

**DOCUMENT NO.: KP1/6C/4/1/TSP/011/043**



**Kenya Power**

**POLE MOUNTED LOW VOLTAGE MOULDED CASE CIRCUIT BREAKERS (MCCB)  
IN ENCLOSURE - SPECIFICATION**

A Document of the Kenya Power & Lighting Co. Ltd.  
November 2017





TITLE:  
**POLE MOUNTED LOW VOLTAGE  
 MOULDED CASE CIRCUIT BREAKERS  
 (MCCB) IN ENCLOSURE -  
 SPECIFICATION**

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**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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**0.2 AMENDMENT RECORD**

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)		Approved by (Name & Signature)
Issue 1, Rev 1	2017-11-24	1.0. Revised title to include enclosure	S. Nguli		Dr. Eng. Peter Kimemia
		2. Scope revised to include type D			
		3. Clause 4.2.1.3 revised to include polycarbonate			

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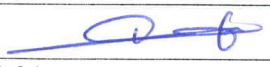
**FOREWORD**

This Specification has been prepared by the Standard Department of Kenya Power and lays down the requirements for Low Voltage Moulded Case Circuit Breakers in Enclosure (MCCBs). The MCCBs are meant for use as a replacement for pole mounted cut-outs. It is intended for use by KPLC in purchasing the Pole Mounted Low Voltage Moulded Case Circuit Breakers

It shall be the responsibility of the supplier to ensure adequacy of the design and good engineering practice in the manufacture of the MCCBs for KPLC. The supplier shall submit information which confirms the manufacturer's satisfactory service experience with products which fall within the scope of this specification.

Users of KPLC specifications are responsible for their correct interpretation and application. The following are members of the team that developed this specification:

Name	Division
Stephen Nguli	Infrastructure Development

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## 1 SCOPE

- 1.1 This specification covers both Moulded Case and industrial class low voltage circuit breakers of the moulded case type, particularly intended for general application in the protection of low voltage a.c. reticulation networks and systems, including, but not restricted to meter boards and distribution kiosks.
- 1.2 The circuit breakers covered by this specification are rated at and intended for application on 50Hz reticulation systems having rated voltages up to and including 230 volts single phase and 230/400 volts three phase three/four wire.
- 1.3 This specification is for temperature-stable, Low Voltage Moulded Case Circuit Breakers (MCCB) of tripping characteristics as per IEC 60947-2. It is intended for use as protection devices in pole mounted distribution transformer installations.

## 2 NORMATIVE REFERENCES

- IEC 60947-1: Low Voltage Switchgear and control gear part 1: General rules
- IEC 60947-2: Low Voltage Switchgear and control gear part 2: Circuit breakers
- IEC 60354: Loading guide for oil immersed transformers
- ISO 179-1: Plastics Determination of Charpy impact properties -- Part 1: Non-instrumented impact test
- ISO 527-2: Plastics -- Determination of tensile properties -- Part 2: Test conditions for moulding and extrusion plastics
- ISO 2577: Plastics -- Thermosetting molding materials -- Determination of shrinkage
- ASTM D2583: Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor
- ASTM D1895: Standard Test Methods for Apparent Density, Bulk Factor, and Pourability of Plastic Materials

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### 3 TERMS AND DEFINITIONS

For the purpose of this specification, the definitions given in the reference standards shall apply.

### 4 REQUIREMENTS

#### 4.1 Service Conditions

The enclosure in which the MCCB shall be mounted shall be suitable for continuous outdoor operation in tropical areas with the following conditions.


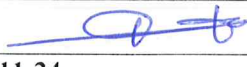
- a) Altitude: up to 2,200m above sea level;
- b) Temperature: average of +30°C with a minimum of -1°C and max +40 °C;
- c) Humidity: up to 95%;
- d) Pollution: Design pollution level to be taken as “Heavy” (Pollution level III) for inland and “Very Heavy” (Pollution level IV) for coastal applications in accordance with IEC 60815.
- e) Isokeraunic level: 180 thunderstorm days per year

#### 4.2 General Requirements

##### 4.2.1 Application

###### 4.2.1.1 Power System characteristics

- 4.2.1.1.1 The circuit breakers are intended for 230V, 50 Hz single phase single wire / two wire and 420V, 50 HZ three phase three wire/ four wire with a tolerance of  $\pm 10\%$ , fed from 11 kV or 33 kV step down distribution transformers with earthed neutral points.
- 4.2.1.1.2 The circuit breakers shall be suitable for operation at 230V and 420V, the current rating being chosen from the ranges indicated in the schedule of requirements.
- 4.2.1.1.3 The Moulded-case circuit-breakers shall have a rated insulation voltage of 700 V AC
- 4.2.1.1.4 The single-pole circuit-breakers shall have breaking capacities of 20 kA for up to 315A and 40 kA for above 315A
- 4.2.1.1.5 The circuit-breakers shall guarantee a mechanical life of 8500 operations up to 125A, 10000 operations up to 250A and 20000 operations up to 630A.
- 4.2.1.1.6 The circuit-breakers shall guarantee an electrical life of 1500 operations at 420V up to 125A, 4000 operations up to 250A and 5000 operations up to 630A.
- 4.2.1.1.7 The maximum permissible temperature rise of various components of the breaker shall not exceed the values stipulated in IEC 60947-1

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#### 4.2.1.2 Mounting

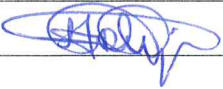
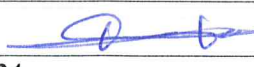
- 4.2.1.2.1 The MCCB is intended to be used individually, and shall be presented for surface mounting.
- 4.2.1.2.2 Suitable screws to be supplied with equipment. In separate cases MCCB's that can be mounted on DIN rail may be requested and in such cases the supplier shall provide DIN compliant MCCB's.
- 4.2.1.2.3 The moulded-case circuit-breakers shall be fitted with a test pushbutton on the front for checking correct operation of the operating mechanism and opening of the poles.

#### 4.2.1.3 Housing

- 4.2.1.3.1 The casing shall be of polycarbonate. It shall not deform when kept in air maintained at 60°C for one hour.
- 4.2.1.3.2 It shall afford protection to IEC 60529 for at least IP 66, except for access associated with cable entry and fixing screws. The polycarbonate shall be pigmented grey.
- 4.2.1.3.3 The housing shall be moulded light grey glass reinforced polyester thermoset material (polycarbonate)
- 4.2.1.3.4 Where Polycarbonate is used, the material shall be UL 746C F1 class suitable for outdoor application with an IP of at least 66.
- 4.2.1.3.5 The enclosure cover base wall shall be 4-6 mm thick.
- 4.2.1.3.6 The enclosure cover shall be with injected joint less PUR (polyurethane) gasket and fitted with polycarbonate material hinges and latches
- 4.2.1.3.7 The enclosure shall be provided with padlocking facility.

#### 4.2.1.4 Dimensions

Generally compact design is called for in order to save space, but the device shall be sturdy.

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#### 4.2.2 Special Requirements

##### 4.2.2.1 Tamper Proof Evidence


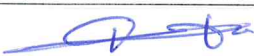
- 4.2.2.1.1 The terminals shall be concealed to discourage any attempts at tampering, and to reveal acts of bypassing of the device through external wiring.
- 4.2.2.1.2 A proven design of external shroud may be used for this purpose, and shall form part of the device. A provision for terminal cover sealing shall be made.

##### 4.2.2.2 Neutral Link

- 4.2.2.2.1 In these applications, which conform to protective multiple earthing (PME), the star point of the distribution transformer is solidly earthed and the neutral conductor of the distributor is also earthed at regular intervals.
- 4.2.2.2.2 The neutral conductor of the service cable is bonded at the meter board to the system earth-conductor. Where applicable, the neutral in the MCCB shall be a solid link rated slightly higher than the phase circuit.
- 4.2.2.2.3 The neutral link shall have two pinch screws at either end otherwise a proven cable connection design (with low probability of failure) must be demonstrated.

##### 4.2.2.3 Motor Starting

The circuit breaker shall be capable of passing a starting in-rush current of at least six times (6In) the full load current of a typical squirrel cage induction motor with the same rating as the circuit breaker.

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#### 4.2.2.4 Tripping Mechanism

The MCCB shall have a trip-free mechanism and be capable of breaking the rated fault current at the rated voltage without contact welding or weakening.

#### 4.2.2.5 Tripping characteristics

4.2.2.5.1 The MCCB tripping characteristics shall be as per IEC 60947-2 and the speed at which they trip shall depend upon the level of overload and determined by the thermal device within the MCCB.

4.2.2.5.2 The MCCB's shall use a magnetic fault protection system, which trips the MCCB within one tenth of a second when the overload reaches a set level.

4.2.2.5.3 Their tripping currents shall be as per IEC 60947-2

#### 4.2.3 Overcurrent Protection Requirements

4.2.3.1 Each circuit breaker shall provide complete circuit overcurrent protection by having inverse time and instantaneous functions.

4.2.3.2 The overload protection elements of the circuit breaker shall be current sensing with the conventional tripping current of the circuit breaker being unaffected by the effects of ambient temperature.

4.2.3.3 The conventional tripping current of the circuit breaker shall not exceed 130% of its rated current. Circuit breakers shall be easily identifiable by a RED operating handle.

4.2.3.4 The overload tripping elements of the circuit breaker shall be of the fixed non-adjustable type.

4.2.3.5 Must be possible to reset the circuit breaker immediately without any waiting period, after a tripping operation either due to overload or short circuit has occurred.

4.2.3.6 The tripping characteristic of the circuit breaker shall be such that selective co-ordination with downstream circuit breakers is easily attainable and ensured by the following operation characteristic requirements:

(i) **Overload:** When tested at 200% of rated current, the circuit breaker shall trip at not less than 20 seconds and at not more than 120 seconds for all circuit breaker ampere ratings up to and including 200A.

(ii) **Short Circuit:** The instantaneous protection level of the circuit breaker shall be defined by, and tested to the following requirements:

a) No tripping within 0.1 seconds at 3 times the rated current

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b) Tripping within 0.1 seconds at 5 times the rated current of the circuit breaker

#### 4.2.4 Operating Mechanism

- 4.2.4.1 The circuit breakers shall be provided with operating handles for manual ON/OFF operation with sealing facilities for either position to prevent unauthorized operation.
- 4.2.4.2 The circuit breakers shall have a quick-break switching mechanism that is mechanically trip-free from the handle so that contacts cannot be held closed against short circuit currents.
- 4.2.4.3 Tripping due to overload or short circuit shall be clearly indicated by the position of the operating handle.
- 4.2.4.4 The ON and OFF positions shall be clearly marked on the cover of the circuit breaker, using the international symbols “I” for ON and “O” for OFF.

#### 4.2.5 Short Circuit Power Factor

The short circuit power factor shall be in accordance with Table 2 and Table 11 of IEC 60947-2 with the exception that for all short circuit breaking capacity tests up to and including 20 kA the power factor shall be 0.5.

#### 4.2.6 Rating



The MCCBs shall be available in ratings of 63A, 100A, 160A, 200A, 250A, 315A, 415A and 630A (All single pole), within the parameters of this specification.

#### 4.2.7 Resistance To Abnormal Heat and Fire

The moulded case of the circuit breaker shall comply with the requirements for the glow-wire test in accordance with clauses 4 to 10 of IEC 60695-2-1 at a temperature of  $960 \pm 15^\circ \text{C}$  for external parts in contact with current carrying parts, and at a temperature of  $650 \pm 10^\circ \text{C}$  for other external parts of insulating materials.

#### 4.2.8 Terminals

- 4.2.8.1 The terminals shall be made of tinned copper.
- 4.2.8.2 The terminals of the circuit breaker shall be of the pressure type and suitable for the termination, without special preparation and with ability to accommodate lugs of cable 25 to 300mm<sup>2</sup> 4-core PVC insulated stranded Aluminium conductor, 120mm<sup>2</sup> single core PVC

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insulated stranded Aluminium/ Copper conductor and 300mm<sup>2</sup> single core PVC insulated conductor.

4.2.8.3 Terminals shall be constructed to ensure a uniform contact pressure without damage to the conductor strands.

4.2.8.4 The Terminals are suitable for bolted type lugs, suitable for copper and aluminium stranded conductors

#### 4.2.9 Mounting and Enclosures

4.2.9.1 The moulded enclosure of the circuit breakers shall be of moulded insulating material possessing high electric properties, good temperature stability and mechanical strength as specified in clause 4.2.1.3 above.

4.2.9.2 The moulded enclosure shall be robust and shall conserve its properties over the full-service life. The moulded material shall be non-ignitable and non-flammable. Only non-hydroscopic materials shall be used.

4.2.9.3 The enclosure shall be suitable for any surface mounting and shall be provided complete with a shroud.

4.2.9.4 The shroud shall prevent access to terminals and shall be provided with a sealing facility.

4.2.9.5 The shroud shall be manufactured from flame retardant material with a minimum rating of V1 to UL 94 and shall have a minimum wall thickness of 2 mm.

4.2.9.6 The circuit breaker shall be supplied together with its enclosure and shall be suitable for pole mounting.

## 5 TESTING REQUIREMENTS

### 5.1 Type Tests

Type tests, sampling tests and routine tests shall be done in accordance with the requirements of IEC 60947-1&2, and this specification. It shall be the responsibility of the supplier to perform or to have performed all the tests specified.

5.2 Copies of Type Test Certificates & Type Test Reports issued by a well-recognized Conformity Assessment Body accredited according to, ISO / IEC 17025 or ISO / IEC 17065. The conformity certification shall be submitted with the tender for the purpose of technical evaluation. A copy

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of the accreditation certificate to ISO/IEC 17025 for the testing laboratory shall also be submitted (all in English language).

5.3 The following Type Test certificates shall be submitted with tender for evaluation

- (i) Verification of constructional requirements
- (ii) Temperature rise tests
- (iii) Verification of dielectric properties
- (iv) Verification of breaking and making capabilities
- (v) Verification of short-circuit breaking and making capabilities
- (vi) Verification of operating limits
- (vii) Verification of operational performance
- (viii) Verification of degree of protection of enclosed equipment

**Note:** *Manufacturer's self-certification will not be accepted. Any translations of certificates and test reports into English language shall be signed and stamped by the third-party ISO/IEC 17025 accredited Testing Laboratory that carried out the tests.*



#### 5.4 Routine Tests

Routine Tests as per IEC 60947 shall be carried out on all the MCCB and routine tests report shall be made available

- (i) Mechanical operation Tests
- (ii) Dielectric Tests
- (iii) Verification of the calibration of release
- (iv) Temperature rise test

#### 5.5 Inspection of MCCB

The MCCB shall be subject to acceptance tests at the manufactures' works before dispatch. Acceptance tests (routine & sample tests) will be witnessed by two Engineers appointed by The Kenya Power & Lighting Co. Ltd. (KPLC). Routine and sample test reports for the MCCB to be supplied shall be submitted to KPLC for approval before shipment of the goods. Tests to be witnessed by KPLC Engineers at the factory before shipment shall be in accordance with IEC 60947-1&2, and this specification

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## 5.6 Sampling

The number of MCCB to be selected by random sampling method for acceptance inspection and testing shall be as indicated in table 1 below

Table 1 : MCCB sampling

S/n	No of MCCBs	No of batches	No. of samples to be selected
1	<100	1	3
2	100-500	5	4
3	500-1000	10	6
4	100-1500	15	8
5	>1500	>15	10

## 6 MARKING, LABELLING AND PACKAGING

### 6.1 MARKING



The MCCB shall have the following markings embossed, indented, or otherwise indelibly marked on it in the factory; the electrical rating markings shall remain visible when the circuit breaker is in its normal operating position:

- (i) Name and registered trade mark of the manufacturer
- (ii) Country of origin
- (iii) Year of manufacture
- (iv) Voltage rating (which shall be 230V or 400V)
- (v) Current rating (which shall be within the range given below)
- (vi) Terminal identifications, both line side and load side
- (vii) The words "Property of KPLC", at least 4 mm high
- (viii) Type / Tripping characteristics as per IEC 60947-2

### 6.2 PACKAGING

6.2.1 Each packing shall be clearly and indelibly marked with the following;

- a) Name of Item
- b) Quantity

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c) Gross Weight

d) The boxes shall be marked with manufacturer's identification and property class and the words "**Property of The Kenya Power & Lighting Co. Ltd.**".



6.2.2 The MCCB shall be packed in such a manner as to protect them from damage during transportation and storage.

6.2.3 The MCCBs shall be packed in cartons which are reinforced and held closed by external nylon straps. Each carton shall permit stacking and the nylon straps shall be designed to keep the carton firmly closed and permit easy and rapid opening at time of issue.

6.2.4 The cartons shall then be stacked on sturdy wood pallet. The assembly shall be held tightly in place with nylon bands and protected against moisture by a complete covering of heat-shrinkable polyethylene film.

6.2.5 Instructions for storage, handling and installation shall be provided, all in the English Language. MCCBs requiring special tools (other than screwdriver) for installation shall be supplied complete with the relevant tools.

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## APPENDICES

### A. QUALITY MANAGEMENT SYSTEM (NORMATIVE)

- A.1 The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the transformer 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 9001:2008.
- A.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.
- A.3 The bidder shall indicate the delivery time of each type of MCCB, manufacturer's monthly & annual production capacity and experience in the production of the type and size of MCCB being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for exact or similar rating of MCCB sold in the last five years together with four customer reference letters shall be submitted with the tender for evaluation.

### B. DOCUMENTATION

- B.1 The bidder shall submit its tender complete with technical documents required by Annex A (Guaranteed Technical Particulars) for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:
- Guaranteed Technical Particulars signed by the manufacturer;
  - Copies of the Manufacturer's catalogues, brochures, drawings and technical data which shall include:
  - Sales records for the last five years and at least four customer reference letters;
  - Details of manufacturing capacity and the manufacturer's experience;
  - Copies of required type test reports by a third-party testing laboratory accredited to ISO/IEC 17025;
  - Copy of accreditation certificate to ISO/IEC 17025 for the third-party testing laboratory;
  - Manufacturers letter of authorization, ISO 9001:2008 certificate and other technical documents required in the tender.

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TITLE:  
**POLE MOUNTED LOW VOLTAGE  
MOULDED CASE CIRCUIT BREAKERS  
(MCCB) IN ENCLOSURE -  
SPECIFICATION**



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B.2 The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Co. Ltd. for approval before manufacture:

- a) Guaranteed Technical Particulars stamped and signed by the manufacturer;
- b) Design Drawings with details of pole mounted low voltage molded case circuit breakers to be manufactured 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 9001:2008;
- d) Detailed test program to be used during factory testing;
- e) Marking details and method to be used in marking of the MCCB and their enclosures;
- f) 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 pole mounted Low Voltage molded case circuit breakers for The Kenya Power & Lighting Co. Ltd.;
- g) Packaging details (including packaging materials).

B.3 The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the pole mounted Low Voltage molded case circuit breakers to KPLC stores.

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**C. GUARANTEED TECHNICAL PARTICULARS (Normative)**

*To be filled and signed by the Supplier 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	Specification	KPLC Requirement	Tender Specification
	Manufacturer's Name and address	State	
	Country of Manufacture	State	
	Bidder's Name and address	State	
	Reference standards	IEC 60947-2:2004 IEC60664-1, IEC 60898	
4.1	Operating conditions	a) Altitude: b) Temperature: c) Humidity: d) Pollution: e) Isokeraunic level:	
4.2.1.1	Power system characteristics	230V,400V 50HZ State	
	Mechanical life	State guaranteed mechanical life of each rating	
	Electrical life	State guaranteed electrical life of each rating	
4.2.1.2	Mounting	Specify type of mounting Provision of DIN rails in the enclosure	
4.2.1.3	Housing material	Specify material of the hosing and characteristics	
	Degree of protection	Minimum IP 66	
4.2.1.4	Design of housing to be compact & sturdy	Specify design drawings submitted with tender for evaluation	

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Clause	Specification	KPLC Requirement	Tender Specification
	Gasket, hinges and latches	Provision of PUR gasket and hinges and latches, padlocking	
4.2.2.1	<b>Terminals</b> design to be tamper proof	Provide design drawings with tender for evaluation Terminals concealed Terminal cover sealing and padlocking	
4.2.2.2	<b>Neutral link</b>	Provided drawings showing PME bonding provisions on enclosure and rating.	
4.2.2.3	<b>Motor starting</b>	Provide time current plot curves proofing this Specify inrush current rating of the MCCB(6In)	
4.2.2.4	<b>Tripping Mechanism</b>	Thermal-Magnetic (specify)	
4.2.2.5	<b>Tripping Characteristics</b>	As per IEC 60947-2 and fault level	
	Number of poles	Single	
4.2.3	<b>Overcurrent Protection</b>		
4.2.3.1	Tripping Current (Amps)	1.3 In	
4.2.3.3	Short Circuit Current (Amps)	20kA	
4.2.3.4	Type of tripping element	Specify	
4.2.3.5	Overload capacity of MCCB Short circuit capacity of MCCB	Specify	
4.2.4	<b>Operating Mechanism</b>		
4.2.4.1	Manual operation ON /OFF indication	Provide	
4.2.4.2	ON/OFF switching mechanism	Specify	
4.2.5	Short circuit power factor and reference standard	Provide type test, P.F at 0.5	
4.2.6	<b>Ratings</b>		
	Rated Current	63A, 100A, 160A, 200A, 250A, 315A, 415A, 630A	
	Voltage	230,400V +/- 6%	
	Frequency	50Hz	
	Number of poles	Single	

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Clause	Specification	KPLC Requirement	Tender Specification
4.2.7	<b>Resistance to abnormal heat and Fire</b>		
	Glow wire test and reference standard	Provide type test report as per IEC 60695-2-1	
4.2.8	<b>Terminals</b>		
4.2.8.1	Material	Tinned copper	
4.2.8.2	Size and material of terminal lug used	Bimetallic bolted type lugs and as per cable size	
4.2.8.3	Ensuring adequate contact pressure at terminals	Specify	
	Phase barriers	Specify material and provide	
4.2.9	<b>Mounting and Enclosures</b>		
4.2.9.1-4.2.9.6	Material of enclosure and characteristic	Polycarbonate or DMC. Provision of shrouds and thickness of 2mm	
5.0	<b>Test and Inspection</b>		
5.1	Test Standard & requirements	State	
	Responsibility of testing & manufacturer's capability to carry out specified tests	List	
5.2	Copies of type test reports and certificates submitted	List	
5.3	Type test certificates to be submitted with tender	List	
	Contact details for testing authority	State	
5.4	Routine tests	Submit	
5.5	Inspection or test by KPLC during delivery before acceptance to stores	State compliance	
	Complete test reports for approval before shipment	Submit	
5.6	Sampling	Confirm	
6.	<b>Marking, Labeling &amp; Packing</b>		
6.1	Marking	State	

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Clause	Specification	KPLC Requirement	Tender Specification
	Permanent Rating & Diagram plate indelibly marked (by etching, engraving or stamping)	State	
6.2	Packing		
6.2.1	Assemble & package of items suitably marked	State	
6.2.2	Protection from damage	State	
6.2.3	Nature of packing	State	
6.2.4	Stacking and securing	State	
6.2.5	information	State	
A	<b>QUALITY MANAGEMENT SYSTEM</b>		
A.1	Certifications	KEMA, UL, CSA, VDE, UL 1500, SGS or Others acceptable	
	Quality Assurance Plan to be based on ISO 9001:2008	Provide	
A.2	Manufacturer's Declaration of Conformity and copy of ISO 9001:2008 certificate submitted	Copy and state validity	
A.3	Monthly & annual production capacity	State	
A.4	Delivery time	List	
	Production capacity	State	
	Experience	State	
	List of previous customers	Provide	
B.1	Tender submitted with all technical documents	State	
B.2	Successful bidder to submit documents/details for approval before manufacture	Provide	
a)	Guaranteed Technical Particulars	Provide	
b)	Design Drawings	Provide	
c)	Quality assurance plan (QAP)	Provide	
d)	Detailed test program	Provide	
e)	Marking details	Provide	

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Clause	Specification	KPLC Requirement	Tender Specification
f)	Manufacturer's undertaking	Provide	
g)	Packaging details	Provide	
B.3	Recommendations for use, care, storage and routine inspection/testing procedures	Provide	
	Manufacturer's experience	Provide	
	Detailed list of all the required fittings and accessories indicating type/model number, manufacturer and quantities	Provide	
	List catalogues, brochures and technical data submitted to support offer	Provide	

.....

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

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