XM Monitoring Modules Specifications

Catalog Numbers 1440 series

The XM series of intelligent I/O modules process, in real-time, the critical parameters used to assess the current health and predict the future health of industrial machinery—providing machinery protection and reducing downtime. Use the XM modules in a standalone system, or integrate them with existing automation and control systems.

Type	Module	Cat. No.	Page
Measurement modules	XM DYN Dynamic Measurement Module	1440-DYN02-01RJ	3
	XM-124 Standard Dynamic Measurement Module	1440-SDM02-01RA	6
	XM-160 Direct (overall) Vibration Module (1440-VDRS06-00RH)	1440-VDRS06-00RH	10
	XM-161 Direct (overall) Vibration Module with 4…20 mA Out (1440-VDRS06-06RH)	1440-VDRS06-06RH	10
	XM-162 Direct (overall) Vibration Module with Proximity Probe Power (1440-VDRP06-00RH)	1440-VDRP06-00RH	10
	XM-220 Dual Speed Module	1440-SPD02-01RB	13
Process modules	XM-320 Position Module	1440-TPS02-01RB	16
	XM-360 Process Module	1440-TPR06-00RE	19
Temperature modules	XM-361 Universal Temperature Module	1440-TUN06-00RE	22
	XM-362 Isolated Thermocouple Temperature Module	1440-TTC06-00RE	22
Relay modules	XM-440 Master Relay Module	1440-RMA00-04RC	25
	XM-441 Expansion Relay Module	1440-REX00-04RD	27
	XM-442 Voted EODS Relay Module	1440-REX03-04RG	29
Accessories	Terminal Bases	1440-TB-A, 1440-TB-B, 1440-TB-C, 1440-TB-D, 1440-TB-E, 1440-TB-G, 1440-TB-H, 1440-TBS-J	31
	Serial Configuration Utility	N/A	32
	Fuse Kit	1440-5AFUSEKIT	33
	Serial Communication Cable	1440-SCDB9FXM2	33
	ControlNet Adapter	1440-ACNR	34

Summary of Changes

This manual contains new and updated information. Changes throughout this revision are marked by change bars, as shown to the left of this paragraph.

Topic	Page
Updated the specifications for the XM-124 Standard Dynamic Measurement Module.	6
Updated the specifications for the XM-160 Direct (overall) Vibration Module (1440-VDRS06-00RH), XM-161 Direct (overall) Vibration Module with 4…20 mA Out (1440-VDRS06-06RH), and XM-162 Direct (overall) Vibration Module with Proximity Probe Power (1440-VDRP06-00RH).	10
Updated the specifications for the XM-220 Dual Speed Module.	13
Updated the specifications for the XM-320 Position Module.	16
Updated the specifications for the XM-360 Process Module.	19
Updated the specifications for the XM-361 Universal Temperature Module.	22
Updated the specifications for the XM-362 Isolated Thermocouple Temperature Module.	22
Updated the specifications for the XM-440 Master Relay Module.	25
Updated the specifications for the XM-441 Expansion Relay Module.	27
Updated the specifications for the XM-442 Voted EODS Relay Module.	27

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at http://www.rockwellautomation.com/literature/. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

XM DYN Dynamic Measurement Module

The XM dynamic measurement module (catalog number 1440-DYN02-01RJ) is a two-channel, general purpose monitor that supports measurements of dynamic inputs such as vibration, pressure, and strain. The module can be used for monitoring shaft, casing, and pedestal vibration in rotating equipment. The module is designed specifically for integration with ControlLogix controllers, connected through the 1440-ACNR ControlNet adapter.

Attribute	XM DYN (1440-DYN02-01RJ)
Inputs	
Two dynamic channel inputs	Eddy current transducer signals Accelerometer signals Voltage signals from any dynamic measurement sensor such as velocity or pressure transducer
Transducer power	Constant voltage 24V DC, -24V DC, 60 mA Constant current 4.5 mA +30%/-20% from 24V DC (IEPE) Bias current: monitors self-powered coil-based transducers None
Voltage ranges	-20…0V DC -10…10V DC 0…20V DC
Input impedance	> 100 kΩ
Sensitivity	Up to 15% from nom

mV/g	mV/ ips	mV/ mms	mV/ mil	mV/µ m	mV/ psi	mV/ mbar	V/V
10	100	4	100	3.94	20	0.29	1
25	150	6	150	5.91	50	0.73	
50	200	8	200	7.87	100	1.45	
100	500	20	285	11.2			
500	1000	40					
1000							
10000							

Tachometer Input	
One tachometer input	±25V (50V max peak-to-peak)
Input impedance	> 120 kΩ
Range	1…1.2 M rpm/0.0167…20 kHz
Pulses per revolution	0 (tach off)…50,000
Rate of change of speed, max	500 Hz/s

Attribute	XM DYN (1440-DYN02-01RJ)
Outputs	
Buffered outputs	One active buffer per dynamic channel One resistive buffer for tachometer
Indicators	
Status indicators	Module Network Channel 0 Channel 1 Tachometer Setpoint multiplier Virtual relay
Communication	
XM bus	Autobaud 125, 250, or 500 Kbps Max distance: 10 m (32.81 ft) Node number mechanically set to simplify installation and commissioning Customizable poll assembly optimizes space utilization within scanner Logix controller integration over the ControlNet network via 1440-ACNR adapter
Signal Conditioning	
Sampling mode	Selectable per channel Asynchronous FMAX: 1 Hz…20 kHz Synchronous FMAX: 10 < Orders x Speed (Hz) < 5000 Order range: 4…200 Min FMAX: 10 Hz Max FMAX: 5000 Hz
Resolution	A/D conversion: 24 bits Dynamic range: 80 dBfs (0.01% fs), 90 dBfs, typical
FFT lines	100, 200, 400, 800
Integration	None, single, or double
High pass analog filters	-3 dB corners: 0.2, 1, 5, 10, 40 Hz Roll off: -30 dB/octave for the 0.2 Hz filter, otherwise 24 dB/octave Spike Energy gSE HPF: 200, 500, 1000, 2000, 5000 Hz Roll Of: -12 dB/octave
Low pass filter	Applied to integrated acceleration measurements -6 dB corner: 2 kHz Roll off: -12 dB/octave
Units	g, ips, mm/s, mils, µm, PSI, mbar, volt
Measurements	
Types	FFT and time waveform Asynchronous or synchronous

Attribute	XM DYN (1440-DYN02-01RJ)
Real time	Overall RMS Peak (true or calculated) Peak-to-peak (true or calculated) Optional low pass filter – -3 dB corner: 200 Hz…20 kHz – Roll off: -24 dB/octave Gap (or transducer bias voltage) Speed SMAX magnitude SMAX phase
FFT derived	FFT bands Four bands per channel Defined in frequency or order domain Overall or max peak in band Orders Magnitude: 1x, 2x, 3x Phase: 1x, 2x Not 1x Sum harmonics
Alarms	
Number	Six alert and danger pairs Alarm on any measured value
Operators	Greater than Less than Inside range Outside range
Hysteresis	User-defined
Startup inhibit/setpoint multiplication	Period 0…1092 min Inhibit/multiplication function: Multiply by N (0…10, 0 = Disarm)
Speed inhibit	Speed range can be specified for each alarm. When applied, the alarm is disabled if the speed is outside the defined range
Configuration	
Automatic module configuration	Automatically configured from a configuration stored in module memory at powerup, or from a configuration held in a Logix5000 controller
Relays	
One virtual relay	Logic is provided to drive one virtual relay. Relay status is indicated by the relay status indicator
Relay function	Normally energized (failsafe) or normally deenergized (non-failsafe) Latching or non-latching Time delay: 0…25.5 s in100 ms increments Single or paired AND or OR logic applied to any alarm Reset by digital command from configuration software, via a command from the XM bus, or from output tag when integrated via ControlNet adapter

Attribute	XM DYN (1440-DYN02-01RJ)
Alarm status to activate on	Normal Alert Danger Gap/bias out of range Module fault Tachometer fault Disarm
Power	
Type	Requires Class 2 power supply
Module	24V DC
Consumption	250 mA, max 210 mA, typical
Heat production	4.56 W, max 3.60 W, typical
North American Temp Code	T4A
IEC Temp Code	T4
Environmental	
Temperature, operating	-20…70 °C (-4…158 °F)
Temperature, storage	-40…85 °C (-40…185 °F)
Relative humidity	5…95% noncondensing
Physical	
Terminal base	1440-TBS-J
Dimensions (H x W x D), approx	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)
Weight, approx	0.172 kg (0.38 lb)
Certifications[1]	
cULus	UL Listed for US and Canada. See File E234338 UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
C-Tick	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions

Attribute	XM DYN (1440-DYN02-01RJ)
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • Ex nA IIC T4 X Gc
KCC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3

(1) When product or packaging is marked. See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates, and other certification details.

XM-124 Standard Dynamic Measurement Module

The XM-124 module (catalog number 1440-SDM02-01RA) is a two-channel, general purpose monitor that supports dynamic measurements such as vibration, pressure, strain, and spike energy (gSE). The module also supports static (DC) thrust and eccentricity measurements.

The XM-124 consolidates and improves on most of the functionality provided by the earlier XM-120, XM-120E, XM-121, XM-122 and XM-123 modules. It also provides the same basic, single-channel, thrust measurement as the XM-320 module. This makes the XM-124 suitable for monitoring of almost any rotating machine, including steam turbines, aeroderivative and industrial gas turbines, hydro turbines, motors, pumps, fans, compressors, and gear boxes.

Attribute	XM-124 (1440-SDM02-01RA)
Inputs	
Two dynamic channel inputs	Eddy current transducer signals Accelerometer signals Voltage signals from any dynamic measurement device, such as a velocity or pressure transducer
Transducer power	Constant voltage: 24V DC, -24V DC, 40 mA Constant current 4.5 mA ± 30% / -20% from 24V DC (IEPE) None (voltage input) Tachometer can be powered, constant voltage, or configured as voltage input
Voltage range	-20…0V DC -10…10V DC 0…20V DC
Input impedance	> 100 kΩ
Sensitivity	Up to 15% from nom

mV/g	mV/ ips	mV/ mms	mV/ mil	mV/µ m	mV/ psi	mV/ mbar	V/V
10	100	4	100	3.94	20	0.29	1
25	150	6	150	5.91	50	0.73	
50	200	8	200	7.87	100	1.45	
100	500	20	285	11.2			
500	1000	40					
1000							
10000							

Attribute	XM-124 (1440-SDM02-01RA)
Tachometer Input	
One tachometer input	±25V (50V max peak-to-peak) 1…50,000 events/revolution
Input impedance	> 120 kΩ
Range	1…1,200,000 rpm 0.0167…20,000 Hz
Pulses per revolution	0 (tach off)…50,000
Rate of change of speed, max	500 Hz/s
Outputs	
4…20 mA	Each output is independently programmed to represent any measured parameter, from either channel Two isolated outputs 300 Ω max load
Buffered outputs	One active buffer per dynamic channel One resistive buffer for tachometer
Indicators	
Status indicators	Module Network Channel 1 Channel 2 Tachometer Setpoint multiplier Virtual relay
Communication	
DeviceNet network	Standard DeviceNet protocol for all functions (not power—module power is provided independently) Available EDS file provides support for most DeviceNet compliant systems Communication rate automatically set by bus master to 125, 250, or 500 Kbps Configurable I/O Poll Response message helps optimize space utilization within scanner input tables: Selectable poll response assembly Selectable poll response size (bytes)
Serial	RS-232 via mini-connector or terminal base unit Communication rate fixed at 19.2 Kbps Local configuration via the Serial Configuration utility

Attribute	XM-124 (1440-SDM02-01RA)
Signal Conditioning	
Sampling mode	Selectable per channel Dynamic Measurements Asynchronous FMAX: 1 Hz…20 kHz Synchronous Order range: 4…200 Min FMAX: 10 Hz Max FMAX: 5000 Hz Measured: Orders x Speed (Hz) Spike Energy Static Measurements Eccentricity Peak-to-Peak Eccentricity Thrust Normal mode (single channel measurement)
Resolution	A/D conversion: 24 bits Dynamic range: 80 dBfs (0.01% fs), 90 dBfs, typical
FFT lines	100, 200, 400, 800, 1600
Integration	None or single
High pass analog filters	-3 dB corners: 0.2, 1, 5, 10, 40 Hz Roll off: -30 dB/octave for the 0.2 Hz filter, otherwise 24 dB/octave
Low pass analog filter	Applied to integrated acceleration measurements -6 dB corner: 2 kHz Roll off: -12 dB/octave
Low pass digital filter	Independently configured per channel Optional Overall LP Filter 100…20000 Hz Spike Energy Spectra FMAX: 10…5000 Hz Roll Off: -24 dB/octave
Tracking digital filter	Independently configured per channel Tracked speed multiple: 0.1…20.0 times the measured (tachometer) rpm Constant Q: 1…200 Constant bandwidth: 0.1…25 Hz Roll off: -36 dB/octave, typical
Band pass digital filter	Independently configured per channel Frequency, min 25…1000 Hz Frequency, max 100…5500 Hz Roll off: -60 dB/octave
Units	g, ips, mm/s, mils, µm, PSI, mbar, volt

Attribute	XM-124 (1440-SDM02-01RA)
Data[1]	
Complex data	Spectra (synchronous or asynchronous) Waveform (synchronous or asynchronous) Simultaneous waveforms (synchronous) gSE Spectra
Accuracy, min	±1% of full scale range for the channel ±1% of alarm setpoint for speed
Measurements[2]	
Types	FFT and time waveform Asynchronous or synchronous
Real time	Overall RMS Peak (true or calculated) Peak-to-peak (true or calculated) gSE[5] Optional low pass filter – -3 dB corner: 200 Hz…20 kHz – Roll off: -24 dB/octave Gap (or transducer bias voltage) Speed SMAX magnitude SMAX phase Band pass filter value Tracking filter magnitude Tracking filter phase Thrust position Eccentricity
FFT derived	FFT bands Four bands per channel Defined in frequency or order domain Overall or max peak in band Orders Magnitude: 1x, 2x, 3x Phase: 1x, 2x Not 1x Sum harmonics
Data Buffers	
Delta time buffer	Number of records: 2048 Delta time interval: 1…3600 s Trigger mode: Relay is activated or trigger event (such as DeviceNet command from a controller or host)
Delta rpm buffer	Number of records: 512 Delta speed interval: 1…3600 rpm Trigger mode: Startup collects data in increasing rpm direction only; coast-down collects data in both increasing and decreasing directions The data collected in the buffer is user configurable and can contain up to 16 of the measurements
Spectra or waveform	Saved upon same trigger as delta time buffer

Attribute	XM-124 (1440-SDM02-01RA)
Alarms	
Number	16 alarm and danger pairs
Alarm parameters	Any measured parameter
Operators	Greater than Less than Inside range Outside range
Hysteresis	User configurable in software
Startup inhibit/setpoint multiplication	Period: 0…1092 min, adjustable in 0.1 min increments Inhibit/multiplication function: Multiply by N (0…10, 0 = Disarm)
Speed inhibit	A speed range can be specified for each alarm. When applied, the alarm is disabled when speed is outside of the defined range.
Relays	
Number	Single on-board relay, Single Pole Single Throw (SPST), 1 Form A Four additional DPDT relays when interconnected to an XM-441 expansion relay module, or Four virtual relays whose status can be used by remote control systems or the XM-440 master relay module, also 4 DPDT relays
Rating (resistive)	Capacity, nominal: 1.5 A @ 24V DC Capacity, min 100 µA @ 100 mV DC Power, max 41.4 W Voltage, max 27.6V DC Current, max 1.5 A
Expected life (min operations)	Mechanical: $2x10^7$ Electrical @ 20 cpm – 1.5A, 24VDC: 10^5
Failsafe	Normally energized (failsafe) or Normally de-energized (non-fail-safe)
Latching	Latching or Non-latching
Time delay	0…25.5 s, adjustable in 100 ms increments
Logic	Single or paired AND or OR logic applied to any alarm
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: Normal Alert Danger Disarm Transducer fault Module fault Tacho fault

Attribute	XM-124 (1440-SDM02-01RA)
Peak speed capture	The XM-124 retains the value of the highest speed observed since module power was cycled or the peak speed value was manually reset
Configuration	
Nonvolatile configuration	A copy of the module configuration is retained in nonvolatile memory from which the configuration is loaded upon powerup The configuration stored in nonvolatile memory can be deleted only by a module-reset command sent via a serial interface, using the Serial Configuration utility or via a DeviceNet interface from any compliant software application
Module	
Power supply	24V DC 350 mA Requires Class 2/SELV/PELV power supply
Power dissipation	8.7 W, max
Isolation voltage	50V (continuous), basic insulation type between uninsulated live parts and the enclosure with the relay contacts open and closed Type tested at 707V DC for 60 s between uninsulated live parts and the enclosure with the relay contacts open and closed Type tested at 707V DC for 60 s between supply and output terminals
Wiring category[3]	2 - on signal ports 1 - on power and relay ports 2 - on DeviceNet ports 3 - on serial ports
North American temp code	T5
IEC temp code	T4
Environmental	
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-20…65 °C (-4…149 °F)
Temperature, surrounding air max	65 °C (149 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)

Attribute	XM-124 (1440-SDM02-01RA)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Emissions CISPR11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±3 kV at 5 kHz on power ports ±3 kV at 5 kH on signal ports ±3 kV at 5 kHz on DeviceNet ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power and relay ports ±2 kV line-earth (CM) on shielded signal ports ±2 kV line-earth (CM) on DeviceNet ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Enclosure type rating	None (open-style)
Physical	
Terminal base	1440-TB-A (XM-940) Series C
Dimensions (H x W x D), approx	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)
Weight	Module: 0.172 kg (0.38 lb) Terminal base: 0.172 kg (0.38 lb)
Certifications[4]	
c-UL-us	UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • II 3 G Ex nAC [ic] IIC T4 Gc X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3

(1) Complex data is available when the channel is configured for dynamic measurements.

(2) Measurement availability is dependent on channel configuration.

(3) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(4) When product or packaging is marked. See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates, and other certification details.

(5) gSE Measurements can be configured to update continuously, or to alternate with standard acceleration or velocity measurements. The gSE Overall will update in "Real Time" only when configured for continuous update.

XM-160 Direct (overall) Vibration Module (1440-VDRS06-00RH)

XM-161 Direct (overall) Vibration Module with 4…20 mA Out (1440-VDRS06-06RH)

XM-162 Direct (overall) Vibration Module with Proximity Probe Power (1440-VDRP06-00RH)

The XM-160 series modules monitor direct (overall) vibration levels. 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.

Attribute	XM-160 (1440-VDRS06-00RH) XM-161 (1440-VDRS06-06RH) XM-162 (1440-VDRP06-00RH)
Inputs	
Six channels	Eddy current transducer signals IEPE accelerometer signals Voltage signals from any dynamic measurement device, such as a velocity or pressure transducer
Transducer power	IEPE constant current 2.69 mA ±20% from 24V DC None (voltage input) Constant voltage -24V DC (XM-162 only): 20 mA per channel, max
Sensitivity	User configurable in software
Input impedance	> 100 kΩ
Discrete switch (XM-161 and XM-162 only)	Relay reset and setpoint multiplier functions Non-isolated switch input: switch to ground (24V COM) Max nom sourced current (circuit limited): 5.1 mA
Buffered Outputs	
Number	One active buffer per vibration input channel
Range configurable in software	All channels negative (-22…3V DC) or positive (0.6…22V DC)
Output impedance	500 Ω
Response	-3 dB @ 16 kHz (down 5% @ 5 kHz)
Outputs	
4…20 mA outputs (XM-161 only)	Two isolated banks of three outputs (one per channel) 600 Ω max load (24V loop power) Outputs proportional to overall value Non-powered (external loop voltage required, 7…36V)
Accuracy	±0.5% of full scale, max ±0.2% of full scale, typical
Response time (3 tau)	1.5 s

Attribute	XM-160 (1440-VDRS06-00RH) XM-161 (1440-VDRS06-06RH) XM-162 (1440-VDRP06-00RH)
Indicators	
Status indicators	Module - red/green Network - red/green Channel 1 - yellow/red Channel 2 - yellow/red Channel 3 - yellow/red Channel 4 - yellow/red Channel 5 - yellow/red Channel 6 - yellow/red
Communication	
DeviceNet network	Standard DeviceNet protocol for all functions (not power—module power is provided independently) Available EDS file provides support for most DeviceNet compliant systems Communication rate automatically set by bus master to 125, 250, or 500 Kbps Configurable I/O Poll Response message helps optimize space utilization within scanner input tables: Selectable poll response assembly Selectable poll response size (bytes)
Serial	RS-232 via mini-connector or terminal base unit Communication rate fixed at 19.2 Kbps Local configuration via the Serial Configuration utility
Vibration Measurement and Signal Conditioning	
A/D conversion	12 bits
Resolution	0.05% of full scale
Accuracy	±5% of full scale 3 Hz…1 kHz; +5/-10% 1…5 kHz, max ±1% of full scale, typical
Units	volts, g, ips, mm/s, mils, um, PSI, Pa
Range	0…2 ips RMS (integrated 100 mV/g accel @ 1 kHz) 0…20 g RMS (100 mV/g accel) 0…15.6 mils peak (200 mV/mil probe)
Low pass filter	1 kHz or 5 kHz selectable, two-pole 0.1 dB Chebyshev (-0.1 dB @ fo)
HigH pass filter	3.0 Hz or 10.0 Hz selectable, two-pole 0.1 dB Chebyshev (-0.1 dB @ fo)
Additional overall low pass filter	Single pole, -3 dB @ 10 kHz (down 10% @ 5 kHz)
Integrator	Single stage selectable, -0.3 dB @ 3 Hz RMS
Overall level	Peak (true or calculated) Peak-to-peak (true or calculated)
DC Bias (gap) Voltage Measurement	
Low pass filter	Single pole, -3 dB @ 335 Hz
Range	-24…24V DC
Accuracy	±5% of full scale (48V DC), max ±1% of full scale, typical
Resolution	4 mV

Attribute	XM-160 (1440-VDRS06-00RH) XM-161 (1440-VDRS06-06RH) XM-162 (1440-VDRP06-00RH)
Trend Buffer	
Number or records	1…12 parameters
Time interval	1…3600 s
Trigger	Relay on the expansion relay module is activated or by a trigger event (for example, DeviceNet command from a controller or host) The data collected in the buffer is user configurable in software
Post trigger	Percent of trend that is to be acquired after the trigger
Capacity	17…2048 records
Alarms	
Number	One per channel
Operators	Greater than Less than Inside range Outside range
Hysteresis	User configurable in software
Startup inhibit	Period: 0…1092 min, adjustable in 0.1 min increments Inhibit/multiplication function: Multiply by N (0…10, 0 = Disarm) Inhibit/multiplication initiated by: DeviceNet command Front terminal setpoint multiplier circuit closure (XM-161 and XM-162 only) Inhibit/multiplication terminated by: Expired timer DeviceNet command Front terminal setpoint multiplier circuit open (XM-161 and XM-162 only)
Relays	
Number	Up to eight relays when interconnected to one or two XM-441 expansion relay modules or Eight virtual relays whose status can be used by remote control systems
Failsafe	Normally energized (failsafe) or Normally de-energized (non-fail-safe)
Latching	Latching or Non-latching
Time delay	0…25.5 s, adjustable in 100 ms increments
Logic	Single or paired AND or OR logic applied to any alarm
Reset	Local reset switch on top of module Digital reset command via serial or DeviceNet interface Remote reset switch wired to terminal base (XM-161 and XM-162 only)

Attribute	XM-160 (1440-VDRS06-00RH) XM-161 (1440-VDRS06-06RH) XM-162 (1440-VDRP06-00RH)
Activation On	Alarm status Normal Alert Danger Disarm Transducer fault Module fault
Configuration	
Nonvolatile configuration	A copy of the module configuration is retained in nonvolatile memory from which the configuration is loaded upon powerup The configuration stored in nonvolatile memory can be deleted only by a module-reset command sent via the serial interface, using the Serial Configuration utility or via a DeviceNet interface from any compliant software application
Power	
Module	24V DC Class 2/SELV
XM-160 module XM-162 module	Current, max: 190 mA @ 24V DC Class 2/SELV Power dissipation, max: 4.56 W @ 24V DC (4.3 W @ 18V DC, 4.9 W @ 32V DC)
XM-161 module	Current, max: 310 mA @ 24V DC Class 2/SELV Power dissipation, max: 7.44 W @ 24V DC (7 W @ 18V DC, 8 W @ 32V DC)
Environmental	
Temperature, storage	-40…85 °C (-40…185 °F)
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-20…65 °C (-4…149 °F)
Temperature, surrounding air, max	65 °C (149 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g

Attribute	XM-160 (1440-VDRS06-00RH) XM-161 (1440-VDRS06-06RH) XM-162 (1440-VDRP06-00RH)
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	20 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on shielded power ports ±2 kV at 5 kHz on shielded signal ports ±2 kV at 5 kHz on XMbus port
Surge transient immunity IEC 61000-4-5	±2 kV line-earth(CM) on shielded power ports ±2kV line-earth(CM) on shielded signal ports ±2kV line-earth(CM) on XMbus port
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Enclosure type rating	None (open-style)
Isolation voltage	Not rated
Wiring category[1]	2 - on shielded power and shielded signal ports 3 - on Serial ports 2 - on XMbus ports
Wire type	Power and Signal connections: shielded
North American temp code	T4
IEC temp code	T4
Physical	
Terminal base	1440-TB-H
Dimensions (H x W x D), approx	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)

Attribute	XM-160 (1440-VDRS06-00RH) XM-161 (1440-VDRS06-06RH) XM-162 (1440-VDRP06-00RH)
Certification[2] (when product is marked)	**Description**
c-CSA-us	CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for US and Canada. See CSA File 150115.
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
C-Tick	Australian Radiocommunications Act, compliant with AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • II 3 G Ex nAC [ic] IIC T4X Gc • EN 61000-6-2; Industrial Immunity
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with Article 58-2 of Radio Waves Act, Clause 3

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates, and other certification details.

XM-220 Dual Speed Module

The XM-220 module (catalog number 1440-SPD02-01RB) measures speed, rotor acceleration, and peak speed and can detect zero speed, locked rotor, and reverse rotation. The module can also serve as a component of an electronic overspeed detection System (EODS).

Attribute	XM-220 (1440-SPD02-01RB)
Inputs	
Two tachometer inputs	±25V (50V max peak-to-peak) Eddy current transducer signals Magnetic pickups TTL output devices
Input impedance	120 kΩ min
Speed/frequency range	1…1,200,000 rpm 0.0167…20,000 Hz
Speed measurement error	1…240 rpm: ±0.2 rpm 241…12,000 rpm: ±2 rpm 12,001…20,400 rpm: ±5 rpm 20,401…120,000 rpm: ±20 rpm 120,001…360,000 rpm: ±50 rpm 360,001…1,200,000 rpm: ±160 rpm
Outputs	
4…20 mA outputs	Each output is independently programmed to represent speed or acceleration, from either channel Two isolated outputs 300 Ω max load One active buffer per input channel
Buffered outputs	Output range configurable by wiring: -24…9V -5…24V -5…9V Third buffered output available when the module is configured for single redundant channel mode. Outputs a CMOS (0…5V) level square-wave that corresponds to the active input signal
Sensor Fault Detection	
Eddy current transducer	Bias voltage is compared with the fault limits
Magnetic pickups	A current source is available for biasing passive magnetic pickups to detect open or short circuits
Indicators	
Status indicators	Module - red/green Network - red/green Channel 1 - yellow/red Channel 2 - yellow/red Startup -yellow Relay - red AUX - reserved for future use
Communication	
DeviceNet network	Standard DeviceNet protocol for all functions (not power—module power is provided independently) Available EDS file provides support for most DeviceNet compliant systems Communication rate automatically set by bus master to 125, 250, or 500 Kbps Configurable I/O Poll Response message helps optimize space utilization within scanner input tables: Selectable poll response assembly Selectable poll response size (bytes)
Serial	RS-232 via mini-connector or terminal base unit Communication rate fixed at 19.2 Kbps Local configuration via the Serial Configuration utility
Measurements	
Units	rpm Direction of rotation Acceleration in rpm/min
Measured parameters	Forward Reverse rpm Direction of rotation Acceleration in rpm/min
Peak speed capture	The module retains the value of the highest speed observed since module power was cycled or the peak speed value was manually reset
Measurement Modes	
Dual channel	Two sensors 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 measurements. If the current sensor fails, the module automatically switches to the second (redundant) sensor
Reverse rotation	Two sensors are used to monitor both speed and direction. The two sensors must be mounted out of phase from each other so that the rotational direction can be determined by monitoring which sensor the shaft keyway passes first
Alarms	
Number	Eight alarms, fixed per channel
Alarm parameters	Alarm and danger pair provided for each of: Speed Acceleration Zero speed Locked rotor

Attribute	XM-220 (1440-SPD02-01RB)
Operators	Greater than Less than Inside range Outside range
Hysteresis	User configurable in software
Relays	
Number	Single on-board relay, two sets of contacts - DPDT (2 Form C) Four additional relays when interconnected to an XM-441 expansion relay module, or Four virtual relays whose status can be used by remote control systems or the XM-440 master relay module
On-board relay rating	Voltage, max: 120V DC, 125V AC Current, max: 3.5 A Current, min: 0 Power, max: 60 W, 62.5VA Max current is up to 40 °C (104 °F), then derates to 2 A at 65 °C (149 °F) Agency rating 120V AC @ 0.5 A 110V DC @ 0.3 A 30V DC @ 1.0 A
Failsafe	Normally energized (failsafe) or Normally de-energized (non-fail-safe)
Latching	Latching or Non-latching
Time delay	0…25.5 s, adjustable in 100 ms increments
Logic	Single or paired AND or OR logic applied to any alarm
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 Normal Alert Danger Disarm Transducer fault Module fault Tacho fault
Configuration	
Nonvolatile configuration	A copy of the module configuration is retained in nonvolatile memory from which the configuration is loaded upon powerup The configuration stored in nonvolatile memory can be deleted only by a module-reset command sent via the serial interface, using the Serial Configuration utility or via a DeviceNet interface from any compliant software application

Attribute	XM-220 (1440-SPD02-01RB)
Power	
Module	24V DC
Consumption	300 mA, max 225 mA, typical
Heat production	7 W (24 BTU/hr), max 4 W (14 BTU/hr), typical
Transducer	Isolated 24V DC, user configurable with wiring
Environmental	
Temperature, storage	-40…85 °C (-40…185 °F)
Conformal coating	All printed circuit boards are conformally coated in accordance with IPC-A-610C
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-20…65 °C (-4…149 °F)
Temperature, surrounding air, max	65 °C (149 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	20 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges

Attribute	XM-220 (1440-SPD02-01RB)
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on power ports ±1 kV at 5 kHz on relay and shielded signal ports ±1 kV at 5 kHz on XMbus port
Surge transient immunity IEC 61000-4-5	±2 kV line-earth(CM) on relay and shielded signal ports ±2kV line-earth(CM) on XMbus port
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Enclosure type rating	None (open-style)
Voltage and current ratings	Supply: 24V DC, 0.3 A max, Class 2/SELV Relay: 120V AC, 0.5 A 110V DC, 0.5 A 30V DC, 1.0 A
Power dissipation	7 W max
Isolation voltage	250V (continuous), Basic Insulation Type, relay to all other circuits. Isolation between other circuits is not rated. Type tested at 1500V AC for 60 s
Wiring category[1]	2 - on relay and signal ports 3 - on serial and power ports 2 - on XMbus ports
Wire type	Signal connections: shielded Power and relay connections: unshielded
Pilot duty rating	Relay port: Not rated
North American temp code	T4A
IEC temp code	T4
Physical	
Terminal base	1440-TB-B
Dimensions (H x W x D), approx	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)

Attribute	XM-220 (1440-SPD02-01RB)
Certification[2] (when product is marked)	**Description**
c-CSA-us	CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for US and Canada. See CSA File 150115.
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2006/95/EC LVD, compliant with: EN 61131-2; Programmable Controllers (Clause 11)
C-Tick	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • II 3 G Ex nAC [ic] IIC T4X Gc • when used at or below 60V AC or 75V DC
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates and other certification details.

XM-320 Position Module

The XM-320 module (catalog number 1440-TPS02-01RB) measures turbine supervisory position measurements, including axial position (thrust), valve position, differential expansion, and case expansion.

Attribute	XM-320 (1440-TPS02-01RB)
Inputs	
Two channels	Eddy current transducer signals Linear variable differential transformer Voltage signals from any position measurement sensor
Transducer power	Isolated 24V that can be wired to be either +24V or -24V
Voltage range	Selectable in software between -24…24V
Sensitivity	User configurable in software
Input impedance	> 100 kΩ
Outputs	
4…20mA outputs	Two isolated outputs 600 Ω max load
Buffered outputs	Two outputs (one per channel)
Indicators	
Status indicators	Module - red/green Network - red/green Channel 1 - yellow/red Channel 2 - yellow/red Setpoint multiplier - yellow Relay - red
Communication	
DeviceNet network	Standard DeviceNet protocol for all functions (not power—module power is provided independently) Available EDS file provides support for most DeviceNet compliant systems Communication rate automatically set by bus master to 125, 250, or 500 Kbps Configurable I/O Poll Response message helps optimize space utilization within scanner input tables: Selectable poll response assembly Selectable poll response size (bytes)
Serial	RS-232 via mini-connector or terminal base unit Communication rate fixed at 19.2 Kbps Local configuration via the Serial Configuration utility
Measurement Modes	
Measurement modes	Normal (two independent channels) Head-to-head Radial cancel
Delta Time Buffer	
Number of records	2048
Delta time interval	1…3600 s
Trigger mode	Relay on the module is activated or by a trigger event (for example, DeviceNet command from a controller or host)
Alarms	
Number	Two alarm and danger pairs
Operators	Greater than Less than Inside range Outside range
Hysteresis	User configurable in software
Startup inhibit/setpoint multiplication	Period: 0…1092 min, adjustable in 0.1 min increments Inhibit/multiplication function: Multiply by N (0…10, 0 = Disarm)
Relays	
Number	Single on-board relay, two sets of contacts - DPDT (2 Form C) Four additional relays when interconnected to an XM-441 expansion relay module or Four virtual relays whose status can be used by remote control systems or the XM-440 master relay module
On-board relay rating	Voltage, max: 125V DC, 125V AC Current, max: 3.5 A Current, min: 0 Power, max: 60 W, 62.5VA Max current is up to 40 °C (104 °F), then derates to 2 A at 65 °C (149 °F).
Failsafe	Normally energized (failsafe) or Normally de-energized (non-fail-safe)
Latching	Latching or Non-latching
Time delay	0…25.5 s, adjustable in 100 ms increments
Logic	Single or paired AND or OR logic applied to any alarm
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: Normal Alert Danger Disarm Transducer fault Module fault

Attribute	XM-320 (1440-TPS02-01RB)
Configuration	
Nonvolatile configuration	A copy of the module configuration is retained in nonvolatile memory from which the configuration is loaded upon powerup The configuration stored in nonvolatile memory can be deleted only by a module-reset command sent via a serial interface, using the Serial Configuration utility or via a DeviceNet interface from any compliant software application
Power	
Module	24V DC
Consumption	200 mA, max 165 mA, typical
Heat production	5.28 W (18 BTU/hr), max 3.96W (13.5 BTU/hr), typical
Transducer	Isolated 24V DC, user configurable with wiring
Environmental	
Temperature, storage	-40…85 °C (-40…185 °F)
Conformal coating	All printed circuit boards are conformally coated in accordance with IPC-A-610C
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-20…65 °C (-4…149 °F)
Temperature, surrounding air, max	65 °C (149 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	20 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	8 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on power ports ±1 kV at 5 kHz on relay and shielded signal ports ±1 kV at 5 kHz on XMbus port
Surge transient immunity IEC 61000-4-5	±1 kV line-earth(CM) on relay ports ±2 kV line-earth(CM) on shielded signal ports ±2 kV line-earth(CM) on XMbus port
Conducted RF immunity	IEC 61000-4-6: 10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Enclosure type rating	None (open-style)
Voltage and current ratings	Supply: 24V DC, 0.2 A max, Class 2/SELV Relay: 120V AC, 50/60Hz, 0.5 A Res 110V DC, 0.3 A Res 30V DC, 1.0 A Res
Power dissipation	5.3 W max
Isolation voltage	250V (continuous), Basic Insulation Type, relay to all other circuits. Isolation between other circuits is not rated. Type tested at 1500V AC for 60 s
Wiring category[1]	2 - on relay and shielded signal ports 3 - on Serial and power ports 2 - on XMbus ports
Wire type	Signal connections: shielded Power and relay connections: unshielded
Pilot duty rating	Relay port: Not rated
North American temp code	T4A
IEC temp code	T4
Physical	
Terminal base	1440-TB-B

Attribute	XM-320 (1440-TPS02-01RB)
Dimensions (H x W x D), approx	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)
Certification[2] (when product is marked)	**Description**
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E234338.
c-CSA-us	CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for US and Canada. See CSA File 150115.
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2006/95/EC LVD, compliant with: • EN 61131-2; Programmable Controllers (Clause 11)
C-Tick	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • II 3 G Ex nAC [ic] IIC T4X Gc • when used at or below 60V AC or 75V DC
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates, and other certification details.

XM-360 Process Module

The XM-360 module (catalog number 1440-TPR06-00RE) measures a DC voltage or a loop current and reports the data value, the rate of change for each channel, and the difference between adjacent channels.

Attribute	XM-360 (1440-TPR06-00RE)
Inputs	
Six channels	1…6 process DC voltage inputs or loop current inputs
Isolation	Up to 250V of isolation for each input
Sensitivity	User configurable in software
Input range	User configurable per channel as: 0…5V 0…10V 4…20 mA -5…5V 1…5V 0…20 mA
Input impedance	50 Ω current input 1 MΩ voltage input
Outputs	
4…20 mA outputs	Two isolated banks of three outputs (one per channel) 600 Ω max load
Accuracy	±1% of full scale, max ±0.2% of full scale, typical
Indicators	
Status indicators	Module - red/green Network - red/green Channel 1 - yellow/red Channel 2 - yellow/red Channel 3 - yellow/red Channel 4 - yellow/red Channel 5 - yellow/red Channel 6 - yellow/red

Attribute	XM-360 (1440-TPR06-00RE)
Communication	
DeviceNet network	Standard DeviceNet protocol for all functions (not power—module power is provided independently) Available EDS file provides support for most DeviceNet compliant systems Communication rate automatically set by bus master to 125, 250, or 500 Kbps Configurable I/O Poll Response message helps optimize space utilization within scanner input tables: Selectable poll response assembly Selectable poll response size (bytes)
Serial	RS-232 via mini-connector or terminal base unit Communication rate fixed at 19.2 Kbps Local configuration via the Serial Configuration utility
Signal Conditioning	
Accuracy	1% of full scale, max ±0.2% of full scale, typical
Low pass filter	User configurable for the measurement value and rate of change value from each channel
Resolution	0.05% of input range
Units	°C, °F, PSI, inHg, CFM, mbar, m/s2, Pa, g, kPa, gSE, mA, rpm, ips, Hz, mm/s, mm, µm, radian, in, revolution, mil, °, %, unspecified
Measurements	
Rate of change	Per minute Updated once per second
Delta Time Buffer	
Number or records	2048
Delta time interval	1…3600 s
Trigger mode	Relay on the XM-441 expansion relay module is activated, or by a trigger event (for example, DeviceNet command from a controller or host)
Alarms	
Number	12 alarm and danger pairs Measurement value and rate of change value from each channel
Operators	Greater than Less than Inside range Outside range
Hysteresis	User configurable in software

Attribute	XM-360 (1440-TPR06-00RE)
Relays	
Number	Up to eight relays when interconnected to one or two XM-441 expansion relay modules or Eight virtual relays whose status can be used by remote control systems
Failsafe	Normally energized (failsafe) or Normally de-energized (non-fail-safe)
Latching	Latching or Non-latching
Time delay	0…25.5 s, adjustable in 10 ms increments
Logic	Single or paired AND or OR logic applied to any alarm
Reset	Local reset switch on top of module Digital reset command via serial or DeviceNet interface
Activation on	Alarm status Normal Alert Danger Disarm Sensor-out-of-range Module fault
Configuration	
Nonvolatile configuration	A copy of the module configuration is retained in nonvolatile memory from which the configuration is loaded upon powerup The configuration stored in nonvolatile memory can be deleted only by a module-reset command sent via the serial interface, using the Serial Configuration utility or via a DeviceNet interface from any compliant software application
Power	
Module	24V DC
Consumption	300 mA, max 170 mA, typical
Heat production	7.2 W (24.6 BTU/hr), max 4 W (14 BTU/hr), typical
Transducer	Isolated 24V DC, user configurable with wiring
Environmental	
Temperature, storage	-40…85 °C (-40…185 °F)
Conformal coating	All printed circuit boards are conformally coated in accordance with IPC-A-610C

Attribute	XM-360 (1440-TPR06-00RE)
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-20…65 °C (-4…149 °F)
Temperature, surrounding air, max	65 °C (149 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	20 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on power ports ±1 kV at 5 kHz on shielded signal ports ±1 kV at 5 kHz on XMbus port
Surge transient immunity IEC 61000-4-5	±2 kV line-earth(CM) on shielded signal ports ±2 kV line-earth(CM) on XMbus port
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Enclosure type rating	None (open-style)

Attribute	XM-360 (1440-TPR06-00RE)
Voltage and current ratings	Supply: 24V DC, 0.3 A max, Class 2/SELV
Power dissipation	7.2 W max
Isolation voltage	Not rated
Wiring category[1]	2 - on shielded signal ports 3 - on Serial and power ports 2 - on XMbus ports
Wire type	Signal connections: shielded Power connections: unshielded
North American temp code	T4
IEC temp code	T4
Physical	
Terminal base	1440-TB-E
Dimensions (H x W x D), approx	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)
Certification[2] (when product is marked)	**Description**
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E234338.
c-CSA-us	CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for US and Canada. See CSA File 150115.
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
C-Tick	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • II 3 G Ex nAC [ic] IIC T4X Gc
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates, and other certification details.

XM-361 Universal Temperature Module

XM-362 Isolated Thermocouple Temperature Module

The XM-361 (1440-TUN06-00REA) and XM-362 (1440-TTC06-00REA) modules measure temperature from RTDs and thermocouples. The modules report, and can alarm on, the measured temperature, rate of change for each channel, and difference between adjacent channels.

When only thermocouples are monitored, the XM-362 module is the preferred solution.

Attribute	XM-361 (1440-TUN06-00RE) XM-362 (1440-TTC06-00RE)
Inputs	
Channels	1…6 RTD or thermocouple signals, user configurable XM-361 accepts RTD and isolated thermocouple inputs XM-362 accepts isolated or grounded thermocouple inputs
Supported thermocouple types (XM-361 and XM-362)	• B 0…1810 °C (32…3290 °F) • C 0…1316 °C (32…2400 °F) • E 5…284 °C (41…543 °F) • J 0…364 °C (32…687 °F) • K -40…484 °C (-40…903 °F) • N -40…620 °C (-40…1148 °F) • R -40…1760 °C (-40…3200 °F) • S -40…1760 °C (-40…3200 °F) • T -40…379 °C (-40…714 °F)
Supported RTD types (XM-361 only)	• 100 Ω 2-wire and 3-wire platinum (alpha = 0.00385) -40…660 °C (-40…1220 °F) • 200 Ω 2-wire and3-wire platinum (alpha = 0.00385) -40…453 °C (-40…847 °F) • 100 Ω 2-wire and 3-wire platinum (alpha = 0.003916) -40…660 °C (-40…1220 °F) • 200 Ω 2-wire and 3-wire platinum (alpha = 0.003916) -40…443 °C (-40…829 °F) • 250 Ω 2-wire and 3-wire platinum (alpha = 0.00392) -40…389 °C (-40…732 °F) • 100 Ω 2-wire and 3-wire nickel (alpha = 0.00618) -40…180 °C (-40…356 °F) • 120 Ω 2-wire and 3-wire nickel (alpha = 0.00672) -40…439 °C (-40…822 °F) • 10 Ω 2-wire and 3-wire copper (alpha = 0.00427) -40…260 °C (-40…500 °F)
RTD current source value	1.004 mA ±1%
Common mode input voltage (XM-361 only)	±3V
Input impedance	XM-361: 1 MΩ voltage input XM-362: 10 kΩ voltage input
Outputs	
4…20 mA outputs	Two isolated banks of three outputs (one per channel) 600 Ω max load
Accuracy	±1% of full scale, max ±0.2% of full scale, typical
Isolation	250V
Indicators	
Status indicators	Module - red/green Network - red/green Channel 1 - yellow/red Channel 2 - yellow/red Channel 3 - yellow/red Channel 4 - yellow/red Channel 5 - yellow/red Channel 6 - yellow/red
Communication	
DeviceNet network	Standard DeviceNet protocol for all functions (not power—module power is provided independently) Available EDS file provides support for most DeviceNet compliant systems Communication rate automatically set by bus master to 125, 250, or 500 Kbps Configurable I/O Poll Response message helps optimize space utilization within scanner input tables: Selectable poll response assembly Selectable poll response size (bytes)
Serial	RS-232 via mini-connector or terminal base unit Communication rate fixed at 19.2 Kbps Local configuration via the Serial Configuration utility
Signal Conditioning	
Accuracy	C thermocouples: ±3 °C (±6 °F) or 0.6% of full scale, whichever is greater E, J, K, N, T thermocouples: ±1 °C (±2 °F) or 0.6% of full scale, whichever is greater B, R, S thermocouples: ±4 °C (±7 °F) or 0.6% of full scale, whichever is greater Platinum and nickel RTDs (3-wire only): ±1 °C (±2 °F) or 0.6% of full scale, whichever is greater Copper RTDs (three-wire only): ±7 °C (±13 °F) or 5% of full scale, whichever is greater
Resolution	0.025% of temperature range

Attribute	XM-361 (1440-TUN06-00RE) XM-362 (1440-TTC06-00RE)
Low pass filter	User configurable for the measurement and rate of change value from each channel
Sampling rate	200 Hz
Units	°C, °F
Measurements	
Measured value	Temperature
Rate of change	Per minute Updated once per second
Delta Time Buffer	
Number of records	2048
Delta time interval	1…3600 s
Trigger mode	Relay on an XM-441 expansion relay module is activated, or by a trigger event (for example, DeviceNet command from a controller or host)
Alarms	
Number	18 alarm and danger pairs Measurement value and rate of change value from each channel
Operators	Greater than Less than Inside range Outside range
Hysteresis	User configurable in software
Relays	
Number	Up to eight relays when interconnected to one or two XM-441 expansion relay modules or Eight virtual relays whose status can be used by remote control systems
Failsafe	Normally energized (failsafe) or Normally de-energized (non-fail-safe)
Latching	Latching or Non-latching
Time delay	0…25.5 s, adjustable in 100 ms increments
Logic	Single or paired AND or OR logic applied to any alarm
Reset	Local reset switch on top of module Digital reset command via serial or DeviceNet interface
Activation on	Alarm status Normal Alert Danger Disarm Sensor Out of Range Module fault

Attribute	XM-361 (1440-TUN06-00RE) XM-362 (1440-TTC06-00RE)
Configuration	
Nonvolatile configuration	A copy of the module configuration is retained in nonvolatile memory from which the configuration is loaded upon powerup The configuration stored in nonvolatile memory can be deleted only by a module-reset command sent via a serial interface, using the Serial Configuration utility or via a DeviceNet interface from any compliant software application
Power	
Module	24V DC Class 2/SELV
Consumption	400 mA, max for XM-361, 300mA for XM-362
Heat production	7.2 W (24.6 BTU/hr), max 4 W (14 BTU/hr), typical
Environmental	
Temperature, operating	-20…65 °C (-4…149 °F)
Conformal Coating	All printed circuit boards are conformally coated in accordance with IPC-A-610C
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-20…65 °C (-4…149 °F)
Temperature, surrounding air, max	65 °C (149 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	20 g

Attribute	XM-361 (1440-TUN06-00RE) XM-362 (1440-TTC06-00RE)
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on power ports ±1 kV at 5 kHz on shielded signal ports ±1 kV at 5 kHz on XMbus port
Surge transient immunity IEC 61000-4-5	±2 kV line-earth(CM) on shielded signal ports ±2 kV line-earth(CM) on XMbus port
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Enclosure type rating	None (open-style)
Voltage and current ratings	XM-362 Supply: 24V DC, 0.3 A max, Class 2/SELV XM-361 Supply: 24V DC, 0.4 A max, Class 2/SELV
Power dissipation	7.2 W max
Isolation voltage	Not rated
Wiring category(1)	2 - on shielded signal ports 3 - on Serial and power ports 2 - on XMbus ports
Wire type	Signal connections: shielded Power connections: unshielded
North American temp code	T4
IEC temp code	T4
Physical	
Terminal base	1440-TB-E
Dimensions (H x W x D), approx	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)
Certification(2) (when product is marked)	**Description**
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E234338.
c-CSA-us	CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for US and Canada. See CSA File 150115.

Attribute	XM-361 (1440-TUN06-00RE) XM-362 (1440-TTC06-00RE)
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
C-Tick	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • II 3 G Ex nAC [ic] IIC T4X Gc
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates, and other certification details.

XM-440 Master Relay Module

The XM-440 master relay (catalog number 1440-RMA00-04RC) combines four relay outputs with XM bus master capabilities to provide remote, shared, and voted relay operation for distributed XM measurement modules. The relay supports linking of one or two XM-441 expansion relays to provide a capacity of up to 12 relays.

Attribute	XM-440 (1440-RMA00-04RC)
Indicators	
Status indicators	Module - red/green Network -red/green Relay 1 - red Relay 2 -red Relay 3 - red Relay 4 - red
Communication	
DeviceNet network	Standard DeviceNet protocol for all functions (not power—module power is provided independently) Available EDS file provides support for most DeviceNet compliant systems Communication rate automatically set by bus master to 125, 250, or 500 Kbps Configurable I/O Poll Response message helps optimize space utilization within scanner input tables: Selectable poll response assembly Selectable poll response size (bytes)
Serial	RS-232 via mini-connector or terminal base unit Communication rate fixed at 19.2 Kbps Local configuration via the Serial Configuration utility
Relays	
Number	Four relays, two sets of contacts each - DPDT (2 Form C) Four or eight additional relays when connected to one or two XM-441 expansion relay modules
Contacts	250V AC, 50/60 Hz @ 3 A resistive
Failsafe	Normally energized (failsafe) or Normally de-energized (non-fail-safe)
Latching	Latching or Non-latching
Time delay	0…25.5 s, adjustable in 100 ms increments
Logic	Per relay, defined as A out of B where B is up to 16 alarms or relays from any XM module on the bus and A is from 1 to B
Reset	Local reset switch on top of module Remote reset switch wired to terminal base Digital reset command via serial or DeviceNet interface
Power	
Module	24V DC Class 2/SELV
Consumption	200 mA, max
Heat production	3.4 W (11.6 BTU/hr), max
Environmental	
Temperature, storage	-40…85 °C (-40…185 °F)
Conformal coating	All printed circuit boards are conformally coated in accordance with IPC-A-610C
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-20…65 °C (-4…149 °F)
Temperature, surrounding air, max	65 °C (149 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	20 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	4 kV contact discharges 8 kV air discharges

Attribute	XM-440 (1440-RMA00-04RC)
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on power ports ±1 kV at 5 kHz on relay and shielded signal ports ±1 kV at 5 kHz on XMbus port
Surge Transient immunity IEC 61000-4-5	±1 kV line-earth(CM) on relay ports ±2 kV line-earth(CM) on shielded signal ports ±2 kV line-earth(CM) on XMbus port
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Enclosure type rating	None (open-style)
Voltage and current ratings	Supply: 24V DC, 0.2A max, Class 2/SELV Relay: 250V AC, 50/60 Hz, 3 A Res
Power dissipation	3.4 W max
Isolation voltage	250V (continuous), Basic Insulation Type, relay to relay and to all other circuits. Type tested at 1500V AC for 60 s
Wiring category[1]	2 - on relay and shielded signal ports 3 - on Serial and power ports 2 - on XMbus ports
Wire type	Signal connections: shielded Power and relay connections: unshielded
Pilot duty rating	Relay ports: Not rated
North American temp code	T4A
IEC temp code	T4
Physical	
Terminal base	1440-TB-C
Dimensions (H x W x D), approx	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)
Certification[2] (when product is marked)	**Description**
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E234338.
c-CSA-us	CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for US and Canada. See CSA File 150115.
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2006/95/EC LVD, compliant with: • EN 61131-2; Programmable Controllers (Clause 11)
C-Tick	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • II 3 G Ex nAC [ic] IIC T4X Gc when used at or below 60V AC or 75V DC
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates, and other certification details.

XM-441 Expansion Relay Module

The XM-441 expansion relay (catalog number 1440-REX00-04RD) adds four relays to any XM measurement module or to the XM-440 master relay.

Attribute	XM-441 (1440-REX00-04RD)
Indicators	
Status indicators	Module power -green Relay 1 - red Relay 2 - red Relay 3 - red Relay 4 - red
Communication	
Host communication	The XM-441 module communicates to a host module via the side connector of the terminal base. If the host is an XM-440 master relay module, then you can place two XM-441 modules immediately to the right of the XM-440 module. All XM measurement modules support just one expansion module, which must be connected directly to and on the right of the host module
Relays	
Number	Four relays, two sets of contacts each - DPDT (2 Form C)
Contacts	250V AC, 50/60 Hz @ 3 A resistive
Failsafe	Normally energized (failsafe, or Normally de-energized (non-failsafe)
Other features	These features are managed by the host XM module: Latching Time delay Logic Reset Activation
Environmental	
Temperature, storage	-40…85 °C (-40…185 °F)
Conformal coating	All printed circuit boards are conformally coated in accordance with IPC-A-610C
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-20…65 °C (-4…149 °F)
Temperature, surrounding air, max.	65 °C (149 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	20 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	4 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4:	±2 kV at 5 kHz on power ports ±1 kV at 5 kHz on relay and signal ports ±1 kV at 5 kHz on XMbus port
Surge transient immunity IEC 61000-4-5	±1 kV line-earth(CM) on relay ports ±1 kV line-earth(CM) on signal ports ±1 kV line-earth(CM) on XMbus port
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Enclosure type rating	None (open-style)
Voltage and current ratings	Supply: 24V DC, 0.2 A max, Class 2/SELV Relay: 250V AC, 50/60 Hz, 3 A Res
Power dissipation	2.9 W (9.9 BTU/hr) max

Attribute	XM-441 (1440-REX00-04RD)
Wiring category[1]	2 - on relay, power, and signal ports 3 - on serial ports 2 - on XMbus ports
Physical	
Terminal base	1440-TB-D
Dimensions (H x W x D), approx	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)
Certification[2] (when product is marked)	**Description**
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E234338.
c-CSA-us	CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for US and Canada. See CSA File 150115.
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2006/95/EC LVD, compliant with: • EN 61131-2; Programmable Controllers (Clause 11)
C-Tick	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • II 3 G Ex nAC [ic] IIC T4X Gc • when used at or below 60V AC or 75V DC
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3
Wire Type	Signal connections: shielded Power and Relay connections: unshielded
Pilot Duty Rating	Relay ports: Not rated
North American Temp Code	T4A
IEC Temp Code	T4

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates and other certification details.

XM-442 Voted EODS Relay Module

The XM-442 module (catalog number 1440-REX03-04RG) combines with three XM-220 modules to provide an API-compliant, triple-redundant electronic overspeed detection system (EODS).

Attribute	XM-442 (1440-REX03-04RG)
Indicators	
Status indicators	Module power - red/green Shutdown relay - red Alarm relay - red
Communication	
Host communication	The XM-442 module communicates to the speed modules connected to it only via the three digital inputs on the front of the terminal base. Power and communication pass through the side connector of the terminal base but are not used by the XM-442 module
Relays	
Number	Four relays, two sets of contacts each - DPDT (2 Form C)
Contacts	250V AC, 50/60 Hz @ 3 A resistive 150V DC, 1.6 A Resistive
Failsafe	Normally energized
Latching	The shutdown and alarm relays latch when the conditions that activate them are met
Logic	Two-out-of-three One-out-of-three
Activation	Low logic level (< 0.8V) on the overspeed/circuit fault inputs
Reset	Local reset switch on top of module Remote reset switch wired to terminal base
Power	
Voltage and current ratings	Supply: • 24V DC, 0.2 A max, Class 2/SELV Relay: • 250V AC, 50/60 Hz, 3 A Res • 150V DC, 1.6 A Res
Heat production	2.9 W (9.9 BTU/hr), max
Environmental	
Temperature, storage	-40…85 °C (-40…185 °F)
Conformal coating	All printed circuit boards are conformally coated in accordance with IPC-A-610C

Attribute	XM-442 (1440-REX03-04RG)
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-20…65 °C (-4…149 °F)
Temperature, surrounding air, max	65 °C (149 °F)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	20 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	4 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on power ports ±1 kV at 5 kHz on relay and signal ports ±1 kV at 5 kHz on XMbus port
Surge transient immunity IEC 61000-4-5	±1 kV line-earth(CM) on relay ports ±1 kV line-earth(CM) on signal ports ±1 kV line-earth(CM) on XMbus port
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Attribute	XM-442 (1440-REX03-04RG)
Enclosure type rating	None (open-style)
Power dissipation	2.9 W max
Wiring category[1]	2 - on relay, power, and signal ports 3 - on serial ports 2 - on XMbus ports
Wire type	Signal connections: shielded Power and relay connections: unshielded
Pilot duty rating	Relay ports: Not rated
North American temp code	T4A
IEC temp code	T4
Physical	
Terminal base	1440-TB-G
Dimensions (H x W x D), approx	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)
Certification[2] (when product is marked)	**Description**
c-CSA-us	CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for US and Canada. See CSA File 150115.
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2006/95/EC LVD, compliant with: • EN 61131-2; Programmable Controllers (Clause 11)
C-Tick	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • II 3 G Ex nAC [ic] IIC T4X Gc when used at or below 60V AC or 75V DC
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates, and other certification details.

Accessories

Terminal Bases

NA Temp Code:	T4A	T4A	T4A	T4A	T4	T4A	T4	T4A
Attribute	**XM-940 (1440-TB-A)**	**XM-941 (1440-TB-B)**	**XM-942 (1440-TB-C)**	**XM-943 (1440-TB-D)**	**XM-944 (1440-TB-E)**	**XM-946 (1440-TB-G)**	**XM-947 (1440-TB-H)**	**XM-DYN (1440-TBS-J)**
Supported XM Modules	XM-12*x*	XM-220, XM-320	XM-440	XM-441	XM-36*x*	XM-442	XM-16*x*	XM DYN
Environmental								
Temperature, operating	-20…65 °C (-4…149 °F)							-20…70 °C (-4…158 °F)
Temperature, storage	-40…85 °C (-40…185 °F)							-40…85 °C (-40…185 °F)
Relative humidity	95% noncondensing							5…95% noncondensing
Physical								
Dimensions (H x W x D)	97 x 94 x 94 mm (3.8 x 3.7 x 3.7 in.)							
Side connector	Interconnect to adjacent modules passes primary power (3 A max), DeviceNet protocol and power (300 mA max), and the circuits necessary to support expansion modules							
Terminal screw torque	0.8 N•m (7 lb•in)							
Certifications[(1)]								
CE:	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab. Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)							
C-Tick	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions							
Ex	• European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements II 3 G Ex nAC [ic] IIC T4X Gc when used at or below 60V AC or 75V DC							
c-CSA-us	CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for US and Canada. See CSA File 150115.							
c-UL-us	UL Listed, certified for U.S. and Canada. See UL File E234338 UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.							

(1) When product or packaging is marked. See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates, and other certification details.

Serial Configuration Utility

Use the XM Serial Configuration utility to commission and configure XM modules. The utility ships with each XM module and can be downloaded from http://www.rockwellautomation.com/support/.

From the support website, choose Downloads>Firmware Updates>Condition Monitoring.

Attribute	Serial Configuration Utility
Operating systems	Microsoft Windows: NT, 2000, XP
Computer requirements	Computer with an available RS-232 serial port Recommended: 400 MHz CPU, 128+ MB RAM, 10 MB free disk space Almost any up-to-date computer will suffice for configuring modules. The recommended configuration is suggested for systems that will be heavily used or that will be used to view live data
Security	Password facility that precludes unauthorized use
DeviceNet address management	0…63
Additional features	• Auto save configuration • Alarm and relay management • Module firmware update • Store highest tachometer speed with reset
Supported XM modules	XM-160 direct vibration XM-161 direct vibration with 4…20 mA output XM-162 direct vibration with eddy current probe power XM-220 dual speed XM-320 position XM-360 process XM-361 universal temperature XM-362 thermocouple temperature XM-440 master relay
Plots	Spectra Time waveform Trend Level Alarm and relay status The available plots depend on the module providing the data

Fuse Kit

The fuse kit limits the available current from listed safety extra low voltage (SELV) or protected extra low voltage (PELV) sources. The kit lets you use SELV or PELV supplies as an alternative to a listed Class 2 power source for an XM monitoring system.

Attribute	Fuse Kit (1440-5AFUSEKIT)
Fuse	Bussmann model MDA-5-R
Wire	(0.2…6 mm^2 (30…10 AWG) solid or stranded
Tightening torque	0.5…0.6 N•m (4.5…5.3 lb•in)
Stripping length	10 mm (0.4 in.)

Serial Communication Cable

The serial communication cable connects a computer to an XM module for configuration by using the XM Serial Configuration utility.

Attribute	Communication Cable (1440-SCDB9FXM2)
Length	2 m (6.56 ft)
Connectors	9-pin female serial to micro-USB

ControlNet Adapter

The ControlNet adapter (catalog number 1440-ACNR) bridges an XM bus network and a ControlNet network. Use only with 1...10 XM dynamic measurement modules (cat. no. DYN02-01RJ).

Attribute	ControlNet Adapter (1440-ACNR)
I/O Capacity	
XM modules, max	10 XM dynamic measurement modules (cat.no. 1440-DYN02-01RJ)
ControlNet communication rate	5 M (fixed value)
XM bus communication rate	500 Kbps (fixed value)
Technical	
Status indicators	Module Backplane (XM bus) ControlNet A ControlNet B
Power consumption, max	2.4 W
Power dissipation, max	2.4 W
Thermal dissipation	8.194 BTU/hr
Input over voltage protection	Reverse polarity protected
Isolation voltage	Tested @ 900V AC for 60 s between XM bus-to-ControlNet network and ControlNet network-to-user power
Field power	Class 2 power supply Voltage: 24V DC Current: 120 mA
Wiring	
Power conductor wire size	22…14 AWG (0.34… 2.1 mm^2) solid or stranded copper wire rated at 75 °C (167 °F) or greater 1.2 mm (3/64 in.) insulation max
Wiring category[1]	1 - on power ports 2 - on communication ports
Screw torque	0.8 N•m (7 lb•in)
Physical	
Dimensions (H x W x D), approx	86.4 x 94 x 68.6 mm (3.4 x 3.7 x 2.7 in.)
Weight, approx	0.2 kg (0.44 lb)
Environmental	
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-20…70 °C (-4…158 °F)
Temperature, surrounding air, max.	70 °C (158 °F)

Attribute	ControlNet Adapter (1440-ACNR)
Temperature, nonoperating IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	15 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	20 g
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10…500 Hz
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD Immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF Immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B Immunity IEC 61000-4-4	±4 kV at 5 kHz on power ports no signal ports - omit from publication ±2 kV at 5 kHz on communications ports
Surge Transient Immunity IEC 61000-4-5	±1 kV line-line(DM) and ±2 kV line-earth(CM) on power ports no signal ports - omit from publication no shielded ports - omit from publication ±2 kV line-earth(CM) on communications ports
Conducted RF Immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz
Enclosure Type Rating	None (open-style)
Isolation Voltage	50V (continuous), Basic Insulation Type, between ControlNet to system and ControlNet to power. Type tested at 900V AC for 60 s
Wire Size	Power connections: 0.34… 2.1 mm2 (22…14 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater 1.2 mm (3/64 in.) insulation max
North American Temp Code	T4A
IEC Temp Code	T4

Attribute	ControlNet Adapter (1440-ACNR)
Certifications[2]	
CE	European Union 2004/108/EC EMC Directive, compliant with: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) •
C-Tick	Australian Radiocommunications Act, compliant with: • AS/NZS CISPR 11; Industrial Emissions • AS/NZS CISPR 11; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with: • EN 60079-15; Potentially Explosive Atmospheres, Protection "n" • EN 60079-11; Explosive Atmospheres, Protection "i" • EN 60079-0; General Requirements • II 3 G Ex nA nL IIC T4X Gc when used at or below 60V AC or 75V DC
KCC	Korean Registration of Broadcasting and Communications Equipment, compliant with: • Article 58-2 of Radio Waves Act, Clause 3
c-UL-us	UL Listed, certified for U.S. and Canada. See UL File E234338 UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.

(1) Use this Conductor Category information for planning conductor routing. Refer to Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(2) When product or packaging is marked. See the Product Certification link at http://www.rockwellautomation.com for Declarations of Conformity, Certificates, and other certification details.

Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at https://rockwellautomation.custhelp.com/ for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/services/online-phone.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview.page, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

Documentation Feedback

Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication RA-DU002, available at http://www.rockwellautomation.com/literature/.

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