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Kenya Power

DIGITAL LOW RESISTANCE OHMMETER- SPECIFICATION

A Document of the Kenya Power & Lighting Co. Ltd
June 2018

TABLE OF CONTENTS

0.1 CIRCULATION LIST

COPY NO.	COPY HOLDER
1	Manager, Standards
2	Electronic copy (pdf) on Kenya Power server (http://172.16.1.40/dms/browse.php?fFolderId=23)

REVISION OF KPLC STANDARDS

In order to keep abreast of progress in the industry, KPLC Standards shall be regularly reviewed. Suggestions for improvements to approved Standards, addressed to the Manager, Standards department, are welcome.

0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2018-06-28	New issue	Nancy Wairimu	Dr. Eng. Peter Kimemia

FOREWORD

This specification has been prepared by the Standards Department in collaboration with Technical Services Department both of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for Digital Low Resistance Ohmmeter.

The Digital Low Resistance Ohmmeter is intended for use by the Technical Services Department for measuring resistance.

This specification was prepared to establish and promote uniform requirements for Digital Low Resistance Ohmmeter to be used at Kenya Power and Lighting Company Ltd.

There are no other specifications in this series.

This specification stipulates the minimum requirements for Digital Low Resistance Ohmmeter acceptable for use in the company and it shall be the responsibility of the suppliers and manufacturer to ensure that the offered design is of the highest quality and guarantees excellent service to KPLC, and exhibits good workmanship and good engineering practice in the manufacture.

Users of Kenya Power specifications are responsible for their correct interpretation and application.

The following are members of the technical team that developed this specification:

Name	Division
Adriano Sagwe	Technical services
Nancy Wairimu	Infrastructure Development

1. SCOPE

1.1. This specification is for Digital Low Resistance Ohmmeter for use by company's Technical Services Department.

1.2. The specification covers requirements, design, inspection and tests and schedule of Guaranteed Technical Particulars of Digital Low Resistance Ohmmeter.

2. NORMATIVE REFERENCES

The following standards contain provision which, through reference in this text, constitute provisions of this specification. For dated editions the cited edition will apply; for undated editions the latest edition of the referenced document shall apply.

IEC 61557: Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c - Equipment for testing, measuring or monitoring of protective measures -- Part 1: General requirements; -- Part 4: Resistance of earth connection and equipotential bonding;

IEC 60815: Selection and dimensioning of high voltage insulators intended for use in polluted conditions –Part 1: Definitions, information and general principles

OIML D 11: General Requirements for Measuring Instruments - Environmental Conditions

ISO 9001: Quality Management systems – Requirements

ISO/IEC 17025: General Requirements for the competence of testing and calibration laboratories

3. DEFINITIONS AND ABBREVIATIONS

For the purpose of this specification the definitions and abbreviations given in the reference standards shall apply together with the following abbreviations.

3.1. ABBREVIATIONS

KPLC- Kenya Power and Lighting Company Limited

ISO – International Organization for Standardization.

Kg –Kilogram

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

4.1.1 The Digital Low Resistance Ohmmeter shall be suitable for use outdoors in tropical areas and harsh climatic conditions including areas exposed to:

a) Altitudes of up to 2200m above sea level;

b) Humidity of up to 95%;

c) Average ambient temperature of +30ºC with a minimum of -1°C and a maximum of +40°C

d) Pollution: Design pollution level to be taken as "Heavy" (Pollution level III) for inland and "Very Heavy" (Pollution level IV) for coastal applications in accordance with IEC 60815.

4.2. DESIGN AND CONSTRUCTION

4.2.1. The Digital Low Resistance Ohmmeter shall be designed, manufactured and tested according to IEC 61557.

4.2.2. It shall be light weight and portable.

4.2.3. It shall be capable of measuring contact resistance measurement on:

a) Circuit breakers contacts;
b) Isolators/switch contacts;
c) Conductor joints;
d) Busbar joints;
e) Motor windings.

4.2.4. It shall have direct digital readings (no conversion scales required).

4.2.5. It shall have digital readout with automatic zero circuit to eliminate field test inaccuracies.

4.2.6. It shall have broad line of test leads to simplify and enhance data collection.

4.2.7. It shall have Kevin type four measurement to eliminate errors caused by lead and contact resistance.

4.2.8. It shall be capable of suppressing electrical and magnetic interference automatically.

4.2.9. It shall be powered by rechargeable batteries and shall have battery level charge indicator.

4.2.10. It shall have overload protection features.

4.2.11. Measuring instruments shall also comply with OIML D 11 requirements such that:

a) Their errors do not exceed the maximum permissible errors under rated operating conditions.

b) When they are exposed to disturbances, either

(i) Significant faults do not occur, or

(ii) Significant faults are detected and acted upon by means of a checking facility.

4.2.12. It shall have the technical particulars as shown in table 1 below:

Table 1: Technical particulars of Digital Low Resistance Ohmmeter

Parameter	Requirement		
Input	230 V ±10% , 50HZ		
Test / Output VA	6 x 430VA/3 X 860VA/ 1 X 1000VA		
Accuracy	0.25 %		
Test Resistance Ranges	Resistance range	Resolution	current
	0 – 5999 μΩ	1 μΩ	10A
	0 - 59.99 mΩ	10 μΩ	1A
	0 - 599.9 mΩ	0.1 mΩ	100 mA
	0 - 5.999 Ω	1 mΩ	10mA
	0 - 59.99 Ω	10 mΩ	1mA
Dimensions - Approximate	300mm x 160mm x 250mm (LxHxB)		
Weight	Approximately 6kgs		
Accessories	a) Two sets of 6 m Potential leads b) Two set of 6m Current leads c) One set of 6m duplex lead that combine current and potential connections in one set d) Spare rechargeable battery e) AC Power cord f) Transport case g) Operation Manual (Soft copy and Hard copy).		

5. TESTS REQUIREMENTS

The Digital Low Resistance Ohmmeter shall be inspected and tested in accordance with the requirements of relevant standards and provision of this specification.

6. MARKING AND PACKING

6.1. MARKING

The following information shall be marked legibly and in a permanent manner on the Digital Low Resistance Ohmmeter:

a) The manufacturer's name and trade mark;

b) The type reference number / model number;

c) Units of the measured quantity;

d) Ranges of measurement;

e) Type of battery and polarity of connection in the battery compartment

f) Standard of manufacture;

g) The serial number;

h) The words "PROPERTY OF KENYA POWER AND LIGHTING COMPANY."

6.2. PACKING

6.2.1. The Digital Low Resistance Ohmmeter shall be packed in a carrying case so as to protect it from damage and entry of moisture during transportation, handling and storage.

6.2.2. The carrying case shall shock proof and impact resistant and shall be able to withstand a fall of one meter without damage to the Digital Low Resistance Ohmmeter.

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APPENDICIES

A: TESTS AND INSPECTION (Normative)

A.1 It shall be the responsibility of the supplier to test or to have all the relevant tests performed.

A.2 Copies of Type Test Certificates and Type Test Reports issued by a third party testing laboratory that is accredited to ISO/IEC 17025 shall be submitted with the tender for the purpose of technical evaluation. A copy of the accreditation certificate for the testing laboratory shall also be submitted with the tender (all in English Language). Any translations of certificates and test reports into English language shall be signed and stamped by the Testing Authority.

A.3 Test certificates and calibration certificates for the Digital Low Resistance Ohmmeter to be supplied shall be submitted to KPLC for approval before shipment/delivery of the equipment.

A.4 On receipt of the Digital Low Resistance Ohmmeter, Kenya Power will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification. The supplier shall replace without charge to Kenya Power, any Handheld Partial Discharge Detector which upon examination, test or use fail to meet any or all of the requirements in the specification.

B: QUALITY MANAGEMENT SYSTEM (Normative)

B.1 The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the Digital Low Resistance Ohmmeter physical properties, tests and documentation, will fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001:2008 or 2015.

B.2 The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001:2008 or 2015 certificate shall be submitted with the tender for evaluation.

B.3 The bidder shall indicate the delivery time of the equipment, manufacturer's monthly & annual production capacity and experience in the production of the Digital Low Resistance Ohmmeter being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the Digital Low Resistance Ohmmeter sold in the last five years as well as reference letters from at least four of the customers shall be submitted with the tender for evaluation.

C: DOCUMENTATION AND DEMONSTRATION (Normative)

C.1 The bidder shall submit its tender complete with technical documents for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:

a) Fully filled clause by clause guaranteed technical particulars (GTP) signed by the manufacturer;
b) Copies of the Manufacturer's catalogues, brochures, drawings giving all relevant dimensions, Wiring diagram / Schematic Diagram and technical data;
c) Sales records for the last five years and at least four customer reference letters;
d) Details of manufacturing capacity and the manufacturer's experience;
e) Copies of required type test reports by a third party testing laboratory accredited to ISO/IEC 17025;
f) Copy of accreditation certificate to ISO/IEC 17025 for the third party testing laboratory;
g) Manufacturers letter of authorization, ISO 9001 certificate, and other technical documents required in the tender.
h) Manufacturer's warranty and guarantee; subject to 12 months from date of delivery to KPLC stores
i) Operational manual.
j) Service manual.

C.2 The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:

a) Fully filled clause by clause guaranteed technical particulars (GTP) stamped and signed by the manufacturer;
b) Design Drawings with details of the Digital Low Resistance Ohmmeter to be manufactured for KPLC.
c) Product manuals, operation manuals and brochures,
d) Quality assurance plan (QAP) that will be used to ensure that the design, material; workmanship, tests, service capability, maintenance and documentation will fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001.
e) Marking details and method to be used in marking the Digital Low Resistance Ohmmeter;

f) All documentation necessary for safety of the equipment.

g) Packaging details (including packaging materials).

C.3. The Ohmmeter shall be supplied with a full set of user operation and maintenance manuals all in the English language that guide use, care, storage and routine inspection/testing, during delivery to KPLC stores.

C.4. The successful bidder shall demonstrate to KPLC Staff (in Nairobi) the use of the Digital Low Resistance Ohmmeter.

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D: GUARANTEED TECHNICAL PARTICULARS (Normative)

To be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records for previous five years, four customer reference letters, details of suppliers' capacity and experience; and copies of complete type test certificates and test reports for tender evaluation, all in English Language)

Tender No. .....

Bidder's name and Address.....

Clause number	Requirement	Bidder's offer
Manufacturer's Name and address		Specify
Country of Manufacture		Specify
Name and model Number		Specify
1.	Scope	State
2.	Normative References	State
3.	Definitions and Abbreviations	
3.1.	Abbreviations	State
4.	Requirements	
4.1	Service Conditions	State
4.2	Design and construction	
4.2.1	Standard of manufacture	State
4.2.2	Weight & portability	State
4.2.3	Measurement capabilities	State
4.2.4	Shall have direct digital readings	State
4.2.5	Digital readout with automatic zero circuit present?	Specify
4.2.6	Type of test leads	State
4.2.7	Mode of measurement	State
4.2.8	Capability of suppressing electrical and magnetic interference automatically	State
4.2.9	Source of power	State
4.2.10	Overload protection features present?	State
4.2.11	Compliance to OIML D 11	State
4.2.12	**Technical Particulars**	
	Input	Specify
	Test / Output VA	Specify
	Accuracy	Specify
	Test Resistance Ranges	Specify

Clause number	Requirement	Bidder's offer
	Dimensions	Specify
	Weight	Specify
	Accessories	Specify
5	**Test Requirements**	Specify
6	**Marking and Packing**	
6.1	Marking	Specify
6.2	Packing	Specify
A	**Test and inspection (Normative)**	
A.1	Responsibility of carrying out tests	State
A.2	Copies of Type Test Reports submitted with tender	Provide
A3	Test certificates and calibration certificates to be submitted by supplier to KPLC for approval before supply/delivery	Provide
A.4	Inspection at the stores and replacement of rejected items	State compliance
B	**Quality Management System (Normative)**	
B.1	Quality Assurance Plan	Provide
B.2	Copy of ISO 9001:2008 Certificate	Provide
B.3	Delivery time of the equipment	Provide
	Manufacturer's experience	Provide
	Manufacturing Capacity (units per month)	Provide
	List of previous customers	Provide
	Customer reference letters	Provide
C	**Documentation (Normative)**	
C.1	Documents submitted with tender	Provide
C.2	Documents to be submitted by supplier to KPLC for approval before manufacture	Provide
C.3	Documents to be submitted during delivery at the store	Provide
C.4	Demonstration	State
	Statement of compliance to specification (indicate deviations if any & supporting documents)	State compliance

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Manufacturer's Name, Signature, Stamp and Date