

DOCUMENT NO.: KP1/6C/4/1/TSP/14/057



Kenya Power

CURRENT TRANSFORMER (CT) ANALYSER EXPANDER - SPECIFICATION

A Document of The Kenya Power & Lighting Co. Ltd.
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TITLE:
**CURRENT TRANSFORMER
 (CT) ANALYSER EXPANDER
 - SPECIFICATION**

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0.1 CIRCULATION LIST

COPY NO.	COPY HOLDER
1	Manager, Standards
2	Electronic copy (pdf) on Kenya Power server (http://172.16.1.40/dms/browse.php?fFolderId=23)

REVISION OF KPLC STANDARDS

To keep abreast of progress in the industry, KPLC Standards shall be regularly reviewed. Suggestions for improvements to approved Standards, addressed to the Manager, Standards Department, are welcome.

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Users are reminded that by 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 a retrieval system by any means without prior permission from the Managing Director & CEO, KPLC.

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0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Issue 1, Rev 0	2019-03-01	New issue	Eng. S. K Nguli	Dr (Eng) P. Kimemia

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FOREWORD

This specification has been prepared by the Standards Department in collaboration with Energy Management Department, both of The Kenya Power and Lighting Co. Ltd (KPLC) and it lays down requirements for the Current Transformer Analyzer Expander (CT Analyzer Expander), which will increase efficiency and cut down-time of testing and verification of Current Transformers both within the Meter Central Laboratory and out in the field.

This specification stipulates the minimum requirements for the CT Analyzer Expander acceptable for use in the company and it shall be the responsibility of the supplier and manufacturer to ensure that the offered design is of the highest quality and guarantees excellent service to KPLC, good workmanship and good engineering practice in the manufacture of the CT Analyzer Expander for KPLC.

The following are members of the team that developed this specification:

Name	Division
Patricia Ngaanga	Customer Service
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Robert Chitepo	Customer Service
Stephen Nguli	Standards

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1. SCOPE

- 1.1. This specification is for the Current Transformer (CT) Analyzer Expander for testing current transformers with Omicron CT Analyzer.
- 1.2. The specification stipulates the IEC standards, minimum requirements of the CT Analyzer Expander 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.

IEC 60529 edition 2.2.2013: Degrees of protection provided by enclosures (IP Code)

IEC 60068-2-27 Basic Environment testing procedures – Part 2: Tests – Test Ea and guidance: Shock

IEC/EN 60068-2-6 Environment testing - Part 2: Tests – Test Fc: Vibration (sinusoidal)

IEC 60044-1 :2013 Instrument Transformers, Part1: Current transformers

BS 1363-2: 2016+A1:2017 :13 A plugs, socket-outlets, adaptors and connection units. Specification for 13 A switched and unswitched socket-outlets

3. DEFINITIONS AND ABBREVIATIONS

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

- IEC: International Electro-Technical Commission
- ISO: International Organization for Standardization
- KPLC: Kenya Power & Lighting Co. Ltd.

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4. REQUIREMENTS

4.1. SERVICE CONDITIONS

The CT Analyzer Expander shall be suitable for use both indoors and outdoors in tropical areas and harsh climatic conditions including areas exposed to:

- a) At altitudes of up to 2200m above sea level
- b) Humidity of up to 95%,
- c) Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C and
- d) Pollution: Design pollution level to be taken as “Heavy” (Pollution level III) for inland and “Very Heavy” (Pollution level IV) for coastal applications.
- e) Isokeraunic levels of up to 180 thunderstorm days per year.

4.2. DESIGN FEATURES

- 4.2.1. The CT Analyzer Expander’s casing shall be made of robust material, able to withstand shocks as per IEC/EN 60068-2-27 and vibrations as per IEC/EN 60068-2-6.
- 4.2.2. The terminals of the testing points shall not be exposed in order to prevent any exposure to electrical shocks.
- 4.2.3. The terminal test points shall be able to test single-core, multi-core, and multi-tapped current transformers.
- 4.2.4. The CT Analyzer Expander shall conform to the degree of protection of at least IP20 according to IEC 60529.
- 4.2.5. The CT Analyzer Expander shall have an external electrical power supply cable of not less than 2 meters in length.
- 4.2.6. The power supply cable provided with the CT Analyzer Expander shall have dimensions as per BS 1363-2: 2016 +A1:2017 :13
- 4.2.7. The CT Analyzer Expander dimensions shall not exceed the following values:
Width: 290 mm, Length: 235 mm, Height: 75 mm

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4.3. COMMUNICATION

The CT Analyzer Expander shall have provision for communication for:

- 4.3.1 PC interface - On the CT Analyzer Expander to exclusively connect the CT Analyzer Expander to a computer.
- 4.3.2 CT Analyzer interface - On the CT Analyzer Expander to exclusively connect the CT Analyzer Expander to a CT Analyzer.

4.4. FUNCTIONALITY AND LOAD CONTROL

- 4.4.1. The CT Analyzer Expander shall carry out single ratio and Multi-ratio CT testing.
- 4.4.2. The CT Analyzer Expander shall carry out automatic testing of multi-ratio CTs with a minimum of 6 (six) tap connections. With the CT Analyzer Expander, the CT Analyzer shall be able to measure every tap combination of multi-ratio CTs without any need of changing the wiring during the test.
- 4.4.3. The CT Analyzer Expander shall carry out automatic burden measurements without any need of wiring changes during the test.
- 4.4.4. The CT Analyzer Expander shall carry out automatic Primary Winding Resistance measurements without any need of wiring changes during the test.
- 4.4.5. The CT Analyzer Expander's Output voltage shall not exceed 150V.
- 4.4.6. The CT Analyzer Expander shall have protection for overload and short circuits

4.5. COMPUTER AND SOFTWARE REQUIREMENTS

- 4.5.1. The CT Analyzer Expander shall be supplied with one laptop computer, pre-loaded with the CT Analyzer Expander software, at no extra cost.
- 4.5.2. The software shall be able to calibrate the CT Analyzer Expander.
- 4.5.3. The software shall have troubleshooting capability.
- 4.5.4. The software shall have the following functions:
 - a) Automatic control: this function allows the user to perform tests automatically.
 - b) Manual control: This function allows the user to perform tests on manual mode.

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- 4.5.5 The software shall allow the user to save and view test results in a format that cannot be edited.
- 4.5.6 The software shall allow customization of the test reports (e.g. utility logo, name, date, etc.) and to exporting of the test results for analysis in Excel.
- 4.5.7 The software shall allow for Retrieval and printing of the results.

4.6. SUPPLY VOLTAGE

- 4.6.1 The CT Analyzer Expander shall be operated from main power with reference values of (100-230V) $\pm 10\%$ at a frequency of 50 Hz $\pm 10\%$.

5. TESTS REQUIREMENTS

The CT Analyzer Expander shall be inspected and tested in accordance with the requirements of IEC 60044-01;2003 and other relevant standards and provisions of this specification.

6. MARKING, LABELLING AND PACKING

- 6.1. The CT Analyzer Expander shall be marked legibly and indelibly in English with the following information:
- a) Name and trade mark of the manufacturer;
 - b) Country of origin;
 - c) Type/model;
 - d) Serial no;
 - e) The inscription "Property of The Kenya Power & Lighting Co. Ltd."
 - f) Month and year of manufacture.
- 6.2. The CT Analyzer Expander shall be packaged in such a manner as to minimize damage and entry of moisture during transportation and handling.

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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 in IEC 60044-1:2013, this specification and other appropriate standards. 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 CT Analyzer Expander shall be subject to acceptance tests at the manufacturer's premises before dispatch. Tests shall be witnessed by two or more Engineers appointed by The Kenya Power and Lighting Company Limited (KPLC).

A.4 Testing Facility

A.4.1 The bidder shall provide current e-mail address, fax and telephone numbers and contact person at the Testing Laboratory where Type Tests and Special Tests were carried out.

A.4.2 All test and measuring equipment to be used during acceptance testing shall have been calibrated and copies of valid calibration certificates shall be provided to KPLC Engineers. A detailed list of workshop tools, test/measuring equipment and list of tests that can be carried out by the manufacturer shall be submitted with the tender for evaluation.

A.5 Test reports

Test reports for the CT Analyzer Expander shall be submitted to The Kenya Power and Lighting Company for approval before shipment.

A.6 Inspection on Delivery

During delivery of the CT Analyzer Expander, KPLC will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification. The supplier shall replace/rectify without charge to KPLC, failure of the CT Analyzer Expander to meet any or all of the requirements in the specification. The supplier shall commission and conduct training on operation of the CT Analyzer Expander.

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B. QUALITY MANAGEMENT SYSTEM (Normative)

- B.1 The bidder shall submit a quality assurance plan (QAP) that will be used to ensure that the CT Analyzer Expander 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.
- B.2 The Manufacturer's Declaration of Conformity to applicable standards, this specification 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 the CT Analyzer Expander. A detailed list and contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for exact or similar CT Analyzer Expander sold in the last five years shall be submitted with the tender for evaluation.

C. DOCUMENTATION AND DEMONSTRATION (Normative)

- C.1 The bidder shall submit its tender complete with technical documents required by Appendix D (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, CT Analyzer Expander drawings and wiring diagrams and technical data showing description leaflet, programming details and manuals,
 - c) Sales records for the last five years and at least four customer reference letters,
 - d) Details of manufacturing capacity and the manufacturer's experience.
 - e) Copies of required type test certificates and type test reports by a third-party testing laboratory accredited to ISO/IEC 17025,
 - f) Copy of accreditation certificate to ISO/IEC 17025 for the third-party testing laboratory,
 - g) Manufacturer's warranty and guarantee; subject to 5 years from date of delivery to KPLC laboratory.
 - h) Manufacturer's letter of authorization, copy of the manufacturer's ISO 9001:2008/15 certificate, ISO 17025:2005/17 certificate.
- C.2 The successful bidder (supplier) shall submit the following documents/details to The Kenya Power & Lighting Company for approval before manufacture:

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- a) Fully filled clause by clause Guaranteed Technical Particulars (GTP) signed by the manufacturer,
 - b) Design drawings and wiring diagrams of the CT Analyzer Expander,
 - c) In addition, a detailed Calibration Procedure and Service Manual specific to the CT Analyzer Expander shall be submitted.
 - d) A training schedule of the CT Analyzer Expander and software operation for KPLC staff operators on site,
 - e) Detailed test program to be used during factory testing,
 - f) Marking details and method to be used in marking the CT Analyzer Expander,
 - 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 CT Analyzer Expander for The Kenya Power & Lighting Company,
 - h) Packaging details (including packaging materials).
- C.3 The successful bidder and manufacturer shall demonstrate at their cost to at least two KPLC staff at the manufacturers' factory the operations of the CT Analyzer Expander

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D. GUARANTEED TECHNICAL PARTICULARS (Normative)

To be filled and signed by the manufacturer and submitted together with relevant copies of the Manufacturer's catalogues, brochures, drawings, technical data, sales records 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
	Description of item on offer	Specify
	Manufacturer's Name and address	Specify
	Country of Manufacture	Specify
	Bidder's Name and address	Specify
	Item on offer	Specify
1	Scope	State
2	Reference Standards	State
3	Specific requirements	State
4.1	Service Conditions a) At altitudes of up to 2200m above sea level b) Humidity of up to 95%, c) Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C and d) Pollution: Design pollution level to be taken as "Heavy" (Pollution level III) for inland and "Very Heavy" (Pollution level IV) for coastal applications. e) Isokeraunic levels of up to 180 thunderstorm days per year.	Specify
4.2	DESIGN FEATURES	
4.2.1	The CT Analyzer Expander's external casing shall be made of robust material, able to withstand shocks as per IEC/EN 60068-2-27 and vibrations as per IEC/EN 60068-2-6.	Specify

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4.2.2	The terminals of the testing points shall not be exposed to prevent any exposure to electrical shocks.	Specify
4.2.3	The terminal test points shall be able to test single-core, multi-core, and multi-tapped current transformers.	Specify
4.2.4	The CT Analyzer Expander shall conform to the degree of protection of at least IP20 according to IEC 60529.	Specify
4.2.5	The CT Analyzer Expander shall have an external electrical power supply cable of not less than 2 meters in length.	Specify
4.2.6	The power supply cable provided with the CT Analyzer Expander shall have dimensions as per BS 1363.	Specify
4.2.7	The CT Analyzer Expander dimensions	Specify
	The CT Analyzer Expander weight	Specify
4.3.	COMMUNICATION	
4.3.1	A PC interface on the CT Analyzer Expander to exclusively connect the CT Analyzer Expander to a computer.	specify
4.3.2	A CT Analyzer interface on the CT Analyzer Expander to exclusively connect the CT Analyzer Expander to a CT Analyzer	specify
4.4.	Functionality and Load Control	
4.4.1	The CT Analyzer Expander shall carry out single ratio and Multi-ratio CT testing.	Specify functions
4.4.2	Automatic testing of multi-ratio CTs with a minimum of 3 tap connections. With the CT Analyzer Expander, the CT Analyzer shall be able to measure every tap combination of multi-ratio CTs without any need of changing the wiring during the test.	Specify
4.4.3	The CT Analyzer Expander shall carry out automatic Burden measurements without any need of wiring changes during the test.	specify

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4.4.4	The CT Analyzer Expander shall carry out automatic Primary Winding Resistance measurements without any need of wiring changes during the test.	specify
4.4.5	The CT Analyzer Expander's Output voltage shall not exceed 150V	state
4.4.6	The CT Analyzer Expander shall have protection for overload and short circuits	State
4.5	Computer and Software Requirements	
4.5.1	laptop computer, pre-load with the CT Analyzer Expander software, at no extra cost.	Specify brand, manufacture and type
4.5.2	The software shall be able to calibrate the CT Analyzer Expander.	Specify the software used for this application
4.5.3	The software shall have Troubleshooting capability.	specify
4.5.4	The software shall have the following functions: a) Automatic control: this function allows the user to perform tests automatically. b) Manual control: This function allows the user to perform tests on manual mode.	specify
4.5.5	The software shall allow the user to save and view test results in a format that cannot be edited.	specify
4.5.6	The software shall allow customization of the test reports (e.g. utility logo, name, date, etc.) and to exporting of the test results for analysis in excel.	specify
4.5.7	The software shall allow for Retrieval and printing of the results.	state
4.6	SUPPLY VOLTAGE	

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4.6.1	The CT Analyzer Expander shall be operated from main power with reference values of: 230 V $\pm 10\%$ at a frequency of 50 Hz $\pm 10\%$.	state
5	TESTS REQUIREMENTS	
	The CT Analyzer Expander shall be inspected and tested in accordance with the requirements of IEC 60044-01;2003	List the Tests to carried out at the factory during FAT
6	MARKING, LABELLING AND PACKING	
6.1	The CT Analyzer Expander shall be marked legibly and indelibly in English	Specify the marking to marked on the CT analyzer expander and method of marking to be used
6.2	Packaging	Specify the method of packaging to be used
A	TESTS AND INSPECTION (Normative)	
A.1	The responsibility of the manufacturer to perform or to have performed all the tests specified and the manufacturer's capabilities in this regard when submitting tenders. Any limitations shall be clearly specified.	State and clarify any limitations
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.	Attach a copy of accreditation certificates
A.3	The CT Analyzer Expander shall be subject to acceptance tests at the manufacturer's premises before dispatch. Acceptance tests shall be witnessed by two Engineers appointed by The Kenya Power and Lighting Company Limited (KPLC)	List routine tests to be performed
	Tests and test conditions Acceptance tests given in IEC 60044-1:2013	Specify tests conditions
A.4	Testing Facility	

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A.4.1	The bidder shall provide current e-mail address, fax and telephone numbers and contact person at the Testing Laboratory where Type Tests and Special Tests were carried out.	List
A.4.2	All test and measuring equipment to be used during acceptance testing shall have been calibrated and copies of valid calibration certificates shall be provided to KPLC Engineers. A detailed list of workshop tools, test/measuring equipment and list of tests that can be carried out by the manufacturer shall be submitted with the tender for evaluation.	Give lists of tools and equipment to be used for this purpose
A.5	Test reports Test reports for the CT Analyzer Expander shall be submitted to The Kenya Power and Lighting Company for approval before shipment.	State compliance
A.6	Inspection on Delivery During delivery of the CT Analyzer Expander, KPLC will inspect them and may perform or have performed any of the relevant tests in order to verify compliance with the specification. The supplier shall replace/rectify without charge to KPLC, failure of the CT Analyzer Expander to meet any or all of the requirements in the specification. The supplier shall commission and conduct training on operation of the CT Analyzer Expander.	State compliance
B	QUALITY MANAGEMENT SYSTEM (Normative)	
B.1	The bidder shall submit a quality assurance plan (QAP) that will be used to ensure that the CT Analyzer Expander 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.	Attach copy of ISO certificate
B.2	The Manufacturer's Declaration of Conformity to applicable standards, this specification and copies of quality management	Statement of declaration

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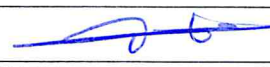
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	certifications including copy of valid and relevant ISO 9001 certificate shall be submitted with the tender for evaluation.	
B.3	The bidder shall indicate the delivery time of the CT Analyzer Expander. A detailed list and contact addresses (including e-mail) of the manufacturer's previous customers outside the country of manufacture for exact or similar CT Analyzer Expander sold in the last five years shall be submitted with the tender for evaluation.	Indicate
C	Documentation and Demonstration (Normative)	
C.1	Documents submitted with tender for evaluation	List
C.2	Documents to be submitted for approval before manufacture	List
C.3	Demonstration of the principle of operation at the factory	Specify

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 labeled drawings complete with dimensions, catalogues and/or brochures for the purpose of tender evaluation.
- 2) Bidders should note that the above Guaranteed Technical Particulars Schedules must be fully completed and submitted with the bid. Wherever 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', Yes, etc. shall not be accepted and shall be considered non-responsive.

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Manufacturer's Name, Signature, Stamp and Date

Issued by: Head of Section, Standards Development	Authorized by: Head of Department, Standards
Signed: 	Signed: 
Date: 2019-03-01	Date: 2019-03-01