Allen-Bradley

XM Monitoring Modules Specifications

Catalog Numbers 1440 Series

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

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Relay modules	XM-441 Expansion Relay Module	1440-REX00-04RD	17
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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. You can use the module to monitor shaft, casing, and pedestal vibration in equipment that rotates. The module is designed specifically for integration with ControlLogix® controllers, which are connected through the 1440-ACNR ControlNet adapter.

Table 1 - XM DYN Dynamic Measurement Module Attribute Descriptions

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/ µm	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
Outputs	
Buffered outputs	• One active buffer per dynamic channel • One resistive buffer for tachometer

Table 1 - XM DYN Dynamic Measurement Module Attribute Descriptions (continued)

Attribute	XM DYN (1440-DYN02-01RJ)
Indicators	
Status indicators	• Module • Network • Channel 0 • Channel 1 • Tachometer • Setpoint multiplier • Virtual relay
Communication	
XM bus	• Autobaud 125 Kbps, 250 Kbps, or 500 Kbps • Max distance: 10 m (32.81 ft) • Node number that is 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 off: -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
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

Table 1 - XM DYN Dynamic Measurement Module Attribute Descriptions (continued)

Attribute	XM DYN (1440-DYN02-01RJ)
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 that is stored in module memory at power-up, or from a configuration that is held in a Logix5000™ controller.
Relays	
One virtual relay	• Logic is provided to drive one virtual relay. • Relay status indicator
Relay function	• Normally energized (fail-safe) or normally de-energized (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
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

Table 1 - XM DYN Dynamic Measurement Module Attribute Descriptions (continued)

Attribute	XM DYN (1440-DYN02-01RJ)
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, which are 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
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 that is 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. The XM-124 is suitable for monitoring almost any rotating machine, including steam turbines, aeroderivative and industrial gas turbines, hydro turbines, motors, pumps, fans, compressors, and gearboxes.

Table 2 - XM-124 Standard Dynamic Measurement Module Attribute Descriptions

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/ µm	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) • 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

Table 2 - XM-124 Standard Dynamic Measurement Module Attribute Descriptions (continued)

Attribute	XM-124 (1440-SDM02-01RA)
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 supports most DeviceNet compliant systems • Communication rate that is set automatically by bus master to 125 Kbps, 250 Kbps, 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 that is fixed at 19.2 Kbps • Local configuration via the Serial Configuration Utility
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, 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
Low pass analog filter	• Applied to integrated acceleration measurements • -3 dB corner: 5 kHz Roll off: -18 dB/octave

Table 2 - XM-124 Standard Dynamic Measurement Module Attribute Descriptions (continued)

Attribute	XM-124 (1440-SDM02-01RA)
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
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

Table 2 - XM-124 Standard Dynamic Measurement Module Attribute Descriptions (continued)

Attribute	XM-124 (1440-SDM02-01RA)
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 that is 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
Alarms	
Number	Sixteen 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), one 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 four 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 – 1.5 A, 24V DC: 10^5
Failsafe	• Normally energized (fail-safe) or • Normally de-energized (non-fail-safe)
Latching	• Latching • 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 that is wired to terminal base • Digital reset command via serial or DeviceNet interface

Table 2 - XM-124 Standard Dynamic Measurement Module Attribute Descriptions (continued)

Attribute	XM-124 (1440-SDM02-01RA)
Activation on	• Alarm status – Normal – Alert – Danger – Disarm – Transducer fault – Module fault – Tacho fault
Peak speed capture	The XM-124 retains the value of the highest speed that is 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 that is stored in nonvolatile memory can be deleted only by a module-reset command that is 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)
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

Table 2 - XM-124 Standard Dynamic Measurement Module Attribute Descriptions (continued)

Attribute	XM-124 (1440-SDM02-01RA)
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 the conductor routing. See 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 updates in "real-time" only when configured for continuous update.

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).

Table 3 - XM-220 Dual Speed Module

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

Table 3 - XM-220 Dual Speed Module (continued)

Attribute	XM-220 (1440-SPD02-01RB)
Communication	
DeviceNet network	• Standard DeviceNet protocol for all functions (not power—module power is provided independently) • Available EDS file supports most DeviceNet compliant systems • Communication rate that is automatically set by bus master to 125 Kbps, 250 Kbps, 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 that is 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 that is 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, which are fixed per channel
Alarm parameters	Alarm and danger pair that is provided for each of: • Speed • Acceleration • Zero speed • Locked rotor
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 (two 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

Table 3 - XM-220 Dual Speed Module (continued)

Attribute	XM-220 (1440-SPD02-01RB)
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 (fail-safe) • Normally de-energized (non-fail-safe)
Latching	• Latching • Non-latching
Time delay	0…25.5 s, adjustable in 100 ms increments
Logic	Single or paired AND or OR logic that is applied to any alarm
Reset	• Local reset switch on top of module • Remote reset switch that is 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 that is stored in nonvolatile memory can be deleted only by a module-reset command that is 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 • 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)

Table 3 - XM-220 Dual Speed Module (continued)

Attribute	XM-220 (1440-SPD02-01RB)
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 relay and shielded signal ports • ±1 kV at 5 kHz on XM bus port
Surge transient immunity IEC 61000-4-5	• ±2 kV line-earth(CM) on relay and shielded signal ports • ±2 kV line-earth(CM) on XM bus 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 XM bus 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

Table 3 - XM-220 Dual Speed Module (continued)

Attribute	XM-220 (1440-SPD02-01RB)
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.)
Certification[2] (when product is marked)	
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 the conductor routing. See 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.

Table 4 - XM-441 Expansion Relay Module Attribute Descriptions

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 (two Form C)
Contacts	250V AC, 50/60 Hz @ 3 A resistive
Failsafe	• Normally energized (fail-safe) • 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

Table 4 - XM-441 Expansion Relay Module Attribute Descriptions (continued)

Attribute	XM-441 (1440-REX00-04RD)
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 XM bus 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 XM bus 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
Wiring category(1)	• 2 - on relay, power, and signal ports • 3 - on serial ports • 2 - on XM bus 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

Table 4 - XM-441 Expansion Relay Module Attribute Descriptions (continued)

Attribute	XM-441 (1440-REX00-04RD)
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 the conductor routing. See 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).

Table 5 - XM-442 Voted EODS Relay Module

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 that is 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
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

Table 5 - XM-442 Voted EODS Relay Module (continued)

Attribute	XM-442 (1440-REX03-04RG)
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 XM bus 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 XM bus 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)
Power dissipation	2.9 W max
Wiring category[1]	• 2 - on relay, power, and signal ports • 3 - on serial ports • 2 - on XM bus 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)	
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

Table 5 - XM-442 Voted EODS Relay Module (continued)

Attribute	XM-442 (1440-REX03-04RG)
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 the conductor routing. See 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

Table 6 - Terminal Bases Specifications

NA Temp Code	T4A	T4A	T4A	T4A	T4A
Attribute	**XM-124 (1440-TB-A)**	**XM-941 (1440-TB-B)**	**XM-943 (1440-TB-D)**	**XM-946 (1440-TB-G)**	**XM-DYN (1440-TBS-J)**
Supported XM Modules	XM-124	XM-220, XM-320	XM-441	XM-442	XM DYN
Environmental					
Temperature, operating	-20…65 °C (-4…149 °F)				
Temperature, storage	-40…85 °C (-40…185 °F)				
Relative humidity	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 can be used for module configuration. The recommended configuration is suggested for systems that are heavily used or that are 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-120 standard vibration • XM-120E eccentricity • XM-121 low frequency vibration • XM-121A absolute shaft vibration • XM-122 gSE vibration • XM-123 aeroderivative • XM-124 standard dynamic • 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 or protected extra low voltage (PELV) sources. The kit lets you use safety extra low voltage 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 (cat. no. 1440-ACNR) bridges an XM bus network and a ControlNet network. Use only with 1...10 XM dynamic measurement modules (cat. no. DYN02-01RJ).

Table 7 - ControlNet Adapter Attribute Descriptions

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 that is 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)

Table 7 - ControlNet Adapter Attribute Descriptions (continued)

Attribute	ControlNet Adapter (1440-ACNR)
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)
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
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 that is 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
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

Table 7 - ControlNet Adapter Attribute Descriptions (continued)

Attribute	ControlNet Adapter (1440-ACNR)
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 the conductor routing. See 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.

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.

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

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