DOCUMENT NO.:

Kenya Power

CIRUIT BREAKER 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 AE, E/plant Nairobi
2	Senior 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	2025-02-21	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 Circuit Breaker Analyzer intended for use by KPLC engineers to test and analyze high voltage circuit breakers. The analyzer shall be portable, easy to use and intuitive interface and gives final measurements with minimum user interaction. The analyzer shall not be high end and complex and shall be used for day to day circuit breaker maintenance requirements.

This specification was prepared to ensure the adaptability of circuit breaker 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 Circuit Breaker Analyzer 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 simple circuit breaker analyzer for use by company's E/plant department mainly in distribution circuit breakers.

1.2. The specification covers requirements, design, tests and inspection and schedule of Guaranteed Technical Particulars of the CB 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 60529 is an international standard that defines the IP (Ingress Protection) Code system. This system classifies and rates the level of protection that electrical equipment enclosures provide against the intrusion of solid foreign objects (including dust) and water.

IEC 60068-2-27 is an international standard that provides procedures for determining the ability of electrical and electronic components and equipment to withstand mechanical shocks.

IEC 60068-2-6 is a foundational international standard within the IEC 60068 series that specifies procedures for testing the ability of electrical and electronic components and equipment to withstand sinusoidal vibrations.

IP54 indicates that an enclosure provides a specific, moderate level of protection against both solid foreign objects and water intrusion.

IEC 62271 High Voltage switchgear and control gear.

IEEE C37 Standard requirements for all types of electrical control circuits for ac high voltage.

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

USB- Universal Serial Bus

CB- Circuit Breaker

CBA- Circuit Breaker Analyzer

Gb- Giga bits

LCD- Liquid crystalline Display

PC- Personal Computer

PIR- Pre-Insertion Resistor

IP-Ingress Protection

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

4.1.1. Operating conditions.

The Circuit Breaker Analyzer shall be suitable for continuous

Outdoor operation in tropical areas with the following conditions.

(a) Altitude: Up to 2000 meters above sea level.

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

4.1.2 Weight- the total weight of the equipment together with its associated accessories shall not exceed 13 Kg

4.2.0 **Applications of the circuit breaker analyzer**

4.2.1 Timing of main and PIR contacts

4.2.2 Coil current analysis of close, open 1 and 2 coils

4.2.3 Station voltage measurement

4.2.4 Motion measurement.

4.2.5 Motor current measurement.

4.2.6 Minimum pickup voltage test for close, open 1 and 2 coils.

4.2.7 Measurement of OC, CO, OCO, and COCO Operating sequences.

4.3.0 Measurement Requirements.

4.3.1 Circuit breaker analyzer shall be capable of both single side and double side grounded testing.

4.3.2 Circuit breaker auxiliary contact timing for both dry and wet contacts.

4.3.3 The analyzer shall be fitted in strong, rugged case of IP class not less than IP54 and accessories in strong back-pack.

4.3.4 Analyzer shall have a dedicated control output for opening coil 2.

4.3.5 Measurement reporting shall be by integrated thermal printer and report generation in pdf.

4.3.6 The analyzer shall have three channels for auxiliary contact measurements to facilitate simultaneous measurement of the three phases in single phase CBs.

4.3.7 The analyzer shall be equipped with three digital inputs for motion transducers.

4.3.8 The analyzer shall have at least three multi-purpose analogue channels to facilitate three phase measurement.

4.3.9 The connectors and test leads shall be color coded for ease of identification and verification of connections.

4.3.10 The analyzer shall be equipped with at least 7 inch LCD touch screen for ease of navigation. Navigation language shall be English.

4.3.11 Test equipment control shall be by touch screen and control knob.

4.4.0 Data Storage and Communication

4.4.1 Communication shall be by USB1 used for direct down load of results, USB 2 for connection to PC and RJ45 for connection to PC.

4.4.2 Data memory capacity shall not be less than 1.3 GB.

4.4.3 The analyzer shall have software for result analysis and report creation.

4.5.0 Physical and Environmental

4.5.1 Weight: Shall not be more than 13 kg.

4.5.2 Encapsulation shall be at least IP54 rated as per IEC 60529

4.5.3 Operating Temperature shall be -20°C to +50°C

4.5.4 Operating humidity 5%-95%.

4.6.0 Power supply

4.6.1 Mains input 240V AC, 50Hz, Power consumption not more than 210VA,

4.7.0 Accessories

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

4.7.2 Carrying back (back pack) for leads

4.7.3 5NO thermal printing papers.

4.7.4 Protective Earth, Ethernet cable ≥5m,USB cable ≥3m,USB memory stick, power cable, user guide, lead ties.

4.7.5 Printed manual documentation.

4.7.6 Test leads from the analyzer to the CB mechanism box at least 5m.

4.7.7 Test leads from analyzer to CB poles at least 10m

4.7.8 Universal transducer mounting kit for both rotary and linear travel transducers.

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 CB Analyzer 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) User manual.

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 diverter switch 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		State	
Country of Manufacture		State	
Name and model Number		State	
1.	Scope	State	
2.	Normative references	Specify	
3	Definitions and abbreviation	Specify	
4.	**Requirements**		
4.1	Service conditions		
4.1.1	Operating conditions	specify	
4.1.2	Weight	specify	
4.2	**Applications of circuit breaker analyzer**		
4.2.1	Timing of main and PIR contacts	State	
4.2.2	Coil current analysis	State	
4.2.3	Station voltage measurement	State	
4.2.4	Motion measurement	State	
4.2.5	Motor current measurement	State	
4.2.6	Coil minimum pickup voltage	State	
4.2.7	Measurement of operating sequences	State	
4.3	Measurement requirements		
4.3.1	Shall be capable of single side and double side grounded testing	State	
4.3.2	Auxiliary contact testing for both dry and wet contacts	State	
4.3.3	Fittings for analyzer and accessories	State	

Clause number	Requirement	Bidder's offer	
4.3.4	Dedicated control output for opening coil 2	State	
4.3.5	Measurement reporting by integrated thermal camera and software generated pdf	State	
4.3.6	Number of channels for auxiliary contact measurement	State	
4.3.7	Number of digital inputs for motion transducers	State	
4.3.8	Number of analogue channels for measurement	State	
4.3.9	Colour coding of test leads and connectors for ease of identification and verification	State	
4.3.10	LCD touch screen provision and size	State	
4.3.11	Test equipment control by touch screen and test knob	State	
4.4	Data storage and communication		
4.4.1	Communication shall be by USB1, USB 2 and RJ45.	State	
4.4.2	Capacity of memory	State	
4.4.3	Software for results analysis and report creation	State	
4.5	Physical and Environmental		
4.5.1	Weight	State	
4.5.2	Case IP class	State	
4.5.3	Operating temperature range	State	
4.5.4	Operating humidity	State	
4.6.0	Power supply		
4.6.1	Mains voltage, frequency and power	State	
4.7.0	Accessories	State	
4.7.1	Carrying case	State	
4.7.2	Test leads back pack	State	
4.7.3	Number of thermal printing papers	State	
4.7.4	Protective earth, Ethernet cable, USB Cable, Memory stick, power	State	

Clause number	Requirement	Bidder's offer	
	cable, user guide lead ties.		
4.7.5	Printed manual documentation	State	
4.7.6	Length of test leads to CB mechanism box	State	
4.7.7	Length of test leads to CB poles	State	
4.7.8	Universal transducer mounting kit for both linear and rotary travel transducers.	State	
A	TESTS AND INSPECTION		
A.1	Responsibility to test	State compliance	
A.2	Replacement if it fails to meet any or all of the requirements in the specification.	Specify	
B	Quality Management System		
B.1	Delivery time of the product	state	
C	Documentation and demonstration		
C.1	Documents submitted with tender	State	
C.2	Recommendations for use	State	

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Bidder's Name, Signature, Stamp and Date