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Kenya Power

INSTANTANEOUS CURRENT MEASUREMENT DEVICES - SPECIFICATION

A Document of the Kenya Power & Lighting Co. Plc
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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.

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0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Issue 1 Rev 0	2022-09-29	New Issue	John Ng'ang'a	Dr. Eng. Peter Kimemia

FOREWORD

This specification has been prepared by the Standards Department in collaboration with Installations Management Section in Commercial Services and Sales Division, both of The Kenya Power and Lighting Company Plc (KPLC) and lays down requirements for Instantaneous Current Measurement Devices. It is intended for use by KPLC in purchasing these items.

This Specification was prepared to establish and promote uniform requirements for Instantaneous Current Measurement Devices to be used by Kenya Power and Lighting Company Plc in overhead lines upto 400kV.

This Specification stipulates the minimum requirements for the items acceptable for use in the company and it shall be the responsibility of the supplier 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 this KPLC specification are responsible for its correct interpretation and application.

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

Name	Division
Peter Wanyonyi	Commercial Services and Sales Division
John Ngángá	Institute of Energy Studies and Research Division

1. SCOPE

1.1. This Specification is for Instantaneous Current Measurement Devices.

1.2. The specification stipulates minimum requirements, inspection and tests of the Instantaneous Current Measurement Devices as well as schedule of Guaranteed Technical Particulars.

2. NORMATIVE REFERENCES

The following standards contain provisions 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.

UL 94:	The Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances testing,
IEC 61010-1:	Safety requirements for electrical equipment for measurement, control, and laboratory use -Part 1: General requirements,
IEC 61869-2:	Instrument transformers - Part 2: Additional requirements for current transformers,
IEC 60855-1:	Live working - Insulating foam-filled tubes and solid rods - Part 1: Tubes and rods of a circular cross-section,
IEC 61235:	Live working - Insulating hollow tubes for electrical purposes,
EN 50508:	Multi-purpose insulating sticks for electrical operations on high voltage installations,
ISO 9001:2015	Quality management systems – Requirements.

3. DEFINITIONS

For the purpose of this specification, the definitions given in the reference standards shall apply.

CT: Current Transformer.

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

The Instantaneous Current Measurement Device shall be suitable for use in tropical areas and harsh climatic conditions including areas exposed to:

a) At altitudes of up to 2200m above sea level and humidity of up to 95%,

b) Average ambient temperature of +30ºC with a minimum of -1ºC and a maximum of +40ºC, in direct sunlight,

c) 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.

d) Isokeraunic levels of up to 180 thunderstorm days per year.

4.2. DESIGN AND CONSTRUCTION

4.2.1 The Instantaneous Current Measurement Device shall be suitable for use on overhead lines up to 400kV.

4.2.2 The Instantaneous Current Measurement Devices shall be designed to comply with international safety standard IEC 61010-1.

4.2.3 The housing of the Instantaneous Current Measurement Devices shall be resistant to shock, repels water and shall be flame resistant meeting UL 94 standard requirements.

4.2.4 The accuracy class of the CT sensors shall be class 0.2. The CT sensors shall comply with IEC 61869-2 standard.

4.2.5 The CT sensor design shall allow the user to measure individual conductors within close proximity to adjacent conductors without interference.

4.2.6 The opening of the sensor shall be electronically closed. All external currents shall be electronically rejected.

4.2.7 The Instantaneous Current Measurement Device shall hold a minimum of four records, for easy reading of current of four conductors on a three-phase four-wire system, without raising and lowering the hot stick for each reading.

4.2.8 Once positioned over a conductor the Instantaneous Current Measurement Device shall store the current measurement within 5 seconds for each conductor.

4.2.9 The Instantaneous Current Measurement Device shall have a display with backlight which will turn on automatically when ambient light is low.

4.2.10 It shall be possible to scroll through the readings stored on the meter easily once the unit is returned to eyelevel.

4.2.11 The Instantaneous Current Measurement Device shall have a single robust button for operation. More may be allowed if they are of robust design.

4.2.12 The Instantaneous Current Measurement Device shall be complete with hot stick, hot stick adaptors, re-chargeable 9V alkaline/ Lithium battery and its charger and a hard carrying case.

4.2.13 The hot stick shall preferably be a telescopic stick tested and approved to IEC-61235, IEC-60855 and EN 50508.

4.2.14 The hot stick shall be suitable for voltages up to 400kV.

4.2.15 The material of manufacture of the hot stick shall be fibre glass/resin polyester and resin epoxy foam where applicable and have lockable copper alloy press buttons to secure the extendable telescopic sticks.

4.2.16 The hot stick shall have Isolating skirts to provide further protection and resistance to shocks.

4.2.17 The insulating sticks shall be suitable for use in both wet and dry conditions.

4.2.18 The overall insulating length of the hot stick shall be at least 7m.

4.3. CHARACTERISTICS

	Description	Requirement
1	Voltage range	0 to 400kV
2	Current range	1 to 2000A
3	Sensor opening	Up to 10cm
4	Resolution	
	1 to 99.9A	0.1A
	100 to 1000A	1A
5	Accuracy	± 1%, ±2 Counts
6	Frequency	50Hz with range 47 to 53Hz
7	Weight	At most 2 kg
8	Housing	Shock resistant molded composite material
9	Hot Stick mounting	Universal.
10	Battery	Re-chargeable 9V Alkaline or Lithium
11	Measurements	At least four readings
12	Display	3.5 Digit display or better

5. TESTS REQUIREMENTS

The Instantaneous Current Measurement Device shall be inspected and tested in accordance with the provisions of this specification and applicable standards.

6. MARKING AND PACKING

6.1. Each Instantaneous Current Measurement Device shall be marked legibly and indelibly with the following information:

a) The inscription "KPLC.",

b) Name and trade mark of the manufacturer;

c) Country of origin;

d) Standard of manufacture

e) Manufacturers type designation, serial number and year of manufacture.

6.2. The Instantaneous Current Measurement Device shall be packaged, in a shockproof and impact proof hard carrying case, in such a manner as to minimize damage during transportation and handling.

6.3. The hot stick shall be supplied complete with a canvas carrying bag with shoulder straps. The bag shall have an internal pocket for keeping the hot stick adaptors if they do not fit in the carrying case.

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APPENDICES

A. TESTS AND INSPECTION (Normative)

A.1 It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified. Tenderers shall confirm the manufacturer's capabilities in this regard when submitting tenders. Any limitations shall be clearly specified.

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 to ISO/IEC 17025 for the testing laboratory shall also be submitted. Any translations of certificates and test reports into English language shall be signed and stamped by the Testing Laboratory that carried out the tests.

A.3 The Instantaneous Current Measurement Device shall be subject to factory acceptance tests at the manufacturer's works before dispatch. Acceptance tests shall be witnessed by two Engineers appointed by The Kenya Power and Lighting Company Plc (KPLC).

A.4 On receipt of the product, KPLC will perform any of the tests specified in order to verify compliance with this specification. The supplier shall replace without charge to KPLC the items which upon examination, test or use, fail to meet any of the requirements in the specification.

B. QUALITY MANAGEMENT SYSTEM (Normative)

B.1 The bidder shall submit a quality assurance plan (QAP) that will be used to ensure that the items design, material, workmanship, tests, service capability, maintenance and documentation, will fulfil the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfil 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 certificate shall be submitted with the tender for evaluation.

B.3 The bidder shall indicate the delivery time of each type of items, manufacturer's monthly & annual production capacity and experience in the production of the type of Instantaneous Current Measurement Device being offered. A detailed list and contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for exact or similar rating of meters sold in the last five years shall be submitted with the tender for evaluation.

C. DOCUMENTATION (Normative)

C.1 The bidder shall submit its tender complete with technical documents required by Appendix E (Guaranteed Technical Particulars) for tender evaluation. The 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 and manuals,

c) Sales records for the last five years and at least four customer reference letters, three outside the country of manufacture,

d) Details of manufacturing capacity and the manufacturer's experience,

e) Copies of required type test certificates and 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) Manufacturer's warranty and guarantee,

h) Manufacturer's letter of authorization, copy of the manufacturer's ISO 9001:2015 certificate, and Testing Laboratory's ISO 17025 certificate.

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

a) Fully filled clause by clause Guaranteed Technical Particulars (GTP) signed by the manufacturer,

b) Design drawings,

c) Operation manuals and brochures shall be submitted,

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 9001:2015,

e) Detailed test program to be used during factory testing,

f) Marking details and method to be used in marking the items,

g) Manufacturer's undertaking to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the Instantaneous Current Measurement Devices for The Kenya Power & Lighting Company Plc,

h) Packaging details (including packaging materials and marking and identification of batches).

C.3. The successful bidder shall demonstrate to at least 20 KPLC Staff (in Nairobi) the use of the Instantaneous Current Measurement Devices.

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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	KPLC requirement	Bidder's offer
Manufacturer's Name and address		Specify
Country of Manufacture		Specify
Bidder's Name and address		Specify
1.	**Scope**	Specify
1.1-1.2		
2.	Applicable Standards	Specify
3.	Terms & Definitions	Specify
4.	**Requirements**	
4.1	Service Conditions	Specify
4.2	**Design and Construction**	
4.2.1	Suitable for use on overhead lines up to 400kV.	Specify
4.2.2	Designed to comply with international safety standard IEC 61010-1	Specify
4.2.3	Shall be resistant to shock, repels water and shall be flame resistant meeting UL 94 standard requirements.	Specify
4.2.4	The accuracy class of the CT sensors shall be class 0.2. The CT sensors shall comply with IEC 61869-2 standard.	Specify
4.2.5	The CT sensor design shall allow the user to measure individual conductors within close proximity to adjacent conductors without interference.	Specify
4.2.6	The opening of the sensor shall be electronically closed. All external currents shall be electronically rejected.	Specify
4.2.7	Number of measurement records.	Specify
4.2.8	Once positioned over a conductor the device shall store the current measurement within 5 seconds for each conductor.	Specify
4.2.9	Shall have a display with backlight which will turn on automatically	Specify
4.2.10	It shall be possible to scroll through the readings stored on the meter easily once the unit is returned to eyelevel.	Specify
4.2.11	Shall have a single robust button for operation. More may be allowed if they are of robust design.	Specify

Clause number	KPLC requirement		Bidder's offer
4.2.12	Items are; Instantaneous Current Measurement Device.		Specify
	Hot stick.		Specify
	Hot stick adaptors.		Specify
	Re-chargeable 9V alkaline/ Lithium battery and its charger.		Specify
	Battery charger.		Specify
	Hard carrying case.		Specify
4.2.13	The hot stick shall preferable be a telescopic stick tested and approved to IEC-61235, IEC-60855 and EN 50508.		Specify
4.2.14	The hot stick shall be suitable for voltages upto 400kV.		Specify
4.2.15	The material of manufacture of the hot stick shall be fibre glass/resin polyester and resin epoxy foam and have lockable copper alloy press buttons to secure the extendable telescopic sticks.		Specify
4.2.16	The hot stick shall have Isolating skirts to provide further protection and resistance to shocks.		Specify
4.2.17	The insulating sticks shall be suitable for use in both wet and dry conditions.		Specify
4.2.18	The overall insulating length of the hot stick shall be at least 7m.		Specify
4.3	**Characteristics of the Instantaneous Current Measurement Device**		
4.3.1	Voltage range	0 to 400kV	Specify
4.3.2	Current range	1 to 2000A	Specify
4.3.3	Sensor opening	Up to 10cm	Specify
4.3.4	Resolution		Specify
	1 to 99.9A	0.1A	Specify
	100 to 1000A	1A	Specify
4.3.5	Accuracy	± 1%, ± 2 Counts	Specify
4.3.6	Frequency	50Hz with range 47 to 53Hz	Specify
4.3.7	Weight	At most 2 kg	Specify
4.3.8	Housing	Shock resistant molded composite material	Specify
4.3.9	Hot Stick mounting	Universal.	Specify
4.3.10	Battery	9V Alkaline or Lithium, one each per recorder	Specify
4.3.11	Measurements	At least four readings	Specify
4.3.12	Display	3.5 Digit display or better	Specify
5	**Test Requirements**		State
6	**Marking and Packing**		
6.1	a) The inscription "KPLC.", b) Name and trade mark of the manufacturer; c) Country of origin; d) Standard of manufacture		Specify

Clause number	KPLC requirement	Bidder's offer
	e) Manufacturers type designation, serial number and year of manufacture.	
6.2	The kits shall be packaged, in a shockproof and impact proof carrying case, in such a manner as to minimize damage during transportation and handling.	Specify
6.3	The hot stick shall be supplied complete with a canvas-carrying bag with shoulder straps. The bag shall have an internal pocket for keeping the hot stick adaptors if they do not fit in the carrying case.	Specify
A	**Tests and Inspection**	
A.1	Responsibility of carrying out tests.	State
A.2	Copies of Type Test Reports submitted with tender.	State
A.3	Acceptance tests to be witnessed by KPLC at factory before shipment.	State
A.4	Inspection at the stores and replacement of rejected items.	State compliance
B	**Quality Management System**	
B.1	Quality Assurance Plan.	Provide
B.2	Copy of ISO 9001:2015 Certificate.	Provide
B.3	Manufacturer's experience.	Provide
	Manufacturing Capacity (units per month)	Provide
	List of previous customers.	Provide
	Customer reference letters.	Provide
C	**Documentation and demonstration**	
C.1	Documents submitted with tender.	List
C.2	Documents to be submitted by supplier to KPLC for approval before manufacture.	List
C.3	The successful bidder shall demonstrate to at least 20 KPLC Staff (in Nairobi) the use of the current loggers.	State compliance
	Statement of compliance to specification.	Provide

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Manufacturer's Name, Signature, Stamp and Date