

## MM3010 Series (96x96) Operating Instructions



### SAFETY PRECAUTIONS

This manual is meant for personnel involved in wiring, installation, operation and routine maintenance of the equipment. All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure operator and instrument safety. Any misuse may impair the protection provided by the equipment.

**CAUTION:** Read complete instructions prior to installation and operation of the unit.

**CAUTION:** Risk of electric shock.

### INSTALLATION INSTRUCTIONS

#### CAUTION

- This equipment, being built-in-type, normally becomes a part of the main control panel and the terminals do not remain accessible to the user after installation.
- Conductors must not come in contact with the internal circuitry of the equipment else it may lead to a safety hazard that may endanger life or cause electrical shock to the operator.
- Circuit breaker or mains switch must be installed between the power source and supply terminals to facilitate power 'ON' or 'OFF' function.
- The equipment shall not be installed in environmental conditions other than those specified in this manual.
- The equipment does not contain a built-in fuse. Installation of external fuse rated 275VAC/1A is recommended.
- Since this equipment forms part of the main control panel, its output terminals get connected to the host equipment. Such equipment shall also comply to EMI/EMC and safety requirements like BS EN 613261 and BS EN 61010.
- Thermal dissipation of equipment is met through ventilation holes provided on housing of equipment. Obstruction of these ventilation holes may lead to a safety hazard.
- The output terminals shall be loaded strictly as per the values/range specified by the manufacturer.

### ELECTRICAL PRECAUTIONS DURING USE

Electrical noise generated by switching of inductive loads can create momentary disruption, erratic display, latch up, data loss or permanent damage to the instrument. To reduce noise:

A) Use of MOV / Snubber circuit across load / Contactors of the unit and snubber circuits across the load are recommended.

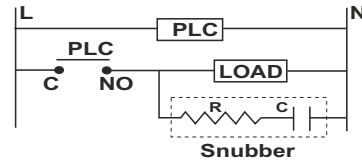
- MOV Part no.: AP-MOV-03
- Snubber Part no.: APRC-01.

### CAUTION

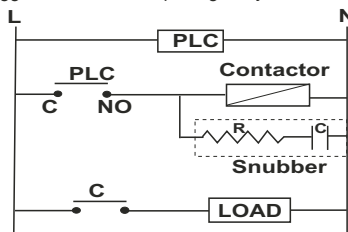
**Note:** Below mentioned diagram is applicable only for PLC's and Relay Outputs.

### TYPICAL CONNECTIONS FOR LOADS :

For load current < 0.5A



For bigger loads use interposing relay/contactor

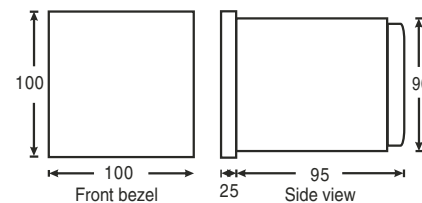


**NOTE:** Use snubber as shown above to increase life of internal relay.

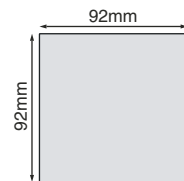
B) Use separate shielded wires for inputs.

### MECHANICAL INSTALLATION

#### Outline dimensions (in mm)



#### Panel Cutout (in mm)



For installing the controller

- Prepare the panel cutout with proper dimensions as shown above.
- Remove the clamp from the PLC.
- Fix the unit into the cutout. Insert the clamp from both sides and tighten the screws.

### CAUTION

The equipment in its installed state must not come in close proximity to any heating sources, caustic vapors, oils, steam, or other unwanted process byproducts.

#### EMC Guidelines:

- Use proper input power cables with shortest connections and twisted type.
- Layout of connecting cables shall be away from any internal EMI source.

#### MAINTENANCE

- To avoid blockage of ventilation holes, clean the equipment regularly using a soft cloth.
- Do not use Isopropyl alcohol or any other organic solvents for cleaning.

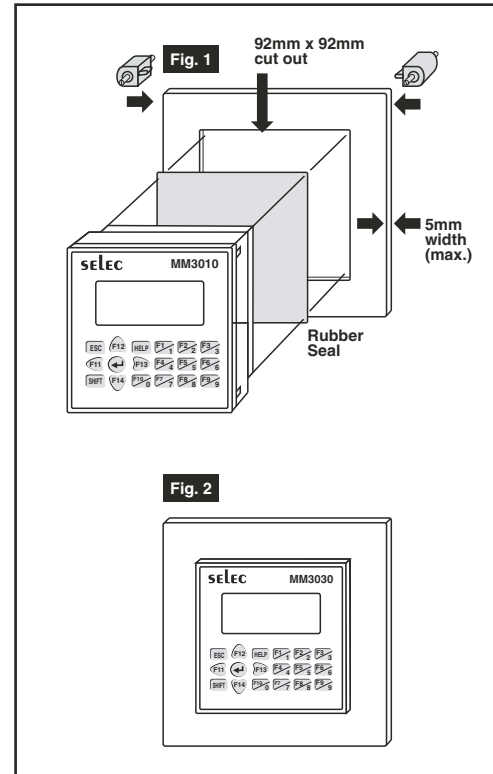
### WIRING INSTRUCTIONS

#### CAUTION

- To prevent risk of electric shock, power supply to the equipment must be kept OFF while wiring.
- Terminals and electrically charged parts must not be touched when the power is ON.
- Wiring shall be done strictly according to the terminal layout provided in the operating manual.
- To eliminate electromagnetic interference use short wire with adequate ratings and twists of equal size.
- The power supply connection cable must have a cross section of 1sq.mm or greater and insulation capacity of atleast 1.5KV.

### MOUNTING

#### PANEL MOUNTING



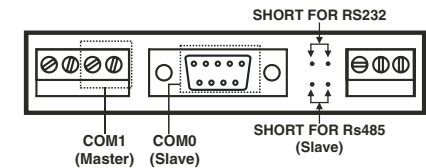
- Before you begin, note that the mounting panel cannot be thicker than 5 mm (0.197").
- Make a panel cut-out measuring 92mm x 92mm (3.622" x 3.622").
- Slide the controller into the cut-out, ensuring that the rubber seal is in place.
- Push the 2 mounting brackets into their slots on the sides of the controller as shown in Fig. 1.
- Tighten the bracket screws against the panel. Hold the bracket securely against the unit while tightening the screw.
- When properly mounted, the controller is squarely situated in the panel cut out as shown in Fig. 2.

### COMMUNICATION

**While making communication connections, make sure that the power supply to the unit is OFF.**

MM3010 has 2 serial communication ports:

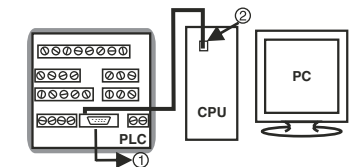
- COM0 (SLAVE)
  - COM1 (MASTER)
- COM0 - RS232 / RS485 (switchable): This port can be used as RS232 / RS485 depending on the jumper selection made provided on rear side. Jumper selections for RS232 & RS485 are as shown below:



When configured as RS232, COM0 is used for:

- To download application program from PC to PLC.
- For Online simulation
- For Standard modbus communication of all the user defined variables in ladder; PLC acting as a slave device. The modbus variable table is generated by the ladder editor and can be viewed on demand.
- To upload ladder

When configured as RS485, COM0 is used to create a communication network between devices supporting MODBUS/RTU.



2. COM1 - RS485

This port is used to create a multi-drop communication network between devices supporting MODBUS/RTU. Upto 255 (Slave ID - 1 to 255) such devices can be connected in the network.

Continue

## ORDERING INFORMATION

MM3010



Choose from Legend

LEGEND		
Slots	Cards	Order Code
C1 Digital Input Cards	8 Digital Input	DI08
	13 Digital Input	DI13
	19 Digital Input + 1 Quad	DIQ19
C2 Digital output Cards	8 Digital Output (Relay type)	DR08
	11 Digital Output (Relay type)	DR11
	14 Transistor Output, PNP, 100mA	DT14
C3 Digital / Analog Mixed I/ Other Cards	Digital Mixed I/O : 8DI + 4DO	MD-I08, R04
	6 channel Analog I/P (TC / RTD type)	AI-06, TC/RTD
	6 channel Analog I/P (Voltage / Current type)	AI-06, V/I
	2 Channel Analog I/P (Universal type)	AI-02
	Analog Mixed I/O : 4AI + 2AO 4AI (Universal I/P) - Set internal Jumpers (Default TC/RTD) 2AO (Factory set-to be specified while ordering (0-10V/0-20mA)	MA-I04, O02
C4 Power Supply	85 to 270V AC/DC	270 V
	24V DC	24V DC

## ORDERING INFORMATION

### ACCESSORIES (to be ordered separately)

Communication cable:  
Part no. - ACH - 001.

Windows-based software for ladder programming:  
Part no. - ACD-003

Four Relay module  
Part no. - AR - 04 - 5A - NONC

Power Supply module  
Part No. Part no – AP-24V-500mA-NS131

RS485 to RS232 converter  
Part no. - AC - RS485 - RS232 - 01 ( Non Isolated )  
Part no. - AC - RS485 - RS232 - ISO ( Isolated )

### Ordering information for IO610

IO610-8DI (8 Digital inputs)

IO610-4RO (4 Relay Outputs)

IO610-4TO (4 Transistor Outputs)

IO610-2AI-VI (2 Analog inputs (Voltage / Current)

IO610-2AI-TCR (2 Analog inputs (TC/RTD)

IO610-2AO (2 Analog Outputs)

### ? SERVICE DETAILS

This device contains no user serviceable parts and requires special equipment and specialized engineers for repair. Please contact service center for repair on the following numbers:

NO WARRANTY ON UNIT DAMAGED DUE TO WRONG POWER SUPPLY.



**FEATURES**

- Compact PLC with built-in HMI.
- 4 x 16 line character LCD display.
- User friendly Windows based software for ladder programming and HMI configuration
- Online parameter setting.
- Battery back up and RTC available
- RS 485 based communication with MODBUS protocol.

SPECIFICATIONS	
Display	LCD (backlight) 4 line x 16 character Font Size 5 x 7
No. of Keys	18 (10 numeric keys)
No. of Configurable Keys	14

DIGITAL SECTION	
No. of Digital Inputs	Dependent on card selection
Input Type	PNP
Input Voltage Range	11-28V DC (abs. max.: 30V DC)
Response Time (Inputs other than fast counter)	Programmable upto 1 to 255ms from Front End (Default 10ms)(Also depends on ladder execution time)
Isolation	2kV

FAST COUNTER INPUT	
Input Type	NPN (Applicable for 19 DIQ Card only)
Operating Modes / Frequency	Bidirectional, Unidirectional : 7.5khz, Quadrature : 2.5 khz
Maximum Count	10 digits

DIGITAL OUTPUT	
No. of Relay / Transistor Output	Relay / Transistor Dependent on card selection

Relay (NO Type)	
Contact Rating	4ch / 8ch: 5 A resistive @ 240V AC 11ch: 3 A resistive @ 240V AC
Min. Switching Time	1 ms (or as per Ladder Scan Time)
Isolation	2 kV

TRANSISTOR	
Transistorised Output Rating	For 4 / 8 / 11 Channels : NPN Type : 24V, 50 mA For 14 Channels : PNP Type : 24 V,100 mA

ANALOG SECTION	
ANALOG INPUT (Applicable in 4AI-2AO Card)	
No of Inputs / Type	Dependent on card selection
Sensors	J, K, T, R, S, C, V, D, N, L, U, W, PLTNL, RTD,MVOLT, VOLT (0-10 V),CURR (0-20 mA)
Resolution	14 bits

ANALOG OUTPUT	
(Applicable in 4AI-2AO Card)	
No of Analog Output	Dependent on card selection
Output Type	0-20 mA / 0-10 V (factory set)
Resolution	12 bit
Conversion Time	100 msec
Linearity Error	0.1%

FUNCTIONAL SPECIFICATIONS	
Programming Method	Windows based software for ladder program and HMI configuration
Memory	Data memory: 16k , Code memory: 351k , Upload memory: 96k
No. of Objects	Maximum 5000 (as per memory)
Minimum Scan Time	200 µsec (Typically 1ms)

FUNCTIONAL BLOCKS	
Timer Operational Modes	On Delay, Off Delay, Pulse, Special (Up/Down) Timer
Timer Resolution	1 ms
Timer Display Format	Sec, Min, Hr, Day, Min.Sec, Hr.Min, Day.Hr, Hr.Min.Sec, Day.Hr.Min.Sec
Counter	Up, Down, Up/Down, Fast Counter(up to 10 digits) Uni/Bi/Quad
Other Blocks	PID Control with autotune, Analog input, Analog output, Time switch, Communication, RTC
Communication Ports	Master - RS485 Slave - RS232 / RS485 (Selectable)
Communication Protocol	MODBUS RTU
Memory Retention	10 years
RTC	Yes
Supply Voltage	85-270V AC, 24V DC

Temperature	
Operating	0 to 50° C
Storage	-20 to 50° C
Humidity	95% (non-condensing)
Weight	564 gms

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# TERMINAL CONNECTIONS

After making your choice from **C1** **C2** **C3** **C4** the unit shall represent in the following way:

**NOTE: For illustrative purposes, it is assumed that the user has ordered the following card options** ( for detailed ordering information, please refer to Common Sheet ):

**C1**

**C2**

**C3**

**C4**

13 Digital Inputs - 8 Digital Outputs - Analog Mixed I/O (4AI + 2AO) - 85 to 270V AC/DC

