

TECHNICAL DATA

XM-220 DUAL SPEED MODULE

EVERYTHING ABOUT SPEED IN A DISTRIBUTED ARCHITECTURE

The award winning Allen-Bradley XM® series is the world's most comprehensive family of distributed machine condition monitoring and protection devices.

With the XM series, discreet or networked monitoring solutions can be quickly and cost effectively deployed for steam, gas and hydro turbines, motors, compressors, pumps, fans, blowers and most other rotating machinery.

The XM-220 Dual Speed Module is an intelligent 2-channel 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-220 can be configured to operate in three different modes including:

Dual Channel Mode

In the default mode the two sensors are used independently to perform two separate speed, acceleration, and peak speed measurements.

Single Redundant Channel Mode

One sensor is used to perform the speed, acceleration, and peak speed measurement. The module automatically switches to the second (redundant) sensor when a transducer or tachometer fault is detected on the current sensor.

Reverse Rotation Mode

The two sensors are used to monitor both speed and direction. The first sensor measures the speed, acceleration, and peak speed in the forward direction. The second sensor measures the speed, acceleration, and peak speed in the reverse direction.



The module includes a single on board relay, expandable to five, two 4-20mA outputs, and a buffered output for each input. A third buffered output is available when the module is functioning in the single redundant channel mode. This buffered output signal corresponds to the active input signal. It is provided so that connected devices, including other XM modules, can be assured of always receiving a valid speed signal - as long as at least one of the two redundant speed inputs is functioning properly.

Configuration can be performed either locally or remotely via the DeviceNet network. Local configuration is provided by a simple, intuitive Serial Configuration Utility executing on a PC connected to the modules serial communications port. Remote configuration can be performed from any networked PC executing either any standard DeviceNet configuration software, or the XM specific configuration tool included in Rockwell Software's RSMACC Enterprise Online software system

The XM-220 can operate stand alone, or it can be deployed on a standard or dedicated DeviceNet network where it can provide real-time data and status information to other XM modules, PLCs, distributed control systems (DCS), and Condition Monitoring Systems.

SPECIFICATIONS

Communications

DeviceNet:

- Standard DeviceNet protocol for all functions
- Available Electronic Data Sheet (EDS) file provides support by most DeviceNet compliant systems
- Autobaud to 125kb, 250kb or 500kb

The XM-220 uses only the DeviceNet protocol, not power. Module power is provided independently.

Side Connector: All XM measurement and relay modules include side connectors that allow interconnecting adjacent modules thereby simplifying the external wiring requirements. The Interconnect provides primary power, DeviceNet communication and the circuits necessary to support expansion modules such as the XM-441 Expansion Relay module.

Serial: Local configuration via Serial Utility Program

- RS-232 via mini-connector or terminal block
- Baud rate auto baud to 19200

Inputs

2 Tachometer Inputs:

±25V (50V maximum peak to peak)

- Eddy current transducer signals
- Magnetic pickups
- TTL output devices

Input Impedance:

120k ohms minimum

Speed/Frequency Range:

1 to 1,200,000 RPM

0.0167 to 20,000Hz

Speed Measurement Error:

1 to 240 RPM: ±0.2 RPM

241 to 12,000 RPM: ±2 RPM

12,001 to 20,400 RPM: ±5 RPM

20,401 to 120,000 RPM: ±20 RPM

120,001 to 360,000 RPM: ±50 RPM

360,001 to 1,200,000 RPM: ±160 RPM

Sensor Fault Detection:

- Eddy Current Transducer:
Bias voltage is compared with user defined fault limits
- Magnetic pickups:

A current source is available for biasing passive magnetic pickups to detect open or short circuits

Outputs

4-20mA Outputs:

- Each output is independently programmed to represent speed or acceleration, from either channel
- 2 isolated outputs
- 300 ohm max load

Buffered Outputs:

- 1 active buffer per input channel
- Output range configurable by wiring:
-24V to +9V
-4.7 to +24V
-4.7 to 9V
- Third buffered output available when the module is configured for single redundant channel mode. Outputs a TTL level square-wave that corresponds to the active input signal.

Indicators

6 LEDs:

- Module Status - red/green
- Network Status - red/green
- Channel 1 Status - off/yellow/red
- Channel 2 Status - off/yellow/red
- Startup - off/yellow
- Relay - off/red

Measurement Modes

Dual Channel:

Inputs are used independently to perform two separate speed, acceleration and peak speed measurements

Single Redundant Channel:

One sensor is used to perform the speed, acceleration and peak speed measurement. If the current sensor fails the module automatically switches to the second (redundant) sensor

Reverse Rotation:

Two sensors are used to monitor both the speed and direction. The first sensor measures the speed, acceleration and peak speed in the forward direction. The second sensor measures the speed, acceleration and peak speed in the reverse direction

Data Buffer

Trend Buffer: Stores a set of records containing measured parameters in response to a trigger event

- Trend Interval: 1 to 3600 seconds
- Trigger: The trend is saved when a specified relay actuates, or on command from an XM-440, host or controller
- Capacity: 128 to 2048 records depending on the number of parameters stored
- Capacity: 1024 or 2048 records depending on the number of parameters stored

Signal Conditioning

Measured Units:

- RPM
- Acceleration in RPM/Minute
- Direction of rotation

Measured Parameters:

- Direction (Forward / Reverse)
- Speed
- Acceleration
- Peak Speed
- Gap / Bias voltage

Peak Speed: Retains the value of the highest speed observed, per channel, since the module was powered up or since the "peak speed" value was manually reset

Alarms

Number: 8 alarms 4 per channel

Alarmed Parameters:

Alarm and danger pair provided for each of:

- Speed
- Acceleration
- Zero Speed
- Locked Rotor

Operators:

- Greater than
- Less than
- Inside Range
- Outside Range

Hysteresis: User defined

Startup inhibit/Set point multiplication:

User configurable

Speed Inhibit: A speed range may be specified for each alarm. The alarm is disabled when the speed is outside of the range.

Relays

Number:

- Single on-board relay, two sets of contacts – DPDT (2 Form C)
- Four virtual relays - or -
- Four additional relays when linked to an XM-441 Expansion Relay module

Onboard Relay Rating:

- Max. Voltage = 120 Vdc, 125 Vac
- Max. Current = 3.5 (Max current is up to 40°C, and then derates to 2A at 65°C)
- Min. Current = 0
- Max. Power = 60 W, 62.5 VA
- UL Rating:
 - 120 Vac @ 0.5 Amps resistive;
 - 110 Vdc @ 0.3 Amps resistive;
 - 30 Vdc @ 1.0 Amps resistive

Failsafe:

- Normally energized (failsafe), or
- Normally de-energized (non-fail-safe)

Latching:

- Latching, or
- Non-latching

Time Delay: 0 to 25.5 seconds in 100msec increments

Voting Logic: Single or paired "And" or "Or" logic applied to any alarms

Reset:

- Local reset switch on top of module
- Remote reset switch wired to terminal base
- Digital reset command via serial or DeviceNet interface

Activation On:

Alarm Status	Fault
Normal	Sensor Out of Range
Alert	Module Fault
Danger	Tachometer Fault
Disarm	

Non-Volatile Configuration

A copy of the module configuration is retained in non-volatile memory from where it is read upon power up.

Power

All XM Measurement and Relay modules support redundant power. Each module includes redundant power inputs on its terminal base.

Module: 21.6 - 26.4Vdc

Consumption:

- Max: 300 mA
- Typical: 225 mA

Heat Production:

- Max: 7 Watts (24 BTU/hr)
- Typical: 4 Watts (14 BTU/hr)
- Transducer: 24V DC, user configurable with wiring

Physical

Dimensions:

- Height: 3.8in (97mm)
- Width: 3.7in (94mm)
- Depth: 3.7in (94mm)

Weight:

- Module: 5.8 ounces (164 grams)
- Terminal Base: 8.2 ounces (232 grams)

Environmental

Operating Temperature: -20 to +65°C (-4 to 149°F)

Storage Temperature: -40 to +85°C (-40 to 185°F)

Relative Humidity: 95% non-condensing

Conformal Coating: All printed circuit boards are conformal coated:

- Per material specifications MIL-I-46058C/IPC-CC-830
- In accordance with IPC-A-610C

Approvals

CE, C-Tick, ODVA,
CSA Class I Div 2 Groups A, B, C, D,
UL, EEX

HOW TO ORDER

The XM-220 Dual Speed Module can be ordered by contacting your local authorized Allen-Bradley distributor or Rockwell Automation sales office.

Catalog Number	Description
1440-SPD02-01RB	XM-220 Dual Speed Module*
1440-TB-B	Terminal Base B for XM-220 and XM-320
1440-SCDB9FXM2	XM Serial Communications Cable

* Requires Terminal Base B

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