Integrated Machinery Protection and Prediction with Process Automation

- Easy three-step integration process of machinery protection with DeltaV™ digital automation system
- Eliminate complex and expensive integration
- Out-of-the box machinery health diagnostics for operators
- Build operator graphics quickly with pre-configured dynamos and macros
- Complete machinery monitoring for protection, prediction, and performance monitoring

Fast, trouble-free integration delivers critical machinery health feedback to operators.

Introduction

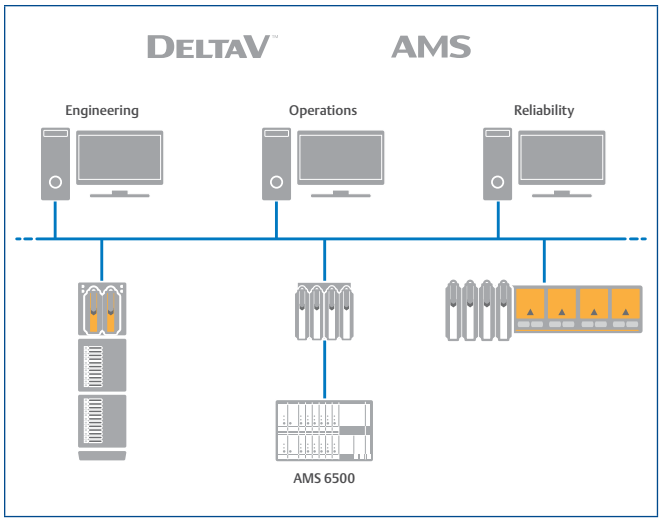
As turbomachinery and mechanical equipment health deteriorate, performance decreases, throughput is reduced, and unplanned shutdowns are possible. When operators have visibility to the performance of these high stakes assets, they can make process adjustments and reduce process disruptions. Real-time integration of machinery information in the DeltaV™ system delivers actionable information to operations staff and protects the condition of critical machinery assets.

Eliminate Complex and Expensive Integration

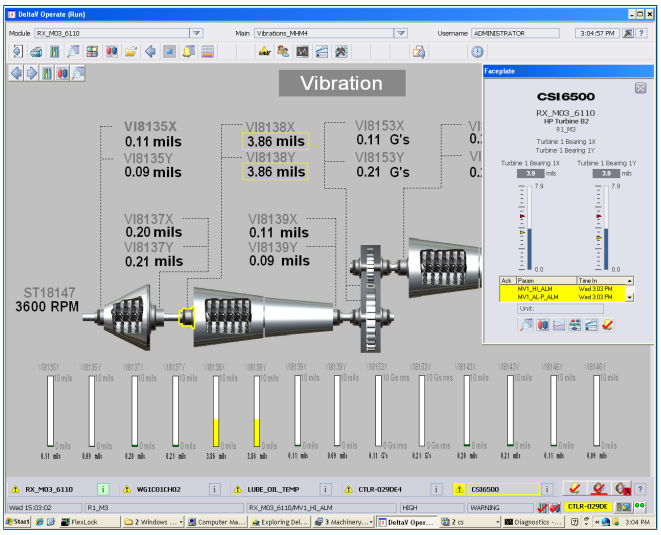
Control room operators use real-time vibration information as start-up permissives and to make start-up decisions for critical turbomachinery. In traditional control systems, integration with machinery monitors is complex and expensive, requiring Modbus expertise, system expertise, and specific machinery knowledge. Typical machinery protection systems can require 2,400 steps for 24 vibration channels to complete the integration process — not to mention the discovery process to determine how vibration and process automation systems are implemented. It typically takes up to five days for complete integration.

With this many steps, network issues, additional testing time, and nuisance alarms are easily introduced. All too often, plants don't have the time or staff to complete the integration, leaving plant operators without key machinery health diagnostics, including overall vibration levels, thrust position, and eccentricity value.

The easy three-step integration between machinery protection and the DeltaV system saves hundreds of man-hours and gives you a complete, error-free integration of machinery information with the DeltaV system.



Give your plant operators visibility to the condition of high-stakes assets.



AMS 6500 faceplate and dynamos are included in DeltaV software. Dynamos allow users to drag and drop bargraphs and number elements on the screen to create graphics in no time — attach dynamo to the data point and you're done.

An Easy Three-Step Integration Process

Easily connect vibration information from turbomachinery to the DeltaV system in three simple steps that take less than ten minutes. From AMS software applications and the AMS 6500 Machinery Health™ Monitor, asset parameters are scanned, selected, and imported into the DeltaV system:

Step 1, Scan: The scan process auto-detects each card inserted in the AMS 6500, and reads the configuration information. There is no need to research user manuals to identify parameters and no need to re-type information in the control system that was already entered during machinery monitor setup.

AMS software scans the AMS 6500 via Ethernet or serial connection and discovers the monitor and all of its properties. Automatically collected information includes monitoring module type, module name, sensor name, bearing name, machine name, engineering units, sensor sensitivity, alarm limits, module health status, scale factor, full scale range, and relay states. This scan typically takes about 20 seconds. By using the easy integration process, alert and alarm limits in the machinery monitor always remain synched with the process control system.

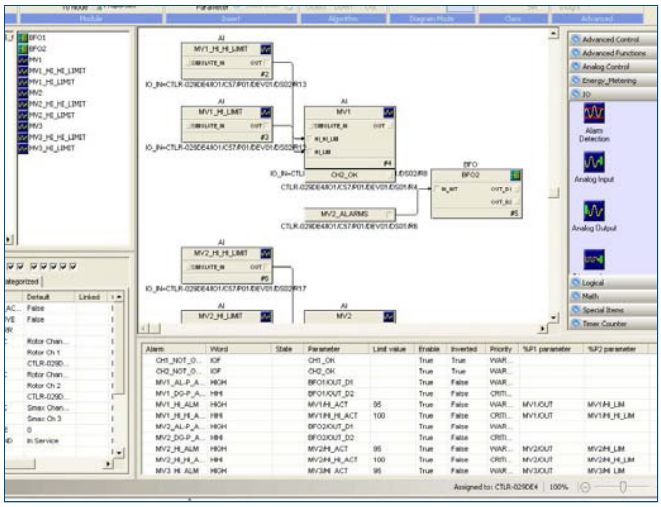
Step 2, Select: After the automatic scan in step 1, the machinery health values are presented for selection. You can accept the defaults or simply check a box to select values as viewable for the operator. Choose from overall vibration peak and phase relay states, and indicate which monitoring modules and sensors should be imported.

During this selection process, you can choose either the DeltaV VIM using Ethernet or the DeltaV serial interface communication method. To enable redundant communications, simply check a box. The need to create duplicate mapping for redundance is gone.

To complete step 2, type the DeltaV controller name, the area name in Explorer, and the name of the first virtual serial port of the controller (typically c57) where the imported information will reside. Step 2 typically takes about 5-10 minutes.

Step 3, Import: After the autoscan and select steps are completed, go to the DeltaV system and import the .fhx file. The easy integration is done.

During the import, control modules and function blocks are automatically built in control studio. Vibration function blocks are now part of the process automation control strategy.



Function blocks, fan out blocks, sensor status, relay status, vibration parameters, alarm limits, engineering units, point descriptions full scale range all automatically configured in control studio — days of effort saved.

Function blocks make use of scale factors, engineering units, alarm limits, full scale range, and all of the data that was selected in Step 2.

To complete import process, simply right click and download the controller. Step 3 takes about 30 seconds to complete. Then the entire easy integration process is complete.

Machinery Health Diagnostics for Operators

When the .fhx file is imported to the DeltaV system, many engineering tasks are automatically completed:

- Control modules are created
- Function blocks are created and linked
- Faceplates are linked
- Alarm limits are programmed and activated
- Sensor health monitoring is activated

The .fhx file is pre-engineered with automatic sensor health and automatic synchronization of alarm limits in the DeltaV system. Simply switch to DeltaV Operate and when machinery health alarms occur, they will automatically appear in the alarm banner with no extra setup required.

After the easy integration, alarms will automatically appear in the alarm banner. When the operator clicks on the alarm, a AMS 6500 faceplate opens with critical machinery health information that is useful for real-time decision making. The faceplate immediately provides operators with information like which sensor, which bearing, which machine, or which vibration parameter is in alarm. In addition, the faceplate includes a bargraph that shows the vibration levels proportional to full scale range in the appropriate engineering units.

Built-in instrumentation alarms automatically synch alarm limits with Emerson's machinery health systems so immediate action can be taken before faulty measurements shut down the plant. Automatic synch of alarm limits means you only need to configure them once, saving time and money and ensuring alarms are correct.

Function blocks are automatically created in the DeltaV control studio, which include out-of-the-box rules and allow you to build custom rules for plant-specific abnormal situation scenarios. This is an easy and fast way to give decision support to your operators.

Build Operator Graphics

Traditionally, once data pipes were established via Modbus or another bus protocol, extensive services were required to actually make the data useful for the operator through control strategies and operator graphics.

With Integrated Machinery Protection and Prediction, datasets and control modules are automatically configured in the DeltaV system during the import process. In addition, a machinery health faceplate template and dynamos are created to enable quick creation of operator graphics.

You can custom configure operator graphics using three fundamental dynamos to create a functional operator interface. Pre-defined dynamos are:

- **Bar graph dynamo** that indicates vibration level proportional to bar height, relative to alarm limits.
- **Num element dynamo** that displays sensor/bearing description, vibration value, and units anywhere on the screen in text form.
- **Highlight dynamo** that can be layered over any machinery graphic to visually point the operator to the exact location of the fault on the machine.

Building a dynamic operator interface like this used to require custom programming. With Integrated Machinery Protection and Prediction, you can drag and drop dynamos to quickly create your unique interface.

Total Machinery Monitoring Solution

Integrated Machinery Monitoring delivers prediction, protection, and performance monitoring for a comprehensive solution in a single rack:

- Machinery Protection with full API 670 protection to avoid catastrophic failures, increase safety, and satisfy insurers
- Machinery Prediction to maximize availablity, increase dependability, and reduce maintenance costs
- Performance Monitoring to maximize production, reduce energy consumption, and minimize emissions

Integration with the DeltaV system delivers critical missing machinery health feedback to operators.

Comprehensive protection, plant-wide prediction, and performance monitoring integrated with process control provides confidence that your mechanical equipment is truly operating reliably.

Emerson's Integrated Machinery Protection and Prediction solution, a key component of the PlantWeb® digital plant architecture, delivers a tremendous savings in time, resources, improved integration quality, and more complete integration than any other control system.

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