of the* ***Agent*** *which is facilitating the connection. See: Agents*
C. ***Address*** *— (Required) This is the IP address where the* ***Emerson Wireless Gateway*** *is located. The maximum length is 250 characters.*
D. ***Port*** *— (Required) The standard port is* ***5094****, and this value is filled in by default. In some installations this port could be different. The valid range is from 1 to 65535.*
E. ***Description*** *— (Optional) You can enter any useful description information or notes here. The maximum length is 500 characters.*
F. ***Cancel / Save*** *— Click* ***Cancel*** *to exit without making changes, or click* ***Save*** *to save your changes and exit*

Figure 5-22: Modify an Emerson Wireless Gateway

You can edit a previously configured Emerson Wireless Gateway. All of the fields except for the **Description** are required.

1. **Device Name** — (Required) This is the name that you choose for this device within AMS Machine Works.
2. **Address** — (Required) This is the IP address where the **Emerson Wireless Gateway** is located.
3. **Port** — (Required) The standard port is **443**, and this value is filled in by default. In some installations this port could be different.
4. **Description** — (Optional) You can enter any useful description information or notes here.

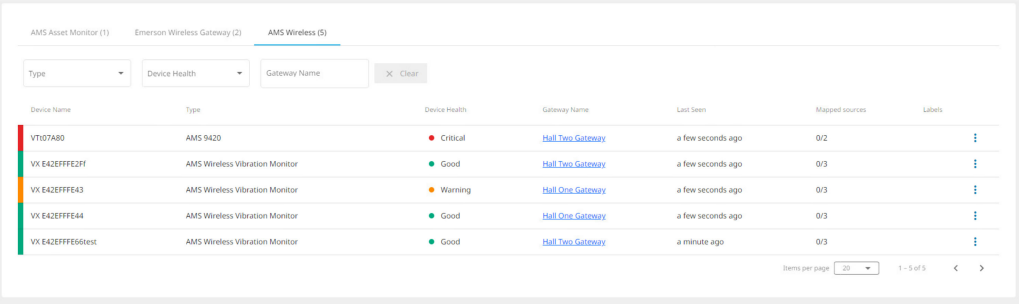
Figure 5-23: Remove an Emerson Wireless Gateway



If you want to **Remove** an Emerson Wireless Gateway device from your AMS Machine Works installation, click **Confirm**. To exit without making any changes, click **Cancel**.

5.2.3 AMS Wireless Tab

Figure 5-24: AMS Wireless Tab

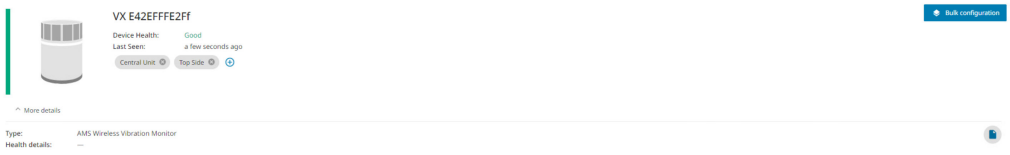


A. ***AMS Wireless Tab*** — *When this tab is underlined with a blue line the **AMS Wireless Tab** is selected.*
B. ***Search*** — *Use this field to search for a particular device.*
C. ***Type*** — *Filter the list accprding to device type.*
D. ***Device Health*** — *Filter the device list by **Device Health**. See: Device Health*
E. ***Gateway Name*** — *Filter the device list by which **Emerson Wireless Gateway** the devices are connected to.*
F. ***Clear*** — *Clear any active filtering parameters. When this button is grey, there are no active filters.*
G. ***Health Bar*** — *The color of the vertical **Health Bar** matches the color and description of the **Device Health**. See: Device Health*
H. ***Device Name*** — *Name of the device.*
I. ***Type*** — *The **Type** of the device, e.g., **AMS 9420**, or **AMS Wireless Vibration Monitor**.*
J. ***Device Health*** — *This displays the health of the monitoring device: **Critical**, **Warning**, **Advice**, **Good**,or **Unknown**. See: Device Health*
K. ***Gateway Name*** — *The name of the **Emerson Wireless Gateway** that acts as a gateway for this device. It includes a hyperlink which leads to the page of the gateway.*
L. ***Last Seen*** — *How long ago the device was seen on the network. (number / unit of time / ago)*
M. ***Mapped Sources*** — *A list of how many sources out of the total for that device are mapped to a **Machine Train**. (e.g., 2/3, 2 out of three sources available in this device are mapped to a **Machine Train**) See: Step 3: Channel Mappings*
N. ***Labels*** — *Any custom **Label** that is defined for the device is displayed here.*
O. ***Mini Menu*** — *Click these three dots to bring up a menu for **Bulk Configuration: Bulk Configure**, **Configure**, and **Delete**. See: Bulk Configuration*

AMS Wireless Details

When you view the details of any device the header of the window displays a breadcrumb path to the device. You can click on any item in the path to navigate between views.

Figure 5-25: Main Section

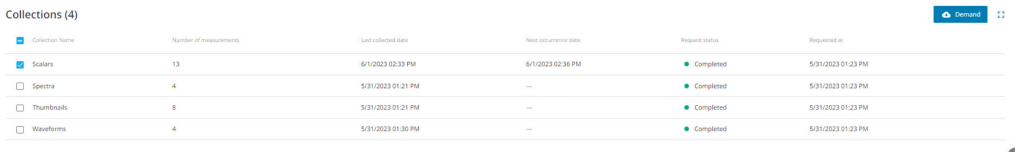


1. **Device Health Bar** — This bar represents the overall health of the device.
2. **Device Name** — The name of the device as configured.
3. **Device Health** — The overall health of the device is written and is color coded to match. See: Device Health
4. **Last Seen** — How long ago the device was seen on the network. (number / unit of time / ago)
5. **Add label** — Click this control to add a custom label to this device. You can add more than one label. Labels are for informational purposes only.
6. **Bulk configuration** — Click this button to do bulk configuration of several settings. See: Bulk Configuration
7. **Configure** — Click this button to modify the device name and set the Wireless Noise Threshold (RMS) level.
8. **Delete** — Click this button to delete the device from the list.
9. **More details** — Click **More details** to expand the section and see the following three items:
   - **Type** — Shows the debice type.
   - **Device health details** — Shows details about device health.
   - **Sensor health details** — Shows details about sensor health.
   - **Additional statuses** — Displays status messages about the device.

Collections

For more information about what is included in a **Collection** see: Collection Details

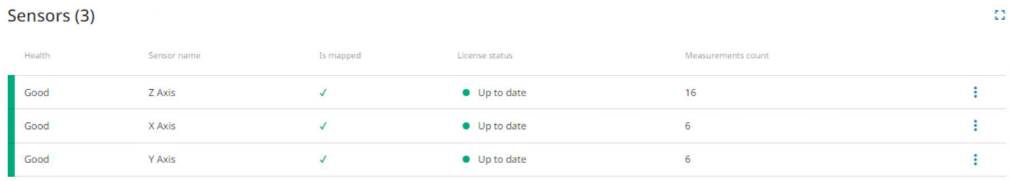
Figure 5-26: Collections



1. **Demand** — When you have one or more **Collection** boxes marked you can use the **Demand** button to refresh the data.
2. **Selection boxes** — Mark the **Collections** you want to **Demand** here.
3. **Collection Name** — The name of the **Collection**.

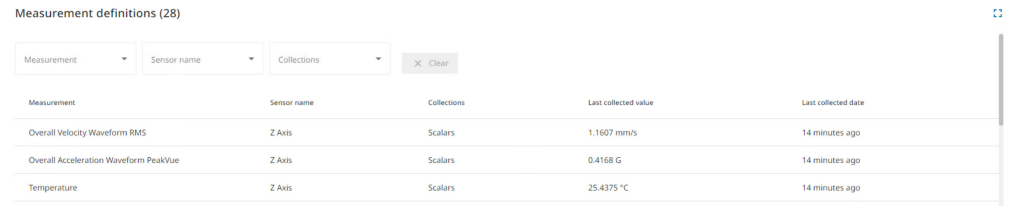
4. **Number of measurements** — This is the number of measurements defined in this **Collection**.
5. **Last collected date** — The date and time of when data was last gathered.
6. **Next occurrence date** — The date and time of when data will be gathered next.
7. **Demand status** — **Requested** / **Completed** / **Outdated** / **Not requested** / **Failed**. Also shows the progress of the request in percentage.
8. **Demanded at** — This is the date (MM/DD/YYYY) and time (HH:MM AM/PM) the request was made at.

Figure 5-27: Sensors



1. **Health** — **Health** is displayed by color code and text. See: Device Health
2. **Sensor name** — This can be a custom name, or a standard one such as 'Z Axis'.
3. **Train info** — Includes a hyperlink to the train in the Dashboard.
4. **License status** — The three possible statuses are: "Not applicable", "Out of date", and "Up to date"
5. **Measurements count** — This column displays how many measurements the sensor is capable of delivering.

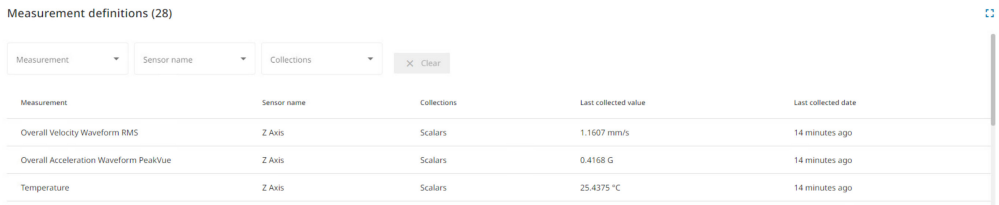
Figure 5-28: Measurement Definitions



1. **Filter Options** — The **Measurement Definitions** can be filtered by four characteristics. Only the **Measurement Definitions** which meet all of the conditions you apply will be displayed. Click **Clear** to reset the filter.
   - **Measurement** — You can filter for **Measurement Definitions** which have a particular type. (Waveform, Spectrum, Scalar, Interval Band, Thumbnail, Peak List)
   - **Sensor name** — For wireless devices you can filter by **X Axis**, **Y Axis**, and **Z Axis**.
   - **Collections** — For wireless devices you can filter by the following types of **Collection**: **Scalars**, **Spectra**, **Thumbnails**, **Waveforms**.

2. **Measurement** — A short description of the type of measurement.
3. **Sensor name** — The name of the sensor. (X Axis, Y Axis, or Z Axis)
4. **Collections** — The name of the **Collection** that this data is gathered in.
5. **Last collected value** — The latest value along with the associated unit for that type of **Measurement**.
6. **Last collected date** — A value along with a unit of time to indicate how long ago the measurement was taken.

Figure 5-29: Device Parameters



1. **Measurement** — This column lists the type of **Measurement**, e.g., Temperature or Voltage.
2. **Last collected value** — The latest value along with the associated unit for that type of **Measurement**.
3. **Last collected date** — A value along with a unit of time to indicate how long ago the measurement was taken.

Event Logs

This section shows the event logs of the device.

Bulk Configuration

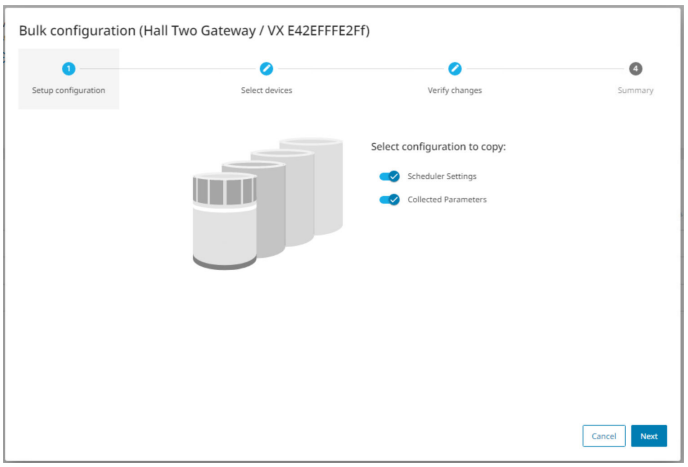
Bulk Configuration is a four step process that takes one device as a source of a configuration and copies it into other devices.

This configuration process is defined for AMS 9420 and AMS Wireless Vibration monitors.

Bulk configuration can be initiated from two places:

- From the **Bulk configuration** button in the main section of the AMS Wireless Details.
- From the '3-dot' menu on the right hand side of the AMS Wireless device list.
- From the '3-dot' menu in the Logical Devices list in Emerson Wireless Gateway Details.

Figure 5-30: Step One — Select Configuration



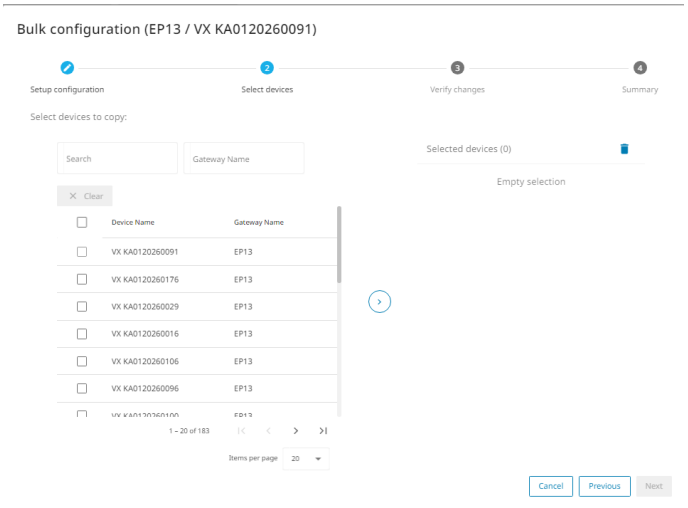
Step One: Select one or both of the types of configuration information to copy to proceed to the next step.

1. **Scheduler Settings** — These settings relate to the period between data collection actions.

   Note
   The period is copied but its starting time is randomly offset to avoid network congestion. The burst rate on the target device is also changed.

2. **Collected Parameters** — These settings relate to what data is collected.
3. **Cancel** / **Next** — Click **Cancel** to exit without making any changes. Click **Next** to proceed to the next step.

Figure 5-31: Step Two — Select Devices to Copy



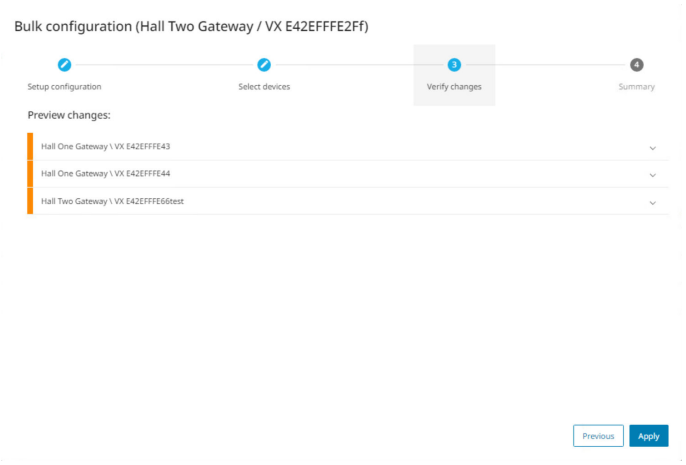
Step Two: Select the target devices for the configuration operation.

1. **Search** — Use this field to search for a device.
2. **Gateway Name** — You can filter the device selection list by the gateway used to gain access to those devices.
3. **Clear** — Click this button to clear the filter. This button is grey when no filter is set, and blue when a filter is active.
4. **Selection Checkboxes** — Check the boxes next to the items you want to select, or check the box at the top to select every item currently in the list.
5. **Device Name** — The name of each device.
6. **Gateway Name** — The name of the gateway used to gain access to the device.
7. **Items per page** — Select the number of items to display per page. (5, 10, 20, 50, 100)
8. **Page Forward / Page Back** — Use the arrows to navigate between different pages of the device list.
9. **Move Control** — Click the **Move Control** to confirm your selections and transfer those devices to the **Selected Devices** list.
10. **Clear selection** — Click the **X** next to an item to remove it from the list of selected devices, or click the trashcan icon at the top to clear the entire list.
11. **Previous** — Click **Previous** to return to the previous screen.

    Note
    You can only cancel the process from the first screen.

12. **Next** — Click **Next** to proceed to the verification phase.

Figure 5-32: Step Three

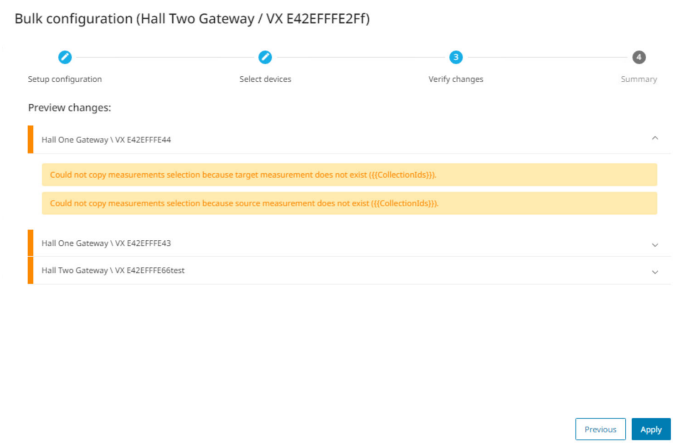


Step Three: Review any warnings and apply your changes.

1. **Warning Indicator** — The colored status bar to the left of each device in the list indicates if there are potential problems.

2. **Display Details** — Click on any item in the list to display the warning message details.

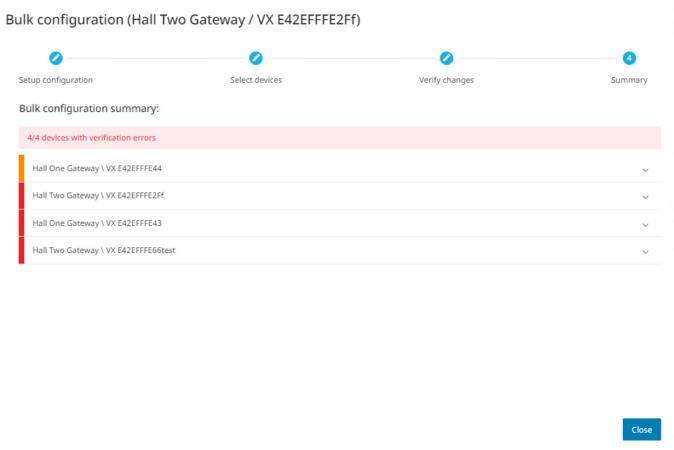
Figure 5-33: Step Three — Details



3. **Previous** — Click **Previous** to return to the previous screen if you need to resolve some warnings.
4. **Apply** — Click **Apply** to configure the devices and proceed to the **Summary**.

Note
When you click **Apply** the devices will be configured even if there are potential problems. It is recommended that you return to the **Previous** step and resolve any potential configuration issues.

Figure 5-34: Step Four

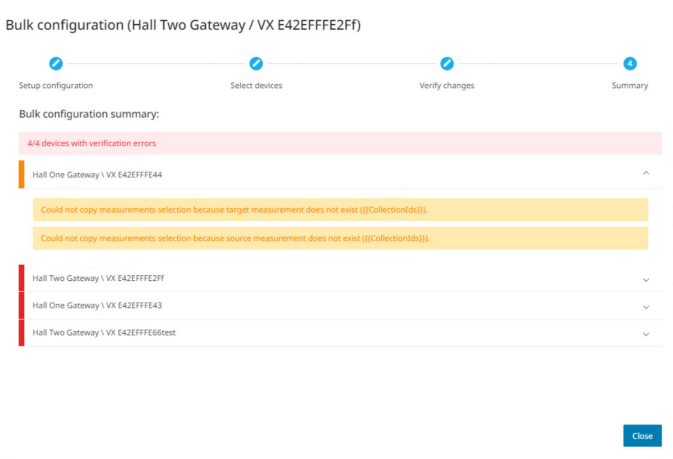


Note
Device name is presented as a hyperlink. Clicking it opens the device page.

Step Four A: Review any error messages.

1. **Warning Indicator** — The colored status bar to the left of each device in the list indicates if a problem occurred, and indicates the severity of the problem.
2. **Display Details** — Click on any item in the list to display the warning message details.

Figure 5-35: Step Four — Details



Step Four B: Make note of corrections you may need to make.

1. **Close** — Click **Close** to finish your after action review.

5.2.4 Collection Details

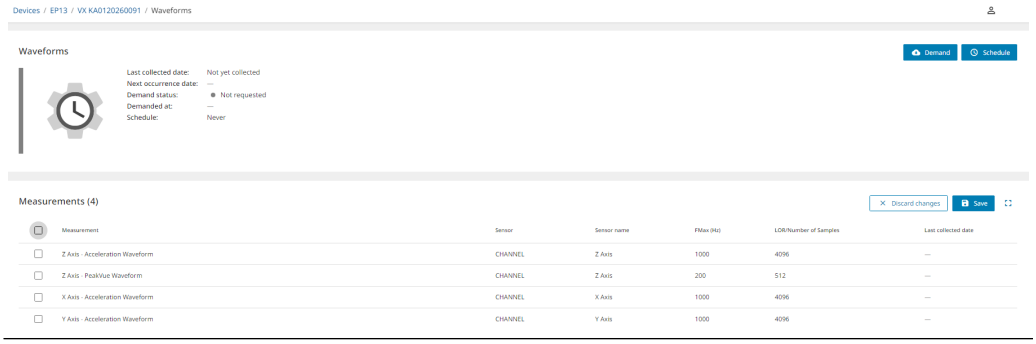
When you click on a **Collection** in the **Collections** section of AMS Wireless Details or AMS Asset Monitor Details your view switches to the **Collection Details** view. In this view you can:

- Edit which measurements are included in the **Collection**. The configuration of a **Collection** defines what data is collected in three situations:
  - **Schedule** — See below.
  - **Demand** — See below.
  - **Store on Alert** — See: Store on Alert Settings
- Set a **Schedule** for data collecting.

  Note
  The **Schedule** button is not available AMS Asset Monitor. AMS Asset Monitor has its own scheduling functionality.

- **Demand** that the data be collected now. A progress bar will be displayed.

Figure 5-36: Collection Details



1. **Demand** — Click **Demand** to gather data immediately. A progress bar will be displayed.
2. **Schedule** — Click **Schedule** to open the scheduler dialog. See: Schedule Collection

   Note
   The **Schedule** button is not available for AMS Asset Monitor. AMS Asset Monitor has its own scheduling functionality.

3. **Checkboxes** — Click on individual checkboxes to include or exclude a measurement in the **Collection**. Click on the checkbox at the top of the column to include or exclude all measurements.
4. **Discard changes** / **Save** — Click **Discard changes** to exit without making changes, or click **Save** to exit and save your changes.

   Note
   This selection only appears when the current selection of checkboxes differs from the previous selection.

5. **Standard Columns** — The following columns are available for all devices:
   - **Measurement**, **Sensor**, **Sensor name**, **Last collection date**
6. **Additional Columns** — Depending on the combination of **Device Type** and **Collection Type** some additional columns of information will be displayed.

Table 5-3: Additional Columns

Device Type	Collection Type	Optional Columns
AMS 9420	Waveforms, Spectra	FMax (Hz), LOR/Number of Samples
AMS 9420	Burst Variables, Scalars, Energy Bands	Last collected value
AMS Wireless Vibration Monitor	Thumbnails, Waveforms, Spectra	FMax (Hz), LOR/Number of Samples
AMS Wireless Vibration Monitor	Scalars	Last collected value

Table 5-3: Additional Columns *(continued)*

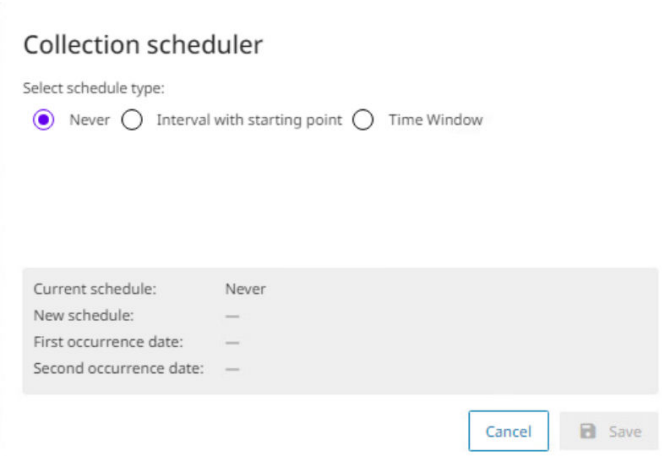
Device Type	Collection Type	Optional Columns
AMS Asset Monitor	All other collections	FMax (Hz), LOR/Number of Samples
AMS Asset Monitor	Scalars	Last collected value

Schedule Collection

There are three schedule types: **Never**, **Interval with starting point**, and **Time Window**.

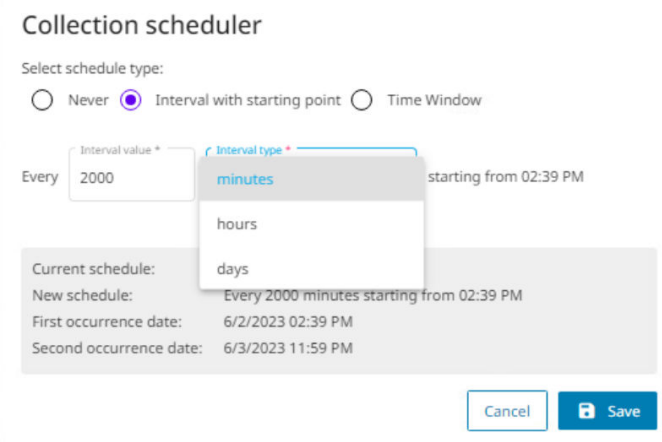
A **Collection** which has an **Never** schedule type is only available by clicking the **Demand** button.

Figure 5-37: Schedule — Never



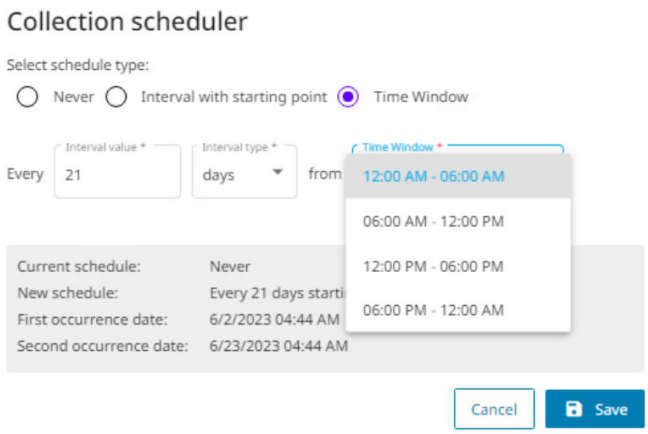
A **Collection** which has an **Interval** schedule type has minimum and maximum intervals. The interval depends on the collection and device type.

Figure 5-38: Schedule — Interval



A **Collection** which has a **Time Window** schedule type should have a minimum interval of once per day, and a maximum interval of once per 31 days. It collects data within a 6-hour time window every interval. There are four 6-hour long time windows to chose from starting from 12:00 AM, 6:00 AM, 12:00 PM, and 6:00 PM.

Figure 5-39: Schedule — Time Window



5.3 Agents

An **Agent** in AMS Machine Works enables communication with different types of devices. Currently there are two types of **Agent**, an **AMS Asset Monitor Agent**, and an **Emerson Wireless Gateway Agent**.

A standard installation of AMS Machine Works has one of each type of **Agent** installed on the same machine as AMS Machine Works. To add more agents you can install just the **Agent** software on additional machines. These machines can act as gateways through firewalls in complicated secure networks.

Expanded installations with many agents can be done to access secure areas, or to improve throughput in extremely large networks of monitoring infrastructure.

Figure 5-40: Agents View

1. **Health Bar** — The **Health Bar** has a color which matches the written **Connection Status** next to it.
2. **Connection Status** — The written form of the connection status matches the **Health Bar**.
3. **Agent Name** — The name of the **Agent**.

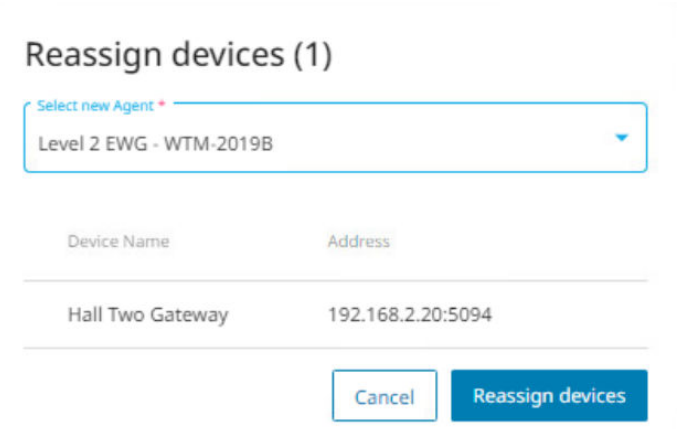
4. **Host** — The name of the computer which this **Agent** runs on.
5. **Type** — The type of **Agent**, either **AMS Asset Monitor** or **Emerson Wireless Gateway**.
6. **Defined Network Devices** — The number of **AMS Asset Monitor** or **Emerson Wireless Gateway** devices defined for this **Agent**.
7. **Connected Network Devices** — The number of **AMS Asset Monitor** or **Emerson Wireless Gateway** devices currently connected to this **Agent**.
8. **Defined Logical Devices** — The number of endpoint devices which are connected to this **Agent**.
9. **Menu** — This three-dot menu has two options:
   - **Reassign devices** — Select this option to reassign all the devices connected to this **Agent** to another **Agent**. See: Change Agent
   - **Rename** — Select this option to rename this **Agent**. See: Rename Agent

5.3.1 Change Agent

When you select devices by clicking checkboxes next to their names in either the AMS Asset Monitor Tab or the Emerson Wireless Gateway Tab, and then click the **Change Agent** button, the following dialog appears. This dialog enables you to select from a list of compatible agents for that type of device.

Alternatively, you can click **Reassign devices** option in the 3-dot menu found on the left side of the Agents screen.

Figure 5-41: Change Agent / Reassign devices Dialog



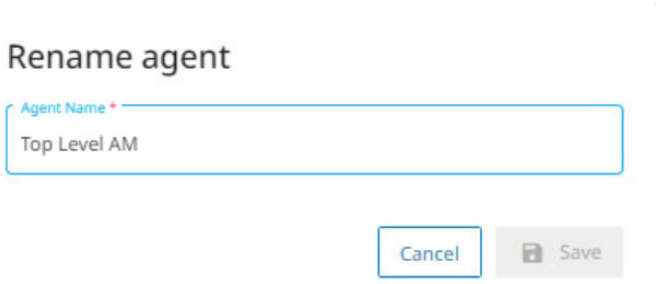
1. **Select new Agent** — Select the new agent from this dropdown list.
2. **Device Name** — The names of the devices that will get a new **Agent**.
3. **Address** — The IP addresses and port numbers used to contact the devices.
4. **Cancel** — Click **Cancel** to exit without saving any changes.

5. **Reassign devices** — Click **Reassign devices** to save your changes and exit.

5.3.2 Rename Agent

When you select the **Rename Agent** option from the 3-dot menu in the Agents screen the following dialog opens. The name can have a combination of letters, numbers, and symbols.

Figure 5-42: Rename Agent Dialog



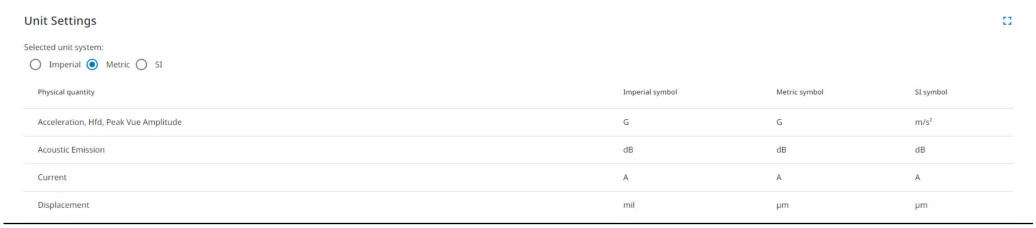
1. **Agent Name** — Enter the new name for this **Agent**. The maximum is 100 characters.
2. **Cancel** — Click **Cancel** to exit without saving any changes.
3. **Save** — Click **Save** to save your changes and exit.

5.4 Unit Settings

Your data can be displayed in three different measurement systems **Imperial**, **Metric**, or **SI**. When you make a selection your data will be recalculated to display properly with the new units.

The **Unit Settings** the Network Device Module are synchronized with the Plot and Unit Settings in the the Analysis Dashboard.

Figure 5-43: Unit Settings

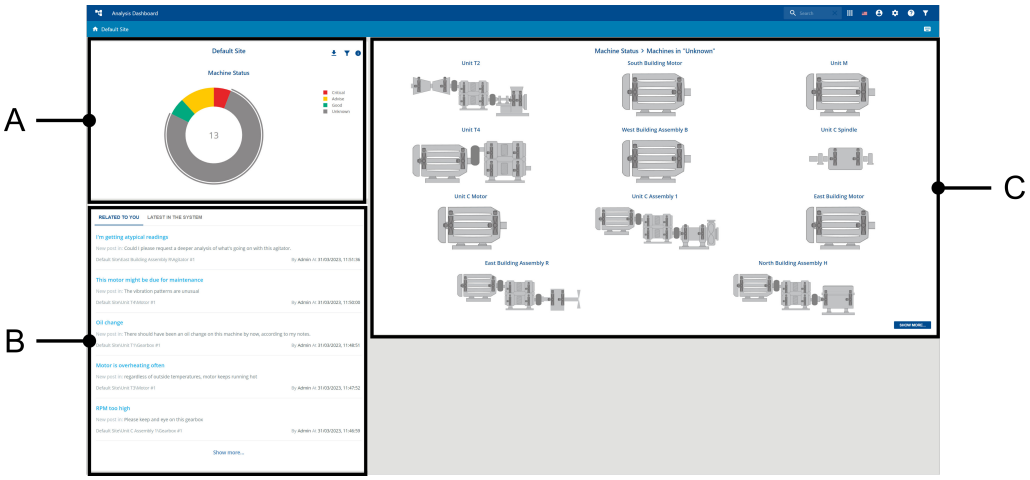


6 Analysis Dashboard

This intuitive graphical dashboard delivers clear visibility to overall machine and system health at a glance. The information displayed is persona-based, ensuring that team members receive only the data that is relevant to their position. Users can easily identify if there are any issues which require their attention and drill down for further analysis.

Note
Ensure that every **Machine Train** and **Alert** is properly configured so that you have reliable information displayed in the user interface.

Figure 6-1: Analysis Dashboard Overview — Default View / System View



A. ***Machine Status*** *Key Performance Indicator (KPI)*
B. ***System Status***
C. ***Machine List*** *of every selected* ***Machine Train****, based on the KPI selection.*

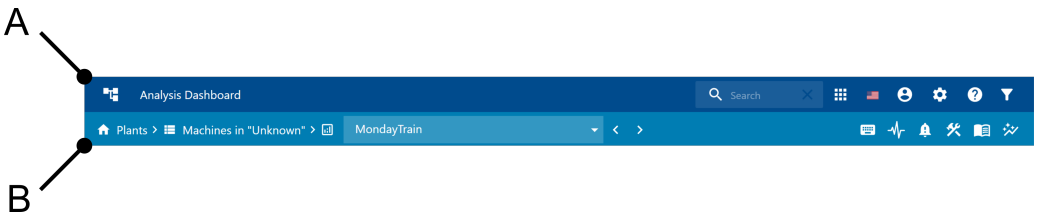
Note
If the **Machine List** section of the **System View** contains more than 12 items a **SHOW MORE** button is displayed in the bottom right corner of the **Machine List**. Clicking on **SHOW MORE** will transfer your view to the **List View** with a scrollable list of every **Machine Train** you have selected.

6.1 User Interface Elements

The **Analysis Dashboard** window has three main areas, the header, the subheader, and the view. The functionality and information which is available depends on the view you are in:

- System View
- List View
- Analysis View

Figure 6-2: Analysis Dashboard — Header and Subheader



A. Header: Analysis Dashboard Header Section
B. Subheader: Analysis Dashboard Subheader Section

Note
The arrangement of the views depends on your browser settings, and on your Microsoft Windows display settings.

6.1.1 Colors and Icons

Standardized elements such as a color system, different alert levels, and icons help to distinguish the types of notifications. The user interface elements which are used in the Analysis Dashboard user interface depend on what view you are operating in.

Color Meanings

Buttons and status diagrams are colored depending on their functions and meanings.

Table 6-1: Standard meanings of colors

Color	Meaning
Blue	Information
Green	Good
Yellow	Advise
Orange	Warning
Red	Critical
Gray	Unknown

Icons

Icons are used to indicate the availability of important functionality or information.

Table 6-2: General Purpose Icons

Icon	Meaning
	The **Filter** icon gives you access to filter functionality appropriate for the context it is located in. The circle on the **Filter** icon indicates how many filters are in effect. **Note** The **Filter** icon works differently within the context of the pane or view in which it is located. For example, the **Filter** icon in the **Header** helps you select a **Machine Train**, but the **Filter** located in the **Trend Plots** panel helps you select which trends to display. For more information see: Filters
	The letter 'i' within a solid circle will display contextual information when you hover your mouse pointer over it.
	The **Download Asset Status Report** icon in the **Machine Status** panel will download a report for every **Machine Train** which has been select. This selection is affected by the Persistent Machine Train Filters.
	The **Machine View** icon is available in the Machine Status panel for switching views.
	The **Text View** icon is available in the Machine Status panel for switching views.
	The **Table View** icon is available in the **Parameters** section of the Machine Information panel for switching views.
	The **Bars View** icon is available in the **Parameters** section of the Machine Information panel for switching views.
	The **Refresh associated data** control is available in the **Trend Plots** panel. **Note** You must click this icon every time you want to obtain fresh data.
	Click the **Trash** icon to reset filter options for one section of the Temporary Machine Train Filters.

Table 6-2: General Purpose Icons *(continued)*

Icon	Meaning
	The 'X' control gives different functionality depending on the context. (e.g., **Close**, **Reset**, **Clear**)
	**Fullscreen**
	**Collapse**
	**Previous**
	**Next**
	**Expand / Collapse Tile**: Depending on context.
	**Expand / Collapse Tile**: Depending on context.
	**Expand Tile**
	**Collapse Tile**
	This 3-dot menu, also known as a mini-menu, can be clicked to display additional menu items or functions.

Table 6-3: Header Icons

Icon	Meaning
	**Navigation tree** See: Navigation Tree

Table 6-3: Header Icons *(continued)*

Icon	Meaning
	**Search** See: Search
	**App Switcher** See: App Switcher
	**User** See: User Menu
	**System Settings** See: System Settings
	**Help** See: Help
	In the context of the header the **Filter** icon is for a **Machine Train** filter. See: Temporary Machine Train Filters

Table 6-4: Sub-Header Icons

Icon	Meaning
	**System View** See: System View
	**List View** See: List View
	**Analysis View** See: Analysis View
	**Previous**
	**Next**

Table 6-4: Sub-Header Icons *(continued)*

Icon	Meaning
	**Hotkeys** See: Hotkeys
	**View in Vib App** See: Vibration Analyzer
	**Alerts** See: Alerts
	**Machine Config** See: Machine Configuration
	**Machine Journal** See: Machine Journal
	**Plot Settings** See: Plot and Unit Settings

6.1.2 Analysis Dashboard Header Section

The **Analysis Dashboard Header** is available in every view of the application. It contains functionality for switching between AMS Machine Works applications, searching for items, finding help, and more. The figure below illustrates all the options.

Figure 6-3: Analysis Dashboard Header — User Interface Elements

A. ***Navigation Tree*** *— Navigate through the plant hierarchy of ever* ***Machine Train****. See: Navigation Tree*
B. ***Analysis Dashboard*** *— The name of the application.*
C. ***Search*** *field — Search for a* ***Machine Train****. See: Search*
D. ***App Switcher*** *— Open other applications. See: App Switcher*
E. ***Language Settings*** *— Change the main application language. See: Language Settings*
F. ***User*** *menu — View your user information, and option to sign out. See: User Menu*
G. ***System Settings*** *— Change the* ***Alert Hysteresis Percentage****. See: System Settings*
H. ***Help*** *— Open the online version of this help documentation. See: Help*
I. ***Filter*** *— A* ***Machine Train*** *filter. See: Temporary Machine Train Filters*

Navigation Tree

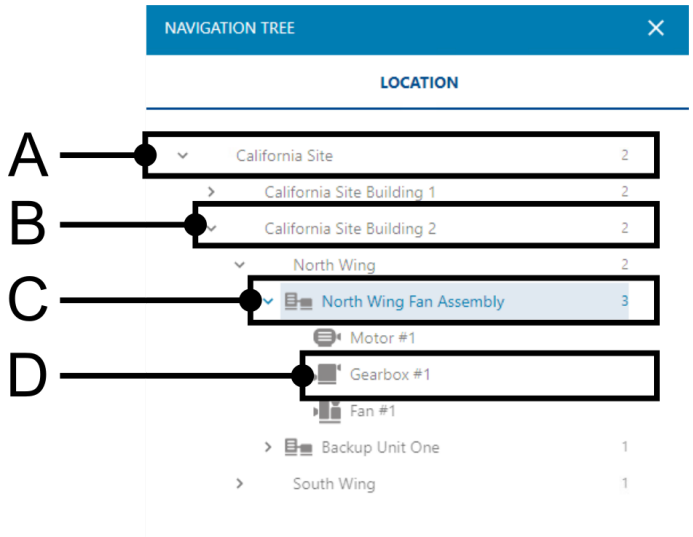
The Navigation Tree is visible on all pages of the Analysis Dashboard and contains the following elements:

Click the Navigation Tree icon to open the location or source overview.

Figure 6-4: Navigation Tree Icon

The **Navigation Tree** displays a hierarchy of all the available locations and the machines configured in the site. The hierarchy has three logical levels: site, locations, and machines.

Figure 6-5: Navigation Tree



A. ***Site*** *with a number 2, which indicates there are 2* ***Location*** *elements inside.*
B. ***Location*** *with a number 2, which indicates there are 2* ***Location*** *elements inside.*
C. ***Machine Train*** *with a number 3, which indicates that is is composed of 3* ***Component*** *elements.*
D. ***Component***

The color of the **Machine Train** icon indicates the status of the machine.

When you select a **Machine Train** or **Component** from the hierarchy a diagnostic view in the **Analysis View** opens. This contains a detailed analysis view of the selected machine, which presents plots for trends, waveforms, spectra, and other measurements.

See: Analysis View for more details.

See: Color Meanings for more details.

App Switcher

Click the **App Switcher** icon to open a menu of available apps.

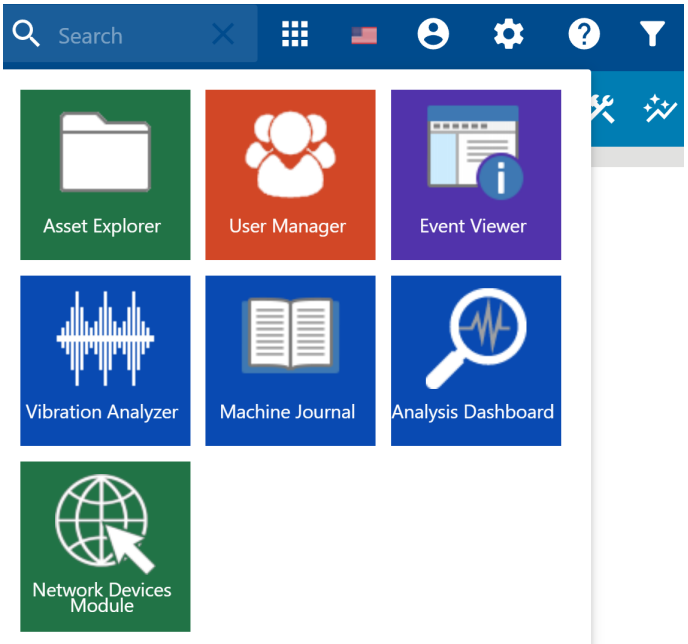
Figure 6-6: App Switcher icon

Click an icon to open an application.

There are seven applications to choose from:

1. Asset Explorer
2. User Manager
3. Event Viewer
4. Vibration Analyzer - VibApp
5. Machine Journal
6. Analysis Dashboard
7. Network Device Module

Figure 6-7: App Switcher menu

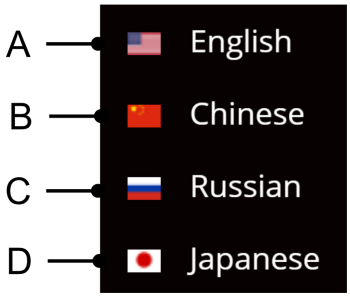


Click the **App Switcher** icon again to close the menu.

Language Settings

The **Language Settings** icon is represented by a flag icon of a country which predominantly speaks a particular language. The Analysis Dashboard and other AMS Machine Works applications are available in these languages.

Figure 6-8: Language Settings



A. *American flag: English*
B. *Chinese flag: Chinese*
C. *Russian flag: Russian*
D. *Japanese flag: Japanese*

User Menu

To open this menu click the **User Menu** icon. This menu has information about the current user, and the option to click **Sign Out**.

Figure 6-9: User Menu Icon

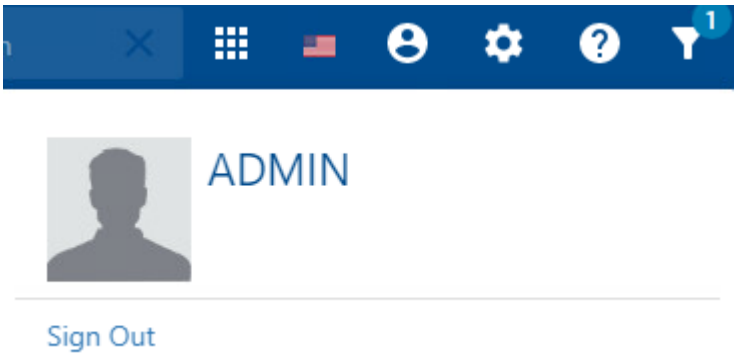
Click **Sign Out** to exit AMS Machine Works.

Once you are signed out you can sign in as a different user.

⚠ CAUTION

Users should always sign out of unattended or publicly accessible machines.

Figure 6-10: User Menu



To close the menu, click the **User Menu** icon again.

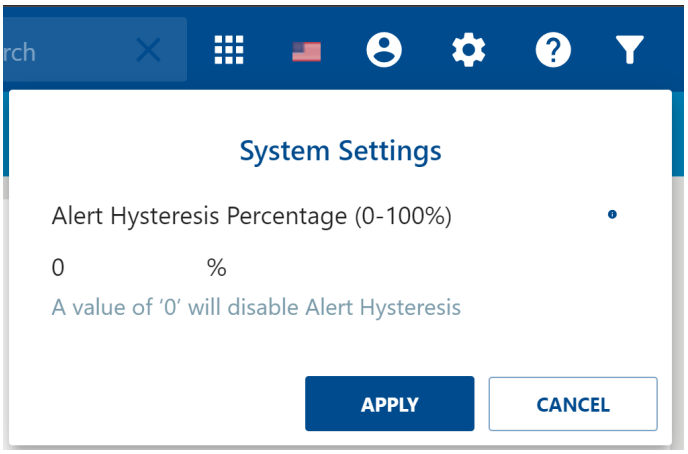
System Settings

Click the **System Settings** icon to open the system settings menu.

Figure 6-11: System Settings icon

The system settings menu contain configuration for **Alert Hysteresis**.

Figure 6-12: System Settings window



Note
To disable Alert Hysteresis, set it to 0. For a definition of Alert Hysteresis see: alert hysteresis

Help

Click the **Help** icon to open the online version of this help documentation.

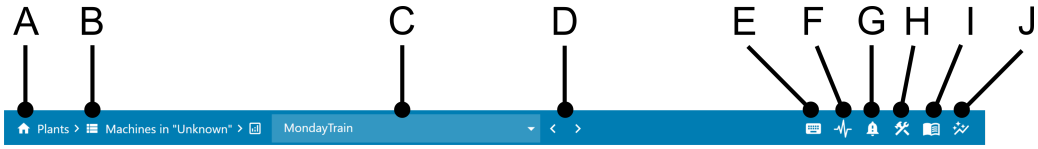
Figure 6-13: Help Icon

Additional help resources are listed here: Where to get help

6.1.3 Analysis Dashboard Subheader Section

The **Analysis Dashboard** subheader contains a broad range of functionality for navigating your site, launching other applications, and configuring settings. The functionality of the subheader changes depending on what view you are in, **System View**, **List View**, or **Analysis View**.

Figure 6-14: Analysis Dashboard Subheader — User Interface Elements



A. ***System View*** *link. See: System View.*
B. ***List View*** *link. See: List View.*
C. ***Analysis View*** *dropdown list containing every* ***Machine Train*** *you currently have selected. See: Analysis View.*
D. ***Previous*** *and* ***Next*** *arrows for navigating between every* ***Machine Train*** *you currently have selected.*
E. ***Hotkeys****, which opens Hotkeys popup window describing the function of the hotkeys available in the* ***Analysis View****. See: Analysis View.*
F. ***VibApp****, launcher for the Vibration Analyzer application.*
G. ***Alerts****, launcher for the Alerts application.*
H. ***Machine Config****, launcher for the Machine Configuration application.*
I. ***Machine Journal****, launcher for the Machine Journal application.*
J. ***Plot Settings****, which opens the Plot and Unit Settings popup window to choose between various measurement systems.*

Navigation Breadcrumbs

The subheader contains a breadcrumb path which enables you to go to other views by clicking on those breadcrumbs.

Figure 6-15: Subheader - Navigation Breadcrumbs

- **System View**: See: System View
- **List View**: See: List View

You can select a **Machine Train** in the Analysis View, , from the dropdown, or by using the **Previous** and **Next** arrows.

Subheader Shortcuts

Analysis View - Subheader

The **Analysis View** subheader shortcuts are located on the right side of the Navigation Breadcrumbs.

Figure 6-16: Subheader - shortcuts

The subheader contains following shortcuts:

Hotkeys

Figure 6-17: Subheader - Hotkeys shortcut

Click on the **Hotkeys** shortcut to display the hotkey functions which are available for that view:

In the **Analysis View**:

A — Show the Waveform & Spectrum data together in the **Associated Data** panel.

W — Show the Waveform data in the **Associated Data** panel.

S — Show the Spectrum data in the **Associated Data** panel.

R — Reload the data points in the **Associated Data** panel.

H — Switch to the **History** tab in the **Associated Data** panel.

E — Switch to the **Event List** tab in the **Machine Information** panel.

P — Switch to the **Parameters** tab in the **Machine Information** panel.

M — Switch to the **Machine Journal** tab in the **Machine Information** panel.

C — Switch to the **Machine Config** tab in the **Machine Information** panel.

In the **System View**:

R — Switch to the **Related to You** tab in the **System Messages** panel.

L — Switch to the **Latest in the System** tab in the **System Messages** panel.

View in Vibration Analyzer

Figure 6-18: Subheader - View in VibApp shortcut

Click on the **VibApp** shortcut to open the Vibration Analyzer and display the selected measurements.

Configure Alerts

Figure 6-19: Subheader - Configure Alerts shortcut

Click on the **Configure Alerts** shortcut to open a new tab in your browser for configuring the Alerts for the currently selected **Machine Train** or **Component**.

Machine Configuration

Figure 6-20: Subheader - Machine Config shortcut

Click on the **Machine Config** shortcut to view or change the Machine Configuration of the **Machine Train** you have selected.

Plot Settings

Figure 6-21: Subheader - Machine Journal shortcut

Click on the **Machine Journal** shortcut to open the Machine Journal application.

Plot Settings

Figure 6-22: Subheader - Plot and Unit Settings shortcut

Click on the **Plot and Unit Settings** shortcut to open the Plot and Unit Settings window.

Plot and Unit Settings

The **Plot and Unit Settings** window has options for choosing the appearance of your plots, and for choosing the unit system you wish to use:

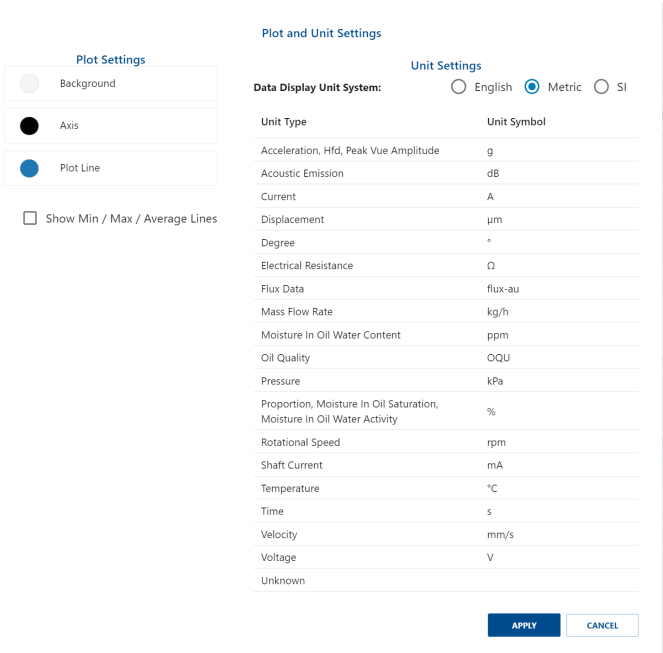
- Metric
- SI
- English

⚠ CAUTION

Pay close attention to the **Unit Settings** you have chosen to avoid confusion and the misreading of results.

These settings are synchronized with those set in the Unit Settings window of the Network Device Module.

Figure 6-23: Plot and Unit Settings Window



Background	Click the colored button to open the dialog for the color selection. Select a color for the plot background. The button color changes to the selected color. Click the button again to close the dialog.
Axis	Click the colored button to open the dialog for the color selection. Select a color for the axis. The button color changes to the selected color. Click the button again to close the dialog.
Plot Line	Click the colored button to open the dialog for the color selection. Select a color for the line. The button color changes to the selected color. Click the button again to close the dialog.
Show Min / Max / Average Lines	Place a checkmark in the box to show minimum and maximum lines on trend plots in addition to the average value line. **Note** Averaged values are shown when there are more trend values present than can be shown given the current screen resolution. When averaged values are shown, you may zoom in until actual values are displayed.
Unit Settings	Allows selecting **English**, **Metric**, or **SI** unit systems for display. The units used for displaying various types of data are listed below the unit system options.

6.2 Search

To search for a **Machine Train**, enter text into the search field.

Figure 6-24: Search

Search results update dynamically in the **List View** as you type.

Click on a **Machine Train** displayed in the **List View** to go to the **Analysis View** of that machine.

Click on a **Breadcrumb** in the **Subheader** to go back to those results.

Press **X** in the search field, or return to the **System View**, to cancel the search.

6.3 Filters

Finding a **Machine Train** in a complex site is made easier by filtering out irrelevant results.

There are two kinds **Machine Train** filters in AMS Machine Works:

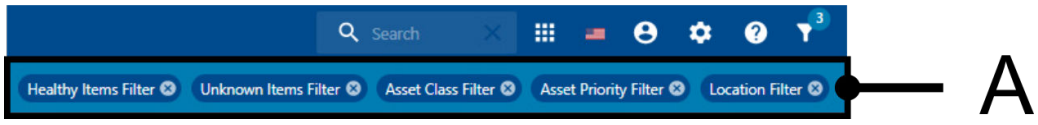
1. Temporary Machine Train Filters: **Asset Class**, **Asset Priority**, **Location**
2. Persistent Machine Train Filters: **Healthy Items**, **Unknown Items**

Temporary Filters	are **Machine Train** filters which automatically reset between browser sessions, or page refreshes. These can also be manually reset.
Persistent Filters	are **Machine Train** filters which remain in effect between browser sessions and page refreshes until you manually reset them.

You can select any combination of **Asset Class**, **Asset Priority**, **Healthy Items**, **Location**, and **Unknown Items** filters that you need.

When you select a filter the results are displayed dynamically in the view you are using, i.e. the System View or the List View.

Figure 6-25: Display of Currently Active Filters Types



A. *Display of Currently Active Filter Types: (**Healthy Items**, **Unknown Items**, **Asset Class**, **Asset Priority**, **Location**)*

You can clear an active filter by clicking the 'x' next to its name.

6.3.1 Temporary Machine Train Filters

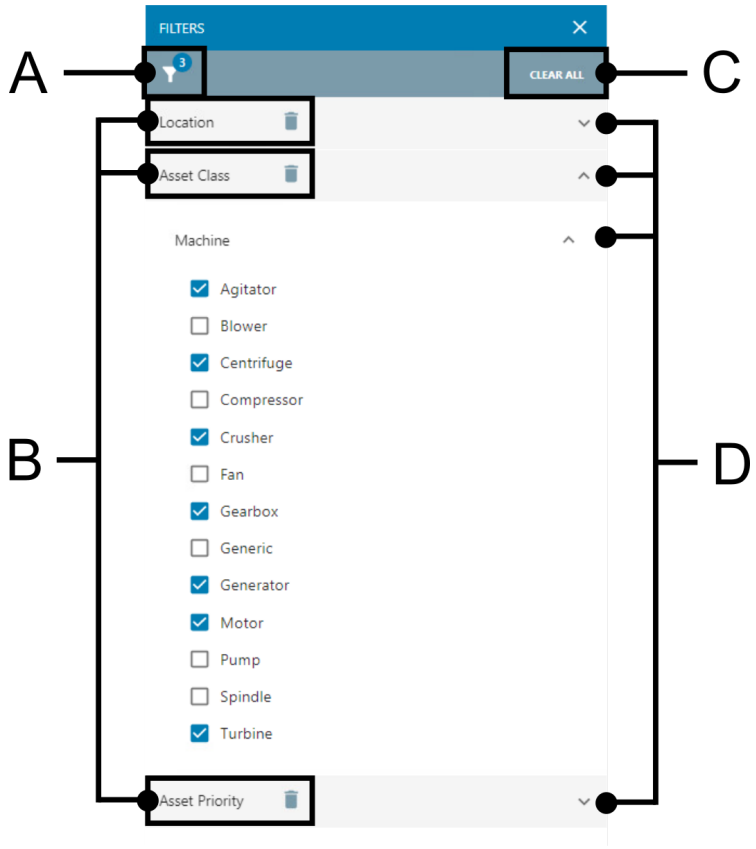
To set a temporary filter, click the **Filters** icon in the Analysis Dashboard Header Section to open the **Filters** panel.

Figure 6-26: Filters Icon

How many types of temporary filters are in effect is shown by a number on the **Filters** icon.

Figure 6-27: Filters icon indicating that one type is in use

Figure 6-28: Temporary Filters



A. ***Filter Icon*** *showing the number of active filters.*
B. *There are three types of filters:*
   - ***Location****: This is the tree structure you have defined for your site.*
   - ***Asset Class****: There are 13 asset classes, (e.g.,* ***Fan****), to choose from.*
     — *For more info on Asset Classes read: Step 1: Add Machine Train Details*
   - ***Asset Priority****: Select between:* ***Not Set****,* ***Low****,* ***Medium****,* ***High****, and* ***Very High***
C. *Click the* ***Clear All*** *button to reset these filters.*
D. ***Expand*** */* ***Collapse*** *icons for each filter section.*

Note

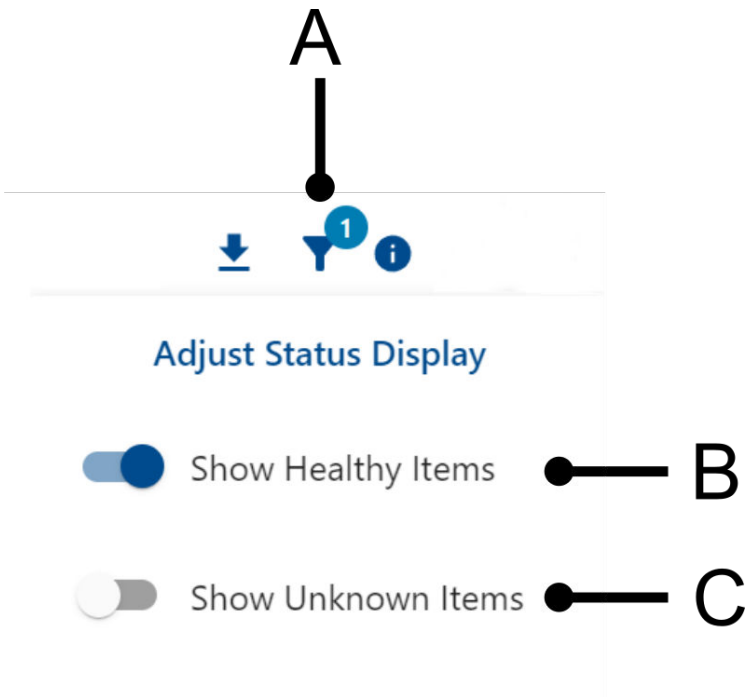
Filters remain in effect until deactivated. To reset the Temporary Filters will you can:

1. Click on the **CLEAR ALL** button to deactivate all temporary filters.
2. Reload the page in your browser.
3. Log off.

6.3.2 Persistent Machine Train Filters

Persistent filters also control which **Machine Train** elements are displayed, but this setting persists between browser sessions. (See: Temporary Machine Train Filters.)

Figure 6-29: Adjust Status Display for Persistent Filters



A. *The **Adjust Status Display** popup window activated from the Machine Status KPI Display.*
B. ***Show Healthy Items** setting. (Set to on.)*
C. ***Show Unknown Items** setting. (Set to off.)*

Note
Persistent filters can be set and cleared from the **Adjust Status Display** by clicking on the controls for **Show Healthy Items** and **Show Unknown Items**.

6.3.3 Displayed Trends Filter

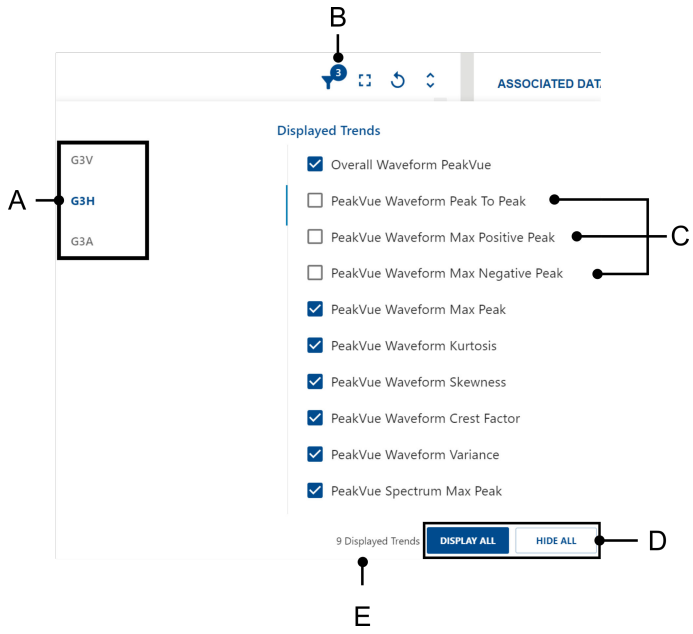
When you click on the **Filter** icon, , in the **Trend Plots** panel, the **Displayed Trends Filter** selection panel opens.

Note
These **Filter** settings are stored in a cookie so they will persist in the browser they were set in until you change the setting. If you use a different machine or browser, this filter will be set according to the cookie set in that browser.

The **Displayed Trends Filter** panel contains a variable amount of trends to choose from. The number of trends depends on the number of channels which are mapped, and how many measurements are collected.

Measurements can be scalars, or waveforms, and the number of available trends can quickly become very large.

Figure 6-30: Displayed Trends Filter Panel



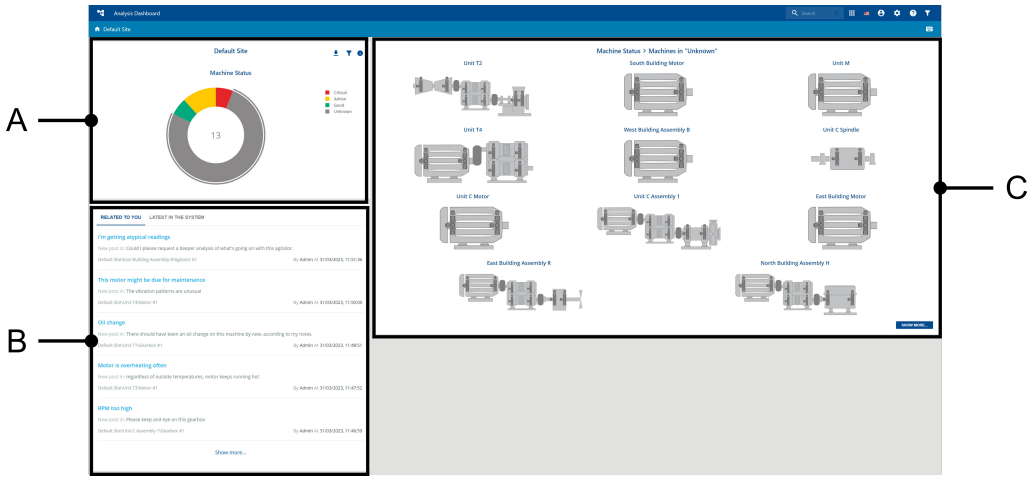
*A. **Measurement Location** selection list.*
*B. **Filter** icon showing that 3 **Trend Plots** are filtered out.*
*C. Three unselected **Trend Plots** which are filtered out.*
*D. **DISPLAY ALL** and **HIDE ALL** buttons.*
*E. Number of **Trend Plots** which are selected to be displayed.*

The available trends are grouped by **Measurement Location** or channels. Check the boxes of the trends you want to display. Uncheck the box of a trend to filter it. To close the panel, click anywhere outside the **Displayed Trends Filter** panel, or click the **Filter** icon again.

6.4 System View

This view displays the **Machine Status** summary and is the starting point for opening an **Analysis View** to get more details about the status of a particular **Machine Train** or a group of them. To help the user to focus on the Key Performance Indicators (KPIs) for every **Machine Train**, and on which measurements are in alert status (advise, warning, or critical), you have options to select or deselect which items to display.

Figure 6-31: System View Overview



A. ***Machine Status*** *Key Performance Indicator (KPI)*
B. ***System Messages***
C. ***Machine List*** *of every selected* ***Machine Train****, based on the KPI selection.*

Note
If the **Machine List** section of the **System View** contains more than 12 items a **SHOW MORE** button is displayed in the bottom right corner of the **Machine List**. Clicking on **SHOW MORE** will transfer your view to the **List View** with a scrollable list of every **Machine Train** you have selected.

The **System View** displays the overall health status for different elements within the AMS Machine Works database. It shows the three Key Performance Indicators (KPIs) – Machine Status, Device Measurement Status, and Device Status and provides a context sensitive list of every applicable **Machine Train** depending on the selected KPI. A notification of system status is provided, with a trend of the historical database occupancy indicating the health of the system. In addition, applicable messages from the **Machine Journal** application are displayed.

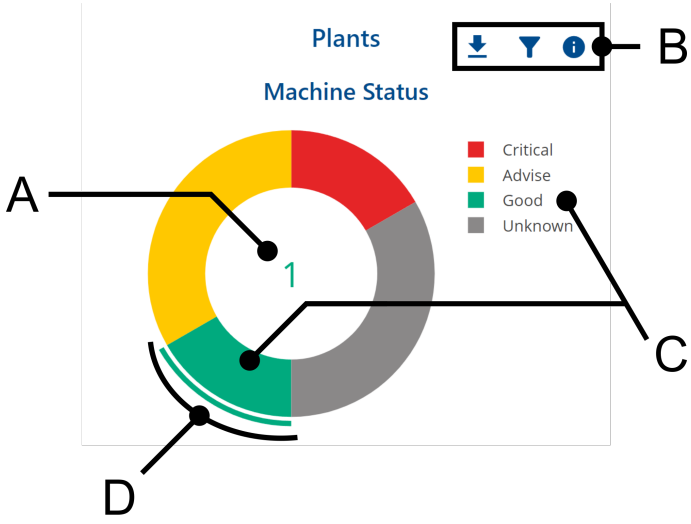
6.4.1 Machine Status KPI Display

The **Machine Status KPI** (Key Performance Indicator) display is a doughnut chart which is used to display the status of every **Machine Train** which is configured in your AMS Machine Works site.

There are five alert status levels:

- **Unknown**
- **Good**
- **Advise**
- **Warning**
- **Critical**

Figure 6-32: Machine Status KPI Display



A. *The number in the center of the doughnut chart is the number of **Machine Trains** with a particular alert level. If you have not selected an alert level, then the total number of **Machine Trains** in your site is displayed.*

B. *This area contains icons for:*

- ***Download Asset Status Report** icon:*
- ***Adjust Status Display** filter icon:*
- ***Machine Status** information popup icon:*

C. *You can click either a section of the doughnut chart, or an alert level in the legend, to select all the **Machine Trains** with that alert level.*

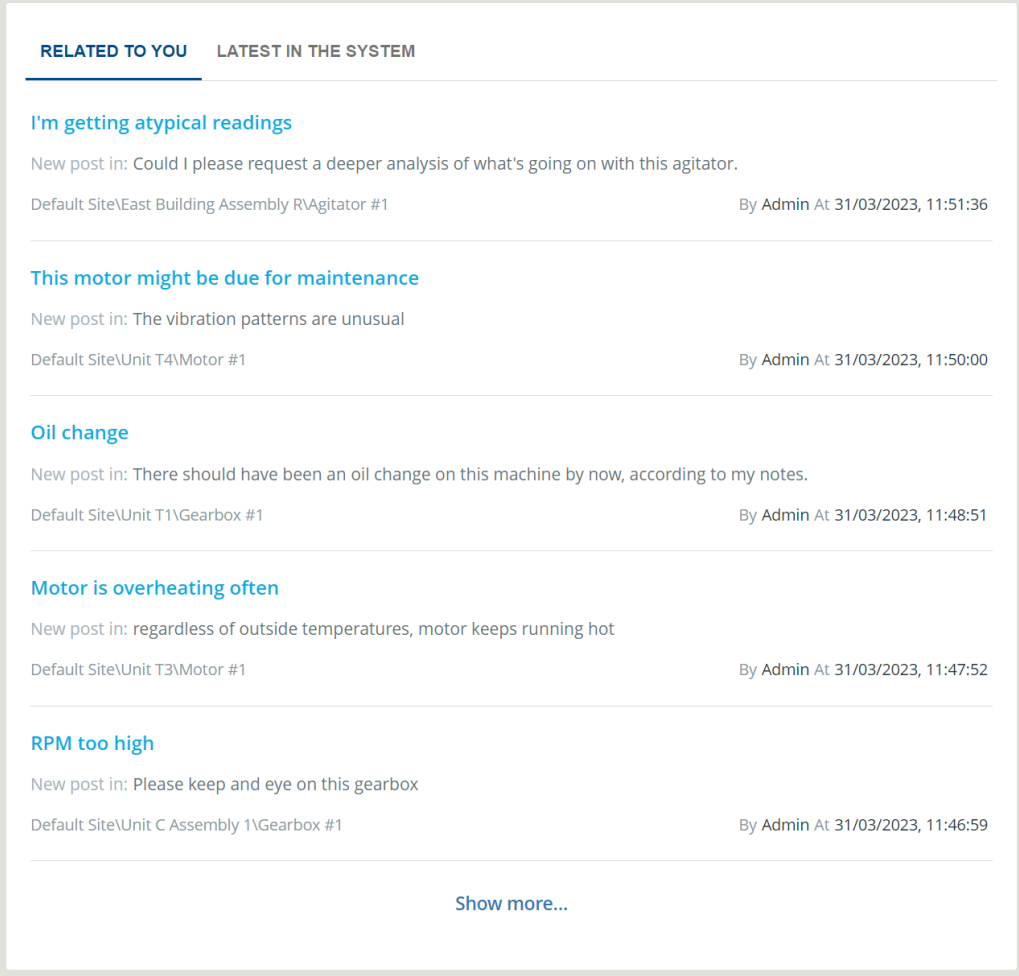
D. *The section of the KPI chart which is currently selected is highlighted with an arc.*

Every **Machine Train** that meets your filtering criteria is listed in the List View area to the right of the **Machine Status KPI** display. If there are more machines than can be displayed in this view, an icon shows the number of additional **Machine Trains** that are displayed on the subsequent page(s).

6.4.2 System Messages

The messages displayed in the **System Messages** pane are created in the Machine Journal.

Figure 6-33: System Messages



The **Related to You** contains a list of the latest system events specifically related to the current user.

The **Latest in the System** contains a list of the latest system events that the user has access to.

Two hotkeys are available to switch tabs:

R — Switch to the **Related to You** tab in the **System Messages** panel.

L — Switch to the **Latest in the System** tab in the **System Messages** panel.

6.5 List View

The **List View** shows the status of every **Machine Train** you have searched for.

Searching: Search

The results in the **List View** are affected by the currently selected filtering options. More results are progressively loaded as you scroll through long lists. To reduce the number of results in the **List View** you can apply more filtering options.

Filters:

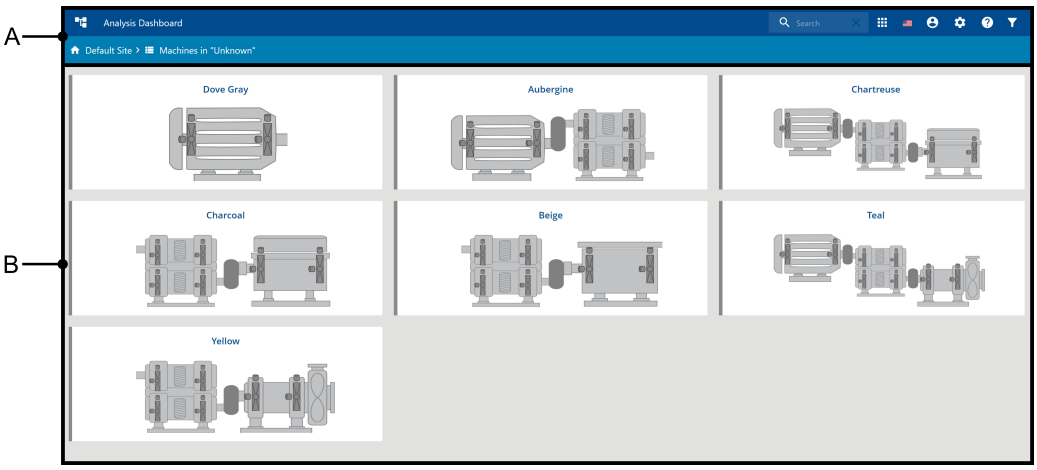
- Temporary Machine Train Filters
- Persistent Machine Train Filters

If you click on the tile of a **Machine Train** in **List View** your view will change to the **Analysis View** for that **Machine Train**.

6.5.1 Machine Train List

This area shows every **Machine Train** you selected via the **Machine Status KPI** diagram, or searched for with the Search functionality. If there are more machines than can be displayed on this view, an icon shows the number of additional machines that are displayed on the subsequent page(s).

Figure 6-34: List of Machine Trains



A. *Headers:*
   A. *Analysis Dashboard Header Section*
   B. *Analysis Dashboard Subheader Section*

B. ***Machine Train List***

Machine Train List	This area contains a panel for each **Machine Train** which matches either the alert level you have selected, or that matches your **Search** criteria. Each panel has a status bar on the left which has a color that matches its alert level. Machine details, such as bearings and measurement locations, also have colors which match their alert levels. Click on a panel to open a more detailed view of the machine. Click on a **Machine Train** panel to open an **Analysis View** for that item.

6.6 Analysis View

The Analysis View provides a detailed analysis view of the selected machine with trends, waveforms, spectrum, and other measurements of interest for the selected measurement point.

Figure 6-35: Analysis View – Overview

*A. **Machine Status** panel with measurement locations.*
*B. **Trend Plots** panel*
*C. **Machine Information** panel*
*D. **Associated Data** panel*

Click the arrow icon ⌃⌄ in the upper right corner of a panel to enlarge it, and click ⌄ to reset the view.

6.6.1 Machine Status panel

This area shows a view of the selected **Machine Train** as either a **Machine View**, or as a **List View**.

The diagnostic view shows every **Machine Train** which is available. Availability depends on how you arrived in the diagnostic view, either from selecting a KPI, from a **Search**, or by clicking on a specific **Machine train** in the **Navigation Tree**.

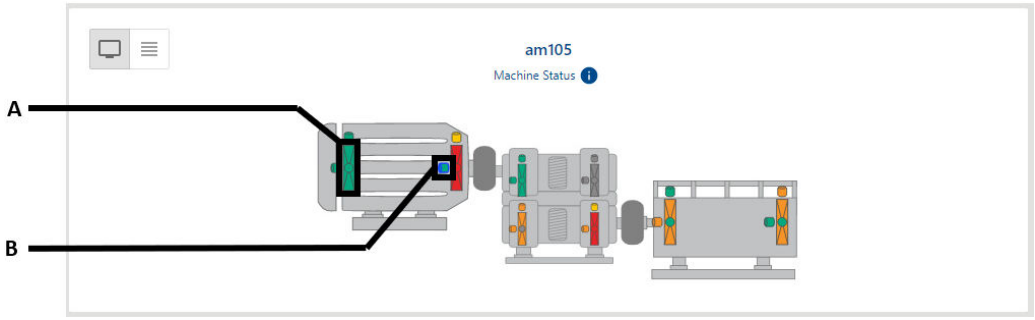
For more about filtering options see: Filters

For more about search criteria see: Search

For more about the **Navigation Tree** see: Navigation Tree

If there is more than one **Machine Train** available, the others can be reached by the navigation options available in the Navigation Breadcrumbs.

Figure 6-36: Measurement Selection Panel: Machine View

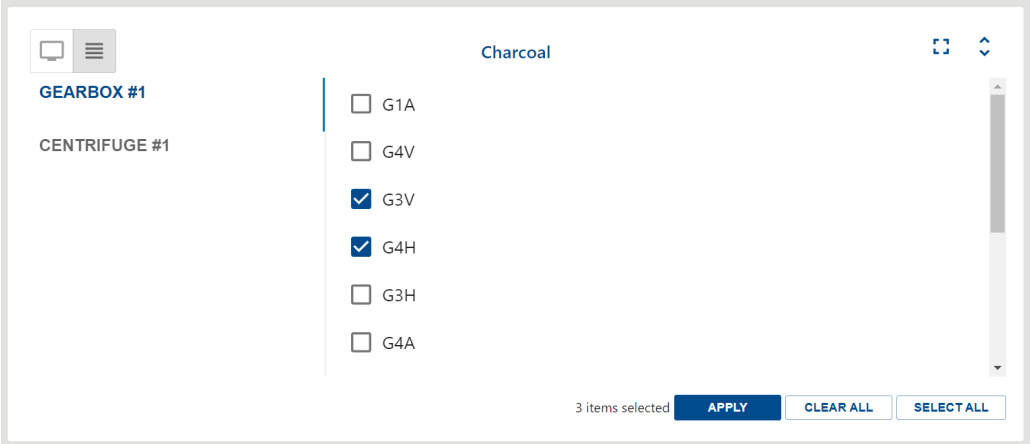


A. ***Bearing Indicator*** *which usually has three* ***Measurement Location*** *points (X, Y, Z).*
B. ***Measurement Location*** *which indicates sensor placement.*

In the **Machine View** shown above, click on the **Measurement Location** of a data source to display the associated trend data. A blinking blue border shows which elements is selected.

Note
In the **Machine View** of a **Machine Train** you can select only one **Measurement Location**, or one **Bearing Indicator**. One **Bearing Indicator** usually has three **Measurement Location** points.

Figure 6-37: Measurement Selection Panel: List View



Note
In **Text View** you can select more than one **Measurement Location**.

A **Measurement Location** which is selected is marked by a blue check.

To change between **Text View** and **Machine View** click the appropriate icon:

- **Text View:**

- **Machine View:**

Plots for the selected channels will be shown in the other panels. The number of hidden trends is indicated in a blue solid circle on the **Trend Filter** icon. Each **Machine Train** has a different number of **Measurement Location** are available depends on the selected machine.

Selecting a data source synchronizes, within the same time frame, all the panels such as trend plots, parameter views, waveforms and spectra, and status indicators.

6.6.2 Machine Information panel

Several tabs provide information about the currently selected **Machine Train**.

The following keyboard shortcuts enable you to switch tabs in the **Machine Information** panel:

P — Switch to **Parameters** tab.

M — Switch to **Machine Journal** tab.

C — Switch to **Machine Config** tab.

Parameters (default view)

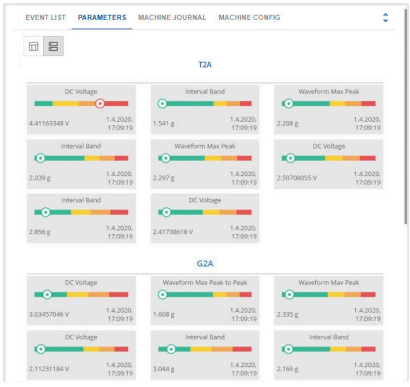
Parameters of the data source selected on the machine status panel. Select the **Bars View** icon to display the values as bar graphs.

Figure 6-38: Bars View Icon

Select the **Table View** icon to display the information in tabular form.

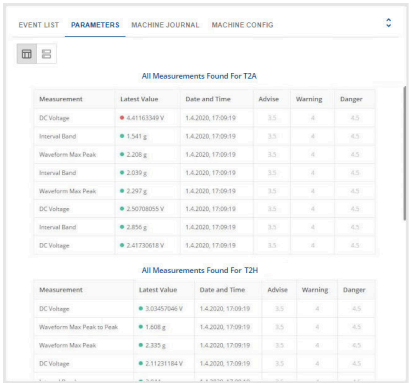
Figure 6-39: Table View Icon

Figure 6-40: Parameters – Bars View



The parameter bars are grouped by **Measurement Location**, and by alert severity.

Figure 6-41: Parameters – Table View

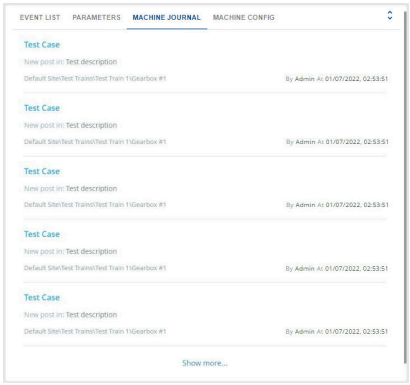


The parameters are grouped by **Measurement Location**, and ordered by alert severity.

Machine Journal

If a **Machine Train** is selected, all the **Machine Journal** entries for the selected **Machine Train** and its components are listed.

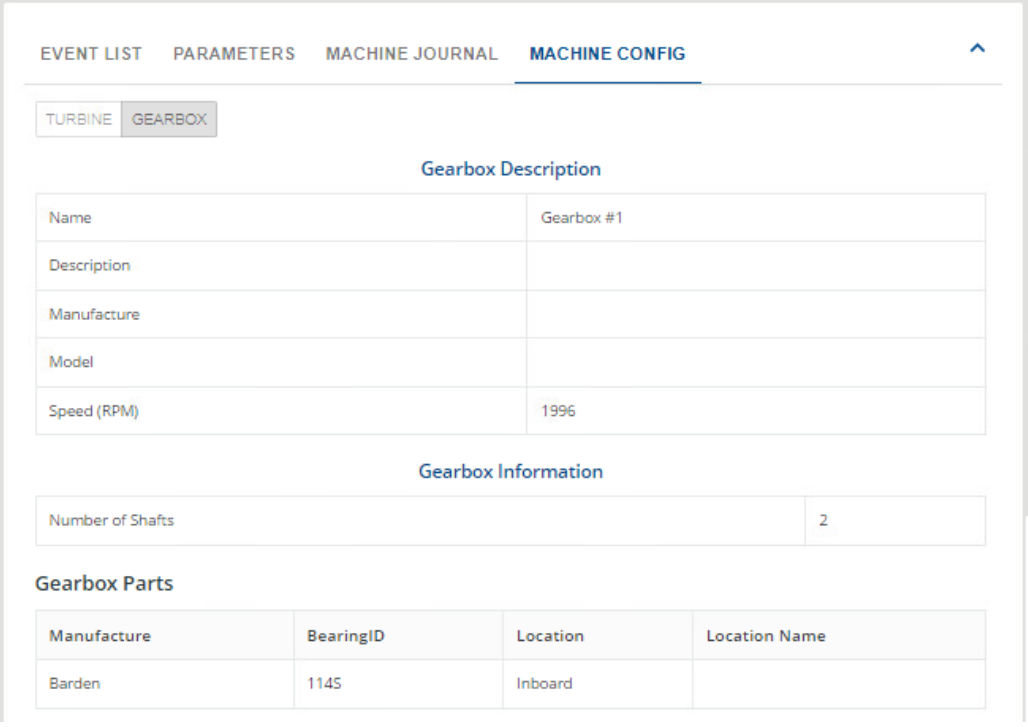
Figure 6-42: Machine Journal



Machine Config

When you select a **Machine Train**, you can view details about the components that are in its subassembly.

Figure 6-43: Machine Config



6.6.3 Trend Plots panel

The trend plots for the last 30 days of the data source, or **Measurement Location**, selected on the **Machine Train** diagram are displayed in the **Trend Plots** panel. The number of trends depends on the data source you have selected.

Note
For more information on how to select a **Machine Train** and data sources see:

- Search
- Temporary Machine Train Filters
- Persistent Machine Train Filters

One data source can provide several trends. The trends are grouped by **Measurement Location**, such as all measurements for a selected bearing. All the trends displayed have a synchronized time frame.

When you click the **Filter** icon, , in the upper right corner of the **Trend Plots** panel, the **Displayed Trends Filter** selection panel opens.

Note
The Displayed Trends Filter section has more information about selecting a **Measurement Location**.

The trend plots contain several functions to adapt the view to your needs:

Maximize / Minimize Chart

- To maximize a **Trend Plot**, click the outward pointing arrows icon.
- To reset the **Trend Plot** view, click the inward pointing arrows

Figure 6-44: Refresh associated data button

Once you have selected a point on the trend plots you must click the **Refresh Associated Data** button to refresh the data in the **Associated Data** view.

Trend cursor: Move the cursor over the trend to display date, time, and average amplitude of a particular point of the trend. Click to select a point. The selection is marked with a red dotted line. The same point in time is also marked on all trends shown on this panel. Waveform and spectrum of the selected data block are displayed on the waveform and spectrum panel.

Figure 6-45: Trend with selected value

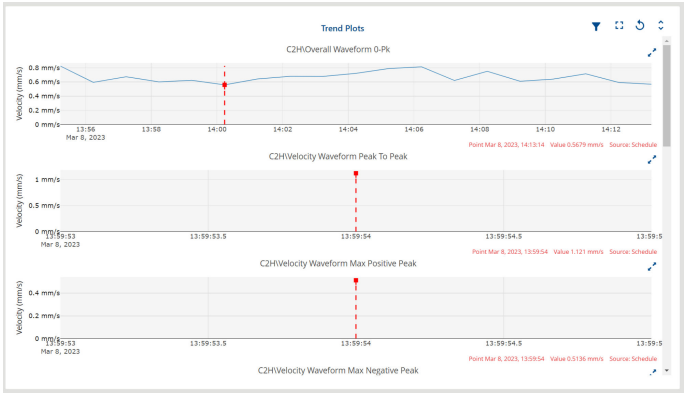
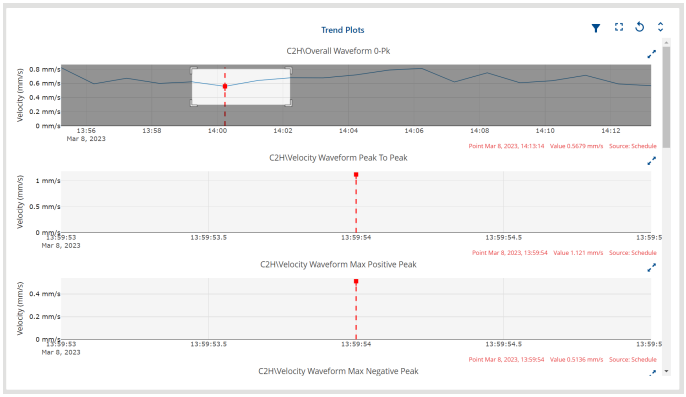


Figure 6-46: Region zoom



A. Place the mouse cursor close to the area of interest, left-click, and hold.
B. Move the mouse to frame the area of interest.
C. Release the mouse button to enlarge the selected area.

Double left-click on the trend to reset the view.

6.6.4 Associated Data panel

The Associated Data panel consists of the two tabs, the **Associated Data** tab and the **History** tab..

Note
You can use the keyboard shortcuts to navigate between **Associated Data** views.

- A : Press 'a' to view associated data, i.e. waveform and spectrum together.
- W : Press 'w' to view waveforms.
- S : Press 's' to view spectra.
- R : Press 'r' to **Refresh associated data**.
- H : Press 'h' to switch to the **History** tab.

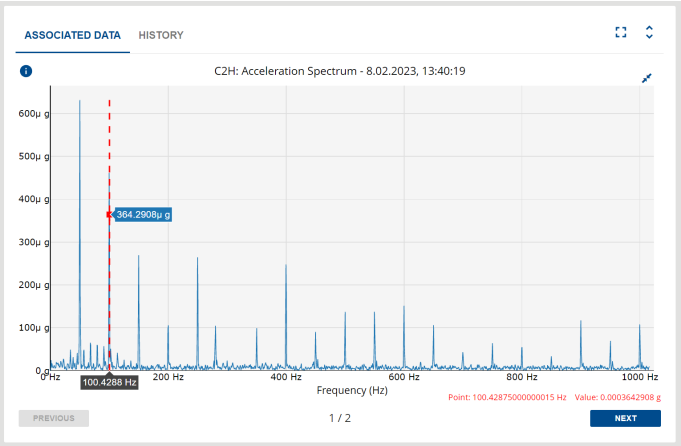
The waveform and spectrum plots under Associated data contain several functions to adapt the view to your needs:

Cursor

Select a point on a waveform or spectrum to display the data from that particular point on the plot.

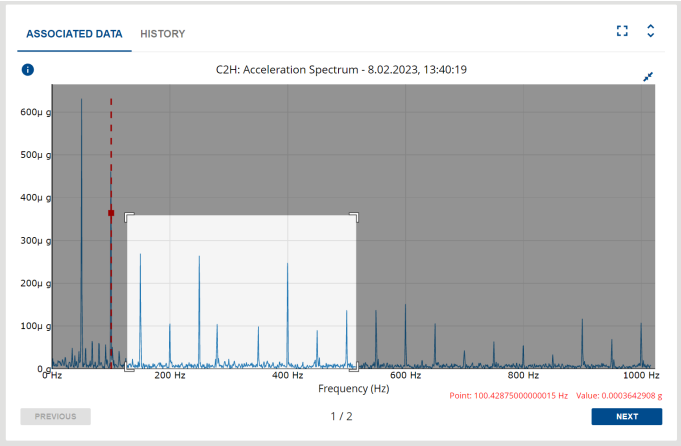
- With a waveform, time and amplitude are displayed.
- With a spectrum, frequency and amplitude are displayed.

Figure 6-47: Spectrum with selected data point



Left-click to select that point. The selection is marked with a red solid line. Use the **Previous** and **Next** navigation buttons of the waveform and spectrum panel to move through the available waveforms and spectra.

Figure 6-48: Region zoom



To enlarge an interesting part of a spectrum:

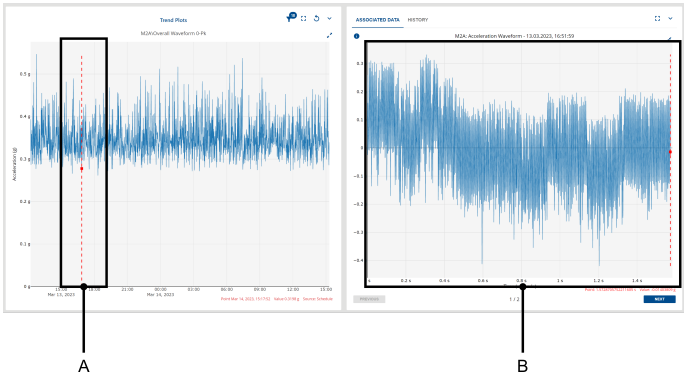
1. Place the mouse cursor close to the area of interest, left-click, and hold.
2. Move the mouse to frame the area of interest.
3. Release the mouse button to enlarge the selected area.

Double left-click on the plot to reset the view.

Waveform

When you select a data block (point) on the trend plot, and then click, (Refresh associated data), the waveform of the signal contained in this block is displayed.

Figure 6-49: Waveform

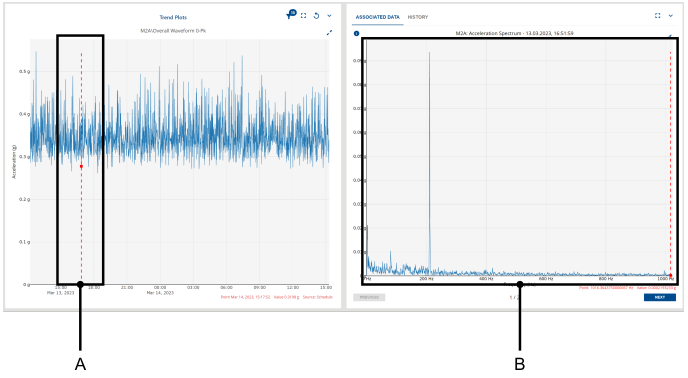


A. Selected trend plot data block.
B. Corresponding waveform.

Spectrum

On the spectrum plots panel, the spectrum of the signal contained in the data block, selected in Trend Plot, is displayed when you click, (Refresh associated data). Use the **Previous** and **Next** navigation buttons of the waveform and spectrum panel to move through the available waveforms and spectra.

Figure 6-50: Spectrum

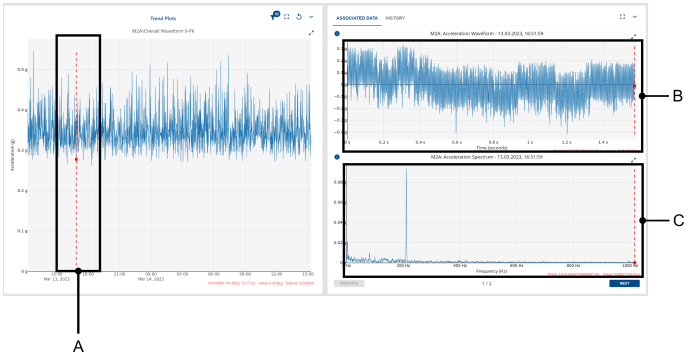


A. Selected trend plot data block.
B. Corresponding spectrum.

Waveform and Spectrum

Both waveform and spectrum of the selected data block are displayed. Use the **Previous** and **Next** navigation buttons of the waveform and spectrum panel to move through the available waveforms and spectra.

Figure 6-51: Waveform and spectrum



A. Selected trend plot data block.
B. Corresponding waveform.
C. Corresponding spectrum.

7 Vibration Analyzer

The AMS Machine Works Vibration Analyzer is a module of AMS Machine Works. You can use it to diagnose your machines by viewing plots to analyze vibration data collected from devices that are monitoring machines in your site.

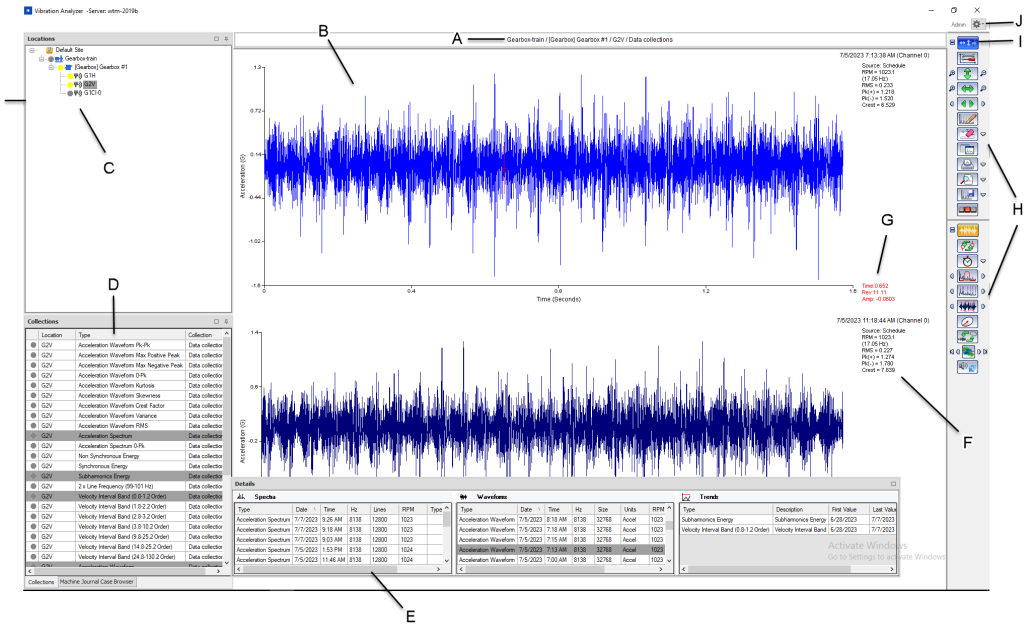
A wide variety of plots are available such as: Spectrum, Trend, Waveform; but also: Orbit, Shaft Centerline, Cascade, Bode/Nyquist, and Full-Spectrum.

You can launch the Vibration Analyzer on the client or server computer where it is installed. Choose one of the following to open the Vibration Analyzer:

- Click **Start** → **AMS Machine Works** → **Vibration Analyzer**.
- In Asset Explorer, select a machine train or component, and then click the **Vibration Analyzer** button in the **Home** ribbon.
- Select the Vibration Analyzer icon from the App Switcher.
- In the Network Device Module, select **Vibration Analyzer** from the sidebar.

7.1 Vibration Analyzer user interface

Figure 7-1: Vibration Analyzer user interface



The workspace lets you organize your screen to display only information that is relevant to you. It can contain any variation of the following:

A. ***Label for plotting workspace*** *— identifies the data currently displayed in the plotting workspace.*
B. ***Plotting workspace*** *— displays plots and information about each plot type.*
C. ***Locations navigator*** *— lets you navigate to a measurement location.*
D. ***Collections navigator*** *— displays available measurements by asset, location, and collection.*
E. ***Details navigator*** *— displays all available measurements for the selection in the Locations and Collections navigators. The measurements are shown under the Spectra, Waveform, and Trends tables.*
F. ***Plot information*** *— information about the current plot.*
G. ***Cursor details*** *— displays details about the cursor location on the plot.*
H. ***Function bar*** *— shows the functions that are available according to the plot selection.*
I. ***Common controls*** *— functions that are available to all plot types.*
J. ***Settings*** *— used to configure selected settings and preferences (e.g. units, server connection, and others).*

Moving the Navigators

The Locations, Collections, and Details navigators are movable windows. To move these navigators, click and drag the navigator title bar to a desired location. To move it back to the default location, drag it back.

You can also click the Settings icon and then select **Refresh Hierarchies** to return the navigators to their default positions. **Refresh Hierarchies** is also used to update the

Vibration Analyzer application when changes are made in Asset Explorer. The software prompts you to do this when changes are made.

If you want to keep your custom navigator locations, exit the Vibration Analyzer application after making the edits in Asset Explorer, and then reopen it, instead of using **Refresh Hierarchies** as prompted.

Hiding the Navigators

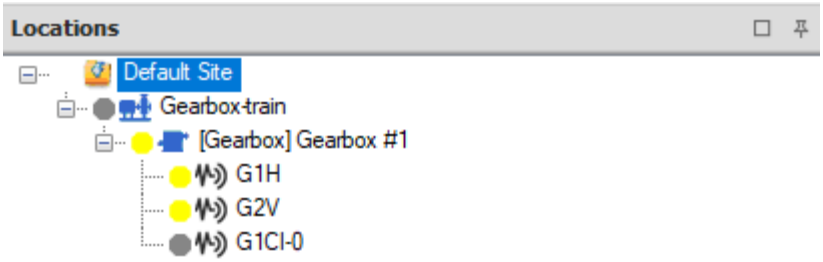
Use the pushpin icon to hide the navigators. When a navigator is hidden, a tab displays to the left or at the bottom of the main application window. Click this tab to toggle the navigator's display.

7.1.1 Locations navigator

This navigator lets you browse machines in your site, including measurement locations. The machines are organized in tree form, which represent all available machine trains onsite. For more information on creating a machine train, see the Asset Explorer section.

When you add machines in Asset Explorer utility, this is also reflected in the Locations navigator, including the measurement locations. When you click an item in the Locations navigator, the Collections navigator shows the available measurements in the selected location.

Figure 7-2: Locations navigator



All items in this navigator have bubble states indicator in the form of a color disk. The color of the indicator is related with item status. The table below describes the indicator color with relation to the alarm status. The machine component status reflects the most severe measurement point status. Similarly, the machine train status reflects the most severe measurement component status.

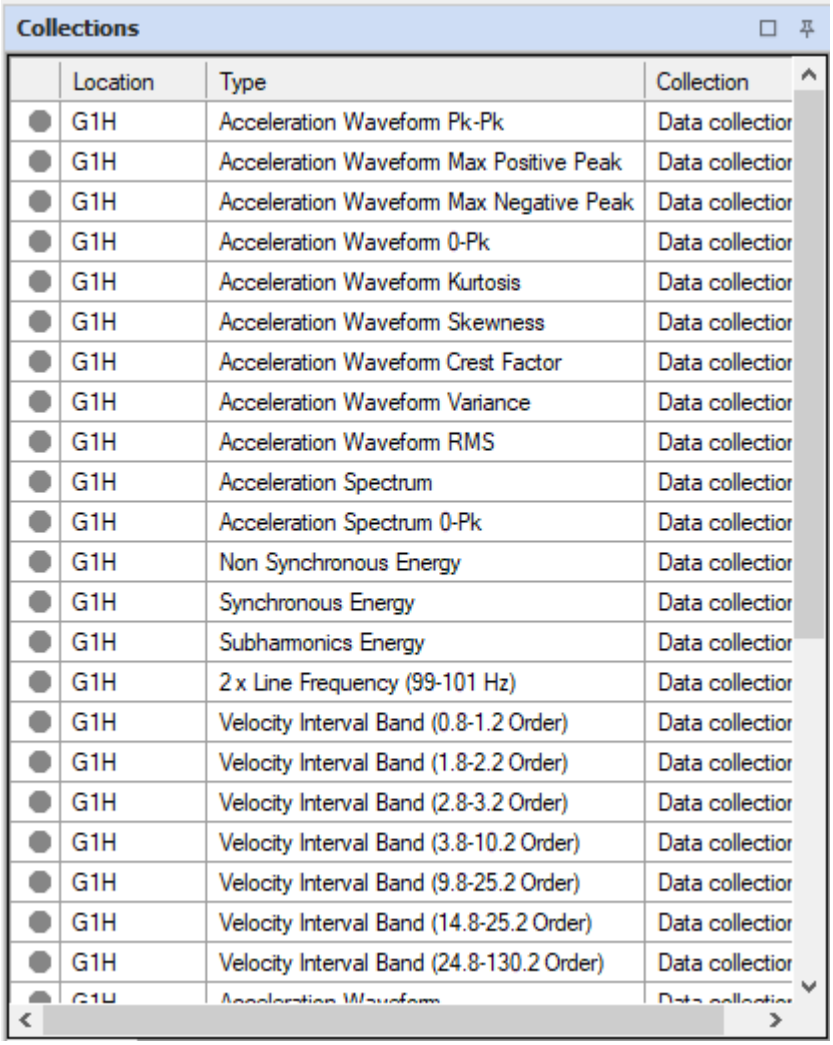
Table 7-1: Locations navigator bubble states for machine trains

Color	Meaning
Red	Critical Alert
Orange	Warning Alert
Yellow	Advise Alert
Green	Normal, No alert
Grey	Alert not applicable Alert not received
Black	No Data

7.1.2 Collections navigator

When an asset or measurement location is selected in Locations, the Collections navigator displays all measurements that are available in this location. The measurements are grouped into collections.

Figure 7-3: Collections navigator



	Location	Type	Collection
●	G1H	Acceleration Waveform Pk-Pk	Data collectior
●	G1H	Acceleration Waveform Max Positive Peak	Data collectior
●	G1H	Acceleration Waveform Max Negative Peak	Data collectior
●	G1H	Acceleration Waveform 0-Pk	Data collectior
●	G1H	Acceleration Waveform Kurtosis	Data collectior
●	G1H	Acceleration Waveform Skewness	Data collectior
●	G1H	Acceleration Waveform Crest Factor	Data collectior
●	G1H	Acceleration Waveform Variance	Data collectior
●	G1H	Acceleration Waveform RMS	Data collectior
●	G1H	Acceleration Spectrum	Data collectior
●	G1H	Acceleration Spectrum 0-Pk	Data collectior
●	G1H	Non Synchronous Energy	Data collectior
●	G1H	Synchronous Energy	Data collectior
●	G1H	Subharmonics Energy	Data collectior
●	G1H	2 x Line Frequency (99-101 Hz)	Data collectior
●	G1H	Velocity Interval Band (0.8-1.2 Order)	Data collectior
●	G1H	Velocity Interval Band (1.8-2.2 Order)	Data collectior
●	G1H	Velocity Interval Band (2.8-3.2 Order)	Data collectior
●	G1H	Velocity Interval Band (3.8-10.2 Order)	Data collectior
●	G1H	Velocity Interval Band (9.8-25.2 Order)	Data collectior
●	G1H	Velocity Interval Band (14.8-25.2 Order)	Data collectior
●	G1H	Velocity Interval Band (24.8-130.2 Order)	Data collectior
●	G1H	Acceleration Waveform	Data collectior

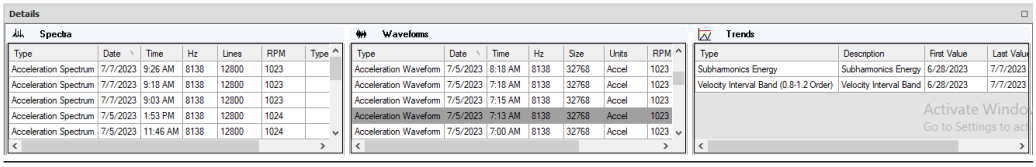
You can select multiple measurements, which then populates the Details navigator.

7.1.3 Details navigator

The Details navigator displays all available measurements from the machines and collections that you selected in the Locations and Collections navigators. These measurements are shown in the Spectra, Waveforms, and Trends tables.

Click on any of the measurements in the Spectra, Waveforms, and Trends tables to display the plot in the plotting workspace. You can select multiple measurements by pressing **CTRL** or **SHIFT** on the keyboard while clicking.

Figure 7-4: Details navigator



7.1.4 Function bar

The Function bar contains controls that you can use while analyzing the plot.

The controls are grouped into functions such as waveform controls which are displayed for waveform data, trend controls for trend data, spectrum controls for spectrum data, and common controls, which are available for all measurement types.

This section discusses the functions and controls in details.

Common controls

Common controls are available for all plot types.

Click ⊞ to display all functions under Common controls.

Button	Function	Description
	Setup Options	Change setup options for all the plots in the plotting workspace.
	Vertical Scale	Enable vertical scaling. Click the left icon (+) to increase the scale and the right icon (-) to decrease the scale around cursor location. Click center button to auto-scale plot.
	Horizontal Scale	Enable horizontal scaling. Click the left icon (+) to increase the scale and the right icon (-) to decrease the scale around cursor location. Click center button to auto-scale plot.
	Horizontal Pan	Enable horizontal panning. Click the gray left / right arrow icons to pan left and right.
	Annotate Plot	Displays a list of plot annotation options.
	Clear Plot	Clear the plotting workspace. Click the arrow to set the default option for the Clear Plot icon. Choose from Clear Active and Clear All.
	New Window	Launch active plots in a new window. Click one plot or shift-click additional plots to activate plots.

Button	Function	Description
	Print/Print Options	Click the Print icon to print an Image Summary Report. Click the arrow to set the default option for the icon. Choose from Print All, Print Active, and Print Workspace.
	Print Preview	Preview the Image Summary Report in the Report Viewer. Click the arrow to set the default option for the icon. Choose from Print Preview All, Print Preview Active, and Print Preview Workspace.
	Save Image	Save a single plot or plotting workspace as an image. Click the arrow to set the default option for the icon.
	Hot Keys	Launch the Hot Keys list to see the key combinations for features available for the active plotting workspace. Hot Keys vary depending on the plots shown in the plotting workspace.

Trend

These functions are available for Trend plots. Click + to view all available functions.

Clicking on the Trend plot icon allows to display (yellow color) or hide (blue color) Trend plots in the plotting workspace.

For more information, see Trend plots.

Spectrum

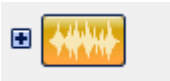
These functions are available for Spectrum plots. Click + to view all available functions.

Clicking on the Spectrum plot icon allows to display (yellow color) or hide (blue color) Spectrum plots in the plotting workspace.

For more information, see Spectrum plots.

Waveform

These functions are available for Waveform plots. Click + to view all available functions.



Clicking on the Waveform plot icon allows to display (yellow color) or hide (blue color) Waveform plots in the plotting workspace.

For more information, see Waveform plots.

7.2 Active plots

Active plots allow you to perform functions and view details about a specific point on the plot.

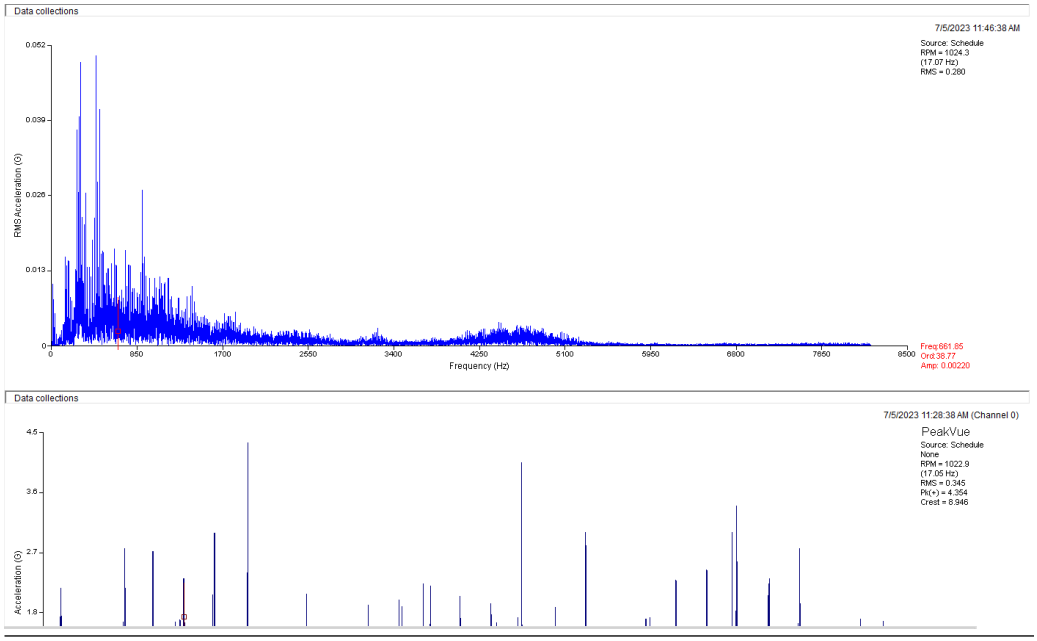
Click on a plot to make it active. The controls in the Function bar changes when you switch between active plots presenting different types of data, whether it is waveform, spectrum, or trend.

By default, active plots show up as bright blue in color whereas inactive plots are dark blue.

You can have more than one active plot by holding the **Shift** or **Ctrl** key and clicking on the plots you want to be active. You can make all plots in the plotting area active by pressing **Ctrl** + **A**.

Most function bar options and hot key commands only operate on an active plot. Some exceptions are **Clear Plot**, **Print**, and **Print Preview**, which can be set to work on either active or all plots. The color of the function bar icon is changing from blue to orange if you turn plot visibility to **ON** from **OFF**.

Figure 7-5: Active plot (top) vs inactive plot (bottom)



7.3 Cursor types

The available cursor types are: single, reference, difference, harmonic, and sideband. Depending on the plot, one or more cursor types are available.

Cursor mode	Description
Single	A single cursor helps you identify a specific point on the plot. A square identifies a single cursor.
Reference	A reference cursor is used to calculate the delta (Dfrq) between the primary cursor and the point you select as the reference cursor. A triangle identifies a reference cursor.
Difference	Difference cursors are available on waveform plots. A circle identifies a difference cursor.

Cursor mode	Description
Harmonic	Harmonic cursors are available on spectrum and waveform plots. A circle identifies a harmonic cursor.
Sideband	Sideband cursors are only available for spectrum plots. A diamond identifies a sideband cursor.

7.3.1 Mark a single cursor

To mark a single cursor, click on an active plot.

A cursor appears at the nearest data point. The exact cursor position displays in the lower right-hand corner of the plot legend and updates as the cursor moves.

7.3.2 Move a cursor

There are four ways to move a cursor.

Procedure

- Press and hold **Ctrl** while using the left or right arrow key to move the cursor to a short distance (micro-cursor movement).
- Press the left or right arrow keys to move between neighboring points.
- Use your mouse by dragging and dropping the cursor or clicking on a different point on the plot to move the cursor.
- Press **Home** to move the cursor to the start of the data, or press **End** to move the cursor to the end of the data.

7.3.3 Mark cursors on a single spectrum plot

Procedure

1. Set the cursor on a spectrum plot.
2. Right-click the plot and select **Mark Cursors** → **Add**.
   The cursor is marked by a unique symbol. The symbol type changes each time a new cursor is marked.

Note
To clear marked cursor symbols, right-click the plot and select **Mark Cursors** → **Clear**.

7.3.4 Set a reference cursor

If you have a single cursor placed on a plot, you can set a reference cursor on trend, spectra, cascade, and waveform plots.

Procedure

1. Mark a single cursor by first clicking on an active plot. A cursor appears at the nearest data point. The exact cursor position displays in the lower right-hand corner of the plot legend and updates as the cursor moves.
2. Press **Alt** and click on the plot again.
   A second cursor, the reference cursor, appears at the nearest data point. The primary cursor remains and can be moved. The plot legend displays the position of the reference cursor, the primary cursor, and their delta in the X dimension.

3. You can also right-click the plot and select **Set Reference Cursor** to place the reference cursor exactly at the position of the primary cursor.
   This is useful when measuring the precise frequency difference between two peaks.

7.3.5 Display a harmonic cursor

Harmonic cursors are available on all spectrums and waveforms plots.

Procedure

1. Mark a single cursor by first clicking on an active plot.
   A cursor appears at the nearest data point. The exact cursor position displays in the lower right-hand corner of the plot legend and updates as the cursor moves.
2. Right-click on the plot and then select **Cursor Type** → **Harmonic**.
   Moving a harmonic cursor results in moving its harmonics.

7.3.6 Display a sideband cursor

Sideband cursors are only available for spectrum plots.

Procedure

1. Set a reference cursor.
2. Right-click the plot and select **Cursor Type** → **Sideband**.

N sideband cursors are displayed at intervals of the delta of the reference and primary cursor. You can set the value for N in the Spectrum tab of the Setup Options Editor. You can also move the primary sideband cursor in relation to the reference cursor. This will update the locations of all N sideband cursors. See Related information for details.

7.3.7 Display difference cursors

Difference cursors apply only to waveform plots. On a plot, they are used for measuring time difference between selected points.

Procedure

1. Set a reference cursor.
2. Right-click the plot and select **Cursor Type** → **Difference**.

The primary cursor can be moved relative to the reference cursor, and cursor information is displayed for both cursors and delta spacing.

7.3.8 Use linked cursors

Linked cursors let you synchronize the movement of cursors on multiple active plots. Generally, only plots of the same type have linked cursors.

Procedure

1. Display multiple plots of the same type either together or separately.
2. Mark a cursor on one of the plots.
3. Press **Ctrl** and click the plots you want to activate.

When you move a cursor on one active plot, a cursor appears on all other active plots at the same location and moves simultaneously.

7.4 Zoom in or out on a plot

Procedure

1. To zoom in, right-click and hold on the plot, and select the area you want to zoom. A dotted box shows the selection area.
2. Release the right mouse button. The plot zooms in to display only the portion of the plot you selected.
3. To zoom out, right-click near the axis of a plot and select **Zoom Out**. The X and Y axis can be zoomed in and out separately. Zoom to the original view by clicking the green scale arrow icons.

   Alternatively, place a cursor on a plot. Use the Vertical Scale and Horizontal Scale functions from Common controls to zoom in or zoom out.

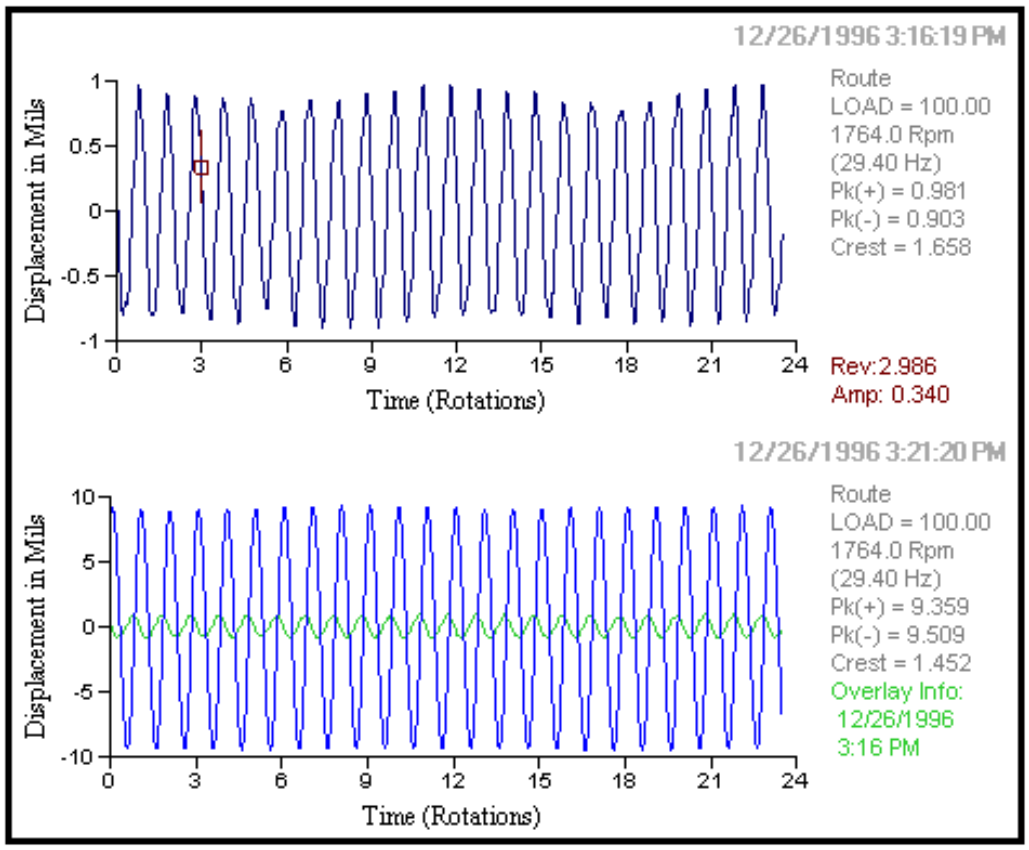
7.5 Overlay

An overlay lets you compare two plots of the same type using similar units. You can generate an overlay by dragging and dropping one plot onto another plot. All plot types except for cascade plots support overlays.

The image below illustrates two waveform plots with the same amplitude units. The top waveform was dragged and dropped to the bottom waveform to create an overlay. The

data from the top waveform is displayed in green. This color can be changed in the **Plot Options** tab of the **Setup Options Editor** dialog.

Figure 7-6: Overlay



For all plot types except spectrum plots, a plot can only have one overlay at a time. If another plot is dragged to a plot that already has an overlay, the current overlay is replaced.

For spectrum plots, the default view of overlay data can be set in the **Spectrum** tab of the Setup Options Editor dialog. Multiple overlays can be displayed by pressing the **Ctrl** key and dragging and dropping multiple spectrum plots to a target spectrum plot.

The overlay function generally requires plots to have the same amplitude units. However, you can overlay spectrum and waveform plots even if the amplitude units are different. Overlay units will be converted to the units of the target plot.

You can view information about the overlay by right-clicking the plot and selecting **Display Overlay Info**.

7.6 Annotate plot

Mark plots with annotations to point out specific areas of interest and make notes.

Procedure

1. Click  on the **Common Controls** function bar, or right-click on a plot and select **Annotate Plot**.

   The **Adjust Annotations** dialog appears.

2. Click the icon for the type of annotation you want to add.

Icon	Option	Description
	New Line Annotation	Adds a new line to the plot.
	New Rectangle Annotation	Adds a new rectangle to the plot.
	New Ellipse Annotation	Add a new ellipse to the plot.
	New Text Annotation	Adds new text to the plot.
	Advanced Editing Tools	Lets you specify additional details for the annotation you selected.

3. Click on the annotation and adjust the size by dragging a sizing handle. You can also move the annotation by dragging it.
4. Click  .

   Click  to delete a selected annotation or click  to delete all annotations on the plot.

Note
Annotations are NOT saved. Save the plotting workspace as an image if you want to keep the annotations.

7.7 Configure the plotting workspace

Change the type of information to display automatically when you make a selection in the navigators.

Procedure

1. Click  and select **Selection Type Preferences**.
   The **Selection Type Preferences** dialog appears.
2. Expand a selection type and select an option to modify.
   Display settings appear on the right pane.

3. Modify your desired settings.

Note
Click **Defaults** to reset settings to default values.

4. Click **OK**.

7.7.1 Set the line frequency

The line frequency can be used for identification of some faults, e.g. while using flux measurements, or can be used for identification of line component in a spectrum.

Procedure

1. Click  and select **General Settings**.
2. Enter a value and click **OK**.

7.7.2 Set unit preferences for the Vibration Analyzer

Procedure

1. Click  and select **Units Preferences**.
2. Use the drop-down menu to configure the unit modes and decibel references for the following:
   - Acceleration
   - Velocity
   - Displacement
   - Sound Pressure
   - General Dynamic
   - HFD
   - Motor Current
   - Flux Data
   - Shaft Voltage
   - Shaft Current
3. For **Data Display Units**, select **English** or **Metric**.
4. Click **OK**.

7.8 Customize display for plots

Procedure

1. From the Locations navigator, select a measurement location, and then select a collection from the Collections navigator.

Press **CTRL** to make multiple selections.

2. Select a measurement from the tables in the Details navigator to display a plot in the plotting workspace.You can select multiple data entries.
   - **Spectra** — customize display for spectrum plots.
   - **Waveforms** — customize display for waveform plots.
   - **Trends** — customize display for trend plots.

7.8.1 Waveform tab

From the plotting worksace, right-click on a waveform plot, and then select **Setup Options → Waveform tab**. The Waveform tab displays options for waveform plots.

Time Axis Options

Option	Description
Units	Select either time or revolutions as the unit used for the time axis. Revolutions do not apply to live waveforms.
Independent Scaling	Allows each plot to scale independently to maximize data resolution.
Autoscale Across Plots	Scales similar data plots to the same time axis scale to make time differences more visually obvious.
Fixed Scale Enabled	Limits the range of Time or Revolution to a specified lower and upper value.
Starting Position	Set the starting position for the fixed scale.
Ending Position	Set the ending position for the fixed scale.
Defaults	Resets all Time Axis options to default values.

Amplitude Axis Options

Option	Description
Units	Select Stored Units, Acceleration, Velocity, or Displacement as the unit used for the amplitude axis.
Independent Scaling	Allows each plot to scale independently to maximize data resolution.
Autoscale Across Plots	Scales similar data plots to the same amplitude axis scale to make amplitude differences more visually obvious.

Option	Description
Fixed Scale Enabled	Limits the Amplitude Axis range based on specified lower and upper amplitudes for selected units. Enter the lower scale and upper scale values. The lower scale sets the lower amplitude and the upper scale sets the upper amplitude.
Defaults	Resets Amplitude Axis options to default values.

Display Options

Option	Description
Number of Cursor Markers	Sets the number of cursor markers to display. The default value is 5.
Mark Normalizing Frequency	Displays marks for the normalizing frequency.
Plot in Circular Format	Displays the waveform in circular format rather than X-Y format.
Display In Single Column	Displays the analysis pane in a single column.
Display Grid Lines	Displays grid lines on plots.
Display Alarm Levels	Displays alarm levels on waveform plots. Selecting this check box enables the four fields below.
Maximum Peak Acceleration Maximum Peak Velocity Maximum Peak Displacement Maximum Crest Factor	Enter the waveform alarm levels to generate waveform alarms for points that do not have measured waveform analysis.
Defaults	Resets Display options to default values.

Filter Settings

Option	Description
Acceleration	Select a filter for each field. The filters are: • None — No filter is applied to the data. • 1x — A 1xRPM filter is applied to the data. • 2x — A 2xRPM filter is applied to the data. • 3x — A 3xRPM filter is applied to the data. • Custom — A custom filter is applied to data. If any filter is selected, the type of filter can be set to Bandpass or Lowpass. A custom filter is defined by Custom Value - a whole number multiple of the rotation speed.
Velocity	
Displacement	
General Dynamic	
Defaults	Resets all Filter Settings options to default values.

7.8.2 Spectrum tab

From the plotting workspace, right-click on the spectrum plot, and then select **Setup Options** → **Spectrum**. The Spectrum tab displays options for spectrum plots.

Frequency Axis Options

Option	Description
Units	Select Hz, CPM, or Orders as the unit used for the frequency axis.
Type	Select either Linear or Log as the scale.
Fixed Scale Enabled	Select the check box to limit the frequency axis range to a specified lower and upper frequency.
Lower Frequency	Set the lower frequency for the fixed scale.
Upper Frequency	Set the upper frequency for the fixed scale.
Defaults	Resets Frequency Axis options to default values.

Amplitude Axis Options

Option	Description
Units	Select Stored Units, Acceleration, Velocity, or Displacement as the unit used for the amplitude axis.
Type	Select either Linear or Log as the scale.
Independent Scaling	Allows each plot to scale independently to maximize data resolution.
Autoscale Across Plots	Scales similar data plots to the same amplitude axis scale to make amplitude differences more visually obvious.
Fixed Scale Enabled	Limits the Amplitude Axis range based on specified lower and upper amplitudes for selected units. Enter the lower scale and upper scale values. The lower scale sets the lower amplitude and the upper scale sets the upper amplitude.
Defaults	Resets Amplitude Axis options to default values.

Display Options

Option	Description
Harmonic Cursor Markers	Enter the number of harmonic cursors to display. The default value is 8.
Peaks to List	Enter the number of peaks to be listed when the peak list viewer is displayed. The default value is 24.

Option	Description
Sideband Cursor Markers	Enter the number of sideband cursor markers to display. The default value is 5.
Display Grid Lines	Displays grid lines on plots.
Automatic Overlay Type (Periodic and Online)	Lets you display an automatic overlay. Select None, Reference, or Previous.
Defaults	Resets Display options to default values.

Peak Label Options

Option	Description
Displayed Information	Choose the type of information to be displayed. Select Frequency, Amplitude, or Both.
Automatic Peak Labelling	Select the check box to automatically display peak levels.
Number of Peaks to Label	If Automatic Peak Labelling is selected, specify the number of peaks to label. The default value is 5.

Multiple Spectrum Options

Option	Description
Highlight Active Trace	Highlights the active spectrum in a multi-spectral plot.
Display Floor Cursor	Select the check box to display a floor-type cursor.
Display Plane Cursor	Select the check box to display a plane-type cursor.
Opacity	If Display Plane Cursor is selected, enter the opacity of the plane cursor.
Z-Axis Angle	Enter the Z-axis angle of spectral data in multi-spectral plots.
Overlap Percentage	Enter the overlap percentage of spectral plots displayed in multi-spectral plots.
Plot Sequence	Lets you choose the direction of time for spectral data displayed in multi-spectral plots. Select either Top Down or Bottom Up.
Defaults	Resets Multiple Spectrum options to default values.

7.8.3 Trend tab

From the plotting workspace, right-click on the trend plot, and then select **Setup Options → Trend tab**. The Trend tab displays options for trend plots.

Time Axis Options

Option	Description
Fixed Scale Enabled	Select the check box to limit the range of the Time axis to a specified starting and ending position.
Starting Date	If the Fixed Scale Enabled check box is selected, choose the starting date.
Ending Date	If the Fixed Scale Enabled check box is selected, choose the ending date.
Keep End Date Set to Current on Restart	Select the check box to match the end date with the current date.
Defaults	Resets all Time Axis options to default values.

Amplitude Axis Options

Option	Description
Independent Scaling	Allows each plot to scale independently to maximize data resolution.
Autoscale Across Plots	Scales similar data plots to the same amplitude axis scale to make amplitude differences more visually obvious.
Fixed Scale Enabled	Limits the Amplitude Axis range based on specified lower and upper amplitudes for selected units. Enter the lower scale and upper scale values. The lower scale sets the lower amplitude and the upper scale sets the upper amplitude.
Defaults	Resets Amplitude Axis options to default values.

Display Options

Option	Description
Display Grid Lines	Displays grid lines on plots.
Update Spectrum/ Waveform with Trend Cursor	Select the check box to allow the trend point where the cursor is positioned to simultaneously display the time-associated spectrum and waveform, if available.
Alarms	Select the check box beside each alarm level you want to display.
Defaults	Resets Display options to default values.

7.8.4 Plot Options tab

From the plotting workspace, right-click on the plot, and then select **Setup Options → Plot Options tab**.

The Plot Options tab provides settings available for most plot types. You can change the color settings, labeling preferences, fault frequencies display options, and image saving options.

Plot Color Setup

Select a color for different element types displayed on a plot. Click **Defaults** to reset the color settings to default values.

Miscellaneous

Miscellaneous portion of the Plot Options tab contains the options for Fault Frequencies and Saved Images.

Option	Description
Source	Fault frequencies can come from different sources. Select All, Configuration, or Measurement Location.
Format	Select either Lines or Lines and Values. Lines only display fault frequency lines on the plot while Lines and Values display fault frequency lines on the plot and the value on the plot legend.
Line Thickness	Specify the thickness of the line used to mark the fault frequency position on the data plot. Select either Thin or Thick.
Match Tolerance (%/Order)	Specify the percentage per order of tolerance to be applied to consider the frequency a match.
Specify Colors	Change plot colors for specific components of the plot.
Default Frequency Units	Set the default frequency units. Select either Hz or CPM.
Format for Speed Values	Set the unit for speed. Select either RPM or RPS.
Plot Font Size	Set the size of the text displayed in the plot. Select Small, Medium, Large, or Extra Large. More information is displayed if a smaller font is chosen.
Auto-hide Function Bar	Mark the box to automatically hide the Common Controls function bar when it is not used. Hiding the function bar increases the size of the plot area.

Saved Images

Each plot type can be saved as an image file.

Option	Description
File Format	Set the default file format for images. Select: .bmp, .jpeg, .png, or .emf.
Manually Enter Filename	Mark the box to be prompted to enter a filename when saving an image. Otherwise, the filename will be added automatically.
Link Image to Machine Journal Entry	Select this option to link images to a Journal entry.
Save Image to File on Local Machine	Save images on your computer in the database system.

Option	Description
File Save Location	Location of a file on a Local Machine. The default location is `C:\temp`. Click **Browse** to select a different location.
Defaults	Resets all settings in this section to the default values.

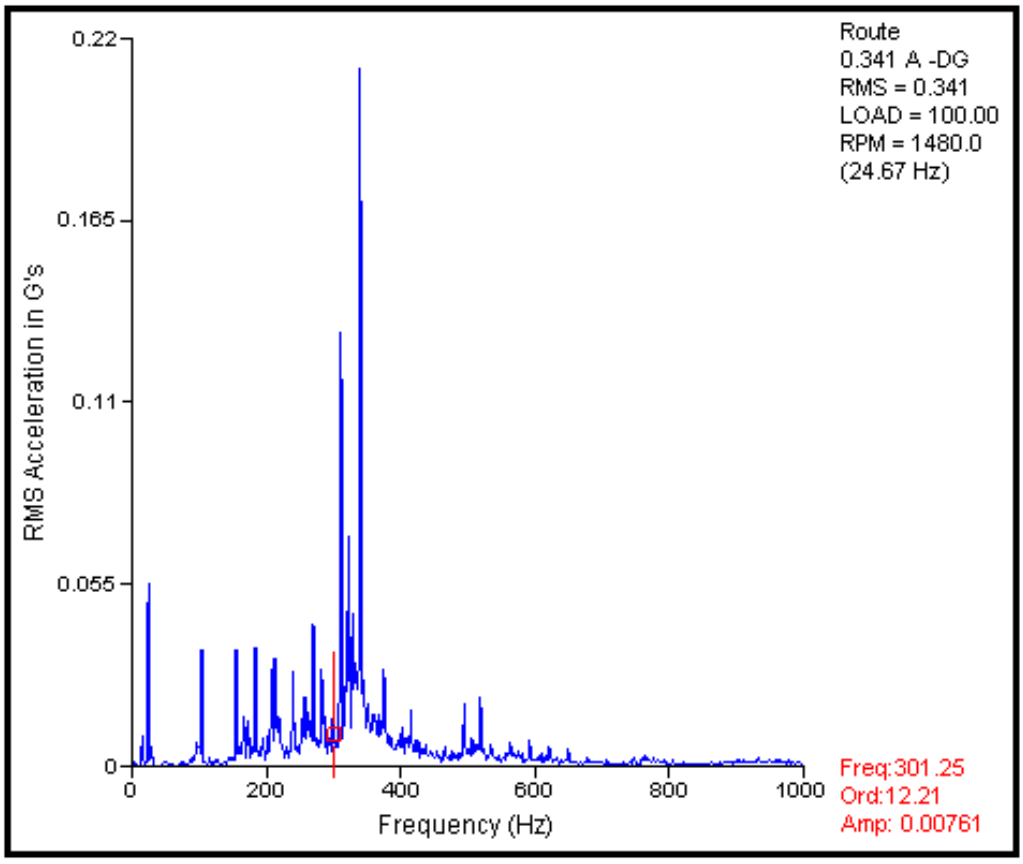
7.9 Spectrum plots

A spectrum plot is a graphical representation of vibration amplitudes in the frequency domain.

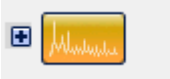
To view a spectrum plot, select a measurement location in the Locations navigator, and then select a collection in the Collections navigator.

In the Details navigator, under the Spectra table, select a date/time of interest.

Figure 7-7: Spectrum plot



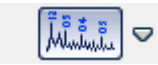
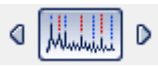
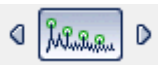
7.9.1 Spectrum function bar



The spectrum function bar is available when:

- a spectrum plot is the only open plot
- a spectrum plot is selected in a plot viewer with multiple plots
- a spectrum plot is an active plot in plotting workspace containing multiple plots

Click ⊞ to display all functions.

Button	Function	Description
	Cursor Type	Click to toggle cursor types.
	Peak Locate	Click to locate a peak.
	Label Peaks	Click to label peaks. Click the arrow to label the primary cursor or all cursors.
	Fault Frequencies	Click to open the Fault Frequency List Viewer. Click the left or right buttons to show the previous or next fault frequency.
	Peak List	Click to open the Peak List Viewer. Click the left or right buttons to show the previous or next peak.
	Harmonic Family List	Click to open the Harmonic Family Viewer. Click the left or right buttons to show the previous or next harmonic family.
	Set Rpm	Click to open pop-up window allowing to set correct RPM speed. Cursor can be used to identify RPM value.

Note
For multiple spectrum plots, only the Cursor Type, Peak List, and Harmonic Family buttons are displayed.

7.9.2 Peak List Viewer

To display the Peak List Viewer, click  on the Spectrum function bar.

Use the Peak List Viewer to:

- Display detailed information about peaks in a spectrum plot.
- Select specific peaks to print detailed information.
- Select specific peaks to label on the plot.

7.9.3 Display harmonic family list

Procedure

1. Open a spectrum plot.

2. Click  on the Spectrum function bar.
   The **Harmonic Family Viewer** dialog appears.
3. Select a harmonic family or difference family.
   The plot displays your selection.
4. You can also use the left or right buttons to display harmonic families or difference families.

7.9.4 Display fault frequencies

You can display fault frequencies in autocorrelation plots, waveforms, and spectra. Fault frequency markers start at the fist point in the waveform and are separated by time distance being a reciprocal of the fault frequency.

Procedure

1. Open a spectrum or waveform plot. To open auto the autocorrelation plot right click on the waveform plot and choose **Autocorrelate**.
2. Expand the Spectrum or Waveform function bar.
3. Click  .
   The **Fault Frequency List Viewer** dialog appears.
4. Select a fault frequency.
   The plot displays the selected fault frequency.
5. Select **Keep Frequency Displayed** if you want the plot to always display your chosen fault frequency.

   A checkmark appears beside the selected fault frequency.

Note

- You can select multiple fault frequencies to be always displayed.
- You can also click the left or right buttons to view the previous or next fault frequency without opening the Fault Frequency List Viewer dialog.

To clear fault frequencies, right-click on the plot, and then click **Clear Displayed Frequencies** or **Clear Fault Frequencies**.

7.9.5 Match the fault frequency of a cursor location

AMS Machine Works compares all fault frequencies (including harmonics) to the current cursor location. If the difference between the cursor frequency and a given fault frequency is less than the match tolerance specified in the Plot Options tab, the frequency will be considered a match.

Procedure

1. Activate a spectrum plot.
2. Mark a cursor to identify the location you want to match.
3. Press **K** on your keyboard.

Matches display on the plot for the current cursor.

7.9.6 Match any available fault frequency

You can find a match from the entire peak list to any of the available fault frequencies. If the difference between the frequency of a peak in the peak list and a given fault frequency is less than the match tolerance specified in the Plot Options tab, the frequency will be considered a match.

Procedure

1. Activate a spectrum plot, but do not place a cursor.
   If you have a cursor on the plot, remove the cursor.
2. Press **K** on your keyboard.
   Matches display on the plot for the entire peak list.

7.9.7 Locate peaks

When you mark a cursor, the cursor may be near the peak, on a slope instead of a peak. Use this function to move the cursor so that it is on a precise peak. For example, it can be used to determine the exact frequency and amplitude of a peak.

Procedure

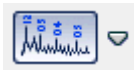
1. On a spectrum plot, place the cursor on top of the desired peak by clicking near the peak.
2. Click  on the Spectrum function bar or right-click on the plot and select **Locate Peak**.

Note
To remove a peak, right-click on the plot and select **Remove Peak**. This action will temporarily remove a group of points creating the peak from the spectrum plot and will connect neighboring points with a straight line. You can bring all removed peaks back by selecting **Restore Peak**s from a context menu.

7.9.8 Label peaks on single spectrum plots

If you have located peaks on a spectrum plot, you can label the peaks. You can label the primary cursor or all cursors. Use the following methods:

Procedure

- To label the primary cursor, right-click on the plot and select **Label Peak** → **Primary Cursor**. You can also use the Label Peaks button  on the Spectrum function bar. Click the down arrow and select **Label Primary Cursor**.
  The primary cursor is labeled with the horizontal axis value of the peak.

- To label all cursors, right-click on the plot and select **Label Peak → All Cursors**. You can also use the Label Peaks button  on the Spectrum function bar. Click the down arrow and select **Label All Cursors**.
  All cursors are labeled with the horizontal axis value of the peaks.

7.9.9 View multiple spectra in one plotting workspace

Multiple spectra plots can be viewed in the plot area together or separately.

Procedure

1. From the Details navigator, find a spectrum.
2. Press **Shift** and then click on another spectrum to select a range of data.You can also press **Ctrl** and click more than one spectrum to select multiple, specific data. The plots appear separately on the plotting workspace.
3. Right-click on the plotting workspace and select **Display Spectra Together**.

Note
To change the plot display back to separate plots, right-click and select **Display Spectra Separately**.

7.9.10 Display calculated trend from cascade plots

Procedure

1. Mark a cursor on the plot.
2. Right-click and select **Display Calculated Trend → Primary Cursor Location**.
   The **Primary Cursor Amplitude Trend** dialog is displayed.

Notes
- The generated trend plot includes data points from the displayed spectra.
- If a single cursor is marked on the plot, a calculated trend for the frequency or order is displayed.
- If the plot has a reference cursor and a primary cursor, an additional option allows the calculation of a trend for the spectral band bounded by cursors.

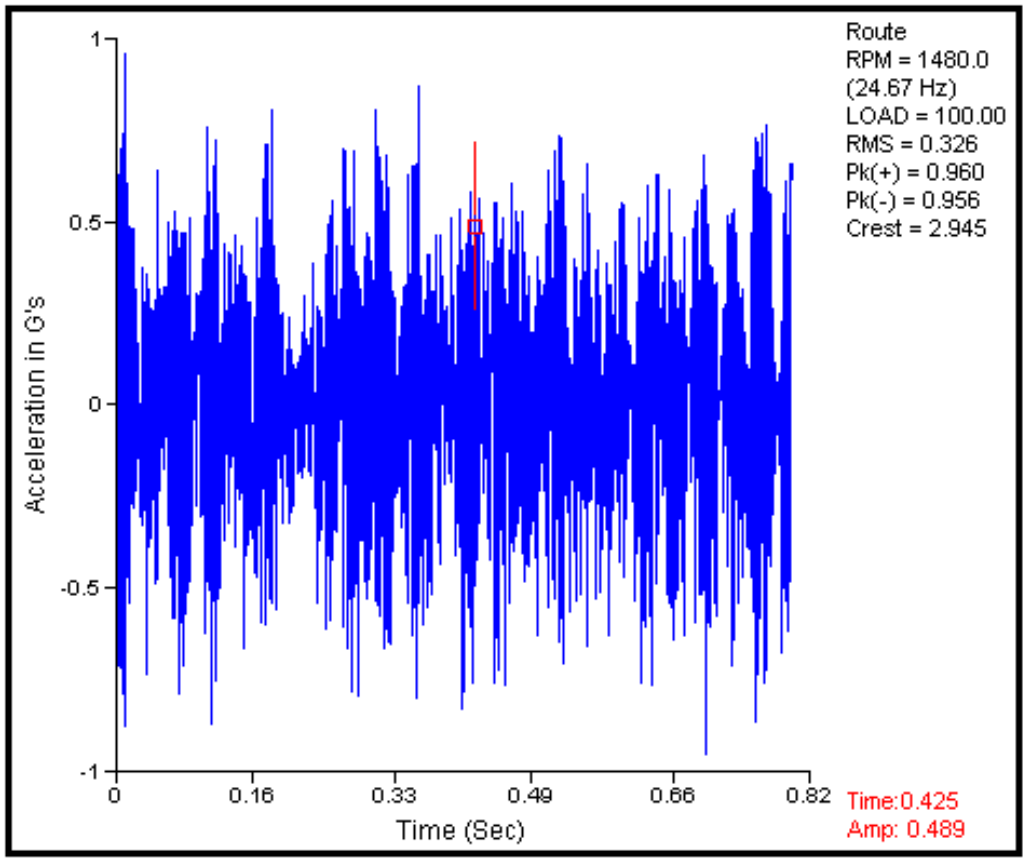
7.10 Waveform plots

A waveform plot is a graphical representation of how the vibration level changes with time.

To view a waveform plot, click on a measurement location from the Locations navigator and then select the appropriate waveform measurement from the Collections navigator.

In the Details navigator, under the Waveform table, select a date/time of interest.

Figure 7-8: Waveform plot

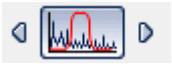
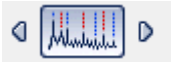


7.10.1 Waveform function bar

These functions are available for waveform plots.

Click ⊞ to display all functions.

Button	Function	Description
	Cursor Type	Click to toggle cursor types: Single, Difference, and Harmonic.
	Mark RPM	Click to display RPM markers. Use the arrow to select **Toggle Markers** or **Set Markers**. **Toggle Markers** displays or hides the RPM markers. **Toggle Markers** synchronizes the RPM markers with the current cursor location.

Button	Function	Description
	Filter Options	Click the left or right button to show the previous or next filter type. You can select all the available options for band-pass and low-pass filters.
	Fault Frequencies	Click to open the Fault Frequency List Viewer. Click the left or right buttons to show the previous or next fault frequency.
	Peak List	Click the left or right buttons to show the previous or next peak.
	Set RPM	Click to open pop-up window allowing to set correct RPM speed. Cursor can be used to identify RPM value.
	Toggle Display Format	Click to change the plot display. You can view a waveform in standard X/Y format or in a circular format.
	Toggle All/One Revolutions	Click to display all revolutions or one revolution at a time. When displaying one revolution, click the left or right arrows to display the previous or next revolution. Click the first or last arrows to show the first or the last full revolution (on some data plots, clicking the arrow again will show the remaining "partial" revolution"). When displaying all revolutions, click the arrows to step through each revolution with the cursor.
	Play Audio	Click to open the Waveform Audio Replay dialog and listen to an audio recording of the waveform.

7.10.2 Use micro-step cursor on waveform plots

Note
When moving the micro-step cursor, you are not moving through different data points, but through virtual points only artificially created between real data points.

Procedure

1. Click on a plot.
2. On keyboard press **Ctrl+LEFT ARROW** or **Ctrl+RIGHT ARROW** to move through different data points.

7.10.3 Display fault frequencies

You can display fault frequencies in autocorrelation plots, waveforms, and spectra. Fault frequency markers start at the fist point in the waveform and are separated by time distance being a reciprocal of the fault frequency.

Procedure

1. Open a spectrum or waveform plot. To open auto the autocorrelation plot right click on the waveform plot and choose **Autocorrelate**.
2. Expand the Spectrum or Waveform function bar.
3. Click  .
   The **Fault Frequency List Viewer** dialog appears.
4. Select a fault frequency.
   The plot displays the selected fault frequency.
5. Select **Keep Frequency Displayed** if you want the plot to always display your chosen fault frequency.
   A checkmark appears beside the selected fault frequency.

Note

- You can select multiple fault frequencies to be always displayed.
- You can also click the left or right buttons to view the previous or next fault frequency without opening the Fault Frequency List Viewer dialog.

To clear fault frequencies, right-click on the plot, and then click **Clear Displayed Frequencies** or **Clear Fault Frequencies**.

7.10.4 Play waveform audio

Procedure

1. Activate a waveform plot.
   The controls on the Function bar changes.
2. From the Function bar, click 
   The **Waveform Audio Replay** dialog is displayed.
3. Use these buttons  to play and operate the waveform audio recording.
4. You can also save a copy of the audio file by clicking  .
   The **Save Waveform Audio File** dialog is displayed. Browse to your selected folder and then click **Save**.

7.10.5 View each revolution in a waveform

You can view each single revolution in a waveform plot. You can view all the revolutions on the same plot or display them one at a time.

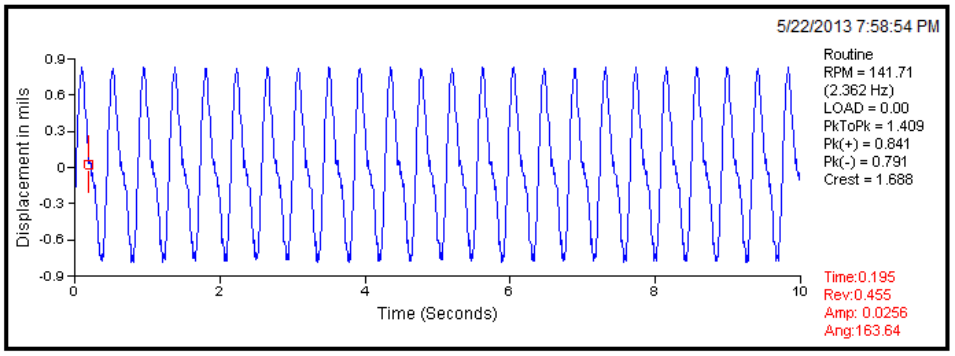
Procedure

1. Use the navigators to find a measurement point.
2. Expand the measurement point and then click a waveform.

In the plotting workspace, a waveform is displayed for all the revolutions in the measurement. The revolutions are selected based on set rotation speed.

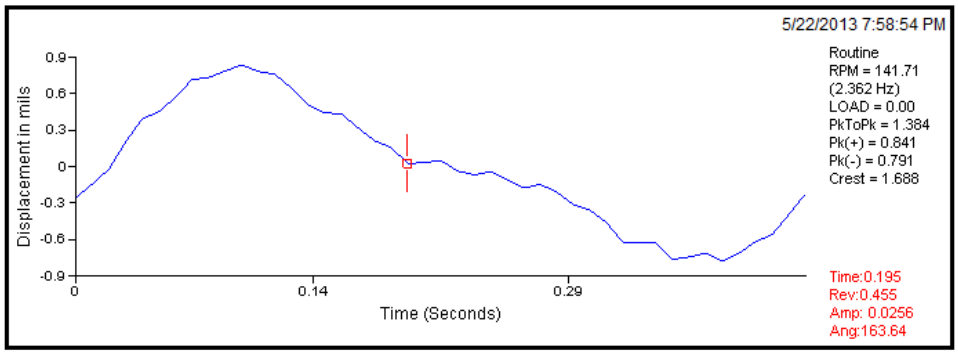
You can select multiple waveforms. Press **Shift** and click the range of points. You can also press **Ctrl** and then click multiple, specific waveforms.

Figure 7-9: Waveform plot: all revolutions in X/Y mode

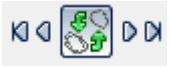


3. Click  to toggle from all rotations to one revolution.

Figure 7-10: Waveform plot: one revolution in X/Y mode



4. Click the right and left arrows  to view the next and previous complete revolution.

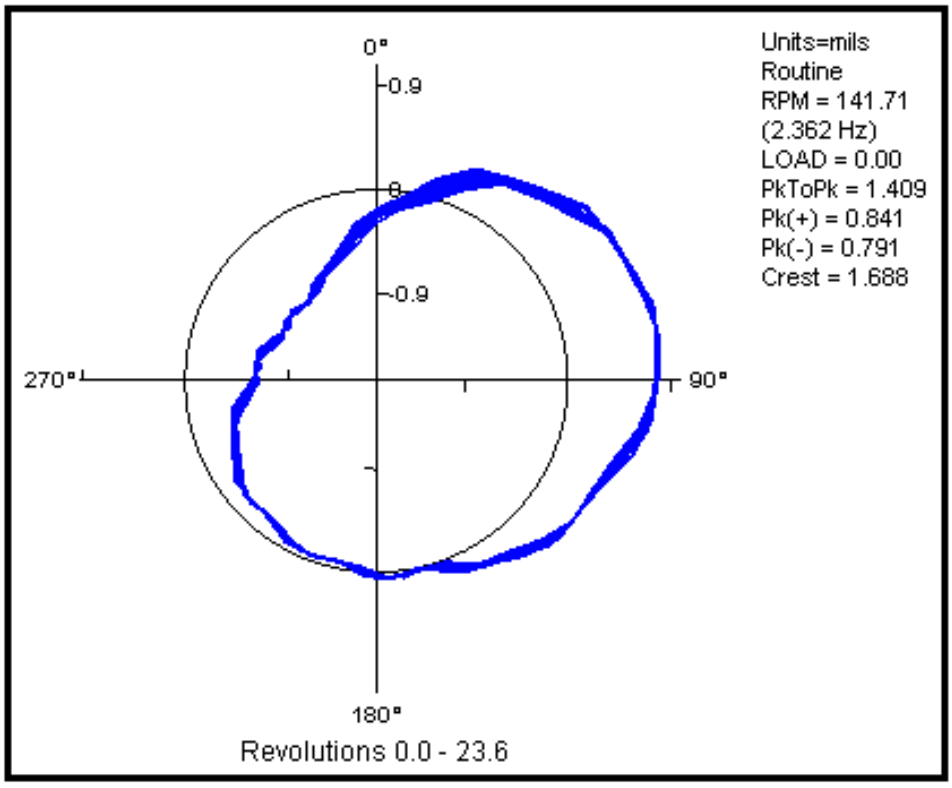
5. Click the first and last arrows  to view the first and last complete revolutions.

   To see a partial revolution after the last complete revolution, click the right arrow.

6. Click  to toggle from the waveform plot in standard X/Y format to a circular format.

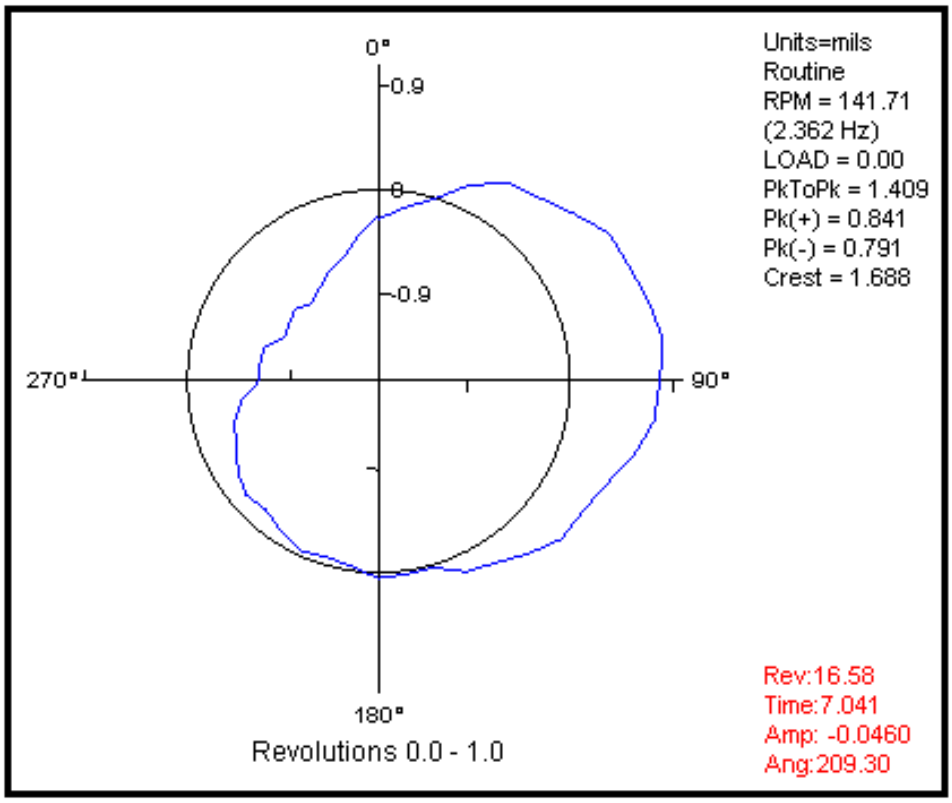
   The waveform plot displays all the revolutions in the measurement.

Figure 7-11: Waveform plot: all revolutions in circular mode



7. Click  to toggle from all rotations to one revolution.

Figure 7-12: Waveform plot: one revolution in circular mode



8. Use the arrows to view each revolution.

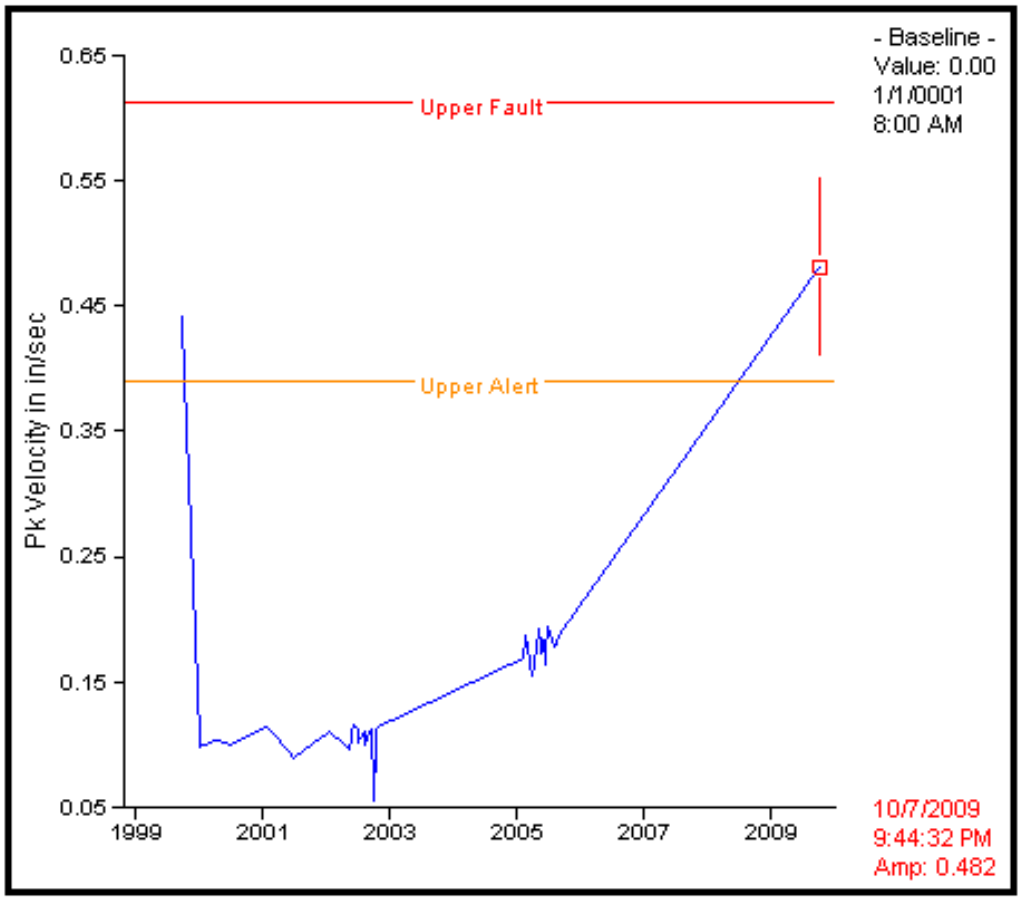
7.11 Trend plots

A trend plot shows a set of values of a vibration parameter over a period of time.

To view a Trend plot, select a measurement location in the Locations navigator, and then select a measurement type in the Collections navigator.

In the Details navigator, under the Trends table, select a date/time of interest.

Figure 7-13: Trend Plot



7.11.1 Trend function bar

These functions are available when a trend plot is shown on the plotting workspace:

Button	Function	Description
	Trend On/Off	Click the button beside the image to show all functions.
	Label Point	Displays a label for your selected data point.

7.11.2 View multiple trend plots on one plot

Trends with the same amplitude units can be displayed together in the plotting workspace using the overlay feature. You can generate an overlay by dragging and dropping one plot onto another plot.

For more information, see Overlay.

7.11.3 Display critical, warning, and advise alarm levels

Procedure

1. From the plotting workspace, right-click on the trend plot, and then select **Setup Options**.
2. On the Trend tab, go to Vibration Alarms under Display Options.
   Select the alarms that you want to show.

   To show upper alarm levels:

   - **Upper Critical**
   - **Upper Warning**
   - **Upper Advise**

   To show lower alarm levels:

   - **Lower Advise**
   - **Lower Warning**
   - **Lower Critical**
3. Click **Apply**, and then click **OK**.

7.12 Connect Vibration Analyzer to a different AMS Machine Works server

If you have more than one AMS Machine Works deployment, you can connect Vibration Analyzer to a different AMS Machine Works server. For example, a site might have different plants with AMS Machine Works setup independently on different networks, or service personnel may use the same laptop to connect to different AMS Machine Works servers as they visit plants and perform analysis on different AMS Machine Works servers. When you have Vibration Analyzer installed, you can switch the AMS Machine Works server in Vibration Analyzer. This is a convenient option because AMS Machine Works Vibration Analyzer is a windows-based application. This feature allows a single installation of Vibration Analyzer to select from a list of AMS Machine Works servers to connect to.

Note
The version of the Vibration Analyzer in the Windows client application must match the version on the AMS Machine Works server.

Prerequisites

- Refer to your System Architecture drawings or other installation records for information about where AMS Machine Works Web Services and AMS Machine Works Historian are installed. They can be installed on the same server or on different servers. You need the server connection information before creating a profile for each AMS Machine Works server connection.
- Confirm the version of AMS Machine Works Vibration Analyzer you have installed is compatible with the AMS Machine Works server.

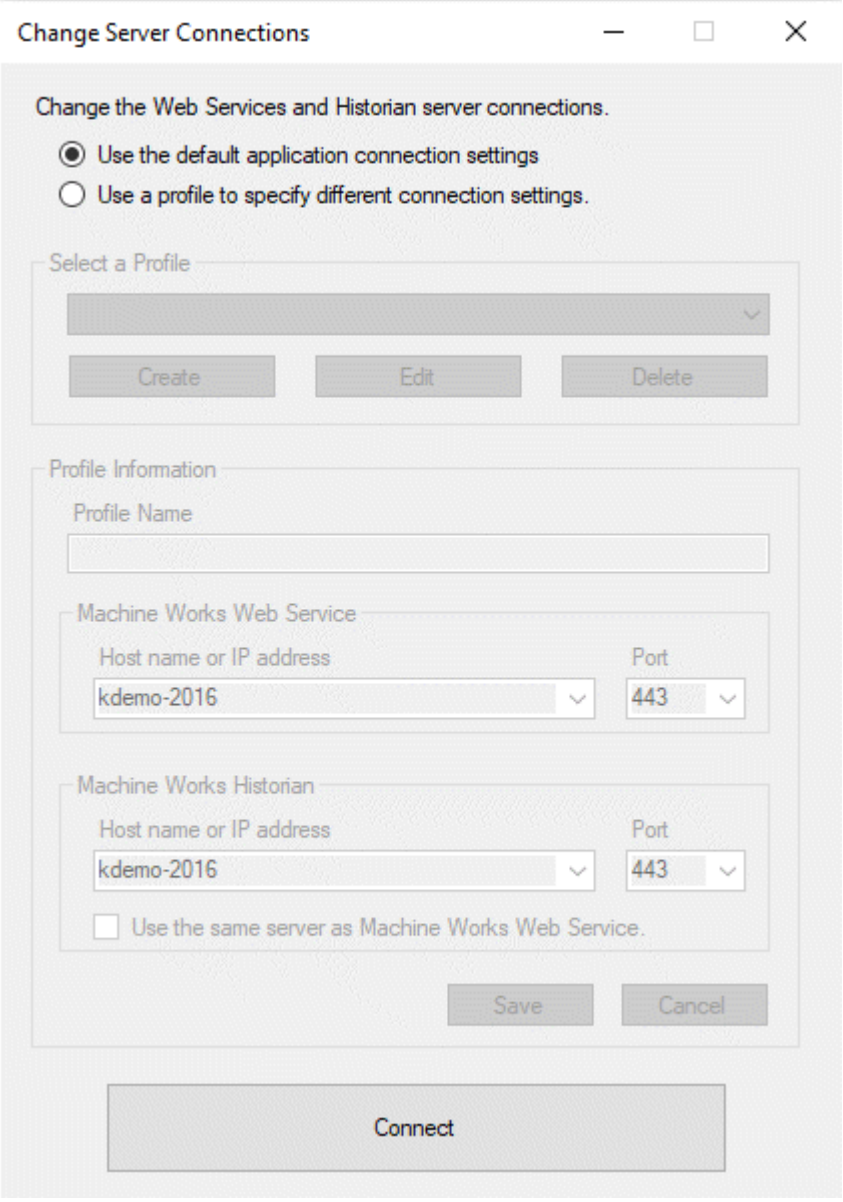
- Confirm the other AMS Machine Works server is available by using your browser to connect to one of the web-based utilities such as Asset Explorer.
- Install the certificate from the AMS Machine Works server on your PC.

Procedure

1. Click  and select **Machine Works Server Setting**.

   The **Change Server Connections** dialog appears. By default, the option **Use the default application connection settings** is selected.

Figure 7-14: Change Server Connections dialog



2. To change the server, create a profile for the connection.
   a) Select **Use a profile to specify different connection settings**.
   b) Under **Select a Profile**, click **Create**.
   c) Under **Profile Information**, enter a name for the profile. Emerson recommends using the name of the AMS Machine Works server.
   d) For **AMS Machine Works Web Service**, enter the Host name and Port. The host information for **AMS Machine Works Historian** is automatically updated to the same information, by default.

      Note
      Only use an IP address if the AMS Machine Works was configured during installation with the **Use IP Address** option. Emerson recommends using a server name instead of an IP address for the setup.

   e) If the AMS Machine Works Historian is on a different server, clear the check box beside **Use the same server as AMS Machine Works Web Service**. Then, under **AMS Machine Works Historian**, enter the Host name and Port.
   f) Click **Save**.

   The profile name appears in the **Select a Profile** menu as the selected profile. You can edit this information later by clicking **Edit**. If you need to delete the profile, click **Delete**.
3. Under **Select a Profile** select the profile name from the menu.
4. Click **Connect**.

   The **Connect** button is only active if a profile is selected.

Vibration Analyzer displays information from the different instance of AMS Machine Works. If there is a problem connecting to the server, an error message displays and prompts you to edit the configuration settings.

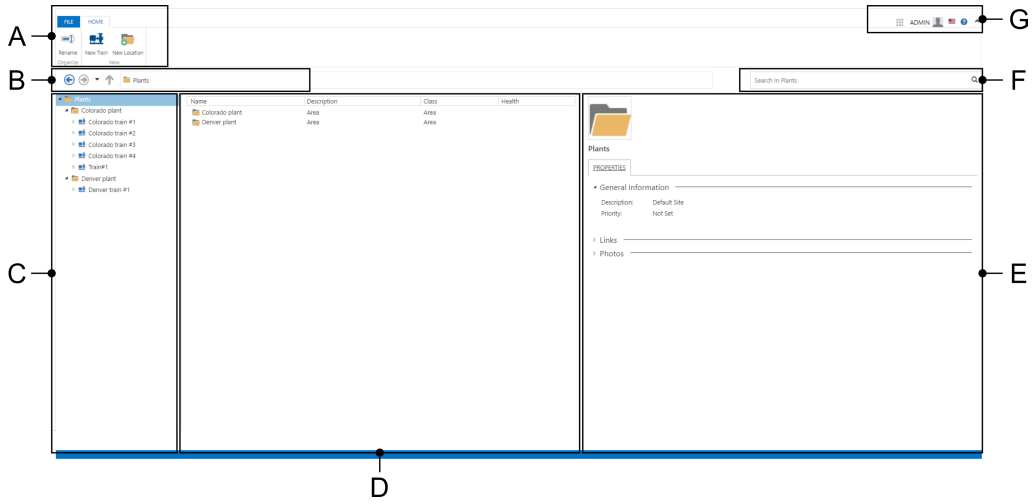
8 Asset Explorer

The Asset Explorer utility allows you to set up your site, create locations, add machines, and arrange them according to how your plant is set up. You can set persona-specific functions for user accounts by setting responsibilities and permissions in the User Manager utility. Permissions and responsibilities ensure each user has the proper access to locations and assets to which they are assigned. You can also do the following in the Asset Explorer utility:

- Set up your site hierarchy: Add a Location
- Add assets to AMS Machine Works: Add a Machine Train
- Launch the AMS Machine Works Vibration Analyzer (VibApp): Home menu

8.1 User Interface Elements

Figure 8-1: Asset Explorer user interface

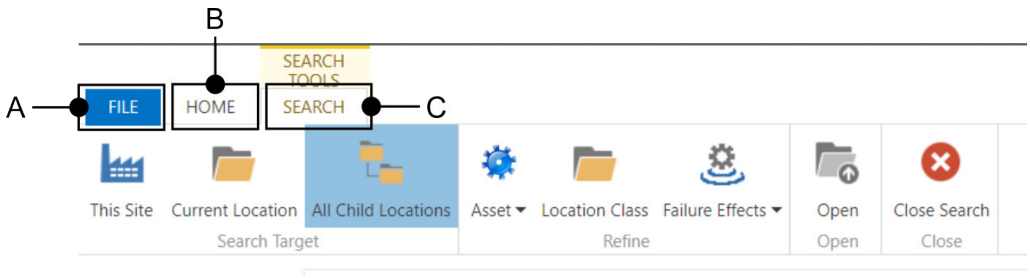


A. ***Ribbon***— *contains a link to the File menu and to the Home ribbon, a context-sensitive tab that displays actions and editable settings.*
B. ***Navigation bar***— *icons and breadcrumbs that help you move through the* ***Location navigator****.*
C. ***Location navigator***—*displays the Location trees.*
D. ***Contents pane***— *displays the name, description, and class of the item selected in the* ***Location navigator****.*
E. ***Details pane***— *displays information based on the selection in the* ***Contents pane****.*
F. ***Search bar***— *enables searching for machine trains and assets in the* ***Location navigator****, and contains a link to the* ***Search Menu****.*
G. ***User toolbar***— *enables launching of other applications, utilities, and software via the* ***App Switcher****, and has links for the* ***User Menu****,* ***Language Settings****,* ***Help****, and a button to collapse the* ***Ribbon****.*

8.1.1 Ribbon

The ribbon section contains three menus:

Figure 8-2: Ribbon menus



A. The File menu, which has information about the current user and enables validation of the license.

B. The Home menu, which is a context sensitive display of currently available actions and settings.

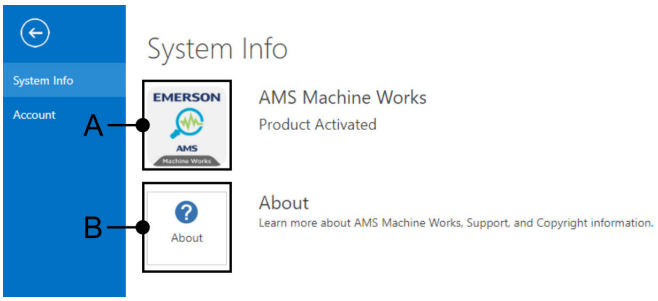
C. The Search menu, which becomes available whenever the user has entered something into the Search bar.

File menu

The **File** menu has two sections:

- **System Info**, which is displayed by default.
- **Account**, which has basic info about the current user and a sign out option.

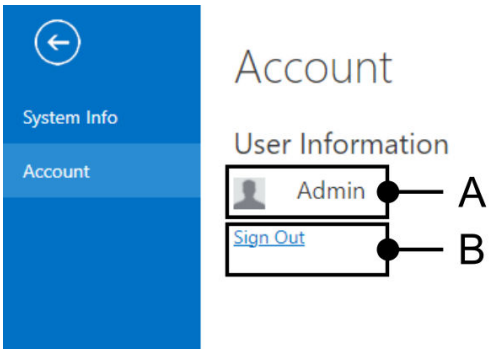
Figure 8-3: System Info details



A. AMS Machine Works — Shows the activation status of the software.

B. About — Click on this section to open a window with detailed information about versions and licences.

Figure 8-4: Account section details

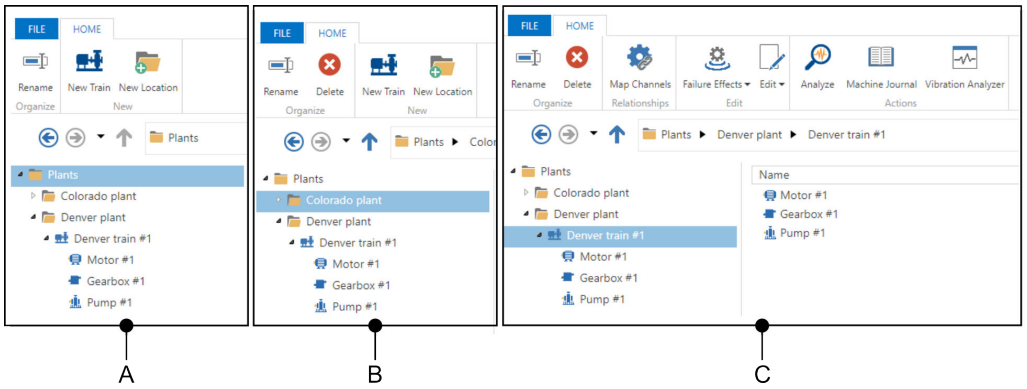


A. *Name of the current user.*
B. *Clickable link to **Sign Out**.*

Home menu

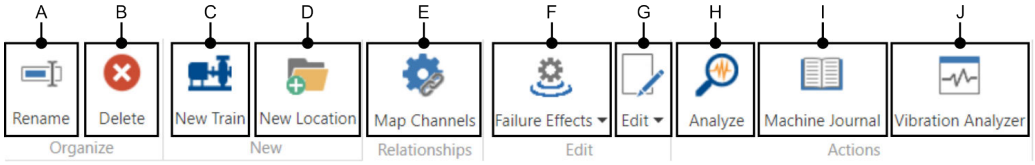
The **Home** ribbon displays different groups of contextual menus depending on what you have selected in the Location navigator.

Figure 8-5: Home menu — contextual menu configurations



A. *Main **Site** selected — default view.*
B. *User deflined **Location** selected.*
C. *User defined **Machine Train** or **Asset** selected.*

Figure 8-6: Home menu ribbon — icon specification



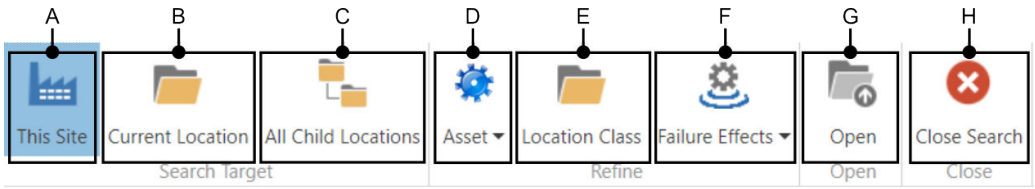
A. ***Rename*** *— which enables you to change the name of the currently selected* ***Location*** *or* ***Machine Train****.*
B. ***Delete*** *— which deletes the currently selected* ***Location*** *or* ***Machine Train****.*
C. ***New Train*** *— which adds a new* ***Machine Train*** *to the currently selected* ***Location****.*
D. ***New Location*** *— which adds a new* ***Location*** *folder as a child of the currently selected* ***Location****.*
E. ***Map Channels*** *— which opens a browser tab where you can associate each channel on an asset source with a particular measurement location on a* ***Machine Train****.*
F. ***Failure Effects*** *— which opens the* ***Failure Effects*** *selection submenu.*
G. ***Edit*** *— has two submenus:*
   - ***Edit Alert*** *— which opens a browser tab for defining alerts.*
   - ***Edit Machine*** *— which opens a* ***Machine Configuration*** *browser tab for editing the currently selected* ***Machine Train****.*

H. ***Analyze*** *— which launches the AMS Machine Works* ***Analysis Dashboard*** *for the currently selected* ***Machine Train****.*
I. ***Machine Journal*** *— which launches the AMS Machine Works* ***Machine Journal*** *for the currently selected* ***Machine Train****.*
J. ***Vibration Analyzer*** *— which launches the AMS Machine Works* ***Vibration Analyzer*** *for the currently selected* ***Machine Train****.*

Search menu

This menu becomes available whenever the user has entered something into the **Search Bar.**

Figure 8-7: Search menu options



A. ***This Site*** *— which enables you to search for assets, machine trains, and locations in the entire Site.*
B. ***Current Location*** *— which enables you to search for specific values in the currently selected Location.*
C. ***All Child Locations*** *— which enables you to search for specific values in the currently selected* ***Location*** *and all of its* ***Child Locations****.*
D. ***Asset*** *— which enables you to search by selecting a single asset type, or by a combination of asset types.*
E. ***Location Class*** *— which enables you to search for a specific location in all the defined locations.*
F. ***Failure Effects*** *— which enables you to search by selecting a failure effect, or a combination of failure effects, for assets and machine trains in the current location.*

> ***Note***
> *Inverse search is also possible for finding assets and machine trains* ***without*** *a failure effect or a combination of failure effects.*

G. ***Open*** *— This option is not currently used in* ***AMS Machine Works****.*
H. ***Close Search*** *— This option closes the* ***Search menu****.*

8.1.2 Navigation bar

The **Navigation bar** is a group of navigational elements to aid the user in stepping through the levels of the your Site and all the Locations and Assets it contains. The **Navigation bar** has the following elements:

Figure 8-8: Navigation bar elements:

A. ***Navigation arrows***
   - *The **back arrow** moves to the last item selected in the navigator.*
   - *The **forward arrow** moves the view to the previous view.*

     Note
     *The **Forward arrow** only becomes active after you have clicked **back arrow**.*
   - *Click on the **triangle icon** to display a list of every place you have visited in this session.*
   - *The **up arrow** moves the view to one level higher in the your Site hierarchy.*

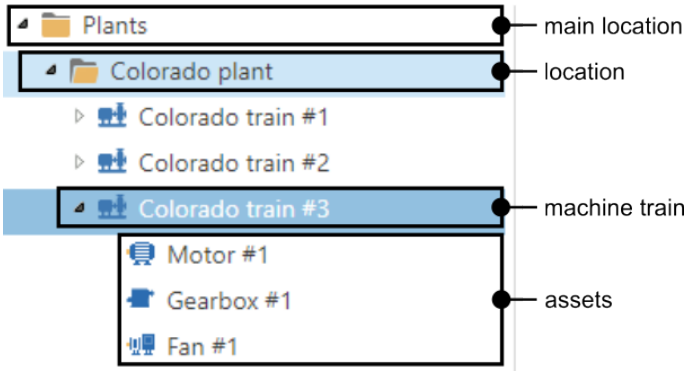
B. ***Breadcrumbs** — The breadcrumb path shows the full path to your current location in the navigator. Go to any level within the path by clicking its breadcrumb.*

8.1.3 Location navigator

The Location navigator enables you organize machines in the Asset Explorer utility in a way that makes sense to you and your users. It also enables you view information about the locations, machine trains, and assets you create. You can perform operations within the context of a selected location or machine train.

The Location navigator is a representation of your Site with three main levels of organization: **Location** → **Machine train** → **Asset**.

Figure 8-9: Location navigator - heirachy example



1. Location folders can be expanded and collapsed, and can contain other location folders and machine trains.
2. Machine trains can be expanded and collapsed, and contain from one to three assets.

3. Assets are elements of a machine train such as fans, gearboxes, and motors.

Related information:

- For more information about how to add a Location: Add a Location
- For more information about how to add a Machine train: Add a Machine Train

8.1.4 Contents pane

The **Contents pane** displays information about locations, machine trains, and assets. There are three columns:

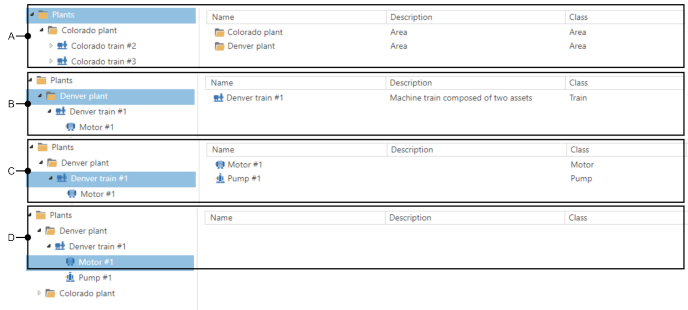
- **Name** — the name of the **Location**, **Machine Train**, or **Asset**.
- **Description** — the user-defined description of the contents.

  Note
  Each **Location** has a default description of "Area".

- **Class** — the type of the item.
  1. **Area** — the class for a **Location**.
  2. **Train** — the class for a **Machine Train**.
  3. **Asset** — one of the predefined classes for an **Asset**. (e.g., Motor, Pump, etc.)

Your selection in the Location navigator determines what data is displayed:

Figure 8-10: Contents pane



*A. **Site** or **Main Location** — displays every child **Location**.*

Note
*Best practice is to place every **Machine Train** in the end nodes of a folder structure which reflects the organization of your site. However, you can place them at any level of your location structure if you need to.*

*B. **Location** — displays every child **Location**, or if it is an end node it displays every **Machine Train** that it contains. (See the note above for exceptions.)*

*C. **Machine Train** — displays the assets included in that train such as a Motor, Pump, etc.*

*D. **Asset***

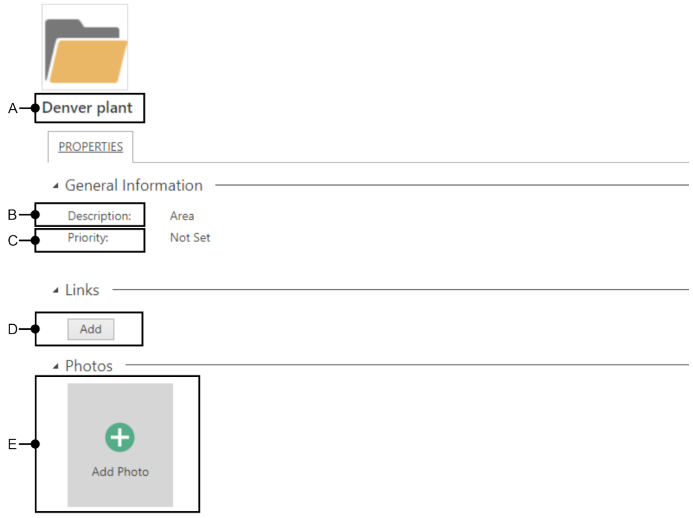
Related information:

- For more information about how to add a Location: Add a Location
- For more information about how to add a Machine train: Add a Machine Train

8.1.5 Properties pane

The **Properties pane** displays detailed information about the currently selected **Location**, **Machine Train**, or **Asset**. Different information is displayed for a **Location** vs. a **Machine Train** or **Asset**.

Figure 8-11: Properties pane — Location view

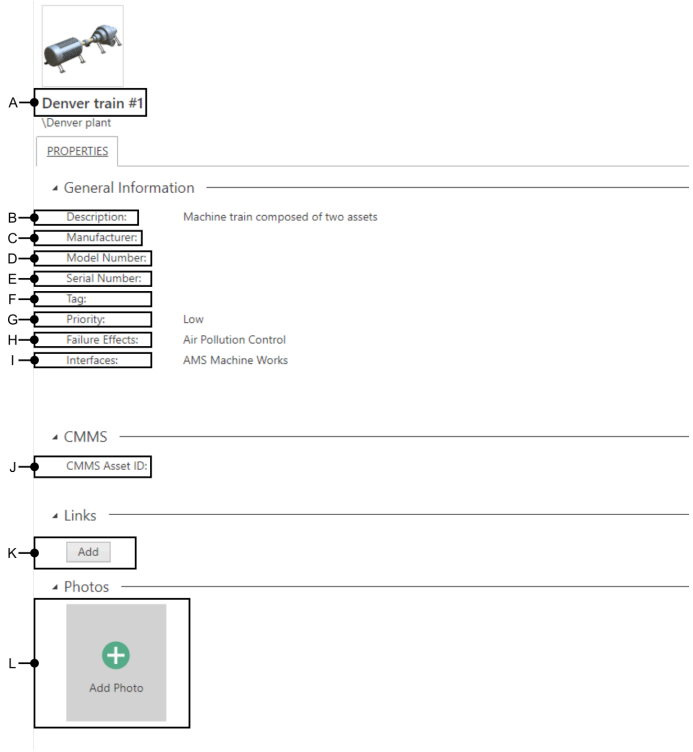


Note
Save and **Cancel** buttons appear for you to confirm or reject any edits, and disappear once you click one of the buttons.

For a **Location** the following fields are available:

A. *The **Location** name*
B. *Description – You can edit the description here. The default description for a Location is, "Area".*
C. *Priority – A **Location** inherits its priority from its parent folder. You can change it here by selecting from: Not Set, Low, Medium, High, or Very High.*
D. *Add link button – You can define a link to an external website.*
E. *Add Photo – You can add photos here.*

Figure 8-12: Properties pane — Machine Train and Asset view



Note

Save and **Cancel** buttons appear for you to confirm or reject any edits, and disappear once you click one of the buttons.

For a **Machine Train** or **Asset**, the following fields are available:

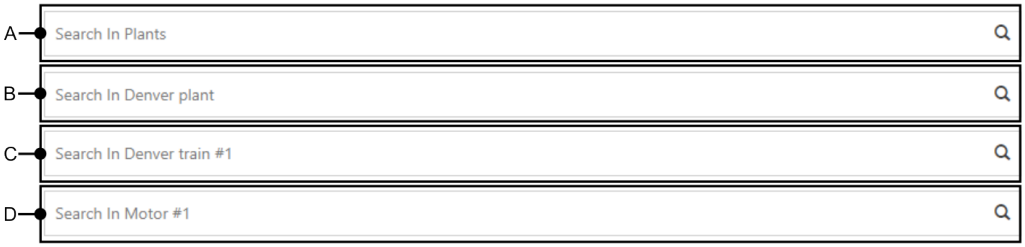
A. ***Machine Train*/*Asset*** *name.*
B. *Description – The description is displayed here, and can be edited here.*
C. *Manufacturer – This information is only filled in for an* ***Asset****.*
D. *Model Number – This is an* ***Asset*** *model number, and is only filled in for assets.*
E. *Serial Number – This option is not currently used in AMS Machine Works.*
F. *Tag – This option is not currently used in AMS Machine Works.*
G. *Priority – A* ***Machine Train*** *or* ***Asset*** *inherits its priority from its parent folder. You can change it here by selecting from: Not Set, Low, Medium, High, or Very High.*
H. *Failure effects – This is an editable drop-down list. For more information refer to: Failure Effects.*
I. *Interfaces – This is the name of the interface which the* ***Asset*** *uses to communicate, currently only through AMS Machine Works.*
J. *CMMS Asset ID - This option is not currently used in AMS Machine Works*
K. *Add link button – You can define a link to an external website.*

L. *Add Photo – You can add photos here.*

8.1.6 Search bar

The **Search bar** is located in the top right area of the User Interface Elements . The **Search bar** enables you to perform searches with different scopes:

Figure 8-13: List of search levels



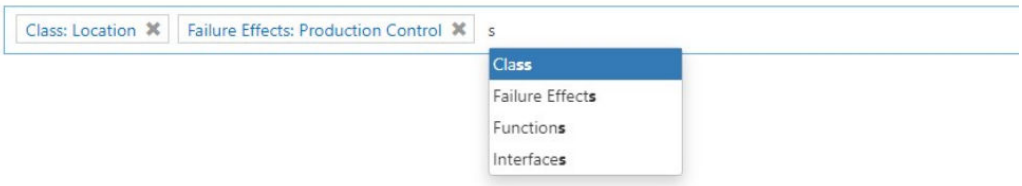
A. *Search in the entire **Site**, the main **Location** for this installation of AMS MW Asset Explorer.*
B. *Search in the currently selected **Location**. For example, search for a **Machine Train** or asset in the Denver plant.*
C. *Search in the currently selected **Machine Train** for an **Asset**. For example, search for the motor in Denver train #1.*
D. *Search in the currently selected **Asset** for some data. For example, search for the failure effects defined for motor #1.*

The **Search bar** enables users to search with additional labels applied. For example, a user can add **Failure Effects** labels to their search criteria. Once users click in the **Search bar** the contextual Search menu ribbon is activated.

You can then type in some text to start your search. To refine your search results you can choose to add labels by clicking on **Asset**, **Location Class**, or **Failure Effects** and selecting labels.

For more information see: Apply Failure Effect Labels

Figure 8-14: Searching with labels and hints



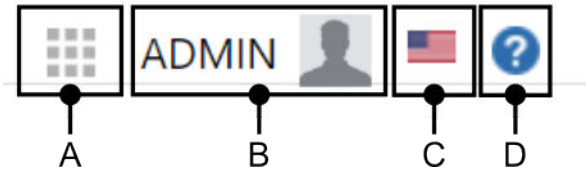
This search bar has two labels added to refine the search, **Class: Location** and **Failure Effects: Production Control**. Also, the **Search bar** is offering suggestions based on what has been typed, 's'.

Note
You can also define custom failure effects: Define Custom Failure Effect Labels

8.1.7 User toolbar

The **User toolbar** contains a links to other applications and services..

Figure 8-15: User toolbar



A. *Application Switcher — this menu enables you to switch to other AMS Machine Works applications. For more information: App Switcher*
B. *User Menu — this menu has information about the current user and the option to log out. For more information: User Menu*
C. *Langugage Settings — this menu allows you to change the interface language for AMS Machine Works. For more information: Language Settings*
D. *Online Help — click this link to get to the online version of this documentation. For more information: Help*

8.2 Locations vs. Assets

A **Location** or generic assets can contain a **Machine Train**, and other generic assets. In certain situations, it makes sense to use one of these instead of the others. You can create several types of **Location** and organize them in the **Location Navigator**. Every **Location** has some basic properties, and every type of specialized location has some specific additional properties. These specialized properties are represented in the **Location Navigator** by icons.

Areas are the most basic type of **Location** and are represented by a folder icon. Its properties include a name and links to its sub-locations (children).

Location assets are also represented by folder icons and can contain other locations, and assets.

A machine, or a **Machine Train**, is a type of asset defined in AMS Machine Works. A machine has specific properties defined for collecting measurements such as PeakVue, vibration, and temperature. This data is analyzed and used to diagnose problems and the condition of the equipment in order to schedule maintenance before a failure occurs.

Table 8-1: Assets vs. Locations

Property	Assets	Locations
Contents	Generic assets can contain any number of machines or asset sources, but cannot contain a location.	A **Location** can contain any number of sub-locations (children). This allows you to organize your **Location Navigator** in any way that makes sense to you.
Filtering	You can apply filter preferences to assets so they are easier to find with the search functions.	You cannot apply filter preferences to locations.
Customization	You can customize assets to display specific icons and images.	The icon for a **Location** is always a folder.

Related information:

- Add a Location
- Add a Machine Train

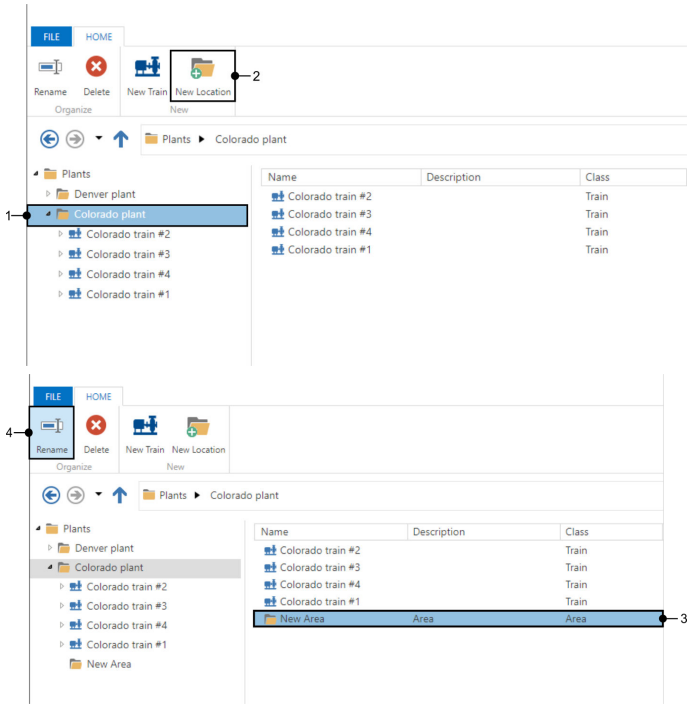
8.3 Add a Location

Use a **Location** hierarchy to represent the functional areas, floors, or sections of your site. You can nest a **Location** within another **Location**.

⚠ CAUTION

When you add a **Location** it inherits the priority of its parent **Location**.

Figure 8-16: Add a Location



Procedure

1. In the Asset Explorer utility highlight a **Site** or **Location**.
2. In the **Home** ribbon click **New Location**.
   A new location folder named **New Area** appears at the bottom of the **Contents Pane**. You may type in a name now, or rename it later.
3. To rename a Location, highlight it in the **Location navigator** or in the **Contents pane**.
4. Next, click **Rename** in the **Home** ribbon. You may now type in a name.

Postrequisites

Note
You can create a practically unlimited number of locations with a practically unlimited depth of folder structure.

Postrequisites

Add a Machine Train to your site.

8.4 Add a Machine Train

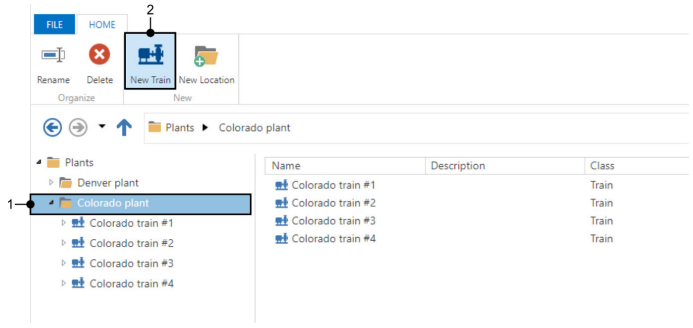
Best practice is to add a **Machine Train** to an end (leaf) node folders in the **Location Navigator.** The folders in the **Location Navigator** should be organized in logical groups which are similar to the organization of the physical site in your facility.

Note
You can add a **Machine Train** to your main **Site** or at any level in the **Location Navigator** if you need to.

⚠ CAUTION

When you add a **Machine Train** it inherits the priority of its parent folder.

Figure 8-17: Add a Machine Train



Procedure

1. In the Asset Explorer's **Location Navigator**, highlight the **Location** where you want to add a **Machine Train**.
2. In the Home ribbon, select **New Train**.

Your view is transferred to a new tab in your browser for further configuration steps.

Postrequisites

Follow the instructions in the Machine Configuration section beginning with Step 1: Add Machine Train Details.

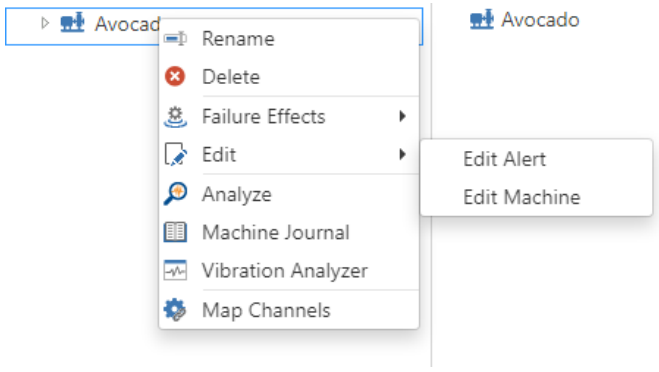
Related information:

- Add a Location
- Locations vs. Assets
- Step 2: Add Machine Details
- Step 3: Channel Mappings
- Step 4: Summary

8.5 Edit a Machine Train

You can start to reconfigure a **Machine Train** in the **Asset Explorer** by selecting the **Edit** → **Edit Machine** option in the **Home menu**.

Figure 8-18: Select the Edit Machine option



Procedure

1. In the **Asset Explorer** select a **Machine Train** in either the **Location navigator** or **Contents pane**.
2. There are two ways to access the **Edit Machine** function:
   a) (Shown above.) Right-click on a **Machine Train** or a **Component**, and select the **Edit** → **Edit Machine** option.
   b) In the **Home menu** select **Edit** → **Edit Machine**.

Your view is transferred to a new tab in your browser for further configuration steps.

Postrequisites

Follow the instructions in the Machine Configuration section beginning with Step 1: Add Machine Train Details.

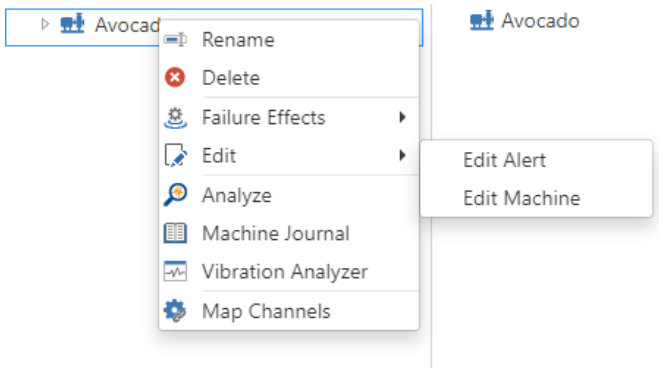
Related information:

- Add a Location
- Locations vs. Assets
- Step 2: Add Machine Details
- Step 3: Channel Mappings
- Step 4: Summary

8.6 Edit Alerts

You can edit the **Alerts** for a **Machine Train** in the **Asset Explorer**.

Figure 8-19: Select the Edit Alerts option



Procedure

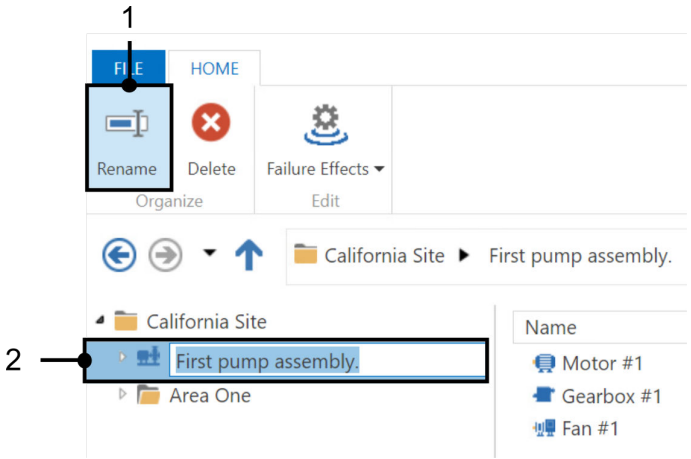
1. In the **Asset Explorer** select a **Machine Train** in either the **Location navigator** or **Contents pane**.
2. There are two ways to access the **Edit Alert** function:
   a) (Shown above.) Right-click on a **Machine Train** or a **Component**, and selecting the **Edit** → **Edit Alert** option.
   b) In the **Home menu** select **Edit** → **Edit Alert**.

Your view is transferred to a new tab in your browser for further configuration steps.

8.7 Renaming Locations, Machine Trains, and Assets

To rename a **Location**, **Machine Train**, or **Asset** follow this procedure below.

Figure 8-20: Rename Icon



Procedure

1. In the **Location navigator** or **Contents pane**, select a **Location**, **Machine Train**, or an **Asset** and then click **Rename** in the **Home menu**.
2. In the name field of the item, enter the new name, and then press the **Enter** key to accept the change.
3. To reject the name change, press the **Esc** key.

The new name is displayed.

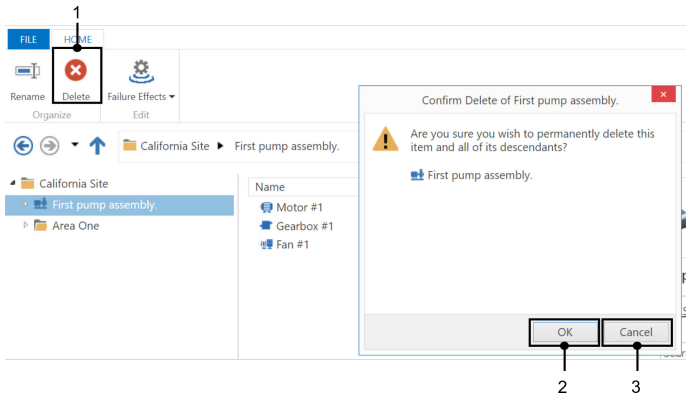
8.8 Deleting Locations and Machine Trains

To delete a **Machine Train** or **Location** you may use the following method. It is recommended to only delete items at the end (leaf) nodes of your heirarchy.

⚠ CAUTION

Deleting a **Machine Train** or **Location** also deletes **ALL** of its descendants or contents. (i.e., **ALL** of the **Location**, **Machine Train**, or **Asset** elements that it contains.)

Figure 8-21: Delete Icon



Procedure

1. In the **Location Navigator** or **Contents pane**, select a **Location** or **Machine Train**, and then click **Delete** in the **Home menu**.
2. Click **OK** to confirm your intention to delete.

   ⚠ CAUTION

   Deleting a **Machine Train** or **Location** also deletes **ALL** of its descendants or contents. (i.e., **ALL** of the **Location**, **Machine Train**, or **Asset** elements that it contains.)

3. Click **Cancel** to finish without deleting.

8.9 Failure Effects

Failure Effects settings help you identify and organize both **Machine Train** and **Asset** elements by the effects caused if they fail. For example, you could label a Fan Asset with an **Environmental Control** setting if the purpose of the fan is to provide cooling to a production environment.

⚠ CAUTION

1. Failure effects are for informational purposes only.
2. Failure effects do not affect system performance or trigger alerts.
3. Failure effects are only for filtering searches.

8.9.1 Apply Failure Effect Labels

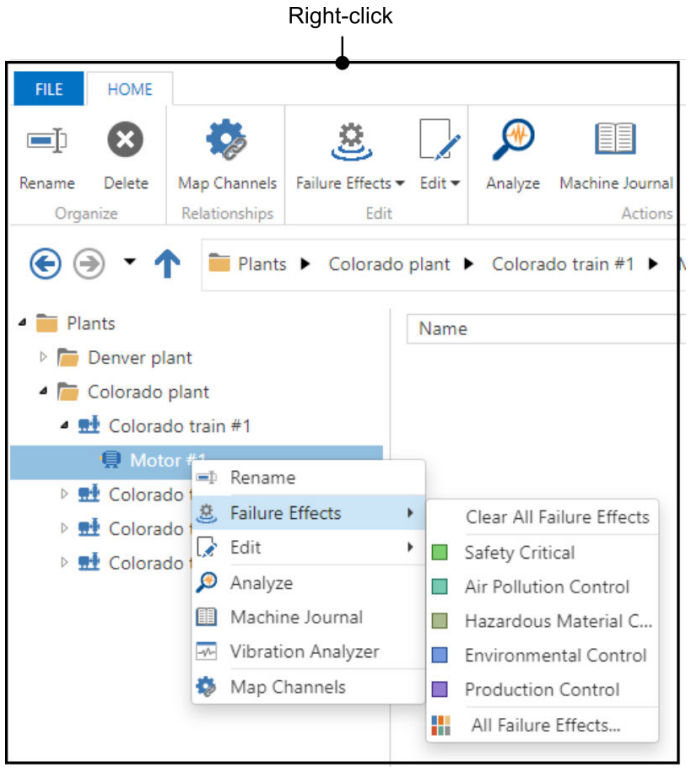
Failure Effects are labels for categorizing system elements. This enables grouping and filtering of these elements when using the Search bar.

Note
Failure Effect Settings do not transfer automatically in either direction between Machine Train and Asset elements. **All Failure Effect Settings must be made separately for each individual element.**

There are three ways to apply labels in the **Asset Explorer**:

Apply an effect — right-click method

Figure 8-22: Method One: Apply a Failure Effect with a right click

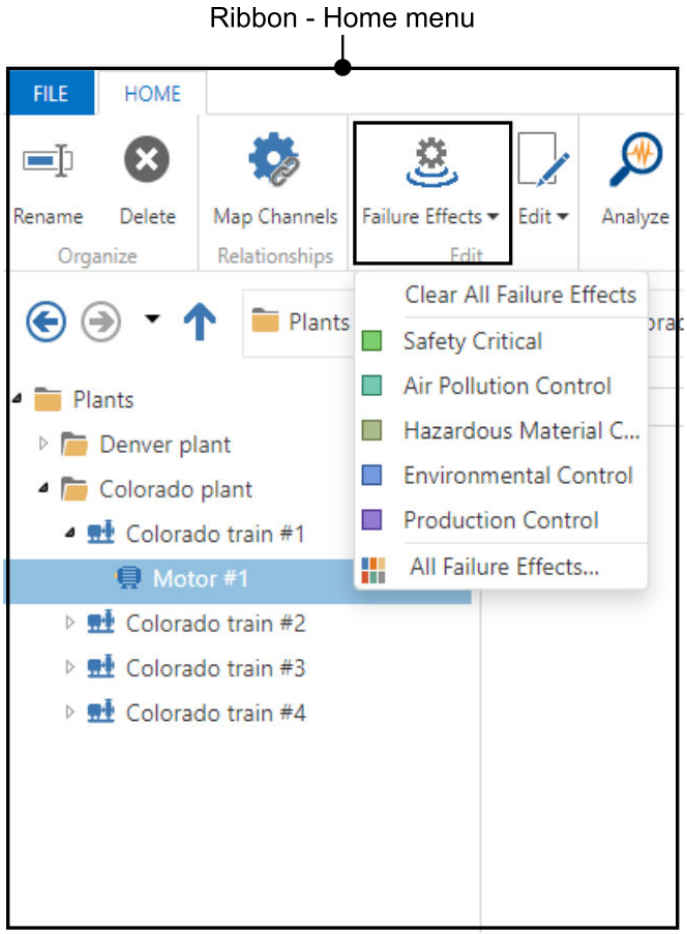


Procedure

Right-click method: In the **Location navigator** or **Contents pane**, right-click on a **Machine Train** or an **Asset** and select an effect from the **Contextual Menu** → **Failure Effects** menu.

Apply an effect — Home menu method

Figure 8-23: Method Two: Apply a Failure Effect by the Home menu

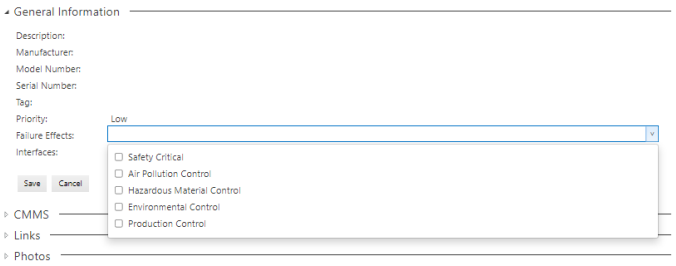


Procedure

Home Menu method: In the **Location navigator** or **Contents pane**, select a **Machine Train** or an **Asset** and then in the **Home Menu** click **Failure Effects** and select an effect to add.

Apply an effect — Properties pane method

Figure 8-24: Method Three: Apply a Failure Effect — Properties pane method



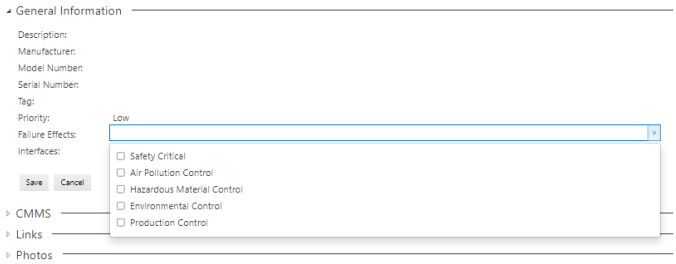
Procedure

1. **Properties pane** method: In the **Location navigator** or **Contents pane**, select a **Machine Train** or an **Asset** and then in the **Properties pane** select all the applicable effects from the **Failure Effects** drop-down menu.
2. Next, click **Save** to confirm your choices, or **Cancel** to reject your choices.

8.9.2 Remove Failure Effect Labels

This is the same method as: Apply an effect — Properties pane method. So you may also use this method to add effects.

Figure 8-25: Remove Failure Effect Labels



Procedure

1. **Properties pane** method: In the **Location navigator** or **Contents pane**, select a **Machine Train** or an **Asset** and then in the **Properties pane** select the effects from the **Failure Effects** drop-down menu that you want to remove.
2. Next, click **Save** to confirm your choices, or **Cancel** to reject your choices.

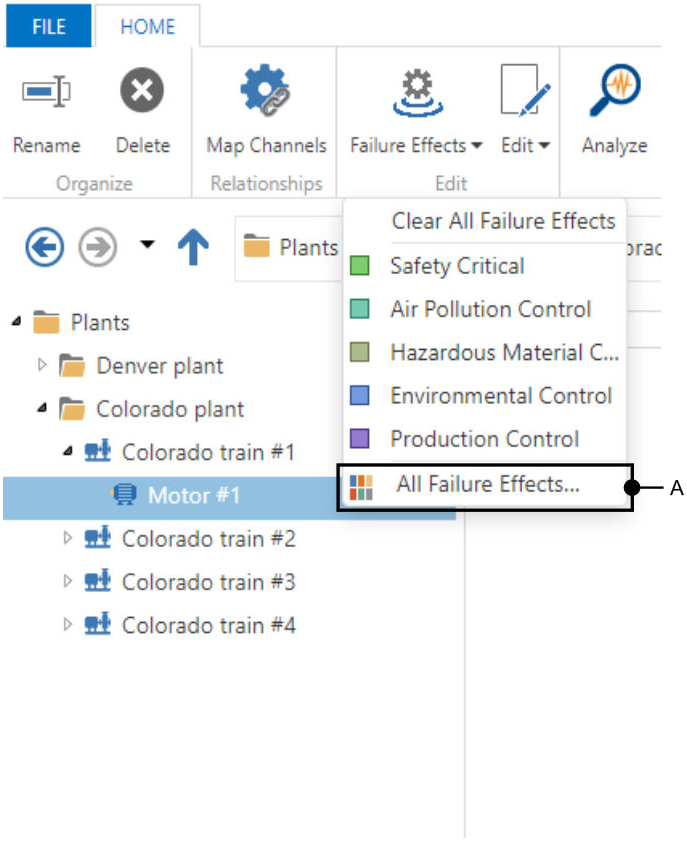
8.9.3 Define Custom Failure Effect Labels

You can define or modify Failure Effects and assign a colored label to them. There are 25 colors to choose from.

Procedure

1. In the **Asset Explorer**, select a **Machine Train** or **Asset** in the **Location navigator**.

Figure 8-26: Choose: All Failure Effects



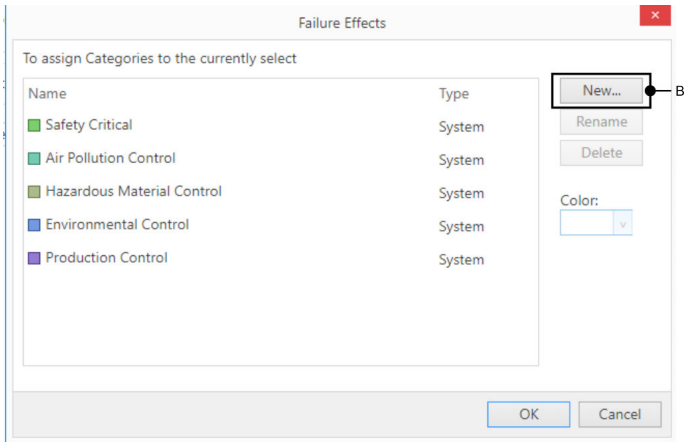
2. Right-click your selection and choose **Failure Effects**from the menu, or click the **Failure Effects** menu in the **Home** ribbon, and then select **All Failure Effects**.

Note
This step is similar to:

- Apply an effect — right-click method
- Apply an effect — Home menu method

3. In the window that pops up, click the **New** button.

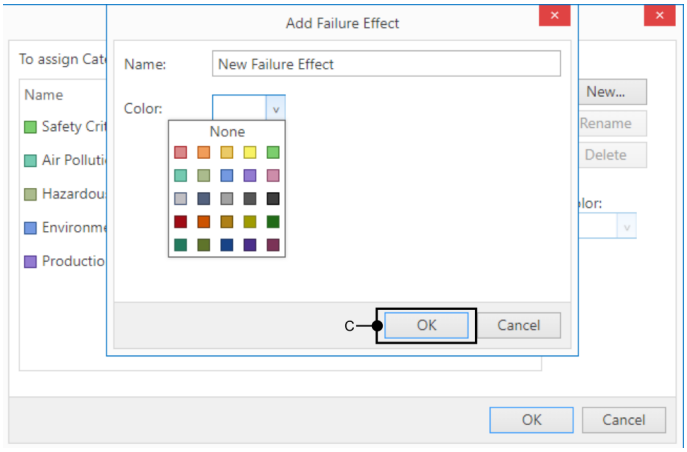
Figure 8-27: Add a new Failure Effect



4. Enter a new **Failure Effect** name and choose a color.

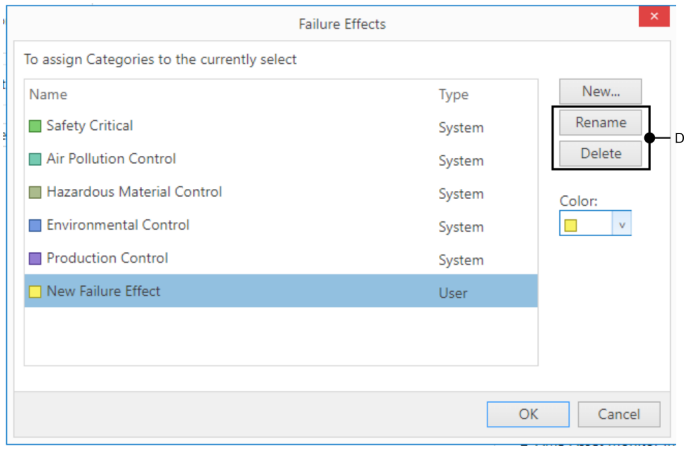
Note
Default is without a color.

Figure 8-28: Enter a new Failure Effect name



5. To modify, rename, or delete a user defined **Failure Effect** follow Step One and Step Two and then click **Rename**, **Delete**, or choose a new **color**.

Figure 8-29: Modify or Delete a user defined Failure Effect



9 Machine Journal

The **Machine Journal** is a web application in AMS Machine Works. The **Machine Journal** enables Analysts to track problems which are developing in machines.

The **Machine Journal** application is also accessible from a menu in **VibApp** (Vibration Analyzer application).

The **Machine Journal** enables you to:

- track work orders for every **Machine Train**
- and add notes and observations along with supporting images and data
- search for and filter cases
- gather statistics which complex analysis
- create case reports to support work orders

9.1 Launch the Machine Journal

The **Machine Journal** can be launched by the **App Switcher** in the **Analysis Dashboard**, or from other utilities such as the **Asset Explorer**.

See:

- App Switcher
- Home menu

9.2 Machine Journal Terms

Terms

The following terms are used to describe the Machine Journal functionality.

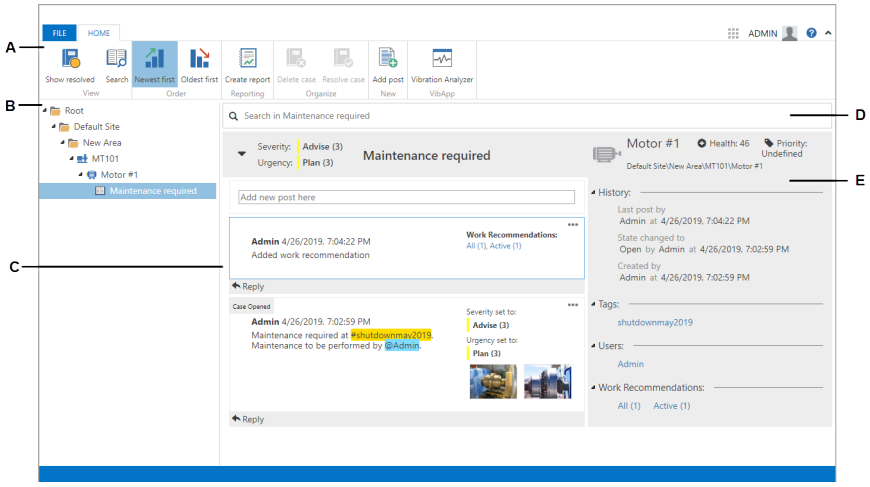
Case	A case is related to a machine asset. It has a title, creation date, severity, urgency, open or resolved status, and a list of posts.
User Mention	A user mention is used to associate a user with a post, which is different from a Tag. A tag is used to categorize a post by, for example, fault type. User mentions are prefixed by the @ sign.
Post	A post is a note, data link, or image that is associated with a case.
Tag	A tag is a word or phrase used to identify or categorize a post. Tags are prefixed by a **#** sign.
Urgency	Urgency is a property you can assign to a case to indicate how quickly the problem needs to be fixed. Urgency has a number, caption, and corresponding color. You can select urgency from a list of values and create custom values. You can manage the list of values for urgency. The urgency you set applies only to Machine

	Journal cases and does not contribute to the health value of a machine.
Severity	Severity is a property you can assign to a case to indicate how much impact this problem has on your plant or operations. Severity has a number, caption, and corresponding color. You can select severity from a list of default values and create custom values. You can manage the list of values for severity. Use severity to indicate the significance of the problem or the impact to your plant operations. The severity you set applies only to Machine Journal cases and does not contribute to the health value of a machine.
Work Recommendation	The request for action to be tracked and executed on particular machine asset.

9.2.1 Machine Journal user interface

The Machine Journal Posts News Feed is the main view from which you navigate the site and select machines to add or modify cases.

Figure 9-1: Machine Journal user interface



A. ***Home ribbon menu***—*options for case creation, search and sort cases, and to create a report*
B. ***Navigation tree***—*list of machines that may have cases added to the components under each machine*
C. ***Posts news feed***—*list of cases based on the selection in the navigation tree*
D. ***Search bar***—*list in which you can add or remove search parameters*
E. ***Case history details***—*a summary of machine information, history, tags, users, and work recommendations*

The information displayed in the navigation tree depends on the responsibilities assigned to your user. The responsibilities are configured in the user settings, available from the **File** → **User Settings** menu in Asset Explorer or User Manager.

The home ribbon displays different options depending on what is selected. Options display in the ribbon menu based on your context in the tree. These options are also available from a context menu. Right-click a node in the tree to see the available options.

Table 9-1: Home ribbon menu default options

Option	Description
Show resolved	Show cases that are resolved.
Search	Open the search ribbon menu to refine the results displayed in the cases in the Posts News feed.
Newest First	Display newest cases first.
Oldest First	Display oldest cases first.
Create Report	Open the News Feed view in print preview mode.

9.3 Machine Journal settings

9.3.1 Severity and Urgency

Severity and Urgency are properties of a case that help you describe the impact of a problem and how quickly the problem needs to be fixed. These categories are used only within the Machine Journal application and do not contribute to the health value of a machine.

9.3.2 Customize severity and urgency

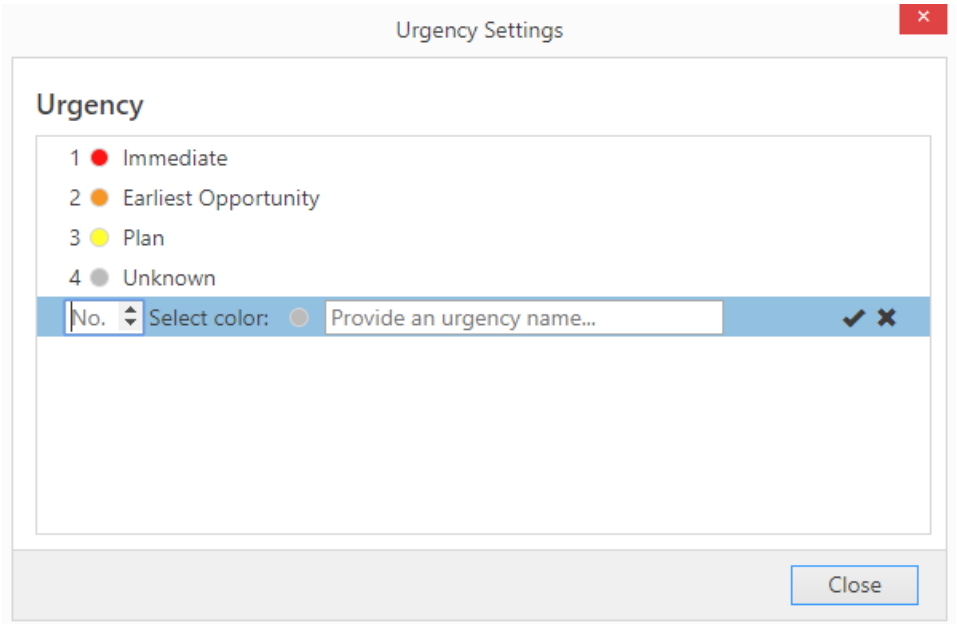
You can customize the text, value, and color for the Severity and Urgency categories.

You can add new items to the categories or edit and delete existing items. The default values can only be deleted if they have not yet been used in the system.

Procedure

1. Select **File** → **Urgency Settings** or **File** → **Severity Settings**.
2. Hover over a category.
   The row becomes light blue and displays a pencil icon and a trash icon.
3. To add a new category, click **Add new**.
   A new row appears for the category in edit mode.

Figure 9-2: Urgency Settings: Add a new category



4. Edit the number, select a color, and add a text label for the category.
5. To edit an existing category, click the pencil icon or double click the category.

   You can change the number, color, or text of an existing item. Each entry must be unique. Do not select the same color, text, or number used by another category.
6. To delete an existing item, click the item, then click the trash icon.

   You can delete an existing category if it is not used in the system. Hovering over the trash icon displays a message that the category is used in the system. If the category is not used in the system, the trash icon is dark gray, indicating it is active. If the category is used in the system, the trash icon is light gray, indicating it is inactive.

9.3.3 Show or hide resolved cases in the navigation tree

You can show or hide resolved cases. By default, resolved cases are hidden. Resolved cases must be displayed before you can reopen a resolved case.

Procedure

Click **Show Resolved** in the **Home** ribbon to show the resolved cases in the navigation tree.

The navigation tree shows all resolved cases.

9.3.4 Show or hide deleted posts in case information

When you select to show deleted posts in the case information, all cases will show all the deleted posts. Emerson recommends using the default setting, which hides the deleted posts. You can temporarily show deleted posts to perform an audit of the cases.

Procedure

1. Select **File** → **Settings** → **Preferences**.
2. Place a check mark in **Show deleted posts in the case information**.

9.4 Procedures

9.4.1 View the Posts News Feed

The Posts News Feed shows all the information below your selection in the navigation tree, according to your settings. You can modify your view of the Posts News Feed by date and time order. By default, the news feed shows newest posts first.

Procedure

- In the navigation tree, select the root node to display all open cases.
- Select a machine to display only the cases and posts for the machine.
- Change the sort order by selecting either **Oldest first** or **Newest first** in the ribbon.

9.4.2 Set news feed sort and filter options

From the **Search** ribbon, you can select options for customizing your news feed and posts.

As you select options to customize your search results, the search results are automatically updated.

Procedure

1. Click **Search** on the ribbon or place the cursor in the search bar.
   A **Search Tools** ribbon appears.
2. Select any node in the tree to narrow the results to the items below the selected node. For example, select a folder to display the cases of machines in that area.
3. Reorder the search results by selecting **Ascending Order** or **Descending Order** from the home tab of the ribbon.
4. Type text in the search parameters bar.
   The search phrase is compared against case title and post descriptions.
5. In the **Search Tools** ribbon, select from the filter options to limit the results.

Option	Description
State	Show cases by state: open, resolved, or deleted. All states are included by default. This search setting is independent from the

Option	Description
	preferences setting to show resolved cases or deleted posts. If you have **Hide Resolved** selected in the ribbon, you can still see resolved cases when you select resolved as a search property.
Urgency	Show cases with the urgency selected.
Severity	Show cases with a selected severity.
Tag	Tags are specified in notes field prefixed by the # symbol.
User	Users are specified in notes field prefixed by the @ symbol. List of users is provided from the User Manager utility.
Asset Type	Asset type shown in Asset Explorer.
Date Range	Show only results within range defined by the dates. Select only a start date to show results newer than the specified date and newer. Select only an end date to show results older than the specified date. When you choose the date, it appears on the search parameters bar. If you need to change the date, click the **x** beside the date to clear the date.

The results view displays all matching posts.

The search options you select are shown as filters with an **x** in the search parameters bar.

6. Remove a search parameter by clicking **x**.

9.4.3 Create a new case

When creating a new case, some basic information is required such as: title and description. The title and description are required. Values indicating severity and urgency are required and set to the highest level by default. You can update the case later, for example, by adding: images or a post to the case, or by changing the urgency or severity of the case.

Procedure

1. In the Posts News feed, select a machine from the navigation tree.

   Existing cases display in the main pane. If the machine has no cases, the main pane is empty.

2. Click **Add case** in the ribbon.

   An entry named ***New case** appears beneath the selected machine. The asterisk (*) means the case is not saved.

   The **Create Case** view appears with placeholders for you to fill in.

3. Provide a name for the case. Use a name that helps identify the symptom being diagnosed.
4. Add notes in the description field.

In the description, you can add tags by entering a # before the word to be tagged. You can mention users by entering @ and selecting a user from the list.

5. Select a value for **Severity**. The default is **Impending Failure (1)**.
6. Select a value for **Urgency**. The default is **Critical (1)**.
7. Click **Publish**.

The new case name appears (without an asterisk) in the tree in the left panel.

An entry named **Case Opened** appears in the case. The entry includes the user's name, the current date and time, the severity and urgency settings, and the description.

Machine details, post history, and summary information display in the case details on the right side of the case information.

The case status is open.

9.4.4 Add and remove notes and tags on a case

A case shows all the tags from underlying posts. When you add a post to a case, and the post contains a tag, the tag is associated with the case if the case did not already have the tag. A machine condition is a type of tag.

To remove a tag from a case, delete the post in the case that contains the tag you want to remove.

9.4.5 Add a post to a case

When you add a new post to a case, the post contains one note and may contain images, data links, attachments and work recommendations. You can also change the severity or urgency of the case. Changes you make to the case while editing the post will be included in the post. You can add multiple posts to a case. You can add a post to an open case but not to a resolved case. Once you create the post, you cannot edit the post, but you can update the case information by adding a reply to the post or creating a new post. For example, you cannot change the severity or urgency of the case in a post, but can in a reply.

Prerequisites

The machine has an open case.

Procedure

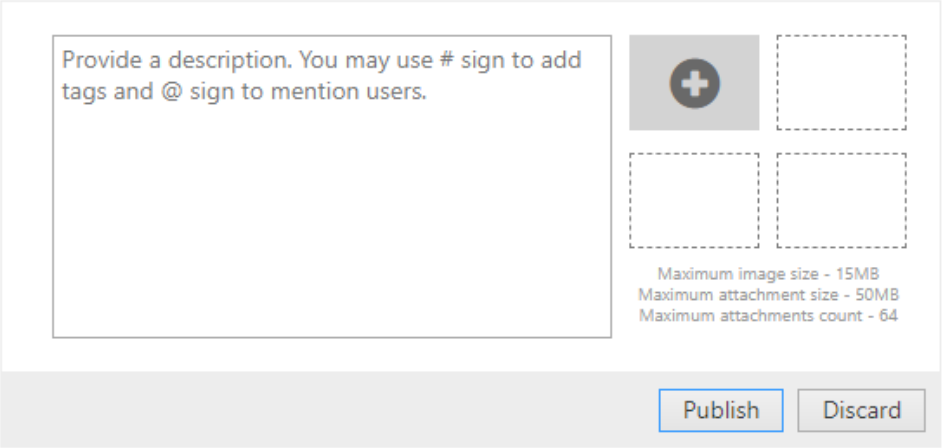
1. In the navigation tree, select the case you want to update.

   The case information displays the case details, posts, and replies.

2. Select **Add Post** from the ribbon.

   The **Add Post** form appears below the case title.

Figure 9-3: New post form



3. Add a note, images, or data links as a main part of the post.
4. Click **Publish**.

   The post is added to the case. The user name and current date and time are saved with the post.

Add a tag or mention a user to a post

Tags and mentions help you flag any topic or user you want to associate with your case. You can tag any phrase or mention a user while typing in a post. When you mention a user, the post or case displays in that user's Machine Journal Dashboard. When using Search, select tags and users to limit the results.

Procedure

- To tag a phrase:
  a) While typing a note, create a tag by starting a phrase with the # symbol. Text you type after # is the tag.

     As you type the tag, any relevant matching tags appear in a list.

  b) Select the existing tag from the list, or continue typing to create a new tag.

     When you type a new tag for the first time and save the post, that tag will be available in future posts.

- To mention a user:
  a) While typing a note, mention a user by typing the @ symbol.

  b) Select a user from the list that appears by the @ symbol.

Add images to a post

When adding a post, you can click the + icon beside the notes field to add an image. You can also drag and drop an image or attachment.

Procedure

1. Click the + icon beside the notes field and select **Add image**.
2. In the **Browse** dialog, locate the image to upload. Click **OK**.
   The image appears in the next available box after the + icon.
3. Add more images if desired.
4. To discard one of the uploaded images, click the image in the post.
   The **Gallery** dialog appears.

A. Selected image
B. Delete
C. Next image in gallery
D. Full screen view

5. Click to delete the selected image.
6. Close the **Gallery** dialog when finished.
7. Click **Publish**.

   The added images are saved when the post is saved. If the post is discarded, the added images are also discarded.

Add data from Vibration Analyzer to a post

When adding a post, you can click the + icon beside the notes field to add data from Vibration Analyzer. This lets you easily launch Vibration Analyzer to select the image to add. Images added from Vibration Analyzer are standard images in Machine Journal and are included in the attachments limit.

Procedure

1. To the right of the notes field, click the + icon to the right of the notes field and select **Add data from VibApp**.
2. Vibration Analyzer launches.
3. Finish editing the post and click **Publish**. The added data is saved when the post is saved. If the post is discarded, the added data is also discarded.

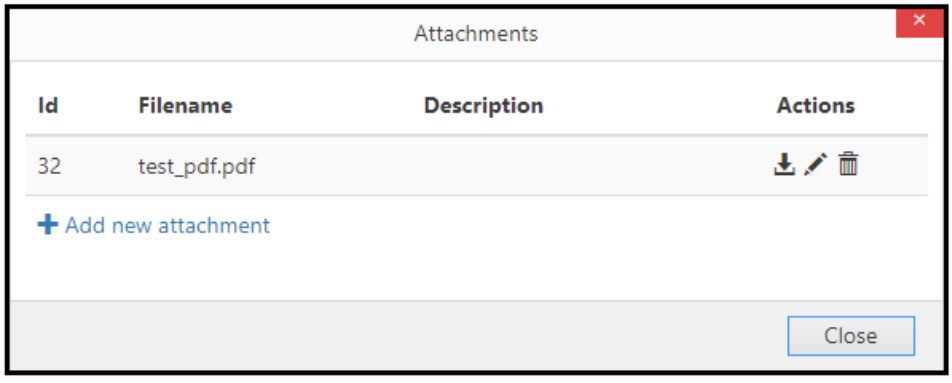
Add attachments to a post

When adding a post, simply drag and drop an image or document to your post. Or you can click the + icon beside the notes field to add attachments. The attachments list can contain up to 64 items (up to 50 MB per document and 15 MB per image). The images from Vibration Analyzer are standard images and also count in this total. If you add an image as an attachment, it appears in a documents list, and to see it, you must download the image first. If you prefer to see preview icons of your images, do not upload it as an attachment; add it as an image instead.

Procedure

1. To the right of the notes field, click the **+** icon and select **Add attachment**.
2. In the **Browse** dialog, locate the attachment to upload. Click **OK**.
   An **Attachment** link appears in the post below the image gallery. The number of attachments displays in parentheses.
3. To view, edit, or discard one of the attachments, click **Attachments**.
   The **Attachments** dialog displays a list of attachments and actions including download, edit the description, delete, or add a new attachment.

Figure 9-4: Attachments dialog



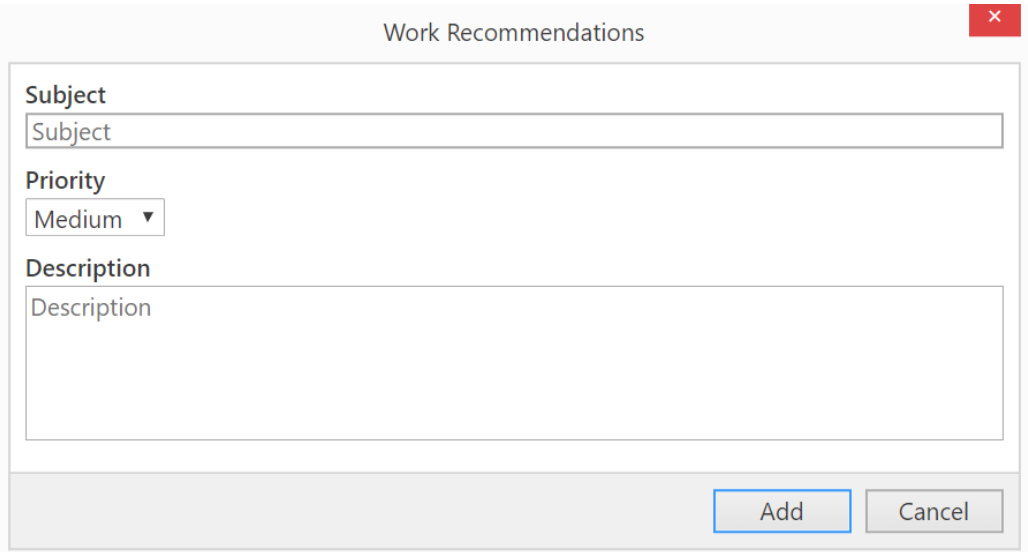
4. Click the pencil icon and type a description. Click **Save**.

   Adding a description helps provide other users with more information to identify the attachment without downloading and opening the attachment.
5. Click **Close**.
6. Finish editing the post and click **Publish**. The added attachments are saved when the post is saved. If the post is discarded, the added attachments are also discarded.

Add a work recommendation to a post

While adding a post, you can add a recommendation to a case. A work recommendation is a type of note that lets you categorize work or a suggestion to fix the problem. One way a work recommendation is helpful is that you can search for cases with work recommendations. It helps you track information about the work performed on a specific case as well. You can use the work recommendations like a ToDo list. A case can only be resolved when its work recommendations are resolved or rejected.

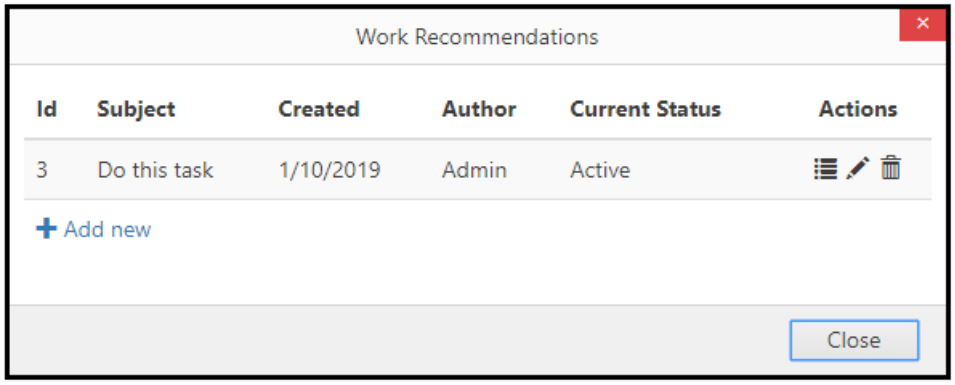
Figure 9-5: Work Recommendations dialog



Procedure

1. Click **Add recommendation** in the ribbon.
2. In the **Work Recommendations** dialog, enter a **Subject**, **Priority**, and a **Description** and click **Add**.
   A **Work Recommendations** link appears in the post below the image gallery. The number of recommendations displays in parentheses.
3. To view, edit, or discard one of the work recommendations, click **Work Recommendations**.
   The **Work Recommendations** dialog displays a list of work recommendations and actions including view details, edit, delete, and add.

Figure 9-6: Work Recommendations dialog



4. Click the pencil icon to edit the description, subject, and status. Click **Save**.
5. Click **Close**.
6. Finish editing the post and click **Publish**.

The recommendation is saved when the post is saved. If the post is discarded, the recommendation is also discarded.

The work recommendation is created with an active status.

All work recommendations for a case must be resolved or rejected before the case can be resolved.

Add a reply to a post

A reply is a post that you can use to add more details to the case. You can add a reply to a post in an open case. For readability, all posts and replies are displayed at the same level of a case, not nested within posts. If you reply to a post, it appears as a post to the case. The posts are nested and collapsed by default.

Procedure

1. In the navigation tree, select the case you want to update.

   The case information displays the case information, posts, and replies.

2. Click **Reply** on a post that you want to update.

   A reply field appears where you can fill in notes or add images.

3. Click **Publish**.

The reply appears on the case information screen, under the original post.

9.4.6 Delete a post from a case

You can delete a post from an open case, one post at a time. Deleted posts are marked as deleted, and by default do not appear in the case information. You can change the settings to show deleted posts.

Procedure

1. In the navigation tree, select an open case.
   The case information shows posts and replies, if present.
2. Locate the post to delete.
3. In the upper right corner of the post, select **...** → **Delete post**.
4. At the prompt, select **OK**.

   The post no longer appears in the case information. You can select other posts to delete.

9.4.7 Update a work recommendation

All work recommendations for a case must be resolved before the case can be resolved. The status can be Completed or Rejected.

Procedure

1. In the Posts news feed, select a machine from the navigation tree.

Existing cases display in the middle pane. If the case has work recommendations, the case details contain links to the **Work Recommendations** list.

2. Click **All** to see all of the work recommendations. Choose other links to see the items of that status (Active, Completed, or Rejected).
3. In the Work Recommendations list, click the checkmark to mark the work completed, or click **X** to reject the work recommendation.

9.4.8 Resolve a case

When you are finished working on a case, mark it resolved so it no longer appears in the list of cases.

Procedure

1. In the navigation tree, select an open case.
2. Click **Resolve case** in the ribbon bar.
3. A new post appears with a **Resolve case** button.
4. Fill in details about why the case is being resolved.
5. Click **Resolve Case**.

The case status is resolved. The case no longer appears in the navigation tree. You can show or hide the list of resolved cases by clicking **Show Resolved** from the **Home** ribbon.

9.4.9 Delete a resolved case

Prerequisites

Resolve the case. A case status must be set to resolved before it can be deleted.

Deleting a resolved case causes it to become an archive. Once deleted, the case cannot be reopened. When resolved cases are visible in the navigation tree, you can delete or reopen a resolved case.

Procedure

1. Click **Show Resolved** in the **Home** ribbon to show the resolved cases in the navigation tree.
2. Select the case you want to delete.
3. Select **Delete case** from the ribbon.
4. At the prompt, select **OK**.

The case status is deleted.

By default, deleted cases do not appear in the navigation tree. The case appears in the navigation tree if **Show deleted cases, posts, and replies** is enabled in **Preferences**.

9.4.10 Reopen a resolved case

After a case is resolved, it may be necessary to open the case again. If more work needs to be done on the same issue, it is convenient to reopen a resolved case instead of creating a new case.

Procedure

1. Click **Show Resolved** in the **Home** ribbon to show the closed cases in the navigation tree.
2. In the navigation tree, select the case you want to reopen.
3. Select **Reopen case** from the ribbon.

   The **Reopen case post** view appears.

4. Write an explanation for reopening the case.
5. Click **Publish**.

The case status is open.

The case appears in the tree in the left panel.

9.4.11 Print a report of the Machine Journal screen

You can print the contents of your Machine Journal screen as a PDF report.

Prerequisites

Install a PDF generator as a printer on the computer if you want to save the report as a PDF. Contact your IT department if you do not have a PDF option in your list of printers.

Procedure

1. In the navigation tree, select a machine to display the cases and posts for the machine.
2. Select **Create Report** in the ribbon.

   A new window displays a print preview of the report.

3. Print the report.

9.5 Vibration Analyzer

9.5.1 Launch Vibration Analyzer from Machine Journal

You can launch Vibration Analyzer to show the machine you have selected in Machine Journal.

Prerequisites

Vibration Analysis must be installed on the PC where you are using Machine Journal.

Procedure

1. In the Machine Journal navigation tree, select a machine.
2. Click **Vibration Analyzer** in the ribbon.

Vibration Analyzer opens to this machine in the Location Navigator.

9.5.2 Create a new case from Vibration Analysis

In Vibration Analyzer you can see a list of existing cases for a machine in the **Machine Journal Browser** pane.

You can also create a new case while using Vibration Analyzer.

Procedure

1. In Vibration Analyzer, select a machine in the Location navigator.
2. Select the **Machine Journal Case Browser** tab.

   The tab displays a list of open cases for the selected machine.

3. Select **Add Case**.

   Machine Journal opens to the new case for this machine.

4. In Machine Journal, fill in placeholders with new case information:
5. Type a title for the case.
   a) Select values for **Severity** and **Urgency**.
   b) Click **Publish**.

The new case appears in the tree in the left panel.

The user name and current date and time are saved with the new case.

The case status is open.

9.5.3 Add a new post to a case from Vibration Analyzer

In Vibration Analyzer you can see a list of existing cases for a machine.

You can update a case in Machine Journal by adding a new post while using Vibration Analyzer.

Procedure

1. In Vibration Analyzer, select a machine in the Location navigator.
2. Select the **Machine Journal Case Browser** tab.

   The tab displays a list of open cases for the selected machine.

3. Locate the case you want to edit and select + in the **Add Post** column.

   Machine Journal opens to a new post for this case.

10 User Manager

User Manager functionality is different for **Administrators**, and regular users, (i.e., **Non-Administrators**).

Administrators can use the **User Manager** to add users to, or remove users from, the system. **Administrators** can also edit properties, responsibilities, and other settings for all users.

For **Non-Administrators**, the **User Manager** displays read-only information about that user's settings and responsibilities.

Note
Administrators are users that have been given the **MANAGEUSER** permission in **User Manager**.

Note
Some options may not be available in your user account, and may only be available for **Administrator** accounts. Some features may be visible in the user interface but have no function. For example, tokens are not used by AMS Machine Works.

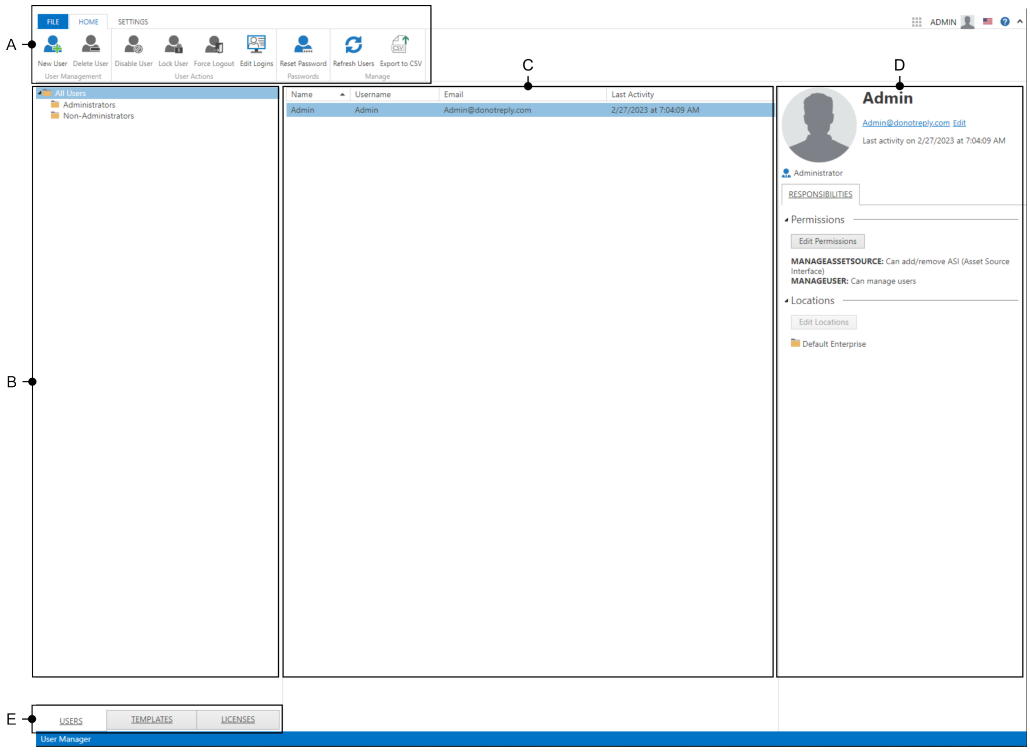
10.1 User Manager Interface Overview

The user interface for the **User Manager** is divided into five main sections. The **Ribbon** menu, and the three information panes (**Navigation**, **Contents**, and **Details**), and the **Tab Menu**.

Your selection in the **Context Tab Menu** changes the functionality and informational content of the other four sections.

The image below shows a general overview of the sections of the **User Manager** interface.

Figure 10-1: User Manager — Interface Overview



A. ***Ribbon*** *menu — The appearance of the* ***Home*** *tab of the* ***Ribbon*** *menu changes depending on which* ***Context Tab****, marked as E in the image, is currently selected. See: Ribbon Menu*

   For a full description of the ***Home Menu*** *functionality which is available when a particular* ***Tab*** *is selected see:*

   - ***Users Tab****: User Management Functions*
   - ***Templates Tab****: Template Management Functions*
   - ***Licenses Tab****: License Management Functions*

B. ***Navigation Pane*** *— This pane displays a different folder hierarchy depending on which* ***Tab*** *is currently selected. See: Navigation Pane*

C. ***Contents Pane*** *— This pane displays lists of items based on your selection in the* ***Navigation*** *pane. See: Contents Pane*

D. ***Details Pane*** *— This pane displays detailed information about the item currently highlighted in the* ***Contents*** *pane.*

   For a full description of what information is displayed in the ***Details Pane*** *when a particular* ***Tab*** *is selected see:*

   - ***Users Tab****: Details Pane — Users Tab Selected*
   - ***Templates Tab****: Details Pane — Templates Tab Selected*
   - ***Licenses Tab****: Details Pane — Licenses Tab Selected*

E. ***Context Tab Menu*** — *The* ***Context Tab Menu*** *enables you to switch contexts. See:* *Context Tab Menu*

10.1.1 Context Tab Menu

There are three tabs on the bottom left side of the **User Manager Interface** page. This **Context Tab Menu** controls the context you are operating in.

The **Context Tab Menu** enables you to switch between three contexts, **Users**, **Templates**, and **Licenses**.

The **Home** tab in the **Ribbon** menu, and the three information panes (**Navigation**, **Contents**, and **Details**), change their functionality and informational content depending on which **Context Tab** you have selected.

Links to detailed information about how each **Context Tab** affects the other four user interface elements is listed below.

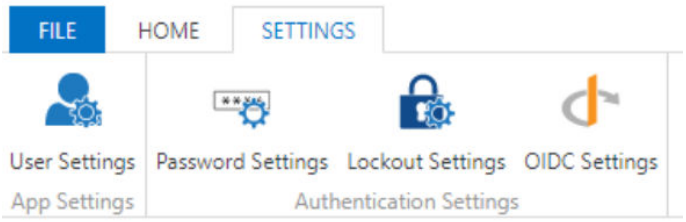
1. **Users** context:
   - **Navigation Pane**: Navigation Pane
   - **Contents Pane**: Contents Pane
   - **Details Pane**: Details Pane — Users Tab Selected
   - **Home Menu**: User Management Functions
2. **Templates** context:
   - **Navigation Pane**: Navigation Pane
   - **Contents Pane**: Contents Pane
   - **Details Pane**: Details Pane — Templates Tab Selected
   - **Home Menu**: Template Management Functions
3. **Licenses** context:
   - **Navigation Pane**: Navigation Pane
   - **Contents Pane**: Contents Pane
   - **Details Pane**: Details Pane — Licenses Tab Selected
   - **Home Menu**: License Management Functions

10.1.2 Ribbon Menu

The **Ribbon Menu** in the **User Manager** utility is a context dependent collection of functions. The **Ribbon Menu** is divided into three sub-menus: **File**, **Home**, and **Settings**.

- **File Menu**: This menu does not change when you change your selection in the **Context Tab Menu**, and is identical to the **File Menu** in the **Asset Explorer**. See: File menu
- **Settings Menu**: This menu does not change when you change your selection in the **Context Tab Menu**. See: Ribbon Menu — Settings Menu Functions

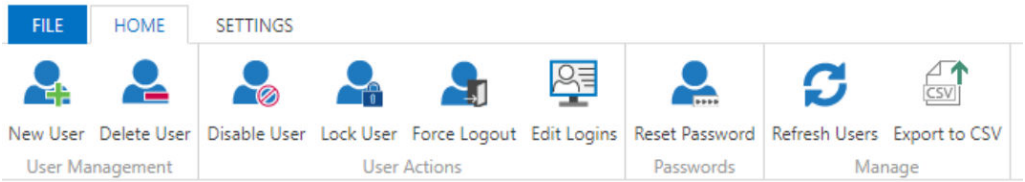
Figure 10-2: Settings Menu



See: Ribbon Menu — Settings Menu Functions

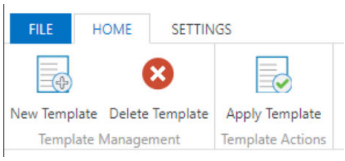
- **Home Menu**: This menu changes its layout depending on your selection in the Context Tab Menu:

Figure 10-3: Home Menu — Users Tab Selected



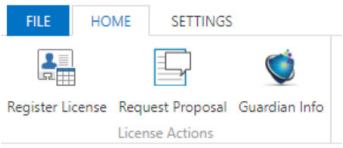
See: User Management Functions

Figure 10-4: Home Menu — Templates Tab Selected



See: Template Management Functions

Figure 10-5: Home Menu — Licences Tab Selected



See: License Management Functions

10.1.3 Navigation Pane

The **Navigation Pane** has folders for different types of records.

- When operating in the **Users Tab** context the **Navigation Pane** has the following folder structure:
  - **All Users**

- **Administrators**: These **Users** have administration privileges.

  Note
  Administrators are users that have been given the **MANAGEUSER** permission.

- **Non-Administrators**: These **Users** do not have administration privileges.

- When operating in the **Templates Tab** context the **Navigation Pane** has the following folder structure:
  - **All Templates**
    - **Default Templates**: This folder contains system defined **Templates**.
    - **Custom Templates**: This folder contains **Templates** created with the Create a User Template process.
- When operating in the **Licenses Tab** context the **Navigation Pane** has the following folder structure:
  - **All**
    - **Good**: A **Good License** has more than 80% of its resources still available.
    - **Fair**: A **Fair License** has less than 80%, but more than 0%, of its resources still available.
    - **Poor**: A **Poor License** has 0% of its resources still available.

  Note
  A **License** which is based on a **Start Date** and an **End Date** is **Good** until the **End Date** and then it is **Poor**. See: License Management Functions

10.1.4 Contents Pane

The **Contents Pane** is a list of records available in the folder which is selected in the **Navigation Pane**.

Depending on which **Context Tab Menu** you have selected, different columns of information will be displayed.

- When the **Users Tab** is selected:
  - **Name** – The name of the user.
  - **Username** – The alias defined in the system for the user.
  - **Email** – The email associated with the user.
  - **Last activity** – The date and time of the last user activity.
- When the **Templates Tab** is selected:
  - **Name** – The name of the template.
  - **# of Permissions** – The number of permissions assigned to this template.
  - **# of Locations** – The number of locations available for this template.
- When the **Licenses Tab** is selected:
  - **Status** – The status of the license.

- **Source** – The source of the license. The default is AMS Machine Works.
- **Feature** – The name of the license. In AMS Machine Works 1.7.5 there are two entries.
  - **AMS_Machine_Works_OPC_UA_Server**: This is the **License** for the software.
  - **AMS_Machine_Works_Users**: This is the **License** for the number of unique **User** accounts which are available.
- **Expires** – The date when the license will expire.

10.1.5 Details Pane

The **Details Pane** displays information and controls based on your previous selections in the **Context Tab Menu**, the **Navigation Pane**, and the **Contents Pane**.

The format and controls are set by your selection in the **Context Tab Menu**, and the informational content is determined by your selections in the **Navigation Pane** and the **Contents Pane**.

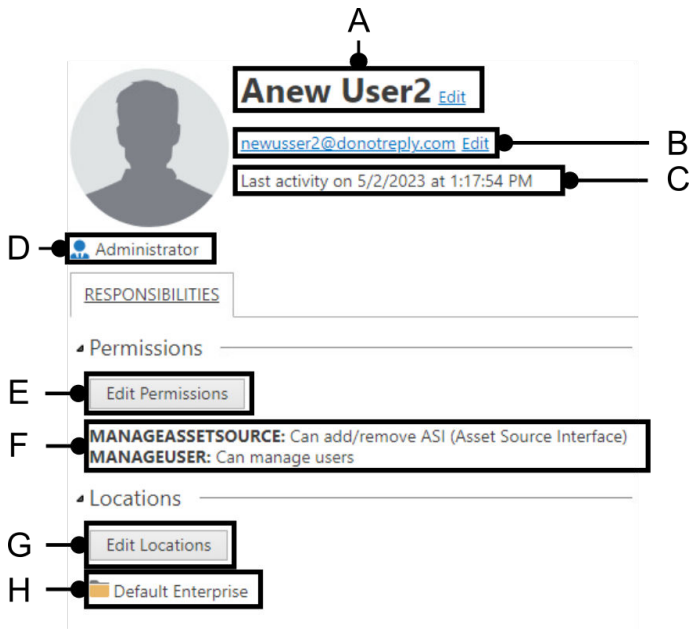
The three sections below show the exact layout and contents of the **Details Pane** for each context:

- Details Pane — Users Tab Selected
- Details Pane — Templates Tab Selected
- Details Pane — Licenses Tab Selected

Details Pane — Users Tab Selected

The **User Manager** provides functionality in the **Details Pane** for changing a user's permissions, and for granting access to each **Location** they can view in AMS Machine Works.

Figure 10-6: Details Pane — Users Tab Selected



A. ***Name*** *– The first and last name of the* ***User****. Click the* ***Edit*** *link to edit this value. See: Edit Name*

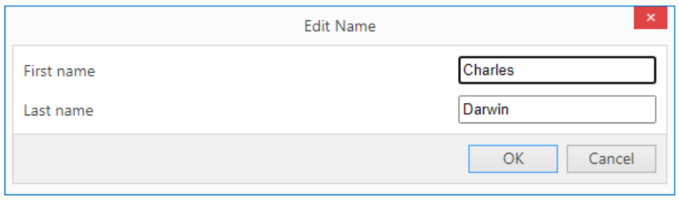
> ***Note***
> *The name of the initial user, the* ***Admin*** *user, is not editable.*

B. ***Email address*** *– The email address associated with this account. Click the* ***Edit*** *link to edit this value. See: Edit Email*
C. ***Last activity*** *– The date and time when the user was logged in the last time.*
D. ***Status*** *– By default this field is empty. It can display three statuses:*
   - ***Administrator*** *– For an account which has the* ***MANAGEUSER*** *permission.*
   - ***Disabled*** *– For an account which is disabled. See: Disable / Enable a User*
   - ***Locked*** *– For an account which is locked. See: Lock / Unlock a User*

E. ***Edit Permissions*** *button – Click this button to edit the permissions that this user has. Descriptions of each permission are provided on the screen. See: Edit Permissions*
F. ***Permission List*** *– This list is empty by default. It can contain one or both of the possible permissions,* ***MANAGEASSETSOURCE*** *and* ***MANAGEUSER****.*
G. ***Edit Locations*** *button – Click this button to open the* ***Edit Locations*** *window where you grant access to specific locations. See: Edit Locations*
H. ***Location List*** *– The default option is the root of your* ***Location*** *structure. Access can be edited individually for every item in your* ***Location*** *structure.*

Edit Name

Figure 10-7: Edit Name

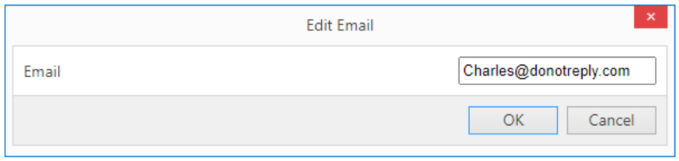


- Add a **First name** and a **Last name** for the **User** and click **OK** to accept this change.
- Click **Cancel** to finish without making changes.

Note
The name of the initial user, the **Admin** user, is not editable.

Edit Email

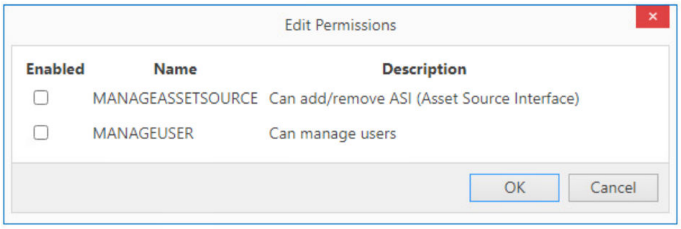
Figure 10-8: Edit Email



- Add an **Email** address for the **User** and click **OK** to accept this change.
- Click **Cancel** to finish without making changes.

Edit Permissions

Figure 10-9: Edit Permissions



Two different permissions can be selected:

- **MANAGEASSETSOURCE** – This permission enables the user to add and remove asset sources.

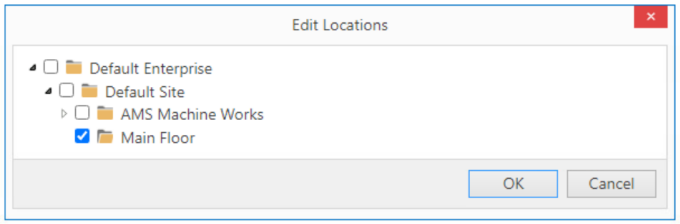
  Note
  This option is not supported in AMS Machine Works 1.7.5.

- **MANAGEUSER** – This permission gives the user administrator privileges. Specifically, it allows the user to perform the following actions in the **User Manager**: manage users; manage templates; manage user, password, lockout, and OIDC settings.

Note
The original 'admin' account cannot be deleted and always retains **MANAGEUSER** permissions.

Edit Locations

Figure 10-10: Edit Locations



- Access can be granted to specific a **Location** folder individually for an end node in your hierarchy, or to the entire contents of a **Location** folder and all of its sub-folders.

Details Pane — Templates Tab Selected

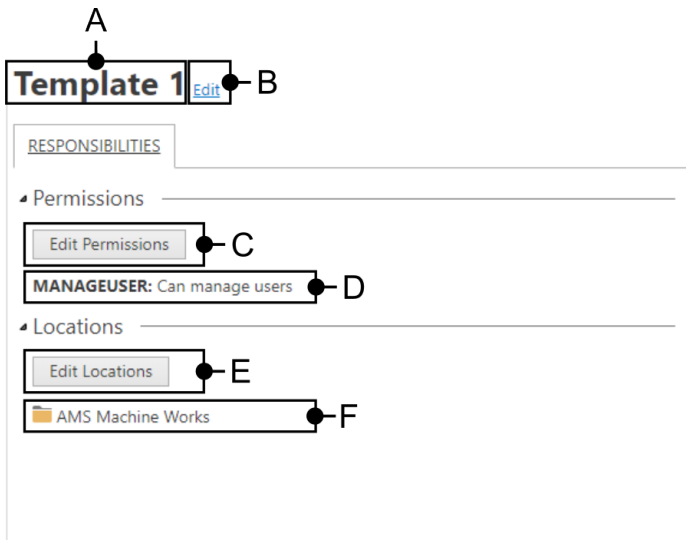
A **Template** is a configuration of permissions to access specific functions and locations for a role within your organization. Every **User** who has the same **Template** has the same permissions.

For example, you could define template for every **User** who has access to "Plant A", but does not have access to "Plant B". See: Create a User Template

Afterward, when you have a new **User**, you can apply the appropriate **Template** for that person's role. Apply a User Template

Note
When you change a **Template** that has been used to set the **Permissions** for a **User** it must be manually reapplied to the **User** for the changes to take effect.

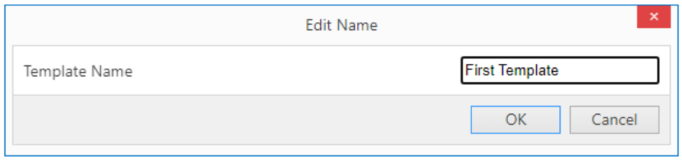
Figure 10-11: Details Pane — Templates Tab Selected



A. ***Name*** *– The name of the template.*
B. ***Edit*** *– Click this link to edit the name of the* ***Template****. See: Edit Name*
C. ***Edit Permissions*** *– Click this button to add or remove permissions to this* ***Template****. See: Edit Permissions*
D. ***Permission List*** *– This is a list of the permissions granted to a* ***User*** *by this* ***Template****.*
E. ***Edit Locations*** *– Click this button to grant or remove access to a* ***Location*** *for this* ***Template****. See: Edit Locations*
F. ***Location List*** *– The default option is the root of your* ***Location*** *structure. Access can be edited individually for every item in your* ***Location*** *structure.*

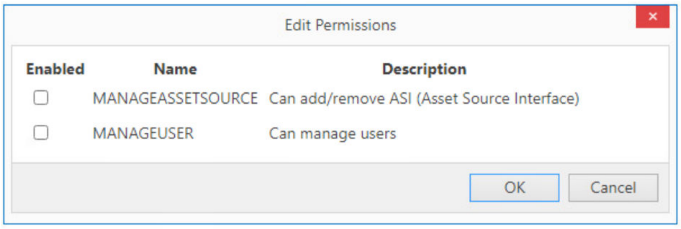
Edit Name

Figure 10-12: Edit Name



- Add a name for your **Template** and click **OK** to accept this change.
- Click **Cancel** to finish without making changes.

Edit Permissions



Two different permissions can be selected:

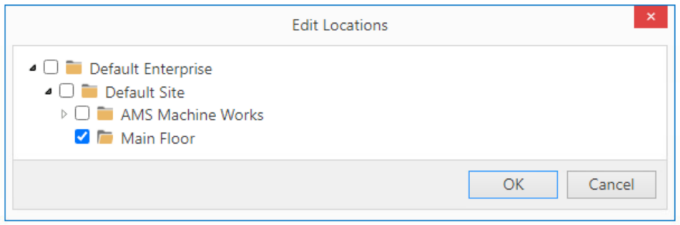
- **MANAGEASSETSOURCE** – This permission enables the user to add and remove asset sources in the **Asset Explorer**.

  Note
  This option is not supported in AMS Machine Works 1.7.5.

- **MANAGEUSER** – This permission gives the user administrator privileges. Specifically, it allows the user to perform the following actions in the **User Manager**: manage users; manage templates; manage user, password, lockout, and OIDC settings.

Edit Locations

Figure 10-13: Edit Locations



- Access can be granted to specific a **Location** folder individually for an end node in your hierarchy, or to the entire contents of a **Location** folder and all of its sub-folders.

Details Pane — Licenses Tab Selected

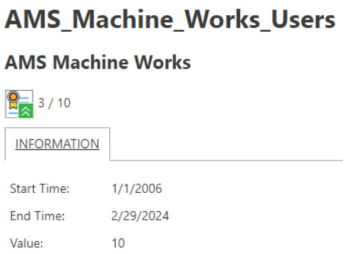
When the **Licenses Tab** is selected, the **Details Pane** contains information about the **License** you currently have selected in the **Contents Pane**.

There are two types of **License** in AMS Machine Works 1.7.5:

- **AMS_Machine_Works_OPC_UA_Server**
- **AMS_Machine_Works_Users**

Note
Complete information about your installation and licences can be found in your **Guardian Information**. See: View Guardian Information

Figure 10-14: Details Pane — Licenses Tab Selected



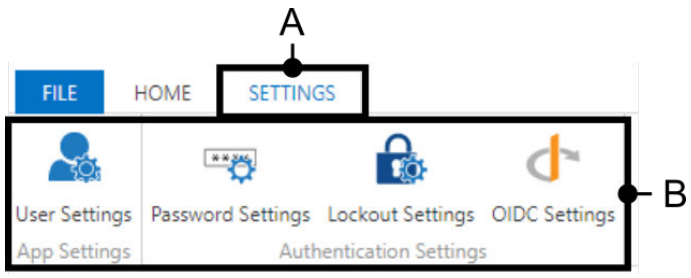
This includes information such as:

- **Status**:
  - **On/Off** — In the case of an **AMS_Machine_Works_OPC_UA_Server License**.
  - **Number Used / Total Number** — This is the number of user accounts currently in use in the case of an **AMS_Machine_Works_Users License**. (e.g., 3/10)
- **Start Date** — (month/day/year)
- **End Date** — (month/day/year)
- **Value**:
  - **On/Off** — In the case of an **AMS_Machine_Works_OPC_UA_Server License**.
  - **Total Number** — This is the total number of user accounts in the case of an **AMS_Machine_Works_Users License**.

10.2 Ribbon Menu — Settings Menu Functions

In the **User Manager** the **Settings Menu** functions remain the same in every context set by the Context Tab Menu.

Figure 10-15: Settings Menu



A. ***Settings Menu***
B. *Available functions:*
   - *User Settings*
   - *Password Settings*
   - *Lockout Settings*
   - *OIDC Settings*

10.2.1 User Settings

The **User Settings** function is in the **Settings Menu** of the **User Manager**.

Note
This functionality is only available for **Administrators**.

Figure 10-16: User Settings Control

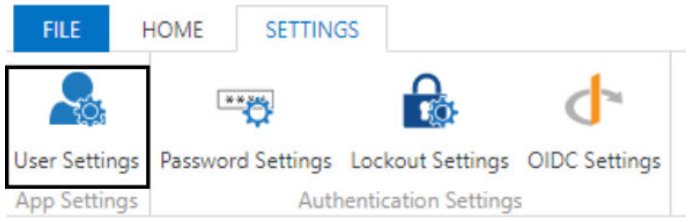
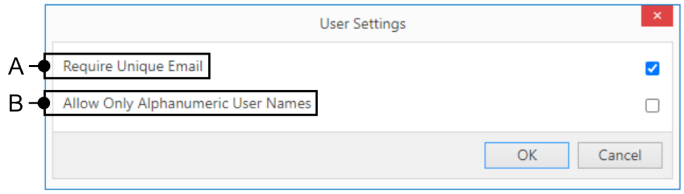


Figure 10-17: User Settings Window



The **User Settings Window** has the following two options:

A. ***Require Unique Email*** *– (Default: Checked) Check this box to prevent any email addresses from being connected to multiple accounts.*
B. ***Allow Only Alphanumeric Usernames*** *– (Default: Unchecked) Check this box to prevent users from adding special characters to their usernames.*

10.2.2 Password Settings

The **Password Settings** function is in the **Settings Menu** of the **User Manager**.

Note
This functionality is only available for **Administrators**.

Figure 10-18: Password Settings Control

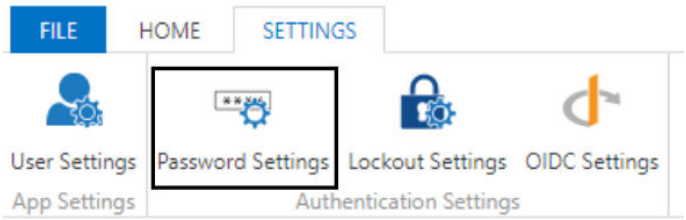
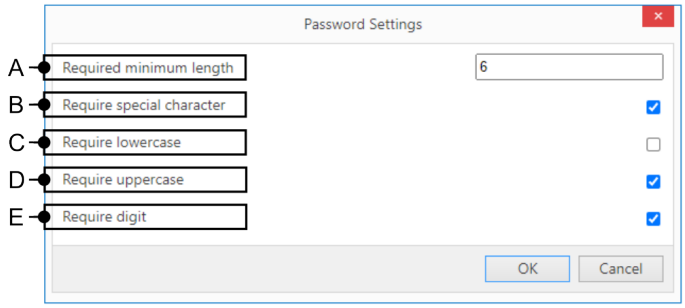


Figure 10-19: Password Settings Window



The **Password Settings Window** has the following options:

A. ***Required minimum length*** *– (Default: 6) Enter a minimum length for user passwords.*

> ***Note***
> *The default setting is 6, but the recommended best practice is to use passwords of at least 8 characters and up to a reasonable maximum length, such as 24. This field accepts a wide range of values, (0 to 999999999), which fall outside of the recommended range. Values larger than 999999999 will not be saved, and result in an error.*

B. ***Require special character*** *– (Default: Checked) Check this box to require users to include at least one special character in their passwords. The following characters are allowed:* ***Space; ! @ # $ % ^ & * ( ) : < > ? , . ; ' " [ ] { } - _ = + ~ `***

> ***Note***
> *This is a recommended option.*

C. ***Require lowercase*** *– (Default: Unchecked) Check this box to require users to include at least one lowercase letter in their passwords.*

> ***Note***
> *This option is not selected by default, but this is a recommended best practice.*

D. ***Require uppercase*** *– (Default: Checked) Check this box to require users to include at least one uppercase letter in their passwords.*

> ***Note***
> *This is a recommended option.*

E. ***Require digit*** *– (Default: Checked) Check this box to require users to include at least one numeric character in their passwords.*

> ***Note***
> *This is a recommended option.*

10.2.3 Lockout Settings

The **Lockout Settings** function is in the **Settings Menu** of the **User Manager**. These settings control the Lock / Unlock a User functions found in the **Home Menu** of the **User Manager** when the **Users** context tab is selected.

Note
This functionality is only available for **Administrators**.

Figure 10-20: Lockout Settings Control

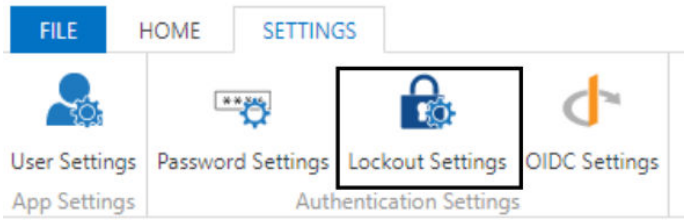
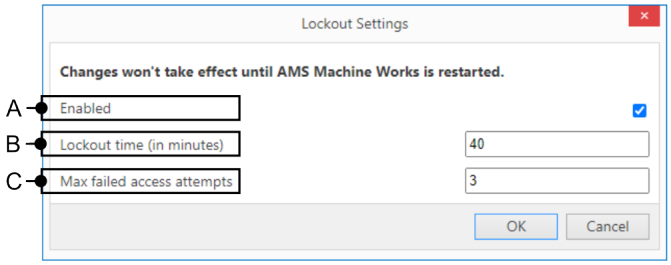


Figure 10-21: Lockout Settings Window



The **Lockout Settings Window** has the following options:

A. ***Enable*** *– (Default: Checked) Check this box to enable lockout functionality.*
B. ***Lockout time (in minutes)*** *– (Default: 40) Enter the amount of time, in minutes, that a user is prevented from attempting to log in after the account is locked. This field accepts numbers from 0 to 59.*

Note
Values larger than 59 will be not saved, and result in an error.

C. ***Max failed access attempts*** *– (Default: 3) Enter the number of times a user can incorrectly enter their login credentials before the account is locked.*

Note
The recommended range is 3 to 5. This field accepts a wide range of values, (0 to 999999999), which fall outside of the recommended range. Values larger than 999999999 will not be saved, and result in an error.

10.2.4 OIDC Settings

The **OIDC Settings** function is in the **Settings Menu** of the **User Manager**.

Note
This functionality is only available for **Administrators**.

The OpenID Connect Settings (OIDC) control which external login options are available on the login page. These external accounts allow you to log in to AMS Machine Works by using credentials from another source — for example, from Google, Microsoft, your Active Directory account, or some other provider.

If these external providers implement the OpenID Connect protocol for sharing authentication information between Web Services, they can be used to link AMS Machine Works users to external accounts. The OpenID Connect settings are different for every authentication provider.

Note
Any changes, or the addition of a OIDC provider, are not applied until the **Administrator** restarts the system.

Figure 10-22: OIDC Settings

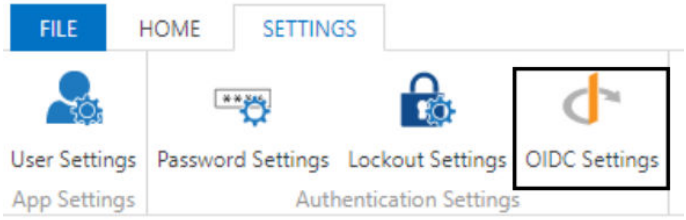
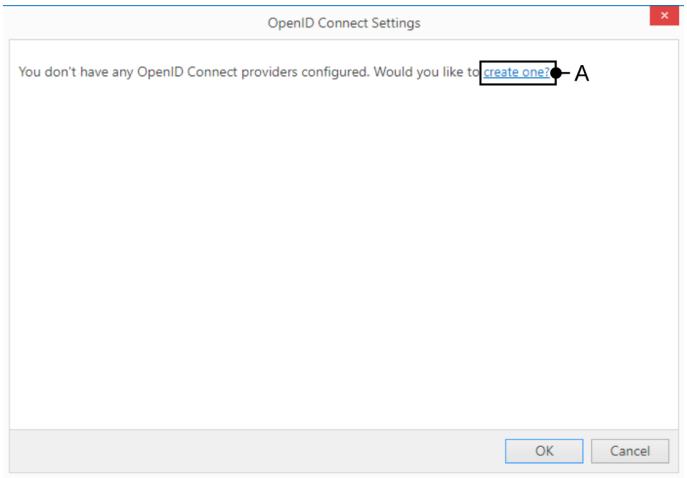
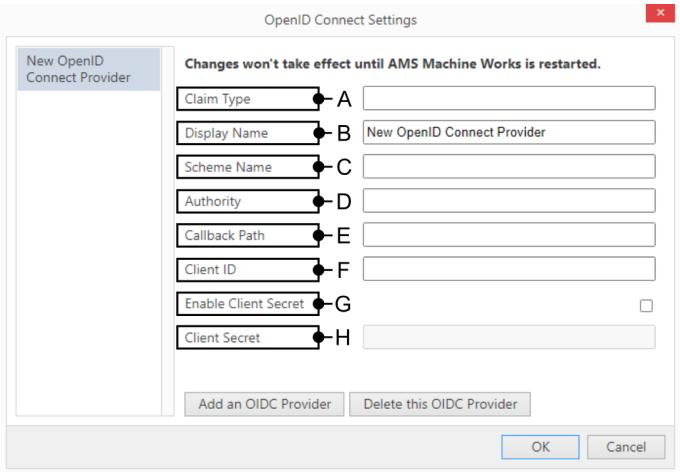


Figure 10-23: OpenID Connect Settings — First Configuration



A. — When there are no OIDC connections configured you may configure the first one by clicking this link.

Figure 10-24: OpenID Connect Settings — Add OIDC Provider Details



The list of the OpenID Connect providers that are currently defined is located on the left. You can select one to edit or delete.

A. ***Claim Type*** *– Enter the claim type information specific to the provider. The* ***Claim Type*** *field defines which claim is used to link the user in the* ***Edit Logins*** *dialog.*
B. ***Display Name*** *– Enter the user-defined display name. For example, OIDC_Provider_Name.*
C. ***Scheme Name*** *– Enter the user-defined scheme name. For example, OIDC_Scheme_Name. The* ***Scheme Name*** *must be unique and cannot be the same name as another OpenID Connect Provider in the software.*
D. ***Authority*** *– Enter the URL specific to the provider in the following format:*
   - *https://<AUTHORITY>/.well-known/openid-configuration*
   - *For example, https://accounts.google.com/.well-known/openid-configuration*
E. ***Callback Path*** *– Enter the* ***Callback Path*** *specified by the provider.*
F. ***Client ID*** *– Enter the* ***Client ID*** *specific to the provider you are using.*
G. ***Enable Client Secret*** *– If the provider requires a* ***Client Secret****, check the* ***Enable Client Secret*** *checkbox.*
H. ***Client Secret*** *– Enter the secret in the* ***Client Secret*** *field.*

10.3 Ribbon Menu — Home Menu Functions

The **Home Menu** functions are completely different depending on which **Context Tab** is active. See: Context Tab Menu

- **Users Tab**: User Management Functions
- **Templates Tab**: Template Management Functions
- **Licenses Tab**: License Management Functions

10.3.1 User Management Functions

There are a variety of **User Management Functions** available in the **Home Menu** when the **Users Tab** is selected:

- Add a User
- Delete a User
- Disable / Enable a User
- Lock / Unlock a User
- Force a User to Logout
- Edit Logins Settings
- Reset Password
- Refresh Users
- Export to CSV

Add a User

Before you begin, confirm that:

- You are logged in as an **Administrator**.
- There is an **AMS_Machine_Works_Users** license available.
  - See: Details Pane — Licenses Tab Selected

When the **Users Tab** is active, click the **New User** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu

Figure 10-25: New User Function

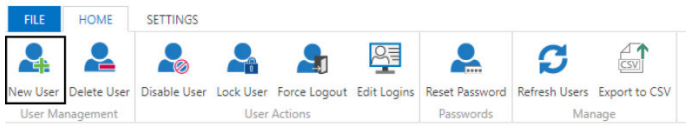
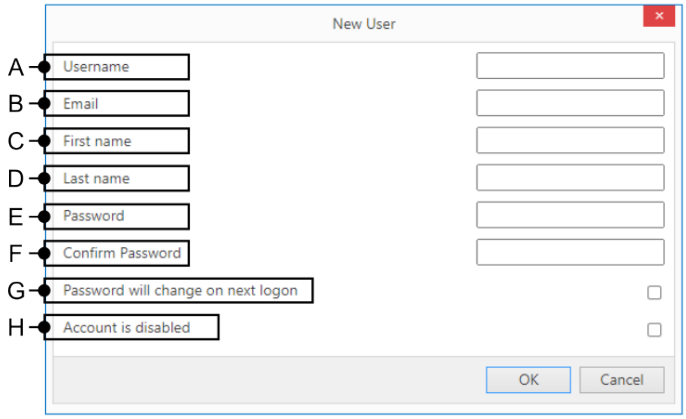


Figure 10-26: New User Details



A. ***Username*** *– Set the* ***Username*** *for accessing the software. The* ***Username*** *must be unique to the system.*

> ***Note***
> *We recommend setting a* ***Username*** *with a length of 8 to 24 characters without spaces, but spaces are allowed and there is no character limit.*

B. ***Email*** *– The email address used to contact the user. The user receives notification emails and messages at this address according to the user's subscription settings.*
C. ***First name*** *–The user's first name. There are no character limits.*
D. ***Last name*** *– The user's last name. There are no character limits.*
E. ***Password*** *– The* ***Password*** *for the user when logging in to the software for the first time. Password must be at least 6 characters, have at least one special character, at least one digit (0-9), and at least one uppercase (A-Z). The above validation is related to the password complexity settings.*
F. ***Confirm Password*** *– Re-enter the password to ensure that it was entered correctly.*
G. ***Password will change on the next login*** *– Check this checkbox if you want to require the user to create a new password when the user logs in for the first time.*
H. ***Account is disabled*** *– Check this checkbox if you want to set up the new user now but want the user account to remain disabled until a later time.*

> ***Note***
> *A disabled account still uses one of your user licenses.*
> - *To obtain more licenses: Request a License Proposal*

Delete a User

Before you begin, confirm that:

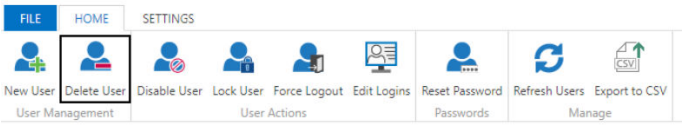
- You are logged in as an **Administrator**.

When the **Users Tab** is active:

1. Find the **User** you want to delete by making selections in the **Navigation Pane** and the **Contents Pane**.

2. Click the **Delete User** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu

Figure 10-27: Delete User Function



Note
Double check that you have selected the correct **User** to delete. There is no confirmation dialogue for this function.

Disable / Enable a User

This control has two functions depending on the state of the **User**.

- For **Enabled Users** it is labeled **Disable User**.
- For **Disabled Users** it is labeled **Enable User**.

A disabled user account cannot log in and cannot receive notifications or messages.

Note
A disabled account still uses one of your user licenses.

- To check if a user is **Disabled**, look in the Details Pane — Users Tab Selected, for a **Disabled** label under the **User** portrait.
- To obtain more licenses: Request a License Proposal
- To remove unnecessary users: Delete a User

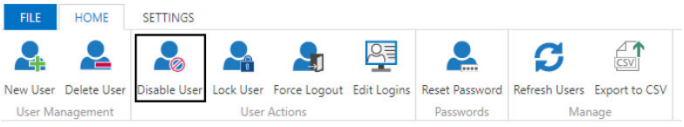
Before you begin, confirm that:

- You are logged in as an **Administrator**.

When the **Users Tab** is active:

1. Find the **User** you want to **Disable** / **Enable** by making selections in the **Navigation Pane** and the **Contents Pane**.
2. Click the **Disable User** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu

Figure 10-28: Disable / Enable User Function



Note
There is no confirmation dialogue for this function.

Lock / Unlock a User

This control has two functions depending on the state of the **User**.

- For **Unlocked Users** it is labeled **Lock User**.
- For **Locked Users** it is labeled **Unlock User**.

A **Locked** user account receives notifications or messages, but cannot log in.

Note
A **Locked** account still uses one of your user licenses.

- To check if a user is **Locked**, look in the Details Pane — Users Tab Selected, for a **Locked** label under the **User** portrait.
- To obtain more licenses: Request a License Proposal
- To remove unnecessary users: Delete a User

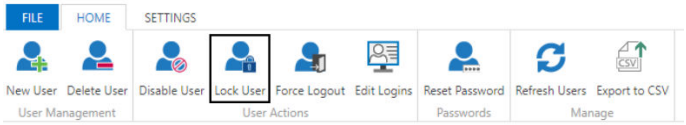
Before you begin, confirm that:

- You are logged in as an **Administrator**.

When the **Users Tab** is active:

1. Find the **User** you want to **Lock** / **Unlock** by making selections in the **Navigation Pane** and the **Contents Pane**.
2. Click the **Lock User** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu

Figure 10-29: Lock / Unlock User Function



Note
There is no confirmation dialogue for this function.

Force a User to Logout

An **Administrator** can force a **User** to log out at any time.

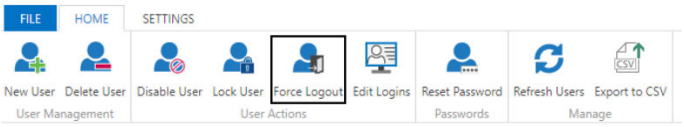
Before you begin, confirm that:

- You are logged in as an **Administrator**.

When the **Users Tab** is active:

1. Find the **User** you want to force to logout by making selections in the **Navigation Pane** and the **Contents Pane**.
2. Click the **Force Logout** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu
3. The **User** is logged out after a 5 minute delay.

Figure 10-30: Force Logout Function



Note
Double check that you have selected the correct **User** to **Force Logout**. There is no confirmation dialogue for this function.

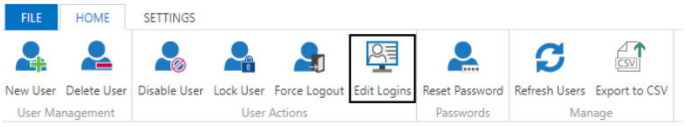
Edit Logins Settings

The **Edit Logins** button enables you to change the **OpenID Connect Provider** and the **Claim Value** settings for a **User**.

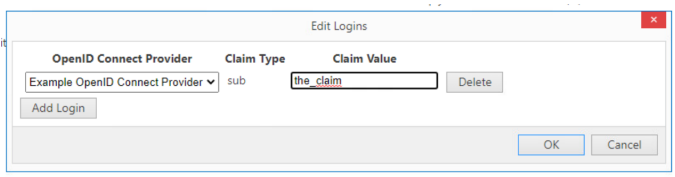
Before you begin, confirm that:

- You are logged in as an **Administrator**.

1. Find the **User** you want to edit by making selections in the **Navigation Pane** and the **Contents Pane**.
2. When the **Users Tab** is active, click the **Edit Logins** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu



3. The **Edit Logins** window appears.



- **OpenID Connect Provider** — Select from a dropdown list of providers that you defined in the OIDC Settings.
- **Claim Value** — Add the appropriate value here for that provider you have selected.
- **Delete** — Delete this connection type for this **User**.
- **Add Login** — Add a new provider for this **User**.

Note
When no OIDC Settings are defined, the following error message is displayed:

- There aren't any OpenID Connect providers to pick from. You can add them by clicking the "OIDC Settings" button under the Settings tab.

See: OIDC Settings

Reset Password

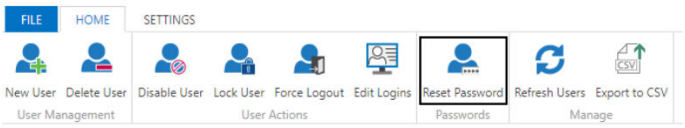
Administrator privileges are not required to reset your own password, but they are required to reset other users' passwords.

The **Reset Password** button enables you to send an email with a reset link for your **Password**.

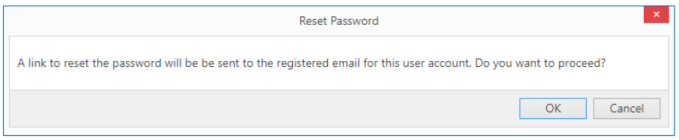
If you want to reset the password of a different **User**, confirm that:

- You are logged in as an **Administrator**.

1. Find the **User** you want to edit by making selections in the **Navigation Pane** and the **Contents Pane**.
2. When the **Users Tab** is active, click the **Reset Password** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu



3. The **Reset Password** window appears.



   - **OK** — Click **OK** to proceed, and an email will be sent to the address associated with that account.
   - **Cancel** — Click **Cancel** to exit without making any changes.

Refresh Users

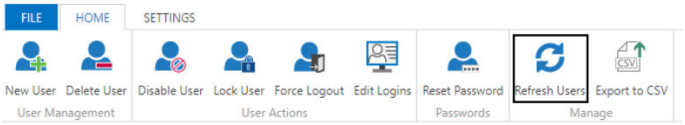
After changes are made to **User** information, you can refresh the **User List** with updated information by clicking the **Refresh Users** button.

Before you begin, confirm that:

- You are logged in as an **Administrator**.

When the **Users Tab** is active:

1. Select the scope of users you want to refresh.
   a. To refresh the information of every **User**, select the **All Users** folder in the **Navigation Pane**.
   b. To refresh the information of a specific **User**, find the **User** you want to refresh by making selections in the **Navigation Pane** and the **Contents Pane**.
2. Click the **Refresh Users** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu



The information is then reloaded.

Export to CSV

Information about every **User** can be exported to a .csv file. The information includes:

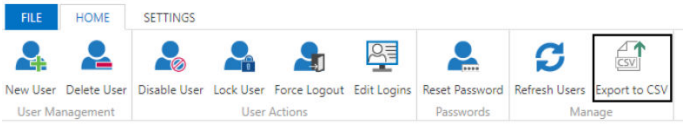
- **Username**
- **Display Name**
- **Last Activity**
- **Locked**
- **Disabled**

Before you begin, confirm that:

- You are logged in as an **Administrator**.

When the **Users Tab** is active:

1. Click the **Export to CSV** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu



The information is then saved in the **Downloads** directory you have configured in your browser settings as **Users.csv**.

10.3.2 Template Management Functions

AMS Machine Works has functionality for preparing different kinds of **User Template**. This enables an **Administrator** to create a group of privileges as a **Template**, and then use the **Template** to assign those privileges to a **User**.

There are three **Template Management Functions** available in the **Home Menu** when the **Templates Tab** is selected:

- Create a User Template
- Delete a User Template
- Apply a User Template

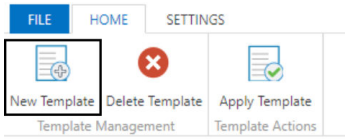
Create a User Template

The **New Template** button enables you to create a **Template** with standard settings for managing **User Permissions**. Every **Template** is created in the **Custom** folder found in the **Navigation Pane**.

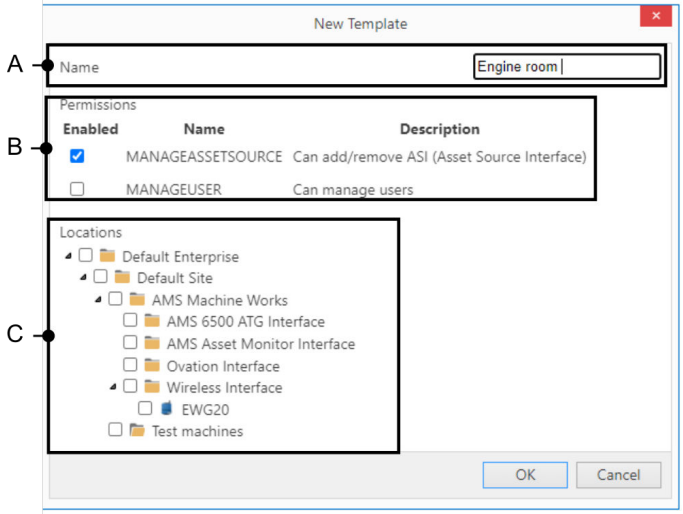
Before you begin, confirm that:

- You are logged in as an **Administrator**.

1. When the **Templates Tab** is active, click the **New Template** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu



2. The **New Template** window appears.



- **A** — Enter the name for this **Template**.
- **B** — Select which permissions are granted by this **Template**.
- **C** — Select which **Location** a **User** is granted access to by this **Template**.

Delete a User Template

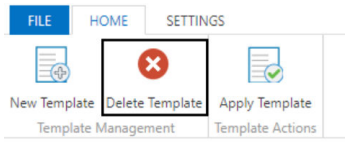
To remove a **Template**, use the **Delete Template** function.

Before you begin, confirm that:

- You are logged in as an **Administrator**.

When the **Templates Tab** is active:

1. Find the **Template** you want to delete by making selections in the **Navigation Pane** and the **Contents Pane**.
2. Click the **Delete Template** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu



Note
Double check that you have selected the correct **Template** to delete. There is no confirmation dialogue for this function.

Apply a User Template

The **Apply Template** button enables you to use a **Template** with standard **User Permissions** to manage **User** access to features and **Locations**.

Note
Future changes to a **Template** do not affect any **User** automatically. The **Template** must be reapplied manually.

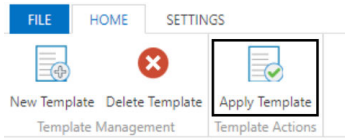
Before you begin, confirm that:

- You are logged in as an **Administrator**.

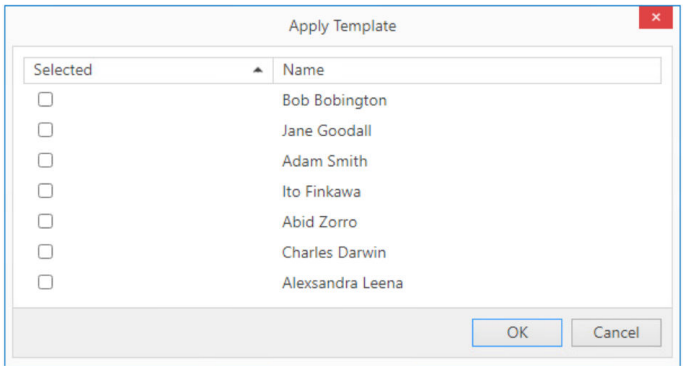
1. Find the **Template** you want to use by making selections in the **Navigation Pane** and the **Contents Pane**.

   Note
   There are no **Default Templates** available in AMS Machine Works 1.7.5.

2. When the **Templates Tab** is active, click the **Apply Template** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu



3. The **Apply Template** window appears.



   - **Selected** — Check the box next to the name of every **User** you want to have this **Template**.
   - **Name** — The names of every **User** in the system.
   - **OK** — Click **OK** to confirm your choices.
   - **Cancel** — Click **Cancel** to exit without making changes.

10.3.3 License Management Functions

There are a variety of types of AMS Machine Works **License** which enable different features and capabilities.

The list of **License** types includes:

- **AMS_Machine_Works_OPC_UA_Server**: This is the **License** for the software.
- **AMS_Machine_Works_Users**: This is the **License** for the number of unique **User** accounts which are available.

Note
Complete information about your installation and licenses can be found in your **Guardian Information**. See: View Guardian Information

A **License** has one of three statuses:

- **Good**: A **Good License** has more than 80% of its resources still available.
- **Fair**: A **Fair License** has less than 80%, but more than 0%, of its resources still available.
- **Poor**: A **Poor License** has 0% of its resources still available.

Note
A **License** which is based on a **Start Date** and an **End Date** is **Good** until the **End Date** and then it is **Poor**. See: License Management Functions

When a **License** which has a **Start Date** and an **End Date** is closer than 90 days to the **End Date**, emails are sent to the **Administrator** at the following intervals:

Where **N** equals the number of days until the **End Date**

1. If **N** > 60 and **N** ≤ 90, a reminder is sent once a week.
2. If **N** > 30 and **N** ≤ 60, a reminder is sent twice a week.
3. If **N** > 7 and **N** ≤ 30, a reminder is sent three times a week.
4. If **N** ≤ 7, a reminder is sent every single day.

There are three **License Management Functions** available in the **Home Menu** when the **Licenses Tab** is selected:

- Register a License
- Request a License Proposal
- View Guardian Information

Register a License

The **Register License** button enables you to select the **License** file which matches the **Machine Fingerprint** of the computer which AMS Machine Works is installed on.

The **Machine Fingerprint** is available in the Request a License Proposal window.

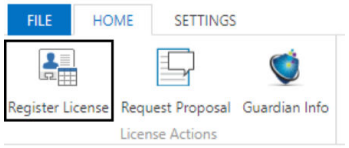
A **License** can be active for a specific duration, or control which features are enabled, or how many users are allowed.

Note
A **License** is cryptographically connected to the **Machine Fingerprint** value, and cannot be used for a different machine.

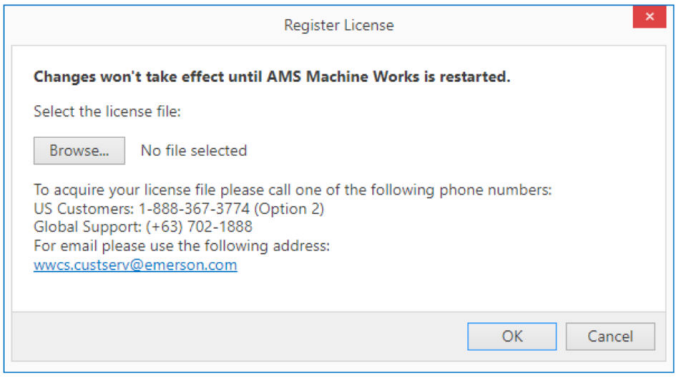
Before you begin, confirm that:

- You are logged in as an **Administrator**.

1. When the **Licenses Tab** is active, click the **Register License** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu



2. The **Register License** window appears.



- **Browse** — Navigate your storage to find the **License** file.
- **Contact Info** — Customer support phone numbers.
  - US Customers: 1-888-367-3774 (Option 2)
  - Global Customers: (+63) 702-1888
- **Email Link** — Link to customer support. wwcs.custserv@emerson.com
- **OK** — Confirm the selection of the **License** file.
- **Cancel** — Close the window without making any changes.

Request a License Proposal

The **Request Proposal** button enables you to request a **License** proposal from Emerson which matches the **Machine Fingerprint** of the computer which AMS Machine Works is installed on.

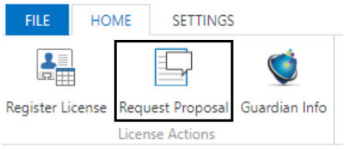
A **License** can be active for a specific duration, or control which features are enabled, or how many users are allowed.

Note
A **License** is cryptographically connected to the **Machine Fingerprint** value, and cannot be used for a different machine.

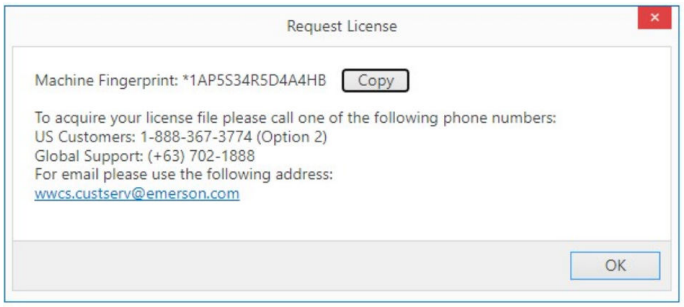
Before you begin, confirm that:

- You are logged in as an **Administrator**.

1. When the **Licenses Tab** is active, click the **Request Proposal** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu



2. The **Request License** window appears.



- **Copy** — Click **Copy** to copy the **Machine Fingerprint** generated for this specific machine.
- **Contact Info** — Customer support phone numbers.
  - US Customers: 1-888-367-3774 (Option 2)
  - Global Customers: (+63) 702-1888
- **Email Link** — Click the link to customer support, and paste in the **Machine Fingerprint** value you copied. wwcs.custserv@emerson.com
- **OK** — Click **OK** to exit this window.

View Guardian Information

The **Guardian Info** button enables you to view the many pieces of the **Registration** and **Configuration** information associated with your **License** and the current state of the software.

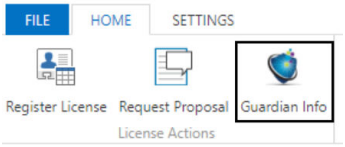
The **Machine Fingerprint** is available in the Request a License Proposal window.

A **License** can be active for a specific duration, or control which features are enabled, or how many users are allowed.

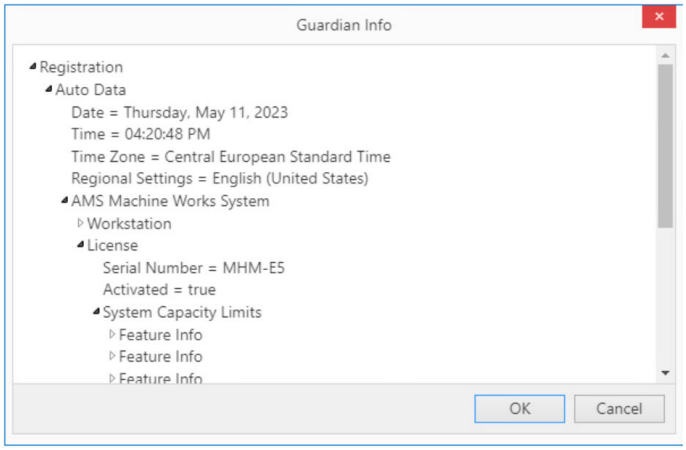
Before you begin, confirm that:

- You are logged in as an **Administrator**.

1. When the **Licenses Tab** is active, click the **Guardian Info** function in the **Home Menu** view of the **Ribbon Menu**. See: Ribbon Menu



2. The **Guardian Info** window appears.



- **Registration** — This is an expandable hierarchy of many aspects of your **License**, **Users**, and **Machine Configuration**.
- **OK** — Click **OK** to export the **Guardian Info** in a file named **SysRegData.epm** to the **Downloads** directory you have configured in your browser settings.
- **Cancel** — Click **Cancel** to close the window without making any changes.

11 Event Viewer

The Event Viewer utility allows you to view system-generated events. You can choose to display events per module or view all events logged by the system.

The following modules log events:

- **Device Configuration** — events relating to configuration of connected devices, such as device discovery errors.
- **Asset Explorer** — events and configurations in the **Asset Explorer** utility, such as adding, editing, and deleting assets and locations, asset binding, and all asset health changes.
- **Data Highway** — all events occurring in the **Data Highway**, such as parameter registration and unregistration.
- **Machine Configuration** — all machine configurations, such as adding, editing, and deleting components, bearings, collections, measurement definitions, alarm limits, and channel mappings.
- **User Manager** — all events in the **User Manager** utility, such as adding, editing, and deleting users and logging in and logging out users.
- **Vibration Analyzer** — all events in the **Vibration Analyzer**, also known as **VibApp**, such as adding, editing, and deleting plot labels and machine notes, RPM changes, machine health train changes, and alarms.

Events are displayed with the following details:

- **Date and Time**—date and time the event was recorded.
- **Event Type**—the type of event to which the interface responds.
- **Source**—the module associated with the event.
- **Asset**—the asset associated with the event.
- **Attachments**—the attachment associated with the event. Events with attachments have a paper clip icon.

Note
The database in a Tier-1 installation (Limited Storage), Microsoft SQL Server 2017 Express, has a size limit of 10 GB. If the databases reach this size limit, the software will no longer be able to store new events.

11.1 View events

Only system-generated events can be viewed in the **Event Viewer** utility.

Prerequisites

Launch the **Event Viewer** utility.

Procedure

1. On the left pane, select to view events by **Application** or by **Modules**:

- Click **Application** to view all events logged by the system.
- Expand the **Modules** folder and click on a module to view events recorded for the specific module.

2. Select an event from the list.

   Details display in the bottom pane. If an event has an attachment, a thumbnail of the attachment is displayed.

11.2 Archive events

Events stored in Plantweb Optics are archived periodically. Archived events are deleted from the database and stored in an archive file.

By default, events that are older than 180 days are archived. Event archiving automatically happens every 30 days. You can retrieve archived files in `C:\EMERSONCSI\DATA\Backups\Events`. Archive files are in .csv format with the text `OpticsEventsArchive` appended in the file name.

Note
Archived events cannot be imported and viewed in the software.

12 AMS Machine Works Limits

Table 12-1: AMS Machine Works Limits

Name	Limit	Units
Network Devices		
AMS 9420s	400	count
Emerson Wireless Gateway	20	count
Asset Explorer		
New Asset (Name)	60	characters
Asset Generic	500	count
Locations	1,000	count
Machine Trains	500	count
Device Configuration		
Measurement Points	2,000	count
Measurements per collection	2,000	count
Machine Configuration		
Machine Train Details		
Machine Train Components	3	components
Speed	120,000	RPM
Machine Train Name	60	characters
Machine Train Description	125	characters
Machine Train Component Name	60	characters
Machine Train Component Description	125	characters
Motor		
Manufacturer	60	characters
Model	60	characters
Speed (RPM)	120,000	RPM
Power	50,000	HP
Number of Poles	48	
Number of Rotor Bars	500	
Number of Stator Slots	501	
Frame Size	NaN	-N
Rated Volts	20,000	Volts
Full Load Current	1,000	Amps

Table 12-1: AMS Machine Works Limits *(continued)*

Name	Limit	Units
Rated RPM	120,000	RPM
Motor Parts (similar to turbine parts, blower, centrifuge, compressor, generator, Generic, Spindle)		
Shaft Name	60	characters
Bearing	9	-
Coupling		
Coupling Name	60	characters
Coupling Description	255	characters
Gearbox		
Gearbox Name	60	characters
Gearbox Description	255	characters
Manufacturer	60	characters
Model	60	characters
Gearbox Ratio	100	-
Shaft	3	-
Gearbox Parts - Shaft Name	60	characters
Gearbox Parts - Gear Name	60	characters
Gearbox Parts - Number of Teeth	2,000	-
Number of Gears per shaft	2	-
Number of Bearings per shaft	2 per shaft	-
Pump		
Pump Information - Number of Inlet Pump Vanes	100	-
Pump Information - Number of Outlet Pump Vanes	100	-
Pump Stages	20	-
Number of Vanes	100	-
Number of Bearings per Pump	9	-
Fan		
Fan - Number of Primary Fan Blades	100	-
Fan - Number of Secondary Fan Blades	100	-
Fan Stages	20	-
Fan Number of Blades	100	-
Number of Bearings per Fan Shaft	9	-

Table 12-1: AMS Machine Works Limits *(continued)*

Name	Limit	Units
Machine Configuration		
Combined Measurement Location Properties		
Sensor Angle	360	Degrees
Tach. Angle	360	Degrees
Resting Voltage	24	Volts
Bearing Clearance	1000	microns
Tach name	60	characters
Misc		
Point ID	30	characters
Point ID Description	60	characters
Machine Journal		
General		
Cases per system	5,000	count
Cases (Open) per machine component	50	count
Cases (Resolved) per machine component	50	count
Cases (Open + Resolved) per machine component	100	count
Posts/Replies per system	500,000	count
Posts/Replies per case	100	count
Replies per post	NA	count
Post text size	102,400	characters
Case text size	64	characters
Attachments per post	64	count
Attachment (Single image) size	15	MB
Attachment (Single other) size	50	MB
Attachment filename length	256	characters
Attachment link length	1,024	characters
Attachment description length	256	characters
Tag text size	64	characters
Tags per post	50	count
Mentioned users per post	20	count
Number of severities	100	count
Number of urgencies	100	count

Table 12-1: AMS Machine Works Limits *(continued)*

Name	Limit	Units
Severity text size	64	characters
Urgency Text Size	64	characters
Number values of severities	100	value
Number values of urgencies	100	value
Attachment size per download	1	GB
Work recommendations per post	64	count
Work recommendations per system	480,000	count
Posts per report	200	count
Work recommendation subject length	256	characters
Work recommendation description length	500	characters
Work recommendation comment length	256	characters
Vibration Analyzer		
Concurrent Users	5	
Maximum nested hierarchy levels supported	6	

Glossary

agent

A lightweight service responsible for communicating with devices. Each type of agent is designed to communicate with a specific kind of device. An AMS Machine Works installation can support multiple instances of every type of agent simultaneously. Multiple instances of a single type of agent can be used to load balance network traffic as well as support multiple isolated networks.

alert hysteresis

is expressed as a percentage of the value of an alert by which the value must change towards a safe value before the alert can be triggered again.

For example, if you have an **Upper Absolute Alert** set for x=100, and the **Alert Hysteresis** is set at 5%, the **Alert** will not be repeatedly triggered by fluctuations within the 5% band, (i.e., values where 100 < x > 95).

But if the value of x passes below 95, a fresh alert will be triggered the next time x > 100.

alert state

A user-defined categorization of the health of an asset. There are four alert state statuses: advise, warning, critical, and good.

Analysis Dashboard

The AMS Machine Works Analysis Dashboard provides an overview of the status, measurement, and health information of machines trains.

asset

Any physical component (such as a device or machine) being monitored by AMS Machine Works, or the logical representation of a physical asset. Examples include: motor, pump, fan, turbine, and more.

Asset Explorer

A utility that provides an interface for organizing and interacting with assets, and launching other utilities.

asset priority

A value representing the importance of an asset with respect to other assets in the system: **Not Set**, **Low**, **Medium**, **High**, or **Very High**.

auto mapping

In the measurement pane of the device configuration process you can AUTOMAP a device's three measurements to the **horizontal**, **vertical**, and **axial** axes.

channel mapping

The association of each channel on an BROKEN: [xsh1673258136315.dita] asset source with a particular measurement location on a machine.

collection

In the Network Device Module, a collection can be configured for each device. A collection defines the measurement(s) which can be demanded, and some collections are stored

whenever the Store on Alert function is triggered by one the device's native scalar measurements.

device

A measurement instrument connected to AMS Machine Works.

device location

A representation of the real-world, physical position of the measurement device.

event

Any change related to the network connection status, health status, or on demand collection status of a device.

Event Viewer

Utility that allows you to view system-generated events.

failure effects

This filter option identifies and organizes assets according to the effects they cause if there is an equipment failure. For example, you can label a Machine Train component, e.g. a **Fan**, with **Environmental Control** if the purpose of the component is to provide cooling to a production environment.

filters

Labels for categorizing system elements to allow grouping and filtering using the search feature. In the Asset Explorer utility, you can label any asset with the failure effects label.

health status

There are five health statuses:

- **Good**: health status — good
- **Advice**: health status — advice
- **Warning**: health status — warning
- **Critical**: health status — critical
- **Unknown**: health status — unknown

health status — advice

health status — critical

health status — good

health status — unknown

Unknown status is for:

- Devices which currently have no network connection.
- Devices which have not yet communicated their the initial configuration information.

health status — warning

location

A location is used to organize your site. A location can contain another location or a machine train. For example a location could be used to hold all the machine trains and sub-locations in a physical area, or it could be used to group similar types of machine trains.

location navigator

An area in the Asset Explorer utility where you can create and organize your site, view information about the locations and assets you create, and perform operations within the context of a selected location or asset.

machine train

A machine train is a representation of every asset and device used to define and monitor a piece real world equipment.

measurement location

An approximate representation of the physical location where data is acquired, usually the physical location of a measurement device.

protocol

A protocol describes how a device sends and receives information on the network. Examples include HART and Ethernet.

site

The site is the root of your location tree structure.

spectrum

A spectrum plot is a graphical representation of vibration frequencies and their amplitude. In AMS Machine Works you can view spectra in the Vibration Analyzer application or in the AMS Machine Works Dashboard.

store on alert

The store on alert function enables data capture for a Collection or Collections whenever an alert state is triggered. Store on alert settings are available for any native scalar measurement.

trends

A trend plot shows a number of measurements of a parameter over a period of time. In AMS Machine Works you can view trends in the Vibration Analyzer application or in the AMS Machine Works Dashboard.

User Manager

Utility that lets you control and monitor access to various components of the software.

Vibration Analyzer

A module of AMS Machine Works that lets you analyze periodic vibration data collected from supported devices connected to machines in your site.

waveform

A waveform plot is a graphical representation of how the vibration level changes with time. In AMS Machine Works you can view waveforms in the Vibration Analyzer application or in the AMS Machine Works Dashboard.

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