PUNJAB STATE POWER CORPORATION LTD.
(*O/o Chief Engineer Transmission System, B – 1, Shakti Vihar, PSPCL Patiala)*
(Registered Office: PSEB Head Office,The MALL Patiala-147001)
(Phone No. 0175-2301537 , Fax No. 0175-2220143. Email : addlsecell2@gmail.com)
(Corporate Identity Number U40109PB2010SGC033813 : Website : www.pspcl.in)

EXPRESSION OF INTEREST (EOI)

Invitation for Expression of Interest (EOI) regarding Standardization of Firms for the procurement of Tri-Vector Meters used in 11 KV VCB Panels.

EOI is invited from National manufacturers for standardization of firms for supply of Tri-Vector Meters used in 11 KV VCB Panels. Bidders, who are manufacturer of these types of meters are requested to submit 3 no. sample meters (2 no. sample meters without ultrasonic welding and 1 no. sample meter with ultrasonic welding) along with their serial numbers/meter constant upto 21.08.2014 ,11 : 00 Hrs along with detailed literature and latest Type Test Reports from Govt. / NABL accredited lab. The sample meters shall be tested in PSPCL Lab in order to examine its acceptability. Further, the short listed firms may be asked to get their sample meters tested from any of the NABL accredited lab at their cost. The detailed technical specification of the meters is available on PSPCL website www.pspcl.in.

Interested parties may obtain further information required, if any, at the address given below during office time (09.00 to 17.00 Hrs.) on working days. Sample meters, along with latest Type Test Reports from Govt./ NABL accredited lab, must be delivered to the address given below by 21.08.2014, 11 :00 Hrs. and the same shall be opened on the same day at 12:00 Hrs. The EOI shall be submitted by the bidder in a sealed envelope super scribed as EOI For Tri-Vector Meters used in 11 KV VCB Panels alongwith **DD of Rs. 2500/- in favour of AO/TS, PSPCL, Patiala** as document fees.

Dy.CE/Sub-Station Design,
C-1, Shakti Vihar,
PSPCL, Patiala
Tel: 0175-2301537.
Fax: 0175-2220143.
Mobile: 96461-19408

INSTRUCTIONS AND TERMS & CONDITIONS FOR INTERESTED PARTIES :

i) Interested parties are advised to study & understand the technical specification of the TVMs carefully (Annexure-A). Applying for EOI shall be deemed to have been done after careful study and examination of the documents with full understanding of its implications, terms and conditions.

ii) The response should be full and complete in all respects. Incomplete, partial or conditional response shall be rejected.

iii) PSPCL reserves the right to clear any doubt/ contradiction/ ambiguity/ in the stipulations of this EOI. PSPCL's decision on this account will be absolute & final and binding.

iv) The Interested parties shall bear all costs associated with the preparation of the documents and submission of the samples, including cost of presentation and verification of claims made by the applicant for the purposes of clarification, if so desired by PSPCL. PSPCL will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the process.

v) Interested parties are required to fill up the performa " Guaranteed Technical Particulars For 3 Phase 4 Wire CT PT Operated Trivector Energy Meter" enclosed as Annexure- B & sign on the each page of the same and also give the stated certificates on letter head of the company duly signed by the authorized person of the company along with authentic document/s to prove the authority of the signatory (i.e. valid legal power of attorney in favour of signatory) must be attached.

vi) In case the offered meters are not compatible with the existing DCD/ CMRI/ HHU already available within PSPCL, then the Interested party shall also submit one suitable DCD/ CMRI/ HHU and data downloading software for BCS along with the sample for meter reading purpose.

PRE-QUALIFYING REQUIREMENTS :

i) Bidder should have all the facilities in his works for design, assembly, quality assurance, burn-in test(fully assembled energy meter), testing(all routine and acceptance tests), automatic calibration of Energy Meter on software based test bench, qualified team of technical and software engineers.

ii) Turn-Over of the firm during last three financial years in respect of energy meters should be minimum of Rs. 25 Crores.

iii) The firm should either have in house manufacturing facility based on surface mounting technology (SMT) for fixing various electronic components on PCBs or if surface mounting is outsourced, then at least the firm should be making

procurement by itself of all vital components to be mounted on the PCBs proof for which shall be submitted along with the bid.

iv) Bidder should possess fully computerized automatic test bench system for carrying out routine and acceptance tests as per IS-14697:1999 (Amended upto date).

v) Firms with whom business has been suspended, black listed firms, debarred firms shall not be considered.

vi) The calibration curve and routine test certificates should also be submitted with sample meters. No subsequent change in design shall be allowed. The EOI of the firm (s) shall only be opened if sample meters are submitted before the last date / time of receipt of samples / tenders.

vii) The bidders shall be required to furnish a certificate in their tender that "No fake ICs will be used by them in the meters to be supplied".

viii) The manufacturer shall submit along with the EOI the type test certificates of meters, issued by one of CPRI/ERTL/ETDC/ERDA/YMPL/Central Electronics Centre, IIT, Chennai/Hi-tech Meter Laboratory, UGVCL, Ahmedabad/Hi-Physix laboratory India Private Ltd., Pune for all type tests covered in IS-14697:1999& CBIP-304 with latest amendments and these test certificates shall pertain to HT TPT meters of required accuracy class and for each ratio as per requirement of specification. Further these tests must not have been conducted earlier than two years from the original scheduled date of bid opening. In case, required type test certificates are not attached with the tender then the tender of the firm shall be rejected.

ix) The manufacturers must have valid BIS certificates for meters.

NOTE:

1. The bidder shall have to submit: -

a) Certificate from Chartered Accountant indicating his turn over for the last three financial years in support of (ii) above.

b) Documentary proof towards having fully automatic meter test bench in support of (iv) above.

2. Bidder must have VAT/TIN registration no.

3. The particulars of the firm i.e. Names & addresses of Directors of the firm, their income tax permanent Account Number. Income tax return & turnover of the firm for the last three years and any other specific allied information on the following Performa shall be supplied along with the tender:-

Name of the firm	Name of Directors/ Partners	Income Tax PAN of firm	Turn over of the firm (Last three years)

4. Manufacturer should have supplied TVMs to at least two SEBs/Power utilities.

5. **WORKS APPRAISAL:**

The work appraisal, if necessary, of the short listed firms shall be carried out by PSPCL as per the following details.

a) Rs. 50,000/- for the firms located outside Punjab.

b) Rs. 25,000/- for the firms located within Punjab.

The work appraisal Performa is attached as Annexure-C.

The recommendation of the work appraisal does not give any right to the firm to be on the standardized list of PSPCL. The decision of the competent authority of PSPCL in this regard shall be final and bidding on the firm.

Note:

I. The above specifications are guidelines for standardization only.

II. Firms should be regular supplier of the similar material to reputed organizations like NTPC, Power Grid/other state utilities etc.

III. Firm should be equipped with all in-house testing facilities as per relevant IS for carrying out test and quality control of the material during &after the manufacturing process.

IV. Conditional & telegraphic email quotations shall not be accepted.

6. **PROCEDURE FOR SUBMISSION OF EOI:**

Detailed EOI along with documents confirming compliance with technical & commercial requirements may be submitted by 21.08.2014, 11:00 Hrs.

Address for Communication and Submission of EOI :

Dy.Chief Engineer/ Substation Design,
C-1, Shakti Vihar, PSPCL, Patiala- 147001.
Phone: 0175-2301537, Fax: 0175-2220143.

Dy.CE/SS(D),
PSPCL, Patiala.

Annexure-A

TECHNICAL PARTICULARS OF STATIC TRIVECTOR METERS

1) TRIVECTOR METER SHOULD CONFORM TO:

a) PSPCL Spec. MQP-67/2013-14/PR of CE/Metering, PSPCL, Patiala subject to the modifications and additional following features:-

2) The accuracy of the Meter shall be 0.2(or better).

3) The TVMs shall be provided with RS-485 Port on MODBUS Protocol compatible with AMR system.

4) Meter shall display direct reading without multiplying factor at lowest tap of the CT of the panel on which these are to be installed. Panel manufacturers shall co-ordinate with meter suppliers accordingly.

MQP-67/2013-14/PR: Specification for 220/132/66/33/11kV/110 Volt, DLMS compliant 3 Phase, 4 wire CT/PT operated fully Static and AMR compatible Tri vector Energy meters of accuracy class 0.2S

1.0 SCOPE

Design, manufacturing, testing, inspection, supply and delivery of AC, 3 Phase, 4 wire, CT/PT operated fully Static and AMR compatible Tri vector Energy meters for measurement of different electrical parameters, listed elsewhere in the document, including Active energy (KWH), reactive Energy(KVARH), Apparent Energy (KVAH) etc. Meter shall be suitable for 3 Phase 4 Wire solidly earthed system as well as 3 phase 3 wire balanced and un-balanced loads.

2.0 APPLICATION

a) In Substation on incoming/Outgoing HT feeders (Category A)

3.0 APPLICABLE STANDARDS

a. IS 15959:2011 for DATA EXCHANGE FOR ELECTRICITY METER READING, TARIFF AND LOAD CONTROL-(including amendments, if any).
b. IS 14697/1999 (reaffirmed 2004) specification for AC Static Transformer operated Watt Hour & VAR-Hour meters (class 0.2S)
c. IS15707 Specification for testing, evaluation, installation & maintenance of AC Electricity meters-Code of Practice
d. CBIP-Publication No.304
e. IS 12063 for enclosure protection against ingress of dust, moisture & vermin.
f. IS-9000 for environment testing.
g. IS-11731 (FH-1 Category) for Polycarbonate cover.
h. ISO-75 - For test requirement of poly-carbonate cover.
i. IS-11000 (Part-2/Sec-1), 1984 ---do---.
j. IEC-60695-10-2 ---do---

k. IS-11731(Part-2) 1986 ---do---

The equipment meeting the requirements of other authoritative standards, which ensure equal or better quality than the standard mentioned above, also shall be considered. For conflict related with other parts of the specification, the order of priority shall be – i) This technical specification ii) IS 14697/1999 (reaffirmed 2004).
In case of conflict related with communication protocol, the standard IS:15959 shall prevail upon.

4.0 CLIMATIC CONDITIONS

The meter shall be suitable to work satisfactorily under the following conditions:

Minimum ambient temperature	-5ºC
Maximum ambient temperature	55ºC
Minimum relative humidity	26%
Maximum relative humidity (condensing)	95%
Altitude	Upto 1000 meter above mean sea level

The meter shall withstand and operate satisfactorily without loss of accuracy under the most hazardous climatic conditions specified above. Parts and surface, which are subject to corrosion, shall be provided with protective coating.

5.0 GENERAL TECHNICAL REQUIREMENTS

1	FREQUENCY	50Hz ± 5%
2	ACCURCAY CLASS	0.2 s.
3	SECONDARY VOLTAGE	Suitable for operation from 110V Ph-Ph or 63.5V Ph-N
4	BASIC CURRENT(Ib)	-/5 Amp as per requirement
5	MAXIMUM CONTINOUS CURRENT	2.0Ib Starting and Short time current shall be as per IS 14697
6	POWER CONSUMPTION	i) The active and apparent power consumption in each voltage circuit at reference voltage , reference temperature and reference frequency shall not exceed 1.5W and 8 VA ii) The apparent power taken by each current circuit , at basic current, reference frequency and reference temperature shall not exceed 1.0VA **Note:** The test procedure shall be strictly in accordance with clause no.12.9 of IS:14697
7	POWER FACTOR	0.0 lag-Unity-0.0 Lead
8	DESIGN	Meter shall be designed with application specific integrated circuit (ASIC) or micro shall be assembled on printed circuit board using surface mounting technology, factory calibration using high accuracy (0.02 class) software based test bench

6.0 POWER SUPPLY VARIATION

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 +20 % to –40%
Frequency: 50 Hz ±5%

7.0 COMMUNICATION CAPABILITY

Meter shall be provided with two ports for communication of the measured/collected data, i.e. a hardware port compatible with RS 485 (for Category A) as per IS:15959 which shall be used for remote access through suitable Modem (GPRS/GSM/EDGE/CDMA/PSTN) and an Optical port complying with hardware specifications detailed in IEC-62056-21. This shall be used for local data downloading through a DLMS compliant HHU/CMRI.

RS-485 port shall be used at Substations suitable for multi-drop connections of the meter for exporting data to sub-station data logger/DCU/Computer and the remote end server.

8.0 PUSH BUTTON & AUTO DISPLAY

The meter shall have atleast 6 whole digits+1 decimal digits display, parameter identifier, backlit Liquid Crystal Display (LCD) of minimum 10 mm height, wide viewing angle. LCD shall be suitable for temperature withstand of 70 deg C.
The data stored in the meters shall not be lost in the event of power failure. The meter shall have Non Volatile Memory (NVM), which does not need any battery backup. The NVM shall have a minimum retention period of 10 years. Meter should have the facility for data downloading during power OFF position.

In case of failure of power supply, the meter shall be capable to display the measured quantities through an internal battery in-built in the meter. The battery provided shall have life of not less than 10 years. The battery shall not get damaged or damage the meter even during idle storage of the meter for two years.

9.0 DISPLAY PARAMETERS

The Meter shall have 3 modes of display as mentioned below:

9.1 Mode 1 or Auto Scroll Mode: Following parameters shall Auto Scroll in this mode with persistence time of 9 or 10 seconds:

The parameters for Display Mode 1(Auto Scroll Mode) be read as under:

a) Meter Serial No.
b) Date and Time
c) Cumulative Active Energy kWh/MWh
d) Cumulative Apparent Energy kVAh/MVAh
e) Instantaneous Load(kVA/MVA & kW/MW)

f) Instantaneous Three Phase Power Factor.
g) Maximum Demand for last reset period(kVA/MVA & kW/MW)
h) Last reset date and time of Maximum Demand.
i) Current Maximum Demand. (kVA/MVA & kW/MW)
j) Rising Demand with elapsed time(kVA/MVA & kW/MW)

Note: Maximum Demand for last reset period is the maximum demand registered by the meter in the time period between the last 2 MDI resets.

Display shall automatically come back to the auto-scroll mode, if the pushbutton is not pressed for one minute.

9.2 Mode 2(Push Button Mode):

Mode 2 shall include all the display parameters as mentioned above under Mode 1 as well as all other parameters as per standard IS 15959:2011 or any other parameter specified explicitly elsewhere in the specification.

9.3 Mode 3(Push Button Mode):

Display Mode-3 shall be for displaying Energy consumption and maximum demand recorded during TOD slots indicated in this specification. Mode-2 & 3 may be selectable through same push button.

10.0 MAXIMUM DEMAND INTEGRATION

Meter shall monitor demand in KVA& kW during the integration period set and record & display the maximum registered values. The rising demand under the current integration period shall be displayed along with the elapsed time. The integration period shall be 30 minutes. This maximum demand shall correspond to any consecutive 30 minutes for block interval. Integration logic should be such that integration time remains consistent with the real time clock and are set every 30 minutes and should not be linked with the Power ON/OFF. It should be possible to reset MD by the following options:

a) Local push button
b) Auto reset at 24:00 hrs at the last day of every month. Auto reset date should be remotely programmable from central data station for change in billing date (on any day of month).

11.0 LOAD SURVEY CAPABILITIES

Meter shall be capable of storing the following 5 parameters for minimum 45 days for category A with integration period of 30 minutes.:

i) RTC (Real Time Clock – Date and Time).
ii) KVArhlag.
iii) KVArh lead.
iv) KVAh
v) KWH

12.0 SELF DIAGNOSTIC FEATURES

Indications to show the satisfactory performance of the meter shall be provided in the meter. The meter shall have capability to check its circuits for any malfunctioning. If some malfunctioning occurs, the meters should record such malfunctioning. The details of the self-diagnostic feature shall be furnished by the manufacturer/supplier. It should be possible to check correctness of CT & PT connection to meter and polarity for proper functioning.

13.0 TIME OF DAY (TOD) TARIFF

Meter shall have 8 different zones for storing TOD consumption (KWH/KVAH) and Maximum Demand(KW/KVA).

The timing of TOD zones are as under:

Zone No.	Timing
1.	00.00- 06.00
2.	06.00 -18.00
3.	18.00 -18.30
4.	18.30 -19.00
5.	19.00 -21.00
6.	21.00 -21.30
7.	21.30 -22.00
8.	22.00 -24.00

The TOD zones shall be programmable as per DLMS standard.

14.0 CONSTRUCTIONAL REQUIREMENTS, METER COVER & SEALING ARRANGEMENT

14.1 CONSTRUCTION

Meter shall be made of high quality materials/components to ensure high reliability and long life. The meter shall be compact in design. Meter shall be immune to vibration and shocks during transportation and handling. It should also be immune to external magnetic/electric fields.

All the terminals for CTs and PTs connections shall be arranged in a row along the meter in the lower side. The terminals shall be moulded/tight fit constructions with barriers and covers to provide secure and safe connections of CTs and PTs through the stranded copper conductors of 2.5mm size. The terminal cover design shall be pilfer proof & extended type and preferably of transparent polycarbonate. The meter cover shall be continuously ultrasonically welded with meter base from all sides. Transparent poly carbonate cover to be used shall be unbreakable. Polycarbonate to be used shall be of high grade which shall conform to IS 11731 (FH-1category) besides meeting the test requirement of heat deflection test as per ISO-75, glow wire test as per the IS-11000 (part 2/SEC-1) 1984 OR IEC PUB,60695-2-12, Ball pressure test as per IEC--60695-

10-2 and Flammability Test As per UL-94 or As per IS-11731(Part-2) 1986. The casing should be dust & moisture proof to the degree of IP-51 as per IS:12063. Bidder must submit the test certificate to this effect

14.2 SEALING OF THE METER

Proper sealing arrangements shall be provided on the meter to make it tamper-proof. There should be a provision of two (2) seals on the meter body, two (2) seals on the terminals cover, one (1) seal on maximum demand resetting device, one(1) seal on optical port. RS-485 terminal should also be sealable.

15. ACCURACY

The accuracy of measurement by meter shall be tested in accordance with relevant standards. Provision may be made that once the accuracy is brought within limits, the adjustments should be ceased and it shall not be possible to change the calibration of meters at site.

16.0 TAMPER & FRAUD MONITORING FEATURES

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.

Tamper details shall be stored in internal memory for retrieval by authorised personal through either of the following:

i) HHU/CMRI
ii) Remote access through suitable communication network

16.1 Meter shall record the occurrence and restoration of tamper events along with parameters such as current, voltage, kWh, power factor, event code, date & time for the tampers listed below:

i) **Phase sequence Reversal**: The offered meter will keep working accurately irrespective of the phase sequence of supply.

ii) **CTs Polarity Reversal**: meter shall detect and record the tamper of Phase wise CT reversal with date & time of occurrence and restoration or duration of tamper .
Further in the event of CT polarity reversal, the energy recorded by the affected phase/phases will be added to the Forward energy register.

iii) **CT open**: meter shall detect and record the tamper of CT open with date & time of occurrence and restoration or duration of tamper.

iv) **Missing Potential**: The offered meter will be capable of recording occurrence of missing Potential of one or two potential which can happen due to intentional / accidental disconnection of potential leads, along with the total number of such occurrences for all phases. All such Occurrences and restorations will be recorded with date and time.

v) **Over Voltage& Low Voltage:** meter shall detect & record the incidence of Over voltage in any phase (120% of Vref& above.) & Low voltage in any Phase (80% of Vref& below) with date & time of occurrence and restoration or Duration

vi) **Over Current:** : meter shall record the incidence of Over Current in any Phase (more than 1.3 times of Ib) with date & time of occurrence and restoration or Duration.

vii) **Meter Cover Open:** In case meter top cover is opened, the same should be recorded as tamper event with date & time stamping and the meter reading should get blocked and only the words "C-Open" with date & time should appear permanently, on auto display (Mode-1). The other two modes of display i.e. mode-2 & mode-3 shall not get blocked. Under this condition meter shall, however, keep recording the consumption, which can be checked from its memory. Cover open tamper should not be re-settable, i.e. once the cover open tamper occurs, the above display should always be there. Cover open tamper should not be activated during the manufacturing process. "Meter Cover Open" tamper must also get logged and preferably displayed even when the power supply is 'OFF'.

viii)Power OFF will be recorded as an event if it persists for more than 30 minutes. Print out with total number of events occurred can also be taken out by base computer system.

viii) Meter should record tamper when there is load difference of 25% Ib or above between any two phases provided minimum 10% of Ib load is flowing.

x) Meter shall log the actual date and time of occurrence and restoration of tamper. Meter will also log the snap shot of instantaneous data i.e. individual voltages, currents, power factors, kWH etc. along with tamper events. Snapshot for occurrence shall be taken at the end of persistence time of 3 minutes and snapshot for restoration shall be taken at the end of restoration time of 3 minutes after actual removal of tamper. The actual time of occurrence and actual time of removal of tamper or actual duration of tamper will be indicated in the printout. (In case of conflict with any standard, this clause of the specification shall prevail upon)

xi) All tampers except “Cover Open" and "Power Off" will be recorded if the tamper persists for three minutes and restoration after 3 minutes.

xii) In case more than one tamper exists simultaneously then meter will record all the tamper with date and time of occurrence. The list of simultaneous tampers to be checked is as under:

1. Both PT missing.
2. Both CT missing.
3. Both CT reversed.
4. One PT missing, One CT reverse current.
5. One PT missing, Over current.
6. One PT missing, One CT missing.

xiii) The offered meter will record accurately under tamper conditions of neutral disturbance when DC voltage is fed to neutral by installing a diode.

xiv) At least 350 Nos. tampering events (175 no. occurrence and 175 no. restorations) shall be recorded with date & time.

NOTE:

1. Tamper information and readings logged by energy meter, should not be changeable by either Common Meter Reading Instrument or P.C.
2. All tamper events shall be recorded with date and time.
3. E vent wise allocation of 350 tampers in the meters shall be as under:-

Event Category description	Tamper counts
Voltage related events	120
Current related events	80
Power failure related events	80
Transaction related events	40
Other events	20
Non-rollover events	10
Total	350

17.0 ABNORMAL VOLTAGE/ FREQUENCY DEVICE TEST:

The accuracy of the meter should not be affected with the application of abnormal voltage / frequency generating device available in ME labs of PSPCL 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 a total period of 10 minutes:

i) On any of the phase or neutral terminals.

ii) On any connecting wires of the meter (Voltage discharge with 0-10 mm spark gap).
iii) Spark on meter body.
iv) At any place in load circuit.

However this test shall not be conducted in side of RS-232/485 terminal after removing the sealing cover. Bidders may test these meters with these devices at ME lab, Patiala before submitting their bids/samples.

18.0 EFFECT OF ABNORMAL MAGNETIC INDUCTION:

In the event of logging of abnormal magnetic induction with date and time, the meter shall record at Imax as per IS-14697. At all other points where meter does not record at Imax, it should record correct energy.
Tamper will be recorded if it persists for three minutes and shall be restored after 3 minutes. The actual time of occurrence and either of actual time of removal of tamper or actual duration of tamper will be indicated in the printout.

19.0 The offered meter will record energy accurately under the effect of radiation emitted by mobile phone. We have noted that the test will be carried out by bringing a mobile phone in the close proximity of the meter for 10 minutes when there is an incoming call and will be checked under the following condition:

a) 10%Ib at UPF
b) 50%Ib at UPF
c) Ib at UPF
d) 120%Ib at UPF

20.0 WORKING ENVIRONMENT

As per IS 14697-1999 reaffirmed 2004) .meter to perform satisfactorily under Non Air conditioned environment (with in stipulations of IS)

Meter body will conform to IP51 degree of protection.
The meter shall be suitable designed for satisfactory operation under the hot and hazardous tropical climate conditions and shall be dust and vermin proof. All the parts and surface, which are subject to corrosion, shall either be made of such material or shall be provided with such protective finish, which provided suitable protection to them from any injurious effect of excessive humidity.

21.0 MANUFACTURING PROCESS, ASSEMBLY AND TESTING

Meter shall be manufactured using latest 'state of the art' technology and methods prevalent electronic industry. The meter shall be made from high accuracy and reliable surface mount technology (SMT) components. All inward flow of major components and sub assembly parts (CT, PT/RTC/Crystal, LCD, LED, power circuit assembly etc.) shall have batch and source identification. Multilayer 'PCB' assembly with 'PTH' (plated through Hole) using surface

mounted component shall have adequate track clearance for power circuits. SMT components shall be assembled using automatic 'pick-and place' machines, reflow soldering oven, for stabilised setting of the components on PCB. For soldered PCBs, cleaning and washing of cards, after wave soldering process is to be carried out as a standards practice. Assembly line of the manufacturing system shall have provision for testing of sub-assembled cards. Manual placing of components and soldering to be minimized to items, which cannot be handled by automatic machines. Handling of 'PCB' with ICs/CMOS components, to be restricted to bare minimum and precautions to prevent 'ESD' failure to be provided. Complete assembled and soldered PCB should undergo functional testing using computerized Automatic Test equipment

Fully assembled and finished meter shall undergo 'burn-in' test process for 12 hrs at 55 degree Celsius (Max. temperature not to exceed 60 degree Celsius) under base current (Ib) load condition.

Test points should be provided to check the performance of each block/stage of meter circuitry. RTC shall be synchronised with NPL time at the time of manufacture. Meters testing at intermediate and final stage shall be carried out with testing instruments, duly calibrated with reference standard with tractability of source and date

22.0 PERFORMANCE UNDER INFLUENCE QUANTITIES

The meters performance under influence quantities shall be governed by IS:14697-1999(reaffirmed-2004). The accuracy of meter shall not exceed the permissible limits of accuracy as per standard IS 14697(latest version).

23.0 OUTPUT DEVICE

Energy meter shall have test output, accessible from the front, and be capable of being monitored with suitable testing equipment while in operation at site. The operation indicator must be visible from the front and test output device shall be provided in the form of LED. Resolution of the test output device shall be sufficient to enable the starting current in less than 10minutes

24.0 MARKING OF METERS

The marking of meters shall be in accordance with IS: 14697/1999(reaffirmed 2004).

The meter shall also store name plate details as per IS:15959. These shall be readable as a profile as and when required.

The letters PSPCL & 'ISI' mark shall be indelibly and clearly marked at the appropriate place of the meters. In addition the words 'Property of PSPCL, Purchase Order No. and date' shall be either punched or marked indelibly on the name plate.

25.0 HAND HELD UNIT(HHU)

To enable local reading of meter data, a DLMS compliant HHU shall be used (The HHU shall be as per IS:15959). It shall be compatible to the DLMS compliant energy meters that are to be procured / supplied on the basis of this

specification. The HHU shall be supplied by the meter manufacturer along with the meters. Numbers of HHU to be procured shall be decided by PSPCL at the time of placement of order. However bidder shall quote the per unit rate of HHU in schedule B (Price Bid) separately.

26.0 INSPECTION AND TESTING

The inspection and testing shall be done as per CBIP-304 and IS:14697 & this specification. All the meters shall be tested, calibrated and sealed by the supplier at their works before dispatch and all the routine test certificates of individual meters shall be supplied.

27.0 TYPE TESTS

Bidder shall furnish along with the tender type tests reports as per IS: 14697(for each ratio i.e -/5 Amp of accuracy class as per specification) and IS:15959 issued by one of CPRI/ERTL/ETDC/ERDA/ YMPL/Central Electronics Centre, IIT, Chennai/Hi-tech Meter Laboratory, UGVCL, Ahmedabad/Hi-Physix laboratory India Private Ltd., Pune to prove that meters meet these requirements of tender specification. Tenderers shall also submit, along with tender, Type Test Certificates of high quality Reinforced Polycarbonate or equivalent High Grade Engineering Plastic material used for meter housing material i.e. base/cover/terminal cover from any Govt. approved Laboratory. Reports for type tests conducted in manufacturer's own laboratory and certified by testing institute shall not be acceptable. These tests must not have been conducted earlier than two years from the original scheduled date of bid opening (Part-I & II). The purchaser reserves the right to demand repetition of some or all the type tests in the presence of purchaser's representative free of cost. In case type test certificate are not enclosed with the tender then the tender shall be rejected.

Routine/Acceptance tests and inspections shall be carried out at the place of manufacture. The bidder shall give the list of test for which testing facilities with the manufacturer are not available and submit the proposal of carrying out the same at reputed test Laboratories. The manufacturer shall provide the Inspector/representative of the purchaser all reasonable facilities, without charge, to satisfy him that the equipment offered is in accordance with this specification. It shall be responsibility of the supplier to arrange such tests and purchaser shall be informed of the date and time of conduction of tests well in advance to enable him to witness such tests. Firm should have BIS certificate for meters similar to offered meter at the time of submission of tenders.

28.0 ACCEPTANCE & ROUTINE TESTS

Criteria for selection for such tests and performance requirements shall be as per IS 14697-1999(reaffirmed 2004)

Additional acceptance shall include Surge withstand (SWC) for 6kVp as per IEC62052-11, Lightning impulse test and HF disturbance test as per IS 14697. One sample meter per order from one of the offered lot shall be subjected to these specific tests. Meters subjected to these tests shall not be used after tests Accuracy tests shall be performed at the beginning and at the end of the acceptance after tests.

29.0 QUALITY ASSURANCE

The manufacturer shall have a comprehensive quality assurance program at all stages of manufacture for ensuring products giving trouble free performance. Details of the bidder's quality assurance and test set up shall be furnished with the bid. A detailed quality assurance program shall be finalised with the successful bidder during the award stage. Bidder shall furnish following information along with the bid:

i) Organisation structure of the manufacture and his main sub suppliers(PCB, SMT cards, CT/PT with details of QA set up, overall workflow)
ii) Copy of system manual showing 'QAP'9Quality assurances Plan) as actually practiced during manufacturing and final testing
iii) List of raw material and critical components(ASIC chip, crystal clock, memory register Chip, transformers, optical ports etc.) with their suppliers
iv) Stage inspection of product before final testing
v) Procedure adopted for 'in-situ' testing of PCBs, after placement of surface mounted components for quantitative parameters variations of tolerance by self or sub contractor
vi) Testing and calibration facility, date of calibration of test bench, manpower data of bench operators
vii) Sample copies of test certificate of bought out components

30.0 WARRANTY:

The manufacturer/supplier/ contractor shall be responsible to replace the defective meter free of cost with no transportation and insurance expenses to the purchaser upto the destination of material/ equipment, the meter which under normal and proper use and maintenance, proves defective in material or workmanship within 5 years from the date, it is taken over by the purchaser provided the Purchaser gives prompt written notice of such defects to the supplier/contractor.

Such replacement shall be affected by the Supplier/Contractor, within a reasonable time not exceeding 2 months of the intimation of defects. Supplier's /Contractor's responsibility arising out of supply of material or its use whether on guarantee or otherwise shall not in any case exceed the cost of replacing the defective meter and upon the expiry of the guarantee period stipulated above, all such liabilities shall terminate.

The guarantee period for meters will be restricted to 5 years from the date of receipt. However, if the meter gets defective in its very first year (whether once or repeatedly) the fresh guarantee of 5 years shall be applicable from the date of receipt of replaced meters.

In case replacement of defective meter is not carried out within two months of intimation of defects, the supplier/contractor shall have to pay interest @ 12% per annum on the value of each complete operational unit of equipment beginning from the date of becoming defective upto date of its re-commissioning after replacement.

31.0 SAMPLE:

Firms are requested to submit samples as per Pre-Qualification clause and supply software details. The tender of the firm shall only be opened if sample meters as detailed above are submitted. In case order is placed on a firm, the meters shall be supplied as per the sample & the specification. In case of external battery, the bidders shall supply one no. external battery along with the sample meters.
In case the sample does not conform to the specification, the financial bid of such firms shall not be opened.

The bidders shall have to demonstrate the reading of meter data at the Base Computer Station at Patiala, in the existing AMR network of PSPCL, for ascertaining compatibility as per IS:15959. Price Bid of only those bidders shall be opened whose meters shall be complying with the above requirements.

32.0 CALIBRATION AT SITE

It shall not be possible to change calibration of meters at site.

33.0 OPERATION MANUALS

The supplier shall supply free of cost with each meter a detailed operating and maintenance manual and software to the purchaser for use.

34.0 PACKING

The meters shall be properly packed in shockproof packing to ensure their safe arrival at destination.

35.0 SUPPORT SERVICES

In addition to the supply of meters and equipment the supplier would be required to extend supports services as under:-
The supplier shall provide meters along with software for data transfer to base computer through HHU/Direct down loading of data to lap-top computer/direct transmission media i.e. telephone line, cellular phone, wireless etc. with auto-dialer feature and shall assist in converting the same into data base in the base computer. The software should have feature to give command to reset the MDI through base computer.

Supplier shall generate analysis report for the Board, based on the data retrieved from the meters, so as to reflect on the following parameters for enabling the purchaser to take necessary corrective actions for future:-

i) Load profiles.
ii) Tamper analyses data and any other such useful information.
iii) Violations (for consumer meters).
iv) The computer software (Windows based preferably) should have suitable interface to transfer the billing Data to billing software on line through LAN or through CD/USB drive etc. for processing/printing out the energy bills. The computer software should be able to convert the data received from the meter into database so that further processing of the output is possible.
v) The successful bidder shall be required to impart free of charge practical training to purchaser's staff at the place of installation so as to equip them for use of the meters, HHU, software including data off loading and report generation.

36.0 MISCELLANEOUS

a) Meter should work properly in the event of removal of neutral according to electrical conditions and connection in case of 3 phase 4 wire connection and measure energy/parameters according to electrical conditions and connections.

b) The registration of reactive and apparent energy at leading power factor shall be as follows:-

i) Reactive energy shall be stored in a separate register.
ii) Apparent energy shall be equated to the active energy considering the reactive energy as zero.

c) The real time clock provided in the meter shall be pre-programmed for 30 years without any necessity for correction with maximum drift not more than (+/-) 180 seconds per year. The day/date setting and synchronization shall only be possible once in a year subject to maximum of 3 minutes through password/key code command from one of the following:

Remote server through suitable Communication network/ PC/Substation data logger.

d) The software provided by the meter manufacturer for base computer should have the provision for entering meter CT ratio, meter PT ratio, line CT ratio & line PT ratio. Also its software shall be capable of multiplying the meter data with whole number or fractional number arising due to non-matching of meter CT/PT ratio and line CT/PT ratio. Further the base computer software shall have a feature for filtering the load survey data with reference to time slot of the day.

e) The manufacturer should also submit complete technical write up along with literature of tri-vector meters.

f) Provision should be made for recording cumulative daily energy(in kWH & KVAH) at 00:00 Hours, for the purpose of energy auditing for last seventy days.

g) Blinking LED and High resolution display for testing active and reactive energy should be available and meter constant should be invariably printed on the dial plate. The testing pulse should be homogenous and manufacturer should state necessary number of pulses counts (s) to ensure measurement and accuracy of at least $1/10^{th}$ of class of meters at different test point.

h) Maximum Demand History data should be available for last 12 calendar months, all the MDI registers should be with date and time stamping. Cumulative energy(kWh) at 00.00 Hrs shall also be available in the memory for last 12 calendar months.

i) Meter shall be suitable for mounting on Simplex type vertical panel with front door.

37.0 CERTIFICATES

Following Certificates will be furnished by the bidders in their offer that:

i) Their meters are capable of recording of 350 tamper events.
ii) Their meters are capable of recording of minimum 45 days for CAT-A meters and 70 days load survey for CAT-C meters.
iii) RTC Drift shall be within (+/-) 180 seconds per year.
iv) Software takes care of 29^{th} Feb of the leap year.
v) Meter will not be affected by Abnormal Voltage/ Frequency Device as per clause-17 of specification.

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Annexure-B

SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS FOR 3 PHASE 4 WIRE CT PT OPERATED TRIVECTOR ENERGY METER :-

Item Bidder's data

1. Type
2. Application
3. Rated Voltage
4. Rated Current
5. Frequency
6. Overload capacity
7. Minimum starting current in % of base current
8. Power loss in potential circuit
9. Power loss in current circuit
10. Change in error due to
    a. Variation in frequency
    b. Variation in temperature
    c. Variation in voltage
11. Accuracy Class
12. Total Weight of meter
13. Details of case
14. H.V. withstand
15. Insulation Resistance
16. Standard to which the meter confirm
17. Type of Energy Registration Mechanism.
18. MD Reset Mechanism
19. Insulation Test (Voltage 50Hz for 1Min)
20. Temperature co-efficient from 10% of rated load to 100 % rated load (5°C to 45°C)
21. **Working range**
    Voltage
    Current
22. Type of load (linear, non linear,

balanced /unbalanced at any P.F.)

23. Display details

i. Display Cycle (descriptive In order of display)

ii. Period of display of each parameter

iii. Display scroll-lock facility

iv. Backlit LCD

24. Memory

25. Power on in absence of mains

26. Tamper data preservation capacity

27. Load Survey

a. Parameter Logged

b. Logging interval

c. No. of days of Load Survey

28. Time of the day Zone

29. Capability for fraud Prevention & detection

30. Sealing and Locking Arrangement

31. Type of communication

Local- Optical port

Additional Communication port

32. Real Time Clock

NOTE:

The above information as mentioned from Sr. No. 1 to 32 must be furnished alongwith the EOI.

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Annexure-C

PROFORMA FOR APPRAISAL OF FIRM'S CAPABILITY AND CAPACITY TO MANUFACTURE ITEM (S)

1. (A) i) Name of the tendering Firm.
   ii) Complete address of the office.
   iii) Telephone Number(s).
   iv) Fax Number.
   (B) i) Name of the Responsible Officer with designation along with Mobile No. (Managing Director/Partner/Chief Engineer/Works Engineer etc.)
   ii) Day on which weekly holiday is observed.
   (C) Complete Address of the works.
   i) Telephone Number(s)
   ii) Names of two responsible persons with designation along with Mobile No. (Managing Director/Partner/Chief Engineer/Works Engineer etc.).
   iii) Day on which weekly holiday is observed.

2. Year of Establishment.
3. Constitution of the firm.
   a) Private or public limited.
   b) Registered under the companies ACT or any other ACT. Give Registration No. & Date.
4. FINANCIAL POSITION:

i) a) Land (Area & Value)
   b) Building (Covered Area & Value).
   c) Plant & Machinery.
   d) Total drawing limit from Banks.

ii) Annual Financial turnover duly audited for the last two years.
iii) Latest Income Tax clearance certificate.

5. MAN POWER:
   a) Graduate Engineer(s).
   b) Diploma Holder(s).
   c) Skilled work.
   d) Non-skilled workers.

6. PRODUCTION CAPACITY PER MONTH OF THE ITEM COVERED IN YOUR QUOTATION AND JUSTIFICATION FOR ASSESSMENT.
   Production capacity per month of quoted item.

Details of plant and machinery installed (please attached separate sheets, if necessary).

Details of raw material required.

Source of raw material.

Place of manufacturing of equipment

Stock in hand.

In case, any raw materials are required to be imported, indicate arrangement of raw material procurement.

Quality controls exercised in procurement of its materials.

7. a) Details of manufacturing process.
   b) Scheme of quality controls.
      During manufacturing process.
      At the finished stage.
   c) Whether any records being maintained in respect of quality controls exercised.
8. Details of testing facilities available with the firm. (Information may be supplied in the enclosed performa as per annexure-I).
9. Details of orders executed/under execution during the last three years (including quantity and value).
   a) With PSPCL.
   b) Other State Electricity Boards (SEBs) /Govt. of India and their institutions/undertakings.
   c) Other important customers.
10. a) Whether the item(s) are on Punjab Govt./DGS&D/Central Govt. approved Rate Contracts (Attach copies of rate contracts).
    b) Whether the firms works is having ISO for the item quoted, if yes, please mention ISO No. and validity.

    c) Whether the firm is licenses to use ISI mark or any other Govt. quality Mark for the item quoted. Please specify No. and validity of licence. (Copies of latest test certificates issued by Govt. Laboratories/any recognised Test House be attached).

Signature of authorised Signatory of the firm
Seal of the firm.

NOTE: -1. Please attached additional sheets, where required.

2. Copies of documents attached with the performa should be attested by the firm's authorised representative with stamp mark of the firm.

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