

# AMS Machine Works

## Version 2.2



- Ultramodern, intuitive, and comprehensive asset health monitoring software application for mechanical and rotating assets
- Supports Emerson’s AMS monitoring technologies, including:
  - AMS 2140 Machinery Health Analyzer
  - AMS Wireless Vibration Monitor
  - AMS 9420 Wireless Vibration Transmitter
  - AMS Asset Monitor
  - AMS 6500 ATG



*AMS Machine Works is relied on by reliability engineers, maintenance technicians, predictive maintenance analysts, asset managers, vibration analysts, plant engineers, maintenance supervisors, industrial automation engineers, and others.*

## Overview

In the past when a problem arose with one of your critical assets you might have had to comb through tons of data, and potentially even different software and databases to identify what's important to you at that moment. Unfortunately, time isn't always on your side in these scenarios. You need relevant information fast, and you need the right tools there to diagnose faults as fast as possible.

AMS Machine Works is a comprehensive software solution that greatly simplifies the fault diagnosis and analysis process by combining predictive maintenance techniques with comprehensive analysis tools to provide easy and accurate assessment of machinery health in your facility.

- One software application and database for all Emerson vibration hardware
- Easy to get started and understand, but contains the power tools necessary for experts
- Scalable and flexible deployment models

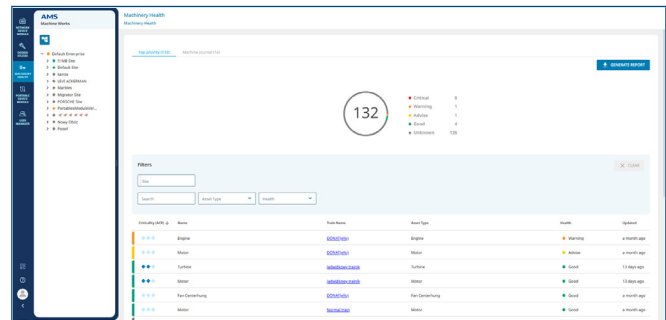
## Powerful Tools in an Intuitive Interface

AMS Machine Works includes a vibration analysis module with familiar, easy-to-use analytical tools such as:

- Scalar value trending
- 1x, 2x, Nx, peak/phase trending, energy in a band trending
- Waveform
- Spectrum
- Spectrum Waterfall and Cascade
- PeakVue™ measurements including overall, waveform, spectrum
- Fault frequencies

- Standard, harmonic, and sideband cursor
- Circular plot
- Orbit
- Bode/Nyquist
- Harmonic family detection
- Sideband frequency detection
- Shaft centerline

## Machinery Health Dashboard Enhancements



The new AMS Machine Works Analysis Dashboard allows users to easily identify what's important and filter by asset type or alert status.



**New:** Native plotting tools on the AMS Machine Works dashboard give enable quick access to trend, spectrum and waveform data for each measurement point.

## Machine Health at a Glance

With the AMS Machine Works Analysis Dashboard you are no longer required to search through alarm logs or dig through hierarchies to find out what machines need your attention. Nor are you required to look through notes and emails to find out what predictive maintenance activities are taking place and what machines need repair.

With one glance at the Analysis Dashboard you can see:

- Machine health
- Device/system health
- Machines that need your immediate attention
- Work recommendations and status

Selecting any of the items on the dashboard allows you to quickly focus in on what's important, greatly improving workflow and optimizing user experience.

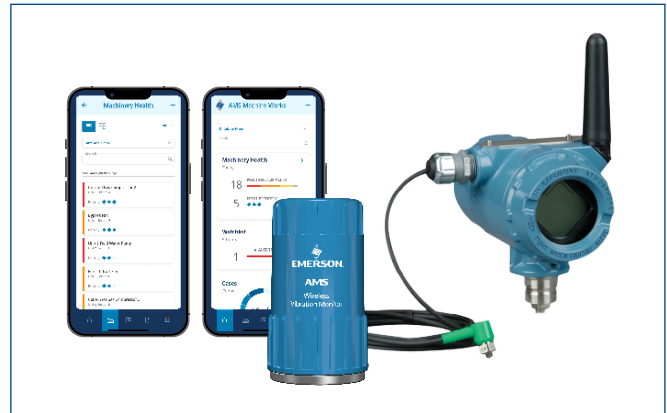
## AMS Wireless Vibration Monitor and AMS 9420 Wireless Vibration Transmitter

Emerson's AMS Wireless Vibration Monitor and AMS 9420 Wireless Vibration Transmitter's are integrated into AMS Machine Works through the Emerson Smart Wireless Gateway (1410 and 1420 models). AMS Machine Works then utilizes that data to perform in-depth vibration analysis of the monitored rotating assets.

AMS Machine Works provides wireless vibration users with all of the necessary tools and functionality needed to utilize the wireless vibration transmitters to their full potential. This includes complete vibration data including overall levels, energy bands, high resolution spectra, and waveforms.

Also included is Emerson's unique PeakVue™ technology that filters out traditional vibration signals to focus exclusively on impacting, a more reliable indication of asset health in specific types of equipment. PeakVue can visualize distress signals on a machine that are simply not visible with other vibration measurements.

The AMS Wireless Vibration Monitor also supports Emerson's new PeakVue Plus technology which automates analysis and presents the information in a color-coded graphic so that users can, at a glance, identify not only a machinery issue but its severity.



*Emerson's wireless vibration solutions provide best-in-class wireless vibration data and capabilities.*

## AMS Asset Monitor

AMS Asset Monitor communicates directly with AMS Machine Works, enabling users to store process and vibration data from the AMS Asset Monitor to perform in-depth analysis of your important assets.

It accommodates up to 12 CHARMs including several Vibration CHARMs as well as DeltaV CHARMs for process inputs. Predicates can be configured to optimize collection of high resolution waveforms and spectra.

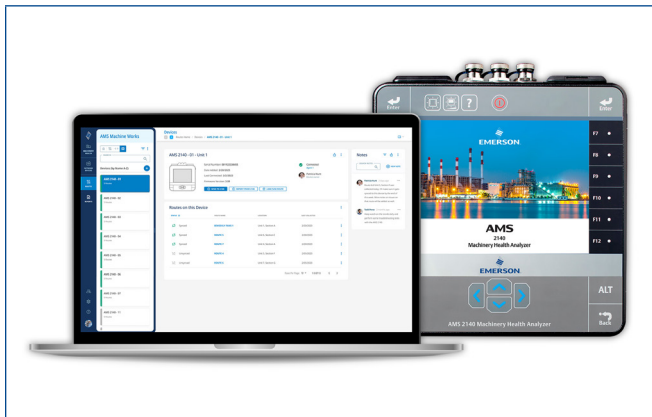


*Up to the moment process and condition monitoring results with Store on Alert for automated fault detection.*

## AMS 2140 Machinery Health Analyzer

AMS 2140 now joins other AMS condition monitoring data acquisition technology in AMS Machine Works. This includes a new Portable Device Agent, a lightweight service that enables your laptop to sense when your AMS 2140 connects to the USB port. Once the device is sensed and discovered by your laptop, AMS 2140 communication is then routed to the AMS Machine Works server.

Users can now transfer routes and condition monitoring data from AMS 2140 to the AMS Machine Works database. Additionally, the service will also support Wi-Fi and Ethernet communication.



### Improved Resolution of the Native Parameters in the Long-Term Database

- The benefit of AMS Machine Works database consolidation with MongoDB

### Dual Use of Transient Grab

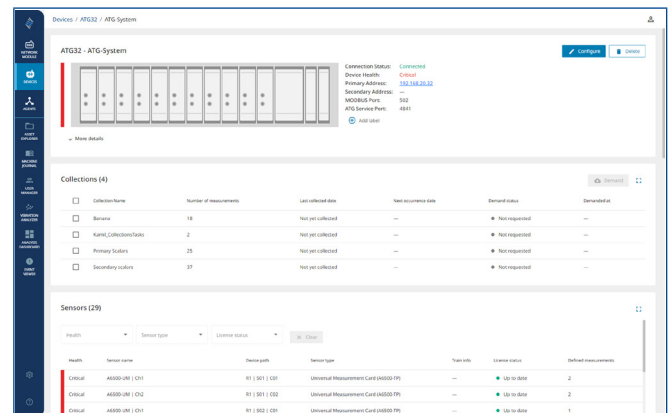
- Transient plotting tools in VibApp, long Transient waveform analysis
- The short waveform extracted from the Transient Grab (with pre-processing tool to define LOR and spectrum averaging)
- Analysis Parameters with Alerts calculated from the short waveform



## AMS 6500 ATG

### AMS 6500 ATG Agent

- Device configuration and status (not including 6500 ATG rack configuration, only connectivity parameters)
- Collection configuration (native scalars and Transient Grab / long waveform)
- Improved support for Transient Grab data provided by the device with internal triggers. Internal 6500 ATG schedule and events will be the primary data collection drivers
- Store on Alert (alarms from the native parameters, configurable alert level)
- Store on Demand



## Portable Device Module

AMS Machine Works 2.2 Portables Modules Features:

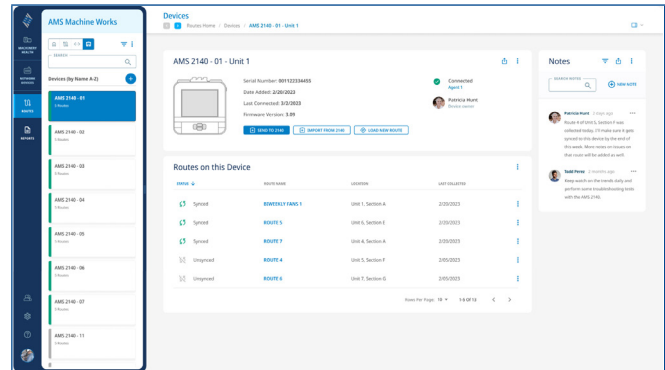
- Dashboard
- User Management
- Route Management
  - Creation and Edit
  - Route Data Transfer
  - Analysis Parameters
  - Filter, search and other editing tools
  - Reporting
    - Configuration (single route)
    - Status Report (all routes, vibration data collection program report)
- Standard Vibration Analysis Module Functionality
- Stand Alone Data Transfer
- Analyze Experts are supported in Route Mode

### Portable Device Agent

- Lightweight service that may be installed on a user's laptop listens for the AMS 2140 to be plugged into the USB port, then routes the AMS 2140 communication to the AMS Machine Works server.
  - AMS 2140 device discovery, connection and details
  - Route transfer to AMS 2140
  - Data transfer from AMS 2140 to AMS Machine Works database
- Will also support Wi-Fi and Ethernet communication with the AMS 2140 in addition to USB cable connection
- Standalone Data Transfer (AMS Machinery Manager existing tool) will also be available in AMS Machine Works

## Route

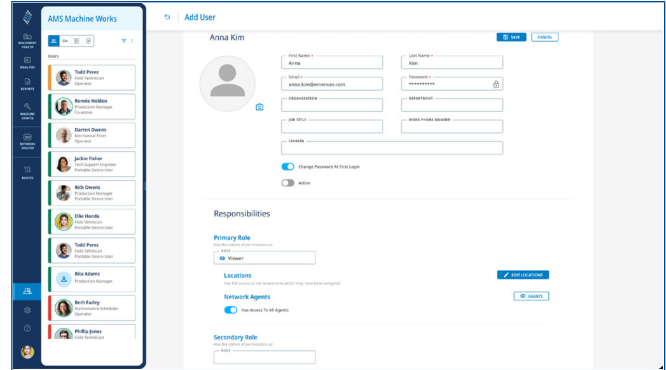
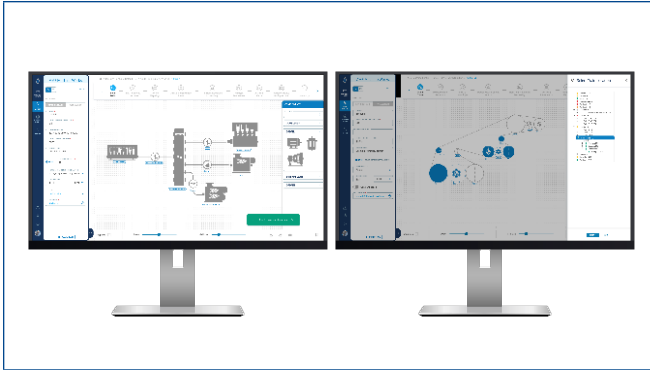
- Route configuration and modification
- Analysis Parameter Sets and Alarm Sets as known from AMS Machinery Manager
- Analytical Jobs related to the Route
- Vibration data analysis (waveform, spectrum, parameter trends) in VibApp and Web VibApp



## Design Studio

In the Design Studio module, users will have access to an intuitive drag-and-drop diagramming tool, a more streamlined design workflow, redesigned menus, and an extensive library of specialized asset types—reflecting Emerson’s embedded domain expertise. Design Studio improves the process of mapping measurement locations of your sensor devices, setting measurement and analysis alerts and schedules, generating waveform signal processing, configuring portable devices, and finally, “commissioning” the train to activate and initiate machine monitoring.

In version 2.2, machine building and configuration will greatly increase capacity to support a maximum of 72 assets within one machine train. Version 2.2 also adds custom fault frequencies, the ability to set more alarms per measurement point, short and transient waveform collection for AMS 6500 ATG, and more customization for analysis parameters.



## User Management

AMS Machine Works features role-based access control, allowing for customizable, predefined roles with default permissions. Users may also be assigned to one or more roles.

### Admin

- All possible privileges and credentials, agent setup and assignment, creation of additional accounts for lower access roles

### Co-Admin

- Admin access to select parts of the hierarchy

### Operator

- Edit access to agents, edit access to machine train editor, edit access to VibApp, Network Device Module setup

### Portable Device User

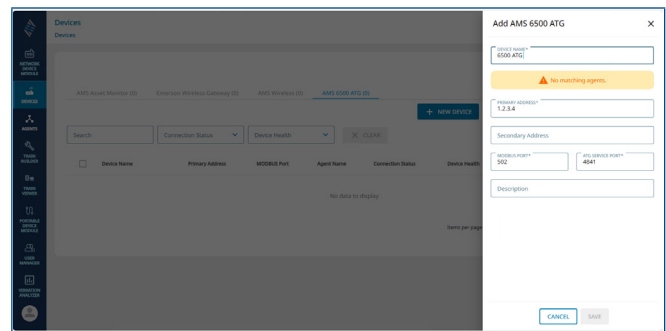
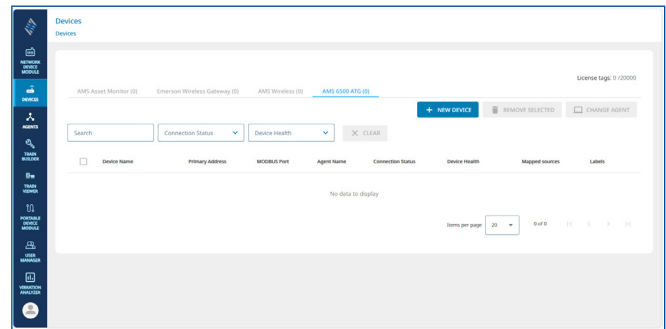
- Portable Device Module setup/config activities, edit access to VibApp and network device module

### Viewer

- View-only access to all applications in the location(s) to which they have been assigned. Cannot perform any configuration actions there
- Machinery Health and VibApp access (data review and analysis)
- Network Device Module (only the agents assigned by the Admin or Co-admin)
- Can see the configurations and device status only
- Can trigger the on-demand collection

## OPC UA Server

The new OPC UA server will enable automated integration and easy generation of the required tag list, as well as a more intuitive tree for selecting data sources.

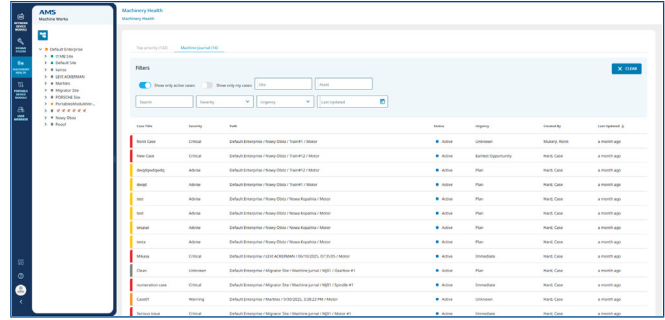


## Network Device Module

The network device module is dedicated to the purpose of configuring channels and measurement points for your AMS condition monitoring equipment like AMS Wireless Vibration Monitor, AMS Asset Monitor, AMS 6500 ATG, and AMS 9420 Wireless Vibration Transmitter. This enables users to focus on device setup and maintenance as a separate activity while not interfering with configuration of alarms, analysis parameters and machine train configuration.

### Machine Journal

Users can create a case against assets accessible to their functional location for Co-Administrators and Operators, or anywhere in the enterprise for a global administrator. Users can collaborate and enter comments or attach images to provide additional details against each case. Additional filters such as case name, severity, urgency, site, asset and last updated date will enable faster querying of the desired cases.



### System Requirements

System Requirements: AMS Machine Works Server	
Operating System	<ul style="list-style-type: none"> <li>Windows Server 2022 Standard or Datacenter</li> <li>Windows Server 2019 Standard or Datacenter</li> <li>Windows Server 2016 Standard or Datacenter</li> </ul>
CPU Architecture	64 Bit
Internet Information Services (IIS)	v8.5, v10 (Supplied with OS)
Browsers	<ul style="list-style-type: none"> <li>Google Chrome (latest version)</li> <li>Microsoft Edge (latest version)</li> </ul>
Processor	Large and Extra-Large Systems — 3.2 GHz, 8-core processor, Intel Xeon-scalable (Gold) or faster (recommended) Small and Medium Systems — 2.4 GHz, 6-core processor, Intel Xeon-scalable (Gold) or faster (minimum)
RAM	<ul style="list-style-type: none"> <li>Large and Extra-Large Systems — 64 GB</li> <li>Medium Systems — 32 GB</li> <li>Small Systems — 16 GB</li> </ul>
Hard Drive	SSD hard drive (recommended) SAS hard drive (10K RPM) (minimum)
Available Disk Space	<ul style="list-style-type: none"> <li>1 TB (recommended)</li> <li>500 GB (minimum)</li> <li>100 GB (for wireless-only setup)</li> </ul>
Screen Resolution	<ul style="list-style-type: none"> <li>4K UHD (3840 x 2160 pixels)</li> <li>SXGA (1280 x 1024 pixels) (minimum)</li> </ul>
Network	<ul style="list-style-type: none"> <li>2 x 1 GB NIC (use 2 NICs to isolate Level 3 traffic from Level 2 traffic) (recommended)</li> <li>1 x 1 GB NIC (supported)</li> </ul>

System Requirements: AMS Machine Works Vibration Analyzer Client	
Operating System	<ul style="list-style-type: none"> <li>■ Windows Server 2022 Standard or Datacenter</li> <li>■ Windows Server 2019 Standard</li> <li>■ Windows Server 2016 Standard</li> <li>■ Windows 11</li> <li>■ Windows 10 Pro</li> <li>■ Windows 10 Enterprise</li> </ul>
CPU Architecture	64-bit
Internet Information Services (IIS)	v8.5, v10 (supplied with OS)
Browsers	2.2 GHz, 4-core processor Intel Xeon, Intel Core i5 6th Gen (i5 6400T) or better
RAM	<ul style="list-style-type: none"> <li>■ 16 GB (recommended)</li> <li>■ 8 GB (minimum)</li> </ul>
Hard Drive	SAS hard drive (10K RPM)
Available Disk Space	100 GB
Screen Resolution	4K UHD (3840 x 2160 pixels) SXGA (1280 x 1024 pixels) (minimum)

Supported Device Quantities	
Assets	2000 Machine Trains with network devices
Configured Users	250 total users
Concurrent Users	15
Concurrent VibApp Users	10
AMS 9420 Wireless Vibration Transmitter	<ul style="list-style-type: none"> <li>■ 600 devices maximum per system connected across 50 Emerson Wireless Gateways</li> <li>■ 600 devices maximum per AMS Machine Works Wireless Agent</li> </ul>
AMS Asset Monitor	400 AMS Asset Monitors maximum per system and per AMS Asset Monitor Agent
AMS Wireless Vibration Monitor	<ul style="list-style-type: none"> <li>■ 5000 devices maximum per system connected across 120 Emerson Wireless Gateways</li> <li>■ One AMS Machine Works Wireless Agent can be installed per server</li> </ul>
AMS 6500 ATG Agent	100 Single Rack Systems
AMS 2140 Agent	<ul style="list-style-type: none"> <li>■ Maximum number of concurrent users: 15</li> <li>■ Maximum number of concurrent data transfers: 2</li> </ul>

System Requirements: AMS Machine Works Agent Server	
Emerson Wireless Gateway Agent	Refer to AMS Machine Works V2.2 System Guide
AMS Asset Monitor Agent	Refer to AMS Machine Works V2.2 System Guide
AMS 2140 Agent	Refer to AMS Machine Works V2.2 System Guide
AMS 6500 ATG Agent	Refer to AMS Machine Works V2.2 System Guide

## Ordering and Licensing Information

AMS Machine Works can be licensed on a subscription basis. The length of the subscription and renewal terms will be three years unless otherwise set forth in the applicable Emerson proposal. Each license must include an AMS Machine Works Server and a purchased quantity of users and vibration tags. The purchaser may not use the AMS Machine Works software with more than the purchased number of users and vibration tags, all of which as set forth in the applicable Emerson proposal.

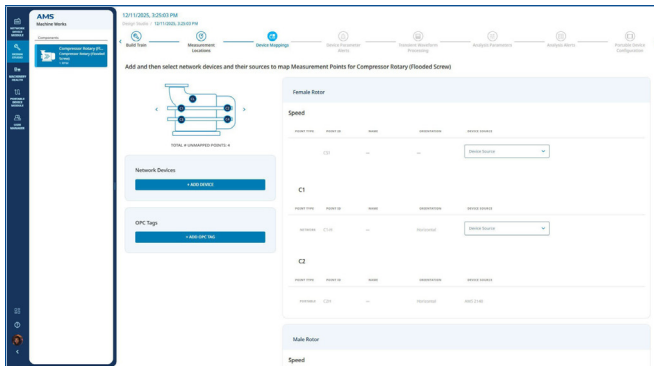
License Options	Options	Subscription Part Number
AMS Machine Works Server	Select 1 per installation	A43-SYSTEM-0
<b>Users (combine for desired amount)</b>		
1 User	Available in Qty 1-4	A43USER-1-0
5 Users	Available in Qty 1-2	A43USER-5-0
15 Users	Available in Qty 1	A43USER-15-0
25+ Users	Available in Qty 1	A43USER-25-0
<b>Vibration Tags</b>		
100	Available in Qty 1	A43TAGS-100-0
500	Available in Qty 1	A43TAGS-500-0
1,000	Available in Qty 1	A43TAGS-1000-0
2,000	Available in Qty 1	A43TAGS-2000-0
5,000	Available in Qty 1	A43TAGS-5000-0
10,000	Available in Qty 1	A43TAGS-10000-0
20,000	Available in Qty 1	A43TAGS-20000-0
<b>Portable Devices</b>		
1 Device (Qty 1-9)	Available in Qty 1-9	A43DEVICE-1-0
1 Device (Qty 10-19)	Available in Qty 10-19	A43DEVICE-10-0
1 Device (Qty 20+)	Available in Qty 20+	A43DEVICE-20-0
<b>Add-on Licenses</b>		
OPC UA (Out)	Optional 1 per installation	A43OPCUA-SVR-0

## AMS Machine Works v2.2 Overview

Several new and improved major functional enhancements have been incorporated into AMS Machine Works v2.2, enhancing the overall workflow for stakeholders monitoring asset health across multiple technologies.

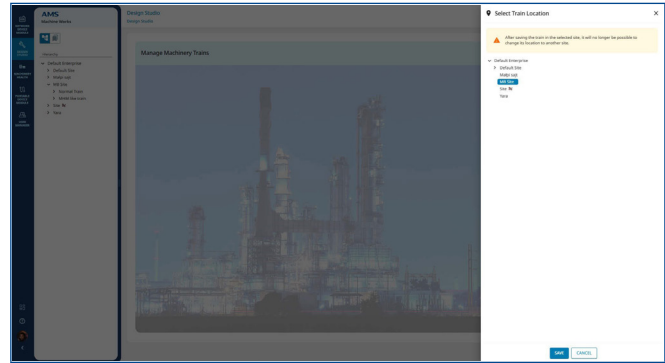
The first of these are around OPC UA data import. This feature will enable non-vibration process data to be mapped to an asset to provide the analyst additional context on their vibration readings. Additionally, we will also introduce Speed Manager, which will optimize the reference speed input used for spectrum analysis. Speed Manager will import the speed value from OPC and store it as a trend within AMS Machine Works. If the speed data from the AMS 9530 is unreliable or experiencing latency due to poor network traffic, AMS Machine Works will default to the speed data from OPC UA as the next best source. This will be especially key for variable speed applications

### OPC UA Data Import



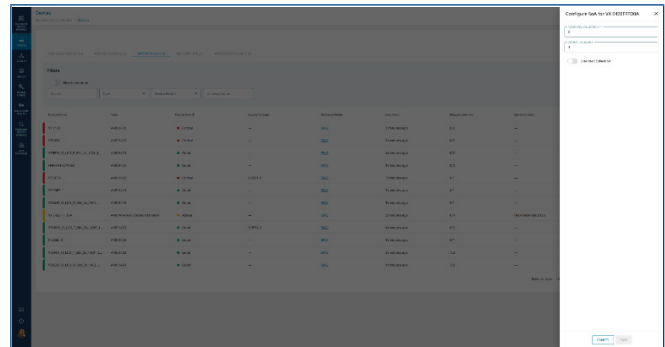
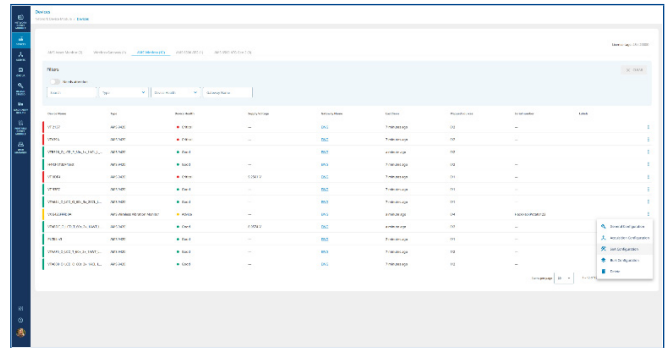
In addition to this, AMS Machine Works v2.2 also adds workflow enhancement tools to reduce configuration time. Central to this is the ability to copy a machine train with all configuration details and paste it elsewhere in the hierarchy. Closely tied to this is the ability to rearrange machine trains within a folder to change the order in which they appear.

### Copy/Paste Machine Trains



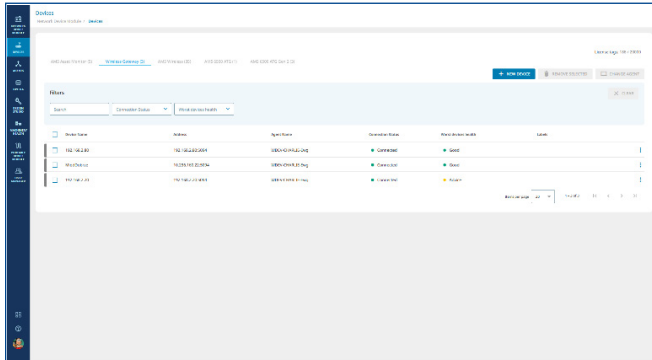
### Store on Alert Improvements

Store on alert has been greatly improved in AMS Machine Works V2.2. Based on the severity of the alert, (advise, warning, critical), AMS Machine Works will allow for additional scheduled collections, as well as the ability to perform an extended collection from multiple wireless units on an asset.



### Honeywell/Centero Gateway Support

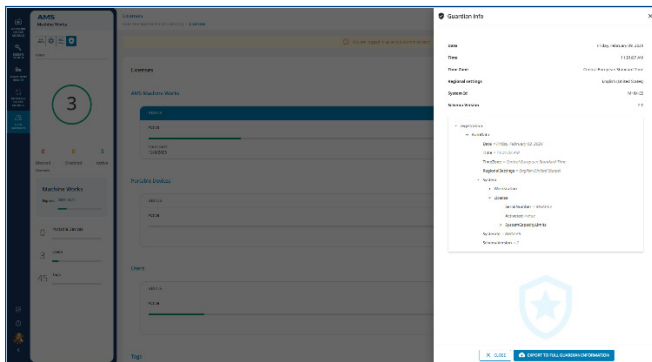
AMS Machine Works V2.2 will also support third-party wireless gateways, namely from Honeywell and Centero, to enable more flexible deployment options.



### Guardian System Registration

Another key feature to AMS Machine Works v2.2 is the ability to create a system registration file from AMS Machine Works to be sent to the Emerson Guardian Digital portal.

This file contains key information on system ID, server information, license information, and associated data collection devices such as the AMS 9530, AMS Asset Monitor or AMS 6500 ATG. This file can be manually uploaded to Guardian or automatically emailed to the Guardian Support team periodically.



## AMS Machine Works Connect

### Condition Monitoring-as-a-Service

**AMS Machine Works Connect** is Emerson's, cost-conscious condition monitoring bundle combining industry-leading vibration sensors, edge analytics, machinery health software, and global deployment services.

AMS Machine Works Connect offers users the same powerful machine health analysis software in the cloud with minimal investment in costly and burdensome infrastructure procurement, maintenance, and cybersecurity. This Emerson hosted asset management solution for monitoring industrial rotating machinery offers hardware (sensor, gateway, router, SIM card, enclosure) software, cloud services, installation, and configuration services.



## Asset Condition Monitoring Services (now part of AMS Machine Works Connect)

Emerson's team of machinery monitoring experts can supplement plant programs with **Asset Condition Monitoring Services**. Specialists are available to monitor and analyze data from Emerson's route-based vibration analyzers, wireless vibration devices, and online systems. They follow up with easy-to-read, actionable periodic reports for your maintenance department. With some changes made recently to the AMS Machine Works Connect program, asset condition monitoring services are now included by default for all AMS Machine Works Connect bundles.

## Software Support

Standard support including 24x7 call support, hotfixes, and updates to the software is included for the current and previous major software versions.

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