

TECHNICAL SPECIFICATIONS FOR 1 PHASE ELECTRONIC ENERGY METER OF CLASS 1.0 ACCURACY WITH NET METERING CAPABILITY

1.0 SCOPE

- a. This specification covers the design, engineering, manufacture, testing and calibration at manufacturer's works before dispatch, packing, supply and delivery 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.
- b. Requirement
 1. Single Phase Electronic Energy meter of class 1.0 Accuracy with Net Metering Capability – 500 Nos
 2. CMRI: 1 per 100 Nos of meters

2.0 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

3.0 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.

4.0 General Technical Requirement

- 4.1 Application : 1 phase 2 wire
- 4.2 Rated Secondary Voltage : 240 volts (Phase to Neutral)
- 4.3 Current Rating : 05-30A,
- 4.4 Rated Frequency : 50 Hz.
- 4.5 Accuracy class : 1.0
- 4.6 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.

5.0 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 ± 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.

6.0 ACCURACY

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

7.0 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.

8.0 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.

9.0 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} .

10.0 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.

11.0 ANTI-TAMPER FEATURES

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

11.1 Reversal of line and load terminals

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

11.2 Interchanging of phase and neutral wires

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

11.3 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.

11.4 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.

11.5 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.

11.6 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.

11.7 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 (V_{ref} , 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.

11.8 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

12.0 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

13.0 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.

14.0 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.

15.0 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.

16.0 MIDNIGHT ENERGY SNAPSHOT RECORDING

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

17.0 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

18.0 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.

19.0 COMMUNICATION

19.1 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).

19.2 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.

19.3 The meter shall also support an optional RS 232 communication port for remote meter reading. The connector type shall be micro USB.

19.4 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)

20.0 CMRI/BCS REQUIREMENTS

The Common Meter Reading Instrument (CMRI) should be capable of being loaded with user friendly software for reading/downloading meter data. 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.

21.0 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) "Property of JVVNL"

22.0 CONNECTION DIAGRAM & TERMINAL MARKINGS

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

23.0 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).

24.0 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.

25.0 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.

26.0 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 Energy meter offered shall be fully type tested at any accredited test laboratory as per IS 13779 relevant standards but test reports shall not be more than two years old from the date of opening of bid. The bidder shall furnish type test reports along with the bid.

b) Acceptance Test :

All acceptance tests as stipulated in the relevant standards shall be carried out by the supplier in the presence of the purchaser's representative.

c) 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).

27.0 SAMPLE ALONG WITH BID :

The bidder shall furnish one sample of meter along with Box conforming to this specification duly sealed along with the routine test certificates directly in the office of the Superintending Engineer(M&P), JVVNL Jaipur one day prior from the date of opening of Tender, If the sample(s) are not received the bid shall be considered as Non-responsive. In case sample meter submitted with bid don't conform the Type tests, Addl. Type Tests and Tamper tests of specifications/IS, the financial bid of offer shall not be opened

Sample(s) meter shall be broken to verify components of the meter.

One sample of meter along with Box along with HHU meeting the requirements of this specification should be furnished along with bid for checking and testing in our Meter Testing Laboratory at Jaipur in presence of bidders representative or at independent test laboratory, at the discretion of purchaser.

After finalization of the tender, the bidder(s) will collect their sample(s) so submitted otherwise department does not hold itself responsible for safe custody of sample(s) so received. The offer received without sample(s) is liable to be ignored.

The meter cover shall be ultrasonically welded with the meter base. The sample meter to be sent along with bid may not be ultrasonically welded with the meter base, as at the time of sample testing it has to be opened to ascertain conformity of meter as per specification. However, before commencement of supply, sample has to be got approved with ultrasonically welded meter by the successful bidder.

The meter sample should be sealed with the bidder's seal(s). The details of logic and threshold values for various kinds of tampers as proposed and incorporated by the bidder in their meter samples shall be furnished along with the meter sample(s).

Tests to be conducted:

- i) Starting condition test.
- ii) Power consumption test.
- iii) Repeatability of error test. `
- iv) Accuracy requirements.
- v) Voltage Variation Test (-30% to +20%).
- vi) Tamper and fraud protection test: Tests to prove compliance to this specification.
- vii) A.C. and D.C. Magnetic Immunity test.

28.0 FURNISHING OF PRE- COMMENCEMENT SAMPLES:

a) The successful bidder shall furnish one nos. pre commencement samples of meter and metr box fully meeting the requirement of specification directly in the office of the Superintending Engineer(M&P), JVVNL Jaipur within **fifteen days** from the date of receipt of Purchase Order for Nigam's approval. The samples shall be tested at Nigam's own NAB lab or CPRI/NABL, at the discretion of the purchaser. The testing charges in case samples are send to third party lab, shall be borne by the supplier. The bidder shall supply the meters only after approval of pre-commencement of sample.

In case of major deviation in Electrical testing, physical features and communication capability, the supplier be allowed to furnish second set of sample. In case of failure of second set of sample, order may be cancelled with penalty @5% of Ex-works + taxes as applicable on the ordered quantity.

b) The purchaser shall reserve the right to pick up energy meter at random from the lot(s) offered and get the meter tested at third party lab i.e. CPRI /NABL accredited lab at the sole discretion of the purchaser . The supplier has no right to contest the test results of the third party lab or for additional tests and has to replace / take corrective action at the cost of the supplier.

It shall be responsibility of the supplier to arrange such test and purchaser shall be inform of the date and time of conduction of tests well in advance to enable him to witness such tests. Test charges of the testing authority for such successful type tests shall be borne by the purchaser and in case of unsuccessful type test, same shall be borne by the supplier.

29.0 GUARANTEE:

The equipments supplied should be guaranteed for their performance for a minimum period of five years from the date of commissioning or five and half years from the date of receipt in stores whichever date is earlier. The equipment found defective within the above guarantee period shall be repaired/replaced by the supplier free of cost within one month of receipt of intimation.

The supplier shall also 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.

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 program 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 gone at the place of the manufacturer unless otherwise especially agreed upon by the Bidder and Purchaser at the time of purchase.

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 NUMBER OF SAMPLES AND CRITERIA FOR CONFORMITY:

The recommended sampling plan and the criteria for acceptance of the lot shall be as per IS: 13779 for the type of meters covered in this specification.

32.0 PACKING:

The equipments shall be suitably packed in order to avoid damage or disturbance during transit or handling.

Each meter may be suitably packed in the first instance to prevent ingress of dust and moisture and then placed in cushioned carton of a suitable material to prevent damage due to shocks during transit. The lid of the carton may be suitably sealed. A suitable number of sealed cartons may be packed in a case of adequate strength with extra cushioning, if considered necessary. The cases may then be properly sealed against accidental opening in transit. The packing cases may be marked to indicate the fragile nature of the contents. Suitable provisions should be made to avoid accidental closure of meter box during transit.

33.0 DELIVERY SCHEDULE:

Commencement period 30 days from the date of receipt of purchase order and completion within 3 months at equal monthly rate from the date of approval of pre commencement sample. Firm is required to furnish pre commencement sample within 15 days of receipt of purchase order. The delay in furnishing of pre commencement sample beyond 15 days shall be on the part of the supplier and such delayed period shall be reduced from the stipulated delivery schedule. It will be ensured by Nigam to convey approval of pre-commencement sample within 15 days of receipt of sample.

3.46 ADDITIONAL ORDER

Repeat orders for additional quantities, upto 50% of original ordered quantities, may be placed by the Nigam, on the same rates, terms and conditions given in the contract.

3.49 GENERAL INFORMATION :

- (a) Frequent changes in specifications during currency of contract will be avoided and if required the same shall be effected on mutually agreed basis.
- (b) 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.	Applicable Standard	
2.	Class of Accuracy 1.0	
3.	Type of Meter	
4.	Reference Voltage (Vref)	
5.	Basic Current (Ib)	
6.	Maximum Current (Imax)	
7.	Maximum withstand Current for two hours	
8.	Maximum withstand voltage for 15 minutes The meter should be capable enough to withstand phase to phase voltage of 415 V±10% continuously	
9.	Rated frequency i.e. 50 Hz	
10.	Power Factor Range (-1 to +1)	
11.	Operating temperature range (as per IS)	
12.	Starting Current (0.2 % of Ib)	
13.	Fixing of case in such a way that leave the physical evidence if it is opened.	
14.	Materials of the terminal block should conform to the relevant clause of the specification	
15.	Details of screw provided on each terminal for fixing stranded wire	
16.	The terminal cover should be fixed with case through upper hinge	
17.	Voltage and Current Circuits should be solidly connected inside the meter without any links	
18.	Components of the PCB should be surface mounted except power component	
19.	Power consumption in voltage circuit (<0.5 W & 1 VA)	
20.	Power consumption in current circuit (< 0.1 VA)	
21.	Overall dimension of the meter with ± tolerance	
22.	Overall weight of the meter with ± tolerance	
23.	Impulse voltage withstand capacity (10 kV)	
24.	Auto display mode	
25.	Manual mode display	
26.	The meter shall be provided with suitable facility for downloading all data through optical port provided on the meter through CMRI.	
27.	Display Details Backlit, 8 mm height, six digit LCD with tamper annunciators.	
28.	Accuracy of RTC	
29.	The meter should be equipped with the facility to read the parameters during power cut. Same actuator shall be used for display access and reading.	
30.	Indications should be provided to facilitate test	

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	output pulse	
31.	Guaranteed Accuracy within different ranges of voltage and P.F.	
32.	Meter should run with no load on 70% to 120% of the rated voltage	
33.	The meter should be immune to DC magnetic fields as per the IS 13779	
34.	The meters should record energy as per rated parameters even when neutral from the incoming and outgoing is removed	
35.	<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 	
36.	The meter should be designed with application specific integrated circuit and should be manufactured using Surface Mount Technology (SMT) components	
37.	The meter should be capable to detect the opening of the case in power off conditions also	
38.	For local meter reading the meter should be capable enough to provide entire meter data and the download time should be within 150 seconds	
39.	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. ACCEPTANCE TEST

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

6. 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.	