

Other products from Martindale:

- 16th Edition Testers
- All-in-one's
- Calibration Equipment
- Continuity Testers
- Electrician's kits
- Full Calibration & Repair Service
- Fuse Finders
- Digital Clamp Meters
- Digital Multimeters
- Microwave Leakage Detectors
- Motor Maintenance Equipment
- Non-trip loop testers
- Pat testers & Accessories
- Phase rotation
- Proving units
- Socket Testers
- Thermometers & Probes
- Test Leads
- Voltage Indicators
- Specialist Metrohm testers (4 & 5kV)
- Specialist Drummond testers

Martindale Electric Company Limited  
Metrohm House, Penfold Trading Estate, Watford, WD24 4YY, UK.  
Tel: +44(0)1923 441717 Fax: +44 (0)1923 446900  
E-mail: [sales@martindale-electric.co.uk](mailto:sales@martindale-electric.co.uk)  
Website: [www.martindale-electric.co.uk](http://www.martindale-electric.co.uk)

© Martindale Electric Company Ltd. 2004  
Registered in England No. 3387451. Rev 4

## INSTRUCTIONS



## E-ZeTEST EZ2100 LOOP TESTER

**MARTINDALE**  
● ● ● ELECTRIC

Trusted by professionals

**SAFETY INFORMATION:** Always read before proceeding.

## **WARNING**

These instructions contain both information and warnings that are necessary for the safe operation and maintenance of the E-Ze Test EZ2100. It is recommended that you read the instructions carefully and ensure that the contents are fully understood. Failure to understand and to comply with the warnings and instructions can result in serious injury, damage or even death.

In order to avoid the danger of electrical shock, it is important that proper safety measures are taken when working with voltages exceeding 30 V AC rms, 42 V AC peak or 60 V DC.








The E-Ze Test EZ2100 must only be used under the conditions and for the purposes for which it has been constructed. Particular attention should be paid to these Warnings, the Precautions, the Technical Specifications and the use of the E-Ze Test EZ2100 in dry surroundings.

Always check the E-Ze Test EZ2100 is in good working order before use and that there are no signs of damage to the unit. Do not use if damaged.

Always inspect your meter, test leads and accessories for any sign of damage before use. If any abnormal conditions exist (e.g: broken test leads, cracked case, display not reading, etc.), do not attempt to use it. Do not expose it to direct sunlight, excessive temperature or moisture.

Keep these instructions for future reference. Updated instructions and product information are available at: [www.martindale-electric.co.uk](http://www.martindale-electric.co.uk)

## **SYMBOLS:**

-  Equipment complies with relevant EU Directives
-  AC (Alternating Current)
-  Ground
-  Direct Current
-  Equipment protected by Double Insulation (Class II)
-  Caution - refer to accompanying documents
-  Caution - risk of electric shock

## 4. MAINTENANCE

### 4.1 Cleaning

The E-Ze Test EZ2100 may be cleaned using a soft damp cloth. Do not use abrasives, solvents, or detergents, which can be conductive. Allow to dry completely before using.

### 4.2 Repair & Service

There are no user serviceable parts in this unit. Return to Martindale Electric Company Ltd if faulty. Our service department will quote promptly to repair any fault that occurs outside the guarantee period.

Before the unit is returned, please ensure that you have checked the unit and associated leads thoroughly for flat batteries (check & replace), blown fuses (check & replace) and other poor connections.

### 4.3 Storage Conditions

The E-Ze Test EZ2100 should be kept in warm dry conditions away from direct sources of heat or sunlight, and in such a manner as to preserve the working life of the unit. It is strongly advised that the unit is not kept in a tool box where other tools may damage it.

## 5. WARRANTY

The E-Ze Test EZ2100 is guaranteed against faults in manufacture and materials for 24 months from date of invoice and will be rectified by us free of charge, provided the unit has not been tampered with and is returned to us with its housing unopened. Damage due to dropping, abuse or misuse are not covered by this guarantee. Batteries and fuses are not covered by this guarantee.

Nothing in these instructions reduces your statutory rights.

## CONTENTS

### 1 Introduction

- 1.1 Description
- 1.2 Unpacking & Inspection

### 2 Specifications

### 3 Operation

- 3.1 Precautions
- 3.2 Description of Display
- 3.3 Using the E-Ze Test EZ2100
  - 3.3.1 Connection
  - 3.3.2 Self-Test
  - 3.3.3 Earth Loop Impedance Test
  - 3.3.4 Wiring and Voltage Check
  - 3.3.5 Repeat Measurements
  - 3.3.6 RCD's in the Circuit Under Test
  - 3.3.7 Possible Measurement Errors of Earth Loop Impedance
- 3.4 Table of messages

### 4 Maintenance

- 4.1 Cleaning
- 4.2 Calibration
- 4.3 Repair & Service
- 4.4 Storage Conditions

### 5 Warranty

# 1. INTRODUCTION

## 1.1 Description

The E-ZeTest EZ2100 is a simple-to-use Earth Loop Impedance tester designed to make the accurate measurement of earth loop impedance remarkably quick and easy. The E-ZeTest EZ2100 employs patented 'T Safe' non-trip technology to avoid tripping in-circuit Residual Current Devices (RCDs).

Mains powered and free of batteries, the E-Ze Test 2100 is fully automatic, requiring no actions on the part of the user to complete a comprehensive check of the wiring and to obtain an earth loop impedance result displayed to 2 decimal places, in accordance with the requirement of BS7671 16th Edition. If the wiring is faulty or the mains supply voltage is below 198 Volts (<198V), or above 264 Volts (<264V), appropriate error messages are displayed and the Earth Loop Impedance test is not performed.

The E-ZeTest EZ2100 also measures and displays the mains supply voltage.

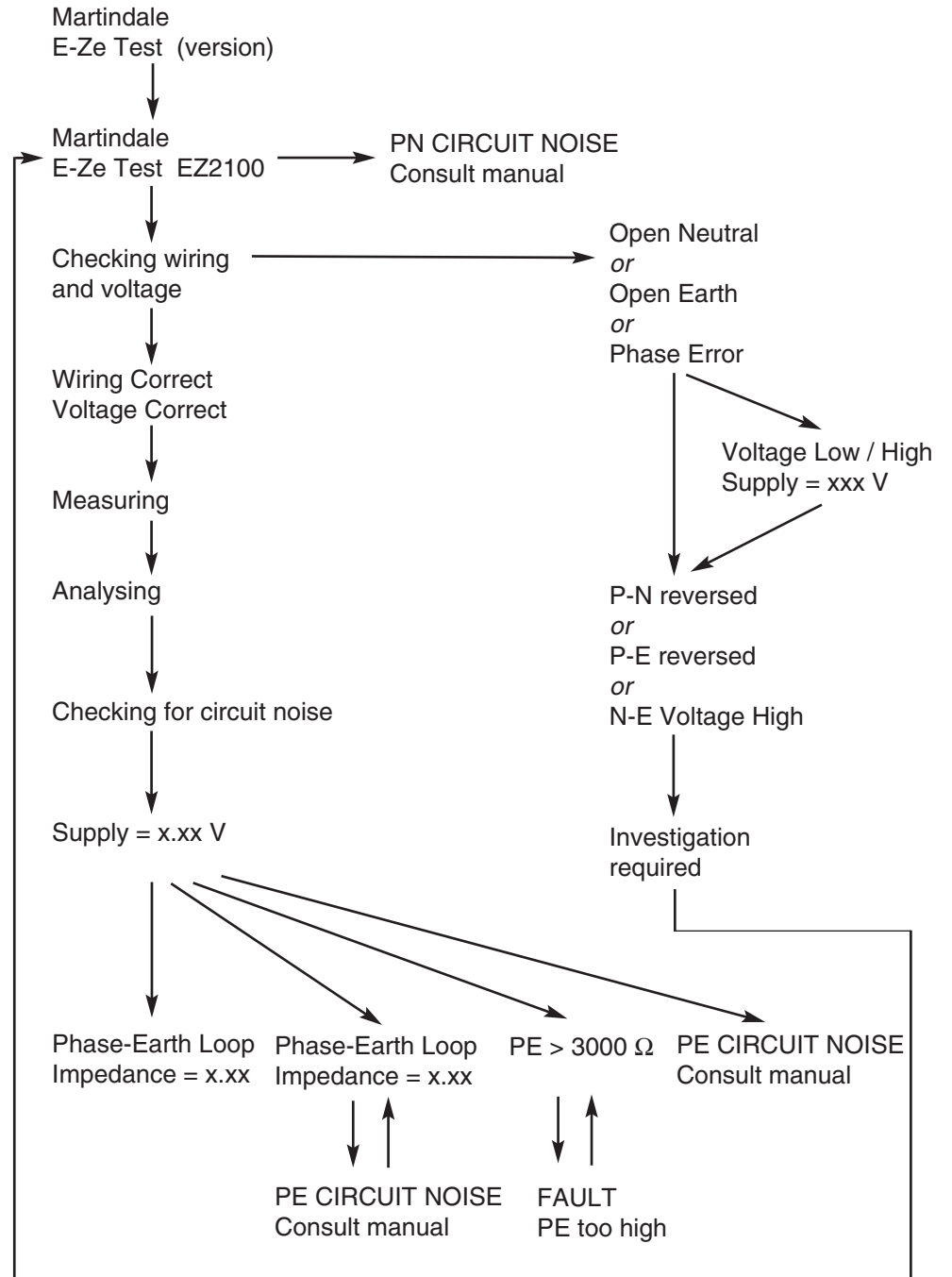
## 1.2 Unpacking and Inspection

Before unpacking the E-ZeTest EZ2100, examine the shipping carton for any sign of damage. Unpack and inspect the E-ZeTest EZ2100 and any associated leads for damage. If there is any damage then consult your distributor immediately.

# 2. TECHNICAL SPECIFICATION

<b>Nominal Voltage Rating:</b>	220 - 240 V
<b>Voltage Range for Impedance Measurement:</b>	198 - 264 V
<b>Voltage Range for Error Detection:</b>	30 - 275 V
<b>Frequency:</b>	50 Hz
<b>Earth Loop Impedance Ranges:</b>	0 - 8.99Ω, 9.0 - 89.9Ω, 90 - 899Ω, 900 - 3000Ω
<b>Earth Loop Impedance Accuracy:</b>	0 - 8.99Ω, ± 4% ± 0.03Ω * 9.0 - 89.9Ω, ± 5% ± 0.5Ω * 90 - 899Ω, ± 5% ± 5Ω * 900 - 3 000Ω, ± 5% ± 30Ω *
<b>Voltage Accuracy:</b>	± 4 %
<b>Open Earth indication:</b>	> 3000Ω - (If Open Earth detected, no Impedance Measurement displayed)
<b>Temperature Range:</b>	-10° to 40° C at max 80 % Relative Humidity, Non-Condensing

# 3.4 TABLE OF DISPLAY MESSAGES



Therefore, caution should be exercised where earth leakage currents inherent in the circuit under test are approaching the trip threshold of the in-circuit RCD, for example where several computers are all connected to one ring circuit.

Where tripping of the RCD may have a critical impact on the equipment connected to the supply, the RCD should be bridged temporarily during the test. Ensure any bridging links are removed immediately the tests are completed.

### 3.3.7 Possible Measurement Errors of Earth Loop Impedance

Where supply circuits under test have highly inductive or capacitive components distributed on that circuit (such as mains filters), or there is an excessive amount of mains disturbance present (e.g. motors running, rain or condensation shorting exposed wiring, or a generator with high inductance supplying power, etc), it is possible the Earth Loop Impedance measurement could be adversely affected. The message PN CIRCUIT NOISE is displayed to indicate noise on Phase Neutral wires. The message PE CIRCUIT NOISE is displayed to indicate noise on Phase Earth wires. If the noise levels on Phase Earth are not adversely too high, an estimated Phase Earth Impedance measurement is displayed together with a circuit noise warning.

**Note:** Always aim to disconnect as many devices as possible from the circuit before taking measurements to minimise inductive, capacitive and noise related effects.

<b>Dimensions:</b>	145 x 85 x 53mm + Cable
<b>Weight:</b>	240g plus cable plus case
<b>Power supply:</b>	From mains
<b>Power consumption:</b>	< 1.6 W
<b>Overvoltage category:</b>	Cat III/300V
<b>Pollution degree:</b>	2

**Supplied with:** zip carry case, mains lead & instructions

\* **Note:**-Measurement accuracy can be affected by noise in circuit and by highly inductive or capacitive components distributed on the supply (see section 3.3.7).

## 3. OPERATION

### 3.1 Precautions

The E-Ze Test EZ2100 has been designed with your safety in mind, but please pay attention to the following warnings and cautions before using the unit.

#### Warning

Before use check the E-ZeTest EZ2100 for cracks or any other damage. Make sure the unit is free from dust, grease and moisture. Also check any associated leads for damage. Do not use if damaged. **DO NOT USE IN DAMP CONDITIONS.**

#### Warning

If the E-ZeTest EZ2100 does not power-up, so no messages appear on the LCD, this does not necessarily mean the circuit under test is dead. The phase supply may still be live, but the earth and neutral lines could both be open circuit. Always investigate such conditions with suitable care.

#### Warning

Always verify the E-ZeTest EZ2100 is in good working order before use, by testing it on a known correctly wired socket.

**Caution:** Avoid severe mechanical shock or vibration and extreme temperature.

### 3.2 Description of Display

The E-ZeTest EZ2100 uses a two-row dot-matrix LCD to indicate mains voltage level, correctness of socket wiring and earth loop impedance, or to indicate a series of fault conditions that may exist.

See Table 3.4 for full list of messages and their inter-relationship.

### 3.3 Using the EZ2100

#### 3.3.1 Connection

It is recommended that testing is carried out, as far as it possible, on a circuit where all appliances are disconnected. Ensure you have read the Precautions (Section 3.1) before proceeding.

- ◆ Plug the E-Ze Test EZ 2100 into the socket to be tested using the IEC lead supplied.
- ◆ Ensure the socket is switched on.
- ◆ View the messages on the display.

If you are using the E-Ze Test EZ2100 with TL88 leads to test wiring, connect the green clip to earth, black to neutral and red to live in that order and then plug the TL88 lead into the IEC inlet socket of the E-Ze Test EZ2100.

#### 3.3.2 Self Test

Every time the E-Ze Test EZ2100 is plugged in it will perform a self-test routine, displaying a brief series of messages, before it calculates and displays the Earth Loop Impedance.

**Note:** If the E-Ze Test EZ2100 does not perform its self-test, or the display does not illuminate, this could mean that the supply voltage is less than 30V, or could mean a simultaneous fault on both earth and neutral (see Precautions section 3.1). Verify the E-Ze Test EZ2100 in a known correctly-wired socket.

If the E-Ze Test EZ2100 is shown to be functioning correctly, investigate the socket where a fault response occurred.

#### 3.3.3 Earth Loop Impedance Test

If the wiring is correct and the supply voltage of the circuit under test is between 198V and 264V the E-Ze Test EZ 2100 will perform an Earth Loop Impedance check automatically. No interaction is required by the user, simply note down the Earth Loop Impedance value displayed at the end of the message sequence.

#### 3.3.4 Wiring and Voltage Check

If the E-Ze Test EZ2100 detects a fault condition in the wiring under test, or the supply voltage is less than 198V (<198V) or greater than 264V (>264V), or the Earth Loop Impedance is greater than 3000Ω (>3000Ω), the LCD will display an appropriate message or set of messages, according to table 3.4. The Earth Loop Impedance measurement will not be displayed

In such circumstances, always have suspect wiring investigated.

**Note:** The E-Ze Test EZ2100 is designed to operate and detect faults if phase is available on any one of the three input pins and a neutral or earth return is available on one or both of the remaining two input pins. This ensures that the unit will alert the user to the need for investigation under a wide variety of wiring fault conditions.

The fault messages that are displayed relate to the most common wiring faults. However, these common wiring faults share symptoms with other unusual faults that may exist.

In such circumstances, the wiring fault could be different to that reported on the display.

For example, the symptoms detected and displayed as a "phase earth reversed" fault would also be present for a fault where the neutral was open between the distribution board and the socket under test and the neutral was shorted to the phase within the socket under test.

Therefore, always investigate wiring faults with care, testing for live voltages on all pins. Ensure that all wiring faults are rectified without delay.

**Note:** As with all other testers, the E-Ze Test EZ2100 does not detect earth-neutral reversal.

#### 3.3.5 Repeat measurements

If the E-Ze Test EZ2100 is left plugged into a socket, the display will not be updated but will continue to show the last measured value of Earth Loop Impedance.

To take a fresh measurement, disconnect the E-Ze Test EZ2100 from the supply and re-connect as before.

#### 3.3.6 RCD in the Circuit Under Test

The E-Ze Test EZ2100 should not trip RCD's during the testing of wiring with in-circuit RCD's.

**Note:** However, that many modern products have a constant low level of earth leakage, for example, 3mA earth leakage is typical for a desk-top computer.

**Note:** Also that a 30mA RCD is guaranteed to trip at 30mA earth leakage, but should not trip at 15mA, but is very likely to trip at anything above 22mA.