



# PASCHIM GUJARAT VIJ COMPANY LIMITED

REGD. & CORPORATE OFFICE:- OFF NANA MAVA MAIN ROAD, LAXMINAGAR, RAJKOT-360004

Telephone Nos:-0281-2380425/427/2360182

Fax No:-0281-2368175

Website:-www.pgvcl.com

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## TENDER NOTICE No: PGVCL/RJT/3P WCM 10-60A/377

### TECHNICAL SPECIFICATIONS FOR 3 PHASES, 4 WIRE A.C. STATIC WHOLE CURRENT TRIVECTOR ENERGY METER OF ACCURACY CLASS 1.0

#### 1.SCOPE:

This specification covers the design, manufacture, assembly, inspection, testing at manufacturers works before dispatch, supply and delivery at site/FOR destination anywhere in " Gujarat State" static whole current electronic meter of Class 1.0 accuracy of current range 10-60 Amps for tariff purpose along with other associated component as per requirement given in this specification which is based on IS-13779/99, however meters matching with requirements of IEC-61036/2000, or other international standards which ensure equal or better performance than the standards mentioned above shall also be considered.

i) The meter shall be 3 phase 4 wire type suitable for connection to LT 3x240V, 3 phase 4 wire systems. The meter shall be suitable for balanced as well as unbalanced load at all power factors i.e. Zero lag-Unity -Zero lead. The meter shall be capable to record and display kWh, KVARH, KVAH and maximum demand in kW for 3 phase 4 wire AC balanced/unbalanced loads for a power factor range of zero (lagging), unity and zero (leading) as per requirement given in this specification.

ii) It is not the intent to specify completely herein all the details of the design and construction of meter. The meter shall, however, conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing for continuous commercial operation in a manner acceptable to the purchaser, who will interpret the meanings of drawings and specification and shall have the power to reject the meter which is not in accordance therewith. The offered meter shall be complete with all accessories, hardware, software and components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in this specification and/or the commercial order or not.

#### 2. STANDARDS APPLICABLE:

Unless otherwise specified elsewhere in this specification, the performance and testing of the meters shall conform to the following Indian/International Standards and all related Indian/International standards to be read with up To-date and latest amendments/revisions thereof:

Sr. No.	Standard No.	Title
1.	IS 13779/1999	Specification of AC Static Watt hour meters, class 1.0 & 2.0.
2.	CBIP Technical Report No. 88(revised July 1996) read with amendments issued	Specification for AC Static Electrical Energy Meters.

Signature of Tenderer

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	(April 99-Sep.99) & CBIP Technical Report No.304	
3.	CBIP Technical Report No. 111	Specification for Common Meter Reading Instrument.
4.	IEC 61036-2000	Specification for AC static Watt-hour Meters, Class 1 & 2.
5.	IS : 9000	Basic Environmental Testing Procedures for Electronic & Electrical items.
6	IEC 1036	Static Energy Meters
7	IEC 62052-11	Electrically Metering equipment(AC)-General Requirement, Test & Test condition
8	IEC 62053-21	Static Energy Meters for Active Energy
9	IS 12346	Specification for testing equipments for ac energy meters
10	ICS Doc : ETD 13 (6211) April-2010	Data Exchange for electricity meter reading, tariff & load control companion specifications.

When the equipment offered by the bidder 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.

### **3. CLIMATIC CONDITIONS:**

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

a)	Maximum ambient air temperature in shade.	50° Cent.
b)	Minimum ambient temperature	(-) 5° Cent.
c)	Maximum relative humidity	95%
d)	Minimum relative humidity	10%
e)	Max Height above mean sea level	Up to 1000 meters.
f)	Dust storms likely to occur	Between March to July in a year
g)	Average number of thunder storm days per annum	40
h)	Average number of tropical monsoon months per annum	4 months
i)	Annual rain fall	10 cms. to 150 cms.
j)	Seismic level(Horizontal accn)	0.30g
k)	Iso-ceramic level (days per year)	50
l)	Maximum wind pressure	150 kg/sqmt

The temperature range and relative humidity for performance of meters shall be as per relevant standards.

### **4. GENERAL AND CONSTRUCTIONAL REQUIREMENTS:**

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- 4.1. Meter shall be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However, the following shall be ensured.
  - 4.1.1. Personal safety against electric shock
  - 4.1.2. Personal safety against effects of excessive temperature
  - 4.1.3. Protection against spread of fire
  - 4.1.4. Protection against penetration of solid objects, dust and water
- 4.2. All the material and electronic power components used in the manufacture of the meter shall be of highest quality and reputed make to ensure higher reliability, longer life and sustained accuracy.
- 4.3. The meter shall be designed and manufactured using SMT (Surface Mount Technology) components.
- 4.4. All insulating material used in the construction of meter shall be non-hygroscopic, non-ageing and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion by providing suitable protective coating.
- 4.5. The meter shall have an operation indication device such as a blinking LED. The operation indicator shall be visible from the front window and capable of being monitored conveniently with suitable testing equipment.
- 4.6. The meter shall conform to the degree of protection IP 51 of IS: 12063/IEC: 529 for protection against ingress of dust, moisture and vermin's.
- 4.7. The meter shall be supplied with a transparent extended terminal block cover (ETBC).
- 4.8. The polycarbonate material of only following manufacturers shall be used.
  - a) GE PLASTICS                      LEXAN 943A FOR COVER AND TERMINAL COVER/  
LEXAN 503R FOR BASE & TERMINAL BLOCK
  - b) BAYER                                      GRADE CORRESPONDING TO ABOVE
  - c) DDW CHEMICALS                      -DO-
  - d) MITSUBISHI                              -DO-
  - e) TEJIN                                      -DO-
  - f) DUPONT                                      -DO-

The meter base shall be manufactured from high quality industrial grade material viz. Polycarbonate with 10 % glass filled which shall meet following properties to ensure higher reliability and long life of the meter base.

Meter base & cover and 2) terminal cover shall conform to the following.

Sr. No	Test	10% Glass filled non-transparent material for meter base & terminal block	Transparent material for meter cover & terminal cover
1	UV ageing for 200 Hrs. as per ASTM : G53(CL No. 9.3)	4 Hours UV at 60° C, 4 Hours condensation at 50° C	4 Hours UV at 60° C, 4 Hours condensation at 50° C

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2	Boiling water test(10 MIN)	No softening & whitening & No change in colour, shape, size & dimensions	No softening & whitening & No change in colour, shape, size & dimensions
3	Ball pressure test as per IEC--60695-10-2	125° C +/- 2° C	125° C +/- 2° C
4	Flammability Test (a) As per UL 94 or (b) As per IS 11731(Part-2) 1986	VO FVO	VO FVO
5	Glow wire test IS:11000(part 2/SEC-1) 1984 OR IEC PUB,60695-2-12	960° C	850° C
6	Heat deflection Temp.(HDT) HDT/Ae, 1.8MPa edge(100mm) As per ISO 75/Ae	132° C	125° C

4.8.1 The terminal block shall be of high grade non-hygroscopic, fire retardant, low tracking fire resistant, reinforced poly-carbonate or equivalent high grade engineering plastic which shall form an extension of the meter case and shall have terminal holes and shall be of sufficient size to accommodate the insulated conductors & meeting the requirement of IS 13779:1993/CBIP technical report- 88/304.

The meter cover shall be fully transparent. However, in case of non transparent cover the window shall be of fully transparent Polycarbonate material for easy reading of all the displayed values/ parameters, name plate details and observation of operation indicator. The fixing of the window with the cover in the later case shall be temper proof, dust proof & moisture proof.

The meter cover and base shall be suitably shielded with metallic material so as to protect the meter from adverse effect of AC/DC Abnormal external magnetic field. The meter shall meet the requirements of CBIP-88 with its latest amendment for immunity against continuous magnetic induction.

The terminal block, the ETBC meter cover & meter base shall ensure reasonable safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them.

4.9 The terminals shall have suitable construction with barriers and cover to provide firm and safe connection of current and voltage leads of stranded copper conductors or copper reducer type terminal ends (thimbles).The manner of fixing the conductors to the terminal block shall ensure adequate and durable contact such that there is no risk of loosening or undue heating. Screw connections transmitting contact force and screw fixing which may be loosened and tightened several times during the life

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of the meter shall be such that the risk of corrosion resulting from contact with any other metal part is minimized. Electrical connections shall be so designed that contact pressure is not transmitted through insulating material. The internal diameter of the terminal holes shall be 8.5 mm minimum. The clearance and creepage distance shall conform to relevant clause of IS 13779:1999/CBIP technical report no.-88/304(latest version)

4.10 The meter shall be compact in design. The entire design and construction shall be capable of withstanding stresses likely to occur in actual service and rough handling during transportation. The meter shall be convenient to transport and immune to shock and vibration during transportation and handling.

4.11 All parts that are likely to develop corrosion shall be effectively protected against corrosion. The construction of the meter shall be such as to be sealed independently and prevent unauthorized tampering.

### **5.SAMPLING RATE AND DERIVATION OF BASIC MEASURABLE QUANTITIES:**

The actual supply wave of related voltages and currents shall be sampled out at the rate of minimum 3000 samples per second and shall provide integrated values of each actual voltage and current (available on display in push button mode) while deriving actual basic active (cosine part measurable component) and reactive (sine part measurable component) energies (with respect to relevant voltage wave and current wave) even under presence of harmonics.

The meter shall have internal Real Time Clock with the back up of a Lithium maintenance free battery of minimum shelf life of Ten (10) years for operation of the time clock. The Real Time Clock shall be based on Quartz crystal timer so as to make it independent of line frequency variations.

### **6. QUANTITIES TO BE MEASURED, MONITORED AND MEMORISED:**

6.A. The meter shall be capable of measuring and storing in the memory and displaying the following electrical quantities within specified limits of error for poly phase supplies [i.e. 3-phase, 4wire system with star point (neutral) solidly grounded or floated] of 3-phase Delta or Star connected load having a floating or a grounded Star point with balanced or unbalanced loads at all power factors. Apparent demand and energy shall be derived from active energy (cosine part recording arrangement) and reactive energy (sine part lagging and leading power factor recording arrangement) through vector summation of active energy and only lagging reactive electrical energies traversed for 30 minutes integration period.

The meter shall also be capable of measuring, monitoring and storing in the memory minimum three (3) time zone (TOD) electrical quantities for pre-specified periods of the day. However, since at present the features of TOD energy measurement are required for three time zones only, provision shall be made so

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that the same can be programmed up to eight (8) zones through MRI/PC at site as and when required in the future.

The three time zones to be provided in the meter and its sequence is as under. In MRI data TOD energy and demand report should be available for Nos. of time zone programmed (Presently only 3 Nos. to be available in the MRI report)

Sr. No.	TOD Details	Timings	Total Hours in TOD
1.	TOD-1 (Peak)	07:00 Hrs. to 11:00 Hrs. Plus 18:00 Hrs. to 22:00 Hrs.	8
2.	TOD-2 (Night)	00:00 Hrs. to 06:00 Hrs. Plus 22:00 Hrs. to 24:00 Hrs.	8
3.	TOD-3 (Rest)	06:00 Hrs. to 07:00 Hrs. Plus 11:00 Hrs. to 18:00 Hrs.	8

- 6.A.1. Active energy: Absolute Cumulative KWH energy.
- 6.A.2. Reactive energy: Cumulative KVARH lagging with respect to Active energy.
- 6.A.3. Apparent energy: Cumulative Absolute KVAH derived vector ally from lagging Reactive and Active energy.
- 6.A.4. Maximum Demand: Highest Active MD KW demand established after last Reset.
- 6.A.5 HIGH RESOLUTION MODE FOR KWH, KVAH, KVARH(LAG), KVARH(LEAD)

### Recording of active energy (KWH) for billing purpose.

The Meter should record and display maximum demand in KW (i.e. Fundamental plus Harmonics power) and Total KWH (i.e. Fundamental plus Harmonics energy) and cumulative Total export KWH energy (i.e. Fundamental plus Harmonics energy).

The Meter should record Average Max. KVA MD derived from Vectorial summation of Total KW (i.e. Fundamental plus Harmonics power) and Lag KVAR power. Similarly, it should measure and record cumulative KVAH energy also derived from vectorial summation of Total cumulative KWH (fundamental + harmonic energy) and cumulative KVARH energy (lag only).

The high resolution display having of minimum seven digit (two digits before decimal points & six digits after decimal points e.g. 21.642867) for KWH, KVAH, KVARH (lag) & KVARH (lead) shall be provided under mode-3 for the accuracy checking of meter in the field.

a) The meter shall have 3 modes of display parameters viz. Mode-1, 2 & 3 and shall display parameters as per Annexure-1.

b) Recording of active energy (KWH) for billing purpose shall indicate on the display measurement of total energy (fundamental + harmonics) i.e. it will display total

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energy i.e. (fundamental + harmonics) KWH. The same shall also be available while down loading the data from meter to CMRI to DCS.

- 6.B. The meter shall keep following quantities recorded and memorized in its Non Volatile memory chip for ever, so that in event of failure/damage of the meter the last reading of billing quantities would not be lost.

Cumulative energies from the date of installation -

- 6.B.1. Cumulative KWH energy to the consumer.

- 6.B.2. Cumulative KVARH lag (With respect to export KWH) and Cumulative KVARH lead (With respect to KWH) both separately with identification.

- 6.B.3. Cumulative KVAH energy derived from Victorial summation of Active and Reactive (lag only) energy.

### 7. SEALING OF THE METER:

Reliable sealing arrangement shall be provided to make the meter tamperproof and to avoid fiddling or tampering by unauthorized persons. For this, at least two (2) Nos. seals on meter body, two (2) No. seal on meter terminal cover, one (1) No. seal on communication port and one (1) No. seal on MD reset button (if such button is provided) shall be provided. All the seals shall be provided on front side only. Rear side sealing arrangement shall not be accepted. The bidder in their offer shall explain the sealing arrangement. The sealing screw should be unidirectional.

The supplier shall have to provide two polycarbonate Plastic seals on the meter body of each meter before dispatch of the meter. The plastic seal shall have embossing of the supplier's logo on one side of seal & PGVCL & sr. no. of seal on other side of seal. 6 Digit sr. no. of seal is to be provided on both male & female part of the seal.

### 8. BOUGHT OUT ITEMS:

A detailed list of bought out items, which are used in the manufacture of the meter, shall be furnished indicating the name of firms from whom these items are procured. The bidder shall also give the details of quality assurance procedures followed by him in respect of the bought out items.

### 9. OUT PUT DEVICE:

The meter shall have a test output accessible from the front and be capable of being monitored with suitable testing equipment. The operation indicator must be visible from the front. Test output device shall be provided in the form of LED output device for KWH and KVARH measurement.

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The relation between test output shall comply with the marking on the name plate or with the indication on display, if so provided in addition to details on name plate i.e. pulse per KWH/KVARH or KWH/KVARH per pulse.

### 10.COMMUNICATION PORT:

The meter shall have galvanically isolated communication port so that it can be easily connected to a hand-held meter reading instrument (MRI) for Data transfer or subsequently hooked to remote metering instrument such as modem etc. The meter shall be capable of executing instructions from base computer service center only after due authentication through protected two level pass word, for the following:

- i) Meter make, type & Sr. No.
- ii) Change in integration period
- iii) Change in automatic re-setting for billing data date & time.
- iv) Activation of TOD energy measurement OR Modifications in TOD timings if required in future.

The meter shall thereafter communicate above information while off-loading the data to computer through hand-held meter reading instrument (MRI) with either relevant billing quantities or relevant energy audit/load survey data.

### 11.MARKING OF METER:

The meter terminal marking and mounting arrangement shall be as per Indian Standard/IEC. The marking on every meter shall be in accordance with IS 13779/1999 or IEC.

The meter shall have name plate beneath the meter cover such that the name plate cannot be accessed without opening the meter cover and without breaking the seals of the meter cover and the name plate shall be marked indelibly. The name plate marking shall not fade with lapse of time.

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

- Manufacturer's name and trade mark
- Type designation
- Number of phases and wires
- Serial number
- Month and Year of manufacture
- Reference voltage
- Rated Current
- Principal unit(s) of measurement
- Meter constant (imp/kWh)
- 'BIS' Mark (Applicable for Indian meter manufacturers only)
- Accuracy Class of meter (class-1.0)
- "Property of PGVCL."
- Purchase Order No. & date

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- Guarantee period-5 ½ years.
- Category of the meter and corresponding ICS No

PGVCL shall provide their own serial No. which is to be provided on the name plate along with the meter serial no provided by the party. Only one meter Sr. no which is provided by the PGVCL must be on name plate. The same sr. no must be display in parameter and meter must communicate with MRI and BCS on this Sr. no only.

Unique procedure of meter sr.no. having 8 Alfa-numeric characters will be decided by PGVCL and will be given at the time of placing order so that same sr.no. will appear on meter and downloaded MRI data.

### 12.CONNECTION DIAGRAM, PHASE SEQUENCE & TERMINAL MARKINGS:

Clear indication of phase sequence shall be marked and connection diagram relevant to meter must be permanently pasted (manufactured from good quality plastic sticker material) on the inside of the extended transparent terminal cover.

### 13.ELECTRICAL REQUIREMENTS:

#### 13.1 SUPPLY SYSTEM

Rated voltage (Vref)	3x240V-Phase to Neutral (3 phase 4 wire system) 3 x 415 V- Phase to Phase
Rated current (Ib) (connected through CT)	Basic current 10A (Ib), Maximum current-60 Amps (Imax.)

#### 13.2 POWER FACTOR RANGE:

The meter shall be suitable for full power factor range from zero (lagging) through unity to zero (leading).

#### 13.3 POWER SUPPLY VARIATION:

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

Specified operating range	0.8 to 1.1 V ref.
Limit range of operation	0.7 to 1.2 V ref.
Frequency	50 Hz +/-5% (As per standard)

For influence quantities like voltage variation, frequency variation, voltage unbalance etc. the limits of variation in percentage error shall be as per IS:13779.

#### 13.4 ACCURACY:

Class of accuracy of the meter shall be 1.0.

#### 13.5 POWER CONSUMPTION

13.5.1 Voltage Circuit: The active and apparent power consumption in each voltage circuit including the power supply of meter at reference voltage, reference

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temperature and reference frequency shall be as per the provision of IS-13779 /IEC(latest amendment)

**13.5.2.Current Circuit:** The apparent power taken by each current circuit at basic current, reference frequency and reference temperature shall be as per the provision of IS-13779/IEC(latest amendment )

### **13.6 STARTING CURRENT:**

The meter shall start registering the energy at 0.4% of Ib and unity power factor.

### **13.7 MAXIMUM CURRENT:**

The rated maximum current for the meter shall be 60 Amps (600 % Ib) at which the meter purports to meet the accuracy requirement.

### **13.8 IMPULSE VOLTAGE:**

The meter shall withstand impulse voltage at 10 KV. This is a special requirement of PGVCL. To verify this requirement, PGVCL reserves the right to select the sample meter from any offered lot and to get the same tested at any National Accredited laboratory prescribed by PGVCL. The test is to be carried out in the presence of PGVCL representative and also the test report shall get approved from the CE (Tech). The test charges for this shall be born by the party. In case, failure of sample meter in this test not only the entire offered lot, but the lot previously supplied shall also be rejected and supplier has to replace the same at his cost. In case of the meter already utilized by PGVCL prior to the test and failure of sample therein, the PGVCL reserve the rate to deduct suitable penalty in lieu of the replacement of meter.

### **13.9 REPEATIBILITY TEST:**

The test shall be carried out at 5% Ib and Ib at UPF - six readings at the interval of 5 minutes. The difference between maximum and minimum error shall not be more than 0.5.The test shall be conducted on the three sample selected from the eight meters selected for accuracy test as per clause no. 12.7 of IS 13779.

### **14.SOFTWARE:**

Software shall be supplied free of cost by the meter manufacturer and its Nos. will be decided by the PGVCL.

The above software shall be suitable for the operating system of the associated PGVCL's computers:

(i) Software for reading the meter contents in the MRI.

(ii) Base Computer Software (BCS) for accepting data from MRI and down loading instructions from Base Compute to MRI. Windows based BCS for receiving data from CMRI and downloading instructions from BCS to CMRI. This BCS shall have, amongst other requirements and features and facilities described later in this specification, the facility to convert meter reading data into user definable ASCII file format so that it may be

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possible for the user to integrate the same with the user's billing data and process the selected data in desired manner.

(iii) The meter should be capable to communicate directly to Lap Top /Desktop computer. Any other special applications software and additional software not mentioned above but necessary for functioning of the system should also be supplier free of cost.

The above software shall be suitable for the operating system of the associated PGVCL's computers:

### 15.SALIENT FEATURES:

The meters shall have the following additional salient features.

- 15.1 The meter shall have provision to read in absence of power through an internal rechargeable battery or external power pack unit. In latter case, supplier has to supply 1 power pack per every 100 nos. of meters free of cost.
- 15.2 The meter shall work accurately irrespective of phase sequence of the mains supply.
- 15.3 The meter shall remain powered up and functional in presence of any two wires.
- 15.4 The meter shall continue to record accurately as per prevailing electrical conditions even if the neutral of supply gets disconnected.
- 15.5 The meter shall record correct energy in case of current reversal of one or more phase.
- 15.6 The measurement by meter shall not get influenced by injection of AC Voltage/ Chopped signal/DC signal and Harmonics in any of out going leads of the meter.
- 15.7 In case of drawing of current through local earth, the meter shall register accurate energy even if load is drawn partially or fully through local earth.
- 15.8 The potential link shall not be provided outside on meter terminal block. Instead, internal link of sliding/spring type arrangement having adequate capacity shall be provided.
- 15.9 In case of potential missing, meter should record energy as per the actual current considering reference voltage and unity power factor.
- 15.10 In case of current bye pass , meter should record energy accurately(Threshold value is 10 % i.e. if difference in current between phase and neutral is more than 10% )
- 15.11 In case of neutral disturbance, meter should record energy accurately.

### 16.DISPLAY OF MEASURED VALUES:

- 16.1. The measured values shall be displayed on SEVEN segment SEVEN digit Liquid Crystal Display (LCD) with backlit unit, having minimum character height of 8 mm. Good quality display shall be used to enable correct reading even from distance.
- 16.2. The data shall be stored in non-volatile memory (NVM). The NVM shall retain data for a period of not less than 10 years under un-powered condition.

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16.3. It shall be possible to easily identify the displayed parameters through symbols/legend on the meter display itself.

16.4. In case of multiple values presented by a single display, it shall be possible to identify each displayed value/parameter through separate symbol/legend to be made available on the display itself.

### 17.METER SERIAL NUMBER:

In addition to providing serial number of the meter on meter display and meter name plate, the same shall also be programmed into meter memory for identification through CMRI/meter reading printout.

### 18.MAXIMUM DEMAND (MD) REGISTRATION:

The meter shall monitor and calculate the average demand in KW established during pre-specified integration period set and record/display the maximum registered value and the same shall be stored along with date and time when it occurred in the meter memory. The rising demand under the current integration period shall be displayed along with elapsed time. The integration period shall be capable of making adjustment with duration of 30 minutes with due authentication.

### 19.MAXIMUM DEMAND RESET:

The meter shall have the following maximum demand resetting arrangements:

- (a) Automatic resetting at the end of pre-specified date of every calendar month (e.g. 00.00 hours on last day of every month).
- (b) A provision for revising the resetting cycle for modifying the date and time of automatic resetting through base computer service center or via hand-held meter reading instrument only after using protected pass word through authenticated BCS should be available.
- (c) Provision for Manual Resetting of the monthly Max Demand with adequate sealing arrangement must also be made.

### 20.LOAD SURVEY CAPABILITY & BILLING POINT REQUIREMENTS:

Meter shall record load survey of minimum 180 days for KWH and KVAH with integration period of 30 minutes. It shall be possible to select either demand or energy view at the BCS end.(Load survey report should be available for the available parameters only)

The load survey data shall be available in the form of bar charts as well as in spread sheets. The BCS shall have the facility to give complete load survey data both in numeric and graphic form.

The load survey data must be available in FIFO manner (First In First Out) and all tamper data separately for each event shall be made available with its time of

Signature of Tenderer

Company's Round Seal

Date:

Place:



# PASCHIM GUJARAT VIJ COMPANY LIMITED

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Telephone Nos:-0281-2380425/427/2360182

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## TENDER NOTICE No: PGVCL/RJT/3P WCM 10-60A/377

occurrence and time of restoration with total duration period and in no case shall be made available to reset to ZERO. The bidder must also specify Nos. of tamper events that the meter is capable to store.

However, the meter must provide Summary Report for all total Nos. of tamper events and total duration for the events occurred from the date of manufacturing or installation.

It shall be possible to retrieve these data via communication port on to hand-held meter reading instrument (MRI) and it shall be possible to off load these data on to IBM compatible computer and get complete details of the load/demand pattern in terms of KW/KWh both in numeric data form and in graphic form for all the 24 hours a day divided as per the pre-set integration period of 30 minutes in each individual case. Necessary software for this purpose must be provided by the supplier. The total time in minutes to be taken by meter for retrieval of all above data shall have to be clearly indicated in offer.

20.2 Energy and demand values and its consumption for last twelve reset should be available with time stamp.

20.3 Total power ON and OFF time should be available for last twelve months.

### **21.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 date memory location all the time. The meter shall provide information for unsatisfactory/non-functioning/malfunctioning of the following.

- a. Time and date
- b. All display segments as per the requirement
- c. Real Time Clock (RTC)
- d. Non Volatile Memory (NVM)

If possible, the details of malfunctioning shall be recorded in the meter memory.

### **22.TAMPER AND FRAUD PROTECTION:**

The meter shall have features to detect the occurrence and restoration of the below mentioned common ways of tamper and fraud. The voltage and current related tampers logging shall be as per Annexure-II.

- A) 1. Missing Potential: The meter shall be capable of detecting and recording occurrences and restoration of missing potential (one phase or two phases) which can happen due to intentional/accidental disconnection of potential leads, along with the total number of such occurrences for all phases.

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2. Current Polarity Reversal: The meter shall be capable of detecting and recording occurrences and restoration of current polarity reversal of one or more phases. (Refer salient Features for forward recording).
3. Current Short (Bypass): The meter shall be capable of detecting and recording occurrences and restoration of shorting (bypassing) of any one or two phases of current when the meter is connected to a 3 phase 4 wire system.
4. Current Open: The meter shall be capable of detecting and recording occurrences and restoration of opening of any one or two phases of current when the meter is connected to a 3 phase 4 wire system.
5. DC immunity: The meter shall not saturate on passage of direct current which can cause the meter either to stop recording or record in-accurately as per IS-13779( latest version)

The bidder shall furnish with detailed explanation as to how their meter is able to detect/protect recording the above tamper & fraud features with sketches & phasor diagrams. Additional features any in their meter may also be highlighted.

- B) Snap Shots (numerical values) of voltage, current, power factor and energy (KWH) readings as well as the date and time of logging of the occurrence and restoration of tamper events, subject to meter-memory space as described herein under, should be logged in the meter memory and available for retrieving through the meter's optical port via CMRI and downloading to the BCS.
- C) Minimum of total four hundred (400) events (occurrence and restoration) of all types of tamper with date and time shall be available in the meter memory on FIFO basis without any compartment(It should be in sequential manner only). It shall be possible to retrieve the tamper data along with all related snap shots data through the meter's optical port with the help of CMRI and download the same to the BCS where it shall be available for viewing. All this information shall be available in simple and easily understandable format. Minimum 400 events will be shown during the testing of LOI of meter offered for inspection.

The threshold values for voltage, current and P.F. etc. for the purpose of logging occurrence and restoration of various types of tamper will be as per Annexure-II attached herewith. The supplier shall give their confirmation for these values in their offer.

### **23.TAMPER LOGIC:**

Properly designed meter tamper logic shall be provided. The tamper logic shall be capable of discriminating the system abnormalities from source side and load side and it shall not log/record tamper due to source side abnormalities.

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Meter shall not record wrong KWH if only unbalanced capacitive load is connected at the consumer end.

The tamper events shall be recorded in sequence manner in FIFO/Roll Over basis.

The total Nos. of tamper counts to be displayed and memorized shall increase as per occurrence (not restoration) of tamper events. The total number of tamper counts shall also be provided on the meter display as well as at the BCS end.

### 24.TAMPER PERSISTENCE TIME:

The tamper persistence time for logging/registration of an occurrence & restoration time of tamper i.e. recovery time shall be as per Annexure-II.

### 25.ACCURACY REQUIREMENT:

The accuracy of parameters measured by meters shall be tested in accordance with the relevant standards described in clause 2.0 of this specification.

The test shall be carried out for balanced load and unbalanced current load i.e. individual phase.

### 26.ELECTRICAL REQUIREMENT:

The electrical requirement of meters shall be as specified in the relevant standards described in clause 2.0 of this specification.

### 27.ELECTROMAGNETIC COMPATIBILITY AND INTERFERENCE REQUIREMENT:

The meter shall meet EMI/EMC requirements as specified in the relevant standards described in Clause 2.0 of this specification.

ESD withstand limit shall be minimum 35 KV. The meter should be preferably immune to any abnormal frequency/voltage device/jammer. Meter should not stop recording energy under such condition.

Following test shall be conducted on sample meter & at the time of inspection and acceptance testing of lot offered.

Application of abnormal voltage/frequency.

The accuracy of the meter should not be affected with the application of abnormal voltage/frequency such as spark discharge of approximately 35KV in any of the following manner for 10 minutes:

- i) On any of the phases or neutral terminals OR without connecting neutral.
- ii) On any connecting wires of the meter.
- iii) Voltage discharge with 0-10 mm spark gap.
- iv) At any place in load/supply circuit.
- v) Spark on meter body.

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However, during the test, function of the meter shall be verified by visual inspection of pulse output. Changes in KWH should not be negative during the test & shall be verified before and after test.

### **28.MECHANICAL REQUIREMENT:**

The meter shall meet the mechanical requirements as specified in the relevant standards described in clause 2.0 of this specification.

### **29.CLIMATIC INFLUENCE REQUIREMENT:**

The meter shall meet Dry Heat/Cold/Damp heat cycle test requirement as per the relevant standards described in clause 2.0 of this specification.

### **30.MINIMUM TESTING FACILITIES:**

The Bidder shall have the necessary minimum testing facilities for carrying out the following tests:

1. AC voltage test
2. Insulation resistance test
3. Test of limits of errors
4. Test of meter constant
5. Test of starting condition
6. Test of no load condition
7. Repeatability of error test
8. Test of power consumption
9. Tamper conditions - as per this specifications
10. Transportation Test.
11. ESD Test for 35 KV as per clause no.27
12. Effect of harmonics.
13. DC immunity test
14. Voltage and frequency variation test.
15. AC , DC and permanent magnet test.

On placement of L.O.I. the supplier shall have to manufacture 03 Nos. of Proto type meters exactly as per the technical specification and requirement of this Tender and offer for inspection and testing. The proto type meter will be tested at CPRI, Bangalore for conformity of Indian Companion Standard (ICS) with DLMS common protocol. This test will be conducted in addition to inspection & verification with respect to functional requirement and acceptance testing as per IS:13779 and as per tender requirement in presence of DISCOM Engineer at supplier works. Only after successful testing and passing proto meters at supplier works and CPRI Bangalore, manufacturer should start manufacturing of bulk supply order quantities. Further, purchaser reserves all right to get any meter out of any lots offered be tested at CPRI, Bangalore for conformance of common protocol with ICS. All expenses i.e. transportation and testing of meter at CPRI Bangalore in respect of proto meter shall have to be borne by the supplier.

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The manufacturer shall have duly calibrated ERS meter of Class 0.5 accuracy or better.

Manufacturer also shall possess automatic 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.

### 31.TESTS:

#### 31.1 SAMPLING

##### 31.1.1 Tender Sample

The supplier shall submit three nos. samples of meters of offered rating at the time of offer. Offer without sample will not be scrutinized on the strength of GTP. The samples are to be delivered to The Deputy Engineer, Regional Store Office, Dudhsagar Road, Rajkot, Gujarat. The samples shall be tested at ERDA/CPRI for acceptance tests, as per IS 13779/99/IEC1036 & PGVCL Specifications & AC/DC MAGNETIC TEST as per CBIP Technical report 88/304(latest version). The samples shall be tested at CPRI Bangalore for DLMS conformance as per ICS, if required. The same samples may be further tested for type tests as per IS 13779/99/IEC1036, PGVCL specifications & CBIP technical report no 88/304, if required. If the sample found failed in any of the test carried out at ERDA, the offer of that bidder shall be considered disqualified.

##### 31.1.2 Prototype Sample

The supplier shall also have to manufacture 3 nos. of sample meters complying to all above technical specification, type rating functional requirements, tamper features, display design etc. and shall have to offer for inspection within 30 days from the date of placement of LOI and before commencement of bulk supply. The bulk manufacturing must be commenced only after confirmation from PGVCL authority. The three no. of samples prepared as above shall have to be preserved till the completion of the supply of last lot. The supplier shall also have to offer one no. of MRI for functional testing and verifications /testing of related software.

During the proto type sample testing all the display parameter and other parameters shall be checked and same shall be tested/observed for acceptance test & other tests as per cl. no 31.3 of the specifications.

##### 31.2 Routine Tests

All routine tests as stipulated in the relevant standards shall be carried out and routine test-certificates/reports shall be submitted along with inspection call letter in the form of composite disk (CD) and on the CD, A/T No. serial no. of meters to be offered etc. shall be provided with sticker pasted on the CD, to the purchaser for approval and also placed inside individual meter packing.

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### 31.3 Acceptance Test

All acceptance tests as stipulated in the relevant standards shall be carried out by the supplier in the presence of the purchaser's representative. Also the following additional tests are carried out on mutually agreed quantity of meters from each lot offered for inspection.

- I) Magnetic induction of external origin (AC & DC)
- II) Tamper & fraud protection
- III) Measurement of Total energy - Effect of Harmonics. As per cl.no-5.6.2.1 of IEC 61036/2000
- IV) Application of abnormal voltage/frequency as per clause no.27.

The meter should pass acceptance tests as per IS-13779/99, CBIP 88/304 latest version and IEC61036/2000 during inspection. Please note that the total energy i.e. fundamental + harmonics shall be measured as per cl. no. 5.6.2.1 of IEC 61036/2000 along with other tests. If the facility for any of the tests are not available at supplier's works, the testing shall be arranged at any of the NABL approved lab. viz, ERDA, NPL, ETDC, ERTL, CPRI only and for such tests all the expenditures i.e. test charges etc. shall have to be borne by the supplier.

In case order is placed on part or full quantity, PGVCL reserves right to select sample as per relevant IS/IEC from the first lot (minimum 20% of the ordered quantity) offered by party and the samples will be tested at any Govt. approved laboratory which is approved by PGVCL for type tests and on successful passing the test the lot will be accepted or otherwise the whole lot will be rejected and in that case testing charges shall have to be borne by the party concerned.

### 31.4 Type Tests:

The bidder should submit Type Test Reports for all tests as per schedule of IS -13779/99 for the tests having been conducted on the sample meter, not prior to 3 (Three) years before the issue of tender, from reputed third party Govt. approved laboratory viz. CPRI, ERTL, ETDC, NPL, ERDA only. All the type tests must have been conducted within One year's tenure and on the sample as specified under cl. No: 12.2.2.1 of IS-13779-1999. Offers without the Type Test reports shall be rejected. The type test report submitted shall be of the same type and design of the meter offered. Please note that the bidder in case of supplier having own NABL accredited lab, the type test certificate furnished with tender from such lab shall not be accepted.

### 32.INSPECTION:

The purchaser may carry out the inspection at any stage of manufacturing. The manufacturer shall grant access to the purchase'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 meters in accordance with the specification and shall not prevent subsequent rejection if the meters are found to be defective.

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All acceptance tests and inspection shall be made at the place of manufacturer works unless otherwise especially agreed upon by the bidder and purchaser at the time of purchase. The bidder shall offer the inspector representing the purchaser all responsible facilities without charge, to satisfy him that the equipment is being furnished in accordance with this specification.

The supplier shall keep the purchaser informed in advance, about the manufacturing program so that arrangement can be made for inspection.

In case of non availability of meter during the visit of inspection of the lot offered, the visit shall be considered as unfruitful visit and all charges of this visit shall be deducted from the bill of the supplier.

The purchaser reserves the right to carry out type tests of any meter selected from the lot/meter received at stores of PGVCL.

### 33.QUALITY ASSURANCE PLAN:

33.1 The bidder shall invariably furnish the following information along with his bid, failing which his bid shall be liable for rejection. Information shall be separately given for individual type of material offered.

- 1.The structure of organization.
- 2.The duties and responsibilities assigned to staff ensuring quality of work.
- 3.The system of purchasing, taking delivery and verification of materials.
- 4.The system of ensuring quality of workmanship.
- 5.The quality assurance arrangement shall confirm to relevant requirements of ISO : 9001/9002 as applicable.
- 6.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 test normally carried out on raw materials in presence of Bidders representative, copies of test certificates etc.
- 7.Information and copies of test certificates as above in receipt of bought out accessories.
- 8.List of manufacturing facilities available.
- 9.Level of automation achieved and lists of area where manual processing exists.
- 10.List of area in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.
- 11.List of testing equipment available with the bidder for final testing equipments specified and test plant limitation. If any vis-a-vis the type, special acceptance and routine tests specified in the relevant standards, these limitations shall be very clearly brought out in schedule of deviations from specified test requirements.

33.2 The offer will be accepted only from the original manufacturers/supplier/authorized

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representative. The manufacturer must be having at least five years experience of manufacturing and operation of similar type of tri vector meters.

33.3 BIS MARK- In case of Indian meter manufacturer, the meter manufacturer having valid BIS license for 10/60A meters shall be preferred & in such case, meters offered shall be ISI marked. For imported meters, this is not applicable. Manufacturer having ISO:9001/9002 shall be preferred.

### **34.GUARANTEE:**

The meter shall be guaranteed for the period of five years from the date of commissioning or five and half year from the date of delivery whichever is earlier. The meters found defective within above guarantee period shall be replaced/repared by the supplier free of cost. If defective meters are not replaced/repared within one month from the date of the receipt of the intimation, PGVCL shall recover an equivalent amount plus 15% supervision charges from any of the bills.

### **35.PACKING:**

The meters shall be suitably packed in order to avoid damage or disturbance during transit or handling. Each meter may be suitably packed in the first instance to prevent ingress of moisture and dust and then placed in a cushioned carton of a suitable material to prevent damage due to shocks during transit.

### **36.SERVICES:**

The bidder shall provide following services:

- a) Services free of cost during guarantee period.
- b) To train PGVCL staff for installation and handling of these meters.
- c) To assist PGVCL lab staff to install, calibration, checking etc.
- d) To assist the PGVCL staff for taking MRI reading, theft wrapped meter analysis etc. at free of cost during guarantee period.
- e) The 3 phase meter 10-60A whole current meter for DLMS Protocol, meter should comply as per BIS ICS.doc ETD 13(6211) April, 2010 for category 'C'. The bidder will have to submit the certificate of CPRI conforming above BIS within 2 Months from the date of inviting the tender. If the certificate/relevant documents are not submitted, the bid will not be considered for further evaluation. However, the necessary documents, certification and samples to be submitted along with the technical offer should be conforming and compliant to DLMS as per IEC 62056. The offers, not complying to above, shall be rejected without any further correspondence
- f) To assist the PGVCL staff for installing, using and operation of software.

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### APPENDIX-A

#### GUARANTEED TECHNICAL PARTICULARS-(GTP)

SR. NO	DESCRIPTION	AS PER PGVCL'S REQUIREMENT	AS OFFERED BY PARTY
1.	Type of meter i)Basic current (A) ii)Maximum current	LT Whole Current Meter Ib : 10 Amps. Imax : 60 Amps.	
2	Standards to which the meter conform	All standards as mentioned in clause no. 2 of specifications	
3	Overload capacity	600% of Ib	
4	Dynamic range	0.4% to 600% of Ib	
5	Power supply variation (i)Specified operational range (ii)Limit range of operation (iii) Frequency	0.8 to 1.1 V ref. 0.7 to 1.2 V ref. 50 HZ $\pm$ 5%	
6.	Accuracy class	Class 1.0	
7.	P.F. Range	Zero lag -unity-Zero lead.	
8.	Variation of voltage at which meter functions normally	+20% to -30% of Vref.	
9.	Power Consumption per phase (i)Voltage circuit (ii)current circuit	To be specified by bidder	
10.	Minimum starting current of the meter (%Ib)	0.4% of Ib	
11	Impulse voltage	10KV	
12.	Display (No. of digits and character height)	Minimum 7 segment seven digit LCD Display of minimum character height 8 mm.	
13.	Continuous display (Auto Display mode)	Mode-1 as per Annexure-1	
14	Operational indication LED	To be provided	
15.	(a)Material for base/terminal block (b)Material for meter	10% glass filled nontransparent poly carbonate -LEXAN-943A Transparent poly carbonate	

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	cover/terminal cover	-LEXAN-503R	
16	a) Meter terminal block having sealable extended terminal cover b) No. of seals to be Provided c) Connection diagram inside the terminal cover d) Maximum safe current the terminals and screws shall carry	To be provided  2 nos. on meter body, 2 nos. on terminal cover, 1 no on optical port, 1 no on MD reset button To be Provided.  150% of I <sub>max</sub> .	
17	Communication port	To be provided	
18	REAL Time Clock With back up battery Life of battery	To be provided  10Years (minimum)	
19.	Non volatile memory retention time in absence of power	To be specified by bidder.	
20.	Memory capacity (KB)	To be specified by party.	
21	Details of tamper and fraud provisions (i)MISSING POTENTIAL (ii)CURRENT POLARITY REVERSAL (iii)CURRENT SHORT(BY PASS) (iv)CURRENT OPEN (v)DC IMMUNITY	TO BE DETECTED & RECORDED BY METER TO BE DETECTED & RECORDED BY METER TO BE DETECTED & RECORDED BY METER TO BE DETECTED & RECORDED BY METER  Meter shall record accurately.	
22	SALIENT FEATURES (1)Meter shall have provision to read in the	Internal Battery or external power pack-to be specified	

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	absence of power  (2)Meter shall work accurately irrespective of phase sequence of the main supply. (3)Meter shall remain powered up and functional in presence of two wires (4)Meter shall record accurately even if neutral is disconnected (5)Meter shall record correct energy in case of current reversal of one or more phases (6)Measurement by meter shall not get influenced by injection of AC voltage/chopped signal/DC signal & harmonics (7)Meter shall register accurate energy even if load is drawn partially or fully through local earth. (8)Potential link shall not be provided out side on meter terminal block. (9) Meter should record and display MD in KW as well as KVA for 30 minute integration period (10) Meter should record and display TOD energy. However, TOD MD in MRI report should be available.	by bidder  To be provided  To be provided  To be provided  To be provided  To be provided  To be provided  To be provided  To be provided	
23	MD reset	Auto as well as manual	
24	Self diagnostic feature	To be provided	
25	Load Survey in graphical as well as in tabular	minimum RTC, KWH & KVAH parameters(energy and	

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	form	demand) for 180 days with 30 minute integration period in FIFO Manner.	
26	Snap Shot Facility	Voltage, current, power factor, KWH with date & time of occurrence & restoration of tamper event.	
27	No of tamper events	minimum 400	
28	Temper persistence time	15minutes	
	TESTS		
29	Routine tests	As per IS 13779/IEC 1036	
30	Acceptance tests	As per IS 13779/IEC 1036 And as per PGVCL requirement	
31	Type tests	To be submitted	
32	Testing facilities	Fully Automatic test bench as per cl. no 30 of this specification	
33	BIS license	To be submitted-BIS NO & date of validation to be mentioned.	
34	ISO 9001/9002	ISO No & validity is to be specified.	
35	Guarantee	5 Years from the date of commissioning or 5½ years from the date of delivery.	
36	After services as per Cl. No.36	To be confirmed	

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**Annexure-I**

## **DISPLAY SHEET OF 10-60 WHOLE CURRENT METER**

<b>AUTO MODE DISPLAY</b>		
<b>SR</b>	<b>PARTICULAR</b>	<b>HOLD TIME IN SEC</b>
1	DISPLAY CHECK	4
2	METER SERIAL NUMBER	4
3	R-PHASE VOLTAGE	4
4	Y-PHASE VOLTAGE	4
5	B-PHASE VOLTAGE	4
6	R-PHASE CURRENT	4
7	Y-PHASE CURRENT	4
8	B-PHASE CURRENT	4
9	FRQUENCY	4
10	INSTANT POWER FACTOR WITH LAG / LEAD	4
11	RTC ( Date and time)	4
12	RISING MD IN KVA WITH ELAPSED TIME	4
13	RISING MD IN KW WITH ELAPSED TIME	4
14	CUMM. FORWARD KWH ( FUNDAMANETAL+HARMONICS)	30
15	CUMM. FORWARD KVARH LAG	30
16	CUMM. FORWARD KVARH LEAD	4
17	CUMM. FORWARD KVAH	4
18	MAXIMUM DEMAND OF CURRENT MONTH IN KW	4
19	MAXIMUM DEMAND OF CURRENT MONTH IN KVA	4
20	MAXIMUM DEMAND OF PREVIOUS MONTH IN KW	10
21	MAXIMUM DEMAND OF PREVIOUS MONTH IN KVA	10
22	CUMMULATIVE MAXIMUM DEMAND IN KW	4
23	CUMMULATIVE MAXIMUM DEMAND IN KVA	4
24	NO OF RESET COUNT	4
25	CUMMULATIVE FUNDAMENTAL KWH	4
26	TOTAL POWER ON TIME IN HRS.	4

Signature of Tenderer

Company's Round Seal

Date:

Place:



# PASCHIM GUJARAT VIJ COMPANY LIMITED

REGD. & CORPORATE OFFICE:- OFF NANA MAVA MAIN ROAD, LAXMINAGAR, RAJKOT-360004

Telephone Nos:-0281-2380425/427/2360182

Fax No:-0281-2368175

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## TENDER NOTICE No: PGVCL/RJT/3P WCM 10-60A/377

PUSH BUTTON DISPLAY		
1	TOTAL FORWARD PEAK HOURS KWH	
2	TOTAL FORWARD NIGHT HOURS KWH	
3	TOTAL FORWARD REST HOURS KWH	
4	PHASE WISE VOLTAGE FAILURE COUNT	
5	PHASE WISE CURENT FAILURE COUNT	
6	VOLTAGE UN BALANCE COUNT	
7	CURRENT UN BALANCE COUNT	
8	CURRENT BY PASSED COUNT	
9	PHASE WISE CURRENT REVERSAL COUNT	
10	NEUTRAL DISTURBANCE COUNT	
11	TOTAL MAGNET TEMPER COUNT	
12	TOTAL TAMPER COUNT	
13	METER VERSION	
HIGH RESOLUTION DISPLAY		
1	KWH	
2	KVARH LAG	
3	KVARH LEAD	
4	KVAH	

Signature of Tenderer

Company's Round Seal

Date:

Place:



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### ANNEXURE - II

Tamper Logic & threshold values for 3 Ph. 4 Wire 10-60 Amp whole current static energy meters

Sr. NO	Tamper Type	Phase wise	Logic & Threshold value	Persistence time	Restoration time
1	Missing Potential	Yes	$V_x < 40\%$ of V reference i.e. 240 Volt irrespective to any other phase voltage) and $I_x > 10\%$ of $I_b$	15 Minutes	2 Minutes
2	Unbalancing of Voltage	No	$V_{max}-V_{min}>10\%$ of max voltage of 3 phase voltages .& All voltages $>60\%$ $V_{ref}$	15 Minutes	2 Minutes
3	Current failure (CT open)	Yes	$I_r$ or $I_y$ or $I_b < 2\%$ of actual maximum and any one phase has value greater than $10\%$ $I_b$	15 Minutes	2 Minutes
4	Current unbalance	No	Difference of actual maximum & minimum current $> 30\%$ of actual maximum current and all phase has value greater than $10\%$ $I_b$	15 Minutes	2 Minutes
5	Current bye pass	Yes	The meter shall be capable of detecting and recording occurrences and restoration of shorting (bypassing) of any one or two phases of current when the meter is connected to a 3 phase 4 wire system. Threshold value is $10\%$ i.e. if difference in current between phase and neutral is more than $10\%$	15 Minutes	2 Minutes
6	Current Reversal	Yes	$I_x > 10\%$ of $I_b$ & direction of current reverse and P.F value greater than 0.2	15 Minutes	2 Minutes
7	Neutral Disturbance	Yes	Any two phase to neutral voltage is more than 350Volt & one phase to neutral voltage is less than 50Volt	15 Minutes	2 Minutes
8	Magnet Tamper	Yes	Record tamper when magnet start affecting the accuracy and meter should start recording at $I_{max}$ . I.e 60A	10 Seconds	10 Seconds
9	Low Voltage	no	$V_x > 40\%$ $V_{ref}$ and $V_x < 75\%$ $V_{ref}$	15 Minutes	2 Minutes
10	High Voltage	Yes	$V_x > 115\%$ $V_{ref}$	15 Minutes	2 Minutes

Signature of Tenderer

Company's Round Seal

Date:

Place:



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### BIDDERS ARE REQUESTED TO READ THE FOLLOWING AS THE PART OF TENDER TECHNICAL SPECIFICATIONS DOCUMENT.

**[A] As per tender technical specification and tender document tender sample(s) shall have to be submitted the following conditions are mandatory.**

[1] The sample(s) submitted shall have ISI marking as well as relevant IS Number”.

[2] The sample(s) not complying the above condition shall not be tested and shall be rejected and no further correspondence shall be make in this regard.

**[B] At the end of the tender technical specification, following paragraph should be added and read as under.**

The material supplied shall be conforming to Indian Standard Specification and also with ISI marking and even after inspection of the lot, if the material received at site is found without ISI marking , the lot shall be rejected and no further correspondence shall be entertained in this regard.

### **[C] Security Seal**

In addition to 2 Nos. of polycarbonate seals, further 2 Nos. of tamper proof void seals are to be provided on the Meter body in such a way that both the side covers shall be sealed by the tamper proof void seals. The tamper proof void seals to be provided on Meters shall be as per the following specification:

[1] Size of the seal -- 3 x 1 inches.

[2] The seal should be digitally printed on white VOID film having UV destructive inks printed with thermal resin ribbon technology.

[3] The seal should be water proof and should withstand all the weather conditions. The seal should have adhesive of sufficient strength to avoid peeling off under extreme temperature and environmental conditions.

[4]The seal should be sticker type seal and applied on both the side of the Meter which connects the body and the box.

[5]If some one lifts the seal, “VOID” impression should be transferred on the meter and if this is applied back, “VOID” impression should be readable from the surface of the seal.

[6]The disturbed portion of the seal should glow under UV light if the seal is disturbed from any part.

Signature of Tenderer

Company’s Round Seal

Date:

Place:



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[7]Barcodes of serial numbers should be printed on the seals and the barcodes should be readable with a barcode scanner.

[8]The seals should have continuous variable serial numbers along with security codes of last three digits of serial numbers printed in black and the same serial numbers along with code of serial numbers shall also be printed in a vertical semi circular shape which should be visible only under Ultra-violet (UV) light.

[9]Two security cuts should be given on the seal on both the sides, and if some one tries to lift the seal it should tear off from the security cuts. The security cuts should be made with a computer controlled plotter which should put the security cuts on the same position on each seal.

[10]The name of the supplier and supplier logo along with the security warning or any other information in any language as given by the company should be printed on the sea.

[11]There should be a provision of incorporating officers' signature on the seal as given by the company.

[12]If some one tries to remove the seal by allying heat, the printing should get disturbed and the shape of the seal should change if more heat is applied.

The seals to be used for sealing of Meters are to be fixed after inspection is over.

Signature of Tenderer

Company's Round Seal

Date:

Place: