

LM10 to MM200 Retrofit

Replace old LM10 Motor Controller relays with the Multilin™ MM200 Motor Management System

The LM10 Motor Controller (discontinued in 2013) has been replaced by new generation MM200 Motor Controllers. The Multilin MM200 is a digital motor protection and control system, designed for low voltage motor applications that integrates protection, control and multiple communication protocols in a rugged compact device. Easily integrated into new and existing control system architectures, the Multilin MM200 provides comprehensive low voltage motor protection and communications for all types of motor protection applications.

Key Benefits

- Flexible protection, control, and communication options to suit low voltage motor applications
- Small footprint designed specifically for IEC and NEMA MCC applications
- Integrated pushbuttons and LED indicators reduce external components and wiring
- Flexible DIN rail mounting
- Multiple communication protocols allow simple integration into monitoring and control systems.
- Optional control panel provides local control
- 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 Motors
- MCC and standalone Panel Mount Applications
- IEC and NEMA Motor Control Center (MCCs)
- Process control applications
- System architecture requiring multiple simultaneous communications
- FVNR, FVR, two speed



Protection and Control

- Protection and Control
- Motor Thermal Model
- Undercurrent & Current Unbalance
- Acceleration Time, Sensitive Ground Fault
- Built-in Starter Logic; FVNR, FVR, Two-Speed
- Auto / Manual Control, Configurable Inputs
- Power Fail Restart

Metering & Monitoring

- Current, Motor Loads, Thermal Capacity
- Motor Running Time, Cause of Trip, Total Number of Trips
- 1A / 5A combined CT inputs

Communications

- Networking through RS485
- ModBus RTU, DeviceNet & ProfiBus
- ODVA Certified DeviceNet and ProfiBus Network powered by external (preferred) or internal power
- Simultaneous Communications
- Easy Integration with MM200/MM300 Setup Program
- GE ViewPoint Monitor™ Software for Easy Motor Controls
- Connect to the Graphical Control Panel HHD

EnerVista™ Software

- Simplify setup and configuration
- Strong document archive and management system
- Simplify full-featured monitoring and data recording
- Strong maintenance and troubleshooting tool
- Seamless integration toolkit



Specifications - LM10 & MM200

DEVICE DESCRIPTION	LM10 MODULAR MOTOR CONTROLLER	MM200 MOTOR CONTROLLER
BASIC SPECIFICATIONS		
Protection Class	NEMA class 10, 15, 20 and 30, hot and cold	10, 15, 20, 30 (selectable)
Starter Types	FVNR, FVR, RV, 2S1W, 2S2W, custom	FVNR; FVR & Two Speed
Ambient Compensation	No	Yes with Thermistor Biasing
Phase Loss Protection	Yes	Yes
Phase Unbalance	Yes	Yes
Ground Fault	Yes	Yes
Self Powered	Power from Starter CPT	For AC Inputs: No (Power from starter CPT recommended) For DC Inputs (Low Power Option): Yes
FLA Adjustable Range	0.05 to 8 × CT Primary (3200.0 A max.)	0.5 to 1000 FLA in steps of 0.1
Reset Mode	Manual & Automatic	Manual & Automatic
Trip Test	Manual & Automatic	Manual & Automatic
Trip Indication	Unit LEDs/User Interface - PDU/SCADA	LED/User Interface/SCADA
Operating Temp. Range	Operating temp: 0 to 60°C	Operating temp: -20°C to +60°C Storage temp: -30 to 80°C Humidity: up to 95% noncondensing
Communications	DeviceNet only	<ul style="list-style-type: none"> • Modbus RTU • Modbus RTU + Profibus DP • Modbus RTU + DeviceNet
PLC Compatible Contacts	Yes	Yes
Aux. Contacts	4 on-board Form-C Relays with NEMA C150 Pilot Duty Ratings	Two Form A Types for Controlling & One Form C
Mounting	Flexible Three Different Mounting Options	Din-Rail Panel Mount

Notes:

The LM10 Motor Controller System supported Voltage Signal Based Sensor CT Packs using two sets of CTs connected to separate CT terminals. In MM200, this is achieved by connecting two separate sets of CTs to the same CT Terminals.

MM200 does not support CT sensor packs.

MM200 Relay Options

B: Basic Control Panel

L: 24 VDC

H: 60-300 VAC

1. RS485 Modbus RTU + DeviceNet Slave
2. RS485 Modbus RTU + Profibus DP Slave

HHD (Hand Held Display): a graphical control panel used to control, monitor, and enter setpoints manually

For further details on the MM200 Motor Management System, visit GE Multilin's web site at www.GEMultilin.com where you can download the MM200 brochure with complete order codes, the MM200 instruction manual, and details about the EnerVista suite of setup and monitoring software tools.

Specifications - LM10 & MM200

DEVICE DESCRIPTION	LM10	MM200
PROTECTION		
Thermal Model (49)		
Custom programmable overload curves		
IOC, Ground (50G)	√	√
TOC, Phase (51P)	√	
Jam Protection (51R)	√	√
Stall Protection	√	
Phase Overvoltage (59P)	√	
Phase Under-voltage (27P)	√	
Power Loss/Under-voltage Auto-restart (27/79)	√	Power Failure Restart (PFR) is available
Undercurrent/Under-power (37)	√	√
Current Unbalance (46)	√	√
Frequency (81)	√	√
Power Factor (55)	√	√
Reduced Voltage Start (19)	√	√
Remote Start/Stop via Communications	√	√
Start Inhibit		√
Emergency Start	√	√
Two-speed motor protection	√	√
Learned motor data	√	√

BASIC

Control Power	120 V AC	(H) 65 - 300 V AC / 84 - 250 V DC (L) 24 V DC
LCD Display	4 line 16 character small display with a keypad	1. none 2. optional HHD 3. Basic Control Panel available

OVERLOAD CURVE COMPARISON

LM10 (NEMA curve) MM200 (curve multiplier)	Class 10	Class15	Class 20	Class 30
	4	6	8	12

For a feature comparison of all available GE Multilin relays, visit our selector guide at: www.gegridsolutions.com/multilin/selector

DEVICE DESCRIPTION	LM10	MM200
CONTROL		
Remote Display	√	√
Power Supply	AC Only	AC/DC
CT Inputs	Designed for 5 Amp; Adjustable to 1 Amp for Voltage based Current Sensor Packs	5/1 A
Self-Test Failure Contact		
Contact Inputs	7	6
LCD Display with Keypad	√	√ - Yes with HHD
Basic Control Panel (No Writing)		√
User-Programmable LEDs		√
Thermistor Inputs		√
Event Recorder (in form of trip counter)	Last 10 trips	Last trip

MONITORING & METERING SPECIFICATIONS

Power Factor	√	
Thermal Capacity Used		√
Current - RMS	√	√
Current - Unbalance	√	√
Current - Ground Leakage	√	√
Voltage - RMS	√	
Power - Apparent, Real, Reactive Active	Active	

ENVIRONMENT & MECHANICAL SPECIFICATIONS

Operating Temperature Range - Minimum °C	0°	-20°
Operating Temperature Range - Maximum °C	60°	60°
Humidity	Up to 95% noncondensing	Up to 95% noncondensing

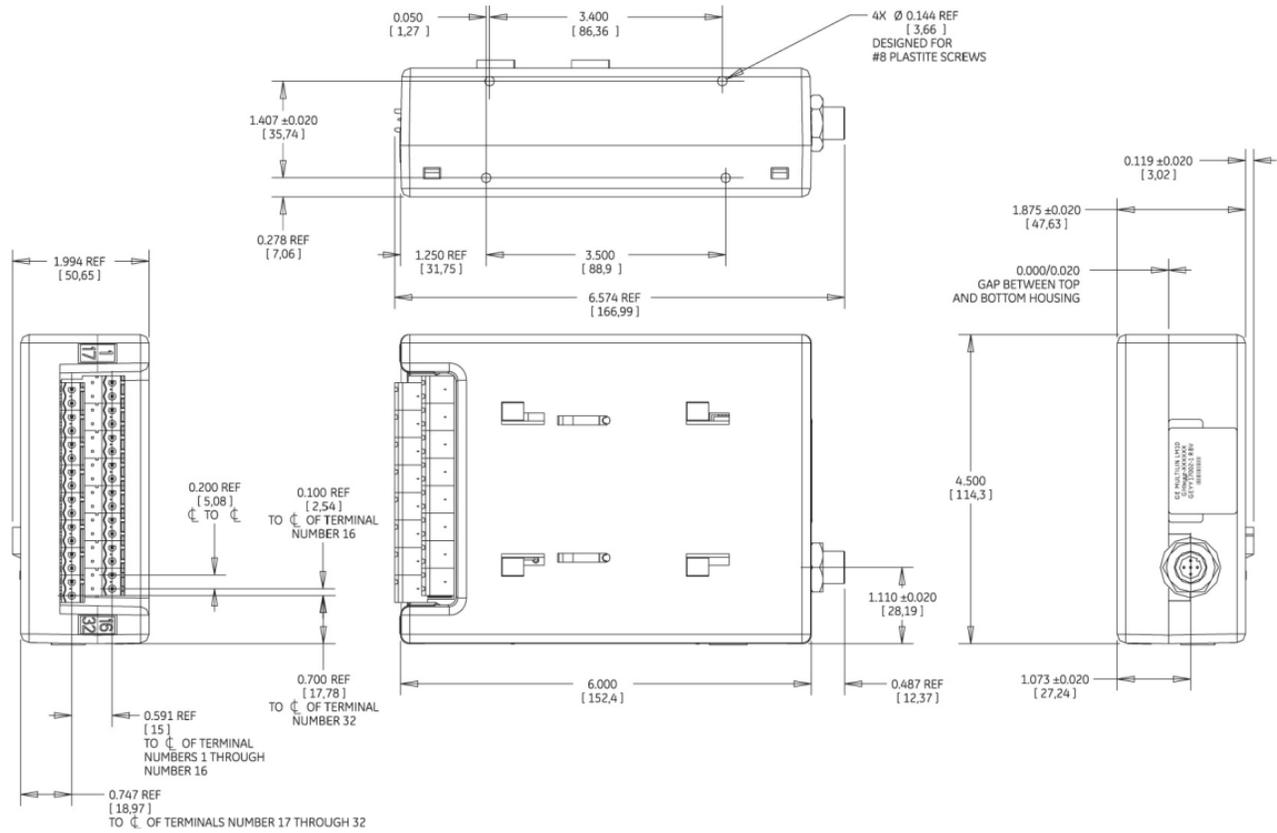
COMMUNICATION SPECIFICATIONS

Interface Program	√	√
RS232 Port	√	√
RS485 Port		√
Communication Baud Rates	125kbps; 250kbps or 500kbps	9600; 19200; 38400; 57600 or 115,200
ModBus Protocol		√
ModBus User Map		√
Profibus Port		√
Device Net	√	√
USB Port		√ - Yes with HHD

Specifications - LM10 & MM200

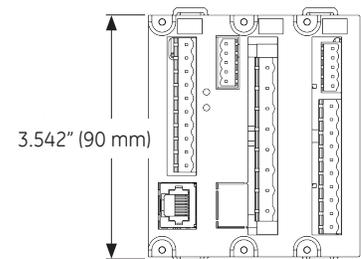
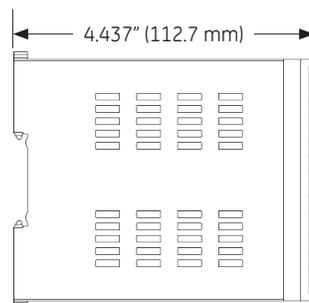
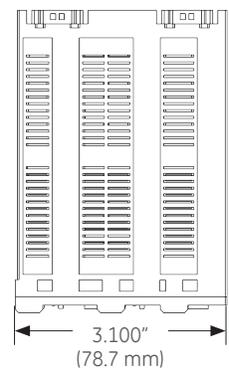
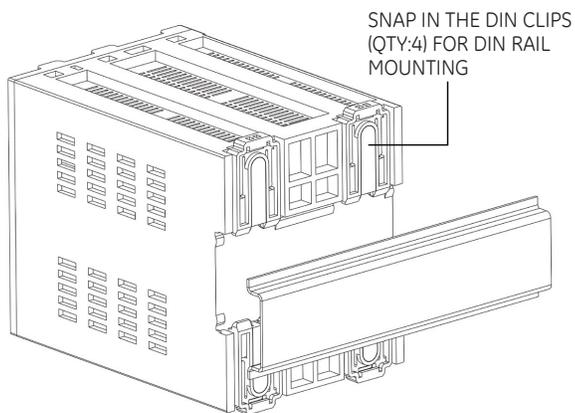
LM10 Dimensions

Existing LM10 relays may be mounted using a mounting plate, mounting bracket, or door mount cutout.



MM200 Dimensions & Mounting

MM200 relays are DIN rail mounted, as shown. The DIN rail conforms to EN 50022.



Terminal Mappings LM10 to MM200

LM10 #	LM10 DESCRIPTION	MM200 #	MM200 DESCRIPTION		
Control Connection Terminals	Upper Signal Row	1	Live Connection - 120 V AC	PSU - L	PSU
		2	Neutral Connection	PSU - N*	Voltage Terminal - Phase A
		3	Switch Input - STOP	A2 to A5 - (Any Input)	Switch Input
		4	Switch Input - RESET	A2 to A5 - (Any Input)	Switch Input
		5	Switch Input Common	NR*	Neutral Return
		6	Relay 1 - Normally Open - Run	C1	Contact Output 1 - Normally Open - Run
		7	Relay 1 - Common - Run	C2	Contact Output 1 - Common - Run
		8	Chasis Ground	PSU - GROUND*	Neutral Terminal - Control Power
		9	Relay 2 - Normally Open - Run	C3	Contact Output 2 - Normally Open - Run
		10	Ground Fault Relay - Normally Closed	Not Required in MM200	MM200 uses Contact Output 1 or 2 based on the Settings
		11	Relay 2 - Common - Run	C4	Contact Output 2 - Common - Run
		12	CT Input - Set 1 - 5 Amps - Phase B	B5	Phase B - 5 Amps or 1 Amp - CT Terminal
		13	CT Input - Set 1 - 5 Amps - Phase A	B3	Phase A - 5 Amps or 1 Amp - CT Terminal
		14	CT Input - Set 1 - 5 Amps - Phase C	B7	Phase C - 5 Amps or 1 Amp - CT Terminal
		15	CT Input - Set 1 - 5 Amps CT - Common	B4, B6 & B8	Phase A, B & C CT Commons respectively
		16	Ground CT - 1 Amp Secondary or 20 : 0.2 Amp Type Only	50:0.025 CT Connection is required	MM200 supports 50:0.025 Type CBCTs
	Lower Signal Row	17	Switch Input - Auxiliary 2	A2	Switch Input - Contactor B - Feedback
		18	Switch Input - Auxiliary 1	A1	Switch Input - Contactor A - Feedback
		19	Switch Input - Run 2	A2 to A5 - (Any Input)	Switch Input
		20	Switch Input Run 1	A2 to A5 - (Any Input)	Switch Input
		21	Switch Input - DedviceNet Control	Not Required in MM200	Order Code based feature supported by Settings
		22	Ground Fault Relay - Normally Open	Not Required in MM200	MM200 uses Contact Output 1 or 2 based on the Settings
		23	Ground Fault Relay - Common	Not Required in MM200	MM200 uses Contact Output 1 or 2 based on the Settings
		24	Programmable Relay - Normally Open	C5	Contact Output 3 - Normally Open Contact
		25	Programmable Relay - Normally Close	C7	Contact Output 3 - Normally Close Contact
		26	Programmable Relay - Common	C6	Contact Output 3 - Common Terminal
		27	CT Input - Set 2 - 5 Amps - Phase B	B5	Phase B - 5 Amps or 1 Amp - CT Terminal
		28	CT Input - Set 2 - 5 Amps - Phase A	B3	Phase A - 5 Amps or 1 Amp - CT Terminal
		29	CT Input - Set 2 - 5 Amps - Phase C	B7	Phase C - 5 Amps or 1 Amp - CT Terminal
		30	CT Input - Set 2 - 5 Amps CT - Common	B4, B6 & B8	Phase A, B & C CT Commons respectively
		31	No Connection	Not Required in MM200	Not Required
		32	Ground CT - 1 Amp Secondary or 20 : 0.2 Amp Type Only	50:0.025 CT Connection is required	MM200 supports 50:0.025 Type CBCTs
Sensor Pack Inputs	Sensor Pack - 01	1	Phase A - CT	Not Supported in MM200	MM200 does not accept Voltage Input based Sensor Packs
		2	Phase B - CT		
		3	Phase C - CT		
		4	Phase A - CT - Common		
		5	Phase B - CT - Common		
		6	Phase C - CT - Common		
	Sensor Pack - 02	1	Phase A - CT		
		2	Phase B - CT		
		3	Phase C - CT		
		4	Phase A - CT - Common		
		5	Phase B - CT - Common		
		6	Phase C - CT - Common		

Note: * Indicates MM200 retrofit terminals selected under the assumption a CPT with Non-Polarity Secondary (Neutral) is grounded and fed to both Neutral and Ground Terminals of the LM10 Relay.

GE's Projects and Professional Service

GE has developed a Professional Services Process . The process is comprehensive, application specific, and includes customer collaboration for successful project implementation. GE's Professional Services Process is based on a common set of building blocks, utilized and tailored for each customer's unique communication network requirements. While GE uses well documented and repeatable processes, we realize that flexibility is also key to accommodate our customer's specific requirements and needs unique to their environment.

Dedicated Project Management

GE assigns a project manager at the beginning of each project to lead the team throughout the project lifecycle. The project manager acts as an extension of the customer's team to coordinate and drive all aspects of the project to a successful outcome.

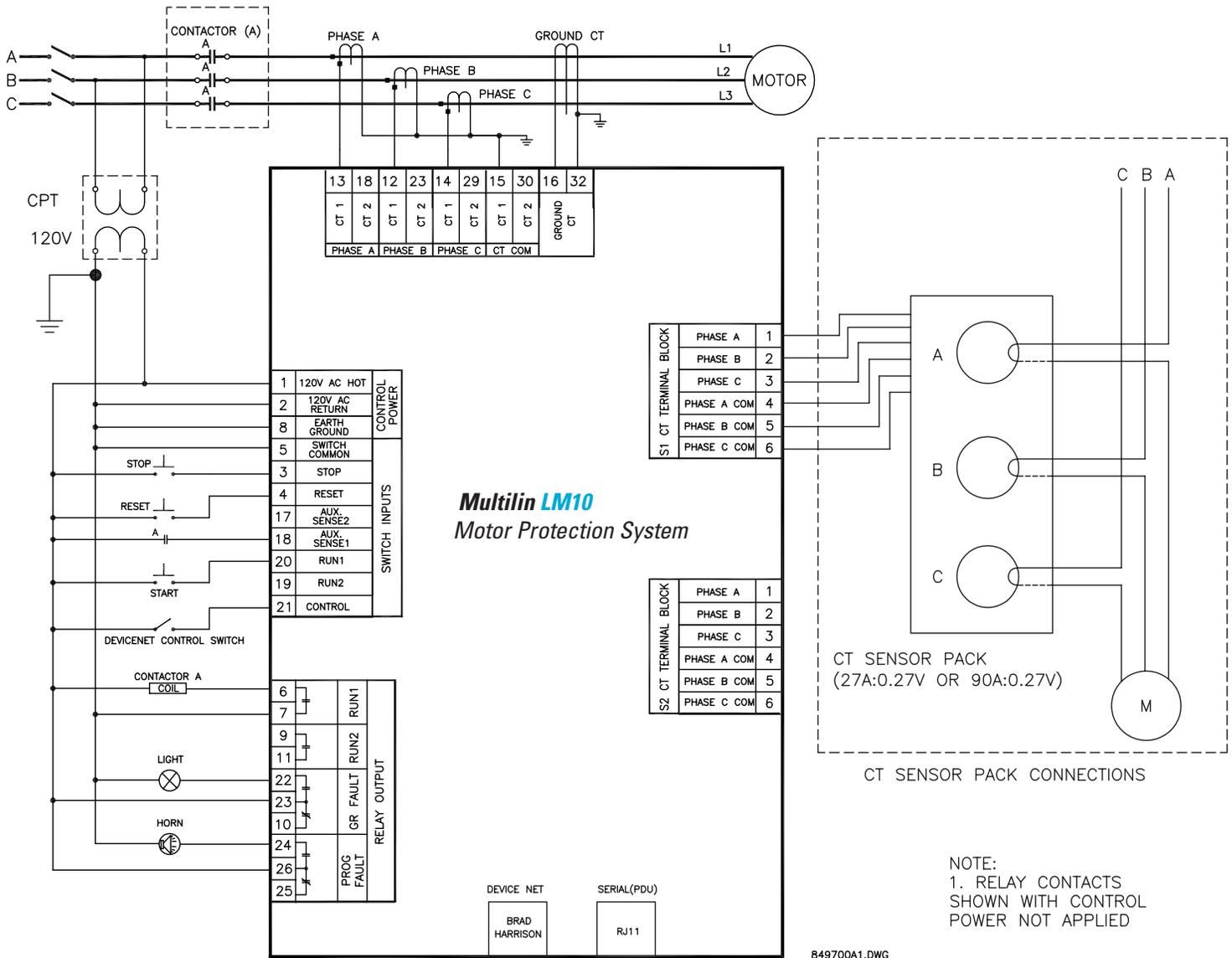
Global Capabilities

GE's dedicated engineering teams are located in regions around the world and bring a wealth of international experience to every project. Customers benefit from GE's local systems subject matter experts who drive compliance with regional/local requirements ensuring our customers business and technical objectives are met. GE has an excellent track record in planning, executing and delivering a broad range of projects. GE's systems subject matter experts work in state-of-the-art facilities that include design, research and development, manufacturing and testing capabilities. Customer are supported with 24/7 field and application support.

Professional Services Offerings and Activities

Conventional Control Systems <ul style="list-style-type: none"> • Packaged Solutions • Protection Panels Projects • RTU Centric Panel Engineering 	<ul style="list-style-type: none"> • Standard pre-designed protection and RTU panels • Design to specification protection and control panels • Legacy retrofit solutions • Protection and Control System design • Drop in Control House
Digital Control Systems <ul style="list-style-type: none"> • Substation Automation Engineering Substation Automation Projects • Integrated Energy Management Systems • Microgrids 	<ul style="list-style-type: none"> • Automation and Protection project design and build • Local HMI through complex substation SCADA Solutions • WAMS / Synchrophasers Implementation • Integrated Energy Monitoring Systems implementation and custom applications • RTU upgrade engineering
Technical Expertise	<ul style="list-style-type: none"> • Power system studies • System setting studies • Real Time Digital Simulation and modelling • Complex system design (Fast Load Shedding, Remedial Action Schemes, Synchrophasor and Microgrid Project Design) • NERC Compliance Support • Modified field drawings • Setting and configuration • Monitoring & Diagnostic, Process Bus Consulting Services
Technical Services	<ul style="list-style-type: none"> • Training • Commissioning & Field Service • Maintenance Contracts • Life Cycle Management Services • Designed, build and tested in house with customer settings if needed

LM10 Typical Wiring Diagram



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