

The TP Southern Odisha Distribution Limited		Specification for Single Phase DLMS Energy Meter
Meter management Group		

**TECHNICAL SPECIFICATION FOR
3P4W, STATIC, 200-100A, CLASS-1.0,
WHOLE CURRENT ENERGY METERS
(Category-C2)
&
Box**

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**TECHNICAL SPECIFICATION FOR ISI MARKED 3 PH 4 WIRE WHOLE CURRENT
STATIC ENERGY METERS WITH BOXES (DLMS CAT-C2)**

1.0 SCOPE of WORK :

This specification covers the design, engineering, manufacture, assembly, inspection, testing at manufacturer's works before dispatch, supply and delivery at destination

(_____ store) of indoor / outdoor type ISI Marked 3 phase 4 wire, 20100A, accuracy class- 1.0 Static Whole Current Energy Meter with pilfer proof weather proof Meter Box made up of polycarbonate material having flame retardant properties, compatible for Automatic meter reading (DLMS Cat-C standard), data downloading through any CMRI/ HHU and other associated instruments & software for remote reading as per requirements given in this specification. The meter shall be suitable for energy measurement of solidly earthed balanced/ unbalance 3 phase system with power factor range of zero (lagging) to unity to zero (leading).

2.0 GENERAL FEATURE :

2.1. The meter system should be flexible enough to accommodate any change in tariff requirements in future and should be designed for minimum maintenance.

2.2. These Meters should have in addition to the normal communication ports another RS 232 port for remote data collection through GSM / PSTN network. Related analysis software suitable for operation in the Base Computer also forms a part of the offer.

2.3. It is not the intention to specify completely herein all the details of the design and construction of material. The material shall however conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing for continuous operation in a manner acceptable to the purchaser.

2.4. Purchaser shall interpret the meanings of drawings and specification. The purchaser shall have the power to reject any work or material, which in his judgment is not in accordance with the standard specification.

2.5. The offered materials shall be complete with all accessories, hardware, software and components necessary for effective and trouble-free operation.

3.0 APPLICABLE STANDARDS :

3.1. The specified meters should be of 0.5s accuracy class and confirm to the following Indian and international standard specifications. In case, certain details are not covered in this specification, any other Indian /International standard shall be applicable, may be specified and adopted.

- 1) IEC 62053-22 : A.C. Static watt-hour meters for active energy (Class 0.5)
- 2) IS 13779 : A.C. static wathour meters for active energy (class 1 & 2)
- 3) IS 12063 : Specification for degree of protection
- 4) IS 9000 : Basic environmental testing procedure for electronic and electrical items
- 5) CBIP Tech report : Specification for AC static electrical energy of CBIP with its 88 (July 96) & latest amendments. latest amendments

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- 6) IS-2629 : Hot dip galvanization
- 7 IS:5133 (Pt-II) : Specification for boxes for electrical accessories. (Part II boxes made of insulating material)
- 8) IS:15959 : Category 'C2' Consumer Metering

- 3.2. The static meters should conform to the latest version available of the standard as specified above.
- 3.3. Energy meters meeting with the requirements of other authoritative standards, which ensure equal or better quality than the standard mentioned above, shall also be considered.
- 3.4. Where the equipment offered by the supplier conforms to other standards, salient points of difference between the standard adopted and the specified standards shall be clearly brought out in the schedule. Two copies of such standards in authentic English translation shall be furnished along with the offer.
- 3.5. In case of any dispute, the order of precedence shall be 1) CBIP technical report –88 (read with all amendment) 2) IS 3) IEC 4) Other standards. In case of any difference, between provisions of the above standards and provision of this specification, then provisions contained in this specification shall prevail.

4.0 SERVICE CONDITIONS

The meter shall be suitable for satisfactory continuous operation as per relevant standards under the following tropical conditions:-

- a) Maximum ambient temperature : 50 °C
- b) Maximum ambient temperature in closed box : 60 ° C
- c) Maximum ambient temperature in shade : 45 °C
- d) Relative Humidity : 10 to 95%
- e) Maximum annual rainfall : 1450 mm²
- f) Maximum wind pressure : 150 kg/m.sq.
- g) Maximum altitude above mean seal level : 1000 meters
- h) Isoceraunic level : 50 days/year
- i) Seismic level (Horizontal acceleration) : 0.3g
- j) Permitted noise level : 45 dB
- k) System of earthing : Solidly grounded

Moderately hot and Humid

- l) Climate :

tropical climate

5.0 GENERAL TECHNICAL REQUIREMENT OF METERS :

- a) Application : 3 phase 4 wire WC
- b) Rated Voltage (V_{ref}) : 230 V (Phase to Neutral)
- c) Voltage Variation range : (+)20% V_{ref} to (-)30% V_{ref}
- d) Rated Current (I_b) : 20 Amps (balanced & unbalanced load)
- e) Rated maximum continuous current (I_{max}) : 100 A
- f) Minimum starting Current for energy registration : 0.2% of I_b at unity PF
- g) Current working range : 0.2% of I_b to I_{max}

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- h) Rated Frequency : 50 Hz.
- i) Frequency variation range : 50 Hz. \pm 5%
- j) Accuracy class : 1
- k) Power Factor : Zero (lagging)- Unity - Zero (leading)
- l) Temperature : The standard reference temperature for performance shall be 27°C. The mean temperature co-efficient shall be as per IS.

However manufacturer can offer meters, which can withstand higher variations.

- 5.1. Starting Current- The meter shall start and continue to register on application of 0.2% of basic current at Unity P.F. It should be fully functional within 5 seconds after rated voltage is applied.
- 5.2. Running with No Load- When the 115% of rated voltage is applied with no current flowing in the current circuit, the meters shall not register any energy and test output of the meter shall not be more than one pulse on "no load".
- 5.3. Power Supply- The energy meters shall be self powered up type i.e. power for working of the meter's internal electronic circuit shall be drawn from all the three phases & neutral. Further, the power supply for the meter's internal electronic circuits shall be such that meter shall function accurately, within the limits specified by the relevant standard, in the event of loss of neutral. The meter shall continue to work in case of loss of any two phases or loss of any one phase and neutral.
- 5.4. Power Consumption (Voltage Circuit) - The active and apparent power consumption in each voltage circuit of the LT CT Operated meters at reference voltage, temperature and frequency shall not exceed 1.5 W and 10 VA per phase respectively.
- 5.5. Power Consumption (Current Circuit) - The apparent power consumption in each current circuit for the LT CT Operated meters at basic current, reference frequency and reference temperature shall not exceed 4.0 VA per phase.

6.0 PERFORMANCE UNDER INFLUENCE QUANTITIES :

- 6.1. The meter shall be designed and protected such that all external effects and influences shall not change its performance & shall work satisfactorily within guaranteed accuracy limits, as specified in IS 13779 :1999/CBIP technical report – 88 with latest amendments, under the presence of influence quantities.

6.2. Electro-Magnetic Compatibility-

The static energy meters shall conform to requirements listed in relevant standards and shall also be protected against radiated interference from either magnetic or radio-frequency source. The meter shall also withstand DC Immunity test as per relevant standard so as to ensure that the meter does not saturate on passage of Direct Current.

6.3. Immunity to Electromagnetic Disturbances-

The meter shall be designed in such a way that conducted or radiated electromagnetic disturbances as well as electrostatic discharges do not damage or substantially influence the meter and it shall work satisfactorily as per relevant standards. The disturbance to be considered as:-

- a) Harmonics

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- b) Voltage dips and short interruptions.
- c) Conducted transients.
- d) D.C. and A.C. magnetic fields
- e) Electrostatic discharges
- f) Electro Magnetic Fields.
- g) High frequency devices.

6.4. Radio Interference Suppressions -

The meter will not generate noise which could interfere with other equipment and the meter will work satisfactorily as per relevant standards.

6.5. Influence of High Magnetic Field -

The meters will be provided with appropriate magnetic shielding so that any external magnetic field (AC/DC electromagnet) as per CBIP Technical Report no. 88 with latest amendments, applied on meter would not affect the proper functioning of the meter and meter will work satisfactorily as per relevant standards.

7.0 GENERAL & CONSTRUCTIONAL REQUIREMENTS :

7.1. The construction of the meter shall be rigid & suitable to withstand shock & vibration involved in transportation & handling, as specified in IS 13779/ CBIP technical report – 88 with latest amendments.

7.2. Meter shall be designed and constructed in such a way as to avoid introducing any danger in normal use and under normal conditions, so as to ensure especially personal safety against electric shock, safety against effect of excessive temperature, protection against spread of fire, protection against penetration of solid objects, dust and water. The design of meter shall conform to the degree of protection IP 51 of IS: 12063 / IEC: 529 for protection against ingress of dust, moisture and vermin.

7.3. Meters shall be designed and constructed in such a way as to avoid introducing any danger in use so as to ensure specially:

- Personnel safety against electric shock.
- Personnel safety against effects of excessive temperature.
- Protection against spread of fire
- Protection against penetration of solid objects, dust and moisture and vermin.

7.4. Tropical Treatment -

7.4.1. All parts, which are subject to corrosion under normal working conditions, shall be protected effectively. Any protective coating shall not be liable to damage by ordinary handling or damage due to exposure to air, under normal working conditions.

7.4.2. Meters shall withstand solar radiation. The meters shall be suitably designed and treated for normal life & satisfactory operation under the hot and hazardous tropical climatic conditions as specified in clause no. 4.0 of this specification. The meter shall work from -10°C to +55°C and RH 95% noncondensing type.

7.5. Construction -

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- 7.5.1. The meter shall be of three-element construction to suit measurement in 3 phase 4 wire direct connected system.
- 7.5.2. The energy meter should conform to state-of-the art technology using ‘surface mounted’ components and thus shall ensure high reliability and long trouble free service.
- 7.5.3. Potential link less connection shall be provided inside the offered meter.

7.6. Meter Case -

- 7.6.1. The housing of the meter shall be safe high-grade Engineering plastic / polycarbonate or any other high quality insulating material and shall be very compact in design. All the insulation materials used in the construction of meter shall be non-hygroscopic, non ageing & of tested quality, capable of withstanding at least 4 kV and resistant to heat & fire.
- 7.6.2. The construction of the meter offered shall be such that it can be sealed independently and the meter cover cannot be removed without the use of a tool. The internal part of the meter can be accessible only after breaking the seal of the meter cover. The case of meters shall be so constructed that any non-permanent deformation shall not prevent the satisfactory operation of the meter.
- 7.6.3. The meter cover shall be fixed into the meter base with specially designed covered unidirectional screws and the meter body cover should be seamless ultrasonically welded/ fixed rigidly with the meter base to make the system ‘break-to-open’ type. Any other suitable break to open arrangement can also be considered subject to approval by purchaser. The details of the ‘break-to-open’ arrangement to be provided shall be furnished in shape of descriptive literature with drawings, brochures etc. along with bid. The meter top cover shall be made up of fully transparent polycarbonate material.

7.7. Windows -

- 7.7.1. The window will be scratch and break resistant type made of toughened transparent polycarbonate material suitably fixed with the meter cover so that it will form an integral part with the meter cover and thus it cannot be removed undamaged without breaking the meter cover seals. It would not fade in course of time and become opaque causing inconvenience for reading.
- 7.7.2. The viewing window would be minimum 2 ± 0.2 mm thickness. The fixing of window will be tight with single complete frame all round and will permit clear view of the display. There would not be ingress of moisture and dust through window.

7.8. Terminals and Terminal Block -

- 7.8.1. The base of the meter shall have a common terminal block at the bottom made out of High grade Engineering plastic so as to facilitate bottom connection and house solid brass terminals having capability to carry 150% of maximum value of current.
- 7.8.2. The terminal block should be non hygroscopic, non ignitable and with material of good dielectric and mechanical strength. The material of the terminal block shall pass the tests specified in CBIP technical report – 88 with latest amendments and IS13779.

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- 7.8.3. The terminal block shall satisfy all the conditions such as clearance & creepage distance between terminals & surrounding part of the meter as specified in relevant clause of IS 13779 : 1999 and CBIP technical report – 88 with latest amendments.
- 7.8.4. The terminal holes in the insulating material shall be of sufficient size to accommodate the insulation of the conductors. The terminal hole diameter shall not be less than 8.0 mm (approx.) & shall be of adequate length in order to have proper grip of conductors / crimping pins with the help of two screws.
- 7.8.5. The manner of fixing the conductors to the terminals shall ensure adequate and durable contact such that there shall be no risk of loosening or undue heating. Screw connections transmitting contact force and screw fixing which may be loosened and tightened several times during the life of the meter shall be such that the risk of corrosion resulting from contact with any other metal part is minimised.
- 7.8.6. Electrical connections shall be so designed that contact pressure shall not transmit through insulating material of the terminal block. For current circuits, the voltage shall be considered to be at the same potential as for the related voltage circuit.
- 7.8.7. Terminals with different potentials, which are grouped close together, shall be protected against accidental short-circuiting. Protection may be obtained by insulating barriers. Terminals of one current circuit are considered to be at the same potential.
- 7.8.8. All connection screws and washers shall be tinned / nickel plated brass. The terminal screws shall not have pointed end at the bottom. All terminals shall have two screws.
- 7.8.9. Terminal arrangement and marking- The terminal arrangement shall be marked in accordance with relevant Clause of IEC: 62053-22/ IS: 14697- 1999. Terminal arrangement shall be in single tier and shall be in sequence Ph-R (in), Ph-R (out), Ph-Y (in), Ph-Y (out), Ph-B (in), Ph-B (out), Neutral (in), Neutral (out).
- 7.9. Extended Terminal Block Cover (ETBC) –
- 7.9.1. The terminals block cover for the energy meters shall be of extended type made up of transparent polycarbonate material, and shall be fixed to the meter terminal block by two screws and can be sealed independently with the meter cover.
- 7.9.2. The terminals, their fixing screws, external conductors, their insulation and the insulated compartment housing them shall be enclosed by extended terminal cover in such a way that no part of meter or cable / accessories shall be accessible from the front of the meter. The terminal cover shall be provided with suitable cut / holes to allow easy connection / termination of cable.
- 7.9.3. The terminals shall not be accessible without removing the seal(s) of terminal cover when energy meter is mounted on the meter board. Bidirectional screws shall be provided for terminal cover.
- 7.9.4. The terminal block shall have the provision with double screws for fixing to the meter board. It shall not be possible to remove the meter from the hanging screws without removing the screws from the terminal block.
- 7.10. Connection Diagram –

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- 7.10.1. Every meter shall be indelibly marked with a connection diagram showing the phase sequence for which it is intended and shall be attached on the inner side of the extended terminal block cover.
- 7.10.2. In case any special precautions need be taken at the time of testing the meter, the same may be indicated along with circuit diagram.

7.11. Non Flammability -

- 7.11.1. The terminal block, terminal cover and the case shall ensure reasonable safety against spread of fire. They shall not be ignited by thermic overload of live parts in contact with them.
- 7.11.2. To comply with this, these parts shall fulfil the conditions of the glow wire test as per clause 5.2.4 of CBIP Technical report No. 88 with latest amendments. Test certificate for the material to be used for manufacture of terminal block, terminal cover and case shall be furnished.

8.0 REAL TIME CLOCK:

A real time quartz clock shall be used in the meter for maintaining time and calendar and as such no time switches etc. shall be provided. The uncertainty of setting initial time shall not be more than +/- 30 seconds from the Indian Standard Time as maintained by NPL, New Delhi. The Maximum drift shall not exceed ± 7 min. / year as per CBIP technical report-88 with latest amendments. Facility for adjustment of real time shall be provided through Meter Reading Instrument or PC / Laptop with proper security of hardware and software locks.

9.0 NON VOLATILE MEMORY:

The Meter shall have non-volatile memory (NVM) independent of battery backup & it shall retain data in ‘power-off’ conditions for a period of minimum 12 years without power supply. Readings shall be retained undisturbed in ‘power-off’ conditions and at the time of resumption of power supply, meter shall start reading / displaying cumulative values recorded prior to power interruption.

The meter shall have adequate memory capacity to keep records of meter reading, abnormalities of tamper events, billing history, load survey data & other relevant meter information.

10.0 SELF DIAGNOSTIC FEATURE:

The meter shall keep log in its memory for unsatisfactory / non-functioning of the RTC battery, LCD, Memory etc.. Further, the meter should have the capability to check the correctness of the wiring at the time of meter installation. The meter may display any suitable indication like ‘OK / Circuit OK’ etc. during installation for ensuring safe operation of meter. It should also indicate any failure of RTC battery/ memory. A detailed write-up on self-diagnostic feature to be provided by the bidder.

11.0 COMMUNICATION:

11.1. For Local Communication –

The energy meter will have a galvanically isolated optical port located in front of the meter for data transfer to/ from hand held Data Collection Device (Common Meter Reading Instrument, conforming to CBIP technical report-111 with latest amendments) with proper security and without error.

11.2. For Remote Communication –

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Meter will have an additional communication port RS 485/RJ 11 or any suitable port to interface standard dial up modems for remote data collection using PSTN/GSM/GPRS modem or any other means. In all case the bidder must supply the customized software. This shall be used for local data downloading through a DLMS compliant CMRI.

11.3. Data Downloading-

To enable local reading of meters data a CMRI with DLMS software tools to read any DLMS meter shall be used. The CMRI shall be as per specification given in the IS: 15959. It shall be able to collect the data from any DLMS compliant energy meters. Both the ports provided in the meter shall support communication on DLMS and should be accessible through a DLMS compliant CMRI . All necessary software (BCS & for CMRI) required for downloading shall be provided by the supplier without any additional cost to the purchaser.

11.4. The manufacturer may quote for any other improved type of communication port conforming to any international accepted standards. The manufacturer may adopt protocol of his choice but should load the meter software, protocol software, dial up software and any other required software into the base computer station of the purchaser.

11.5. After loading the software in the purchaser's base computer station / central computer station, the manufacturer shall demonstrate the data transfer through CMRI and PSTN/GSM/GPRS lines and regenerations of appropriate reports to the purchaser.

11.6. The data element size and its overhead speed of transmission shall be such that the entire billing data, load profile / survey, historical, tamper and all other data in the meter memory can be transferred within a maximum period of 10 minutes in order to achieve faster reading of meters.

12.0 CALIBRATION & TEST OUTPUT:

12.1. Meters shall be tested, calibrated and sealed at works before despatch. Further, no modification of calibration shall be possible at site by any means.

12.2. The meter shall have a test output accessible from the front and be capable of being monitored with suitable testing equipment. The operation indicator, if fitted, must be visible from the front. Test output device shall be provided in the form of LED(s) for kWh and kVArh with direct or the provision of selecting the parameter being tested.

12.3. Resolution of the test output shall be sufficient to enable the starting current test in less than 10 minutes and accuracy test at the lowest load shall be completed with desired accuracy within 5 minutes (as per clause 4.2.2.10 of CBIP report no.88 with latest amendments).

12.4. The relation between test output and the indication on display shall comply with the marking on the name plate (imp per kWh/kVArh or kWh/kVArh per imp).

13.0 DISPLAY OF MEASURED VALUE:

13.1. The meter information should be shown by an electronic display device. The electronic display of the meters should be bright enough and distinctly visible LCD with adequate contrast between letters / digits and the background for clarity and visibility so as to read one tenth of kWh.

13.2. Various display parameters can be cycled through a push button. Displayed parameters under present display will be identified with appropriate text and symbol. The height of display unit will be minimum 10 mm.

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- 13.3. Under normal condition, the meter will be in auto display mode, so that designated parameters will scroll cyclically in a continuous manner and the display 'ON TIME' will be at least 10 seconds for each measured value.
- 13.4. The meter would have the 'scroll-lock' facility i.e. the facility for continuous display of desired parameter from 'push button display sequence' to facilitate meter reading for a particular parameter. Push button display sequence will have overriding effect over auto-scroll-display sequence. Desired parameter can be seen for 5 minutes or more time instead of 'scroll lock' is also acceptable.
- 13.5. The meter Display should have backlight arrangement. When the meter is not energized, the electronic display will not be visible. However, in absence of power, meter display will be activated for meter reading by means of an additional internal battery backup.
- 13.6. The principal unit for the measured values shall be the kWh for active energy, kVARh for reactive energy & kVAh for apparent energy.
- 13.7. The display resolution of the meters will depend on commissioning value (CT /PT ratio) However, The energy register will be able to record and display, starting from zero for a minimum of 1500 hours, the energy corresponding to rated maximum current at reference voltage and unity power factor as per IS 13779. The register should not roll over in between this duration.
- 13.8. High resolution display of minimum 04 digits after decimal shall be provided for testing purpose only.
- 13.9. Apparent Energy Calculation shall be lag only (by default)/ Lag+lead depending upon the tariff. It shall be programmable & shall be informed at the time of placing PO.
- 14.0 QUANTITIES TO BE MEASURED AND DISPLAY:
- 14.1. Display parameters under present display will be identified with appropriate text and symbol on the LCD display of the meter. Therefore no such legend plate for details of various parameters being displayed will be required. The parameters shall be displayed in two modes of operation i.e Auto scroll display mode and Push button display mode.
- 14.2. The meter should be capable of recording and displaying following data in Auto scroll Display Mode:
1. LCD test (Display Test)
 2. Real Date
 3. Real Time
 4. Active Energy (Forward)
 5. Reactive Energy (Lag)
 6. Reactive Energy (Lead)
 7. Apparent Energy
 8. Maximum Demand in KVA
 9. Inst. Voltage (Each Phase to neutral)
 10. Inst. Current (R , Y & B Phase)
 11. Signed active power, KW (+ forward, - reverse)
 12. Apparent power, KVA
 13. Cumulative power failure duration
 14. Monthly Power on hours(Reset at billing point)
 15. Present TOD Energy (Active & Apparent)-(Zone-1, Zone-2)
 16. Present TOD Maximum Demand KW & KVA-(Zone-1,Zone-2)

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17. Previous Month Max Demand (KVA)
18. Cumulative Maximum Demand (KVA)
19. Previous Month TOD Energy (Active & Apparent)-(Zone-1, Zone-2)
20. Previous Month TOD MD KW & KVA)-(Zone-1, Zone-2)

14.3. The meter should be capable of recording and displaying following data in Push Button Display Mode:

1. LCD test (Display Test)
2. Real Date
3. Real Time
4. Rising Demand with E.T.(KVA)
5. Active Energy (Import)
6. Reactive Energy (Lag)
7. Reactive Energy (Lead)
8. Apparent Energy
9. Maximum Demand in KW & KVA
10. MD Reset Count/ Cumulative billing Count
11. Signed Power factor (Phase Wise & average)
12. Instant Frequency
13. Inst. Voltage (Each Phase to neutral)
14. Inst. Current (R , Y & B Phase)
15. Signed active power, KW (+ forward, - reverse)
16. Signed reactive power, KVAr (+ lag, - lead)
17. Apparent power, KVA
18. Cumulative power failure duration
19. Monthly Power on hours(Reset at billing point)
20. Present TOD Energy (Active & Apparent)-(Zone-1, Zone-2)
21. Present TOD Maximum Demand KW & KVA-(Zone-1,Zone-2)
22. Previous Month Max Demand (KW & KVA)
23. Cumulative Maximum Demand (KW & KVA)
24. Tamper Magnetic Influence on display
25. Present Status of Abnormality
26. Latest Occurrence of Abnormality with date & time
27. Latest Restoration of Abnormality with date & time
28. Previous Month TOD Energy (Active & Apparent)-(Zone-1, Zone-2)
29. Previous Month TOD MD KW & KVA)-(Zone-1, Zone-2)
30. Number of power failures
31. Cumulative Tamper Count
32. Cumulative Programming Count

Above parameters shall be configurable in three different pages in push button mode for displaying instantaneous parameters, energy & demand values, and tamper related events.

Display sequence of the above parameters can be changed as desired at the time of placement of order or Four (4) weeks before commencement of delivery.

15.0 BILLING, LOAD SURVEY & TAMPER DATA IN HISTORY:

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15.1. The meter shall have sufficient memory capacity in the Non-Volatile Memory for recording following parameters as history for last twelve billing cycles:

- a) Billing data- Billing date, system PF for billing period, Cumulative KWh, Cumulative KVARh (lag & lead), Cumulative KVAh, Maximum Demand (KW & KVA), TOD Cumulative KWh, TOD Cumulative KVAh, TOD MD in KW & TOD MD in KVA.
- b) Load survey data- Date & Time, phase wise voltage, phase wise current, Block energy in KWh, Block energy in KVARh (Lag & lead), Block energy in KVAh, Block Demand in KW, Block Demand in KVA and Signed Power Factor (+Lag/- Lead)
- c) Monthly power ON or OFF hours
- d) Cumulative power ON or OFF hours
- e) Tamper events minimum last 150 events (occurrences and restorations as separate events) on FIFO basis.

15.2. The meter shall be capable of recording and storing load survey data for at least 70 Power On Days. In case there is no power for the complete day from 00:00 hrs to 2400 hrs, the same shall not be recorded in Load survey days.

15.3. The logging interval or integration period for load survey shall be 15 Minutes by default and shall be programmable.

15.4. The load survey data can be retrieved with the help of Common Meter Reading Instrument and through remote connectivity, as and when desired & load profiles could be viewed graphically / analytically with the help of meter application software. The meter application software shall be capable of exporting these data for analysis to other user software in spreadsheet format (Excel or any other advanced format).

Apparent energy calculation	Apparent Energy shall be computed considering Reactive Energy (Lag) only
TOD DATA	
No. of Programmable Time Zones	Eight
No. of Active Time zones	Two
TOD Timing	Zone 1- 22: 00 Hrs to 06:00 Hrs Zone 2- 06:00 Hrs to 22:00 Hrs Programmable 8zones
TOD parameters to be recorded	TOD Cumulative KWh, TOD Cumulative KVAh, TOD MD in KW & TOD MD in KVA
	TOD timings shall be informed at time of placing PO

16.0 MD REGISTRATION :

16.1. The meter shall continuously monitor and calculate maximum demand for each tariff rate for TOD metering. At the end of every demand integration period (15 minutes) the new calculated MD shall be compared with the previous MD and meter shall store whichever value is higher.

16.2. MD RESET: The meter shall have the following MD resetting options:-

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- a) Automatic reset at the end of a certain predefined period. The predefined period shall be at 24:00 Hrs of the last date of each calendar month (or 00:00hrs of 1st day of each calendar month) for which at least 30 years calendar shall be programmed by the manufacturer.
- b) Resetting locally through a CMRI or remotely through GSM / PSTN communication with the meter through authenticated command is not allowed.
- c) Manual resetting arrangement (MD reset push button) with sealing facility is not required.
- d) All MD reset shall be recorded as an event.

17.0 ABNORMALITY EVENTS DETECTION :

17.1. The functioning of the meter shall be as follows under these common abnormal conditions:

Sl. No.	Abnormality	Meter behaviour	Tamper Logging
1	Phase sequence reversal	The meter shall keep working accurately irrespective of the phase sequence of the supply.	-
2	Missing Potential & Potential imbalance	The meter shall be capable of detecting and recording the cases of Potential failure which could happen due to disconnection of potential leads (one or two) or failure of phase line fuse from the Transformer primary side. Meter shall also detect and log cases of potential imbalance (from 20 % or more, for persistence time of minimum 10 minutes).	The meter shall record occurrence and restoration of event with date and time. Meter shall also log cases of potential imbalance.
3	Missing Neutral	The meter shall continue to record energy according to electrical connections even if the Neutral of potential supply is accidentally or incidentally disconnected.	-
4	Neutral Disturbance	Meter shall be provided with the proper logic to identify neutral disturbance	Meter shall record the event with date & time of occurrence & restoration.
5	Diode circuit on outgoing neutral.	Meter should record energy accurately as per IS with external diode circuit in the outgoing neutral.	-
6	Current reversal / connection reversal	The meter shall record actual energy in forward direction within accuracy.	Meter shall record the event with date & time of occurrence & restoration with phase identification.

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7	CT Short & CT Open	The meter shall be capable of detecting the event.	Meter shall record the event with date & time of occurrence
		On no load condition in any phase shall not be treated as CT open event.	& restoration.
8	Current imbalance	The meter shall be capable of detecting the event (30% or more for persistence time of minimum 10 minutes).	Meter shall record the event with date & time of occurrence & restoration.
9	External magnetic influence	The metering system shall be provided with adequate magnetic shielding so that any external magnetic field (AC Electro Magnet or DC Magnet) applied on the metering system shall record the energy as per error limits specified in CBIP Technical Report No.88 (with latest amendments).	Additionally, meter shall be capable to record the presence/ removal of magnet with date & time stamp in case the influence of magnet exceeds the limit as desired in the respective standard.
10	Top Cover open	Meter shall be capable to detect the cover open event in both powers on and off condition instantly.	Meter shall log the event with date and time. Indication shall be provided on display.

N.B. The meter shall record the above abnormalities with time and date of their occurrences & restorations with a snap shot of electrical conditions viz. Voltage, current, PF, KWH etc at Base Computer System. Logic for logging tamper events shall be furnished by the bidder.

- 17.2. Power on/off- The meter shall be capable to record power on /off events in the meter memory persisting beyond specified time. Persistence time shall be 10 minutes by default. The report shall be available through base computer software in a meaningful format indicating occurrence / restoration and total power outage.
- 17.3. Software Changing- Any communication with the meter for any change in meter software or any attempt to write in meter software (software tamper) shall be recorded in the meter memory with date and time stamping. However, any communication for reading the meter data should not be recorded in the meter memory. This data should also be available in the display as highlighted in this specification.
- 17.4. Software locking- The meter shall have password protected software locking provision to enable any change in TOD timings or any other requirement of DISCOM.
- 17.5. Spark discharge of approximately 35 KV- The accuracy of the meter should not be affected with the application of abnormal voltage/ frequency generating device such as spark discharge of approximately 35 KV. The meter shall be tested by feeding the output of this device to meter in any of the following manner for 10 minutes: -
- One any of the phases or neural terminals
 - On any connecting wires of the meter
 - Voltage Discharge with 0-10 mm spark gap

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- d) At any place in load circuit
- e) On RS 485/RJ 11 or any suitable port
- f) On meter display

The accuracy of meter shall be checked before and after the application of above device(s) with site conditions.

- 17.6. The meter shall also be capable to withstand and shall not get damaged if phase-to-phase voltage is applied between phase- to- neutral.
- 17.7. The meter shall keep records for the minimum last 150 events (occurrences and restorations as separate events) for above of abnormal conditions. The recording of events shall be on FIFO basis.
- 17.8. It shall be possible to retrieve the abnormal event data along with all related snap-shots data through the meter's optical port/ RS 485/RJ 11 or any suitable port with the help of a DLMS complied CMRI and download the same to the BCS where it shall be available for viewing. All this information shall be made available in simple and easily understandable format.
- 17.9. The selection of the abnormality events and manner of recording, retrieval etc. shall be decided during the technical evaluation of the offers and will be spelt out in the contract.
- 17.10. The bidder may offer any other recordable abnormality event, which will be useful in consumer metering, along with the detailed descriptions, literatures, usefulness and every other implications

18.0 SEALING ARRANGEMENT OF METER:

- 18.1. Proper sealing arrangement should be provided on the meter to make it tamper proof and avoid mishandling by unauthorized person.
- 18.2. The manufacturer shall provide minimum two nos of poly carbonate seals applied on meter body at the factory after calibration and testing.
- 18.3. The meter cover shall have provision for placing minimum two numbers additional seals by the purchaser.
- 18.4. The terminal block cover shall have provision for placing minimum two seals by the purchaser.
- 18.5. One separate sealing arrangement shall be provided for optical port used for data communication.
- 18.6. The holes for sealing wire shall be of 2mm diameter approximately, suitable for making satisfactory sealing of the meters.
- 18.7. All the sealing screws when they are in open condition (i.e. not fixed) should not be easily detachable from the respective cover. The meter shall be designed and constructed in such manner to make it pilfer proof.
- 18.8. All the above seals should be provided on front side only apart from two numbers of tamper evident holographic seals or any better quality on the side of the meter. Rear side sealing arrangement will not be preferred.

19.0 MARKING OF METER:

- 19.1. The meter terminal marking and mounting arrangement should be as per Indian installation practices. The marking on every meter shall be in accordance with IEC.62053-22/ IS 13779:1999.
- 19.2. Every meter shall have name plate beneath the meter cover such that the name plate cannot be accessed without opening/ breaking the seals of the meter cover.

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19.3. The marking on name plate of the meter shall be indelible, distinct and readable from outside of the meter. Standard symbols may also be used. The name plate marking should not fade with lapse of time.

19.4. The basic markings on the meter name plate shall be as follows:-

- 1) Manufacturer's name or trade mark.
- 2) Designation of type
- 3) Number of phase and number of wires
- 4) Serial number
- 5) Year of Manufacture
- 6) Reference voltage
- 7) Principal unit(s) of measurement
- 8) Rated secondary current of CT
- 9) Reference frequency in Hz
- 10) Meter constant
- 11) Class index of meter
- 12) Firmware version of meter
- 13) ISI marking
- 14) Purchase Order Number & Date
- 15) Guarantee Period
- 16) Property of _____

20.0 MANDATORY ACCESSORIES :

- 20.1. Bidders should undertake to maintain sufficient inventory of spares and critical components of the meters at their local office at Bhubaneswar or at their manufacture works, which are likely to become obsolete due to rapid technological changes in electronics and IT sectors.
- 20.2. In the event of placement of order, they must also ensure availability of required components and spares such as inter facing cord & supporting software (indigenous or imported) for data communication, even if the same components and spares become obsolete, till completion of guarantee period.
- 20.3. Inability to supply required spares/accessories during the guarantee period will be considered as a breach of contract and may warrant penal action. An undertaking to this effect must be enclosed by the bidder along with his offer.
- 20.4. Bidders are requested to ensure clearly above mandatory accessories are the part of price schedule.

21.0 SOFTWARE :

- 21.1. The firm has to provide required BCS & CMRI software for data down loading & analysis at free of cost.

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21.2. The supplier shall provide the required copies of meter Software in CDs. Any further modification required for the meter Software after purchase of meter should be done free of cost by the supplier.

22.0 METER READING PROTOCOL :

The Supplier has to provide Meter Reading Protocols for billing parameters, tamper data etc. at free of cost with valid key.

23.0 SAMPLES :

23.1. Two sample meters conforming to this specification duly sealed along with the Type Test certificates shall be submitted with the bid. The above sample meters shall be tested in purchaser's meter testing lab and/or any independent test lab and the testing charges will be borne by the supplier.

23.2. The samples shall be complete in all respects and no deviations shall be allowed thereafter. In case sample meters do not conform to the prescribed specifications, the price bid of the bidder shall not be opened.

23.3. It will be compulsory to submit sample meters as above along with the bid, failing which the bid will be ignored.

24.0 DRAWING :

The detailed drawing of the tendered items will have to be furnished with the bid document for approval

25.0 TEST AND TEST CONDITIONS :

25.1. Type Test –

25.1.1. The offered materials should have been type-tested at NABL accredited laboratory/ Govt. approved laboratory such as CPRI/ ERDA / ERTL etc.

25.1.2. The offered meter should have been tested and passed the compatibility test for conformance to DLMS as per IS: 15959 from any Govt./ NABL accredited Laboratory. Relevant test report shall be submitted along with the bid.

25.1.3. The bid shall accompanied with type-test reports conducted at any above laboratories & duly approved by the Type Testing Agency for the offered materials conducted within five years before the date of opening of the tender.

25.1.4. Bids not accompanied with type test reports conducted within five years shall not be considered for evaluation.

25.2. Routine Test-

25.2.1. All routine tests shall be carried out on each meter to check conformity with the requirements as stipulated in the relevant standard.

25.2.2. The Routine tests certificates shall be submitted to the purchaser for verification before submission of inspection intimation at factory premises of the manufacturer.

25.3. Acceptance Tests:

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25.3.1. All acceptance tests as stipulated in the relevant standard shall be carried out by the supplier at factory site in the presence of Purchaser's authorized representative on samples from the lot for the purpose of acceptance of the meters.

25.3.2. Also the following additional acceptance tests shall be carried out as per CBIP technical report –88 (with latest amendments) on randomly selected samples from each lot offered for inspection –

- a) Magnetic induction of external origin (AC & DC)
- b) Tamper and fraud protection as per clause- 17.0 of this Specification
- c) Effect of high frequency devices

25.4. Additional Acceptance Tests :

25.4.1. Ageing Test (Dry Heat Test)

During inspection, each one meter selected randomly from 500 meters shall be subjected to accelerated ageing test to eliminate infant mortality, i.e., meters are to be kept in ovens for 72 hours at 70±2 deg. Centigrade temperature & atmospheric humid condition. After 72 hours meters should work correctly. Facilities / arrangement for conducting ageing test should be available with the manufacturer.

25.4.2. Full load test for 12 hours-

During inspection, each one meter (other than the meter tested under aging test) selected randomly from 500 meters shall be subjected to a full load operation continuously for a minimum period of 12 hours to test its durability at high loads.

26.0 INSPECTION :

26.1. The supplier will keep the Purchaser informed in advance of the time of the starting and the progress of manufacture of equipment in its various stages so that arrangement could be made for inspection. The customer hold points will be defined at the time of issue of final order. The authorized representative of the _____ will have access to the supplier's or his subcontractor's work at any time during working hours for the purpose of inspecting the materials during manufacturing of the materials / equipment and testing and may select test samples from the materials going into plant and equipment. The supplier will provide the facilities for testing such samples at any time including access to drawings and production data at no charge to Purchaser.

26.2. The supplier will give 15 days advance intimation to enable the Purchaser depute his representative for witnessing the tests.

26.3. As soon as the materials are ready the supplier will duly send intimation to _____ and carry out the tests in the presence of authorized representative of the _____. If feels necessary _____ may select one sample from the lot at factory to send for testing at any Govt./ NABL accredited Laboratory or any other standard laboratory. In this case all inspection & testing charges in this connection will be borne by the supplier.

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- 26.4. The _____ may at its option get the materials inspected by the third party if it feels necessary and all inspection charges in this connection will be borne by the supplier.
- 26.5. The dispatches will be affected only if the test results comply with the specification. The dispatches will be made only after the inspection by the _____ authorized representative is completed to the _____ satisfaction.
- 26.6. The acceptance of any quantity of materials will in no way relieve the supplier of its responsibility for meeting all the requirements of this specification and will not prevent subsequent rejection if such materials are later found to be defective or deviation from specification/IS.
- 26.7. Should any inspected or tested materials / equipment fail to conform to the specification, the Purchaser may reject the materials and supplier will either replace the rejected materials or make alterations necessary to meet specifications requirements free of costs to the Purchaser.

27.0 PACKING & FORWARDING :

- 27.1. The meters shall be packed in crates suitable for vertical / horizontal transport, as the case may be, and suitable to withstand handling during transport and outdoor storage during transit. The supplier shall be responsible for any damage during transport and outdoor storage during transit due to improper and adequate packing.
- 27.2. The easily damageable material shall be carefully packed and marked with appropriate caution symbol. Wherever necessary, proper arrangement for lifting such as lifting hooks etc. shall be provided. Any material found short inside the packing cases shall be supplied immediately without extra cost.
- 27.3. Each consignment shall be accompanied with detailed packing list containing the following instructions:
- a) Name of the consignee
 - b) Details of consignment
 - c) Destination
 - d) Total weight of consignment
 - e) Handling and packing instructions
 - f) Bill of material indicating contents of each package

27.4. The packing shall be done as per the manufacturer's standard practice. However, he shall ensure that the packing is such that the material should not get damaged during transit by rail / road. The marking on each package shall be as per relevant standard and shall contain " _____ " imprint.

28.0 RANDOM SAMPLE TESTING AFTER DELIVERED AT STORE :

- 28.1. After receipt of meters at _____ Stores, random samples shall be collected from the received lot of meters as per sampling plan of relevant IS to which the meter conforms and shall be sent to purchaser's laboratory for testing as per IS and GTP.
- 28.2. The consignment of meters received at Stores shall be taken into account only after the meters are passed at purchaser's laboratory as per sampling plan. If the sample fails in the above tests, the entire lot will be rejected.

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28.3. The purchaser may test the sample meters at any nationalized laboratory / standard laboratory for conformity to the specification. In this case, the testing charges will be borne by the supplier

29.0 COMPONENTS

<u>Components to be used in Whole Current Meter</u>		
Sl. No.	Name of Components	Make
1	Current Element	Any make or origin conforming to IS-2705
2	Measurement / computing chips	Analog Devices, AMS, Cyrus Logic, Atmel, SAMES, NEC, Texas Instruments, Phillips, Maxim, Toshiba, Renesas, Siemens, National Semiconductor, Free scale semiconductor
3	Memory chips	Atmel, National Semiconductors, Microchip, Texas Instruments, Phillips Hitachi, Teridian, Toshiba, Renesas, ST
4	Display modules	Hailing, Holtek, Bonafied Technologies, Advantek, Truly Semiconductor, Hitachi, Sony, Tianma, Fairchild
5	Communication modules	National Semiconductors, Hitachi, Texas Instrument, Philips, Hp, Agilent, Everlight
6	Optical port	National Semiconductors, Hitachi, Texas Instruments, Siemens, Agilent, Philips, HP, Everlight
7	Electronic components	Philips, Toshiba, Fairchild, Murata, Rohm, Siemens. National Semiconductors, ATMEL, Texas Instruments, Hitachi, Ligitec, OKI, EPCOS, EPSON, Panasonic
8	Mechanical parts	INDIA: Precision Industrial Components Ltd, Prem Industries Ltd, AMPSON PLASTICS

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9	Battery	Renata, Panasonic, Varta, Tedrium, Sanyo, National, Tadiran, Duracell, Tekcell, Vitzrocell
10	RTC / Micro controller	Philips, Dallas, Atmel, Motorola, NEC, Renesas, Hitachi, Xicor, Texas Instruments, NEC, OKI, EPSON, Free scale semiconductor,

TECHNICAL SPECIFICATION FOR TAMPER PROOF BOX TO HOUSE THE METER

1. **SCOPE:** The box shall be weather proof made out of polycarbonate flame retardant properties. It shall be capable of withstanding temperatures of boiling water for 5 minutes continuously without distortion or softening. The colour of the box shall be Transparent.
2. **STANDARD:** The Boxes shall generally comply with the provisions of IS 5133. The boxes shall be suitable for outdoor/ indoor application. The outdoor box shall have its roof designed for easy flow of rain water without any stagnation on the box. The box shall be with good workmanship.
3. **THICKNESS:** The thickness of the box shall not be less than 3 mm on the load bearing side (i.e. back side of the box) and other sides, door and roof shall not be less than 2.5 mm.
4. **DIMENSION:** The overall dimension of the box shall be such that, there should be adequate clearance on front side and all other sides between meter and box surface , to provide flexibility to the installation and operation of the meter.
5. **INTERNAL HINGES:** A minimum of 2 nos. metallic internal hinges well protected against corrosion shall be provided. The hinges of the door should be concealed and they shall be fixed to the flanges provided to the base and cover of the box in such a manner that the door opens by a minimum of 120 degrees & it shall not be possible to access the hinges from outside.
6. **Handle:** Suitable handle or knob shall be provided for easy opening of the box door.
7. **Latch:** The door shall be provided with a MS Zinc Plated GI latch or a ‘U’ clamp to secure it with the base of the box.
8. **INLET/ OUTLET HOLES:** Suitable circular holes shall be provided at the bottom of the box for inlet and outlet with self adjusting collapsible glands securely fixed to the box on both sides by check nuts. The incoming and outgoing cables shall be clamped to the inside base of the meter box to ensure fixing of the cable. Barrier plate shall be provided suitably, so that direct access to meter terminals shall not be possible from outside.
9. **GASKET PROVISION:** Soft rubber gaskets shall be provided all around wherever required for protection against entry of dust and water. It shall comply with IP-53. There should not be any ingress of moisture through this window into the box.

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10. **PUSH BUTTON:** To facilitate for reading the parameters by manual push button on the meter, a spring loaded push button arrangement shall be provided at the front of the box with sealing provision.
11. **FIXING ARRANGEMENT:** The meter base supports inside the box are raised by about 10 mm in the box for ease of wiring. While fixing the meter screws should not protrude outside. For fixing the box to wall or wooden board 4 nos. key holes of minimum 6 mm dia shall be provided at the four corners of the meter box. The meter is to be installed in the box and the box in the assembled condition shall have provision to fix it to a pole or on wall. The fixing arrangements shall not be complex and it shall be easily approachable for connections when the door is open and is completely tamper evident once it is sealed.
12. **SEALING ARRANGEMENT:** The box shall have provision to put 2 nos. seals for making it fully tamper evident.
13. **PRINTING:** Metallic label containing the letters “_____” and the P.O. No. and date shall be engraved on the top cover of the box. The name of the manufacturer shall be engraved on the front side of the box.
14. **D. PORT:** Provision for fixing of 01 no of RS-232 serial port (D-Port) with sealing arrangement must be provided for communication of meter with meter reading instrument without opening the door.
15. **Modem Housing In the Meter:** The meter box should be capable to house modem with antenna.
16. **DRAWING:** The dimensional drawing giving details of meter box shall be enclosed in the bid. Bidders are requested to furnish detail Meter mounting arrangement in their bid. The dimensional drawing giving details of meter box shall be enclosed in the bid.

GUARANTEED TECHNICAL PARTICULARS

(Tender Specification No. _____
 3P4W, STATIC, 200-100A, CLASS-1.0, WHOLE CURRENT ENERGY METERS
 (Category-C2)

Sl. No.	Item	Purchaser's Requirement	Bidder's data
1	Make	-	
2	Type	-	
3	Country of origin	-	
4	Standard to which the meter confirm	As per CI 3.0, section- IV of this specification/ any other standard followed shall be mentioned by bidder	
5	Suitable type of load for metering	All type of load (linear, non linear, balanced /unbalanced at any P.F.)	
6	Application	3 phase 4 wire	

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7	Rated Voltage	230 Volts (Ph to N)	
8	Voltage Variation range	(+)20% V _{ref} to (-)30% V _{ref}	
9	Rated Current	20 Amps (balanced & unbalanced load)	
10	Rated maximum continuous current (I _{max})	100 Amps	
11	Minimum starting Current for energy registration	0.2% of I _b at unity PF	
12	Current working range	0.2% of I _b to I _{max}	
13	Rated Frequency	50 Hz	
14	Frequency Variation range	50 Hz ± 5 %	
15	Accuracy Class	1.0	
16	Power Factor	Zero (lagging)- Unity - Zero (leading)	
17	standard Temperature for performance	The standard reference temperature for performance shall be 27°C. The mean temperature co-efficient shall be as per IS.	
18	Working range of temperature	-10°C to +55°C	
19	Power consumption in		
a)	Voltage circuit	shall not exceed 1.5 W and 10 VA per phase respectively	
b)	current circuit	shall not exceed 4.0 VA per phase	
20	Performance under influence quantities	shall work satisfactorily within guaranteed accuracy limits, as specified in IS 13779: 1999 / CBIP technical report – 88 with latest amendments	
21	Total Weight of meter	To be specified by the bidder	
22	Details of Meter body		
a)	Degree of protection of meter	IP 51 (as per IS: 12063 / IEC: 529) for protection against ingress of dust, moisture and vermin.	
b)	Meter construction material		
i	Meter case	high-grade Engineering plastic / polycarbonate or any other high quality insulating material	

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ii	Window	scratch and break resistant type toughened transparent polycarbonate material	
iii	Terminal Block	High grade Engineering plastic	
iv	Extended terminal block cover	Transparent polycarbonate material	
v	Terminals	Solid brass	
vi	Terminal screw material	Tin / nickel plated Brass	
c)	Clearance & creepage distance of terminals	Shall conform to standards as specified in relevant clauses of IS 13779:1999 and CBIP technical report – 88 with latest amendments	
d)	Terminal hole diameter	shall not be less than 8.0 mm (approx.)	
e)	No. of terminal screws	Two	
f)	Terminal arrangement and marking	Shall be arranged and marked in accordance with relevant clause of IEC: 62053-22/ IS: 13779- 1999.	
g)	Connection diagram	Shall be indelibly marked and attached on the inner side of the extended terminal block cover	
23	Real time clock (RTC)		
a)	Clock	real time quartz clock	
b)	Uncertainty of setting initial time	shall not be more than +/- 30 seconds from the Indian Standard Time as maintained by NPL, New Delhi	
c)	Maximum drift	shall not exceed ± 7 min. / year as per CBIP technical report-88 with latest amendments	
d)	Facility for adjustment of time	shall be facilitated through Meter Reading Instrument or PC / Laptop with proper security of hardware and software locks	
24	Non volatile memory		
a)	Memory capacity	shall have adequate memory capacity to keep records of meter reading, abnormalities of tamper events, billing history, load survey data & other relevant meter information	
b)	Memory retention period	For at least 12 years without power supply	
25	Self diagnostic feature		

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a)	Logging in memory	shall keep log in its memory for unsatisfactory / non-functioning of the RTC battery, LCD, Memory etc.	
b)	Display Indication for safe operation during installation	any suitable indication like 'OK / Circuit OK' etc.	
c)	Indication for failure of RTC battery/memory	Shall be provided in meter display	
26	Communication port available in meter		
a)	For Local communication	galvanically isolated optical port	
b)	For Remote communication	communication port RS 485/RJ 11	

		or any suitable port to interface standard dial up modems for remote data collection using PSTN/GSM/GPRS modem	
27	Data downloading facility		
a)	Instrument	CMRI with DLMS software tools to read any DLMS meter	
b)	Compatibility	It shall be able to collect the data from any DLMS compliant energy meters.	
c)	Maximum time allowed for data downloading	10 minutes	
28	Test output device	shall be provided in the form of LED(s)	
29	Details of Display		
a)	Type of Energy Registration Mechanism.	Electronic display (LCD screen)	
b)	Height of display unit	10 mm (minimum)	
c)	Digits to display for energy reading	Minimum 7 digit (without decimal)	
d)	Digits to display in high resolution mode	minimum 04 digits after decimal	
e)	Segments for display of one digit	7 (Seven) segment display	
f)	Display backlit	Arrangement shall be provided	
g)	Modes of display	Auto scroll mode and Push button mode	
h)	Default mode of display	Auto scroll mode	
j)	Minimum time for display of each parameter	Should be sufficient to read & note (around 10 sec.)	
k)	Display parameters in Auto scroll mode	As per Cl. 14.2, section- IV of this specification	

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l)	Display parameters in push button mode	As per Cl. 14.3, section- IV of this specification	
m)	Display Scroll-lock facility	As per Cl. 13.4, section- IV of this specification	
n)	Display unit power backup	In absence of power, meter display will be activated for meter reading by means of an additional internal battery backup	
30	Meter data as history		
a)	History period	Last twelve billing cycles	
b)	History parameters to be recorded in NVM	As per Cl. 15.1, section- IV of this specification	
31	Load Survey Data		
a)	No of days	70 power on days	
b)	Demand integration period	15 minutes by default (programmable)	
c)	Load survey Parameters	Date & Time, phase wise voltage, phase wise current, Block energy in KWh, Block energy in KVARh (Lag & lead), Block energy in KVAh, Block Demand in KW, Block Demand in KVA and Signed Power Factor (+Lag/- Lead)	
d)	Apparent energy calculation	Apparent Energy shall be computed considering Reactive Energy Lag only	
32	TOD Data		
a)	No. of Programmable Time Zones	Eight	
b)	No. of Active Time zones	Two	
c)	TOD Timing Zone	Zone 1- 22: 00 Hrs to 06:00 Hrs Zone 2- 06:00 Hrs to 22:00 Hrs	
d)	TOD parameters to be recorded	TOD Cumulative KWh, TOD Cumulative KVAh, TOD MD in KW & TOD MD in KVA	
33	MD Reset Mechanism	Automatic 24:00 Hrs of the last date of each calendar month (or 00:00hrs of 1st day of each calendar month)	
34	Abnormality events detection		
a)	Phase Sequence reversal	As per Cl. 17.1 Sl. No.1, section- IV of this specification	
b)	Missing Potential & Potential imbalance	As per Cl. 17.1 Sl. No.2, section- IV of this specification	

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c)	Missing Neutral	As per Cl. 17.1 Sl. No.3, section-IV of this specification	
d)	Neutral Disturbance	As per Cl. 17.1 Sl. No.4, section-IV of this specification	
e)	Diode circuit on outgoing neutral	As per Cl. 17.1 Sl. No.5, section-IV of this specification	
f)	Current reversal / connection reversal	As per Cl. 17.1 Sl. No.6, section-IV of this specification	
g)	CT Open & CT Short	As per Cl. 17.1 Sl. No.7, section-IV of this specification	
h)	Current imbalance	As per Cl. 17.1 Sl. No.8, section-IV of this specification	
i)	External magnetic influence	As per Cl. 17.1 Sl. No.9, section-IV of this specification	
j)	Top Cover open	As per Cl. 17.1 Sl. No.10, section-IV of this specification	
35	Abnormal event data preservation capacity	Should be able to store minimum last 150 events (occurrences and restorations as separate events) on FIFO basis.	
36	Power on off event	The meter shall be capable to record power on /off events in the meter memory persisting beyond specified time (15 minutes by default)	
37	Software Changing	Any communication with the meter for any change in meter software or any attempt to write in meter software (software tamper) shall be recorded in the meter memory with date and time stamping	
38	Software locking:	The meter shall have password protected software locking provision to enable any change in TOD timings or any other requirement of DISCOM.	
39	Sealing arrangement of meters		
a)	Sealing at factory	manufacturer shall provide minimum two nos of poly carbonate seals applied on meter body at the factory after calibration and testing	
b)	Sealing by purchaser	meter cover shall have provision for placing minimum two numbers seals by the purchaser	

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c)	Terminal block sealing	terminal block cover shall have provision for placing minimum two seals	
d)	Optical port sealing	One separate sealing arrangement shall be provided for optical port used for data communication	
40	Marking of meter	As per Cl. 19.4, section- IV of this specification	
41	Mandatory Spare parts/accessories	To be mentioned by bidder	
42	Undertaking to maintain sufficient inventory of spares and critical components of meter	To be furnished by the bidder along with bid document	
43	Software	The firm has to provide required BCS & MRI software for data down loading & analysis at free of cost.	
44	Meter Reading Protocol	The Supplier has to provide Meter Reading Protocols for billing parameters, tamper data etc. at free of cost with valid key.	
45	Components to be used in LT CT Meter		
a)	Current Transformers	To be specified by bidder	
b)	Measurement or computing chips	To be specified by bidder	
c)	Memory chips	To be specified by bidder	
d)	Display modules	To be specified by bidder	
e)	Optical port	To be specified by bidder	
f)	Power Supply	To be specified by bidder	
g)	Electronic components	To be specified by bidder	
h)	Mechanical parts	To be specified by bidder	
i)	Battery	To be specified by bidder	
j)	RTC & Micro controller	To be specified by bidder	

Signature of bidder
with seal of company

This form is to be duly filled up & ink signed by the Bidder along with seal & submitted along with the Part-I of tender

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ANNEXURE – IV (B)

TECHNICAL PARTICULARS OF T.P BOX FOR 3 PH4W, 20-100A WC METER

Sl. No.	Characteristics	Purchaser's Requirements	Bidders Data
1	Manufacture's Name		
2	Material used for box body	Polycarbonate	
6	Colour	Transparent.	
3	Material withstanding temperature	Capable withstanding temperatures of boiling water for 5 minutes continuously without distortion or softening.	
4	Standard to which the meter box follows	IS 5133	
5	Suitability of installation	for outdoor/ indoor application	
6	Thickness (mm)	3 mm on the load bearing side (i.e. back side of the box) and other sides, door and roof shall not be less than 2.5 mm	
7	Dimensions of box	Length x Breadth x Depth of the box Shall be mentioned by bidder. Should be capable to house the modem with antenna. Necessary arrangement of fixing the modem should be provided.	
8	Viewing window material	non-scratchable break resistant UV stabilized transparent poly carbonate material	
9	Thickness of viewing window	2.0 mm thickness (minimum)	
10	Shade arrangement to window	To be Provided	
11	No. of Internal hinges provided	Two (minimum)	
12	Hinge Material	Metallic	
13	Handle Provision	To be Provided	
14	latch or a 'U' clamp material	MS Zinc Plated GI	
15	Inlet & Outlet holes	Suitable circular holes shall be provided at the bottom of the box for inlet and outlet of cables	
16	Glands at holes	Self adjusting collapsible glands shall be provided	
17	Gasket provision	Soft rubber gaskets shall be provided all around the box. It shall comply with IP-53.	
18	Push Button arrangement	spring loaded push button arrangement shall be provided at the front of the box with sealing provision	

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19	Fixing arrangement	4 nos. key holes of minimum 6 mm dia shall be provided at the four corners of the meter box	
20	Sealing Arrangement	The box shall have provision to put 2 nos. seals for making it fully tamper evident	
21	Printing	Metallic label containing the letters “_____” and the P.O. No. and date shall be engraved on the top cover of the box. The name of the manufacturer shall be engraved on the front side of the box	
22	D Port arrangement	Provision for fixing of 01 no of RS-232 serial port (D-Port) with sealing arrangement must be provided for communication of meter with meter reading instrument without opening the door.	
23	Drawing	The dimensional drawing giving details of meter box shall be enclosed in the bid.	

Signature & Seal of Bidder

This form is to be duly filled up & ink signed by the Bidder along with seal & submitted along with the Part-I of tender

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