

# MM2 & MM3 to MM300 Retrofits



## Replace old MM2 and MM3 Relays with the Multilin™ MM300 Motor Management System

Taking advantage of new technologies and the advanced Multilin thermal model for motor protection, the Multilin MM300 Motor Management Systems offer substantial capabilities, flexibility and control functions, as compared to Multilin MM2 and MM3 relays. In particular, GE's Multilin MM300 Motor Management System devices offer advanced features through the combination of several functions such as advanced communications, automation, control and metering capabilities, all in one device.

The MM300 integrates protection, control, automation, metering, diagnostics, and multiple communication protocols all in a rugged compact device for low voltage motor protection & control applications. Designed for NEMA and IEC Motor Control Centers, the MM300 delivers superior protection and control to extend motor life and maximize process uptime.

### Key Benefits

- Full-featured protection for low voltage AC motors
- Advanced automation capabilities for providing customized protection and integrated process control
- Advanced FlexLogic™ reduces requirement for local controllers
- Reduced space requirements through integration of multiple devices
- Enhanced troubleshooting tools including sequence of event records and waveform capture
- Powerful communications including Serial, Ethernet, Profibus, and DeviceNet protocols
- Small form factor and remote display options designed to fit various MCC buckets
- Universal device for all motor power ratings
- No CTs required for less than 5A motor ratings
- Thermistor input to monitor the ambient or motor temperature
- Support for Hand Held Display (HHD) that provides a graphical color local interface allowing local operators to view and change setting files and quickly access relay diagnostic information

### Applications

- Low Voltage three phase AC motors
- MCC or stand alone panel mount applications
- Process control and applications requiring Automation or Control i.e. conveyor systems or well recovery pumps
- IEC or NEMA class motors and Motor Control Centers (MCCs)
- System architecture requiring multiple simultaneous communications
- Applications require full-voltage reversing or non-reversing, two-speed, wye-delta open transition, inverter, soft starter or autotransformer motor starting

## Protection and Control

- Enhanced Thermal Modeling
- Mechanical Jam & Stalled Rotor
- Undercurrent & Underpower
- Acceleration Time & Current Unbalance
- Ground & Sensitive Ground Fault
- Phase Overvoltage / Undervoltage
- Thermistor & RTD Overtemperature

## Automation

- Programmable FlexLogic™ option
- Starter Control & Process Interlocks
- Programmable inputs and outputs
- Undervoltage Auto-restart

## Monitoring & Metering

- Metering - current, voltage, power, energy, frequency, RTD & Thermistor
- Oscillography (analog values at 32 samples/cycle and digital states) & Event Recorder (256 events)
- Advanced device health diagnostics

## Communications

- Two Wire RS485, RJ45 Ethernet
- Programming Ports - USB, RS485 & Ethernet
- Multiple Protocols (Modbus RTU or TCP/IP, internally or externally powered Profibus, ODVA compliant DeviceNet)

## EnerVista™ Software

- Simplify setup and configuration
- Strong document archive/management system
- Strong maintenance and troubleshooting tool



## Products Comparison

### Featruce Comparison

FEATURE / OPTION	MM3	MM2	MM300
Phase(P) / Auxiliary(X) Undervoltage	X	X	P & X
Underpower	√-Optional	√	√
Undercurrent	√	√	√
Reverse-Phase or Current Unbalance	√	√	√
Incomplete Sequence			√
Thermal Model	√	√	√
RTD Biasing towards Thermal Model			√
Unbalance Biasing towards Thermal Model			√
Overload	√	√	√
Number of Standard Overload Curves	8	8	15
Availability of Custom Overload Curve			
NEMA Compatible Overload Curves	4	4	4 - See Overload Curve Table
Total Number of Standard Overload Curves	12	12	15
Instantaneous Overcurrent, Ground, Neutral, Phase	G/N	G/N	G
Locked Rotor	√	√	√
Time Overcurrent, Ground/ Neutral/Phase	G/N	G/N	G
Power Factor			√
Overvoltage, Neutral/Phase	P	P	P
Voltage Transformer Fuse Failure			√
Phase Reversal			√ - with Expansion Module B
Ground Detector	√	√	√
Starts per hour	√	√	√
Control Power Supply - AC/DC	AC only - 240 V AC Max	AC only - 240 V AC Max	AC - 60 to 300 V AC & DC - 84 V DC to 250 V DC
CT Inputs	250 Amps - w/o Additional CTs	5 or 1 Amp Terminals; direct connection up to 5 A FLA	Combined 1 A / 5 A direct connection up to 5 A FLA
Self-Test Failure Contact	√	√	√
Flash Memory	√	√	√
Contact Inputs - Programmable - up to	10	10	28 or 29 - Based on Order Code (Max) and Starter Type
Contact Inputs - Fixed	6	6	2 Max - Base on Starter Type
Contact Outputs - Fixed	2	2	2 Max - Base on Starter Type
Contact Outputs - Programmable	2	2	16 or 17 - Based on Order Code (Max) and Starter Type
Virtual Inputs			√ - with Flexlogic (Option 3)
Virtual Outputs			√ - with Flexlogic (Option 3)
Display	√	√	√
Keypad	√	√	√
Remote Display	√	Optional	√
Hand Held Display			√ - Optional

FEATURE / OPTION	MM3	MM2	MM300
Thermister Connection	√	√	√
Programmable Logic			√
User Programmable LEDs			√
Digital Counters			√
Digital Elements			√
Analog Outputs	1		
Mechanical Jam	√	√	√
Starts per Hour (for Jogging Starts mainly)		√	√
Time between Starts		√	√
Start Inhibit	√	√	√
Restart Block			√
Acceleration Time	√	√	√
Hot Motor RTD Feedback			√
RTD Temperature Trips			√
Stator RTD Alarm			√
Bearing RTD Alarm			√
RTD Broken Alarm			√
RTD Short/Low Alarm			√
Current - RMS	√	√	√
Voltage 3-ph Reading			√ - Based on Order Code
RTDs			√
Three Phase Active Power	√	√	√
Three Phase Reactive Power			√
Three Phase Apparent Power			√
Three Phase Active Energy	√	√	√
Three Phase Reactive Energy			√
Three Phase Apparent Energy			√
Demand			√
Frequency Display			√
Analog Inputs	1	1	
Event Recorder			256 Events
Motor Historical data	√	√	√
Pre-Trip Values	√	√	√
Learned Motor Parameters	√	√	√
Oscillography - Waveform Capture			√
Datalogger			√
Interface Program	√	√	√
RS-232 Serial Communication			√ - with a DB-9 to RJ-45 Cable
RS-485 Port	√	√	√
Baud Rate	56.6 k MAX	19.2 k MAX	115200 MAX
Modbus TCP/IP			√ - Based on Order Code
Modbus RTU	√	√	√
Profibus Protocol			√ - Based on Order Code
Devicenet Protocol			√ - Based on Order Code
Modbus User Memory Map		√	√
Simple Network Timesync Protocol (SNTP)			√ - Based on Order Code
Number of Start Types		See Starter Type Table	
Undervoltage Auto Restart	√	√	√ - Based on Order Code
Reduced Voltage Starting	√	√	√

## Starter Type Comparison

STARTER TYPE	MM3	MM2	MM300
Full Voltage Non-Reversing Starter	√	√	√
Full Voltage Reversing Starter	√	√	√
Two-Speed Starter	√	√	√
Wye - Delta Open Transition Starter	√	√	√
Wye - Delta Closed Transition	√	√	√ - For configuration information, consult regional sales team or factory directly
Inverter Starter - VFD & VSD - Variable Frequency Drives / Variable Speed Drives			√
Soft Starter	√	√	√
Autotransformer Open Transition Starter	√	√	√
Autotransformer Closed Transition Starter	√	√	√
Customer Starter - Provided to match Other Non-popular Starter Types			√ - For configuration information, consult regional sales team or factory directly
Slip Ring Starter	√	√	√ - For configuration information, consult regional sales team or factory directly
Part Winding Starter	√	√	√ - For configuration information, consult regional sales team or factory directly
Duty / Stand-by Starter	√	√	√ - For configuration information, consult regional sales team or factory directly

\* Note: With certain Starter Types, the Undervoltage Autorestart feature may not be available in MM300.

For further details on the MM300 Motor Management System, visit GE's web site at [GEGridSolutions.com/Protection\\_Control.htm](http://GEGridSolutions.com/Protection_Control.htm) where you can download the MM300 brochure with complete order codes, the MM300 instruction manual, and details about the EnerVista suite of setup and monitoring software tools.

## Overload Curve Comparison

CURVE NUMBERS													
MM2	1	2	3	4	5	6	7	8	Class 10	Class 15	Class 20	Class 30	
MM3	1	2	3	4	5	6	7	8	Class 10	Class 15	Class 20	Class 30	
MM300	1	2	3	4	7	9	12	15	4	6	8	12	

## ANSI Device Numbers & Functions

MM3		MM2		MM300	
DEVICE#	FUNCTION	DEVICE#	FUNCTION	DEVICE#	FUNCTION
49/51	Three Phase Overload Protection	49	Overload	27AUX	Undervoltage - Auxiliary Input
46	Phase Unbalance Welded / Open Contactor	46	Phase Unbalance (Single-phase welded/ open contactor)	27	Undervoltage - Three Phase
50G/51G	Ground Fault Trips	50G/51G	Ground Fault	37	Undercurrent/Underpower
48	Stalled Rotor Protection	51R	Locked Rotor/Stalled Rotor	38	Bearing Temperature RTD
	Display kW and kWh	49	Hot Winding (thermistor)	46	Current Unbalance
37	Undercurrent / Underpower	37	Undercurrent/Underpower	47	Voltage Phase Reversal
59	Overvoltage	27P	Undervoltage	49	Thermal Overload
27	Undervoltage	59P	Overvoltage	50G	Ground Instantaneous Overcurrent
				51G	Ground Time Overcurrent
				51R	Locked/Stalled Rotor/Mechanical Jam
				59	Overvoltage - Three Phase
				66	Starts/Hour & Time Between Starts

For a feature comparison of all available GE Protection & Control devices, visit our selector guide at: [www.GEGridSolutions.com/multilin/selector](http://www.GEGridSolutions.com/multilin/selector)

## MM2 to MM300 Ordering

MM2	*	*	*	*	MM300 Matching Order Codes
Base Unit	MM2				Basic unit MM300
Mounting	PD				G: Graphical Control Panel with USB
	C				X: No control panel or display
Option 1		1			Suggested order code based on the example: MM300-GEHS-1-C-A-C-C-X-X S: RS485 Modbus RTU (standard) 1: Standard control & event recorder + undervoltage autorestart C: 2 × 10 A Relay form A + 6 × Digital Input 60 – 300 VAC A: 3-phase current and thermal O/L, undercurrent, single phase underpower  (18 inputs total)  Note: An analog input option is not available with MM300
			2		Suggested order code for both examples: MM300-GEHS-1-C-A-C-X-X-X S: RS485 Modbus RTU (standard) 1: Standard control & event recorder + undervoltage autorestart C: 2 × 10 A Relay form A + 6 × Digital Input 60 – 300 VAC A: 3-phase current and thermal O/L, undercurrent, single phase underpower  (12 inputs total)  Note: An analog input option is not available with MM300
Option 2				2	
Control Power		120	120	240	120 V AC Control Voltage 240 V AC Control Voltage  H: 60 – 300 - VAC (80 – 250 VDC) H: 60 – 300 - VAC (80 – 250 VDC)

Notes: If **MOD 603** - ESD (Emergency Shut Down Relay) is used in the MM2, then the MM300 Order Code should include Flexlogic (option 3), and Expansion Modules D and E. Other MM2 and MM3 MODs may be available for MM300 units. Please contact the factory for more information.

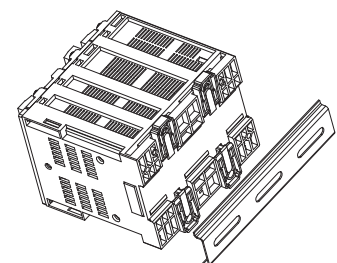
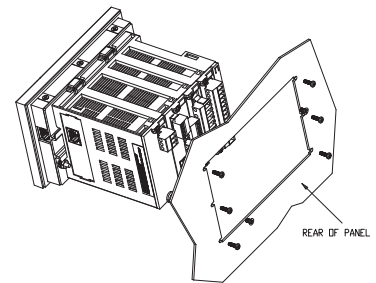
### Sample Order Codes

MM2 ORDER CODE	MM300 ORDER CODE
MM2-C-1-0-120/240 (14 inputs)	MM300-XEHS-1-C-A-C-C-X-X
MM2-C-0-2-120/240 (8 inputs)	MM300-XEHS-1-C-A-C-X-X-X
MM2-PD-1-2-120/240 (16 inputs)	MM300-GEHS-1-C-A-C-C-X-X

The MM300 can be mounted on a standard panel mount or DIN rail mount (or screw mount for high vibration environments). When replacing an MM2 unit, a panel mount is suggested.

### MM2 Option Comparison

	STANDARD	OPTION 1 ADDS	OPTION 2 ADDS
Protection & Control	OVERLOAD (49/51) PHASE UNBALANCE (46) WELDED/OPEN CONTACTOR	UNDERVOLTAGE AUTO RESTART	GROUND FAULT (50G/51G), RAPID TRIP LOCKED/STALLED ROTOR (48) OVERTEMPERATURE THERMISTOR (49) UNDERCURRENT/UNDERPOWER (37) OVERVOLTAGE (59)/UNDERVOLTAGE (27)
Inputs	4 Control 2 Programmable	8 Programmable 1 Analog	2 Control Thermistor Input  Single-phase voltage input for kW and kWh
Relays Mounting Configurations	Contactant control (A) Chassis Mount	Auxiliary 1 and 2 Chassis Mount	Contactant control (B) Chassis Mount
	Panel mount with display available when both options are ordered		



## MM3 to MM300 Ordering

	MM3	*	*	*	*	MM300 Matching Order Codes
Base Unit	MM3					Basic unit MM300
Option 1	1					1: Basic Unit Example: MM3-1-E-W-240 Protection: Three Phase Overload Protection, Phase Unbalance, Welded / Open Contactor, Ground Fault Trips, Stalled Rotor Protection Display kW and kWh, Undercurrent / Underpower, Overvoltage, Undervoltage Inputs: 4 Control Inputs, 2 Programmable Inputs Relays: Contactor A, Aux 1, Aux 2 or ESD Relay Suggested order code based on the example: MM300-GEHS-S-C-A-C-E-X (Any MM300 with one Expansion Module C meets all input requirements.) C: 2 × 10 A Relay form A + 6 × Digital Input 60 – 300 VAC Note: An analog input option is not available with the MM300
Option 2	2					2: Full Unit Example: MM3-2-E-N-120 Protection: Three Phase Overload Protection, Phase Unbalance, Welded / Open Contactor, Ground Fault Trips, Stalled Rotor Protection Display kW and kWh, Undercurrent / Underpower, Overvoltage, Undervoltage Inputs: 6 Control Inputs, 10 Programmable Inputs, Thermistor Input, Analog-in Input, Analog Output Relays: Contactor A, Contactor A , Aux 1, Aux 2 or ESD Relay Suggested order code based on the example: MM300-XEHS-S-C-A-C-C-E-X (Any MM300 with three Expansion Module C options meets all input requirements.) C: 2 × 10 A Relay form A + 6 × Digital Input 60 – 300 VAC Note: An analog input option is not available with the MM300
				E		E: ESD (Emergency Shut Down) Relay ESD is used to determine whether a STOP is due to an Emergency. The ESD relay can only be energized and de-energized via terminals 34 & 35.  The MM3 determines an ESD stop by monitoring the status of the ESD relay and the motor contactors via feedback into the Contactor A Status and Contactor B Status terminals. If either of the motor contactors drop out at the same time as the ESD de-energizes, an ESD stop occurs and the MM3 displays the message "ESD STOP". The ESD Output can be set as "Latched" or "Unlatched". In MM300, output latching is achieved through Flexlogic programming. The MM300 Order Code should include Flexlogic (option 3), and Expansion Modules D and E. For example: MM300-GEHS-3-C-A-C-C-E-D 3: Standard control & event recorder + undervoltage autorestart + waveform capture & datalogger + FlexLogic™ D: 4 × 10A form-C relays (Expansion Slot C) E: 2 × 10A form-A relays and six (6) 20 to 60V DC digital Inputs (Expansion Slot D) Note: An analog input option is not available with the MM300
				A		A: Auxiliary 2 Relay Example: MM3-1-A-W-240  The AUX 2 relay can be internally energized by the MM3, or externally energized by applying a +24 V DC signal to these terminals. Correct polarity is required. In an MM300, there is no direct way to energize an output relay by applying 24 V DC Voltage. Instead this is achieved by using a DC Input whose closure results in closing an output relay. Suggested order codes based on the example: MM300-GEHS-S-C-A-C-C-E-D If AUX2 Relay is externally operated MM300-GEHS-S-C-A-C-C-D-X If AUX2 Relay is internally operated For an external wet (24 V DC) Aux 2 Relay, use Expansion Module E. If the Aux 2 is internally operated (by the MM3 CPU), Expansion Module D is adequate. Note: An analog input option is not available with the MM300
Display				W N		W: With Local Display N: No Display (chassis unit) G: Graphical Control Panel with USB X: No control panel
Control Power			120 240			20 VAC Control Voltage 240 VAC Control Voltage H: 60 – 300 – VAC (80 – 250 VDC) H: 60 – 300 – VAC (80 – 250 VDC)

Notes: The MM3 the Maximum AC Voltage that can be applied to Input / Output Modules is 380 V AC; In MM300 this limit is 300 V AC.

The MM3 does not have CT Inputs. Instead it sniffs Motor Power Supply through its built-in CT Module. The MM3 CT Module can "sniff" the motor full load amperage up to a maximum of 250 Amps. Therefore, when MM3 is replaced with MM300s, CTs also need to be introduced into the system.

MM2 and MM3 MODs may be available for MM300 units. Please contact the factory for more information.

The MM300 can be mounted on a standard panel mount or DIN rail mount (or screw mount for high vibration environments). When replacing an MM3 unit, a DIN rail mount is suggested.

