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CEB SPECIFICATION

PORTABLE THREE PHASE METER TESTING EQUIPMENT

CEB Approved Specification
2020.2.14
Chairman Dist. Coordination Committee

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SPECIFICATION FOR PORTABLE THREE PHASE METER TESTING EQUIPMENT

1.0 SCOPE

This Specification covers the general requirements of the design, manufacture, testing, supply and delivery of Portable Three Phase Meter Testing Equipment (MTE) suitable for onsite testing of 3 Phase 4 wire and 3 Phase 3 wire energy meters.

2.0 SYSTEM PARAMETERS

(a)	Nominal voltage (U)	400 V	11 kV	33 kV
(b)	System highest voltage (U_m)	415 V	12 kV	36 kV
(c)	System frequency	50 Hz		
(d)	Method of earthing	Effectively earthed	Effectively earthed	Non-Effectively earthed
(e)	System fault level	25 kA	12.5 kA	16 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

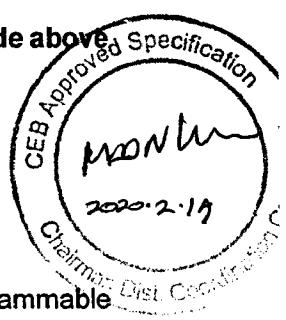
4.0 APPLICABLE STANDARDS

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

(a)	IEC 60529:1989	Degrees of protection provided by enclosures (IP Code)
(b)	IEC 61140:2016	Protection against electric shock - Common aspects for installation and equipment

Material conforming to other International Standards which are not less stringent than the Standards stipulated above may be offered. When such alternative Standards are used, reference to such Standards shall be quoted and English language copies of such Standards shall be provided with the offer.

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



5.0 BASIC FEATURES

5.1. Design

(a) The portable three phase meter testing equipment (MTE) shall be of the static, programmable type suitable for operation on low voltage three phase supply.

In addition, it shall have:

I. Fuse protected power supply.
II. Internal clock to record time with password protection. Precision of the clock shall retain for the life span of the MTE.
III. Possibility to test meters when there is bi-directional energy flow in different phases of three phase supplies (e.g. in case of distributed generation).

(b) The MTE shall be suitable for testing:

i) Electromechanical (Ferraris) meters of accuracy class 2 and Class 1 having rotating disc.

ii) Three Phase Static meters 440V four wire, Direct Connected (up to 100 A) and CT Connected (1A or 5A), conforming to IEC 62053-21, IEC 62053-22 and IEC 62053-24 of accuracy class 1 and 0.5S for active energy and accuracy class 2 for reactive energy respectively having light emitting diodes. In case of CT Connected meters primary current shall be up to 2,000A.

iii) Three Phase Static meters 110V three wire CT/VT Connected conforming to IEC 62053-22 and IEC 62053-24 of accuracy class 0.2S for active energy and accuracy class 1S for reactive energy respectively having light emitting diodes. CT primary current shall be up to 400A and secondary current shall be 1A or 5A.

(c) The MTE shall have the following features;

i. An input for scanning head, which can be used for sensing of disc revolutions in the electro-mechanical meters and indicating LED in static meters.
ii. Keys to enter the following data and information

- Meter Number, Customer Account No and Address
- Accuracy class of the meter
- Meter Constant (Revolutions/kWh or pulses per kWh)
- Current/Voltage Transformers ratios, etc.
- Configuration Method
- Energy Reading for dosage test

iii. Start stop button to check the meter accuracy without scanning head.
iv. The MTE shall be capable to display Voltage, Current, Power factor, Power (active, reactive & Apparent), Phase Diagram, Harmonic %, THD, Waveform, Accuracy Result and Harmonic Chart.
v. Facility to check the connection of installed meters at site (through vectoral display).
vi. Storage of test results, electrical parameters, meter constant, no of revolutions etc.
vii. Retrieval of stored data through RS 232/USB interface and download into PC.
viii. Should have facility to store at least 200 test results and retrieve saved data.

(d) The MTEs shall fulfill following technical requirements.

(i)	Operating Voltage Range	V	230 ± 10% Phase to Neutral for testing Direct and CT connected meters 110 ± 10% Phase to Phase for testing CT/VT connected meters
(ii)	Operating Current Range		
	a) For direct measurement	A	0.005 - 6

	b) With clamp on CT – Fixed jaws	A	0.5 -100
	c) With clamp on CT – Flexible	A	100 – 2,000 (CT diameter should be large enough to accommodate three 300 mm² cables)
(vi)	Accuracy of power/ energy measurement %		≤0.1 (For direct measurement) ≤0.2 (Overall accuracy with CT clamps up to 100A)
(vii)	Measuring Modes		3 Ph. Four wire kWh and kVA 3 Ph Three wire kWh and kVA (Provision shall be made for quick and easy selection of the measuring modes.)
(viii)	Interface		RS 232 /USB

5.2. Accessories

Following accessories shall be supplied along with the meter testing equipment.

i. 1 No. Scanning head suitable for sensing of rotor mark of Ferrari wheel meters and LED of static meters. Suitable clamping components for clamping the scanning head to the meter.

ii. 3 Nos. Clamp on CT to measure current up to 100 Amp for testing the direct connected meters without interrupting meter connection. Minimum CT hole diameter shall be 12mm.

iii. 3 Nos. Flexible CT to measure current up to 2000 Amp (for testing of CT operated meters without interrupting meter connection). Minimum probe length shall be 450mm.

iv. All necessary leads with quick connecting terminals.

v. Power supply cable to power up the MTE during data download.

vi. RS 232, USB interface cable for data download.

ix. PC Software (which is compatible with MS Windows 7 or Higher environment) for handling the stored results to use in multiple computers. This software shall be suitable for data download and analysis testing results, electrical parameters (like voltage, current, power factor, power, meter constant etc. Future updates if any shall be provided free of charge.

vii. Hard carrying case for instrument and accessories, suitable for carrying out field test and to prevent damage during transit.

viii. A 230V portable printer (Thermal Printer) with necessary connecting leads (to take the printouts of the test results in the field) shall also be provided **if specified in the Price Schedule.**

6.0 REQUIREMENTS FOR SELECTION

6.1. Quality Assurance

The manufacturer shall possess ISO 9001:2015 or latest Quality Assurance Certification for the design, manufacture of MTEs. 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 9001:2015 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.

6.2. Manufacturing Experience

The manufacturer shall have minimum of 10 years' experience in manufacturing MTEs of accuracy class 0.2 or better. The manufacturer shall have supplied MTEs similar to the offered, to minimum of 5 Electricity Authorities/Utilities out of which at least 3 are from outside the country of manufacture during last 5 years.

The manufacturer shall furnish a list of Authorities/Utilities to whom meters were supplied during the past 5 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. Test Certificates

Following test certificates shall be furnished with the offer;

i. Test certificates to conform the technical requirements of the MTEs indicated in clause 5.1.

ii. Calibration Certificate of formally supplied equipment of same model.

iii. Calibration Certificates of Equipment used to calibrate the Meter Testing Units being manufactured.

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) A copy of the manual of the software.
(vii) Video demonstration

(b) ISO 9001:2015 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) 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.

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

8.0 PERFORMANCE GUARANTEES AND WARRANTY

8.1. Warranty

Manufacturer shall provide 3-year warranty to CEB for the MTEs and accessories from the date of FOB dispatch of the meters to CEB stores. Manufacturer should forward the duly signed Warranty Certificate together with the letter of acceptance of the award.

If MTEs become defective within the warranty period, they shall be replaced or repaired free of charge by the supplier.

9.0 DOCUMENTS TO BE SUBMITTED WITH DELIVERY

i. Operating manual of equipment in English

ii. Operating manual of software in English

iii. Calibration and test certificates of each equipment

10.0 PACKING AND LABELING/MARKING

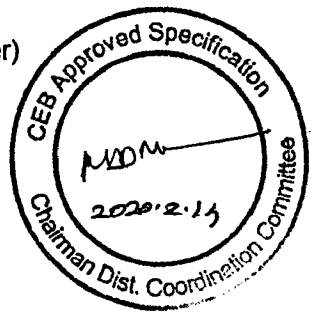
10.1. Packing

Each MTE shall be suitable packed separately in a bio-degradable packing material to withstand rough handling and carry a label indicating the name of item, model/type No. etc.

10.2. Identification and Labeling/Marking

Every meter testing equipment shall be provided with a Name - plate incorporating the following minimum information as applicable:

(a) Words "Property of CEB" with a mark "Warranty 3Y" 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_o/U (U_m)/ current / size / capacity
(d) Standard adopted
(e) Model no.
(f) Year of manufacture, manufacturer's name or trade mark



11.0 INSPECTION AND TESTING

Depending on the choice of the applicable standards, relevant Routine/Functional Test Certificates conforming to, but not limited to, standards in clause 4.0 shall be furnished for the observation of the Engineer appointed by the CEB at the time of inspection unless CEB waive off the inspection. In addition, the routine test certificates shall be sent with the shipment of the items.

12.0 ANNEXES

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

Annex B - Non - Compliance Schedule.

Annex- A

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)

			Offered
1.	Name of Manufacturer		
2.	Country of manufacture		
3.	Model No./ Catalogue Ref. No.		
4.	Applicable Standards		
5.	Supply Voltage range (Phase to Neutral and Phase to Phase)	V	
6.	Current Range		
	a) For direct measurement	A	
	b) For clamp on CT measurement – Fixed jaws	A	
	c) For clamp on CT measurement – Flexible	A	
7.	Accuracy of Power/Energy measurement		
	a) For direct measurement	%	
	b) For clamp on CT measurement (up to 100A)	%	
8.	Display size	mm x mm	
9.	Power Losses		
10.	Operating Temperature range		
11.	Degree of protection (IP Category)		
12.	Insulation level		
	a) Insulation withstand voltage for 1 min.		
	b) Impulse withstand voltage		
13.	Whether the MTE is programmable?	Yes/No	
14.	Whether the MTE is suitable for field-testing of:		
	(a) Electromechanical meters of accuracy class 1 and class 2 having rotating disc.		
	(b) Static meters specified in clause 5.1 (b) ii		
	(c) Static meters specified in clause 5.1 (b) iii		
15.	Whether the MTE is capable of displaying instantaneous voltage, current, power factor and parameters specified in clause 5.1 (c) iv?		
16.	No of test results which and be stored and retrieved?		
17.	Whether the software conform to Clause 5.2 ix?		
18.	Whether the accessories as per Clause 5.2 provided?		
19.	Weight of the equipment		
20.	Whether the calibration certificate of same equipment could be provided?		
21.	Whether the marking as per Clause 10.2 provided?		

22.	Whether a certified copy of ISO 9001:2015 or latest furnished with the offer?	
23.	Whether the entire Test Certificates in accordance with clause 6.3 furnished with the offer?	
24.	Whether the information requested in clause 7 furnished with the offer?	
25.	Whether the display is non-volatile memory type?	
26.	Memory retention period (months)	
27.	Whether the Acceptance tests as per clause 11.0 is carried out by the manufacturer?	
28.	Guaranteed Life Span of MTEs and accessories	
29.	Warranty for MTEs and accessories	

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Signature of the Manufacturer and seal **Date**

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

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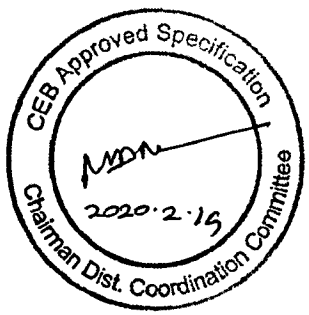
Signature of the Bidder and seal **Date**



Annex – B

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**

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