



**SPECIFICATIONS**

- DISPLAY** : 1<sup>st</sup> row of 4 digits to show electrical parameters  
 : 2<sup>nd</sup> row of 7 digits to show electrical parameters  
 : 3<sup>rd</sup> row of 7 digits to show electrical parameters  
 : Liquid crystal display with backlight.  
 : Digit integrated with parameter units.
- LED INDICATIONS**  
**LCD INDICATIONS** : INT - Integration of energy  
 : - Communication in progress  
**MD** - Maximum Demand of Power
- WIRING INPUT** : 3Ø - 4wire, 3Ø - 3wire, 1Ø - 2wire, 2Ø - 3wire
- RATED INPUT VOLTAGE** : 85-285V AC (L-N)  
 : 148-494V AC(L-L) } Self-Powered
- FREQUENCY RANGE** : 46Hz to 65Hz
- RATED INPUT CURRENT** : I<sub>b</sub> = 10A, I<sub>min</sub> = 0,5A, I<sub>max</sub> = 100A
- DISPLAY UPDATE TIME** : 1 sec for all parameters
- DISPLAY SCROLLING** : Auto / Manual / Default (Programmable)
- POWER CONSUMPTION** : Less than 8VA
- OUTPUT** : 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
- ENVIRONMENTAL CONDITIONS** : Indoor use  
 : Altitude up to 2000 meters  
 : Pollution degree II
- Temperature : Operating : -10°C to 55°C  
 : Storage : -20°C to 75°C
- Humidity : Upto 85% (non - condensing)
- MOUNTING** : Din rail mounting
- WEIGHT** : 400gms
- COMMUNICATION** : RS485 MODBUS RTU
- ACCURACY CLASS** : Class 1 for Active energy

**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 <sub>L-N</sub>	±0.5% of Full scale
Voltage V <sub>L-L</sub>	±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.

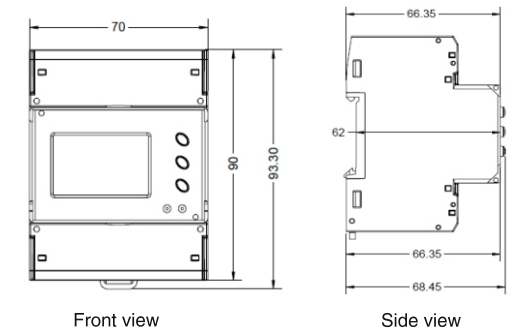
4. To reduce electromagnetic interference use of wires with adequate ratings and twists of the same in equal size shall be made with shortest connections.
5. Layout of connecting cables shall be away from any internal EMI source.
6. Cable used for connection to power source, must have a cross section of 35mm<sup>2</sup>(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**

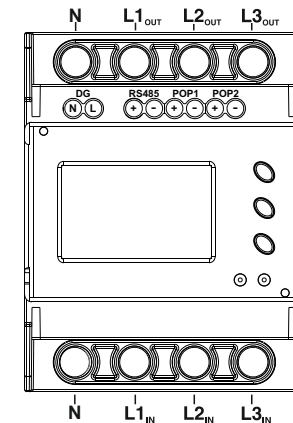
**CAUTION :**

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**



**ORDER CODE INFORMATION**

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

## 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 <sup>st</sup> time)	-	Display Current of three phases
Press (●) key (2 <sup>nd</sup> 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
	-	Display Power factor of three phases & Frequency
	Press (●) Key (1 <sup>st</sup> time)	Display active power of three phases
	Press (●) Key (2 <sup>nd</sup> time)	Display reactive power of three phases
	Press (●) Key (3 <sup>rd</sup> time)	Display apparent power of three phases
Press (●) key (3 <sup>rd</sup> time)	Press (●) Key (4 <sup>th</sup> time)	Display total active power
	Press (●) Key (5 <sup>th</sup> time)	Display total reactive power
	Press (●) Key (6 <sup>th</sup> time)	Display total apparent power
	Press (●) Key (7 <sup>th</sup> time)	Display max demand of active power
	Press (●) Key (8 <sup>th</sup> time)	Display max demand of reactive power
	Press (●) Key (9 <sup>th</sup> time)	Display max demand of apparent power
Press (●) key (4 <sup>th</sup> time)	-	Display import & export active energy of 1 <sup>st</sup> phase
	Press (●) Key (1 <sup>st</sup> time)	Display import & export active energy of 2 <sup>nd</sup> phase
	Press (●) Key (2 <sup>nd</sup> time)	Display import & export active energy of 3 <sup>rd</sup> phase
	Press (●) Key (3 <sup>rd</sup> time)	Display total import active energy of three phase
	Press (●) Key (4 <sup>th</sup> time)	Display total export active energy of three phase
	Press (●) Key (5 <sup>th</sup> time)	Display total active energy of three phase MAINS (SRC1)
	Press (●) Key (6 <sup>th</sup> time)	Display total active energy of three phase DG (SRC2)
		-
Press (●) key (5 <sup>th</sup> time)	Press (●) Key (1 <sup>st</sup> time)	Display import & export reactive energy of 2 <sup>nd</sup> phase
	Press (●) Key (2 <sup>nd</sup> time)	Display import & export reactive energy of 3 <sup>rd</sup> phase

## ONLINE PAGE DESCRIPTION

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

Key Press	Parameter Key	Online page description
Online page description for 1P2W		
At Power on	-	Displays line to neutral voltage of Selected single phase
Press (●) key (1 <sup>st</sup> time)	-	Display Current of Selected single phase
Press (●) key (2 <sup>nd</sup> time)	-	Display line to neutral voltage, current, PF & Frequency of Selected single phase
	-	Display power factor & Frequency of Selected single phase
Press (●) key (3 <sup>rd</sup> time)	Press (●) Key (1 <sup>st</sup> time)	Display active power of Selected single phases
	Press (●) Key (2 <sup>nd</sup> time)	Display reactive power of Selected single phases
	Press (●) Key (3 <sup>rd</sup> time)	Display apparent power of Selected single phases
	Press (●) Key (4 <sup>th</sup> time)	Display max demand of active power
	Press (●) Key (5 <sup>th</sup> time)	Display max demand of reactive power
	Press (●) Key (6 <sup>th</sup> time)	Display max demand of apparent power
Press (●) key (4 <sup>th</sup> time)	-	Display import & export active energy of Selected single phase
	Press (●) Key (1 <sup>st</sup> time)	Display total Active energy MAINS (SRC1)
	Press (●) Key (2 <sup>nd</sup> time)	Display total Active energy DG (SRC2)
Press (●) key (5 <sup>th</sup> time)	-	Display import & export reactive energy of Selected single phase
	Press (●) Key (1 <sup>st</sup> time)	Display total reactive energy MAINS(SRC1)
Press (●) key (6 <sup>th</sup> time)	-	Display selected single phase apparent energy MAINS (SRC1)
	Press (●) Key (1 <sup>st</sup> time)	Display selected single phase apparent energy DG (SRC2)

## 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 1<sup>st</sup> 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	3P4W
		3P3W	
		1P2W-P1	
		1P2W-P2	
	1P2W-P3		
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 Kvarh	No / Yes	No
16.6	Reset max demand	No / Yes	No

**Note:** For resetting energy parameter user will be promoted 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	0.01 to 0.5sec
		Per kVarh - Total/IMP/EXP	

**MODBUS REGISTER ADDRESS LIST**

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

Address	Parameter	Address	Parameter
30000	Voltage V1N	30058	Total Net kWh (MAINS)
30002	Voltage V2N	30060	Total Net kVArh (MAINS)
30004	Voltage V3N	30062	Total Net kVAh (MAINS)
30006	Average Voltage LN	30064	Total Net kWh (DG)
30008	Voltage V12	30066	Total Net kVArh (DG)
30010	Voltage V23	30068	Total Net kVAh (DG)
30012	Voltage V31	30070	Max DMD Active Power
30014	Average Voltage LL	30072	Max DMD Reactive Power
30016	Current I1	30074	Max DMD Apparent Power
30018	Current I2	30076	kWh1 – Import
30020	Current I3	30078	kWh2 – Import
30022	Average Current	30080	kWh3 – Import
30024	kW1	30082	kWh1 – Export
30026	kW2	30084	kWh2 – Export
30028	kW3	30086	kWh3 – Export
30030	kVAr1	30088	Total kWh – Import
30032	kVAr2	30090	Total kWh – Export
30034	kVAr3	30092	kVArh1 – Import
30036	kVA1	30094	kVArh2 – Import
30038	kVA2	30096	kVArh3 – Import
30040	kVA3	30098	kVArh1 – Export
30042	Total kW	30100	kVArh2 – Export
30044	Total kVAr	30102	kVArh3 – Export
30046	Total kVA	30104	Total kVArh – Import
30048	PF1	30106	Total kVArh – Export
30050	PF2	30108	kVAh-1
30052	PF3	30110	kVAh-2
30054	Average PF	30112	kVAh-3
30056	Frequency	30684	Serial No. (Data structure : Hex)
		30710	DG Sensing

**ROLLOVER ADDRESS**

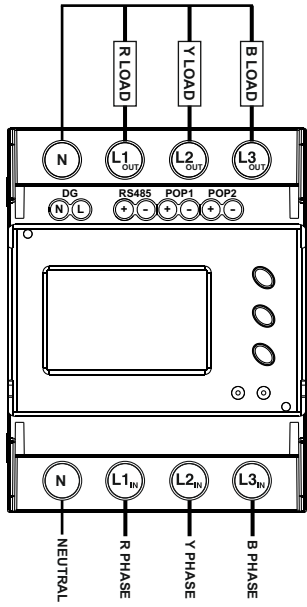
Address	Parameter	Address	Parameter
31149	Import kWh1	31162	Export kVArh2
31150	Import kWh2	31163	Export kVArh3
31151	Import kWh3	31164	Total Import kVArh
31152	Export kWh1	31165	Total Export kVArh
31153	Export kWh2	31166	Total kVArh (MAINS)
31154	Export kWh3	31167	kVAh1
31155	Total Import kWh	31168	kVAh2
31156	Total Export kWh	31169	kVAh3
31157	Total kWh (MAINS)	31170	Total kVAh (MAINS)
31158	Import kVArh1	31171	Total kWh (DG)
31159	Import kVArh2	31172	Total kVArh (DG)
31160	Import kVArh3	31173	Total kVAh (DG)
31161	Export kVArh1		

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

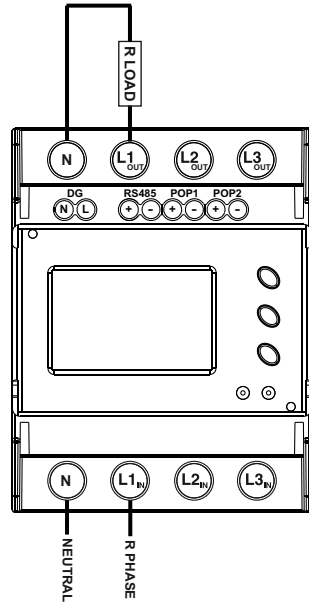
Address	Parameter	Range		Length (Register)
		Min Value	Max Value	
40000	Password	0	9998	1
		<b>Min Value</b>	<b>Max Value</b>	
40001	Slave id	1	255	1
		<b>Value</b>	<b>Meaning</b>	
40004	N/W Selection	0	3P4W	1
		1	3P3W	
		2	1P2W-P1	
		3	1P2W-P2	
		4	1P2W-P3	
		<b>Value</b>	<b>Meaning</b>	
40005	Demand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

**TYPICAL WIRING DIAGRAM**

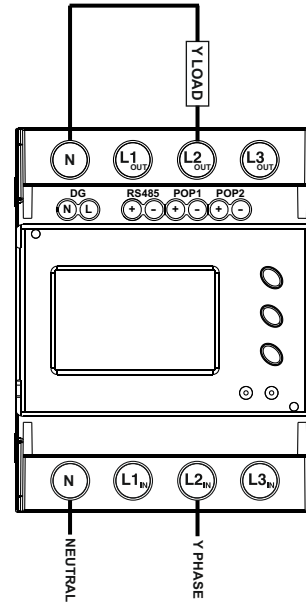
3 Phase - 4 Wire



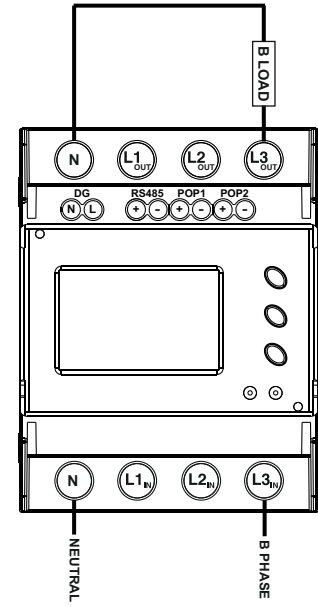
1 Phase - 2 Wire - R



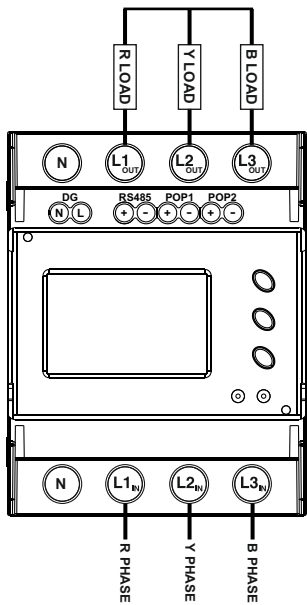
1 Phase - 2 Wire - Y



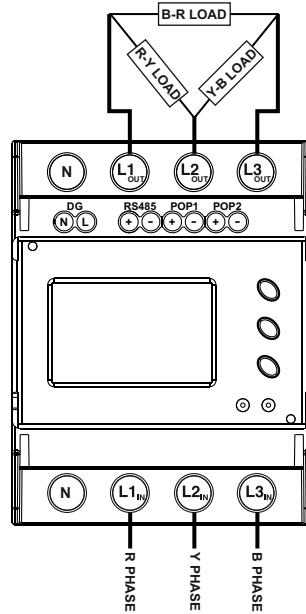
1 Phase - 2 Wire - B



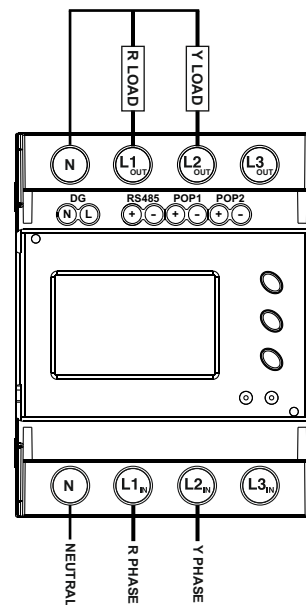
3 Phase - 3 Wire (Star Load)



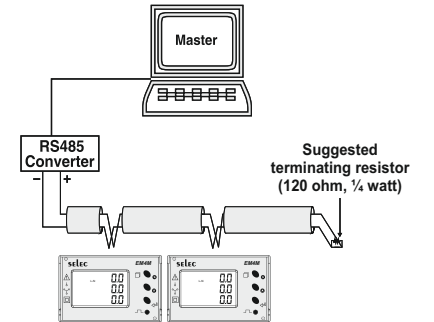
3 Phase - 3 Wire (Delta Load)



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.

**Selec Controls Pvt. Ltd., India**

Factory Address :  
 EL-27/1, Electronic Zone, TTC Industrial Area,  
 MIDC, Mahape, Navi Mumbai - 400 710, INDIA.  
 Tel. No. : +91-22-28476443 / 1882  
 Fax No. : +91-22-28471733 | Toll free : 1800 227 353  
 Website : [www.selec.com](http://www.selec.com) | Email : [sales@selec.com](mailto:sales@selec.com)