



SPECIFICATIONS

DISPLAY

- : 1st row of 4 digits to show electrical parameters
- : 2nd row of 7digits to show electrical parameters
- : 3rd row of 7digits to show electrical parameters

: Liquid crystal display with backlight.
: Digit integrated with parameter units.

: INT - Integration of energy

: ➡ - Communication in progress

: MD - Maximum Demand of Power

: 3Ø - 4wire, 3Ø - 3wire, 1Ø - 2wire,

: 2Ø - 3wire

: 85-285V AC (L-N)

: 148-494V AC(L-L) } Self-Powered

: 46Hz to 65Hz

: Ib = 10A, Imin = 0.5A, Imax = 100A

: 1 sec for all parameters

: Auto / Manual / Default (Programmable)

: Less than 8VA

: INT1 1000 Pulses/kWh (Fixed)

: INT2 1/10/100/1000 Pulses/kWh or

: Pulses/kVArh (Configurable)

: POP Voltage range : External 24V DC

: max

: Current capacity : 100mA max

LED INDICATIONS
LCD INDICATIONS

WIRING INPUT

RATED INPUT VOLTAGE

FREQUENCY RANGE

RATED INPUT CURRENT

DISPLAY UPDATE TIME

DISPLAY SCROLLING

POWER CONSUMPTION

OUTPUT

ENVIRONMENTAL CONDITIONS

Temperature

Humidity

MOUNTING

WEIGHT

COMMUNICATION

ACCURACY CLASS

ORDER CODE INFORMATION

Product	Output	Certification
		CE
EM4M-3P-C-100A-CE	RS485 (Modbus RTU) & Pulse	■
EM4M-3P-C-100A	RS485 (Modbus RTU) & Pulse	---

SERIAL COMMUNICATION

Interface standard and protocol	RS485 AND MODBUS RTU
Communication address	1 to 255
Transmission Mode	Half duplex
Data types	Float & Integer
Transmission distance	500 m maximum
Transmission speed	2400, 4800, 9600, 19200, 38400 (in bps)
Stop bits	1 or 2
Parity	None, Odd, Even

ACCURACY

Measurement	Accuracy
Voltage V _{LN}	±0.5% of Full scale
Voltage V _{LL}	±0.5% of Full scale
Current	±0.5% of Nominal
Power Factor	±0.01 of Full scale
Frequency	±0.1% of Full range
Active Power	1.00% of Full range
Reactive Power	1.00% of Full range
Apparent Power	1.00% of Full range
Active Energy	50470 (Class B)
Reactive Energy	62053-23 (Class 2)
Apparent Energy	Class1
Demand Active Power	1.00% of Full range
Demand Reactive Power	1.00% of Full range
Demand Apparent Power	1.00% of Full range

RESOLUTION

Energy	0.01k
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Note: For voltage, current & power resolution is adjusted automatically.

For power factor resolution is 0.01

! SAFETY PRECAUTIONS

All safety related codifications, symbols and instructions that appear in this operating manual or on the equipment must be strictly followed to ensure the safety of the operating person as well as the instrument.

If the equipment is not used in a manner specified by the manufacturer it might impair the protection provided by the equipment.

- Do not use the equipment if there is any mechanical damage.
- Ensure that the equipment is supplied with correct voltage.

! CAUTION :

1. Read complete instructions prior to installation and operation of the unit.
2. Risk of electric shock.
3. The equipment in its installed state must not come in close proximity to any heating sources, oils, steam, caustic vapors or other unwanted process by products.

WIRING GUIDELINES

! WARNING :

1. To prevent the risk of electric shock, power supply to the equipment must be Kept OFF while doing the wiring Arrangement.
2. Wiring shall be done strictly according to the terminal layout. Confirm that all connections are correct.
3. Use lugged terminals.

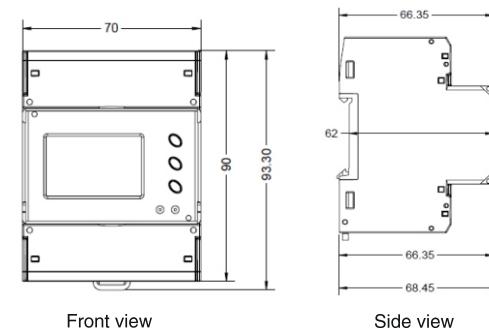
4. To reduce electromagnetic interference use of wires with adequate ratings and twists of the same in equal size shall be made with shortest connections.
5. Layout of connecting cables shall be away from any internal EMI source.
6. Cable used for connection to power source, must have a cross section of 35mm²(2AWG ; 75°C(min)).
7. Copper cable should be used (Stranded or Single core cable).
8. Before attempting work on device, ensure absence of voltages using appropriate voltage detection device.

INSTALLATION GUIDELINES

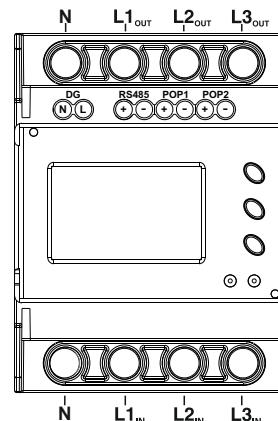
! CAUTION :

1. This equipment, being built-in-type, normally becomes a part of main control panel and in such case the terminals do not remain accessible to the end user after installation and internal wiring.
2. Conductors must not come in contact with the internal circuitry of the equipment or else it may lead to a safety hazard that may in turn endanger life or cause electrical shock to the operator.
3. The equipment shall not be installed in environmental conditions other than those mentioned in this manual.
4. Connector screw must be tightened after installation.

MECHANICAL DIMENSION



TERMINAL CONNECTION



FRONT PANEL DESCRIPTION



ONLINE PAGE DESCRIPTION

There are 2 dedicated keys labeled as (●) & (↔)

Simply press these keys to read parameters. Units of corresponding parameter on display will automatically glow.

Key-1	●	Used for scrolling main pages
Key-2	●	Used for scrolling sub pages
Key-3	↔	Used for display crc/serial no.

Key Press | Parameter Key | Online page description

Online page description for 3P4W		
At Power on	-	Displays line to neutral voltage of three phases
Press (●) Key		Displays line to line voltage of three phases
Press (●) key (1 st time)	-	Display Current of three phases
Press (●) key (2 nd time)	-	Display average of three phase line to neutral voltage, current, PF & frequency
Press (●) Key		Display average of three phase line to line voltage, current , PF & Frequency
Press (●) key (3 rd time)	-	Display Power factor of three phases & Frequency
Press (●) Key (1 st time)		Display active power of three phases
Press (●) Key (2 nd time)		Display reactive power of three phases
Press (●) Key (3 rd time)		Display apparent power of three phases
Press (●) Key (4 th time)		Display total active power
Press (●) Key (5 th time)		Display total reactive power
Press (●) Key (6 th time)		Display total apparent power
Press (●) Key (7 th time)		Display max demand of active power
Press (●) Key (8 th time)		Display max demand of reactive power
Press (●) Key (9 th time)		Display max demand of apparent power
Press (●) key (4 th time)	-	Display import & export active energy of 1 st phase
Press (●) Key (1 st time)		Display import & export active energy of 2 nd phase
Press (●) Key (2 nd time)		Display import & export active energy of 3 rd phase
Press (●) Key (3 rd time)		Display total import active energy of three phase
Press (●) Key (4 th time)		Display total export active energy of three phase
Press (●) Key (5 th time)		Display total active energy of three phase MAINS (SRC1)
Press (●) Key (6 th time)		Display total active energy of three phase DG (SRC2)
Press (●) key (5 th time)	-	Display import & export reactive energy of 1 st phase
Press (●) Key (1 st time)		Display import & export reactive energy of 2 nd phase
Press (●) Key (2 nd time)		Display import & export reactive energy of 3 rd phase

ONLINE PAGE DESCRIPTION

Key Press	Parameter Key	Online page description
Press (●) key (5 th time)	Press (●) Key (3 rd time)	Display total import reactive energy of three phase
Press (●) key (5 th time)	Press (●) Key (4 th time)	Display total export reactive energy of three phase
Press (●) key (5 th time)	Press (●) Key (5 th time)	Display total reactive energy of three phase MAINS (SRC1)
Press (●) key (5 th time)	Press (●) Key (6 th time)	Display total reactive energy of three phase DG (SRC2)
Press (●) key (6 th time)	-	Display apparent energy of 1 st phase
Press (●) key (6 th time)	Press (●) Key (1 st time)	Display apparent energy of 2 nd phase
Press (●) key (6 th time)	Press (●) Key (2 nd time)	Display apparent energy of 3 rd phase
Press (●) key (6 th time)	Press (●) Key (3 rd time)	Display total apparent energy of three phase MAINS (SRC1)
Press (●) key (6 th time)	Press (●) Key (4 th time)	Display total apparent energy of three phase DG (SRC2)

Key Press	Parameter Key	Online page description
Online page description for 3P3W		
At Power on	-	Displays line to line voltage of three phases
Press (●) key (1 st time)	-	Display Current of three phases
Press (●) key (2 nd time)	-	Display average of three phase line to line voltage, current , PF & Frequency
Press (●) key (3 rd time)	-	Display Effective Power factor of three phases
Press (●) Key (1 st time)		Display total Active power
Press (●) Key (2 nd time)		Display total reactive power
Press (●) Key (3 rd time)		Display total apparent power
Press (●) Key (4 th time)		Display max demand of active power
Press (●) Key (5 th time)		Display max demand of reactive power
Press (●) Key (6 th time)		Display max demand of apparent power
Press (●) key (4 th time)	-	Display total import active energy of three phase
Press (●) Key (1 st time)		Display total export active energy of three phase
Press (●) Key (2 nd time)		Display total active energy of three phase MAINS (SRC1)
Press (●) Key (3 rd time)		Display total active energy of three phase DG (SRC2)
Press (●) key (5 th time)	-	Display total import reactive energy of three phase
Press (●) Key (1 st time)		Display total export reactive energy of three phase
Press (●) Key (2 nd time)		Display total reactive energy of three phase MAINS (SRC1)
Press (●) Key (3 rd time)		Display total reactive energy of three phase DG (SRC2)
Press (●) key (6 th time)	-	Display total Apparent energy of three phase MAINS (SRC1)
Press (●) Key (1 st time)		Display total Apparent energy of three phase DG (SRC2)
Key Press	Parameter Key	Online page description

AUTOMATIC AND MANUAL MODE DESCRIPTION

Press key ↔ for 3 seconds to toggle between Automatic and Manual mode.

Note : By default unit operates in manual mode. In automatic mode online pages scroll automatically at the rate of 5 seconds per page. In automatic mode when any key is pressed, unit temporarily switches to manual mode and the appropriate page is displayed.

SERIAL NUMBER DESCRIPTION

Press ↔ key . to display 8 digit serial number only for 5sec at 2nd & 3rd row of display.

CONFIGURATION

There are two dedicated keys with symbol ● & ↔ Use these 2 keys to enter into configuration menu

Note : Setting should be done by professional after going through this user manual and having understood the application situation

For the configuration setting mode :

- Use (●) & ↔ key for 3 sec to enter and exit from configuration menu
- Use (●) key to increment the configuration parameter value
- Use (●) key to edit the value and shift the cursor to next digit, after last digit cursor goes back to 1st digit.
- Use ↔ key for enter & save the parameter value & go to the next page

Config. page	Function	Range or selection	Factory setting
1	Password	0000 to 9998	1000
2	Change Password	No / Yes	No
2.1	New Password	0000 to 9998	--
3	Network Selection	3P4W 3P3W 1P2W-P1 1P2W-P2 1P2W-P3	3P4W
4	Demand interval method	Sliding / Fixed	Sliding
5	Demand interval duration	1 to 30	15
6	Demand interval length	1 to 30 min	1
7	POP Type	Kwh-Total/IP/EP ; Kvarh-Total/IP/EP	Total varh
8	Pulse weight	1/10/100/1000	1000
9	Pulse duration	0.01 to 0.5 sec	0.01
10	Slave Id	1 to 255	1
11	Baud Rate	2400,4800,9600,19200 & 38400 bps	9600
12	Parity	None, Odd, Even	None
13	Stop Bit	1 or 2	1
14	Backlight	0 to 7200	0
15	Factory default	No / Yes	No
16	Reset Energy and max Dmd	No / Yes	No
16.1	Password	0001 to 9999	1001
16.2	Reset Energy and max Dmd	SRC1/SRC2	SRC1
16.3	Reset Kwh	No / Yes	No
16.4	Reset Kvarh	No / Yes	No
16.5	Reset Kvah	No / Yes	No
16.6	Reset max demand	No / Yes	No

Note: For resetting energy parameter user will be prompted for password. If correct password is entered. User will be able to reset all energy parameters. This password is

NETWORK SELECTION AND WIRING INPUT

Network selection in configuration mode	Wiring
3P4W	3P4W, 1P2W, 2P3W
3P3W	3P3W
1P2W	1P2W (P1/P2/P3)

PULSE OUTPUT DESCRIPTION

Pulse output	Type	Description	Pulse Width
POP1	Fixed 1000 Pulses	Per kWh	0.01 to 0.5sec
POP2	Configurable 1/10/100/1000 Pulses	Per kWh - Total/IMP/EXP Per kVArh - Total/IMP/EXP	0.01 to 0.5sec

MODBUS REGISTER ADDRESS LIST

Readable parameters for Communication Model Only : [Length (Register) : 2 ; Data Structure : Float]

Address	Parameter
30000	Voltage V1N
30002	Voltage V2N
30004	Voltage V3N
30006	Average Voltage LN
30008	Voltage V12
30010	Voltage V23
30012	Voltage V31
30014	Average Voltage LL
30016	Current I1
30018	Current I2
30020	Current I3
30022	Average Current
30024	kW1
30026	kW2
30028	kW3
30030	kVAr1
30032	kVAr2
30034	kVAr3
30036	kVA1
30038	kVA2
30040	kVA3
30042	Total kW
30044	Total kVAr
30046	Total kVA
30048	PF1
30050	PF2
30052	PF3
30054	Average PF
30056	Frequency

ROLLOVER ADDRESS

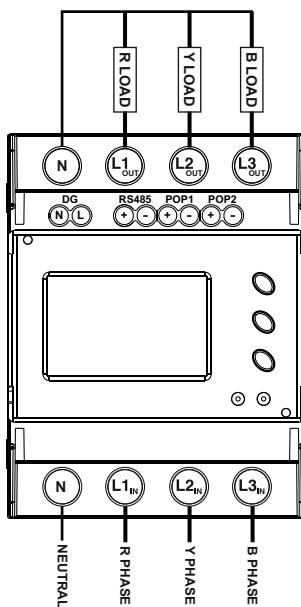
Address	Parameter
31149	Import kWh1
31150	Import kWh2
31151	Import kWh3
31152	Export kWh1
31153	Export kWh2
31154	Export kWh3
31155	Total Import kWh
31156	Total Export kWh
31157	Total kWh (MAINS)
31158	Import kVArh1
31159	Import kVArh2
31160	Import kVArh3
31161	Export kVArh1

READABLE / WRITABLE PARAMETERS FOR COMMUNICATION MODEL ONLY :[DATA STRUCTURE :INTEGER]

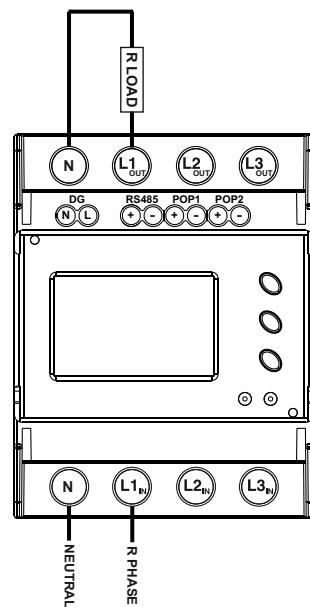
Address	Parameter	Range	Length (Register)
		Min Value	Max Value
40000	Password	0	9998
40001	Slave id	1	255
40002	N/W Selection	Value	Meaning
40003		0	3P4W
40004		1	3P3W
40005		2	1P2W-P1
40006		3	1P2W-P2
40007		4	1P2W-P3
40008	Demand Interval Method	Value	Meaning
40009		0	Sliding
40010		1	Fixed
40005	Demand Interval Duration	Min Value	Max Value
40006		1	30
40007	Demand Interval Length	Min Value	Max Value
40008		1	30
40009	POP	Value	Meaning
40010		0	Total kWh
40011		1	Total kVArh
40012		2	IP kWh
40013		3	EP kWh
40014		4	IP kVArh
40015		5	EP kVArh
40009	Pulse Weight	Value	Meaning
40010		0	1
40011		1	10
40012		2	100
40013		3	1000
40009		Value	Meaning
40010	Pulse Duration	0	0.01
40011		1	0.05
40012		2	0.1
40013		3	0.2
40014		4	0.3
40015		5	0.4
40016		6	0.5
40017	Baud rate (bps)	Value	Meaning
40018		0	2400
40019		1	4800
40020		2	9600
40021		3	19200
40022		4	38400
40023	Parity	Value	Meaning
40024		0	None
40025		1	odd
40026		2	Even
40027	Stop bit	Value	Meaning
40028		0	1
40029		1	2
40030	Backlight OFF (sec)	Min Value	Max Value
40031		0	7200

TYPICAL WIRING DIAGRAM

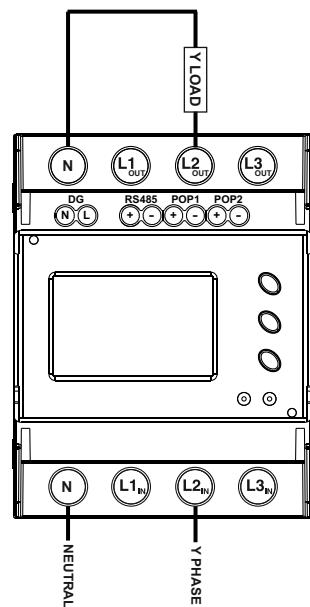
3 Phase - 4 Wire



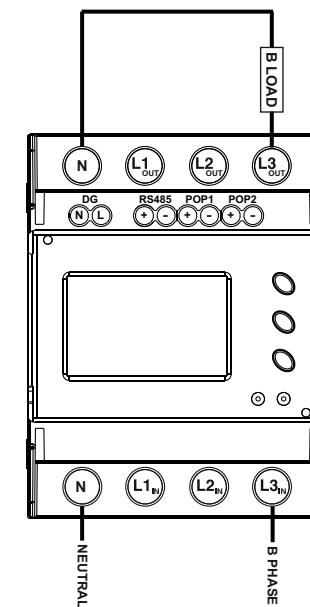
1 Phase - 2 Wire - R



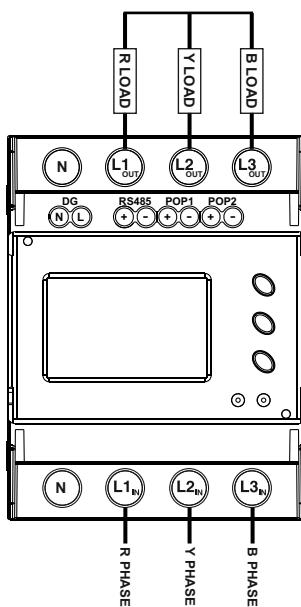
1 Phase - 2 Wire - Y



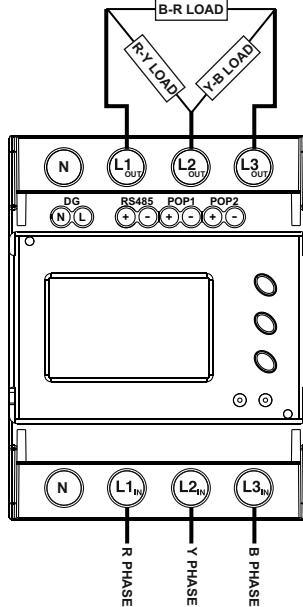
1 Phase - 2 Wire - B



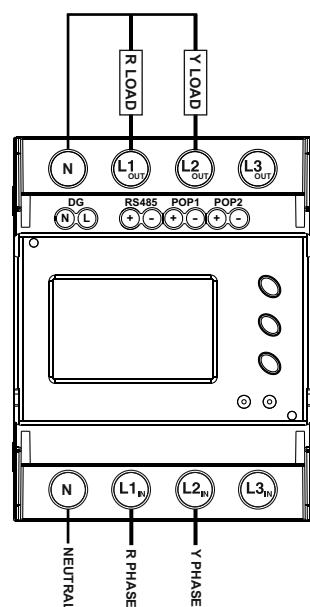
3 Phase - 3 Wire (Star Load)



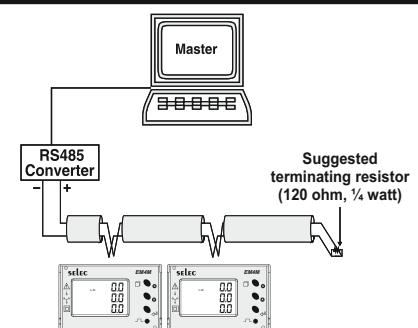
3 Phase - 3 Wire (Delta Load)



2 Phase - 3 Wire



CONNECTION DIAGRAM FOR COMMUNICATION



Contact sales for PC based monitoring software to communicate with the meters.

Specifications subject to change as development is a continuous process.

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