

**DOCUMENT NO.: KP1/13D/4/1/TSP/09/126**



**VOLTAGE TRANSFORMER ANALYZER - SPECIFICATION**

A Document of the Kenya Power & Lighting Co. Plc

February 2024



**TITLE:**  
**VOLTAGE TRANSFORMER**  
**ANALYZER -**  
**SPECIFICATION**

<b>Doc. No.</b>	<b>KP1/13D/4/1/TSP/09/126</b>
<b>Issue No.</b>	<b>1</b>
<b>Revision No.</b>	<b>0</b>
<b>Date of Issue</b>	<b>2024-02-06</b>
<b>Page 1 of 20</b>	

**Table of Contents**

0.1	CIRCULATION LIST .....	2
0.2	AMENDMENT RECORD.....	3
	FOREWORD.....	4
1.0.	SCOPE .....	5
2.0.	REFERENCES .....	5
3.0.	DEFINITIONS AND ABBREVIATIONS.....	5
4.0.	REQUIREMENTS.....	6
4.1.	Service Conditions .....	6
4.2.	Design Features .....	6
4.3.	Communication .....	8
4.4.	Voltage Transformer Analyzer Display .....	8
4.5.	Functionality.....	8
4.6.	Computer and Software Requirements .....	9
4.7.	Calibration of the Voltage Transformer Analyzer .....	10
4.8.	Supply Voltage.....	11
5.0.	Tests Requirements.....	11
6.0.	Marking, Labelling and Packing.....	11
	APPENDICES .....	12
A.	TESTS AND INSPECTION (Normative) .....	12
B.	QUALITY MANAGEMENT SYSTEM (Normative).....	13
C.	DOCUMENTATION AND DEMONSTRATION (Normative).....	13
D.	SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS ( GTPs).....	15

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ANALYZER -  
SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 2 of 20	

**0.1 CIRCULATION LIST**

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

**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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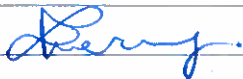



**TITLE:**  
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**ANALYZER -**  
**SPECIFICATION**

<b>Doc. No.</b>	<b>KP1/13D/4/1/TSP/09/126</b>
<b>Issue No.</b>	<b>1</b>
<b>Revision No.</b>	<b>0</b>
<b>Date of Issue</b>	<b>2024-02-06</b>
<b>Page 3 of 20</b>	

**0.2 AMENDMENT RECORD**

<b>Rev No.</b>	<b>Date (YYYY-MM-DD)</b>	<b>Description of Change</b>	<b>Prepared by (Name &amp; Signature)</b>	<b>Approved by (Name &amp; Signature)</b>
Issue 1 Rev 0	2024-02-01	New Issue	Eng. Faith M. Gicugu	Eng. Benson Dianga

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TITLE:  
**VOLTAGE TRANSFORMER  
ANALYZER -  
SPECIFICATION**

Doc. No.	KPI/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 4 of 20	

**FOREWORD**

This Specification has been prepared by the Standards Department in collaboration with Utility Consultancy Department both The Kenya Power and Lighting Company Plc (Kenya Power) and it lays down requirements for a Voltage Transformer Analyzer. It is intended for use in purchasing the equipment.

The specification stipulates the minimum requirements for the Voltage Transformer Analyzer acceptable for use for use in calibration and testing of Voltage Transformers at the Meter Central Laboratory in Kenya Power. It shall be the responsibility of the supplier and manufacturer to ensure adequacy of the design, good workmanship, good engineering practice and adherence to standards, specifications and applicable regulations, and that the offered design is of the highest quality and guarantees excellent service to Kenya Power.

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

Name	Division
Eng. Faith Gicugu	Standards
Patricia Ngaanga	IESR
John Kenyanya	IESR

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Date: 2024-02-06

Date: 2024-02-06



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ANALYZER -  
SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 5 of 20	

### 1.0. SCOPE

- 1.1. This specification is for the voltage transformer analyzer for testing purposes.
- 1.2. The specification stipulates the minimum requirements of the voltage transformer analyzer as well as schedule of Guaranteed Technical Particulars.

### 2.0. REFERENCES

The following standards contain provisions, which, through reference in this text constitute provisions of this specification. Unless otherwise stated, the latest editions (including amendments) apply.

IEC 60529 ed. 2.2.2012: Degrees of protection provided by enclosures (IP Code).

IEC 61010-1: Safety requirements for electrical instrument for measurement, control, and laboratory use – Part 1: General requirements

IEC 61010-2-30: Safety requirements for electrical instrument for measurement, control, and laboratory use – Part 2: Particular requirements for testing and measuring circuits"

IEC 61869: Instrument Transformers

### 3.0. DEFINITIONS AND ABBREVIATIONS

For the purpose of this specification, the definitions given in the reference standards shall apply as well as the following abbreviations:

IEC: International Electro-Technical Commission

ISO: International Organization for Standardization

LCD: Liquid Crystal Display

KPLC: Kenya Power and Lighting Co. PLC

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**VOLTAGE TRANSFORMER  
ANALYZER -  
SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 6 of 20	

#### 4.0. REQUIREMENTS

##### 4.1. Service Conditions

The voltage transformer analyzer shall be suitable for use indoors in tropical areas and harsh climatic conditions including areas exposed to:

- a) Altitudes of up to 200m above sea level and humidity of up to 95%,
- b) Average ambient temperature of +30°C with a minimum of -10°C and a maximum of +50°C.
- 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.

##### 4.2. Design Features

- 4.2.1. The voltage transformer analyzer shall have dimensions NOT exceeding (W × H × D) width 380mm; height: 300mm and a depth: 160mm.
- 4.2.2. The voltage transformer analyzer test set shall be supplied together with an external voltage amplifier (booster) as a separate device.
- 4.2.3. The voltage transformer analyzer and voltage amplifier shall each have a weight of NOT exceeding 8kg without accessories
- 4.2.4. The voltage transformer analyzer and voltage amplifier external casing shall be made of a rugged material to cushion the equipment against vibration and shock.
- 4.2.5. The voltage transformer analyzer shall be able to SELF-TEST on startup and have STATUS indicators when powered on.
- 4.2.6. The voltage transformer analyzer shall be designed in such a way as to prevent access to LIVE parts
- 4.2.7. The voltage transformer analyzer shall be equipped with a Serial Port (RS232) and a USB Port.
- 4.2.8. The voltage transformer analyzer shall be equipped with Output ports (generator outputs) with voltage and current outputs as follows:
  - a) DC Output voltage: 0 ... 120 V
  - b) AC Output Voltage: 0 ... 40 V - rms

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Date: 2024-02-06

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**VOLTAGE TRANSFORMER  
ANALYZER -  
SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 7 of 20	

- c) Output current 0 ... 15 Amperes - rms (15Amperes - peak)
- d) Output power 0 ... 400 VA - rms (1500 VA - peak)

4.2.9. The voltage transformer analyzer shall be equipped with two (2) Input ports (voltage measurement inputs). Input one (1) shall have a measurement capability of 300 VAC and Input two (2) shall have a measurement capability of 30VAC .The accuracy of the measurement inputs shall be 0.1%.

4.2.10. The voltage transformer analyzer shall have a grounding terminal.

4.2.11. The voltage transformer analyzer be equipped with INTERNAL MEMORY for storage of measurement data.

4.2.12. The voltage transformer analyzer shall be equipped with a built in display with keyboard and/or soft keys to operate the device manually.

4.2.13. The voltage transformer analyzer shall conform to the degree of protection of at least IP20 as given in IEC 60529.

4.2.14. The voltage transformer analyzer shall be supplied with an external AC power supply of 85V to 264V, 45 to 65Hz/6A fuse to protect the device.

4.2.15. The power cables provided with the voltage transformer analyzer shall have dimensions as per BS 1363.

4.2.16. The voltage transformer analyzer shall have protection against overload and short circuits.

4.2.17. The voltage amplifier shall have status LEDs.

4.2.18. The voltage amplifier shall have ports for high voltage tests (output voltage and current of 4kVrms/ 40 mA rms and output power of 160 VA rms) and low voltage tests.( output voltage and current of AC: 40 Vrms/ 5 A rms and DC: 120V/5A (15A peak)

4.2.19. The voltage amplifier shall have a grounding terminal.

4.2.20. The voltage amplifier shall have a multipole socket for the connection to the voltage transformer analyzer.

4.2.21. The voltage amplifier shall have a control interface for use with an external safety box during operation.

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Date: 2024-02-06

Date: 2024-02-06





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**VOLTAGE TRANSFORMER  
ANALYZER -  
SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 8 of 20	

4.2.22. The safety box shall have emergency stop buttons and LEDs to indicate the status of wiring and testing

4.2.23. The voltage transformer analyzer and the voltage amplifier test set shall be provided with all the licenses to carry out the tests as outlined in clause 4.5.

4.2.24. The voltage transformer analyzer and voltage amplifier test set shall be provided with all the accessories needed to carry out the tests as outlined in clause 4.5

**4.3. Communication**

4.3.1 The voltage transformer analyzer shall have a communication port for external laptop/PC control to remotely control the device, export data and upgrade software.

4.3.2 The voltage transformer analyzer shall have a Serial communication port for serial communication.

4.3.3 The voltage transformer analyzer shall have a USB communication port to provide access to printers, mouse, external monitors and USB memory options.

4.3.4 The voltage transformer analyzer shall have an EXTERNAL SD port

4.3.5 The voltage transformer analyzer and voltage booster test set shall be equipped with clearly marked input and output pulse port and its associated accessories.

**4.4. Voltage Transformer Analyzer Display**

4.4.1 The voltage transformer analyzer shall have a built in LCD screen display, with a keyboard to input measurement information

4.4.2 The keyboard shall be used to select the functions of the tests to be performed.

**4.5. Functionality**

4.5.1. The voltage transformer analyzer shall carry out the tests on the different types of voltage transformer according to IEC and IEEE standards as below:

4.5.1.1. Inductive voltage transformers (VT) of voltage level 0.6kV... > 123kV:

- a) Transformer Ratio measurement: accuracy of 0.08%
- b) Phase displacement measurement: accuracy of 4 min

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 ANALYZER -  
 SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 9 of 20	

4.5.1.2. Capacitive voltage transformers/ capacitive coupled voltage transformers (CVT/CCVT) of voltage > 30kV ... > 500kV

- a) Transformer Ratio measurement: accuracy of 0.09%
- b) Phase displacement measurement: accuracy of 4 min

4.5.1.3. Secondary winding resistance measurement at a resolution of 1mΩ and accuracy of 0.1% + 1mΩ

4.5.1.4. Excitation characteristics measurement

4.5.1.5. Short-circuit impedance measurement.

4.5.1.6. Burden measurement

4.5.2. The voltage transformer analyzer shall be operated either directly via the in-built display or via the fully licensed software package for complete measurements and simulation of VTs and CVTs up to accuracy class 0.1 with automatic IEC/IEEE class assessment.

**4.6. Computer and Software Requirements**

4.6.1. The Energy test system with an integrated current and voltage source (equipment) shall be supplied with two rugged laptop computers at no extra cost.

4.6.2. The laptop shall be designed and manufactured as per the requirements of IEC 60950 with minimum requirements as per Table 6

**Table 1: Technical data for Laptop**

No.	Item	Minimum Specification
1.	Processor	Intel@ CoreTM i7-920 Processor
2.	Clock speed	2.2 GHz or higher
3.	Chipset	Compatible
4.	Motherboard	Compatible
5.	Memory	2GB DDR3, 1333 Mhz or higher
6.	Cache memory	3MB L2 or higher
7.	Graphics	256MB Dedicated DDR3 Memory
8.	Hard disk controller	Serial ATA
9.	Hard disk	500GB or higher
10.	Shock resistant	Anti-shock mounting design to protect screen and hard disk drive from damage and data loss

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 ANALYZER -  
 SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 10 of 20	

No.	Item	Minimum Specification
11.	Keyboard	Spill resistant keyboard
12.	Mouse	2- or 3-button with scroll wheel optical PC Mouse with pad - USB 3.0
13.	Touch pad	Intelligent Touch with configurable vertical and horizontal scroll functions

4.6.3. The laptop computer shall be loaded with a Windows – based Operating System, preferably Windows 10, or higher.

4.6.4. The laptop computer shall be pre - loaded with the latest, licensed version of an Anti – Virus Software

4.6.5. The laptop computer shall be pre - loaded with a fully licensed Software that allows connection and communication with the Voltage Transformer Analyzer via the provided communication ports.

4.6.6. The fully licensed software shall allow the user to perform tests on the utility under test (UUT).

4.6.7. The voltage transformer analyzer fully licensed software shall be capable of tracking user access.

4.6.8. The fully licensed software shall identify a fault in the system by indicating where the fault is i.e. Troubleshooting capability.

4.6.9. The fully licensed software shall have the following functions:

- a) Automatic control: this function allows the user to perform tests automatically.
- b) Manual control: This function allows the user to perform tests on manual mode.

4.6.10. The fully licensed software shall allow the user to save and view test results in an uneditable format.

4.6.11. The fully licensed software shall allow customization of the test reports (e.g. utility log, name date, etc.) and to exporting of the test results for analysis in excel.

4.6.12. The fully licensed software shall allow for Retrieval and printing of the results.

**4.7. Calibration of the Voltage Transformer Analyzer**

4.7.1. The Calibration procedure of the voltage transformer analyzer shall be provided.

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Date: 2024-02-06

Date: 2024-02-06



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**VOLTAGE TRANSFORMER  
ANALYZER -  
SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 11 of 20	

- 4.7.2. The Test points for calibration of the voltage transformer analyzer shall be defined.
- 4.7.3. The Calibration kit and accessories associated with the calibration of the voltage transformer analyzer including high precision calibration VT- 0.05% accuracy shall be provided.
- 4.7.4. The Calibration and Measurement Capability (CMC) values shall be defined in the Calibration certificate provided for the equipment.
- 4.7.5. The various test points of the energy reference standard in the calibration certificate shall have the defined values of the Uncertainty of Measurement.

#### 4.8. Supply Voltage

- 4.8.1. The voltage transformer analyzer shall be operated from main power with reference values of: 230 V  $\pm$ 10% at 45-65 Hz

#### 5.0. Tests Requirements

- 5.1.1. The voltage transformer analyzer shall be inspected and tested in accordance with the requirements of IEC 61869 and other relevant standards and provisions of this specification.

#### 6.0. Marking, Labelling and Packing

- 6.1. The voltage transformer analyzer shall be marked legibly and indelibly in English with the following information:

- Name or trade mark of the manufacturer;
- Country of origin;
- Type/model;
- Serial no;
- The inscription "Property of K.P. & L. Co PLC."
- Year of manufacture.

- 6.2. The voltage transformer analyzer shall be packaged in such a manner as to minimize damage and entry of moisture during transportation and handling.

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ANALYZER -  
SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 12 of 20	

## 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 on the voltage transformer analyzer in accordance with IEC 61869 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 voltage transformer analyzer shall be subject to acceptance tests at the manufacturer's premises before dispatch. Acceptance tests shall be witnessed by two Engineers appointed by Kenya Power.
- A.4. During delivery of the equipment, Kenya Power shall inspect and perform the relevant tests in order to verify compliance with the specification.

### A.5 Testing Facility

- A.5.1. The bidder shall provide current e-mail address, fax and telephone numbers and contact person at the Testing Laboratory where Type Tests and Special Tests were carried out.
- A.5.2. All test and measuring equipment to be used during acceptance testing shall have been calibrated and copies of valid calibration certificates shall be provided to KPLC Engineers. A detailed list of workshop tools, test/measuring equipment and list of tests that can be carried out by the manufacturer shall be submitted with the tender for evaluation.
- A.6. Test reports for the voltage transformer analyzer shall be submitted to The Kenya Power and Lighting Company for approval before shipment.
- A.7. During delivery of the voltage transformer analyzer, KPLC will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification.

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Date: 2024-02-06



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 SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 13 of 20	

The supplier shall replace/rectify without charge to KPLC, failure of the bench to meet any or all 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 voltage transformer analyzer 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 or later.
- B.2 The Manufacturer's Declaration of Conformity to applicable standards, this specification 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 the voltage transformer analyzer. A detailed list and contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for exact or similar voltage transformer analyzer sold in the last five years 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 required by Appendix D (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, voltage transformer analyzer drawings and wiring diagrams and technical data showing description leaflet, programming details and manuals,
  - 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 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,

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SPECIFICATION**

Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 14 of 20	

- g) Manufacturer's warranty and guarantee; subject to 18 months warranty and 10 years guarantee from date of acceptance by KPLC.
  - h) Manufacturer's letter of authorization, copy of the manufacturer's ISO 9001:2015 certificate, ISO 17025:2005/17 certificate.
- 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) signed by the manufacturer,
  - b) Design drawings and wiring diagrams of the voltage transformer analyzer,
  - c) Original software, software manuals and operation manuals 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 voltage transformer analyzer,
  - 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 voltage transformer analyzer for The Kenya Power & Lighting Company,
  - h) Packaging details (including packaging materials).
- C.3. The successful bidder and manufacturer shall demonstrate at their cost to at least two KPLC staff at the manufacturer's factory.
- C.4. The supplier shall conduct training on the use of the Energy test system in Nairobi Kenya for a minimum of 10 No. staff.

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Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 15 of 20	

**D. SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS ( GTPs)**

*(to be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data & calculations, sales records, four customer reference letters, details of manufacturing capacity, the manufacturer's experience, copies of complete type test reports and accreditation certificate to ISO/IEC 17025 for the testing laboratory for tender evaluation, all in English Language)*

**TENDER NO. ....BIDDER'S NAME & ADDRESS .....**

CLAUSE NO.	DESCRIPTION	KPLC REQUIREMENT	BIDDER'S OFFER
	Name and address of the Bidder	State	
	Name and address of the Manufacturer	State	
	Country of manufacture	State	
	Manufacturer's Letter of Authorization	Provide	
<b>1</b>	<b>Scope</b>		
1.1	This specification is for the voltage transformer analyzer for testing purposes	State	
1.2	The specification stipulates the minimum requirements of the voltage transformer analyzer as well as schedule of Guaranteed Technical Particulars	State	
2	Applicable standards	State	
3	Definitions and Abbreviations	State	
<b>4.0</b>	<b>Requirements</b>		
<b>4.1</b>	<b>Service conditions</b>		
a)	Altitude	State	
b)	Humidity	State	
c)	Temperature	State	
d)	Design pollution level	State	
<b>4.2</b>	<b>Design Features</b>		
4.2.1	Dimensions (W x H x D)	State	
4.2.2	External voltage amplifier (booster) as a separate device	Provide	
4.2.3	Maximum weight of Analyzer	State	
	Maximum weight of Amplifier	State	
4.2.4	External casing material design to cushion the equipment against vibration and shock	Specify	
4.2.5	Shall SELF-TEST on startup	Specify	
	STATUS indicators when powered	Provide	
4.2.6	Designed to prevent access to LIVE parts	Specify	
4.2.7	Equipped with a Serial Port (RS232).	Specify	
	Equipped with a USB Port	Specify	

Issued by: Head of Section, Standards Development

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<b>Doc. No.</b>	<b>KP1/13D/4/1/TSP/09/126</b>
<b>Issue No.</b>	<b>1</b>
<b>Revision No.</b>	<b>0</b>
<b>Date of Issue</b>	<b>2024-02-06</b>
<b>Page 16 of 20</b>	

CLAUSE NO.	DESCRIPTION	KPLC REQUIREMENT	BIDDER'S OFFER
4.2.8	Equipped with Output ports (generator outputs):	Specify	
a)	DC Output Voltage	Specify	
b)	AC Output Voltage	Specify	
c)	Output Current	Specify	
d)	Output Power	Specify	
4.2.9	Equipped with Voltage measurement input ports	Specify	
	Input 1 capability	Specify	
	Input 2 capability	Specify	
4.2.10	Grounding terminal	Provide	
4.2.11	Internal Memory for data storage	Provide	
4.2.12	Built in display with keyboard and/or soft keys to operate the device manually	Provide	
	Keyboard and/or soft keys	Specify	
4.2.13	Degree of protection	Specify	
4.2.14	AC power supply Voltage range	Specify	
	Protective Fuse	Provide	
4.2.15	Power cables dimensions as per BS 1363	Specify	
4.2.16	protection against overload and short circuits	Specify	
4.2.17	LED status for the voltage amplifier	Specify	
4.2.18	voltage amplifier shall have ports for high voltage tests	Specify	
	Output voltage and current of 4kVrms/ 40 mA rms	Specify	
	output power of 160 VA rms	Specify	
	voltage amplifier shall have ports for low voltage tests	Specify	
	Output voltage - AC: 40 Vrms/DC: 120V	Specify	
	Output current - AC: 5A (15A peak) / DC: 5 A rms	Specify	
4.2.19	Grounding terminal for Voltage amplifier	Specify	
4.2.20	Voltage amplifier shall have a multipole socket for connection to VT analyzer	Provide	
4.2.21	Voltage amplifier shall have a control interface for use with an external safety box during operation	Specify	
4.2.22	Safety box shall have emergency stop buttons and LEDs to indicate the status of wiring and testing	Specify	
4.2.23	Licenses for both Analyzer and voltage amplifier	Provide	
4.2.24	Accessories required for testing	State & Provide	
<b>4.3</b>	<b>Communication</b>		
4.3.1	Communication port for external laptop/PC control	Provide	
4.3.2	Serial communication port	Provide	
4.3.4	USB communication port	Provide	

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Doc. No.	KP1/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 17 of 20	

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4.3.5	Clearly marked input and output pulse port and its associated accessories	Provide	
<b>4.4</b>	<b>Voltage Transformer Analyzer Display</b>		
4.4.1	Built in LCD screen display	Provide	
	Keyboard to input measurement information	Provide	
4.4.2	Keyboard to select the functions of the tests to be performed	Specify	
<b>4.5</b>	<b>Functionality</b>		
4.5.1	Analyzer testing capability as per IEC and IEEE requirements	State the tests	
4.5.1.1	Inductive voltage transformers (VT) voltage of 0.6 kV ... >123 kV	Specify	
a)	Transformer Ratio measurement accuracy	Specify	
b)	Phase displacement measurement accuracy	Specify	
4.5.1.2	(CVT/CCVT) voltage of >30 kV ... >500 kV	Specify	
a)	Transformer Ratio measurement accuracy	Specify	
b)	Phase displacement measurement accuracy	Specify	
4.5.1.3	Secondary winding resistance measurement	Specify	
	Resolution	Specify	
	Accuracy	Specify	
4.5.1.4	Excitation characteristics measurement	Specify	
4.5.1.5	Short-circuit impedance measurement	Specify	
4.5.1.6	Burden measurement	Specify	
4.5.2	Modes of operation:		
	Direct through the built-in display	Specify	
	Use of licensed software package	Specify	
	VT accuracy of up to 0.1	Specify	
<b>4.6</b>	<b>Computer and software Requirements</b>		
4.6.1	Supplied with two laptop computers at no extra cost	Provide	
	Laptop designed and manufactured as per IEC 60950	Specify	
	Minimum Requirements for laptop	Specify	
	<b>Item</b>	<b>Minimum Specification</b>	
	Processor	Intel@ CoreTM i7-920 Processor	Specify
	Clock speed	2.2 GHz or hi her	Specify
	Chipset	Compatible	Specify
	Motherboard	Compatible	Specify
	Cache memory	3MB L2 or higher	Specify
	Graphics	256MB Dedicated DDR3 Memory	Specify

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 SPECIFICATION**

Doc. No.	KPI/13D/4/1/TSP/09/126
Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 18 of 20	

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	Hard disk controller	Serial ATA	Specify
	Hard disk	500GB or higher	Specify
	Shock resistant	Anti-shock mounting design to protect screen and hard disk drive from damage and data loss	Specify
	Keyboard	Spill resistant keyboard	Specify
	Mouse	2- or 3-button with scroll wheel optical PC Mouse with pad - USB 3.0	Specify
	Touch pad	Intelligent Touch with configurable vertical and horizontal scroll functions	Specify
4.6.3	Laptop Operating System	Specify	
4.6.4	Pre – loaded with the latest, licensed version of an Anti – Virus Software	Specify	
4.6.5	Pre - loaded with a fully licensed Software for VT analyzer	Specify	
4.6.6	The licensed software shall allow the user to perform tests on the utility under test (UUT)	Specify	
4.6.7	The licensed software shall be capable of tracking user access	Specify	
4.6.8	The licensed software shall identify a fault in the system (Troubleshooting capability)	Specify	
4.6.9	licensed software functions:		
a)	Automatic control:	Specify	
b)	Manual control:	Specify	
4.6.10	The licensed software shall allow the user to save and view test results in an un-editable format	Specify	
4.6.11	test reports customization	Specify	
	exporting of the test results for analysis in excel	Specify	
4.6.12	The licensed software shall allow for Retrieval and printing of the results	State	
<b>4.7</b>	<b>Calibration of the Voltage Transformer Analyzer</b>		
4.7.1	Calibration procedure of the VT Analyzer	Provide	
4.7.2	Test points for calibration shall be defined	Provide	
4.7.3	Calibration kit and accessories	Provide	
4.7.4	Calibration and Measurement Capability (CMC) values shall be defined in the Calibration certificate provided for the equipment	Provide	
4.7.5	Various test points of the VT Analyzer in the calibration certificate shall have the defined values of the Uncertainty of Measurement	Provide	

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<b>Issue No.</b>	1
<b>Revision No.</b>	0
<b>Date of Issue</b>	2024-02-06
<b>Page 19 of 20</b>	

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<b>4.8</b>	<b>Supply Voltage</b>		
4.8.1	Mains power supply voltage	Specify	
<b>5.0</b>	<b>Test Requirements</b>		
5.1	Provisions for Inspection and Testing of Voltage analyzer	Provide	
<b>6.0</b>	<b>Marking, Labelling and Packing</b>	Provide	
6.1	Voltage transformer analyzer shall be marked legibly and indelibly in English	Specify	
	Marking information	Specify	
6.2	Packaging to minimize damage and moisture during transportation	Specify	
<b>A.</b>	<b>Test and Inspection</b>		
A.1.	Responsibility of testing transformer & manufacturer's capability	State	
	Manufacturer's capability to conduct the tests	State	
	Any limitations to conducting required tests	State	
A.2.	Copies of type test certificates and reports to IEC 61869 issued by a third party testing laboratory accredited to ISO/IEC 17025	Submit	
	Copy of the accreditation certificate to ISO/IEC 17025 for the testing laboratory	Submit	
A.3.	Acceptance tests at manufacturers premises witnessed by appointed KPLC representatives	State	
	Routine tests to be done during factory acceptance testing	List	
A.4.	KPLC shall inspect and perform the relevant tests in order to verify compliance on Delivery	State compliance	
<b>A.5.</b>	<b>Testing facility</b>		
A.5.1.	Contact details for testing authority	Submit	
A.5.2	Calibration of test and measuring equipment	Submit	
	A detailed list of workshop tools, test/measuring equipment		
A.6.	Complete test reports for approval before shipment	Submit	
A.7.	Inspection or test by KPLC during delivery before acceptance to stores	State Compliance	
	Replacement/Repair of the test system without charge to KPLC in case of failure	State Compliance	
<b>B.</b>	<b>Quality management system</b>		
B.1.	Quality assurance plan (QAP)	Submit	
	Copy of ISO 9001: 2015 certificate	Submit	
B.2.	Manufacturer's Declaration of Conformity to reference standards	Submit	

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Issue No.	1
Revision No.	0
Date of Issue	2024-02-06
Page 20 of 20	

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B.3.	Production capacity (monthly & annual)	Submit	
	List & contact addresses (including e-mail) of the manufacturer's customers in the last 5 years	Submit	
<b>C.</b>	<b>Documentation and Demonstration (Normative)</b>		
C.1.	Documents to be submitted with tender for evaluation	List	
a)	Guaranteed Technical Particulars (GTP)		
b)	Manufacturer's catalogues, brochures, drawings and technical data		
c)	Sales records for the last five years		
d)	Four customer reference letters		
e)	Manufacturing capacity		
f)	Manufacturer's experience		
g)	Copies of required type test certificates and type test reports		
h)	ISO/IEC 17025 for the third party testing laboratory		
i)	Manufacturer's warranty and guarantee (18 Months)		
j)	Manufacturer's letter of authorization		
k)	Manufacturer's ISO 9001:2015 certificate		
C.2.	Documents to be submitted by manufacturer for approval before manufacture	List	
a)	Guaranteed Technical Particulars (GTP)		
b)	Design drawings and wiring diagrams		
c)	Software manuals and operation manuals		
d)	Quality assurance plan (QAP)		
e)	Detailed test program to be used during factory testing		
f)	Marking details and method to be used in marking the test system		
g)	Manufacturer's undertaking to ensure adequacy of the design		
h)	Packaging details (including packaging materials)		
C.3.	Demonstration of equipment operation to Kenya Power staff at the factory	State Compliance	
C.4.	Training on the use of the Energy test system in Nairobi Kenya for a minimum of 10 No. staff	State Compliance	
	Deviations from tender specifications (indicate supporting documents submitted)	State	

.....  
**Manufacturer's Name, Signature, Stamp and Date**

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