Kenya Power

SPECIFICATION FOR BATTERY CELL IMPEDANCE TESTER.

DECEMBER 1, 2022

KENYA POWER AND LIGHTING CO.LTD
P O BOX 30099 NAIROBI

FOREWARD.

This specification has been prepared by the technical services department of Kenya power and lays down minimum requirements for battery impedance tester. It is intended for use in the purchase of battery impedance testers.

Supplier shall submit information which demonstrates satisfactory service experience of the manufacturer with the products which fall within the scope of this specification.

1. Scope.

1.1 This specification is for a battery impedance tester with operating test voltage range from 0V to 15V DC and resistance measurement range of 0mΩ-100mΩ to be used in the impedance battery cells of 24V,30V,48V,110V and 220V DC battery banks installed in transmission and distribution Substations of Kenya power and lighting Company Limited.

1.2 The specification also covers inspection and test of battery impedance tester and guaranteed technical Particulars to be filled, signed by the manufacturer and submitted for tender evaluation.

1.3 The specification stipulates the minimum requirements for the battery impedance tester acceptable for use within KPLC system and it shall be the responsibility of the manufacturer to ensure adequacy of the design, good workmanship and good engineering practice in the manufacture of the battery impedance tester.

2. REFERENCES.

The following documents were referred to during the preparation of the specification, in case of conflict, the requirements of this specification shall take precedence.

IEEE 450-210: Recommended practice for sizing of lead acid batteries for stationary applications.

IEEE 1188-2005: Recommended practice for sizing of nickel cadmium batteries for stationary applications.

IEEE 1106-2015: Recommended practice for maintenance, testing and replacement of vented nickel Cadmium batteries for stationary applications.

IEC 60896 11/22: Stationary lead acid batteries vented types general requirements and test methods.

IEC 60623: Secondary cells and batteries containing alkaline or other non-acid electrolytes-vented nickel cadmium prismatic rechargeable single cells.

3. TERMS AND TERMINATIONS.

Battery unit: A number of cells assembled in a rack.

Battery: Two or more battery units connected in series.

Nominal voltage: Standard battery voltage of a single rechargeable cell e.g. 1.2V for Ni-Cd

Rated capacity: Capacity in ampere hours at 5 hours (C5) discharge rate to an end voltage of 1.0V.

Battery cell:
Battery impedance:

4. REQUIREMENTS.

4.1 Service conditions

The battery capacity tester shall be used under the following environmental conditions.
Operating temperature range -1˚C to 40˚C with average temperature of 30˚C.
Humidity: Up to 95%
Altitude: 2200m.a.s.l

4.2 Battery impedance tester.

4.2.1 The battery impedance tester shall be suitable for the impedance measurement of cells of a wide range of battery banks from 0V to 250V DC applicable for DC nominal voltage levels of 24V, 30V, 48V, 110V and 220V.

4.2.2 The impedance tester mains external supply voltage shall be single phase 220-240V AC, 50HZ through an adaptor of adequate rating. Normal power supply will be rechargeable lithium ion battery of adequate capacity and voltage.

4.2.3 The tester shall perform impedance measurement of lead acid, nickel cadmium and lithium ion battery cells.

4.2.4 The battery impedance tester shall have a measurement range of between 0-100mΩ for impedance and 0-15V for voltage measurement.

4.2.5 Accurately measure battery cell resistance and voltage, easy operation with intelligent and digital display.

4.2.6 Smart and portable hand held device, rugged and easy operation.

4.2.7 Meet the internal resistance detection standard with whole battery internal resistance parameter data and define battery standard internal resistance according to different batteries.

4.2.8 The weight of the battery impedance tester shall not be more than 0.8kgs.

4.2.9 The test kit shall have large measurement data record, data results query and analysis, direct USB drive for software update and data charts and curves transfer to pc for further analysis

4.2.10 As the test progress, test results shall be displayed from the instrument LCD screen

4.2.11 The impedance tester shall have test resume feature in case of power supply interruption or accidental disconnection of the test leads.

4.2.12 The Impedance tester shall have test leads and clamps made of copper and of adequate cross sectional area and length.

4.2.13 A communication cable to facilitate communication between the pc and the instrument shall be provided.

4.2.14 The test instrument shall have buzzer alarm function and over voltage protection.

4.2.15 System management, clock setting, measurement correction, system parameter set, procedure update and software management function.

4.3 Measurement Accuracies.

Measurement	Range	Resolution	Accuracy
Voltage	0-15V	At most 1mV	±0.2% of reading ±6dgt
Resistance	0-100mΩ	At most 0.01mΩ	±2% of reading ±6dgt

ANNEXES.

A. QUALITY MANAGEMENT SYSTEM.

A1. The supplier shall submit the quality assurance plan that will be used to ensure that the design, material, workmanship, tests, service capability and documentation of the battery impedance tester complete with its accessories shall fulfill requirements stated in the specification and regulation.

A2. Quality Assurance plan shall be based on and include relevant parts to fulfil the requirements of ISO 9001:2015.

A3. Manufacturers' declaration of conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001:2015 certificate shall be submitted with the tender for evaluation.

A4. The bidder shall indicate the delivery time of the battery impedance tester, manufacturers monthly and annual production capacity and experience in the production of the battery impedance testers.

B. TESTS AND INSPECTION.

B1. The battery impedance tester shall be inspected and tested in accordance to the relevant standards. It shall be the responsibility of the supplier to perform or to have performed all the tests required to prove the correct operation of the battery tester.

B2. Copies of type test reports issued by a third party testing laboratories accredited to ISO/IEC 17025 shall be submitted with tender for the purposes of technical evaluation. Valid accreditation certificate in English of the same third party laboratory shall also be submitted

B3. The test reports of the battery impedance tester shall be submitted to KPLC before the shipment of the test set.

B4. The acceptance test certificates shall be submitted for approval before dispatch of the battery capacity tester and its accessories.

B5. On receipt of the battery impedance tester, KPLC shall undertake a comprehensive inspection of the test set in order to verify compliance with the specification. The equipment stands rejected if any of the requirement is not met and the supplier shall be asked to supply a new test set or accessory.

C. MARKING AND PARKING.

C1. MARKING

The following information shall be legibly and indelibly marked on battery impedance tester by molding screen printing process.

a. Serial Number
b. Manufacturer
c. Type and Model
d. Current capacity
e. Discharge voltage range.

C2. PARKING.

C.2.1 Parking shall be suitable for handling during transit and secured to avoid any loss or damage.

C.2.2 All the accessories shall be within the same parking as the test set

C.2.3 Instructions on the proper handling of the battery impedance tester and its accessories shall be provided together with the necessary safety precautions to be taken in the management of the unit.

D. DOCUMENTATION

D1. The bidder shall submit its tender complete with technical documents required by annex A (Guaranteed technical particulars) for evaluation. The technical documents to be submitted (all in English) for tender evaluation shall include the following.

- Guaranteed technical particulars signed and stamped by the manufacturer.
- Manufacturers catalogues, brochures and technical data sheets for battery impedance tester and accessories.
- Product data: electrical parameters of the selected battery impedance tester.
- Details of manufacturing capacity and manufacturer's experience.
- Copies of updated calibration/test reports from ISO/IEC 17025 an accredited laboratory.
- Copy of own valid accreditation certificate to ISO/IEC 17025 or for the third party testing laboratory.

- Manufacturers letter of authorization and ISO 9001:2015 certificate.

5. GUARANTEED TECHNICAL PARTICULAR.

Clause Number	KPLC requirement		Bidders offer
Manufacturers name and address	Specify		
Country of manufacture	Specify		
Bidders name and address	Specify		
Scope			
1. Clause 1.1 - 1.3	Specify		
2. Applicable standards	Specify		
3. Terms and definitions	Specify		
4. Requirements			
4.1. Service condition	Minimum temperature	State	
	Maximum temperature	state	
	Average temperature	state	
	Humidity	state	
	Altitude	state	
4.2. Impedance tester requirements			
4.2.1. Voltage range of battery banks	0-250VDC		
4.2.2. Normal supply voltage and external supply voltage	state		
4.2.3. Types of battery cells.	state		
4.2.4. Impedance and voltage	State		

Clause Number	KPLC requirement		Bidders offer
measurement range.			
4.2.5.Test set operation	state		
4.2.6.smart, portable, rugged and hand held	state		
4.2.7.Internal resistance measurement standard	state		
4.2.8.Weight of impedance tester	state		
4.2.9.Data storage and handling	state		
4.2.10. Display of test progress	state		
4.2.11. Test resume feature after disruption	state		
4.2.12. Test leads and clamps	state		
4.2.13. Communication cable	state		
4.2.14. Buzzer alarm and overvoltage function	state		
4.2.15. Test management	state		
4.3. Measurement accuracy	state		
A. QMS			
A1. Quality assurance plan	State		
A2. ISO 9001:2015			
A3. Conformity to standard, copy of ISO 9001:2015			

Clause Number	KPLC requirement		Bidders offer
A4. Delivery time, manufacturers' experience.			
B. Test and inspection			
B1. Inspection and testing			
B2. Type test report copies			
B3. Submission of test reports before shipment			
B4. Submission of test reports for approval before dispatch			
B5. Inspection at KPLCs stores			
C. MARKING AND PARKING			
C1. Marking	State		
C2. PACKING			
C.2.1 Packing to avoid loss and damage on transit	State		
C.2.2 Packing of accessories	state		
C.2.3 Handling instructions	state		
D. DOCUMENTATION			
D1. List of required documents for evaluation	State		