

TECHNICAL SPECIFICATION EMPANELMENT OF FOR STATIC 3 PHASE 4 WIRE CT OPERATED STATIC TRIVECTOR NET ENERGY METER

1. OBJECTIVE & SCOPE

This specification shall cover design, engineering, manufacture, assembly, inspection, testing of Class 0.5s accuracy class static 3 phase–4 wire CT operated three-vector 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.

2. SERVICE CONDITION

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

- a) Maximum ambient temperature : 50 °C
- b) Maximum ambient temperature in shade : 45 °C
- c) Relative Humidity : 10 to 95%
- d) Maximum annual rainfall : 1450 mm'
- e) Maximum wind pressure : 150 Kg/m. sq.
- f) Maximum altitude above mean seal level : 1000 meters
- g) Isoceraunic level : 50 days/year
- h) Seismic level (Horizontal acceleration) : 0.3g
- i) Moderately hot and humid tropical climate

3. APPLICABLE STANDARDS

The CT operated energy meter shall be of accuracy Class 0.5 for active/ reactive / apparent energy and conform to relevant clauses of following standards or report: -

IS 14697: 1999	Specification for A.C Static Transformer operated Watt Hour & VAR – Hour meters, class 0.5s
CBIP Technical Report No. 304	Specification for A.C. Static Electrical Energy Meters.
IS 15959 (Companion specification)	DLMS Indian Companion Standard – Category 'B' for Boundary/Bank/Ring/ABT Metering

Unless otherwise specified elsewhere in this specification the static meters shall conform to the latest version available of the standard as specified above.

4. GENERAL TECHNICAL REQUIREMENT

- 4.1 Application : 3 phase 4 wire
- 4.2 Rated Secondary Voltage : 63.5 volts (Phase to Neutral)
- 4.3 Rated secondary Current (I Basic) :5 Amps
- 4.4 Rated Frequency : 50 Hz.
- 4.5 Accuracy class : 0.5s (the meter should meet the same class of accuracy for reactive energy also)
- 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 0.1% of basic current at Unity P.F., as per relevant standards and shall work satisfactorily up to maximum continuous current of 2 times rated basic current with the following supply system variation:

Voltage: $V_{ref} \pm 30\%$
Frequency: $50 \text{ Hz} \pm 5\%$

4.8 Temperature: The standard reference temperature for performance shall be 27 °C. The mean temperature co-efficient shall not exceed 0.03%.

4.9 The reactive accuracy class of the meter shall be same as the active accuracy class

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 14697: 1999 / CBIP technical report – 304, 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 14697. 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 IP51 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 houses solid nickel plated brass terminals having capability to carry maximum value of current.

The material of the terminal block shall be capable of passing the tests given in IS 14697: 1999.

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 5.0 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 14697: 1999.

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 min 40±5mm, 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 one window. The window shall be of transparent material ultrasonically welded with the meter cover 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.

Both the ports will support communication on DLMS and should be accessible through a DLMS compliant HHU

8. DATA DOWNLOADING CAPABILITY

Meter shall support a minimum baud rate of 9600 on optical port as well as RS 485 remote communication port. It shall be possible to read selective data from the meter as specified in the companion standard.

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.

Meter shall have Scroll Lock facility to display any one desired parameter continuously from display parameters.

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 Wh/kWh/MWh for active energy, VARh/kVARh/MVARh for reactive energy & VAh/kVAh/MVAh for apparent energy based on secondary current. 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.

Parameter value with relevant OBIS code should also be simultaneously available along with the respective values on the display.

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.

A. 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

B. RADIO INTERFERENCE SUPPRESSIONS

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

C. INFLUENCE OF HIGH MAGNETIC FIELD

The meters shall be provided appropriate magnetic shielding so that any external magnetic field (AC/DC electromagnet) as per CBIP Technical Report no. 304 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 0.1% of Ib.

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 of the CT Operated meters 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 for the CT Operated meters 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 and other one shall be configurable for rest two (kVAh, kVAh). Resolution of the test output shall be sufficient to enable the starting current test in less than 10 minutes

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. QUANTITIES TO BE MEASURED:

The meter shall be able to provide the following data in line with Category 'B' type as per IS 15959 - Indian Companion Specification.

- a) Instantaneous Parameters
- b) Block Profile / Load Survey data
- c) Abstract quantities
 - Name Plate Details
 - Programmable parameters
- d) Event Conditions.
- e) Mid Night energy snap shot/Daily load profile

The meter shall be able to measure and provide the parameters listed in the guideline document. The OBIS code for each parameter shall be as identified as per DLMS /COSEM protocol in line with Indian companion standard.

17. ABNORMALITY EVENTS DETECTION:

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 and recording occurrence and restoration with date and time if the current is flowing in reverse direction in one or more phases. The meter shall continue to record in forwarded direction even in case of CT reversal.

- 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 above shall be selectable and will be in line with IS 15959 : Data Exchange for Electricity Meter Reading, Tariff and Load Control – Companion Specification

The meter shall keep records for the minimum last 300 events (occurrence + restoration) for above abnormal conditions. Each event shall be logged with date and time of occurrence/restoration with snapshot of voltage, current power factor and active 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.

18. 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
- vi) At any place in load circuit.

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

19. LOAD SURVEY: -

Meter should support parameters as mentioned in IS-15959 for category B
Following parameters shall be made available for last 60 days with integration period of 15 min. Out of which the utility should be able to select any five parameters

- i) Real time clock ,date and time.
- ii) Frequency
- iii) Voltage ,V Rn
- iv) Voltage ,V Yn
- v) Voltage ,V Bn
- vi) Total Active Import
- vii) Active Net (Imp-Exp)
- viii) Total Active Export
- ix) Apparent While Active Import
- x) Apparent While Active Export

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. Mid Night Energy Parameters.

Meter should support mid night parameter as mentioned in table no 26 of IS 15959.
The parameters shall be logged at midnight (00:00 hrs).The meter should store these parameters for 22 days.

- Real time clock , date and time
- Total Active Import
- Total Active Export
- Reactive Import While Active Import
- Reactive Import While Active Export
- Reactive Export While Active Export
- Reactive Export While Active Import
- Apparent While Active Import
- Apparent While Active Export

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

- It should be possible to check the healthiness of phase voltages by phase indicator available on meter display.

- 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.
- The meter should work accurately irrespective of phase sequence of the supply.

24. 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 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 compatible with DLMS protocol offered shall be fully type tested at any NABL accredited test laboratories as per relevant standards .The bidder shall furnish two sets of type test reports along with the bid. Type test reports shall not be more than five years old from the date of opening of bid.

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

Beside above bidder should also submit the test report from CPRI, Banglore/Bhopal/ ERDA, Vadodara /government approved/ government recognized/NABL accredited laboratory along with the bid for the latest version of the "Indian standard on data exchange for electricity meter reading, tariff and load control-companion specification" ETD(13)6211 released by BIS.

b) Routine test :

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.

25 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.

26.0 SAMPLE ALONG WITH BID :

The bidder shall furnish three sample of HT TVM of each category conforming to this specification duly sealed along with the routine test certificates directly in the office of the Superintending Engineer (MM-II), 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.

Three sample of HT-TVM of 0.5S class of each category 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.
- viii) Power factor calculation procedure to be ensured.**
- ix) Forward logging feature in the meter to be ensured.**

27 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.

28 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.

29.0 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.

30.0 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.

31.0 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.

32.0 Qualification Requirements

The qualification requirements shall be as per Schedule-III A.

33.0 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 CT OPERATED
TRIVECTOR NET ENERGY METER FOR CONSUMER METERING**

S.No.	Item	Bidder's data
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 (page mode display)	
	ii. Period of display of each parameter	
	iii. Display scroll-lock facility	
	iv. Backlit LCD	
	v. Relevant OBIS codes for parameter	
	vi. Legend for Cover open detection	
	vii. 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.	Time of the day Zone	

32.	Capability for fraud Prevention & detection	
33.	Sealing and Locking Arrangement	
34.	Type of communication i. Local- Optical port IEC 1107 ii. RS 232 port for remote comms	
35.	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	