

# TEK402/TEK404 CONTINUITY TESTERS

## INSTRUCTION MANUAL



### ALWAYS READ THESE INSTRUCTIONS BEFORE PROCEEDING

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

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### 1. SAFETY INFORMATION: Always read before proceeding.

#### REMEMBER: SAFETY IS NO ACCIDENT

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.

Particular attention should be paid to the Warnings, Precautions and Technical Specifications.

Please 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)

#### 1.1 Meaning of Symbols and Markings

**Caution - risk of danger & refer to instructions**

**Caution - risk of electric shock**

**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.

**CAT III (Measurement Category III)** is applicable to test and measuring equipment connected to the distribution part of the building's low-voltage MAINS installation.

**CAT IV (Measurement Category IV)** is applicable to test and measuring equipment connected at the source of the building's low-voltage MAINS installation.

For further information on measurement categories see page 11 or visit [www.martindale-electric.co.uk/measurement\\_categories.php](http://www.martindale-electric.co.uk/measurement_categories.php)

**Equipment complies with relevant EU Directives**

**End of life disposal of this equipment should be in accordance with relevant EU 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 30V AC rms, 42V AC peak or 60V DC.

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

The continuity 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.

Before each use the continuity tester should be examined for damage, cracks, cuts or scratches. If there is any doubt the voltage indicator should **not be used**.

Make sure the unit 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 continuity tester **must only** be used to test de-energised dead circuits.

The **TEK402 must NOT** be connected to CAT II, CAT III or CAT IV circuits.

The **TEK404 must only** be used on CAT III installations up to 600V to earth, and within the operating temperature and humidity range specified.

If the removable probe tip caps are not fitted to the probes of the test leads, their measurement category becomes CAT II 1000V, and they **must not be used** on CAT III or CAT IV installations to avoid the risk of shorting high energy circuits and arc flash. When this unit is used in combination with test leads, the measurement category of the combination is the lower measurement category of either this unit or the test leads used. Likewise if test lead accessories such as crocodile clips are also used, the measurement category will be the lowest measurement category in that combination.

**Do not use** if the battery compartment cover is not fitted.

When using test leads, **always** keep your fingers behind the finger guard on the test lead probe.

### **Cautions**

Avoid severe mechanical shock or vibration and extreme temperature.

Remove the leads from the unit when not in use, to avoid flattening the battery.

When using test leads avoid excessive stresses to the cable entry points at the probe and 4mm plug connector.

To avoid possible corrosion from a leaking battery, remove the battery if discharged, or when the unit is not in use for an extended period.

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## 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 then consult your distributor immediately.

### 2.2 Description

The TEK402 and TEK404 are battery powered continuity testers that give an audible indication of the continuity resistance of a circuit under test.

The TEK404 also includes a LED to indicate the continuity of the circuit under test.

Both units must **ONLY** be applied to de-energised dead circuits.

The TEK402 has fused over-voltage protection for instances where the unit may accidentally be connected to a live circuit.

In the event that the TEK404 is connected to a live circuit the buzzer and LED will indicate an alarm condition.

### 2.3 Accessories (included)

- ◆ TL49 test leads with uninsulated crocodile clips (TEK402 only)
- ◆ TL47 test leads with insulated crocodile clips (TEK404 only)
- ◆ 9V battery
- ◆ Instructions

### 2.4 Battery Installation

On receipt the battery is inside the battery compartment but not connected. Refer to section 4.1 (Battery Replacement) for the battery installation instructions for the TEK402/TEK404.

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## 3. OPERATION

### 3.1 General

To verify that the TEK402/TEK404 is functioning correctly, connect the 4mm plugs of the test leads provided to the 4mm sockets of the TEK402/TEK404.

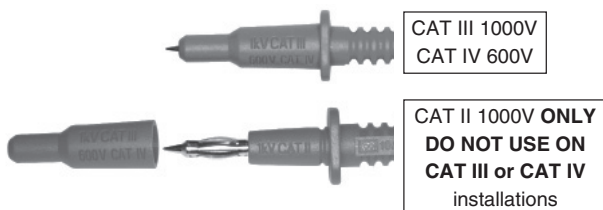
Short together the probe tips. A loud audible tone will be emitted, and on the TEK404 only, a LED will be illuminated.

If the audible tone is not present, or low in amplitude, replace the TEK402/TEK404 battery (see 4.1 Battery Replacement).


If the audible tone is not present after replacing the TEK402 battery, replace the TEK402 fuse (see 4.2 Fuse Replacement).

### 3.2 Use of the TL47 and TL49 Test Leads

When crocodile clips are to be fitted, or where it may be required to plug the probes into 4mm sockets, the probe tip covers may be removed by gently pulling them forward until they unclip from the probe body to reveal 4mm plugs.



### 3.3 Continuity Testing using the TEK402

 This unit must **NOT** be connected to CAT II, CAT III or CAT IV circuits.

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Make all possible checks to verify that the circuit to be tested is **NOT** live.


Connect the 4mm plugs of the test leads provided to the 4mm sockets of the TEK402.

Taking all necessary safety precautions connect the test lead probes to the circuit to be tested. Uninsulated crocodile clips are provided for added convenience.

The sound level will be reduced by the presence of increased continuity resistance. The maximum sound level will be evident with the test leads shorted. Minimum sound level will be at approximately 10k $\Omega$ .

Note: The behaviour of the buzzer will be misleading if any voltage is present on the circuit under test.

### 3.4 Continuity Testing using the TEK404

 Make all possible checks to verify that the circuit to be tested is **NOT** live.

Connect the 4mm plugs of the test leads provided to the 4mm sockets of the TEK404.

Taking all necessary safety precautions connect the test lead probes to the circuit to be tested. Insulated crocodile clips are provided for added convenience.

The sound level and LED brightness will be reduced by the presence of increased continuity resistance. The maximum sound level and LED brightness will be evident with the test leads shorted. Minimum sound level and LED brightness will be at approximately 1.7k $\Omega$ .

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The buzzer and LED will cease to operate at approximately 2.2kΩ.

Note: The behaviour of the buzzer will be misleading if any voltage is present on the circuit under test.

### 3.5 Fused Overvoltage Protection (TEK402 only)

If the TEK402 is inadvertently connected to a live circuit, the internal circuitry will intentionally draw a current to blow the internal fuse, and protect other components of the TEK402.

### 3.6 Alarm Function (TEK404 only)

The TEK404 incorporates an alarm function which operates if it is inadvertently connected to a live circuit >30V DC or AC rms.


The alarm is indicated by an interrupted pulsed buzzer tone and a pulsed LED illumination.

Note: The TEK404 should not be used as a voltage detector.

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## 4. MAINTENANCE

### 4.1 Battery Replacement

 To avoid shock or injury, disconnect the TEK402/TEK404 from any external circuits or components and remove the test leads before proceeding.


Unscrew the battery cover retaining screw and lift off the battery cover.

Fit a new 9V, PP3 alkaline battery (IEC 6LR61, NEDA 1604A), observing correct polarity.

Replace the battery cover and secure it with the battery cover retaining screw.

Check the unit functions by replacing the test leads and shorting them together.

### 4.2 Fuse Replacement (TEK402 only)

 To avoid shock, injury or damage, disconnect the TEK402 from any external circuits or components and remove the test leads and battery before proceeding.

Replace only with the fuse specified.

Unscrew the battery cover retaining screw and lift off the battery cover.

Remove the blown fuse from the metal clips, and replace it with a 50mA 250V Ceramic Fast Acting, 20mm x 5mm fuse.  
Martindale Ref: FUSE50250X3 (Pack of 3).


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Replace the battery cover and secure it with the battery cover retaining screw.

Check the unit functions by replacing the test leads and shorting them together.

### 4.3 Test Lead Replacement

If the test leads become damaged they should be replaced.

 The replacement test leads must have the same (or better) overvoltage category rating as the TL49 (TEK402) / TL47 (TEK404) leads supplied.

### 4.4 Cleaning

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

### 4.5 Repair & Service

There are no user serviceable parts in this unit other than those that may be described in section 4. 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, battery, fuse, leads and poor connections.

### 4.6 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.

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## 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 reasonable 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.

10 Nothing in this statement reduces your statutory rights.

## Measurement Categories

Measurement categories are determined by the potential for dangerous transient impulses on the mains supply system, the magnitude of which depends on the amount of damping of the transient energy due to the location within the system and the system voltage. Short-circuit current levels are also a factor. Test equipment used for measuring mains circuits will be marked with one or more of three measurement categories, CAT II, CAT III or CAT IV, to identify on which installations of a mains supply system it can safely be used.

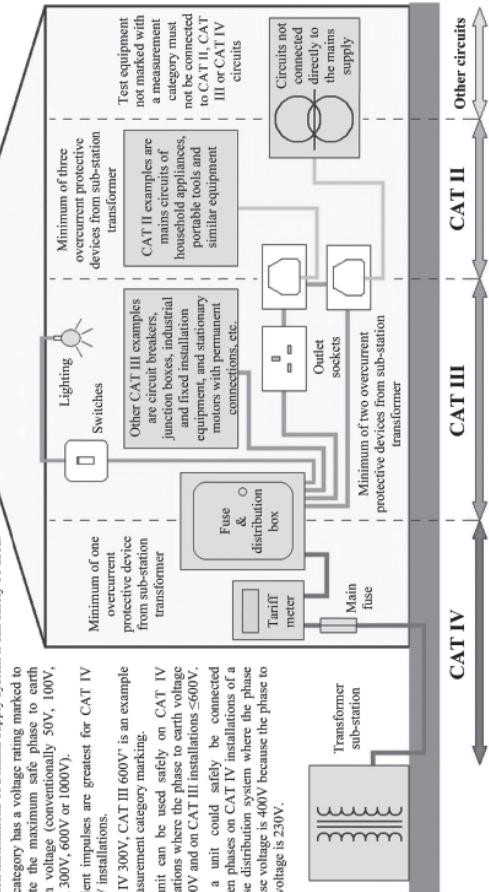
Each category has a voltage rating marked to indicate the maximum safe phase to earth system voltage (conventionally 50V, 100V, 150V, 300V, 600V or 1000V).

Transient impulses are greatest for CAT IV 1000V installations.

\*CAT IV 300V, CAT III 600V\* is an example of measurement category marking.

The unit can be used safely on CAT IV installations where the phase to earth voltage is ≤300V and on CAT III installations ≤600V.

Such a unit could safely be connected between phases on CAT IV installations of a 3-phase distribution system where the phase to phase voltage is 400V because the phase to earth voltage is 230V.



CAT IV measurements are extremely dangerous. All proper safety measures must be taken to avoid the risk of shorting high energy circuits and arc flash.

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## Specification TEK402/TEK404 Continuity Tester



### Electrical

#### TEK402 Mk3

Probe voltage: 9V DC approx

Test current: 5mA

Continuity range (audible): up to 10kΩ nominal

Audible output level: 85dB minimum at 30cm with leads shorted

Overvoltage protection fuse rating: 50mA, 250V, Fast Acting Ceramic Fuse, 20mm x 5mm

#### TEK404 Mk3

Probe voltage: 9V DC approx. (open circuit probe voltage) 4.6V DC (loaded)

Test current: <math>50\mu\text{A}</math> (across short circuit)

Continuity range:  $0\Omega$  to  $2.2k\Omega \pm 10\%$

Audible output level: 85dB minimum at 30cm with leads shorted

LED indication: bright orange LED Buzzer and LED intensity reduce with increasing continuity resistance.

Alarm function threshold:  $>30V \pm 20V$  DC & AC rms

### Environmental

Temperature & humidity (Operating): -10 to 40°C at max 70% R.H.

(Storage): -10°C to 50°C ≤ 80% R.H.

Altitude: up to 2000m

Pollution degree 2

### General

Power: 9V, PP3 alkaline battery (IEC 6LR61, NEDA 1604A),

Dimensions: 150(H) x 64(W) x 31(D) mm.

Weight: TEK402 Mk3 approx 264g (including leads, croc clips & battery)



## Specification TEK402/TEK404 Continuity Tester

TEK404 Mk2 approx 296g (including leads, croc clips & battery)

Includes: TL49 test leads with uninsulated crocodile clips (TEK402 only), TL47 test leads with insulated crocodile clips (TEK404 only), 9V battery, instructions

### Safety

TEK402 Mk3 conforms to BS EN 61010-1, max 50 V to earth (no measurement category)

TEK404 Mk3 conforms to BS EN 61010-1 CAT III 600 V Class II, double insulation

### EMC

Conforms to BS EN 61326-1

### SPECIFICATION FOR TL47 & TL49 TEST LEADS

Maximum voltage: 1000V AC/DC Maximum current: 10A continuous

Connector: 4mm banana plug with fixed shroud

### Environmental

Temperature (operating & storage): 0°C to 40°C

Altitude: up to 2000m

Pollution degree 2

### Safety (TL47)

Conforms to BS EN 61010-031,

Probe tip caps fitted - CAT IV 600V, CAT III 1000V, 10A

Probe tip caps removed - CAT II 1000V, 10A

Crocodile clip fitted - CAT III 600V, CAT II 1000V, 10A

Class II, double insulation

### Safety (TL49)

Conforms to BS EN 61010-031,

Probe tip caps fitted - CAT III 1000V, 10A

Probe tip caps removed - CAT II 1000V, 10A

Crocodile clip fitted - Max 50 V to earth (no measurement category), 10A

Class II, double insulation

## Check out what else you can get from Martindale:

- 18th Edition Testers
- Accessories
- Calibration Equipment
- Continuity Testers
- Electricians' Kits
- Environmental Products
- Full Calibration & Repair Service
- Fuse Finders
- Digital Clamp Meters
- Digital Multimeters
- Labels
- Microwave Leakage Detectors
- Motor Maintenance Equipment
- Multifunction Testers
- Non-trip Loop Testers
- Pat Testers & Accessories
- Phase Rotation Testers
- Proving Units
- Socket Testers
- Thermometers & Probes
- Test Leads
- Voltage Indicators
- Specialist Metrohm Testers (4 & 5kV)
- Specialist Drummond Testers



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