7.0 Technical Specification

The Plant & Equipment shall comply with following Technical Specifications:

Specification for

Three Phase Smart Prepayment Energy Meter With Communication Module

7.1 Scope

Three Phase: This Technical Specification covers the Supply Three phase whole current AC 10(100) Amps smart Pre-payment Energy Meter of Accuracy Class 1.0 for active energy; 2.0 for reactive energy confirming to IEC62052-11, IEC 62053-21 with provisions for TOU (Time of Use) tariff and RTC (Real Time Clock) suitable for measurement of Energy in three phase four wire system.

The smart Pre-payment Meter should have plug & play type BPLC and GPRS communication module. The meter should be able to connect point to point communication with head end system (HES).

The Smart Pre-payment features like online recharge, tariff and charge configuration, emergency credit/ friendly hour configuration, daily and monthly billing data collection, on demand read etc to be implemented through HES.

The meter must be able to detect and record power off & power on, tamper, load control, configuration, tariff setting, firmware update and payment related event with date and time stamp. Meter can push the related event to HES when the event occurs, such low credit alarm, no credit disconnection, emergency in use or friendly in use, tamper. Utility and customer can receive the related SMS notification as per the configuration.

7.2 Scope of Supply

The tenderer shall be responsible for supply of Energy Meter with related services packing, loading, shipment, custom clearance if necessary, and transportation, insurance and unloading at site. The supplied meters will be operated by existing purchasers' software. Interfacing of the offered meter is the responsibility of the tenderer.

Item No.	Name of Goods or Related Services	Description	Unit of Measurement	Quantity
1	Three Phase Solid State Smart Pre-payment meter with plug & play type BPLC communication module	Three phase, 400 Volt (p-p), 10(100) A	Nos.	1302

7.3 Service conditions:

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

Sl.No.	Condition	Specification
1	Maximum ambient temperature (^{o}C)	50
2	Minimum ambient temperature (^{o}C)	5
3	Maximum daily average temperature (^{o}C)	35
4	Maximum annual average temperature (^{o}C)	30
5	Mean annual rainfall (mm)	2500
6	Minimum annual rainfall (mm)	1461
7	Maximum annual rainfall (mm)	4127
8	Maximum relative humidity (%)	100

Sl.No.	Condition	Specification
9	Average relative humidity (%)	80
10	Maximum wind velocity (km/h)	180
11	Maximum altitude above mean sea level (meters)	200

7.4 Standards and codes of practice

All material and equipment supplied and all works carried out shall comply in every respect with the technical codes of the International Organization for Standardization (ISO) and with the recommendations of the International Electrotechnical Commission (IEC), which apply to the electrical equipment.

Goods and special guarantees beyond the scope of ISO and IEC shall conform at least to one of the following standards and codes.

IEC 62052-11	Electricity metering equipment (AC)- General requirements, tests and test Conditions- Part 11: Metering equipment
IEC 62055	Part 21: Framework for standardization Part 31: Particular Requirements-Static payment meters for active energy (classes 1)
IEC 62053-21, IEC 62053-23	Alternating current static watt-hour meters (classes 1)
IEC62052-21, IEC 62054-21	Time switches for tariff and load control
IEC 62056-21,61	Data exchange for meter reading, tariff and load control and direct local data exchange
IEC 1038	The switches for tariff and load control
IEC 1107	Data exchange for meter reading, tariff and load control and direct local data exchange
IEC 58	Shock and vibration, humidity, solar radiation and salt mist etc.
ISO 9001	Code of practice for quality systems part 1: Model for quality assurance in design/development, production, installation and servicing.
IEC 62054	Real Time Clock (RTC)
Others	All other relevant IEC specifications for metering equipment.

7.5 Supply System

Description	Three Phase
Rated voltage (Vref.)	3x230 V – Phase to Neutral
Rated Current	Basic Current 10 Amps (Ib),
Rated Frequency	Maximum Current 100 Amps (Imax)

7.6 Specific Technical Requirements

The meters to be supplied against this specification shall meet the requirements specified in this clause.

7.6.1 Electrical requirements

Meter supplied shall meet the following electrical requirements.

Sl.No	Description	Specification
A	**Phase**	**Three Phase**
1	Connection	3-Phase, 4-Wire, direct connected
2	Number of element	03 (Three)
3	Rated voltage	400 V phase to phase
4	Rated Current: a) Base current, I_b b) Maximum continuous current, I_{max}	 ≤ 10 A ≥ 100 A Moreover the 10-100 Amps meter shall work accurately up to 120 % of Imax i.e.; 120 Amps.
5	Starting current	40 mA (0.4% I_b)
6	Power consumption in the voltage circuit	≤ 5 Watts and 10 VA
7	Limit of Current	Shall be Programmable within the range of 0.04A to 100 A
8	Continuous over voltage	Should withstand 400 volts for 48 hours without causing any damage or degrading of its operating life, or causing changes of more than 0.01 kWh in its credit registers (excluding the possible decrement of credit due to power being consumed).
9	Variation in voltage	+30% to –30%; The meter shall be suitable for working satisfactorily within the specified range.
10	Rated frequency	50 Hz
11	Variation in frequency	± 2%
12	Power factor	The Meter shall be suitable for working satisfactorily from 0.5 lag – unity – 0.8 lead
13	Class index	1.0 for active energy; 2.0 for reactive energy; The accuracy shall not drift with time.
14	Keypad	12-key, International Standard layout including “information” and “backspace” keys
15	Clock	Built-in real time clock with 10 years battery backup
16	a) Display	LCD; Visibility should be sufficient to read the meter mounted at height of 0.5 to 2.0 m. Pin type; trans-reflective HTN or STN type industrial grade; temperature range –20^{0}C to +70^{0}C
	b) Period of display	Continuous
	c) Digits	WxH: 6 mm x 10 mm (minimum)
	d) Maximum viewing angle	160 degrees
	e) Number of display digits	6+2
17	Harmonic energy	Meter shall record total energy including harmonic energy
18	Memory	Non-volatile memory that retains information up to 10 years in the absence

Sl.No	Description	Specification
		of power. Described in section 7.7 & 7.16.8.3 The data stored in memory chip can be read by a tool when the meter is broken after demonstration.
19	Power limiting	Meter shall disconnect the load when a pre-programmed threshold power is reached. The threshold shall be programmable in steps of 500W or less.
20	Tamper detection	Sensor to detect any kind of tamper
21	Load disconnection	Latching relay
22	Audible alarm	Buzzer
23	Lightning Protection	In accordance to IEC 62053-21 or latest version of IEC
24	Communication	plug & play type BPLC AND GPRS communication module
25	Application Protocol	DLMS/COSEM and IDIS
26	Installation of Communication Module	Adding or exchanging the communication module should be done without turning off the meter. Meter must be compatible with multi communication module. Utility can replace any module in the same meter if required.
27	Maximum pulse frequency	Shall not exceed 2.5 kHz
28	Sealing Condition	Hermetically Sealed / Fully Ultrasonic Welded.

7.6.2 Mechanical requirements:

The enclosure shall be tamper-resistant and shall be suitable for outdoor mounting. The meter shall be such that the internal components in the active part of the meter shall be protected against unintentional damage or tamper during handling and installation.

Furthermore, Meter supplied shall meet the following mechanical requirements.

Sl. No.	Description	Specification
1	Meter Case	The meter shall be constructed by employing flame retardant and high impact strength material. The base, body and frame including terminal block shall be of heat resistive; shock proof and rust proof good quality hard material e.g. unbreakable engineering or stamped metal or molded phenol resin which shall be capable of withstanding of 145° C. The base will be provided with 3 (three) screw mounting holes, 1 (one) slotted meter support bracket at the top and 1 (one) round hole on each side in the bottom half of the base for securely mounting the meter to the meter board. The meter cover shall be of molded transparent Poly-Carbonate. The meter cover shall be provided with a window of transparent Poly-Carbonate or toughened glass. The display shall be of LCD. The base cover should be transparent. The meter shall be effectively sealed to prevent entrance of moisture, rain and dust into its internal parts.

Sl. No.	Description	Specification
2	Terminal	a) Terminal block shall be polycarbonate grade 500R or equivalent bakelite; brass or copper current terminals; two flat-head brass screws at each terminal; b) Terminal cover should be transparent and have provision for sealing. c) Terminal cover should have provision for Side entry connection. d) Minimum free space between bottom of terminal and terminal cover are 60 mm **e) For Three Phase:** Minimum 8 terminals to accommodate 16 mm^2 duplex; terminal cover shall be extended type; terminal bore diameter 8.5 mm;
3	Connections diagrams and terminal marking	Every meter shall be indelibly marked with a diagram of connection. Meter terminals shall be marked; this marking shall appear on the diagram Stickers of any kind shall not be accepted.
4	Insulation level	Shall withstand a power frequency test of 4kV and impulse withstand test of 6 kV.
5	Protection against penetration of dust and water	Conform to the degree of protection of IP54 or better
6	Top cover sealing	Hermetically Sealed/ Fully Ultrasonic Welded.
7	Pulse output	The meter shall be provided with flashing red LED to represent the pulse output for testing the meter by suitable testing equipment. The operation indicator must be visible from the front.
8	Protection against magnetic field	The Meter Accuracy shall not be affected by AC/DC magnetic field from all sides of the meter i.e.; front, sides, top and bottom of the meter. Meter shall not be affected by permanent magnet of 0.5 mT.
9	Temperature range	Limit range of operation: -25^{0}C to 55^{0}C Limit range of storage and transport: -25^{0}C to 70^{0}C
10	Name plate	Every meter shall have clearly visible, effectively secured against removal and indelibly and distinctly marked. The following information's marked on name plate: i) Manufacturer's name and year of manufacture, ii) Meter type iii) Number of phases and number of wire iv) Meter serial number v) Rated voltage vi) Basic current and maximum current vii) Reference frequency in hertz viii) Meter constant in imp/kWh& imp/kVarh ix) Class index of the meter x) Over-current breaking capacity (in kA) xi) UTILITY logo (when supply) xii) Contract No. (When supply) xiii) Reference Standard
11	Optical Port & RS485 port	Meter should have standard optical port for local read and configuration. Meter should have active RS485 port for remote communication.

7.6.3 Latching relay specifications

The latching relay shall be compatible with the offered meter and the operating principle shall be as per requirement. Technical specification of the relay shall be engraved or marked on the body of the relay.

The specification for the latching relay is as follows:

Sl. No	Description	Requirements
		Three Phase
1	Manufacturers Name & Country of origin	To be mentioned
2	Country of Manufacturing	To be mentioned
3	No. of coils	2 (two)
4	Rated coil voltage	12 VDC
5	Rated coil power	9 W
6	Pulse to set	30 ms
7	Contact Material	Silver alloy
8	Maximum Switching Power	25,000 VA
9	Maximum Switching Voltage	450 V AC (P-P) **250 V AC (P-n)**
10	Maximum Switching Current (rms)	120A
11	Contact resistance	≤ 2 mΩ
12	Electrical Cycle	$5x10^3$
13	Mechanical Cycle	$1x10^5$
14	Insulation resistance	≥ 1,000 MΩ
15	Dielectric Strength between contacts	≥ 2,000 VAC
16	Dielectric Strength between contact and coil (50 Hz)	≥ 3,000 VAC
17	Dielectric Strength between contacts assembly	≥ 4,000 VAC
18	Ambient temperature	-40 ^oC ~ +55^oC
19	Operating humidity	40 to 90%
20	Temperature rise at rated current (assuming 30^0C room temp.)	60^0C

7.7 MEASURED & STORED PARAMETERS:

i) Parameters to be Measured

Sl. No	Description	Requirements
		Three Phase
1	**Instantaneous:**	Voltage (V); Current (I); Cumulative -Active Energy Kwh (Total, Peak, Off-peak); Cumulative – Reactive Energy KVarh (Total, Peak, Off-peak); Power Factor; Phase wise kW; Current Demand in kW.
2	**Billing parameters** The billing parameters	Previous month's MD in kW; Cumulative-Active Energy Kwh(Total, Peak, Off-peak);

Sl. No	Description	Requirements
		Three Phase
	shall be retained in the meter for at least 12(Twelve) months. :	Cumulative – Reactive Energy KVarh (Total, Peak, Off-peak); Average Power Factor; Consumption Active Energy(Kwh) in current month; Remaining balance, Money recharge and used in current month.
3	**Time of Use**	Meter Should Support at-least 4 Time of Use tariff registers with programmable.

ii) Power Quality information

Logging of quality of supply events like power on/off, over/under voltage, over current (minimum 100 events). Setting of Under/Over Voltage and over current shall be configurable.

iii) Maximum Demand

Should have Maximum Demand registers kW with integration period of 30 minutes. Resets should be auto monthly or through communication command from HES / HHU.

iv) Load Survey Storage

Meter shall record load survey of minimum 365 days for average voltage, average current, average PF, for all phases, kWh reading and kvarh reading, kVAh reading, average demand in kW with integration period of 30 minutes. It shall be possible to select either demand or energy view at the system end.

v) Tamper/Event recording

A total of last 100 events considering all tampers defined must be detected and logged as tamper events on first in first out basis along with date & time. Meter shall log following Tampers/Events – Over voltage, Low voltage, Over current, Magnet tamper, Neutral missing, Top cover open, Terminal cover open etc.

7.8 Data display facility (manual/auto):

All the above parameters shall be displayed for minimum 10 seconds (configurable) including LCD check & all parameters are configurable. Data Display shall have following modes

a) Auto Scroll: All the following parameters shall be available in auto scrolling mode with OBIS Code.

- Date (DD:MM:YY) & Time (HH:MM:SS)
- Meter Serial Number
- Balance Amount (Tk.)
- Cumulative Forwarded Active Energy (Kwh)
- KVARH
- PF
- Current month Active MD
- Instantaneous voltage (V)
- Instantaneous phase current (A)
- Instantaneous Neutral current (A)
- Instantaneous Active power(KW)
- Last Recharge Date & Time
- The current Tariff

b) Scroll with Push-button: It shall be possible to display the following parameters in sequence through push-button provided on the meter with OBIS Code:

- LCD All Segment Display
- Date (DD:MM:YY) & Time (HH:MM:SS)
- Meter Serial Number
- Balance Amount (Tk.)
- Cumulative Forwarded Active Energy (Kwh)
- Instantaneous voltage (V)
- Instantaneous phase current (A)
- Instantaneous Neutral current(A)
- Instantaneous Active power (KW)
- Current Month Forwarded Active MD
- Cumulative Forwarded Active Energy of Last Bill
- Forwarded Active MD of Last Month
- Date & Time of Last Month MD
- Balance Amount (Tk.)
- Last Recharge Date & Time
- Error Code for communication problem diagnosis
- Latest Sequence number of token.

7.9 Tamper detection

a) A tamper sensor shall be provided to detect that terminal cover has been opened both in power supply and without power supply.

b) Tamper shall be detected with and without power supply. When the meter detects a tamper condition, it should enter a shutdown state, with an appropriate message. The customer should be disconnected immediately.

c) Meter should not power up /work in missing neutral connection (relay should open).

d) Removal of battery shall be considered as a tamper.

In case of Magnetic effect, Neutral disturbance, Terminal cover open and any other tamper detection, relays should get disconnected immediately which can be reconnected through HES or through token. Meter must be capable of detecting multiple tampers.

The tamper status shall be reset by using a uniquely coded tamper reset token that may only be used once.

The meter should be able to count energy in any type of connection as long as the credit remains. Whenever the credit is zero, the relay should trip except for emergency or friendly hour. Otherwise, the tender will be rejected.

7.10 Indication on display:

a) Status of Relay-indication of status of relay i.e. Connected/Disconnected should be available on display.

b) Power Supply Status: visible indication of the status of the incoming supply i.e. Power supply On/Off.

c) *Low Credit indication***.**

d) Credit Status.

e) Voltage indication.

f) Tamper Indication

g) Network Status

7.11 Display Unit/LCD:

a) The measured value(s), status, alarm, event information etc. Should be displayed on a Liquid Crystal display (LCD) register.

b) The display should have backlit capability for easy reading.

c) An illuminated display with a minimum lifetime of ten years is required.

d) The size (number of rows and characters per row) should be appropriate for the display and interpretation of the messages and meter information, and should be legible from a distance of at least 500 cm with a viewing angle no less than 30°.

7.12 Memory/Data Retention:

The data should be stored in non-volatile memory (NVM). The non-volatile memory should retain data for a period of not less than 10 years under un-powered condition**. The memory should record billing history and load profile data for last one year.**

7.13 Optical Interface

[The meter shall have an IEC 62056-21 compliant optical communication port. This should allow the utility to access via front for variety of customer information stored inside the meter and to upload it into a hand-held unit (HHU).

7.14 Electromagnetic compatibility

(a) Immunity to electromagnetic disturbance

The meter shall be designed in such a way that conducted or radiated electromagnetic disturbances as well as electrostatic discharge do not damage or substantially influence the meter. The disturbances to be considered are:

i. Electrostatic discharges

ii. Electromagnetic HF field

iii. Fast transient burst

(b) Radio interference suppression

The meters shall not generate conducted or radiated noise which could interfere with other equipment.

7.15 Accuracy requirements

(a) Limits of error due to variation of the current

The percentage errors shall not exceed the limits for the relevant accuracy class stipulated in IEC standard.

(b) Limits of error due to other influence quantities

The additional percentage error due to the change of influence quantities shall not exceed the limit for the reference accuracy class stipulated in IEC standard.

(c) Limits of error due to ambient temperature variation

The limits of error shall not exceed the limits stipulated in IEC standard.

(d) Starting and running with no-load

Initial start-up of the meter: The meter shall be fully functional within 5 seconds after the voltage is applied to the meter terminals.

Running with no load: When the voltage is applied with no current flowing in the current circuit the test output of the meter shall not produce more than one pulse.

Starting: The meter shall start and continue to register at a) Three phase: $0.4I_b$% at power factor of 1.

(e) Meter constant

The relation between the test output and the indication in the display shall comply with the marking on the name-plate.

7.16 Functional Requirement

7.16.1 Security

All credit and meter management tokens shall be meter specifically encrypted to guarantee security of the system. Encrypted tokens shall not be reusable. Tokens to display status and test the meter may be un-encrypted and reusable.

7.16.2 Token validation

If a token not meant for the meter is applied, the meter should display a message to that effect. Similarly, if a valid token is re-entered into the meter then the meter must display an appropriate message.

7.16.3 Meter personalization

In addition to factory personalization and personalization via encrypted tokens, it shall be possible to personalize the meter from a hand-held unit (HHU) provided the HHU is authorized/ programmed to communicate with the meter.

7.16.4 Meter modes

The meter shall be required to support at least three modes of operation, namely the Pre-payment mode, post payment mode and the meter test mode.

7.16.5 Pre-payment mode

The basis of this mode is that credit is transferred to the meter, and provided the meter remains in credit, the meter provides supply. The credit register is decremented against current consumption with the countdown total being displayed on the meter display.

7.16.6 Meter Post Paid Mode

The meter should support a postpaid mode that is activated either from a dedicated token or using HHU. This mode allows the meter to work as AMI smart meters to keep online and calculate the consumption and payment in the billing system as required.

7.16.7 Meter test mode

The meter should support a test mode that is activated either from a dedicated test token, or using the HHU. This test should be automated in the meter and should include a full diagnostic test, testing of the all the active and inactive functionality, metering accuracy test (1 minute load test), and connection validation tests. Meter test mode shall also display following information:

i) Meters software version
ii) Current limit
iii) Switch open and close count
iv) Token acceptance & rejection count

7.16.8 Energy accounting

7.16.8.1 Credit register

The credit register is the "operating account" of the meter being decremented by the metering process. The specific requirements of this register are:

a) This register must be decremented for the equivalent of every credit unit consumed.
b) When the available credit has been consumed, the meter must open the contactor and isolate supply from the customer (unless the Friendly hours or Emergency Credit option is invoked).
c) This register can become negative only from use of emergency credit/friendly hour.

7.16.8.2 Consumption during current billing period

a) This register records the cumulative energy consumption for the current billing period.
b) The registers shall be updated at least every 10 Wh.

7.16.8.3 Historic consumption

For this option there are six energy registers that store the total energy consumed for the previous six months.

a) These registers are cycled at during the month-end process, with the oldest data being deleted.

7.16.8.4 Cumulative energy consumption

a) This register records the cumulative consumption since the meter was commissioned.
b) The units of storage are kWh, rounded to two decimal points (10 Wh).

7.16.8.5 *Billing*

Billing operates on a monthly basis. Energy consumption charge is deducted within the meter for at least every 10 Wh. All other charges including demand charge, meter rent, vat etc are deducted as per prevailing rules of Bangladesh Energy Regulatory Commission (BERC) at the POS.

7.16.8.6 Month-end calculation

At the end of each month, the meter should perform a month-end calculation that consists of the following minimum steps:

a) The cumulative monthly energy registers must be reset, and the historic registers must be updated.

b) The meter must determine whether a new tariff will become active, and if so, must delete the old tariff.

7.16.8.7 ***Date and time management***

a) The meter shall be equipped with a real time clock supporting the date and time as per IEC standard. Pseudo-clock using mains crossing detection is not acceptable. The maximum drift of the clock shall be less than 30 seconds per month. The battery and/or auxiliary power source shall operate maintenance free for a period of at least 10 years.

b) The meter must be equipped with a battery monitoring system that monitors the battery's condition and initiates a "Change Battery Alarm" to the point of sale when the battery approaches the end of its operating life. If the battery is not replaced, the failure of the battery is deemed to constitute a meter failure, and the meter should be shut down.

c) Date and time may be changed using meter parameterization software.

7.16.9 Tariff Management

7.16.9.1 Tariff

All tariff calculation must be done within the meter.

The meter is required to support stepped tariffs structures as well as time-of-use and maximum demand.

The tariff structure consists of the following records:

i) Each tariff must be uniquely identified using the tariff code

ii) Each tariff shall have an activation date, being the date on which the tariff becomes effective.

iii) Each tariff has up to seven steps (in kWh) for different levels of energy pricing.

iv) The rate describes the cost per kWh for energy consumption in that step.

7.16.9.2 Tariff management in the meter

a) Tariffs shall be entered into the meter via the two-way token or HHU. The meter should not allow tariffs to be manually entered using meter parameterization software.

- When the meter is active with a tariff, the current tariff cannot be overwritten bypassing the token/MDM.
- The meter must record time and date stamp when the tariff is loaded into meter.

b) In general, when a tariff has expired in the meter, the tariff is automatically deleted by the meter.

7.16.9.3 Tariff security and verification

The meter shall write the active tariff code to the token on each insertion.

7.16.9.4 Tariff switchover

When the meter detects that a new tariff is applicable (using the tariff activation date), the meter should execute the following steps:

i) The meter shall begin the billing against the new tariff.

ii) The current tariff code shall be updated to reflect the new tariff code.
iii) The old (expired) tariff should be deleted.
iv) New tariffs will only be activated at 00:00 Hr on the first day of a month.

7.17 Status/Event displays

In addition to the displays required above the meter must display the following minimum information in an intuitive way such that an inexperienced user can understand and interpret the information intelligibly. Laminated instruction cards are to be provided for each unit.

i) Meter ID.
ii) Out of Credit message
iii) Invalid token entered
iv) Duplicate token entered
v) Meter tamper state
vi) Meter failure and/or fault code

7.18 Friendly*:*

The meter shall accommodate the "Friendly hours" features. These are time periods during which the meter shall not cut-off power to consumer if the credit becomes negative. Meter should not be on until full negative amount is paid back. Insufficient (not more than negative balance) recharge token will be accepted by meter and update the current balance. But the meter will be disconnected. Details of the features are described in the following table. All options should be allowed for one time in each vending.

Sl. No.	Requirement	Description
1	Friendly hours	There shall be provision to define 'Friendly hours' in the meter. The utility shall be able to define the 'Friendly hours' and shall be communicated to the meter through token.

7.19 Emergency credit:

Provision shall be made in the meter for an Emergency Credit facility that allows the customer to draw on an emergency credit should the credit in the register be consumed.

The specific requirements of this facility are:

a) When the credit register value reaches a programmable Emergency Credit Threshold the meter should sound an audible alarm, and prompt the user to accept the use of the Emergency Credit facility (card insertion or button depression). The meter should not supply energy against emergency credit unless acknowledged by the customer.

b) If all the available credit in the credit register is expired and power disconnected, the facility to activate the Emergency Credit should remain an option to the user.

c) The meter should remain in service until the Emergency Credit Limit has been reached and not recharged an amount more than current outstanding, after which the supply should be disconnected.

d) If the Emergency credit limit is set to zero, the Emergency Credit Threshold shall function as a low credit warning and provide the user with a visual and audible alarm that credit is low. The user

shall have the option to silence the alarm by inserting a card or pressing a button to accept the alarm.

e) If emergency credit has been previously consumed, then the value of emergency credit used shall be deducted from the next token inserted into the meter. Meter should not be on until full loan amount is paid back.

f) Once emergency credit has been exhausted, no further credit facilities shall be available until the full emergency credit allocation has been paid for.

g) In case of negative credit status, meter should not accept balance clear token.

7.20 Load Control

Meters shall have the options to control loads with the following features:

a) There shall be provision in the meter to define the allowable loads for given time periods within a day.

b) There shall be provision in the meter to accommodate the date of activation of the defined load allocation,

c) Load limit shall be defined in step of 500 W.

d) Three phase Smart meter shall be equipped with integrated/ separate load control switches (latching relay) at both phase and neutral to control flow of electricity to the load at the instance of connect/ disconnect commands as per functional need of the system. Both Load switches (latching relay) shall operate simultaneously for connect/ disconnect purpose and shall be mounted inside the meter with suitable arrangement.

e) The meter should be able to count energy in any type of connection as long as the credit remains. Whenever the credit is zero, the relay should trip except for emergency or friendly hour. Otherwise, the tender will be rejected.

f) The rating of switches used shall be as per IEC.

g) The three-phase meter should not trip irrespective of unbalanced power in different phases.

7.21 *Load Disconnection/Reconnection:*

a) The load shall be disconnected by a latching relay under the following conditions:

i) The credit in the meter has expired and grace facilities also expired.

ii) The load power threshold has been exceeded.

iii) The meter is in a tampered state.

iv) Neutral missing at source side.

b) The meter shall indicate whether the load is connected or not and shall display the reason for disconnection.

c) The customer shall not have the option to switch the contactor manually. Under over-current conditions the mechanism to automatically reconnect the load must ensure that the number of switching cycles is limited. The meter shall attempt to reconnect the load up to 5 times at 30-second intervals. If the over-current condition still exits the meter shall wait a period of 30 minutes before attempting to reconnect the load.

d) After the load is disconnected by a latching relay, all the circuits should remain disconnected even if the phase and neutral connections are shifted to each other.

e) After load is disconnected by a latching relay, all circuits should remain disconnected and there will be no possibility of being circuited through a local earth either in phase or in neutral terminal as partially or fully.

7.22 Smart Pre-Payment Features

7.22 *.1* Balance calculation:

Balance calculation will be implemented at pre-payment meter as per energy consumption. HES will collect the billing data on the midnight of every day.

7.22 .2 Friendly Hours:

Friendly Hours list shall be configurable on meter & during this period no disconnection shall be done.

The utility shall be able to define the Friendly Hours and shall be communicated to the meter through HES. The meter shall accommodate the "Friendly Hours" features. These are time periods during which the meter shall not cut-off power to consumer if the credit becomes negative.

7.22 .3 Emergency credit:

Provision shall be made in the meter for an Emergency Credit facility that allows the customer to draw on an emergency basis should it be recorded in the register. Emergency Credit facility shall be configurable on HES & during this period no disconnection shall be done from HES side.

7.22 .4 Load Control

Meter shall support relay connection/disconnection in following conditions:

- Over Current
- Load control limit (Load Control limits shall be remotely programmable)
- Disconnect signal from Utility Control Centre

7.22 *.5* Load Disconnection/Reconnection:

i) Load disconnection –

a) If meter credit is exhausted, then meter should disconnect immediately. At any reason if authority wants to disconnect the load of the meter, Disconnection shall be done from HES.

b) On defined tamper/event condition meter will disconnect the load.

ii) Load Reconnection –

a) Reconnection mechanism under disconnection from utility control center: Reconnection shall normally be done from HES.

7.22 *.6* Low Credit indication & alarm:

When balance is less than defined value in meter, the meter could trigger one alarm and push to HES.

7.22 .7 E-Recharge / Vending –

a) The Vending system shall be available for online recharge as well as physical recharge. After online recharge, meter should get credited immediately and automatically.

b) Customer should receive SMS/email notification like low credit, zero balance, negative balance, recharge successful, recharge failed, Emergency in use, friendly in use, load disconnect.

7.23 *Meter identification cards*

a) In case of keypad meters, for each meter shall be supplied with a meter identification card, which complies with NRS 009-4: 1995.

b) The printed details and graphic design of the cards shall be submitted prior to producing the cards.

7.24 *Testing and approval*

a) It will be the responsibility of the tenderer to submit to the Employer's representative for approval a complete Acceptance Test Procedure (ATP) for system verification.

b) Once the Employer's representatives approve the ATP, the testing and performance validation tests on 2% (random samples) of the supplied meters will commence. The Employer's representative at the utility's premises will witness these tests.

7.25 Quality assurance

Tenderers shall comply with and be certified to the following ISO levels:

ISO 9001 Quality systems

Model for quality assurance in design, development, production, installation and servicing

Model for quality assurance in final inspection and test

Tenderers shall submit copies of certification with their proposal to this effect.

7.26 *Keypad Numbering Scheme*

The meter number scheme will be the unique and be followed by a convention of all the utilities. The number scheme will not be the scheme described but the description will be the basic of the convention of the meter number scheme which will be supplied after signing of the contract.

While the manufacturer is free to use any number scheme they see fit, the number scheme must be secure and use minimum number of digits and must always contain the following fields in encrypted form:

- Meter ID
- Recharged amount
- Sanctioned Load
- Sequence Number

The meter must check the validity of these fields before recharging the credit. The sequence number is an auto-generated number starting from 1 for each recharge or keypad numbers. A keypad number will only be accepted if the previous number has been keyed in. For example, if a consumer goes to POS to recharge 300Tk and gets key code xxxyyyzzz (which contains sequence number **n**). The next month he goes again to recharge 250Tk and gets key code pppqqqrrr (which contains sequence number **n+1**). Key code pppqqqrrr will only be accepted if xxxyyyzzz has been keyed in previously i.e. meter will only accept a key code containing sequence number '**n**' if at some point key code containing sequence number '**n–1**' has been keyed in. This is to ensure that key codes are not discarded by a consumer intentionally.

Periodically it may be necessary to generate a key code that contains more data. The key code scheme must be able to accommodate the following data if and when required:

- Meter ID
- Recharged amount
- Sanctioned Load
- Sequence Number

Load Change

- Sanctioned Load
- Start Time

Rate

- Start Unit
- Peak Rate
- Off peak Rate
- Activation Date

It is assumed that the keypad number with only the meter id, amount, load and sequence number will be a lot shorter than the key code containing all the rate information.

7.27 Meter Connection Procedure

After meter install in the field, it is mandatory to register meter in the vending system. The register operation will make system communicate with meter and confirm the communication ability.

7.28 Meter Numbering

It must be possible to program the meter with 12-digit meter number.

7.29 Tariff Management

7.29 .1 Tariff Definition

The System Manager shall be able to define tariff objects. Each tariff has a unique tariff ID associated with it. The following information is required to define a tariff.

Tariff ID	A unique tariff identifier
Effective Date	The date on which the tariff will be effective.

Tariff and all charges will be effective as per direction of Bangladesh Energy Regulatory Commission (BERC).

Tariff Structure and other charges (for reference)

LT (Low Tension) : i) Single Phase: 230 Volt, 0-7.5 KW & ii) Three Phase: 400 Volt, 0-50 KW

1. LT-A: Residential		
Step Structure	**Step**	**Energy Rate/Charge (Tk./Kwh)**
Life line	0-50 kWh	R_0 = 4.63
1st Step	0-75 kWh	R_1= 5.26
2nd Step	76-200 kWh	R_2= 7.20
3rd Step	201-300 kWh	R_3= 7.59
4th Step	301-400 kWh	R_4= 8.02
5th Step	401-600 kWh	R_5= 12.67
6th Step	600+ kWh	R_6= 14.61

Consumer Class		ToU	Energy Rate/Charge (Tk./Kwh)
2	LT-B: Agriculture Pump		R_0 = 5.25
3	LT-C1: Small Industries	Flat Off-peak Peak	R_0= 10.76 R_1= 9.68 R_2= 12.95
4	LT-C2: Construction		R_0= 15.15
5	LT-D1: Education, Religious & Charitable and Hospital		R_0= 7.55
6	LT-D2: Street Light, Water Pump		R_0= 9.71
7	LT-D3: Battery Charging Station	Flat Off-peak Supper Off-peak Peak	R_0= 9.62 R_1= 8.66 R_2= 7.68 R3= 12.14
8	LT-E: Commercial & Office	Flat Off-peak Peak	R_0= 13.01 R_1= 11.71 R_2= 15.62
9	LT-T: Temporary		R_0= 20.17

Subject	Tariff Category	PFC Calculation
Power Factor Correction (PFC) Charges	LT-A, B, C1, D1& E' Category,3-Phase, 400V, 20KW & above	* PF Maintain in 0.95 to 1.00. * Power Factor (PF) obtained from meter. * Monthly average PF less than 0.95 then- From 0.95 to 0.75 for every 0.01 step less surcharge will impose 0.75% of energy bill.
	LT- C2 & D2 (Only Pump)' Category, 3-Phase, 400V	

Subject	Tariff Category	Time
Time of Use	LT-C1& E Category	Peak – 17:00 to 23:00 Off Peak-23:00 to 17:00 Flat-24 hours
	LT-D3 Category	Peak – 17:00 to 23:00 Off Peak-23:00 to 05:00 and 09:00 to 17:00 Super Off Peak-05:00 to 09:00 Flat-24 hours

Meter Rent	A fixed charge is levied per month.

Sanctioned Demand Charges (Fixed Charge)	A fixed charge per kW of the sanctioned demand is levied per month.
Maximum Demand Charges	Integrated over ½ hourly periods Maximum Demand in KW.
VAT	Value added tax is levied on electricity charges and must be catered for in the system.

a) The tariff code, effective date, kWhx (in units of kWh), Rx together with a fixed monthly service charge Service Charges and a fixed monthly sanctioned demand shall be used to define all Pre-payment tariffs used in the system.
b) The MIC shall make provision for up to 500 tariff definitions.
c) The MIC must verify the tariff data entered and shall not allow discontinuities in the energy levels or negative rates for energy and fixed charges.
d) There shall be a facility to copy tariffs to new tariff codes for editing purposes. The edit facility shall include a mechanism to increase the values of any of the variables Rx, SC, and DC by a fixed percentage.
e) Tables of Supply Group Codes and tariffs shall be securely stored at the MIC.
f) No penalty Charges for Power Factor above 0.95 to 1.0. Power Factor Correction Charge is computed as above and average power factor is measured by meter based on only reactive energy. The monthly average power factor from meter is used for the factor and applied on the monthly consumption.

7.29 .2 Tariff Algorithm

The Pre-payment system could be implemented stepped tariffs. The tariffs will be implemented at the vending equipment/meter. The algorithm must ensure that:
a) The Stepped tariffs are implemented in meter as accurately as is the case for conventionally billed customers.
b) Customers are not restricted to the amount and frequency of electricity token purchases provided purchases do not exceed 12 times the calculated monthly average consumption without penalty.
c) If any tariff changes, the updated tariff will be sent using special numbers for keypad meters. For both meters, after utility decides the tariff update, all purchase of credit (with keypad number) will carry and tariff change flag. So that the meter will not accept any credit addition until it gets the tariff update.
d) Customers will purchase only following credit transfer principles.
e) For consecutive purchase in the same month, credit values without any fixed charge will be sent to the meter.
f) Slab reset service charges, power factor penalty (PFC) should be on a monthly basis.
g) The tender shall provide a detailed description of the algorithm including:

1. All assumptions made.
2. An explanation of how the averaging algorithm operates.
3. Examples of how the algorithm works.
4. Examples of how to explain the algorithm to customers.

5. Examples of how to deal with customer's queries.
6. Description of how the algorithm manages tariff rate and tariff structure change.
7. Description to apply corrections.
8. Description of mechanisms to deal with the situation where a customer buys at two different locations between data transfers.
9. Online data transfer is required so that customers can buy token from any vending system and different locations.

7.30 Data Format

Individual Meter Status

Column	Data Name	Data Type	Description
1	Meter No	String(12)	014012345678
2	Status	String(1)	0: offline 1:online
3	Reading Time	String(19)	YYYY-MM-DD_HH:mm:ss

7.31 Packing:

Meters must be export packed and properly protected for shipment, rough transportation and storage. Specific care shall be taken for protection in store and reference is made to the climatic condition prevailing in Bangladesh.

Each unit shall be sealed in waterproof polyethylene bag having a silica gel packet placed inside the unit and then packed in polystyrene foam gasket closed by self adhesive tape rating of the meter shall be marked by marker pen or label on the form for easy identification.

Maximum 10 (ten) nos. of complete metering units are allowed to pack into a wooden packaging box lined with heavy gauge polyethylene. Between metering units, a suitable packing material for protection and preventing their movement should be used. Silica gel should be provided inside each polyethylene wrapper. The packing case should be able to withstand accidental direct exposure to weather for reasonable period.

The supplier shall be responsible for damages due to inadequate packing. A packing list showing the contents of each packing shall be enclosed in a waterproof envelope secured outside of the packing case. A copy of the packing list shall also be enclosed inside the package.

All packages imported are liable to be opened for customs examination at the port of landing and packing shall therefore be designed to facilitate opening and repackaging thereafter.

A red band (20 cm wide) shall be painted all around each package. Each package shall have the following information printed on it bold letters.

- Name of supplier.
- Port of loading.
- Port of destination.
- Name of consignee.
- Contract number.
- Brief description of stores.

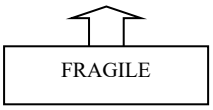
- Number of packages. (total quantity)
- Gross and net weight.
- Dimension.

In addition, each package shall be clearly marked or stenciled in red on two sides, the shipping mark WZPDCL, BANGLADESH inscribed within a triangle marked shown below:

The shipping mark

On the other two sides, arrow marking with words "THIS SIDE UP" and "FRAGILE" shall be clearly marked or stenciled to indicate the face of the package to keep upward.

THIS SIDE UP



7.33 TECHNICAL ORIENTATION AND QUALITY TEST WITNESS:

A. FACRORY INSPECTION AND TEST WITNESS:

Witnessing of the manufacturing process and tests of the equipment at manufacturer's premises including transfer of technical know-how shall be required/held as detailed elsewhere in Particular Conditions of Contract (GCC 41.2) of tender document and other than this the following will be as follows:

The inspection team proposed by the purchaser or consignee (if consignee is Project Director) and approved by the competent authority shall have the right to inspect, examine and test the workmanship and performance of the goods/materials to confirm the conformity to the specification at all reasonable time before and during manufacture at the manufacturer's premises.
The manufacturer will allow inspection team to inspect the manufacturing process and quality control and progress of the work at any time need by inspection team. This team will witness the Factory/Technical orientation & Quality test at the manufacturer's plant. The Manufacturer shall have facilities to carry out all tests at its premises and shall provide free of charge such assistance, labor, materials, electricity, fuel, stores, apparatus and instruments as may be requisite and as may be reasonably demanded to carry out such test efficiently.

The inspection team maximum 2 (two) times may inspect (if required) the goods during the manufacturing process or after manufacture of Goods as required and shall also request to supplier for the purchase/ import/ shipping documents of major/key materials of Goods and shall check in accordance with Guaranteed Technical Particulars (GTP) and guarantees of the contract. All expenses for such tests shall be borne by the supplier.

Inspection Team will witness the routine test at the manufacturer's premises. Tests shall be performed in accordance with the relevant IEC/BS/ANSI/ASTM/BDS standards or any other standard mentioned in the contract document which shall be complied with the Guaranteed Technical Particulars (GTP) of the Contract. All expenses for such tests shall be borne by the Contractor.
At the time of Factory Test witness Inspection Team will check the calibration seal/certificate of the testing/measuring equipment, meters etc. issued by the competent authority. The contractor shall

ensure that the Manufacturer shall complete the calibration of the testing/ measuring equipment, meters etc. before the inspection of team.

The Supplier shall, after consulting the consignee, give notice to the consignee in writing of the date and the place where the material or equipment will be ready for testing at least 15 days before schedule of inspection. The consignee shall give the supplier timely notice in writing of his intention to attend the test. As and when the consignee is satisfied that any materials/equipment shall have passed the tests referred to in this clause, consignee shall notify the contractor in writing to that effect.

Should any inspected/ tested goods fail to conform to the specification, the consignee shall have the right to reject any of the items or complete batch if necessary. In that case Supplier has to replace the equipment and to make good of them and the supplier shall conduct similar pre-delivery Inspection and factory tests without any financial involvement to the consignee. In case any of the Equipment/goods found not conforming to the specification at the time of post landing Inspection, the supplier will in no way be relieved from the responsibility of replacing them on making them good at their own cost, despite the Equipment were found good at the time of Factory Acceptance Test in respect of quality and quantity. Nothing in this clause shall in any way release the supplier from any warranty or other obligations under the contract.

If the offered goods are manufactured outside the purchaser's country then Utility's Inspection Team shall have to conduct Technical Orientation and Quality Test Witness at the manufacturer's factory premises. The Purchaser's nominated "Engineering Team" consisting of at least 03 (Three) Engineers in each team shall take part in the witness of the QAT of the goods/ Technical Orientation on the manufacturer's premises for a period of 7 days (excluding journey time). All the cost regarding QAT witness by the Purchaser's 'Engineering Team' i.e. the cost of Air Ticket from Dhaka to the place of inspection/training & return, internal transportation, Phone, Fax, E-mail, Health insurance, Hotel accommodation, Food etc. and pocket money of 150 USD per day per person for the period of 7 days (excluding journey time) shall be borne by the Contractor and the cost shall be included with the equipment's quoted price.

For any reason, if Purchaser's/ Employer's representative(s) cannot attend above mentioned "Witnessing of the manufacturing process and tests of the Goods at manufacturer's works including transfer of technical know-how" program, a Third-Party Inspection Company/Agency shall conduct/ witness Pre-shipment Inspections as well as Factory Acceptance Tests as per Contract and relevant standard at the manufacturer's Premises with the concurrence of WZPDCL. The Third-Party Inspector shall submit a comprehensive report to Purchaser with recommendation accompanied with photograph and video clips with date and time of the Equipment/ Materials/ Goods inspected within 7 days after completion of respective inspection/Test. After approval of Third-Party Inspection report by WZPDCL, Shipping advice shall be issued to Supplier/ Contractor. No Equipment/ Materials/ Goods shall be shipped without shipping advice.
The inspections/ Tests shall be performed on as-needed basis as per schedule provided by the respective manufacturers.
Manufacturer/ Supplier/ Contractor shall bear cost pertaining to third party inspection team/WZPDCL's representative(s). Manufacturer/ Supplier/ Contractor shall facilitate and provide full support for the Pre-Shipment Inspection/Witnessing of Factory Acceptance Test and transfer of technical know-how to WZPDCL representative(s).
The third-party inspection company/agency must not be involved in design, procurement, fabrication, construction and installation under this Contract.
WZPDCL will select any of the following companies/agencies as Third Party Inspector:

1. BUREAU VERITAS
2. SGS
3. Black and Veatch
4. TUV SUD
5. Lloyd Inspection Agency
6. Mott MacDonald
7. Intertek group

With the approval of WZPDCL, Contractor/Supplier shall engage Third Party Inspection company/agency. WZPDCL reserves the right to revise the above-mentioned list.

If the offered goods are manufactured within the purchaser's country, then the manufacturer/supplier shall have the testing facilities at manufacturer's/supplier's premises in accordance with the relevant IEC/BS/ANSI/ASTM/BDS Standards. The inspector(s) shall send the sample material (selected by the Inspection Team consisting of at least three engineers in each consignment) to Utility's own Meter Testing Lab/BUET/CUET/KUET/RUET/DUET to carry out any test(s) pending due to lack of testing facilities or any reason at the manufacturer's/supplier's premises. All cost of testing including carrying, loading, unloading etc. will be borne by the supplier and shall be deemed to be included in the offered price. If the sample(s) fails to confirm the specification, the full consignment will be rejected.

No goods shall be packed, prepared for shipment/delivery unless it has been approved and written instructions have been received from the consignee.
On successful completion of Pre-shipment inspection/quality test witness, delivery of goods will be made to the designated stores under contractor's/supplier's responsibility until Post-Landing Inspection is successfully completed without any obligation on part of utility. Quality and quantity of the delivered goods will be determined at the time of post-landing inspection at the designated stores in presence of the authorized representative of the contractor/supplier. After approval of the satisfactory Post-Landing Inspection, R&I Report will be issued following the contractual obligations.

B. RANDOM SAMPLE TEST DURING FACTORY INSPECTION AND WITNESS: Required
During Pre-Delivery Inspection & Factory Test Witnessing of the goods to be supplied under the Contract, the Inspection Team will witness the routine tests at the manufacturer's premises. The Inspection Team will select goods on random sampling basis. The Tests shall be performed in accordance with the relevant IEC/BS/ANSI/ASTM/BDS standards or any other standard mentioned in the contract document which shall be complied with the Guaranteed Technical Particulars (GTP) of the Contract. All expenses for such tests shall be borne by the Contractor.

C. ACCEPTANCE REPORT OF GOODS FOR DELIVERY:
If the test results of the tested sample(s) during factory test witness by the inspection team fail to confirm the specification and the Guaranteed Technical Particulars (GTP), the full consignment will be rejected.
A formal delivery order will be issued after satisfactory pre-delivery inspection & test report by inspection team.

D. POST-DELIVERY INSPECTION & TESTING:
Post Landing Inspection shall be done after arrival of the goods at Final destination as detailed elsewhere in Particular Conditions of Contract (GCC 41.2) of Tender Document and other than this the following will be as follows:
The Supplier shall inform (within 5 (five) working days) the purchaser or consignee (if consignee is

Project Director) immediately after arrival of the goods at the designated store of utility (as per delivery schedule).

An Inspection team (may be the previously or newly formed team) shall start to perform the post-landing inspection not beyond 10 (ten) working days in presence of supplier's representative after getting information from supplier about the delivery of goods at designated store. The Supplier shall arrange post-landing inspection as per program in consultation with the consignee. If any defect or damage has been found at post-landing inspection, the defective or damaged materials/ goods shall be replaced by the supplier at his own cost within the stipulated time.

The purchaser's or consignee's (if consignee is Project Director) right to inspect, test (where necessary) and reject the goods after delivery at the designated stores of utility shall in no way be limited or waived by reason of the goods having previously been inspected, tested and passed by the purchaser prior to the goods' delivery.

The Inspection team will check the physical conditions and quantity of the goods delivered. The inspection team will select the sample of good(s) on random sampling basis and sent the selected sample goods to Utility's own Meter Testing Lab/BUET/CUET/KUET/RUET/DUET (as selected by the inspection team) to carry-out the test(s) as per contract to confirm the conformity to the approved Technical Specifications, Guaranteed Technical Particulars (GTP), drawings and relevant standards. If the tested sample(s) fail to confirm the specifications in tests, the full consignment will be rejected. All cost of testing of Materials/ Goods including carrying, loading, unloading etc. will be borne by the supplier.

7.34 Guaranteed Technical Particulars

GTP of 400 Volt, 10(100) A Three Phase Smart Prepayment Energy Meter

(To be filled up and signed by the Tenderer)

Sl. No.	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
1.	Reference Standard	-	IEC	
2.	Manufacturer's Name & address		To be mentioned	
3.	Year of Manufacturing		To be mentioned	
4.	Country of Origin		To be mentioned	
5.	Firmware version for meter		To be mentioned	
6.	Firmware version for communications		To be mentioned	
7.	Meter parameterization software version		To be mentioned	
8.	Model of Meter	-	To be mentioned	
9.	Type of meter	-	Indoor/Outdoor	
10.	Connection	-	3- phase, 4-wire, (unidirectional, programmable to bi-directional for net metering)	
11.	Rated voltage	Volt	400	
12.	Maximum voltage	Volt	500	
13.	Basic Current (I_b)	Amp	<=10	
14.	Maximum Current (I_{max})	Amp	>=100	

Sl. No.	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
15.	Frequency	Hz	50 Hz	
16.	Number of Terminal	No.	8	
17.	Diameter of Terminal; Bore	mm	8.5mm to accommodate 16 mm^2 cable	
18.	No. of Element (minimum)	No.	3	
19.	Voltage circuit loss at rated voltage	VA & W	<=5 W and 10 VA	
20.	Current circuit loss at rated current	VA	2.5	
21.	Variation of Power factor		0.5 lag to 0.8 lead	
22.	Variation of voltage		+30% to -30%	
23.	Impulse withstand voltage	KV	6	
24.	Starting current (minimum)	mA	<=0.4% of basic current	
25.	KWh register type	-	LCD Display	
26.	Meter constant	Impulse/ kWhr	To be mentioned	
27.	Accuracy class	Class	1.0 for active enrgy, 2.0 for reactive energy	
28.	Performance Curve		To be submitted	
29.	Type of Battery		Lithium Battery. It is to be noted here that without support of external battery, meter should operate at least six hours with the support of inbuilt super-capacitor. (Supported by Manufacturer's Authorization Letter)	
30.	Built in clock		Real Time Clock (RTC) as per IEC 62054-21 or updated version (Sample meter time and date shall be same as real time of Bangladesh)	
31.	Battery Reserve & life		10 (Ten) Years	
32.	No. of Digits for Credit Storage		6+2	
33.	Credit Transfer System		CTS	
34.	Tariff Structure		Utility's tariff structure	
35.	KWhr dispensing register		Solid state LCD Display	
36.	Front Page Indications		- Credit Status - Accept/Reject - Low credit warning - Consumption Rate - Tamper Indication	
37.	Disconnection Facility		- On credit expiry - Decommissioning state - Exceeded Power threshold - When tampered	
38.	Provision for emergency Friendly Credit		To be mentioned	

Sl. No.	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
39.	Time interval of re-calibration (minimum)	Year	10	
40.	Service life (minimum)	Year	10	
41.	Weight of meter	Kg	To be mentioned	
42.	Overall dimensions (height, width, depth)	Mm	To be mentioned	
43.	Load Control		To be mentioned	
44.	Warranty	Years	3 Years	
45.	List of Recommended Spares		To be mentioned	
46.	Any other facility if any		To be mentioned	
47.	Meter body sealing condition		Fully Ultrasonic welded/ Hermatically Sealed	
48.	Latching relay		As per specification mentioned in Section- 7.6.3 (Supported by Manufacturer's Authorization Letter)	
49.	Number of latching relay	Nos.	**One relay for each phase** and **one relay for neutral** Or **A single integrated** (having more than one contact) **relay for all the phases and neutral** Or **Any combination of single relay and integrated** (having more than one contact) **relay for all the phases and neutral**	
50.	Communication		Plug and play type BPLC and GPRS	
51.	Communication Protocal		DLMS/COSEM & IDIS	

Demonstration of the Prepayment Meter and DCU

1. The Employer shall invite Tenderer to demonstrate smart prepayment meters as part of the technical evaluation. The demonstration of the offered smart meters shall be mandatory to accept the Bids for detailed technical evaluation.
2. The demonstration shall be held in Utility Premises and the Employer shall provide a venue with projector.
3. The Tenderer shall arrange all equipment, software and logistics, included but not limited to, computers, printers and network equipment, communication links, smart prepayment meter prototypes, power supplies, test loads for the meters, all cables/wiring and consumables, transport

including human resources required for the demonstration. The contractor shall explain how the demonstration set-up differs from the production set-up required for this Bid and explains the data architecture of the system prior to the demonstration.

The key requirements for the demonstration shall be:

a) A fully functional smart prepayment system with two Three phase prepayment meters with BPLC and GPRS communication modules shall be demonstrated.
For demonstration purpose, the Tenderer has to submit fully functional offered type Two Three Phase Smart Pre-payment meters as Sample Meter(s) along with their bid. Bidders can apply for interfacing or interoperability test of meter with existing DCU/ Vending System/ HES/ MDM prior to demonstration and the utility must cooperate the potential bidders by providing necessary documents, test environment etc. engaging own experts. During demonstration the tenderer shall demonstrate using offered type meters with emphasis on demonstrating key functionality. It is to be noted here that without support of external battery, meter should operate at least six hours with the support of inbuilt super-capacitor.
The Tenderer shall have to present and demonstrate successfully the functionality of the offered type sample meters with HES as per Technical Specification of tender requirements. The Tenderer needs to demonstrate interfacing and interoperability of the offered type smart meter with existing DCU compliance to interoperability protocol. For each single device, proof of conformity for the chosen application standards (e.g., DLMS/COSEM) as well as communication standards (e.g., BPLC, etc.) is required.

Additional Key points

1. Utility incorporates the necessary API documents or procedural manual in the tender document for any kind of integration with existing vending system or MDM as well as interfacing with installed DCU.
2. The meter shall be programmable for special arrangements like Mother-Child Scheme and Net Metering implementation.
3. The meter must follow the guideline of BSTI and marked its logo on the meter body.
4. End to End data transfer shall be encrypted with AES-256. Communication devices shall support IPv6.
5. Hardware Security Module (HSM) can be used for security.

Justified Short Code

There are short code table, through this short code, user can get the information of meter.

Short code	Data meaning	Short code	Data meaning
Any code	Cancel audible alarm	00	Active emergency overdraft
800	Total positive active energy	801	Meter remaining balance
802	Current date	803	Current time
804	Meter serial No.	805	SGC No.
806	Reason of relay operation	807	Meter status words
808	Total instantaneous power	809	Tariff index number
810	Emergency Overdraft limit	811	Active emergency overdraft
813	Total forward active energy for yesterday	814	Total forward active energy for current month
815	Recharge date for last time	816	Recharge time for last time
817	Recharge amount for last time	818	Log out return code
819	Power outage No	820	Total forward active energy for last month

821	Total forward active energy for last 2nd month	822	Total forward active energy for last 3rd month
823	Total forward active energy for last 4th month	824	Total forward active energy for last 5th month
825	Total forward active energy for last 6th month	830	TOKEN code for last time recharging
831	TOKEN codes for last 2nd time recharging	832	TOKEN codes for last 3rd time recharging
833	TOKEN codes for last 4th time recharging	834	TOKEN codes for last 5th time recharging
835	TOKEN codes for last 6th time recharging	836	TOKEN codes for last 7th time recharging
837	TOKEN codes for last 8th time recharging	838	TOKEN codes for last 9th time recharging
839	TOKEN codes for last 10th time recharging	865	Meter entering normal working mode
866	Measuring accuracy displays 3 decimals, automatically exit after 1 minute	868	Relay testing
869	Maximum power (Load Limit)	870	A phase voltage
871	B phase voltage (not support in Three phase meter)	872	C phase voltage (not support in Three phase meter)
873	Key version No.	874	A phase current
875	B phase current	876	C phase current (not support in Three phase meter)
877	A phase power	878	B phase power
879	C phase power (not support in Three phase meter)	880	Average value for daily power consumption
881	Average value for monthly power consumption	886	The price of current Tariff
887	Current step tariff	888	Recharging return code
889	Current TOKEN sequence No.	890	TOKEN rejected times
891	TOKEN accepted times	892	Relay connection times
893	Relay disconnection times	894	Max. overdraft amount under friendly mode
895	Allowed using days under friendly mode	896	Already used days under friendly mode
897	Start time of friendly hour	898	End time of friendly hour
899	Weekend	900	The status of friendly mode 1：uuworkday: No-friendly mode or friendly times is run out 2：F-Hour: Friendly hour 3：uueekend : weekend 4：holiday: holiday 5：EnnErg: emergency mode 6：SpEciAL: weekend or friendly day is finished but does not arrival next day 10 o' clock
901	kWh of Step 1/ kWh of Tariff 1	902	kWh of Step 2/ kWh of Tariff 2
903	kWh of Step 3/ kWh of Tariff 3	904	kWh of Step 4/ kWh of Tariff 4
905	kWh of Step 5/ kWh of Tariff 5	906	kWh of Step 6/ kWh of Tariff 6
907	kWh of Step 7/ kWh of Tariff 7	908	rate of Step 1/ price of Tariff 1
909	rate of Step 2/ price of Tariff 2	910	rate of Step 3/ price of Tariff 3
911	rate of Step 4/ price of Tariff 4	912	rate of Step 5/ price of Tariff 5
913	rate of Step 6/ price of Tariff 6	914	rate of Step 7/ price of Tariff 7
915	rate of Step 8/ price of Tariff 8	916	The average PF of last month
917	Level 1 alarm of balance low	918	Level 2 alarm of balance low
919	Level 3 alarm of balance low	920	Special step status word
921	Already used times of weekend	922	Consumption amount of current month
923	Consumption amount of last month	924	Consumption amount of last 2nd month
925	Consumption amount of last 3rd month	926	Consumption amount of last 4th month
927	Consumption amount of last 5th month	928	Consumption amount of last 6th month
930 *	PFC of last month (not support in Three phase meter)	931	PFC of last 2nd month (not support in Three phase meter)
932	PFC of last 3rd month (not support in Three phase meter)	933	PFC of last 4th month (not support in Three phase meter)
934	PFC of last 5th month (not support in Three phase meter)	935	PFC oflast 6th month (not support in Three phase meter)
940	Reactive energy of last month	941	Reactive energy of last 2nd month
942	Reactive energy of last 3rd month	943	Reactive energy of last 4th month
944	Reactive energy of last 5th month	945	Reactive energy of last 6th month
952	Prepay Mode or Post-pay mode indication	953	Neutral Current

954	Total tariff 1active energy (KWh)	955	Total tariff 2 active energy(KWh)
956	Total tariff 3active energy(KWh)	957	Total tariff 4 active energy(KWh)
958	Total tariff 5active energy(KWh)	959	Total tariff 6 active energy(KWh)
960	Total tariff 7active energy(KWh)	961	Total tariff 8 active energy(KWh)
962	Positive tariff 1 reactive energy	963	Positive tariff 1 reactive energy
964	Positive tariff 3 reactive energy	965	Positive tariff 3 reactive energy
966	Total positive reactive energy	970	Negative tariff 1 reactive energy
971	Negative tariff 2 reactive energy	972	Negative tariff 3 reactive energy
973	Negative tariff 4 reactive energy	974	Total negative reactive energy
981	Emergency overdraft balance	985	Total consumption credit
986	Remaining energy (estimated value)	998	Average power factor of current month
420	The opening terminal cover time for last time	421	The opening terminal cover date for last time

Standard OBIS Information

NO.	Data Name	Standard OBIS	Standard CIM
1	A phase Current	3#1.0.31.7.0.255#2	0.0.0.12.0.1.4.0.0.0.0.0.0.0.128.0.5.0
2	A phase Power Factor	3#1.0.33.7.0.255#2	0.0.0.12.19.1.37.0.0.0.0.0.0.0.224.3.38.0
3	A phase Voltage	3#1.0.32.7.0.255#2	0.0.0.12.0.1.54.0.0.0.0.0.0.0.128.0.29.0
4	Active energy (|+A|-|-A|) Net tariff1	3#1.0.16.8.1.255#2	0.26.0.1.4.1.12.0.0.0.0.1.0.0.224.3.72.0
5	Active energy (|+A|-|-A|) Net tariff2	3#1.0.16.8.2.255#2	0.26.0.1.4.1.12.0.0.0.0.2.0.0.224.3.72.0
6	Active energy (|+A|-|-A|) Net tariff3	3#1.0.16.8.3.255#2	0.26.0.1.4.1.12.0.0.0.0.3.0.0.224.3.72.0
7	Active energy (|+A|-|-A|) Net tariff4	3#1.0.16.8.4.255#2	0.26.0.1.4.1.12.0.0.0.0.4.0.0.224.3.72.0
8	Active energy (|+A|-|-A|) Net total	3#1.0.16.8.0.255#2	0.26.0.1.4.1.12.0.0.0.0.0.0.0.224.3.72.0
9	Active energy (|+A|+|-A|) Combined tariff1	3#1.0.15.8.1.255#2	0.26.0.1.20.1.12.0.0.0.0.1.0.0.224.3.72.0
10	Active energy (|+A|+|-A|) Combined tariff2	3#1.0.15.8.2.255#2	0.26.0.1.20.1.12.0.0.0.0.2.0.0.224.3.72.0
11	Active energy (|+A|+|-A|) Combined tariff3	3#1.0.15.8.3.255#2	0.26.0.1.20.1.12.0.0.0.0.3.0.0.224.3.72.0
12	Active energy (|+A|+|-A|) Combined tariff4	3#1.0.15.8.4.255#2	0.26.0.1.20.1.12.0.0.0.0.4.0.0.224.3.72.0
13	Active energy (|+A|+|-A|) Combined total	3#1.0.15.8.0.255#2	0.26.0.1.20.1.12.0.0.0.0.0.0.0.224.3.72.0
14	Active energy export (-A)	3#1.0.2.8.0.255#2	0.26.0.1.19.1.12.0.0.0.0.0.0.0.224.3.72.0
15	Active energy export (-A) rate1	3#1.0.2.8.1.255#2	0.26.0.1.19.1.12.0.0.0.0.1.0.0.224.3.72.0
16	Active energy export (-A) rate2	3#1.0.2.8.2.255#2	0.26.0.1.19.1.12.0.0.0.0.2.0.0.224.3.72.0
17	Active energy export (-A) rate3	3#1.0.2.8.3.255#2	0.26.0.1.19.1.12.0.0.0.0.3.0.0.224.3.72.0
18	Active energy export (-A) rate4	3#1.0.2.8.4.255#2	0.26.0.1.19.1.12.0.0.0.0.4.0.0.224.3.72.0
19	Active energy export (-A) rate5	3#1.0.2.8.5.255#2	0.26.0.1.19.1.12.0.0.0.0.5.0.0.224.3.72.0
20	Active energy export (-A) rate6	3#1.0.2.8.6.255#2	0.26.0.1.19.1.12.0.0.0.0.6.0.0.224.3.72.0
21	Active energy export (-A) rate7	3#1.0.2.8.7.255#2	0.26.0.1.19.1.12.0.0.0.0.7.0.0.224.3.72.0
22	Active energy export (-A) rate8	3#1.0.2.8.8.255#2	0.26.0.1.19.1.12.0.0.0.0.8.0.0.224.3.72.0
23	Active energy import (+A)	3#1.0.1.8.0.255#2	0.26.0.1.1.1.12.0.0.0.0.0.0.0.224.3.72.0
24	Active energy import (+A) rate1	3#1.0.1.8.1.255#2	0.26.0.1.1.1.12.0.0.0.0.1.0.0.224.3.72.0
25	Active energy import (+A) rate2	3#1.0.1.8.2.255#2	0.26.0.1.1.1.12.0.0.0.0.2.0.0.224.3.72.0
26	Active energy import (+A) rate3	3#1.0.1.8.3.255#2	0.26.0.1.1.1.12.0.0.0.0.3.0.0.224.3.72.0
27	Active energy import (+A) rate4	3#1.0.1.8.4.255#2	0.26.0.1.1.1.12.0.0.0.0.4.0.0.224.3.72.0

28	Active energy import (+A) rate5	3#1.0.1.8.5.255#2	0.26.0.1.1.1.12.0.0.0.0.5.0.0.224.3.72.0
29	Active energy import (+A) rate6	3#1.0.1.8.6.255#2	0.26.0.1.1.1.12.0.0.0.0.6.0.0.224.3.72.0
30	Active energy import (+A) rate7	3#1.0.1.8.7.255#2	0.26.0.1.1.1.12.0.0.0.0.7.0.0.224.3.72.0
31	Active energy import (+A) rate8	3#1.0.1.8.8.255#2	0.26.0.1.1.1.12.0.0.0.0.8.0.0.224.3.72.0
32	Active MD (-)	4#1.0.2.6.0.255#2	0.8.2.6.19.1.8.0.0.0.0.0.0.0.224.3.38.0
33	Active MD (-) tariff1	4#1.0.2.6.1.255#2	0.8.2.6.19.1.8.0.0.0.0.1.0.0.224.3.38.0
34	Active MD (-) tariff2	4#1.0.2.6.2.255#2	0.8.2.6.19.1.8.0.0.0.0.2.0.0.224.3.38.0
35	Active MD (-) tariff3	4#1.0.2.6.3.255#2	0.8.2.6.19.1.8.0.0.0.0.3.0.0.224.3.38.0
36	Active MD (-) tariff4	4#1.0.2.6.4.255#2	0.8.2.6.19.1.8.0.0.0.0.4.0.0.224.3.38.0
37	Active MD (|QI+QIV|+|QII+QIII|)	4#1.0.15.6.0.255#2	0.8.0.6.20.1.8.0.0.0.0.0.0.0.224.3.38.0
38	Active MD (|QI+QIV|+|QII+QIII|) tariff1	4#1.0.15.6.1.255#2	0.8.0.6.20.1.8.0.0.0.0.1.0.0.224.3.38.0
39	Active MD (|QI+QIV|+|QII+QIII|) tariff2	4#1.0.15.6.2.255#2	0.8.0.6.20.1.8.0.0.0.0.2.0.0.224.3.38.0
40	Active MD (|QI+QIV|+|QII+QIII|) tariff3	4#1.0.15.6.3.255#2	0.8.0.6.20.1.8.0.0.0.0.3.0.0.224.3.38.0
41	Active MD (|QI+QIV|+|QII+QIII|) tariff4	4#1.0.15.6.4.255#2	0.8.0.6.20.1.8.0.0.0.0.4.0.0.224.3.38.0
42	Active MD (+)	4#1.0.1.6.0.255#2	0.8.0.6.1.1.8.0.0.0.0.0.0.0.224.3.38.0
43	Active MD (+) tariff1	4#1.0.1.6.1.255#2	0.8.0.6.1.1.8.0.0.0.0.1.0.0.224.3.38.0
44	Active MD (+) tariff2	4#1.0.1.6.2.255#2	0.8.0.6.1.1.8.0.0.0.0.2.0.0.224.3.38.0
45	Active MD (+) tariff3	4#1.0.1.6.3.255#2	0.8.0.6.1.1.8.0.0.0.0.3.0.0.224.3.38.0
46	Active MD (+) tariff4	4#1.0.1.6.4.255#2	0.8.0.6.1.1.8.0.0.0.0.4.0.0.224.3.38.0
47	Tariff 5 Active MD(+)	4#1.0.1.6.5.255#2	0.8.0.6.1.1.8.0.0.0.0.5.0.0.224.3.38.0
48	Tariff 6 Active MD(+)	4#1.0.1.6.6.255#2	0.8.0.6.1.1.8.0.0.0.0.6.0.0.224.3.38.0
49	Tariff 7 Active MD(+)	4#1.0.1.6.7.255#2	0.8.0.6.1.1.8.0.0.0.0.7.0.0.224.0.1.0
50	Tariff 8 Active MD(+)	4#1.0.1.6.8.255#2	0.8.0.6.1.1.8.0.0.0.0.8.0.0.224.3.38.0
51	Angle of U(L1) - U(L2)	3#1.0.81.7.10.255#2	0.0.0.1.0.1.55.0.0.0.0.0.0.0.224.0.1.0
52	Angle of U(L1) - U(L3)	3#1.0.81.7.20.255#2	0.0.0.1.0.1.55.0.0.0.0.1.0.0.224.0.1.0
53	Apparent power+ (QI+QIV) , Phase A	3#1.0.29.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.128.3.61.0
54	Apparent power+ (QI+QIV) , Phase B	3#1.0.49.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.64.3.61.0
55	Apparent power+ (QI+QIV) , Phase C	3#1.0.69.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.32.3.61.0
56	B phase Current	3#1.0.51.7.0.255#2	0.0.0.12.0.1.4.0.0.0.0.0.0.0.64.0.5.0
57	B phase Power Factor	3#1.0.53.7.0.255#2	0.0.0.12.19.1.37.0.0.0.0.0.0.0.224.3.63.0
58	B phase Voltage	3#1.0.52.7.0.255#2	0.0.0.12.0.1.54.0.0.0.0.0.0.0.64.0.29.0
59	C phase Current	3#1.0.71.7.0.255#2	0.0.0.12.0.1.4.0.0.0.0.0.0.0.32.0.5.0
60	C phase Power Factor	3#1.0.73.7.0.255#2	0.0.0.12.0.1.38.0.0.0.0.0.0.0.32.0.65.0
61	C phase Voltage	3#1.0.72.7.0.255#2	0.0.0.12.0.1.54.0.0.0.0.0.0.0.32.0.29.0
62	Current , neutral	3#1.0.91.7.0.255#2	0.0.0.1.0.1.4.0.0.0.0.0.0.0.224.0.5.0
63	Daily Freezing For Energy	7#0.0.98.2.0.255#2	11.26.0.1.0.1.12.0.0.0.0.0.0.0.224.3.72.0
64	Daily Freezing For Total Energy	7#0.0.98.5.128.255#2	11.0.0.1.0.1.12.0.0.0.0.0.0.0.224.3.72.0
65	Daily Freezing Prepaid Information	7#0.0.99.2.0.255#2	11.26.0.1.0.1.12.0.0.0.0.1.0.0.224.3.72.0
66	Daily Frozen Forward Active Energy Block	7#0.0.98.1.128.255#2	11.26.0.1.0.1.12.0.0.0.0.2.0.0.224.3.72.0
67	Instantaneous active export power (-A)	3#1.0.2.7.0.255#2	0.0.0.12.19.1.37.0.0.0.0.0.0.0.224.3.38.0
68	Instantaneous active import power (+A)	3#1.0.1.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.224.3.38.0
69	Instantaneous active import power (+A) L1	3#1.0.21.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.128.3.38.0

70	Instantaneous active import power (+A) L2	3#1.0.41.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.64.3.38.0
71	Instantaneous active import power (+A) L3	3#1.0.61.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.32.3.38.0
72	Instantaneous net frequency	3#1.0.14.7.0.255#2	0.0.0.12.0.1.15.0.0.0.0.0.0.0.224.0.33.0
73	Instantaneous Power factor (+A/+VA)	3#1.0.13.7.0.255#2	0.0.0.12.0.1.38.0.0.0.0.0.0.0.0.0.65.0
74	Instantaneous reactive export power (-R)	3#1.0.4.7.0.255#2	0.0.0.12.19.1.37.0.0.0.0.0.0.0.224.3.63.0
75	Instantaneous reactive import power (+R)	3#1.0.3.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.224.3.63.0
76	Meter Log Off Return Token	1.0.129.129.11.255	0.0.0.12.0.0.0.0.0.0.0.128.0.211.0
77	Monthly Freezing For Active MD Import Register Package	7#0.0.98.7.128.255#2	13.0.0.1.0.1.8.0.0.0.0.0.0.0.224.3.72.0
78	Monthly Freezing For Energy	7#0.0.98.1.0.255#2	13.0.0.1.0.1.12.0.0.0.0.1.0.0.224.3.72.0
79	Monthly Freezing For Total Energy	7#0.0.98.6.128.255#2	13.0.0.1.0.1.12.0.0.0.0.5.0.0.224.3.72.0
80	Monthly Freezing Prepaid Information	7#0.0.99.1.0.255#2	13.0.0.1.0.1.12.0.0.0.0.2.0.0.224.3.72.0
81	Monthly Frozen Forward Active Energy Block	7#0.0.98.3.128.255#2	13.0.0.1.0.1.12.0.0.0.0.3.0.0.224.3.72.0
82	Monthly Frozen Special Block	7#0.0.98.9.0.255#2	13.0.0.1.0.1.12.0.0.0.0.4.0.0.224.0.72.0
83	Reactive energy export (-R)	3#1.0.4.8.0.255#2	0.26.0.1.13.1.12.0.0.0.0.0.0.0.224.3.73.0
84	Reactive energy export (-R) rate1	3#1.0.4.8.1.255#2	0.26.0.1.13.1.12.0.0.0.0.1.0.0.224.3.73.0
85	Reactive energy export (-R) rate2	3#1.0.4.8.2.255#2	0.26.0.1.13.1.12.0.0.0.0.2.0.0.224.3.73.0
86	Reactive energy export (-R) rate3	3#1.0.4.8.3.255#2	0.26.0.1.13.1.12.0.0.0.0.3.0.0.224.3.73.0
87	Reactive energy export (-R) rate4	3#1.0.4.8.4.255#2	0.26.0.1.13.1.12.0.0.0.0.4.0.0.224.3.73.0
88	Reactive energy export (-R) rate5	3#1.0.4.8.5.255#2	0.26.0.1.13.1.12.0.0.0.0.5.0.0.224.3.73.0
89	Reactive energy export (-R) rate6	3#1.0.4.8.6.255#2	0.26.0.1.13.1.12.0.0.0.0.6.0.0.224.3.73.0
90	Reactive energy export (-R) rate7	3#1.0.4.8.7.255#2	0.26.0.1.13.1.12.0.0.0.0.7.0.0.224.3.73.0
91	Reactive energy export (-R) rate8	3#1.0.4.8.8.255#2	0.26.0.1.13.1.12.0.0.0.0.8.0.0.224.3.73.0
92	Reactive energy import (+R)	3#1.0.3.8.0.255#2	0.26.0.1.5.1.12.0.0.0.0.0.0.0.224.3.73.0
93	Reactive energy import (+R) rate1	3#1.0.3.8.1.255#2	0.26.0.1.1.1.12.0.0.0.0.1.0.0.224.3.73.0
94	Reactive energy import (+R) rate2	3#1.0.3.8.2.255#2	0.26.0.1.1.1.12.0.0.0.0.2.0.0.224.3.73.0
95	Reactive energy import (+R) rate3	3#1.0.3.8.3.255#2	0.26.0.1.1.1.12.0.0.0.0.3.0.0.224.3.73.0
96	Reactive energy import (+R) rate4	3#1.0.3.8.4.255#2	0.26.0.1.1.1.12.0.0.0.0.4.0.0.224.3.73.0
97	Reactive energy import (+R) rate5	3#1.0.3.8.5.255#2	0.26.0.1.1.1.12.0.0.0.0.5.0.0.224.3.73.0
98	Reactive energy import (+R) rate6	3#1.0.3.8.6.255#2	0.26.0.1.1.1.12.0.0.0.0.6.0.0.224.3.73.0
99	Reactive energy import (+R) rate7	3#1.0.3.8.7.255#2	0.26.0.1.1.1.12.0.0.0.0.7.0.0.224.3.73.0
100	Reactive energy import (+R) rate8	3#1.0.3.8.8.255#2	0.26.0.1.1.1.12.0.0.0.0.8.0.0.224.3.73.0
101	Reactive MD (-)	4#1.0.4.6.0.255#2	0.8.0.6.19.1.8.0.0.0.0.0.0.0.224.3.63.0
102	Reactive MD (-)tariff1	4#1.0.4.6.1.255#2	0.8.0.6.19.1.8.0.0.0.0.1.0.0.224.3.63.0
103	Reactive MD (-)tariff2	4#1.0.4.6.2.255#2	0.8.0.6.19.1.8.0.0.0.0.2.0.0.224.3.63.0
104	Reactive MD (-)tariff3	4#1.0.4.6.3.255#2	0.8.0.6.19.1.8.0.0.0.0.3.0.0.224.3.63.0
105	Reactive MD (-)tariff4	4#1.0.4.6.4.255#2	0.8.0.6.19.1.8.0.0.0.0.4.0.0.224.3.63.0
106	Reactive MD (+)	4#1.0.3.6.0.255#2	0.8.0.6.1.1.8.0.0.0.0.0.0.0.224.3.63.0
107	Reactive MD (+) tariff1	4#1.0.3.6.1.255#2	0.8.0.6.1.1.8.0.0.0.0.1.0.0.224.3.63.0

108	Reactive MD (+) tariff2	4#1.0.3.6.2.255#2	0.8.0.6.1.1.8.0.0.0.0.2.0.0.224.3.63.0
109	Reactive MD (+) tariff3	4#1.0.3.6.3.255#2	0.8.0.6.1.1.8.0.0.0.0.3.0.0.224.3.63.0
110	Reactive MD (+) tariff4	4#1.0.3.6.4.255#2	0.8.0.6.1.1.8.0.0.0.0.4.0.0.224.3.63.0
111	Reactive power(+), Phase A	3#1.0.23.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.128.3.63.0
112	Reactive power(+), Phase B	3#1.0.43.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.64.3.63.0
113	Reactive power(+), Phase C	3#1.0.63.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.32.3.63.0
114	Relay Control Mode	70#0.0.96.3.10.255#4	0.0.0.12.0.0.0.0.0.0.0.5.0.211.0
115	Relay Control Status	70#0.0.96.3.10.255#3	0.0.0.12.0.0.0.0.0.0.0.4.0.211.0
116	Relay Output Status	70#0.0.96.3.10.255#2	0.0.0.12.0.0.0.0.0.0.0.3.0.211.0
117	Remaining balance	3#1.0.140.129.0.255#2	0.0.0.12.0.0.0.0.1.0.0.0.0.0.0
118	Tariff 1 Active billing energy+	3#1.0.1.9.1.255#2	13.0.0.1.1.1.12.0.0.0.0.1.0.0.224.3.72.0
119	Tariff 1 Active MD(-) occurring time	4#1.0.2.6.1.255#5	0.8.0.6.19.1.7.0.0.0.0.1.0.0.224.0.1.0
120	Tariff 1 Active MD(+) occurring time	4#1.0.1.6.1.255#5	0.8.0.6.1.1.7.0.0.0.0.1.0.0.224.0.1.0
121	Tariff 1 apparent energy-	3#1.0.10.8.1.255#2	0.0.0.1.19.1.12.0.0.0.0.1.0.0.224.3.71.0
122	Tariff 1 apparent energy+	3#1.0.9.8.1.255#2	0.0.0.1.1.1.12.0.0.0.0.1.0.0.224.3.71.0
123	Tariff 1 apparent MD(-)	4#1.0.10.6.1.255#2	0.8.0.6.19.1.8.0.0.0.0.1.0.0.224.0.61.0
124	Tariff 1 apparent MD(-) occurring time	4#1.0.10.6.1.255#5	0.8.0.6.19.1.7.0.0.0.0.1.0.0.224.0.1.0
125	Tariff 1 apparent MD(+)	4#1.0.9.6.1.255#2	0.8.0.6.1.1.8.0.0.0.0.1.0.0.224.0.61.0
126	Tariff 1 apparent MD(+) occurring time	4#1.0.9.6.1.255#5	0.8.0.6.1.1.7.0.0.0.0.1.0.0.224.0.1.0
127	Tariff 1 reactive billing energy+	3#1.0.3.9.1.255#2	13.0.0.1.1.1.12.0.0.0.0.1.0.0.224.3.73.0
128	Tariff 1 reactive MD(-) occurring time	4#1.0.4.6.1.255#5	0.8.0.6.19.1.7.0.0.0.0.1.0.0.224.0.1.0
129	Tariff 1 reactive MD(+) occurring time	4#1.0.3.6.1.255#5	0.8.0.6.1.1.7.0.0.0.0.1.0.0.224.0.61.0
130	Tariff 2 Active billing energy+	3#1.0.1.9.2.255#2	13.0.0.1.1.1.12.0.0.0.0.2.0.0.224.3.72.0
131	Tariff 2 Active MD(-) occurring time	4#1.0.2.6.2.255#5	0.8.0.6.19.1.7.0.0.0.0.2.0.0.224.0.1.0
132	Tariff 2 Active MD(+) occurring time	4#1.0.1.6.2.255#5	0.8.0.6.1.1.7.0.0.0.0.2.0.0.224.0.1.0
133	Tariff 2 apparent energy-	3#1.0.10.8.2.255#2	0.0.0.1.19.1.12.0.0.0.0.2.0.0.224.3.71.0
134	Tariff 2 apparent energy+	3#1.0.9.8.2.255#2	0.0.0.1.1.1.12.0.0.0.0.2.0.0.224.3.71.0
135	Tariff 2 apparent MD(-)	4#1.0.10.6.2.255#2	0.8.0.6.19.1.8.0.0.0.0.2.0.0.224.0.61.0
136	Tariff 2 apparent MD(-) occurring time	4#1.0.10.6.2.255#5	0.8.0.6.19.1.7.0.0.0.0.2.0.0.224.0.1.0
137	Tariff 2 apparent MD(+)	4#1.0.9.6.2.255#2	0.8.0.6.1.1.8.0.0.0.0.2.0.0.224.0.61.0
138	Tariff 2 apparent MD(+) occurring time	4#1.0.9.6.2.255#5	0.8.0.6.1.1.7.0.0.0.0.2.0.0.224.0.1.0
139	Tariff 2 reactive billing energy+	3#1.0.3.9.2.255#2	13.0.0.1.1.1.12.0.0.0.0.2.0.0.224.3.73.0
140	Tariff 2 reactive MD(-) occurring time	4#1.0.4.6.2.255#5	0.8.0.6.19.1.7.0.0.0.0.2.0.0.224.0.1.0
141	Tariff 2 reactive MD(+) occurring time	4#1.0.3.6.2.255#5	0.8.0.6.1.1.7.0.0.0.0.2.0.0.224.0.61.0
142	Tariff 3 Active billing energy+	3#1.0.1.9.3.255#2	13.0.0.1.1.1.12.0.0.0.0.3.0.0.224.3.72.0
143	Tariff 3 Active MD(-) occurring time	4#1.0.2.6.3.255#5	0.8.0.6.19.1.7.0.0.0.0.3.0.0.224.0.1.0
144	Tariff 3 Active MD(+) occurring time	4#1.0.1.6.3.255#5	0.8.0.6.1.1.7.0.0.0.0.3.0.0.224.0.1.0
145	Tariff 3 apparent energy-	3#1.0.10.8.3.255#2	0.0.0.1.19.1.12.0.0.0.0.3.0.0.224.3.71.0
146	Tariff 3 apparent energy+	3#1.0.9.8.3.255#2	0.0.0.1.1.1.12.0.0.0.0.3.0.0.224.3.71.0
147	Tariff 3 apparent MD(-)	4#1.0.10.6.3.255#2	0.8.0.6.19.1.8.0.0.0.0.3.0.0.224.0.61.0
148	Tariff 3 apparent MD(-) occurring time	4#1.0.10.6.3.255#5	0.8.0.6.19.1.7.0.0.0.0.3.0.0.224.0.1.0
149	Tariff 3 apparent MD(+)	4#1.0.9.6.3.255#2	0.8.0.6.1.1.8.0.0.0.0.3.0.0.224.0.61.0
150	Tariff 3 apparent MD(+) occurring time	4#1.0.9.6.3.255#5	0.8.0.6.1.1.7.0.0.0.0.3.0.0.224.0.1.0
151	Tariff 3 reactive billing energy+	3#1.0.3.9.3.255#2	13.0.0.1.1.1.12.0.0.0.0.3.0.0.224.3.73.0

152	Tariff 3 reactive MD(-) occurring time	4#1.0.4.6.3.255#5	0.8.0.6.19.1.7.0.0.0.0.3.0.0.224.0.1.0
153	Tariff 3 reactive MD(+) occurring time	4#1.0.3.6.3.255#5	0.8.0.6.1.1.7.0.0.0.0.3.0.0.224.0.61.0
154	Tariff 4 Active billing energy+	3#1.0.1.9.4.255#2	13.0.0.1.1.1.12.0.0.0.0.4.0.0.224.3.72.0
155	Tariff 4 Active MD(-) occurring time	4#1.0.2.6.4.255#5	0.8.0.6.19.1.7.0.0.0.0.4.0.0.224.0.1.0
156	Tariff 4 Active MD(+) occurring time	4#1.0.1.6.4.255#5	0.8.0.6.1.1.7.0.0.0.0.4.0.0.224.0.1.0
157	Tariff 4 apparent energy-	3#1.0.10.8.4.255#2	0.0.0.1.19.1.12.0.0.0.0.4.0.0.224.3.71.0
158	Tariff 4 apparent energy+	3#1.0.9.8.4.255#2	0.0.0.1.1.1.12.0.0.0.0.4.0.0.224.3.71.0
159	Tariff 4 apparent MD(-)	4#1.0.10.6.4.255#2	0.8.0.6.19.1.8.0.0.0.0.4.0.0.224.0.61.0
160	Tariff 4 apparent MD(-) occurring time	4#1.0.10.6.4.255#5	0.8.0.6.19.1.7.0.0.0.0.4.0.0.224.0.1.0
161	Tariff 4 apparent MD(+)	4#1.0.9.6.4.255#2	0.8.0.6.1.1.8.0.0.0.0.4.0.0.224.0.61.0
162	Tariff 4 apparent MD(+) occurring time	4#1.0.9.6.4.255#5	0.8.0.6.1.1.7.0.0.0.0.4.0.0.224.0.1.0
163	Tariff 4 reactive billing energy+	3#1.0.3.9.4.255#2	13.0.0.1.1.1.12.0.0.0.0.4.0.0.224.3.73.0
164	Tariff 4 reactive MD(-) occurring time	4#1.0.4.6.4.255#5	0.8.0.6.19.1.7.0.0.0.0.4.0.0.224.0.1.0
165	Tariff 4 reactive MD(+) occurring time	4#1.0.3.6.4.255#5	0.8.0.6.1.1.7.0.0.0.0.4.0.0.224.0.61.0
166	Tariff 5 Active MD(+) occurring time	4#1.0.1.6.5.255#5	0.8.0.6.1.1.7.0.0.0.0.5.0.0.224.0.1.0
167	Tariff 6 Active MD(+) occurring time	4#1.0.1.6.6.255#5	0.8.0.6.1.1.7.0.0.0.0.6.0.0.224.0.1.0
168	Tariff 7 Active MD(+) occurring time	4#1.0.1.6.7.255#5	0.8.0.6.1.1.7.0.0.0.0.7.0.0.224.0.1.0
169	Tariff 8 Active MD(+) occurring time	4#1.0.1.6.8.255#5	0.8.0.6.1.1.7.0.0.0.0.8.0.0.224.0.1.0
170	Total Active billing energy+	3#1.0.1.9.0.255#2	0.26.0.1.0.1.12.0.0.0.0.0.0.0.224.3.72.0
171	Total Active MD(-) occurring time	4#1.0.2.6.0.255#5	0.8.0.6.19.1.7.0.0.0.0.0.0.0.224.0.1.0
172	Total Active MD(+) occurring time	4#1.0.1.6.0.255#5	0.8.0.6.1.1.7.0.0.0.0.0.0.0.224.0.1.0
173	Total apparent energy-	3#1.0.10.8.0.255#2	0.0.0.1.19.1.12.0.0.0.0.0.0.0.224.3.71.0
174	Total apparent energy+	3#1.0.9.8.0.255#2	0.0.0.1.1.1.12.0.0.0.0.0.0.0.224.3.71.0
175	Total apparent MD(-)	4#1.0.10.6.0.255#2	0.8.0.6.19.1.8.0.0.0.0.0.0.0.224.0.61.0
176	Total apparent MD(-) occurring time	4#1.0.10.6.0.255#5	0.8.0.6.19.1.7.0.0.0.0.0.0.0.224.0.1.0
177	Total apparent MD(+)	4#1.0.9.6.0.255#2	0.8.0.6.1.1.8.0.0.0.0.0.0.0.224.0.61.0
178	Total apparent MD(+) occurring time	4#1.0.9.6.0.255#5	0.8.0.6.1.1.7.0.0.0.0.0.0.0.224.0.1.0
179	Total average power factor	3#1.0.13.15.0.255#2	0.2.0.1.0.1.38.0.0.0.0.0.0.0.224.0.65.0
180	Total average power factor, tariff 1	3#1.0.13.15.1.255#2	0.2.0.1.0.1.38.0.0.0.0.1.0.0.224.0.65.0
181	Total average power factor, tariff 2	3#1.0.13.15.2.255#2	0.2.0.1.0.1.38.0.0.0.0.2.0.0.224.0.65.0
182	Total average power factor, tariff 3	3#1.0.13.15.3.255#2	0.2.0.1.0.1.38.0.0.0.0.3.0.0.224.0.65.0
183	Total average power factor, tariff 4	3#1.0.13.15.4.255#2	0.2.0.1.0.1.38.0.0.0.0.4.0.0.224.0.65.0
184	Total reactive billing energy+	3#1.0.3.9.0.255#2	13.0.0.1.1.1.12.0.0.0.0.0.0.0.224.3.73.0
185	Total reactive MD(-) occurring time	4#1.0.4.6.0.255#5	0.8.0.6.19.1.7.0.0.0.0.0.0.0.224.0.1.0
186	Total reactive MD(+) occurring time	4#1.0.3.6.0.255#5	0.8.0.6.1.1.7.0.0.0.0.0.0.0.224.0.61.0
187	Vector sum of current in all Phases	3#1.0.128.7.0.255#2	0.0.0.1.0.1.4.0.0.0.0.0.0.0.224.0.5.0

Specification for

Single Phase Smart Prepayment Energy Meter with Communication Module

7.1 Scope

Single Phase: This technical specification covers the design, manufacture, testing and supply of single-phase whole current AC 5(60) Amps Smart Pre-payment Energy Meter of accuracy Class 1.0.

The smart Pre-payment Meter should have plug & play type BPLC and GPRS communication module. The meter should be able to connect point to point communication with head end system (HES).

The Smart Pre-payment features like online recharge, tariff and charge configuration, emergency credit/friendly hour configuration, daily and monthly billing data collection, on demand read etc. to be implemented through HES.

The meter must be able to detect and record power off & power on, tamper, load control, configuration, tariff setting, firmware update and payment related event with date and time stamp. Meter can push the related event to HES when the event occurs, such low credit alarm, no credit disconnection, emergency in use or friendly in use, tamper. Utility and customer can receive the related SMS notification as per the configuration.

7.2 Scope of Supply

The tenderer shall be responsible for supply of Energy Meter with related services packing, loading, shipment, custom clearance if necessary, and transportation, insurance and unloading at site. The supplied meters will be operated by existing purchasers' software (API attached in appendix). Interfacing of the offered meter is the responsibility of the tenderer.

Item No.	Name of Goods or Related Services	Description	Unit of Measurement	Quantity
1.	Single Phase Solid State Smart Pre-payment meter with plug & play type BPLC communication module	Single phase, 230 Volt, 5(60)A	Nos.	74694

7.3 Service conditions

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

Sl.No.	Condition	Specification
1	Maximum ambient temperature (^oC)	50
2	Minimum ambient temperature (^oC)	5
3	Maximum daily average temperature (^oC)	35
4	Maximum annual average temperature (^oC)	30
5	Mean annual rainfall (mm)	2500
6	Minimum annual rainfall (mm)	1461
7	Maximum annual rainfall (mm)	4127
8	Maximum relative humidity (%)	100
9	Average relative humidity (%)	80
10	Maximum wind velocity (km/h)	180
11	Maximum altitude above mean sea level (meters)	200

7.4 Standards and codes of practice

All material and equipment supplied and all works carried out shall comply in every respect with the technical codes of the International Organization for Standardization (ISO) and with the recommendations of the International Electrotechnical Commission (IEC), which apply to the electrical equipment.

Goods and special guarantees beyond the scope of ISO and IEC shall conform at least to one of the following standards and codes.

IEC 62052-11	Electricity metering equipment (AC)- General requirements, tests and test Conditions- Part 11: Metering equipment
IEC 62055	Part 21: Framework for standardization Part 31: Particular Requirements-Static payment meters for active energy (classes 1)
IEC 62053-21, IEC 62053-23	Alternating current static watt-hour meters (classes 1)
IEC62052-21, IEC 62054-21	Time switches for tariff and load control
IEC 62056-21	Data exchange for meter reading, tariff and load control and direct local data exchange
IEC 1038	The switches for tariff and load control
IEC 1107	Data exchange for meter reading, tariff and load control and direct local data exchange
IEC 58	Shock and vibration, humidity, solar radiation and salt mist etc.
ISO 9001	Code of practice for quality systems part 1: Model for quality assurance in design/development, production, installation and servicing.
IEC 62054	Real Time Clock (RTC)
Others	All other relevant IEC specifications for metering equipment.

7.5 Supply System

Description	Single Phase
Rated voltage (Vref.)	230 V – Phase to Neutral
Rated Current	Basic Current 5 Amps (Ib), Maximum Current 60 Amps (Imax)
Rated Frequency	50 Hz

7.6 Specific Technical Requirements

The meters to be supplied against this specification shall meet the requirements specified in this clause.

7.6.1 Electrical requirements

Meter supplied shall meet the following electrical requirements.

Sl.No	Description	Specification
A	**Phase**	**Single Phase**
1	Connection	1-Phase, 2-Wire, direct connected (unidirectional, programmable to bi-directional in case of Net Metering)
2	Number of element	02 (two)
3	Rated voltage	230 V phase to neutral.
4	Rated Current: a) Base current, I_b b) Maximum continuous current, I_{max}	 ≤ 5 A ≥ 60 A; Moreover the 5-60 Amps meter shall work accurately up to 120 % of Imax
5	Starting current	20 mA (0.4% I_b)
6	Power consumption in the voltage circuit	≤ 2 Watts and 5 VA
7	Limit of Current	Shall be Programmable within the range of 0.02A to 60 A
8	Continuous over voltage	Should withstand 400 volts for 48 hours without causing any damage or degrading of its operating life, or causing changes of more than 0.01 kWh in its credit registers (excluding the possible decrement of credit due to power being consumed).
9	Variation in voltage	+30% to –30%; The meter shall be suitable for working satisfactorily within the specified range.
10	Rated frequency	50 Hz
11	Variation in frequency	± 2%
12	Power factor	The Meter shall be suitable for working satisfactorily from 0.5 lag – unity – 0.8 lead
13	Class index	1.0; The accuracy shall not drift with time.
14	Keypad	12-key, International Standard layout including “information” and “backspace” keys
15	Clock	Built-in real time clock with 10 years battery backup
16	a) Display	LCD; Visibility should be sufficient to read the meter mounted at height of 0.5 to 2.0 m. Pin type; trans-reflective HTN or STN type industrial grade; temperature range –20^{0}C to +70^{0}C
	b) Period of display	Continuous
	c) Digits	WxH: 6 mm x 10 mm (minimum)
	d) Maximum viewing angle	160 degrees
	e) Number of display digits	6+2
17	Harmonic energy	Meter shall record total energy including harmonic energy

Sl.No	Description	Specification
18	Memory	Non-volatile memory that retains information up to 10 years in the absence of power. Described in section 7.7 & 7.16.8.3 The data stored in memory chip can be read by a tool when the meter is broken after demonstration.
19	Power limiting	Meter shall disconnect the load when a pre-programmed threshold power is reached. The threshold shall be programmable in steps of 500W or less.
20	Tamper detection	Sensor to detect any kind of tamper
21	Load disconnection	Latching relay
22	Audible alarm	Buzzer
23	Lightning Protection	In accordance to IEC 62053-21 or latest version of IEC
24	Communication	plug & play type BPLC AND GPRS communication module
25	Application Protocol	DLMS/COSEM and IDIS
26	Installation of Communication Module	Adding or exchanging the communication module should be done without turning off the meter. Meter must be compatible with multi communication module. Utility can replace any module in the same meter if required.
27	Maximum pulse frequency	Shall not exceed 2.5 kHz
28	Sealing Condition	Hermetically Sealed / Fully Ultrasonic Welded.

7.6.2 Mechanical requirements

The enclosure shall be tamper-resistant and shall be suitable for outdoor mounting. The meter shall be such that the internal components in the active part of the meter shall be protected against unintentional damage or tamper during handling and installation.

Furthermore, Meter supplied shall meet the following mechanical requirements.

Sl. No.	Description	Specification
1	Meter Case	The meter shall be constructed by employing flame retardant and high impact strength material. The base, body and frame including terminal block shall be of heat resistive; shock proof and rust proof good quality hard material e.g. unbreakable engineering or stamped metal or molded phenol resin which shall be capable of withstanding of 145° C. The base will be provided with 3 (three) screw mounting holes, 1 (one) slotted meter support bracket at the top and 1 (one) round hole on each side in the bottom half of the base for securely mounting the meter to the meter board. The meter cover shall be of molded transparent Poly-Carbonate. The meter cover shall be provided with a window of transparent Poly-Carbonate or toughened glass. The display shall be of LCD. The base cover should be transparent. The meter shall be effectively sealed to prevent entrance of moisture, rain and dust into its internal parts.

Sl. No.	Description	Specification
2	Terminal	a) Terminal block shall be polycarbonate grade 500R or equivalent bakelite; brass or copper current terminals; two flat-head brass screws at each terminal; b) Terminal cover should be transparent and have provision for sealing. c) Terminal cover should have provision for Side entry connection. d) Minimum free space between bottom of terminal and terminal cover are 60 mm e) For Single Phase: Minimum 4 terminals to accommodate 10 mm^2 duplex; terminal cover shall be extended type; terminal bore diameter 6 mm;
3	Connections diagrams and terminal marking	Every meter shall be indelibly marked with a diagram of connection. Meter terminals shall be marked; this marking shall appear on the diagram. Stickers of any kind shall not be accepted.
4	Insulation level	Shall withstand a power frequency test of 4kV and impulse withstand test of 6 kV
5	Protection against penetration of dust and water	Conform to the degree of protection of IP54 or better
6	Top cover sealing	Hermetically sealed/ Fully ultrasonic welded.
7	Pulse output	The meter shall be provided with flashing red LED to represent the pulse output for testing the meter by suitable testing equipment. The operation indicator must be visible from the front.
8	Protection against magnetic field	The Meter Accuracy shall not be affected by AC/DC magnetic field from all sides of the meter i.e.; front, sides, top and bottom of the meter. Meter shall not be affected by permanent magnet of 0.5 mT.
9	Temperature range	Limit range of operation: -25^0C to 55^0C Limit range of storage and transport: -25^0C to 70^0C
10	Name plate	Every meter shall have clearly visible, effectively secured against removal and indelibly and distinctly marked. The following information's marked on name plate: Manufacturer's name and year of manufacture, Meter type Number of phases and number of wire Meter serial number Rated voltage Basic current and maximum current Reference frequency in hertz Meter constant in imp/kWh& imp/kVarh Class index of the meter Over-current breaking capacity (in kA) UTILITY logo (when supply) Contract No. (When supply)

Sl. No.	Description	Specification
		Reference Standard
11	Optical Port & RS485 port	Meter should have standard optical port for local read and configuration. Meter should have two wired active RS485 port for remote communication.

7.6.3 Latching relay specifications

The latching relay shall be compatible with the offered meter and the operating principle shall be as per requirement. Technical specification of the relay shall be engraved or marked on the body of the relay.

The specification for the latching relay is as follows:

Sl. No	Description	Requirements
		Single Phase
1	Manufacturers Name &Country of origin	To be mentioned
2	Country of Manufacturing	To be mentioned
3	No. of coils	2 (two)
4	Rated coil voltage	12 VDC
5	Rated coil power	6 W
6	Pulse to set	30 ms
7	Contact Material	Silver alloy
8	Maximum Switching Power	15000 VA
9	Maximum Switching Voltage	250 V AC
10	Maximum Switching Current (rms)	60A
11	Contact resistance	≤ 2 mΩ
12	Electrical Cycle	$1x10^4$
13	Mechanical Cycle	$1x10^5$
14	Insulation resistance	≥ 1000 MΩ
15	Dielectric Strength between contacts	≥ 2000 VAC
16	Dielectric Strength between contact and coil (50 Hz)	≥ 3000 VAC
17	Dielectric Strength between contacts assembly	≥ 4000 VAC
18	Ambient temperature	-40 ^oC ~ +55^oC
19	Operating humidity	40 to 90%
20	Temperature rise at rated current (assuming 30^0C room temp.)	60^0C

7.7 MEASURED & STORED PARAMETERS:

i) Parameters to be Measured

Sl. No	Description	Requirements
		Single Phase
1	**Instantaneous:**	Voltage (V); Current (I);

Sl. No	Description	Requirements
		Single Phase
		Cumulative-Active Energy Kwh ; Current Demand(kW); Power factor.
2	**Billing parameters** The billing parameters shall be retained in the meter for at least 12(Twelve) months. :	Previous month's MD in kW and Cumulative-Active Energy Kwh; Consumption Active Energy (Kwh) in current month; Remaining balance; Money recharge and used in current month;
3	**Time of Use**	-Peak, Off-Peak & Super Off-Peak

ii) Power Quality information

Logging of quality of supply events like power on/off, over/under voltage, over current (minimum 100 events). Setting of Under/Over Voltage and over current shall be configurable.

iii) Maximum Demand

Should have Maximum Demand registers kW with integration period of 30 minutes. Resets should be auto monthly or through communication command from HES / HHU.

iv) Load Survey Storage

Meter shall record load survey of minimum 365 days for average voltage, average current, average PF, for all phases, kWh reading and kvarh reading, kVAh reading, average demand in kW with integration period of 30 minutes. It shall be possible to select either demand or energy view at the system end.

v) Tamper/Event recording

A total of last 100 events considering all tampers defined must be detected and logged as tamper events on first in first out basis along with date & time. Meter shall log following Tampers/Events – Over voltage, Low voltage, Over current, Magnet tamper, Neutral missing, Top cover open, Terminal cover open etc.

7.8 Data display facility (manual/auto):

All the above parameters shall be displayed for minimum 10 seconds (configurable) including LCD check & all parameters are configurable. Data Display shall have following modes

a) Auto Scroll: All the following parameters shall be available in auto scrolling mode with OBIS Code.

- Date (DD:MM:YY) & Time (HH:MM:SS)
- Meter Serial Number
- Balance Amount (Tk.)
- Cumulative Forwarded Active Energy (Kwh)
- Current month Active MD
- Instantaneous voltage (V)
- Instantaneous phase current (A)
- Instantaneous Neutral current (A)

- Instantaneous Active power (KW)
- Last Recharge Date & Time
- The current Tariff

b) Scroll with Push-button*:* It shall be possible to display the following parameters in sequence through push-button provided on the meter with OBIS Code:

- LCD All Segment Display
- Date (DD:MM:YY) & Time (HH:MM:SS)
- Meter Serial Number
- Balance Amount (Tk.)
- Cumulative Forwarded Active Energy (Kwh)
- Instantaneous voltage (V)
- Instantaneous phase current (A)
- Instantaneous Neutral current(A)
- Instantaneous Active power (KW)
- Current Month Forwarded Active MD
- Cumulative Forwarded Active Energy of Last Bill
- Forwarded Active MD of Last Month
- Date & Time of Last Month MD
- Balance Amount (Tk.)
- Last Recharge Date & Time
- Error Code for communication problem diagnosis
- Latest Sequence number of token.

7.9 Tamper detection

a) A tamper sensor shall be provided to detect that terminal cover has been opened both in power supply and without power supply.

b) Tamper shall be detected with and without power supply. When the meter detects a tamper condition, it should enter a shutdown state, with an appropriate message. The customer should be disconnected immediately.

c) Meter should not power up /work in missing neutral connection (relay should open).

d) Removal of battery shall be considered as a tamper.

In case of Magnetic effect, Neutral disturbance, Terminal cover open and any other tamper detection, relays should get disconnected immediately which can be reconnected through HES or through token. Meter must be capable of detecting multiple tampers.

The tamper status shall be reset by using a uniquely coded tamper reset token that may only be used once.

The meter should be able to count energy in any type of connection as long as the credit remains. Whenever the credit is zero, the relay should trip except for emergency or friendly hour. Otherwise, the tender will be rejected.

7.10 Indication on display:

a) Status of Relay-indication of status of relay i.e. Connected/Disconnected should be available on display.

b) Power Supply Status: visible indication of the status of the incoming supply i.e. Power supply On/Off.

c) *Low Credit indication***.**

d) Credit Status.

e) Voltage indication.

f) Tamper Indication

g) Network Status

7.11 Display Unit/LCD:

a) The measured value(s), status, alarm, event information etc. Should be displayed on a Liquid Crystal display (LCD) register.

b) The display should have backlit capability for easy reading.

c) An illuminated display with a minimum lifetime of ten years is required.

d) The size (number of rows and characters per row) should be appropriate for the display and interpretation of the messages and meter information, and should be legible from a distance of at least 500 cm with a viewing angle no less than 30°.

7.12 Memory/Data Retention:

The data should be stored in non-volatile memory (NVM). The non-volatile memory should retain data for a period of not less than 10 years under un-powered condition. The memory should record billing history and load profile data for last one year.

7.13 Optical Interface

The meter shall have an IEC 62056-21 compliant optical communication port. This should allow the utility to access via front for variety of customer information stored inside the meter and to upload it into a hand-held unit (HHU).

7.14 Electromagnetic compatibility

(a) Immunity to electromagnetic disturbance

The meter shall be designed in such a way that conducted or radiated electromagnetic disturbances as well as electrostatic discharge do not damage or substantially influence the meter. The disturbances to be considered are:

i. Electrostatic discharges
ii. Electromagnetic HF field
iii. Fast transient burst

(b) Radio interference suppression

The meters shall not generate conducted or radiated noise which could interfere with other equipment.

7.15 Accuracy requirements

(a) Limits of error due to variation of the current

The percentage errors shall not exceed the limits for the relevant accuracy class stipulated in IEC standard.

(b) Limits of error due to other influence quantities

The additional percentage error due to the change of influence quantities shall not exceed the limit for the reference accuracy class stipulated in IEC standard.

(c) Limits of error due to ambient temperature variation

The limits of error shall not exceed the limits stipulated in IEC standard.

(d) Starting and running with no-load

Initial start-up of the meter: The meter shall be fully functional within 5 seconds after the voltage is applied to the meter terminals.

Running with no load: When the voltage is applied with no current flowing in the current circuit the test output of the meter shall not produce more than one pulse.

Starting: The meter shall start and continue to register at a) Single Phase: $0.4I_b$% at power factor of 1.

(e) Meter constant

The relation between the test output and the indication in the display shall comply with the marking on the name-plate.

7.16 Functional Requirement

7.16.1 Security

All credit and meter management tokens shall be meter specifically encrypted to guarantee security of the system. Encrypted tokens shall not be reusable. Tokens to display status and test the meter may be un-encrypted and reusable.

7.16.2 Token validation

If a token not meant for the meter is applied, the meter should display a message to that effect. Similarly, if a valid token is re-entered into the meter, then the meter must display an appropriate message.

7.16.3 Meter personalization

In addition to factory personalization and personalization via encrypted tokens, it shall be possible to personalize the meter from a hand-held unit (HHU) provided the HHU is authorized/ programmed to communicate with the meter.

7.16.4 Meter modes

The meter shall be required to support at least three modes of operation, namely the prepayment mode, post payment mode and the meter test mode.

7.16.5 Prepayment mode

The basis of this mode is that credit is transferred to the meter, and provided the meter remains in credit, the meter provides supply. The credit register is decremented against current consumption with the countdown total being displayed on the meter display.

7.16.6 Meter Post paid mode

The meter should support Post paid mode that is activated either from a dedicated token or using HHU. This mode allows meter to work as AMI smart meters to keep online and calculate the consumption and payment in billing system as required.

7.16.7 Meter test mode

The meter should support a test mode that is activated either from a dedicated test token, or using the HHU. This test should be automated in the meter and should include a full diagnostic test, testing of the all the active and inactive functionality, metering accuracy test (1 minute load test), and connection validation tests. Meter test mode shall also display following information:

i) Meters software version
ii) Current limit
iii) Switch open and close count
iv) Token acceptance & rejection count

7.16.8 Energy accounting

7.16.8.1 Credit register

The credit register is the "operating account" of the meter being decremented by the metering process. The specific requirements of this register are:

a) This register must be decremented for the equivalent of every credit unit consumed.
b) When the available credit has been consumed, the meter must open the contactor and isolate supply from the customer (unless the Friendly hours or Emergency Credit option is invoked).
c) This register can become negative only from use of emergency credit/friendly hour.

7.16.8.2 Consumption during current billing period

a) This register records the cumulative energy consumption for the current billing period.
b) The registers shall be updated at least every 10 Wh.

7.16.8.3 Historic consumption

For this option there are six energy registers that store the total energy consumed for the previous six months.

a) These registers are cycled at during the month-end process, with the oldest data being deleted.

7.16.8.4 Cumulative energy consumption

a) This register records the cumulative consumption since the meter was commissioned.
b) The units of storage are kWh, rounded to two decimal points (10 Wh).

7.16.8.5 Billing

Billing operates on a monthly basis. Energy consumption charge is deducted within the meter for at least every 10 Wh. All other charges including demand charge, meter rent, vat etc are deducted as per prevailing rules of Bangladesh Energy Regulatory Commission (BERC) at the POS.

7.16.8.6 Month-end calculation

At the end of each month, the meter should perform a month-end calculation that consists of the following minimum steps:

a) The cumulative monthly energy registers must be reset, and the historic registers must be updated.
b) The meter must determine whether a new tariff will become active, and if so, must delete the old tariff.

7.16.8.7 Date and time management

a) The meter shall be equipped with a real time clock supporting the date and time as per IEC standard. Pseudo-clock using mains crossing detection is not acceptable. The maximum drift of the clock shall be less than 30 seconds per month. The battery and/or auxiliary power source shall operate maintenance free for a period of at least 10 years.

b) The meter must be equipped with a battery monitoring system that monitors the battery's condition and initiates a "Change Battery Alarm" to the point of sale when the battery approaches the end of its operating life. If the battery is not replaced, the failure of the battery is deemed to constitute a meter failure, and the meter should be shut down.

c) Date and time may be changed using meter parameterization software.

7.16.9 Tariff Management

7.16.9.1 Tariff

All tariff calculation must be done within the meter.

The meter is required to support stepped tariffs structures as well as time-of-use and maximum demand.

The tariff structure consists of the following records:

i) Each tariff must be uniquely identified using the tariff code
ii) Each tariff shall have an activation date, being the date on which the tariff becomes effective.
iii) Each tariff has up to seven steps (in kWh) for different levels of energy pricing.
iv) The rate describes the cost per kWh for energy consumption in that step.

7.16.9.2 Tariff management in the meter

a) Tariffs shall be entered into the meter via the two-way token or HHU. The meter should not allow tariffs to be manually entered using meter parameterization software.
   - When the meter is active with a tariff, the current tariff cannot be overwritten bypassing the token/MDM.
   - The meter must record time and date stamp when the tariff is loaded into meter.
b) In general, when a tariff has expired in the meter, the tariff is automatically deleted by the meter.

7.16.9.3 Tariff security and verification

The meter shall write the active tariff code to the token on each insertion.

7.16.9.4 Tariff switchover

When the meter detects that a new tariff is applicable (using the tariff activation date), the meter should execute the following steps:

i) The meter shall begin the billing against the new tariff from the current slab.

ii) The current tariff code shall be updated to reflect the new tariff code.

iii) The old (expired) tariff should be deleted.

iv) New tariffs will only be activated at 00:00 on the first day of a month.

7.17 Status/Event displays

In addition to the displays required above the meter must display the following minimum information in an intuitive way such that an inexperienced user can understand and interpret the information intelligibly. Laminated instruction cards are to be provided for each unit.

i) Meter ID.
ii) Out of Credit message
iii) Invalid token entered
iv) Duplicate token entered
v) Meter tamper state
vi) Meter failure and/or fault code

7.18 Friendly*:*

The meter shall accommodate the "Friendly hours" features. These are time periods during which the meter shall not cut-off power to consumer if the credit becomes negative. Meter should not be on until full negative amount is paid back. Insufficient (not more than negative balance) recharge token will be accepted by meter and update the current balance. But the meter will be disconnected. Details of the features are described in the following table. All options should be allowed for one time in each vending.

Sl. No.	Requirement	Description
1	Friendly hours	There shall be provision to define 'Friendly hours' in the meter. The utility shall be able to define the 'Friendly hours' and shall be communicated to the meter through token.

7.19 Emergency credit:

Provision shall be made in the meter for an Emergency Credit facility that allows the customer to draw on an emergency credit should the credit in the register be consumed.

The specific requirements of this facility are:

a) When the credit register value reaches a programmable Emergency Credit Threshold the meter should sound an audible alarm, and prompt the user to accept the use of the Emergency Credit facility (card insertion or button depression). The meter should not supply energy against emergency credit unless acknowledged by the customer.

b) If all the available credit in the credit register is expired and power disconnected, the facility to activate the Emergency Credit should remain an option to the user.

c) The meter should remain in service until the Emergency Credit Limit has been reached and not recharged an amount more than current outstanding, after which the supply should be disconnected.

d) If the Emergency credit limit is set to zero, the Emergency Credit Threshold shall function as a low credit warning and provide the user with a visual and audible alarm that credit is low. The user shall have the option to silence the alarm by inserting a card or pressing a button to accept the alarm.

e) If emergency credit has been previously consumed, then the value of emergency credit used shall be deducted from the next token inserted into the meter. Meter should not be on until full loan amount is paid back.

f) Once emergency credit has been exhausted, no further credit facilities shall be available until the full emergency credit allocation has been paid for.

g) In case of negative credit status, meter should not accept balance clear token.

7.20 Load Control

Meters shall have the options to control loads with the following features:

a) There shall be provision in the meter to define the allowable loads for given time periods within a day.

b) There shall be provision in the meter to accommodate the date of activation of the defined load allocation.

c) Load limit shall be defined in step of 500 W.

d) Single phase Smart meter shall be equipped with integrated/ separate load control switches (latching relay) at both phase and neutral to control flow of electricity to the load at the instance of connect/ disconnect commands as per functional need of the system. Both Load switches (latching relay) shall operate simultaneously for connect/ disconnect purpose and shall be mounted inside the meter with suitable arrangement.

e) The meter should be able to count energy in any type of connection as long as the credit remains. Whenever the credit is zero, the relay should trip except for emergency or friendly hour. Otherwise, the tender will be rejected.

f) The rating of switches used shall be as per IEC.

7.21 Load Disconnection/Reconnection:

a) The load shall be disconnected by a latching relay under the following conditions:

   i) The credit in the meter has expired and grace facilities also expired.

   ii) The load power threshold has been exceeded.

   iii) The meter is in a tampered state.

   iv) Neutral missing at source side.

b) The meter shall indicate whether the load is connected or not and shall display the reason for disconnection.

c) The customer shall not have the option to switch the contactor manually. Under over – current conditions the mechanism to automatically reconnect the load must ensure that the number of switching cycles is limited. The meter shall attempt to reconnect the load up to 5

times at 30-second intervals. If the over-current condition still exists the meter shall wait a period of 30 minutes before attempting to reconnect the load.

d) After the load is disconnected by a latching relay, all the circuits should remain disconnected even if the phase and neutral connections are shifted to each other

e) After load is disconnected by a latching relay, all circuits should remain disconnected and there will be no possibility of being circuited through a local earth either in phase or in neutral terminal as partially or fully.

7.22 Smart Pre-Payment Features

7.22.1 Balance calculation:

Balance calculation will be implemented at pre-payment meter as per energy consumption. HES will collect the billing data on a scheduled basis.

7.22.2 Friendly H*ours:*

Friendly *Hours* list shall be configurable on meter & during this period no disconnection shall be done.

The utility shall be able to define the **Friendly *Hours*** and shall be communicated to the meter through HES. The meter shall accommodate the "**Friendly *Hours***" features. These are time periods during which the meter shall not cut-off power to consumer if the credit becomes negative.

7.22.3 Emergency credit:

Provision shall be made in the meter for an Emergency Credit facility that allows the customer to draw on an emergency basis should be recorded in the register. Emergency Credit facility shall be configurable on HES & during this period no disconnection shall be done from HES side.

7.22.4 Load Control

Meter shall support relay connection/disconnection in following conditions:

- Over Current
- Load control limit (Load Control limits shall be remotely programmable).
- Disconnect signal from Utility Control Centre

7.22.*5 Load Disconnection/Reconnection:*

i) Load disconnection –

a) If meter credit is exhausted, then meter should disconnect immediately. At any reason if authority wants to disconnect the load of the meter, Disconnection shall be done from HES.

b) On defined tamper/event condition meter will disconnect the load.

ii) Load Reconnection-

a) Reconnection mechanism under disconnection from utility control center: Reconnection shall normally be done from HES.

7.22.6 Low Credit indication & alarm*:*

When balance is less than defined value in meter, the meter could trigger one alarm and push to HES.

7.22.7 E- Recharge /Vending -

a) The Vending system shall be available for online recharge as well as physical recharge. After online recharge, meter should get credited immediately and automatically.

b) Customer should receive SMS/email notification like low credit, zero balance, negative balance, recharge successful, recharge failed, Emergency in use, friendly in use, load disconnect.

7.23 *Meter identification cards*

a) In case of keypad meters, for each meter shall be supplied with a meter identification card, which complies with NRS 009-4: 1995.

b) The printed details and graphic design of the cards shall be submitted prior to producing the cards.

7.24 *Testing and approval*

a) It will be the responsibility of the tenderer to submit to the Employers representative for approval a complete Acceptance Test Procedure (ATP) for system verification.

b) Once the Employer's representatives approve the ATP, the testing and performance validation tests on 2% (random samples) of the supplied meters will commence. The Employer's representative at the utility's premises will witness these tests.

7.25 Quality assurance

Tenderers shall comply with and be certified to the following ISO levels:

ISO 9001 Quality systems

Model for quality assurance in design development production installation and servicing

Model for quality assurance in final inspection and test

Tenderers shall submit copies of certification with their proposal to this effect.

7.26 *Keypad Numbering Scheme*

The meter number scheme will be the unique and be followed by a convention of all the utilities. The number scheme will not be the scheme described but the description will be the basic of the convention of the meter number scheme which will be supplied after signing of the contract

While the manufacturer is free to use any number scheme they see fit, the number scheme must be secure and use minimum number of digits and must always contain the following fields in encrypted form:

Meter ID

Recharged amount

Sanctioned Load

Sequence Number

The meter must check the validity of these fields before recharging the credit. The sequence number is an auto generated number starting from 1 for each recharge or keypad numbers. A keypad number will only be accepted if the previous number has been keyed in. For example, if a consumer goes to POS to recharge 300Tk and gets key code xxxyyyzzz (which contains sequence number n). The next month he goes again to recharge 250Tk and gets key code pppqqqrrr (which contains sequence number n+1). Key code pppqqqrrr will only be accepted if xxxyyyzzz has been keyed in previously i.e. meter will only accept a key code containing sequence number 'n' if at some point key code containing sequence number 'n-1' has been keyed in. This is to ensure that key codes are not discarded by a consumer intentionally.

Periodically it may be necessary to generate a key code that contains more data. The key code scheme must be able to accommodate the following data if and when required:

Meter ID

Recharged amount

Sanctioned Load

Sequence Number

Load Change

- Sanctioned Load
- Start Time

Rate

- Start Unit
- Peak Rate
- Off peak Rate
- Activation Date

It is assumed that the keypad number with only the meter id, amount, load and sequence number will be a lot shorter that the key code containing all the rate information.

7.27 *Meter Connection Procedure*

After meter install in the field, it is mandatory to register meter in the vending system. The register operation will make system communicate with meter and confirm the communication ability.

7.28 Meter Numbering

It must be possible to program the meter with 12-digit meter number.

7.29 Tariff Management

7.29.1 Tariff Definition

The System Manager shall be able to define tariff objects. Each tariff has a unique tariff ID associated with it. The following information is required to define a tariff.

Tariff ID	A unique tariff identifier
Effective Date	The date on which the tariff will be effective.

Tariff and all charges will be effective as per direction of Bangladesh Energy Regulatory Commission (BERC).

Present Tariff Structure and other charges (for reference)

LT (Low Tension) : i) Single Phase: 230 Volt, 0-7.5 kW & ii) Three Phase: 400 Volt, 0-50 kW

1. LT-A : Residential		
Step Structure	**Step**	**Energy Rate/Charge (Tk./Kwh)**
Life line	0-50 kWh	R_0 = 4.63
1st Step	0-75 kWh	R_1= 5.26
2nd Step	76-200 kWh	R_2= 7.20
3rd Step	201-300 kWh	R_3= 7.59
4th Step	301-400 kWh	R_4= 8.02
5th Step	401-600 kWh	R_5= 12.67
6th Step	600+ kWh	R_6= 14.61

Consumer Class		**ToU**	**Energy Rate/Charge (Tk./Kwh)**
2	LT-B: Agriculture Pump		R_0 = 5.25
3	LT-C1: Small Industries	Flat Off-peak Peak	R_0= 10.76 R_1= 9.68 R_2= 12.95
4	LT-C2: Construction		R_0= 15.15
5	LT-D1: Education, Religious & Charitable and Hospital		R_0= 7.55
6	LT-D2: Street Light, Water Pump		R_0= 9.71
7	LT-D3: Battery Charging Station	Flat Off-peak Supper Off-peak Peak	R_0= 9.62 R_1= 8.66 R_2= 7.68 R3= 12.14
8	LT-E: Commercial & Office	Flat Off-peak Peak	R_0= 13.01 R_1= 11.71 R_2= 15.62
9	LT-T: Temporary		R_0= 20.17

Subject	**Tariff Category**	**PFC Calculation**
Power Factor Correction (PFC) Charges	LT-A, B, C1, D1& E' Category,3-Phase, 400V, 20KW & above LT- C2 & D2 (Only Pump)' Category, 3-Phase, 400V	* PF Maintain in 0.95 to 1.00. * Power Factor (PF) obtained from meter. * Monthly average PF less than 0.95 then- From 0.95 to 0.75 for every 0.01 step less surcharge will impose 0.75% of energy bill.

Subject	Tariff Category	Time
Time of Use	LT-C1& E Category	Peak – 17:00 to 23:00 Off Peak-23:00 to 17:00 Flat-24 hours
	LT-D3 Category	Peak – 17:00 to 23:00 Off Peak-23:00 to 05:00 and 09:00 to 17:00 Super Off Peak-05:00 to 09:00 Flat-24 hours

Meter Rent	A fixed charge is levied per month.
Sanctioned Demand Charges (Fixed Charge)	A fixed charge per kW of the sanctioned demand is levied per month.
Maximum Demand Charges	Integrated over ½ hourly periods Maximum Demand in KW.
VAT	Value added tax is levied on electricity charges and must be catered for in the system.

a) The tariff code, effective date, kWh_x (in units of kWh), R_x together with a fixed monthly service Charges and a fixed monthly sanctioned demand shall be used to define all Pre-payment tariffs used in the system.

b) The MIC shall make provision for up to 500 tariff definitions.

c) The MIC must verify the tariff data entered and shall not allow discontinuities in the energy levels or negative rates for energy and fixed charges.

d) There shall be a facility to copy tariffs to new tariff codes for editing purposes. The edit facility shall include a mechanism to increase the values of any of the variables R_x, SC and DC by a fixed percentage.

e) Tables of Supply Group Codes and tariffs shall be securely stored at the MIC.

f) No penalty Charges for Power Factor above 0.95 to 1.0. Power Factor Correction Charge is computed as above and average power factor is measured by meter based on only reactive energy. The monthly average power factor from meter is used for the factor and applied on the monthly consumption.

7.29.2 Tariff Algorithm

The Pre-payment system can implement stepped tariffs. The tariffs will be implemented at the vending equipment/meter. The algorithm must ensure that:

a) The Stepped tariffs are implemented in meter as accurately as is the case for conventionally bitted customers.

b) Customers are not restricted to the amount and frequency of electricity token purchases provided purchases.

c) If any tariff changes, the updated tariff will be sent using special numbers for keypad meters. After utility decides the tariff update, all purchase of credit (with keypad number) will carry and tariff change flag. So that the meter will not accept any credit addition until it gets the tariff update.

d) Customers will purchase only following credit transfer principles.

e) For consecutive purchase in the same month, credit values without any fixed charge will be sent to the meter.

f) Slab reset service charges, power factor penalty (PFC) should be monthly basis.

g) The tender shall provide a detailed description of the algorithm including:

1. All assumptions made.
2. An explanation of how the averaging algorithm operates.
3. Examples of how the algorithm works.
4. Examples of how to explain the algorithm to customers.
5. Examples of how to deal with customer's queries.
6. Description of how the algorithm manages tariff rate and tariff structure change.
7. Description to apply corrections
8. Description to mechanisms to how to deal with the situation where a customer buys at two different locations between data transfers.
9. Online data transfer is required so that customers can buy token from any vending system and different locations.

7.30 Data Format

Individual Meter Status

Column	Data Name	Data Type	Description
1	Meter No	String (12)	014012345678
2	Status	String (1)	0: offline 1: online
3	Reading Time	String (19)	YYYY-MM-DD_HH:mm: ss

7.31 Packing:

Meters must be export packed and properly protected for shipment, rough transportation and storage. Specific care shall be taken for protection in store and reference is made to the climatic condition prevailing in Bangladesh.

Each unit shall be sealed in waterproof polyethylene bag having a silica gel packet placed inside the unit and then packed in polystyrene foam gasket closed by self adhesive tape rating of the meter shall be marked by marker pen or label on the form for easy identification.

Maximum 10 (ten) nos. of complete metering units are allowed to pack into a wooden packaging box lined with heavy gauge polyethylene. Between metering units, a suitable packing material for protection and preventing their movement should be used. Silica gel should be provided inside each polyethylene wrapper. The packing case should be able to withstand accidental direct exposure to weather for reasonable period.

The supplier shall be responsible for damages due to inadequate packing. A packing list showing the contents of each packing shall be enclosed in a waterproof envelope secured outside of the packing case. A copy of the packing list shall also be enclosed inside the package.

All packages imported are liable to be opened for customs examination at the port of landing and packing shall therefore be designed to facilitate opening and repackaging thereafter.

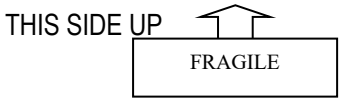
A red band (20 cm wide) shall be painted all around each package. Each package shall have the following information printed on it bold letters.

- Name of supplier.
- Port of loading.
- Port of destination.
- Name of consignee.
- Contract number.
- Brief description of stores.
- Number of packages. (total quantity)
- Gross and net weight.
- Dimension.

In addition, each package shall be clearly marked or stenciled in red on two sides, the shipping mark WZPDCL, BANGLADESH inscribed within a triangle marked shown below:

The shipping mark

On the other two sides, arrow marking with words “THIS SIDE UP” and “FRAGILE” shall be clearly marked or stenciled to indicate the face of the package to keep upward.



7.33 TECHNICAL ORIENTATION AND QUALITY TEST WITNESS:

A. FACRORY INSPECTION AND TEST WITNESS:

Witnessing of the manufacturing process and tests of the equipment at manufacturer’s premises including transfer of technical know-how shall be required/held as detailed elsewhere in Particular Conditions of Contract (GCC 41.2) of tender document and other than this the following will be as follows:

The inspection team proposed by the purchaser or consignee (if consignee is Project Director) and approved by the competent authority shall have the right to inspect, examine and test the workmanship and performance of the goods/materials to confirm the conformity to the specification at all reasonable time before and during manufacture at the manufacturer's premises.

The manufacturer will allow inspection team to inspect the manufacturing process and quality control and progress of the work at any time need by inspection team. This team will witness the Factory/Technical orientation & Quality test at the manufacturer's plant. The Manufacturer shall have facilities to carry out all tests at its premises and shall provide free of charge such assistance, labor, materials, electricity, fuel, stores, apparatus and instruments as may be requisite and as may be reasonably demanded to carry out such test efficiently.

The inspection team maximum 2 (two) times may inspect (if required) the goods during the manufacturing process or after manufacture of Goods as required and shall also request to supplier for the purchase/ import/ shipping documents of major/key materials of Goods and shall check in accordance with Guaranteed Technical Particulars (GTP) and guarantees of the contract. All expenses for such tests shall be borne by the supplier.

Inspection Team will witness the routine test at the manufacturer's premises. Tests shall be performed in accordance with the relevant IEC/BS/ANSI/ASTM/BDS standards or any other standard mentioned in the contract document which shall be complied with the Guaranteed Technical Particulars (GTP) of the Contract. All expenses for such tests shall be borne by the Contractor.

At the time of Factory Test witness Inspection Team will check the calibration seal/certificate of the testing/measuring equipment, meters etc. issued by the competent authority. The contractor shall ensure that the Manufacturer shall complete the calibration of the testing/ measuring equipment, meters etc. before the inspection of team.

The Supplier shall, after consulting the consignee, give notice to the consignee in writing of the date and the place where the material or equipment will be ready for testing at least 15 days before schedule of inspection. The consignee shall give the supplier timely notice in writing of his intention to attend the test. As and when the consignee is satisfied that any materials/equipment shall have passed the tests referred to in this clause, consignee shall notify the contractor in writing to that effect.
Should any inspected/ tested goods fail to conform to the specification, the consignee shall have the right to reject any of the items or complete batch if necessary. In that case Supplier has to replace the equipment and to make good of them and the supplier shall conduct similar pre-delivery Inspection and factory tests without any financial involvement to the consignee. In case any of the Equipment/goods found not conforming to the specification at the time of post landing Inspection, the supplier will in no way be relieved from the responsibility of replacing them on making them good at their own cost, despite the Equipment were found good at the time of Factory Acceptance Test in respect of quality and quantity. Nothing in this clause shall in any way release the supplier from any warranty or other obligations under the contract.

If the offered goods are manufactured outside the purchaser's country then Utility's Inspection Team shall have to conduct Technical Orientation and Quality Test Witness at the manufacturer's factory premises. The Purchaser's nominated "Engineering Team" consisting of at least 03 (Three) Engineers in each team shall take part in the witness of the QAT of the goods/ Technical Orientation on the manufacturer's premises for a period of 7 days (excluding journey time). All the cost regarding QAT witness by the Purchaser's 'Engineering Team' i.e. the cost of Air Ticket from Dhaka to the place of inspection/training & return, internal transportation, Phone, Fax, E-mail, Health insurance, Hotel accommodation, Food etc. and pocket money of 150 USD per day per person for the period of 7 days (excluding journey time) shall be borne by the Contractor and the cost shall be included with the equipment's quoted price.
For any reason, if Purchaser's/ Employer's representative(s) cannot attend above mentioned "Witnessing of the manufacturing process and tests of the Goods at manufacturer's works including transfer of technical know-how" program, a Third-Party Inspection Company/Agency shall conduct/ witness Pre-shipment Inspections as well as Factory Acceptance Tests as per Contract and relevant standard at the manufacturer's Premises with the concurrence of WZPDCL. The Third-Party Inspector shall submit a comprehensive report to Purchaser with recommendation accompanied with photograph and video clips with date and time of the Equipment/ Materials/ Goods inspected within 7 days after completion of respective inspection/Test. After approval of Third-Party Inspection report by WZPDCL, Shipping advice shall be issued to Supplier/ Contractor. No Equipment/ Materials/ Goods shall be shipped without shipping advice.

The inspections/ Tests shall be performed on as-needed basis as per schedule provided by the respective manufacturers.
Manufacturer/ Supplier/ Contractor shall bear cost pertaining to third party inspection team/WZPDCL's representative(s). Manufacturer/ Supplier/ Contractor shall facilitate and provide full support for the Pre-Shipment Inspection/Witnessing of Factory Acceptance Test and transfer of technical know-how to WZPDCL representative(s).
The third-party inspection company/agency must not be involved in design, procurement, fabrication, construction and installation under this Contract.
WZPDCL will select any of the following companies/agencies as Third Party Inspector:
1. BUREAU VERITAS
2. SGS
3. Black and Veatch
4. TUV SUD
5. Lloyd Inspection Agency
6. Mott MacDonald
7. Intertek group

With the approval of WZPDCL, Contractor/Supplier shall engage Third Party Inspection company/agency. WZPDCL reserves the right to revise the above-mentioned list.

If the offered goods are manufactured within the purchaser's country, then the manufacturer/supplier shall have the testing facilities at manufacturer's/supplier's premises in accordance with the relevant IEC/BS/ANSI/ASTM/BDS Standards. The inspector(s) shall send the sample material (selected by the Inspection Team consisting of at least three engineers in each consignment) to Utility's own meter testing lab/BUET/CUET/KUET/RUET/DUET to carry out any test(s) pending due to lack of testing facilities or any reason at the manufacturer's/supplier's premises. All cost of testing including carrying, loading, un-loading etc. will be borne by the supplier and shall be deemed to be included in the offered price. If the sample(s) fails to confirm the specification, the full consignment will be rejected.
No goods shall be packed, prepared for shipment/delivery unless it has been approved and written instructions have been received from the consignee.

On successful completion of Pre-shipment inspection/quality test witness, delivery of goods will be made to the designated stores under contractor's/supplier's responsibility until Post-Landing Inspection is successfully completed without any obligation on part of utility. Quality and quantity of the delivered goods will be determined at the time of post-landing inspection at the designated stores in presence of the authorized representative of the contractor/supplier. After approval of the satisfactory Post-Landing Inspection, R&I Report will be issued following the contractual obligations.

B. RANDOM SAMPLE TEST DURING FACTORY INSPECTION AND WITNESS: Required
During Pre-Delivery Inspection & Factory Test Witnessing of the goods to be supplied under the Contract, the Inspection Team will witness the routine tests at the manufacturer's premises. The Inspection Team will select goods on random sampling basis. The Tests shall be performed in accordance with the relevant IEC/BS/ANSI/ASTM/BDS standards or any other standard mentioned in the contract document which shall be complied with the Guaranteed Technical Particulars (GTP) of the Contract. All expenses for such tests shall be borne by the Contractor.

C. ACCEPTANCE REPORT OF GOODS FOR DELIVERY:
If the test results of the tested sample(s) during factory test witness by the inspection team fail to confirm the specification and the Guaranteed Technical Particulars (GTP), the full consignment will be rejected. A formal delivery order will be issued after satisfactory pre-delivery inspection & test report by inspection team.

D. POST-DELIVERY INSPECTION & TESTING:
Post Landing Inspection shall be done after arrival of the goods at **Final destination** as detailed elsewhere in Particular Conditions of Contract (GCC 41.2) of Tender Document and other than this the following will be as follows:

The Supplier shall inform (within 5 (five) working days) the purchaser or consignee (if consignee is Project Director) immediately after arrival of the goods at the designated store of utility (as per delivery schedule). An Inspection team (may be the previously or newly formed team) shall start to perform the post-landing inspection not beyond 10 (ten) working days in presence of supplier's representative after getting information from supplier about the delivery of goods at designated store. The Supplier shall arrange post-landing inspection as per program in consultation with the consignee. If any defect or damage has been found at post-landing inspection, the defective or damaged materials/ goods shall be replaced by the supplier at his own cost within the stipulated time.
The purchaser's or consignee's (if consignee is Project Director) right to inspect, test (where necessary) and reject the goods after delivery at the designated stores of utility shall in no way be limited or waived by reason of the goods having previously been inspected, tested and passed by the purchaser prior to the goods' delivery.

The Inspection team will check the physical conditions and quantity of the goods delivered. The inspection team will select the sample of good(s) on random sampling basis and send the selected sample goods to utility's own meter testing lab/BUET/ CUET/ KUET /RUET/DUET (as selected by the inspection team) to carry-out the test(s) as per contract to confirm the conformity to the approved Technical Specifications, Guaranteed Technical Particulars (GTP), drawings and relevant standards. If the tested sample(s) fail to confirm the specifications in tests, the full consignment will be rejected. All cost of testing of Materials/ Goods including carrying, loading, un-loading etc. will be borne by the supplier.

7.34 Guaranteed Technical Particulars (GTP)

GTP of 230 Volt, 5(60)A Single-Phase Smart Prepayment Energy Meter

(To be filled up and signed by the Tenderer)

Sl. No.	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
1.	Reference Standard	-	IEC	
2.	Manufacturer's Name & address		To be mentioned	
3.	Year of Manufacturing		To be mentioned	
4.	Country of origin		To be mentioned	
5.	Firmware version for meter		To be mentioned	
6.	Firmware version for communications		To be mentioned	
7.	Meter parameterization software version		To be mentioned	
8.	Model of Meter	-	To be mentioned	
9.	Type of meter	-	Indoor/Outdoor	
10.	Connection	-	1- phase, 2-wire (unidirectional, programmable to bi-directional for net metering)	
11.	Rated voltage	Volt	230	
12.	Maximum voltage	Volt	280	

Sl. No.	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
13.	Basic Current (I_b)	Amp	<=5	
14.	Maximum Current (I_{max})	Amp	60	
15.	Frequency	Hz	50	
16.	Number of Terminal	No.	4	
17.	Diameter of Terminal; Bore	mm	6mm to accommodate 10 mm^2 cable	
18.	No. of Element (minimum)	No.	2 (One in Phase & other in Neutral)	
19.	Voltage circuit loss at rated voltage	VA & W	5VA, 2 Watt	
20.	Current circuit loss at rated current	VA	2.5	
21.	Variation of Power factor		0.5 lag to 0.8 lead	
22.	Variation of voltage		+30% to -30%	
23.	Impulse withstand voltage	KV	6	
24.	Starting current	mA	<= 0.4% of basic current	
25.	KWh register type	-	LCD Display	
26.	Meter constant	Impulse/ kWhr	To be mentioned	
27.	Accuracy class	Class	1.0	
28.	Performance Curve		To be submitted	
29.	Type of Battery		Lithium Battery. It is to be noted here that without support of external battery, meter should operate at least six hours with the support of inbuilt super-capacitor. (Supported by Manufacturer's Authorization Letter)	
30.	Built in clock		Real Time Clock (RTC) as per IEC 62054-21 or updated version (Sample meter time and date shall be same as real time of Bangladesh)	
31.	Battery Reserve & life		10 (Ten) Years	
32.	No. of Digits for Credit Storage		6+2	
33.	Credit Transfer System		CTS	
34.	Tariff Structure		Utility's tariff structure	
35.	KWh dispensing register		Solid state LCD Display	
36.	Front Page Indications		- Credit Status, - Accept/Reject - Low credit warning - Consumption Rate - Tamper Indication	
37.	Disconnection Facility		- On credit expiry, - Decommissioning state - Exceeded Power threshold - When tampered	
38.	Provision for emergency Friendly		To be mentioned	

Sl. No.	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
	Credit			
39.	Time interval of re-calibration (minimum)	Year	10	
40.	Service life (minimum)	Year	10	
41	Weight of meter	Kg	To be mentioned	
42	Overall dimensions (height, width, depth)	mm	To be mentioned	
43	Load Control		To be mentioned	
44	Warranty	Years	3 Years	
45	List of Recommended Spares		To be mentioned	
46	Any other facility if any		To be mentioned	
47	Meter body sealing condition		Fully Ultrasonic welded/ Hermatically Sealed	
48	Latching relay		As per specification mentioned in Section- 7.6.3 (Supported by Manufacturer's Authorization Letter)	
49	Number of latching relay	Nos.	**One relay for phase** and **one relay for neutral** Or **A single integrated** (having more than one contact) **relay for phase and neutral**	
50	Communication		Plug and play type BPLC AND GPRS	
51	Communication Protocal		DLMS/COSEM & IDIS	

Demonstration of the Prepayment Meter and DCU

1. The Employer shall invite Tenderer to demonstrate smart prepayment meters as part of the technical evaluation. The demonstration of the offered smart meters shall be mandatory to accept the Bids for detailed technical evaluation.
2. The demonstration shall be held in Utility Premises and the Employer shall provide a venue with projector.
3. The Tenderer shall arrange all equipment, software and logistics, included but not limited to, computers, printers and network equipment, communication links, smart prepayment meter prototypes, power supplies, test loads for the meters, all cables/wiring and consumables, transport including human resources required for the demonstration.

The contractor shall explain how the demonstration set-up differs from the production set-up required for this Bid and explains the data architecture of the system prior to the demonstration.

The key requirements for the demonstration shall be:

a) A fully functional smart prepayment system with two single phase prepayment meters with BPLC and GPRS communication modules shall be demonstrated.

For demonstration purpose, the Tenderer has to submit fully functional offered type Two Single Phase Smart Pre-payment meters as Sample Meter(s) along with their bid. Bidders can apply for interfacing or interoperability test of meter with existing DCU/ Vending System/ HES/ MDM prior to demonstration and the utility must cooperate the potential bidders by providing necessary documents, test environment etc.

engaging own experts. During demonstration the tenderer shall demonstrate using offered type meters with emphasis on demonstrating key functionality. It is to be noted here that without support of external battery, meter should operate at least six hours with the support of inbuilt super-capacitor.
The Tenderer shall have to present and demonstrate successfully the functionality of the offered type sample meters with HES as per Technical Specification of tender requirements. The Tenderer needs to demonstrate interfacing and interoperability of the offered type smart meter with existing DCU compliance to interoperability protocol. For each single device, proof of conformity for the chosen application standards (e.g., DLMS/COSEM) as well as communication standards (e.g., BPLC, etc.) is required.

Additional Key points

1. Utility incorporates the necessary API documents or procedural manual in the tender document for any kind of integration with existing vending system or MDM as well as interfacing with installed DCU.
2. The meter shall be programmable for special arrangements like Mother-Child Scheme and Net Metering implementation.
3. The meter must follow the guideline of BSTI and marked its logo on the meter body.
4. End to End data transfer shall be encrypted with AES-256. Communication devices shall support IPv6.
5. Hardware Security Module (HSM) can be used for security.

Justified Short Code

There are short code table, through this short code, user can get the information of meter.

Short code	Data meaning	Short code	Data meaning
Any code	Cancel audible alarm	00	Active emergency overdraft
800	Total positive active energy	801	Meter remaining balance
802	Current date	803	Current time
804	Meter serial No.	805	SGC No.
806	Reason of relay operation	807	Meter status words
808	Total instantaneous power	809	Tariff index number
810	Emergency Overdraft limit	811	Active emergency overdraft
813	Total forward active energy for yesterday	814	Total forward active energy for current month
815	Recharge date for last time	816	Recharge time for last time
817	Recharge amount for last time	818	Log out return code
819	Power outage No	820	Total forward active energy for last month
821	Total forward active energy for last 2nd month	822	Total forward active energy for last 3rd month
823	Total forward active energy for last 4th month	824	Total forward active energy for last 5th month
825	Total forward active energy for last 6th month	830	TOKEN code for last time recharging
831	TOKEN codes for last 2nd time recharging	832	TOKEN codes for last 3rd time recharging
833	TOKEN codes for last 4th time recharging	834	TOKEN codes for last 5th time recharging

835	TOKEN codes for last 6th time recharging	836	TOKEN codes for last 7th time recharging
837	TOKEN codes for last 8th time recharging	838	TOKEN codes for last 9th time recharging
839	TOKEN codes for last 10th time recharging	865	Meter entering normal working mode
866	Measuring accuracy displays 3 decimals, automatically exit after 1 minute	868	Relay testing
869	Maximum power (Load Limit)	870	A phase voltage
871	B phase voltage (not support in single phase meter)	872	C phase voltage (not support in single phase meter)
873	Key version No.	874	A phase current
875	B phase current	876	C phase current (not support in single phase meter)
877	A phase power	878	B phase power
879	C phase power (not support in single phase meter)	880	Average value for daily power consumption
881	Average value for monthly power consumption	886	The price of current Tariff
887	Current step tariff	888	Recharging return code
889	Current TOKEN sequence No.	890	TOKEN rejected times
891	TOKEN accepted times	892	Relay connection times
893	Relay disconnection times	894	Max. overdraft amount under friendly mode
895	Allowed using days under friendly mode	896	Already used days under friendly mode
897	Start time of friendly hour	898	End time of friendly hour
899	Weekend	900	The status of friendly mode 1：uuworkday: No-friendly mode or friendly times is run out 2：F-Hour: Friendly hour 3：uueekend : weekend 4：holiday: holiday 5：EnnErg: emergency mode 6：SpEciAL: weekend or friendly day is finished but does not arrival next day 10 o' clock
901	kWh of Step 1/ kWh of Tariff 1	902	kWh of Step 2/ kWh of Tariff 2
903	kWh of Step 3/ kWh of Tariff 3	904	kWh of Step 4/ kWh of Tariff 4
905	kWh of Step 5/ kWh of Tariff 5	906	kWh of Step 6/ kWh of Tariff 6
907	kWh of Step 7/ kWh of Tariff 7	908	rate of Step 1/ price of Tariff 1
909	rate of Step 2/ price of Tariff 2	910	rate of Step 3/ price of Tariff 3
911	rate of Step 4/ price of Tariff 4	912	rate of Step 5/ price of Tariff 5
913	rate of Step 6/ price of Tariff 6	914	rate of Step 7/ price of Tariff 7
915	rate of Step 8/ price of Tariff 8	916	The average PF of last month
917	Level 1 alarm of balance low	918	Level 2 alarm of balance low
919	Level 3 alarm of balance low	920	Special step status word
921	Already used times of weekend	922	Consumption amount of current month
923	Consumption amount of last month	924	Consumption amount of last 2nd month
925	Consumption amount of last 3rd month	926	Consumption amount of last 4th month
927	Consumption amount of last 5th month	928	Consumption amount of last 6th month
930 *	PFC of last month (not support in single phase meter)	931	PFC of last 2nd month (not support in single phase meter)
932	PFC of last 3rd month (not support in single phase meter)	933	PFC of last 4th month (not support in single phase meter)
934	PFC of last 5th month (not support in single phase meter)	935	PFC oflast 6th month (not support in single phase meter)
940	Reactive energy of last month	941	Reactive energy of last 2nd month
942	Reactive energy of last 3rd month	943	Reactive energy of last 4th month
944	Reactive energy of last 5th month	945	Reactive energy of last 6th month
952	Prepay Mode or Post-pay mode indication	953	Neutral Current
954	Total tariff 1active energy (KWh)	955	Total tariff 2 active energy(KWh)
956	Total tariff 3active energy(KWh)	957	Total tariff 4 active energy(KWh)
958	Total tariff 5active energy(KWh)	959	Total tariff 6 active energy(KWh)
960	Total tariff 7active energy(KWh)	961	Total tariff 8 active energy(KWh)
962	Positive tariff 1 reactive energy	963	Positive tariff 1 reactive energy

964	Positive tariff 3 reactive energy	965	Positive tariff 3 reactive energy
966	Total positive reactive energy	970	Negative tariff 1 reactive energy
971	Negative tariff 2 reactive energy	972	Negative tariff 3 reactive energy
973	Negative tariff 4 reactive energy	974	Total negative reactive energy
981	Emergency overdraft balance	985	Total consumption credit
986	Remaining energy (estimated value)	998	Average power factor of current month
420	The opening terminal cover time for last time	421	The opening terminal cover date for last time

Standard OBIS Information

NO.	Data Name	Standard OBIS	Standard CIM
1	A phase Current	3#1.0.31.7.0.255#2	0.0.0.12.0.1.4.0.0.0.0.0.0.0.128.0.5.0
2	A phase Power Factor	3#1.0.33.7.0.255#2	0.0.0.12.19.1.37.0.0.0.0.0.0.0.224.3.38.0
3	A phase Voltage	3#1.0.32.7.0.255#2	0.0.0.12.0.1.54.0.0.0.0.0.0.0.128.0.29.0
4	Active energy (|+A|-|-A|) Net tariff1	3#1.0.16.8.1.255#2	0.26.0.1.4.1.12.0.0.0.0.1.0.0.224.3.72.0
5	Active energy (|+A|-|-A|) Net tariff2	3#1.0.16.8.2.255#2	0.26.0.1.4.1.12.0.0.0.0.2.0.0.224.3.72.0
6	Active energy (|+A|-|-A|) Net tariff3	3#1.0.16.8.3.255#2	0.26.0.1.4.1.12.0.0.0.0.3.0.0.224.3.72.0
7	Active energy (|+A|-|-A|) Net tariff4	3#1.0.16.8.4.255#2	0.26.0.1.4.1.12.0.0.0.0.4.0.0.224.3.72.0
8	Active energy (|+A|-|-A|) Net total	3#1.0.16.8.0.255#2	0.26.0.1.4.1.12.0.0.0.0.0.0.0.224.3.72.0
9	Active energy (|+A|+|-A|) Combined tariff1	3#1.0.15.8.1.255#2	0.26.0.1.20.1.12.0.0.0.0.1.0.0.224.3.72.0
10	Active energy (|+A|+|-A|) Combined tariff2	3#1.0.15.8.2.255#2	0.26.0.1.20.1.12.0.0.0.0.2.0.0.224.3.72.0
11	Active energy (|+A|+|-A|) Combined tariff3	3#1.0.15.8.3.255#2	0.26.0.1.20.1.12.0.0.0.0.3.0.0.224.3.72.0
12	Active energy (|+A|+|-A|) Combined tariff4	3#1.0.15.8.4.255#2	0.26.0.1.20.1.12.0.0.0.0.4.0.0.224.3.72.0
13	Active energy (|+A|+|-A|) Combined total	3#1.0.15.8.0.255#2	0.26.0.1.20.1.12.0.0.0.0.0.0.0.224.3.72.0
14	Active energy export (-A)	3#1.0.2.8.0.255#2	0.26.0.1.19.1.12.0.0.0.0.0.0.0.224.3.72.0
15	Active energy export (-A) rate1	3#1.0.2.8.1.255#2	0.26.0.1.19.1.12.0.0.0.0.1.0.0.224.3.72.0
16	Active energy export (-A) rate2	3#1.0.2.8.2.255#2	0.26.0.1.19.1.12.0.0.0.0.2.0.0.224.3.72.0
17	Active energy export (-A) rate3	3#1.0.2.8.3.255#2	0.26.0.1.19.1.12.0.0.0.0.3.0.0.224.3.72.0
18	Active energy export (-A) rate4	3#1.0.2.8.4.255#2	0.26.0.1.19.1.12.0.0.0.0.4.0.0.224.3.72.0
19	Active energy export (-A) rate5	3#1.0.2.8.5.255#2	0.26.0.1.19.1.12.0.0.0.0.5.0.0.224.3.72.0
20	Active energy export (-A) rate6	3#1.0.2.8.6.255#2	0.26.0.1.19.1.12.0.0.0.0.6.0.0.224.3.72.0
21	Active energy export (-A) rate7	3#1.0.2.8.7.255#2	0.26.0.1.19.1.12.0.0.0.0.7.0.0.224.3.72.0
22	Active energy export (-A) rate8	3#1.0.2.8.8.255#2	0.26.0.1.19.1.12.0.0.0.0.8.0.0.224.3.72.0
23	Active energy import (+A)	3#1.0.1.8.0.255#2	0.26.0.1.1.1.12.0.0.0.0.0.0.0.224.3.72.0
24	Active energy import (+A) rate1	3#1.0.1.8.1.255#2	0.26.0.1.1.1.12.0.0.0.0.1.0.0.224.3.72.0
25	Active energy import (+A) rate2	3#1.0.1.8.2.255#2	0.26.0.1.1.1.12.0.0.0.0.2.0.0.224.3.72.0
26	Active energy import (+A) rate3	3#1.0.1.8.3.255#2	0.26.0.1.1.1.12.0.0.0.0.3.0.0.224.3.72.0
27	Active energy import (+A) rate4	3#1.0.1.8.4.255#2	0.26.0.1.1.1.12.0.0.0.0.4.0.0.224.3.72.0
28	Active energy import (+A) rate5	3#1.0.1.8.5.255#2	0.26.0.1.1.1.12.0.0.0.0.5.0.0.224.3.72.0
29	Active energy import (+A) rate6	3#1.0.1.8.6.255#2	0.26.0.1.1.1.12.0.0.0.0.6.0.0.224.3.72.0
30	Active energy import (+A) rate7	3#1.0.1.8.7.255#2	0.26.0.1.1.1.12.0.0.0.0.7.0.0.224.3.72.0

31	Active energy import (+A) rate8	3#1.0.1.8.8.255#2	0.26.0.1.1.1.12.0.0.0.0.8.0.0.224.3.72.0
32	Active MD (-)	4#1.0.2.6.0.255#2	0.8.2.6.19.1.8.0.0.0.0.0.0.0.224.3.38.0
33	Active MD (-) tariff1	4#1.0.2.6.1.255#2	0.8.2.6.19.1.8.0.0.0.0.1.0.0.224.3.38.0
34	Active MD (-) tariff2	4#1.0.2.6.2.255#2	0.8.2.6.19.1.8.0.0.0.0.2.0.0.224.3.38.0
35	Active MD (-) tariff3	4#1.0.2.6.3.255#2	0.8.2.6.19.1.8.0.0.0.0.3.0.0.224.3.38.0
36	Active MD (-) tariff4	4#1.0.2.6.4.255#2	0.8.2.6.19.1.8.0.0.0.0.4.0.0.224.3.38.0
37	Active MD (|QI+QIV|+|QII+QIII|)	4#1.0.15.6.0.255#2	0.8.0.6.20.1.8.0.0.0.0.0.0.0.224.3.38.0
38	Active MD (|QI+QIV|+|QII+QIII|) tariff1	4#1.0.15.6.1.255#2	0.8.0.6.20.1.8.0.0.0.0.1.0.0.224.3.38.0
39	Active MD (|QI+QIV|+|QII+QIII|) tariff2	4#1.0.15.6.2.255#2	0.8.0.6.20.1.8.0.0.0.0.2.0.0.224.3.38.0
40	Active MD (|QI+QIV|+|QII+QIII|) tariff3	4#1.0.15.6.3.255#2	0.8.0.6.20.1.8.0.0.0.0.3.0.0.224.3.38.0
41	Active MD (|QI+QIV|+|QII+QIII|) tariff4	4#1.0.15.6.4.255#2	0.8.0.6.20.1.8.0.0.0.0.4.0.0.224.3.38.0
42	Active MD (+)	4#1.0.1.6.0.255#2	0.8.0.6.1.1.8.0.0.0.0.0.0.0.224.3.38.0
43	Active MD (+) tariff1	4#1.0.1.6.1.255#2	0.8.0.6.1.1.8.0.0.0.0.1.0.0.224.3.38.0
44	Active MD (+) tariff2	4#1.0.1.6.2.255#2	0.8.0.6.1.1.8.0.0.0.0.2.0.0.224.3.38.0
45	Active MD (+) tariff3	4#1.0.1.6.3.255#2	0.8.0.6.1.1.8.0.0.0.0.3.0.0.224.3.38.0
46	Active MD (+) tariff4	4#1.0.1.6.4.255#2	0.8.0.6.1.1.8.0.0.0.0.4.0.0.224.3.38.0
47	Tariff 5 Active MD(+)	4#1.0.1.6.5.255#2	0.8.0.6.1.1.8.0.0.0.0.5.0.0.224.3.38.0
48	Tariff 6 Active MD(+)	4#1.0.1.6.6.255#2	0.8.0.6.1.1.8.0.0.0.0.6.0.0.224.3.38.0
49	Tariff 7 Active MD(+)	4#1.0.1.6.7.255#2	0.8.0.6.1.1.8.0.0.0.0.7.0.0.224.0.1.0
50	Tariff 8 Active MD(+)	4#1.0.1.6.8.255#2	0.8.0.6.1.1.8.0.0.0.0.8.0.0.224.3.38.0
51	Angle of U(L1) - U(L2)	3#1.0.81.7.10.255#2	0.0.0.1.0.1.55.0.0.0.0.0.0.0.224.0.1.0
52	Angle of U(L1) - U(L3)	3#1.0.81.7.20.255#2	0.0.0.1.0.1.55.0.0.0.0.1.0.0.224.0.1.0
53	Apparent power+ (QI+QIV) Phase A	3#1.0.29.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.128.3.61.0
54	Apparent power+ (QI+QIV) Phase B	3#1.0.49.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.64.3.61.0
55	Apparent power+ (QI+QIV) Phase C	3#1.0.69.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.32.3.61.0
56	B phase Current	3#1.0.51.7.0.255#2	0.0.0.12.0.1.4.0.0.0.0.0.0.0.64.0.5.0
57	B phase Power Factor	3#1.0.53.7.0.255#2	0.0.0.12.19.1.37.0.0.0.0.0.0.0.224.3.63.0
58	B phase Voltage	3#1.0.52.7.0.255#2	0.0.0.12.0.1.54.0.0.0.0.0.0.0.64.0.29.0
59	C phase Current	3#1.0.71.7.0.255#2	0.0.0.12.0.1.4.0.0.0.0.0.0.0.32.0.5.0
60	C phase Power Factor	3#1.0.73.7.0.255#2	0.0.0.12.0.1.38.0.0.0.0.0.0.0.32.0.65.0
61	C phase Voltage	3#1.0.72.7.0.255#2	0.0.0.12.0.1.54.0.0.0.0.0.0.0.32.0.29.0
62	Current, neutral	3#1.0.91.7.0.255#2	0.0.0.1.0.1.4.0.0.0.0.0.0.0.224.0.5.0
63	Daily Freezing For Energy	7#0.0.98.2.0.255#2	11.26.0.1.0.1.12.0.0.0.0.0.0.0.224.3.72.0
64	Daily Freezing For Total Energy	7#0.0.98.5.128.255#2	11.0.0.1.0.1.12.0.0.0.0.0.0.0.224.3.72.0
65	Daily Freezing Prepaid Information	7#0.0.99.2.0.255#2	11.26.0.1.0.1.12.0.0.0.0.1.0.0.224.3.72.0
66	Daily Frozen Forward Active Energy Block	7#0.0.98.1.128.255#2	11.26.0.1.0.1.12.0.0.0.0.2.0.0.224.3.72.0
67	Instantaneous active export power (-A)	3#1.0.2.7.0.255#2	0.0.0.12.19.1.37.0.0.0.0.0.0.0.224.3.38.0

68	Instantaneous active import power (+A)	3#1.0.1.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.224.3.38.0
69	Instantaneous active import power (+A) L1	3#1.0.21.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.128.3.38.0
70	Instantaneous active import power (+A) L2	3#1.0.41.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.64.3.38.0
71	Instantaneous active import power (+A) L3	3#1.0.61.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.32.3.38.0
72	Instantaneous net frequency	3#1.0.14.7.0.255#2	0.0.0.12.0.1.15.0.0.0.0.0.0.0.224.0.33.0
73	Instantaneous Power factor (+A/+VA)	3#1.0.13.7.0.255#2	0.0.0.12.0.1.38.0.0.0.0.0.0.0.0.0.65.0
74	Instantaneous reactive export power (-R)	3#1.0.4.7.0.255#2	0.0.0.12.19.1.37.0.0.0.0.0.0.0.224.3.63.0
75	Instantaneous reactive import power (+R)	3#1.0.3.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.224.3.63.0
76	Meter Log Off Return Token	1.0.129.129.11.255	0.0.0.12.0.0.0.0.0.0.0.128.0.211.0
77	Monthly Freezing For Active MD Import Register Package	7#0.0.98.7.128.255#2	13.0.0.1.0.1.8.0.0.0.0.0.0.0.224.3.72.0
78	Monthly Freezing For Energy	7#0.0.98.1.0.255#2	13.0.0.1.0.1.12.0.0.0.0.1.0.0.224.3.72.0
79	Monthly Freezing For Total Energy	7#0.0.98.6.128.255#2	13.0.0.1.0.1.12.0.0.0.0.5.0.0.224.3.72.0
80	Monthly Freezing Prepaid Information	7#0.0.99.1.0.255#2	13.0.0.1.0.1.12.0.0.0.0.2.0.0.224.3.72.0
81	Monthly Frozen Forward Active Energy Block	7#0.0.98.3.128.255#2	13.0.0.1.0.1.12.0.0.0.0.3.0.0.224.3.72.0
82	Monthly Frozen Special Block	7#0.0.98.9.0.255#2	13.0.0.1.0.1.12.0.0.0.0.4.0.0.224.0.72.0
83	Reactive energy export (-R)	3#1.0.4.8.0.255#2	0.26.0.1.13.1.12.0.0.0.0.0.0.0.224.3.73.0
84	Reactive energy export (-R) rate1	3#1.0.4.8.1.255#2	0.26.0.1.13.1.12.0.0.0.0.1.0.0.224.3.73.0
85	Reactive energy export (-R) rate2	3#1.0.4.8.2.255#2	0.26.0.1.13.1.12.0.0.0.0.2.0.0.224.3.73.0
86	Reactive energy export (-R) rate3	3#1.0.4.8.3.255#2	0.26.0.1.13.1.12.0.0.0.0.3.0.0.224.3.73.0
87	Reactive energy export (-R) rate4	3#1.0.4.8.4.255#2	0.26.0.1.13.1.12.0.0.0.0.4.0.0.224.3.73.0
88	Reactive energy export (-R) rate5	3#1.0.4.8.5.255#2	0.26.0.1.13.1.12.0.0.0.0.5.0.0.224.3.73.0
89	Reactive energy export (-R) rate6	3#1.0.4.8.6.255#2	0.26.0.1.13.1.12.0.0.0.0.6.0.0.224.3.73.0
90	Reactive energy export (-R) rate7	3#1.0.4.8.7.255#2	0.26.0.1.13.1.12.0.0.0.0.7.0.0.224.3.73.0
91	Reactive energy export (-R) rate8	3#1.0.4.8.8.255#2	0.26.0.1.13.1.12.0.0.0.0.8.0.0.224.3.73.0
92	Reactive energy import (+R)	3#1.0.3.8.0.255#2	0.26.0.1.5.1.12.0.0.0.0.0.0.0.224.3.73.0
93	Reactive energy import (+R) rate1	3#1.0.3.8.1.255#2	0.26.0.1.1.1.12.0.0.0.0.1.0.0.224.3.73.0
94	Reactive energy import (+R) rate2	3#1.0.3.8.2.255#2	0.26.0.1.1.1.12.0.0.0.0.2.0.0.224.3.73.0
95	Reactive energy import (+R) rate3	3#1.0.3.8.3.255#2	0.26.0.1.1.1.12.0.0.0.0.3.0.0.224.3.73.0
96	Reactive energy import (+R) rate4	3#1.0.3.8.4.255#2	0.26.0.1.1.1.12.0.0.0.0.4.0.0.224.3.73.0
97	Reactive energy import (+R) rate5	3#1.0.3.8.5.255#2	0.26.0.1.1.1.12.0.0.0.0.5.0.0.224.3.73.0
98	Reactive energy import (+R) rate6	3#1.0.3.8.6.255#2	0.26.0.1.1.1.12.0.0.0.0.6.0.0.224.3.73.0
99	Reactive energy import (+R) rate7	3#1.0.3.8.7.255#2	0.26.0.1.1.1.12.0.0.0.0.7.0.0.224.3.73.0
100	Reactive energy import (+R) rate8	3#1.0.3.8.8.255#2	0.26.0.1.1.1.12.0.0.0.0.8.0.0.224.3.73.0
101	Reactive MD (-)	4#1.0.4.6.0.255#2	0.8.0.6.19.1.8.0.0.0.0.0.0.0.224.3.63.0

102	Reactive MD (-)tariff1	4#1.0.4.6.1.255#2	0.8.0.6.19.1.8.0.0.0.0.1.0.0.224.3.63.0
103	Reactive MD (-)tariff2	4#1.0.4.6.2.255#2	0.8.0.6.19.1.8.0.0.0.0.2.0.0.224.3.63.0
104	Reactive MD (-)tariff3	4#1.0.4.6.3.255#2	0.8.0.6.19.1.8.0.0.0.0.3.0.0.224.3.63.0
105	Reactive MD (-)tariff4	4#1.0.4.6.4.255#2	0.8.0.6.19.1.8.0.0.0.0.4.0.0.224.3.63.0
106	Reactive MD (+)	4#1.0.3.6.0.255#2	0.8.0.6.1.1.8.0.0.0.0.0.0.0.224.3.63.0
107	Reactive MD (+) tariff1	4#1.0.3.6.1.255#2	0.8.0.6.1.1.8.0.0.0.0.1.0.0.224.3.63.0
108	Reactive MD (+) tariff2	4#1.0.3.6.2.255#2	0.8.0.6.1.1.8.0.0.0.0.2.0.0.224.3.63.0
109	Reactive MD (+) tariff3	4#1.0.3.6.3.255#2	0.8.0.6.1.1.8.0.0.0.0.3.0.0.224.3.63.0
110	Reactive MD (+) tariff4	4#1.0.3.6.4.255#2	0.8.0.6.1.1.8.0.0.0.0.4.0.0.224.3.63.0
111	Reactive power(+), Phase A	3#1.0.23.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.128.3.63.0
112	Reactive power(+), Phase B	3#1.0.43.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.64.3.63.0
113	Reactive power(+), Phase C	3#1.0.63.7.0.255#2	0.0.0.12.1.1.37.0.0.0.0.0.0.0.32.3.63.0
114	Relay Control Mode	70#0.0.96.3.10.255#4	0.0.0.12.0.0.0.0.0.0.0.5.0.211.0
115	Relay Control Status	70#0.0.96.3.10.255#3	0.0.0.12.0.0.0.0.0.0.0.4.0.211.0
116	Relay Output Status	70#0.0.96.3.10.255#2	0.0.0.12.0.0.0.0.0.0.0.3.0.211.0
117	Remaining balance	3#1.0.140.129.0.255#2	0.0.0.12.0.0.0.0.1.0.0.0.0.0.0
118	Tariff 1 Active billing energy+	3#1.0.1.9.1.255#2	13.0.0.1.1.1.12.0.0.0.0.1.0.0.224.3.72.0
119	Tariff 1 Active MD(-) occurring time	4#1.0.2.6.1.255#5	0.8.0.6.19.1.7.0.0.0.0.1.0.0.224.0.1.0
120	Tariff 1 Active MD(+) occurring time	4#1.0.1.6.1.255#5	0.8.0.6.1.1.7.0.0.0.0.1.0.0.224.0.1.0
121	Tariff 1 apparent energy-	3#1.0.10.8.1.255#2	0.0.0.1.19.1.12.0.0.0.0.1.0.0.224.3.71.0
122	Tariff 1 apparent energy+	3#1.0.9.8.1.255#2	0.0.0.1.1.1.12.0.0.0.0.1.0.0.224.3.71.0
123	Tariff 1 apparent MD(-)	4#1.0.10.6.1.255#2	0.8.0.6.19.1.8.0.0.0.0.1.0.0.224.0.61.0
124	Tariff 1 apparent MD(-) occurring time	4#1.0.10.6.1.255#5	0.8.0.6.19.1.7.0.0.0.0.1.0.0.224.0.1.0
125	Tariff 1 apparent MD(+)	4#1.0.9.6.1.255#2	0.8.0.6.1.1.8.0.0.0.0.1.0.0.224.0.61.0
126	Tariff 1 apparent MD(+) occurring time	4#1.0.9.6.1.255#5	0.8.0.6.1.1.7.0.0.0.0.1.0.0.224.0.1.0
127	Tariff 1 reactive billing energy+	3#1.0.3.9.1.255#2	13.0.0.1.1.1.12.0.0.0.0.1.0.0.224.3.73.0
128	Tariff 1 reactive MD(-) occurring time	4#1.0.4.6.1.255#5	0.8.0.6.19.1.7.0.0.0.0.1.0.0.224.0.1.0
129	Tariff 1 reactive MD(+) occurring time	4#1.0.3.6.1.255#5	0.8.0.6.1.1.7.0.0.0.0.1.0.0.224.0.61.0
130	Tariff 2 Active billing energy+	3#1.0.1.9.2.255#2	13.0.0.1.1.1.12.0.0.0.0.2.0.0.224.3.72.0
131	Tariff 2 Active MD(-) occurring time	4#1.0.2.6.2.255#5	0.8.0.6.19.1.7.0.0.0.0.2.0.0.224.0.1.0
132	Tariff 2 Active MD(+) occurring time	4#1.0.1.6.2.255#5	0.8.0.6.1.1.7.0.0.0.0.2.0.0.224.0.1.0
133	Tariff 2 apparent energy-	3#1.0.10.8.2.255#2	0.0.0.1.19.1.12.0.0.0.0.2.0.0.224.3.71.0
134	Tariff 2 apparent energy+	3#1.0.9.8.2.255#2	0.0.0.1.1.1.12.0.0.0.0.2.0.0.224.3.71.0
135	Tariff 2 apparent MD(-)	4#1.0.10.6.2.255#2	0.8.0.6.19.1.8.0.0.0.0.2.0.0.224.0.61.0
136	Tariff 2 apparent MD(-) occurring time	4#1.0.10.6.2.255#5	0.8.0.6.19.1.7.0.0.0.0.2.0.0.224.0.1.0
137	Tariff 2 apparent MD(+)	4#1.0.9.6.2.255#2	0.8.0.6.1.1.8.0.0.0.0.2.0.0.224.0.61.0
138	Tariff 2 apparent MD(+) occurring time	4#1.0.9.6.2.255#5	0.8.0.6.1.1.7.0.0.0.0.2.0.0.224.0.1.0
139	Tariff 2 reactive billing energy+	3#1.0.3.9.2.255#2	13.0.0.1.1.1.12.0.0.0.0.2.0.0.224.3.73.0
140	Tariff 2 reactive MD(-) occurring time	4#1.0.4.6.2.255#5	0.8.0.6.19.1.7.0.0.0.0.2.0.0.224.0.1.0
141	Tariff 2 reactive MD(+) occurring time	4#1.0.3.6.2.255#5	0.8.0.6.1.1.7.0.0.0.0.2.0.0.224.0.61.0
142	Tariff 3 Active billing energy+	3#1.0.1.9.3.255#2	13.0.0.1.1.1.12.0.0.0.0.3.0.0.224.3.72.0
143	Tariff 3 Active MD(-) occurring time	4#1.0.2.6.3.255#5	0.8.0.6.19.1.7.0.0.0.0.3.0.0.224.0.1.0
144	Tariff 3 Active MD(+) occurring time	4#1.0.1.6.3.255#5	0.8.0.6.1.1.7.0.0.0.0.3.0.0.224.0.1.0
145	Tariff 3 apparent energy-	3#1.0.10.8.3.255#2	0.0.0.1.19.1.12.0.0.0.0.3.0.0.224.3.71.0

146	Tariff 3 apparent energy+	3#1.0.9.8.3.255#2	0.0.0.1.1.1.12.0.0.0.0.3.0.0.224.3.71.0
147	Tariff 3 apparent MD(-)	4#1.0.10.6.3.255#2	0.8.0.6.19.1.8.0.0.0.0.3.0.0.224.0.61.0
148	Tariff 3 apparent MD(-) occurring time	4#1.0.10.6.3.255#5	0.8.0.6.19.1.7.0.0.0.0.3.0.0.224.0.1.0
149	Tariff 3 apparent MD(+)	4#1.0.9.6.3.255#2	0.8.0.6.1.1.8.0.0.0.0.3.0.0.224.0.61.0
150	Tariff 3 apparent MD(+) occurring time	4#1.0.9.6.3.255#5	0.8.0.6.1.1.7.0.0.0.0.3.0.0.224.0.1.0
151	Tariff 3 reactive billing energy+	3#1.0.3.9.3.255#2	13.0.0.1.1.1.12.0.0.0.0.3.0.0.224.3.73.0
152	Tariff 3 reactive MD(-) occurring time	4#1.0.4.6.3.255#5	0.8.0.6.19.1.7.0.0.0.0.3.0.0.224.0.1.0
153	Tariff 3 reactive MD(+) occurring time	4#1.0.3.6.3.255#5	0.8.0.6.1.1.7.0.0.0.0.3.0.0.224.0.61.0
154	Tariff 4 Active billing energy+	3#1.0.1.9.4.255#2	13.0.0.1.1.1.12.0.0.0.0.4.0.0.224.3.72.0
155	Tariff 4 Active MD(-) occurring time	4#1.0.2.6.4.255#5	0.8.0.6.19.1.7.0.0.0.0.4.0.0.224.0.1.0
156	Tariff 4 Active MD(+) occurring time	4#1.0.1.6.4.255#5	0.8.0.6.1.1.7.0.0.0.0.4.0.0.224.0.1.0
157	Tariff 4 apparent energy-	3#1.0.10.8.4.255#2	0.0.0.1.19.1.12.0.0.0.0.4.0.0.224.3.71.0
158	Tariff 4 apparent energy+	3#1.0.9.8.4.255#2	0.0.0.1.1.1.12.0.0.0.0.4.0.0.224.3.71.0
159	Tariff 4 apparent MD(-)	4#1.0.10.6.4.255#2	0.8.0.6.19.1.8.0.0.0.0.4.0.0.224.0.61.0
160	Tariff 4 apparent MD(-) occurring time	4#1.0.10.6.4.255#5	0.8.0.6.19.1.7.0.0.0.0.4.0.0.224.0.1.0
161	Tariff 4 apparent MD(+)	4#1.0.9.6.4.255#2	0.8.0.6.1.1.8.0.0.0.0.4.0.0.224.0.61.0
162	Tariff 4 apparent MD(+) occurring time	4#1.0.9.6.4.255#5	0.8.0.6.1.1.7.0.0.0.0.4.0.0.224.0.1.0
163	Tariff 4 reactive billing energy+	3#1.0.3.9.4.255#2	13.0.0.1.1.1.12.0.0.0.0.4.0.0.224.3.73.0
164	Tariff 4 reactive MD(-) occurring time	4#1.0.4.6.4.255#5	0.8.0.6.19.1.7.0.0.0.0.4.0.0.224.0.1.0
165	Tariff 4 reactive MD(+) occurring time	4#1.0.3.6.4.255#5	0.8.0.6.1.1.7.0.0.0.0.4.0.0.224.0.61.0
166	Tariff 5 Active MD(+) occurring time	4#1.0.1.6.5.255#5	0.8.0.6.1.1.7.0.0.0.0.5.0.0.224.0.1.0
167	Tariff 6 Active MD(+) occurring time	4#1.0.1.6.6.255#5	0.8.0.6.1.1.7.0.0.0.0.6.0.0.224.0.1.0
168	Tariff 7 Active MD(+) occurring time	4#1.0.1.6.7.255#5	0.8.0.6.1.1.7.0.0.0.0.7.0.0.224.0.1.0
169	Tariff 8 Active MD(+) occurring time	4#1.0.1.6.8.255#5	0.8.0.6.1.1.7.0.0.0.0.8.0.0.224.0.1.0
170	Total Active billing energy+	3#1.0.1.9.0.255#2	0.26.0.1.0.1.12.0.0.0.0.0.0.0.224.3.72.0
171	Total Active MD(-) occurring time	4#1.0.2.6.0.255#5	0.8.0.6.19.1.7.0.0.0.0.0.0.0.224.0.1.0
172	Total Active MD(+) occurring time	4#1.0.1.6.0.255#5	0.8.0.6.1.1.7.0.0.0.0.0.0.0.224.0.1.0
173	Total apparent energy-	3#1.0.10.8.0.255#2	0.0.0.1.19.1.12.0.0.0.0.0.0.0.224.3.71.0
174	Total apparent energy+	3#1.0.9.8.0.255#2	0.0.0.1.1.1.12.0.0.0.0.0.0.0.224.3.71.0
175	Total apparent MD(-)	4#1.0.10.6.0.255#2	0.8.0.6.19.1.8.0.0.0.0.0.0.0.224.0.61.0
176	Total apparent MD(-) occurring time	4#1.0.10.6.0.255#5	0.8.0.6.19.1.7.0.0.0.0.0.0.0.224.0.1.0
177	Total apparent MD(+)	4#1.0.9.6.0.255#2	0.8.0.6.1.1.8.0.0.0.0.0.0.0.224.0.61.0
178	Total apparent MD(+) occurring time	4#1.0.9.6.0.255#5	0.8.0.6.1.1.7.0.0.0.0.0.0.0.224.0.1.0
179	Total average power factor	3#1.0.13.15.0.255#2	0.2.0.1.0.1.38.0.0.0.0.0.0.0.224.0.65.0
180	Total average power factor, tariff 1	3#1.0.13.15.1.255#2	0.2.0.1.0.1.38.0.0.0.0.1.0.0.224.0.65.0
181	Total average power factor, tariff 2	3#1.0.13.15.2.255#2	0.2.0.1.0.1.38.0.0.0.0.2.0.0.224.0.65.0
182	Total average power factor, tariff 3	3#1.0.13.15.3.255#2	0.2.0.1.0.1.38.0.0.0.0.3.0.0.224.0.65.0
183	Total average power factor, tariff 4	3#1.0.13.15.4.255#2	0.2.0.1.0.1.38.0.0.0.0.4.0.0.224.0.65.0
184	Total reactive billing energy+	3#1.0.3.9.0.255#2	13.0.0.1.1.1.12.0.0.0.0.0.0.0.224.3.73.0
185	Total reactive MD(-) occurring time	4#1.0.4.6.0.255#5	0.8.0.6.19.1.7.0.0.0.0.0.0.0.224.0.1.0
186	Total reactive MD(+) occurring time	4#1.0.3.6.0.255#5	0.8.0.6.1.1.7.0.0.0.0.0.0.0.224.0.61.0
187	Vector sum of current in all Phases	3#1.0.128.7.0.255#2	0.0.0.1.0.1.4.0.0.0.0.0.0.0.224.0.5.0

7.35 GTP of Optical Communication Cable

(To be filled up and signed by the Tenderer)

Sl No.	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
1.	Brand		Any International reputed brandoperating in the recognized continental markets for decades.	
2.	Model		To be mentioned by the supplier/tenderer.	
3.	Country of Origin		To be mentioned by the supplier/tenderer.	
4.	Mode		Multimode and single mode as required	
5.	Length		5M	
6.	Compatibility		Compatible with selected storage system and HBAs	
7.	Warranty Period	Calendar Year	Full 03(Three) years replacement and instant service warranty. Replacement time maximum 07(Seven) days.	

7.36 GTP of Router (8-port switch integrated) for UVS & UCC

(To be filled up and signed by the Tenderer)

Sl No	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
1	Brand		Any International Reputed Brand: To be mentioned by Tenderer	
2	Model		To be mentioned by Tenderer	
3	Country of origin		USA /EU/Japan	
4	Country of Assemble		To be mentioned by Tenderer	
5	**Interfaces**		WAN : 1 x Ethernet 1000Base-T - RJ-45 LAN : 8 x Ethernet 1000Base-T - RJ-45 Management : 1 x Console - RJ-45, Peripheral : Min. 1 x USB	
6	**Capacity**		IPSec VPN tunnels : 50	
7	**Remote Management Protocol**		HTTPS, Telnet, SNMP 3, HTTP, SSH	
	Encryption Algorithm		256-bit AES, 192-bit AES, PKI, PEAP, 128-bit AES, TKIP, DES, Triple DES, SSL, LEAP	
	Features		DHCP server, DNS proxy, Traffic shaping, Bidirectional Forwarding Detection (BFD), IPv6 support, Content filtering, VLAN support, URL filtering, Intrusion Prevention System (IPS), High Availability, Stateful Failover, Dynamic Multipoint VPN (DMVPN), Weighted Fair Queuing (WFQ), Class-Based Weighted Fair Queuing (CBWFQ), Link Fragmentation and Interleaving (LFI), DiffServ support, IGMP snooping, Stateful Packet Inspection (SPI), NAT support, WAN failover, VPN support, Virtual Route Forwarding-Lite (VRF-Lite), Access Control List (ACL) support, Spanning Tree Protocol (STP) support, Quality of Service (QoS), Load balancing, Auto-uplink (auto MDI/MDI-X), MAC address filtering	
	RAM		512 MB (installed) / 768 MB (max)	
8	**Flash Memory**		256 MB (installed) / 256 MB (max)	

Sl No	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
9	**Connectivity Technology**		Wired	
10	**Network / Transport Protocol**		L2TPv3, DHCPDNS, IPSec, FTP, L2TP, DDNS	
11	**Routing Protocol**		EIGRP, BGP, RIP-1, RIP-2, VRRP, NHRP, GRE, HSRP, PIM-SM, OSPF	
12	**Power Supply / Device**		Power adapter External	
13	**Voltage Required**		AC 120/230 V	
14	**Data Link Protocol**		Fast Ethernet, Ethernet	
15	**Enclosure Type**		Desktop	
16	Warranty		Full 03 (Three) years replacement and instant service warranty from the date of commissioning.	

7.37 GTP of Work Station

(To be filled up and signed by the Tenderer)

Sl No.	Name of Item	Unit	Required Specification	Full Technical Specification & Standard (to be mentioned)
1	Brand		Any International reputed brandoperating in the recognized continental markets for decades.	
	Model		To be mentioned by the supplier/tenderer.	
2	Country Of Origin		North America / EU / Japan	
3	Country of Manufacture		To be mentioned by the supplier/tenderer.	
4	Processor		Intel core i7-12C-13th generation or higher	
5	Clock Speed	GHz	To be mentioned	
	Cache Memory	MB	Minimum 25 MB	
6	Chipset		Intel 600 series or higher	
7	Bus Speed	Mhz	Minimum 3200 MHz	
8	RAM	GB	Minimum 16 GB	
9	HDD	GB	2000 GB (1024 RPM)	
10	Mouse		Same Brand USB Scroll Optical (V-Track) Mouse	
11	Keyboard		Same brand USB Multimedia Keyboard	
12	Graphics		Integrated UHD or Higher	
13	Monitor	inch	Same brand LED 18.5" Monitor	
14	DVD ROM Drive		DVD RW Drive	
15	Hard disk controller	gbps	Serial ATA 3.0 Gbps or Latest	
16	Audio		Integrated sound card	
17	I/O Ports		8 USB 3.0 (2 front,6 rear,1 internal) ,Serial, Parallel, RJ-45 Etc. + Display port 1.2, Mic.in & Headphone out (front)	
18	NIC		Integrated/Built in Gigabit LAN or higher	
	Wireless NIC		Integrated/Built in wireless Wi-Fi + Bluetooth V4.0 or higher	
19	Slots		At least 3. 2 PCI, 1 PCIe x1	

20	OS Support		Any version of Windows, Linux, etc.	
21	OS		License with recovery kit	
22	Software		Licensed Anti-Virus Software	
23	Brochure and CDs		All brochure, instructions, manual and driver CDs to be supplied with the product	
24	Connection Cables		All necessary power and data connection cables to be supplied along with the product , power cables (3 pin flat)	
25	Warranty Period	Calendar Year	Full 03(Three) years replacement and instant service warranty. Replacement time maximum 07(Seven) days.	

7.38 GTP of Laptop

(To be filled up and signed by the Tenderer)

Sl No.	Name of Item	Unit	Required Specification	Full Technical Specification & Standard (to be mentioned)
1	Brand		Any International reputed brand operating in the recognized continental markets for decades.	
2	Model		To be Mentioned by the supplier/tenderer.	
3	Country of Origin		North America / EU/ Japan	
4	Country of Manufacturer		To be Mentioned by the supplier/tenderer.	
5	Processor	GHz	Intel core i7-10C-13th generation or higher	
	Clock speed		To be mentioned	
	Cache Memory	MB	Minimum 12 MB	
6	RAM	GB, MHz	Minimum 16 GB 3200 MHz DDR4 or higher	
7	Hard Disk Drive	GB, TB	Minimum 512GB M.2 PCIe NVMe internal SSD with 2 TB External portable HDD	
9	Combo Drive		To be mentioned (if any)	
10	Graphics		Integrated UHD or higher	
11	Monitor	inch	To be mentioned	
	Display Technology		FHD, LED Display	
12	Port & Connector		Min 2 USB 3.0 port, 1 X RJ 45 port for LAN, 1 X RJ, External Micro phone, Head Phone + Media Card Reader, Audio Jecks	
	NIC		Integrated/Built in Gigabit LAN or higher	
13	Keyboard		Integrated standard Keyboard	
14	Pointing Devise		Both Touch Pad and one additional USB mouse	
15	Webcam		HD Webcam	
16	Speaker		Integrated Internal Speaker	
17	Wireless Technology		Wireless LAN and Bluetooth	
18	Battery		6 cell lithium ion battery	
19	Battery Backup		4 hours or higher with A/C Adapter	
20	Weight & Colour	kg	To be mentioned	
21	Operating System		Windows 10 with Original License and recover CD.	
22	Carrying Case		Original Standard Carrying Case, Same brand.	
23	Software		License Anti-Virus Software (Kesperesky/Norton/Semantic)	
24	Bangla software		Licensed Software with CD (Preferably Lekhoni)	
25	Certification		FCC class B, ISO 9001: 2000	

Sl No.	Name of Item	Unit	Required Specification	Full Technical Specification & Standard (to be mentioned)
26	Warranty Period	Calendar Year	Full 03(Three) years replacement and instant service warranty. Replacement time maximum 07(Seven) days.	

7.39 GTP of Network Laser Duplex Printer

(To be filled up and signed by the Tenderer)

Sl No.	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
1	Brand		Any International reputed brandoperating in the recognized continental markets for decades.	
2	Model		To be mentioned by the supplier/tenderer.	
3	Country of Origin		North America / EU / Japan	
4	Country of Manufacturer		To be mentioned by the supplier/tenderer.	
5	Toner type		Pre-installed original laser jet toner cartridge, No starter toner.	
6	Fuser Unit		Instant on fuser technology with ceramic heating elements.	
7	Resolution	dpi	1200 × 1200 dpi (Minimum)	
8	Processor	MHz	Minimum 1200 MHz	
9	Printing Speed	ppm	62-Page-per Minute (Letter), 35 PPM (A4) (min.)	
10	First Page Print Out	second	As fast as 8 seconds	
11	Duplex Printing		Automatic	
12	Mobile Printing		Yes	
13	Memory	MB	256 MB (Minimum) Expandable to 1 GB	
14	Memory Slots		2 DIMM Slots Minimum	
15	Interface		USB, LAN, Wi-Fi	
16	Languages		PCL 6, PCL 5e, POST Script 3 emulation	
17	Duty Cycle	page	2, 75,000 Pages per Month	
18	Trays		100 sheet multi-purpose input tray,2 x 500 sheet input tray 50-sheet face up output tray, 250-sheet face down output tray	
19	Media Sizes		Letter, Legal, A4, A5, B5 and custom sizes	
20	Media Types		Paper (Plain, Preprinted, Letterhead, Bond, Color, Recycled, Rough),Transparencies, Labels	
21	Power Requirements		220-240 V / 50Hz ±	
22	Client Operating System Supported		Any version of Windows, Linux etc.,	
23	Network Operating System Supported		Via HP Jetdirect print server: Me, NT 4.0, 2000, XP, XP 64-bit, Server 2003, Red Hat Linux 6 and later.	
24	Network Protocols Supported		TCP/IP, UDP, HTTP etc.	
25	Weight and color		To be mentioned	
26	Warranty Period	Calendar Year	Full 03(Three) years replacement and instant service warranty. Replacement time maximum 07 (Seven) days.	

7.40 GTP of Air-conditioner (AC)

(To be filled up and signed by the Tenderer)

Sl No.	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
1	Brand		Any International reputed brandoperating in the recognized continental markets for decades like General, Hitachi, LG, Sharp etc.	
2	Model		To be mentioned by the supplier/tenderer.	
3	Country of Origin		To be mentioned by the supplier	
4	Country of Manufacturer		To be mentioned by the supplier/tenderer.	
5	Type		Split	
6	Capacity	Tonnage	2	
7	Compressor Type		To be mentioned by the supplier/tenderer.	
8	Cooling Capacity	Watts	To be mentioned by the supplier/tenderer.	
9	Noise Level Indoor (High/medium/Low)	Db	To be mentioned by the supplier/tenderer.	
10	Moisture Removal	(Ltrs/Hr)	To be mentioned by the supplier/tenderer.	
11	Star Rating		3/4/5	
12	Energy Efficiency Rating (EER)	W/W	>= 3.10	
13	Power Input	Watts	To be mentioned by the supplier/tenderer.	
14	Running Current	Amps	To be mentioned by the supplier/tenderer.	
15	Voltage/ Frequency	Volt/ Hz	230V/ 50/60 Hz±0.5%	
16	Timer		Yes/ No (Shall be mentioned)	
17	Sleep		Yes/ No (Shall be mentioned)	
18	Indicator		Yes/ No (Shall be mentioned)	
19	Auto Restart:		Yes/ No (Shall be mentioned)	
20	Remote Control Type		To be mentioned by the supplier/tenderer.	
21	Air Direction (Up/Down):		Yes/ No (Shall be mentioned)	
22	Anti-Bacteria Filter		Yes/ No (Shall be mentioned)	
23	Dimensions (Indoor unit/ Outdoor unit)	mm	To be mentioned by the supplier/tenderer.	
24	Weight (Indoor unit/ Outdoor unit)	Kg	To be mentioned by the supplier/tenderer.	
25	Warranty Period	Calendar Year	Full 03(Three) years replacement and instant service warranty. Replacement time maximum 03 (Three) days.	

7.41 GTP of GPRS/EDGE/EVDO/CDMA Modem

(To be filled up and signed by the Tenderer)

Sl No.	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
1	Brand		Any International reputed brandoperating in the recognized continental markets for decades.	
2	Model		To be mentioned by the supplier/tenderer.	
3	Country of Origin		To be mentioned by supplier/tenderer.	

4	Country of Manufacture		To be mentioned by the supplier/tenderer.	
5	Band		UMTS 850/1900/2100/900 MHz. EGPRS/GSM 850/900/1800/1900 MHz	
6	SIM		Internal SIM interface, Push-push SIM holder.	
7	Data		EDGE Circuit Switched data.	
8	APN		Support for multiple APNs.	
9	Interface		Data interface: USB specification 2.0 compliant full-speed.	
10	Display		LED display, simple integration via plug & play.	
11	Power		USB bus-powered, requires no external power supply.	
12	Size		Highly compact, light and powerful.	
13	OS Support		Any version of windows	
14	Upload/Download Speed	Mbps	50/150 Mbps	
15	SIM Support		Must support EDGE Network and SIM.	
16	Warranty Period	Calendar Year	Full 03(three) years replacement and instant service warranty. Replacement time maximum 07(Seven) days.	

7.42 GTP of Slip Printer

(To be filled up and signed by the Tenderer)

SINo	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
01	Brand		Any International reputed brandoperating in the recognized continental markets for decades.	
02	Model		To be mentioned by supplier/tenderer.	
03	Country of Origin		To be mentioned by supplier/tenderer.	
04	Country of Manufacturer		To be mentioned by supplier/tenderer.	
05	Print Method		Thermal line printing	
06	Print Speed		To be mentioned	
07	Data Buffer	KB	4KB.	
08	Inked Ribbon		To be mentioned by supplier/tenderer.	
09	Interface		USB Interface (Mandatory)	
			Serial, Parallel, LAN, Wi-fi etc. (Optional)	
10	Power Supply (Adapter)	Volt	AC 120 ~240V DC 24V, 1.5A.	

SlNo	Name of Item	Unit	Required specifications	Full Technical Specification & Standard (to be mentioned)
11	Auto Cutter		Yes.	
12	Paper		Roll Paper.	
13	Driver/Manual	nos.	All Manual, Driver CD/DVD, Power Cable (3 Pin Flat), USB Cable have to be provided.	
14	OS Supported		Any version of Windows, Linux etc.	
	Warranty Period	Calendar Year	Full 03(three) years replacement and instant service warranty. Replacement time maximum 07(Seven) days.	

7.43 GTP for Hand Held Units

(To be filled up and signed by the Tenderer)

Item No	Name of Item	Required specifications	Full Technical Specification & Standard (to be mentioned)
01.	Manufacturer Name	To be mentioned	
02.	Manufacturer Address	To be mentioned	
03.	Operating System	Android (Updated version)	
04.	Model no.	To be mentioned	
05.	Country of Origin	To be mentioned	
06.	Type	To be mentioned	
07.	Transaction capacity	500	
08.	Rechargeable Battery	Minimum 8 hours	
09	Communications Interface	IEC 1107	
10	Feature	Energy: Current values of energy. Billing Data: Monthly and daily frozen energy and credit data. Instantaneous Values: Instantaneous values of meters, such as voltage, current, frequency, active power, and so on. Event: There are three types of events in total. Select each type to read the relevant events. Prepayment: prepay information. Parameter: meter basic parameters that can only be read out. Billing parameters, Basic	

		parameters, Display configuration, Friend holiday, Power quality, GPRS parameters, Function watch, Token, RTC	

7.44 GTP of DCU (Data Concentrator Unit) for prepaid meters

(To be filled up and signed by the Tenderer)

Sl No	Name of Item	Required specifications	Full Technical Specification & Standard (to be mentioned)
1	Brand	Any International Reputed Brand: To be mentioned by Tenderer	
2	Model	To be mentioned by Tenderer	
3	Country of origin	To be mentioned by Tenderer	
4	Country of Assemble	To be mentioned by Tenderer	
5	Metering Accuracy	Active energy: Class 1 Reactive energy: Class 2	
6	Data collection	Provide collection of real-time data, historical data, event data, and status data. The data collection process complies with IEC 62056 (IDIS & DLMS/COSEM). DC shall have provision of energy measurement of transformer and conduct scheduled meter reading function.	
7	Data storage	Provide cyclic storage for minor and major events and historical data, including the load curve, hour frozen data, daily frozen data, and monthly frozen data.	
8	Network communication	Provide connect to downstream smart meters through BROADBAND PLC/ GPRS, RS485. For BROADBAND PLC/GPRS Communication, provide connect to upstream front-end processors through 4G (which will also support all other available bands in Bangladesh) Network Communication module (BPLC and GPRS) shall be plug and play type.	
9	Maximum Power	≤30W	
10	Power Supply	AC:90~290V power supply, support three-phase four-wire and single-phase power supply	
11	Dimensions (HxWxD)	To be mentioned GPRS: BPLC:	
12	Operating Temperature	-25°C to +65°C	
13	Ingress Protection Level	IP54 or better	

Sl No	Name of Item	Required specifications	Full Technical Specification & Standard (to be mentioned)
14	Security	Support AES256 and ECC192 Encryption Support SSL Protocol	
15	Industrial Environment	Provide IP54 or better protection level Work at the temperature of -40°C to +60°C	
16	Remote upgrade	Support upgrade software package stored locally, and dispatch the package to all connected meters by multicast. Support OTA (Over the Air) technology	
17	RAM	128 MB/256 MB	
18	Feeding phase monitor	The concentrator should be able to identify the feeding phase of each meter (for single-phase meters) via PLC communication. The concentrator should be able to detect changing of feeding phase of meter (for single-phase meters) via PLC communication.	
19	Last gasp	When power off, the concentrator will send the alarm to Master Station.	
20	Transformer Monitoring and Protection	Overload detection and alarm. Low power factor detection and alarm.	
21	Type of External CT	Split Core Clamp type CT Minimum accuracy class: 0.5 Current Measurement Capacity: Min. 400 A Secondary Current output: Compatible with DCU	
22	Other features	-Plug and play communication module -Easy and friendly UI -Automatically detect meter -Remote and local firmware upgrade -On demand read/write -Remote configuration -Scheduled Reading -Concentrator Firmware upgrade -Meter firmware upgrade -Alarm -Meter Data Management -Network Clock Management -Web service Management	