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MARTINDALE ELECTRIC

Trusted by Professionals

Martindale Electric Company Limited
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E-mail: sales@martindale-electric.co.uk
Website: www.martindale-electric.co.uk

CE

EZ150 / EZ650
SOCKET TESTER

INSTRUCTION MANUAL

MARTINDALE ELECTRIC

Trusted by professionals

GENERAL SAFETY
INFORMATION: Always read before proceeding.

Warning
These instructions contain both information and warnings that are necessary for the safe operation and maintenance of this product. 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 30V AC RMS, 42V AC peak or 60V DC.

This product must only be used by a competent person capable of interpreting the results under the conditions and for the purposes for which it has been constructed. Particular attention should be paid to the Warnings, Precautions and Technical Specifications. Always check the unit is in good working order before use and that there are no signs of damage to it. Do not use if damaged.

Where applicable other safety measures such as use of protective gloves, goggles etc. should be employed.

Please keep these instructions for future reference. Updated instructions and product information are available at: www.martindale-electric.co.uk/instruct

REMEMBER: SAFETY IS NO ACCIDENT

MEANING OF SYMBOLS:

CE **equipment complies with relevant EU Directives**

~ **alternating current (ac)**

caution - risk of danger & refer to instructions

end of life disposal of this equipment should be in accordance with relevant EU Directives

MARTINDALE ELECTRIC

Specification
EZ650
E-ZE Check Xtra Pro

EZ650 E-Ze Check Xtra Pro is supplied with an IEC socket with an interchangeable 3 pin adaptor and a 3 way flying lead with croc clips allowing testing at light fittings, junction boxes and terminals.

Nominal operating voltage: 230 V

Frequency: 50 Hz

Non-trip Earth loop impedance ranges: 0-1.7-5-10-100-200-500Ω

Earth loop threshold accuracy: ±(10% + 0.3 Ω)*

Voltage low indication: <195 V ±5%

Voltage high indication: > 270 V ±5%

Earth neutral voltage high indication: > 30V ±5%

Open earth indication: > 500 Ω

Temperature Range: -10 to 40°C, non-condensing

Dimensions: 315mm x 260mm x 85mm **Weight:** Approx 1kg

Power supply: From mains

Power consumption: < 2.5W

Overvoltage category: Cat II / 300 V

Pollution degree: 2

Safety: Complies with BS EN 61010-1:1993

* Note: Measurement accuracy can be affected by highly inductive or capacitive loads distributed on the supply (see section 3.3.4)

MARTINDALE ELECTRIC

Specification
EZ150
E-ZE Check Xtra

Nominal operating voltage: 230 V

Frequency: 50 Hz

Non-trip Earth loop impedance ranges:
0-1.7 - 5-10-100-200-500Ω

Earth loop threshold accuracy:
±(10% + 0.3 Ω) *

Voltage low indication: <195 V ±5%

Voltage high indication: > 270 V ±5%

Earth neutral voltage high indication: > 30V ±5%

Open earth indication: > 500 Ω

Temperature Range: -10 to 40°C, non-condensing.

Dimensions: Approx 65mm x 65mm x 50mm **Weight:** Approx 64g

Power supply: From mains

Power consumption: < 2.5W

Overvoltage category: Cat II / 300 V

Pollution degree: 2

Safety: Complies with BS EN 61010-1:1993

*** Note:** Measurement accuracy can be affected by highly inductive or capacitive loads distributed on the supply (see section 3.3.4)

Thank you for buying one of our products. For safety and full understanding of its benefits please read this manual before use. Technical support is available from 01923 441717 and support@martindale-electric.co.uk.

CONTENTS

1. INTRODUCTION

1.1 Inspection

Examine the shipping carton for any sign of damage. Inspect the unit and any accessories for damage. If there is any damage then consult your distributor immediately.

1.2 Description

The E-Ze Check™ Xtra is a socket tester that additionally checks the earth loop impedance of the wiring under test, and indicates the range that the measured earth loop impedance falls within. If the wiring is faulty the earth loop impedance test is not performed.

The E-Ze Check™ Xtra will also indicate if the mains voltage is below 195V or above 270V.

The 'T Safe' technology employed by the E-Ze Check™ Xtra allows the earth loop impedance to be measured with a 30mA or higher RCD in circuit without it tripping.

The E-Ze Check™ Xtra Professional Kit is supplied with both a 13A 3 pin adaptor and a flying lead with croc clips which can be used at junction boxes and terminals where there is only access to bare wires.

1.3 Earth Loop Impedance

Health and Safety regulations require that electrical installations be periodically checked for satisfactory operation, and for electricians to work to the British Standard BS7671, which lays down a schedule for such testing.

decision-maker of competent jurisdiction, such holding will not affect the validity or enforceability of any other provision or other part of that provision.

Nothing in this statement reduces your statutory rights.

5. WARRANTY AND LIMITATION OF LIABILITY

This Martindale product is warranted to be free from defects in material and workmanship under normal use and service. The warranty period is 2 years and begins on the date of receipt by the end user. This warranty extends only to the original buyer or end-user customer, and does not apply to fuses, disposable batteries, test leads or to any product which, in Martindale's opinion, has been misused, altered, neglected, contaminated, or damaged by accident or abnormal conditions of operation, handling or storage.

Martindale authorised resellers shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of Martindale.

Martindale's warranty obligation is limited, at Martindale's option, to refund of the purchase price, free of charge repair, or replacement of a defective product which is returned to Martindale within the warranty period.

This warranty is the buyer's sole and exclusive remedy and is in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability or fitness for a particular purpose. Martindale shall not be liable for any special, indirect, incidental or consequential damages or losses, including loss of data, arising from any cause or theory.

Since some jurisdictions do not allow limitation of the term of an implied warranty, or exclusion or limitation of incidental or consequential damages, the limitations and exclusions of this warranty may not apply to every buyer. If any part of any provision of this warranty is held invalid or unenforceable by a court or other

The presence, quality and connection of the earth wiring is part of the check, with loop impedance a necessary test. This measurement requires some current to flow through a temporary live to earth link (made by the tester), which causes a small mains voltage change and allows the impedance value to be assessed.

Readings for earth loop impedance should normally be a few ohms, or less; but in rural areas can be tens or even hundreds of ohms. This is because outlying locations rely on one or two copper coated steel earth rods inserted into the ground, instead of the more usual solid metal sheath of the supply cable being connected back to a main earth at the source of supply.

Low earth loop impedance values are important to achieve the flow of a large fault current in the event of a fault in order to disconnect the mains supply very quickly through a circuit breaker.

Increasingly, protective devices (RCD's or RCBO's) are used for the earth circuit, just as fuses or breakers are used in the live circuit. These RCD's can be sensitive to test currents used during a temporary measurement link and trip out easily, which can cause both nuisance and loss of data in computer systems. More modern electronic protective devices are particularly sensitive, even being tripped out by instruments which were usable with the earlier electro-mechanical types.

Martindale non-trip testers use our own Patented T-Safe™ technique to make earth loop impedance checks. They ensure rapid, easy to use operation, all without tripping the 30mA or higher RCD or RCBO.

1.4 Variants

The E-Ze Check™ Xtra, EZ150, is a plug style unit that plugs straight into a 13A socket.

The E-Ze Check™ Xtra Professional Kit, EZ650, is fitted with an IEC inlet to allow the unit to be used with either a 13A plug lead or a TL88 lead set.

4. MAINTENANCE

4.1 Calibration

To maintain the integrity of measurements made using your instrument, Martindale Electric recommends that it is returned at least once a year to an approved Calibration Laboratory for recalibration and certification.

Martindale Electric is pleased to offer you this service. Please contact our Service Department for details.
Email: service@martindale-electric.co.uk Tel: 01923 650660

4.2 Cleaning

The unit may be cleaned using a soft dry cloth. Do not use moisture, abrasives, solvents, or detergents, which can be conductive.

4.3 Repair & Service

There are no user serviceable parts in this unit other than those that may be described in section 3. Return to Martindale Electric 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, poor connections and the leads (EZ650 only).

4.4 Storage Conditions

The instrument 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.

3.3.3 RCD's in the Circuit Under Test

The E-Ze Check™ Xtra should operate satisfactorily on circuits protected by most 30mA or higher RCDs or RCBOs.
Factors which should be considered are where equipment, such as computers may introduce earth leakage currents due to internal noise filter circuits. This earth leakage current can approach the trip threshold of an RCD or RCBO, and the E-Ze Check™ Xtra test current will add to it with the possibility of the protective device tripping.

Before using the E-Ze Check™ Xtra on critical circuits which supply computers, medical equipment, or other systems where loss of supply is unacceptable, ensure these are not being operated, in line with normal practice when using electrical test equipment.

3.3.4 Possible Effects on Accuracy when Measuring Earth Loop Impedance

Where supply circuits under test have highly inductive or capacitive loads distributed on that circuit or there is an excessive amount of mains disturbance present (e.g. motors running, etc) it is possible the earth loop impedance measurement could be affected.

In such circumstances, where possible, disconnect any loads that may be a source of error. Alternatively, perform the measurement when the wiring under test is electrically quiet.

The effect of these mains disturbances can be to reduce accuracy on the lower two ranges, e.g. if the actual loop impedance of the circuit under test is <1.7Ω then the E-Ze Check™ Xtra may indicate in the range 1.7Ω to 5Ω.

2. PRODUCT SPECIFIC SAFETY INFORMATION

2.1 Precautions

This product has been designed with your safety in mind, but please pay attention to the following warnings and cautions before use.

Warning

Before use check the unit for cracks or any other damage. Make sure the unit is free from dust, grease and moisture. Also check any associated leads and accessories for damage. Do not use if damaged.

Warning

If the E-Ze Check™ Xtra does not power-up and none of the indicators illuminate this does not necessarily mean the circuit under test is dead. E.g. the earth and neutral lines could both be open circuit, or the mains supply voltage could be less than 160V but still at a dangerous level.

Warning

Wherever possible verify that the E-Ze Check™ Xtra is in good working order before use by testing it in a known correctly wired socket

Warning

If the E-Ze Check™ Xtra indicates a fault condition in the wiring under test, always investigate the wiring or have the wiring investigated by a competent person.

Warning
Do not use the E-Ze Check™ Xtra EZ650 at main incoming distribution boards, or any other area which would require a Cat. III / 300V instrument.

Warning
Do not connect across two phases of a three phase supply.

Warning
The E-Ze Check™ Xtra will not correctly test circuits using isolation transformers.

Caution
Avoid severe mechanical shock or vibration and extreme temperature.

KEY TO LED COLOURS IF THIS DOCUMENT IS PRINTED IN BLACK AND WHITE

OFF

red

orange

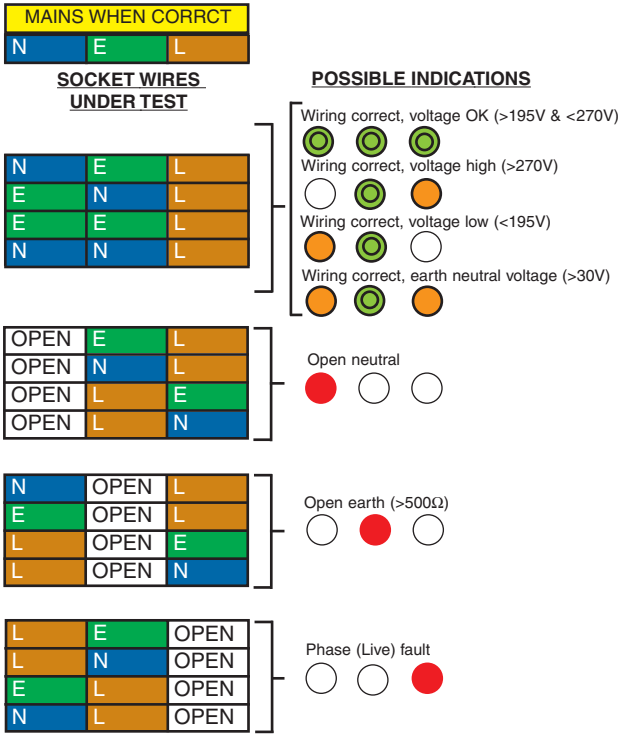
green

SOCKET WIRES UNDER TEST			POSSIBLE INDICATIONS
L	E	N	Phase neutral reversal
L	E	E	
L	N	E	
L	N	N	
E	L	L	
N	L	L	
N	L	E	Phase earth reversal
E	L	E	
E	L	N	
N	L	N	
L	E	L	
L	N	L	
OPEN	OPEN	OPEN	Serious wiring fault or Voltage <160V (see section 3.1 Precautions)
L	L	L	
L	L	OPEN	
L	OPEN	L	
OPEN	L	L	
L	OPEN	OPEN	
OPEN	L	OPEN	
OPEN	OPEN	L	

Note: 'OPEN' can mean absent connection or poor connection
Note: The E-Ze Check™ Xtra does not detect earth-neutral reversal, or faults that have commoned the earth and neutral pins of the E-Ze Check™ Xtra.

If a fault is detected, always investigate the wiring under test or have the wiring investigated by a competent person.

Figure 2. Mains Wiring Connections to Check Plug Pins



Note: 'OPEN' can mean absent connection or poor connection

3. OPERATION

3.1. Description of Indicators

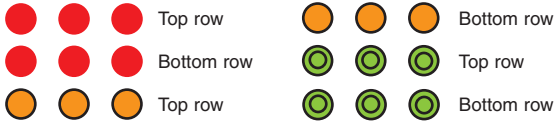
The E-Ze Check™ Xtra uses two rows of 3 LED's to indicate earth loop impedance, mains voltage level and wiring faults. The top row of 3 tri-colour LED's marked LOOP TEST indicate the range within which the measured earth loop impedance falls.

Note: The Loop Test indicators will not illuminate if there is a wiring fault or the mains voltage is <195V or >270V. The bottom row of 3 tri-colour LED's indicate the condition of the wiring and if the mains supply is <195V or >270V.

Note: The level of the mains supply is only indicated if the wiring is correct.

3.2. Self Test

Every time the E-Ze Check™ Xtra is plugged in it will perform its self-test routine by flashing each row of indicators once in the following sequence:-



If the E-Ze Check™ Xtra does not perform its self-test and none of the indicators illuminate this could mean the supply voltage is less than 160V (see section 2 Precautions). Verify the E-Ze Check™ Xtra in a known correctly wired socket.

If any indicators do not illuminate or do not illuminate in the above sequence then do not use the E-Ze Check™ Xtra and return it for repair.

3.3. Using the E-Ze Check™ Xtra

Ensure you have read the precautions (Section 2) before proceeding and have tested the unit in a known correctly wired socket or fitting if using the professional kit.

Plug the E-Ze Check™ Xtra EZ150 into the socket to be tested. If you are using the E-Ze Check™ Xtra EZ650 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 E-Ze Check™ Xtra IEC inlet socket.

Verify that the E-Ze Check™ Xtra performs its self-test routine correctly (see section 3.2) then simply compare the status of the flashing indicators with figures 1 & 2 referring also to sections 3.3.1 and 3.3.2.

If the E-Ze Check™ Xtra does not power up and perform its self-test and none of the LED's illuminate this could mean that the wiring is incorrect or that the supply voltage is less than 160V (see section 2 Precautions). Investigation of the wiring is required. In such circumstances verify the E-Ze Check™ Xtra in a known correctly wired socket to confirm the need for investigation.

The E-Ze Check™ Xtra is designed to be plugged into a socket and removed after the test has been performed. If the E-Ze Check™ Xtra is left plugged into a socket or connected to wiring, then after approximately 2 minutes the measurement rate and indicator flash rate will be decreased automatically.

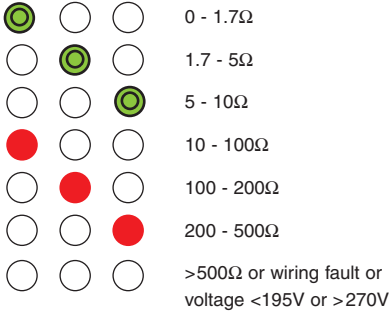
3.3.1. Loop Test

If the wiring is correct and the supply voltage of the circuit under test is between 195V and 270V the lower indicators will all flash green and one of the top indicators (Loop Test) will indicate the range into which the measured earth loop impedance falls.

E.g. If the top centre indicator is flashing green then the measured earth loop impedance of the circuit under test is between 1.7Ω and 5Ω, or if the top left-hand indicator is flashing red then the measured earth loop impedance is between 10Ω and 100Ω.

Refer to the IEE Wiring Regulations, 16th Edition or later, to determine if the indicated earth loop impedance of the wiring under test meets the necessary requirements.

Figure 1. Loop Test (Top Indicators)



3.3.2 Wiring and Voltage Check

If the wiring is faulty or the supply voltage is <195V or >270V or the earth loop impedance is >500Ω one of the fault sequences of figure 2 will be indicated on the lower indicators. The top indicators will not illuminate as a loop impedance measurement is not made if a wiring fault is detected or the supply voltage is <195V or >270V.