

EM1000/EM1200/EM1220 Power and Energy Meter
Quick Start Guide
C60000243-01

English
06/2014



Safety Precautions

Read and follow all the safety precautions and instructions before installing and working with this equipment.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. In the USA, see NFPA 70E.
- Only qualified electrical workers should install this equipment. Such work should be performed only after reading this entire set of instructions.
- If the equipment is not used in the manner specified by the manufacturer, the protection provided by the equipment may be impaired.
- NEVER work alone.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of backfeeding.
- Turn off all power supplying the energy meter and the equipment in which it is installed before working on it.
- Always use a properly rated voltage sensing device to confirm that all power is off.
- Before closing all covers and doors, carefully inspect the work area for tools and objects that may have been left inside the equipment.
- When removing or installing panels, do not allow them to extend into the energized bus.
- The successful operation of this equipment depends upon proper handling, installation, and operation. Neglecting fundamental installation requirements may lead to personal injury as well as damage to electrical equipment or other property.
- NEVER bypass external fusing.
- NEVER short the secondary of a PT.
- NEVER open circuit a CT; use the shorting block to short circuit the leads of the CT before removing the connection from the energy meter.
- Before performing Dielectric (Hi-Pot) or Megger testing on any equipment in which the energy meter is installed, disconnect all input and output wires to the energy meter. High voltage testing may damage electronic components contained in the energy meter.
- The energy meter should be installed in a suitable electrical enclosure.

Failure to follow these instructions will result in death or serious injury

Additional Resources

To download user manuals and other documentation, visit www.schneider-electric.co.in. Type the device model (For e.g., EM1220) in the search field.

Introduction
Models and Parameters

The power and energy meter ships in three different configurations.

Parameter		EM1000	EM1200	EM1220
RMS	VLL - V12 V23 V31 VLN - V1 V2 V3			•
	A A1 A2 A3			•
	F			•
	PF PF1 PF2 PF3	•	•	•
	W W1 W2 W3 / VA VA1 VA2 VA3 / VAR VAR1 VAR2 VAR3	•	•	•
INTG & OLD	KWh / KVAh / KVARh	•	•	•
	Run.h	•	•	•
	On.h	•	•	•
	INTR	•	•	•
POP		•		
RS-485 communication			•	•
Class 0.5 Accuracy		□	□	□
Class 1.0 Accuracy		□	□	□

NOTE: • Standard □ Option specified while ordering

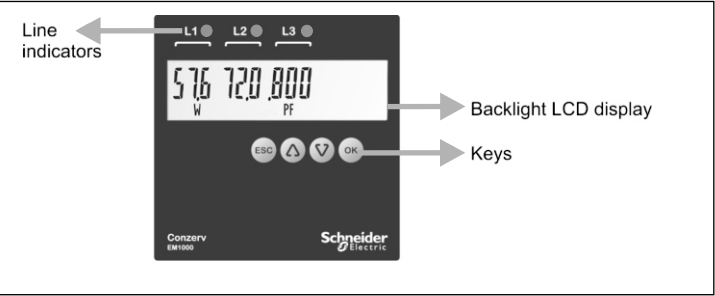
The power/energy parameters are user-programmable. Only one power related parameter will be available at a time in the meter.

Box Contents

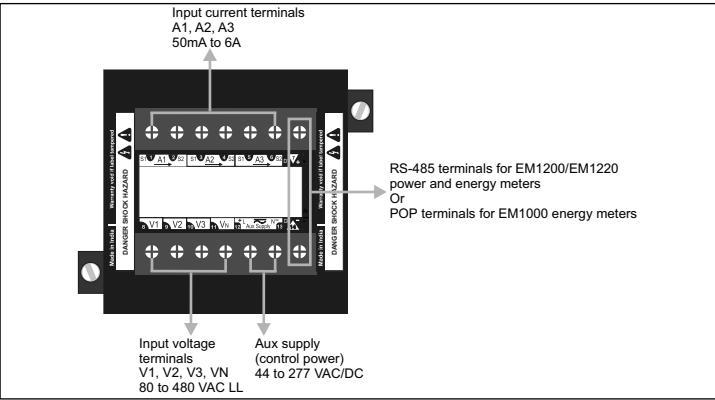
- One (1) EM1000/EM1200/EM1220 power and energy meter.
- One (1) quick start guide (QSG).
- One (1) test and calibration certificate for the power and energy meter.

Power and Energy Meter Physical Description

Front Panel



Rear Panel



Installation

Connecting Cable Recommendations

	Current rating	Wire size	Temperature Rating	Insulation rating
Voltage circuit	> 0.1 A	0.82 - 3.31 mm ² (18 - 12 AWG)	> 75 °C (167 °F)	> 600 VAC
Current circuit	> 7.5 A	2.08 - 3.31 mm ² (14 - 12 AWG)		

NOTICE

DAMAGE TO THE DEVICE

- Use only the specified tool for tightening and loosening the screw
- Do not over-torque the screw above the specified range

Failure to follow these instructions can result in equipment damage.

Tools and Equipment Requirements

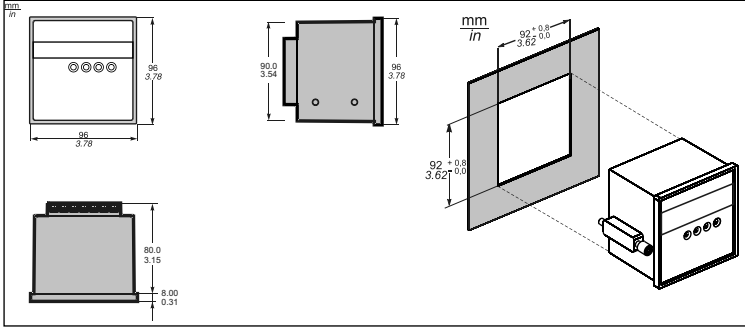


Driver	Torque driver preferred; may use hand screwdriver.
Tip	Phillips tip preferred, but you can also use flat. Do not use Pozidriv tip.
Screw head diameter	3.5 mm(0.14 in.)
Shaft diameter	< 5 mm (0.2 in.). Diameter ≥ 5 mm (0.2 in.) will get stuck in the cover.
Torque	Tightening Torque: 0.25 to 1 N.m (2.21 to 8.85 lb-in) If the torque is more than 1 N.m (8.85 lb-in), then it may damage the screw or the screw head. Loosening Torque: 1.2 N.m

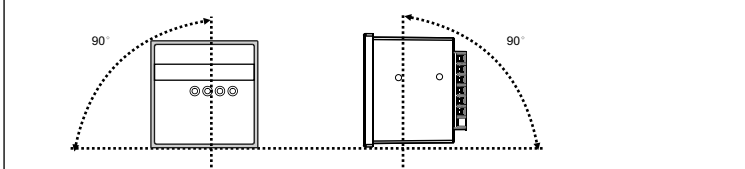
NOTE: Installation should include a disconnecting device, like a switch or circuit breaker, with clear ON/OFF markings, to turn-off the auxiliary supply (control power). The disconnecting device should be within the reach of the equipment and the operator.

Dimensions and Mounting

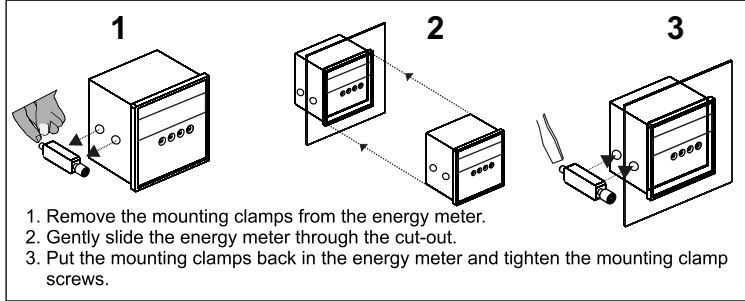
Dimensions



Mounting angle



Mounting



Wiring

Supported System Types

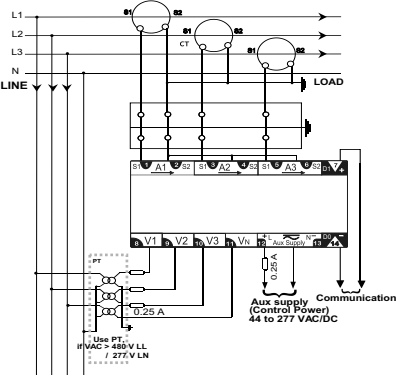
System type	Meter configuration
Star/Wye	StAr
Delta, open delta	dLtA
2-phase	2 ph
Single-phase	1 ph

Wiring Diagram Symbols

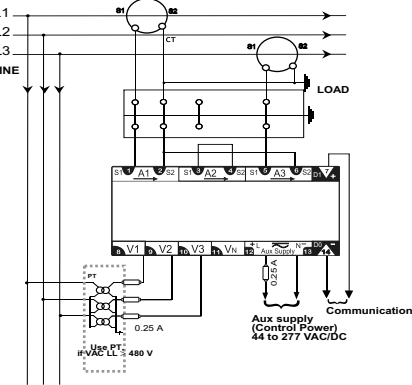
Symbol	Description
	Fuse (Slow blow)
	Current transformer (CT)
	Potential transformer (PT)

Wiring Diagrams

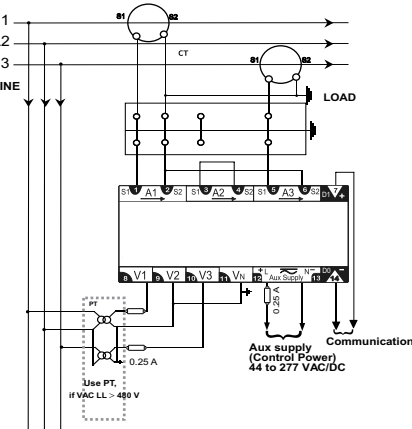
3-phase 4-wire star/wye connection

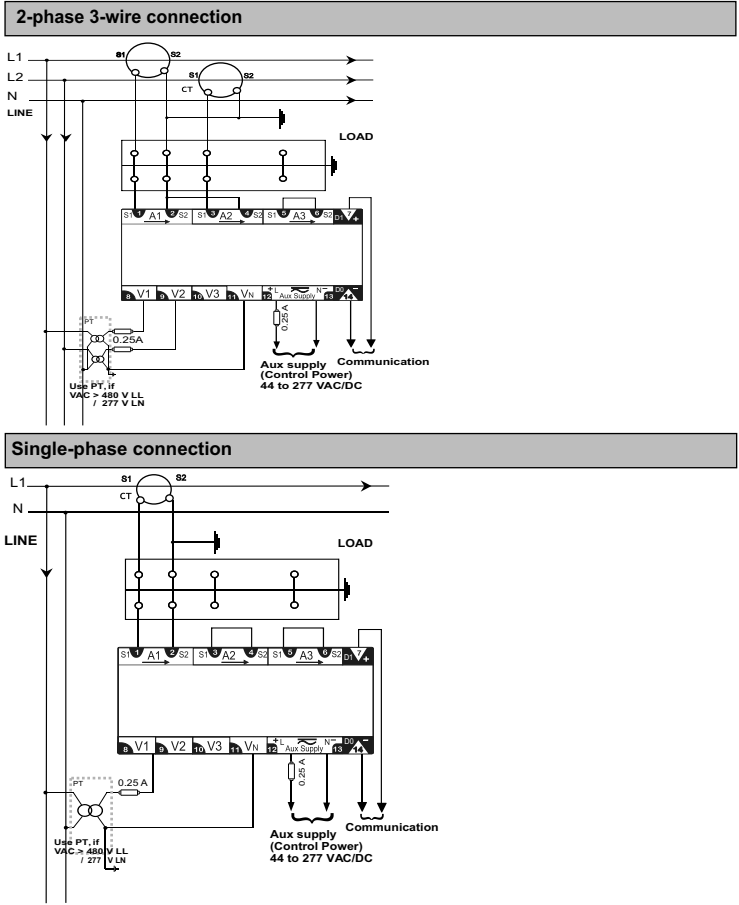


3-phase 3-wire delta connection



3-phase 3-wire open delta connection





Keys and Operation

Keys Description

The EM1000/EM1200/EM1220 power and energy meter has four keys. The keys and their descriptions are explained in the following table :

Keys and Description

	OK key: To navigate forward to the sub-parameter pages.
	ESC key: To navigate back to the main parameter pages.
	Up Key: Used to scroll up through the display pages of same level, within the same function. In Set mode, used to increase the value by one .
	Down Key: Used to scroll down through the display pages of same level, within the same function. In Set mode, used to decrease the value by one.

NOTE: The following symbols are used to represent the different keys operations.
▶/→ - operation.

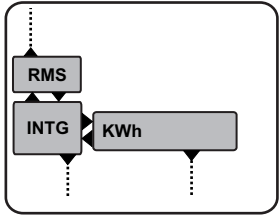
◀/← - operation.

▲/↑ - operation.

▼/↓ - operation.

Keys Operation

The following example explains how to navigate from the **RMS** page to the **KWh** display page and back to the **RMS** page.



1. Press from **RMS**. The display shows **INTG** page.
2. Press from **INTG**. The display shows **KWh**.
3. Press to return to **INTG** page.
4. Press to return to **RMS** page.

NOTE:
Use to go forward to the sub parameter pages.
Use to go back to the main parameter pages.
Use and to scroll up and down through the display pages.

PROG Menu – Setup

- The PROG menu setup gives the complete list of user-programmable parameters.
- You must set up the power and energy meter to match the application settings before use. Otherwise, readings will be wrong.
 - All the setup parameters can be re-programmed, using SET. However, the following settings critically determine the scaling of the measured readings: SYS (star or delta), Vpri, Vsec, Apri, Asec.
 - The scaling may be used to minimize the errors in reading due to Instrument Transformer errors. However, wrong settings will introduce errors in readings on other running systems.

You can enter PROG menu setup in

- **View mode:** To view the set parameters.
- **Edit mode:** To view or edit the set parameters.

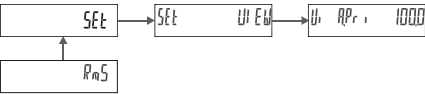
CAUTION

HAZARD OF UNINTENDED OPERATION

Only qualified personnel are authorized to set up the power and energy meter.

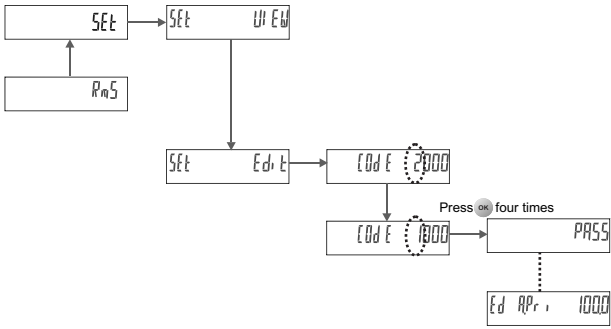
Failure to follow this instruction can result in injury or equipment damage.

Enter Setup Menu in View Mode



1. Press from **RMS**. The display shows **SET**.
2. Press . The display shows **SET VIEW**.
3. Press . The display shows **VI A.PRI 100.0**. Use and to view the setup parameters and their default values.

Enter Setup Menu in Edit Mode



NOTE:
 - Means **blinking**.

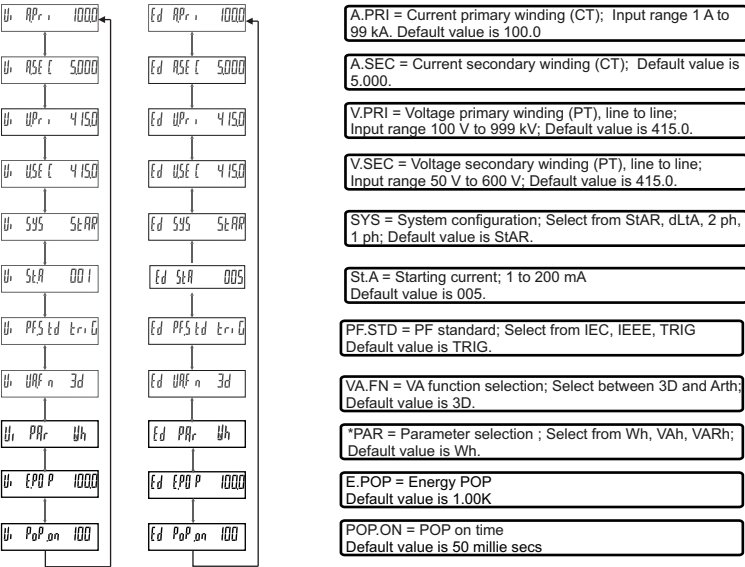
- Means **2 is blinking**.

1. Press from **RMS**. The display shows **SET**.
2. Press . The display shows **SET VIEW**.
3. Press . The display shows **SET EDIT**. You are required to enter **CODE** to enter into setup in Edit mode.
4. Press .The display shows **CODE 2000** with blinking **2**.The factory set **CODE** is **1000**.
5. Press . The display shows **CODE 1000** with blinking **1**.
6. Press four times. The display flashes **PASS** and then **Ed A.PRI 100.0**.

This indicates that you have successfully entered the setup menu in edit mode.

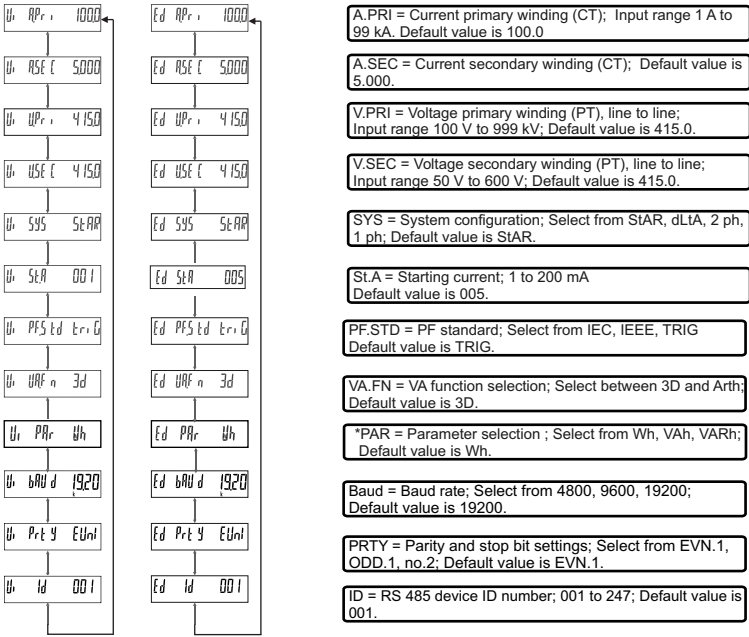
NOTE: If you enter a wrong **CODE**, the display flashes **FAIL** and then shows **SET EDIT**. Repeat the steps and make sure that you enter the correct **CODE**.

Setup Parameters in View and Edit Modes (EM1000)



NOTE:
•*Parameters such as Wh, VAh, and VARh are User selectable.
• If a parameter is changed in setup, the integrator will get reset. The following integrators will be reset:
- VA h/ Wh/ VAR h
- Run.h
- On.h
- No. of INTR

Setup Parameters in View and Edit Modes (EM1200/EM1220)

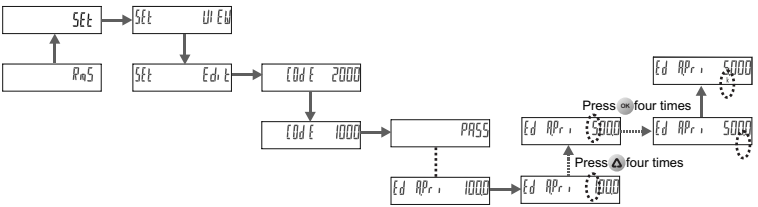


NOTE:
•*Parameters such as Wh, VAh, and VARh are User selectable.
• If a parameter is changed in setup, the integrator will get reset. The following integrators will be reset:
- VA h/ Wh/ VAR h
- Run.h
- On.h
- No. of INTR

Edit Set Parameters

This section explains how to edit the setup parameter **A.PRI** from **100.0** to **5000** in the EM1000/EM1200/EM1220 power and energy meter. For better understanding, the editing is explained in two parts: Edit and Accept Setup, Save New Value to the Setup.

Edit and Accept Setup

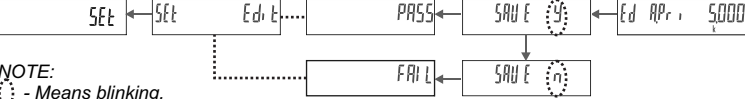


NOTE:
 - Means **blinking**.

- Means **2 is blinking**.

1. After you have successfully entered the setup in Edit mode (See "Enter Setup Menu in Edit Mode" for more information), press . The display shows **ED A.PRI 100.0** with blinking **1**.
2. Press four times. The display shows **ED A.PRI 500.0** with blinking **5**.
3. Press four times. The display shows **ED A.PRI 500.0** with blinking " ".
4. Press once. The display shows **ED A.PRI 5.000** with blinking " " and **k indicator**. The value **5000** is represented as **5.00** with **k indicator**. See "Indicators" on page 3 for more information.
5. Press . The new value is accepted.

Save New Value to the Setup



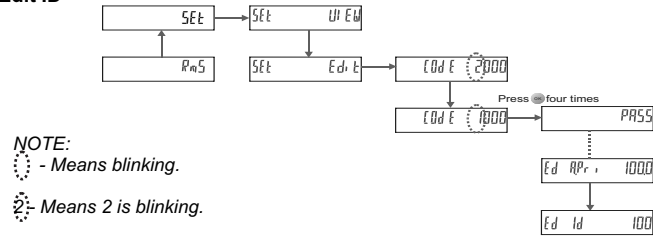
NOTE:
 - Means **blinking**.

- Means **y is blinking**.

1. After you edit and accept the parameter as previously described, press . The display shows **SAVE y** with blinking **y**.
2. Press . The display flashes **PASS** and shows **SET EDIT**.
3. Press . The display shows **SET**.

NOTE:
1.If you do not want to save the new value, press to change **SAVE y** to **SAVE n** in step 1. Press . The display flashes **FAIL** and shows **SET EDIT**. Proceed to step 3.
2.If you want to go back to the **ED A.PRI 5.000** page from **SAVE y** in step 1, then press .

Edit ID



NOTE:
 - Means **blinking**.

- Means **2 is blinking**.

1. Press from **RMS**. The display shows **SET**.
2. Press . The display shows **SET VIEW**.
3. Press . The display shows **SET EDIT**.
4. Press .
5. You are required to enter CODE to enter into setup in Edit mode.
6. Press .The display shows **CODE 2000** with blinking **2**.The factory set CODE is **1000**.
7. Press . The display shows **CODE 1000** with blinking **1**.
8. Press four times. The display flashes **PASS** and then **Ed A.PRI 100.0**.
9. Press . The display shows **ED ID 001**.
10. To edit the values, press and set the values as required.
11. Press , the display shows **SAVE y** with blinking **y**.
12. Press . The display flashes **PASS** and shows **SET EDIT**.

Technical Specifications

Description		Specification		
Sensing/measurement		True RMS, two quadrant power and energy, one second update time.		
			Accuracy % of Full Scale	
		Applicable for	CL 1.0	CL 0.5
Measurement Accuracy (3 Phase)	Voltage LN and LL per phase and average	EM1220	1.0	0.5
	Amp per phase* and average		1.0	0.5
	Frequency		0.2	0.2
	Active power (kW) & Active energy**(kWh)	EM1220/ EM1200/ EM1000	1.0	0.5
	Apparent power(kVA)& Apparent energy**(kVAh)		1.0	0.5
	Reactive power (kVAR) & Reactive energy** (kVARh)		2.0	1.0
Auxiliary supply (control power)		AC: 44 to 277 V LN ~ 50Hz +/- 5% DC: 44 to 277 V		
Input voltage		Three voltage inputs (V1, V2, V3, VN) 110 or 415 VLL nominal (80 to 480 VLL) ~ 50Hz +/- 5%		
Input current (energy measurement)		50 mA to 6 A (5 mA is the starting) ~ 50Hz +/- 5%		
Burden		Voltage and current input < 0.2 VA per phase Auxiliary supply (control power): • AC burden: 4 VA Max • DC burden: 2 W Max		
Overload		10 A max continuous		
Display and resolution		Backlight LCD display; Resolution: RMS Three digits (phase wise, average values); INTG Nine digits.		
Safety		CAT III - Measurement Pollution degree 2 ⏏ - Double insulation at user-accessible area		
Communication (EM1200/EM1220)		RS 485 serial channel connection industry standard Modbus RTU protocol		
Environmental		Operating temperature: -10 °C to 60 °C (14 °F to 140 °F) Storage temperature: -25 °C to 70 °C (-13 °F to 158 °F) Humidity 5 % to 95 % non-condensing		
Altitude		≤ 2000 m		
Weight		400 gms approx, unpacked 500 gms approx, shipping		
IP degree of protection		Front display: IP 51 Meter body: IP 40		
EM1000/EM1200/EM1220 conform to		Emission : CISPR11 class A; Fast Transient: IEC 61000-4-4***; Surge withstand: IEC 61000-4-5***; ESD: IEC 61000-4- 2***;Impulse voltage: IEC 60060-1;		

NOTE:
* In delta system configuration, the accuracy for ampere per phase would be CL 1.0.
** For 5A nominal CT ,from 250 mA to 6 A
¹ Class 1.0 for delta system configuration
*** As per IEC 61326-1