**TECHNICAL SPECIFICATION FOR SUPPLY OF PRE PAID METERING SYSTEM, SUPPORT FOR OPERATION & SYSTEM RUNNING FOR A PERIOD OF 3 YEARS**

**Brief Scope of Work**

The work includes the following products/ services

1. Supply of 1-phase direct connect prepaid meters along with mobile app & meter boxes for consumer metering.
2. Support for Operation, Maintenance & running the system for vending token generation for 3 years from the date of supply of meters.

**TECHNICAL SPECIFICATION FOR SUPPLY OF SINGLE PHASE KEYPAD PRE PAYMENT METER**

1. **SCOPE:**

This specification covers design, manufacture, testing and supply of single phase electronic, accuracy class 1.0 keypad Prepaid meters with Box and provisions for TOD (Time of Day) tariff and R.T.C. (Real Time Clock).

The requirements of the online Vending/Transaction system to be provided for the keypad Prepaid metering system are also covered in the scope. The meter shall use keypad technology for the transfer of credit from the vending system to the meter. The meter shall contain the measuring element, main switch, display and keypad and comply with the requirements of the standards. The switch shall be used to disconnect customers depending on their load demand or the state of their account and shall be capable of operating over the life of the meter.

1. A mobile application shall be provided to each consumer. So that recharge can be done through mobile application via Bluetooth in addition to keypad facility available on the meter. Also mobile app should be capable to demonstrate consumption in terms of money and units (kWh) both..
2. **SPECIFICATION FOR SINGLE PHASE PRE PAID KEY PAD TYPE ENERGY METER:**
   1. STANDARD:

The meters with accuracy class–1.0 are required for measurement of Active Energy and shall conform to the latest edition of following standards:—

|  |  |  |
| --- | --- | --- |
| **IS:13779** | **:** | **A.C. Static Watt Hour Meters (Class–1.0 and 2.0)** |
| **IS: 14772:2000** |  | **Specification for boxes for the enclosure of electrical accessories** |
| **Reference is made to CBIP Technical Report No., 325 read with latest Amendments** |  | **Specification for AC Static Electrical Energy Meters.** |
| **Reference is also made to CBIP Technical Report No. 111 (Copy enclosed)** |  | **Specification for Common Meter Reading Instrument for optical Communication with meter.** |
| **IS:15884** | **:** | **AC Direct Connected Static Prepaid Meters for Active Energy (Class 1 and Class 2)** |
| **IS-15959** | **:** | **ELECTRICITY METERING — DATA EXCHANGE FOR METER READING,TARIFF AND LOAD CONTROL — COMPANION SPECIFICATION**  **The meter should be complied to IS15959 DLMS. Suitable arrangement shall also be made in meter box to take reading from outside.** |

* 1. **CLIMATIC CONDITIONS:**

The meter is required to operate satisfactorily and continuously with specified accuracy under hot, dusty and tropical conditions and other climatic condition specified as herein after:—

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **i)** | **Specified operating range** | | **:** | **–10°C to + 55°C** |
| **ii)** | **Limit range of operation** | | **:** | **–25°C to + 55°C** |
| **iii)** | **Limit range of storage and Transport** | | **:** | **–25°C to + 70°C** |
| **iv)** | **RELATIVE HUMIDITY:** | |  |  |
|  | **(a)** | **Annual Mean** | **:** | **<75 percent** |
|  | **(b)** | **For 30 days (spread over one year)** | **:** | **<95 percent** |
|  | **(c)** | **Occasionally on other days** | **:** | **<85 percent** |
| **v)** | **Maximum attitude above M.S.I.** | | **:** | **1000 Meter** |
| **vi)** | **Average Annual rain fall** | | **:** | **1200 mm.** |

* 1. **CURRENT AND VOLTAGE RATING:**

Rated Voltage (Vref) : 230 V or 240 V Phase to Neutral

Rated Current : Basic Current 5A (Ib) or 10A (Ib)

Maximum current 60A (Imax)

* 1. **VARIATION IN POWER SUPPLY:**

The meters shall be suitable for working satisfactorily with the following power supply system variations:—

* + 1. **VOLTAGE RANGE:**

|  |  |  |  |
| --- | --- | --- | --- |
| **(i)** | **Specified Operating Range** | **:** | **0.7 to 1.3 Vref (-30% to +30%)** |
| **(ii)** | **Operating voltage range for accuracy requirement** | **:** | **0.85 to 1.15 Vref i.e.**  **–15% to + 15%** |

* + 1. **FREQUENCY VARIATION:**

The standard reference frequency for performance shall be 50Hz with tolerance + 5%.

* 1. **POWER CONSUMPTION:**
  2. **VOLTAGE CIRCUIT:**

The active, apparent Power consumption in voltage circuit including the power supply of the meter at reference voltage, reference temperature and reference frequency shall be within limits as specified in relevant IS standard.

* + 1. **CURRENT CIRCUIT:**

The apparent Power taken by each current circuit at basic current, reference frequency and reference temperature shall be within limits as specified in relevant IS standard.

* 1. **STARTING CURRENT:**

The meter shall start registering the energy at 0.4% of Ib as per relevant IS.

* 1. **ACCURACY:**

Class of accuracy of meter shall be 1.0 and shall conform to accuracy requirement as per specified IS standard.

* 1. **KEYPAD PREPAID METER:**
* The keypad buttons shall have numbers, which shall be clearly visible and resistant to wear. The keypad button shall be of capacitive touch type for ease of use. Button ‘5’ shall have some form of physical identification (raised printing or a pip) to facilitate customers with poor sight.
* The entry of encrypted numeric codes for credit or commands associated with programming functions such as tariff change shall be facilitated with keypad. The meter shall permit a time delay of up to 20 seconds between subsequent keystrokes for smooth entry.
* The meter keypad should have buttons which enables the user to view various displays available on the meter. The display parameters shall be as follows, mainly:
* Balance Account
* Days Left (based on consumption of last seven days)
* Today’s consumption
* Current active rate and applicable price
* Last 5 successful recharge codes in the meter
* “Authenticated Billing Code (ABC)” #
* Total amount vended
* Refund code
* Current and previous month consumption in Rupees / kwh.
* Current Active forwarded maximum demand with date and time
* Instantaneous load and the projected hourly cost
* Date and Time

The meter shall display authenticated meter reading code. The token shall contain the following frozen value at midnight (00:00 Hr) of month end

* Cumulative Active forwarded energy register
* Cumulative money consumed
* Date of frozen data
* Tamper flag status
* Remaining Debt
  1. **TARIFF:**

Following are the features required in the meter for Tariff. It shall be possible to change the tariff related parameters through vend code. Vend token can be transferred through mobile application as well.

* + 1. **Minimum charges**: Using the online vending system it shall be possible to define the minimum charge for the applicable tariff category. If the consumer consumes electricity equivalent of amount less than the minimum charge then at the end of the billing period the meter shall deduct the difference of the minimum amount and the monthly consumption (Amount)
    2. Fixed Charges: Meter shall be able to deduct fixed charges on daily basis such as meter rent, sanctioned load based charges etc. The fixed charges shall be defined using the online vending system.
    3. Time of Day (TOD) Tariff: The meter shall have facility for recording and storing of TOD consumption on minimum Four Tariff Rates on per day basis.
    4. Slab Tariff: The meter shall have capability for defining minimum four tariff slabs
    5. Tax/Duty: It shall be possible to define the tax percentage through online vending system which has to be levied on the amount of the energy consumed.
    6. Debt Management: It shall be possible to collect the debt from the consumers with the use of the online vending system. The debt percentage shall be defined in the vending system.
    7. Retrospective tariff : Meter should support retrospective calculation for slab tariff. Up to 6 months
  1. LATCHING RELAY

The meter shall have ganged latching relays in phase to disconnect full load.

The latching relay shall be bi-stable type latching relay switch designed and shall conform to the load switching capabilities as per the IS15884.

* 1. **COMMUNICATION CAPABILITY:**

The meter shall be provided with an optical communication port. It shall be possible to read the meter through the optical port or BLE via mobile app or with hand held device.

The meter shall have suitable provision for consumer token entry, consumption information monitoring through mobile app. The mobile app connection to meter shall be through Bluetooth communication.

**“Meter CMRI port should essentially be placed at the front side of meter box.”**

The meter should have a galvanically isolated optical communication port for data communication . The port shall be compatible with IEC 1107/ PACT/ ANSI and shall be capable of being hooked to a remote metering device such as modem, etc. for future to enable Automatic meter reading. **“For local meter reading, it shall be possible to do entire meter data download within 5 minute (containing instantaneous values, load survey, 12 histories and events) but billing data within one minute.”**

The meter shall have suitable provision for consumer token entry, consumption information monitoring through mobile app. The mobile app connection to meter shall be through Bluetooth (4.1 onwards) communication

**3.13 CONSUMER INTERFACE UNIT (CIU) like IHD (In-home display) unit or Mobile application:** IHD (In-home display) unit

* The meter shall be supplied with a separate In-home display unit.
* The display unit shall be powered up from the meter
* The display unit shall have a LCD display.
* The display unit shall have a keypad to enter the code. The keypad should be similar to the keypad available on the meter.
* The display unit shall have an RJ11 connection port to connect to the meter.
* The display unit and energy meter shall be connected using a 4 wire connection cable (Similar to telephone cable)/wifi (Bluetooth).
* The display unit shall have a buzzer to generate alarm signal in case of low credit and overload.
* IHD shall be supplied with Bluetooth compatibility for exchange of data
* Pairing facility shall be available on IHD to connect with mobile app (OS Android / iOS, provided by the meter manufacturer)
* For security reason an initial parity shall be provided between Bluetooth module and app to avoid unnecessary intervention of other devices using same frequency band
* It should support Blue tooth 4.0 (BLE) or above to connect to mobile app.
* Pairing facility shall be available on IHD to connect with mobile app.
* It should work on ISM band from 2.4 to 2.485 GHz,
* Distance should be as per Blue tooth specification class 2 (within 10 meters of Line of Sight)
* It should support reading from mobile app OS Android / iOS / Windows

**Or**

**Mobile App:**

* The meter shall be supplied with inbuilt Bluetooth.
* The energy meter shall be connected using a Bluetooth with the mobile app.
* Pairing facility shall be available on Meter to connect with mobile app (OS Android / iOS/, provided by the meter manufacturer)
* Consumer shall have facility to transmit recharge token through mobile app (when mobile is connected with the meter)
* Mobile app have facility to define more then one mobile number for the meter.
* For security reason an initial parity shall be provided between Bluetooth module and app to avoid unnecessary intervention of other devices using same frequency band
* Pairing facility shall be available on meter to connect with mobile app.
* Distance should be as per Blue tooth specification class 2 (within 10 meters of Line of Sight)
  1. **GENERAL REQUIRMEENTS**

Meter shall be designed and constructed in such a way as to avoid introducing any danger in use and under normal conditions so as to ensure specially the following:—

* Personnel safety against electric shock
* Personnel safety against effects of excessive temperature.
* Protection against penetration of solid objects, dust and water.
* Protection against spread of fire.
  + 1. All the material used in the manufacturing of meters shall be of highest quality. The entire design and construction shall be capable of withstanding stresses likely to occur in actual service and rough handling during transportation.
    2. All insulating material used in the construction of meter shall be non-hygroscopic, non-ageing and of tested quality and shall conform to tests as specified in relevant Standards.
    3. The meter shall be designed on application specific integrated circuit and shall be manufactured using SMT (Surface Mount Technology) components.
    4. The terminal block, the terminal cover and the meter case shall ensure reasonable safety against the spread of fire. They should not be ignited by thermic overload of live parts in contact with them.
    5. The meter shall conform to the degree of protection IP 54 against ingress of dust, moisture and vermin.
    6. All parts which are subject to corrosion under normal working conditions shall be protected effectively. Any protective coating shall not be liable to change by ordinary handling due to exposure to air under normal working conditions.
    7. The meters shall be designed such that their working remains unaffected by electromagnetic interference, electrostatic discharges and high voltage transients as specified in standard.
  1. **CONSTRUCTIONAL REQUIREMENTS:**
     1. **Meter Case:**

1. The meter shall have completely insulated body and be of wall mounted projected type. The meter shall have a case made of unbreakable high grade fire resistant, reinforced polycarbonate or equivalent high grade engineering plastic which can be sealed in such a way that the internal parts of the meter are accessible only after breaking the meter cover seals. The meter cover shall have at least two sealing screws, each screw having the sealing holes.
2. The meter case shall have at least three mounting holes. Two holes for mounting screws on the terminal block sealed beneath the terminal cover and one for hanging screw on the top.
3. The meter case shall be ultrasonically or chemically welded with the meter cover in such a way that it should not be possible to open the meter cover without damaging the cover.

3.15.2 **LCD Unit:**

The display unit shall be Pin type built-in liquid crystal display. The measured value(s) shall be displayed on minimum six digit Liquid Crystal display (LCD) i.e. display unit, having minimum character size of 8mm height. When the meter is not energized, the display need not be visible. Each display shall be retained for a minimum period of 2s.

* + 1. **Window:**

The meter cover shall be of high grade, fire resistant, reinforced polycarbonate or equivalent high grade engineering plastic with one window made of UV stabilized, silicon coated polycarbonate or equivalent high grade engineering plastic for reading the register. The window shall be integral part of the meter cover such that it cannot be removed undamaged without breaking the meter cover.

* + 1. **Terminals and Terminals block:**

1. The terminal block shall be made from best quality non-hygroscopic, fire retardant, reinforced polycarbonate (not Bakelite) or equivalent high grade engineering plastic which should form an extension of the meter case. If shall have terminal of minimum internal diameter 8.5mm
2. The meter shall be provided with terminal to connect the cables. The screws shall not have pointed edge at the end of thread. The clearance and creep age distance of terminal block and tips between the terminal and the surrounding parts of metal enclosure shall be as per relevant IS standard.
3. All parts of each terminal shall be such that the risk of corrosion resulting from contact with any other metal part is minimized.
4. Electrical connections shall be so designed that contact pressure is not transmitted through insulating material.
   * 1. **Terminal Cover:**
5. The meter terminal Block shall be provided with an extended terminal cover with independent sealing arrangement in such a way that it shall cover the terminals, the conductor fixing screws, the external conductors and their insulation i.e. no part of meter or cable accessories shall be visible from the front of the meter.
6. When the meter is mounted, no access to the terminals shall be possible without breaking the seal of the meter terminal cover.
   * 1. **Terminal Arrangement:**

A diagram of connections should be provided inside the cover the terminal block. The terminal cover shall be extended such that when it is placed in position it is not possible to approach the connections or connecting wires.

* + 1. **Name Plate Marking:**

The name plate shall have following markings which shall be indelible, distinct and readable from outside the meter:—

* + - Manufacturer's name and/or trade mark and the place (with country) of manufacture;
    - Designation of type;
    - The no. of phases and no. of wires for which the meter is suitable for;
    - The manufacturer’s serial number and year of manufacture;
    - Reference voltage;
    - The basic current and the maximum current;
    - The principal unit in which the meter reads;
    - Meter constant;
    - Class index of the meter;
    - Reference Frequency;
    - Guarantee Period
  1. **TAMPER AND FRAUD PROTECTION:**

The meter shall operate normally under the following conditions:

* + 1. Phase current reversal: The meter shall record forwarded energy or should disconnect the switch.
    2. Neutral current reversal: The meter shall record forwarded energy or should disconnect the switch.
    3. Phase and neutral interchange: The meter shall record forwarded energy.
    4. The meter shall operate normally in case the phase and neutral are swapped with neutral connected to earth.
    5. In case the neutral is opened with earth load connected, partial phase by pass or full phase bypass the energy shall be recorded on the wire which has higher current recording. Such tampers shall be logged in the memory of the meter.
    6. The metering system shall be provided with adequate magnetic shielding so that any external magnetic field (AC Electro Magnet or DC Magnet) as per the values specified in standard applied on the metering system shall not affect the proper functioning and recording of energy as per error limits prescribed by standard.
    7. **Spark Immunity**: The meter shall be immune up to 35 kV spark discharge. The meter shall be tested by feeding spark under the following manner for 10 minutes and accuracy shall be maintained:
  1. On any of the phases or neutral terminals.
  2. On any of the connecting wires of the meter (Voltage discharge with 0-10 mm spark gap)
     1. At any place in load circuit
     2. At any location of meter body.
     3. **Meter Cover Open detection**: If case of meter cover/base is opened it shall log the tamper in meter memory with meter time & date.
     4. **Measurement shift**: The meter shall have measuring element for both phase and neutral to avoid tampering with neutral. The energy measurement shall always be done on the element with higher current and it is preferable to supply the CT’s for both phase and neutral. The meter shall detect the measurement shifting from phase to neutral circuit and neutral to phase circuit in the memory. This shall be done by finding the imbalance between phase and neutral current and comparing with the pre defined threshold and the persistence time.
     5. **Magnetic Interference**: Meter shall record accurate energy in case of external magnetic influencing signals. Meter shall comply to IS-15884 & Latest CBIP repor
     6. If neutral is disconnected from both supply & load side the meter shall not power up and / or shall disconnect the supply.
  3. **TESTS**
     1. **Type Tests**

Meter shall be fully type tested as per the relevant IS. The Type Test Reports shall clearly indicate the constructional features of the type tested meters. All the Type Tests shall have been carried out from any NABL accredited Laboratories viz CPRI/ERDA/ERTL/NTH to prove that the meters meet the requirements of the specification.

* + 1. Meters shall pass the entire acceptance and a routine test as laid down in relevant IS and also additional acceptance tests as prescribed in this specification.
    2. Prepaid functionality shall be tested by the utility as per IS: 15884 meant for Pre-paid meter.
    3. Other Acceptance tests
  1. The meter shall withstand continuously for a period of at least 5 minutes at a voltage of 440 V between phase and neutral without damage/problems,
  2. Power consumption tests,
  3. The meter shall withstand impulse voltage at 6kV as per IS.
  4. The meters shall be tested at (-) 15% and at (-) 30% of reference voltage as well as (+) 10% and (+) 20% of reference voltage and shall record energy within limits of variation as per relevant IS.
  5. For other influence quantities like frequency variation the limits of variation in percentage error will be as per relevant IS.
  6. The meter shall have measuring element for both phase and neutral to avoid tampering with neutral. The energy measurement shall always be done on the element with higher current. The condition for measurement shift shall be according to below conditions and the meter shall log the forwarded energy in this conditions:

|  |  |
| --- | --- |
| **1** | **Interchanging of phase & neutral terminals.** |
| **2** | **Neutral connected on incoming side but connected to earth via resistor on outgoing side. Load is connected solidly to ground.** |
| **3** | **Phase & neutral interchanged at incoming and load is connected to earth.** |

* 1. Meters shall offer compliance to requirements of relevant IS and its amendments for tampering using external magnets and meter should record energy at Imax whenever the meter gets affected during that condition:

a) Meter shall log the event in its memory as Magnetic tamper with date and time stamp.

b) Meter shall show “TAMPER” in the display.

c) Meter shall start recording at 100% of Imax (Defrauded metering)

* + 1. **Sample Meter**:

Three nos. samples prepaid meters with meter box duly signed by permanent marker by firm representative are to be submitted along with the tender within 7 days of opening of part-1, meter shall be the tested at Third Party Govt. Lab CPRI/ERDA/ERTL/NTH decided by the Discom on the cost of suppliers.

AND

One no. sample prepaid meter with meter box is to be submitted in separate packing duly signed by permanent marker by firm representative for verification of integration with existing prepaid vending system and billing application of UPPCL.

**Testing of samples:**

Testing of samples submitted by the firms shall be tested on the cost of suppliers at third party Govt. lab & its place decided by the Discom as per technical specifications given in NIT, in presence of firm’s representatives. Date of testing shall be informed to all bidders. Engineer of the bidder shall come with vending software and token generation system. Other than verification of sample meter as per relevant IS, below mention tests shall also be done and bidders’ representative shall be well equipped to demonstrate desired features:-

1. Vending system operation.
2. Test of application of tariff.
3. Token generation.
4. Token punch & checking all display parameters on meter
5. Balance available in the meter.
6. Test of friendly credit hours start & end time
7. Test of disconnect the output supply once when credit reach to zero.
8. Test of reconnect the output supply on providing credit limit / charging with new token.
9. Test of disconnect the out supply if load / current exceed the preset value in the meter.
10. Test of reconnect the out supply if load / current falls below the preset value in the meter.
11. Test of visible / audible over load warning.
12. Test of visible / audible low credit warning.
13. Authentic Billing Code (ABC) verification.
14. All tampers shall be tested as mentioned in the specification.
15. MRI of meter for verification of tamper information with date & time stamping, load survey and meter readings.

Price Bid i.e. Part-II will be opened for only those successful bidders whose sample meters will pass in testing & integration with the existing billing system of as per PVVNL specification.

**GUARANTEED TECHNICAL SPECIFICATION FOR SINGLE PHASE PREAPID METERS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl** | **DESCRIPTION** | **REQUIREMENT** | **Offered** | **Remarks** |
| **1** | **Type of the meter** | **Single phase two wire, whole current meter- direct reading type without application of any multiplication constant** |  |  |
| **2** | **Accuracy Class of the meter** | **1.0** |  |  |
| **3** | **Basic Current (lb) & rated Maximum current (Imax)** | **lb= 5A or 10A; Imax= 60 Amps**  **(Meter shall be able to continuously carry 120% of Imax Meeting the accuracy requirements)** |  |  |
| **4** | **Operating Voltage** | **Meter shall be operational with required accuracy from 0.7 Vref to 1.2 Vref.** |  |  |
| **5** | **Operating Frequency** | **50 Hz± 5%.** |  |  |
| **6** | **Power Consumption** | Voltage circuit: As per relevant IS standard  Current Circuit : As per relevant IS standard |  |  |
| **7** | **Starting Current** | **As per IS** |  |  |
| **8** | **Short time over current** | **1800 A for 0.01 sec ( 30 Imax for one half cycle at rated frequency) (As per IS)** |  |  |
| **9** | **Insulation**  **resistance**  **a) Between frame & current voltage circuits connected together:**  **b) Between each current (or voltage circuit) and each and every other circuit.** | **5 M ohm**  **50 M ohm.** |  |  |
| **10** | **Mechanical requirements** | **Meter shall be in compliance with Relevant IS Standard** |  |  |
| **11** | **Resistance to heat and fire** | **The terminal block and Meter case shall ensure safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per IEC. Fire retardant material shall be used.** |  |  |
| **14** | **Connection Diagram** | **The connection diagram for the system shall be provided on terminal cover.** |  |  |
| **15** | **Self Diagnostic feature in the metering or indicated in the HES** | **The metering shall have indications for unsatisfactory/ non-functioning of**  **(i) Time and calendar**  **(ii) Real Time Clock**  **(iii) NVM** |  |  |
| **16** | **Initial start-up of meter** | **Meter shall be fully functional within 5 sec after reference Voltage is applied to the meter terminals.** |  |  |
| **17** | **Internal diameter of the terminal holes:**  **Depth of the terminal holes:** | **8.5 mm to 10.5 mm**  **Between 20 to 25mm** |  |  |
| **18** | **Clearance between adjacent terminals** | **10 mm (minimum)** |  |  |
| **19** | **Display** | **Scrolling, 02 seconds for each parameter** |  |  |
| **20** | **Calibration** | **Meters shall be software calibrated at factory and modifications in calibration shall not be possible at site by any means.** |  |  |

**Special Conditions**:

* + - 1. Supplier will provide secured android / ios app for communication with Meter and token exchange.
      2. Supplier will have to be integrate prepaid meter with existing prepaid vending system & billing application system.
      3. PVVNL Payment gateway(s) shall be integrated within Mobile app / Web app for receiving payments against recharge.
      4. PVVNL reserves the right to conduct security audit of system with the help of third party at predefined frequency.
      5. Supplier will maintain master data of installation points of prepaid meters and update such data whenever instructed.
      6. Energy and commercial data processed and stored with prepaid meters share be transferred to PVVNL billing systems through web services for reconciliation and audit.

1. **METER DATA READ THROUGH MRI AND / OR BCS:**

It shall be possible to read the prepaid meters and minimum following information shall be available in meter reading data.

* The transaction history data with date and time.
* All the events history with time based and category based information.
* Tariff details including the TOD tables, slab tables and information about the current active rate price.
* 12 months history All the account related information like meter credit, emergency credit details, minimum charge and fixed charges value.

1. **VENDING SYSTEM REQUIREMENTS:**

This section specifies the requirements of the vending system for currency based Prepaid metering solution.

The meter shall work on the latest currency transfer keypad technology supported by an online vending system. Since the keypad technology is future proof, cost effective and in this communication age, enables consumers to buy electricity over the multiple vending options like Utility billing centers, Utility website, through third party POS providers and SMS based vending and many other vending options such as IVR (Utility Call Centre), , etc which enables 24x7 anywhere anytime vending faculties, hence the system provided by the bidder shall have such capabilities to integrate with utility / any third party service providers based upon mutual agreement with utility.

The vending system shall use an internationally recognized encryption standard. The code shall be meter specific and can’t be used in any other meter. The encryption standard so chosen must have wide worldwide use due to the high level security structure.

The necessary licensed Software shall be provided by bidder for utility bidding center.

The vending software shall be installed at the billing stations of Utility for which necessary office space, electricity etc. and furniture for this system shall be provided by Utility. Cash shall be collected by Utility staff; the designated staff shall generate a token to transfer the credit to the energy meter. The token shall be printed using the printer attached to the computer. Also the VPN or internet connectivity for access between the vending station placed at Utility premises & the bidder’s server shall be provided by Utility.

The vending system shall be the online vending system from where the vend codes shall be issued. It shall be possible to integrate various vending options like SMS third party app vending, POS terminals based vending, etc.

The vendor shall provide Mobile App for vending tokens by the consumer using Smart Phones through Debit / Credit cards / Net banking. The vended token may be directly transferred to the meter using Bluetooth functionality.Payment gateway service provider shall be provided by the utility and necessary agreement shall be made between utility and the payment gateway provider.

1. **VENDING PROCESS:**
   * 1. On receipt of the vend request the system shall have a provision to ascertain the identity of the consumer. The keys to identify the consumer shall be the meter serial number or consumer number.
     2. The vend terminal shall send the request to a central database that shall authenticate the transaction and generate an encrypted code.
     3. In order to provide maximum security to the system the encryption shall not be done on the vend terminal.
     4. On receipt of each request the vend terminal shall connect to the central database and get the code generated.
     5. The code hence generated shall be sent to consumer mobile in the form of SMS and on mobile app as well directly by central database server if such mobile number is registered with utility.
     6. Also vend code can be printed on paper using the attached printer at utility billing centres.
     7. Consumer can transfer this token from mobile app to meter through BLE (in case of smart phone) or punch the received token in the form of text SMS into the meter using keypad (in case of non-smart phone).The vending system shall be used to transfer current values (Rupees) to the meter.
2. **DATA MONITORING CENTRE (DMC):**

The DMC shall be an integral part of the vending software with supervisior rights in which utility’s “supervisior user” shall have rights to interface with the central database and produce the management reports as detailed in the specification. It shall manage all administrative data, including settings of system accounts, tariffs, meter and Consumer data. It shall also provide reporting system for system analysis.

Various tasks that should be performed from the DMC are outlined below:

* + 1. **Consumer Database Management**
* Entry of new consumers and their details
* Existing consumer database
  + 1. **Meter Database Management**
* Uploading of meter database
  + 1. **Tariff Management**
* Tariff structure definition
* Rate Price definition
* Tariff category
* Tax percentage
* Fixed Charge value
* Minimum charge value
* Slab reset period
* Tariff change administration
  + 1. **Limit Parameters management**
* Define Load Limit
* Current Limit value
* Emergency Credit
  + 1. **Debt (previous charges) Management**
    2. **Transaction management :**
* Cash vend transaction
* Retained credit transaction
* Refund Money Transaction
* Previous Charge Transaction
  + 1. **Reports**
* Debt collection and outstanding report
* Tax and duties accounts report
* Customer’s Vend Report
  + 1. **Import of data by the vending station from the master station / Export of data by the main station to the vending stations:**
* Import of data from Comma separated values(CSV) format files
* Export of data in CSV format.
  + 1. **Message Management**
* Entry of System Message
* Entry of Customer Specific Messages
* Entry of Predefined Messages
  + 1. **User Security Management**
* Group rights definition
* Entry of system users and allocation of group rights

1. **SECURITY ASPECT:**

The vending system shall be a sophisticated system with reliable security features.

* + 1. The token created for particular meter with the defined tariff shall not be used for any other meter.
    2. The meter shall accept the valid token only once. The token generated shall be meter specific and shall be used only on the particular meter for which it is intended.
    3. The token shall not be reusable
    4. The token shall be re-issued in case it is lost the meter shall accept the code generated only once.
    5. Whenever a tariff change takes place no other token shall be accepted by the meter unless the updated tariff token is entered into the meter.
    6. The token generated shall be authenticated as well as encrypted so that no decoding is possible.
    7. The Vending system must be certified to ISO/IEC 27001 which is the only auditable international standard which defines the requirements for an Information Security Management System (ISMS). The standard is designed to ensure the selection of adequate and proportionate security controls.

1. Internet or VPN connectivity IT infra to install vending software shall be the responsibility of Utility. Existing billing collection counters can also be used to install vending Software in respective PCs.

The supplier shall ensure to provide uninterrupted services like generating vend token, tariff management, report generation etc. to electricity Supply Company i.e. DISCOM. The delay in getting vends token responses or server breakdown may invite penalty on the supplier and shall be settled at the time of placement of order.

**TECHNICAL OFFER FOR PILFER PROOF METER BOX TO HOUSE SINGLE PHASE PREPAID ENERGY METER**

1. SCOPE:

The meter box shall be intended to house one number Single Phase Prepaid energy meter. The meter box complies with relevant Indian standard IS: 14772: with latest amendment/IS:13410 / other applicable standard with latest amendment.

1. MATERIAL:
   1. The meter box shall be made Transparent Polycarbonate material which complies following properties:
   2. Meter box shall be weather proof, capable to withstanding temperatures of Glow wire test at 650°C as per IS 14772, HDT of meter box material shall be minimum 120°C.

1. CONSTRUCTION:
   * The meter Box will have provision for easy flow of rainwater with better IP protection.
   * The average thickness of the box will be minimum 2.0 ± 0.2mm on all sides.
   * The overall dimensions of the box will be such that a minimum 15 mm clearance from left, right side and top, 10 mm from front and back side, 75 mm from the live terminals of meter will be maintain in between meter and box surface with general tolerance of ± 2 mm.
   * Box cover should be push fit type.
   * Suitable arrangement will be required on the cover of the box to operate the meter actuators/ push buttons for display access and using associated meter functionalities.
   * Meter box shall have the provision to read the meter through optical port, such arrangement shall have the sealing arrangement.
2. Meter Box would comply with IP - 54.
3. All metallic parts shall be well protected against corrosion.
4. The provision for meter reading through CMRI shall provide on the cover of meter box without opening the meter box cover along with separate sealing arrangement.

1. The front cover and base of meter box would be made of transparent Polycarbonate material.
2. Box Mounting Arrangement :

Offered Meter box’s base and cover shall be of transparent Polycarbonate material

Box should have 1 keyhole and 2 nos. mounting holes of 6 mm diameter for fixing the meter box on wall / wooden board.

1. Cable Entry:

Suitable provision would be available at the bottom side of the meter box bottom for cable inlet & outlet and the same shall be capable of accommodating cable of 18- 22 mm diameter, two nos. engineering plastic cable gland shall be provide for cable incoming & outgoing.

1. Marking :
   * + Following information shall be made available on the cover of meter Box:
       1. Manufacturer information (logo/name)
       2. Danger sign will be engraved/ embossed on the front cover of meter box
     + Name plate details of meter should be readable from outside of meter box as per following
2. Property of XXXXXXX ( Purchaser’s name)
3. Purchaser order No. & date
4. Name / Brand name of Manufacturer
5. TESTS FOR BOXES:

The following tests are to be conducted on the box at any independent NABL accredited laboratory and test reports shall be carried out as per relevant Indian Standard.

* + - * Test of HDT minimum 120° C
      * Test for mechanical strength
      * Glow wire test at 650°C
      * IP protection class : IP 54

1. ACCEPTANCE TEST
   * + - Physical verification of dimensions of the box.
       - Compatibility of the box for housing the meter, and ensuring ease of connecting and reading the meter.

**GUARANTED TECHNICAL PARTICULARS FOR SINGLE PHASE PREPAID METER BOX**

|  |  |  |
| --- | --- | --- |
| **S.N** | **Characteristics** | **Remarks** |
|  | **Material of meter box**  **(Transparent Polycarbonate )** |  |
|  | **Color of Box**   * + 1. **Cover**     2. **Base** | **Transparent** |
|  | **Dimensions of box (L x W x H)** |  |
|  | **Clarence from Meter surface :**  **Left , Right & Top side 20 mm :**  **Bottom ( from terminals) 75 mm :**  **Front side 10 mm :**  **Back side 10 mm :**  **( General tolerance ± 5 mm)** |  |
|  | **Thickness of Meter box**  **Minimum : 2 mm** |  |
|  | **Sealing arrangement on**  **Minimum :- 2 nos.** |  |
|  | **Inlet & Outlets with Engineering plastic Glands** |  |
|  | **Suitable for outdoor installation**  **IP Class : IP 54** |  |
|  | **Meter mounting Arrangement**  **( 4 Nos. holes minimum 4 mm )** |  |
|  | **Heat Deflection Temperature minimum 120 Deg C** |  |

Note: The meter box size should be bare minimum so that meter can be installed in small spaces particularly in multistoried buildings and commercial shops and complexes.

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