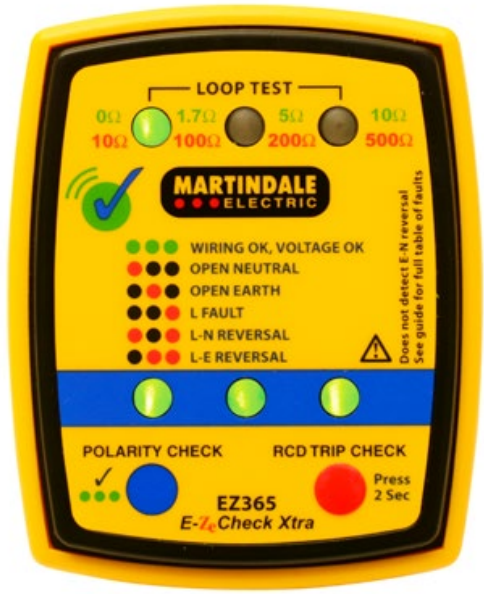
EZ165 EZ365
SOCKET TESTER

INSTRUCTION MANUAL



MARTINDALE ELECTRIC

Keeping You Safe

⚠ ALWAYS READ THESE INSTRUCTIONS BEFORE PROCEEDING

Thank you for using our product. For safety and a full understanding of its benefits please read this manual before use. Technical support is available from +44 (0)1923 441717 and support@martindale-electric.co.uk.

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1. SAFETY INFORMATION

⚠ REMEMBER: SAFETY IS NO ACCIDENT

These instructions contain both information and cautions that are necessary for the correct 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.

Particular attention should be paid to the Precautions and Technical Specification.

If the equipment is used in a manner not specified by Martindale Electric, the protection provided by the equipment may be impaired.

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

1.1 Meaning of Symbols and Markings

Caution - risk of danger and refer to instructions

Caution - risk of electric shock

Equipment protected by double or reinforced insulation (Class II)

CAT II **(Measurement Category II)** is applicable to test and measuring equipment connected directly to utilization points (socket outlets and similar points) of the low-voltage MAINS installation. For further information on measurement categories visit: www.martindale-electric.co.uk

Equipment complies with relevant EU Directives

Equipment complies with relevant UK Conformity Assessed marking

End of life disposal of this equipment should be in accordance with relevant Directives.

1.2 Precautions

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

Warnings

In order to avoid the danger of electrical shock, it is important that proper safety measures are taken when working with voltages exceeding the extra low voltage (ELV) limit of 50V AC RMS or 120V DC.

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

This socket tester must only be used by a skilled and competent person who is familiar with the relevant regulations, the safety risks involved and the consequent normal safe working practices, and under the conditions and for the purposes for which it has been constructed and specified.

Before each use the socket tester should be examined for damage, cracks, cuts or scratches. **Do not use** if damaged in any way.

Make sure the socket tester is dry, clean and free from dust, grease and moisture while in use to avoid the danger from electric shock due to surface leakage.

The EZ165 & EZ365 must only be used on CAT II installations up to 300V to earth.

Always verify the unit is functioning correctly on a known correctly-wired live socket before and after use.

If none of the indicators illuminate, this does not necessarily mean the circuit under test is dead. For example the earth and neutral lines could both be open circuit, or the supply voltage may be <135V.

⚠ Cautions

Avoid severe mechanical shock or vibration and extreme temperature.

2. INTRODUCTION

2.1 Inspection

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

2.2 Description

The EZ165 & EZ365 are socket testers that additionally check the earth loop impedance of the wiring under test and indicate the range that the measured earth loop impedance falls within. If the wiring is faulty or the mains voltage is not within limits the earth loop impedance test is not performed.

The EZ165 & EZ365 also indicate if the mains voltage is below 195V or above 270V or if the neutral to earth voltage is greater than 30V.

The technology employed by the EZ165 & EZ365 allows the earth loop impedance to be measured with a 30mA or higher RCD in circuit without it tripping.

Additional features of the EZ365 are:

- Buzzer indication of socket wiring.
- Polarity reversal check by means of a touch pad.
- RCD trip test for 30mA RCD's.

3. OPERATION

3.1. Description of Indicators

The EZ165 & EZ365 use two rows of LED's to indicate wiring condition, mains voltage level and earth loop impedance.

The top row of three tricolour LED's marked **LOOP TEST** indicates the range within which the measured earth loop impedance falls.

The bottom row of three tricolour LED's indicates the condition of the wiring, or if the mains supply is <195V or >270V, or if the neutral to earth voltage is >30V.

Note 1: The loop test will not be performed, and the loop test indicators will not illuminate if there is a wiring fault or the mains voltage level is outside limits.

Note 2: The level of the mains supply is only indicated if the wiring is correct.

3.2 Buzzer

Table 1 shows the buzzer response for the various wiring and RCD test conditions when using the EZ365.

Table 1.

Continuous tone	Wiring correct, loop impedance <10Ω
Fast pulsed tone	Wiring correct, loop impedance between 10Ω and 500Ω
Slow pulsed tone	Faulty wiring Supply voltage out of tolerance RCD did not trip following RCD test

Pulsed tone increasing to continuous tone	RCD trip test will be activated in 2 seconds

3.3 Using the EZ165 & EZ365

Plug the EZ165 or EZ365 into the socket to be tested.

The wiring test is performed first. As the test is performed, the lower LED's flash orange in sequence, until the test is complete and the result is then displayed. Compare the status of the flashing indicators with the front decal or with figures 1, 2 & 3 in sections 3.3.1 and 3.3.2.

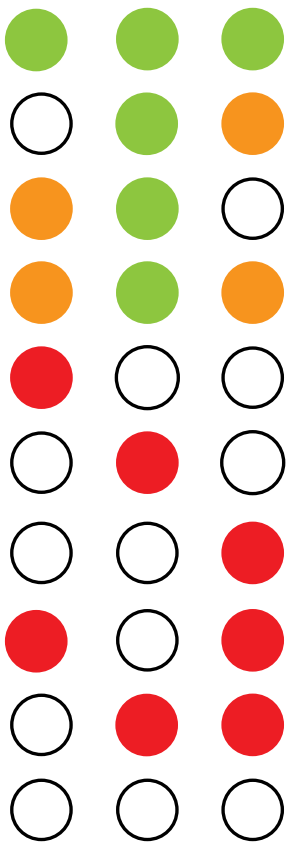
If the wiring test is successful, then the loop impedance test is performed. The top row of LED's will flash orange in sequence until the test is complete. When the test is complete, the result is displayed. If the wiring test detected a fault, then the loop impedance test is not performed.

If the EZ165 / EZ365 does not power up and none of the LED's illuminate this could mean that the wiring is incorrect, or the mains voltage is less than 135V and investigation of the wiring is required. In such circumstances verify the EZ165 / EZ365 in a known correctly wired socket to confirm the need for investigation.

3.3.1 Wiring and Voltage Check

The condition of the wiring at the socket under test or any out of tolerance supply voltage will be indicated by the LED sequences of figure 1 on the lower row of LED's. If a wiring fault is detected or the supply voltage is out of tolerance the top loop indicator LED's will not illuminate as a loop impedance measurement is not made.

Figure 1. Wiring and Voltage Test Indicators (Lower LED's)



Wiring Correct, Voltage OK

Wiring Correct, Voltage high >270V

Wiring Correct, Voltage low <195V

Earth-Neutral voltage >30V

Open Neutral

Open Earth >500Ω

Phase (Live) Fault

Phase-Neutral Reversal

Phase-Earth Reversal

Serious wiring fault or voltage <135V

In the event of a fault being indicated, investigation should only be carried out by a suitably qualified electrician.

Figure 2. *Socket wiring and EZ165 / EZ365 indications when live (phase) is connected to the socket.*

EZ365 Pins			
N	**E**	**L**	
Socket Under Test Wiring			
N	**E**	**L**	● ● ●
E	**N**	**L**	
E	**E**	**L**	
N	**N**	**L**	
OPEN	**E**	**L**	● ○ ○
OPEN	**N**	**L**	
OPEN	**L**	**E**	
OPEN	**L**	**N**	
N	**OPEN**	**L**	○ ● ○
E	**OPEN**	**L**	
L	**OPEN**	**E**	
L	**OPEN**	**N**	
L	**E**	**OPEN**	○ ○ ●
L	**N**	**OPEN**	
E	**L**	**OPEN**	
N	**L**	**OPEN**	
L	**E**	**N**	● ○ ●
L	**E**	**E**	
L	**N**	**E**	
L	**N**	**N**	
E	**L**	**L**	
N	**L**	**L**	
N	**L**	**E**	○ ● ●
E	**L**	**E**	
E	**L**	**N**	
N	**L**	**N**	
L	**E**	**L**	
L	**N**	**L**	
OPEN	**OPEN**	**OPEN**	○ ○ ○
L	**L**	**L**	
L	**L**	**OPEN**	
L	**OPEN**	**L**	
OPEN	**L**	**L**	
L	**OPEN**	**OPEN**	
OPEN	**L**	**OPEN**	
OPEN	**OPEN**	**L**	

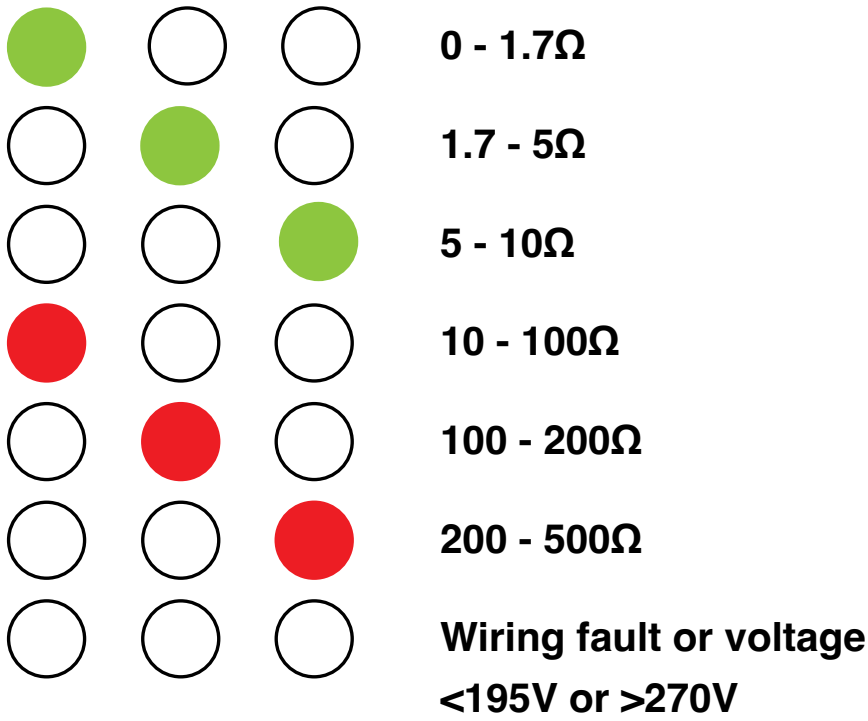
3.3.2. Loop Test

If the wiring is correct and the supply voltage of the circuit under test is between 195V and 270V the lower indicators will all indicate green and one of the top indicators marked **LOOP TEST** will indicate the range into which the measured earth loop impedance falls.

For example if the top centre indicator is 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 red then the measured earth loop impedance is between 10Ω and 100Ω.

Refer to the latest edition of the IET Wiring Regulations (BS 7671), to determine if the indicated earth loop impedance of the wiring under test meets the necessary requirements.

Figure 3. Loop Test Indicators (Top LED's)



3.3.3 Incoming Supply Cross Polarity Check

Where the polarity of the incoming mains supply has been reversed (i.e., Supply Line is connected to Neutral & Earth, Supply neutral & earth are connected to Line) then as with all standard socket testers EZ165 will not detect this fault. The EZ365 can detect this fault using the additional supply cross polarity check.

To check for supply cross polarity on EZ365, an additional test is required which is easily activated by touching the blue POLARITY CHECK touch pad with a finger.

If the incoming supply wiring polarity is correct, the three LED's will flash GREEN and the buzzer indicating correct socket wiring will continue.

If the wiring polarity is reversed, the wiring LED's will flash RED and the buzzer will emit a pulsed tone. The EZ365 will continue to indicate this fault condition once the finger has been removed from the touch pad.

In the event of a fault being indicated, investigation should only be carried out by a suitably qualified electrician.

3.3.4 RCD Trip Check (EZ365 only)

To check the functioning of a 30mA RCD in the circuit under test, press down on the red RCD TRIP CHECK press button pad for >2s.

The lower LED's will flash AMBER and the buzzer will emit a pulsed tone that will speed up to a continuous tone at which point the 30mA test current will be activated.

Releasing the press button before the constant buzzer tone will stop the test.

If the RCD does not trip, the upper LED's will flash AMBER and the buzzer will emit a slow pulsed tone.

3.3.5 RCD's in the Circuit Under Test

The EZ165 / EZ365 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 EZ165 / EZ365 test current will add to it with the possibility of the protective device tripping.

Before using the EZ165 / EZ365 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.

3.3.6 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 highly inductive or capacitive loads and 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 EZ165 / EZ365 may indicate in the range 1.7Ω to 5Ω.

4. MAINTENANCE

4.1 Cleaning

Prior to cleaning, ensure the EZ165 / EZ365 is disconnected from any live circuits.

If contamination is found, clean with a damp soft cloth and, if necessary, a mild detergent or alcohol. Do not use abrasives, abrasive solvents, or detergents which can cause damage to the unit. If a mild detergent is used, the unit should subsequently be thoroughly cleaned with a water dampened soft cloth. After cleaning, dry and allow to remain in a dry environment for 2 hours before use.

4.2 Repair & Service

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

4.3 Storage Conditions

The EZ165 / EZ365 should be kept in warm dry conditions away from direct sources of heat or sunlight, and in such a manner as to preserve their working life. It is strongly advised that they are not kept in a tool box where other tools may damage them.

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 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.

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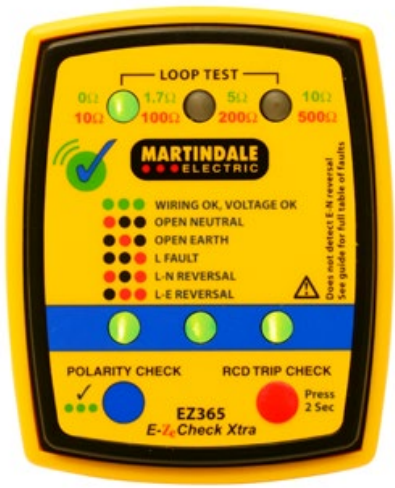
Specification
EZ165 / EZ365



Electrical

Nominal operating voltage: 230V AC rms ± 10%

Operating frequency: 50Hz

Power consumption: <2.5W

Power: from mains socket under test

Non-trip earth loop impedance ranges:

0 - 1.7 - 5 - 10 - 100 - 200 - 500Ω

Earth loop threshold accuracy: ± (10% + 0.3Ω) Note 1

Voltage low indication: <195V ± 5%

Voltage high indication: >270V ± 5%

Earth neutral voltage high indication: > 30V nominal

Open earth indication: >500Ω ± 10%

RCD test current at 195V: 30mA (EZ365 only)

Duration of RCD test current: 300ms (EZ365 only)

Polarity reversal test (EZ365 only)

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EZ165 / EZ365

Note 1: Measurement accuracy can be affected by highly inductive or capacitive loads distributed on the supply (see section 3.3.6).

General

Dimensions: 65 x 80 x 59mm

Weight: approx. 93g

Environmental

For indoor use only

Temperature (Operating & Storage): -10°C to 40°C, at max. 60% RH

Altitude: up to 2000m

Pollution degree: 2

Safety

Conforms to BS EN 61010-1, CAT II 300V

Class II, double insulation

EMC: Conforms to BS EN 61326-1

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