

TECHNICAL SPECIFICATIONS FOR EMPANELMENT OF AC Static Single PHASE ELECTRONIC ENERGY METER OF CLASS 1.0 ACCURACY WITH NET METERING CAPABILITY UNDER TN- 2653

1.0 SCOPE

(i) This specification covers the design, engineering, manufacture, assembly, inspection, testing of Class 1.0 accuracy, electronic energy meter, suitable for connection to LT single phase 2 wire, 240 V system. The static whole current electronic meter shall offer current range of 5-30 A (first digit indicates the Basic Current & second digit indicates the Maximum Current of the respective meters) for tariff purposes, as per requirement given in this specification.

(ii). It is not the intent 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 commercial operation in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which in his judgment is not in accordance therewith. The offered Single Phase Net Meter shall be complete with all accessories, software and components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in this specification and/or the commercial order or not.

(iii)The meter shall be ISI mark & bidder shall furnish the details of ISI license at the time of bid opening.

2.0 REQUIREMENT :

The requirement is of 240 Volt 50 Hz A.C. Static Single Phase 5-30 Amp. rating whole current Energy Meters of accuracy class 1.0 having Net Metering Capability which should be suitable for establishing local communication with CMRI along with separate meter box.

3.0 CLIMATIC CONDITION

The meters to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions. Meters shall be capable of maintaining required accuracy under hot, tropical and dusty climate.

1.	Maximum ambient air temperature in shade.	45 Deg. C
2.	Relative humidity	95% non-condensing
3.	Maximum altitude above mean sea level	Up to 1000 meters.
4.	Maximum wind pressure	150 Kg/m. sq.
5.	Average number of tropical monsoon (conditions) per annum	4 months
6.	Average annual rain fall	10 cms to 100 cms.
7.	Seismic level (Horizontal accn)	0.30g
8.	Isoceraunic level (days per year)	40

4.0 STANDARDS APPLICABLE

Unless specified elsewhere in this specification, the performance & testing of the meters shall conform to the following Indian/International standards, to be read with up to date and latest amendments/revisions thereof.

S. No.	Standard No.	Title
1	IS 13779 and its latest amendment	Specification of AC Static Watt hour meters class 1.0 & 2.0
2	IS 15959 and its latest amendment	Data Exchange for Electricity Meter, Reading, Tariff and Load Control – Companion Specification
3	CBIP 325	

Meter matching with requirements of other national or international standards which ensure equal or better performance than the standards mentioned above shall also be considered. When the equipment offered by the tenderer conforms to standards other than those specified above, salient points of difference between standards adopted and the standards specified in this specification shall be clearly brought out in the relevant schedule.

Manufacturer should have valid BIS License for the offered energy meters and ISI mark should be given on meter rating plate. Copy of BIS license needs to be enclosed with the tender.

5.0 General Technical Requirement

- 5.1** Application : 1 phase 2 wire
5.2 Rated Secondary Voltage : 240 volts (Phase to Neutral)
5.3 Current Rating : 05-30A,
5.4 Rated Frequency : 50 Hz.
5.5 Accuracy class : 1.0
5.6 Power Factor : Unity to Zero (all power factor lag / or lead)

The meter shall start and continue to register on application of 0.2% of basic current at Unity P.F., as per relevant standards.

6.0 POWER SUPPLY VARIATION

The meter should be suitable for working with following supply system variations.

System	1 Phase 2 Wire
Specified range of operation	70% to 130% of reference Voltage i.e. 240 V
Frequency	50Hz \pm 5%

If phase to phase voltage ($415V \pm 10\%$) is applied continuously between phase and neutral of the meter, the meter should not get damaged and continue to record correctly within class 1.0 accuracy after restoration of normal supply.

7.0 ACCURACY

Class of accuracy of the meter shall be 1.0. The accuracy shall not drift with time.

8.0 POWER CONSUMPTION

- 1- Voltage Circuit: The active and apparent power consumption in each voltage circuit including the power supply of meter of reference voltage, reference temperature and reference frequency shall not exceed 1 watt and 1 VA.
- 2- Current Circuit: The apparent power taken by Current circuit at basic current reference and reference temperature shall not exceed 0.5 VA.

9.0 STARTING CURRENT

The meter shall start registering energy at 0.2% of basic current at unity power factor and shall be fully functional within five seconds after the rated voltage is applied.

Running at no load: When voltage is applied and no current flows in the current circuit, the test output of the meter shall not produce more than one pulse.

10.0 MAXIMUM CONTINUOUS CURRENT

The rated maximum current for the meter shall be 100% of I_{max} at which the meter purports to meet the accuracy requirement. Meter terminals should be suitable to carry 150% of I_{max} .

11.0 GENERAL & CONSTRUCTIONAL REQUIREMENTS

- 1) Meters shall be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However, the following should be ensured.
 - Personal safety against electric shock
 - Personal safety against effects of excessive temperature.
 - Protection against spread of fire

- Protection against penetration of solid objects, dust & water
- 2) The meter shall be designed with application specific integrated circuit and shall be manufactured using SMT (Surface Mount Technology) components. Power supply and voltage divider circuits may be of PTH technology. The meter should be housed in a safe, high grade engineering Polycarbonate casing of projection mounting type.
 - 3) All insulating material used in the construction of meters shall be non-hygroscopic, non-ageing and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion during operating life by providing suitable protective coating.
 - 4) The meter shall at least conform to the degree of protection IP 54 for protection against ingress of dust, moisture and vermin's.
 - 5) The meter shall be supplied with a transparent extended terminal block cover (ETBC). Extended terminal cover shall have top side hinge arrangement so that it remains associated with meter always.
 - 6) The meter case, terminal block and ETBC shall be made of unbreakable, high grade non-flammable polycarbonate or equivalent high grade and good quality engineering plastic. The terminal block should have terminal holes and shall be of sufficient size to accommodate the conductors, meeting the requirement of IS 13779.
 - 7) The meter case shall have one full transparent window for display. The window shall be integrated part with the meter case in such a way that it cannot be removed undamaged.
 - 8) The manner of fixing the conductors to the terminal block shall ensure adequate and durable contact such that there is 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 minimized. Electrical connections shall be so designed that contact pressure is not transmitted through insulating material. The terminals shall be made of brass to provide better conductivity. The clearance and creepage distance shall conform to relevant clause of IS 13779:1999.
 - 9) The meter shall be compact in design. The entire construction shall be capable of withstanding stresses likely to occur in actual service and rough handling during transportation. The meter shall be convenient to transport and immune to shock and vibration during transportation and handling.
 - 10) Meter should have push button or a capacitive touch arrangement to avoid water/fluid injection inside of meter circuit.
 - 11) The meter should not saturate on passing of direct current, which can cause the meter either to stop recording or record inaccurately as per IS 13779 in phase and neutral both.

- 12) The meter shall have a design life of at least 10 years. The manufacturer should have conducted accelerated life tests of the proposed design to ensure the design life.

12.0 ANTI-TAMPER FEATURES

The meter should have features to prevent/detect common ways of tamper and fraud.

12.1 Reversal of line and load terminals

On interchanging the load and line wires the meter shall register accurate energy.

12.2 Interchanging of phase and neutral wires

Even on interchanging the phase and neutral wires the meter shall register accurate energy.

12.3 Drawing of current through local earth

The meter shall register accurate energy even if the load is not terminated back to the meter and instead current is drawn partially or fully through a local earth irrespective of the phase and neutral connections to the meter. The earth indication in the form of annunciator shall be made available.

12.4 Drawing of load by disconnecting Neutral of meter & outgoing Earth:

When neutral is disconnected from both load side and supply side, the meter should record energy as per rated parameters (V_{ref} , UPF & actual current). However, meter shall start registering energy at a current of 1.0 Amps under these tamper conditions. Accuracy should be within $\pm 3\%$ for this case. It is preferable to have metering with the help of internal battery under single wire mode.

12.5 Influence of external High Magnetic Field

Meter shall be provided with appropriate magnetic shielding so that any external magnetic field (A.C. electromagnet or D.C. magnet) as per the value specified in IS 13779 (With latest amendment) applied on meter would not affect the proper functioning of meter.

However, the meter should log the presence of abnormal magnetic induction with date & time in case the meter is affected. Under such conditions the positive variation may be beyond 4%. Meters shall offer compliance to requirements of CBIP-304 and its amendments for tampering using external magnets and meter should record energy at I_{max} whenever the meter gets affected during that condition.

The magnet event indication in the form of annunciator shall be available under such condition.

12.6 Meter Body Opening :

It is preferable to have a single integrated base and cover so that chances of cover opening are reduced. Even if the meter case is removed forcibly, it

should leave a clear evidence of being opened. The meter shall additionally have provision for detection and logging of opening of meter cover. The meter must detect / log with date and time meter body opening tamper, body opening tamper must also be logged in absence of power supply. Cover open indication in display sequence shall also be available in tamper status display.

12.7 Neutral Disturbance

The measurement by meter shall not get influenced by injection of spurious signals (like AC Voltages/chopped AC signal/DC signal / pulsating DC etc) in neutral of meter. The meter shall be immune to other common forms of Neutral Disturbance using diode, variable resistance and capacitor circuits in neutral. In case the meter accuracy is disturbed under ND, it should be able to log the event and record energy at reference parameters (Vref, UPF and actual current) with the error band of $\pm 3\%$. The neutral disturbance event indication in the form of annunciator shall be available under such condition.

12.8 Events

The meter shall be capable of recording minimum 100 events in memory with date and time stamp. Following events should be logged in different compartments on FIFO basis

- Earth loading/ Load imbalance (Partial/Full earth)
- Power on off
- Magnetic influence in case meter is affected.
- Neutral Disturbance in case meter is affected.
- Front cover open (Non Roll over event)
- Single Wire metering

12.9 DISPLAY

- 1.** The measured value(s) shall be displayed on Liquid Crystal display (LCD) display. The height of the digit shall be minimum 8.0 mm. The KWh and kVAh energy registration under normal power on condition shall take place on 5 complete digits and 1 decimal. LCD should contain the suitable legends/annunciators for event notification.
- 2.** The data should be stored in non-volatile memory (NVM). The non-volatile memory should retain data for a period of not less than 10 years under un-powered condition. Battery back-up memory will not be considered as NVM.
- 3.** For accessing display, meter shall have one actuator. On short press, next display shall activate.
- 4.** The register shall 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. The register should not roll over in between this duration.

5. In addition to providing serial number of the meter on the display plate, the meter serial number shall also be programmed into meter memory for identification through communication port for CMRI/meter reading print out.

6. DISPLAY SEQUENCE

The meter shall display the required parameters in two different modes as follows:

A) Auto Display Mode:

The following parameters shall be displayed in an auto-cycle mode, in the following sequence:-

Display test – all segments on
Meter serial number
Date
Real time
Line Current: phase
Phase To Neutral Voltage
Power factor
Average power factor
Frequency
Metering Apparent Power
Metering Net Active Power
Power off hours
Tamper count
Number of billing actions (MD resets)
Current Active Import Total Energy Register
Current Active Export Total Energy Register
Current Active net total
Current MD Active Import Total Energy Register (0-24 hrs)
Current MD Active Export Total Energy Register (0-24 hrs)
Self Diagnostic

B) Manual Mode:-

Display test – all segments on
Meter serial number
Date
Real time
Line Current: phase
Phase To Neutral Voltage
Power factor
Average power factor
Frequency
Metering Apparent Power
Metering Net Active Power
Power off hours

Tamper count
Number of billing actions (MD resets)
Current Active Import Total Energy Register
Current Active Export Total Energy Register
Current Active net total
Current MD Active Import Total Energy Register (0-24 hrs)
Current MD Active Export Total Energy Register (0-24 hrs)
Hist 1 Active Import Total Energy Register
Hist 1 Active Export Total Energy Register
Hist 1 Active net total
Hist 1 MD Active Import Total Energy Register (0-24 hrs)
Hist 1 MD Active Export Total Energy Register (0-24 hrs)
Average power factor Hist 1
Hist 2 Active Import Total Energy Register
Hist 2 Active Export Total Energy Register
Hist 2 Active net total
Hist 2 MD Active Import Total Energy Register (0-24 hrs)
Hist 2 MD Active Export Total Energy Register (0-24 hrs)
Average power factor Hist 2
Self Diagnostic

12.10 MAXIMUM DEMAND REGISTRATION & RESET

Meter shall continuously monitor & calculate the average maximum demand for each demand interval time of 30 minutes and maximum of these in a calendar month shall be stored along with date and time when it occurred. The maximum demand shall automatically reset at 24:00 hrs. of the last date of each calendar month for which minimum 30 years calendar shall be programmed by the manufacturer.

The integration period shall be set as 30 minutes, on real-time basis.

The billing purpose parameters (active forwarded energy, maximum demand in kW and kVA) shall be registered and shall be available for a minimum period of last 6 months.

13.0 TIME OF USE MONITORING

The meter shall offer the capability of time of use monitoring for energy. Minimum 4 rate registers shall be capable of being configured for TOD monitoring for Peak/Off peak hours.

14.0 LOAD PROFILE RECORDING

The meter shall be capable of monitoring and recording load profile information for voltage, active and apparent energy for every 30 minutes interval for at least 100 days duration.

15.0 MIDNIGHT ENERGY SNAPSHOT RECORDING

The meter shall be capable of recording energy snapshot for at least 35 days.

16.0 SELF DIAGNOSTIC FEATURE

The meter shall be capable of performing complete self diagnostic check to monitor integrity of data memory location at all time. The meter shall have indication for unsatisfactory/nonfunctioning/malfunctioning of the following:

- a) Time and date
- b) Real Time Clock (RTC) status
- c) Battery status

17.0 METER READING UNDER POWER OFF MODE

Provision to read the meter in no power condition shall be made. In case of power failure Auto mode shall be disabled. The actuator shall be used for displaying the Bill 1 KWh, Bill 1 maximum demand kW on display. In case of power failure meter data download for History energy, maximum Demand & all the events through CMRI (common meter reading instrument) shall be possible. Industrial grade primary battery of long life shall be used.

18.0 COMMUNICATION

- 18.1** The meter should have a galvanically isolated optical communication port for data communication with CMRI on 9600 bps. The port shall be compatible with IEC 1107 (in line with Indian companion specs).
- 18.2** The optical port provided on the meter shall have the capability to transmit the data by connecting the external cable in all 360 degrees i.e. shall be insensitive to cable orientation.
- 18.3** The meter shall also support an optional RS 232 communication port for remote meter reading. The connector type shall be micro USB.
- 18.4** Meter shall support the open protocol (Indian companion specification- IS 15959) for relevant single phase meter data logging. For local meter reading, it shall be possible to do entire meter data download within 150 seconds (containing instantaneous values, 75 days load survey, 6 histories and events)

19.0 BCS REQUIREMENTS

Windows based Base Computer Software (BCS) shall be provided for receiving data from CMRI and downloading instructions from base computer software to CMRI.

This BCS should have, amongst other requirements, features and facilities described later in this specification, the facility to convert meter reading data into user definable ASCII file format so that it may be possible for the user to integrate the same with the user's billing data and process the selected data in desired manner. All the data available in the meter including energy, MD, and history data should be convertible to user defined ASCII file format for integration with third party software. The user shall have the flexibility to select the parameters to be converted into ASCII file. The vendor shall also supply the necessary CMRI software.

20.0 MARKING OF THE METER

The marking on every meter shall be in accordance with relevant clauses of IS 13779.

The basic marking on the meter nameplate shall be as follows:

- a) Manufacturer's name & trade mark
- b) Type Designation
- c) No. of phases & wires
- d) Serial number
- e) Year of manufacture
- f) Reference Voltage
- g) Rated Current
- h) Principal unit(s) of measurement
- i) Meter Constant (imp/kwh)
- j) Class index of meter
- k) Meter Model Number

21.0 CONNECTION DIAGRAM & TERMINAL MARKINGS

The connection diagram of the meter shall be clearly shown on terminal cover.

22.0 OUTPUT DEVICE

The meter shall have a test output accessible from the front and capable of being monitored with suitable testing equipment while in operation at site. The test output device shall be provided in the form of LED output.

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

23.0 ELECTRO-MAGNETIC COMPATIBILITY AND INTERFERENCE REQUIREMENT

The meter shall work satisfactorily under presence of various influencing conditions like External Magnetic Field, Electromagnetic Field, Radio Frequency Interference, harmonic Distortion, Voltage/Frequency Fluctuations, and electromagnetic High Frequency Fields etc. The meter should be immune to any type of radio frequency interference, harmonic distortion, voltage/ frequency fluctuations, electromagnetic high frequency fields and abnormal voltage/ frequency generating device.

24.0 MINIMUM TESTING FACILITIES

The manufacturer should have the necessary minimum testing facilities for carrying out the following tests:

- AC voltage test
- Insulation resistance test
- Test of limits of errors
- Test of meter constant
- Test of starting condition
- Test of no load condition
- Repeatability of error test
- Test of power consumption

The manufacturer should have duly calibrated Reference standard meter of Class 0.2 accuracy or better. Manufacturer also should possess fully computerized meter test bench system for carrying out the relevant routine/acceptance tests as well as facility to generate test reports for each and every meter tested.

25.0 TESTS

The test reports/certificate/records for all type tests specified having been successfully performed on the type of the meter offered shall be submitted with the tender. The bidder shall clearly bring out the deviations from this specification clause by clause whether on account of tests or manufacturing process or features incorporated in the meter. The tender lacking with above information and without supporting test reports for meter meeting the requirement of tests laid in this specification are likely to be rejected.

a) Type Tests:

The bidders shall be required to furnish valid type test reports in respect of single phase static energy meters with optical port as per the requirement of IS 13779:1999 & IS:15959 with latest amendments, along with all additional type test, tamper test and communication test as per provision of the specification from CPRI, or ERDA only which should not be older than **five years** as on the date of opening of techno-commercial bid. For this purpose date of conducting **(test starting date) type test will be considered. Type test carried out after opening of techno-commercial Bid shall not be considered.**

The type test reports which could not be revalidated due to COVID pandemic, since 23.03.2020 may be considered valid up to 30.09.2022 in accordance to guidelines issued by Central Electricity Authority vide letter no.CEA-PS-80/1/2019-PSETD Division-Part(2)/564-640 and CEA-PS-14-80/1/2019-PSETD Division-Part(2) /517-96

b) Routine Tests:

All routine tests as stipulated in the relevant standards shall be carried out and routine test-certificates/reports shall be submitted to the purchaser for approval and also placed inside individual meter packing. Three copies of user manual shall be required in soft copy (CD).

26.0 GUARANTEED TECHNICAL PARTICULARS: -

The bidder shall furnish all the necessary information as desired in the schedule of Guaranteed Technical Particulars and data, appended at Annexure A-I, A-II & A-III of this specification. If the bidder desire to furnish any other information(s) in addition to the details as asked for, the same may be furnished against the last item of this Annexure.

27.0 SAMPLE ALONG WITH BID :

28.0 SAMPLES:

- (a) Samples along with bid – The bidder shall furnish Eight meters and one meter box conforming to this specification duly sealed along with routine test certificates in the office of S.E.(MM-II),JVVNL, Jaipur one day prior to the date of opening of Tender. If the samples are not received, the bid shall be considered as Non-responsive. Out of the above Eight sample meters, Six sample meters (one set of 3 samples for Electrical testing and another set of 3 samples for Environmental & Mechanical tests, Additional test and Tamper test) and one sample shall be tested as per IS 15959 for one port (optical port) at CPRI, Bhopal/ Bangalore and ERDA Vadodara in the presence of firm's representative. The testing charges shall be borne by the bidder. The tentative testing charges Rs. 7 lacs shall be deposited by the bidder in the form of Demand Draft in favour of the Account Officer (MM), Jaipur Discom, Jaipur, subject to adjustment on actual basis.
- (b) One sample meter with meter box shall be checked / tested for mechanical/ physical features in Nigam's Lab. Sample meter shall be broken to verify components of the meter. In case sample meters submitted with bid don't conform the Type tests, Addl. Type Tests and Tamper tests of specification/ IS, the financial bid shall not be opened.
- (c) Bid stage samples shall be accepted in the office of SE(MM-II), JVVNL, Bani Park, Jaipur, by the committee of following officers.
- i. XEn(NABL), JVVNL, Jaipur.
 - ii. XEn-TA to CE(MM), JVVNL, Jaipur.
 - iii. XEn(SPO-IV), JVVNL, Jaipur
 - iv. AEn-II (SPO-IV Division), JVVNL, Jaipur.

The officers/committee which is authorised to accept the bid samples shall physically examine & match the details of sample items i.e. its make, SL. No., Seal no. etc. with the letter having the detail of the sample submitted by the bidder. RTC check shall also be performed on all sample meters while physically examining & accepting the bid stage samples. The received samples shall not be checked by powering up with AC supply.

After physically examining the details, the sample accepting officers/ committee & bidders representative shall put their signatures with permanent marker or provide sticker seals on the samples. There after samples of meter shall be packed by the committee, in the same carton boxes in which these were received from the bidder. The committee members & bidders representative will again put their signature/ sticker seal on the sample carton box at various positions. This sample acceptance and sealing procedure shall be done one day before the bid opening date.

The committee shall prepare a sample sealing statement and hand over the sealed samples to AEn in-charge of sample room, for safe custody in the sample room.

There shall be a separate sample room with proper lock and key arrangement in the office of S.E.(MM-II) for safe custody of samples. It can only be opened by opening of two locks simultaneously, key of one lock will remain in the custody of SPO-IV and key of other lock will remain in the custody of AEn in-charge of sample room.

In-charge of the sample room shall maintain a register and shall enter the detail of sample item, TN, Sl. No., Seal etc. in the register. When the independent test agency is decided, the in-charge of the sample room shall hand over the samples to the same committee which has accepted & sealed the samples for packing in big cartons for safe transportation. The committee shall get the samples packed in its presence and then hand over these packed samples to the courier agency for transporting these samples to the independent Test House.

Whenever, the sample room will be opened, the reason of opening with date and time of opening and closing and signature of persons in presence of room was opened will be recorded in register also. In case of delay in sending the packed samples by courier agency, the packed cartons will again be stored in the sample room.

At the independent test house the samples shall be opened in presence of Nigam's representative. After verification, the test house shall accept the sample for type test etc. and issue acknowledgment of receipt to the Nigam's representative.

29.0 GUARANTEE:

The supplier shall furnish an undertaking that there shall be no drift in the accuracy class of the meter for a minimum period of 10 years from the date of supply.

The supplier shall arrange to provide free training at places as desired by the purchaser for use of meter/Computer Software etc. The supplier shall provide competent and timely after sales service support.

The supplier shall give an undertaking that in case any amendment is required by the Nigam, same shall be amended within 30 days from the date of intimation at consumer's premises or Nigam's office / store.

30.0 INSPECTION:

The purchaser's representative may carry out the inspection during manufacture and before dispatch. The supplier shall keep the purchaser informed

in advance, about the manufacturing programme so that the purchaser can arrange for inspection.

The manufacturer shall grant free access to the purchaser's representative at a reasonable time, when the work is in progress. Inspection and acceptance of any equipment under this specification by the purchaser shall not relieve the supplier of his obligation of furnishing the equipment in accordance with the specification and shall not prevent subsequent rejection if the equipment is found to be defective.

All acceptance tests including other special tests as given in this specification and inspection shall be done by the place of the manufacturer.

The purchaser reserves the right to insist for witnessing the acceptance/routine testing of the bought out items.

The supplier shall give 15 days advance intimation to enable the purchaser to depute his representative for witnessing the acceptance and routine tests. Material shall be dispatched only after getting the dispatch authorization from the purchaser or his authorized representative, after successful inspection/testing.

The bidder shall afford the inspectors representing the purchaser all reasonable facilities without charge, to satisfy him that the equipment is being furnished in accordance with this specification during stage inspection, if any, and final inspection.

31.0 QUALITY ASSURANCE PLAN:

The design life of the meter shall be minimum 20 years and to prove the design life, the firm shall have at least the following quality Assurance Plan:

- (i) The factory shall be completely dust proof.
- (ii) The testing rooms shall be temperature and humidity controlled as per relevant standards.
- (iii) The testing and calibrating equipments should be automatic and all test equipment shall have their valid calibration certificates.
- (iv) Power supplies used in testing equipment shall be distortion free with sinusoidal wave- forms and maintaining constant voltage current and frequency as per the relevant standards.
- (v) During the manufacturing of the meters the following checks shall be carried out.
 - a) Meter frame dimensions tolerance shall be minimum.
 - b) The assembly of parts shall be done with the help of jigs and fixtures so that human errors are eliminated.

- c) The meters shall be batch tested on automatic, computerized test bench and the results shall be printed directly without any human errors.
- vi) The bidder shall invariably furnish the following information alongwith his bid, failing which his bid shall be liable for rejection. The information shall be separately given for individual type of material offered.
 - a) Statement giving list of important raw materials, names of sub-suppliers for the raw materials, list of standards according to which the raw materials are tested, list of tests normally carried out on raw material in presence of bidder's representative and copies of test certificates.
 - b) Information and copies of test certificates as in (i) above in respect of bought out accessories.
 - c) List of manufacturing facilities available.
 - d) Level of automation achieved and list of areas where manual processing exists.
 - e) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.
 - f) List of testing equipment available with the bidder for final testing of equipment specified and test-plant limitations, if any, vis-a-vis the type, special acceptance and routine tests specified in the relevant standards and this specification. These limitations shall be very clearly brought out in schedule of deviations provided with the tender.

32.0 ACCURACY OF METERS: -

The supplier shall furnish written undertaking on Rs. 500.00 Non Judicial Rajasthan Govt. Stamp paper that there will be no drift in the accuracy of the meters supplied against this purchase order for a period of 10 year (life time) from the date of supply. In case any drift is noticed/found beyond permissible limits during this period, he shall recalibrate such meter (s) correct accuracy, and in the event recalibration is not possible, replace such meter (s) with box with new meter(s) with box without any extra cost.

33.0 DOCUMENTATION:

All drawings shall conform to International Standards Organization(s) ISO 'A' series of drawings sheet/Indian Standards Specifications IS: 656. All drawings shall be in ink and suitable for microfilming. All dimensions and data shall be in S.I. Units.

List of drawings and documents: -

The bidder shall furnish the following along with bid:

- i) Two sets of drawings showing clearly the general arrangements, fitting details, electrical connections etc.
- ii) Technical leaflets (User's Manual) giving operating instructions for the meter.

The manufacturing of the equipment shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the supplier's risk.

Approval of drawings/work by purchaser shall not relieve the supplier of his responsibility and liability for ensuring correctness and correct interpretation of the drawings for meeting the requirements of the latest revision of application standards, rules and codes of practices. The equipment shall conform in all respects to high standards of engineering, design, workmanship and latest revisions of relevant standards at the time of ordering and purchaser shall have the power to reject any work or materials which in his judgment is not in full accordance therewith.

The successful Bidder shall, within 2 weeks of empanelment as vendor, submit 30 prints and 2 good quality report copies of the approved drawings for purchaser's use.

Eight sets of operating manuals/technical leaflets shall be supplied to each Circle Store for the first instance of supply, where supplier starts to sell.

One set of routine test certificate shall accompany each dispatch consignment.

The acceptance test certificates, in case pre-despatch inspection or routine test certificates, in cases where inspection is waived, shall be got approved from the purchaser.

34.0 Qualification Requirements

The qualification requirements shall be as per Schedule-III A

35.0 General Information:

- i) Frequent changes in specifications during currency of contract will be avoided and if required the same shall be effected on mutually agreed basis.
- ii) For any further query regarding DLMS protocol refer to document IS: ETD 13(6211): 2010 for Data Exchange for Electricity meter reading, tariff and load control.

GTP of 1 Phase Electronic Energy Meter of Class 1.0 Accuracy

Sr. No.	Technical Specification Requirements	To be filled by the bidder
1.	Name & Address of Manufacturer	
2.	Work's Address	
3.	Type / Designation & Model No of meter offered	
4.	Applicable Standard	
5.	Class of Accuracy 1.0	
6.	Type of Meter	
7.	Reference Voltage (Vref)	
8.	Basic Current (Ib)	
9.	Maximum Current (Imax)	
10.	Maximum withstand Current for two hours	
11.	Maximum withstand voltage for 15 minutes The meter should be capable enough to withstand phase to phase voltage of 415 V±10% continuously	
12.	Rated frequency i.e. 50 Hz	
13.	Power Factor Range (-1 to +1)	
14.	Operating temperature range (as per IS)	
15.	Starting Current (0.2 % of Ib)	
16.	Fixing of case in such a way that leave the physical evidence if it is opened.	
17.	Materials of the terminal block should conform to the relevant clause of the specification	
18.	Details of screw provided on each terminal for fixing stranded wire	
19.	The terminal cover should be fixed with case through upper hinge	
20.	Voltage and Current Circuits should be solidly connected inside the meter without any links	
21.	Components of the PCB should be surface mounted except power component	
22.	Power consumption in voltage circuit (<0.5 W & 1 VA)	
23.	Power consumption in current circuit (< 0.1 VA)	
24.	Overall dimension of the meter with ± tolerance	
25.	Overall weight of the meter with ± tolerance	
26.	Impulse voltage withstand capacity (10 kV)	
27.	Auto display mode	
28.	Manual mode display	
29.	The meter shall be provided with suitable facility for downloading all data through optical port provided on the meter through CMRI.	
30.	Display Details Backlit, 8 mm height, six digit LCD with tamper annunciators.	
31.	Accuracy of RTC	
32.	The meter should be equipped with the facility to	

Specifications for Single phase meter 1.0

	read the parameters during power cut. Same actuator shall be used for display access and reading.	
33.	Indications should be provided to facilitate test output pulse	
34.	Guaranteed Accuracy within different ranges of voltage and P.F.	
35.	Meter should run with no load on 70% to 120% of the rated voltage	
36.	The meter should be immune to DC magnetic fields as per the IS 13779	
37.	The meters should record energy as per rated parameters even when neutral from the incoming and outgoing is removed	
38.	<p>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 the meter in any of the following manner for 10 minutes</p> <ul style="list-style-type: none"> • On any of the phase and neutral terminal • On any connecting wires of the meter • Voltage discharge with 0-10mm spark gap • At any place in the load circuit 	
39.	The meter should be designed with application specific integrated circuit and should be manufactured using Surface Mount Technology (SMT) components	
40.	The meter should be capable to detect the opening of the case in power off conditions also	
41.	For local meter reading the meter should be capable enough to provide entire meter data and the download time should be within 150 seconds	
42.	The meter should have a reliable power supply for operation over a wide range of voltages.	

TECHNICAL SPECIFICATION OF PILFER PROOF METER BOX TO HOUSE SINGLE PHASE W/C ENERGY METER (PUSH TO FIT TYPE)

1. SCOPE:

The meter box will be intended to house one number single-phase electronic energy meter. The meter box complies with IS: 14772:2000 with latest amendment.

2. MATERIAL:

The meter box will be made of Transparent Polycarbonate material which complies following properties:

Meter box will be weather proof, capable to withstanding temperatures of boiling water for 5 minutes continuously without distortion or softening. It will withstand Glow wire test at 650°C as per IS : 11000. HDT of Polycarbonate material will be minimum 120° C ± 5° C (at 1.8 MPa),

3. CONSTRUCTION:

- i. The meter Box will have roof tapering down for easy flow of rainwater.
- ii. The thickness of the box will be minimum 2.0 ± 0.2 mm on all sides.
- iii. The overall dimensions of the box will be such that a minimum 10 mm clearance from left, right side and top, 10 mm from front and back side & 70 mm from meter terminals will be maintain in between meter and box surface.
- iv. The box cover and base will have 4 Nos. snap type locking arrangement.
- v. Meter Box would comply with IP 54.
- vi. All metallic parts will be well protected against corrosion. (Zn passivation)
- vii. Push button arrangement will be required on the cover of the box to operate the meter display push button from outside the meter box for reading the meter display parameters without opening the meter box cover.
- viii. Barrier plate will be provided to protect meter terminal from outside.
- ix. The provision for meter reading through CMRI will provide on the cover of meter box without opening the meter box cover.
- x. Meter shall be readable without using any optical cable inside box
- xi. **Colour:**
The front cover and base of meter box would be made of transparent Polycarbonate material.
- xii. **Box Mounting:**
Box will have 3 nos. holes of 6 ± 1 mm diameter for fixing the meter box on wall / wooden board.
- xiii. **Cable Entry:**
Suitable provision would be available at the bottom side of the meter box bottom for cable inlet & outlet and the same will be capable of accommodating cable of 14-18mm (5-30A) / 18-24 mm (10-60A)diameter, two nos. engineering plastic cable gland will be provide for cable incoming & outgoing

xiv. **Marking:**

- Manufacturer Logo & danger sign will be engraved/ embossed on the front cover of meter box.
- Name plate details of meter should be readable from outside of meter box.

4. TESTS FOR BOXES:

The following tests are to be conducted on the box at any independent NABL accredited laboratory and test reports will be carried out as per IS : 14772.

- i. Test of HDT minimum $120 \pm 5^\circ \text{C}$ (at 1.8 MPa ° C),
- ii. Test for mechanical strength
- iii. Glow wire test at 650°C as per IS: 11000
- iv. Material Identification test

5. ROUTINE TEST

The routine test certificates for the following will be furnished for approval of the purchaser.

- i. Physical verification of dimensions of the box.
- ii. Compatibility of the box for housing the meter, and ensuring ease of connecting and reading the meter.

**GUARANTEED TECHNICAL PARTICULARS FOR SINGLE PHASE METER
BOX – PUSH TO FIT TYPE**

S.N.	Characteristics	To be filled by the bidder
1	Manufacture's Name	
2	Material used for box body	
3	Color of box for base and cover	
4	Dimension of box (LXWXH)	
5	Clarence from meter surface a) Left, Right & Top side : 10mm b) Bottom :70mm c) Front & back : 10mm	
6	Thickness of Meter Box Minimum 2 mm from all sides	
7	Display push Button operating arrangement at cover of the box	
8	Provision for meter reading through CMRI without opening the Box cover	
9	Sealing arrangement: minimum 2 Nos.	
10	Material withstanding temperature as per IS 14772 a) Boiling water test b) Glow wire test at 650deg. C	
11	Inlet & Outlet Glands	
12	Suitable for outdoor installation IP class : IP 54	
13	Meter reading arrangement without opening meter box cover	
14	Embossing details of cover	-
15	Cable entry from bottom side	
16	Mounting hole	
17	Push to fit type arrangement: 4 Nos.	