



Kenya Power

PRODUCT STANDARD FOR:  
**ELECTRICAL INSULATION  
RESISTANCE CALIBRATOR**

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Kenya Power

**ELECTRICAL INSULATION RESISTANCE CALIBRATOR - SPECIFICATION**

**APPROVAL RECORD**

Description	NAME	DESIGNATION	SIGNATURE	DATE
	Eng. Margaret Kanini	Chief Engineer, DSM & Metering solutions		20/02/17
Checked by	Eng. Rosemary Oduor	Manager, Energy Management		21/2/17
Approved by	Eng. Peter Mwichigi	Ag. General Manager, Customer Service		23/2/17



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A Document of the Kenya Power & Lighting Co. Ltd

February 2017



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**0.1 Circulation List**

COPY NO.	COPY HOLDER
1	Standards Manager
Electronic copy (pdf) on KPLC server currently: <a href="http://172.16.1.40/dms/browse.php?ffolderId=23">http://172.16.1.40/dms/browse.php?ffolderId=23</a>	

**0.2 Amendment Record**

Rev No.	Date (YYYY-MM-DD)	Description of Change	Prepared by (Name & Signature)	Approved by (Name & Signature)
Issue	2017-02-09	New Issue	S. Nguli M. Kanini	Dr. Eng. Peter Kimemia



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## Foreword

This standard specification lays down requirement for. This standard specification lays down requirement for Electrical Insulation Resistance Calibrator.

The specification is intended for procurement of equipment and does not include provision of contract.

## INTRODUCTION

This specification was prepared to establish and promote uniform requirements for for Electrical Insulation Resistance Calibrator to be used at Kenya Power and Lighting Company Ltd. The specification lays down the minimum requirements for equipment acceptable for evaluation.

## 1 SCOPE

This specification applies to newly manufacture for Electrical Insulation Resistance Calibrator. Electrical Insulation Resistance Calibrator shall comply with IEC 61010-1/EN61010 standard on safety and shall have a Degree of protection class 1.

The specification is intended for procurement of equipment and does not include provision of contract.

## 2 References

The following documents were referred to during the preparation of this specification; in case of conflict, the requirements of this specification take precedence

- IEC TR 61010-3-032: standard on safety requirement for electrical equipment's for measurements and laboratory use
- IEC 60529: Degree of protection provided by enclosures

## 3 Definitions

The definitions given in the reference standard apply.



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## 4 REQUIREMENTS

### 4.1 Operating conditions

- 4.1.1 Humidity: High at Coast, up to 95 % and operating
- 4.1.2 Altitudes ranging from 0 to 2000m above sea level
- 4.1.3 Temperature: Vary from 0°C to 50°C degrees.

### 4.2 Design and construction

- 4.1.4 The Electrical Insulation Resistance Calibrator shall have the Width less than 460mm, Height less than 450mm and Depth less than 150mm.
- 4.1.5 The Electrical Insulation Resistance Calibrator shall be easy to use using front panel keypad
- 4.1.6 The Electrical Insulation Resistance Calibrator shall calibrate wide range of test Equipment, both analogue and digital.
- 4.1.7 The Electrical Insulation Resistance Calibrator shall have individual Function Keys on the keypad for selection of individual tests the Electrical Insulation Resistance Calibrator will be capable of carrying out.
- 4.1.8 The input and output terminal configuration shall be designed to enable simple connection to a full range of instrumentation.
- 4.1.9 All outputs shall be isolated when not in use, with an LED indicator showing the active Input/ output terminal(s).
- 4.1.10 The Electrical Insulation Resistance Calibrator shall have a hard transit case with wheels.
- 4.1.11 The Electrical Insulation Resistance Calibrator shall have a hard mounting kit with stands on the bottom.
- 4.1.12 The Electrical Insulation Resistance Calibrator shall have standard interfaces, RS 232, USB 3.0 port.
- 4.1.13 Calibration due date message on the display shall be deactivated.
- 4.1.14 The Electrical Insulation Resistance Calibrator shall not weigh more than 20kg without accessories.

## 5 RATINGS

### 5.1 Power Supply

- 5.1.1 The Electrical Insulation Resistance Calibrator shall have



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- i) Single phase 216V – 254V.
- ii) Line Frequency 45Hz. to 55Hz.
- iii) A current circuit breaker with over- current protection
- iv) Maximum power consumption shall not exceed 300VA
- v) Power cord shall be fused 220/240v, 13A.

## 6 FUNCTIONS

- 6.1 The Electrical Insulation Resistance Calibrator shall perform the following functions:
- 6.2 The Electrical Insulation Resistance Calibrator shall perform a self-test on start up.
- 6.3 The Electrical Insulation Resistance Calibrator shall be able to perform a self-internal zero calibration
- 6.4 The Electrical Insulation Resistance Calibrator shall provide reverse power protection, immediate output disconnection and fuse protection on all output functions.
- 6.5 All functions of the Electrical Insulation Resistance Calibrator shall be controlled from the front panel or controlled remotely by a computer over the USB interface.
- 6.6 The Electrical Insulation Resistance Calibrator shall have a Procedure Mode that guides operators step by step on the calibration process
- 6.7 The Electrical Insulation Resistance Calibrator shall have a working voltage (output voltage of the Utility under Test) ranging 250V - 15kV for Electrical Insulation Resistance measurements.
- 6.8 The Electrical Insulation Resistance Calibrator shall have a working resistance (resistance measurements on the Utility under Test at all voltage ranges) ranging 10k $\Omega$  - 1T $\Omega$  (1000G $\Omega$ ) for Electrical Insulation Resistance measurements.
- 6.9 The Electrical Insulation Resistance Calibrator shall have a working current (current supplied from the Utility under Test across all voltage ranges) ranging 0.5 $\mu$ A - 5A for Electrical Insulation Resistance measurements.
- 6.10 The Electrical Insulation Resistance Calibrator shall have a variable resistance output ranging 0.2 $\Omega$  - 20.0 $\Omega$  for Earth Continuity measurements
- 6.11 The Electrical Insulation Resistance Calibrator shall have a fixed resistance output ranging 20 $\Omega$  - 1k $\Omega$  for Earth Continuity measurements
- 6.12 The Electrical Insulation Resistance Calibrator shall have the ability to calibrate Residual Current Devices (RCD) – equipment used to prevent current finding alternative paths to

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ground in the event of faulty appliances - to a test current ranging 0 - 3000mA, within a time of 0.5msec. – 5sec.

- 6.13 The Electrical Insulation Resistance Calibrator shall have the ability to calibrate Loop Resistance Testers – equipment used to test the resistance in the wires/loop between the source and the return - to a ranging 0 - 1kΩ.
- 6.14 The Electrical Insulation Tester Calibrator shall have Absolute Uncertainty values provided for all Equipment ranges.
- 6.15 The Electrical Insulation Tester Calibrator shall be able to generate results certificate compliant with our Quality System requirements (ISO 17025) and other International Quality Standards.

## 7 SOFTWARE

- 7.1 The software shall have Procedure Wizards for creation of procedures for different test equipment.
- 7.2 The procedure wizards shall be easily programmable in the most basic form of HTML.
- 7.3 The Electrical Insulation Resistance Calibrator shall have a software support which provides software upgrades and calibration.
- 7.4 The software shall be able to create and print certificates on plain paper.
- 7.5 The software shall be able to calculate and display the Guide to the Expression of Uncertainty in Measurement (GUM) Uncertainties and indicate equipment status, that is, PASS or FAIL, on the Results sheet and the Calibration Certificate.
- 7.6 The software shall be able to display on screen prompts of the procedure and measurement readings.
- 7.7 The Software shall be able to allow the user to customize their own logo on the Results sheet and the Calibration Certificate.
- 7.8 The Software shall allow for secure digital signing of results sheets and the Calibration Certificate.
- 7.9 The Software shall be able to save in Read Only format - the Results sheet and the Calibration Certificate in Excel and PDF format.
- 7.10 The Software shall be able to export the Results sheets and Calibration Certificates in Excel and PDF format.
- 7.11 The software shall recall details and history of any equipment previously calibrated by the Electrical Insulation Resistance Calibrator.





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7.12 The Software shall generate barcode readable Calibration labels showing, at least, the Calibration Date, Calibration Due Date, Serial Number of equipment and any other information relevant to the Calibration that will fit on the label.

7.13 The Software shall be provided in executable format on a different media, as back up, for safe storage.

### **8 TYPE TESTS CERTIFICATE**

8.1 A type tests calibration certificate from a National Metrology Institute shall be required with Electrical Insulation Resistance Calibrator to be provided.

8.2 Where test and / or calibration certificates/ reports are issued by a laboratory other than the International / National Test Certification Authority, a copy of accreditation certificate from the International / National Testing Certification Authority shall be attached together with the tender documents.

### **9 MARKING, LABELING AND PACKAGING**

#### **9.1 Markings**

9.1.1 The following markings shall be marked clearly and indelible, either on their surface or in their immediate vicinity.

- a) The manufacturer's name or other mark by which he may be readily identified;
- b) Serial number
- c) Rating and accuracy class where applicable
- d) The inscription "PROPERTY OF KPLC."

9.4.4 The Electrical Insulation Resistance Calibrator shall be packaged in such a manner as to minimize damage and entry of moisture during transportation and handling.

9.4.5 Where a tender has been awarded, packaging shall be done only after inspection, testing of the Electrical Insulation Resistance Calibrator has been finalized. In the absence of this consent to package and shipment shall be granted, in writing, by the Procurement manager, Kenya Power Company Ltd.



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## 10 OTHER REQUIREMENTS

### 10.1 Guarantee

The Electrical Insulation Resistance Calibrator shall be guaranteed against any defects, which may develop due to faulty material calibration, transportation or workmanship for a twelve-month period from the date of delivery.

### 10.2 Product information

10.2.1 The following Drawings and Information shall be supplied with the tender.

- (a) Drawing giving all relevant dimensions of the Electrical Insulation Resistance Calibrator.
- (b) Wiring diagram / Schematic Diagram of the Electrical Insulation Resistance Calibrator.
- (c) Description leaflet of the Electrical Insulation Resistance Calibrator.
- (d) Operation manual of the Electrical Insulation Resistance Calibrator.
- (e) Service manual of the Electrical Insulation Resistance Calibrator.

10.2.2 The tenderer shall show proof, by means of appropriate current certificates, of compliance to ISO 9001:2008 and /or ISO 14001 series of Standards.

10.2.3 The manufacturer shall meet the full costs of two engineers, for the Electrical Insulation Resistance Calibrator inspection and acceptance testing at the manufacturer's facility, excepting the cost of engineers' transportation from Kenya to the nearest major airport.

10.2.4 The Electrical Insulation Resistance Calibrator shall be delivered with 2 laptops, pre-installed with the Electrical Insulation Resistance Calibrator software, with minimum specification as attached in appendix A.

10.2.5 The manufacturer shall meet the full cost of Training users on the use of the Electrical Insulation Resistance Calibrator, immediately on/at delivery in Nairobi.



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**APPENDIX A: SPECIFICATIONS FOR THE LAPTOP COMPUTER**

Processor	Hard Disk	Ram	Writer	Display
Intel Core i7	500GB	8GB	DVD-RW	15" 17"

**APPENDIX B: GUARANTEED TECHNICAL PARTICULARS**

Clause Number	Clause Description	Bidders Offer	Reference
4	<b>REQUIREMENTS</b>		
4.1	<b>Operating Condition</b> The Electrical Insulation Resistance Calibrator shall operate in tropical areas with the following atmospheric conditions:		
4.1.1	Humidity: High at Coast, up to 95 % and operating		
4.1.2	Altitudes: From 0 - 2000m above sea level		
4.1.3	Temperature: From 0°C - 50°C.		
4.2	<b>Design and construction</b>		
4.2.1	The Electrical Insulation Resistance Calibrator shall have the Width less than 460mm, Height less than 450mm and Depth less than 150mm.		
4.2.2	The Electrical Insulation Resistance Calibrator shall be easy to use using front panel keypad		
4.2.3	The Electrical Insulation Resistance Calibrator shall calibrate wide range of test Equipment, both analogue and digital.		
4.2.4	The Electrical Insulation Resistance Calibrator shall have individual Function Keys on the keypad for selection of individual tests the Electrical Insulation Resistance Calibrator will be capable of carrying out.		
4.2.5	The input and output terminal configuration shall be designed to enable simple connection to a full range of instrumentation.		
4.2.6	All outputs shall be isolated when not in use, with an LED indicator showing the active input / output terminal(s).		



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4.2.7	The Electrical Insulation Resistance Calibrator shall have a hard transit case with wheels.		
4.2.8	The Electrical Insulation Resistance Calibrator shall have a hard mounting kit with stands on the bottom.		
4.2.9	The Electrical Insulation Resistance Calibrator shall have standard interfaces, RS 232, USB 3.0 port.		
4.2.10	Calibration due date message on the display shall be deactivated.		
4.2.11	The Electrical Insulation Resistance Calibrator shall not weigh more than 20kg without accessories.		
<b>5.0</b>	<b>RATINGS</b>		
<b>5.1</b>	<b>Power Supply</b> The Electrical Insulation Resistance Calibrator shall have		
5.1.1	Single phase 216V – 254V.		
5.1.2	Line Frequency 45Hz. to 55Hz.		
5.1.3	A current circuit breaker with over- current protection		
5.1.4	Maximum power shall not exceed 300VA		
5.1.5	Power cord shall be fused 220V/240V, 13A.		
<b>6.0</b>	<b>FUNCTIONS</b> The Electrical Insulation Resistance Calibrator shall perform the following functions:		
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6.3	The Electrical Insulation Resistance Calibrator shall provide reverse power protection, immediate output disconnection and fuse protection on all output functions.		
6.4	All functions of the Electrical Insulation Resistance Calibrator shall be controlled from the front panel or controlled remotely by a computer over the USB interface.		
6.5	The Electrical Insulation Resistance Calibrator shall have a Procedure Mode that guides operators step by step on the calibration process		



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6.6	The Electrical Insulation Resistance Calibrator shall have a working voltage (output voltage of the Utility Under Test) ranging 250V - 15kV for Electrical Insulation Resistance measurements.		
6.7	The Electrical Insulation Resistance Calibrator shall have a working resistance (resistance measurements on the Utility Under Test at all voltage ranges) ranging 10kΩ - 1TΩ (1000GΩ) for Electrical Insulation Resistance measurements.		
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6.10	The Electrical Insulation Resistance Calibrator shall have a fixed resistance output ranging 20Ω - 1kΩ for Earth Continuity measurements		
6.11	The Electrical Insulation Resistance Calibrator shall have the ability to calibrate Residual Current Devices (RCD) – equipment used to prevent current finding alternative paths to ground in the event of faulty appliances - to a test current ranging 0 - 3000mA, within a time of 0.5msec. – 5sec.		
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6.13	The Electrical Insulation Tester Calibrator shall have Absolute Uncertainty values provided for all Equipment ranges.		
6.14	The Electrical Insulation Tester Calibrator shall be able to generate results certificate compliant with our Quality System requirements (ISO 17025) and other International Quality Standards.		
<b>7.0</b>	<b>SOFTWARE</b>		
7.1	The software shall have Procedure Wizards for creation of procedures for different test equipment.		



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7.8	The Software shall allow for secure digital signing of Results sheets and the Calibration Certificate.		
7.9	The Software shall be able to save – in Read Only format - the Results sheet and the Calibration Certificate in Excel and PDF format.		
7.10	The Software shall be able to export the Results sheets and Calibration Certificates in Excel and PDF format.		
7.11	The software shall recall details and history of any equipment previously calibrated by the Electrical Insulation Resistance Calibrator.		
7.12	The Software shall generate barcode readable Calibration labels showing, at least, the Calibration Date, Calibration Due Date, Serial Number of equipment and any other information relevant to the Calibration that will fit on the label.		
7.13	The Software shall be provided in executable format on a different media, as back up, for safe storage.		
<b>8.0</b>	<b>TYPE TESTS CERTIFICATE</b>		
8.1	A type tests calibration certificate from a national metrology institute shall be required with Electrical Insulation Resistance Calibrator to be provided. Where Test and / or Calibration Certificates/ Reports are issued by a laboratory other than the International / National Test Certification Authority,		



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	a copy of Accreditation Certificate from the International / National Testing Certification Authority shall be attached together with the tender documents.		
<b>9.0</b>	<b>MARKING, LABELLING AND PACKAGING</b>		
<b>9.1.1</b>	The following markings shall be marked clearly and indelible, either on their surface or in their immediate vicinity.		
(a)	The manufacturer's name or other mark by which he may be readily identified;		
(b)	Equipment serial number		
(c)	Rating and accuracy class where applicable		
(d)	The inscription "PROPERTY OF KPLC."		
9.1.2	The Electrical Insulation Resistance Calibrator shall be packaged in such a manner as to minimize damage and entry of moisture during transportation and handling.		
9.1.3	Where a tender has been awarded, packaging shall be done only after inspection, testing of the Electrical Insulation Resistance Calibrator has been finalized. In the absence of this consent to package and shipment shall be granted, in writing, by the Procurement manager, Kenya Power Company Ltd.		
<b>9.4</b>	<b>Packaging</b>		
9.4.1	The Electrical Insulation Resistance Calibrator shall be packaged in such a manner as to minimize damage and entry of moisture during transportation and handling.		
9.4.2	Where a tender has been awarded, packaging shall be done only after inspection, testing of the Electrical Insulation Resistance Calibrator has been finalized. In the absence of these consent to package and shipment shall be granted, in writing, by the Procurement manager, Kenya Power Company Ltd.		
<b>10.0</b>	<b>OTHER REQUIREMENTS</b>		



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10.1	<b>Guarantee</b> The Electrical Insulation Resistance Calibrator shall be guaranteed against any defects, which may develop due to faulty material calibration, transportation or workmanship for a twelve-month period from the date of delivery.		
10.2	<b>Product information</b>		
10.2.1	The following Drawings and Information shall be supplied with the tender:		
(a)	Drawing giving all relevant dimensions of the Electrical Insulation Resistance Calibrator.		
(b)	Wiring diagram / Schematic diagram of the Electrical Insulation Resistance Calibrator.		
(c)	Description leaflet of the Electrical Insulation Resistance Calibrator.		
(d)	Operation manual of the Electrical Insulation Resistance Calibrator.		
(e)	Service manual of the Electrical Insulation Resistance Calibrator.		
10.2.2	The tenderer shall show proof, by means of appropriate current certificates, of compliance to ISO 9001:2008 and /or ISO 14001 series of Standards.		
10.2.3	A statement of compliance or non-compliance with the above specifications shall be required. In case of non-compliance the affected requirements shall be indicated.		
10.2.4	The manufacturer shall meet the full costs of two engineers, for the Electrical Insulation Resistance Calibrator inspection and acceptance testing at the manufacturer's facility, excepting the cost of engineers' transportation from Kenya to the nearest major airport.		
10.2.5	The Electrical Insulation Resistance Calibrator shall be delivered with 2 laptops, pre-installed with the Electrical Insulation Resistance Calibrator software, with minimum specification as attached in appendix A.		
10.2.6	The manufacturer shall organize and meet the full cost of Training users on the use of the Electrical Insulation Resistance Calibrator, immediately on/at delivery.		



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**NB:** - This schedule does not in any way substitute for detailed information required elsewhere in the specification.

**Manufacturer's Declaration:** I .....on behalf  
of.....  
**Declare that the above specifications matrix conforms to a typical tender item  
type..... as clearly marked  
in the attached technical brochures & drawings, and being offered for this tender.**

**Signature**.....  
**Date**.....**Stamp/Seal**.....

