USER'S MANUAL

ENTITY
Energy Meter

This document contains the latest technical information about ENTITY which is a micro-controller based Energy Meter. The unit is tested against latest "MTE" Standard Model PRS 1.3 having basic accuracy of 0.02%, traceable upto International Standards derived using appropriate ratio techniques.

The product, Entity is sophisticated electronic equipment, and the user is advised to read this User's Manual carefully before attempting to install or operate the equipment.

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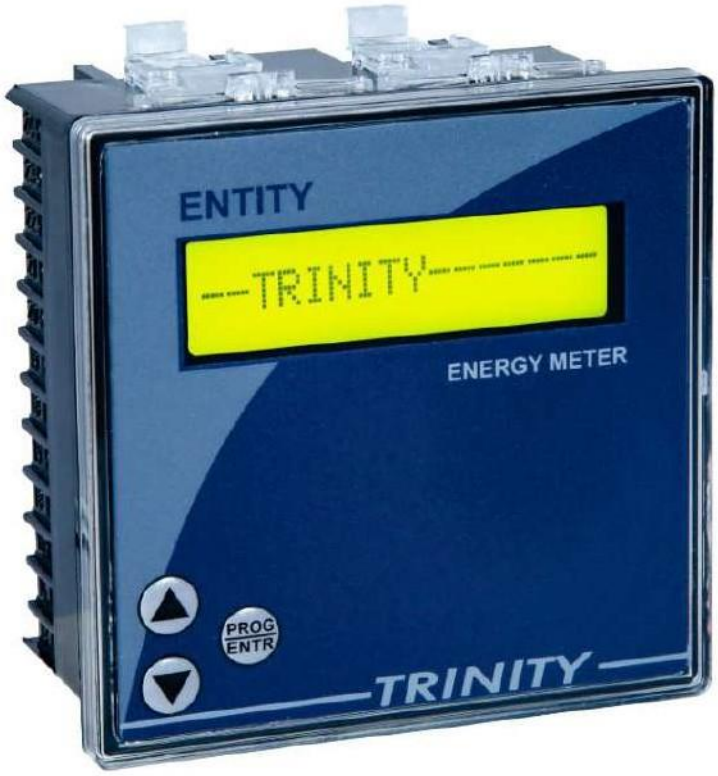
Introduction

Entity is based on proven microcontroller technology with front end ASICs, resulting in compact and accurate energy metering. The accuracy of the meters is maintained even under severely distorted waveform conditions which occur due to harmonics in the system.

Entity is a low cost effective, easy user interface and can measure accurate KWh energy that displays on 16X1 LCD. The unit supports only for three phase four wire in an electrical installation.

The Main Features Available in This Model:

- Class 1.0S accuracy as per IS13779
- Class 0.5S accuracy also available
- Compact 96 x 96 x 55 mm enclosure
- Microcontroller based with true RMS measurement
- 16X1 LC display
- Measurement of KWh,KVAh and KVARh Energy (3 Energy)Variant available without RS485.



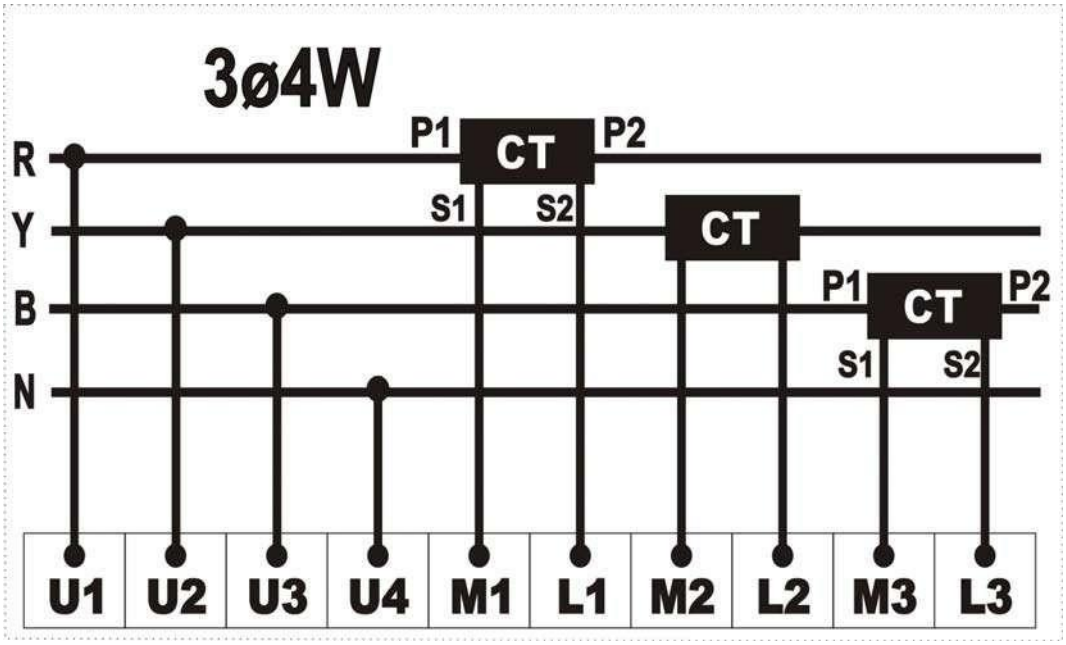
Technical Specifications

Parameter			
Type		**Name**	**Statistics**
INPUT		Supply	Three Phases and Neutral of a 3P4W system
		Voltage	Direct Voltage Input : Up to 300V L-N or 500V L-L Burden : 0.5VA
		Current	Secondary Current Input : 5A or 1A (Site Selectable) CT Primary : Site Selectable Range of Reading : 5 – 5000A Burden : < 1.0VA Overload (Through CT) : 5A CT = 6A RMS Continuous 1A CT = 1.2A RMS Continuous (Whole Current) : 120% of Imax continuous
		Power Supply	Wide operating Voltage SMPS : 80 VAC - 270 VAC, 50-60 Hz.
MEASUREMENT	**Energy**	Total Active Energy (KWh)	Range of Reading : 0 to 9999999.9 KWh Accuracy : 1.0S as per IS13779.
	Dimensions	Bezel	96 X 96 mm
		Panel Cutout	92 X 92 mm
		Depth of installation	55 mm
		Display	16X1 LCD
		Operating temp	10°C to 50°C
		Min. Operating Current	0.4% OF CT-Secondary

Installation and Commissioning:

To install the Unit, proceed the following instruction:

1. Push the unit into the panel and mount using the clamps provided.



2. Connect the Auxiliary supply (80-270 VAC) to the terminals marked P and N.

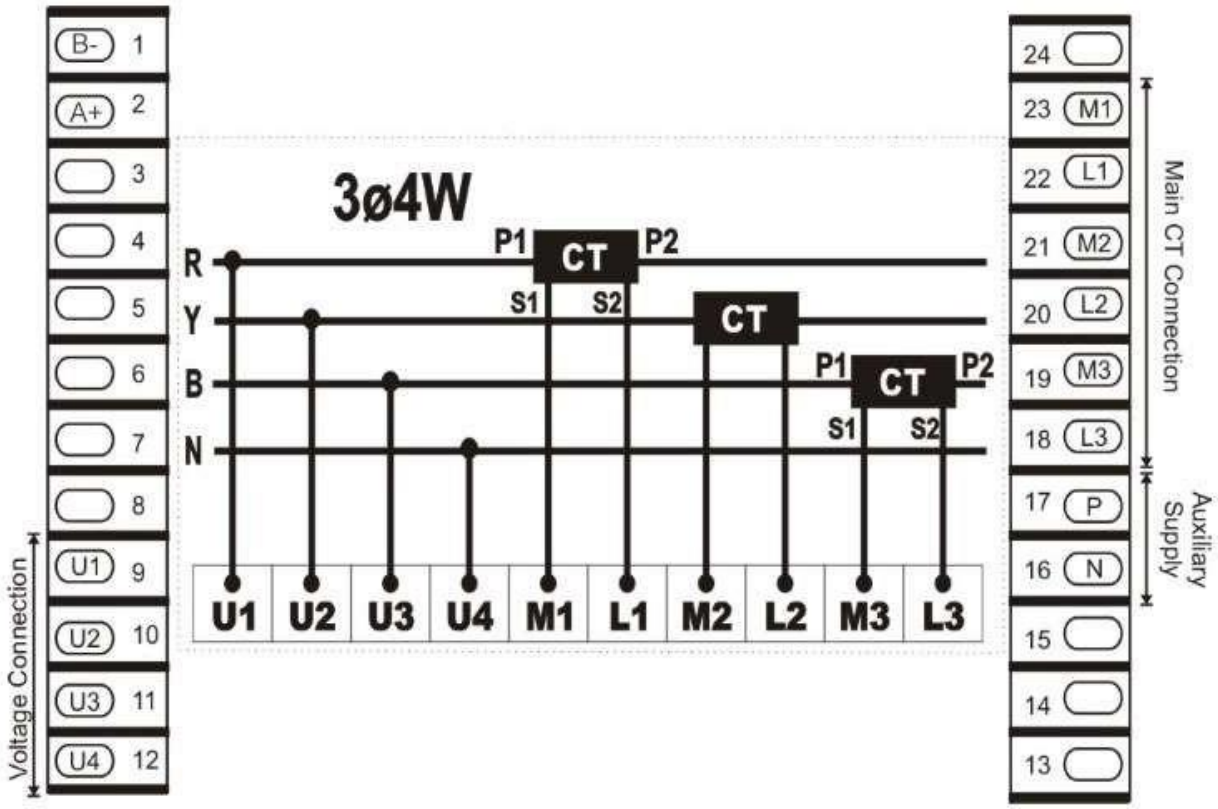
3. Connect the three phases with the phase sequence being R, Y, B to the terminals marked U1, U2, and U3 respectively and then, connect the neutral wire to the terminal marked, U4. Make sure the three phases coming to the unit come through control fuse of 1.0A rating. This will protect the electronic inside from damage due to sever overvoltage or phase fault in the system.

4. Connect the two wires from R-phase CT to the terminals marked M1 and L1 such that S1 goes to the terminal marked M1. Connect the two wires coming from the Y-phase CT to the terminals marked M2 and L2 such that S1 from the CT goes to terminal marked M2. Connect the two wires coming from B-phase CT to the terminals marked M3 and L3 such that S1 from the CT goes to the terminals marked M3.

5. Supply power to the three phases. The unit will display power receiving information such as ““---TRINITY----”,CT Ratio, Device Id(Only In the KWh variant)” then it comes into Run Mode.

6. First the CT-primary should be set, and then enters into Run Mode. Refer Operational Details in the next section.

7. Now the unit is ready for operation.



Connection Scheme

Note: A+ & B- only applicable for Rs 485 Variant

Operational Details:

The energy based Entity is a versatile meter with all the features needed to implement for a robust electrical system. It can be configured to suit for the measurement of energy. There are two types of operational Mode in this unit such as Programming Mode and Run Mode.

After supplying power (80 to 270 VAC), the unit will display with power receiving information such as "---TRINITY ", CT Ratio, Device Id (Only In the KWh variant) and then enters into Run Mode by default with the following display.

Programming Mode:

The unit has programmable parameters CT-Primary, CT Secondary and Device Id and is also easy user interface by pressing three keys such as, ▼ , PROG ENTR and ▲

Setting CT-Primary:

The CT-Primary is freely programmable from 5 to 5000 A of which 5 to 200 can be set with the steps of 5 and 200 to 5000 with the steps of 25, and hence the CT setting falls onto the standard rating of user's desire. The CT setting thus gives the true current value for CT operated meter in your electrical installation system.

To set the CT-Primary, proceed the following instructions.

1. In Run Mode display, press PROG ENTR key for about 4 to 5 seconds continuously. The unit will enter into Programming Mode with the following display.
2.

3. Press PROG/ENTR key. Immediately, "P" starts blinking which shows that CT-Primary can now be set. Set the desired CT-Primary by pressing ▲ and ▼ keys and then press PROG/ENTR to confirm the setting.
4. Now,the unit will reset and return into Run mode PROG/ENTR

Setting CT Secondary:

The CT-Secondary can be set to either 5 or 1.

To set CT-Secondary, Proceed the following instruction:

1. In the Run Mode display,Press PROG/ENTR key for about 4 to 5 seconds.The unit will prompt CT Primary and then,press "UP" key till you get display CT Secondary with following display.

2. Press PROG/ENTR key again, Immediately, P starts blinking which indicates that the parameter can now be changed. Set the parameter value by pressing "UP" and "DOWN" keys untill the desired value is received.

3. Press PROG/ENTR key to confirm the parameter value. Hence, the unit will restart and return into Run Mode

Setting Device Id

The unit also supports RS485 communication port and it should therefore be set the Device ID from 1 to 255 for the communication of it.

To set Device ID, proceed the following instruction:

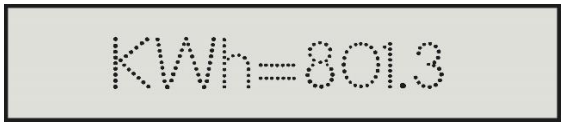
1. In the Run Mode display,Press PROG/ENTR key for about 4 to 5 seconds.The unit will prompt CT Primary and then,press "UP" key till you get display Device IDwith following display.

2. Press PROG/ENTR key again, Immediately, P starts blinking which indicates that the parameter can now be changed. Set the parameter value by pressing "UP" and "DOWN" keys untill the desired value is received.

3. Press PROG/ENTR key to confirm the parameter value. Hence, the unit will restart and return into Run Mode.

Run Mode

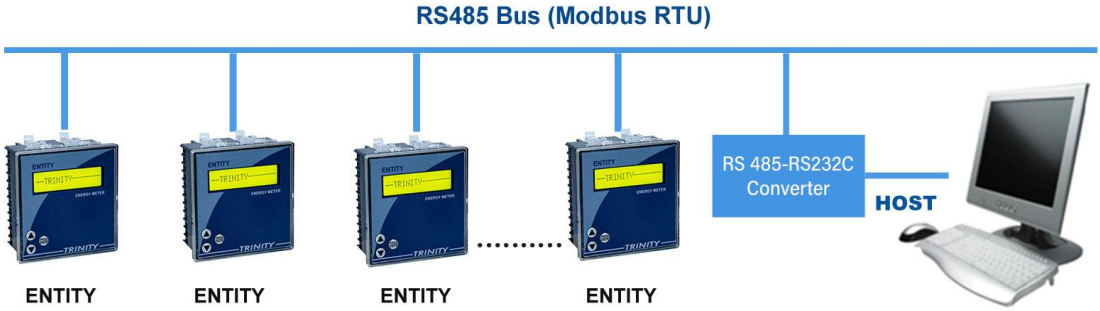
In the Run Mode, KWh energy calculated by the unit is displayed on a 16X1 LC display such as shown below.



Resetting Energies

The Active Energy (KWh), can be reset by pressing PROG/ENTR key and ▼ key simultaneously for about 8 seconds. Hence, the unit will restart and return into Run Mode displaying zero energy.

Communication



RS485 CONNECTION

The industrial standard RS-485 communication port option is also available ENTITY. This option makes it possible for a user to select ENTITY to provide power and energy information into a variety of existing or new control systems and communication networks such as EMS/PLC/SCADA.

Modbus RTU on RS485 Port

In order to download live data for the various system parameters, user can use RS485 connecting to SCADA or EMS software. ENTITY supports an RS485 port with MODBUS-RTU protocol. The station ID for every meter is site selectable. The data which can be read using MODBUS query # 3 (Read Holding Registers) is provided in an address map, with the applicable multiplication factors, vide Appendix.

Communication line parameters: 9600/8/N/1.

The register map is described below. All addresses are in decimal. Parameter is Unsigned long format. If illegal address is sent in the query or the host tries to read more than 2 bytes of data in one query, exception message is generated. The parameters name, address and multiplication factor are also mentioned.

Appendix

ENTITY ADDRESS MAP		
Address	Parameter	MF
3030	KWh	X100

P.O No. : ……

Customer : ……

Sr. No. : ……

Routine and function tests conducted to relevant standards and our Specifications/Literature/O & M Manual.

Traceability: tested against latest "MTE" Standard Model PRS 1.3 having basic accuracy of 0.02% traceable upto International Standards derived using appropriate ratio techniques.

Result of Test : ……

Remarks : ……

Test engineer : ……

Date : ……