PRODUCT PROFILE

XM INTELLIGENT I/O MODULES

MACHINERY PROTECTION AND CONDITION MONITORING IN ONE SOLUTION

There are many considerations when choosing your machinery protection and condition monitoring equipment: Safety, environmental compliance, production requirements, equipment repair and replacement costs, as well as criticality to the process.

When your application requires a condition monitoring and protection solution that provides superior machine reliability, an online, continuous protection is your best choice.

The Allen-Bradley®XM® series of intelligent I/O modules can process in real-time the critical parameters used in assessing the current health, and predicting the future health of industrial machinery — providing machinery protection where needed, and reducing downtime.

XM series is a family of DIN rail mounted measurement, relay and communications modules that can be deployed as necessary to service almost any monitoring or protection application. XM series modules may be applied as a standalone system, or they can be integrated with existing automation and control systems, including programmable controllers and displays.

By using the patented XM series technology, you have unsurpassed critical machinery protection capabilities, which can be used to safely shutdown a machine before significant damage occurs. An appropriately configured XM system will meet or exceed international standards for machinery protection systems, such as the American Petroleum Institute's specification 670.

Thousands of XM systems are installed around the world on fans, turbines, and other machinery that require high-speed protection for safety and to avoid collateral damage.
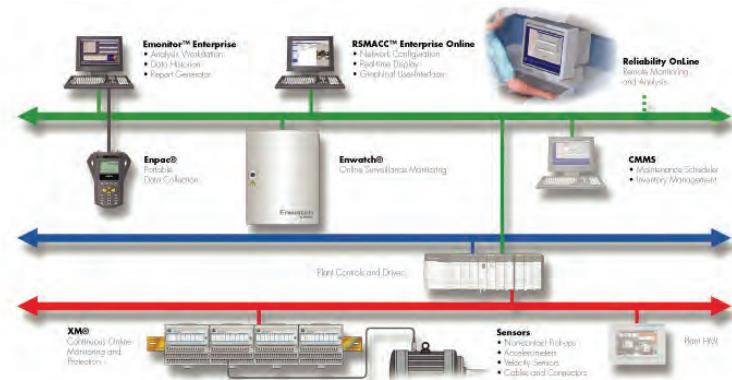
The XM system is also well suited for protection of important assets in medium to small manufacturing applications where a single pump, fan, motor or gearbox is the key asset in the production process.

XM intelligent distributed I/O modules can be deployed as necessary to service almost any monitoring or protection application.

INTEGRATION: KEY TO A SUCCESSFUL CONDITION-BASED MAINTENANCE PROGRAM

Our integrated approach to condition monitoring lowers your total cost by utilizing your existing plant information and control platform as well as open industry standard protocols. And by allowing you to choose the best mix of condition monitoring tools, you will be able to utilize multiple technologies and implement multiple monitoring strategies for your unique application.

LISTEN.
THINK.
SOLVE.℠

ALLEN-BRADLEY • ROCKWELL SOFTWARE

Rockwell
Automation

ONE SOLUTION

Integrated, open or standalone, the XM series of Intelligent I/O Modules provides a proven, reliable and cost-effective solution for all of your monitoring requirements.

Measurement Modules

XM-120 Dynamic Measurement Module

The XM-120 Dynamic Measurement Module is an intelligent, 2-channel, general-purpose monitor. The module supports monitoring of shaft, casing or pedestal vibration in rotating equipment such as turbines, motors, pumps, compressors, fans and most other common rotating machinery where real-time condition monitoring or protection is required. The XM-120 accepts input from any eddy current probe, standard accelerometer, or any voltage output measurement device such as a velocity or pressure transducer. In addition to dynamic inputs, the module accepts one tachometer input to provide speed, phase and order analysis functions making it capable of calculating over 14 critical parameters per channel. The module includes a single onboard relay, expandable to 5, and two 4-20mA outputs.

XM-120E Eccentricity Module

The XM-120E Eccentricity Module is an XM-120 Dynamic Measurement Module with alternative, XM-120E firmware loaded. Critical for steam turbine operation, eccentricity is the measure of the amount of bow in the rotor, usually caused by uneven heating or simply by the weight of the shaft itself while stopped. The XM-120E firmware is included on the distribution CD with every standard XM-120.

XM-121 Low Frequency Vibration Module

The XM-121 Low Frequency Vibration is identical to the XM-120 Dynamic Measurement Module except for the available high pass filter (HPF) selections. The HPF's available in the XM-121 allow for measurements to as low as 0.2 Hz (12 CPM) making it ideal for monitoring low speed machinery such as hydro turbines and many fans, gearboxes, paper rolls, extruder presses and other low speed equipment.

XM-121A Absolute Shaft Module

Absolute Shaft is the measure of a steam turbines shaft motion relative to free space - a measurement requirement for some large machines. The XM-121A is a standard XM-121 Low Frequency Vibration module with alternative, XM-121A, firmware loaded. The XM-121A firmware is included on the distribution CD.

XM-122 gSE Vibration Module

The XM-122 gSE Vibration Module is an intelligent, 2-channel, special-purpose vibration monitor. While similar to the XM-120 Dynamic Measurement Module, the XM-122 alternates collection of standard vibration measurements and specialized gSE overall and gSE spectra measurements. This makes the XM-122 ideal for monitoring motors, pumps, fans, gearboxes, etc. that are fitted with rolling element bearings and where continuous, real-time, protection is not required.

XM-123 Aeroderivative Module

The XM-123 Aeroderivative Module is an intelligent 2-channel special-purpose monitor that is uniquely suited for monitoring Aeroderivative and Industrial Gas Turbines. The XM-123 can be configured, per channel, to perform either tracking filter or band pass style measurements while it also continuously measures each channel's broad band overall level. These capabilities, along with its extraordinary configurability, enable the XM-123 to meet the demanding monitoring requirements of almost any engine in service today.

XM-160 Series Overall Vibration Modules

The XM-160 Series Overall Vibration Modules are intelligent 6-channel monitors that are designed to cost effectively serve applications for real time monitoring of overall (direct) vibration levels. Designed as a simple but complete monitoring system in a compact, easily installed, easily maintained package, each module measures and reports the overall vibration level between selected high and low pass filters, as well as the gap or bias voltage per channel.

XM-220 Dual Speed Module

The XM-220 Dual Speed Module is an intelligent 2-channel measurement module that accepts input from two tachometers of any standard type including eddy current probes, magnetic pickups, optical tachometers and TTL output devices. The module measures speed, rotor acceleration and peak speed and is capable of detecting zero speed, locked rotor and reverse rotation. The module may also serve as a component of an Electronic Overspeed Detection System (EODS).

The XM series is a family of DIN rail mounted measurement, relay and communications modules that can be deployed as necessary to service almost any monitoring or protection application.

Process Measurement Modules

XM-320 Position Module
The XM-320 Position Module is an intelligent 2-channel measurement module. It is designed to measure all common turbine supervisory position measurements including Axial Position (Thrust), Valve Position, Differential Expansion and Case Expansion.

XM-360 Process Module
The XM-360 Process Module is an intelligent 6-channel general-purpose process monitor. Each channel can be configured to measure a DC voltage or a loop current and will report both the data value, in engineering units, the rate of change for each channel and the difference measure between adjacent channels.

XM-361 & XM-362 Temperature Modules
The XM-361 Universal Temperature Module and the XM-362 Isolated TC Temperature Module are intelligent 6-channel temperature monitors. Each channel of the XM-361 module can be configured to measure either an RTD or an isolated thermocouple while the XM-362 is designed specifically for thermocouple measurements - isolated or grounded. Both modules report the measured temperature, in engineering units, the rate of change for each channel and the difference measure between adjacent channels.

Relay Modules

XM-440 Master Relay Module
The XM-440 Master Relay combines 4 relay outputs with XM bus master capabilities to provide remote, shared and voted relay operation for distributed XM measurement modules. The XM-440 offers 4 high power relays suitable for use in most protection applications. The module also supports linking of one or two XM-441 Expansion Relay modules thereby providing a total capacity of up to 12 relays.

XM-441 Expansion Relay Module
The XM-441 Expansion Relay Module is a simple, low cost solution for adding 4 additional relays to any XM series measurement module or to the XM-440 Master Relay module. The XM-441 offers 4 high power relays suitable for use in most any protection application.

XM-442 Voted EODS Relay Module
The XM-442 module is designed to mate with three XM-220 Dual Speed Modules to provide an API compliant triple redundant Electronic Overspeed Detection System (EODS). The XM-442 provides four high power relays that serve as the EODS alarm and shutdown relays.

Packaged Solutions

XM-720 Packaged Monitor
The XM-720 family of Machine Vibration Monitors provides users a complete protection and monitoring system in a compact, easy to install, operate and maintain package. The open frame package includes a 2-channel XM-120, XM-121 or XM-122 measurement module, an XM-441 Expansion Relay Module and is fitted with a front panel display with dual digital meters, alarm / relay indicators, relay reset control and BNC buffered output connections.

XM Electronic Overspeed Detection System
The XM Electronic Overspeed Detection System (EODS) is a highly reliable, redundant system that fully meets the performance, measurement and relay requirements of the American Petroleum Institute Standards 670 and 612 as pertaining to overspeed protection. It is intended for use on gas and steam turbine driven machinery where protection is required to prevent potentially catastrophic failures of the machine from overspeed events.

Configuration & Connectivity

Serial Configuration Utility
The XM Serial Configuration Utility is an easy to use Windows application for installing and configuring the XM series modules. The tool can read, write and modify configurations stored on disk, upload configurations from a module; download configurations, and firmware updates, to a module; and view data from a module.

XM-500 Ethernet/IP Gateway Module
The XM-500 Ethernet/IP Gateway provides a powerful bridge between an XM DeviceNet network and Ethernet. The Gateway provides complete DeviceNet Master functionality and support for a fully populated DeviceNet network with up to 63 devices.

With Rockwell Automation Conditioning Monitoring Services, you'll receive tailored solutions to help you implement your Condition-based Maintenance (CbM) program. Our program specialists will advise you on program content, machinery criticality, collection frequencies, alarm parameters and appropriate monitoring technologies — *or we can run your CbM program for you.*

Our experience in large and small facilities across a range of industries coupled with a successful track record and international service and support will help you evaluate the need for, and implement, a cost-effective CbM strategy — *or you can use our expertise to help fine tune your existing one.* For more information on Condition Monitoring Services, go to: *www.rockwellautomation.com/services.*

EASY TO USE

Rockwell Automation's Allen-Bradley XM Machinery Protection and condition monitoring system is easy to integrate, install, start-up and maintain.

Ease of Integration

XM modules are ODVA (Open DeviceNet Vendors Association) certified. This allows for seamless and easy integration with Rockwell Software products, Allen-Bradley PLC and display products.

Ease of Installation

When compared to traditional centralized rack-based systems, a distributed XM solution can be implemented in less time, at lower cost and with far less complexity. XM modules are DIN-rail mounted and can be easily installed locally at the machine near the actual measurement locations, therefore, significantly reducing wiring cost and intricacy of installation. Rather than using a proprietary backplane, the XM series implements physical connectivity between each XM module by use of integral side connectors on each terminal block or by simple two shielded wire cabling.

Ease of Start-up

The XM series configuration is entirely digital and is performed either locally using a PC connected to each module's serial port, or remotely via the DeviceNet network. Using the serial interface or any ODVA Compliant DeviceNet configuration product, users can quickly configure XM modules to manage a wide variety of dynamic inputs - such as accelerometers, eddy-current displacement probes and speed tachometers - as well as process parameters such as temperature, pressure, and flow.

Ease of Maintenance

After commissioning, the XM series technology continues to provide capabilities that save you time and money such as hot-swappable modules, field wiring landed onto the terminal bases rather than the module itself, field downloadable firmware and, when applied, Plug & Play style replacement using Automated Device Replacement (ADR).

MORE INFORMATION

The XM series of machine protection and monitoring modules can be ordered by contacting your local authorized Allen-Bradley distributor or Rockwell Automation sales office.

For further information on the XM series of intelligent distributed I/O modules for machinery protection and condition monitoring, go to: http://www.rockwellautomation.com/go/xm

Networked Solutions

Gateways are available to link the XM DeviceNet network to Ethernet™, ControlNet™, Profibus, Modbus and other open integrated industrial bus architectures.

Standalone Solutions

Individual XM modules, or distributed XM systems, can provide protection to individual machines independent of any host PC or controller. All XM modules include or support multiple alarms, integral and / or distributed relays, 4-20mA outputs and standard buffered outputs for each input channel. These capabilities combined with real-time processing of key fault indicators offer a comprehensive protection system solution in a low cost, easily installed and maintained package.

Integrated Solutions

Because XM systems use the DeviceNet open standard for all communications; XM modules may be linked directly to a PLC or other control system via industry standard DeviceNet scanner cards. Host controllers can then scan XM modules for data, alarm and relay status information in real-time. Prioritized messaging insures that changes to any alarm or relay status is immediately communicated to network controllers.

Approvals

XM modules are designed to international standards for electrical safety, electromagnetic immunity and emissions, and for service in hazardous areas and marine environments. For certification details refer to:

http://www.rockwellautomation.com/products/certification/

API 670 Compliance

When configured properly, supplied with the correct number of modules, optional displays and power supplies, XM is fully compliant with the latest edition of the American Petroleum Institute Standard 670 for Machinery Protection Systems for vibration, axial position and electronic overspeed protection.