



## INSTRUCTION MANUAL

### MT474

### 690V VOLTAGE TESTER





# Contents

## Page no

1. Safety Warnings.....	4
1.1. International Safety Warnings.....	4
1.2. Safety Notes.....	4
1.3. Warnings.....	4
2. Specifications.....	6
3. Voltage Tester Description.....	7
4. Explanation of Symbols.....	7
5. Operation.....	8
5.1. Function Test / Self Test.....	8
5.2. Voltage Test.....	8
5.3. Low Impedance Test.....	8
5.4. Single-pole Phase Test.....	8
5.5. Voltage Test with RCD Trip Test.....	9
5.6. Continuity Test/Diode Test.....	9
5.7. Rotary Field Indication.....	10
5.8. Measurement Point Illumination.....	10
5.9. Maintenance.....	11
5.10. Cleaning.....	11
5.11. Calibration Interval.....	11
5.12. Battery Replacement.....	11

## 1. SAFETY WARNINGS

### 1.1. International Safety Symbols



Warning of a potential danger, comply with instruction manual.



Caution! Dangerous voltage. Danger of electrical shock.



Double insulation.

### 1.2. Safety Notes

- Reference. Please use utmost attention.
- Do not exceed the maximum allowable input range of any function
- Insulated personnel body protective equipment up to 690V.

### 1.3. Warnings

- ⚠ In order to avoid electrical shock, the valid safety and VDE regulations regarding excessive contact voltages must receive utmost attention, when working with voltages exceeding 120V (60V) DC or 50V (25V) RMS AC. The values in brackets are valid for limited ranges (as for example medicine and agriculture).
- ⚠ Prior to measurement ensure that the test leads and the test instrument are in perfect condition.
- ⚠ When using this instrument only the handles of the probes may be touched – do not touch the probe tips.
- ⚠ This instrument may only be used within the ranges specified and within low voltage systems up to 690V.
- ⚠ Prior to usage ensure perfect instrument function (e.g. on known voltage source).
- ⚠ The voltage testers may no longer be used if one or several functions fail or if no functionality is indicated.
- ⚠ Do not use this instrument under damp conditions.
- ⚠ Perfect display is only guaranteed within a temperature range of -10°C up to +55°C, at relative humidity question <85%.
- ⚠ If the operator's safety cannot be guaranteed, the instrument must be removed from service and protected against use.

### The safety can no longer be insured if the instrument:

- Shows obvious damage
- Does not carry out the desired measurements
- Has been stored for too long under unfavorable conditions
- Has been subjected to mechanical stress during transport.

All relevant statutory regulations must be adhered to when using this instrument.

### **Appropriate Usage**

The instrument may only be used under those conditions and for those purposes for which it was designed. For this reason, in particular the safety references, the technical data including environmental conditions and the usage in dry environments must be followed.

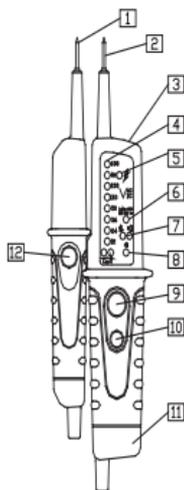
When modifying or changing the instrument, the operational safety is no longer ensured. The instrument may only be opened by an authorized service technician, e.g. for repair.

## 2. SPECIFICATIONS

Function	Range
LED voltage range	12, 24, 36 ,50, 120, 230, 400, 690V AC/DC
LED resolution	±12, 24, 36, 50, 120, 230, 400, 690V AC/DC
Tolerances	-30% to 0% of reading
Voltage detection	automatic
Acoustic signal	(AC voltage) yes
Polarity detection	full range
Range detection	automatic
Response time	< 0.1s LED
ACV Frequency range	50/60Hz
Automatic load (RCD)	yes
Internal basic load	approx. 2.1W at 690V
Peak current	1s <0.2A / Is (5s) < 3.5mA
Operation time	ED =30s
Recovery time	10 min
LED on	About 4.5V AC/DC
<b>Single-pole Phase Test</b>	
Voltage range	100...690V AC
ACV Frequency range	50/60Hz
<b>Continuity Test</b>	
Resistance range	<400kΩ
Test current	5μA
Oversvoltage protection	400V AC/DC, 690VDC
<b>Rotary Field Indication</b>	
Voltage range (LEDs)	100...690V
Frequency range	50/60Hz
Measurement principle	double-pole and contact electrode
<b>Low impedance test</b>	
Voltage range	6....690V AC/DC
Low impedance	<200kΩ
Operation time	5s@<230V AC/DC, 3s@< 400, 690V AC/DC
Oversvoltage protection	400, 690V AC/DC <5s
Power supply	2 x 1.5V "AAA" Batteries
Power consumption	max. 30mA / approx. 250mW
Temperature range	-10°C up to +55°C
Humidity	max. 85% relative humidity
Oversvoltage class	CAT III - 690V

### 3. VOLTAGE TESTER DESCRIPTION

- |                                     |  |
|-------------------------------------|--|
| 1 - Handle test probe - (L1)        | 8 - LED for continuity                 |
| 2 - Instrument test probe + (L2)    | 9 - Low impedance switch (L2)          |
| 3 - Measurement point illumination  | 10 - Measurement point lighting Button |
| 4 - LEDs for voltage display        |  |
| 5 - LED for single-pole phase test  | 11 - Battery case                      |
| 6 - LED for low impedance test      | 12 - Low impedance switch (L1)         |
| 7 - LED for left/right rotary field |  |



### 4. EXPLANATION OF SYMBOLS

The voltage tester shows the following symbols:

DC	DC voltage
AC	AC voltage
—	DC voltage negative potential (DC)
⚡	Phase display from 100 to 690V - 50/60Hz when used as a "single-pole" phase tester.
🔊	Continuity test symbol
R↻	Rotating field display clockwise
↻L	Rotating field display anticlockwise
⚠	Device for work to be performed with voltage present
BAT	Battery replacement symbol

## 5. OPERATION

### 5.1. Function test / Self test

- Test the voltage tester on a known source.
- Connect test probes. An acoustic sound must be audible and the LED (8) must be illuminated.
- The voltage display of the instruments also functions when using discharged or no batteries.
- The voltage testers may no longer be used if one or several functions fails or if no functional reliability can be detected.
- The instruments are equipped with an internal load enabling the tripping of an RCD protection device of 10mA or 30mA.
- For voltage tests (L towards PE) in systems with RCD devices, the RCD may be triggered. To avoid RCD tripping first test between L and N (approx. 5s). Immediately afterwards testing L towards PE can be carried out without RCD tripping.

### 5.2. Voltage Test

- Connect both test probes with power source.
- As from a voltage of >6V the voltage tester switches on automatically.
- The voltage is displayed via LEDs.
- For AC voltages the "+" and "-" LEDs are illuminated and an additional signal sound is audible.
- For negative voltages the "⚡" and "-" LEDs are illuminated and an additional signal sound is audible.
- The instruments are equipped with an LED row comprising: ±12, 24, 36, 50, 120, 230, 400, 690V AC/DC for DC voltage, the polarity of the voltage displayed refers to the instrument test probe (+).
- Due to technical reasons the instrument cannot effectuate an automatic switch-on for DC voltages within the range of approx. 0V to -/+4.5V.

### 5.3. Low impedance Test

Without pressing both low impedance buttons, the following voltage steps (AC or DC) can be indicated: ±24, 36, 50, 120, 230, 400, 690V AC/DC. By pressing both low impedance push buttons the voltage tester switches to a lower internal resistance (suppression of inductive and capacitive voltages). Thus, the indication of low impedance (6) is also activated. The duration of the test with a lower internal resistance of the device (load test) depends on the value of the voltage to be measured. To prevent excessive warming of the voltage tester, it is equipped with a thermal protection.

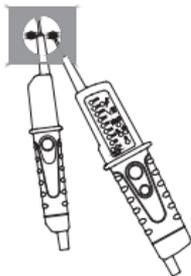
### 5.4. Single-pole phase Test

- The single-pole phase test is only possible when batteries are installed and in good condition.

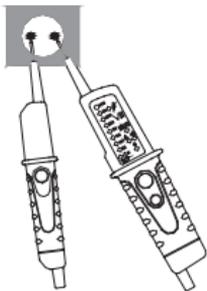
- The single-pole phase test starts at an AC voltage of approx. 100V (pole >100V AC).
- When using single-pole phase tests to determine external conductors the display function may be impaired under certain conditions (e.g. for insulating body protective equipment on insulation locations).
- The single-pole phase testing is not appropriate to determine whether a line is live or not. For this purpose, the double-pole voltage test is always required.
- Connect both test probes with power source.
- A signal sound indicates the phase.
- The LED (5) is illuminated in the display.

### 5.5. Voltage Test with RCD Trip Test

During voltage tests in systems equipped with RCD circuit breakers, a RCD switch can be tripped at a nominal residual current of 10mA or 30mA by measuring the voltage between L and PE.



To avoid RCD tripping a test has to be carried out between L and N during approx. 5s. Immediately afterwards, voltage testing between L and PE can be carried out without RCD tripping.



### 5.6. Continuity Test / Diode Test

The continuity test /diode test is only possible when batteries are installed and in good condition. A signal sound is audible for continuity and the LED for continuity LED (8) is illuminated.

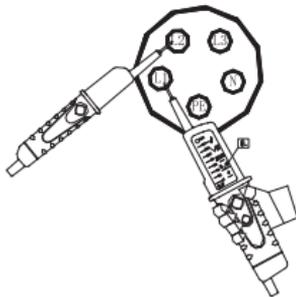
## 5.7. Rotary Field Indication

The voltage testers are equipped with a double-pole rotary field indicator. The rotary phase indication is always active. The symbols "R" or "L" are always displayed. However, the rotary direction can only be determined within a three-phase system. Here, the instrument indicates the voltage between two external conductors.

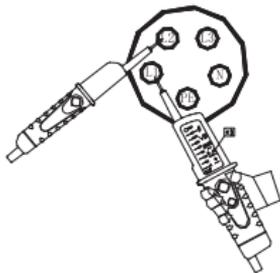
- Connect the instrument test probe with the supposed phase L2 and the handle test probe with the supposed phase L1.

The voltage and the rotary field direction are displayed.

"R" signifies that the supposed phase L1 is the actual phase L1 and the supposed phase L2 is the actual phase L2.



"L" signifies that the supposed phase L1 is the actual phase L2 and the supposed phase L2 is the actual phase L1.



When re-testing with exchanged test probes the opposite symbol has to be illuminated.

## 5.8. Measurement Point Illumination

Voltage testers are equipped with a measurement point illumination feature. Thus, working under bad lighting conditions (e.g. division switch cabinets) is made easier. Press button for measurement point illumination (10) on instrument rear.

## **5.9. Maintenance**

When using voltage testers in compliance with the instruction manual, no particular maintenance is required. If functional errors occur during normal operating, our service department will check your instrument without delay.

## **5.10. Cleaning**

Prior to cleaning, remove voltage test from all measurement circuits. If the instruments are dirty after daily usage, it is advisable to clean them by using a damp cloth and a mild household detergent. Never use acid detergents or dissolvents for cleaning. After cleaning, do not use the voltage tester for a period of approx. 5 hours.

## **5.11. Calibration Interval**

The voltage testers must be calibrated periodically and checked by our service department at regular intervals to ensure the specified accuracy of measurement results. We recommend a calibration interval of one year.

## **5.12. Battery Replacement**

If no signal sound is audible when short-circuiting the test probes, proceed with the battery replacement.

- Completely disconnect voltage tester from the measurement circuit.
- Remove discharged screw, battery cover and batteries.
- Replace by new batteries, two type "AAA" (UM4 R03) by respecting correct polarity.
- Close the battery cover and re-screw the screw.



---

***MAJOR TECH (PTY) LTD***

**South Africa**

 [www.major-tech.com](http://www.major-tech.com)

 [sales@major-tech.com](mailto:sales@major-tech.com)

**Australia**

 [www.majortech.com.au](http://www.majortech.com.au)

 [info@majortech.com.au](mailto:info@majortech.com.au)

