Premier 250 Indian DLMS

Multi-function Three-phase CT/PT-operated Meter

User Manual

BGX501-704-R01

Table of Contents

Important

- As part of Secure's continuous endeavour to improve product design, the specifications mentioned in this document are liable to change and therefore availability of features is product specific.

- Specifications/features, listed in this document are the most advanced available with Secure on the date of release of this document but shall not be considered as default. Availability of all or some of these depends upon the product variants and may not be readily available. Sales team to be contacted for any query.

- Any part or whole of this document shall not be published, used or copied without prior consent of Secure.

- While all efforts have been made by Secure to minimize errors, inadvertently some errors may exist. Secure undertakes to correct such errors wherever possible, and requests feedback from users in this regard.

- Secure reserves the right to alter some or whole of the specifications mentioned in this document without any prior notice.

- For any queries or clarifications, the user is requested to contact the Secure Sales team.

- In most countries, electrical installations comply with more than one set of regulations issued by National Authorities or by recognized private bodies. It is essential to take into account these local constraints.

- Secure in principle has conducted product quality tests as per regulations based on the observance of rigorous safety rules in the design and realization of the product.

- In order to prevent tampering, the meter should be appropriately sealed after installation. Inappropriate handling of the seal may cause damage to the meter thus creating a false impression of being tampered with.

Disclaimer

Secure assumes no responsibility for damages caused to the meter under following circumstances:

- Improper maintenance/installation
- Imprudence, carelessness
- Normal (or abnormal) wear and tear of insulation
- Accidental contact with hazardous elements
- Immersion of meter in water
- Handling of meter by unauthorized persons
- Handling of meter by persons under the influence of alcohol or any other intoxicant

Precautions and Safety Practices

- Energy meters are generally installed in electrically hazardous areas. To minimise the risk of electrical shock, avoid contact with loose or exposed electrical connections. If there is loose or exposed electrical wiring near the meter, initiate appropriate remedial measures.
- The electrical installation of electronic meters at proposed site requires an adequate understanding of all governing rules and regulations.
- Keep the meter away from fire or explosion.
- Meter may break if it falls to the ground so grip it firmly.
- It is recommended to immediately cut off the meter supply on occurrence of faults within the meter.
- Ensure that load does not exceed the current range specified on the rating plate.
- Secure recommends regular installation checks to be carried out, especially when product is installed at locations posing risk of degradation.
- It is hazardous to talk over mobile while installation of the meter is under way

Deliverables

Following is the list of deliverable which can be found in CF Box

S. No.	Item
1	Premier 250 Meter
2	Accessories (as per order)

Abbreviation(s)

Following are the Abbreviations used in this document with their Expansion

S. No.	Abbreviation	Description
1.	MD	Maximum Demand
2.	MRI	Meter Reading Instrument
3.	BCS	Base Computer System
4.	PC-FR	Polycarbonate-Fire Retardant
5.	RPU	Remote Power Unit
6.	LED	Light Emitting Diode
7.	ETBC	Extended Terminal Block Cover
8.	TOD	Time-Of-Day
9.	IP	Integration Period
10.	HHU	Hand Held Unit
11.	HDLC	High-Level Data Link Control
12.	DIP	Demand Integration Period
13.	SIP	Survey Integration Period
14.	DLMS	Device Language Message Specification

Forward

Though the operation of the meter is simple, we recommend a thorough reading of this manual before installing, testing, operating or using it. Premier 250 is robust that can withstand rough handling encountered in fields. However, reasonable care in handling will ensure a long and trouble-free service. Sufficient care has been taken to provide all information regarding this product. Secure Meters Ltd. will not be responsible for any wrong application, misuse, wrong installation or any consequential damage.

Concept

Premier 250 is an all-electronic, solid state poly-phase energy meter which accurately measures all the parameters of supply such as voltage, current, power factor, active load, reactive load, apparent load etc., in addition to active, reactive and apparent energies (as the case may be). This meter is designed around an Application Specific Integrated Circuit (ASIC) based micro-controller with its own programming language. It also has a high degree of programmability to accommodate various types of applications and tariffs.

The Secure Energy Metering System provides a total solution to energy metering. It is not only applicable to a meter and energy billing computer but also to an all-encompassing system that covers all these aspects. It offers a complete package for the analysis of power and revenue.

There are three major aspects:

- Premier 250, an intelligent metering device installed at consumer's premises / large electrical machines for metering.
- MRI, an instrument used by the meter reader, for electronically collecting the meter readings and other performance data from Premier 250.
- BCS, computer system software to interpret readings and other data received from the Meter Reading Instrument and present these useful energy/demand related information in a user-friendly format.

Basic Measurement Principle

- An analogue to digital converter is used to sample voltage and current relative to incoming waveform.
- High sampling rate gives exceptionally accurate results.
- A very highly reliable non-volatile memory (NVM) can retain the data up to a period of 10 years even if there is no power.
- Data from NVM can either be displayed on the meter LCD or communicated via an optical communication port/RJ11 port on to a hand-held MRI.

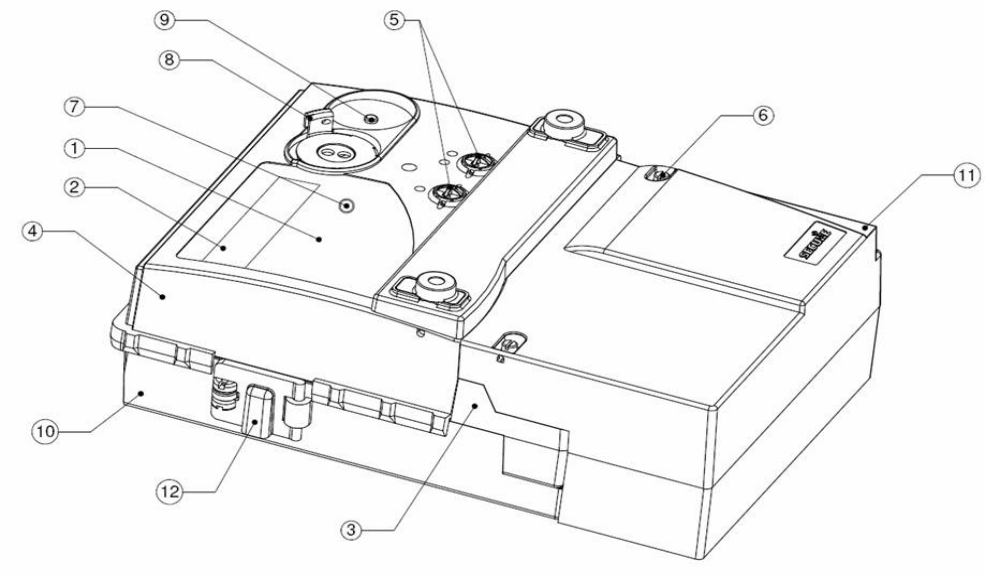
General Description

Specification	Description	
Mechanical	Dimensions (mm)	255 (L) x 187 (W) x 92.5 (H) mm
	Weight	2.0 kg approximately
	Mounting Type	Projection type
	Front Cover	Fire-retardant polycarbonate (PC-FR)
	Base	PC-FR material
	Terminal Cover	PC-FR material
	Terminal Block	Glass filled PC-FR material
	Sealing Provision	2 seals on Terminal Cover, 1 seal on IEC 1107 port, 1 seal on RJ 11 port, 1 seal at left button and 2 seals on the front cover
	Display	Twisted LCD with backlit
Electrical	Meter Type	3 Phase, 4 Wire
	Measuring Elements	3 Current Transformer for HT-3 and HT-4; 4CT for LT-CT
	Rated Voltage	3 x 240V (LT); 3 x 63.5V (HT-4),110V P-P (HT-3)
	Frequency	50 Hz ± 5%
	Current Rating	5A (I_b), 10A (I_{max}), 1A (I_b), 2A (I_{max})
	Power Factor	Zero Lag <-> Unity <->Zero Lead
	Accuracy	Class 0.5 and Class 0.2
	Metrology lamp	Metrological LED
Compliance	Metrological	CBIP-88, IS14697
	Environmental Protection	IP51
Burden	Voltage Circuit	Less than 1.5 W
	Current Circuit	Less than 4 VA

Premier 250 Constructional Details

A detailed description of various parts comprising the Premier 250 meter is given below:

1. **Rating Plate**: This provides information on meter type, accuracy class, voltage and current ratings, serial number etc.
2. **Digital Display**: The meter LCD displays information defined as follows:
   - Value - Seven large Seven-segment characters, with decimal points and colons
   - Text and Index - Five small twelve- segment alphabetic characters
   - Annunciators - Twelve assorted annunciators which can indicate:
     a. Direction - import, export, lag and lead
     b. Quantity - W, Wh, VAr, VArh, VA, Vah, V, A
     c. Multiplier - k, M or "Mk" for representing Giga
3. **Terminal Block:** This is a standard terminal block compatible with conventional meter installation methods. The voltage and current terminals are clearly marked and differentiated.
4. **Top Cover:** Top cover is fastened to the meter base using screws. It is the front top cover to enclose the meter assembly.



5. **Push Buttons:**
   - *Right-hand push button:* This button is used to cycle forward through various displays. The display can be activated by pressing the button once and thereafter each pressing of the button will advance the display to the next item in the list.
   - *Left-hand push button:* This button can be used either as a MD reset push button or for reverse scrolling of display parameters (this is Factory programmable). If programmed for MD reset then first rotate the button by 90 degrees (if it is sealed) and then press the button to reset the demand and billing register.
6. **Sealing Screws:** Two numbers sealing screws are provided on either side of the terminal block cover to seal the meter body. These screws have a transverse hole in its head for sealing with a wire and lead seal.
7. **Calibration LED:** Calibration LED is used to test the meter accuracy when all currents are flowing in one direction. For more detail refer to the 'Calibration LED' section under 'Technical Features' on page 14.
8. **Optical Port (IEC 1107):** It is used to communicate with MRI or any other external devices such as Remote Terminal Unit (RTU).
9. **Remote Power Unit (RPU):** To enable meter reading during power outage, this port can be used to power up the meter for reading purpose. A Power Pack Unit when inductively coupled with the meter through this port can provide necessary power for meter reading and display. This eliminates the need of permanent battery backup.
10. **Meter Base:** It is the rear face of the meter.
11. **Extended Terminal Block Cover:** Transparent ETBC covers both the meter mounting screws and the leads coming into the meter. ETBC is installed using two sealable screws. Being transparent it enables easy inspection of connections to the meter.
12. **RJ11 Port:** It is used for remote communication with the meter by external devices. Further it can also be used for multiplexing the meters over RS485 daisy chain.

Technical Features

Energy Registers

The Meter is capable of measuring Active, Reactive, and Apparent energy. Energy registers can be configured as per customer's requirement.

Maximum Demand and MD Integration Period

The meter can be programmed for a Maximum Demand (MD) Integration Period of 15, 30 or 60 minutes depending upon customer's requirement. The demand is monitored during each demand interval and the maximum value of these demands is stored in the Maximum Demand register. Whenever MD is reset, the registered MD value gets stored along with date and time of its occurrence. The meter is also capable of registering maximum demand with the date and time of its occurrence at BCS end.

Universal (0 – 24 Hours) Maximum Demand: A separate universal demand register is present to record the maximum demand for 24 hours since the last reset. Energies supported for this register are: *Active Forwarded*, *Apparent Forwarded*, *Reactive Lag Forwarded* and *Reactive Lead Forwarded.*

TOD Maximum Demand: The meter has provisions for time-of-day (TOD) demand computation whereby up to 8 time zones can be defined in 24-hour cycle to cover morning and evening peak as well as off-peak periods separately. The timings of these TOD registers are configurable through Tariff Change Transaction with the help of MRI.

Time-of-Day Tariff Energy Registers

The meter supports multiple tariffs (time-of-day metering). The meter can be set to a maximum of 8 non-overlapping time zones in 24-hour cycle to cover morning and evening peak as well as off-peak periods separately. The TOD registers are available in meters as per customer requirement.

Timings of these rate registers are configurable through tariff change transaction with the help of MRI.

Maximum Demand Reset

Maximum Demand can be reset by the following mechanism. The supplied meter may have one or more options given below:

1. Manually by operation of a button with a sealing arrangement.
2. Automatically after certain period defined as Billing Dates in the Meter.

Customers should specify the default MD reset option to be configured in the meter while placing the order.

Maximum Demand Reset Counter

Whenever the maximum demand is reset, this counter is incremented by one. This counter is maintained by the meter to keep track of the number of MD reset operations.

Load Survey

Load survey is a database of load values that are recorded in predefined time intervals. Load survey contains database for different types of parameters for predefined number of days. The number of parameters applicable for Premier 250 meters can be configured at the manufacturer's base depending upon customer's requirement.

Load survey can be configured in the meter for main energies (Active energy, Apparent energy, etc.) and optionally for instantaneous parameters which is (i.e. Phase voltages, Phase currents etc.). The number of days in load survey depends on the Survey Integration Period (SIP) selected and the number of parameters selected. 225 parameter days of load survey with 15 minute SIP can be configured at manufacture.

The data can be read by MRI and stored on the Base Computer Software (BCS). These data can be represented graphically and also converted to a spreadsheet with the help of BCS.

Data Communication

In Premier 250, data communication can be done in two ways:

- **Local Communication**

  Communication link is made between the 1107 Optical (Serial) Port available on the meter and the local port in HHU such as Meter Reading Instrument (MRI). It can only be done if the optical devices are aligned positively. This port communicates at a default baud rate of 9600 bps with sign on.

- **Remote Communication**

  Communication link is made between RJ11 Port available on the meter and a compatible modem which can easily transfer data to BCS. In Premier 250 meter, this port communicates at a default baud rate of 9600 bps (Direct HDLC mode).

Single mode of communication can be used at a time. If both the communication modes are attempted simultaneously then the optical port will be given priority over RJ11 port. Once the communication on priority port is complete, the meter will reside in time-out condition for one minute and then the control will switch to the non-priority port.

Transactions supported: The following transactions are supported in Premier 250 meter using communication techniques:

- Time Set
- SIP Change
- DIP Change
- Tariff Change
- Billing Dates

Security

Security is an essential requirement of any equipment handling financial transactions. Several security methods are incorporated to prevent unauthorised access to the meter.

When the meter is security locked, other than meter readings and gathering load survey data no changes will be allowed that could affect the functioning of the meter. The security system virtually eliminates any fraud or tamper attempts with the meter.

Tamper and Fraud Detection

The special software in consumer energy meter detects and reports conditions of tampers and frauds such as missing potential, CT polarity reversal, current imbalance or CT-open/bypass, power on/off etc. along with the date and time of occurrence.

a) **Missing Potential:** The meter is capable of recording missing potential phase wise along with the date and time of occurrence. Missing potential is checked only when load is above the threshold value. Tamper is restored whenever the condition normalises.

b) **Current Polarity reversal:** The meter is capable of detecting and recording occurrences and restoration of CT polarity reversal of one or more phases. When any current polarity is reversed then such a condition is treated as current polarity reversal tamper.

c) **Current Circuit Open:** The meter can record the opening of one or two Current circuits phase-wise connected to the meter along with the date and time.

d) **Current Circuit bypassing:** The meter can record bypassing of one or two Current circuits connected to the meter along with date and time.

e) **Current Unbalance:** If there is unbalance in load conditions above the configured threshold, the meter will detect this condition as Current unbalance and will log this as a tamper event.

f) **Power On/Off:** The meter detects this condition when all the voltages go below a particular level and stops the meter from functioning.

g) **Magnetic Influence:** The meter is capable of detecting and recording the presence of abnormal magnetic influence near the meter provided the magnetic influence affects the meter functionality.

h) **Neutral Disturbance:** The meter can detect neutral disturbance if any spurious signal is applied at the neutral terminal of the meter.

i) **Front cover opening detection:** The meter records opening of the front cover. If someone tries to tamper the meter by opening its front cover then the meter will log an event in its memory.

j) **High Voltage:** When any phase voltage goes above the defined limit for a persistence time the meter records it with the date and time of occurrence.

k) **Low Voltage:** When any phase voltage goes below the threshold for a persistence time the meter records it with the date and time of occurrence.

The entire events log except the front cover open events has been divided into different rollover type compartments. The front cover open tamper information will be logged in a stay put type compartment, all other tamper information will be logged on first-in-first-out basis.

Note:

1. LT meters have provision to record energy in forward direction in case of CT reversal (this is programmable at the factory).
2. The meter works accurately irrespective of phase sequence of the supply.

Calibration LED

It is possible to configure the metrological output (LED) between main energy (kWh), Reactive Energy (kVArh) and Apparent Energy (kVAh) registers. This is done by scroll down/up button in the following manner.

On initial power up of the meter, the meteorological output shall be for kWh.

The right-hand push button on the meter will allow changing the metrological output to the corresponding ROM unit register of the energy being displayed currently and will continue to remain the same.

The auto display does not affect the metrological output. Hence, if the energy register displayed is of reactive type then it will flash both for reactive lag and reactive lead energy increments.

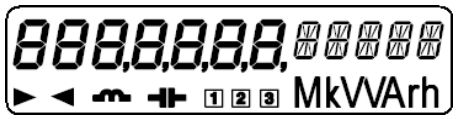
By default, the calibration LED is set to the total consumed active register.

RTC and Time Synchronization

The Real Time clock (RTC) enables the meter to keep track of real time and calendar. Features such as event logging are done on real time basis. The unavoidable drift in RTC time is automatically taken care of whenever the meter is read by MRI provided the drift falls within a set limit.

LCD Description

This section gives a detailed understanding of display scheme used on the meter LCD. The LCD can be divided in five major sections, which are used for indicating different information about the meter. Following figure shows various sections and their significance. Detail of these is as follows:



Details of individual sections			
8.8.8.8.8.8.8.	Main value indicator (7 x 7 segments)	88888	Display ID (5 x 13 Segments)
MkVVArh	Unit indicator	1 2 3	Phase status indicators
	Inductive (status indicator)		Capacitive (status indicator)
◄	Energy direction indicator - Export	►	Energy direction indicator - Import

- **Seven-segment Seven-digit Display:** This section is used to display information or value of display parameters.
- **Annunciators:** This section is made of five twelve-segment characters that displays the parameter legends analogues to the parameter available on the meter display and parameter index.
- **Direction Indicator:** This section indicates direction of flow of energy i.e. import or export as well as lagging or leading status as per the associated parameter available on the meter display.
- **Phase Status Indicator:** 1, 2 and 3 represent R, Y and B phase voltage fed to the respective meter terminal. These indicators have three different states: ON, OFF and flashing. These show the health of phase voltages, and are used to represent different conditions corresponding to phase voltages:

ON: Voltage condition of the corresponding phase is healthy or voltage is above the defined limit.

OFF: Voltage condition of the corresponding phase is unhealthy or voltage is below the defined limit.

FLASH: Any abnormal electrical condition persisting at meter terminals such as current is below a defined limit or current reversal is persisting. Under such conditions, check the meter connection and make corrections as necessary. Connection check display is available in the meter display to know the actual status of indicators in detail. Indicators will resume to normal mode if all conditions are OK.

Display and Push Button Options

Please refer to Annexure B furnished at the end of this manual to see details pertaining to display parameters supported in Premier 250 in auto display as well as push button mode.

Each display has a header followed by its value:

Header: On pressing the push button, the LCD will display the header for 5 seconds (configurable as per customer's requirement) followed by its value.

Value: It is the value of the parameter along with the unit that will appear for 15 seconds (configurable as per customer's requirement).

Right-hand push button is used for 'scrolling down' while the left-hand push button can be configured either for 'scrolling up' or for 'billing'.

Premier 250 Types

Secure Meters Ltd. product range of three phase meters can be divided in to following types:

1. **E3T** – CT operated meters suitable for 3-phase 4-wire 240V (Phase to neutral) LT supply.

CT Secondary rating:	1A or 5A
CT Primary rating:	Can be commissioned to any one of the standard values at the time of manufacturing.

2. **E3V** – CT/PT operated meters suitable for 3-phase 3-wire 110V PT supply.

Secondary voltage rating	110V
Secondary current rating	1A or 5A
Primary voltage and current range	Can be commissioned to any one of the standard values at the time of manufacturing.

3. **E3M** – CT/PT operated meters suitable for 3-phase 4-wire 63.5V HT system.

Voltage rating	110V/_/3
Secondary Current rating	1A or 5A
Primary voltage and current range	Can be commissioned to any one of the standard values at the time of manufacturing.

Note: For connections, please refer to the relevant connection diagrams in Annexure-A.

Installation

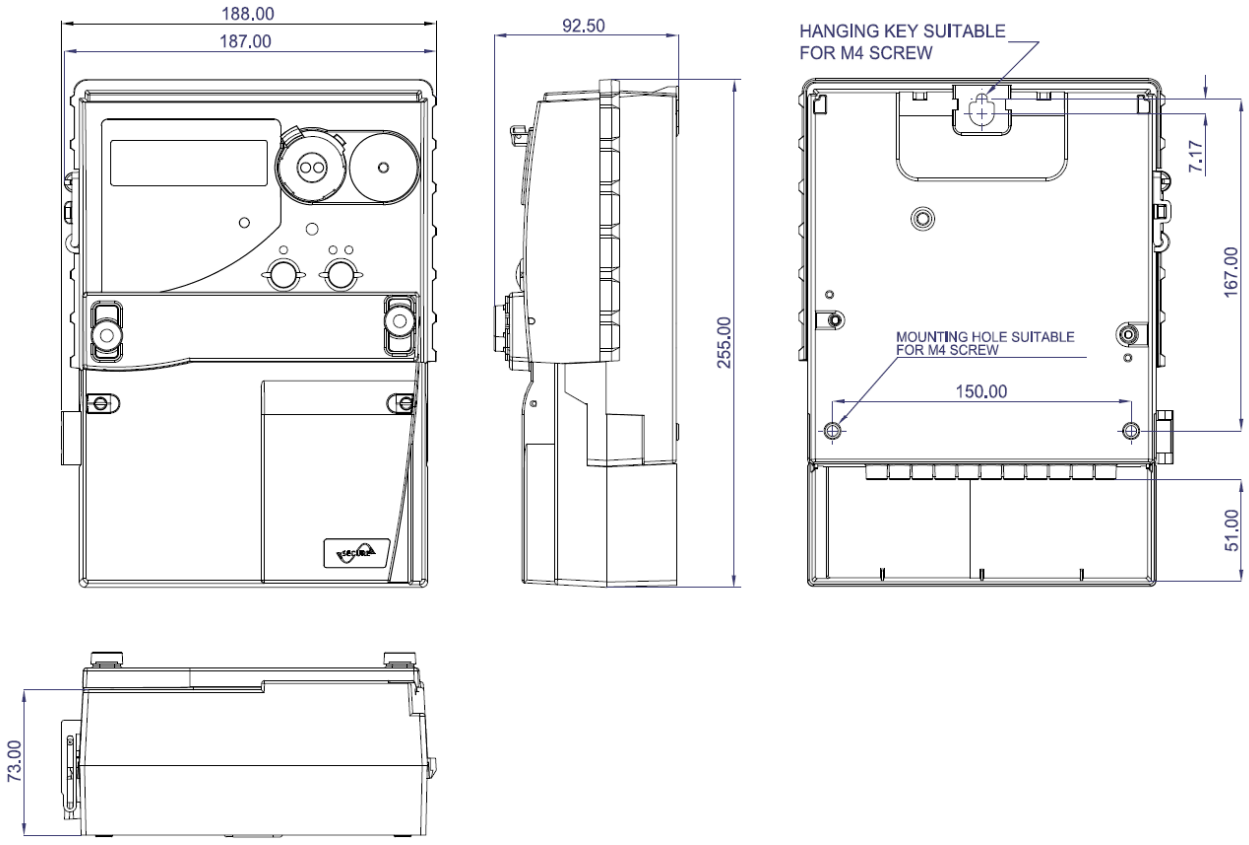
Mounting

The meter has two mounting holes each of 5.5 mm in diameter in the terminal block and a key slot at the top centre-line on the rear plate.

Steps to fix the meter in position:

1. Mark out the meter fixing position on the mounting surface, drill a hole and fit a M4 size fixing screw keeping approximately 5 mm outside the surface to secure the meter in place.
2. Fit the meter over this top fixing screw taking care to align it correctly within the hanging key slot.
3. With the terminal cover removed, mark out the positions of the lower fixing screws.
4. Remove the meter and then drill holes for the lower M4 size fixing screws.
5. Fit the meter over the top fixing screw again and then the lower fixing screws.
6. Tighten the nuts from the rear panel.

Please note that the necessary mounting kit is provided with the meter.



Connections

Local best practice must be observed when selecting conductor size and type.

Making connections to Premier 250 is similar to electromechanical meters. Copper multi-strand conductors should be used for making connections and the following table gives the recommended guideline for using the maximum and minimum conductor size:

Current range (Ib/Imax)	Minimum conductor size	Maximum conductor size
1 - 2 A	1.5 mm^2	4.0 mm^2
5 - 10 A	2.5 mm^2	6.0 mm^2

Premier 250 is equipped with an extended transparent terminal cover, and is intended to be used in installations in which all the cabling is concealed; it is therefore not necessary to use double-insulated cable.

The cables must be cut and trimmed carefully. The insulation must be cut back, removed 'squarely' ensuring that no copper is exposed on the portion of the cable outside the conductor bore. Particular care must be taken to ensure that all the conductor strands are contained within the conductor bore and secured firmly with conductor screws.

Approximately 20 mm conductor should be cut back when the cable is trimmed. The connections should be made as per the connection diagrams shown in Annexure-A depending on the meter type. A suitable connection diagram is shown on terminal block cover of the meter.

The process for fitting the conductors is as follows:

1. Remove the terminal block cover to get access to the terminals
2. Cut and trim the cables
3. Loosen the conductor screws fully
4. Insert the cable fully into the conductor bore, ensuring that no copper is exposed external to the meter
5. Tighten the conductor screws
6. Replace and seal the terminal cover.

A changed phase sequence would not affect the functioning of the meter. After powering up check the meter display as shown in the sequence on page 14. The meter display goes off during a power cut but the energy readings are stored in the registers of the non-volatile memory. The readings can be retrieved when power is restored.

Important: To ensure correct operation of the meter, proper voltages and currents must be connected as specified on the meter rating plate. Also, make sure to connect the neutral for all three-phase four-wire meters.

Safety Precautions

The meter should be installed by trained personnel. The installer must take special care while making CT connection. It is recommended to disconnect the supply while making CT connection. However, if it is connected on load then CT secondary must be shorted on TTB terminal and under no circumstances the circuit should be left open. In addition all essential safety precautions recommended for installation of electrical equipments should be followed.

Meter Calibration

All meters are calibrated at the factory with the help of reference source which have traceability to National Physical Laboratories (NPL), New Delhi. The standards and equipment available at Secure come from reputed manufacturers who themselves maintain traceability to International standardisation agencies.

The certified accuracy of our meters dispatched from factory is sustained without any drift from the accuracy class over a long period and do not require rectification.

Definitions

Reactive energy: Fictitious energy, which is not really consumed but is a part of the energy that keeps flowing back and forth between storage elements.

Forwarded energy: Energy will increment in forward direction irrespective of any CT reversal. It is the absolute sum of all the three-phase energy.

Demand Integration period: Time interval in which instantaneous demand is averaged to get a better idea of true load conditions.

Maximum demand: Maximum of average demands during a given period.

Billing period: Time frame between two successive maximum demand resets.

Time-of-Day metering: To divide a day into certain time slots with tariff rates arranged in such a way so as to encourage consumers to reduce consumption during high demand hours and shift it to lower demand.

Optical head: Interface between standard RS232 port and optical port of the meter.

Meter Reading Instrument: A device used for communicating with the meter.

Warranty

Consumer energy meter (Premier 250) will have Warranty / Guarantee as per the terms and conditions of order contract. Our warrantee is limited to repair/replacement of consumer energy meter.

This warranty does not cover any defect in the product caused by accident, misuse, neglect, alteration, modification or substitution of any of the components or parts, or any attempt at internal adjustment by unauthorised service personnel.

Under no circumstances, shall Secure Meters Ltd. be liable for any consequential or resulting injury or loss, damage of expense directly or indirectly from the use of this product.

Annexure-A

Connection Diagrams

A) E3T TYPE METER:

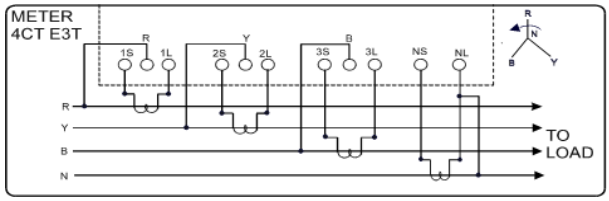


Figure 1: Connection diagram of the Meter with fourth CT in Neutral

Make Fourth CT connection as shown in figure 2. If 4th CT connection is not connected false CT open/Bypass tamper will be detected by the meter.

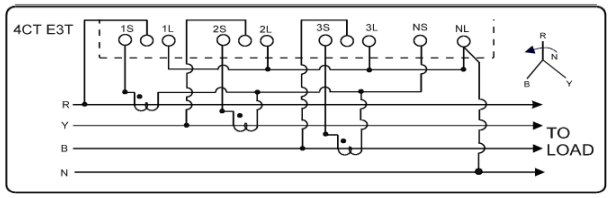


Figure 2: Connection diagram of the Meter without neutral CT

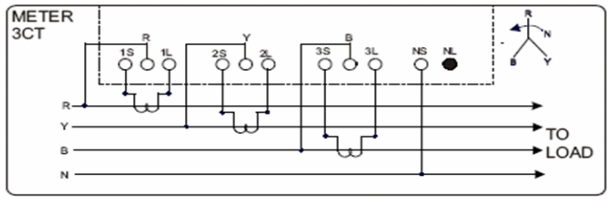


Figure 3: Connection diagram of the Meter with 3 CT

B) E3V TYPE METER:

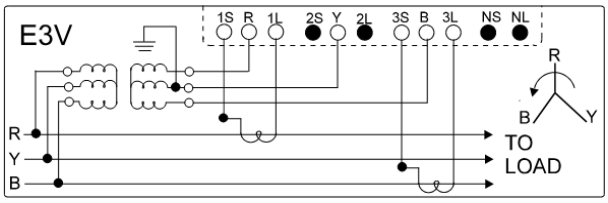


Figure 4: Connection diagram of CT/PT Operated HT (3P3W) Meter (E3V)

C) E3M TYPE METER:

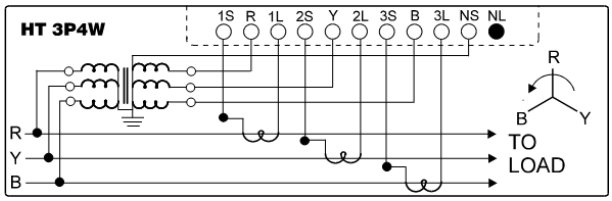


Figure 5: Connection Diagram of CT/PT operated HT (3P4W) Meter (E3M)

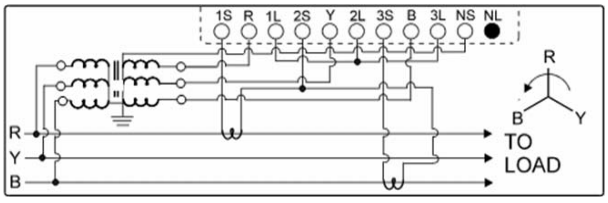
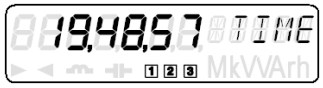
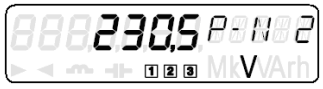
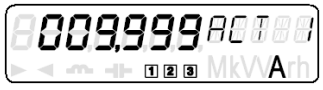
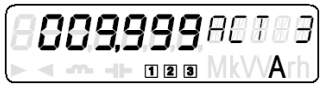
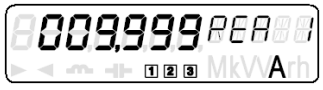
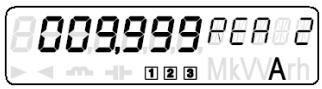
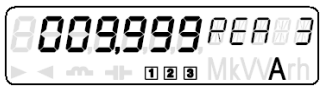
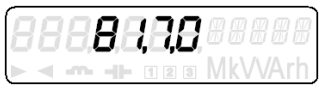
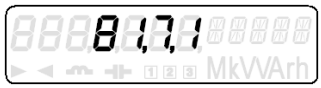
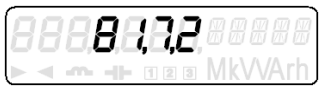
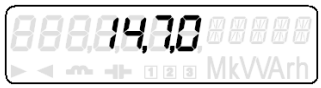
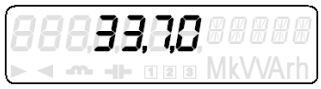
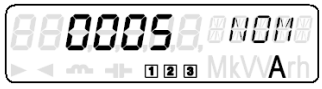
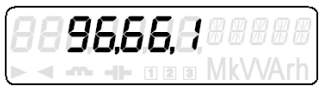
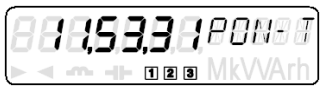
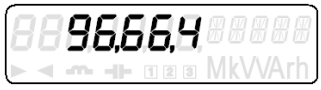
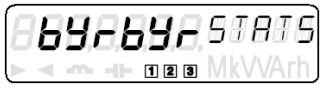
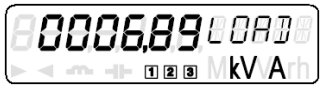
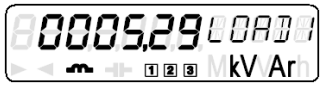
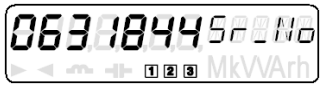
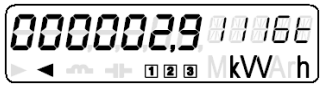


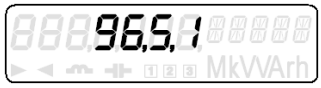
Figure 6: Connection Diagram of CT/PT operated HT (3P4W) Meter used as 3P 3W

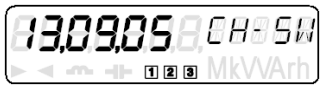
Annexure-B: Display Parameters Details

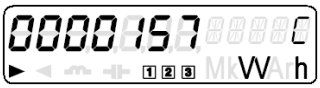
GENERAL DISPLAYS				
S. No.	**PARAMETERS**	**OBIS CODE**	**HEADER**	**VALUE**
1.	Lamp Test	NA	NA	NA
2.	Real Time	1.0.**0.9.1**.255		
3.	Date	1.0.**0.9.2**.255		
4.	Program Name	1.0.**0.0.1**.255		
5.	Tariff Identification	1.0.**0.2.0**.255		
6.	Phase To Neutral Voltage (R)	1.0.**32.7.0**.255		
7.	Phase To Neutral Voltage (Y)	1.0.**52.7.0**.255		
8.	Phase To Neutral Voltage (B)	1.0.**72.7.0**.255		
9.	R Phase Line Current	1.0.**31.7.0**.255		
10.	Y Phase Line Current	1.0.**51.7.0**.255		
11.	B Phase Line Current	1.0.**71.7.0**.255		
12.	R Phase Active Current	1.0.**161.7.0**.255		
13.	Y Phase Active Current	1.0.**163.7.0**.255		
14.	B Phase Active Current	1.0.**165.7.0**.255		
15.	R Phase Reactive Current	1.0.**162.7.0**.255		

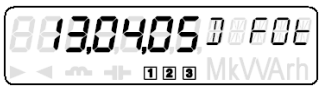
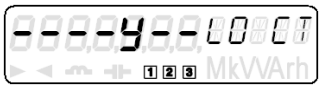
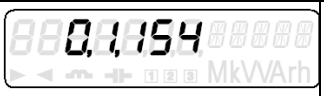
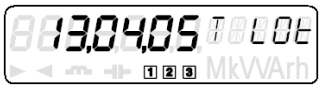
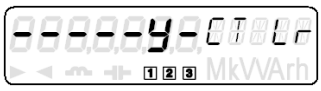
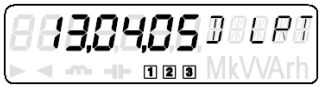
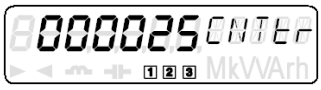
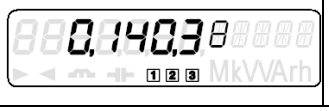
GENERAL DISPLAYS				
S. No.	**PARAMETERS**	**OBIS CODE**	**HEADER**	**VALUE**
16.	Y Phase Reactive Current	1.0.**164.7.0**.255		
17.	B Phase Reactive Current	1.0.**166.7.0**.255		
18.	Voltage to Voltage Angle (R-R)	1.0.**81.7.0**.255		
19.	Voltage to Voltage Angle (R-Y)	1.0.**81.7.1**.255		
20.	Voltage to Voltage Angle (R-B)	1.0.**81.7.2**.255		
21.	Supply Frequency	1.0.**14.7.0**.255		
22.	MD Reset Or Bill Count	1.0.**0.1.0**.255		
23.	Meter Read Count	1.0.**0.1.129**.255		
24.	Instantaneous Average Power Factor	1.0.**13.7.0**.255		
25.	R Phase Power Factor Q1	1.0.**33.7.0**.255		
26.	Y Phase Power Factor Q2	1.0.**53.7.0**.255		
27.	B Phase Power Factor Q3	1.0.**73.7.0**.255		
28.	Primary Current	1.0.**0.6.3**.255		
29.	Primary Voltage	1.0.0.6.0.255		
30.	Cumulative Power On Hours	1.0.**0.1.134**.255		

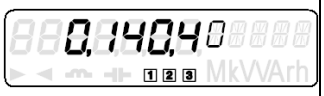
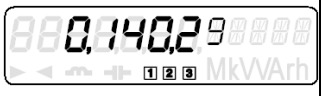
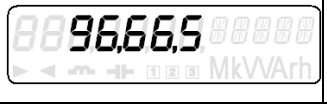
GENERAL DISPLAYS				
S. No.	**PARAMETERS**	**OBIS CODE**	**HEADER**	**VALUE**
31.	Cumulative Power Off Hours	1.0.**94.91.8.**255		
32.	MD Reset Date	1.0.0.1.2.255		
33.	MD Reset Time	1.0.**0.1.2**.255		
34.	Cause of MD Reset	1.0.0.1.12.255		
35.	Last Power ON Time	1.0.**96.66.1**.255		
36.	Last Power ON Date	1.0.**96.66.2**.255		
37.	Last Power OFF Time	1.0.**96.66.3**.255		
38.	Last Power OFF Date	1.0.**96.66.4**.255		
39.	Present Voltage and Current Status	1.0.**96.7.30**.255		
40.	Instantaneous Load Apparent	1.0.**9.7.0**.255		
41.	Signed Active Power	1.0.**1.7.0**.255		
42.	Signed Reactive Power	1.0.**3.7.0**.255		
43.	Meter Serial Number	1.0.**96.1.0**.255		
44.	High Res. Total Active Import Energy Register	1.0.**167.8.0**.255		
45.	High Res. Total Active Export Energy Register	1.0.**168.8.0**.255		

GENERAL DISPLAYS				
S. No.	**PARAMETERS**	**OBIS CODE**	**HEADER**	**VALUE**
46.	High Res. Fund. Reactive Lag (while Active Import) Energy Register	1.0.**173.8.0**.255		
47.	High Res. Fund. Reactive Lead (while Active Export) Energy Register	1.0.**175.8.0**.255		
48.	High Res. Fund. Reactive Lag (while Active Export) Energy Register	1.0.**176.8.0**.255		
49.	High Res. Fund. Reactive Lead (while Active Import) Energy Register	1.0.**174.8.0**.255		
50.	High Res. Apparent (while Active Import) Energy Register	1.0.**178.8.0**.255		
51.	High Res. Apparent (while Active Export) Energy Register	1.0.**179.8.0**.255		
52.	LED Pulse Rate	1.0.**0.3.0**.255		
53.	Phase Sequence (Voltage)	1.0.**96.7.30**.255		
54.	**Self Diagnostic Flags** The numbers indicate the following: '01' - NVM fail '02' - Clock fail '03' - NVM and Clock fail '04' - Bad Battery '05' - NVM fail and Bad Battery '06' - Clock fail and Bad Battery '07' - NVM fail, Clock fail and Bad Battery '08' - Meter Security unlocked	1.0.**96.5.1**.255		
55.	**Connection Check** This display shows if any of the following abnormal electrical conditions has occurred. The priority is as per the sequence given below : (i) Voltage miss: Identifier is 'PT Lo' that will be displayed along with the phase(s) whose voltage is missing.	1.0.**96.5.3**.255		

GENERAL DISPLAYS				
S. No.	**PARAMETERS**	**OBIS CODE**	**HEADER**	**VALUE**
	(ii) CT Reversal: Identifier is CTREV that will be displayed along with the phase(s) whose current terminals are reversed. (iii) When none of the above conditions exists, Circuit OK is displayed.			
56.	Cumulative Programming Count	1.0.**96.2.0**.255		
57.	Software Change Date	1.0.**96.99.0**.255		
58.	CT Ratio	1.0.**0.4.2**.255		
59.	PT Ratio	1.0.**0.4.3**.255		
60.	Physical Device Address	1.0.**22.0.0**.255		

MAIN ENERGY REGISTER DISPLAYS				
S. No.	**PARAMETER**	**OBIS CODE**	**HEADER**	**VALUE**
1.	Current Active Export Energy	1.0.**2.8.0**.255		
2.	Current Active Import Energy	1.0.**1.8.0**.255		
3.	Current Reactive Lag while Active Import Energy	1.0.**5.8.0**.255		
4.	Current Reactive Lead while Active Export Energy	1.0.**6.8.0**.255		
5.	Current Reactive Lag while Active Export Energy	1.0.**7.8.0**.255		
6.	Current Reactive Lead while Active Import Energy	1.0.**8.8.0**.255		
7.	Current Apparent while Active Import Energy	1.0.**9.8.0**.255		
8.	Current Apparent while Active Export Energy	1.0.**10.8.0**.255		

TAMPER DISPLAYS				
S. No.	**PARAMETERS**	**OBIS CODE**	**HEADER**	**VALUE**
1.	Present CT Status	1.0.96.50.1.255		
2.	Present PT Status	1.0.96.50.2.255		
3.	Present Others Status	1.0.96.50.0.255		
4.	First Occurrence Tamper ID	1.0.0.1.150.255		
5.	Time of 1st Tamper Occurrence	1.0.0.1.151.255		
6.	Date of 1st Tamper Occurrence	1.0.0.1.152.255		
7.	Last Occurrence Tamper ID	1.0.0.1.153.255		
8.	Time of Last Tamper Occurrence	1.0.0.1.154.255		
9.	Date of Last Tamper Occurrence	1.0.0.1.155.255		
10.	Last Restoration Tamper ID	1.0.0.1.156.255		
11.	Time of Last Tamper Restoration	1.0.0.1.157.255		
12.	Date of Last Tamper Restoration	1.0.0.1.158.255		
13.	Cumulative Tamper Occurrence Counts	1.0.94.91.0.255		
14.	R Phase CT Reversal Count	1.0.0.140.14.255		
15.	Y Phase CT Reversal Count	1.0.0.140.15.255		
16.	B Phase CT Reversal Count	1.0.0.140.16.255		
17.	R Phase CT Open Count	1.0.0.140.38.255		

TAMPER DISPLAYS				
S. No.	**PARAMETERS**	**OBIS CODE**	**HEADER**	**VALUE**
18.	Y Phase CT Open Count	1.0.0.140.39.255		
19.	B Phase CT Open Count	1.0.0.140.40.255		
20.	CT Bypass Count	1.0.0.140.18.255		
21.	Current Imbalance Count	1.0.0.140.19.255		
22.	Over Current Count	1.0.0.140.20.255		
23.	R Phase PT Miss Count	1.0.0.140.22.255		
24.	Y Phase PT Miss Count	1.0.0.140.23.255		
25.	B Phase PT Miss Count	1.0.0.140.24.255		
26.	Voltage Unbalance Count	1.0.0.140.25.255		
27.	Front Cover Open Count	1.0.0.140.26.255		
28.	Neutral Disturbance Count	1.0.0.140.30.255		
29.	Low Power Factor Count	1.0.0.140.32.255		
30.	Magnetic Tamper Count	1.0.0.140.33.255		
31.	Last Cover Open Time	1.0.96.6.65.255		
32.	Last Cover Open Date	1.0.96.6.65.255		

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