DOCUMENT NO.:

Kenya Power

SURGE ARRESTOR LEAKAGE CURRENT ANALYZER - SPECIFICATION

A Document of the Kenya Power & Lighting Co. Ltd
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TABLE OF CONTENTS

0.1 CIRCULATION LIST

COPY NO.	COPY HOLDER
1	1st Asst. Engineer, E/plant Nairobi
2	Snr Engineer, E/plant Nairobi

0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2026-01-14	New issue	Beatrice Gitonga	Zacheus Oluoch

FOREWORD

This specification has been prepared by the E/plant Nairobi of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for Surge Arrester Leakage Current Analyzer.

Surge Arrester Leakage Current Analyzer is intended for use by KPLC engineers for **condition monitoring and residual life assessment of metal oxide surge arresters (MOAs)** in electrical power systems. It measures the minor current flowing through the arrester during normal operation to detect degradation and prevent catastrophic failures.

This specification was prepared to ensure the adaptability of the Surge Arrester Leakage Current Analyzer to the existing operating and climatic conditions in Kenya.

There are no other specifications in this series.

This specification stipulates the minimum requirements for Surge Arrester Leakage Current Analyzer equipment 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 Plant/Equipment for KPLC.

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

1. SCOPE

1.1. This specification is for Surge Arrester Leakage Current Analyzer for use by company's E/plant department.

1.2. The specification covers requirements, design, tests and inspection and schedule of Guaranteed Technical Particulars of the Surge Arrester Leakage Current Analyzer

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 60815: provide guidelines for the **selection and dimensioning of high-voltage insulators** for use in outdoor power systems, particularly with respect to environmental pollution

IEC 60099-5: provides **guidelines and recommendations for the selection and application of surge arresters** in three-phase electrical power systems with nominal voltages above 1 kV

EC 61010-1: specifies the **safety requirements for electrical equipment** intended for professional, industrial, and educational use in measurement, control, and laboratory applications.

IEC 60099-5-A1 refers to **Amendment 1** of the first edition of the IEC 60099-5 standard. It gives information and guidelines on the online monitoring of metal-oxide surge arresters (MOAs) in service.

IP 67-an international standard defining a high level of protection against both solid objects and water immersion.

3. DEFINITIONS AND ABBREVIATIONS

For 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.

IEC- International electrotechnical commission

Kg –Kilogram

KV - Kilovolt

EHV - Extra High Voltage

CT- Current Transformer

PT- Potential Transformer

USB- Universal Serial Bus

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

4.1.1. Operating conditions.

The Surge Arrester Leakage Current Analyzer shall be suitable for continuous outdoor operation in tropical areas with the following conditions.

(a) Altitude: Up to 2200 meters above sea level.

(b) Temperature: Average of +30°C with minimum of -1°C and Maximum of +40°C.

(c) Humidity: Up to 95%.

(d) Pollution: Design pollution level to be taken as Very Heavy (Pollution level IV) 31mm/kV according to IEC 60815.

(e) Isokeraunic level: 180 thunderstorm days per year.

4.1.2 Weight- the total weight of the equipment together with its associated accessories shall not exceed 6 Kg

4.2 Environmental and Power Specifications

4.2.1 **Power Supply:** Operates on an internal rechargeable battery (Li-ion) for portability, with an option for single phase 230V AC, 50HZ. mains supply operation and charging.

4.2.2 **Operating Time:** A single full charge shall provide 8 hours of continuous operation.

4.2.3 **Environmental Protection:** the analyzer shall be housed in a rugged, weather-proof case of IP 67 when closed, suitable for use in harsh switchyard environments.

4.2.4 Operating Temperature: The operating temperature shall be at least from 0°C to +50°C

4.3.0 Safety and Compliance

4.3.1 **Safety Standards:** the surge arrester leakage current analyzer shall be compliant with IEC 61010-1 and designed with safety features for live-line measurements in EHV switchyards.

4.3.2 **Accessories** The analyzer shall be supplied complete with the following items:

i) **Shielded clamp-on CT**: For measuring total leakage current.

ii) **Field probe**: Used with the telescopic rod for safe, non-contact measurements.

iii) **Insulated telescopic rod**: to provide the necessary isolation for operator safety during high-voltage measurements.

iv) **Test leads**: A complete set of leads for making all necessary connections.

v) **Carrying case**: A hard case designed to protect the instrument and all accessories during transport.

4.4.0 Measurement and Analysis

4.4.1 **Measurement Principle:** the analyzer shall measure the 3rd harmonic resistive leakage current with compensation for system voltage harmonics, as per **IEC 60099-5 Method B2**.

4.4.2 **Total Leakage Current Range shall be:** 1 µA to 20 mA.

4.4.3 **Resistive Leakage Current Range shall be:** 1 µA to 20 mA.

4.4.4 **Field Probe Current Range shall be:** 10 µA to 1 mA.

4.4.5 **Resolution shall be at least:** 1 µA

4.4.6 **The equipment accuracy shall be**: Value ± 5% ± 1 μA.

4.4.7 **Compensation:** the analyzer shall have automatic compensation for system harmonics, temperature, and system voltage variations. The results are corrected to 20°C and the arrester's rated voltage for accurate trend analysis.

5. Hardware and Interface

5.1 **Inputs:** the analyzer shall use a wireless, low-noise, clamp-on Current Transformer (CT) and a wireless Field Probe An external Potential Transformer (PT) input is for the Voltage Peak Method as per IEC 60099-5-A1.

5.2 **Display:** The display shall be a color touch screen for ease of operation and reading of results in varying lighting conditions.

5.3 **Memory:** Storage capacity shall be at least **2000 test results** with date and time stamps.

5.4 **Connectivity:** Connectivity features for communication shall be a USB port/s, Bluetooth and wireless connectivity for data transfer to a PC for further analysis and report generation.

5.5 **Printer:** the analyzer shall have an inbuilt thermal printer for immediate on-site reports of at least 58 mm size.

5.6 **Temperature Sensor:** the analyzer shall have an inbuilt Platinum Resistance Thermometer that measures ambient temperature for compensation.

i. **Battery Life:** Approximately 8 hours of operation on full charge.

ii. **Operating Temperature Range:** -20°C to +55°C.

6. Software and Additional Features

6.1 **Software:** The system must include multi-use Windows-based PC software that enables data downloading, analysis, creation of an arrester library, and performance of trend analysis to guide maintenance decisions. This software must be provided without any additional or recurring licensing fees.

6.2 **Self-Calibration Check:** the analyzer shall have a built-in standard calibration source and self-check facility.

6.3 **Safety:** Designed for safe, online measurements in live EHV switchyards.

APPENDICIES

A: TESTS AND INSPECTION (Normative)

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

A.2 On receipt of the surge arrester leakage current analyzer, 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 part on the equipment 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 bidder shall indicate the delivery time of the equipment

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, and technical data;

c) Bidder's warranty and guarantee; subject to 12 months from date of delivery to KPLC stores

d) All documentation necessary for safety of the product.

e) User manual

f) Packaging details (including packaging materials).

C.2 The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the surge arrester leakage current analyzer to KPLC stores.

D: GUARANTEED TECHNICAL PARTICULARS (Normative)

To be filled and signed by the Bidder and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, for tender evaluation, all in English Language)

Tender No. ……

Bidder's name and Address……

Clause number	Requirement	Bidder's offer	
Manufacturer's Name		Specify	
Country of Manufacture		Specify	
Name and model Number		Specify	
1.	Scope	State	
4.	**Requirements**		
4.1	Service conditions	State	
4.1.1	Operating condition	specify	
4.1.2	Weight	specify	
4.2	Environmental and Power specifications		
4.2.1	Power supply	State	
4.2.2	Operating time	State	
4.2.3	Environmental protection	State	
4.2.4	Operating temperature	State	
4.3	Safety and compliance		
4.3.1	Safety standards	State	
4.3.2	Accessories	State	
4.4	Measurement and analysis		
4.4.1	Measurement principle	State	
4.4.2	Total leakage current range	State	
4.4.3	Resistive leakage current range	State	
4.4.4	Field probe current range	State	
4.4.5	Resolution	State	
4.4.6	Accuracy	State	
4.4.7	Compensation	State	
5	**Hardware and Interface**		
5.1	Inputs	State	
5.2	Display	State	

Clause number	Requirement	Bidder's offer	
5.3	Memory	State	
5.4	Connectivity	State	
5.5	Printer	State	
5.6	Temperature sensor	State	
6	**Software and additional features**		
6.1	Software	State	
6.2	Self calibration check	State	
6.3	Safety	State	
A1	Testing responsibility	State	
A2	Inspection of the surge arrestor leakage current analyzer by KPLC on receipt in stores	State	
B1	Delivery time	State	
C1	Documents to be submitted for evaluation	State	
C2	Recommendations for use	Attach	

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Bidder's Name, Signature, Stamp and Date