kaise

INSULATION TESTER

INSTRUCTION MANUAL

SK-3002 / 3003

MΩ-Ω-ACV

KAISE CORPORATION

FOR SAFETY MEASUREMENTS!!

To prevent an electrical shock hazard to the operator and/or damage to the instruments, read this instruction manual carefully before using the Insulation Tester. WARNINGS with the symbol ⚠ on the Insulation Tester and this instruction manual are highly important.

Important Symbols

⚠ The symbol listed in IEC 61010-1 and ISO 3864 means "Caution (refer to instruction manual)".

⚠ **WARNING** : The symbol in this manual advises the user of an electrical shock hazard that could result in serious injury or even death.

⚠ **CAUTION** : The symbol in this manual advises the user of an electrical shock hazard that could cause injury or material damages.

⚠ WARNING

Measurement on High Power Line is very dangerous. It sometimes includes High Surge Voltage that could cause dangerous arcs of explosive short in the instrument and could result in serious injury to the operator. For dangerous voltage measurement on High Power Line or High Voltage Circuit, always keep the instrument away from your body without holding it in your hands. Do not touch the Insulation Tester, its Test Leads, and any part of the circuit.

INTRODUCTION

Thank you for purchasing KAISE "MODEL SK-3002 / 3003 INSULATION TESTER". To obtain the maximum performance of this instrument, read this Instruction Manual carefully, and take safe measurement.

1. UNPACKING AND INSPECTIONS

Inspect the instrument and acessories for transport damage. If any damage or missing items are found, ask your local dealer for replacement.
Confirm that the following items are contained in the package.

1. Insulation Tester ····· 1 pce.
2. Test Lead (100-34) ····· 1 set.
3. 978 Carrying Case ····· 1 pce.
4. 1.5V(R6P) Batteries ····· 8 pcs.
5. 939 Test Pin ····· 1 pce.
6. Instruction Manual ····· 1 pce.

2. SPECIFICATIONS

A. RATING AND RANGES

MODEL	SK-3002	SK-3003
Rated Voltage/ Resistance	500V/100MΩ 250V/50MΩ	1000V/2000MΩ 500V/1000MΩ
Effective Measuring Range	0.1 to 100MΩ 0.05 to 50MΩ	2 to 2000MΩ 1 to 1000MΩ
Center Scale	2MΩ 1MΩ	50MΩ 20MΩ
AC Voltage	0 to 600V	0 to 600V

B. ACCURACY

1. MΩ Resistance :
   a. First effective range (between 1/1000 and 1/2 of rated resistance) ; ±5% of reading value
   b. Second effective range (over 1/2 up to rated resistance) ; ±10% of reading value
   c. Zero and Infinite ; ±0.7% of full scale length
2. AC Voltage : ±3% of full scale value
3. AC Current : ±4% of full scale value

C. CHARACTERISTCS FOR INSULATION RESISTANCE MEASUREMENTS

1. Terminal Voltage :
   a. Infinite Scale : ±10% of rated voltage
   b. Center Scale : Over 90% of rated voltage
   c. Voltage Characteristic : cf. Fig.1.2.3.4
2. Operating Temperature & Humidity : 0℃ to +40℃, less than 80% RH in non-condensing.
3. Storage Temperature & Humidity : -20℃ to +40℃, less than 85% RH in non-condensing.

Fig.1 SK-3002 Voltage Characteristic

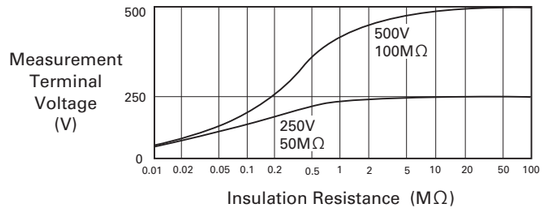
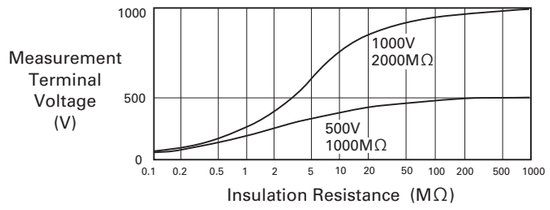


Fig.2 SK-3003 Voltage Characteristic



D. TIMER : Approx. 3 minutes

E. BATTERY CHECK :
Judged on the scale with POWER/FUNCTION Switch set to BATT.CHECK position.

F. BATTERIES :
Eight 1.5V Batteries, type R6P or AA

G. DIMENSIONS AND WEIGHT : 165×100×45mm, 550g

H. ACCESSORIES :
- 100-34 Test Lead ×1 set.
- 1.5V (R6P) Batteries×8 pcs.
- 939 Test Pin
- 978 Carrying Case ×1 pce.

3. NAME ILLUSTRATION

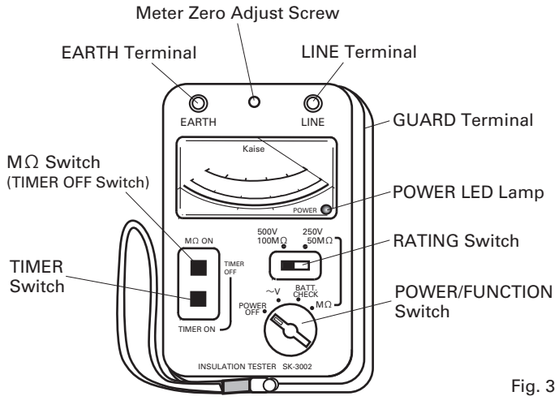


Fig. 3

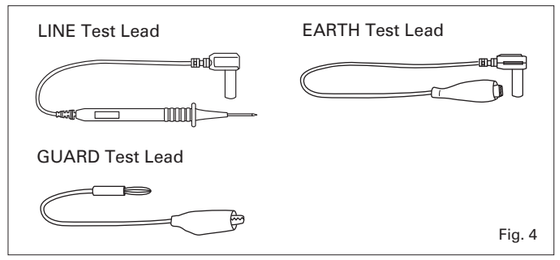


Fig. 4

4. SAFETY PRECAUTIONS

Correct knowledge of electric measurements is essential to avoid unexpected danger such as operator's injury or damage to the instrument. Read carefully and observe the following precautions for safety measurements.

4-1. WARNINGS

⚠WARNING 1. Checks of Body and Test Lead
Before measurement, confirm the body of this instrument and handle insulators of the Test Lead have no cracks or any other damages. Dust, grease and moisture must be removed.

⚠WARNING 2. Warning for High Power Line Measurements
High Power Line (High Energy Circuits) such as Distribution Transformers, Bus Bars and Large Motors are very dangerous. High Power Line sometimes includes High Surge Voltage that could cause explosive short in the instrument and could result in shock hazard. For voltage measurement of High Power Line, do not touch Insulation Tester, its Test Leads, and any part of the circuit.

⚠WARNING 3. Warning for High Voltage Measurements
Even for Low Energy Circuits of electric/electronic appliances, such as heating elements, small motors, line cords and plugs, High Voltage Measurements are very dangerous. Do not touch Insulation Tester, Test Leads, and any part of the circuit. Generally, shock hazard could occur when the current between the circuit, that involves more than 33V rms or 46.7V DC or peak, and ground goes up to 0.5mA or more.

⚠WARNING 4. Dangerous Voltage Measurement Procedure
For dangerous voltage measurement, strictly observe the warnings below. (refer to fig. 5)

- Do not hold Insulation Tester and test leads in your hands. Keep safety distance from power source or circuit to be measured not to touch the dangerous voltage.
- LINE test lead : Attach red alligator clip to test lead pin.
- Turn off the power of the circuit to be measured when connecting test leads.
- After measurement, before detaching alligator clips (test leads), turn the circuit power off and discharge the all capacitors.

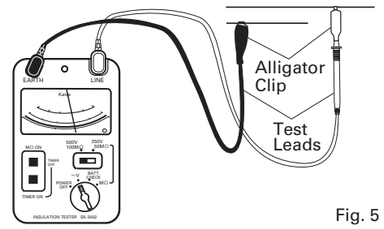


Fig. 5

In case of live-line measurement, strictly observe the warnings below. (refer to fig. 6)

- Do not hold Insulation Tester in your hands. Keep safety distance from power source or circuit to be measured not to touch the dangerous voltage.
- EARTH test lead : Connect to — (earth) side of the circuit.
- LINE test lead : Hold with one hand and connect to + (positive) side of the circuit.

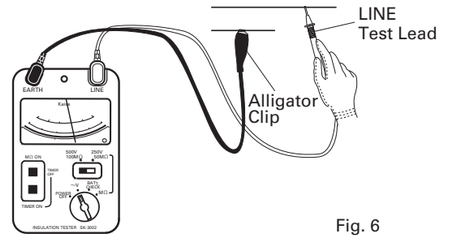


Fig. 6

⚠WARNING 5. Correct Selection of POWER/FUNCTION Switch
Always confirm that POWER/FUNCTION Switch is set to the correct position. Do not measure voltage except for ~V position.

⚠WARNING 6. Maximum Input Observance
Do not measure voltage or current that exceed the specified maximum input values.

⚠WARNING 7. Test Lead Detachment
Detach test leads from measuring circuit before switching measurement functions or removing battery cover for battery replacement.

4-2. GENERAL WARNINGS AND CAUTIONS

⚠WARNING 1
Children and the persons who do not have enough knowledge about electric measurements must not use this instrument.

⚠WARNING 2
Do not measure the electricity naked or barefooted to protect yourself from electrical shock hazard.

⚠WARNING 3
Be careful not to get hurt with the sharp test lead pins.

⚠CAUTION 1.
Do not polish the case or attempt to clean it with any cleansing fluid like gasoline or benzine. If necessary, use silicon oil or antistatic fluid.

⚠CAUTION 2.

Avoid the Insulation Tester from hard mechanical shock or vibration, high temperature and strong magnetic field.

⚠CAUTION 3.

Remove the batteries when the instrument is out of use for a long time. The exhausted batteries might leak electrolyte and corrode the inside.

5. MEASUREMENT PROCEDURE

A. BATTERIES

1. Eight R6P batteries are furnished with this instrument. Remove Battery Cover by pushing its Finger Dip this side.
2. Install the eight batteries in the battery case firmly and in the correct polarity. For easy installation, first insert the negative end of the battery in the (−) holder and then snap the positive end of the battery into (+) holder.
   For replacement, use leakproof 1.5V R6P, AA or any equal.
3. If the instrument is taken out of service for an extended time, remove the batteries from their holders and store separately.

B. ZERO ADJUSTMENT OF METER MOVEMENT

1. Before use, for best accuracy, make certain that the pointer is set exactly on the Zero Position (∞MΩ Line), at the right extremely of the arc.
2. If not on Zero, turn right or left the Zero Adjust Screw at middle top of Meter Case so that the pointer should exactly indicate the Zero Position.
3. Zero adjustment is not necessary to be repeated at every measurement, but the pointer is off the Zero Position due to change of mecahnical condition.

C. TEST LEADS

1. One set of test leads, consisting of a Black Lead for EARTH Terminal (EARTH Test Lead), a Red Lead for LINE Terminal (LINE Test Lead) and another fine Black Lead for GUARD Terminal (GUARD Test Lead) is furnished with this instrument. It is good practice to use the Black Lead for EARTH Terminal and the Red Lead for LINE Terminal.
2. EARTH Test Lead consits of one Plug with a short insulator and one Alligator Clip covered with rubber insulator.
   LINE Test Lead consits of one Plug with a short insulator and one Test Prod with a long handle insulator. GUARD Test Lead consists of one Banana Plug and one small Alligator Clip.
3. The Plugs of Test Leads are inserted in the EARTH and LINE Terminals, and the Alligator Clip and the long Test Prod are used to make contact with the circuit.
4. The Banana Plug fits in the GUARD Terminal, and the small Alligator Clip is used together with the Alligator Clip and the long Test Prod for measuring Volume Resistance of the object under test.

D. MΩ SWITCH (TIMER OFF SWITCH)

When measuring insulation resistance (MΩ), depress MΩ Switch (Timer OFF Switch). POWER LED Lamp lights.

E. TIMER SWITCH

For continuous MΩ measurements, depress TIMER Switch. POWER LED lamp lights.
TIMER Switch and POWER LED lamp turns off automatically after 3 minutes. To set TIMER Switch OFF, depress TIMER OFF Switch (MΩ Switch).

F. POWER/FUNCTION SWITCH

Set POWER/FUNCTION Switch to desired position, ∼V, BATT. CHECK or MΩ position, and set it back to POWER OFF position when measurements are finished.

G. RATING SWITCH

When measuring insulation resistance (MΩ), set RATING Switch to desired position on either right or left side.

H. BATTERY CHECK

1. Set POWER/FUNCTION Switch to BATT.CHECK position.
2. If the pointer indicates within BATT. OK. zone, the batteries are judged to be good. If not, replace the batteries according to "8-C. BATTERY REPLACEMENT".
   NOTE : In this case, make it as quickly as possible since the power consumption becomes maximum. Return POWER/FUNCTION Switch to POWER OFF position after batteries are checked.

I. ZERO CHECK

1. Set POWER/FUNCTION Switch to MΩ position.
2. Short EARTH Test Lead and LINE Test Lead together, then depress MΩ Switch.
3. If the pointer indicates ZERO MΩ at the left extremity of MΩ scale, the instrument proves to be accurately regulated.

6. INSULATION RESISTANCE (MΩ) MEASUREMENTS

⚠WARNING

To avoid electric shock hazard and/or damage to the instrument, always confirm before measurement that the line or object to be tested is not live.

1. Insert Plug of EARTH Test Lead into EARTH Terminal and Plug of LINE Test Lead into LINE Terminal.
2. Set POWER/FUNCTION Switch to MΩ position.
3. Set RATING Switch to desired position.
4. Connect Alligator Clip of EARTH Test Lead and Test Prod of LINE Test Lead to the object under test.
5. Depress MΩ Switch. When the measurement is to be taken continuously for a certain time, depress Timer Switch.
   NOTE : Timer Switch is regulated to cut off automatically the power supply after 3 minutes to conserve the battery consumption.
6. Read the Insulation resistance on the second or third arc down, marked MΩ.
7. Set POWER/FUNCTION Switch back to POWER OFF position when measurements are finished.
8. CAUTIONS AND INSTRUCTIONS
   a. Before measurement, make sure that the line (circuit) or object under test is not live. If the voltage in the line or object is supposed to be less than 600V AC, it is checked on AC.V range.
   b. When one end of the object under test is grounded, connect the grounded side to the EARTH Terminal (plus polarity) in the measurement. Measurement should be taken in this way from safety point of view, since the measurement value normally shows small in this method. Especially, in testing cables, this procedure is commonly followed. In such a test, take care not to make the lead wire conneced with the LINE Terminal (minus polarity) touch the ground or any other object.
   c. If the object under test is not grounded, the above connections to LINE and EARTH Terminals are optional.
   d. The GUARD Terminal is used for measuring only the Volume Resistance of the object under test eliminating the influence of its surface leakage resistance. In a cable insulation test as illustrated in Fig.7 for example, wind a bare lead wire around the insulator and connect it to the GUARD Terminal. As the leakage current along the surface of the insulator does not run through the meter, only the Volume Resistance of the insulator can be measured.

How to measure Volume Resistance

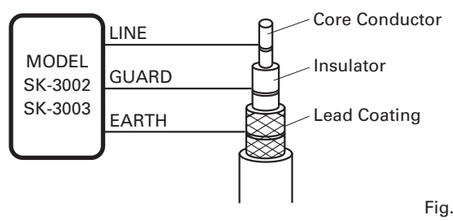


Fig. 7

7. AC VOLTAGE MEASUREMENTS

⚠WARNING

To avoid electric shock hazard and/or damage to the instrument, do not attempt to measure voltage that might exceed 600V AC.

1. Insert Plug of EARTH Test Lead into EARTH Terminal and Plug of LINE Test Lead into LINE Terminal.
2. Set POWER/FUNCTION Switch to ∼V position.
3. Connect Alligator Clip of EARTH Test Lead to one side of the circuit, and apply Test Prod of LINE Test Lead to the other side of the circuit. The connection should be IN PARALLEL with the circuit being measured.
4. Read the voltage on the first arc down, marked ∼V.

8. MAINTENANCE

A. WARRANTY STATEMENT

The warranty statement for the insulation Tester SK-3002 / 3003 is printed on the inside back cover of the manual. Read it carefully before requesting a warranty repair.

B. GENERAL MAINTENANCE

For best and safest performance, the following maintenance and examination are required.

1. Always keep the instrument and test leads clean, dry and without damages.
2. Do NOT polish the tester case, or attempt to clean it with any cleaning fluid, gasoline, benzine, etc. If necessary, use silicon oil or antistatic fluid.
3. Avoid severe mechanical shock or vibration, extreme temperature or very strong magnetic fields.
4. Remove the batteries when not in use for an extended time.
5. Do NOT touch any potentiometers or modify any existing circuits in the instrument.

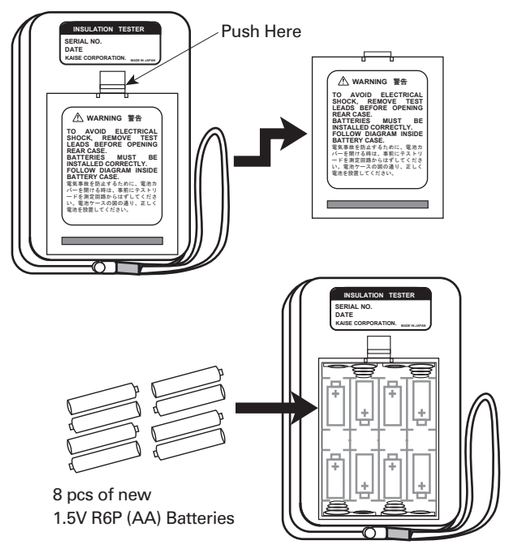
C. BATTERY REPLACEMENT

⚠WARNING

To prevent electrical shock hazard, turn the power off and disconnect Test Leads from the circuit before opening Battery Cover.

Replace the battery by the following procedures.

1. Turn the power off and disconnect Test Leads from the circuit.
2. Remove Battery Cover and remove the exhausted batteries.
3. Insert 8 pcs of new 1.5V R6P (AA) batteries in correct polarity.
4. Fix the Baterry Cover.



D. CALIBRATION

In order to maintain the specifications described in page 2 to 3, it is recommended that the instrument may be calibrated once each year and/or after it is repaired.
Calibration service is available at KAISE AUTHRIZED SERVICE AGENCY through your local dealer at a cost basis charge.
Pack the instrument securely in its original carton together with descriptions of your name, address, telephone number and the service required, and ship prepaid to your local dealer.

E. REPAIR

Repair service, warranty or non-warranty, is available at KAISE AUTHORIZED SERVICE AGENCY through your local dealer. Warranty repair is executed free of charge, but, non-warranty repair is charged on the cost basis.
Pack the instrument securely in its original carton together with descriptions of your name, address, telephone number, problem encountered and the service required, and ship prepaid to your local dealer.

WARRANTY

The Insulation Tester of Model SK-3002 / 3003 is warranted in its entirety against any defects of material or workmanship under normal use and service within a period of one year from the date of purchase of the original purchaser. Warranty service is available at **KAISE AUTHORIZED SERVICE AGENCY** through your local dealer. Their obligation under this warranty is limited to repairing or replacing SK-3002 / 3003 returned intact or in warrantable defect with proof of purchase and transport charges prepaid. **KAISE AUTHORIZED DEALER** and the manufacturer, **KAISE CORPORATION**, shall not be liable for any consequential damages, loss or otherwise. The foregoing warranty is exclusive and in lieu of all other warranties including any warranty of merchantability, whether expressed or implied.
This warranty shall not apply to any instrument or other article of equipment which shall have been repaired or altered outside of **KAISE AUTHORIZED SERVICE AGENCY**, nor which have been subject to misuse, negligence, accident, incorrect repair by users, or any installation or use not in accordance with instructions provided by the manufacturer.

KAISE AUTHORIZED DEALER

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Product specifications and appearance are subject to change without notice due to continual improvements.

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