



MOTORTRONICS™

Solid State AC Motor Controls

RX *Series*



Motor Protection / Overload Relays
200 - 15,000VAC, 1 through 2000A

Your Rx for a Healthy Motor!



Save Time and Money with Rx

- "Thermal Model" Motor Protection
- True Motor Power Monitoring
- Voltage, Current and Power Metering
- Flexible Control Features



3 YEAR WARRANTY

Take your motor protection to a new level. The RX Series provides more than just solid state overload or power protection relays. By using features previously found only in large expensive Motor Protection Relays, the RX Series allows even small to medium sized motor applications to be protected by the best technology available, yet at a price affordable to all.

Protect your 3 phase motors from:

- ✓ Line power problems; Single Phasing Phase Reversal, Voltage Imbalance
- ✓ Thermal Overload (i2t), Class 5-30
- ✓ Equipment Ground Fault
- ✓ Current Imbalance
- ✓ Jammed Load / Locked Rotor
- ✓ Broken shaft / belt / loss of prime
- ✓ Over / Under Voltage
- ✓ Low / High Power Factor
- ✓ Short Cycling, Too Many Starts per Hour
- ✓ Back-Spin Restart Lockout
- ✓ Excessive Run Time
- ✓ Acceleration / Incomplete Sequence
- ✓ Over / Under Frequency from a Generator

Easy to read and simple to use, the RX Series display shows more than just "trip indication".

- 4 digit bright display shows values up to 9999
- LED indicators to show what the display is reading
- Status LEDs for Trip and Relay operations
- Large keypad, no dip switches or rotary dials that may require tools
- Pass code protection can keep out unwanted changes

NEMA 4 Operator Interface can be remote mounted up to 6 feet away

Advanced Technology for Maximum Motor and System Protection

The RX Series uses Thermal Modeling software normally found only in the most sophisticated Motor Protection Relays. This software keeps track of power related issues occurring in the motor circuit that contribute to causing a thermal overload. If there is a power loss, a unique combination of non-volatile memory and a real-time clock ensure that this protection is in effect when power is restored. Should an overload occur, the RX Series is intelligent enough to make sure that it can only be reset when the motor is sufficiently cooled down and is ready to start again successfully. Voltage input features allow true Motor Load Monitoring, not just current, along with Power Factor, kVA and Frequency.

Built-in Flexible Control Features Provide Cost and Space Savings

A 24 hour / 7 day Real Time Clock on board allows for several additional features that can eliminate the need for other discrete devices. Duty cycle can be controlled by using the Starts/Hour and Minimum Time Between Starts features, plus a Coast-Down / Backspin timer can prevent restarting while a motor is spinning backwards. In addition, simple Batch Time processes of up to 7 events can be programmed for daily, multi-day or weekly operations without the need for an external time clock. A Restart Delay timer allows staggered restarting of multiple units as well.

Add Metering and Communications to New or Existing Starters

Metering for Three Phase Currents, Voltages, kW, kVA, kVAR, Power Factor, Frequency, kWh, Elapsed Run Time, Run Cycle Count, Lock-Out Time, Reset Time and Remaining Thermal Capacity are all included, and can be both read on the display and communicated via the built-in RS-485 Modbus RTU comm. Port. Optional converters allow communications via DeviceNet, Field Bus, Profibus and other protocols as well. Fault memory with time and date stamps helps in troubleshooting and returning to operation.

RX Series Specifications

DESIGN

Type of Load 3 Phase AC induction motors	AC Supply Voltage (Motor Voltage) Direct: 200-600VAC, +/- 10% 50/60Hz With 120V PTs: 690-15, 000VAC	Current Ranges 1-2000 Amps
Ambient Conditions 0 to 50°C, 0 to 90% relative humidity Up to 10,000' elevation (3000m) w/h derating	Service Factor (for NEMA design motors) 1.00-1.30	Current Measurement 2 window CTs on units up to 5A External CTs for larger ranges Meets NEC requirements for leg protection
LED Alphanumeric Display High brightness 7-segment display can be seen in high ambient light conditions. 3 digit display allows display of high values	LED Status Lights 10 LED indicators on the front panel give relay status or quick reference for the alphanumeric display.	Full Function Keypad 4 quadrant navigation keys provide easy access to status information and programmable functions.
Power Wiring Feed through or external CT lead feed through	Packaging Open panel mount with DIN rail clips (IP00)	Operator interface Built-in, or remote mount up to 6ft (1.8m) away

CONTROL SYSTEM

Control Voltage Universal control voltage supply 85-265VAC or DC, 50/60Hz	1 Multi-function Digital Input Dry contact input for Timer Start, Remote Start, Remote Trip.	Fault Reset Manual button on display, or Cycle control power for remote reset
Programmable Output Contacts: 1 Form C (SPDT) 5A, 240VAC max., + 1 Form A (SPST) 10A max. 1/2HP @240VAC 29 programmable trip functions	24 Hr 7 Day 7 Event Time Controller Automatic Start for use with Batch Run Timer 1 through 7 days/week 1 through 7 Start events per day	Batch Run Timer Control Minimum Run Timer (Resumes timing if stopped) or Permissive Run Timer (Only runs during time) Time Setting: 1-9999 minutes

PROTECTION SYSTEM DESIGN AND ADJUSTMENTS

Overload Protection Method Real-time Motor Thermal Modeling uses current sensors and microprocessor to continuously calculate motor temperature.	Retentive Thermal Memory Remembers the thermal condition of the motor even if control power is lost. Thermal Register is adjusted for Off-Time when power is resumed.	Dual Overload Curve Settings for RV start Start Curve can be set to Class 5-30 Run Curve can be set to Class 5-30 Automatic Full Speed detection and change over
Learned Dynamic Reset Overload Trip will not reset unless motor has regained enough thermal capacity based on learned motor starting profiles.	Programmable Service Factor Service Factor setting automatically adjusts other settings to compensate. Adjustment Range: 1.0-1.15 SF	Current Imbalance Protection Provides monitoring of phase-to-phase current levels and trips if imbalance exceeds setting. Setting: Off or 5-30% FLA w/1-20 sec. delay
Phase Loss/Sequence Protection Trips on any phase under 20% FLA. Sequence selectable A-B-C, C-A-B or Off	Over-Current Trip Electronic Shear-Pin / Shock Relay Setting: Off or 50-300% FLA w/1-20 sec. delay	Under-Current Trip Load-Loss / Loss of Prime protection Setting: Of or 10-90% FLA w/1-60 sec. delay
Over Voltage Trip Any phase voltage over trip level Of or 1-10% of set voltage, w/1-20 sec. delay	Under Voltage Trip on Startup Off, or 1-20% of set voltage 1-120 second startup time	Under Voltage Trip at Full Speed Off, or 1-20% of set voltage 1-20 second trip delay
Load Monitor (True Motor Power) Under or Over kW trip or alarm Off, or 20-100% motor kW, w/1-20 sec. delay	Power Factor Monitor Leading or Lagging PF, trip or alarm Off, or 0.1-1.0, lead or Lag w/1-20 sec. delay	Frequency Monitor Over or Under programmed frequency Trip Setting: Off, or 1-10Hz, w/1-20 sec. delay
Equipment Ground Fault Protection Electronic Residual current protection method, no additional CTs needed Setting: Off, 5-90% of CT w/1-60 sec. delay	Short Circuit / Shorted Load Peak Current quick trip (electronic fuse) Trip level: Off or 800-1400% FLA, with .1-.5 sec. delay	Restart Delay Timer Programmable delay for restarting after a power failure for use in multiple installations. Setting: 0-999 sec.
Starts-per-Hour Lockout Programmable maximum starts-per-hour to prevent exceeding motor limits. Setting: Off or 0-10 start / Hr	Minimum Time Between Starts Used with or without Start-per-Hour protection to prevent short cycling of motor Setting: Off or 1-60 minutes between starts	Coast-Down Timer Back Spin or Anti-Wind Milling protection N-Re-Start after Stop Command Time Setting: Off or 1-3600 seconds

METERING AND DISPLAY SPECIFICATIONS

Amp Meter for Each Phase Default is Phase A Scroll up or down for Phases B, C and Ground 0-9999A (999A for Ground), +/- 2% accuracy	Elapsed Time Meter Running time from At-Speed detection. Non-Resettable except with password 0-9,999,999.9 hours	Run Cycle Counter Counts starts (At-Speed) for maintenance Non-Resettable except with password 0-99,999,999 counts
Volt Meter for Each Phase 0-600V, or 1-15kV, +/- 2% accuracy Total Voltage Imbalance %	Power Metering kW, kWhr, kVA, kVAR, or MW, MWhr, MVA, MVAR 0-999 units +/- 2% accuracy	Power Factor Metering Leading (Inductive) or lagging (capacitive) 0.1-1.0 pf
Fault Display Alpha abbreviated English display Shows fault code plus 10 LEDs indicate phase and trip status	Fault Event Recorder Records previous 3 fault trips Shown on display and stored in non-volatile memory	Time and Date Stamps Fault history stored with time and date stamps from Real Time Clock. Can be cleared with password protection.
Thermal Capacity Meter Real-time display of Remaining Thermal Capacity of motor after starting or running 0-100%, counts up while cooling	Remaining Time Value Displays View values of lockout timers such as Time Between Starts or Coast-Down, View process timer or time clock values	Remote Display Mounting Display is built-into front of unit Can be remotely mounted up to 10ft. away NEMA 12 display membrane kit available

Other control products available from



MOTORTRONICS™
Solid State AC Motor Controls



VMX Compact Starter

- Built in Bypass
- Motor Protection
- Low Profile
- Remote Keypad
- Pump Control



MVC Medium Voltage Starter

- 2.3 - 15kV
- Class E2
- Heavy Duty
- Motor Protection
- Metering



ME2 Series

- Micro AC Drive
- 0.25 - 3 HP
- Compact Size
- Easy to Operate
- Low Cost



MT Series Drive

- High Performance Drive
- 0.5 - 800 HP
- English Display
- DC Braking
- Built in "Macro"



VCM Series

- Vector AC Drive
- 0.5 - 75 HP
- Built-in Speed Pot
- PID Function
- 150% Starting Torque



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