DOCUMENT NO.: KP1/13D /4/1/TSP/10/010

Kenya Power

33kV VOLTAGE TRANSFORMER - SPECIFICATION

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

May 2021

TABLE OF CONTENTS

0.1 CIRCULATION LIST 3
0.2 AMENDMENT RECORD 4
FOREWORD 5
1. SCOPE 6
2. NORMATIVE REFERENCES 6
3. DEFINITIONS AND ABBREVIATIONS 6
3.1. ABBREVIATIONS 6
4. REQUIREMENTS 7
4.1. SERVICE CONDITIONS 7
4.2. DESIGN AND CONSTRUCTION 7
4.2 RATINGS 9
5 TESTS REQUIREMENTS 10
6 MARKING AND PACKING 11
6.1 MARKING 11
6.2 PACKING 11
6.3 FINAL INSTALLATION AND INSPECTION 12
6.4 MANUFACTURER'S EXPERIENCE AND CAPACITY 12
APPENDICES 13
A: TESTS AND INSPECTION (Normative) 13
B: QUALITY MANAGEMENT SYSTEM (Normative) 14
C: DOCUMENTATION (Normative) 14
E: GUARANTEED TECHNICAL PARTICULARS (Normative) 16

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.

© Kenya Power & Lighting Co. Plc.

Users are reminded that by virtue of Section 25 of the Copyright Act, 2001 (Revised 2009) Cap 130 of the Laws of Kenya copyright subsists in all KPLC Standards and except as provided under Section 26 of this Act, no KPLC Standard produced by KPLC may be reproduced, stored in retrieval system by any means without prior permission from the Managing Director & CEO, KPLC.

0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Issue 3, Rev 0	2021-05-26	Cancels and replaces all previous editions	Eng. J. Ndirangu	Dr. Eng. P. Kimemia

FOREWORD

This Specification has been prepared by the Standards Department and Technical Services Department of The Kenya Power and Lighting Company Plc (KPLC) and it lays down requirements for 33kV Voltage Transformers.

The 33kV Voltage Transformers are intended use with electrical measuring instruments, electrical protective devices and similar applications on system highest voltage of 245kV at power frequency of 50Hz.

The voltage transformer (VT) shall be suitable for supplying a low voltage for measurement, control and system protection functions.

There are no other Specifications in this series.

This Specification stipulates the minimum requirements for 33kV Voltage Transformers acceptable for use in the company. 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 33kV Voltage Transformers for KPLC.

The specification does not purport to include all the necessary provisions of a contract.

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	Department
Eng. Paul Mwangi	Technical Services
Eng. Kahoro Wachira	Technical Services
Eng. Julius Ndirangu	Standards

1. SCOPE

This Specification covers the requirements, design, test methods, marking and packing of 33kV Voltage Transformers.

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.

IEC 61869-1:	Instrument Transformers – Part 1: General Requirements
IEC 61869-3:	Instrument transformers - Part 3: Additional requirements for inductive voltage transformers
IEC/ISO 17025:	General requirements for the competence of testing and calibration laboratories
ISO 1461:	Hot dip galvanized coatings on fabricated iron and steel articles — Specifications and test methods.
IEC 60529:	Degrees of protection provided by enclosures (IP Code).
IEC/TS 80815:	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions
IEC 60296:	Fluids for electro-technical applications – Mineral insulating oils for electrical equipment
IEC 60417:	Graphical symbols for use on equipment

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:

3.1. ABBREVIATIONS

KPLC- Kenya Power and Lighting Company Plc.

IEC – International Electro Technical Commission

ISO – International Organization for Standardization.

ISO 9001: 2015 - Quality Management Systems - Requirements

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

4.1.1 The 33kV Voltage Transformers shall be suitable for continuous use outdoors in tropical areas with the following conditions:

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.

e. Isokeraunic levels of up to 180 thunderstorm days per year.

4.1.2 System Conditions

The voltage transformer will be connected between line and earth on overhead system operating at a nominal line voltage of 33kV with maximum system voltage (highest voltage for equipment) of 36kV, 50Hz and exposed to over-voltages of atmospheric origin. The neutral point is solidly earthed.

4.2. DESIGN AND CONSTRUCTION

4.1.1 The voltage transformer shall be designed, manufactured and tested to IEC 61869 -1 & 3 and the requirements of this specification.

4.1.2 All materials used shall be new and of the best quality and of the class most suitable for working under the conditions specified and shall withstand the variations of temperatures and atmospheric conditions arising under working conditions without undue distortion or deterioration or the setting up of undue stresses in any part, and also without affecting the strength and suitability of the various parts for the work which they have to perform.

4.1.3 The design shall ensure satisfactory operation under such sudden variations of load and voltage as may be met with under working conditions on the system, including those due to short circuits.

4.1.4 All parts of the transformer, including insulators with their mountings, shall be designed so as to avoid pockets in which water can collect.

4.1.5 The voltage transformer shall be outdoor; oil insulated and hermetically sealed type. The insulator portion of the voltage transformer shall be made of high-grade brown-glazed porcelain.

4.1.6 The voltage transformer shall be filled with new Insulating Oil. The Oil shall comply with requirements of IEC 60296.

4.1.7 The Voltage Transformer shall be effectively sealed to prevent liquid loss, as this would lead to contamination of the insulation.

4.1.8 The voltage transformer shall be suitable for vertical installation on a steel structure.

4.1.9 All parts, components and accessories of the voltage transformer shall be resistant to atmospheric corrosion, during the service life and shall be suitable for specified service conditions. The visual appearance shall remain acceptable and the paint work shall be resistant to weathering caused by atmospheric conditions and ultra violet radiation.

4.1.10 A device shall be provided for checking the oil level and shall indicate whether the oil level is within the operating range for duration of operation.

4.1.11 The voltage transformer shall have primary, secondary and earth terminals.

4.1.12 Primary Terminal

4.1.12.1 The primary terminal shall be of high conductivity copper, tin-plated, suitable for connection of both copper and aluminium conductors.

4.1.12.2 It shall have palm clamp connectors suitable for both stranded conductor and tube connection. Conductor overall diameter shall be 18.3mm to 25mm and busbar tubular bus/conductor of 76.2mm diameter.

4.1.12.3 The voltage to be transformed shall be applied to the primary terminal.

4.1.13 Secondary Terminals

4.1.13.1 The secondary terminals of the voltage transformer shall be wired to a terminal box.

4.1.13.2 The terminal box shall be weatherproof with a cable plate at the bottom and shall be covered with removable plate. The degree of protection of enclosure for the secondary terminal box shall be at least IP54 as per IEC 60529.

4.1.13.3 The secondary shall supply the voltage circuits of measuring instruments, meters, relays or similar apparatus.

4.1.13.4 The secondary terminal box of the voltage transformer shall be complete with protection fuses complete with fuse links.

4.1.14 The voltage transformer shall be designed and constructed to withstand without damage, when energized at rated voltage, the mechanical and thermal effects of an external short-circuit for the duration of 1 s.

4.1.15 The complete voltage transformer shall be tight in the full temperature range specified.

4.1.16 The primary and secondary terminal shall be marked in accordance with IEC 61689-5

4.1.17 The Frame of the Voltage Transformer shall be provided with reliable earthing terminal for connection to an earthing conductor. The earth connection point shall be marked with the "earth symbol" as indicated by the symbol No. 5019 of IEC 60417.

4.1.18 The Voltage Transformer shall be of sufficient mechanical strength. In particular, the top cover shall be strong so as to withstand any flying debris resulting from failure of porcelain housing of other nearby equipment in the substation.

4.1.19 The voltage transformer shall have cores and ratings as per clause 4.3.

4.2 RATINGS

4.2.1.1 The ratings of the voltage transformer shall be as indicated in Table 1.

Table 1: Ratings for 33kV Voltage Transformer

Item	Parameters, Units	Value
1.	Nominal primary voltage	33000/√3 volts
2.	Nominal secondary voltage	110/√3 volts
3.	Highest Rated Equipment Voltage	36kV
4.	Rated frequency	50 Hz
5.	Minimum creepage distance of insulator	1120mm

6.	Minimum lightning impulse withstand voltage, primary winding			200kV (peak)	
7.	Minimum power frequency withstand voltage, primary winding, dry			95kV (r.m.s.)	
8.	Minimum power frequency withstand voltage, secondary winding, r.m.s.			5kV (r.m.s.)	
9.	Maximum temperature rise	Windings		65K	
		Oil (at top of tank)		55K	
10	Rated voltage factor	Continuous		1.2	
		for 30 sec.		1.5	
11	Permissible partial discharges (PD)	PD test voltage (r.m.s) = U_m		≤10pC	
		PD test voltage (r.m.s) = $1.2U_m/\sqrt{3}$		≤5pC	
12	Rated Temperature range of Equipment			-5°C to +50°C	
13	Secondary windings Cores	Terminal Markings	Voltage Output	Class	VA (pf 0.8 lagging)
	Core 1	1a-1n	$110/\sqrt{3}$	0.5	75
	Core 2	2a-2n	$110/\sqrt{3}$	3P	150

Note:

(1) The voltage transformer shall be installed at altitude of 2200m above sea level and if tests will be carried out at altitudes below 1000m, the limits of temperature rise given in Table 1 above shall be reduced by 0.4% for each 100m that the altitude at the operating site exceeds 1000m (see clause 6.4.2 of IEC 61869-1).

(2) The voltage transformer shall be installed at altitude of 2200m asl, the arcing distance under the standardized reference atmospheric conditions shall be determined by multiplying the withstand voltages required at the service location by a factor k in accordance with Figure 2 and clause 6.6.2 of IEC 61869-1 (k = em(H-1000)/8150 = e(2200-1000)/8150 =1.16, with m=1 as per IEC 61869-1).

5 TESTS REQUIREMENTS

5.1 The voltage transformer shall be inspected and tested in accordance with the requirements of this specification and IEC 61869-1&3. It shall be the responsibility of the supplier to perform or to have performed the tests specified.

6 MARKING AND PACKING

6.1 MARKING

6.1.1 The nameplates of the voltage transformers shall be marked in accordance with IEC 61869-1&3 in English language. All markings shall be indelible and legible. Nameplate and their fixings shall be weatherproof and corrosion proof.

6.1.2 The following information shall be indicated in the marking:

a. Manufacturer's name or identification mark;
b. Type reference number and serial number
c. Year of manufacture
d. Rated primary and secondary voltage
e. Rated frequency
f. Rated output and the corresponding accuracy class of each secondary winding
g. Highest voltage for equipment : Um [kV];
h. Rated insulation level based on Um: AC/BIL;
i. Class of insulation
j. Short time current ratings and time
k. The use of each secondary winding and its corresponding terminals
l. Equipment Temperature Category

All the marking shall be by engraving (or superior method) and shall be permanent and legible.

6.1.3 The terminals shall be marked clearly and indelibly and in accordance with IEC 61869-1&3. The terminal marking shall consist of letters followed by numbers.

6.1.4 Letters A, B, C denote fully insulated primary winding terminals and the lower-case letters a, b, c and n denote the corresponding secondary terminals. Letters da and dn denote the terminals of windings intended to supply a residual voltage.

6.1.5 Terminals having corresponding capital and lower-case markings shall have the same polarity at the same instant.

6.2 PACKING

6.2.1 33kV Voltage Transformers shall be packaged for outdoor storage in tropical conditions defined in clause 4.1.

6.2.2 The voltage transformers shall be delivered packed in wooden crates firmly bound and closely together to avoid damage to the voltage transformer and its porcelain insulator during transportation and storage.

6.2.3 A set of three (3) Original Hard Cover Installation, Operation and Maintenance Manuals for the voltage transformers shall be supplied with each complete voltage transformer.

6.2.4 Recommendations for use, care, storage and routine inspection/testing procedures, all in English language shall be submitted.

6.3 FINAL INSTALLATION AND INSPECTION

Instructions shall be provided for Inspection and tests which should be carried out after the Voltage Transformer has been installed and after all connections are completed. These instructions should include: -

a) A Schedule of Recommended site tests to establish correct operation.

b) Procedures for carrying out any adjustment that may be necessary to obtain correct operation.

c) Recommendations for any relevant measurements that should be made and recorded to help with future maintenance decisions.

d) Instructions for final inspection and putting the voltage transformer into service.

6.4 MANUFACTURER'S EXPERIENCE AND CAPACITY

6.4.1 The manufacturer shall have a minimum of 25 years' experience in the manufacture of 33kV Voltage Transformers.

6.4.2 The 33kV Voltage Transformers on offer shall have been in service and given reliable service for a minimum period of 8 years in at least two (2) power utilities in at least three (3) of the following continents/regions:

i) Europe
ii) North America
iii) Africa
iv) Asia or South America

The manufacturer shall provide references to support requirements of this including export records with copy of contractual letters, voltage transformer details and date of sale/export, letter of satisfaction from power utilities.

6.4.3 Voltage transformer brands that have failed in service or mal-operated while in service on the Kenyan power system shall not be accepted.

6.4.4 The warranty for the offered 33kV Voltage Transformers shall be 5 years from the date of delivery to KPLC store.

APPENDICES

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 for 33kV Voltage Transformers issued by a third party testing laboratory that is accredited to ISO/IEC 17025 and 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).

Copies of Type Tests Reports and Special Tests Reports to be submitted with the tender shall not be more than five years old and shall include the following as per IEC 61869-1&3:

i. Temperature rise test;
ii. Short circuit withstand capability test;
iii. Lightning impulse test (with both positive and negative polarity – fifteen consecutive impulses of each polarity);
iv. Wet test for outdoor type transformers with AC voltage
v. Determination of errors

NOTE: Any translations of certificates and test reports into English language shall be signed and stamped by the Testing Authority.

A.3 Routine and sample test reports for the 33kV Voltage Transformers to be supplied shall be submitted to KPLC before delivery. KPLC Engineers will witness tests at the factory before shipment.

Tests to be witnessed by KPLC Engineers at the factory before delivery shall be in accordance with IEC 61869-1&3 and this specification and shall include the following:

a) Verification of terminal markings;
b) Power-frequency withstand test on primary windings;
c) Partial discharge measurement;
d) Power-frequency withstand tests on secondary winding;
e) Power-frequency withstand tests between sections;
f) Determination of errors;
g) Accuracy of measuring voltage transformers at 80%, 100% and 120% of rated voltage, at rated frequency and at 25% and 100% of rated burden;
h) Temperature-rise test for residual voltage transformer;
i) Tests for accuracy of protective voltage transformers at 2%, 5% and at 100% of rated voltage and at rated voltage multiplied by the rated voltage factor, at 25% and at 100% of rated burden at a power factor of 0.8 lagging.

j) Visual inspection of complete voltage transformer

A.4 Upon delivery of the 33kV Voltage Transformers, KPLC will inspect them and may perform any of the relevant tests in order to verify compliance with the specification. The supplier shall replace without charge to KPLC, any 33kV Voltage Transformers 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 33kV Voltage Transformers 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.

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.

C: DOCUMENTATION (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 and stamped by the manufacturer;

b) Copies of the Manufacturer's catalogues, brochures, drawings giving all relevant dimensions and technical data;

c) References letters to support requirements of clause 6.4 including export records with copy of contractual letters, 33kV Voltage Transformers details and date of sale/export, letter of satisfaction from power utilities.

d) Details of manufacturing capacity.

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) Contacts and address of third party testing laboratory;

h) Manufacturers letter of authorization, ISO 9001 certificate and other technical documents required in the tender.

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) stamped and signed by the manufacturer (these are not the ones submitted with the tender) ;
b) Detailed Design Drawings with dimensions to be used for manufacture of the 33kV Voltage Transformers for KPLC;
c) 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;
d) Detailed test program to be used during factory testing
e) Marking details and method to be used in marking the 33kV Voltage Transformers
f) Packaging details including packaging materials.
g) Product samples (where applicable).

C.3 Statement of compliance to specification (indicate deviations if any provide supporting documents)

NOTE: *The drawings to be submitted by the supplier to KPLC for approval before manufacture shall be in standard format clearly indicating the drawing number, parts list with material details and quantities, standard of manufacture, ratings, approval details and identity of the manufacturer (as per manufacturer's authorization submitted during tendering).*

E: 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 Requirements	Bidder's offer
Manufacturer's Name and address		Specify
Country of Manufacture		Specify
Name and model Number		Specify
1.	Scope	State
2.	References standards	State
3.	Definitions and Abbreviations	
3.1.	Abbreviations	State
4.	**Requirements**	
4.1.1	Service conditions	State
4.1.2	System Conditions	State
4.2	**Design and Construction**	
4.2.1	Voltage transformer shall be designed, manufactured and tested to IEC 61869 -1 & 3 and the requirements of this specification	State
4.2.2	All materials used shall be new and of the best quality	State
4.2.3	Design shall ensure satisfactory operation under such sudden variations of load and voltage as may be met with under working conditions on the system, including those due to short circuits.	State
4.2.4	All parts of the transformer, including insulators with their mountings, shall be designed so as to avoid pockets in which water can collect	State
4.2.5	The voltage transformer shall be outdoor; oil insulated and hermetically sealed type	State
	The insulator portion of the voltage transformer shall be made of high-grade brown-glazed porcelain	State
4.2.6	The voltage transformer shall be filled with new Insulating Oil. The Oil shall comply with requirements of IEC 60296	State

Clause number	KPLC Requirements	Bidder's offer
4.2.7	The Voltage Transformer shall be effectively sealed to prevent liquid loss, as this would lead to contamination of the insulation	Provide
4.2.8	The voltage transformer shall be suitable for vertical installation on a steel structure.	State
4.2.9	All parts, components and accessories of the voltage transformer shall be resistant to atmospheric corrosion, during the service life and shall be suitable for specified service conditions	State
	The visual appearance shall remain acceptable and the paint work shall be resistant to weathering caused by atmospheric conditions and ultra violet radiation	State
4.2.10	A device shall be provided for checking the oil level and shall indicate whether the oil level is within the operating range for duration of operation.	State
4.2.11	The voltage transformer shall have primary, secondary and earth terminals.	State
4.2.12	**Primary Terminal**	
4.2.12.1	The primary terminal shall be of high conductivity copper, tin-plated, suitable for connection of both copper and aluminium conductors.	Provide
4.2.12.2	It shall have palm clamp connectors suitable for both stranded conductor and tube connection	State
	Conductor overall diameter shall be 18.3mm to 25mm and busbar tubular bus/conductor of 76.2mm diameter.	State
4.2.12.3	The voltage to be transformed shall be applied to the primary terminal.	State
4.2.13	**Secondary Terminals**	
4.2.13.1	The secondary terminals of the voltage transformer shall be wired to a terminal box.	State
4.2.13.2	The terminal box shall be weatherproof with a cable plate at the bottom and shall be covered with removable plate	State
	Degree of protection of enclosure for the secondary terminal box as per IEC 60529.	State
4.2.13.3	The secondary shall supply the voltage circuits of measuring instruments, meters, relays or similar apparatus	State
4.2.13.4	The secondary terminal box of the voltage transformer shall be complete with protection fuses complete with fuse links	State
4.2.14	The voltage transformer shall be designed and constructed to withstand without damage, when energized at rated voltage, the mechanical and thermal effects of an external short-circuit for the duration of 1 s.	State

Clause number	KPLC Requirements				Bidder's offer
4.2.15	The complete voltage transformer shall be tight in the full temperature range specified.				State
4.2.16	The primary and secondary terminal shall be marked in accordance with IEC 61689-5				State
4.2.17	The Frame of the Voltage Transformer shall be provided with reliable earthing terminal for connection to an earthing conductor. The earth connection point shall be marked with the "earth symbol" as indicated by the symbol No. 5019 of IEC 60417				Provide
4.2.18	Top cover shall be strong so as to withstand any flying debris resulting from failure of porcelain housing of other nearby equipment in the substation				State
4.3	**Ratings**				
4.2.3.1	Nominal primary voltage				State
	Nominal secondary voltage				State
	Highest Rated Equipment Voltage				State
	Rated frequency				State
	Minimum creepage distance of insulator				State
	Minimum lightning impulse withstand voltage, primary winding				State
	Minimum power frequency withstand voltage, primary winding, dry				State
	Minimum power frequency withstand voltage, secondary winding, r.m.s.				State
	Maximum temperature rise		Windings		State
			Oil (at top of tank)		State
	Rated voltage factor		Continuous		State
			for 30 sec.		State
	Permissible partial discharges (PD)		PD test voltage (r.m.s) = U_m		State
			PD test voltage (r.m.s) = $1.2U_m/\sqrt{3}$		State
	Rated Temperature range of Equipment				State
	Secondary windings Cores	**Terminal Markings**	**Voltage Output**	**Class**	**VA (pf 0.8 lagging)**
	Core 1	State	State	State	State
	Core 2	State	State	State	State
5	**Test Requirements**				
5.1	Test standard				State
6	**Marking and Packing**				
6.1.1	The nameplates of the voltage transformers shall be marked in accordance with IEC 61869-1&3 in English language				State

Clause number	KPLC Requirements	Bidder's offer
	All markings shall be indelible and legible	State
	Nameplate and their fixings shall be weatherproof and corrosion proof.	State
6.1.2	Information indicated in the marking	State
6.1.3	The terminals shall be marked clearly and indelibly and in accordance with IEC 61869-1&5. The terminal marking shall consist of letters followed by numbers	State
6.1.4	Letters A, B, C denote fully insulated primary winding terminals and the lower-case letters a, b, c and n denote the corresponding secondary terminals. Letters da and dn denote the terminals of windings intended to supply a residual voltage	State
6.1.5	Terminals having corresponding capital and lower-case markings shall have the same polarity at the same instant.	State
6.2	**Packing**	
6.2.1	Shall be packaged for outdoor storage in tropical conditions defined in clause 4.1	State
6.2.2	Set of three (3) Original Hard Cover Installation, Operation and Maintenance Manuals for the circuit breakers shall be supplied with each voltage transformer	State compliance
6.2.3	Recommendations for use, care, storage and routine inspection/testing procedures, all in English language shall be submitted.	submit
6.2.4	Recommendations for use, care, storage and routine inspection/testing procedures, all in English language shall be submitted	submit
6.3	**Final Installation and Inspection**	
	State instructions to be provided for Inspection and tests which should be carried out after the Voltage Transformer has been installed and after all connections are completed	List as per specification
6.4	**Manufacturer's Experience and Capacity**	
6.4.1	Minimum of 25 years' experience in the manufacture of 33kV Voltage Transformers.	State
6.4.2	33kV Voltage Transformers on offer have been in service and given reliable service for a minimum period of 8 years in at least two (2) power utilities in at least three (3) of the following continents/regions: i) Europe ii) North America iii) Africa iv) Asia or South America	Submit references

Clause number	KPLC Requirements	Bidder's offer
6.4.3	voltage transformer failed in service or mal-operated while in service on the Kenyan power system	State
6.4.4	5 years warranty	State
A	**Tests and Inspection**	
A.1	Responsibility of the supplier to test or to have all the relevant tests performed	State
A.2	Copies of type test reports submitted for evaluation	list
A.3	Tests to be witnessed by KPLC Engineers at the factory	list
A.4	Inspection at the stores and replacement of rejected items	State compliance
B	**Quality Management System**	
B.1	Quality Assurance Plan	Submit
B.2	Copy of valid ISO 9001:2015 Certificate	Submit
C	**Documentation**	
C.1	Documents submitted with tender for evaluation	List
C.2	Documents submitted for approval before manufacture	List
C.3	Statement of compliance to specification (indicate deviations if any & supporting documents)	State compliance

NOTE:

1) Bidders shall give full details of the item(s) on offer as per the specification and applicable standards. The details provided shall conform to the test reports and their certificates, as well as labeled drawings complete with dimensions, catalogues and/or brochures for the purpose of tender evaluation.

2) Bidders should note that the above Guaranteed Technical Particulars Schedules must be fully completed and submitted with the bid. Wherever there is conflict between the GTPs and the clauses in the specification, the clauses in the specification take precedence. Failure to complete the schedules shall lead to rejection of the bid.

3) Guaranteed values shall be specified.

** Words like 'agreed', 'confirmed', 'As per KPLC specifications', Yes, etc. shall not be accepted and shall be considered non-responsive.*

.....

Manufacturer's Name, Signature, Stamp and Date