

Electricity is dangerous and can cause injury and death. Always treat it with the greatest of respect and care. If you are not quite sure how to proceed, then stop, take advice from a qualified person.


This instruction manual contains warning and safety rules which must be observed by the user to ensure safe operation of the instrument and maintain it in a safe condition. Therefore, read through these operating instructions before using the instrument.


IMPORTANT:


This instrument must only be used by a competent and trained person and operated in strict accordance with these instructions.


KEWTECH will not accept liability for any damage or injury caused by misuse or non-compliance with the instructions or with the safety procedures.

It is essential to read and to understand the safety rules contained in these instructions and with the safety procedures.

The symbol  indicated on the instrument means that the user must refer to the related sections in the manual for safe operation of the instrument.

Be sure to carefully read instructions following each symbol  in this manual.

 **DANGER is reserved for conditions and actions that are likely to cause serious or fatal injury.**

 **WARNING is reserved for conditions and actions that could cause serious or fatal injury.**

 **CAUTION is reserved for conditions and actions that could cause minor injury or instrument damage.**

Note: This indicates information that is essential for handling the instruments or should be noted in order to familiarise yourself with the instrument's operating procedures and/or functions.

DANGER

- **Do not apply any voltage to the test socket and test lead of this instrument.**
- **For safety reasons, only use the Test Leads designed to be used with this instrument and recommended by KEWTECH.**
- **Do not touch the device under test whilst testing is in progress.**

⚠ DANGER

- Since a high voltage of 250V or 500V is being output continuously, when measuring insulation resistance, the user may get an electrical shock. Any capacitors in the appliance under test may become charged during testing and may contain hazardous voltages do not touch them.
- Do not touch the metal part of the Test Lead with crocodile clip (M-7242) whilst testing is in progress.
- Do not touch or disconnect the appliance under test until testing is completed.

⚠ WARNING

- Never open the instrument case – because dangerous voltages are present. Only fully trained and competent electrical engineers should open the case.
- If abnormal conditions of any sort are noted (such as a faulty display, unexpected readings, broken case, cracked test leads, etc) do not use the instrument and return it to your distributor for inspection and repair.
- Never attempt to use the instrument if the instrument or your hands are wet.

⚠ CAUTION

- When using Test Leads with the crocodile clip, be sure to check the crocodile clip is firmly connected to the metal part of the device under test. Otherwise, inaccurate measurements or arcing at the contacts may occur.
- The recommended rated measuring voltage for the insulation test is 500V DC.
If this voltage seems too high for the appliance under test contact the appliance manufacturer for advice. The IEE Code of Practice allows for a touch current test (substitute leakage) or a 250V insulation test where a 500V insulation test cannot be carried out.
- We are not liable for loss of data on PC during testing with this instrument. The appliance under test is powered on during most tests, but please turn it to the OFF position after testing.
- Use a very slightly damp cloth for cleaning the instrument. Do not use abrasives or solvents.
- When the measurement function is completed, turn the function switch back to the OFF position to turn off.
- This instrument will automatically be powered off after approximately 10 minutes if no key operation is carried out.
- If the instrument will not be used for a prolonged period, remove the batteries.

The KT72 has a dedicated cover to protect against an impact from the outside and to prevent the fascia, the LCD, and the connector socket from becoming dirty. The cover can be detached and put on the backside of the main body during measurement.

2.Procedure of removing cover

2.1 Method of removing the cover

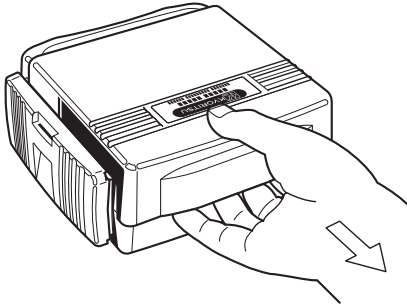


Fig.1

2.2 Method of storing the cover

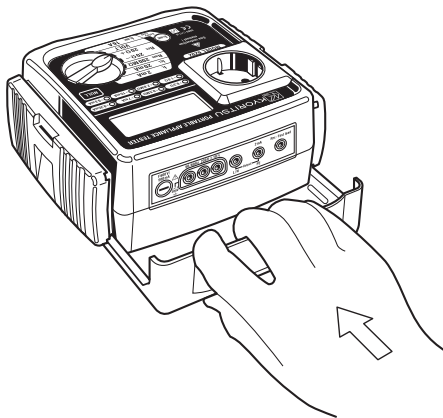


Fig.2

3.Product summary and explanation

3.1 Product summary

The KT72 is a hand-held battery powered portable appliance tester, performing three functions to ensure the Safety of Class I and Class II appliances. Readings are displayed on a large liquid crystal display (LCD) below which are four bicolour LEDs, which unambiguously display a pass or fail indication for results dictated by the IEE Code of Practice.

This instrument is suitable for performing tests as required by the following standard.

The IEE Code of Practice for In-service Inspection and Testing of Electrical Equipment: 2007

This instrument is designed to check the electrical safety of appliances of Class I and Class II categories.

As a guide the two categories are defined as follows:

Class I : Appliances which have functional insulation throughout and an earth connected case. These are often described as earthed appliances.

Class II: Appliances which have both functional and additional insulation where any metal parts cannot become “Live” under fault conditions, often referred to as double insulated.

3.2 Test Functions

KT72 has the following features.

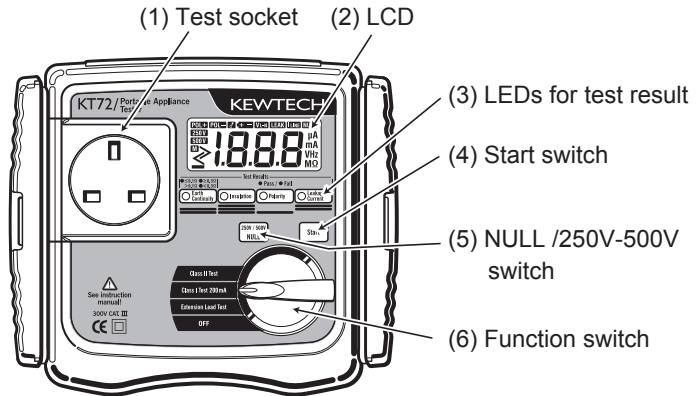
Function	Tests of contents
Class I Test 200mA	<ul style="list-style-type: none"> ● Protective conductor resistance (Test current 200mA DC nominal) ● Insulation (Test voltage 250V DC or 500V DC) ● Substitute leakage current test
Class II Test	<ul style="list-style-type: none"> ● Insulation (Test voltage 250V DC or 500V DC) ● Substitute leakage current test
Extension Lead test	<ul style="list-style-type: none"> ● Protective conductor resistance (Test current 200mA DC nominal) ● Insulation L/N-PE (Test voltage 250V DC or 500V DC) ● L-N Short ● Polarity

3.3 Features

- Auto-testing
- Checks for whether the appliance is correctly switched ON or not
- Selection for 250V or 500V for the insulation resistance test.
- Null function for the earth bond test lead.
- Over range indication on the LCD.
- Pass / fail indication of tests by LEDS and by a buzzer.
- Auto-power-off function

3.4 Instrument layout

Front View



End View

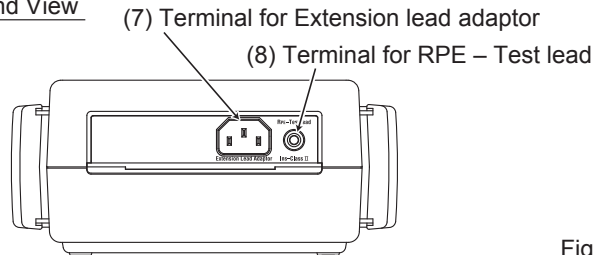


Fig.3

(1) Test socket

Insert the mains plug of the appliance to be tested in to this socket for the protective conductor resistance, insulation resistance, substitute leakage current test and extension lead test.

(2) LCD

Measured value is displayed

(3) LED for test result

When the value of protective conductor resistance, insulation resistance and substitute leakage current exceeds the limit dictated by applicable standards, LEDs light up in red. When it is within the limit, the LEDs light up in green. (For protective conductor resistance, the LED can light orange, for details please refer to the note in section 6.1: Class I Test.)

(4) Start switch

A measurement starts by pressing this switch.

(5) NULL/250V-500V switch

- The rotary dial has to be set to a Class I or Extension Lead test for this button to be used to zero out the test lead resistance.
- The rotary dial has to be set to Class II for this button to be used to select either 250 V or 500V insulation test voltage

(6) Function switch

Select a function with this switch.

(7) Terminal for Extension lead adaptor

For use with the KAMP S (UK) extension lead adaptor.

(8) PE / Class II insulation probe

Connect the Test Lead with crocodile clip (M-7242) (fig 4) to this terminal for the measurement of protective conductor resistance and Class II insulation, and clip the metal parts of the appliance under test with the crocodile clip.

(9) Test Lead with crocodile clip M-7242



Fig.4

(10) Extension leads adaptor KAMP S (UK)

This is for connecting the instrument and a mains extension lead.



Fig.5

(11) Earth pin adapter M-8251

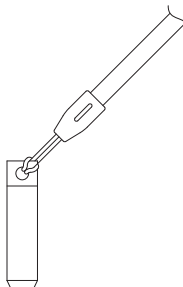


Fig.6

3.5 Explanation for indications LCD Display

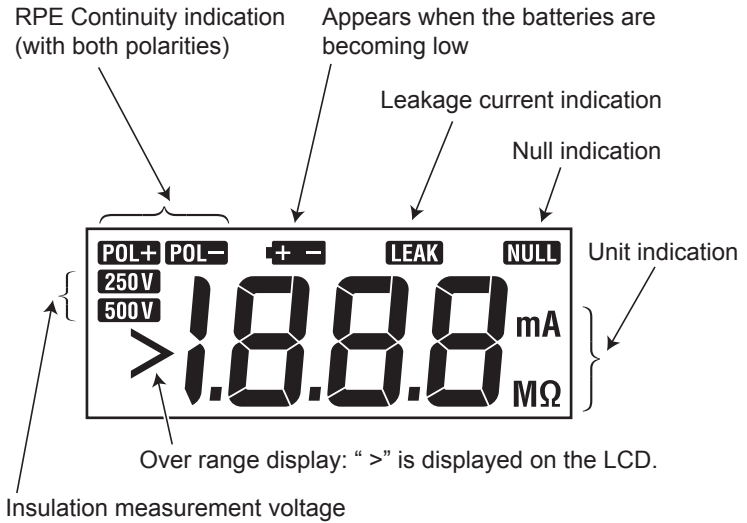


Fig.7

List of display message

$no \Leftrightarrow [on$	Displayed when the value at preliminary measurement for the protective conductor resistance exceeds 20Ω , and the measurement cannot be carried out.
$no \Rightarrow [on \Rightarrow Value$	Displayed when the protective conductor resistance exceeds the threshold value. (*1)
$off \Leftrightarrow .P$	Displayed when appliance under test is switched off.
$no \Rightarrow LNE \Rightarrow Value$	Displayed when the insulation resistance between LN-E is less than the threshold value.
$no \Rightarrow LER \Rightarrow Value$	Displayed when the leakage current exceeds the threshold value.
$no \Leftrightarrow Sht$	Displayed when L-N is close to short during an Extension lead test.
$no \Rightarrow L-L \Rightarrow Value$	Displayed when the resistance between L-L exceeds 10Ω during an Extension lead test.
$no \Rightarrow N-N \Rightarrow Value$	Displayed when the resistance between N-N exceeds 10Ω during an Extension lead test.

(*1): Extension leads and appliances with long mains leads have a greater resistance allowance for earth continuity. Please refer to the table.1 on page 11.

3.6 Applicable standards

Instrument operation

The IEE Code of Practice for In-service Inspection and Testing of Electrical Equipment: 2007

Safety

IEC/EN61010-1 CAT.III 300V-instrument
IEC/EN61010-031 CAT.III 300V-test lead

EMC

EN61326 (EN55022/EN61000-4-2, 4-3)

Product summary and explanation

4.Specification

4.1 General specification, measuring range and accuracy

Measurement of earth continuity (protective conductor resistance) - RPE

Test function	200mA continuity
Measuring range	0 ~ 19.99Ω (including pre-set Null values) (*2)
Resolution	10mΩ
Open-circuit voltage	5V DC
Measuring current	200mA DC (nominal)
Accuracy	± (3%rdg+5dgt)

(*2): Test lead resistance of 3Ω or less can be cancelled by NULL function.

Measurement of insulation resistance - RINS

Output voltage	250V	500V
Measuring range	0.1~19.99MΩ	
Resolution	10kΩ	
Open-circuit voltage	250V (+30%/-0%)	500V (+30%/-0%)
Nominal current	1mA DC min. @250kΩ	1mA DC min. @500kΩ
Short-circuit current	2.5mA DC or less	
Accuracy	± (2%rdg+3dgt)	

Measurement of substitute leakage current test - LEAK

Test function	Leakage current test
Measuring range	0.1~12.00mA rms, 50Hz AC
Resolution	0.01mA
Accuracy	± (3%rdg+5dgt)

4.2 Threshold and display

Function	Earth Continuity	Insulation Resistance	Polarity	Leakage Current
Class I 200mA	RPE ≤ 0.1Ω(*3)	RINS ≥ 1MΩ	—	LEAK ≤ 0.75mA
Class II	—	RINS ≥ 2MΩ	—	LEAK ≤ 0.25mA
Extension Lead	RPE ≤ 0.1Ω(*3)	RINS ≥ 1MΩ	Cont ≤ 10Ω	—

(*3): Extension leads and appliances with long mains leads have a greater resistance allowance for earth continuity. Please refer to the table 1 on next page.

- Green (RPE ≤ 0.1Ω) = Pass for all appliances
- Orange (0.1Ω < RPE < 0.3Ω) = Pass for appliances with extended mains leads
- Red (RPE ≥ 0.3Ω) = Fail

table.1: Summary of flexible table resistance rounded to two decimal places*

Nominal Conductor csa – should be marked on flexible cable (mm ²)	Length (m)	Resistance (at 20°) (Ω)	Max. carrying current (A)
0.5	1	0.04	3
	2	0.08	
	3	0.12	
	4	0.16	
0.75	1	0.025	6
	2	0.05	
	3	0.08	
	4	0.10	
	5	0.13	
1.0	1	0.02	10
	2	0.04	
	3	0.06	
	4	0.08	
	5	0.10	
1.25	1	0.015	13
	2	0.03	
	3	0.05	
	4	0.06	
	5	0.08	
1.5	1	0.01	15
	2	0.03	
	3	0.04	
	4	0.05	
	5	0.06	
2.5	1	0.01	20
	2	0.01	
	3	0.02	
	4	0.03	
	5	0.04	
4	1	0.00	25
	2	0.01	
	3	0.01	
	4	0.01	
	5	0.02	

*For flexible cables to BS 6500 or BS 6360

Note. For further information on protective conductor resistance and testing of portable appliances can be found in the Code of Practice for In-service Inspection and Testing of Electrical Equipment published by the IEE.

Specification

4.3 Reference test condition

Unless otherwise specified, this specification is dependent on the following conditions.

- (1) Ambient temperature: $23 \pm 5^{\circ}\text{C}$
- (2) Relative humidity: 45 ~ 75%
- (3) Attitude: Horizontal
- (4) Altitude: 2000m or less

Operating temperature and humidity range

$0^{\circ}\text{C} \sim +40^{\circ}\text{C}$ Relative humidity: 85% or less (no condensation)

Storage temperature and humidity range

$-20^{\circ}\text{C} \sim +60^{\circ}\text{C}$ Relative humidity: 85% or less (no condensation)

Power supply

AA-size R6 / LR6 (HR6) 1.5V (1.2V) batteries x 8

Use of alkaline batteries is recommended. (AA-size nickel hydride rechargeable batteries are also usable.)

Maximum rated power


Approx. 4.5VA

Outer dimension and weight

Outer dimension: 185(L) × 167(W) × 89(D)mm

Weight: Approx. 1.1kg (instrument with batteries)


Symbols used on the instrument:

 Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION

 Caution (Refer to the accompanying instruction manual)

 Fuse

This symbol indicates a fuse.

 Battery

This symbol indicates a battery.


 Ground

This symbol indicates ground (earth).

5.1 Visual inspection

Before starting a measurement, the user should undertake visual checks on the mains cord, case and that the correct type and rated fuse is fitted to the appliance under test. There should also be no evidence of damage of a nature that may impair the electrical safety of the appliance.

5.2 Battery Voltage Check

If the batteries fall below the normal operating voltage, the "" icon turns on. If the Low battery icon is indicated (Fig.7), replace the batteries according to "7. for Battery and Fuse Replacement".

5.3 Null setting

The IEE Code of Practice pass level for Protective conductor resistance is $0.1\ \Omega$, which is a low value. So even the resistance of Test Leads will affect the measurement result.

The KT72 can cancel the resistance of the test lead by pressing the NULL|250V/500V switch. The procedure of Null setting is shown below.

The Null function is held in memory even when the instrument is turned off, so there's no need to Null the lead resistance every time.

However, when replacing fuses or test leads, it is recommended to do a Null setting again.

Note

- Null setting is possible at both Class I Test and Extension Lead Test. However, only one Null value can be held in memory. For example, when the Null setting is carried out at Class I Test, the set value will also be used for Extension Lead Test (unless it is reset).
- After the function switch is turned to the OFF position, the set Null value is still held in the internal memory.

**Preparation
before a
measurement**

5.3.1 Null setting for Class I Test

- (1) Set the function switch to Class I Test 200mA function.
- (2) Insert the Earth pin adapter (M-8251) in to the end of the Earth terminal of the Test socket.
- (3) Connect the Test lead with the crocodile clip (M-7242) to the Terminal for RPE-Test Lead of the instrument, and attach the crocodile clip on to the earth pin. (Fig.8)
- (4) Press the **NULL|250V/500V** switch whilst maintaining contact between the Test Lead and the earth pin adapter, the resistance of the Test Lead will be displayed on the LCD as shown in Fig.9 for 2sec.

Then, the instrument cancels the resistance value of the Test Lead and adjusts the displayed value to "0.00" as shown in Fig.9.

At this point the **NULL** icon is displayed in the LCD.

The Null setting cannot be done when the test lead resistance is 3Ω or more.

A message "no" appears to indicate that the resistance is exceeding the Null setting range.

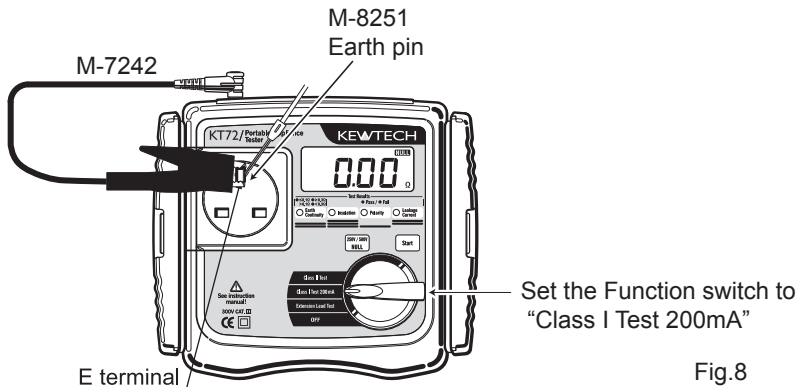


Fig.8

Display at Null setting

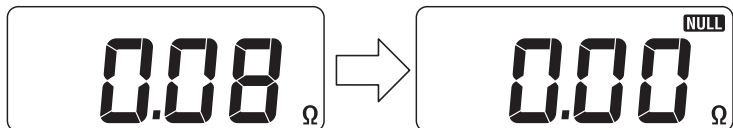


Fig.9

- (5) Null setting can be released by pressing **NULL|250V/500V** switch for 2sec. The **NULL** mark on the LCD will disappear when Null setting is released.

5.3.2 Null setting for Extension Lead Test

- (1) Set the function switch to Extension Lead Test function.
- (2) Connect the Extension lead adaptor KAMP S (UK) as indicated in Fig.10, and then follow the procedure described at clause 5.3.1 (4).
- (3) Follow the procedure described at clause 5.3.1 (5) to cancel the Null setting.

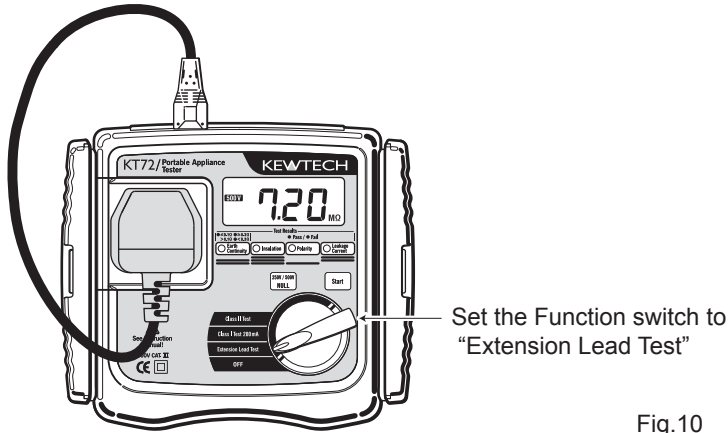


Fig.10

5.4 Voltage setting for insulation resistance measurement (How to change between 250V and 500V)

- (1) Set the function switch to the Class II Test function, and press the **NULL|250V/500V** switch. The LCD display will change to indicate the voltage selected. By pressing the **NULL|250V/500V** switch, 250V and 500V can be changed over.



Fig.11

Note

- The Insulation test voltage setting is saved and kept in the internal memory of the instrument and is maintained even after switching the instrument off.

6. Measuring method

6.1 Class I Test (200mA earth bond test)

The purpose of the test carried out for Class I appliances is to check the resistance of earth continuity from exposed metal parts and the plug is below a certain level and the insulation resistance between live and neutral connected together and earth is above $1M\Omega$. This test sequence also conducts a substitute leakage current test on an appliance. To conduct a test, connect the mains plug of the appliance to the test socket (1) described in clause 3.4. INSTRUMENTS LAYOUT and the PE probe to terminal (8).

Use the following setups, depending upon the type of appliance.

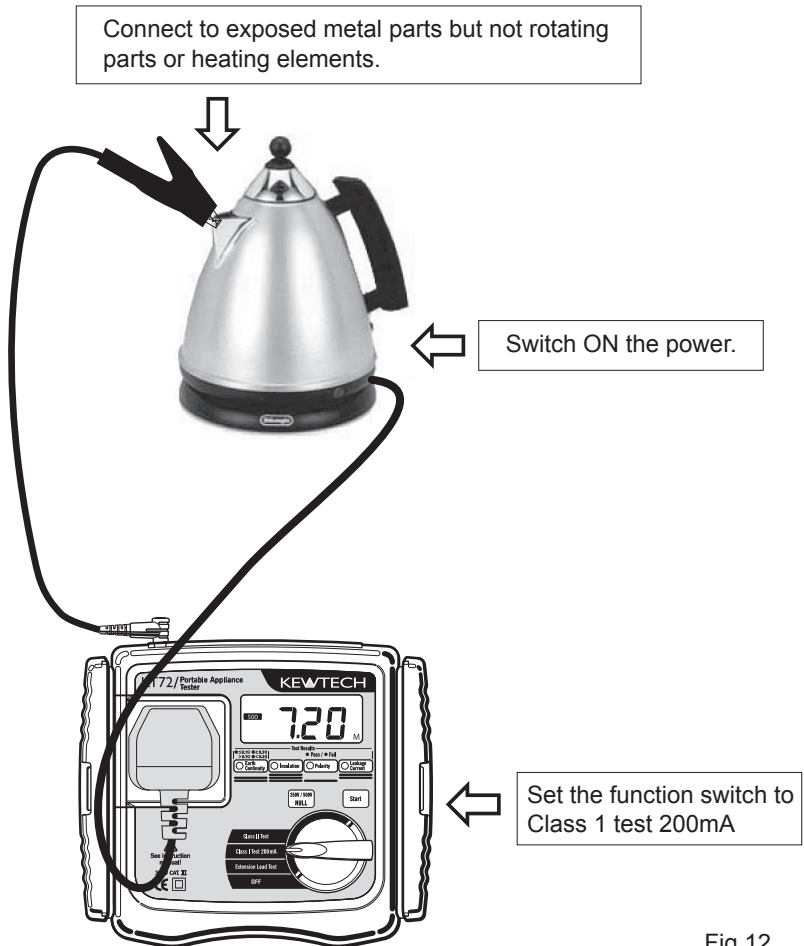
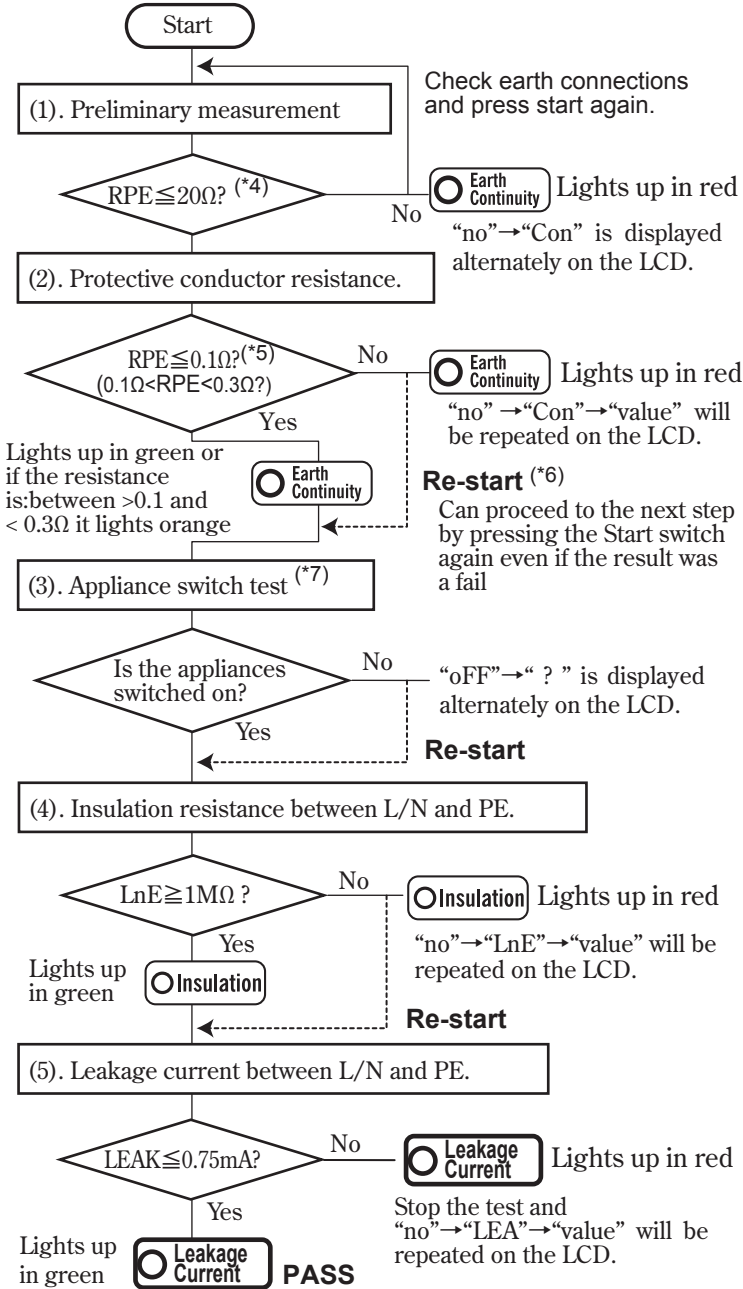


Fig.12

Class I Test Flowchart



Value of (2), (4) and (5) will be alternately displayed on the LCD.


Note

- (*4) This instrument conducts a Preliminary measurement before conducting Protective conductor resistance measurement. In case that the resistance value exceeds 20Ω , “no” and “Con” are alternately displayed on the LCD, and the next measurement in the sequence will not be conducted.
- Extension leads and appliances with long mains leads have a greater resistance allowance for earth continuity. Please refer to the table.1 on page 11.
- (*5) This instrument displays the test results of protective conductor resistance as follows.
Green ($RPE \leq 0.1\Omega$) = Pass for all appliances
Orange ($0.1\Omega < RPE < 0.3\Omega$) = Pass for appliances with extended mains leads
Red ($RPE \geq 0.3\Omega$) = Fail
- (*6) This instrument has a Re-Start function.
It can proceed to the next step by pressing the Start switch again even if the result was a fail.
- (*7) When conducting Insulation resistance test and Leakage current test, the appliance under test must be being switched ON. This instrument automatically detects the condition of power switch “ON”. In case that the condition of power switch “ON” cannot be detected, “oFF” and “?” are alternately displayed on the LCD, and the test will be stopped. In this case, please make sure the power switch of the appliance is “ON”.
- This instrument will automatically be powered off after approximately 10 minutes if no key operation is carried out.

⚠ CAUTION

- **Follow the procedure described in 5.3, 5.4 and undertake the NULL and Voltage setting before taking a measurement.**
- **The crocodile clip must make good contact with the enclosure of the appliance.**
- **When the terminal is open or the resistance value exceeds the measuring range, or the leakage current exceeds the measuring range the “>” mark (over range display) appears on the LCD.**
- **Do not touch the appliance under test whilst testing is in progress. Since a high voltage of 250V or 500V will be present and the user may get an electrical shock.**
- **When the measurement function is completed, turn the function switch back to the OFF position to turn off.**

6.2 Class II Test

The Class II appliances have the indication of “DOUBLE INSULATION” or the  symbol. The class II insulation test is to check the insulation resistance and leakage current of the appliances is within the range defined in the standards.

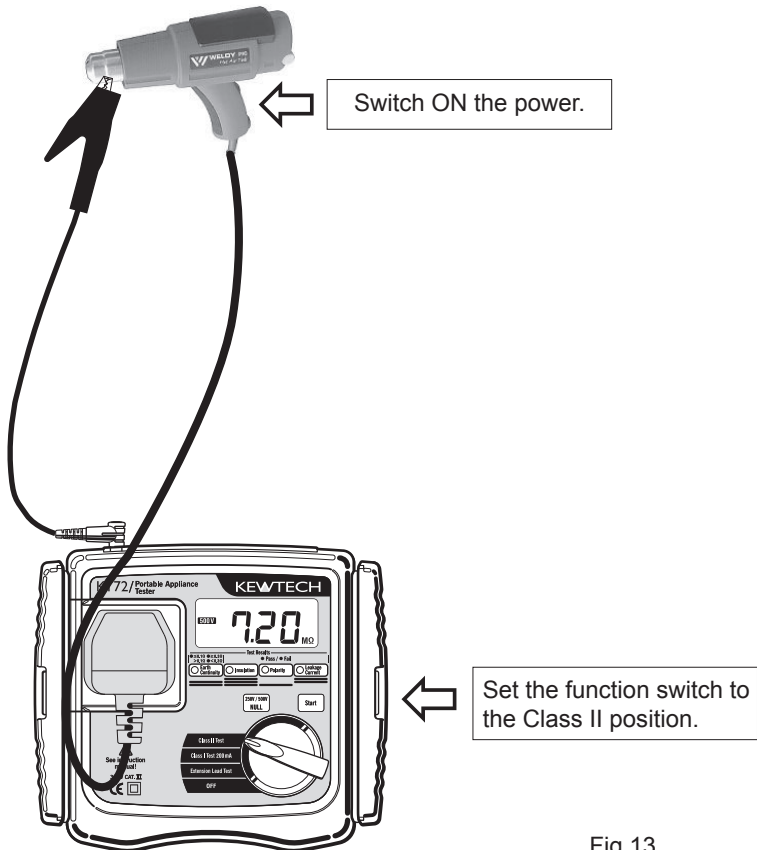
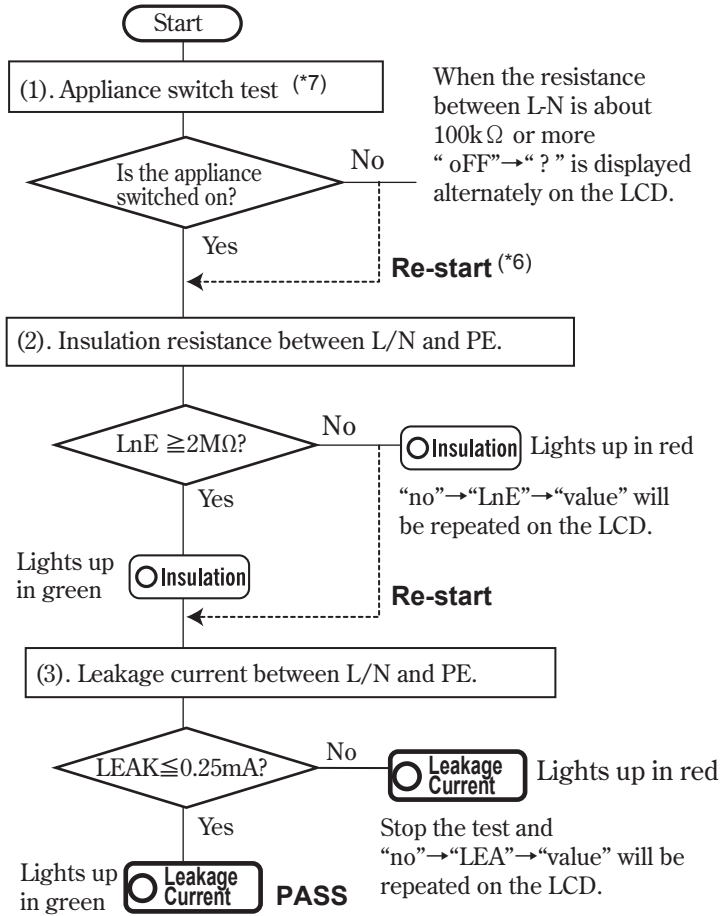


Fig.13

Class II Test Flowchart



Note

- (*6) This instrument has a Re-Start function.
It can proceed to the next step by pressing the Start switch again even if the result was a fail.
- (*7) When conducting Insulation resistance test and Leakage current test, the appliance under test must be being switched ON. This instrument automatically detects the condition of power switch “ON”. In case that the condition of power switch “ON” cannot be detected, “oFF” and “?” are alternately displayed on the LCD, and the test will be stopped. In this case, please make sure the power switch of the appliance is “ON”.
- This instrument will automatically be powered off after approximately 10 minutes if no key operation is carried out.

⚠ CAUTION

- **Follow the procedure described in 5.4 and undertake the Voltage setting before taking a measurement.**
- **The crocodile clip must make good contact with the enclosure of the appliance.**
- **When the terminal is open or the resistance value exceeds the measuring range, or the leakage current exceeds the measuring range the “ > ” mark (over range display) appears on the LCD.**
- **Do not touch the appliance under test whilst testing is in progress. Since a high voltage of 250V or 500V will be present and the user may get an electrical shock.**
- **When the measurement function is completed, turn the function switch back to the OFF position to turn off.**

Measuring method

6.3 Extension Leads Test

This test is for extension leads, and checks for;

- Protective conductor resistance.
- Insulation resistance between L/N and PE.
- Short test between L and N.
- Polarity check of the Line and Neutral terminals of the plug and socket.

Test procedure and the connection are as follows.

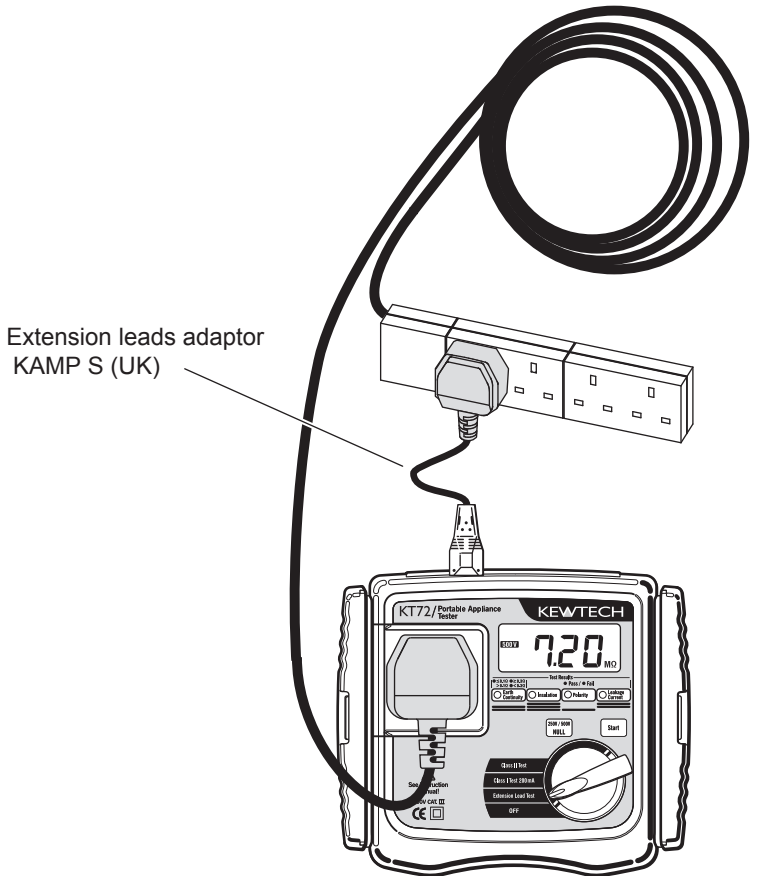
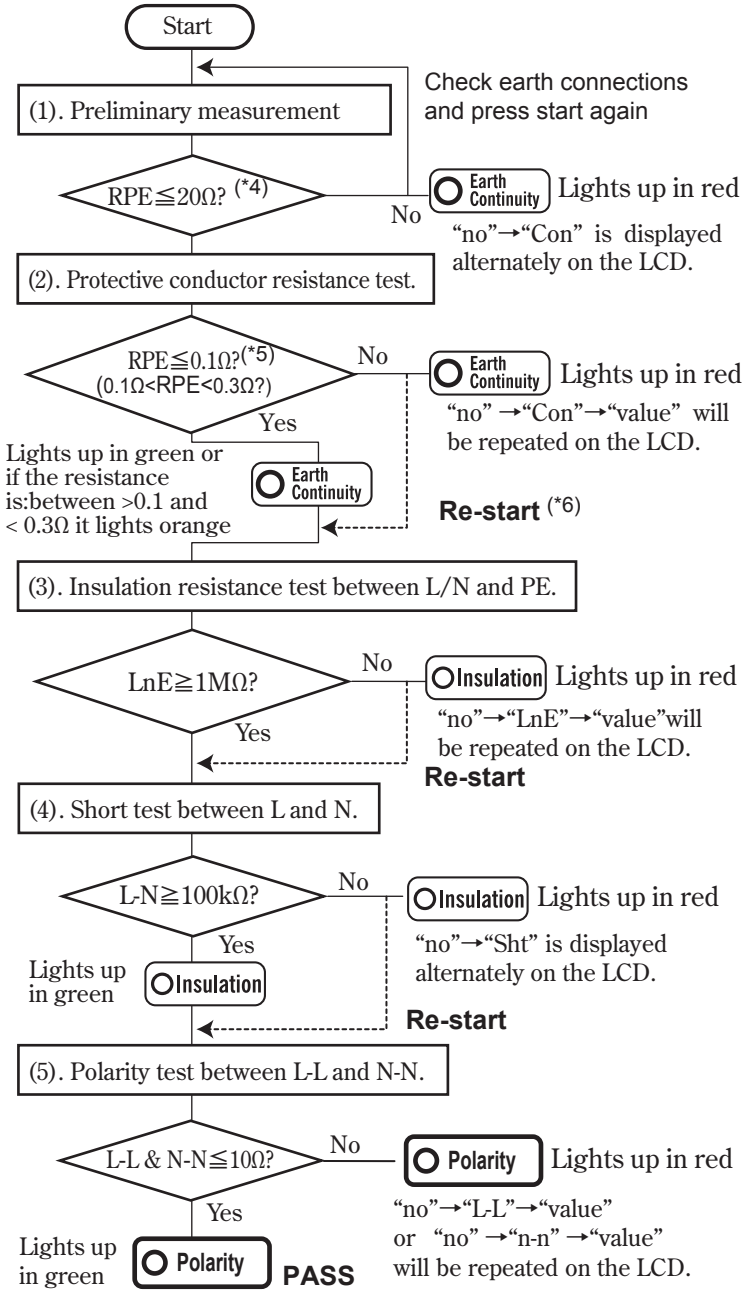


Fig.14

Set the function switch to the extension lead test position

Extension Leads Test Flowchart



Value of (2) and (3) will be alternately displayed on LCD.

Note

- (*4) This instrument conducts a Preliminary measurement before conducting the Protective conductor resistance measurement. In the case that the resistance value exceeds 20Ω , “no” and “Con” are alternately displayed on the LCD, and the next measurement in the sequence will not be conducted.
- Extension leads and appliances with long mains leads have a greater resistance allowance for earth continuity. Please refer to the table.1 on page 11.
- (*5) This instrument displays the test results of the protective conductor resistance as follows.
Green ($RPE \leq 0.1\Omega$) = Pass for all appliances
Orange ($0.1\Omega < RPE < 0.3\Omega$) = Pass for appliances with extended mains leads
Red ($RPE \geq 0.3\Omega$) = Fail
- (*6) This instrument has a Re-Start function.
It can proceed to the next step by pressing the Start switch again even if the result was a fail.
- This instrument will automatically be powered off after approximately 10 minutes if no key operation is carried out.

⚠ WARNING

- **Do not connect the M-7242 to main power supply. And do not apply any voltage to the test socket.**

⚠ CAUTION

- **Follow the procedure described in 5.3 and undertake the Null setting before taking a measurement, but use the short KAMP S lead instead of the M-7242 test lead, by plugging the KAMP S into the Extension Lead Adaptor terminal and the UK socket on the front of the unit.**
- **When the terminal is open or the resistance value exceeds the measuring range, “ > ” (over range display) appears on the LCD.**
- **Do not touch the device under test whilst testing is in progress. Since a high voltage of 250V or 500V will be present, the user may get an electrical shock.**
- **When the measurement function is completed, turn the function switch back to the OFF position to turn off.**

⚠ DANGER

- **Never attempt to replace batteries while making measurements. When replacing the Fuse, use one with the same specification.**

⚠ WARNING

- **To avoid electrical shock hazard, disconnect the Test Leads from the instrument before opening the Battery Compartment. Screw and fasten the cover before using the instrument again.**

⚠ CAUTION

- **Do not mix new and old batteries. Install batteries in the orientation as shown inside the Battery Compartment, observing correct polarity.**
- **If the instrument is not to be used for a prolonged period, remove the batteries.**
- **When disposing of the old batteries, please follow your local regulations.**

7.1 Battery Replacement

- (1) Set the Range Switch to the "OFF" position, and disconnect the Test Leads from the instrument.
- (2) Unscrew the Battery-Compartment-fixing screws, and remove the Cover and replace the batteries with new ones. Replace all 8 batteries.
- (3) Fix the Cover after replacing batteries and screw up the Cover.

7.2 Fuse Replacement

- (1) Set the Range Switch to the "OFF" position, and disconnect the Test Leads from the instrument.
- (2) Unscrew the Battery-Compartment-fixing screws, and remove the Cover.
Replace the fuse with a new one. (Fig.15)
Fuse Spec : T 3.15A / 500V, dia. 6.35 x 32mm.
- (3) Fix the Cover after replacing a fuse and screw up the Cover.

**Battery
and Fuse
Replacement**

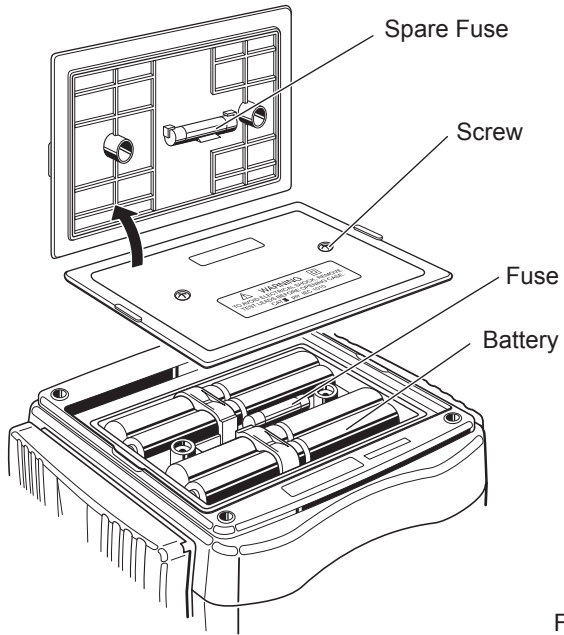


Fig.15

The strap and test lead case can be attached to the instrument as below.

Pass the strap belt down through the side panel of the main body from the top, and up through the slots of the test lead case from the bottom. (Fig. 16).

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

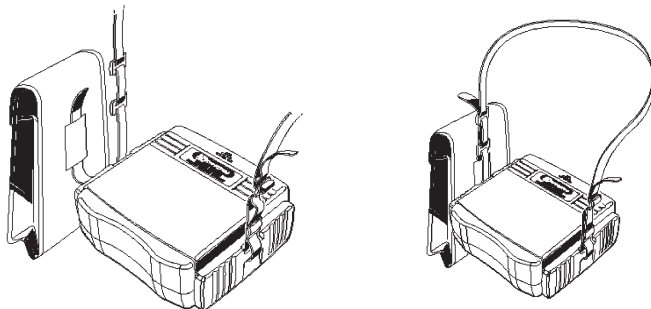


Fig.16

Use a very slightly damp cloth for cleaning the instrument. Do not use abrasives or solvents.

8. Case and strap assembly

9. Maintenance

