DOCUMENT NO.: KP1/13D/4/1/TSP/11/047

Kenya Power

ELECTRICAL WIRING ACCESSORIES - SPECIFICATION

A Document of the Kenya Power & Lighting Co. Plc
March 2021

Table of Contents

0.1 CIRCULATION LIST 4
0.2 AMENDMENT RECORD 5
FOREWORD 6
1. SCOPE 7
2. NORMATIVE REFERENCES 7
3. DEFINITIONS 9
4. REQUIREMENTS 9
4.1. SERVICE CONDITIONS 9
4.2. MINIATURE CIRCUIT BREAKERS 9
4.3. 11 PIN BASE AND RELAY 10
4.4. BRASS CABLE GLAND 11
4.5. SPRING RETURN CIRCUIT BREAKER CONTROL SWITCH 11
4.6. 3-POSITION ROTARY CAM SWITCH (2 WAY WITH OFF POSITION AND 6 POLES) 12
4.7. DC/AC L.E.D PILOT LIGHT(INDICATOR) 12
4.8. DISCREPANCY CONTROL SWITCH WITH INDICATIONS 13
4.9. CABLE / WIRE MARKERS (LETTERS AND NUMBERS) 15
4.10. 10MM^2 COPPER CABLE 15
4.11. DOUBLE SIDED ACRYLIC / PE FOAM TAPE 16
4.12. PVC CABLE TRUNKING 16
4.13. 110 VDC SEMAPHORE INDICATORS 17
4.14. 6MM^2 CT DISCONNECT TERMINAL BLOCKS COMPLETE WITH MARKERS 18
4.15. M10 RAWL BOLTS 19
4.16. 6MM^2 TERMINAL BLOCKS WITH MARKERS 19
4.17. 12 WAY TRIPLE POLE AND NEUTRAL DISTRIBUTION BOARD WITH 125A MAIN MCB 20
4.18. OBA RING TYPE INSULATED TINNED COPPER LUGS 21
4.19. 2BA INSULATED TINNED COPPER LUGS 22
4.20. FORK INSULATED TINNED COPPER LUGS 22
4.21. PIN TYPE INSULATED TINNED COPPER LUGS 23
4.22. 8 WAY 110VDC DISTRIBUTION BOARD WITH 63A DOUBLE POLE MAIN MCB 24
4.23. CABLE TIE MOUNTING BASES WITH SELF ADHESIVE 25
4.24. 110VDC CONTACTORS/ CONTROL RELAYS 25
4.25. DIN RAIL SYMMETRICAL (OMEGA TYPE) 26

4.26. STEP DRILL BIT 26
4.27. ANTI-RUST LUBRICATING SPRAY 27
4.28. LAMP HOLDER 27
4.29. LED LIGHT BULB 28
5. TESTS REQUIREMENTS 28
6. MARKING AND PACKING 28
APPENDICES 29
A. TESTS AND INSPECTION (Normative) 29
B. QUALITY MANAGEMENT SYSTEM (Normative) 29
C. DOCUMENTATION (Normative) 30
D. GUARANTEED TECHNICAL PARTICULARS (Normative) 31

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.

Issued by: Head of Section, Standards Development	Authorized by: Head of Department, Standards
Signed:	Signed:
Date: 2021-03-09	Date: 2021-03-09

0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Issue 1 Rev 0	2019-04-29	New Issue	John Ng'ang'a	Dr. Eng. Peter Kimemia
Issue 1 Rev 1	2021-03-09	Added items in clauses 4.26 to 4.29 (Step drill bit, Anti-rust lubricating spray, lamp holder, LED light bulb)	John Ng'ang'a	Dr. Eng. Peter Kimemia

FOREWORD

This Specification has been prepared by the Standards Department in collaboration with Central Construction – Electrical Plant Projects, both of The Kenya Power and Lighting Company Plc (KPLC) and lays down requirements for electrical wiring accessories. It is intended for use by KPLC in purchasing these items.

This Specification was prepared to establish and promote uniform requirements for electrical wiring accessories to be used by Kenya Power and Lighting Company Plc. The accessories shall be used in assembly of panels.

This Specification stipulates the minimum requirements for the items 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, and exhibits good workmanship and good engineering practice in the manufacture.

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	Division
Abdalla Chanzu	Infrastructure Development
John Ngángá	IESR

1. SCOPE

1.1. This Specification is for electrical wiring accessories.

1.2. The specification stipulates minimum requirements, inspection and tests of the electrical wiring accessories as well as schedule of Guaranteed Technical Particulars.

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.

ISO 898-1	Mechanical properties of fasteners made of carbon steel and alloy steel -- Part 1: Bolts, screws and studs with specified property classes -- Coarse thread and fine pitch thread.
ISO 1966	Crimped joints for aircraft electrical cables.
ISO 3574	Cold-reduced carbon steel sheet of commercial and drawing qualities.
IEC 60079-1	Explosive atmospheres – Part 1: Equipment protection by flameproof enclosures "d".
IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements.
IEC 60454-2	Pressure-sensitive adhesive tapes for electrical purposes - Part 2: Methods of test.
IEC 60454-3-12	Pressure-sensitive adhesive tapes for electrical purposes - Part 3: Specifications for individual materials - Sheet 12: Requirements for polyethylene and polypropylene film tapes with pressure sensitive adhesive.
IEC 60454-3-19	Pressure-sensitive adhesive tapes for electrical purposes - Part 3: Specifications for individual materials - Sheet 19: Tapes made from various backing materials with pressure-sensitive adhesive on both sides.
IEC 60529	Degrees of Protection Provided by Enclosures (IP Codes).

IEC 60815	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions - Part 1: Definitions, information and general principles.
IEC 60684-3-100	Flexible insulating sleeving - Part 3: Specifications for individual types of sleeving - Sheets 100 to 105: Extruded PVC sleeving.
IEC 60898-1	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations - Part 1: Circuit-breakers for a.c. operation.
IEC 60947-1	Low-voltage switchgear and controlgear - Part 1: General rules.
IEC 60947-3	Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units.
IEC 60947-4-3	Low-voltage switchgear and controlgear - Part 4-3: Contactors and motor-starters - AC semiconductor controllers and contactors for non-motor loads.
IEC 60947-5-1	Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices.
IEC 60947-7-1	Low-voltage switchgear and controlgear - Part 7-1: Ancillary equipment - Terminal blocks for copper conductors.
IEC 62471	Photobiological safety of lamps and lamp systems.
BS 1872	Specification for electroplated coatings of tin.
BS 5486-12	Low-voltage switchgear and controlgear assemblies. Specification for particular requirements of type-tested miniature circuit-breaker boards.
BS 6121-1	Mechanical cable glands. Armour glands. Requirements and test methods.
BS EN 1976	Copper and copper alloys. Cast unwrought copper products.
BS EN 50085-2-3	Cable trunking systems and cable ducting systems for electrical installations. Particular requirements for slotted cable trunking systems intended for installation in cabinets.

BS EN 61238-1	Compression and mechanical connectors for power cables for rated voltages up to 36 kV (Um = 42 kV). Test methods and requirements.
BS EN 61439-3	Low-voltage switchgear and controlgear assemblies. Distribution boards intended to be operated by ordinary persons (DBO).
UL 94	The Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances testing.
ISO 9001:2015	Quality management systems – Requirements.
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories.

3. DEFINITIONS

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

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

The electrical wiring accessories shall be suitable for outdoors use in tropical areas and harsh climatic conditions including areas exposed to:

a) At altitudes of up to 2200m above sea level and humidity of up to 95%,

b) Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C, in direct sunlight,

c) Pollution: Design pollution level to be taken as "Heavy" (Pollution level III) for inland and "Very Heavy" (Pollution level IV) for coastal applications in accordance with IEC 60815.

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

4.2. MINIATURE CIRCUIT BREAKERS

4.2.1 Type 1: 6 A, 10 A and 16 A Single Pole (AC type), Type 2: 10A, 16 A, 25A, 32 A and 40A Double Pole (DC Type), Type 3: 6 A, 25A, 32A and 40A Triple Pole (AC type).

4.2.2 Shall be suitable for use in LV Circuit protection against overcurrent and short circuit current.

4.2.3 Shall be sensitive to low thermal overload in LV circuits (Not more than 150% of rated current).

4.2.4 Tripping point shall lie on the current curve of type C or B MCB.

4.2.5 The MCBs shall meet the requirements for IEC 60898-1 standard.

4.2.6 Shall have a Magnetic/bimetallic strip set to operate at rated current.

4.2.7 Shall be suitable for a DIN rail mounting and shall have two positions ON- and –TRIPPED.

4.2.8 The MCB Insulation voltage shall be 3kVac for single pole and triple pole and 600Vdc for double pole MCB.

4.2.9 Breaking capacity shall be 10kA.

4.2.10 The thermal operation of the MCB shall be achieved by use of a bimetallic strip principle whenever continuous over current flows through it.

4.2.11 Single pole MCBs shall be rated 230 Vac (highest 242Vac) and triple pole MCBs shall be rated 400 Vac (highest 420Vac) whereas double pole MCBs shall be rated 110Vdc (highest 130Vdc).

4.2.12 The nominal rating of the MCB shall be clearly stated/embossed.

4.2.13 The minimum tripping current shall be 3Ir or 5Ir (Ir-rated current of the MCB).

4.3. 11 PIN BASE AND RELAY

4.3.1 Shall be designed for DIN rail mounting and of Plug -in mount (relay).

4.3.2 Shall be supplied complete with 11 Pin relay and Base.

4.3.3 The 11Pin relay and base shall meet requirements for IEC 60947-4-3 and IEC 60947-5-1 standards.

4.3.4 The coil rated voltage shall be 110Vdc.

4.3.5 Shall be electromechanical self-resetting type and transparent in color.

4.3.6 Relay shall have a mechanical red flag Indicator when coil is energized.

4.3.7 NO and NC contacts rating shall be at least 16A/300V.

4.3.8 The contact material shall be alloy of silver which shall be gold plated.

4.3.9 The coil shall be labeled clearly 110Vdc, whereas the base shall have the relay contacts numbers clearly marked on each termination point.

4.3.10 The base shall have screw terminals with a clamping plate.

4.3.11 The relay dielectric rating (coil to contact) shall be at least 3kV.

4.3.12 The relay dimensions shall not be more than 2.0x1.5x2.6 inches(LxWxH).

4.3.13 Shall have mininum eight (8) changeover output contacts (4 NO and 4 NC contacts).

4.4. BRASS CABLE GLAND

4.4.1 Type A: 1-1/4 "(32mm large), Type B: 1"(25mm large), Type C: 3/4"(20mm large).

4.4.2 Shall be of nickel plated brass with copper content of at least 60%.

4.4.3 Shall be complete with locknuts, earth tag and black PVC shroud.

4.4.4 Shall be suitable for use on all types steel wire armoured (SWA) multicore control cable.

4.4.5 Shall meet the IEC60079-1 and BS 6121-1 Standards for indoor and outdoor use.

4.4.6 Armour clamping shall be three part armour lock.

4.4.7 Armour shall provide mechanical cable retention and electrical continuity.

4.4.8 The cable gland shall meet IP66 class of ingress protection.

4.5. SPRING RETURN CIRCUIT BREAKER CONTROL SWITCH

4.5.1 Shall be designed for opening and closing of MV and HT circuit breaker.

4.5.2 Shall have three positions/contacts: Trip-Neutral -Close clearly marked on base plate top.

4.5.3 Shall be compact and rugged with spring return.

4.5.4 Shall be ideal for back panel mounting via at most 25mm diameter through hole.

4.5.5 Mounting on the panel shall be by use of a lock nut or screws.

4.5.6 The back mounting plate dimensions shall be not more than 50x50mm.

4.5.7 The switching mechanism plus the rod shall be stainless steel.

4.5.8 Shall be a spring return type locking at the neutral position.

4.5.9 Continous rated current shall be 25A and operating voltage 600V.

4.5.10 Short circuit withstand shall be 250A for 1 Sec.

4.5.11 Shall have a Tee or lever type handle with a 45/60 degree of angle throw.

4.5.12 Shall conform to IEC 60947-5-1.

4.6. 3-POSITION ROTARY CAM SWITCH (2 WAY WITH OFF POSITION AND 6 POLES)

4.6.1 Shall be designed for LV circuit control suitable for flush mounting at the back of panel.

4.6.2 Shall be a stay put type, 3position (2way with OFF) switch.

4.6.3 Shall have a knob type handle and an indication plate clearly marked (1-0-2 or I-O-II).

4.6.4 The rotary cam switch shall have 6 poles (6NOs contact, i.e. 3NOs in series for each position).

4.6.5 The back mounting plate dimensions shall be not more than 50x50mm.

4.6.6 The switch shall be secured on the panel by use of lock nut or counter sunk screws.

4.6.7 The control switch thermal rated current shall be 6-10A and switching withstand voltage of 110Vdc.

4.6.8 Shall be suitable for 110Vdc control voltage applications.

4.6.9 The rotary cam switch shall conform to IEC 60947-3&4, IEC 60947-5-1 and IEC 60204-1.

4.6.10 Shall either be lockable or non-lockable type.

4.7. DC/AC L.E.D PILOT LIGHT(INDICATOR)

4.7.1 Type 1: Green, Type 2: Red, Type 3: Blue, Type 4: Amber, Type 5: White, Type 6: Yellow.

4.7.2 The LED shall be designed for 21mm maximum lock panel mounted cut-out.

4.7.3 They shall be robust diameter 22mm integrated Green, Red, Blue, Amber White and Yellow LEDs.

4.7.4 Terminals shall be made of tin plated copper of 99% purity. All other metals shall be stainless steel.

4.7.5 Shall be supplied complete with fixing/Locking nut and rubber washer.

4.7.6 They shall have tin plated brass finger-proof screw terminals with screw retainer and wire protector.

4.7.7 The terminals shall have a detachable PVC cover.

4.7.8 The Lens shall be chamfer or flush bezel in style, whereas the rear body shall be a block-satin grey or black polycarbonate.

4.7.9 The LEDs shall be ideal for use as both AC/DC indicators.

4.7.10 The overall length shall be 56 mm maximum and Lens diameter shall be 30mm maximum.

4.7.11 The locked-mounting hole shall be 23 mm maximum.

4.7.12 LEDs rating shall be 99-130Vdc/ac, Nominal Voltage 110Vdc/ac, Current 20mA maximum.

4.7.13 The LEDs shall be protected against reverse polarity in addition to terminal's polarity clearly indicated.

4.7.14 They shall meet IP65 class of ingress protection as per IEC 60529 and IEC 62471 standards.

4.7.15 Shall have a minimum viewing angle of 10 degrees.

4.7.16 The insulation withstand voltage shall be 3kV.

4.7.17 The terminals shall be clearly marked X1, and X2.

4.8. DISCREPANCY CONTROL SWITCH WITH INDICATIONS

4.8.1 Shall be robust in design with a square flange and clear milky white manopola grade control knob illuminable by LED or bulb.

4.8.2 Shall be ideal for panel mounting cut out of not more than 42 mm in diameter.

4.8.3 The discrepancy switch shall be used to control, monitor and display status of MV and HV breakers and disconnectors and shall be flicker or continuous lighting type.

4.8.4 The switch main shaft shall exhibit high mechanical strength for robust operation.

4.8.5 The switch terminals shall be copper plated or brass.

4.8.6 The switch shall have two latched position staggered at 90° and operated by turning control knob for signaling.

4.8.7 Pre-selection control shall be by turning the switch at 90°, upon which the LED or lamp shall light up indicating the breaker/disconnector status "OFF" and "ON".

4.8.8 The breaker/disconnector closing/opening signal shall be issued by turning the control knob from the latched position 45° in the same direction and pressing it in, when released it shall jump back into its latched 90° position.

4.8.9 Installation on a panel shall be by use of screw type front ring and or two backside fastening screws.

4.8.10 The discrepancy switch shall be rated not less than 20A, with insulation voltage of 3kV.

4.8.11 The switch shall have a minimum of 8 changeover contacts with screw type terminals.

4.8.12 The switch luminous signal shall be provided by a lamp or LED rated 110V dc.

4.8.13 The rated voltage shall be 500Vdc/ac and withstand shall be 3kV.

4.8.14 The control knob color shall be clear-milky white with a black flange.

4.8.15 The flange of the control knob shall not be more than 60mm^2, whereas the overall switch length shall not be more than180mm.

4.8.16 Accessing the lamp/LED shall be from front of the switch after removing the knob.

4.8.17 Shall have 3 sets each of control contacts (trip and close).

4.8.18 The discrepancy switch shall meet IEC 60947:1, 3 and IEC 60947:5-1 standards and ingress protection class IP 40.

4.8.19 Shall have escutcheon plate/flange marked (I or 1) for ON and (II or 0) for OFF positions.

4.9. CABLE / WIRE MARKERS (LETTERS AND NUMBERS)

4.9.1 The cable/wire markers shall be a single character closed marker.

4.9.2 The cable markers character shall be black in yellow PVC sleeve.

4.9.3 The mark shall be suitable to use on insulated cable of 2.5mm^2 cross section.

4.9.4 The markers shall not be more than 3.5 mm in diameter and 4.3 mm in width.

4.9.5 The markers shall be a single character hot printed/stamped on a closed PVC sleeve.

4.9.6 They shall be chevron cut markers ideal for pre-termination wiring applications.

4.9.7 The cable markers shall be a closed design type easy to slide-on the wire/cable.

4.9.8 Shall be supplied in 1000 Pieces of chevron cut-joined together rolls.

4.9.9 Markers shall be made of high-grade durable flexible PVC material conforming to IEC 60684-3-100 standards.

4.9.10 The markers shall be highly durable in exposed environment and of excellent legibility.

4.9.11 Shall meet requirements for resistance to oils, fuels, acids, alkalis and UV radiations corresponding to 1 year out door environment and withstand temperature of up to 60°C.

4.10. 10MM^2 COPPER CABLE

4.10.1 Shall be suitable for earthing applications.

4.10.2 Shall be composed of multiple copper strands (7 strands of 1.35mm diameter).

4.10.3 Shall be rated suitable to withstand short time duration of 10KA fault current.

4.10.4 Shall have insulation of green and yellow colour and shall comply with all other requirements of the KPLC specification No. KP1/6C.1/13/TSP/05/016 – Specification for PVC insulated wiring and auxiliary cables.

4.10.5 Shall be easily cut and lugged for 10-10, 35-10 Copper lugs.

4.10.6 Shall be packed in a roll of 100 meters length.

4.10.7 Shall be rated at least 63A as per British standard electrical cable ratings.

4.11. DOUBLE SIDED ACRYLIC / PE FOAM TAPE

4.11.1 Shall be suitable for use on both low surface and high surface energy substrates i.e. metals, plastics and polycarbonates.

4.11.2 The material of the tape shall be acrylic foam or PE foam type resistant to high temperature, water, rub and ultraviolet radiation.

4.11.3 The double sided foam tape shall have strong acrylic adhesion of excellent retention on both sides, matched with removable liners on both sides.

4.11.4 The carrier/core shall have energy absorbing black color.

4.11.5 The PSA face and back side adhesive shall be at least 2.5mil(0.06mm).

4.11.6 The overall dimension of the tape per roll shall be: width:25mm, length:3M or 10M, and thickness:1mm.

4.11.7 The tape shall meet the following international standards for safety and mechanical loading tests: IEC 60454-3-12, IEC 60454-3-19, IEC 60454-2.

4.11.8 Shall be suitable for indoor.

4.12. PVC CABLE TRUNKING

4.12.1 Shall be of Type 1: 45mm x 45mm x 2m Long, Type 2: 45mm x 65mm x 2m Long, Type 3: 65mm x 65mm x 2m Long.

4.12.2 Shall be suitable for use in cabinets and control panels.

4.12.3 Shall have snap on lid with nonslip beading on widths.

4.12.4 Shall have pre-punched fixing slots for ease of mounting.

4.12.5 Operating temperatures -15°C to +60°C.

4.12.6 Shall have appropriate covers.

4.12.7 Shall be of grey colour - RAL 7030.

4.12.8 Shall have perforations to allow 2.5mm^2 insulated wires in and out.

4.12.9 Shall be made of self-extinguishing polyvinyl chloride to UL 94-V0 flammability rating.

4.12.10 Shall have open slots and snap on lids.

4.12.11 Shall be open slot beta duct type cable trunking.

4.12.12 Base slots to BS EN 50085-2-3.

4.12.13 Shall be trunking suitable for 2.5mm^2 to 7.02mm^2 insulated copper cable.

4.13. 110 VDC SEMAPHORE INDICATORS

4.13.1 Shall have three terminal points to give position indication (Green, Red & Common).

4.13.2 Shall be rated operational voltage of 110Vdc.

4.13.3 Shall have round head shape of 28mm diameter, length 65mm, width 23mm.

4.13.4 Shall have panel cutout diameter of 23mm.

4.13.5 Operating temperatures -20°C to +60°C.

4.13.6 Mounting plate thickness: 1 - 6mm.

4.13.7 Shall conform to IEC 60947-5-1, IEC 60947-1.

4.13.8 Shall be of IP 52 degree of protection as per IEC 60529.

4.13.9 Terminals shall accommodate 2.5 mm^2 stranded copper wire.

4.13.10 Its insulation shall withstand voltage rating of 250V.

4.13.11 The insulation resistance shall be greater than 1000MΩ.

4.13.12 It shall indicate Green LED when Isolator/Earthswitch is in "OFF" position, Green LED Indication shall have horizontal orientation.

4.13.13 It shall indicate Red LED when Isolator/Earthswitch is "ON" position, Red LED Indication shall have vertical orientation.

4.13.14 Shall be used for indication of Earthswitch/Isolator status (On-Off).

4.13.15 The mimic toggle shall move to align with the mimic circuit as per status.

4.13.16 It shall be durable and robust.

4.13.17 It shall not require external resistor connection. All electronic components shall be internal.

4.13.18 Shall be panel surface mounted by use of locknut and rubber washer.

4.14. 6MM² CT DISCONNECT TERMINAL BLOCKS COMPLETE WITH MARKERS

4.14.1 Shall be din rail mounted.

4.14.2 Shall be rated for maximum load current of 50A, nominal current of 25 A, nominal voltage 800V, Short time Current of 0.72KA.

4.14.3 Shall have a width of 11 mm and a length of 69mm.

4.14.4 Shall have suitable slide-able isolating links, in order to delink protection relays and CT secondary.

4.14.5 Shall have two connection points with one potential.

4.14.6 Shall be universal terminal block with bolt connection with disconnect slides.

4.14.7 Shall have a rated maximum surge voltage of 8KV.

4.14.8 Its connection shall be in accordance to IEC 60947-7-1 standard.

4.14.9 Shall have a cross section of 0.1 to 6mm^2 and width of 11mm.

4.14.10 Shall accommodate minimum cable lug connection cross section of 0.5mm^2 and maximum cable lug connection cross section of 2.5mm^2.

4.14.11 Shall also be suitable for 2.5mm^2 pin lugs and 2.5mm^2 stranded copper wire.

4.14.12 Shall have suitable numerical block markers (1-100) to identify each terminal block.

4.14.13 Shall be heat resistant, self-extinguishing, high quality PVC material.

4.14.14 Terminal screws on each side of terminal block shall be non-corrosive and rugged.

4.15. M10 RAWL BOLTS

4.15.1 Shall be carbon steel 8.8 grade according to ISO 898-1.

4.15.2 Minimum coating thickness of 50μm according to ISO 4041.

4.15.3 The installation torque shall be 27 Newton Meter (Nm).

4.15.4 It shall have dimensions of 10mm x 75mm length and maximum fixture thickness of 15mm.

4.15.5 Nominal tensile strength of 520N/mm^2, cross sectional area of 58mm^2 and anchor diameter of 10mm.

4.15.6 Shall have minimum hole depth of 65mm, minimum install depth of 60mm and hole diameter in fixture of 11mm.

4.15.7 Shall have an M10 loose bolt for fastening.

4.15.8 Shall be suitable for use on concrete floor, block wall and terrazzo floor.

4.15.9 Shall be suitable for mounting panels, meter boxes and power distribution boards.

4.15.10 It shall comply with all other requirements of the KPLC specification No. KP1/3CB/TSP/02/003 – specification for fasteners and washers for overhead lines part 3: Metal anchors for use in concrete (Rawl bolts).

4.16. 6MM^2 TERMINAL BLOCKS WITH MARKERS

4.16.1 Shall be din omega rail (symmetrical) mounted.

4.16.2 Shall be feed-through complete with screw clamp.

4.16.3 Shall accommodate 6mm^2 insulated cable.

4.16.4 Shall be rated 600V 50A.

4.16.5 Shall have nominal dimensions of width 43mm by length 47mm and thickness of 8mm.

4.16.6 Shall conform to IEC 60947-7-1.

4.16.7 Shall have terminal pitch of 8mm.

4.16.8 Shall be complete with end plate on one side.

4.16.9 Shall be of grey colour RAL 7035.

4.16.10 Shall have suitable numerical block markers (1-100) to identify each terminal block.

4.16.11 Shall be suitable for use on 2.5mm^2 stranded copper wire.

4.16.12 Shall be made of nylon material and be robust and durable.

4.16.13 Terminal screws on each side of terminal block shall be brass material.

4.17. 12 WAY TRIPLE POLE AND NEUTRAL DISTRIBUTION BOARD WITH 125A MAIN MCB

4.17.1 Shall conform to IP 31 degree of protection as per IEC 60529.

4.17.2 Electrical supply 400 VAC, 3phase, 50 Hz.

4.17.3 Shall have twelve (12) triple pole outgoing ways.

4.17.4 Dimensions of width 450mm, height 669mm and depth 116mm.

4.17.5 The busbar shall be made of electro-tinned copper.

4.17.6 Shall have full width removable gland plates on top and bottom with knockout type arrangement for cable glands of size 4x20mm, 2x25mm and 1x32mm (at plate center) per plate.

4.17.7 Shall be powder coated with RAL 7035 grey paint.

4.17.8 The AC distribution board shall be designed to ensure appropriate busbar clearances between phases and earth.

4.17.9 Shall have busbar shrouds to insulate unused busbar ways.

4.17.10 Electrically insulated to prevent injury to electrician, conforming to BS EN 61439-3.

4.17.11 Shall have enclosed 200A rated vertical busbar.

4.17.12 Shall be complete with numbered neutral and earth bars.

4.17.13 Shall be supplied with 10 kA, 125A Triple Pole Type "C" main incomer miniature circuit breaker.

4.17.14 Glazed door to allow identification of circuit breaker status, with left/right hand opening with optional key locking facility.

4.17.15 Shall have colour coded circuit designation (Red, Yellow, Blue).

4.17.16 Back plate shall have 4 x 10 mm holes for wall mounting with M10 rawl bolts.

4.17.17 Steel enclosure shall be manufactured from 1.25mm CR4 cold rolled mild steel as per ISO 3574 and powder coated with RAL 7035 grey paint.

4.17.18 Terminal screws on each side of terminal block shall be corrosion resistant and durable.

4.18. OBA RING TYPE INSULATED TINNED COPPER LUGS

4.18.1 Shall have blue colour PVC insulation sleeve.

4.18.2 Current rating shall be at least 25A.

4.18.3 Diameter of the ring type lug shall be 12mm.

4.18.4 Minimum wire size shall be 1mm^2 and maximum conductor cross section of 2.5mm^2.

4.18.5 Shall be ring type crimp terminal lugs.

4.18.6 Ring hole diameter/stud size shall be 6mm.

4.18.7 Diameter of the insulated cable entry of 2.5mm.

4.18.8 Shall be made of tin plated copper contact material.

4.18.9 Shall have overall length of 27mm.

4.18.10 Temperature range -20C to +85C.

4.18.11 Shall be electro tinned to comply with BS 1872.

4.18.12 Terminal shall be copper conforming to BS EN 1976.

4.18.13 Shall comply with BS EN 61238-1, ISO1966.

4.18.14 Thickness of the ring shall be 1.5mm.

4.18.15 Insulated sleeve length shall be 10mm and inner diameter of 4mm.

4.19. 2BA INSULATED TINNED COPPER LUGS

4.19.1 Shall have blue colour PVC insulation sleeve.

4.19.2 Shall be rated at least 25A.

4.19.3 Shall have a ring width of 8mm.

4.19.4 Shall have a minimum wire size of 1mm^2 and maximum conductor cross section of 2.5mm^2.

4.19.5 Shall be ring type crimp terminal lugs.

4.19.6 Ring hole diameter/stud size shall be 5mm.

4.19.7 Diameter of the insulated cable entry shall be 2.5mm.

4.19.8 Shall be electro tinned to comply with BS 1872.

4.19.9 Terminal shall be copper complying with BS EN 1976.

4.19.10 Thickness of the ring shall be 1.5mm.

4.19.11 Temperature range -20C to +85C.

4.19.12 Shall comply with BS EN 61238-1, ISO1966.

4.19.13 Shall have overall length of 22mm.

4.19.14 Insulated sleeve length shall be 10mm and inner diameter of 4mm.

4.20. FORK INSULATED TINNED COPPER LUGS

4.20.1 Shall have blue colour PVC insulation sleeve.

4.20.2 Shall be rated at least 25A.

4.20.3 Shall have a fork width of 8mm.

4.20.4 Minimum wire size shall be 1mm^2 and maximum conductor cross section of 2.5mm^2.

4.20.5 Shall be fork type crimp terminal lugs.

4.20.6 Fork diameter/stud size shall be 5mm.

4.20.7 Diameter of the insulated sleeve cable entry shall be 2.5mm.

4.20.8 Shall be electro tinned to comply with BS 1872.

4.20.9 Fork terminal shall be copper complying with BS EN 1976.

4.20.10 Thickness of the fork shall be 1.5mm.

4.20.11 Temperature range -20°C to +85°C.

4.20.12 Shall comply with BS EN 61238-1, ISO1966.

4.20.13 Shall have overall length of 21mm.

4.20.14 Insulated sleeve length shall be 10mm and inner diameter of 4mm.

4.21. PIN TYPE INSULATED TINNED COPPER LUGS

4.21.1 Shall have blue colour pvc insulation sleeve.

4.21.2 Shall be rated at least 25A.

4.21.3 Shall have a pin width of 1mm and length of 12mm.

4.21.4 Minimum wire size shall be 1mm^2 and maximum conductor cross section of 2.5mm^2.

4.21.5 Shall be pin type crimp terminal lugs.

4.21.6 Shall be electro tinned to comply with BS 1872.

4.21.7 Pin Terminal shall be Copper complying to BS EN 1976.

4.21.8 Thickness of the pin shall be 1.5mm.

4.21.9 Temperature range -20°C to +85°C.

4.21.10 Shall comply with BS EN 61238-1, ISO1966.

4.21.11 Diameter of the insulated sleeve cable entry shall be 2.5mm.

4.21.12 Insulated sleeve length shall be 10mm and inner diameter of 4mm.

4.21.13 Shall have overall length of 22mm.

4.22. 8 WAY 110VDC DISTRIBUTION BOARD WITH 63A DOUBLE POLE MAIN MCB

4.22.1 The sheet steel enclosure shall meet IP31 degree of protection as per IEC 60529.

4.22.2 Shall have 200A rated vertical copper busbars.

4.22.3 Shall be powder coated with RAL 7035 grey finish paint.

4.22.4 Shall have busbar shrouds to insulate unused busbar ways.

4.22.5 Busbar made of electro tinned copper.

4.22.6 Shall be complete with busbars and provision for earthing the enclosure.

4.22.7 Shall be supplied with 10 kA, 63A double pole type C main incomer miniature circuit breaker.

4.22.8 The DC distribution board shall be designed to ensure appropriate busbar clearances between phases and earth.

4.22.9 Removable gland plates on top and bottom of enclosure.

4.22.10 Electrical supply +/-110Vdc.

4.22.11 Dimension shall be at least, width 450mm, height 562mm and depth 116mm.

4.22.12 Shall be suitably insulated electrically, conforming to BS 5486-12.

4.22.13 Shall have a glazed door to allow identification of circuit breaker status, with left/right hand opening with optional key locking facility.

4.22.14 Colour coded circuit designation red for +110Vdc and black for -110Vdc.

4.22.15 Back plate shall have 4 x10 mm holes for wall mounting with M10 rawl bolts.

4.22.16 Steel enclosure manufactured from 1.25 mm CR4 cold reduced mild steel and powder coated.

4.22.17 Shall have eight (8) double pole outgoing ways.

4.22.18 The DC distribution board design shall be robust and rugged.

4.22.19 Terminal screws on each side of terminal block shall be non-corrosive and rugged.

4.23. CABLE TIE MOUNTING BASES WITH SELF ADHESIVE

4.23.1 Shall accept tie insertion from all four sides - 4 way.

4.23.2 Shall have dimensions 28mm width x 28 mm Length x 5.6 mm Height.

4.23.3 Adhesive base shall be able to bond permanently on sheet metal panel and suitable for use in application requiring extra holding strength or higher temperatures.

4.23.4 Base shall be square in shape with acrylic backed adhesive for mounting.

4.23.5 Shall be suitable for use with extra heavy duty cable ties.

4.23.6 Shall be made of NYLON 66 material, natural colour.

4.23.7 Temperature rating of -40°C to 85°C.

4.23.8 Flammability rating - UL 94 -V2.

4.24. 110VDC CONTACTORS/ CONTROL RELAYS

4.24.1 Shall be 4 poles (4 NO contacts) contactor with a top mount auxilliary contact block of 2NO + 2NC.

4.24.2 Suitable depth of the add-on top-mount auxilliary contact block shall be 32mm.

4.24.3 Contacts material shall be tinned copper.

4.24.4 Shall be suitable for 35 mm symmetric DIN (Omega) rail mounting.

4.24.5 Terminals shall meet IP 20 degree of finger protection as per IEC 60529.

4.24.6 Shall meet IEC 947-4 standard for control contactor/relay.

4.24.7 Coil shall be rated 110Vdc, for DC control voltage. The contacts continuous current rating shall be at least 20A.

4.24.8 Suitable dimension: H-77 mm, W-45 mm, D-79 mm.

4.24.9 Rated insulation voltage 600Vdc.

4.24.10 Shall be rugged and suitable for low/medium power switching.

4.25. DIN RAIL SYMMETRICAL (OMEGA TYPE)

4.25.1 DIN rail symmetric (Omega type) shall be made of brass cold rolled carbon steel sheet with zinc plated/brass finish.

4.25.2 Shall have 18 x M6 slots pitched at 25 mm interval.

4.25.3 Suitable for mounting miniature circuit breakers, terminal blocks, pin relays and contactors.

4.25.4 Shall be 35 mm wide and have a 7.5mm depth, with overall length of 2 metres.

4.25.5 Short circuit capacity shall be 80A.

4.25.6 Conforms to BS 5584 Standards and EN50022 standard.

4.26. STEP DRILL BIT

4.26.1 Step drill bit type shall be a high speed spiral groove.

4.26.2 The size and dimension shall be a minimum of 4mm and a maximum of 38mm.

4.26.3 Shall be made of hardened steel having capability and durability in drilling round holes on cutting materials.

4.26.4 The shank size shall be 9.5mm and the shank type 3-Flat sides.

4.26.5 Shall be optimized for use on standard or impact drill.

4.26.6 The cutting materials shall be metal plates, aluminum, copper, stainless, brass and abrasive materials.

4.26.7 Shall be dual flute cutting edges to provide clean, round holes on cutting materials.

4.26.8 Step drill bit shall be power driven with 220 – 250Vac.

4.26.9 Shall have a unique staircase structure to open a variety of size aperture.

4.27. ANTI-RUST LUBRICATING SPRAY

4.27.1 Shall penetrate in rusted areas in a short time and be capable of loosening rusted parts eg nuts on bolts.

4.27.2 Shall stop squeaks and protect metal.

4.27.3 Shall be capable of lubricating and protecting all kinds of machines, removing humidity and preventing rusting.

4.27.4 Shall be an aerosol sprayer with a nozzle to spray on rusted surface/area.

4.27.5 Shall be transparent/semitransparent in appearance.

4.27.6 Shall be light amber in colour.

4.27.7 Shall have Specific Gravity of 0.8 ± 0.02 at 22 °C

4.27.8 Shall have Flash point of 43 °C.

4.27.9 Shall have Fluidity of -73 °C.

4.27.10 Shall have Vapor Content of 78% Weight.

4.27.11 Shall have Nonvolatile Content of 22% Weight.

4.27.12 Shall have Lowest Boiling point of 148 °C.

4.28. LAMP HOLDER

4.28.1 The lamp holder shall be plastic material, pin type B22 and white in color.

4.28.2 The interface style is bayonet base type mounted using self-taping screws.

4.28.3 It shall be a straight lamp holder with Bakelite base and brass inner part.

4.28.4 The base diameter shall be 65mm.

4.28.5 The rated voltage shall be 250V, 2A at 50Hz.

4.28.6 Shall accommodate a 2 pin, type B22 Bayonet base bulb socket.

4.29. LED LIGHT BULB

4.29.1 The LED bulb shall be 2 PIN, type B22 Bayonet base bulb socket.

4.29.2 The bulb shall be rated 7 watts or equivalent and shall operate at 220-250V ac.

4.29.3 Shall be low in energy consumption with low heat output.

5. TESTS REQUIREMENTS

The Accessories shall be inspected and tested in accordance with the provisions of this specification and applicable standards.

6. MARKING AND PACKING

6.1. Each item shall be marked legibly and indelibly with the following information:

a) The inscription "KPLC.",

b) Name and trade mark of the manufacturer;

c) Country of origin;

d) Standards of manufacture

e) Manufacturers type designation and year of manufacture.

6.2. The items shall be packaged in such a manner as to minimize damage during transportation and handling.

---------- SPACE LEFT BLANK ----------

APPENDICES

A. TESTS AND INSPECTION (Normative)

A.1 It shall be the responsibility of the manufacturer to perform or to have performed all the tests specified. Tenderers shall confirm the manufacturer's capabilities in this regard when submitting tenders. Any limitations shall be clearly specified.

A.2 Copies of Type Test Certificates and Type Test Reports issued by a third party testing laboratory that is accredited to ISO/IEC 17025 shall be submitted with the tender for the purpose of technical evaluation. A copy of the accreditation certificate to ISO/IEC 17025 for the testing laboratory shall also be submitted. Any translations of certificates and test reports into English language shall be signed and stamped by the Testing Laboratory that carried out the tests.

A.3 The Electrical Wiring Accessories shall be subject to acceptance tests at the manufacturer's works before dispatch. Acceptance tests shall be witnessed by two Engineers appointed by The Kenya Power and Lighting Company Plc (KPLC).

A.4 On receipt of the product, KPLC will perform any of the tests specified in order to verify compliance with this specification. The supplier shall replace without charge to KPLC the items which upon examination, test or use, fail to meet any of the requirements in the specification.

B. QUALITY MANAGEMENT SYSTEM (Normative)

B.1 The bidder shall submit a quality assurance plan (QAP) that will be used to ensure that the items 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 or later or KEBS diamond mark or quality.

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.

B.3 The bidder shall indicate the delivery time of each type of items, manufacturer's monthly & annual production capacity and experience in the production of the type of meter being offered. A detailed list and contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for exact or similar rating of meters sold in the last five years shall be submitted with the tender for evaluation.

C. DOCUMENTATION (Normative)

C.1 The bidder shall submit its tender complete with technical documents required by Appendix E (Guaranteed Technical Particulars) for tender evaluation. The documents to be submitted (all in English language) for tender evaluation shall include the following:

a) Fully filled clause by clause Guaranteed Technical Particulars (GTP) signed by the manufacturer,

b) Copies of the manufacturer's catalogues, brochures, drawings and manuals,

c) Sales records for the last five years and at least four customer reference letters, three outside the country of manufacture,

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 warranty and guarantee;

h) Manufacturer's letter of authorization, copy of the manufacturer's ISO 9001:2015 certificate, ISO 14001:2004 certificate, ISO 17025(2005) certificate.

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

a) Fully filled clause by clause Guaranteed Technical Particulars (GTP) signed by the manufacturer,

b) Design drawings,

c) Operation manuals and brochures shall be submitted,

d) Quality assurance plan (QAP) that will be used to ensure that the design, material, workmanship, tests, service capability, maintenance and documentation will fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001:2015,

e) Detailed test program to be used during factory testing,

f) Marking details and method to be used in marking the items,

g) Manufacturer's undertaking to ensure adequacy of the design, good engineering practice, adherence to the specification and applicable standards and regulations as well as ensuring good workmanship in the manufacture of the meters for The Kenya Power & Lighting Company,

h) Packaging details (including packaging materials and marking and identification of batches).

D. 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 number	KPLC requirement	Bidder's offer
Manufacturer's Name and address		Specify
Country of Manufacture		Specify
Bidder's Name and address		Specify
1.	**Scope**	Specify
1.1-1.2		
2.	Applicable Standards	Specify
3.	Terms & Definitions	Specify
4.	**Requirements**	
4.1	Operating Conditions	Specify
4.2	**Miniature Circuit Breakers**	
4.2.1	Type and rating	Specify
4.2.2	Suitable for overcurrent and short circuit protection	Specify
4.2.3	Sensitivity	Specify
4.2.4	Tripping point position and curve type	Specify
4.2.5	Standards of manufacture	Specify
4.2.6	Magnetic/ bimetallic strip operation rating	Specify
4.2.7	Mounting type	Specify
4.2.8	Insulation voltage	Specify
4.2.9	Breaking capacity	Specify
4.2.10	Thermal operation principle	Specify
4.2.11	Voltage rating	Specify
4.2.12	Nominal rating marking	Specify
4.2.13	Minimum tripping current	Specify
4.3	**11 Pin Base and Relay**	
4.3.1	Mounting type	Specify
4.3.2	Complete with Relay and base, state pin number	Specify
4.3.3	Standards of manufacture	Specify
4.3.4	Rated coil voltage	Specify
4.3.5	Resetting method, colour	Specify

Clause number	KPLC requirement	Bidder's offer
4.3.6	Relay with mechanical red flag when coil is energized	Specify
4.3.7	Contacts rating (both NO and NC)	Specify
4.3.8	Contact and plating material	Specify
4.3.9	Marking of coil and contacts termination point	Specify
4.3.10	Base screw terminals and clamping plate	Specify
4.3.11	Dielectric rating	Specify
4.3.12	Dimensions	Specify
4.3.13	Has minimum 8 changeover output contacts (4NO and 4NC contacts)	Specify
4.4	**Brass Cable Gland**	
4.4.1	Type and dimensions	Specify
4.4.2	Material composition and coating	Specify
4.4.3	Has locknut, earth tag and PVC shroud	Specify
4.4.4	Suitable for multicore armoured cable	Specify
4.4.5	Standards of manufacture	Specify
4.4.6	Amour clamping type	Specify
4.4.7	Armour shall provide mechanical cable retention and electrical continuity	Specify
4.4.8	Ingress protection class	Specify
4.5	**Spring return circuit breaker control switch**	
4.5.1	For opening and closing MV and HT circuit breaker	Specify
4.5.2	Has Trip Neutral and Close clearly marked on base plate	Specify
4.5.3	Compact and rugged with spring return	Specify
4.5.4	Suitable for panel mounting at most 25mm diameter hole	Specify
4.5.5	Mounting method	Specify
4.5.6	Back mounting plate dimensions	Specify
4.5.7	Material of switching mechanism and rod	Specify
4.5.8	Spring return type locking at neutral position	Specify
4.5.9	Continuous current rating and operating voltage	Specify
4.5.10	Short circuit withstand	Specify
4.5.11	Handle type and angle	Specify
4.5.12	Standards of manufacture	Specify
4.6	**3 Position rotary cam switch (2 way with off position and 6 poles)**	
4.6.1	Suitable for LV circuit control and flush mounting	Specify
4.6.2	Stay put type and 3 position switch	Specify
4.6.3	Knob type handle with indication plate clearly marked	Specify
4.6.4	Rotary cam switch pole numbers	Specify
4.6.5	Dimensions of back mounting plate	Specify

Clause number	KPLC requirement	Bidder's offer
4.6.6	Mode of securing the switch	Specify
4.6.7	Thermal rating of switch and switching withstand voltage	Specify
4.6.8	Suitable for 110/220Vdc	Specify
4.6.9	Standards of manufacture	Specify
4.6.10	Locking type	Specify
4.7	**DC/AC LED Pilot Indicator**	
4.7.1	Type and colour	Specify
4.7.2	Mounting dimensions	Specify
4.7.3	LED colours and dimensions of indicator	Specify
4.7.4	Terminals material and coating. Material of other metallic part	Specify
4.7.5	Complete with locknut and rubber washer	Specify
4.7.6	have tin plated brass finger-proof screw terminals with screw retainer and wire protector	Specify
4.7.7	Terminals with detachable PVC cover	Specify
4.7.8	Style of lens and colour of rear body	Specify
4.7.9	LEDS suitable for AC and DC indication	Specify
4.7.10	Dimensions	Specify
4.7.11	Mounting hole dimension	Specify
4.7.12	LED rating, Nominal voltage and current rating	Specify
4.7.13	LEDs protected against reverse polarity and terminal polarity clearly marked	Specify
4.7.14	IP protection class and standards of manufacture	Specify
4.7.15	Viewing angle	Specify
4.7.16	Insulation withstand voltage	Specify
4.7.17	Terminals marking	Specify
4.8	**Discrepancy control switch with indications**	
4.8.1	Robust in design with a square flange and clear milky white manopola grade control knob illuminable by LED or Bulb	Specify
4.8.2	Ideal for panel mounting, state dimensions of cut	specify
4.8.3	Type of display (Flicker or continuous lighting type?)	Specify
4.8.4	The switch main shaft shall exhibit high mechanical strength for robust operation	Specify
4.8.5	Material of switch terminals	Specify
4.8.6	Latching positions and mode of operation	Specify
4.8.7	Pre-selection control shall be by turning the switch at 90°, upon which the LED or lamp shall light up indicating the breaker/disconnector status "OFF" and "ON"	Specify
4.8.8	The breaker/disconnector closing/opening signal shall be issued by turning the control knob from the latched position 45° in the same	Specify

Clause number	KPLC requirement	Bidder's offer
	direction and pressing it in, when released it shall jump back into its latched 90° position	
4.8.9	Installation on a panel shall be by use of screw type front ring and or two backside fastening screws	Specify
4.8.10	Rating of switch	Specify
4.8.11	Number of changeover contacts and terminals type	Specify
4.8.12	Luminous signal LED rating	Specify
4.8.13	Voltage rating and dielectric withstand	Specify
4.8.14	Control knob colour	Specify
4.8.15	Dimensions of switch and flange of control knob	Specify
4.8.16	Access position to the LED	Specify
4.8.17	Number of control contacts	Specify
4.8.18	Standards of manufacture and IP rating	Specify
4.8.19	Escutcheon plate marking	Specify
4.9	**Cable/wire markers (Letters and numbers)**	
4.9.1	Type	Specify
4.9.2	Marker material and its colour and colour of characters	Specify
4.9.3	Suitable cable sizes	Specify
4.9.4	Dimensions of markers and letters	Specify
4.9.5	Type of printing and number of characters on a marker	Specify
4.9.6	Type of cutting	Specify
4.9.7	Design type and ease of installation	Specify
4.9.8	Packing method	Specify
4.9.9	Material and standard of manufacture	Specify
4.9.10	Durable markers of excellent legibility	Specify
4.9.11	Resistant to oils, fuels, acids, alkalis and UV radiation	Specify
4.10	**10mm^2 copper single core cable**	
4.10.1	Suitable for earthing application	Specify
4.10.2	Has multiple strands	Specify
4.10.3	Fault current withstand level	Specify
4.10.4	Insulation colour	Specify
	Complies with KP1/6C/13/TSP/05/016	Provide GTP
4.10.5	Easily cut and lugged	Specify
4.10.6	Packing length	Specify
4.10.7	Rating	Specify
4.11	**Double sided acrylic/ PE foam tape**	
4.11.1	Suitable for use on low energy and high energy substrates, ie metals, plastic and polycarbonates	Specify

Clause number	KPLC requirement	Bidder's offer
4.11.2	The material of the tape shall be acrylic foam or PE foam type resistant to high temperature, water, rub and ultraviolet radiation.	Specify
4.11.3	The double sided foam tape shall have strong acrylic adhesion of excellent retention on both sides, matched with removable liners on both sides.	Specify
4.11.4	Carrier/core with energy absorbing black colour	Specify
4.11.5	Thickness of adhesive	Specify
4.11.6	Dimensions	Specify
4.11.7	Safety and mechanical tests and standards	Specify
4.11.8	Suitable for indoor use.	Specify
4.12	**PVC cable trunking**	
4.12.1	Type and dimensions	Specify
4.12.2	Suitable for cabinets and control panels	Specify
4.12.3	With snap on lid with nonslip beading widths	Specify
4.12.4	Mounting slots	Specify
4.12.5	Operating temperature	Specify
4.12.6	Covers	Specify
4.12.7	Colour	Specify
4.12.8	Perforations and cable size	Specify
4.12.9	Material and flammability rating	Specify
4.12.10	Has open slots type and snap on lids	Specify
4.12.11	Shall be open slot beta duct type cable trunking	Specify
4.12.12	Base slots standards of manufacture	Specify
4.12.13	Suitable cable sizes	Specify
4.13	**110 Vdc semaphore indicators**	
4.13.1	Position indication terminals	Specify
4.13.2	Rating	Specify
4.13.3	Dimensions and shape of head	Specify
4.13.4	Diameter of cutout	Specify
4.13.5	Operating temperature	Specify
4.13.6	Mounting plate thickness	Specify
4.13.7	Standards of manufacture	Specify
4.13.8	IP class	Specify
4.13.9	Terminals cable size	Specify
4.13.10	Insulation withstand voltage	Specify
4.13.11	Insulation resistance	Specify
4.13.12	Green LED indication and orientation	Specify
4.13.13	Red LED indication and orientation	Specify
4.13.14	Shall be used for indication of Earthswitch/Isolator status (On-Off)	Specify

Clause number	KPLC requirement	Bidder's offer
4.13.15	Mimic toggle to align with mimic circuit as per status	Specify
4.13.16	Durable and robust	Specify
4.13.17	Shall not require external resistor connection. All electronic components shall be internal	Specify
4.13.18	Surface mounted by use of locknut and rubber washer	Specify
4.14	**6 mm² CT disconnect terminal blocks complete with markers**	
4.14.1	Mounting	Specify
4.14.2	Maximum load current, Nominal current, nominal voltage, short time current withstand	Specify
4.14.3	Dimensions	Specify
4.14.4	Isolating links type	Specify
4.14.5	Connection points number and potential	Specify
4.14.6	Terminal block type	Specify
4.14.7	Surge voltage rating	Specify
4.14.8	Standards of connection	Specify
4.14.9	Cross section area and width	Specify
4.14.10	Cable lug connection cross section	Specify
4.14.11	Suitable cable size and pin lugs	Specify
4.14.12	Marking	Specify
4.14.13	Material of manufacture and properties	Specify
4.14.14	Durable and corrosion resistant terminal screws	Specify
4.15	**M10 rawl bolts**	
4.15.1	Steel grade and standards	Specify
4.15.2	Coating thickness	Specify
4.15.3	Torque	Specify
4.15.4	Dimensions	Specify
4.15.5	Tensile strength , cross sectional area and anchor diameter	Specify
4.15.6	Installation dimensions	Specify
4.15.7	Bolt size	Specify
4.15.8	Suitable for concrete floor, block/stone wall, terrazzo floor	Specify
4.15.9	Suitable for panels, meter boxes and boards	Specify
4.15.10	Complies with KP1/3CB/TSP/02/003 – specification for fasteners and washers for overhead lines part 3: Metal anchors for use in concrete (Rawl bolts)	Specify
4.16	**6 mm² terminal blocks with markers**	
4.16.1	Mounting	Specify
4.16.2	Feed through with screw clamp	Specify
4.16.3	Cable size	Specify
4.16.4	Rating	Specify

Clause number	KPLC requirement	Bidder's offer
4.16.5	Dimensions	Specify
4.16.6	Standards of manufacture	Specify
4.16.7	Terminal pitch	Specify
4.16.8	Complete with end plate on one side	Specify
4.16.9	Colour	Specify
4.16.10	Markers type	Specify
4.16.11	Suitable size of cable	Specify
4.16.12	Material of manufacture and properties	Specify
4.16.13	Durable and corrosion resistant terminal screws	Specify
4.17	**12 way triple pole and neutral distribution board with 125A main MCB**	
4.17.1	IP protection class	Specify
4.17.2	Supply rating	Specify
4.17.3	Number and type of poles	Specify
4.17.4	Dimensions	Specify
4.17.5	Busbar material, coating and dimensions	Specify
4.17.6	Gland plates type, size and number	Specify
4.17.7	Colour	Specify
4.17.8	Clearances	Specify
4.17.9	Busbar shrouds	Specify
4.17.10	Safety and standards	Specify
4.17.11	Busbar rating	Specify
4.17.12	Has numbered neutral and earth bars	Specify
4.17.13	Incomer MCB rating and type	Specify
4.17.14	Glazed door, CB status viewable, locking facility	Specify
4.17.15	Colour coded circuit designation	Specify
4.17.16	Mounting holes dimensions and tolerance	Specify
4.17.17	Enclosure material standard and colour	Specify
4.17.18	Durable and corrosion resistant terminal screws	Specify
4.18	**OBA ring type insulated tinned copper lugs**	
4.18.1	Insulation colour	Specify
4.18.2	Current rating	Specify
4.18.3	Diameter of ring	Specify
4.18.4	Cable range	Specify
4.18.5	Type of crimp	Specify
4.18.6	Ring hole diameter	Specify
4.18.7	Diameter of cable entry	Specify
4.18.8	Material of manufacture and standard	Specify
4.18.9	Total Length	Specify

Clause number	KPLC requirement	Bidder's offer
4.18.10	Temperature range	Specify
4.18.11	Coating thickness and standard	Specify
4.18.12	Material of lug and standard	Specify
4.18.13	Standards of manufacture	Specify
4.18.14	Thickness of ring	Specify
4.18.15	Insulated sleeve dimensions	Specify
4.19	**2BA insulated tinned copper lugs**	
4.19.1	Insulation colour	Specify
4.19.2	Current rating	Specify
4.19.3	Width of ring	Specify
4.19.4	Cable range	Specify
4.19.5	Type of crimp	Specify
4.19.6	Ring hole diameter/ stud size	Specify
4.19.7	Diameter of cable entry	Specify
4.19.8	Coating thickness and standard	Specify
4.19.9	Material of manufacture and standard	Specify
4.19.10	Thickness of ring	Specify
4.19.11	Temperature range	Specify
4.19.12	Standards of manufacture	Specify
4.19.13	Total length	Specify
4.19.14	Insulated sleeve dimensions	Specify
4.20	**Fork insulated tinned copper lugs**	
4.20.1	Insulation colour	Specify
4.20.2	Current rating	Specify
4.20.3	Width of fork	Specify
4.20.4	Cable range	Specify
4.20.5	Type of crimp	Specify
4.20.6	Ring hole diameter/ stud size	Specify
4.20.7	Diameter of cable entry	Specify
4.20.8	Coating thickness and standard	Specify
4.20.9	Material of manufacture and standard	Specify
4.20.10	Thickness of fork	Specify
4.20.11	Temperature range	Specify
4.20.12	Standards of manufacture	Specify
4.20.13	Total length	Specify
4.20.14	Insulated sleeve dimensions	Specify
4.21	**Pin type insulated tinned copper lugs**	
4.21.1	Insulation colour	Specify
4.21.2	Current rating	Specify

Clause number	KPLC requirement	Bidder's offer
4.21.3	Width of pin	Specify
4.21.4	Cable range	Specify
4.21.5	Type of crimp	Specify
4.21.6	Coating thickness and standard	Specify
4.21.7	Material of manufacture and standard	Specify
4.21.8	Thickness of pin	Specify
4.21.9	Temperature range	Specify
4.21.10	Standards of manufacture	Specify
4.21.11	Diameter of cable entry	Specify
4.21.12	Insulated sleeve dimensions	Specify
4.21.13	Total length	Specify
4.22	**8 way 110Vdc distribution board with 63A double pole main MCB**	
4.22.1	IP protection class	Specify
4.22.2	Rating of vertical busbars	Specify
4.22.3	Colour	Specify
4.22.4	Busbar shrouds	Specify
4.22.5	Coating thickness	Specify
4.22.6	Complete with busbars and provision for earthing	Specify
4.22.7	Rating of incomer MCB	Specify
4.22.8	Clearances	Specify
4.22.9	Removable glands positions	Specify
4.22.10	Supply rating	Specify
4.22.11	Dimensions	Specify
4.22.12	Insulation standards	Specify
4.22.13	Glazed door, viewable CB status, locking facility	Specify
4.22.14	Colour coded DC circuit	Specify
4.22.15	Back plate mounting holes dimensions	Specify
4.22.16	Steel enclosure material, thickness and colour	Specify
4.22.17	Outgoing poles number and type	Specify
4.22.18	Design	Specify
4.22.19	Durable and corrosion resistant terminal screws	Specify
4.23	**Cable tie mounting base with self-adhesive**	
4.23.1	Access	Specify
4.23.2	Dimensions	Specify
4.23.3	Adhesive base with high holding strength	Specify
4.23.4	Shape of base and type of adhesive	Specify
4.23.5	Suitable for use with cable ties	Specify
4.23.6	Material of manufacture	Specify

Clause number	KPLC requirement	Bidder's offer
4.23.7	Temperature range	Specify
4.23.8	Flammability rating	Specify
4.24	**110 Vdc contactors/ control relays**	
4.24.1	Type of contactors and number	Specify
4.24.2	Depth of auxiliary contact	Specify
4.24.3	Material of contact	Specify
4.24.4	Mounting	Specify
4.24.5	IP class	Specify
4.24.6	Standard of control	Specify
4.24.7	Coil DC voltage rating and current rating	Specify
4.24.8	Dimensions	Specify
4.24.9	Rated insulation voltage	Specify
4.24.10	Rugged and suitable for low/medium power switching	Specify
4.25	**DIN rail symmetrical – Omega type**	
4.25.1	Material of manufacture and coating	Specify
4.25.2	Dimensions of slots and slots numbers	Specify
4.25.3	Suitable for mounting MCBs, terminal blocks, pin relays and contactors	Specify
4.25.4	Overall dimensions	Specify
4.25.5	Short circuit capacity	Specify
4.25.6	Standards of manufacture	Specify
4.26	**Step drill bit**	
4.26.1	Shall be a high speed spiral groove	Specify
4.26.2	Shall be at least 4mm in width and a maximum of 38mm length	Specify
4.26.3	Material: hardened steel	Specify
4.26.4	Shank size: 9.5mm	Specify
	Shank type: with 3 flat sides	Specify
4.26.5	Shall be optimized for use on standard or impact drill	Specify
4.26.6	Suitable for cutting metal plates, aluminum, copper, stainless, brass and abrasive materials.	Specify
4.26.7	Shall be dual flute cutting edges to provide clean, round holes on cutting materials	Specify
4.26.8	Step drill bit shall be power driven with 220 – 250V AC	Specify
4.26.9	Shall have a unique staircase structure to open a variety of size aperture	Specify
4.27	**Anti-rust lubricating spray**	
4.27.1	Shall penetrate in rusted areas in a short time and be capable of loosening rusted parts eg nuts on bolts.	Specify
4.27.2	Shall stop squeaks and protect metal	Specify

Clause number	KPLC requirement	Bidder's offer
4.27.3	Shall be capable of lubricating and protecting all kinds of machines, removing humidity and preventing rusting	Specify
4.27.4	Shall be an aerosol sprayer with a nozzle to spray on rusted surface/area	Specify
4.27.5	Shall be transparent/semitransparent in appearance	Specify
4.27.6	Shall be light amber in colour	Specify
4.27.7	Shall have Specific Gravity of 0.8 ± 0.02 at 22 °C	Specify
4.27.8	Shall have Flash point of 43 °C.	Specify
4.27.9	Shall have Fluidity of -73 °C.	Specify
4.27.10	Shall have Vapor Content of 78% Weight.	Specify
4.27.11	Shall have Nonvolatile Content of 22% Weight.	Specify
4.27.12	Shall have Lowest Boiling point of 148 °C.	Specify
4.28	**Lamp Holder**	
4.28.1	The lamp holder shall be plastic material, pin type B22 and white in color	Specify
4.28.2	The interface style is bayonet base type mounted using self-taping screws	Specify
4.28.3	It shall be a straight lamp holder with Bakelite base and brass inner part	Specify
4.28.4	The base diameter shall be 65mm	Specify
4.28.5	The rated voltage shall be 250V, 2A at 50Hz	Specify
4.28.6	Shall accommodate a 2 pin, type B22 Bayonet base bulb socket	Specify
4.29	**LED light bulb**	
4.29.1	The LED bulb shall be 2 PIN, type B22 Bayonet base bulb socket	Specify
4.29.2	The bulb shall be rated at 7 watts or equivalent and shall operate at 250V	Specify
4.29.3	Shall be low in energy consumption with low heat output	Specify
5	**Test Requirements**	State
6	**Marking and Packing**	
6.1	Marking	Provide with drawing
6.2	Packing	State
A	**Tests and Inspection**	
A.1	Responsibility of carrying out tests	State
A.2	Copies of Type Test Reports submitted with tender	State
A.3	Acceptance tests to be witnessed by KPLC at factory before shipment	State
A.4	Inspection at the stores and replacement of rejected items	State compliance
B	**Quality Management System**	
B.1	Quality Assurance Plan	Provide

Clause number	KPLC requirement	Bidder's offer
B.2	Copy of ISO 9001:2008 Certificate	Provide
B.3	Manufacturer's experience	Provide
	Manufacturing Capacity (units per month)	Provide
	List of previous customers	Provide
	Customer reference letters	Provide
C	**Documentation and demonstration**	
C.1	Documents submitted with tender	Provide
C.2	Documents to be submitted by supplier to KPLC for approval before manufacture	Provide
	Statement of compliance to specification	Provide

.....

Manufacturer's Name, Signature, Stamp and Date