MOTORTRONICS ™

Solid State AC Motor Control

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

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.

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

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

- ● 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

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 50⁰ 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

CORPORATE HEADQUARTERS

Motortronics / Phasetronics
1600 Sunshine Drive
Clearwater, Florida 33765
Tel: 727.573.1819 or 888.767.7792
Fax: 727.573.1803 or 800.548.4104
E-mail: sales@motortronics.com
www.motortronics.com

INTERNATIONAL LOCATIONS

Motortronics Int'l Korea Co Ltd
601, Daeryung Techno Tower 5-cha
Gasan-dong, Geumcheon-gu
Seoul, Korea 9153-774
Tel: 82-2-867-5808 / Fax: 82-2-867-6004
www.motortronics-korea.com

MOTORTRONICS™
Solid State AC Motor Control

M & P Machinery & Electronics Control
113 Zaoshan Road
Qingdao, China 266100
Tel: 86-532-87660633
Fax: 86-532-87660733
www.mp-cn.com

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