



Kenya Power

TITLE:

**SPECIFICATION FOR
33 kV EXPULSION FUSE
CUT-OUT
(Drop out type)**

Doc. No.

KP1/3CB/TSP11/018

Issue No.

2

Revision No.

0

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2014-10-02

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(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 for past five years, 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 third party testing laboratory for tender evaluation, all in English Language)

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Authorized by: Chief Engineer, Technical Stds & Specs

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FOREWORD

This specification has been prepared by the Standards Department of the Kenya Power & Lighting Company Ltd (KPLC) and it lays down requirements for 33kV Expulsion Fuse Cut-out (drop out type). The specification is intended for use by KPLC in purchasing the fuse cutouts.

The manufacturer shall submit information which confirms satisfactory service experience with products which fall within the scope of this specification.

1. SCOPE

- 1.1. This specification is for expulsion fuse cut-out (drop out type) to be used outdoors on 33kV, 50Hz ac system for protection and isolation of substation apparatus and sectionalizing purposes. The expulsion fuse cut-out shall incorporate the fuse mount (fuse base) and its fuse-carrier. The fuse cutout shall also be applicable for use in 19.1 kV SWER system.
- 1.2. The specification also covers inspection and test of the fuse cutouts as well as schedule of Guaranteed Technical Particulars to be filled, signed by the manufacturer and submitted for tender evaluation.
- 1.3. The specification stipulates the minimum requirements for fuse cutouts acceptable for use in the company (KPLC) and it shall be the responsibility of the Manufacturer to ensure adequacy of the design, good workmanship and good engineering practice in the manufacture of the fuse cutouts for KPLC.

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

2. 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.

- ISO 1461: Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and Test Methods.
- IEC 60282: High Voltage Fuses - Part 2: Expulsion and similar fuses
- IEC 60507: Artificial pollution tests on high-voltage insulators to be used on a.c. systems Is applicable for the determination of the power frequency
- IEC 60437: Radio interference test on high-voltage insulators

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4.2. DESIGN AND CONSTRUCTION

4.2.1. General

- 4.2.1.1. The expulsion fuse cutout shall be designed and manufactured to IEC 60282-2 and the requirements of this specification
- 4.2.1.2. The expulsion fuse cutout shall be supplied as a complete unit incorporating the fuse mount (fuse base) with its fuse-carrier.
- 4.2.1.3. All current carrying parts shall be of electrolytic high conductivity copper with the contacts hard drawn copper and silver-plated.
- 4.2.1.4. The fuse cutout shall withstand the specified impulse and power frequency voltages in all applicable mounting positions including angle mounting.

4.2.2. Operation

- 4.2.2.1. It shall not be possible to close the fuse carrier without the top cap fitted. The disconnecter fuse units shall be designed and constructed such that on closing the fuse carrier-fuse link, no additional stress shall be applied to the fuse link which could cause it to fail.
- 4.2.2.2. To allow for interchangeability of fuse carriers between fuse units from different manufacturers, the distance between contacts shall be strictly in accordance with Fig 1.
- 4.2.2.3. Lifting rings of 25 mm nominal internal diameter shall be provided on the bottom end and on the top of the fuse tube to enable the removal and replacement of the fuse tube using a standard operating rod fitted with a hook-link stick. When an expulsion drop-out disconnecter fuse is mounted on a pole the fuse carrier shall not hit the pole during opening operation.
- 4.2.2.4. The top contact support of the disconnecter fuse shall be provided with hooks suitable for attachment of a portable load breaking tool.

4.2.3. Mounting

The angle of inclination of the disconnecter fuse carrier shall be sufficient to allow ease of operation with due regard to the safety of the operator. The disconnecter shall be capable of being mounted on either poles or cross-arms.

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4.2.6. Vibration

When the fuse link is intact and correctly inserted, the carrier shall latch securely when closed and shall not be dislodged from the fuse contacts by vibration or wind pressure. The carrier shall not dislodge from the bottom hinge in the opening operation, or in the open position during wind or vibration conditions.

4.2.7. Bird/Fauna/Vermin Proofing

The insulator/mounting bracket combination shall be designed in such a manner so as to minimize the risk of flashover due to birds, and other wildlife, without the use of plastic or rubber coverings. The fuse carrier design shall minimize the possibility of insect nests being formed in the fuse carrier.

4.2.8. Fuse Link Installation

4.2.8.1. A flipper spring mechanism shall be incorporated into the design of the fuse carrier to assist the fuse link ejection. The fuse link tail shall be held captive such that it does not make contact with the inner walls of the fuse carrier i.e. the flipper spring mechanism shall centrally locate the range of fuse link sizes from the smallest to the largest diameters, within the fuse carrier. Detailed drawings indicating the position of the flipper spring together with the smallest and largest fuse links when installed within the fuse carrier shall be provided.

4.2.8.2. Fuse link attachment to the fuse carrier trunnion must prevent binding of the fuse link on the thread. Further, the tail section of the fuse carrier trunnion shall be metal only i.e. this section shall NOT be covered by PVC or other material. The thumb screw or the attachment used to retain the fuse link shall be held captive in the unscrewed position.

4.2.9. Earthing Attachment

The bottom hinge section of the dropout disconnecter unit shall be provided with an earth attachment device satisfying the following requirements:

- Be capable of supporting the weight of the portable earthing cables (nominally 35kg) and not allow accidental detachment of the portable earths.
- Have a 1 second withstand current rating of 6kA (minimum).
- Provide a clearance of 500mm ((nominal) from the live parts to the earth attachment point.
- Be orientated in-line with the dropout disconnecter so that the device does not interfere with the operation of the unit or reduce the phase to phase clearances.

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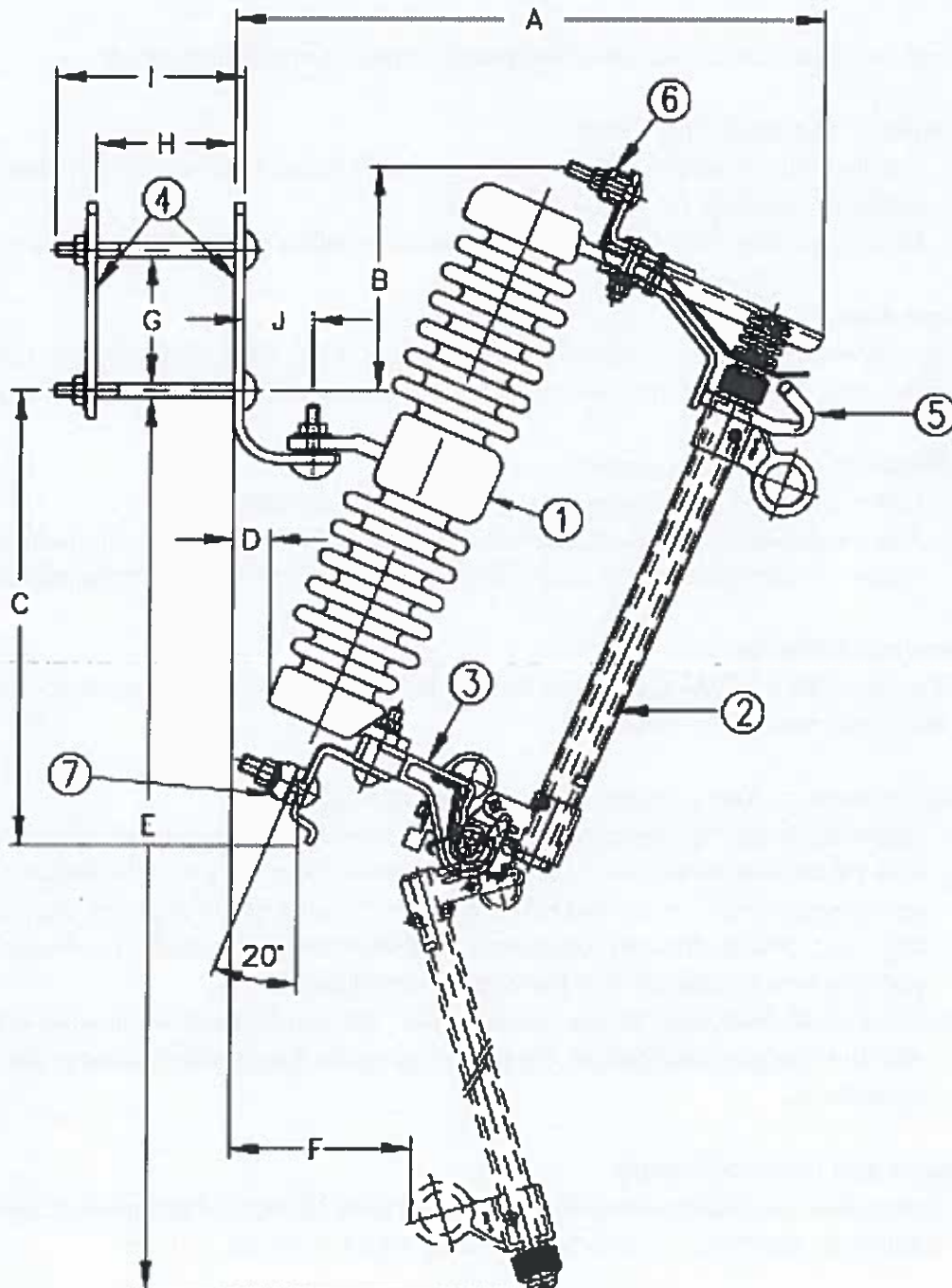


Fig. 1. Arrangement of 33 kV Fuse Cutout.

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- 4.3.2.2. All current carrying parts shall be of a high electrical conductivity, corrosion resistant metal.
- 4.3.2.3. All nuts, bolts and washers other than those associated with the mounting bracket shall be stainless steel. The bolts and washers shall be grade 316 and to avoid binding, the nuts shall be grade 304 and a suitable lubricant shall be applied to the threads of all stainless steel bolts before tightening. The lubricant shall not contain graphite.
- 4.3.2.4. All support brackets and other ferrous parts other than stainless steel shall be hot dip galvanized, with an average minimum zinc coating thickness of 80µm in accordance with ISO 1461.

4.3.3. Dimensions as per Fig. 1.

Type	Dimensions in millimetres										Approximate weight kg
	Tolerance on dimensions - ± 10mm										
	A	B	C	D	E	F	G	H	I	J	
33 kV drop out fuse	528	304	400	60	1083	225	105 - 131	68 - 131	140	95	12

4.4. Quality Management System

- 4.4.1. The supplier shall submit a 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 9001:2008.
- 4.4.2. The Manufacturer's Declaration of Conformity to reference standards and copies of quality management certifications including copy of valid and relevant ISO 9001: 2008 certificate shall be submitted with the tender for evaluation.
- 4.4.3. The bidder shall indicate the delivery time of the fuse cutout manufacturer's monthly & annual production capacity and experience in the production of the type and size of fuse cutout being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for the fuse cutout sold in the last five years together with reference letters from four of the customers shall be submitted with the tender for evaluation.

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- f) Power frequency reference or low current tests.
- g) Galvanization tests

5.3 On receipt of the fuse cutouts, KPLC will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification. The manufacturer shall replace without charge to KPLC, fuse cutouts which upon examination, test or use fail to meet any or all of the requirements in the specification.

6. MARKING, LABELLING AND PACKING

6.1. Marking

The following information shall be marked indelibly and legibly on each fuse cutout in English Language:

- a) Manufacturer's name or trademark;
- b) Manufacturer's type designation;
- c) The year of manufacture;
- d) Rated current;
- e) Rated voltage and insulation withstand.
- f) The letter, "KPLC".

NOTE: *The marking shall be on the fuse base as well as on the fuse carrier.*

6.2. Packing

6.2.1. Each dropout fuse cutout shall be packed individually in a strong non-returnable wooden crate/ card board box in such manner to prevent damage to components during transportation and handling up to installation site.

6.2.2. Packing shall be designed to prevent entry of dust, ingress of moisture and other foreign materials. The mounting bracket may be packed separately as per the manufacturer's discretion. Each container shall have the following information stenciled on it in English language.

- a) Manufacture's name.
- b) Country of origin.
- c) KPLC item number
- d) KPLC purchase order number.
- e) Weight in kilogram.
- f) Handling instruction.
- g) Voltage and current rating.
- h) The word, "The Property of Kenya Power and Lighting Company".

NOTE: *Dropout fuse cutouts shall not be packed in any organic material*

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ANNEX A: SCHEDULE OF GUARANTEED TECHNICAL PARTICULARS FOR OFFERED FUSE CUTOUTS (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 past five years, 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 third party testing laboratory for tender evaluation, all in English Language)

TENDER NO.BIDDER'S NAME & ADDRESS

CLAUSE	Description	Guaranteed Technical Particulars for Fuse Cutouts offered
	Name of Manufacturer & Country of manufacture of the expulsion fuse cutouts being offered	
	Type/Model Reference Number	
1	Scope: Supplier to ensure adequacy of the design, good workmanship, good engineering practice and adherence to standards, specifications and applicable regulations in the manufacture of the expulsion fuse cutouts for KPLC	
2	Design standards complied with	
3	Terms and Definitions	
4	Requirements	
4.1	System conditions	
4.2	Design and construction	
	4.2.1 General	
	4.2.1.1 - 4.2.1.4	
	4.2.2 Operation	
	4.2.2.1 - 4.2.2.2	
	4.2.3 Mounting	
	a. Steel cross-arm mounting	
	b. Pole mounting	
	4.2.4 Contacts	
	4.2.4.1 - 4.2.4.2	
	4.2.5 Terminal connection	
	4.2.5.1 - 4.2.5.4	
	4.2.6 Vibration	
	4.2.7 Bird/Fauna/Vermin Proofing	
	4.2.7.1 - 4.2.7.2	
	4.2.8 Fuse Link Installation	

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	D, mm	60	
	E, mm	1083	
	F, mm	225	
	G, mm	105 - 131	
	H, mm	68 - 131	
	I, mm	140	
	J, mm	95	
	Approximate weight	12	
4.5	Quality Management System		
	Quality Assurance Plan		
	Copy of ISO 9001:2008 Certificate		
	Manufacturer's experience		
	Manufacturing Capacity (units per month)		
	List of previous customers		
	Customer reference letters		
5.1	Test standards and responsibility of carrying out tests		
5.2	Copies of Type Test Reports submitted with tender		
5.3	Acceptance tests to be witnessed by KPLC at factory before shipment		
5.4	Test reports to be submitted by supplier to KPLC for approval before shipment		
5.5	Replacement of rejected fuse cutouts.		
6.1	Marking		
6.2	Packing		
7.1	Documents submitted with tender		
7.2	Documents to be submitted by supplier to KPLC for approval before manufacture		
	Statement of compliance to specification		

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

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