

CEB
SPECIFICATION

**DIRECT CONNECTED STATIC POLY PHASE
ENERGY METER OF ACCURACY CLASS 1**



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SPECIFICATION FOR DIRECT CONNECTED STATIC POLY PHASE ENERGY METERS OF ACCURACY CLASS 1

1.0 SCOPE

This Specification covers the general requirements of the design, manufacture, operation and testing of Direct Connected, Static Poly Phase Energy Meters of Accuracy Class 1.

Following meter is covered under this specification.

Direct Connected PPM with kVA demand Including (With remote reading facility)

The meter shall have facility to program & read using a PC through an USB connection (2.0 or above). Alternative connections are acceptable if the cable & necessary modules for connection to a PC are provided with the meter.

Meter shall also have communication facility & take meter reading remotely via a GSM and GPRS network. The GSM and GPRS Communication module & other accessories required for remote meter reading shall be supplied with the meter (if requested). It should be possible to replace the communication unit at site without breaking the meters alternative seals.

2.0 SYSTEM PARAMETERS

System Voltage	400V
System Highest Voltage	415V
System Frequency	50Hz
Method of Earthing	Effectively earthed
System Fault Level	25 kA

3.0 SERVICE CONDITIONS

Maximum ambient temperature	40°C
Maximum relative humidity	90%
Annual average ambient temperature	30°C
Environmental condition	Humid tropical climate with heavily polluted atmosphere
Highest altitude	from MSL to 1900m above MSL

4.0 APPLICABLE STANDARDS

The equipment and components supplied shall be in accordance with the latest editions/amendments of the Standards specified below. However the CEB specification shall supersede these standards in the event there is a discrepancy.

S.N	Standard No	Title
1	IEC 62052-11(2003)	Electricity metering equipment(AC)- General requirements, tests and test conditions- Part 11: Metering equipment
2	IEC 62053-21(2003)	Electricity metering equipment (AC) Particular requirements- Part 21: Static meters for active energy (classes 1 and 2)
3	IEC 62053-23 (2003)	Electricity metering equipment(A.C) particular requirements-part23 , static meters for reactive energy(classes 2& 3
04	IEC 60870-5-101	Telecontrol equipment and systems or DNP 3.0 or latest versions of them

5.0 BASIC FEATURES

Direct Connected PPM with kVA demand

The Static Three Phase Energy Meters shall be capable of measuring and recording kWh, kVAh, kVA, maximum demand and power factor. The accuracy class of the meters shall be Class 1 for Active Energy (kWh) and Class 2 for reactive Energy (kVAh).

- a) The meter shall operate with specified accuracy for power factors in the full range of all quadrants.
- b) The Meter shall be of the surface mounting type and shall have terminals at the bottom.
- c) The meters shall be a programmable type suitable for recording active energy transaction (import and export) in kilowatt-hour (kWh), kVarh in phase wise as well as summation and maximum demand (kVA).
- d) The meters shall be suitable for "Multiple tariff" metering (minimum of 04 nos. of tariff readings available).
- e) The meters shall record the monthly transaction (generally every 30 days) along with the cumulative consumption of kWh and kVarh separately and the maximum kVA demand over a demand integration period of fifteen (15) minutes for the 30 day period. History of transaction (kWh, kVA (including occurrence date and time) and kVarh) of the previous month shall be displayed in the auto display mode. Further user shall have the facility to program the automatic reset date (billing date) of the meter.
- f) It shall be possible to program (including automatic billing/resetting date), download data and reset the maximum demand both locally and remotely through suitable software running on PC.
- g) The meters shall detect and record current direction reversal as an event with date and time of such occurrence and restoration with phase identification.
- h) The meters shall be capable of recording occurrence of missing voltage of one or two phases and shall display the all details of tampering and restoration such as

time and date of occurrence of tampering, number of times meter tampered, present status etc.

- i) The meters shall record the consumption accurately irrespective of the phase sequence of supply.
- j) The meters shall operate normally, even in the absence of neutral & when any two voltage leads are connected.
- k) The meter shall have a calendar clock to provide time and date information and be equipped with a suitable battery backup. The life time of the supplied battery shall not be less than 10 years under normal usage (Re-chargeable battery with main supply is preferred).
- 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 pulsing outputs which blinks and shall be analogous to the kWh and kVarh metered, for testing/calibration purposes. The number of pulses per kWh/kVarh shall be indicated in the rating plate.
- m) Back light for the LCD display shall be available. Scrolling time of the parameters available in the auto display shall be programmable.
- n) Display should have facility to read readings even at the absence of the input power (Other than push button operation is preferred).
- o) The meter shall be suitable for LV operations as follows:

Operation Voltage	400V (3 phase 4 wire system)
Voltage transformer ratio	Direct connection
Current transformer ratio	Direct connection
Standard Basic Current	10A
Maximum current	100A
Frequency	50Hz

- p) The meters shall directly display (in auto display mode) the following data as applicable at the time of reading (calling) when required.

Instantaneous voltage	Volts (Line/Phase)
Instantaneous current	Amps (on each phase)
Cumulative Active Energy (kWh) , Cumulative Reactive Energy (kVarh) and Maximum Demand (kVA)	
Previous month billing data (kWh, kVarh, MD (kVA) and MD occurrence date and time)	
Phase Sequence	

Note: Add/drop facility of other parameters shall be provided through the programming software in to the Auto and Manual Display (push button)

- q) The meters shall have facilities to store a minimum of twelve months data and to display the necessary data when required.

5.1 General Requirements

5.1.1 Standard Reference Voltages and Frequency;

The meters shall be suitable for operation on, 400 Volt, three phases, 50 Hz, four wire system applications.

5.1.2 Standard Basic Current and Maximum Current;

For Direct Connected PPM with kVA measurement

The Meters shall be suitable for operation on standard basic current of 10A and maximum current of 100A.

5.1.3 Meter Reading / Programming Software

User friendly windows based Graphical User Interface (GUI) software shall be supplied on a CD with the meters in order to program and download data from the meters. The relevant user manual for the software shall be provided. All the features that the meter supports shall be accessible through a proper licensed version of the same software. (This software shall be provided along with the sample of the bid in order to explore the capabilities of the provided sample.)

5.1.4 Remote Communication

5.1.4.1 General Requirement

The meters shall be able to access from software running on a Personnel Computer with operating system widows XP or above. Method of communication between the communication module and the PC modem shall be data enables GSM and GPRS.

5.1.4.2 Remote reading

Facilities shall be available to do the following tasks for each of the meter by remote operation via both GSM and GPRS connection.

- i. To program each meter.
- ii. To take the relevant meter reading for each meter separately.
- iii. To reset the maximum demand value.
- iv. To get and error message when the meter is faulty and the date and time of occurrence of fault.
- v. To download stored data from meter (Load surveyors, event logs etc...).

5.1.4.3 GSM and GPRS Communication module (If requested by CEB)

The GSM and GPRS Communication modules shall be supplied fitted to the meter, as specified in the price schedule. It will be powered from the meter. Alternatively a separate GSM and GPRS module and a power supply for the GSM and GPRS module to operate from available LV supply (as per the operating voltage given under clause 5.0) would be acceptable. The module shall have;

- i. 1800 GSM/GPRS Modem or Dual band GSM/GPRS modem (900/1,800 MHz)
- ii. Tamper proof SIM Card Holder

- iii. A built in connector for and external antenna.
- iv. Minimum speed of 9600 bps.

5.1.4.4 Remote Electricity Metering Software

A user friendly, window based GUI software shall be supplied on a CD with the meters in order to program the meters (locally and remote) and to download the data from the remote GSM and GPRS facilitated meters. The software shall have the facility to communicate via a GSM/GPRS modem connected to the PC. Relevant manuals shall be provided.

The download data shall be stored in a Microsoft Access /SQL or similar database. A delimited text file or MS Excel format is also acceptable.

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;

- a) Personal safety against electric shock
- b) Personal safety against effects of excessive temperature
- c) Safety against spread of fire
- d) Protection against penetration of solid objects, dust and water.

All parts which are subjected 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 polycarbonate 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 for a temperature of 135°C and a pressure of 1.8 Mpa.

The terminals should accommodate a cable of cross section 35mm².

5.2.3 Terminal Cover

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

The terminal covers shall be of extended type with easily breakable knockouts or suitable hole arrangements to insert cables if necessary through separate "U" groove covering removable part. 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 ignited by thermic 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 and IP 65 further as per IEC 60529.

5.2.6 Display of measured values

The meters shall be provided with a clear Electronic Display under a viewing panel conform to the degree of protection of IP 65 and the dimensions of figures shall not be less than 6 mm (Height) and 4mm (Width). Minimum number of digits shall be 7 including a decimal.

The meters shall have non-volatile memory type electronic display. The non-volatile memory shall have a minimum retention time of twelve months. The principal unit for the measured value shall be the kilowatt-hour (kWh), kVA and kVarh (If applicable)

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 and the programming unit / PC with the help of a software package and the software testing the meters shall also be supplied with the meter.

It shall provide an error message when the meter is faulty and the date it becomes faulty.

5.2.8 Data cable to connect meter with a PC.

Data cable to connect the meter with a PC (or a laptop) with the meter for the purpose of data downloading / programming of the meter shall be provided. Minimum length of the cable shall be 2 m and Number of units to be provided is as per the bid data sheet.

5.2.9 Marking of meter, Connection diagrams and Terminal Marking

Every meter shall be provided with a Name – plate incorporating the information as per and the meter terminals shall also be marked.

Every meter shall be indelibly marked with a diagram of connections and this diagram shall also show the sequence for which the meter is intended, preferably inside the meter terminal cover.

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 indoor 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.

5.4 Electrical requirements

5.4.1 Power Consumption

The active and apparent power consumption in the voltage and current circuits of the meters at a reference voltage, frequency, temperature and rated current shall not be more than that stipulated in table 1 and 2 of 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 Table 4.0 of this spec. 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 meter reading 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 not exceed the value indicated in 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 25K 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 meters.

5.4.5 Insulation

The insulation of the meters shall withstand an impulse voltage of 10kV peak and power frequency withstand voltage of 4 kV as stipulated respectively clause 7.3.1 & 7.3.3 of IEC 62052 – 11.

5.4.6 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, conduct or radiate noise which could interfere with other equipment.

5.5 Accuracy Requirements

The meters shall be of accuracy class 1 and shall be suitable for operation within the accuracy class limits specified in a tropical climate and service as given in clause 3.0 of CEB Spec.

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 tables 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) Limits of error due to ambient temperature variation

The limits of error shall not exceed the limits given in table 5 of IEC 62052-11 for indoor meters.

d) Starting of meter

The meter shall start and continue to register at current shown in Table 9 of IEC 62053 -21 for import and export transactions.

e) Meter Constant

Sufficient pulse rates (meter constant) shall be generated at low load condition

6.0 QUALITY ASSURANCE

The manufacturer shall have obtained Quality Management System certification conforming to ISO 9001: 2008 for the manufacturer of Static Poly Phase kilowatt-hour (kWh) Meters and Bidder shall furnish documentary evidence to prove this with the offer.

7.0 ADDITIONAL REQUIREMENTS

7.1 Manufacturing Experience

- a) The manufacturer shall have at least 10 years of experience in the manufacture Static (Electronic) Poly Phase Kilowatt-hour (kWh) Meters of Accuracy Class 1 to the IEC 62053 – 21. The manufacturer shall furnish sufficient documentary evidence in the bid to prove his manufacturing experience.
- b) The Meters shall be rugged construction, proven design and reliable so that the meter shall operate within the stipulated error limits for a period of 10 years.

7.2 Performance

7.2.1 Certificates for service life

“Ofgem “certification on other certification issued by an electricity regulating Institution certifying a minimum service life of 5 years (certified copies of the certificates shall be attached to prove this)

7.2.2 Additional requirements

- a) The manufacturer shall have supplied static (electronic) poly phase energy meters to a minimum of 10 Electricity Authorities/Utilities out of which at least 3 are from outside the country of manufacture during last 8 years.
- b) The manufacture shall furnish a list of Authorities/Utilities to whom meters were supplied during the past eight years, indicating their names and addresses clearly.
- c) 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.

7.3 Warranty

Manufacturer shall provide three year comprehensive warranty from the date of FOB dispatch of the meters to the purchaser. Manufacture should forward the duly signed Warranty Certificate together with the letter of acceptance of the award of contract. The format of the Warranty Certificate is given in the annex B.

When the meters become defective, they should be replaced free of charge.

7.4 Marking of Meters

7.4.1 The Name Plate of Meters shall bear all the information stipulated in clause 5.12 of IEC 62052-11. The marking shall be indelible, distinct and readable from outside the meter.

7.4.2 The words “Property of the Ceylon Electricity Board (CEB) with a mark “Warranty 3 Y “shall be engraved on the nameplate.

7.4.3 A serial number (which will be indicated at the time of placing an order) shall also be engraved on the nameplate.

7.5 Packing

Each meter shall be individually packed in a cardboard box using bubble wrapping to prevent damage due to rough handling and minimum of 5 meters shall be packed in cardboard boxes. Each box shall indicate the type (LV), Rating and serial Nos. of the meters.

All packing materials shall be of bio-degradable type.

8.0 INFORMATION TO BE SUPPLIED WITH THE OFFER

The following shall be furnished with the offer.

- a) Catalogues describing the equipment and indicating the type and model number.
- b) Comprehensive hardware and software manuals should be provided along with the offer. Hardware reference manual should comprehensively describe all hardware features available in the offered meter. Software reference manual should provide the detailed guidelines how to program the meter as per the client's requirement.
Literatures which describe measuring principles of kWh, kVar and kVA also should be furnished with the offer. (if applicable)
- c) Constructional features, materials used for components and relevant technical literature.
- d) Complete dimensional drawings.
- e) Manufacturing Experience and list of purchasers as stipulated in clause 6.1 and 6.2 above.
- f) The details of the information that will be indicated on the Name Plate of the Meter as stipulated in Clause 7.4 above.
- g) Completed Schedule of Guaranteed Technical particulars (ANNEX – A)
- h) Quality Management System certification that conforms to ISO 9001: 2008.
- i) The following Type Test Certificates conforming to IEC 62052 - 11 and IEC 62053-21 from a **recognized testing authority acceptable to the purchaser who have obtained ISO 17025 accreditation for electricity meter testing** shall be furnished.
 - i) Tests of mechanical requirements
 - a) Spring Hammer Test b) Shock test
 - c) Vibration Test d) Test of resistance to heat and fire
 - e) Tests of protection against penetration of dust and water
 - ii) Tests of climatic influence
 - a) Dry heat test
 - b) Cold test
 - c) Damp heat cycle test
 - iii) Test of electrical requirements
 - a) Test of power consumption
 - b) Test of influence of supply voltage
 - c) Test of influence of short-time over current
 - d) Test of influence of self-heating
 - e) Test of influence of heating

- f) Test of insulating properties
 - g) Impulse voltage test`
 - h) A.C. voltage test
- iv) Test of electromagnetic compatibility
 - a) Test of immunity to electrostatic discharges.
 - b) Test of immunity to electromagnetic RF fields
 - c) Fast transient burst test
 - d) Radio interference suppression
- v) Test of Accuracy requirements
 - a) Test of influence quantities
 - b) Test of ambient temperature influence
 - c) Test of no-load condition
 - d) Test of starting condition
 - e) Test of meter constant
 - f.) Limits of error due to variation of current
- vi) The Type Test Certificates shall clearly indicate the following;
 - a) Name, address and country of the testing authority
 - b) Date of testing
 - c) Name of equipment type tested
 - d) Number of pages of the type test certificates
 - e) Manufacturers identify/Catalogue reference number etc.
 - f) Basic parameters
 - g) The Standard to which the equipment type tested.
 - h) Comments and observations of the testing authority

The type test shall be performed at a reference voltage of 230V/415V at a reference frequency of 50Hz.

The type test certificates shall be submitted in complete form as furnished by the testing Authority. Incomplete type test certificates of parts of certificates will not be considered.

Offers of bidders who fail to furnish the above particulars in full, as stipulated in clause 8.0 shall be rejected.

9 INSPECTION AND TESTING

9.1 Inspection

The selected bidder shall make necessary arrangements for inspection by an Engineer appointed by the purchaser and to carry out in his presence necessary sample acceptance tests on the Meters offered as stipulated in Clause 10.2

9.2 Acceptance/Sample test

The following test as per IEC 62052 – 11 and IEC 62053 - 21 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) Test of influence quantities
 - v) Limits of error due to variation of current

Extra copies of the acceptance test report shall also be supplied with the meters.

9.3 Routine Test

Routine tests as per IEC 62052-11 shall be carried out on all meters and each consignment of meters shall company 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.

10 TECHNICAL LITERATURE AND DRAWINGS

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.

ANNEX – A**SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS**

Bidders shall complete and submit with the bid the schedule of technical particulars given below for each rating.

1	Name of Manufacturer & Country of manufacture	
2	Class of Meter & Model No./Catalog Ref. No	
3	Type (3 phase 4 wire / 3 phase 3 wire)	
4	Applicable Standards	
5	Standard Basic Current	
6	Rated Maximum Current I _{max}	
7	Reference voltage and operating range	
8	Starting Current of Meter	
9	Limit of errors when operating in the full power factor range (If applicable only)	
10	Reference Temperature and Temperature coefficient	
11	Insulation Level i) Insulation Withstand voltage for 1 min. ii) Impulse Voltage (10kV) 1.2 / 50μ	
12	Power Losses	
13	Temperature rise as per IEC 62052-11	
14	Type of register	
15	No. of digits	
16	Size of numbers	
17	Type of Meter and Terminal Base	
18	Type of Meter cover and Terminal cover	
19	Maximum size of conductor that can be connected to the Terminals	
20	Degree of protection (IP Category)	
21	Whether the following Type Test certificate as per IEC 62052 – 11 and IEC 62053 - 21 furnished in complete form, from Recognized Testing Authority, indicate the deviations if any. i) Spring Hammer Test -Yes/No - ii) Shock test Yes/No iii) Vibration Test Yes/No - iv) Test of resistance to heat and fire Yes/No - v) Tests of protection against penetration of dust and water Yes/No - vi) Tests of climate influence -Yes/No - vii) Dry heat test -Yes/No - viii) Cold test-Yes/No - ix) Damp cycle test -Yes/No - x) Solar radiation test- Yes/No - xi) Test of electrical requirements -Yes/No - xii) Test for electromagnetic compatibility- Yes/No xiii) Test of Accuracy requirements -Yes/No -	
22	Whether the meters conforming to the following Clauses (Indicate the deviations if any)	

	i) Clause 5.0 – Basic Features – a)-Yes/No- ii) Clause 5.0 – Basic Features – b)-Yes/No- iii) Clause 5.0 – Basic Features – c)-Yes/No- iv) Clause 5.0 – Basic Features – d)-Yes/No- v) Clause 5.0 – Basic Features – e)-Yes/No- vi) Clause 5.0 – Basic Features – f)-Yes/No- vii) Clause 5.0 – Basic Features – g)-Yes/No- viii) Clause 5.0 – Basic Features – h)-Yes/No- ix) Clause 5.0 – Basic Features – i)-Yes/No- x) Clause 5.0 – Basic Features – j)-Yes/No- xi) Clause 5.0 – Basic Features – k)-Yes/No- xii) Clause 5.0 – Basic Features – l)-Yes/No- xiii) Clause 5.0 – Basic Features – m)-Yes/No- xiv) Clause 5.0 – Basic Features – n)-Yes/No- xv) Clause 5.0 – Basic Features – o)-Yes/No- xvi) Clause 5.0 – Basic Features – p)-Yes/No- xvii) Clause 5.0 – Basic Features – q)-Yes/No- xviii) Clause 5.0 – Basic Features – o)-Yes/No- xix) Clause 5.0 – Basic Features – p)-Yes/No- xx) Clause 5.0 – Basic Features – q)-Yes/No-	
23	Battery of the meter; i. Type and model of the battery- ii. Whether it is recharging when main supply is available (yes/no)- iii. Replaceable without breaking manufacturer seals- iv. Guaranteed life span at related climatic conditions- (in years)-	
24	Time Clock i. Type of the crystal used- ii. Accuracy of the clock at 30°C (seconds/month)-	
25	Whether the meter can be programmed remotely-Yes/No	
26	Whether the display is non-volatile memory type -Yes/No Memory retention period -Months	
27	Whether the Certificate of quality Assurance Conforming to ISO 9001 : 2008 furnished-Yes/No-	
28	Whether the activity indicator provided (flashing light) Yes/No	
29	Whether the Blinking LED analogues to the watt-hour consumption provided-Yes/No	
30	Indicate the extra facilities available with the meters. attach separate sheet	
31	Whether the Acceptance/sample Tests as per Clause 10.2 will be carried out by the Manufacturer -Yes/No -	
32	Warranty Period	

33	Whether remote reading of meter is possible via a GSM connection Yes/No (If applicable only)	
34	Whether the Software as per clause 5.0 (f) and Clause 5.1.3 including relevant manuals is provided -Yes/No -	

I/We hereby certify that the above particulars are correct

.....
Seal and Signature of the Manufacturer/Date

Annex B**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 instructions issued by us, as appeared in the contract of our supply or manufacture within a period of not more than thirty six (36) months after the original FOB dispatch date (when the meters become defective within first three years of warranty they shall be replaced free of charge.

- a) All meters having Serial Nos. From tosupplied by the Manufacturer for the CEB Bid 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 handling; repairs or alterations 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,

.....
(Manufacturer)

Date.....