

TECHNICAL SPECIFICATION FOR EMPANELMENT OF AC STATIC STATIC 3 PHASE 4 WIRE DIRECT CONNECTED STATIC TRIVECTOR ENERGY METER WITH NET METERING CAPABILITY UNDER TN-2653

1. OBJECTIVE & SCOPE

- a. This specification shall cover design, engineering, manufacture, assembly, inspection, testing of Class 1.0 accuracy class static 3 phase–4 wire energy meter. The meter shall be suitable for measurement of energy and power, demand requirement in an AC balanced/unbalanced system over a power factor range of zero lag to unity. These meters should have communication port to interface for remote meter reading.
- b) The meter shall be ISI mark & bidder shall furnish the details of ISI license at the time of bid opening.

2. REQUIREMENT :

The requirement is of 3 X 240 Volt 50 Hz A.C. Static Three Phase 10-60 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.

2. SERVICE CONDITION

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

Maximum ambient temperature	:	50 °C
Maximum ambient temperature in shade	:	45 °C
Relative Humidity	:	10 to 95%
Maximum wind pressure	:	150 Kg/m. sq.
Maximum altitude above mean seal level	:	1000 meters
Isoceraunic level	:	50 days/year
Seismic level (Horizontal acceleration)	:	0.3g
Moderately hot and humid tropical climate		

3. APPLICABLE STANDARDS

The whole current energy meter shall be of accuracy Class 1.0 and conform to relevant clauses of following standards or report: -

1.	IS 13779	AC Static Transformer Operated Watt-hour and VAR-Hour Meters, class 1.0.
2.	CBIP Technical report no. 111	Specification for common Meter Reading Instrument
3.	IS :9000	Basic Environmental Testing Procedures for Electronic & Electrical Items.
4.	IS 15959 and its latest amendment	Data Exchange for Electricity Meter, Reading, Tariff and Load Control – Companion Specification

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. GENERAL TECHNICAL REQUIREMENT

- 4.1** Application : 3 phase 4 wire
4.2 Rated Secondary Voltage : 240 volts (Phase to Neutral)
4.3 Current Rating : 10-60A
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)
4.7 The meter shall start and continue to register on application of 0.2% of basic current at Unity P.F., as per relevant standards and shall work satisfactorily with the following supply system variation:
Voltage: $V_{ref} + 30\%$ to -30%
Frequency: $50 \text{ Hz} \pm 5\%$
4.8 Temperature: The standard reference temperature for performance shall be $27 \text{ }^{\circ}\text{C}$. The mean temperature co-efficient shall not exceed 0.03%.

5. INFLUENCE QUANTITIES:

The meter should 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, under the presence of influence quantities.

6. CONSTRUCTION

The case, winding, voltage circuit, sealing arrangements, registers, terminal block, terminal cover & name plate etc, shall be in accordance with the relevant standards. The meter should be compact & reliable in design, easy to transport & immune to vibration & shock involved in the transportation & handling. The construction of the meter should ensure consistence performance under all conditions especially during storms/heavy rains/very hot weathers. The insulating materials used in the meter should be non-hygroscopic, non-ageing & have tested quality. The meter should be sealed in such a way that the internal parts of the meter become inaccessible.

The meter should employ latest technology such as Application Specific Integrated Circuit (ASIC) to ensure reliable performance. The mounting of the components on the PCB should be Surface Mounted Technology (SMT) type except some power supply related component. The electronic components used in the meter should be of high quality.

6.1 GENERAL MECHANICAL REQUIREMENTS

The construction of the meter shall be rigid & suitable to withstand shock & vibration involved in transportation & handling, as specified in IS 13779. 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 IP 51 class degree of protection against dust and moisture as per relevant standards.

6.2 TROPICAL TREATMENT

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. 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. 2. The meter shall work from -10°C to +55°C and RH 95% non-condensing type.

6.3 METER CASE

The housing of the meter shall be safe high-grade Engineering plastic 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 resistant to heat & fire. The construction of the meter offered shall be such that it can be sealed

independently and the cover cannot be removed with the use of a tool, without breaking the seal. The case of offered meters shall be so constructed that any non-permanent deformation shall not prevent the satisfactory operation of the meter. The meter shall have a transparent cover and opaque base with seamless ultrasonic welding.

6.4 TERMINALS -TERMINAL BLOCK

The base of the meter shall have a terminal block at the bottom made out of high grade engineering plastic so as to facilitate bottom connection and having capability to carry maximum value of current.

The material of the terminal block shall be capable of passing the tests given in IS 13779.

The terminal holes in the insulating material shall be of sufficient size to accommodate the insulation of the conductors. The diameter of the terminal hole for current terminals shall not be less than 9 mm & shall be of adequate length in order to have proper grip of conductors / crimping pins with the help of two screws.

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. The material of terminal and connection screws should be brass.

The manner of fixing the conductors to the terminals shall ensure adequate and durable contact such that there shall have 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. Electrical connections shall be so designed that contact pressure shall not be transmitted through insulating material.

6.5 TERMINAL BLOCK COVER

The terminals block cover for the energy meters shall be extended transparent type, which can be sealed independently of the meter cover. The ETBC shall have a clear space of 45 ± 5 mm, thus allowing sufficient clearance space for inserting cables. ETBC shall have a top side hinge arrangement for easy access of terminal for wire termination. The terminals, their fixing screws and the insulated compartment housing them shall be enclosed by extended terminal cover in such a way that no part of meter or accessories at terminal block shall be accessible from the front of the meter. There shall be provision of fixing of seals so that screws cannot be loosened without breaking the seals.

The terminals shall not be accessible without removing the seal(s) of terminal cover when energy meter is mounted on the meter board.

6.6 WINDOW

The energy meter cover shall be made of high-grade engineering plastic with a clear window. The window shall be of transparent material shall be such that it cannot be removed undamaged without breaking the meter cover seals.

6.7 QUALITY

Overall the quality of the meter should be good and the service life of the meter shall be more than the guarantee period. The material, components used for manufacturing the meter shall be of premium quality. The LCD display shall not fade with time and the display annunciators should be visible. Functionality of the meter shall not be affected by the harsh environmental conditions. Quality meters shall be given preference and the performance of previous installed meters shall be analysed before awarding the tender. Aesthetically, the meter shall be of premium quality.

7. COMMUNICATION PORT

a) LOCAL COMMUNICATION PORT

The energy meter shall have a galvanically isolated IEC 1107 optical communication port located in front of the meter for data transfer to or from a hand held Data Collection Device. The sealing provision should be available for optical port.

b) REMOTE COMMUNICATION PORT

Meter shall have an additional communication port (RS 232) in the form of RJ11 port to interface external modem for remote data collection. RS 232 (RJ11) port shall be located under the terminal cover.

8. DATA DOWNLOADING CAPABILITY

Meter shall support a minimum baud rate of 9600 on optical port as well as RS 232 remote communication port.

9. DISPLAY OF MEASURED VALUE:

The measured value(s) shall be displayed on seven segments, seven digit Liquid Crystal Display (LCD) display unit/register, having minimum character height of 10 mm.

The data should be stored in non-volatile memory. The non-volatile memory should retain data for a period of not less than 10 years under unpowered condition. Battery back-up memory will not be considered as NVM.

It should be possible to easily identify the single or multiple displayed parameters through symbols/legend on the meter display itself or through display annunciators.

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.

The principle unit for the measured values shall be kWh for active energy, kVAh for reactive energy & kVAh for apparent energy. Bidder shall mention the scale in which the meter displays the energy values.

Required display list will be given at the time of order. However it will be in line with companion standard such as:

- Connection Check
- Meter Serial Number BIS
- Date
- Real Time
- R Phase Line Current
- Y Phase Line Current
- B Phase Line Current
- Phase To Neutral Voltage R
- Phase To Neutral Voltage Y
- Phase To Neutral Voltage B
- R Phase Power Factor Q1
- Y Phase Power Factor Q2
- B Phase Power Factor Q3
- Instantaneous Average Power Factor
- Supply Frequency
- Instantaneous Load Apparent
- Instantaneous Load Active
- Instantaneous Load Reactive
- Total Active Import Energy Register
- Total Active Export Energy Register
- Active Net (Imp-Exp) Energy Register
- Apparent While Active Import Energy Register
- Apparent While Active Export Energy Register
- Number of Power-Failures
- Cumulative power off duration
- Cumulative Tamper Count
- MD Reset Or Bill Count
- Cumulative programming count
- MD Reset Time and Date
- Reactive Import While Active Import Energy Register
- Reactive Import While Active Export Energy Register
- Reactive Export While Active Import Energy Register
- Reactive Export While Active Export Energy Register
- TOD Total Active Import MD Register(Reg 0-24hrs)
- TOD Total Active Export MD Register(Reg 0-24hrs)

- TOD Apparent While Active Import MD Register(Reg 0-24hrs)
- TOD Apparent While Active Export MD Register(Reg 0-24hrs)
- Last Cover open date
- Last Cover open time
- Rising Demand With Elapsed Time Apparent while active import
- Rising Demand With Elapsed Time Apparent while active export
- Average Power Factor Current Month
- Billed Export Power Factor
- Meter Read Count on Priority Port
- History 1 Total Active Import Energy Register
- History 1 Total Active Export Energy Register
- History 1 Active Net (Imp-Exp) Energy Register
- History 1 Apparent While Active Import Energy Register
- History 1 Apparent While Active Export Energy Register
- History 1 TOD Total Active Import MD Register(Reg 0-24hrs)
- History 1 TOD Total Active Export MD Register(Reg 0-24hrs)
- History 1 TOD Apparent While Active Import MD Register(Reg 0-24hrs)
- History 1 TOD Apparent While Active Export MD Register(Reg 0-24hrs)
- History 1 Billed Average Power Factor
- History 1 Billed Export Power Factor
- History 2 Total Active Import Energy Register
- History 2 Total Active Export Energy Register
- History 2 Active Net (Imp-Exp) Energy Register
- History 2 Apparent While Active Import Energy Register
- History 2 Apparent While Active Export Energy Register
- History 2 TOD Total Active Import MD Register(Reg 0-24hrs)
- History 2 TOD Total Active Export MD Register(Reg 0-24hrs)
- History 2 TOD Apparent While Active Import MD Register(Reg 0-24hrs)
- History 2 TOD Apparent While Active Export MD Register(Reg 0-24hrs)
- History 2 Billed Average Power Factor
- History 2 Billed Export Power Factor
- Self Diagnostic Flags

The meter should have visual quadrant representation on the LCD for energy measurement. Relevant quadrant in which metering is taking place should be in on state for ease of understanding.

10. ELECTROMAGNETIC 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.

10.1 IMMUNITY TO ELECTROMAGNETIC DISTURBANCE

The meter shall be designed in such a way that conducted or radiated electromagnetic disturbance as well as electrostatic discharge do not damage or

substantially influence the meter and meter shall work satisfactorily under these conditions as per relevant standards

NOTE: the disturbances to be considered are: -

- (a) Harmonics
- (b) Voltage dips and short interruptions
- (c) Conducted transients
- (d) D.C. and A.C. magnetic fields
- (e) Electromagnetic fields
- (f) Electrostatic discharges

10.2 RADIO INTERFERENCE SUPPRESSIONS

The meter shall not generate noise, which could interfere with other equipment, and meter shall work satisfactorily as per relevant standards

10.3 INFLUENCE OF HIGH MAGNETIC FIELD

The meters shall be provided appropriate magnetic shielding so that any external magnetic field (AC/DC electromagnet) as per IS 13779 applied on meter would not affect the proper functioning of the meter and meter shall work satisfactorily as per relevant standards.

11. STARTING CURRENT

The meter shall start and continue to register at the current 0.2% of I_b .

12. 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/count on "no load".

13. POWER CONSUMPTION

13.1 The active and apparent power consumption in each voltage circuit at reference voltage; temperature and frequency shall not exceed 1.0 W and 4 VA per phase respectively.

13.2 The apparent power consumption in each current circuit at basic current, reference frequency and reference temperature shall not exceed 1.0 VA per phase.

14. CALIBRATION & TEST OUTPUT

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

However, it shall be possible to check the accuracy of energy measurement of the meter in the field by means of LED output on meter. Meter should have two calibration LEDs for accuracy measurement for different energies. Out of these,

one should be kept fixed on kWh import and other one shall be configurable for rest through push button.

15. CONNECTION DIAGRAM

The connection diagram of the meter shall be clearly shown for 3 phase 4 wire system, on the terminal cover. The meter terminals shall also be marked and this marking should appear in the above diagram.

16. ABNORMAL EVENTS:

The meter should have features to detect the occurrence and restoration of, at least, the following common abnormal events:

- a) **Missing Potential:** The meter shall be capable of detecting and recording occurrence and restoration with date and time the cases of Potential failure (one phase or two phases). All potential missing cases shall be considered as power failure.
- b) **Current imbalance:** The meter shall be capable of detecting and recording occurrence and restoration with date and time of Current unbalance (for more than a defined persistence time).
- c) **Current Reversal:** The meter shall be capable of detecting occurrence if the current is flowing in reverse direction in one or more phases.
- d) **Power on/off:** The meter shall be capable to record power on /off events in the meter memory. All potential failure should record as power off event.
- e) **Magnetic Influence** - The Meter shall be capable of detecting and recording of presence of abnormal magnetic influence near the meter, if the magnetic influence affects the meter functionality. The meter should record at I_{max} on account of magnetic influence. Separate legend for magnet event shall be made available on LCD. This legend shall remain in on state till meter reading so that it will come in to notice of meter reader.
- f) **Voltage unbalance** – Meter shall detect voltage unbalance if there is unbalance in voltages.
- g) **Over Current** – When load condition at any phase i.e. Line current at any phase goes more than defined limit , this will be detected as Over current condition.
- h) **CT Open** – The meter should detect phase wise current circuit open when the circuit is opened from meter side.
- i) **CT Bypass** – The condition should be detected whenever the current terminal is bypassed in the meter

- j) **Neutral Disturbance** – The meter should detect neutral disturbance if any spurious signal is applied at the meter’s neutral.
- k) **High and Low Voltage:** The meter should detect under and over voltage events respectively if voltage falls / rise from defined limits.
- l) **Cover Open:** The meter shall be able to detect cover open occurrence event if cover is opened in mains on or off condition. Separate legend for cover open event shall be made available on LCD. This legend shall remain in on state till meter reading so that it will come in to notice of meter reader

The meter shall keep records for the minimum last 300 events (occurrence + restoration) for above abnormal conditions except Current Reversal. Each event shall be logged with date and time of occurrence/restoration with snapshot of voltage, current power factor and active import energy (except cover open, power on-off). It shall be possible to retrieve the abnormal event data locally using a hand held unit (HHU) through the meter's optical port & same can be viewed / analysed at base computer end in simple and easily understandable format.

17. ABNORMAL VOLTAGE/FREQUENCY DEVICE TEST:

The accuracy of the meter would not be affected with the application of abnormal voltage/ frequency generating device having spark discharge of approximately 35KV. The meter will be tested by feeding the output of this device to meter in any of the following manner for 10 minutes:

- i) On any of the phase or neutral terminals.
- ii) On any connecting wires of the meter.
- iii) Voltage discharge with 0-10 mm spark gap.
- iv) Spark on meter body.
- v) Spark on the optical and RS 232 port.
- vi) At any place in load circuit.

The accuracy of the meter will be checked before and after the application of above device.

18. 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 immune to any type of radio frequency interface, harmonic distortion, voltage/ frequency fluctuations, electromagnetic high frequency fields and abnormal voltage/ frequency generating device.

19. BILLING HISTORY & LOAD SURVEY: -

The meter shall have sufficient non-volatile memory for recording history of energy parameters for minimum last twelve billing cycles

Following parameters shall be made available for last 45 days with integration period of 30 min:

- Active import, export energy
- Reactive import, export energy
- Apparent energy while active import & export
- Phase wise voltage
- Phase wise current

These load survey and history data can be retrieved with the help of Meter Reading Instrument on local interrogation or remotely using the remote communication interface.

20. MD REGISTRATION

The meter shall continuously monitor and calculate maximum demand for each interval of time, which may be programmable as a block of 30 minutes. At the end of every demand integration period the new calculated MD shall be compared with the previous MD and meter shall store whichever value is higher.

21. MD RESET

The meter shall have any of the following MD resetting options: -

- (a) Automatic reset at the end of a certain predefined period (say, end of the month)
- (b) MD reset through authenticated transaction

22. SELF DIAGNOSTIC FEATURE

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

- a) Time and date on meter display
- b) All display segments on meter display
- c) Self diagnostic (RTC, NVM information) on display

23. OTHER SALIENT FEATURES OF METERS

- a) It should be possible to check the healthiness of phase voltages by phase indicator available on meter display.
- b) The meter shall have provision of reading in the absence of power through an internal battery. It shall be possible to access the display in power off condition. It shall also be possible to do meter data download through MRI under power off condition.
- c) The meter should work accurately irrespective of phase sequence of the supply.

24. TEST AND TEST CONDITIONS

- Acceptance test: All acceptance tests as per relevant standards shall be carried out in the presence of utility representatives.
- Routine Test: All the routine tests as per –IS 13779 shall be carried out and routine tests certificates shall be submitted for approval of purchaser.

25. 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. 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).

27.0 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.

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. 8 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.

**GUARANTEED TECHNICAL PARTICULARS FOR 3 PHASE 4 WIRE
WHOLE CURRENT NET ENERGY METER**

S.No.	Item	To be filled by the Bidder
1.	Name & Address of Manufacturer	
2.	Work's Address	
3.	Type / Designation & Model No of meter offered	
4.	Type	
5.	Application	
6.	Rated Voltage	
7.	Rated Current	
8.	Frequency	
9.	Minimum starting current in % of base current	
10.	Power loss in potential circuit	
11.	Power loss in current circuit	
12.	Change in error due to	
	i. Variation in frequency	
	ii. Variation in voltage	
13.	Accuracy Class	
14.	Total Weight of meter	
15.	Details of case	
16.	Standard to which the meter confirm	
17.	Type of Energy Registration Mechanism.	
18.	MD Reset Mechanism	
19.	MD reset button with sealing provision	
20.	Two LEDs for accuracy measurement	
	Working range	
21.	Voltage	
22.	Current	
23.	Display details	
	i. Display Cycle	
	ii. Period of display of each parameter	
	iii. Display scroll-lock facility	
	iv. Backlit LCD	
	v. Legend for Cover open detection	
	vi. Legend for Magnet event	
24.	Power on in absence of mains	
	i. Internal / External Battery	
	ii. Display access	

	iii. Reading (Data downloading)	
25.	Total Events (300 nos)	
26.	Load Survey	
27.	Parameter Logged	
28.	Logging interval	
29.	No. of days of Load Survey	
30.	Daily Energy Snap i. Parameters ii. No. of Days	
31.	Capability for fraud Prevention & detection	
32.	Sealing and Locking Arrangement	
33.	Type of communication i. Local- Optical port IEC 1107 ii. RS 232 port for remote comms	
34.	Event Logging Current Related events: <ul style="list-style-type: none"> • CT reversal (phase wise) • Current imbalance • CT open (phase wise) • CT Bypass Voltage related events <ul style="list-style-type: none"> • PT missing (phase wise) • Voltage unbalance Others: <ul style="list-style-type: none"> • Magnet • Neutral Disturbance Non Rollover events <ul style="list-style-type: none"> • Front Cover open Power on-off events	

TECHNICAL SPECIFICATION OF PILFER PROOF METER BOX TO HOUSE THREE PHASE WHOLE CURRENT 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 \pm 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 \pm 0.2mm 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 $120\pm 5^{\circ}$ 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

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 THREE 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.	