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CEB
SPECIFICATION

PROGRAMMABLE DIRECT CONNECTED STATIC ENERGY METER:

1. SINGLE PHASE

2. THREE PHASE

CEYLON ELECTRICITY BOARD
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CONTENTS

SPECIFICATION FOR PROGRAMMABLE DIRECT CONNECTED STATIC ENERGY METER:

1. SINGLE PHASE
2. THREE PHASE

1.0 SCOPE

This Specification covers the general requirements of the design, manufacture, operation and testing of following metering equipment:

1. Programmable Static Energy Meter (class 1) – Direct Connected Single Phase with/without remote disconnection, with/without Cellular Based communication facility
2. Programmable Static Energy Meter 10 (100)A / 5 (40)A (class 1) – Direct Connected Three Phase with/without remote disconnection, with/ without Cellular Based communication facility

Whether the communication facility is included, to have remote disconnection and the maximum current selected by the procurement entity shall be indicated in the price schedule.

2.0 SYSTEM PARAMETERS

(a)	Nominal voltage (U)	230 V	400 V
(b)	System highest voltage (Um)	240 V	415 V
(c)	Allowable Voltage Variation	U±6%	U±6%
(d)	System frequency	50 Hz	50 Hz
(e)	Method of earthing	Effectively Earthed	Effectively earthed
(f)	System fault level	25 kA	25 kA

3.0 SERVICE CONDITIONS

(a)	Annual average ambient temperature	30 °C
(b)	Maximum ambient temperature	40 °C
(c)	Maximum relative humidity	90%
(d)	Environmental conditions	Humid tropical climate with heavily polluted atmosphere
(e)	Operational altitude	From M.S.L. to 1900 m above M.S.L.
(f)	Isokeraunic (Thunder days) level	100 days

4.0 APPLICABLE STANDARDS

The equipment and components supplied shall be in accordance with the latest editions of the standards specified below and amendments thereof.

(a)	IEC 62052-11:2003	Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 11: Metering equipment
(b)	IEC 62053-21:2003	Electricity metering equipment (AC) Particular requirements – Part 21: Static meters for active energy (Classes 1 and 2)
(c)	IEC 62053-23:2003	Electricity metering equipment (AC) – Particular requirements – Part 23: Static meters for reactive energy (Classes 2 and 3)
(d)	IEC 62058-11:2008	Electricity metering equipment (AC) – Acceptance inspection – Part 11: General acceptance inspection methods
(e)	IEC 62058-31:2008	Electricity metering equipment (AC) - Acceptance inspection – Part 31: Particular requirements for static meters for active energy (Classes 0.2 S, 0.5 S, 1 and 2)

(f)	IEC 62052-21:2004	Electricity metering equipment (AC) – General requirements, tests and test conditions – Part 21: Tariff and load control equipment
(g)	IEC 62056-21:2002	Electricity metering – Data exchange for meter reading, tariff and load control – Part 21: Direct local data exchange
(h)	IEC 62056-5-3:2017	Electricity metering Data Exchange – The DLMS/COSEM suit – Part 5-3: DLMS/COSEM Application layer
(i)	IEC 62056-6-1:2017	Electricity metering – Data exchange for meter reading, tariff and load control – Part 6-1: Object Identification System (OBIS)
(j)	IEC 62056-6-2:2016	Electricity metering – Data exchange for meter reading, tariff and load control – Part 6-2: COSEM interface classes
(k)	IEC 60529:2013	Degrees of protection provided by enclosures (IP Code)

However in the event of discrepancy, details given in this CEB specification supersede above standards.

5.0 BASIC FEATURES

The Programmable Static Energy Meter (hereinafter referred to as "The meter" in this specification) shall have the facility to program and read from a PC connected to the meter, using USB and Optical Port. Alternative connections are acceptable if the cable and necessary modules to connect to a PC are provided with the meter. Meter shall have the communication facility to take the meter readings or any other data remotely via a data communication network. The communication modules including accessories required at both ends and software for remote meter reading shall be supplied with the meter. It shall be possible to replace the communication unit at site without breaking the meter calibration seals.

Following items shall be supplied **as specified in the price schedule**.

1) The meter with required standard rated current.
2) Communication module for the meter including accessories.
3) Communication module for the PC including accessories.
4) PC software and accessories including cables for local configuration.

a) The meter shall operate with specified accuracy for power factors in the full range of all quadrants.

b) The meters shall be of the surface mounting type and shall have terminals at the bottom.

c) The meters shall be of the programmable type suitable for recording active energy consumption in kWh, reactive energy consumption in kvarh and the Maximum Demand (MD) in kVA as well.

d) Meter shall display true rms values of currents and voltage readings.

e) The meters shall be suitable for Time-of-Day (TOD) Metering (minimum of 4 intervals) and Import-Export Metering.

f) The meters shall record the periodical consumption (generally for full month) along with the cumulative consumption of active energy, reactive energy and MD in both import and export directions. MD shall be the maximum of average demands each over a demand integration period of fifteen (15) minutes, over a period of month. Facilities shall be provided for MD calculation using both Block method and Sliding Window method.

g) Facilities shall be provided to reset the maximum demand (MD) automatically at a preset date and time as well as manually. It shall be possible to disable the MD reset button and to seal it, if required. It shall also be possible to program, download data and reset the maximum demand remotely through software running on a PC compatible on Windows 7 or higher version. Method of communication between the communication module and the PC modem shall be "Data enabled GSM and GPRS/3G/4G".

h) Meter DC supply should be able to power the modem. It shall have suitable ports to connect the modem for communication and power.

i) There shall be a suitable and fool proof security scheme (password protections) for the meters and software. Passwords can be changed by the client.

j) Data exchange method between meter and the server end shall comply with the IEC 62056-5-3 standard.

k) The meter shall have a calendar clock to provide time and date information and be equipped with a built in battery backup. Battery life shall not be less than 10 years. Battery replacement should be possible at the site.

l) Flashing light indication shall be available on the front face of the meter which acts as an activity indicator. The meter shall also be provided with two blinking LEDs which blink analogous to the active energy and reactive energy metered, for calibration purposes. Facilities shall be provided to program number of pulses per unit of active energy (kWh) and reactive energy (kvarh) of the meter.

m) The meters shall be suitable for operation on voltages stipulated in Clause 5.1.1 below.

The following data shall be fed to the meter as applicable.

		For Single Phase Application (1 ph 2 wire system)	For Three Phase Application (3 ph 4 wire system)
(i)	Operational Voltage	230 V	400 V
(ii)	Voltage transformer ratio	Direct Connected	
(iii)	Current transformer ratio	Direct Connected	
(iv)	Frequency	50 Hz	
(v)	Accuracy class (active)	Class 1	
(vi)	Accuracy class (reactive)	Class 2	
(vii)	Method of measurement	Single Watt Meter	Three Watt Meter

n) The meters shall directly display the sequence of data given in Annex A. However, it shall be possible to alter the display sequences using the programming software. The meter display shall have OBIS code or clearly readable meaningful text.

o) The meters shall have facilities to store a minimum of twelve months of billing data, Load Profile data for at least forty five (45) days (Load profile data shall contain parameters; average of active power, apparent power in both directions, power factor, frequency, voltage of each phase and current of each phase at 15 minute intervals), Event Log Data (minimum 250 records), Tamper details with instantaneous voltage, current etc. (minimum

100 records). Each event log or tamper log shall have the date and time of occurrence and restoration. However, these log channels and parameters shall be user configurable. Sampling period for load profile shall be 30s or less. There shall be a facility in the meter to select average/ maximum/ minimum of the values to be recorded in Load Profile. It shall have sufficient channels in Load Profile to capture power quality data such as THD in current and voltage.

p)   Three phase meters shall record the consumption accurately irrespective of the phase sequence of supply. Even in the absence of neutral the meters shall operate normally.

q)   Total equipment and material requirement as applicable for the systems are stipulated in Schedule of Technical Requirements and Guaranteed Technical Particulars.

5.1. General Requirements

5.1.1. Standard Reference Voltages and Frequency

Single Phase Programmable Static Energy Meter shall be suitable for operation on 230 V, two wire type low voltage system application with nominal frequency of 50 Hz.

Three Phase Programmable Static Energy Meter shall be suitable for operation on 400 V, four wire type low voltage system application with nominal frequency of 50 Hz

5.1.2. Power Supply Variation

The meter shall be suitable for working with following abnormal system variations.

Specific Range of operation	70% to 120% of the reference voltage
Frequency Range	± 5% of the reference frequency

5.1.3. Standard Basic Current and Maximum Current

The Single Phase Meter shall be suitable for operation on standard rated current of 5 A and the maximum current shall be 40 A.

The Three Phase Meter shall be suitable for operation on standard rated current of 10 A and the Maximum current of 100 A or standard rated current of 5 A and the Maximum current of 40 A as specified in the price schedule.

5.1.4. Remote Communication

5.1.4.1. Remote Reading

Facilities shall be available to carry out following tasks for each of the meter by remote operation via the GSM and GPRS/3G/4G connections

i.   To program each meter
ii.   To take the relevant meter readings from each meter separately.
iii.   To get an error message when the meter is faulty, tampering of meter, power failure, phase failure etc. and the date and time of occurrence of such event.
iv.   To download stored data from meter.
v.   To reset the maximum demand value of each three phase meter.

5.1.4.2. Communication Module

a) At the meter end

A Communication Module shall be supplied with the meter. That shall be powered from the DC supply of the meter. In case main supply failure modem should retain the power at least to send last event. The module shall be compact in design, easy to install, protected from lightening and safe to use in public places.

The module shall have;

i.   A modem which can operate in 900/1800 MHz (GSM including Circuit Switching Data functionality) range and 800/900 MHz (GPRS) range or 2100 MHz (3G) range or 1800/2300 MHz (4G LTE) range.
ii. Tamper proof SIM Card Holder.
iii. A built in connector for an external antenna and antenna cable with 3m wire   length.
iv. Minimum speed of 9.6 kbps for GSM, 40 kbps for GPRS, 2 Mbps for 3G and 6 Mbps for 4G.
v.   Data cables to connect to meter.

Additional meter end communication modules with accessories shall be provided **if specified in the price schedule**.

b) At the PC end / Distribution transformer end

Communication modules shall be supplied with the batch of meters, as specified in the price schedule. It shall have;

i.   A modem which can operate in 900/1800 MHz (GSM) range and 800/900 MHz (GPRS) range or 2100 MHz (3G) range or 1800/2300 MHz (4G LTE) range. It shall be an industrial type modem that support extensive data communication over long periods.
ii. Tamper proof SIM Card Holder.
iii. A built in connector for an external antenna and an external antenna with 3m of wire length.
iv. Minimum speed of 9.6 kbps for GSM, 40 kbps for GPRS and up to 2 Mbps for 3G and 6 Mbps for 4G.
v.   Data cables to connect to PC

5.1.4.3. Remote Communication Software

A user friendly windows based Graphical User Interface (GUI) basic software shall be supplied on a CD with the meters in order to program the meters (locally and remotely) and to download the data from the remote data communication facilitated meters. The software shall have the facility to communicate via a communication modem connected to the PC. Relevant manuals in English language shall be provided.
The downloaded data shall be stored in a suitable fool proof database. This data shall able to be extracted as a delimited text format or MS Excel format. A data cable to read meter directly from PC should be provided.

Software shall be valid or provided with necessary license keys and upgrades for at least the full life span of the meter. The manufacturer/ supplier shall provide necessary support throughout this period. The software should facilitate remote data downloading individually from each meter as well as batch wise data downloading of particular set of meters through automated function.

Further, manufacturer shall disclose and provide all necessary protocol information or API (Application Programming Interface) to CEB at any time throughout the guaranteed life span of the meter, so that independently developed MDMS (Meter Database Management System) can freely communicate with meters supplied.

5.1.4.4. Remote Disconnection

The meters shall have the necessary built-in hardware for remote disconnections & reconnections as requested in the price schedule. If this feature is requested all such disconnections / reconnections shall also be recorded as events.

5.2. Mechanical Requirements

The meter shall be designed and constructed in such a way as to avoid introducing any danger in normal use and under normal working conditions, so as to ensure especially;

  i.   Personal safety against electric shock.
  ii. Personal safety against effects of excessive temperature.
  iii. Safety against spread of fire.
  iv. Protection against penetration of solid objects, dust and water.

All parts which are subject to corrosion shall be suitably protected and any protective coating shall not be liable to damage by normal handling.

5.2.1. Case and Window

The meter shall have an insulated case which shall be sealed in such a way that the internal parts of the meter are not accessible to unauthorized persons.

Any non-permanent deformation of the case shall not affect the satisfactory performance of the meter.

The window shall be of transparent material which cannot be removed undamaged, without breaking seals.

5.2.2. Terminal Block

The terminal block shall be made of insulating material and it shall be capable of passing the test stipulated in ISO 75-2:2013 for a temperature of 135 ^{0}C and a pressure of 1.8 MPa.

Requirement	Single Phase Meter	Three Phase Meter
Size of the Terminal wire	10mm^2	16mm^2 – 35mm^2
Type of Cable	Al / Copper	Al / Copper
Type of termination	Shall be able to accommodate Al and Cu cables of above sizes with sufficient tolerance	Shall be able to accommodate Al and Cu cables of above sizes with sufficient tolerance

All terminals, screws and nuts shall be tin/nickel plated brass/copper to provide high resistance to corrosion.

5.2.3. Terminal Cover

The wiring terminals shall be protected by a sealable transparent terminal cover and it shall be made of an insulating material.

The terminal covers shall be of extended type with easily breakable knockouts. Provision shall be made to seal the meter cover and terminal cover separately.
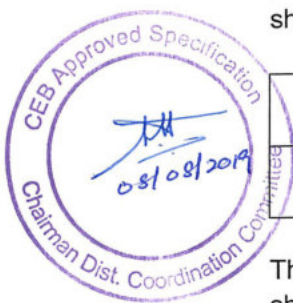
5.2.4. Resistance to Heat and Fire

The terminal block, the terminal cover and the meter case shall not be ignited by thermal overload of live parts in contact with them and they shall meet the tests stipulated in Clause 5.8 of IEC 62052-11.

5.2.5. Protection against Penetration of Dust and Water

The Metering equipment shall be suitable for indoor use and conform to the degree of protection of IP51 as per IEC 60529:2013.

5.2.6. Display of Measured Values

The meters shall be provided with a clear Electronic Display (LED/LCD Type) under a viewing panel conforming to the minimum degree of protection of IP 54 and the dimensions of figures shall not be less than 8 mm (Height) and 4mm (Width).

	Single Phase Meter	Three Phase Meter
Minimum number of digits (Including a decimal)	6	7

The meters shall have non-volatile memory type electronic display. The non-volatile memory shall have a minimum retention time of twelve months.

5.2.7. Output Device

The Meters shall have a test output device (outlet port) accessible from the front and capable of being tested with the help of the universal reference standard meter.

    i.   Meters shall have an optical port for programming and downloading data.

    ii.   Optical cable (downloading data from meter to PC) shall be provided. One optical cable for each 100 Nos. meters shall be provided.

    iii.   LED for pulse output for testing purposes.

5.3. Climate Condition

a) Temperature range

The operating Temperature range of the Meters shall conform to the table 5 of IEC 62052-11 for outdoor meters.

b) Relative humidity

The meters shall be suitable for indoor operation in a humid tropical climate condition with the relative humidity as stipulated in clause 3.0 above.

5.4. Electrical requirements

5.4.1. Power Consumption

The active and apparent power consumption in the voltage and currents circuits of the meters at a reference voltage, frequency, temperature and rated current shall not be more than that stipulated in IEC 62053-21.
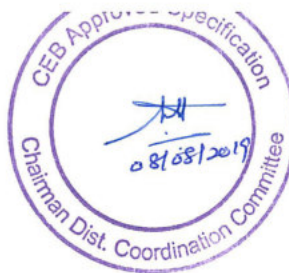
5.4.2. Influence of Supply Voltage

a) Voltage Range

The normal operating voltage range of the meters shall be as stipulated in clause 5.1.1 and the permissible error due to voltage variation shall conform to the table 7 of IEC 62052-11.

b) Voltage dips and short interruptions

Voltage interruptions shall not produce a change in the register as stipulated in Clause 7.1.2 of IEC 62052-11. When the voltage is restored, the meters shall not have suffered degradation of the meteorological characteristics.

c) Influence of short time over current

The meters shall not be damaged by short time over currents and the meter shall perform correctly when back to its initial working conditions and the variation of error shall be in accordance with the Table 3 of IEC 62053-21.

5.4.3. Influence of Self-heating

The variation of error due to self – heating shall not exceed the value given in table 4 of IEC 62053-21.

5.4.4. Influence of heating

The temperature rise at any point of the external surface of the meters shall not exceed 25 K with the ambient temperature at 40°C. Under normal operating condition the electrical circuits and insulation shall not reach a temperature which might affect the operation of the meter.

5.4.5. Insulation

The insulation of the meters shall withstand an impulse voltage of 10kV peak and Power frequencies withstand voltage shall be 4kV as stipulated in clause 7.3.2.3 in IEC 62052-21.

The protective class of the meters shall be class II.

5.5. Electromagnetic Compatibility

a) Immunity to electromagnetic disturbance

The meters shall be designed in such a way that conducted or radiated electromagnetic disturbance as well as electrostatic discharge do not damage or influence the meter.

b) Radio interference suppression

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

5.6. Accuracy requirements

The accuracy requirement of the meters shall be as per clause 5 section I) and shall be suitable for operation within the specified accuracy class limits in a tropical climate and service condition as given in clause 3.0.

a) Limits of error due to variation of the current

The percentage errors shall not exceed the limits for the relevant accuracy class given in table 6 of IEC 62053-21.

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 given in table 8 of IEC 62053-21.

c) **Starting and running with no-load**

The meter shall be fully functional within 5 seconds after the voltage is applied to the meter terminals.

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. The meter shall start and continue to register at current specified in clause 8.3.3 of IEC 62053-21.

d) **Meter Constant**

Sufficient pulse rate (meter constant) shall be generated at low load condition (1/10 of the Accuracy Class). It shall be possible to display the meter constant in the sequence of display parameters and facilities shall be provided to program the meter constant.

6.0 REQUIREMENTS FOR SELECTION

6.1. Quality Assurance

The manufacturer shall possess ISO 9001:2008 or latest Quality Assurance Certification for the design, manufacture and testing Programmable Static Energy Meters. The certificate shall be valid throughout the delivery period of this bid. In the event the meters are manufactured in a plant under the license of the manufacturer, the manufacturing plant shall possess ISO 9001:2008 or latest Quality Assurance Certificate for manufacturing and testing of Programmable Static Energy Meters. The Bidder shall furnish a copy of the ISO certificate certified as true copy of the original by the manufacturer, along with the offer.

Each meter to be tested and calibrated at a meter testing laboratory having ISO/IEC: 17025:2005 and properly sealed with security synthetic seal with identification number. Test reports shall be dispatched to the purchaser before inspection.

The proof documents with regard to the accreditation to the above facility in accordance with ISO/IEC 17025:2005 shall be submitted along with the bid.

6.2. Manufacturing Experience

The manufacturer shall have minimum of ten (10) years experience in the manufacturing of Programmable Static Energy Meters conforming the IEC 62053-21. The manufacturer shall have supplied Programmable Static Energy Meters to minimum of 10 Electricity Authorities/Utilities out of which at least 5 are from outside the country of manufacture during last 7 years.

The manufacturer shall furnish a list of Authorities/Utilities to whom meters were supplied during the past 7 years, indicating their names, addresses and contact details clearly. The purchaser reserves the right to communicate with Electricity supply authorities/utilities to whom meters have been supplied with regard to the performance of the meters.

If the manufacturer has supplied similar items to CEB for the last (5) years with proven sales records; without any adverse performance records, such manufacturers will be exempted from above requirements.

6.3. Type Tests

Type Test Certificates conforming to the above referred standards or any other international standard which is not less stringent, issued by:

Either

(a) an accredited independent testing laboratory acceptable to the CEB or

(b) an accredited or independent testing laboratory acceptable to the CEB where the type test have been witnessed by a reputed independent body acceptable to CEB/ CEB

shall be furnished with the offer. Type Test Certificates shall clearly indicate the relevant standard, items concerned, showing the manufacturers identity, type No. /catalogue No. and basic technical parameters. In case if the submitted type tests are according to any other international standard which is not less stringent than the specified, then the copy of the used standard in English shall be submitted with offer.

Proof of accreditation and accredited scope by a national/ international authority shall be forwarded with the offer. Test certificates shall be complete including all the pages as issued by the testing authority. Type test certificates shall be in English language. Parts of test certificates shall not be acceptable.

The following type test certificates conforming to IEC 62052-11 shall be furnished with the offer.

a) Test of electrical requirements.

    i)   Test of Power consumption.
    ii)   Test of influence of supply voltage.
    iii)   Test of influence of short-time over current.
    iv)   Test of influence of self-heating.
    v)   Test of influence of heating.
    vi)   Test of insulating properties.
    vii)   Impulse voltage test

In addition certificates of impulse test done for 10kV peak shall be submitted.

b) Test for electromagnetic compatibility (EMC).

    i)   Radio interference measurements.
    ii)   Fast transient burst test.
    iii)   Test of immunity to electromagnetic HF fields.
    iv)   Test of immunity to electrostatic discharges.

c) Test of climate influences.

    i)   Dry heat test.
    ii)   Cold test.
    iii)   Damp heat cycle test.
    iv)   Solar radiation test.

d) Tests of mechanical requirements.

    i)   Vibration test.
    ii)   Shock test.
    iii)   Spring hammer test.
    iv)   Tests of protection against penetration of dust and water.
    v)   Test of resistance to heat and fire.

e) Test of Accuracy Requirement.

    i)   Test of influence quantities.
    ii)   Test of no load condition.
    iii)   Test of starting condition.
    iv)   Test of meter constant.

7.0 INFORMATION TO BE FURNISHED WITH THE OFFER

The following shall be furnished with the offer.

(a) Technical details in English clearly identifying the offered items, but not limited to:

     (i) The Comprehensive catalogues
     (ii) The dimensional drawings
     (iii) Schematic diagrams
     (iv) Calculations, graphs and tables
     (v) Literature describing the operational features
     (vi) Name plate drawing to scale, incorporating the particulars called for in clause 10.2
     (vii) Constructional & mounting details with electrical clearances
     (viii) A copy of the manual of the software
     (ix) Materials used for components & relevant literature and electrical properties and mechanical properties

(b) ISO 9001:2008 or latest Quality Assurance Certificate in accordance with clause 6.1.

(c) Manufacturer shall furnish a list of supplies with supplied item, purchaser (specifying address contact persons and contact details, country), year & quantity to prove his manufacturing experience and outside the country sales in accordance with Clause 6.2.

(d) Type Test Certificates in accordance with the clause 6.3.

(e) Duly filled and signed 'Annex - B: Schedule of Technical Requirements and Guaranteed Technical Particulars'.

(f) Other relevant Technical Details, protection operating curves and Calculations.

(g) Certificate of compliance to DLMS issued by DLMS association

(h) Certificate for service life as per clause 8.1

Not furnishing above documents and details may result in offer being rejected.

8.0 PERFORMANCE GUARANTEES AND WARRANTY

8.1. Certificate of Service Life

"Ofgem" certification or other equivalent certification issued by an independent electricity regulating institution certifying a minimum service life shall be provided with the offer.

8.2. Warranty

Manufacturer shall provide 5 years warranty for the meters and accessories from the date of FOB dispatch of the meters to the purchaser. Manufacturer should forward the duly signed Warranty Certificate together with the letter of acceptance of the award. The format of the Warranty Certificate is given in Annex C.

When the meters become defective within first two years of warranty they shall be replaced free of charge. The meters become defective after two years during the warranty period shall be repaired or replaced free of charge.

CEB shall not remove the meter cover for any purpose such that CEB has the right to claim under warranty in the event of any defect in the meter. Manufacturer shall honor the conditions in the warranty certificate accordingly.

9.0 SAMPLES

One sample of meter with manufacturer's seals, all accessories for remote communication (if requested in the price schedule) and copy of the meter reading software with meter reading cable shall be handed over to the Purchaser along with the offer. The software provided with the sample shall have the full functionality in order to facilitate evaluation of the product.

The sample of the successful Bidder will be retained and the samples of the unsuccessful bidders will be returned once the award is made.

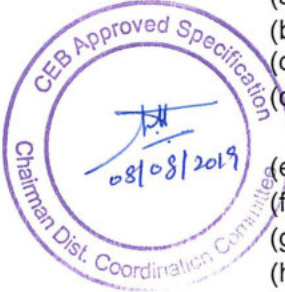## 10.0 PACKING AND LABELING/MARKING

10.1. Packing

Each meter shall be individually packed in a Cardboard Box using bubble wrapping to prevent damage due to rough handling and about 25 meters shall be packed in cardboard boxes. Each packing shall indicate the Type (Single Phase/Three Phase), Rating and Serial Nos. of the meters.

Technical Literature in English language on the installation, calibration and maintenance shall be supplied with each set of meters and they shall be descriptive and self-explanatory, complete with necessary connection diagrams and drawings.

The final packing requirements for the overall consignment are given in bid document.

10.2. Identification and Labeling/Marking

Every meter shall be marked indelibly, legibly and in a weatherproof and abrasion proof manner as follows:

(a) Words "Property of CEB" with a mark "W-5Y" shall be marked on the nameplate
(b) A serial number (which will be indicated at the time of placing the order)
(c) Ratings: voltage U_0/U (U_m)/ current / size / capacity
(d) Diagram of connections (this diagram shall also show the sequence for which the meter is intended, preferably inside the meter terminal cover)
(e) Standard adopted
(f) Product type
(g) year of manufacture, manufacturer's name or trade mark
(h) Any other information stipulated in clause 5.12.1 of IEC 62052-11 markings stipulated in the standards

11.0 INSPECTION AND TESTING

11.1. Routine Tests

The Routine Test Certificates conforming to the relevant standards (depending on the choice of the applicable standards) shall be furnished for the observation of the Engineer appointed by CEB at the time of inspection.

In addition, the routine test certificates shall be sent with the shipment of meters. Routine tests carried out for all meters and each consignment of meters shall accompany one set of routine test results recorded in tabular form. If the test results are recorded in separate sheets all such sheets pertaining to each consignment shall be bound together as one volume.

11.2. Inspection

The Successful bidder shall make necessary arrangements for inspection by an Engineer appointed by the CEB and also to carry out in his presence necessary Acceptance tests on

procured item and material without any additional cost. Acceptance test reports shall be a part of the shipping document. CEB may waive off the inspection either with the condition of witnessing the acceptance tests by an independent body acceptable to CEB or completely. In such a situation a notice of waive off will be issued in advance to the supplier.

11.3. Acceptance Tests

Unless specified below, visual inspection, dimensional checks, sample tests specified in the relevant standards, selected type tests and the routine tests conducted for the selected sample in addition to the complete routine test reports shall form the acceptance test report.

The following test as per IEC 62058-11 and IEC 62058-31 shall be witnessed by the representative of the Purchaser.

a) Test of insulation properties.

    i.   A.C. Voltage Test.

b) Tests of Accuracy requirements.

    i.   Test of Meter Constant.
    ii.   Test of Starting condition.
    iii.   Test of No load condition.
    iv.   Limits of error due to variation of current.
   v.   Limits of error due to influence quantities (Voltage variation, voltage unbalance, harmonics in voltage and current, external magnetic fields).

12.0 ANNEXES

Annex A   - Display Sequence for Programmable Direct Connected Static Energy Meter - Single Phase/Three Phase

Annex B   - Schedule of Technical Particulars – To be filled by the Manufacturer

Annex C   - Warranty Certificate

Annex D   - Non - Compliance Schedule.

Display Sequence for Programmable Direct Connected Static Energy Meter
- Single Phase/Three Phase

Ref	Display Sequence	Single Phase Meter	Three Phase Meter
	Auto Display Mode		
1	Display Test	√	√
2	Current Time	√	√
3	Current Date	√	√
4	Cumulative Total Active Import Energy	√	√
5	Cumulative Active Import Energy (Rate 1)	√	√
6	Cumulative Active Import Energy (Rate 2)	√	√
7	Cumulative Active Import Energy (Rate 3)	√	√
8	Cumulative Total Active Export Energy	√	√
9	Cumulative Active Export Energy (Rate 1)	√	√
10	Cumulative Active Export Energy (Rate 2)	√	√
11	Cumulative Active Export Energy (Rate 3)	√	√
12	Maximum Demand (MD)	√	√
13	MD Occurrence Date and Time	√	√
14	History 1: Cumulative Total Active Import Energy		√
15	History 1: Cumulative Active Import Energy (Rate 1)		√
16	History 1: Cumulative Active Import Energy (Rate 2)		√
17	History 1: Cumulative Active Import Energy (Rate 3)		√
18	History 1: Maximum Demand (MD) Import		√
19	History 1: MD Import Occurrence Date and Time		√
20	History 1: Cumulative Total Active Export Energy		√
21	History 1: Cumulative Active Export Energy (Rate 1)		√
22	History 1: Cumulative Active Export Energy (Rate 2)		√
23	History 1: Cumulative Active Export Energy (Rate 3)		√
24	Last MD Reset Date and Time		√
25	Second Last MD Reset Date and Time		√
	Push Button Mode		
1	Display Test	√	√
2	Current Time	√	√
3	Current Date	√	√
4	Meter Serial Number	√	√
5	Meter Constant Active Energy	√	√
6	Meter Constant Reactive Energy	√	√
7	Phase L1 Voltage	√	√
8	Phase L2 Voltage		√
9	Phase L3 Voltage		√
10	L1 Current	√	√
11	L2 Current		√
12	L3 Current		√
13	Active Power Total	√	√
14	Apparent Power Total	√	√
15	Reactive Power Total	√	√
16	Power Factor (L1)	√	√
17	Power Factor (L2)		√
18	Power Factor (L3)		√
19	Communication signal strength	√	√
20	Cumulative Active Import Energy Total	√	√
21	Cumulative Active Import Energy (Rate 1)	√	√
22	Cumulative Active Import Energy (Rate 2)	√	√
23	Cumulative Active Import Energy (Rate 3)	√	√
24	Cumulative Reactive Import Energy Total	√	√
25	Cumulative Reactive Import Energy (Rate 1)	√	√
26	Cumulative Reactive Import Energy (Rate 2)	√	√
27	Cumulative Reactive Import Energy (Rate 3)	√	√
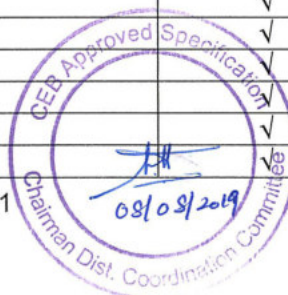
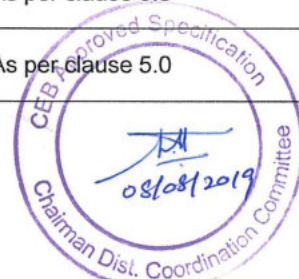| 28	Cumulative Active Export Energy Total	√	√
29	Cumulative Active Export Energy (Rate 1)	√	√
30	Cumulative Active Export Energy (Rate 2)	√	√
31	Cumulative Active Export Energy (Rate 3)	√	√
32	Cumulative Reactive Export Energy Total	√	√
33	Cumulative Reactive Export Energy (Rate 1)	√	√
34	Cumulative Reactive Export Energy (Rate 2)	√	√
35	Cumulative Reactive Export Energy (Rate 3)	√	√
36	Maximum Demand (MD) Import	√	√
37	MD Import Occurrence Date and Time	√	√
38	Maximum Demand (MD) Export	√	√
39	MD Export Occurrence Date and Time	√	√
40	History 1: Cumulative Active Import Energy Total	√	√
41	History 1: Cumulative Active Import Energy (Rate 1)	√	√
42	History 1: Cumulative Active Import Energy (Rate 2)	√	√
43	History 1: Cumulative Active Import Energy (Rate 3)	√	√
44	History 1: Cumulative Reactive Import Energy Total	√	√
45	History 1: Cumulative Reactive Import Energy (Rate 1)	√	√
46	History 1: Cumulative Reactive Import Energy (Rate 2)	√	√
47	History 1: Cumulative Reactive Import Energy (Rate 3)	√	√
48	History 1: Cumulative Active Export Energy Total	√	√
49	History 1: Cumulative Active Export Energy (Rate 1)	√	√
50	History 1: Cumulative Active Export Energy (Rate 2)	√	√
51	History 1: Cumulative Active Export Energy (Rate 3)	√	√
52	History 1: Cumulative Reactive Export Energy Total	√	√
53	History 1: Cumulative Reactive Export Energy (Rate 1)	√	√
54	History 1: Cumulative Reactive Export Energy (Rate 2)	√	√
55	History 1: Cumulative Reactive Export Energy (Rate 3)	√	√
56	History 1: Maximum Demand (MD) Import	√	√
57	History 1: MD Import Occurrence Date and Time	√	√
58	History 1: Maximum Demand (MD) Export	√	√
59	History 1: MD Export Occurrence Date and Time	√	√
60	History 1: MD Reset Date and Time	√	√
61	History 2: Cumulative Active Import Energy Total	√	√
62	History 2: Cumulative Active Import Energy (Rate 1)	√	√
63	History 2: Cumulative Active Import Energy (Rate 2)	√	√
64	History 2: Cumulative Active Import Energy (Rate 3)	√	√
65	History 2: Cumulative Reactive Import Energy Total	√	√
66	History 2: Cumulative Reactive Import Energy (Rate 1)	√	√
67	History 2: Cumulative Reactive Import Energy (Rate 2)	√	√
68	History 2: Cumulative Reactive Import Energy (Rate 3)	√	√
69	History 2: Cumulative Active Export Energy Total	√	√
70	History 2: Cumulative Active Export Energy (Rate 1)	√	√
71	History 2: Cumulative Active Export Energy (Rate 2)	√	√
72	History 2: Cumulative Active Export Energy (Rate 3)	√	√
73	History 2: Cumulative Reactive Export Energy Total	√	√
74	History 2: Cumulative Reactive Export Energy (Rate 1)	√	√
75	History 2: Cumulative Reactive Export Energy (Rate 2)	√	√
76	History 2: Cumulative Reactive Export Energy (Rate 3)	√	√
77	History 2: Maximum Demand (MD) Import	√	√
78	History 2: MD Import Occurrence Date and Time	√	√
79	History 2: Maximum Demand (MD) Export	√	√
80	History 2: MD Export Occurrence Date and Time	√	√
81	History 2:MD Reset Date and Time	√	√
82	Miscellaneous String	√	√

SCHEDULE OF TECHNICAL REQUIREMENTS AND GUARANTEED TECHNICAL PARTICULARS

(CEB Requirements shall be filled by the procurement entity and information of the offer shall be filled by the manufacturer)

		CEB Requirement			Offered
		Single Phase	Three Phase		
1.	Name of Manufacturer				
2.	Country of manufacture				
3.	Model No./ Catalog Ref. No.				
4.	Accuracy Class of Meter (Active)				
5.	Accuracy Class of Meter (Reactive)				
6.	Connection Type		(3Ø 4 wire)		
7.	Method of Measurement		3 Watt Meter		
8.	Applicable Standards	As per clause 4.0			
9.	Standard basic Current	5 A	10 A	5A	
10.	Rated Maximum Current (Imax)	40 A	100A	40A	
11.	Reference voltage and operating range	230 V	400 V		
12.	Starting Current of Meter	As per IEC 62053 - 21			
13.	Limit of errors when operating in the full power factor range				
14.	Reference Temperature and Temperature coefficient				
15.	Insulation Level				
	(a) Power Frequency Withstand voltage for 1 min	4 kV			
	(b) Impulse Voltage at 1.2/50 µsec	10 kV			
16.	Power Losses	As per clause 5.4.1			
17.	Temperature rise as per IEC 62052-11	As per clause 5.4.4			
18.	Type of register				
19.	Meter sampling rate				
20.	Sampling rate for load profile data	30 s or less			
21.	No. of digits in the LCD display	Minimum 6 including a decimal	Minimum 7 including a decimal		
22.	Size of numbers in the LCD display	Minimum 8mm high and 4 mm width			
23.	Type of meter and terminal base				
24.	Type of meter cover and terminal cover	As per clauses 5.2.2 & 5.2.3.			
25.	Bore size of the terminals	As per clause 5.2.2			
26.	Degree of Protection (IP Category)	IP 51 (minimum)			
27.	Battery life time of calendar clock battery	10 years (minimum)			
28.	Whether the type test certificates furnished in complete form, from recognized testing authority? indicate the deviations if any	As per clause 6.3			
29.	Whether the meters conforming to the Clause 5.0. ? Indicate the deviations if any	As per clause 5.0			

30.	Whether the display is non-volatile memory type?	Yes	
31.	Memory retention period (months)	12 months	
32.	Whether the Certificate of quality assurance conforming to ISO 9001:2008 or latest furnished?	Yes	
33.	Whether the certificate of ISO/IEC 17025:2005 accreditation certificate furnished	Yes	
34.	Whether the active indicator provided (flashing light)	Yes	
35.	Whether the Blinking LEDs analogues to the watt-hour and var-hour consumption provided	Yes	
36.	Whether the remote disconnection facility is provided	Yes	
37.	Indicate the extra facilities available with the meters. Attach separate sheet		
38.	Whether the Acceptance / Sample tests as per clause 11.3 is carried out by the manufacturer	Yes	
39.	Method provided for remote communication	As specified in price schedule	
40.	Whether the software as per clause 5.0 (g) and clause 5.1.4.3, including relevant manuals, is provided	Yes	
41.	Whether the certification provided as per clause 8.1?	Yes	
42.	Whether markings as per clause 10.2 provided?	Yes	
43.	Facilities provided by remote operation		
	a) To program each meter	Yes	
	b) To take the relevant meter reading individually	Yes	
	c) To reset the maximum demand	Yes	
	d) To get an error message when the meter is fully faulty tampering indication etc and the date and time of occurrence of such event	Yes	
	e) To download stored data from meter	Yes	
44.	Type of modem	Dual band GSM modem (900/1800 MHz) GPRS/3G/4G modem	
45.	Maximum speed of modem		
46.	Number of events that modem can send during a main supply failure		
47.	Download data to be stored in DBMS	Yes	
48.	Tamper proof SIM card holder available	Yes	
49.	Whether all information as per clause 7.0 finished with the offer?	Yes	
50.	Guaranteed Life Span of meters, communication modules etc.	10 years minimum	
51.	Warranty for meters and accessories	5 years minimum	

....

Signature of the Manufacturer and seal

....

Date

I/We certify that the above data are true and correct

....

Signature of the Bidder and seal

08/08/2019

....

Date

Warranty Certificate

General Manager,
Ceylon Electricity Board,
50, Sir Chittampalam A Gardiner Mawatha,
Colombo 2,
Sri Lanka.

………………………………………………………………………………………(hereinafter called the Manufacturer) shall make good by repair or, at our option by replacement, defects which, under proper use and in accordance with any instruction issued by us, as appeared in the contract of our supply or manufacture within a period of not more than sixty (60) months after the original FOB dispatch date (When the meters become defective within first two years of warranty they shall be replaced free of charge. The meters become defective after two years during the warranty period shall be repaired or replaced free of charge.)Provided that:-

a)   All meters having Serial Nos. From …………………………………To
     ………………………………
     Supplied by the Manufacturer for the CEB Tender No
     ………………………………………….. is
     Handled, installed and commissioned in a manner as agreed to by the Manufacturer and the Ceylon Electricity Board and operated at the designed normal operating conditions at all times for which it was intended.

b)   We are notified of the alleged defect first coming to the purchaser's notice and within the warranty period.

c)   The defective meter(s) is /are returned promptly to our Agent in Sri Lanka free of charge if we so require and we shall return new or repaired meter(s) free of charge to the original contract delivery point unless otherwise arranged within 03 months period from notification.

d)   Any unauthorized handing; repairs or alteration to the meter(s) shall invalidate this warranty.

e)   If it is found that the meter has been mishandled, neglected and / or modified in any way during the storage period, the warranty in general will become null and void.

The warranty applied only to goods and services carried out by the Manufacturer or with the Manufacturer approval.

Yours faithfully,

………………………………………   ……………………………………………………

Signature of the Bidder and seal / Date   **Signature of the Manufacturer and seal / Date**

Non-Compliance Schedule

On this schedule the bidder shall provide a list of non-compliances with this specification, documenting the effects that such non-compliance is likely to have on the equipment life and operating characteristics. Each non-compliance shall be referred to the relevant specification clause.

Clause No.	Non-Compliance

....

Signature of the Manufacturer

....

Date

I/We certify that the above data are true and correct

....

Signature of the Bidder and seal

....

Date