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0.1 CIRCULATION LIST

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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.

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0.2 AMENDMENT RECORD

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Issued by: Head of Section, Standards Development  
Signed:  
Date: 2018-06-08

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Signed:  
Date: 2018-06-08
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 Portable Transformer Turns Ratio Tester.

The portable Transformer Turns Ratio is intended for use by the Technical Services Department for measuring resistance.

This specification was prepared to establish and promote uniform requirements for portable Transformer Turns Ratio Tester 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 portable Transformer Turns Ratio Tester 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, good workmanship and good engineering practice in the manufacture of the Portable Transformer Turns Ratio Tester for KPLC.

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

1.1. This specification is for portable Transformer Turns Ratio Tester 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 portable Transformer Turns Ratio Tester.

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;

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


IEC 60529: Degrees of protection provided by enclosures (IP code)

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
LED – Light Emitting Diode
Kg – Kilogram
KV - Kilovolt
IP – Ingress Protection
LV – Low Voltage
EMC – Electromagnetic Compatibility
EU – European Union

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

4.1.1 The Portable Transformer Turns Ratio Tester 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 +30°C 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 portable Transformer Turns Ratio Tester shall be designed, manufactured and tested according to IEC 61557.

4.2.2. The portable Transformer Turns Ratio Test Set shall be capable of taking different measurements, including:
   a) Transformer,
   b) Reactor,
   c) current transformer (CT),
   d) voltage transformer (PT)
   e) Z-type connection

4.2.3. It shall be portable, weight, compact and rugged.

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

4.2.5. suitable for site testing

4.2.6. With built-in lithium/alkaline battery (12V/5.2AH, Charging time is about 3 hours using special charger (DC4.2V/2A*3 sets) ), no AC power supply. The instrument is suitable for field use.

4.2.7. Portable turn ratio tester be equipped with the function of monitoring and protecting the Battery.

4.2.8. Mechanical key for "run/stop".

4.2.9. Portable turn ratio tester has the functions of high and low voltage reverse connection protection, short circuit protection of transformer and inter-turn short circuit protection.

4.2.10. With function of automatic shutdown: shutdown without operation exceeding 5 minutes.

4.2.11. It shall be suitable for use in an energized switchyard condition.

4.2.12. Equipped With " flash disk" interface for exporting data

4.2.13. Equipped With bluetooth communication function.

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

Table 1: Technical particulars of Portable Transformer Turns Ratio Tester

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test range</td>
<td>0.8-10000</td>
</tr>
<tr>
<td>Minimum resolution</td>
<td>0.0001</td>
</tr>
<tr>
<td>Accuracy</td>
<td>±0.2%(turns ratio&lt;1000), ±0.3%(turns ratio 1000~10000)</td>
</tr>
<tr>
<td>Output voltage</td>
<td>Max 35V/50Hz</td>
</tr>
<tr>
<td>Testing times</td>
<td>≥800 times (quick mode)</td>
</tr>
</tbody>
</table>

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Signed:  
Date: 2018-06-08
### Storage datas
- 100 sets

### Temperature in operation
- -20°C ~ 40°C

### Relative humidity
- ≤90%, No dew

### Volume
- L210mm x W150mm x H70mm

### Net weight
- 1.6 kg

### Display Full Graphics
- LCD module, adjustable back-lighting, wide temperature range, 128 x 64 dots (21 characters by 8 lines)

### Measurement Method

### Excitation Current Range
- 0 to 100 mA, 4-digit resolution

### TESTS REQUIREMENTS
The Portable Transformer Turns Ratio Tester shall be inspected and tested in accordance with the requirements of relevant standards and provision of this specification.

### MARKING AND PACKING

#### 6.1. MARKING

The following information shall be marked legibly and in a permanent manner on the Portable Transformer Turns Ratio Tester:

a) The manufacturer’s name or 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 instructions for handling and use (in the English Language).

i) The words “PROPERTY OF KENYA POWER AND LIGHTING COMPANY.”
6.2. PACKING

6.2.1. The Portable Transformer Turns Ratio Tester 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 be shock proof and impact resistant and shall be able to withstand a fall of one meter without damage to the Portable Transformer Turns Ratio Tester.
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 Portable Transformer Turns Ratio Tester to be supplied shall be submitted to KPLC for approval before shipment/delivery of the equipment.

A.4 On receipt of the portable transformer turns ratio tester 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 Transformer Turns Ratio Tester 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 Portable Transformer Turns Ratio Tester 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: 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 9001:2015 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 Portable Transformer Turns Ratio Tester being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the Portable Transformer Turns Ratio Tester 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 Portable Transformer Turns Ratio Tester 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 Portable Transformer Turns Ratio Tester;
f) All documentation necessary for safety of the equipment.
g) Packaging details (including packaging materials).

C.3. The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the Portable Transformer Turns Ratio Tester to KPLC stores.

C.4. The successful bidder shall demonstrate to KPLC Staff (in Nairobi) the use of the Portable Transformer Turns Ratio Tester.

..................................................THIS SPACE IS LEFT BLANK INTENTIONALLY........................................
### 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** .............................................

<table>
<thead>
<tr>
<th>Clause number</th>
<th>Requirement</th>
<th>Bidder’s offer</th>
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<tbody>
<tr>
<td>Manufacturer’s Name and address</td>
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<tr>
<td>Country of Manufacture</td>
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</tr>
<tr>
<td>Name and model Number</td>
<td>Specify</td>
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<td>1. Scope</td>
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<td>2. Normative References</td>
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<td>3. Definitions and Abbreviations</td>
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<td>3.1. Abbreviations</td>
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<td>4. Requirements</td>
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<td>4.1 Service Conditions</td>
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<td>Responsibility of carrying out tests</td>
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<td>Copies of Type Test Reports submitted with tender</td>
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<td>Test certificates and calibration certificates to be submitted by supplier to KPLC for approval before supply/delivery</td>
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<td>Manufacturing Capacity (units per month)</td>
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<td>Customer reference letters</td>
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<td>Documentation and demonstration</td>
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<td>Documents submitted with tender</td>
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<td>C.2</td>
<td>Documents to be submitted by supplier to KPLC for approval before manufacture</td>
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<td>C.3</td>
<td>Documents to be submitted during delivery at the store</td>
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<td>Statement of compliance to specification (indicate deviations if any &amp; supporting documents)</td>
<td>State compliance</td>
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</table>

Manufacturer’s Name, Signature, Stamp and Date