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Creating Best Value

MM3010

Programmable Logic Controller

OPERATING INSTRUCTIONS

Operating / 0802 / MM3010 / Ver1, OP233-V01.

Selec Controls Pvt. Ltd., India,
Tel: 91-22-28471882 / 4039 4200 / 4039 4202
Tollfree: 1800 227 353 **Fax:** 91-22-28471733,
Website: www.selec.com
E- mail: sales@selec.com

Contents

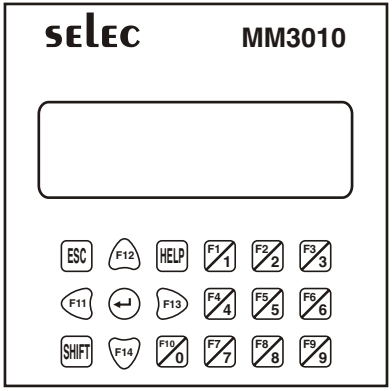
CE

FEATURES

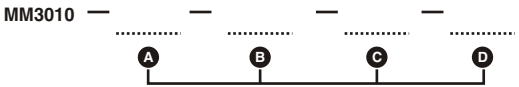
- PLC with built-in HMI.
- 4 x 16 line character LCD display.
- User friendly Windows based software for ladder programming and HMI configuration
- Online parameter setting.
- Battery back up and RTC available
- RS 485 based communication with MODBUS protocol.

Display	LCD (backlight) 4 line x 16 character	
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 - 28 VDC (abs. max.: 30 VDC)	
Response Time (Inputs other than fast counter)	IX0-IX3 (4 inputs) - 1 ms Others - 10 ms	
Isolation	2 kV	
FAST COUNTER INPUT		
Input Type	NPN	
Operating Modes / Frequency	Bidirectional, Unidirectional: 7.5 kHz Quadrature: 2.5 kHz	
Maximum Count	10 digits	
DIGITAL OUTPUT - Relay / Transistor		
No of Relay / Transistor Outputs	Dependent on card selection	
Relay (NO Type) Contact Rating	4ch / 8ch: 5 A resistive @ 240 VAC 11ch: 3 A resistive @ 240 VAC	
Min. Switching Time	1 msec (or as per Ladder Scan Time)	
Transistorised Output Rating	For 4 / 8 / 11 Channels: NPN Type: 30 V, 10 mA	For 14 Channels: PNP Type: 30 V, 100 mA
Isolation	2 kV	

ANALOG SECTION	
ANALOG INPUT	
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	
No of Analog Outputs	2
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 & HMI Configuration
Memory	Data memory: 16K Code memory: 384K
No. of Objects	Maximum 5000 (as per memory)
Minimum Scan Time	200µsec
FUNCTIONAL BLOCKS	
Timer Operational Modes (Least count .01 sec)	On Delay, Off Delay, Pulse, Special(Up/Down) Timer (10 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)
Other Blocks	PID Control, 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 - 270 VAC, 24 VDC
Temperature	**Operating:** 0 to 50° C ; **Storage:** -20 to 50° C
Humidity	95% (non-condensing)
Weight	564 gms



Key	General	Edit Mode (Accept data entry task)	Alarms
F1-F14	User defined in HMI	**F1-F10 (0-9):** Numeric keys **F11-F13**: Shift cursor left / right **F12-F14:** Sign compliment for INT/DINT/REAL/LREAL	No effect
HELP **HELP**	Displays user defined help page. (If defined in HMI)	No effect	No effect
SHIFT **SHIFT**	Dual key functionality as programmed in HMI.	No effect	SHIFT + ↵ to acknowledge alarm.
ESC **ESCAPE**	To enter internal menu	To exit edit mode.	To enter internal menu.
↵ **ENTER**	No effect	No effect	To save the selected / edited parameter & switch to next editable parameter.



Choose from Legend

LEGEND

Slots	Cards	Order Code
A Digital Input Cards	8 Digital Input	**DI08**
	13 Digital Input	**DI13**
	19 Digital Input + 1 Quad	**DIQ19**
B Digital output Cards	8 Digital Output (Relay type)	**DR08**
	8 Digital Output (Transistor type)	**DT08**
	11 Digital Output (Relay type)	**DR11**
	11 Digital Output (Transistor type)	**DT11**
	14 Transistor Output, 100mA	**DT14**
C Digital / Analog Mixed I/O Cards	Digital Mixed I/O: 8DI + 4DO	**MD-I08, R04**
	6 Channel Analog I/P (TC / RTD type) (factory set-to be specified while ordering)	**AI-06, TC/RTD**
	6 Channel Analog I/P (Voltage / Current type) (factory set-to be specified while ordering)	**AI-06, V/I**
	2 Channel Analog I/P (Universal type)	**AI-02**
	Analog Mixed I/O: 4AI + 2AO	**MA-I04, O02**
D Power Supply	85 to 270 VAC/DC	**270 V**
	24 VDC	**24 VDC**

ACCESSORIES (to be ordered separately)

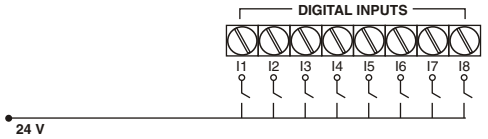
Communication cable: **Part no. -** ACH-001.
Windows-based software for ladder programming: **Part no. -** ACD-003
Four Relay module **Part no. -** AR - 04 - 5A - NONC
Power Supply module **Part No.** 1) AP-24V-300mA
RS485 to RS232 converter **Part no. -** AC - RS485 - RS232 - 01

To order:

Toll free: *1800 227 353*
Phone: *91-22-28471 1882 / 4039 4200 / 4039 4202*
Email: *sales@selecindia.com*

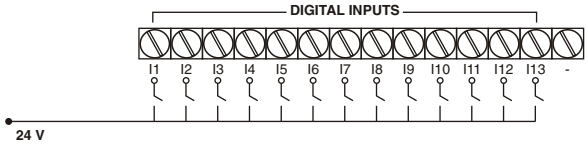
A DIGITAL INPUT CARDS

8 Digital Input



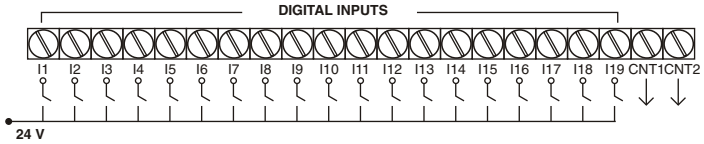
OR

13 Digital Input



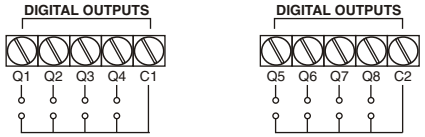
OR

19 Digital Input + 1 Quad



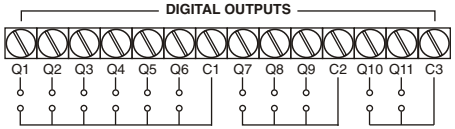
B DIGITAL OUTPUT CARDS

8 Digital Output



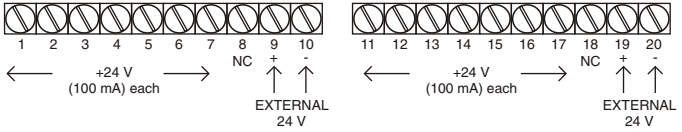
OR

11 Digital Output

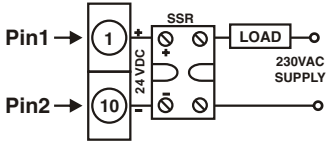


OR

14 Transistorised Output (100 mA)

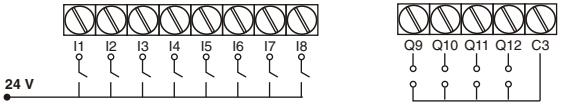


Eg.: If Output 1 is to be used.



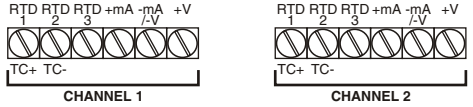
C DIGITAL / ANALOG MIXED INPUT CARD

8 Digital Input + 4 Digital Output



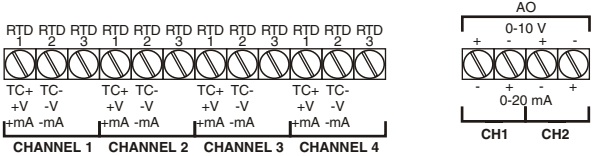
OR

2 Analog Input (RTD / TC / 0-5V / 0-10V / 0-20mA)



OR

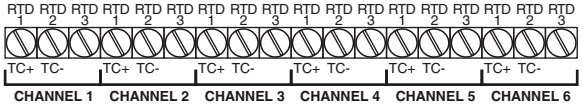
4 Analog Input (RTD / TC / 0-5V / 0-10V / 0-20mA) + 2 Analog Output (0-5V / 0-10V / 0-20mA) + NTC Sensor



OR

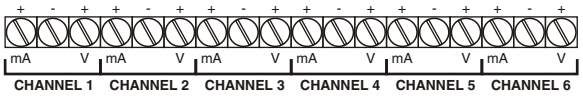
C DIGITAL / ANALOG MIXED INPUT CARD (contd.)

6 Analog Input (RTD / TC) + NTC sensor

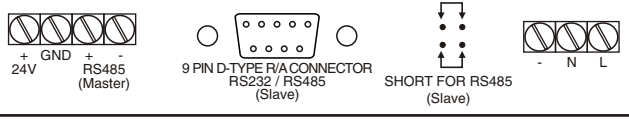


OR

6 Analog Input (0-5V / 0-10V / 0-20mA)



D Power Supply + RS485 + RS232

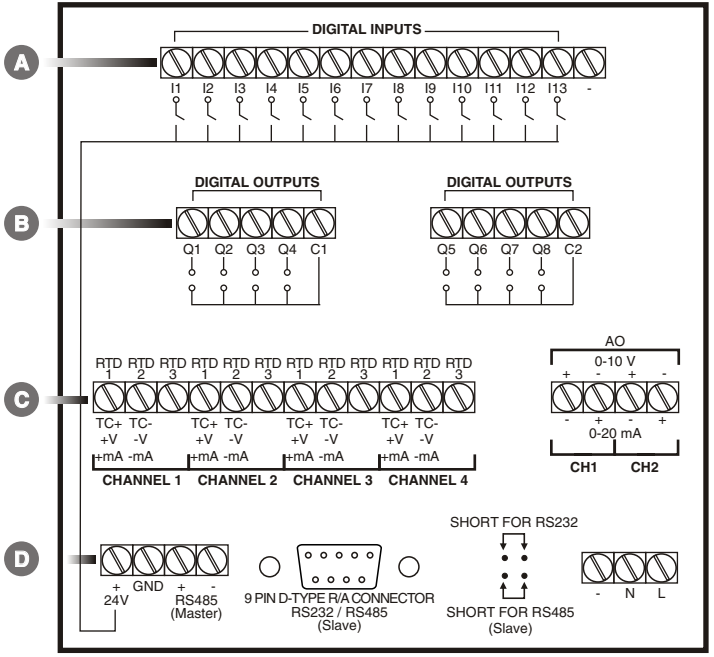


After making your choice from A B C D (pg. no. 06 to 09) the unit shall represent in the following way:

NOTE: For illustrative purposes, it is assumed that the user has ordered the following card options (for detailed ordering information, please refer to page no.04 & 05)**:**

A B C D

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



SAFETY SUMMARY

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**

1. 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.
2. 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.
3. Circuit breaker or mains switch must be installed between the power source and supply terminals to facilitate power 'ON' or 'OFF' function.
4. The equipment shall not be installed in environmental conditions other than those specified in this manual.
5. The equipment does not contain a built-in fuse. Installation of external fuse rated 275VAC/1A is recommended.
6. 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 61326-1 and BS EN 61010.
7. Thermal dissipation of equipment is met through ventilation holes provided on chassis of equipment. Obstruction of these ventilation holes may lead to a safety hazard.
8. The output terminals shall be loaded strictly as per the values/range specified by the manufacturer.

ELECTRICAL PRECAUTIONS DURING USE

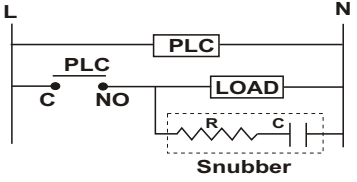
Electrical noise generated by switching of inductive loads can create momentary disruption, erratic display, latch up, data loss or permanent damage to the instrument. To reduce noise:

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

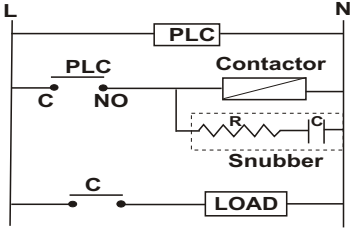
1. MOV Part no.: AP-MOV-03
2. Snubber Part no.: APRC-01.

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 of temperature controller.

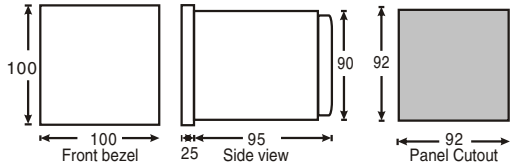
B) Use separate shielded wires for inputs.

INSTALLATION GUIDELINES

Mechanical Installation:

For installing the controller

1. Prepare the panel cutout with proper dimensions as shown.



2. Remove the clamp from the PLC.
3. 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:

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

MAINTENANCE

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

WIRING INSTRUCTIONS

⚠ CAUTION

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

MM3010 is a PLC with built in HMI. The user can configure the product using SELPRO software.

SELPRO has two sections:

1. Ladder logic programming section
2. Selec Machine Interface, used for configuration of HMI

This software is provided with the product, for details of the software and configuration method, please refer to its user manual with the product.

The display shows pages as configured by the user in Selec Machine Interface. An internal window is provided to the user to view status of physical inputs, physical outputs, system settings and communication settings. No editing is possible in this view.

Note: At least one page has to be defined in HMI

At Power ON the control would go to the first page or the page sequence defined by user or the page defined under STR would appear.

To view internal window, press [ESC] key.

Key	Description	Display
[ESC]	To Enter into internal menu or go one step back in internal menu (In Internal menu system setting, digital input/output status, variable value and communication settings can be viewed.	1-DI 5-VAR 2-DO 3-SYS 4-COMM
[F1/1]	To view digital input status when in internal menu. Press [ESC] to go to previous screen.	Digital Inputs: 00000000
[F2/2]	To view digital output status when in internal menu. Press [ESC] to go to previous screen.	Digital Outputs: 00000000

continued

◀ continued

F3/3	To view system settings when in Internal menu Press ESC to go to previous screen. (System settings show RTC's date and time, Scan Rate and Scans per millisecond for the ladder which is currently downloaded in the target.)	VER.NO: 1.01 DATE: 12-06-2008 TIME: 12:13:43 SR: 1ms 3sc/ms
F4/4	To view communication settings when in Internal menu. Press ESC to go to previous screen. (Communication settings show Master & Slave Baud Rate(19K2 BR) Word length (8), Parity (N-None) and Stop Bits (2) & Slave ID)	SL-1 | MASTER 19K2 BR | 19K2 BR 8N2 | 8N2
F5/5	To view variable value when in internal menu. Press ESC to go to previous screen. (Use F11 and F13 keys to scroll through different pages while viewing variables.	1-Read MX 2-Read Holding 3-Read Input
F1/1	To view temporary coils when in variable view. Press ESC to go to previous screen.	MX: 8-10 (3 of 3) 110
F2/2	To view holding registers when in variable view. Press ESC to go to previous screen.	40000: 250 40001: 0 40002: 0 40003: 0
F3/3	To view input registers when in variable view. Press ESC to go to previous screen.	30000: 0 30001: 1000 30002: -1000 30003: 0

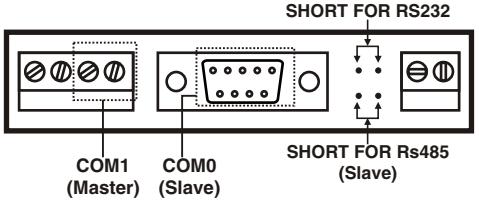
NOTE

- Only variables which have been defined in the ladder would be available in internal view as per their modbus addresses.
- With an increase in number of variables in the ladder, the number of pages in internal menu for viewing variables increases. F13 key is used to go to the next screen and F11 is used to go to the previous screen.
- For variable's modbus address, refer Modbus table in ladder by clicking on View>Modbus Table option in menu bar.
- Number of DI/DO seen in internal MMI is as per card selection.
- Scan rate in system settings is in terms of 1 ms resolution.
- Time data type is displayed in internal menu with fixed 0.01 second resolution.
- Date data type is displayed in DD.MM.YYYY format.
- TOD data type is displayed in HH.MM.SS format.
- REAL/LREAL is displayed with 2 decimals places fixed.

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

MM3010 has 2 serial communication ports:
1. COM0 (SL)
2. COM1 (MASTER)

1. 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:

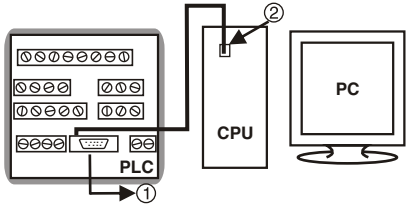


When configured as RS232, COM0 is used for:

1. To download application program from PC to PLC.
2. For Online simulation
3. 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.

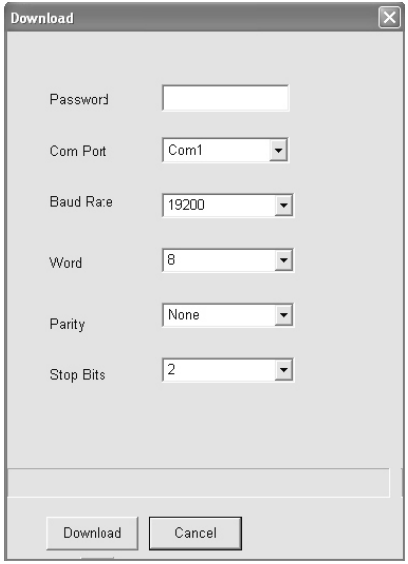
When configured as RS485, COM0 is used to create a communication network between devices supporting MODBUS/RTU.

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.



Downloading application programs (contd.):
1. Save the ladder to be downloaded in the PLC and its corresponding HMI and compile using the Compile option present in the menu bar.

2. Select Download>Communication in the Menu bar. A downloader window as show below appears.



Enter password for downloading which is 9303. Change communication settings as per target settings. Click on the 'Download' button to start downloading.

NOTE: Communication settings show default values.
Downloading would take place only if target communication settings and communication settings of project match.

Master Slave Configuration
Connect a cable from COM1 (dedicated RS485 port) of the master to RS485 of Slave.

9 Pin D-Type Connector Pin Description (COM0)

PIN	DESCRIPTION
1	Not Connected
2	TXD (RS232)
3	RXD (RS232)
4	Not Connected
5	GND
6	RS485 +ve (Slave)
7	RS485 -ve (Slave)
8	Not Connected
9	Not Connected

NOTE:
For further details and information, refer user manual and help provided with the software.