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Kenya Power

33kV ISOLATOR (DISCONNECTOR) – 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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Issued by: Head of Section, Standards Development	Authorized by: Head of Department, Standards
Signed:	Signed:
Date: 2023-08-02	Date: 2023-08-02

0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Issue 2 Rev 0	2010-08-12	Cancels and replaces Issue 1		
Issue 2 Rev 1	2023-06-23	1. Updated the specification to the new format and GTPs to clause by clause format. 2. Updated the testing and marking requirements. 3. Miscellaneous changes	Jean Otsyula	Dr. Eng. Peter Kimemia

FOREWORD

This Specification has been prepared by the Standards Department of the Kenya Power and Lighting Company Plc (KPLC) and it lays down requirements for 33kV Isolators also referred to as Disconnectors or Air Break Switches. It is intended for use by KPLC in purchasing the equipment.

This specification stipulates the minimum requirements for 33kV Isolators (Disconnectors) 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. Good workmanship and good engineering practice shall be exhibited in the manufacture of the Isolators for KPLC.

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
Jean Otsyula	Standards

1. SCOPE

1.1. This specification is for 33kV Isolators (Disconnectors) for use on line disconnection, isolation of substation apparatus and sectionalizing purposes.

1.2. This specification is for the following manually operated Isolators:

a) Overhead Line Isolator (Disconnector)
b) Substation Apparatus Isolator (Disconnector)

Note: the type and mounting required shall be stated for each tender.

1.3. This specification also covers inspection and test of the isolators as well as schedule of Guaranteed Technical Particulars to be filled, signed by the manufacturer and submitted for tender evaluation.

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

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 shall apply; for undated editions the latest edition of the referenced document shall apply.

IEC 62271-102:	High–voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches.
ISO 1461:	Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods.
KPLC1/3CB/TSP/09/019:	Specification for Security Padlocks

3. DEFINITIONS AND ABBREVIATIONS

For the purpose of this specification the definitions and abbreviations given in the reference standards and the following shall apply.

Isolator (Disconnector) – a mechanical switching device which provides, in the open position, an isolating distance in accordance with electrical safety requirements.

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

4.1.1 The isolators shall be suitable for use outdoor in tropical areas and harsh climatic conditions including areas exposed to:

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 in accordance with IEC 60815.

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

4.2. MATERIALS AND CONSTRUCTION

4.2.1. The isolator shall be designed and manufactured in accordance to IEC 62271-102 and the requirements of this specification. The breaking medium shall be air.

4.2.2. The isolator shall be designed for three phase operation. Each switch pole shall incorporate three porcelain insulators mounted on hot dipped galvanized steel underbase. The centre insulator shall be moveable to effect contact operation.

4.2.3. The isolator shall be supplied complete with operating mechanism, all necessary components (coupling, drive rods etc.) and all necessary steelwork for pole mounting including a pair of mounting stalks, a pair of cross member steel channels and assembly bolts & nuts.

4.2.4. The isolator shall be suitable for mounting on a H-pole at phase centres of at least 900 mm.

4.2.5. The isolator shall be suitable for manual operation by means of push – pull reciprocating mechanism. The mechanism shall be interlocked for safe operation. It shall be supplied complete with the operating mechanism.

4.2.6. All the three switch poles shall be arranged so that the phase units are mounted independently and then finally interconnected with coupling tubes so as to ensure simultaneous operation of all switches by drive rods and an operating handle.

4.2.7. The drive rod shall be fitted with an insulation insert to electrically isolate the top section from the lower section of the rod. The insulation insert shall be at least 0.4m in length and of adequate mechanical strength to withstand the switch operations.

4.2.8. All steel parts shall be hot dip galvanised to ISO 1461. The minimum coating of galvanising required is 100 microns.

4.2.9. The isolator shall be designed such that in fully open position, it shall provide adequate electrical isolation between the contacts on all the three phases. It shall conform to the requirement as single point isolation for safety.

4.2.10. The isolator shall be fitted with spring arc horns to enable the isolator interrupt loads of up to 10 Amps.

4.2.11. All current carrying parts of the isolator shall be made of electrolytic high conductivity copper with switch contacts hard drawn and silver plated.

4.2.12. The isolator shall be complete fitted with clamp connectors for Aluminium (ACSR) conductor of up to 18.2 mm diameter. The clamp connectors shall be of ample cross-section and surface for carrying continuously the specified current.

4.2.13. Provision shall be made for padlocking in both CLOSED and OPEN positions. The provision shall be able to accommodate an 8 mm shackle with a height of approximately 50 mm.

4.2.14. The isolator shall have an earthing point for connection to the earth.

4.3. RATING

The rating of the complete isolator shall be as follows:

	Item	Overhead Line Isolator	Substation Isolator
1	Rated voltage and frequency	36kV, 50 Hz	36kV, 50 Hz
2	Rated lightning impulse withstand voltage 1.2/50µs, dry, +ve (with contacts closed)	200kV	200kV
3	Rated power frequency withstand voltage wet, 50 Hz, 60s (with contacts closed)	95kV	95kV
4	Rated continuous current	400 Amps	800 Amps
5	Rated short time withstand current for 3s	16kA	17.5kA
6	Minimum creepage distance of insulators	900mm	900mm

5. TESTS REQUIREMENTS

The isolator shall be inspected and tested in accordance with the requirements of relevant standards and provisions of this specification.

6. MARKING AND PACKING

6.1. MARKING

The following information shall be marked legibly and indelibly and in a permanent manner on a name plate attached in a permanent manner to each isolator:

a) The manufacturer's name or trade mark;
b) The type reference number
c) The KPLC purchase order number
d) The letters "**KPLC**"
e) The rated: voltage, current, frequency and insulation levels.
f) The year of manufacture
g) The batch or serial number

All markings shall be in the English language and figures representing ratings shall be followed by the symbol of the unit in which they are expressed.

6.2. PACKING

6.2.1. The components of the isolator shall be packed in wooden crates so as to protect the porcelain insulators from damage. Each assembly and package of items associated with one complete isolator shall be suitably marked for ease of identification and assembly.

6.2.2. Instructions for storage, handling, assembly and installation shall be included in each package, all in English Language.

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APPENDICES

A: TESTS AND INSPECTION (Normative)

A.1 The isolators shall be inspected and tested in accordance with the requirements of this specification, IEC 62271-102 and ISO 1461. It shall be the responsibility of the manufacturer to perform or to have performed the tests 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 and scope of accreditation for the testing laboratory shall also be submitted with the tender (all in English Language). Any translations of certificates and test reports into English language shall be signed and stamped by the Testing Authority.

Copies of type test certificates and type test reports to IEC 62271-102 for the isolator offered to be submitted for tender evaluation shall include:

- Dielectric tests (Lightning Impulse and Power Frequency Withstand Tests)
- Short time withstand and peak withstand current tests
- Temperature rise test
- Measurement of resistance of the circuits
- Electromagnetic compatibility tests
- Operation and mechanical endurance tests
- Operation at the temperature limits

A.3 The isolator shall be subjected to acceptance tests at the manufacturer's works before dispatch. Acceptance tests shall be witnessed by two Engineers appointed by KPLC and shall include the following routine tests to IEC 62271-102:

- Dielectric tests on main circuit (Lightning Impulse and Power Frequency Withstand Tests)
- Measurement of resistance of the circuits
- Design and visual checks
- Mechanical operating tests

A.4 Test reports for each isolator (including its individual components) shall be submitted by the supplier to The Kenya Power and Lighting Company for approval before shipment.

A.5 On receipt of the isolators, 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/rectify without charge to Kenya Power, any isolator 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 isolator 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.

B.2 The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001:2015 certificate shall be submitted with the tender for evaluation.

B.3 The supplier shall indicate the delivery time of the isolators, manufacturer's monthly & annual production capacity and experience in the production of isolators being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the isolators sold as well as reference letters from at least four of the customers 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 and technical data;
c) Sales records 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;
g) Manufacturer's ISO 9001:2015 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 for approval before manufacture:

a) Fully filled clause by clause guaranteed technical particulars (GTP) signed and stamped by the manufacturer;
a) Design Drawings and construction details of the isolator.
b) Product manuals and brochures,
c) Quality assurance plan (QAP) based on ISO 9001.
d) Test program to be used after manufacture.

e) Marking details and method to be used in marking the isolators.
f) Manufacturer's undertaking to ensure adequacy of the design.
g) Packaging details (including packaging materials).

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, components with material details, standard of manufacture, ratings, approval details and identity of the manufacturer (as per tender) et cetera.

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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, customer reference letters (4), details of manufacturer's 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	Requirement	Bidder's offer
	Manufacturer's Name and address	Specify
	Country of Manufacture	Specify
	Name and model number	Specify
1.	Scope	State
2.	Normative References	State
3.	Definitions and Abbreviations	State
4.	**Requirements**	
4.1	Service Conditions	State
4.2	**Materials and Construction**	
4.2.1	Isolator design and manufacture standards	State
	Isolator breaking medium	State
4.2.2	Isolator design for three phase operation	Specify
4.2.3	Steelwork and components to be supplied (including components and mounting stalks for mounting on 12M wooden or concrete poles)	Specify
4.2.4	Isolator suitable for mounting on a H-pole	State
4.2.5	Isolator suitable for manual operation and operating mechanism interlocked	State
4.2.6	Arrangement of the three switch poles	State
4.2.7	Drive rod fitted with insulation insert	Specify size
4.2.8	Minimum coating of galvanizing for all steel parts	Specify
4.2.9	Adequate electrical isolation provided between the contacts on all the three phases when isolator is in fully open position	State
4.2.10	Isolator fitted with spring arc horns	State
4.2.11	Material of all current carrying parts of the isolator	State
4.2.12	Isolator complete fitted with clamp connectors	State

Clause number	Requirement	Bidder's offer
4.2.13	Provision shall be made for padlocking in both CLOSED and OPEN positions	State
4.2.14	Isolator has an earthing point	State
4.3	**Rating**	
	Rated voltage and frequency	State
	Rated lightning impulse withstand voltage 1.2/50µs, dry, +ve (with contacts closed)	State
	Rated power frequency withstand voltage wet, 50 Hz, 60s (with contacts closed)	State
	Rated continuous current	State
	Rated short time withstand current for 3s	State
	Minimum creepage distance of insulators	State
5	Test Requirements	Specify
6	**Marking and Packing**	
6.1	Marking	Specify
6.2	Packing	Specify
A	**Test and Inspection**	
A.1	Test standards and responsibility of carrying out tests	State
A.2	Copies of: type test certificates & reports, accreditation certificate, and scope of accreditation to ISO/IEC 17025 to submitted with tender	Provide
A.3	Acceptance tests to be witnessed by KPLC at the factory before shipment	State
A.4	Test reports for each isolator (including its individual components) to be submitted to KPLC for approval before shipment	State
A.5	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	Delivery time of the equipment	Provide
	Manufacturing capacity (monthly and annual no. of units)	Provide
	Manufacturer's experience	Provide
	List of previous customers	Provide
	Customer reference letters	Provide
C	**Documentation and demonstration**	

Clause number	Requirement	Bidder's offer
C.1	Documents submitted with tender	Provide
C.2	Documents to be submitted by supplier to KPLC for approval before manufacture	List
	Statement of compliance to specification (indicate deviations if any & supporting documents)	State compliance

.....

Manufacturer's Name, Signature, Stamp and Date

***Note**: All guaranteed values **MUST** be clearly stated. Words like 'agreed', 'yes', 'confirmed', 'as per KPLC specifications', etc. shall not be accepted and shall be considered non-responsive.*