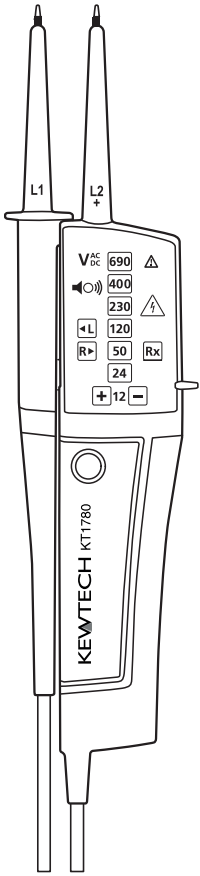
INSTRUCTION MANUAL



VOLTAGE TESTER

KT1780

KEWTECH

1. Features

- Designed to meet international safety standards. BS EN 61243-3 rather than IEC
  Measurement Category (CAT) IV 600V
- Self-Diagnostic test
- AC and DC voltage test up to 690V with LEDs
- Polarity indication
- Single-pole phase test
- Phase rotation test
- Continuity test
- Auto-power ON / OFF
- Pen light for illuminating measurement points
- Slim probe tips (GS38)
- Probe protection cover with earth pin opener protects user and test tips
- IP65 (IEC60529)
- Compact design (Light weight and portable)

2. Safety Warnings

This Instrument has been designed to be used by skilled persons and in accordance with safe methods of work, and has been designed, manufactured and tested according to IEC 61010/61243: Safety requirements for Electronic Measuring apparatus, and is supplied having passed rigorous quality procedures.

The operating instructions contain information and Cautions required for safe operation and use of the instrument. Before using the instrument, read the operating instructions carefully and follow them in all respects.

Failure to follow the instructions or to comply with warnings and cautions may result in life-threatening injuries to the user and damage to the instrument and/or device under test.

⚠ **WARNING** is reserved for conditions and actions that are likely to cause serious or fatal injury.
⚠ **CAUTION** is reserved for conditions and actions that can cause injury or instrument damage.

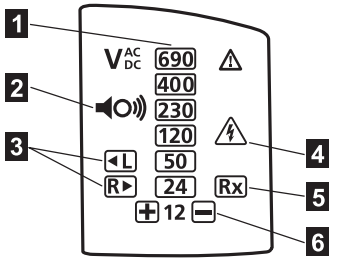
Symbols used on the instrument

⚠	User must refer to the explanations in the instruction manual
▣	Instrument with double or reinforced insulation, Class II insulation.
	Insulated personnel body protective equipment up to 690V.
CAT II	Electrical circuits of equipment connected to an AC electrical outlet by a power cord.
CAT III	Primary electrical circuits of the equipment connected directly to the distribution panel, and feeders from the distribution panel to outlets.
CAT IV	The circuit from the service drop to the service entrance, and to the power meter and primary overcurrent protection device (distribution panel).
CE	Comply with EMC and Low Voltage Directive.

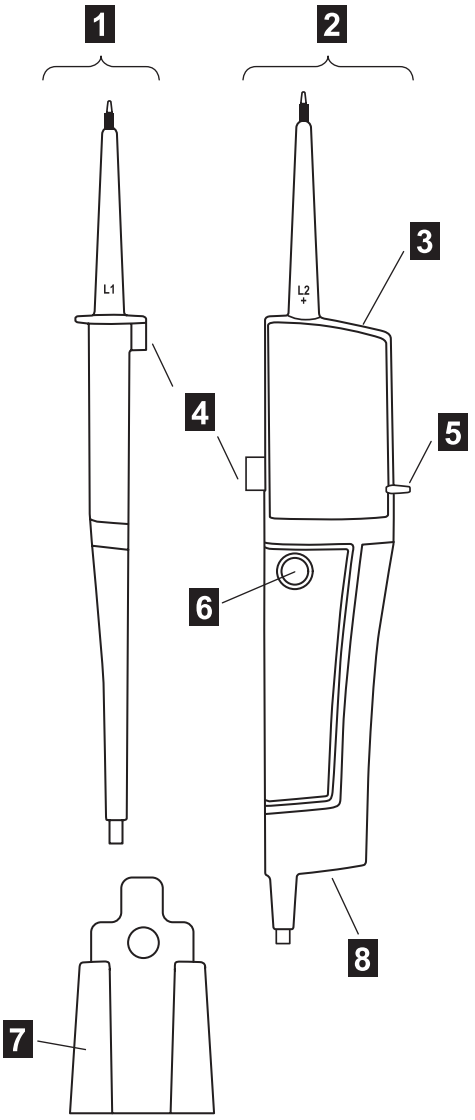
⚠ **WARNING**

- Never make measurement on a circuit in which the electrical potential exceeds 690V.
- Do not attempt to make measurement in the presence of flammable gasses, as the use of the instrument may cause sparking, which could lead to an explosion.
- Never attempt to use the instrument if it's surface or your hands are wet. (Do not use in rainfall.)
- Never unlock and open the battery case during measurements.
- Verify proper operation on a known source before use or taking action as a result of tha indication after use.
- Never attempt to make any measurement if any abnormal conditions, such as broken case or exposed metal parts are present on the instrument or test probes.
- Do not make any disassembly or any modification to the instrument.
- Extreme caution when Live circuit LED blinks or lights on.
- Correct indication of LEDs is only guaranteed within a temperature range of -15°C up to 55°C (<85% RH).

3. Instrument layout



1) 12/24/50/120/230/400/690V LEDs for voltage indication
2) Buzzer
3) L/R LEDs for phase rotation test
4) Live circuit LED for Single-pole phase and Double-pole test
5) Rx LED for Continuity test
6) Polarity indication LEDs



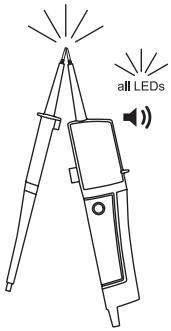
1) L1 - Slim Tip Probe
2) L2 + Slim Tip Probe
3) Pen light
4) Probe Clip
5) Finger Guard
6) Pen light switch
7) Probe protection cover with earth pin opener
8) Battery case

4. Preparation for measurement

4.1 Auto-power-on / Self-diagnostic test

• Auto-power-on

- Short-circuiting the probes as follows powers on the instrument automatically and goes into a Self-diagnostic test. If the tester is not in sleeping mode, please wait for 10 seconds and carry out the self-diagnostic test.



Instrument may power on due to the influence of static charge.

- When the battery voltage is below 2.4±0.1V, Rx LED blinks which indicates that the battery capacity is low.

• Self-diagnostic test

> ⚠ **WARNING**
> **Do not use the instrument when abnormality is found at Self-diagnostic test.**

- Battery voltage is normal when all LEDs are lighting up and the buzzer is beeping.
- When the battery voltage is below approx. 2.6 V, L and/or R LEDs will not light up and the Phase rotation test of Clause 5.4 will not operate.
- When Rx LED blinks, all the functions except for the double-pole test without batteries of Clause 5.2 will not be guaranteed.
- When the necessary functions will not operate, please replace the batteries according to Clause 6.

• Auto-power off

- Instrument is automatically powered off after 10sec when there is no signal contacted to the probes.

Auto-power off may not operate when a significant electric magnetic field exists in the vicinity.

5. Measurement

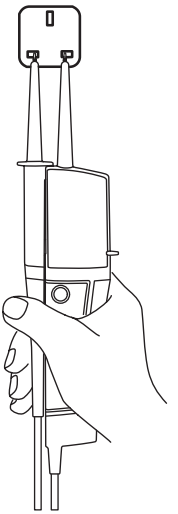
⚠ WARNING

- **Carefully check Clause 2 as well.**
- **Self-diagnostic test should be done prior to measurements and confirm LED and buzzer works properly.**
- **Verify proper operation on a known source before and after use even if the Self-diagnostic test is OK.**
- **Make sure that you can hear the buzzer at locations with a high background noise.**
- **Keep your hand and fingers behind the finger guards on the probes during measurements.**
- **Due to the high internal resistance (approx. 200kΩ), capacitive and inductive voltages (interference voltages) may be indicated.**
- **Make sure that the test probes have good contact. Oxide layers on the device under test may influence the measurement.**

⚠ SAFETY ADVICES

- **Depending on the internal impedance of the voltage detector there will be a different capability of indicating the presence or absence of operating voltage in case of the presence of interference voltage.**
- **A voltage detector of relatively low internal impedance, compared to the reference value of 100 kΩ, will not indicate all interference voltages having an original voltage value above the ELV level. When in contact with the parts to be tested, the voltage detector may discharge temporarily the interference voltage to a level below the ELV, but it will be back to the original value when the voltage detector is removed.**
- **When the indication "voltage present" does not appear, it is highly recommended installing earthing equipment before work.**
- **A voltage detector of relatively high internal impedance, compared to the reference value of 100 kΩ, may not permit to clearly indicate the absence of operating voltage in case of presence of interference voltage.**
- **When the indication "voltage present" appears on a part that is expected to be disconnected of the installation, it is highly recommended confirming by another means (e.g. use of an adequate voltage detector, visual check of the disconnecting point of the electric circuit, etc.) that there is no operating voltage on the part to be tested and to conclude that the voltage indicated by the voltage detector is an interference voltage.**
- **A voltage detector declaring two values of internal impedance has passed a performance test of managing interference voltages and is (within technical limits) able to distinguish operating voltage from interference voltage and has a means to directly or indirectly indicate which type of voltage is present.**

5.1 Voltage test (Double-pole test)



- Connect both probes to the device under test.
- The voltage is indicated by LEDs.

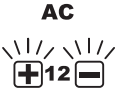
Buzzer sounds when a threshold voltage of 38V is exceeded.

Live circuit LED lights up and Buzzer sounds when the threshold voltage of 50V LED is exceeded.

- Voltage polarity is indicated in following manner.

12V LED lights up when exceeds 7V (Threshold voltage of 12V LED).

12V LED blinks at below approx. 7V (AC only)



NOTE

- This instrument can make measurements between L-PE without tripping RCDs.
- When the L2 probe + is the positive (negative) potential, the Polarity indication LED indicates „+DC" („-DC").
- L/R LED may light up.

5.2 Double-pole test without batteries

Respective LEDs light up even when double-pole test carried out without batteries.

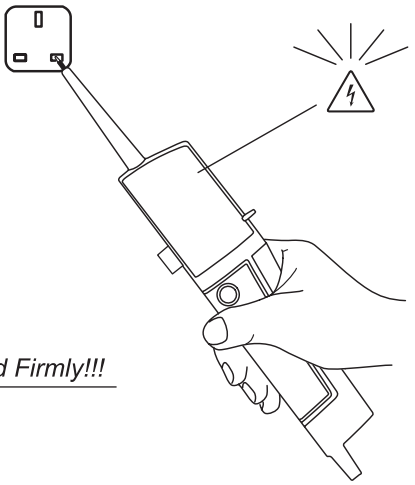
Only the threshold voltage of the 12V LED changes to approx.12V or more.
The threshold voltage of other LEDs (24/50/120/230/400/690V) are according to the Specification. (See Clause 7)

5.3 Single-pole phase test

⚠ WARNING

- **Carefully handle L1 probe - when it is not in use.**
- **Function of this test may not be fully achieved**
  :If the Insulation condition of user or of the device under test is not sufficient.
  :If the device under test contains much high frequency component which exceeds 60Hz.
  Verification of live-circuit shouldn't be dependent on thls Single-pole phase test only, but also on the Double-pole test. (See Clause 5.1.)

- Hold the instrument firmly and connect the L2 probe + to the device under test.
- Live circuit LED lights up and buzzer sounds when a voltage of approx. 100V AC or more exists in the device under test.

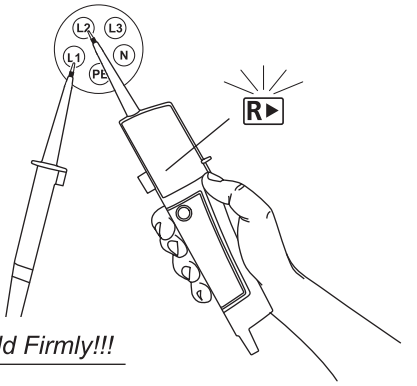


Hold Firmly!!!

5.4 Phase rotation test

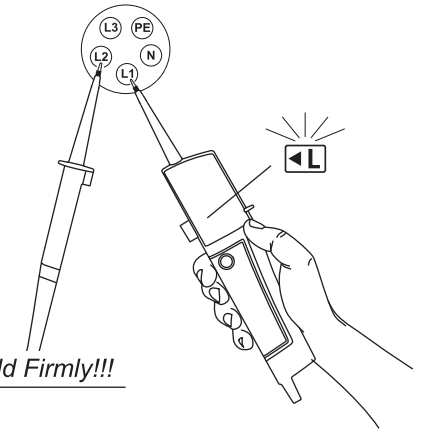
L LED and R LED for Phase rotation test may operate on various wiring systems, but effective testing result can be obtained only on Three-phase 4-wire system.

- Hold the instrument firmly and connect both probes to the device under test.
- Phase-to-phase voltage is indicated by each Voltage LED.
- R LED lights up for Right rotary field.



Hold Firmly!!!

- L LED lights up for Left rotary field



Hold Firmly!!!

The principle of measurement

The instrument detects the phase rising order regarding the user as EARTH.

NOTE

Function of this test may not be fully achieved
:if the insulation condition of user or of the device under test is not sufficient.
:if the device under test contains much high frequency component which exceeds 60Hz.

5.5 Continuity test

> ⚠ **WARNING**
> **Make sure the devlce under test isn't live.**

- Rx LED lights up and buzzer should sound continuously.

5.6 Pen lightfunction

(Illuminating the Measurement Point)
Pen light illuminates the measurement point in dimly lit area.

- Pressing the Pen light switch to turn on the light and after (10s) it will turn itself off.

NOTE

• Using the Pen light shortens the battery life.

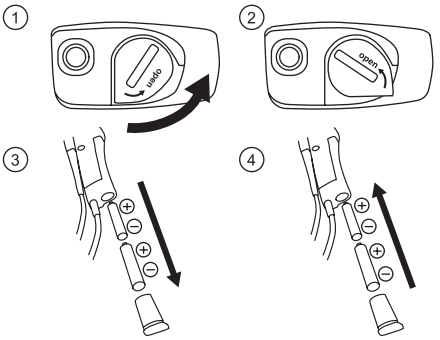
6. Battery Replacement

> ⚠ **WARNING**
> **Remove the probes from any testing point, when opening the Battery case.**

Follow the procedure below and replace batteries with new ones (type IEC LR03 1.5V).

- Unlock the Battery case with a coin-shaped object.

- Pull out the Battery case and replace the batteries. Insert new batteries according to the engraving on the Battery case.
- Insert the Battery case into the instrument and firmly lock the case again.



> ⚠ **WARNING**
> **Confirm that the Battery case is properly locked prior to measurements.**

7. Specification

Voltage test	
Voltage range	12...690V AC/DC
Peak current	Is<3.5mA (at 690V)
Measurement Duty	30s ON (operation time) 240s OFF (recovery time)
Internal battery consumption	Approx. 80 mA (battery 3V, measuring 690V AC)
Battery life	approx.1000 operations (30s ON / 240s OFF duty)
LED	
Nominal voltage	12 / 24 / 50 / 120 / 230 / 400 / 690 V AC (16...400Hz), DC(±)
Tolerance (Threshold voltage)	Light on at more than :7 ±3V (12V LED) :18 ±3V (24V LED) :37.5 ±4V (50V LED) :75% ±5% of nominal voltage (120/230/400/690V LED)
Response time	<0.6s at 100% of each nominal voltage
Single-pole phase test	
Voltage range	100...690V AC (50/60Hz)
Phase rotation test	
System	Three-phase 4-wire system 200...690V phase-to-phase (100...400V earth-to-phase AC 50/60Hz
Phase range	120 ±5 degree
Continuity test	
Detection range	0...400kΩ + 50% (23 ±5°C)
Test current	Approx. 1.5μA (battery 3V, 0Ω)
Internal battery consumption	Approx. 80mA (battery 3V, 0Ω)
Reference condition	
Battery	3V (IEC LR03 1.5V x 2)
Temperature	-15...55°C operation -20...70°C storage (KT1780) -20...60°C storage (KT1790) No condensation
Humidity	Max. 85% RH
Used Location	Altitude up to 2000m
Safety	
Standard	IEC(EN)61010-1:2010(2010) IEC(EN)61243-3:2014(2014) IEC(EN)61010-031:2008(2008) IEC(EN)61557-7:2007(2007)
Category	CAT.III 690V, CAT.IV 600V

Pollution degree	2
IP code	IP65 (IEC60529)
Size	
Dimensions	263 x 64 x 26 mm
Weight	190g (including batteries)

8. Cleaning and storage

⚠ CAUTION

- Use a lightly damp cloth with neutral detergent for cleaning the instrument. Do not use abrasives or solvents.
- Do not expose the instrument to direct sun light, high temperature and humidity or dewfall.
- Put the Probe protection cover on the Tips while not in use. Otherwise it may cause an injury.
- Remove batteries when the instrument will not be in use for a long period.

9. For Environment

This instrument is subject to WEEE Directive (2002/96/EC). Please contact your nearby KEWTECH dealer for disposal.

Notes

Notes

KEWTECH reserves the rights to change
or designs described in this manual without notice and
without obligations.

KEWTECH

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SL5 0EF
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(12-16) (92-2113B)

KEWTECH

Certificate of Conformity & Warranty Registration

This instrument has been calibrated using equipment which has itself been calibrated to standards traceable to International Standards monitored by BIPM (International Bureau of Weights and Measures)

This certificate guarantees that the product has been fully inspected and conforms to all the relevant published specifications.

Free Two Year Warranty

Kewtech's Two Year Warranty enhances the customers' legal rights/ it covers all manufacturing defects for a two year period but Kewtech reserves the right to exclude abuse or accidental damage.

To register your free guarantee simply go to kewtechcorp.com - the link is on the home page.

Re-calibration Service

Regular re-calibration is recommended for this instrument. Kewtech recommends that with normal use the instrument is calibrated at least once in every 12 month interval.

When the instrument is due for re-calibration return it to the address below marked for the attention of the Calibration Department.

Kewtech Corp Ltd
Unit 6, Shaw Wood Business Park
Shaw Wood Way
Doncaster DN2 5TB
t: 01302 761044