kaise CE

DIGITAL PROBE TESTER

INSTRUCTION MANUAL

SK-6592

KAISE CORPORATION

FOR SAFETY MEASUREMENTS!!

Prior to use, to avoid an electrical shock hazard to the operator and/or damage to the instruments, read carefully the WARNINGS with the symbol ⚠ listed in「4. SAFETY PRECAUTIONS」,「5.MEASUREMENT PROCEDURES」and「6. MAINTENANCE」 of this instruction manual.

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

SK-6592 is designed to comply with CAT Ⅲ 600V. But, do not measure High Power Line of more than 6kVA power. High Power Line sometimes includes High Surge Voltage that could possibly induce dangerous arcs of explosive short in the instrument and could result in serious injury to the operator. Even if it is Low Power Line, use extreme care when measuring high voltage.

INTRODUCTION

Thank you for purchasing KAISE "MODEL SK-6592 Digital Probe Tester". To obtain the maximum performance of this instrument, read this Instruction Manual carefully, and take safe measurement.

1. UNPACKING AND SPECIFICATIONS

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. Digital Probe Tester
2. One 3V CR2032 Battery (installed)
3. Carrying Case
4. Instruction Manual

2. SPECIFICATIONS

2-1. GENERAL SPECIFICATIONS

1. **DISPLAY (LCD)**
   - **a. Numerical Display :** 4000 count LCD, 8mm high.
   - **b. Units and Symbols :** mV, V, Hz, %, Ω, kΩ, MΩ, nF, μF, •ıı) , ⊣◄ , DIFF, MAX, MIN, BAT, DH, OL, AUTO, APO, ⎓ , ∼ , ⎓ and decimal point.
2. **OPERATING PRINCIPLE :** ∑△ conversion
3. **RANGE SELECTION :** Autoranging
4. **SAMPLING RATE :** 3 times per second
5. **POLARITY :** Autopolarity, "⎓" symbol when minus
6. **OVERRANGE INDICATION :** "OL" symbol appears. (excluding DC/AC 600V)
7. **DISPLAY HOLD / DIFF (Zero Adjustment) :**
   - **a.** Press DH / DIFF Key for less than 0.5 second → **DISPLAY HOLD**
   - **b.** Press DH / DIFF Key for more than 1 second → **Difference Measurement**
   - **c.** Press DH / DIFF Key for more than 1 second same as above before measuring Capacitance→ **Zero Adjustment**
8. **MAX / MIN Value :** When measuring ⎓V, ∼V, Ω, press SHIFT Key for more than 1 second.
9. **BATTERY WARNING :** BAT symbol appears when battery voltage goes down below approx. 2.4V.
10. **OPERATING TEMPERATURE & HUMIDITY :** 0℃ to 40℃, less than 80%RH in non-condensing.

11. **STORAGE TEMPERATURE & HUMIDITY :** −20℃ to 60℃ less than 80% RH in non-condensing.
12. **POWER SUPPLY :** One 3V CR2032 Battery.
13. **POWER CONSUMPTION :** 4.5mW typically.
14. **BATTERY LIFE :** 70 hours continuous operation.
15. **AUTO POWER OFF :** Power turns off automatically in 15 minutes after any switch operation.
16. **DIELECTRIC STRENGTH :** 5.55kV rms for one minute between Input Terminal and Cases.
17. **OVERLOAD PROTECTION :**
    - **a.** V : 900V DC or AC rms max. for 1 minute. (400mV Range is 600V rms)
    - **b.** Ω / •ıı) / ⊣◄ / ⊣⊢ : 300V rms max. for 1 minute.
18. **DIMENSIONS & WEIGHT :** 179(H) × 28(W) × 20(D)mm, 60g
19. **SAFETY LEVEL :** IEC-61010-1 Overvoltage CAT.Ⅲ 600V and EMC Test passed.
20. **ACCESSORY :** One Black Test Lead, Battery (Installed), Carrying Case, Instruction Manual
21. **OPTIONAL ACCESSORY :** 940 Alligator Clips.

2-2. MEASUREMENT SPECIFICATIONS

(23℃±5℃, less than 80% RH in non-condensing)

1. DC Voltage (⎓ V)

Range	Accuracy	Resolution	Input Impedance	Max Input Voltage	Overload Protection
400.0mV	±0.5%rdg±3dgt	100μV	≒100MΩ	600V DC	900V rms for 1 minute
4.000 V		1mV	≒11MΩ		
40.00 V		10mV	≒10MΩ		
400.0 V	±1.0%rdg±3dgt	100mV			
600 V		1 V			

2. AC Voltage (∼V) Average Rectification

Range	Accuracy	Resolution	Input Impedance	Max Input Voltage	Overload Protection
4.000 V	±1.5%rdg±5dgt	1mV	≒11MΩ	600V rms	900V rms for 1 minute
40.00 V		10mV	≒10MΩ		
400.0 V		100mV			
600 V		1 V			

Frequency Response : 50Hz∼400Hz

3. Frequency (Hz)

Range	Accuracy	Resolution	Input Sensitivity	Max. Input Voltage
1.000Hz ∼100.0kHz	±0.2%rdg ±2dgt	0.001Hz ∼100Hz	3V RMS	600V rms or 2 X 10^5/Hz

4. Duty Cycle (%)

Range	Accuracy	Resolution	Input Sensitivity	Max. Input Voltage	Frequency Scope
0.0% ∼99.9%	±0.5%rdg±5dgt	0.1%	<10KHz : 3V RMS ≧10KHz : no Spec.	600V rms	1Hz∼1kHz

5. Resistance (Ω)

Range	Accuracy	Resolution	Test Current	Open Circuit Voltage	Overload Protection
400.0 Ω	±1.5%rdg±4dgt	0.1 Ω	≦0.2mA	≒0.44V	300V rms
4.000kΩ	±1.0%rdg±3dgt	1 Ω	≦50μA		
40.00kΩ		10 Ω	≦5μA		
400.0kΩ		100 Ω	≦0.5μA		
4.000MΩ	±5.0%rdg±3dgt	1 kΩ	≦50nA		
40.00MΩ	±7.0%rdg±3dgt	10 kΩ			

6. Continuity Tests (•ıı))

Range	Buzzer Sound	Response Time	Open Circuit Voltage	Overload Protection
400.0Ω	less than 60Ω	1m sec	≒0.44V	300V rms

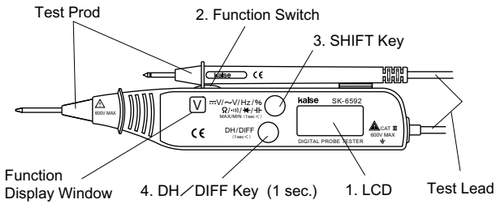
7. Diode Tests (⊣◄)

Range	Accuracy	Open Circuit Voltage	Test Current	Overload Protection
1.000V	±5.0%rdg±3dgt	≦1.7V	≦0.7mA	300V rms

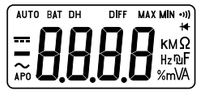
8. Capacitance (⊣⊢)

Range	Resolution	Accuracy	Test Voltage	Overload Protection
50.00nF	10pF	±5.0%rdg±10dgt	≦1.7V	300V rms
500.0nF	100pF			
5.000μF	1nF			
50.00μF	10nF			
100.0μF	100nF			

3. NAME ILLUSTRATION



3-1. LCD



⎓	:	Direct Current (DC) on Voltage
∼	:	Alternating Current (AC) on Voltage
−	:	Minus symbol automatically shown when polarity is minus.
APO	:	Auto Power Off
AUTO	:	Autoranging
BAT	:	Battery Warning
DH	:	Display Hold
DIFF	:	Difference Measurements
MAX	:	Maximum Value Measurements
MIN	:	Minimum Value Measurements
•ıı)	:	Continuity Tests
⊣◄	:	Diode Tests
mV, V	:	Units of Voltage
Hz	:	Frequency
%	:	Duty Cycle
Ω, kΩ, MΩ	:	Units of Resistance
nF, μF	:	Units of Capacitance

3-2. Function Switch

Set FUNCTION Switch to a desired position of V or Ω⊣⊢ position and to OFF position when measurements are finished. V position measures AC/DC Voltage, Frequency, Duty Cycle. Ω⊣⊢ position measures Resistance, Continuity Test, Diode, Capacitance.

3-3. SHIFT Key

Each press of this Key for less than 0.5 second works in the following order.

V : ⎓V → ∼V → Hz → % → ⎓V ...circulates.

Ω⊣⊢ : Ω→ •ıı) → ⊣◄ → ⊣⊢ → Ω...circulates.

MAX / MIN : When measuring ⎓V, ∼V or Ω, press SHIFT Key for more than 1 second, MAX MIN symbol appears on LCD and MAX /MIN measurement starts. To cancel this function, press this Key again for more than 1 second and MAX/MIN symbol disappears.

3-4. DH / DIFF Key

1. DISPLAY HOLD

Press DH / DIFF Key for less than 0.5 second to hold display. DH symbol shows on LCD. To cancel this function, press this Key again and DH symbol disappears.

NOTE: This function is not available for Hz Measurement.

2. Difference Measurement

When measuring functions except Hz (Frequency), % (Duty Cycle), Press DH / DIFF Key for more than 1 second, DIFF symbol shows on LCD. When measuring a value or applying desired value into the instrument, press DH / DIFF Key for more than 1 second and input value is stored and converted to read 0±1digit on LCD with DIFF symbol displayed. The difference between the stored value and a measuring value is displayed on LCD with proceeding mesurements.

Input Value ＝ Xo, Measuring Value proceeding ＝ Xn,

Difference ＝ Xn−Xo

The stored Input Value is renewed with each press of DIFF Key. To cancel this function, press this Key for more than 1 second again and DIFF symbol disappears.

3. Zero Adjustment

When measuring Capacitance, if LCD doesn't show ZERO value, press DH / DIFF Key for more than 1 second to make Zero Adjustment.

3-5. Function Display Window

A function being selected is displayed in this window. Also, see the symbol displayed on LCD.

4. SAFETY PRECAUTIONS

Correct knowledge about electric measurements is necessary because electric measurement is sometimes a very dangerous work.

To eliminate possibility of injury to the operator and damage to the instrument, the following precautions and measurement procedures must be taken. Mis-use, abuse and carelessness cannot be prevented by any written word and is fully the operator's responsibility. Observing the following warnings and cautions, take safe measurements.

4-1. WARNINGS

⚠WARNING 1. Checks of Body and Test Lead

Before every measurement, do not fail to confirm that the body of this instrument and handle insulator of the attached Test Prod have no cracks nor any other damage on them. Make sure that the body and the handle insulator are free of dust, grease and moisture.

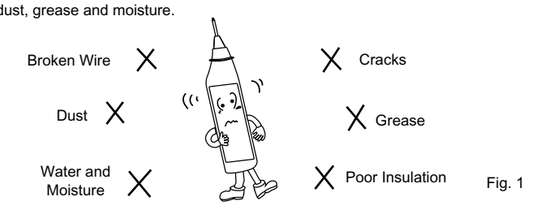


Fig. 1

⚠WARNING 2. Measurement of High Power Line Prohibited

Do not measure with this instrument High Power Line (High Energy Circuits) more than 6kVA power such as Distribution Transformers, Bus Bars, Power Line for Big Motors, etc. High Power Line is very dangerous as it sometimes includes High Surge Voltage that will induce short in the instrument and results in shock hazard. Use the special instrument designed to measure High Power Line.

⚠WARNING 3. Cares of High Voltage Measurements

Even if Low Energy Circuits of electric/electronics appliances, heating elements, small motors, line cords and plugs, etc., High Voltage Measurements are very dangerous. Do not touch the instrument, its Test Leads or any part of the circuit while it is on.

Generally, shock hazard shall be exist at any part involving a potential in excess of 30V rms or 42.4V DC or peak and where a leakage current from that part to ground exceeds 0.5mA.

⚠WARNING 4. Safety Measurement Procedure

When measuring a circuit that will possibly include dangerous voltage, keep strictly the following measuring procedures.

1. Before measurement, turn off power to the circuit to be measured.
2. Attach Black Alligator Clip (optional) to Black Test Prod and Red Alligator Clip (optional) to Red Test Prod of Probe Tester.
3. Set FUNCTION Switch to V position and select ⎓V or ∼V by pressing SHIFT Key.
4. Confirm that the power of the circuit to be measured is OFF. Then, connect Black Alligator Clip to − (earth) side and Red Alligator Clip to + (positive) side of the circuit to be measured.
5. Do not touch Test Prod and Probe Tester with your hands. Also, take safety distance from the power source or the circuit to prevent any part of your body from touching high voltage.
6. Turn on power to the circuit to be measured and read the voltage on LCD.
7. Turn off power to the circuit being measured and discharge all capacitors in the circuit.
8. Disconnect Alligator Clips of Test Prods from the circuit.

In case you want to measure live line, observe the following procedure.

1. Set FUNCTION Switch to V position and select ⎓ or ∼V by SHIFT Key.
2. Take safety distance from the power or the circuit to be measured to prevent any part of your body from touching dangerous voltage.
3. Attach Black Alligator Clip to Black Test Prod. Then, connect Black Alligator Clip to − (earth) side of the circuit to be measured.
4. Hold the Probe Tester with one hand and connect the Test Prod to + (positive) side of the circuit to be measured.
5. Read the voltage on LCD. Refer to the figure.2

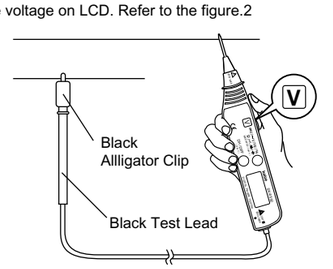


Fig. 2

⚠WARNING 5. Correct Selection of FUNCTION Switch

When making measurements, always confirm that FUNCTION Switch is set to correct position. Measuring voltage on Ω position will cause serious damage to the instrument.

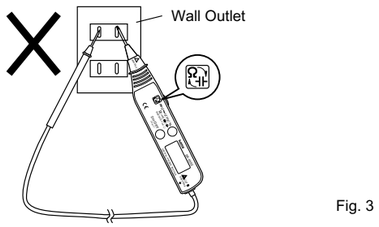


Fig. 3

⚠WARNING 6. Maximum Input Observance

Do not attempt to measure voltage that might exceed the specified maximum voltage of this instrument.

⚠WARNING 7. Test Prod Disconnection

Prior to changing FUNCTION Switch to another function during measurements, or opening Battery Case for replacement of battery, always disconnect Test Prods of Probe Tester from the circuit being measured.

4-2. GENERAL WARNINGS AND CAUTIONS

⚠WARNINGS

- Do not let the children use the instrument or those people who are unable to recognize the dangers of electric measurements.
- Do not make electric measurements in a naked or barefooted state. This will give electric shock hazard to the operator.
- The points of Test Prods are sharp and dangerous. Do not get hurt with them.

⚠CAUTIONS

- Do not polish the meter case, or attempt to clean it with any cleaning fluid, gasoline, benzine, etc. If necessary, use silicon oil or antistatic fluid.
- Avoid severe mechanical shock or vibration, extreme temperature or very strong magnetic field.
- Remove the battery when not in use for an extended time since the exhausted battey might leak electrolyte and corrode the internal components.

5. MEASUREMENT PROCEDURES

5-1. PREPARATION FOR USE

1. INSTRUCTION MANUAL ⚠

Prior to use, read INSTRUCTION MANUAL carefully and acquaint yourself with the specifications and functions of the instrument. Especially, read and observe strictly the「4. SAFETY PRECAUTIONS」.

2. BATTERY

One 3V CR2032 battery is installed in this instrument. When battery is consumed and BAT symbol is shown on LCD, unscrew the mounting screw of Battery Case Lid and remove the lid. Then, replace the battery with fresh one and place the battery in correct polarity. Refer to 「6-2. BATTERY REPLACEMENT」.

3. TEST PRODS

Connect Black Test Prod to − (earth) side of the circuit and Red Test Prod of Probe Tester to ＋ (high potential) side of the circuit being measured.

4. POWER ON

Set FUNCTION Switch to V or Ω position to turn on power. All segments appear on LCD for 1 sec. In case that LCD is not turned on, battery contacts might be bad, battery might be set in the wrong polarity or might be worn out. Take necessary action. Do not fail to turn off power after measurements.

5. OVERRANGE INDICATION

OVERRANGE INDICATION does not show on Voltage measurements, even if voltage value exceeds 600V. On Resistance range, OL symbol is displayed on LCD when ohm value is infinite.

⚠WARNING : To avoid injury to the operator and/or damage to the instrument, do not make measurements that might exceed 600V, the maximum input voltage.

6. AUTORANGING

When Voltage, Resisitance or Capacitance measurement is made, range is selected automatically. AUTO symbol is shown on LCD. When making Diode and Continuity Tests, autoranging does not work as they consist of only one range.

7. AUTO POWER OFF

After 15 minutes of last operation with FUNCTION Switch or Keys, LCD turns off automatically. This function prevents battery consumption when power off is forgotten. When continuous measurements more than 15 minutes are necessay, set FUNCTION Switch to V or Ω position with SHIFT Key pressed on for less than one second, or press MAX/MIN Key.
In this case, APO symbol is not displayed on LCD and Auto Power Off does not work during measurements.

8. SYMBOL MARK

The following symbols shown on the instrument and in the instruction manual are listed in IEC 61010-1 and ISO 3864.

⚠ : Caution (refer to instruction manual).
⎓ : Direct Current (DC)
～ : Alternating Current (AC)
⏚ : Earth (Ground)
⧈ : Double Insulation

5-2. VOLTAGE, FREQUENCY, DUTY CYCLE (⎓V / ～V / Hz / %) MEASUREMENTS

⚠WARNING

Do not measure High Power Line of more than 6kVA power with this instrument. Maximum Input Voltage of Voltage Function is 600V.
Do not measure voltages that might exceed 600V to avoid electrical shock hazard and/or damage to the instrument. Prior to use, read carefully「4. SAFETY PRECAUTIONS」of this instruction manual.

1. Set FUNCTION Switch to V position.
   NOTE : Under this no input condition, random numerals may appear on LCD. This phenomena is caused by high internal resistance of the instrument and not the trouble.
2. Press SHIFT Key to select ⎓V or ～V.
3. Connect Black Test Prod to − (earth) side and Red Test Prod of Probe Tester to ＋ (High potential) side of the circuit to be measured.
   NOTE : For safety measurements, connect Alligator Clips (optional) to Test Prods of Probe Tester.
   NOTE : When taking voltage measurements, always connect the instrument **IN PARALLEL** with the circuit being measured.
4. Read the voltage on LCD.
5. **Hz and % :** When measuring ⎓V or ～V, press SHIFT Key to measure Hz (Frequency) and press this Key again to measure % (Duty Cycle).
   Each press of this Key works in the following order.

   ⎓V → ～V → Hz → % → ⎓V ...circulates.

   MAX/MIN : Press SHIFT Key for more than 1 second to make MAX/MIN measurements. To cancel this key, press it again for more than 1 second.
6. **DH/DIFF Key :** Press this key for less than 0.5 second to hold display. Press this Key for more than one second to make Difference Measurements.
7. After measurements, set FUNCTION Switch to OFF position.

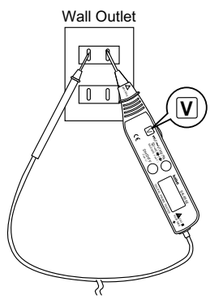


Fig. 4

5-3. RESISTANCE (Ω) MEASUREMENTS

⚠WARNING

Do not measure Voltage on Ω position.
This will cause electrical shock hazard to the operator and/or damage to the instrument. Before taking any in-circuit resistance measurements, remove power to the circuit being tested and discharge all capacitors in the circuit.

1. Set FUNCTION Switch to Ω position.
2. When taking any in-circuit resistance measurements, remove power to the circuit being tested and discharge all capacitors in the circuit. Open one side of the resistor to be measured.
3. Connect Test Prods of Probe Tester to the resistor being measured.
4. Read the resistance on LCD.
5. **MAX/MIN, DH/DIFF Keys :** These Keys are available same as in Voltage Measurements.
6. After measurements, set FUNCTION Switch to OFF position.

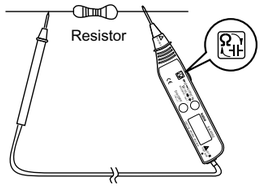


Fig. 5

5-4. CONTINUITY (•ıı)) TESTS

⚠WARNING

Do not measure Voltage on Ω position.
This will cause electrical shock hazard to the operator and/or damage to the instrument. In case continuity test is made, turn off power to the circuit being measured and discharge all capacitors in the circuit.

1. Set FUNCTION Switch to Ω position.
2. Press SHIFT Key 1 time to display •ıı) symbol on LCD.
3. Turn off power to the circuit and discharge all capacitors in the circuit.
4. Connect Test Prods of Probe Tester to the circuit to be tested. Buzzer sounds when the resistance value is less than approx. 60Ω.
5. When measurements are finished, remove Test Prods from the circuit and set FUNCTION Switch to OFF position.

5-5. DIODE (⊣◂) TESTS

⚠WARNING

Do not measure Voltage on Ω position.
If the diode is connected in a circuit, turn off power to the circuit and discharge all capacitors in the circuit. Disconnect one side of the diode and test it.

1. Set FUNCTION Switch to Ω position.
2. Press SHIFT Key 2 times to select ⊣◂ .
   ⊣◂ symbol appears on LCD.
3. If the diode is connected in a circuit, turn off power to the circuit and discharge all capacitors in the circuit and disconnect one side of diode from the circuit.
4. Connect Black Test Prod to Anode and Red Test Prod to Cathode of the diode being measured. This is Reverse Connection. Confirm that the LCD displays OL symbol. Refer to the figure 6.
5. Reverse Test Prod connection to the diode being tested. This is Forward Connection. In case of Silicon diodes, LCD displays 0.4V to 0.7V, Germanium diodes, 0.1V to 0.4V, and the diodes are judged good.
6. When measurements are finished, remove Test Prods from the diode and set FUNCTION Switch to OFF position.

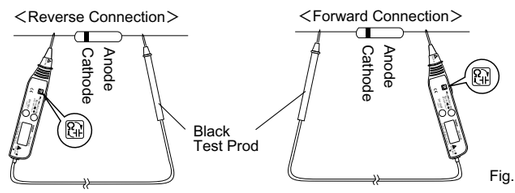


Fig. 6

5-6. CAPACITANCE (⊣⊢) MEASUREMENTS

⚠WARNING

Do not measure Voltage on Ω position.
That will cause electrical shock hazard to the operator and damage to the instrument. Before taking Capacitance measurements, remove power to the circuit being measured and discharge all capacitors.

1. Set FUNCTION Switch to Ω position.
2. Press SHIFT Key 3 times to display nF unit on LCD.
3. Press DIFF Key for more than 1 second to display 0±2digit on LCD in case it shows more digits.
4. Remove power to the circuit being tested and dischrge all capacitors in the circuit.
5. Connect Test Prods of Probe Tester to the capacitor being measured.
6. Read capacitance on LCD.
7. After measurements, set FUNCTION Switch to OFF position.

6. MAINTENANCE

6-1. WARRANTY STATEMENT

The warranty statement for the Digital Probe Tester of Model SK-6592 is printed in the last part of this manual. Read it carefully before requesting a warranty repair.

6-2. BATTERY REPLACEMENT

⚠WARNING

To avoid electrical shock hazard and/or damage to the instrument, turn off power and disconnect Test Prods before removing Battery Case Lid.

1. If the battery is consumed and BAT symbol is shown on LCD, replace the battery.
2. Remove Battery Case Lid by unscrewing the mounting screw.
3. Replace the consumed battery with a fresh 3V CR2032 battery. Be careful of the battery polarity, ＋side up.
4. Replace Battery Case Lid and screw the mounting screw.

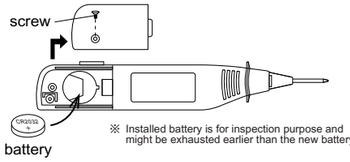


Fig. 7

6-3. PERIODICAL CHECK AND CALIBRATION

Periodical check and calibration are necessary to make safety measurements as well as to maintain the specifications.
It is recommended that the instrument may be checked and calibrated once each year and/or after it is repaired. Periodical Check and Calibration Services are available at KAISE AUTHORIZED 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.

6-4. 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 package together with descriptions of your name, address, telephone number, problem encountered and the service required, and ship prepaid to your local dealer.

When the instrument does not operate properly, the following steps should be taken before returning the instrument for repair, warranty or non-warranty.

1. Check the battery connection.
2. Check the battery if it is installed in the correct polarity. ＋ side must be up.
3. Check the battery if it is alive and usable.
4. Make sure that FUNCTION Switch and SHIFT Key are selected correctly.
5. Make sure that input voltage is within maximum input value on each function.
6. Make sure that the body of this instrument and the Test Prods have no cracks nor any other damage on them.
7. Be careful of noise from the equipment under test or the ambient environment in which the instrument is being used. The instrument is fully shielded against noise, but may read error due to very strong noise.

WARRANTY

SK-6592 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-6592 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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