KEWTECH

KT31 digital multi function tester

Instruction manual

Contents

Congratulations on purchasing this Kewtech model KT31 Analogue Insulation/Continuity Tester. This unit has been designed to comply with the current IEE Regulations and International Regulations. By using the latest technology this Tester will give accurate and reliable results when used in accordance with these operating instructions.

1 Safety Notice

Electricity can cause severe injuries even with low voltages or currents. Therefore it is extremely important that you read the following information before using this Insulation Tester.

1.1 This instrument must only be used by a competent trained person and in strict accordance with the instructions. Kewtech will not accept liability for any damage or injury caused by misuse or non-compliance with instructions or safety procedures.

1.2 This instrument must not be used on live circuits. Ensure all circuits are de-energised before testing.

1.3 Never open the instrument case except for battery or fuse replacement.

1.4 Always inspect your Insulation Tester and test leads before use for any sign of abnormality or damage. If any abnormal conditions exist (broken test leads, cracked case, display faulty, inconsistent readings, etc) do not attempt to take any measurements. Return to Kewtech for rectification.

1.5 Never replace the protective fuse inside the instrument with any other than the specified or approved equal (0.5A/600V) fast acting ceramic to IEC127.

1.6 This meter has been designed with your safety in mind. However, no design can completely protect against incorrect use. Electrical circuits can be dangerous and/or lethal when a lack of caution or poor safety practice is used. Use caution in the presence of voltages above 50V as these pose a shock hazard.

1.7 Pay attention to cautions and warnings which will inform you of potentially dangerous procedures.

1.8 If at anytime during testing there is a momentary degradation of reading, this may be due to excessive transients or

discharges on the system or local area. Should this be observed, the test should be repeated to obtain a correct reading. If in doubt always contact Kewtech.

1.9 Never assume an installation circuit is not live. Confirm it is de- energised before commencing testing.

1.10 Replace worn and/or damaged leads with new ones approved by Kewtech immediately.

1.11 It is essential to understand and follow the safety rules contained in this manual. They must always be observed when using the instrument.

2 Features and Principles of Measurement

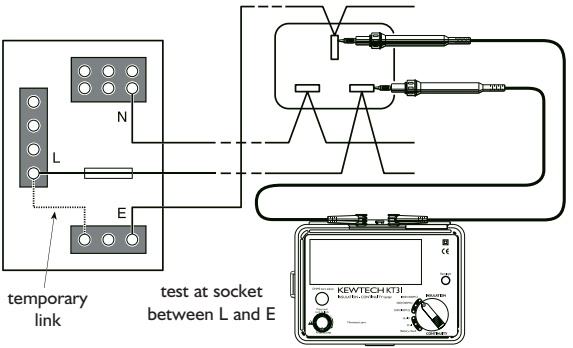
2-1 Features

- Robust new style dual purpose case housing and carrying case.
- Uses only 6 X 1.5V battery type AA or equivalent.
- Incorporates front panel Ohms zero adjust.
- Fuse protected (continuity ranges only).
- Taut band construction.
- Expanded insulation and continuity scales for ease of reading.
- Battery check facility.
- LIVE circuit audible and visual indication.
- 3 insulation test voltages, 2 continuity ranges.
- Back light function.
- 200mA test current on continuity ranges.
- 1mA nominal insulation current.

2-2 Principles of Measurement

An Insulation/Continuity Tester performs two basic functions. As a continuity tester the instrument can be used to measure

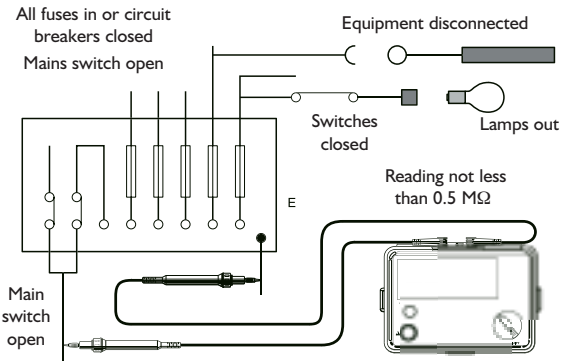
low values of resistance between two points in an electrical circuit. In this mode the instrument acts as a low voltage current source. The resistance is calculated from the measurement of the voltage and the current through the conductor. Careful connection to the circuit under test is essential to avoid measurement errors. Circuits connected in parallel to the circuit under test may also effect the accuracy of the measurement.



Typical arrangement for measuring the continuity of protective conductors. Before proceeding with tests conductors must be proved to be de-energised.

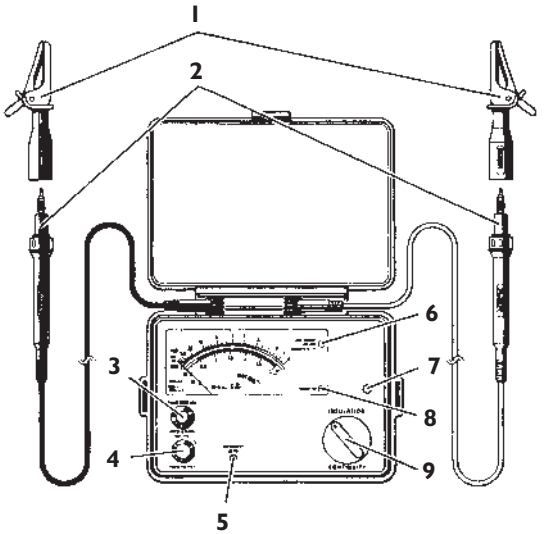
As an insulation tester the instrument is used to measure high values of resistance and hence the electrical quality of the insulating material within the circuit. The insulation tester applies a voltage, measures the total leakage current flow and displays the calculated resistance. A DC voltage is used to eliminate leakage currents caused by capacitance in the circuit. A steady insulation resistance reading will indicate that any capacitance within the system is fully charged and the capacitive leakage current has reduced to zero.

Possible insulation resistance measurement errors may be caused by the circuit under test being wet and/or dirty. Errors may also occur when testing large installations where the insulation resistances may effectively be in parallel.



Note: Insulation testing must only be undertaken on de-energised circuits.

3 Layout Diagram



1 Crocodile Clip
2 Prod
3 Ohms Zero Adjust
4 Test Button
5 Meter Movement Zero Adjust
6 Live Circuit Warning Lamp
7 Light Switch
8 Power-on Indication Lamp
9 Range Switch

4 Specifications

Insulation Resistance Measurement Specification

Test Voltage	250V	500V	1000V
Measuring Ranges	0 -100M Ω	0 -200M Ω	0 -400MΩ
Mid-scale Value	1 MΩ	2 MΩ	4MΩ
Nominal Output Voltage (UN)	250V DC min. at 0.25MΩ	500V DC min. at 0.5MΩ	1000V DC min. at 1MΩ
Nominal Output Current (In)	1mA DC min. at 0.25MΩ	1mA DC min. at 0.5MΩ	1mA DC min. at 1MΩ
Intrinsic Accuracy	±5% of indicated value at 0.1MΩ to 10MΩ	±5% of indicated value at 0.2MΩ to 20MΩ	±5% of indicated value at 0.4MΩ to 40MΩ
	±0.7% of scale length at ranges other than above ranges		

Continuity Resistance Measurement Specification

Measuring Ranges	0 -2Ω	0 - 20Ω
Open circuit voltage (Uq)	4 - 9V	
Nominal output current (In)	200 mA	
Intrinsic accuracy	±3% of scale length	

Reference Conditions

Ambient Temperature: 23 ± 5°C

Relative Humidity: 60 ± 15%

Supply Voltage: 9V

Position: Front panel plane horizontal

Altitude: Less than 2000m

Insulation Resistance Operating Error

Range	Operating Range Compliant with EN 61557-2 Operating Error
250V	0.1MΩ to 10MΩ
500V	0.2MΩ to 20MΩ
1000V	0.4MΩ to 40MΩ

Continuity Resistance Operating Error

Range	Operating Range Compliant with EN 61557-4 Operating Error
Ω x 1	0.2Ω to 2Ω
Ω x 10	2Ω to 20Ω

The influencing variations used for calculating the Operating Error are:

Operating Temperature: 0°C to 40°C
Relative Humidity: 85% maximum
Position: Reference plane ±90°
Supply Voltage: 6.6V to 9V

General Specification

Storage Temperature: -20°C to 60°C
Storage Relative Humidity: 85% maximum
Power Supply: 6 X 1.5V batteries type R6 or equivalent
Fuse (user replaceable): 500mA/600V fast acting ceramic
Weight (minus batteries): 540g
Possible number of operations during battery life:

When the following resistance is connected to a measuring terminal alternating between 5 seconds loading and intervals of 25 seconds, the number of measurements that it is possible to make, until the battery voltage falls 6.6V shall be:

250V Range 0.25MΩ approx.2400 times or more

500V Range 0.5MΩ approx.1200 times or more

1000V Range 1MΩ approx. 600 times or more

Ωx 1 Range 1Ω approx. 800 times or more

Applied Standards

Operation:	EN 61557-1/2/4
Safety:	EN61010 Cat.III 300V
Protection:	IEC60529 (IP40)

Accessories

SL20 ACC020 Test Leads
Test Lead Pouch

5 Testing - General

Preparation for measurements - without pressing the test button, check that the pointer lines up with the ∞ mark on the red megaohm scale. If not, adjust it by rotating the movement zero adjust with a small screwdriver.

Initial Checks:

These must be conducted prior to any testing.

Important: Before pressing the test button, if at any time the live circuit neon is lit or the warning buzzer sounds - STOP - the circuit is live and must be de-energised.

5-1 Battery Check

a) When the battery voltage falls below 6.5V the Tester will not give reliable results, the battery check function ensures that accurate results are maintained.
b) Before conducting the battery check, always ensure that the instrument is not connected to any circuit. Remove the instrument leads.
c) Switch the function selector switch to BATT check and press the test button. If the pointer does not move to BATT good, the battery needs to be replaced.

5-2 Test Leads Check

Connect the leads to the Tester, switch to the Ω x 1 function and press and turn the test button to lock it down. When the leads are connected together, the pointer should move from the ∞ position towards the 0 position on the green ohms scale. If not, the leads or fuse may be faulty (or you need to adjust the ohms zero knob to zero the pointer). Release test button after completion.

6 Insulation Tests

a) Select the desired insulation test voltage 250V, 500V or 1000V.
b) Connect the test leads to the Tester and circuit under test.
c) If the live circuit warning lamp is NOT LIT and the warning buzzer does not sound, press the test button. Read the red megaohm scale directly for the 500V range, multiply by 0.5 for 250V and by 2 for 1000V.

Note: Never turn the test voltage range switch during insulation testing while the test button is depressed, this may damage the instrument. Never touch the circuit under test during an insulation test.

7 Continuity Testing (Resistance Tests)

a) Select the desired ohms range 2Ω(Ωx1) or 20(Ωx10).
b) Short the test leads, press the test button and adjust the ohms zero adjust to zero the pointer on the green ohms scale.
c) Connect the test leads to the circuit under test. If the live circuit warning lamp is NOT LIT and the buzzer does not sound, press the test button. Read the Ω x 1 range directly, multiply by 10 for Ω x 10.
d) Back light function is provided to facilitate work at night or dimly lit locations.
e) Hold down the light switch to obtain illumination.

General

Lock down feature - for hands free operation, press and turn the test button.

Warning: The circuit must not be live-conduct initial checks first before using this feature. Otherwise damage will result.

a) Using the Tester in this mode, may leave the circuits under test charged up when conducting insulation tests due to capacitance. To avoid this, always release the test button by rotating anti-clockwise while the leads are still connected to the circuit. This will ensure that any electrical charge is dumped through the Tester's internal resistor circuits.
b) If pressing the test button has no effect, check the fuse in the instrument. See fuse replacement.
c) Fuse and Battery replacement. Fuse type - 0.5A/600V fast acting ceramic to IEC127 (only use the correct fuse for replacement). Battery type - 6 x 1.5V battery type R-6, AA or equivalent.
To replace the batteries or fuse, first disconnect all test leads from the instrument. Open the back cover on the tester by unscrewing the metal captive screw to reveal the battery compartment. The fuse lifts out of its recess. The 6 1.5V R-6 type batteries are located in a separate detachable battery holder inside the compartment. Always replace all six batteries with new ones at the same time - never mix old and new types.

Back Light Function

To facilitate working in dimly lit situations, a back light function is provided which illuminates the display. To operate this function, the back light button must be depressed and released whilst pressing the test button. When the test button is released the back light will switch off. If the test button is depressed again within a few seconds, the back light will auto-

matically switch on without having to press the back light button. It is advisable that the back light function is only used when absolutely necessary as constant use may degrade the battery life faster than normal.

8 Servicing & Calibration

If this product requires cleaning use a damp cloth to wipe it. Do not use strong cleaning agents as these may damage the plastic surfaces. Ensure that it is perfectly dry before switching on.

If this tester should fail to operate correctly, return to Kewtech marked for the attention of the Service Department, stating exact nature of fault.

Make sure that:

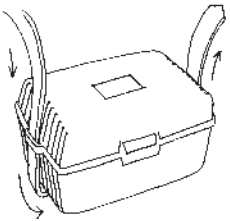
a) Operating instructions have been followed
b) Leads have been inspected
c) Fuse has been checked
d) Batteries have been checked
e) The unit is returned with all accessory leads

Regular re-calibration is recommended for this instrument. We recommend that with normal use this unit is calibrated at least once in every 12 month period. When the unit is due for re-calibration, return to Kewtech marked for the attention of the calibration department and be sure to include all accessory leads as they are part of the calibration procedure.

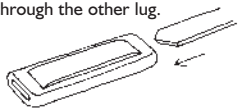
Kewtech reserve the right to improve specifications and designs without notice and without obligations.

Case, strap, shoulder-pad and test lead pouch assembly

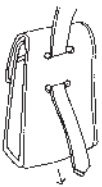
Assemble the shoulder strap through the case lugs and the test lead pouch in the following sequence:



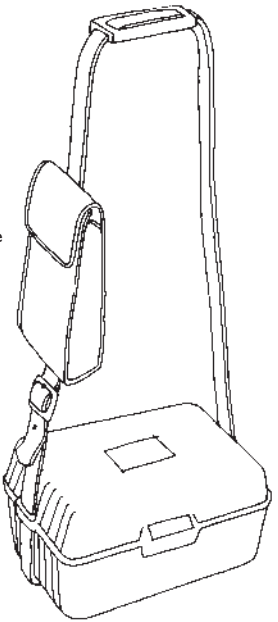
1 Pass the strap **down** through the first lug, under the case and **up** through the other lug.



2 Slide the shoulder pad onto the strap



3 Feed the strap **down** through the slots in the back of the test lead pouch.



4 Pass the strap through the buckle, adjust the strap for length and secure.

Distributor

Kewtech Corporation Limited
76 St. Catherine's Grove
Lincoln LN5 8NA
www.kewtechcorp.com

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