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Kenya Power

ACCESSORIES FOR DISTRIBUTION TRANSFOMER METERING DCU -SPECIFICATION

A Document of the Kenya Power & Lighting Co. Ltd

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0.1 Circulation List

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REVISION OF KPLC STANDARDS

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.

Issued by: Head of Section, Standards Development	Authorized by: Manager, Standards
Signed:	Signed:
Date: 2025-12-24	Date: 2025-12-24

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	2025-12-24	New issue	Eng. Benson Dianga	Eng. Faith Gichugu

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FOREWORD

This Specification has been prepared by the Standards Department in collaboration with, Commercial Services & Sales, Network Management and Information Communication Technology (ICT) all of Kenya Power & Lighting Co. Plc. (KPLC).

Kenya Power (KPLC) is undertaking a strategic transition into interoperable, bidirectional smart metering infrastructure that will also include metering loads served by distribution transformers. This strategy is intended to enable real-time data acquisition, remote monitoring and control of the network. This initiative will involve deployment of some smart devices, one of which is a Data concentrator Unit (DCU) to be installed at each Distribution Transformer. The Accessories required for the Data Concentrator unit (DCU) to collect current and voltage data are the low voltage current transformers, Piecing Connector and instrument signal leads . These data, collected and recorded by the DCU and sent to the KPLCs HES, will be useful in analyzing distribution network health and thereby assisting in improved operational efficiency, enhanced customer service, and strengthened energy accountability across the distribution network

This specification defines the technical and minimum acceptable requirements for the Accessories, namely the Low Voltage Current Transformers (LVCTs) and Piercing Connectors, and lead cables

The supplier and manufacturer shall be responsible for ensuring compliance to general requirements, this specification and all applicable standards of sound engineering practice and good workmanship. Users of the specification shall be responsible for its correct interpretation and application.

The following are committee members that prepared this specification:

Name	Department
Dalton Lagat	Sales
Maurice Owuor	Protection and Automation
Benson Dianga	Standards
Maina Gatheru	Sales
Richard Kioko	Distribution Network
Abiud Monyoro	Enterprise Architecture and IT
Michael Masibo	SCADA & Telecom

1. SCOPE

1.1 This specification covers the design, manufacture, testing at the Manufacturer's works, and delivery of Accessories for Transformer Metering.

1.2 The specification also covers test requirements for the Accessories for Distribution Transformer Metering as well as a schedule of Guaranteed Technical Particulars (GTP) to be fully filled with offered values, parameters and descriptions, signed by the manufacturer and submitted for tender evaluation.

1.3 It shall be the responsibility of the supplier to ensure the 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 Accessories for Distribution Transformer Metering for The Kenya Power & Lighting Company Plc.

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

2. NORMATIVE REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this specification. For dated editions, the cited edition shall apply; for undated editions, the latest edition of the referenced document (including any amendments) shall apply.

IEC 61869-1	General requirements for instrument transformers
IEC 61869-2	Instrument Transformers – Additional requirements for CTs
IEC 61238-1	Compression and mechanical connectors for power cables.
IEC 61210	Electrical connectors (for terminal ends)
IEC 61000-4	Electromagnetic Compatibility (EMC) Testing Techniques
IEC 60998-2-2	Connecting devices for low-voltage circuits
IEC 60811	Mechanical tests on cable insulation and sheath
IEC 60695-2	Fire hazard testing, flame retardance.
IEC 60529	Degrees of protection provided by enclosures (IP Code).
IEC 60502-1	Power cable insulation and sheathing
IEC 60364	LV electrical installations
IEC 60332-1-2	Flame-retardant behavior
IEC 60228	Conductors of Insulated Cables
IEC 60068-2	Temperature, humidity, vibration
IEC 60044-1	fundamental CT requirements for legacy instruments
BS EN 50483-1 & 50483-4	General and Aerial Bundled Cable Connector Requirements).

UL 746C	Polymeric materials for outdoor and electrical insulation.
UL 746C	Polymer material performance
PIE-SA 1018-5	Requirements for insulated connectors for LV systems.
NFC 33-020	LV accessories for overhead distribution systems.

3. TERMS AND DEFINITIONS

For the purpose of this specification, the definitions given in the reference standards shall apply in addition to the ones given below:

LVCT	Low Voltage Current Transformer
UV	Ultra Violet
DCU	Data Concentrator Unit
LV	Low Voltage
CT	Current Transformer
IPC	Insulated Piercing Connectors
DC	Direct Current
KPLC	Kenya Power & Lighting Company
FAT.	Factory Acceptance Test
GTP	Guaranteed Technical Particulars
QAP	Quality Assurance Plan

4. REQUIREMENTS

4.1. Service Conditions

The Low Voltage Current Transformer (LVCT) shall be suitable for use outdoors in tropical areas with harsh conditions including areas exposed to:

i. Altitudes of up to 2200m above sea level

ii. Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +50°C, in direct sunlight

iii. Humidity: up to 95%

iv. Pollution: Design pollution level to be taken as "Very Heavy" (Pollution level IV) in accordance with IEC TS 60815.

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

4.2 General Requirements for DCU Accessories

4.2.1 All accessories shall be designed, manufactured and tested to IEC 60529, IEC 60332, IEC 60502-1, IEC 60364, IEC 60332-1-2, BS EN 50483-1 & 50483-4, NFC 33-020, PIE-SA 1018-5, IEC 60695-2

4.2.2 The accessories shall be robustly constructed to withstand mechanical stresses arising from installation, service vibration, wind loading and routine handling without degradation of performance

4.2.3 All external metallic parts shall be corrosion-resistant (stainless steel, tinned copper, aluminum alloy or equivalent). Non-metallic parts shall be UV-stabilized and resistant to tracking, cracking and thermal aging.

4.2.4 All accessories shall provide adequate electrical insulation for low-voltage systems up to 1.0 kV, shall be resistant to surface tracking, and shall ensure safe operation under normal and fault conditions.

4.2.5 All accessories shall comply with the IEC 61000 series for electromagnetic compatibility, including immunity and emissions, and shall not introduce interference to metering or communication systems.

4.2.6 The accessories shall be fully compatible with the DCU input interfaces and shall not require the use of proprietary tools or special adapters for installation or operation

4.3 Requirements for Low Voltage Current Transformer(LVCT)

4.3.1 The Low Voltage Current Transformer (LVCT) shall be designed, manufactured, and tested in full compliance with IEC 61869-1,2, IEC 60044-1, IEC 60529, IEC 61000 series and IEC 60332-1.

4.3.2 The LVCT shall be rugged, tamper-resistant, and designed for harsh outdoor distribution-network environments typical of pole-mounted or ground-mounted distribution transformers

4.3.3 Shall be single-core, split-core type to allow installation without disconnecting LV conductors. The hinge and locking system shall be designed for secure, long-life operation and shall prevent accidental opening under mechanical stress.

4.3.4 The LVCT shall be equipped with a screw-in-place clamping assembly suitable for mounting on the distribution transformer secondary conductor leads. The internal diameter in closed position shall be suitable for enclosing bundled 4 × 100 mm² PVC single-core conductors, with adequate clearance to prevent abrasion or thermal interference

4.3.5 The LVCT Laminated, high-permeability grain-oriented silicon steel or equivalent low-loss magnetic material. Low hysteresis characteristics to ensure stable accuracy and low phase error in accordance with IEC 61869-2.

4.3.6 Encapsulated in UV-stabilized epoxy resin, polyurethane, or equivalent outdoor-grade potting compound. The CT jacketing shall be corrosion-proof, hydrophobic and resistant to salt-fog, industrial pollutants, and thermal cycling.

4.3.7 The LVCT shall have minimum protection of IP65 in accordance with IEC 60529.Enclosure shall also provide resistance to corona discharge effects and ultraviolet (UV) degradation.

4.3.8 The LVCT secondary circuits shall be designed for connection to a Data Concentrator in a system that is metering power and energy served by distribution transformer. The secondary circuits shall be connected to the DCU by a 3m lead cable whose characteristics are specified in clause 4.5 of this document.

4.3.9 The LVCT secondary terminals shall be designed for pan-type screw fastening of lead lags, and shall be compatible with forked/spade-type lead terminations.

4.3.10 The LVCT shall have a rated secondary current of 1.0A The Secondary circuits shall be suitable for direct connection to the Data Concentrator Unit (DCU) for energy and load profiling applications.

4.3.11 The LVCT Secondary terminals shall be screw-type (pan-head or equivalent), compatible with M5 forked/spade lugs per IEC 61210 and shall incorporate provisions for short-circuiting during testing and maintenance.

4.3.12 **The Ratings**

4.3.12.1 The Low Voltage Current Transformer (LVCT) shall be rated for operation on a 230/420 VAC, 50Hz circuit system and shall be suitable for collecting current data from a distribution transformer metering.

4.3.12.2 The rated secondary current of the LVCTs shall be 1 A. The rated primary currents shall be 50A, 100A, 200A, 300A, 400A, 500A, 1000A and 1500A

4.3.12.3 The LVCT shall have a rated secondary current of 1A and a rated burden of 1.0VA.The corresponding current ratios for each CT shall be any of the following : 50/1A, 100/1A, 200/1A, 300/1A, 400/1A, 500/1A, 1000/1A, and 1500/1A. The type of ratio and quantity of units to be ordered shall be specified in the tender document under schedule of requirements

4.3.12.4 The accuracy class of the LVCTs shall be Class 0.2s in accordance with IEC 61869-2. The limits of current error and phase displacement for Class 0.2s current transformers shall comply with Clause 5.6 and Table 200.1 of IEC 61869-2

4.3.12.5 The power frequency withstand voltage for the winding insulation shall be not less than 3 kV (r.m.s.).

4.3.12.6 The LVCT shall withstand a maximum continuous current of not less than 1.2 × Ip and a short-time (fault) current of not less than 10 × Ip for 1sec with dynamic current (Idyn): ≥ 2.5 × Ith, unless otherwise stated in accordance with IEC 61869-2, Clause 7.1.

4.3.12.7 The LVCT shall exhibit linear performance with a maximum deviation of ±0.1% over the rated current range and shall not saturate at its rated Imax.

4.3.12.8 The general Ratings for the LVCT shall be as summarized on the Table 1 below

Table1: for Distribution Transformer Metering LVCT Ratings

No.	Parameter	Rated Values
1	Primary rating	50A, 100A, 200A, 300A, 400A, 500A, 1000A and 1500A
2	Available primary taps/ratios	50/1A, 100/1A, 200/1A, 300/1A, 400/1A, 500/1A, 1000/1A and 1500/1A
3	Secondary rating	1A
4	Frequency:	50Hz
5	Rated continuous burden:	0.2s
6	Accuracy classes (metering	3P10
7	Thermal rating (continuous thermal, Ith):	≥ 1.2 × In
8	Short-time thermal (Ith):	2/5 for 1sec
9	Dynamic withstand current (peak):	6.0kA
10	Max burden	5VA @ 0.2s
11	IP rating	Minimum IP65

4.4 Requirements for Insulated Piercing Connectors (IPC) for LV Voltage Tapping

4.4.1 The Insulated Piercing Connectors (IPC) shall be designed manufactured and tested in accordance with BS EN 50483-1&4, PIE-SA 1018-5 and NFC 33-020.

4.4.2 The IPC shall be used on LV circuits of 230/420VAC with a withstand of up to 450VAC. The unit shall support live line works.

4.4.3 The IPC shall be designed for safe live-line installation without conductor stripping, with no degradation of electrical or mechanical performance during service

4.4.4 The IPC shall have hardened, factory-greased piercing teeth capable of penetrating insulation without damaging conductor strands. Torque-controlled shear-head bolts, with the torque value

shall clearly be marked on the connector body. The design shall ensure uniform clamping force to maintain stable voltage tapping under load cycling.

4.4.5 The contact plates shall be made of tinned aluminum/copper. The connector teeth shall be factory greased and sealed to retard water or moisture ingress and corrosion.

4.4.6 Each IPC shall be use to tap power per phase of transformer LV circuits. Each transformer shall have a set of 4No. for the main LV circuits other sets of 4no for each circuit

4.4.7 The IPC design shall be suitable for picking voltage signals from aluminum and/or copper insulated conductors. LV conductors, of cross-sectional areas from 50 mm^2 to 100 mm^2, designed in compliance to IEC 60228 (Class 2 or Class 5).

4.4.8 This IPC shall not be exposed to any bare conductor in the environment during connection. The design of the connectors shall ensure total weather and moisture proof so that no water or moisture can enter through the pierced holes on to the cable insulation.

4.4.9 For purposes of test, the IPC connectors shall be able to work at 30cm under water bath for 30 minutes, and when tested at an applied voltage of 4kV for 1 minute, there shall be no flashover/ failure and moisture ingress in it in accordance with EN 50483. The IPC shall have insulation to prevent accidental contact with live conductors.

4.4.10 The IPC design shall withstand working temperatures for installation from -10^0C up to $+60^o$C and operation experience with temperature from -20^0C up to $+75^0$C.the insulation material shall be flame-retardant, self-extinguishing materials per IEC 60695-2, withstand vibration and thermal expansion.

4.4.11 All the metallic part of the connector shall be corrosion resistant and shall be proven in Salt Fog chamber and Wet SO_2 gas chamber and there shall not be any change in contact resistance, temperature after overloads, load cycling.

4.4.12 The body shall be manufactured from corrosion resistant pure aluminum/aluminum alloy with tensile strength of 300MPa. The units shall have a service life of 20 years in outdoor conditions.

4.4.13 The IPC shall have a dielectric withstand of 2.5 kV AC for 1 minute and a Contact Resistance: of $\leq 0.5m\Omega$. The insulation material shall be made of weather and Ultra Violet resistance, reinforced polymer in accordance with UL 746-C.

4.4.14 The outer part shall have conducting free tightening bolts to allow safe installation on live lines. There shall be no loose or detachable components can fall during installation.

4.4.15 The connector shall not have any loose unsecured component which may drop and then lost during installation. The IPC itself shall have Locking mechanism to prevent loosening once installed. The connector shall maintain mechanical integrity for its entire service life.

4.4.16 The following sizes shall form part of this specification, and KPLC shall state the needed sizes and other rating parameters are as per Table 2 :

Table 2: Ratings

Parameter		**Specification**
Transformer LV Circuit to Lead signal cable connection Terminals	Main	50mmsq to 100 mmsq
	Tap	1.5mmsq to 2.5 mmsq
Dielectric withstand:		2.5 kV AC, 1 minute (per EN 50483-4).
Contact resistance		UV-stabilized, weather-resistant polymer in compliance with UL 746C, with tracking resistance (CTI ≥ 600).
Insulation resistance		≥ 1000 MΩ at 1000 VDC
Operational short-circuit performance		Tested as per BS EN 50483-4 Annex C.

4.5 Requirements for Current and voltage Cable Leads

4.5.1 The cable leads shall be designed and manufactured to IEC 60228 (conductors), IEC 60502 (insulation), IEC 60364 (LV installations), IEC 60529 (IP rating). IEC 60332-1-2(testing), IEC 62155(insulation material)

4.5.2 All cable leads shall be constructed using high-conductivity annealed copper conductors, Class 5 flexible type, and insulated with UV-resistant, halogen-free flame-retardant (HFFR) compound suitable for outdoor LV auxiliary wiring.

4.5.3 The cable leads shall have a minimum voltage rating of 600 VAC (1 kV insulation preferred in accordance with IEC 60502-1) and have a minimum continuous current rating of 5A.

4.5.4 The leads shall be minimum 3metres long, flexible, and suitable for outdoor routing on distribution transformer structures and cable management systems.

4.5.5 The insulation and sheathing shall be UV-resistant, ozone-resistant, and moisture-resistant, compliant with IEC 60502 tropical weathering tests and with ingress protection of IP67.

4.5.6 The cable lead outer jacket shall be resistant to oils, transformer mineral oil vapours, weak acids, abrasion, and mechanical impact.

4.5.7 The Insulation resistance shall not be less than 0.5MΩ/m at 20°C, measured in accordance with IEC 60245 or IEC 60502-1 and comply with Conductor resistance of Class 5 values as defined in IEC 60228.

4.5.8 The cable leads shall have a minimum size of 1.5mmsq and maximum size of 2.5mmsq, Single core insulated, with dielectric withstand capability shall be 2.0 kV for 5 minutes without breakdown.

4.5.9 The cable leads shall be colour-coded for phase and signal classification in accordance with IEC 60446 (or IEC 60364 where harmonized) Red, Yellow, Blue – Phase voltage leads and Black – Current transformer secondary signal leads. The colours shall be integral to the insulation, UV-stable, and non-fading under tropical outdoor exposure

4.5.10 The cable shall have a minimum bend radius of 8 × cable diameter and withstand mechanical vibration typical of pole-mounted or ground-mounted transformer installations.

4.5.11 The lead cables shave be designed for operation temperature ranges of –20°C to +80°C continuous, with short-term excursions to 100°C.

4.5.12 The CT-side of cable lead termination shall be fitted with M5 forked spade lugs, suitable for pan-head screw terminals on LVCT secondary terminals.

4.5.13 The DCU and Piecing Connector side shall be fitted with factory-crimped pin or ferrule terminals rated for the conductor size, compliant with IEC 61210 (compression and mechanical connectors). All terminations shall be mechanically crimped using calibrated tooling, ensuring uniform conductivity and pull-out strength.

4.5.14 All metallic terminals shall be tin-plated copper to IEC 61238-1 for enhanced corrosion resistance, oxidation protection, and optimal electrical conductivity in humid and saline-prone environments.

4.5.15 The cable leads shall ensure accurate, low-loss signal transmission between LV Current Transformers, piecing connectors, and the Data Concentrator Unit (DCU).

5. TESTS REQUIREMENTS

The DCU accessories shall be inspected and tested in accordance with IEC 60529, IEC 60332, IEC 60502-1, IEC 60364, IEC 60332-1-2, BS EN 50483-1 and 50483-4, NFC 33-020, PIE-SA 1018-5, IEC 60695-2, and all requirements of this specification. The manufacturer shall be fully responsible for conducting, or having conducted, all specified tests. Tenderers shall confirm the manufacturer's testing capabilities and shall clearly declare any limitations in their tender submission.

5.1 Tests for Low Voltage Current Transformers (LVCTs)

i. IEC 61869-1 – General requirements for instrument transformers
ii. IEC 61869-2 – Additional requirements for current transformers
iii. IEC 60529 – IP rating
iv. IEC 60068 Series – Environmental testing

5.1.1 Type Tests

i. Verification of accuracy class (Class 0.2S)- (current error, phase displacement).
ii. Short-time thermal current test (Ith)
iii. Dynamic current withstand test (Idyn)
iv. Power-frequency withstand voltage test- secondary insulation ((IEC 61869-1, IEC 61869-2).
v. Insulation resistance test
vi. Temperature rise test
vii. Mechanical strength test (for split-core hinge and locking mechanism)
viii. Ingress Protection (IP65 minimum)
ix. EMC immunity and emissions

5.1.2 Routine/Production Tests

i. Polarity test
ii. Turns ratio verification
iii. Secondary winding resistance test
iv. Appearance and mechanical inspection
v. Continuity test of secondary circuit

5.2 Tests for Insulated Piercing Connectors (IPCs)

i. BS EN 50483-1 & 50483-4 – ABC accessories tests
ii. NFC 33-020 – LV overhead accessories
iii. PIE-SA 1018-5 – Insulated connectors
iv. IEC 60529 – IP rating
v. IEC 60695-2 – Fire hazard testing
vi. IEC 60068-2 – Environmental testing
vii. UL 746C – Polymer material performance

5.2.1 Type Tests

i. Voltage withstand test
ii. Water immersion dielectric test

iii. Mechanical tensile strength test
iv. Conductor pull-out test
v. Contact resistance test ≤ 0.5 mΩ after mechanical cycling.
vi. Thermal cycle test / overload test
vii. Corrosion resistance test;Salt fog test (ISO 9227)&Wet SO_2 corrosion test
viii. Penetration test of teeth (without conductor damage)
ix. Fire and flame retardance test
x. UV ageing resistance
xi. Torque shear-head calibration test

5.2.2 Routine/Production Tests

i. Visual and dimensional inspection
ii. Verification of correct torque-shear operation
iii. Sealing integrity check
iv. Mechanical integrity of bolts and body

5.3 Tests for Voltage and Current Signal Lead Cables

i. IEC 60228 – Conductors
ii. IEC 60502-1 – Power cable insulation and sheathing
iii. IEC 60364 – LV electrical installations
iv. IEC 60332-1-2 – Flame propagation test
v. IEC 60529 – IP rating
vi. IEC 60068-2 – Temperature, humidity, vibration
vii. IEC 60811 – Mechanical tests on cable insulation and sheath

5.3.1 Type Tests

i. Conductor resistance test (DC resistance at 20°C)
ii. Insulation resistance test-Minimum 0.5MΩ/m (or as specified).
iii. Dielectric withstand test
iv. Voltage rating confirmation test (600 VAC)
v. Flame retardance test.
vi. Tensile strength and elongation of insulation
vii. Thermal ageing test
viii. UV/weathering resistance test (for outdoor use)
ix. Oil and chemical resistance test (where applicable)
x. Ingress protection (IP67 when assembled with terminals)

xi. Bending/vibration endurance
xii. Cold bend / cold impact test

5.3.2 Routine/Production Tests

i. Conductor continuity test
ii. High-voltage test on completed cable
iii. Dimensional and visual inspection of terminals and ferrules
iv. Crimp pull-out test for terminals
v. Marking and color coding verification

5.4 Acceptance Tests

5.4.1 The successful bidder/manufacturer shall arrange to conduct a Factory Acceptance Test (FAT) for the manufactured Accessories. The Factory Acceptance Test may or may not include that of the DCU. At least two (2) Engineers/Technicians shall attend the FAT.

5.4.2 The training that will be done together with that of the DCU and shall include theory of use followed by practical demonstrations on how to install the accessories on a live network and a guide on how correct use for achieving correct measurement results. All the operational procedures shall be exhaustively explained and demonstrated.

5.4.3 The manufacturer shall plan adequate time for the training which shall be conducted by the manufacturer's expert. The duration and location of the training shall be determined by the manufacturer.

5.4.4 The training shall be dimmed successful once the engineers/technicians are able to install, test and have the accessories working in a power measurement circuit

5.4.5 The manufacturer shall meet all the total cost of the factory training.

6.0 MARKING AND PACKING

6.1. MARKING

The following information shall be marked legibly and permanently on the DCU Accessories

a) The Manufacturer's Name or Trade Mark;
b) Voltage designation
c) Model Number
d) Serial Number;
e) Letters "Property Of Kenya Power & Lighting Plc "

6.2. PACKING

6.2.1. The Accessories or any part of it shall be packed in a carrying case so as to protect it from damage and entry of moisture during transportation, handling and storage.

6.2.2. The carrying case shall be shock proof and impact resistant and shall be able to withstand a fall of DCU Accessories kit

7.0 WARRANTY

7.1 The DCU Accessories shall be backed by a minimum of 36-months warranty period.

7.2 The bidder shall submit along with other required technical data, the Warranty Form Signed and Stamped by the manufacturer.

7.3 Technical support applicable shall be provided free of charge to KPLC for a period of not less than 24 months.

APPENDICIES:

A: TESTS AND INSPECTION (Normative)

A.1 It shall be the responsibility of the supplier to test or to have all the relevant tests performed on the Accessories. Each Accessory unit0including the CTs shall be factory calibrated; a supply calibration certificate showing measured ratio error and phase displacement at specified points (In, 0.1In, 5In, etc.).

A.2 Copies of previous Test/calibration Reports of DCU Accessories issued by own or a third party testing laboratory that is accredited to ISO/IEC 17025:2005 or 17025:2017 shall be submitted with the tender for the purpose of technical evaluation. A copy of the accreditation certificate for the testing laboratory shall also be submitted with the tender (all in English Language). Any translations of certificates and test reports into English language shall be signed and stamped by the Testing Authority.

A.3 On receipt of the Accessories, Kenya Power will inspect the items and may perform relevant tests in order to verify compliance with the specification. The supplier shall replace without charge to Kenya Power, any Accessories or part of its unit which upon test or use fail to meet any or all of the requirements in the specification.

B: QUALITY MANAGEMENT SYSTEM (Normative)

B.1 The Manufacturer shall submit a Quality Assurance Plan (QAP) that will be used to ensure that the Accessories physical properties, tests and documentation, fulfill the requirements stated in the contract documents, standards, specifications and regulations. The QAP shall be based on and include relevant parts to fulfill the requirements of ISO 9001: 2015.

B.2 The manufacturer shall submit a Declaration of Conformity to all applicable standards, together with valid quality management certifications, including a current ISO 9001:2015 certificate, as part of the tender submission for evaluation.

C: TECHNICAL DOCUMENTATION (Normative)

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

a) Fully filled clause by clause guaranteed technical particulars (GTP) signed by the manufacturer;

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

c) Records for previous projects, local or foreign, for the items;

d) Details of manufacturing capacity and the manufacturer's experience;

e) Copies of required test/calibration reports of testing/calibrating laboratory accredited to ISO/IEC 17025;

f) Copy of accreditation certificate to ISO/IEC 17025 for the testing/calibrating laboratory;

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

h) Manufacturer's warranty subject to 12 months from date of delivery of items to KPLC stores.

i) Operational and service manual for the items.

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) stamped and signed by the manufacturer

b) Drawings of the DCU Accessories to be manufactured for KPLC.

c) Product operation manuals and brochures,

d) Quality assurance plan (QAP) 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) Marking details and method to be used in marking the DCU Accessories;
f) All documentation necessary for safety of the equipment.
g) Packaging details (including packaging materials).

C.3. The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the DCU Accessories KPLC stores.

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F. GUARANTEED TECHNICAL PARTICULARS

To be filled and signed by the Manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, all in English Language)

Tender No. .....

Clause Number	KPLC Requirements	Bidder's Offer (indicate full details)
Name and Address of Manufacturer		State
Country of Manufacturer		State
Name & Address of Bidder		State
Type/ Model No.		State
1.	Scope	State
2	Normative References	State
3	Terms and Definitions	State
4	**REQUIREMENTS**	
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4.2.3	Corrosion resistance mechanism on Accessories	State
4.2.4	Insulation requirements and thresholds on Accessories	describe
4.2.5	Provisions of IEC 61000 and its benefit to smart metering	describe
4.2.6	Compatibility design between Accessions and the DCU	List
4.3	**Requirements for Low Voltage Current Transformer(LVCT)**	
4.3.1	Standard of design and manufacturing	State
4.3.2	Outdoor application design requirements for a LVCT	describe
4.3.3	The type of CT in offer and its benefits to installation challenges.	State
4.3.4	Design provision for use on 4x cable circuits and mechanisms for CT attachments	State
4.3.5	Mechanism for low loss, high efficiency current transformer	State
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4.3.8	The CTs designs and compatibility with other related devices	State
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4.3.10	The secondary circuit current	State
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Clause Number	KPLC Requirements		Bidder's Offer (indicate full details)
4.3.12	**The Ratings**		
4.3.12.1	Voltage ratings for the LVCT		State
4.3.12.2	Current ratings for the LVCT, Primary and Secondary		Specify
4.3.12.3	The CT ratios to be that can be provided		State
4.3.12.4	The Metering accuracy of the CT		State
4.3.12.5	Power frequency withstand of the CT coil		State
4.3.12.6	Fault and dynamic current withstand of the current transformer		State
4.3.12.7	Performance characteristics of the current transformer		State
4.3.12.8	**Distribution Transformer Metering LVCT Ratings**		
	No	**Parameter**	State
	1	Primary rating	State
	2	Available primary taps/ratios	State
	3	Secondary rating	State
	4	Frequency:	State
	5	Rated continuous burden:	State
	6	Accuracy classes (metering	State
	7	Thermal rating (continuous thermal, Ith):	State
	8	Short-time thermal (Ith):	State
	9	Dynamic withstand current (peak):	State
	10	Max burden	State
	11	IP rating	State
4.4	**Requirements for Insulated Piercing Connectors (IPC)**		
4.4.1	Standard of design and manufacturing		State
4.4.2	Service voltage		State
4.4.3	The IPC design and installation shall not interfere or interrupt power during installation		State
4.4.4	The operational design mechanism for Insulated Piecing Connector		State
4.4.5	The contact plate material and mechanism for moisture ingress management		State
4.4.6	Number of IPC per transformer LV circuit		State
4.4.7	Application suitability and conductor size of application		State
4.4.8	Weather and moisture proof provisions on the IPC		State
4.4.9	Ingress Protection mechanisms and tests		describe
4.4.10	Maximum working temperature and fire/flame resistance designs		State

Clause Number	KPLC Requirements			Bidder's Offer (indicate full details)
4.4.11	Design f provision or corrosion withstance			State
4..4.12	Material of manufacture and expected service life			State
4.4.13	Dielectric withstand of and contact resistance of the Piecing connector			State
4..4.14	Design Protection against electrical shock during live installation			State
4.4.15	Any locking mechanism employed on the Piecing Connector			State
4.4.16	**Ratings Table 2**			
	1	Transformer LV Circuit to Lead signal cable connection Terminals	Main	State
			Tap	State
	2	Dielectric withstand:		State
	3	Contact resistance		State
	4	Insulation resistance		State
	5	Operational short-circuit performance		State
4.5	**Requirements for Current and voltage Cable Leads**			
4.5.1	Standard of design and manufacturing			State
4.5.2	Cable lead material of manufacture and general design features.			State
4.5.3	Current and voltage ratings for the leads.			State
4.5.4	Length of the leads			State
4.5.5	Ingress protection and other outer cover protection			State
4.5.6	Cover and jacketing protection against oils, acids and vapour			State
4.5.7	Insulation resistance and conductor resistance,			State
4.5.8	Size of the cable leads and dielectric requirements in offer			State
4.5.9	Colour coding for phase discrimination of cable leads			State
4.5.10	Flexibility and suitability outdoor rugged application.			State
4.5.11	Nominal and maximum service temperatures for cable leads			State
4.5.12	Size and type of terminations for cable leads			State
4.5.13	Design and methodology of crimping the terminals			State
4.5.14	Corrosion resistance specifications for the cable leads(terminals)			State
4.5.15	Functional requirements of cable leads			State
5.0	**TESTS REQUIREMENTS**			
5.1	Tests for Low Voltage Current Transformers			State
5.1.1	Type Tests			State
5.1.2	Routine/Production Tests			State
5.2	**Tests for Insulated Piercing Connectors (IPCs**			State
5.2.1	Type Tests			State
5.2.1	Routine/Production Tests			State

Clause Number	KPLC Requirements	Bidder's Offer (indicate full details)
5.3	Tests for Voltage and Current Signal Lead Cables	State
5.3.1	Type Tests	State
5.3.2	Routine/Production Tests	State
5.4	Acceptance Tests	State
6.0	**MARKING AND PACKING**	
6.1	Marking details.	List
6.2	Packing requirement	Provide
7.0	**WARRANTY**	
7.1	Duration of Warranty	State
7.2	Submission of Warranty Form	State
7.3	Duration of technical support after sales	State
APPENDICES		
A	**TEST AND INSPECTION**	
A.1	Responsibility to test	Submit
A.2	Copies and Test reports, brochure and other technical data	Submit
A.3	Post-delivery tests and replacement without charge for faulty or malfunctions	
B	**QUALITY MANAGEMENT SYSTEMS**	
B.1	Submission of QAP	Submit
B.2	Declaration of Conformity and ISO 9001:2015 certificate	Submit
C	**TECHNICAL DOCUMENTATION**	
C.1	Documents to be submitted during tender	Submit
C.2	Documents submitted for approval before manufacture	Submit
C.3	Recommendations for use, care, safety precaution, storage and routine inspection/testing procedures	Submit
Statement of compliance to specification (indicate deviations if any & supporting documents)		State

NOTE:

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

2) Bidders should note that there is conflict between the GTPs and the clauses in the specification, the clauses in the specification take precedence. Failure to complete the schedules shall lead to rejection of the bid.

*3) Guaranteed values shall be specified. * Words like 'agreed', 'confirmed', 'As per KPLC specifications', etc. shall not be accepted and shall be considered non-responsive.*

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Manufacturer's Name, Signature, Stamp and Date