



SPECIFICATION FOR TURNS RATIO CALIBRATION STANDARD

A Document of the Kenya Power & Lighting Co. Ltd
February 2026
Jah...
2026



**TITLE: TURNS RATIO
CALIBRATION STANDARD**

Doc. No.	
Issue No.	1
Revision No.	0
Date of Issue	2026-01-12
Page 2 of 18	

TABLE OF CONTENTS

0.1 CIRCULATION LIST	3
0.2 AMENDMENT RECORD.....	4
FOREWORD.....	5
1. SCOPE.....	6
2. NORMATIVE REFERENCES.....	6
3. DEFINITIONS AND ABBREVIATIONS	7
 3.1. ABBREVIATIONS	7
4. REQUIREMENTS.....	8
 4.1. SERVICE CONDITIONS	8
 4.2. DESIGN AND CONSTRUCTION	8
5. TESTS REQUIREMENTS	9
6. MARKING AND PACKING.....	10
 6.1. MARKING	10
 6.2. PACKING	10
APPENDICIES	11
 A: TESTS AND INSPECTION (Normative)	11
 B: QUALITY MANAGEMENT SYSTEM (Normative)	11
 C: DOCUMENTATION AND DEMONSTRATION (Normative).....	12
 D: GUARANTEED TECHNICAL PARTICULARS (Normative)	14

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**TITLE: TURNS RATIO
CALIBRATION STANDARD**

Doc. No.	
Issue No.	1
Revision No.	0
Date of Issue	2026-01-12
Page 3 of 18	

0.1 CIRCULATION LIST

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CALIBRATION STANDARD**

Doc. No.	
Issue No.	1
Revision No.	0
Date of Issue	2026-01-12
Page 4 of 18	

0.2 AMENDMENT RECORD

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
0	2026-01-19	New issue	George Welimo 	

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 Kenya Power	TITLE: TURNS RATIO CALIBRATION STANDARD	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2026-01-12
		Page 5 of 18	

FOREWORD

This specification has been prepared by the Electrical Plant of The Kenya Power and Lighting Company Limited (KPLC) and it lays down requirements for Turns ratio calibration standard.

The Turns ratio calibration standard is intended for use by the Electrical Plant for field ratio and phase verification of any transformer ratio instrument.

This specification was prepared to establish and promote uniform requirements for Turns ratio calibration standard to be used at Kenya Power and Lighting Company Ltd.

There are no other specifications in this series.

This specification stipulates the minimum requirements for Turns ratio calibration standard acceptable for use in the company and it shall be the responsibility of the suppliers 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 Turns ratio calibration standard for KPLC.

Users of Kenya Power specifications are responsible for their correct interpretation and application.

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 Kenya Power	TITLE: TURNS RATIO CALIBRATION STANDARD	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2026-01-12
		Page 6 of 18	

1. SCOPE

- 1.1. This specification is for Turns ratio calibration standard for use by company's Electrical Plant.
- 1.2. The specification covers requirements, design, inspection and tests and schedule of Guaranteed Technical Particulars of Turns ratio calibration standard.

2. NORMATIVE REFERENCES

The following standards contain provision 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 61557: Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c - Equipment for testing, measuring or monitoring of protective measures - Part 1: General requirements;

IEC 60815: Selection and dimensioning of high voltage insulators intended for use in polluted conditions -Part 1: Definitions, information and general principles

OIML D 11: General Requirements for Measuring Instruments - Environmental Conditions

IEC 61000: Electromagnetic Compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test; – Part 6-2: Generic standards – Immunity for Industrial environment.

IEC 60529: Degrees of protection provided by enclosures (IP code)

ISO 9001: Quality Management systems – Requirements

ISO/IEC 17025: General Requirements for the competence of testing and calibration laboratories

IEC 61010 - Safety requirements for electrical equipment for measurement, control, and laboratory use. During a test, software will perform safety checks before applying full test voltage.

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 Kenya Power	TITLE: TURNS RATIO CALIBRATION STANDARD	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2026-01-12
		Page 7 of 18	

3. DEFINITIONS AND ABBREVIATIONS

For the purpose of this specification, the definitions and abbreviations given in the reference standards shall apply together with the following abbreviations.

3.1. ABBREVIATIONS

KPLC - Kenya Power and Lighting Company Limited

ISO - International Organization for Standardization.

LED -Light Emitting Diode

Kg -Kilogram

KV - Kilovolt

IP – Ingress Protection

LV – Low Voltage

EMC – Electromagnetic Compatibility

EU – European Union

AC-Alternating Current

DC-Direct Current

IEC-

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 Kenya Power	TITLE: TURNS RATIO CALIBRATION STANDARD	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2026-01-12
		Page 8 of 18	

4. REQUIREMENTS

4.1. SERVICE CONDITIONS

4.1.1 The Turns ratio calibration standard shall be suitable for use outdoors in tropical areas and harsh climatic conditions including areas exposed to:

- Altitudes of up to 2000m above sea level;
- Humidity of up to 95%;
- Average ambient temperature of +30°C with a minimum of -1°C and a maximum of +40°C
- Pollution: Degree 2

4.2. DESIGN AND CONSTRUCTION

4.2.1. The Resistance calibration standard shall be used as a portable check standard for field ratio and phase verification of any transformer ratio instrument.

4.2.2. The Resistance calibration standard shall be used with any single phase or three phase ratio meters.

4.2.3. The Resistance calibration standard shall provide ratios in both step down and step up test modes.

4.3. It shall have the technical particulars as shown in table 1 below:

Table 1: Technical particulars of Turns ratio calibration standard

Parameter	Requirement
Step Down Voltage	< 250V AC
Step Up Voltage	< 8VAC
Ratios for Step down mode	1:1, 2:1, 4:1, 8:1, 16:1, 32:1, 64:1, 128:1 256:1, 512:1, 1024:1, 2048:1
Ratios for Step up mode	1:1, 2:1, 4:1, 8:1, 16:1, 32:1

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 Kenya Power	TITLE: TURNS RATIO CALIBRATION STANDARD	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2026-01-12
		Page 9 of 18	

4.4. DOCUMENTATION AND SUPPORT

4.4.1. Warranty and training

- 4.4.1.1. The Turns ratio calibration standard shall be backed by a minimum of 12-months factory warranty.
- 4.4.1.2. Technical support and software upgrade, where applicable shall be provided free of charge to KENYA POWER for a period of not less than 36 months.
- 4.4.1.3. The Bidder shall submit a clause by clause statement of compliance with the specifications together with copies of the manufacturer's catalogues, brochures, technical data and proven test reports clearly marked to support each clause, all in English for evaluation. The manufacturer's type reference/designation of the item offered shall be indicated

5. TESTS REQUIREMENTS

- 5.1. The Turns ratio calibration standard shall be inspected and tested in accordance with standards and this specification. 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.
- 5.2. Copies of previous Test/calibration Reports issued by own or a third party testing laboratory that is accredited to ISO/IEC 17025:2005 or 17025:2017 confirming accuracy and compliance of the Turns ratio calibration standard offered shall be submitted with the offer for evaluation (all in English Language). A copy of the **accreditation certificate** and the **scope of accreditation** of the testing/calibrating laboratory shall also be submitted. Any translations of certificates or reports into English language shall be signed and stamped by the Testing/Calibrating Authority that carried out tests/calibration. Copies of test/calibration reports for the Turns ratio calibration standard offered to be submitted for tender evaluation shall include the following
 - 5.2.1. Measured values of the standard equipment
 - 5.2.2. Indicated values of the unit under test (Turns ratio calibration standard offered)
 - 5.2.3. Expanded Relative uncertainty

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 Kenya Power	TITLE: TURNS RATIO CALIBRATION STANDARD	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2026-01-12
		Page 10 of 18	

5.2.4. Details of standard and reference equipment used in calibration tests.

6. MARKING AND PACKING

6.1. MARKING

The following information shall be marked legibly and in a permanent manner on the Turns ratio calibration standard:

- a) The manufacturer's name or trade mark;
- b) The type reference number / model number;
- c) The serial number;
- d) Letters "PROPERTY OF KENYA POWER"
- e) The instructions for handling and use (in the English Language).

6.2. PACKING

- 6.2.1. The Turns ratio calibration standard 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 shock proof and impact resistant and shall be able to withstand a fall of one meter without damage to Turns ratio calibration standard.

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 Kenya Power	TITLE: TURNS RATIO CALIBRATION STANDARD	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2026-01-12
		Page 11 of 18	

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.

A.2 Copies of previous Test/calibration Reports of Turns ratio calibration standard 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 Turns ratio calibration standard, Kenya Power 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 without charge to Kenya Power, any Turns ratio calibration standard which upon examination, test or use fail to meet any or all of the requirements in the specification.

B: QUALITY MANAGEMENT SYSTEM (Normative)

B.1 The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the Turns ratio calibration standard physical properties, tests 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.

B.2 The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001:2015 certificate shall be submitted with the tender for evaluation.

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 Kenya Power	TITLE: TURNS RATIO CALIBRATION STANDARD	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2026-01-12
		Page 12 of 18	

B.3 The bidder shall indicate the delivery time of the equipment, manufacturer's monthly & annual production capacity and experience in the production of the Turns ratio calibration standard being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the Turns ratio calibration standard sold in the last five years as well as reference letters from at least four of the customers 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 for tender evaluation. The technical documents to be submitted (all in English language) for tender evaluation shall include the following:

- Fully filled clause by clause guaranteed technical particulars (GTP) signed by the manufacturer;
- Copies of the Manufacturer's catalogues, brochures, drawings giving all relevant dimensions, Wiring diagram / Schematic Diagram and technical data;
- Sales records for the last five years and at least four customer reference letters;
- Details of manufacturing capacity and the manufacturer's experience;
- Copies of required test/calibration reports of testing/calibrating laboratory accredited to ISO/IEC 17025;
- Copy of accreditation certificate to ISO/IEC 17025 for the testing/calibrating laboratory;
- Manufacturers letter of authorization, ISO 9001:2015 certificate, and other technical documents required in the tender.
- Manufacturer's warranty and guarantee; subject to 12 months from date of delivery to KPLC stores
- Operational manual.
- Service manual.

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		Issue No.	1
		Revision No.	0
		Date of Issue	2026-01-12
		Page 13 of 18	

C.2 The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of Turns ratio calibration standard to KPLC Isiolo road stores

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**TITLE: TURNS RATIO
CALIBRATION STANDARD**

Doc. No.	
Issue No.	1
Revision No.	0
Date of Issue	2026-01-12
Page 14 of 18	

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	Requirement	Bidder's offer
	Manufacturer's Name and address	State
	Country of Manufacture	State
	Name and model Number	State
1.	Scope	State
2.	Normative References	State
3.	Definitions and Abbreviations	State
3.1.	Abbreviations	State
4.1.	SERVICE CONDITIONS	
4.1.1	The Turns ratio calibration standard shall be suitable for use outdoors in tropical areas and harsh climatic conditions including areas exposed to:	
a)	Altitudes above sea level;	State
b)	Humidity ;	State
c)	Average ambient temperature	state
d)	Pollution:	state

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 Kenya Power	TITLE: TURNS RATIO CALIBRATION STANDARD	Doc. No.	
		Issue No.	1
		Revision No.	0
		Date of Issue	2026-01-12
		Page 15 of 18	

Clause number	Requirement	Bidder's offer										
4.2.	DESIGN AND CONSTRUCTION											
4.2.1.	Portable check standard for field ratio and phase verification of any transformer ratio instrument.	State										
4.2.2.	Used with any single phase or three phase ratio meters.	State										
4.2.3.	Provide ratios in both step down and step up test modes.	State										
4.3.	It shall have the technical particulars as shown in table 1 below:											
	<table border="1"> <thead> <tr> <th>Parameter</th> <th>Requirement</th> </tr> </thead> <tbody> <tr> <td>Step Down Voltage</td><td>Specify</td></tr> <tr> <td>Step Up Voltage</td><td>Specify</td></tr> <tr> <td>Ratios for Step down mode</td><td>Specify</td></tr> <tr> <td>Ratios for Step up mode</td><td>Specify</td></tr> </tbody> </table>	Parameter	Requirement	Step Down Voltage	Specify	Step Up Voltage	Specify	Ratios for Step down mode	Specify	Ratios for Step up mode	Specify	
Parameter	Requirement											
Step Down Voltage	Specify											
Step Up Voltage	Specify											
Ratios for Step down mode	Specify											
Ratios for Step up mode	Specify											
4.4.1.	Warranty and training											
4.4.1.1.	The Turns ratio calibration standard shall be backed by a minimum of 12-months factory warranty.	submit										
4.4.1.2.	Technical support and software upgrade, where applicable shall be provided free of charge to KENYA POWER for a period of not less than 36 months.	State										
4.4.1.3.	The Bidder shall submit a clause by clause statement of compliance with the specifications together with copies of the manufacturer's catalogues, brochures, technical data and proven test reports clearly marked to support each clause, all in English for evaluation. The manufacturer's type reference/designation of the item offered shall be indicated	state										
5	TESTS REQUIREMENTS											
5.1.	The Turns ratio calibration standard shall be inspected and tested in accordance with standards and this specification. 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.	State										
5.2.	Copies of previous Test/calibration Reports issued by own or a third party testing laboratory that is accredited to ISO/IEC 17025:2005 or 17025:2017 confirming accuracy and compliance of the Turns ratio calibration standard offered shall be submitted with the offer for evaluation (all in English Language). A copy of	submit										

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CALIBRATION STANDARD**

Doc. No.	
Issue No.	1
Revision No.	0
Date of Issue	2026-01-12
Page 16 of 18	

Clause number	Requirement	Bidder's offer
	the accreditation certificate and the scope of accreditation of the testing/calibrating laboratory shall also be submitted. Any translations of certificates or reports into English language shall be signed and stamped by the Testing/Calibrating Authority that carried out tests/calibration. Copies of test/calibration reports for the Turns ratio calibration standard offered to be submitted for tender evaluation shall include the following	
5.2.1.	Measured values of the standard equipment	submit
5.2.2.	Indicated values of the unit under test (Turns ratio calibration standard offered)	submit
5.2.3.	Expanded Relative uncertainty	submit
5.2.4.	Details of standard and reference equipment used in calibration tests.	submit
6	MARKING AND PACKING	
6.1.	MARKING	
a)	The manufacturer's name or trade mark;	State
b)	The type reference number / model number;	State
g)	The serial number;	State
h)	Letters "PROPERTY OF KENYA POWER"	State
i)	The instructions for handling and use (in the English Language).	State
6.2.	PACKING	
6.2.1.	The Turns ratio calibration standard should be packed in a carrying case so as to protect it from damage and entry of moisture during transportation, handling and storage.	State
6.2.2.	The carrying case shall shock proof and impact resistant and shall be able to withstand a fall of one meter without damage to the Turns ratio calibration standard .	State
	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.	confirm
A.2	Copies of previous Test/calibration Reports of Turns ratio calibration standard 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	submit

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CALIBRATION STANDARD**

Doc. No.	
Issue No.	1
Revision No.	0
Date of Issue	2026-01-12
Page 17 of 18	

Clause number	Requirement	Bidder's offer
	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 Turns ratio calibration standard, Kenya Power 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 without charge to Kenya Power, any Turns ratio calibration standard which upon examination, test or use fail to meet any or all of the requirements in the specification.	State
B:	QUALITY MANAGEMENT SYSTEM (Normative)	
B.1	The supplier shall submit a quality assurance plan (QAP) that will be used to ensure that the Turns ratio calibration standard physical properties, tests 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.	submit
B.2	The Manufacturer's Declaration of Conformity to applicable standards and copies of quality management certifications including copy of valid and relevant ISO 9001:2015 certificate shall be submitted with the tender for evaluation.	submit
B.3	The bidder shall indicate the delivery time of the equipment, manufacturer's monthly & annual production capacity and experience in the production of the Turns ratio calibration standard being offered. A detailed list & contact addresses (including e-mail) of the manufacturer's previous customers for similar type of the Turns ratio calibration standard sold in the last five years as well as reference letters from at least four of the customers shall be submitted with the tender for evaluation.	State
C:	DOCUMENTATION AND DEMONSTRATION (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;	submit

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**TITLE: TURNS RATIO
CALIBRATION STANDARD**

Doc. No.	
Issue No.	1
Revision No.	0
Date of Issue	2026-01-12
Page 18 of 18	

Clause number	Requirement	Bidder's offer
b)	Copies of the Manufacturer's catalogues, brochures, drawings giving all relevant dimensions, Wiring diagram / Schematic Diagram and technical data;	submit
c)	Sales records for the last five years and at least four customer reference letters;	submit
d)	Details of manufacturing capacity and the manufacturer's experience;	submit
e)	Copies of required test/calibration reports of testing/calibrating laboratory accredited to ISO/IEC 17025;	submit
f)	Copy of accreditation certificate to ISO/IEC 17025 for the testing/calibrating laboratory;	submit
g)	Manufacturers letter of authorization, ISO 9001:2015 certificate, and other technical documents required in the tender.	submit
h)	Manufacturer's warranty and guarantee; subject to 12 months from date of delivery to KPLC stores	submit
i)	Operational manual.	submit
j)	Service manual.	submit
C.2.	The supplier shall submit recommendations for use, care, storage and routine inspection/testing procedures, all in the English Language, during delivery of the Turns ratio calibration standard to KPLC Isiolo road stores.	State

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

Issued by: Head of Section, E/Plant	Authorized by: Head of Department, E/Plant
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