KAISE KF-23 Analog Multi Tester Instructions

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ANALOG MULTITESTER KF-23
INSTRUCTION MANUAL
KAISE CORPORATION

Contents

KF-23 Analog Multi Tester

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 instrument.

WARNINGS with the symbol ⚠ on the instrument 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**

Do not measure High Power Line (High Energy Circuits). High Power Line is very dangerous and sometimes includes High Surge Voltage thatcould cause explosive short in the instrument and could result in serious injury to the operator. This instrument is for Low Power Linemeasurement. Even in the Low Power Line, pay careful attention when measuring high voltage line.

INTRODUCTION

Thank you for purchasing KAISE “KF-23 ANALOG MULTITESTER”. To obtain the maximum performance of this instrument, read this Instruction Manual carefully, and take safe measurement.

UNPACKING AND INSPECTIONS

Confirm if the following items are contained in the package in good condition.
If there is any damage or missing items, ask your local dealer for replacement.

1. Analog Multitester 1 pce.
2. Test Lead (100-64) 1 set
3. Carrying Case (1020) 1 pce.
4. Battery (1.5V R6P) 2 pcs.
5. Instruction Manual 1 pce.

SPECIFICATIONS

2-1. GENERAL SPECIFICATIONS

1. DISPLAY Analog Meter (Pivot-type 42μA)
2. METER PROTECTION Overload Protection by diode
3. CIRCUIT PROTECTION 0.75A/250V fuse protection for mA, and resistance ranges against over voltage up to 250V AC of commercial power supply.
4. RANGE SELECTION Manual-ranging
5. POWER SUPPLY 1.5V R6P (AA) battery x 2
6. FUSE 0.75A/250V (5.2φ×20mm) x 1
7. DIMENSIONS & WEIGHT 136(H)×90(W)×30(D)mm, Approx. 230g
8. ACCESSORIES 100-64 Test Lead, 1020 Carrying Cace, 1.5V R6P (AA) battery x 2, F15 Spare Fuse (0.75A/250V) x 1 (inside the case), Instruction Manual
9. OPTIONAL ACCESSORIES 100-41 Test Lead Kit, 100-62 Test Lead Set, 940 Alligator Cilps, 948 Alligator Clips, 793 Coil-Type Contact Pin

2-2. MEASUREMENT SPECIFICATION

Measurement Items	Measurement Range	Tolerance
DC Voltage (DC.V)	0.3V/3V/12V/30V/120V/300V/1200V	±3% full scale
AC Voltage (AC.V)	12V/30V/120V/300V/1200V	±4% full scale
DC Current (DC.mA/A)	60μA/3mA/30mA/600mA/12A ※1	±3% full scale
Measurement Items	Measurement Range	Tolerance
Resistance (Ω)	5kΩ/50kΩ/5MΩ (×1/×10/×1k)	±3% f.s. length
Continuity (•)))	Buzzer at approx. 50Ω to 1000Ω or less	–
1.5V Battery Test	0.9V to 1.6V : 50mA load (at 1.5V)	–
Decibel (dB)	10 to 23, 31, 43, 51, 63dB	–
LEDTest	LED lighting test at Ω×10 range	–

Internal Resistance : DC Voltage 20kΩ/V, AC Voltage 10kΩ/V
❇**NOTE 1 :** Continuous measurement in 12A DC range is restricted up to 30 seconds.
More than 1 minute interval is required for the next measurement.

SAFETY PRECAUTIONS

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

3-1. WARNINGS

⚠ **WARNING 1.** Checks of the Instrument and Test Leads Before measurement, check if there are no damage to the instrument and the test leads. Dust, grease and moisture must be removed.

⚠ **WARNING 2. Prohibition of High Power Line Measurement**
Do not measure High Power Line (High Energy Circuits) such as Distribution Transformers, Bus Bars and Large Motors. High Power Line sometimesincludes High Surge Voltage that could cause explosive short in theinstrument and could result in shock hazard. Generally, shock hazard could occur when the current between the circuit, that involves more than 30V AC or 42.4V DC, and ground goes up to 0.5mA or more.

⚠ **WARNING 3.** Warning for High Voltage Measurement Even for Low Power Circuits of electric/electronic appliances, such as heating elements, small motors, line cords and plugs, High Voltage Measurements are very dangerous. To prevent electric shock hazard, pay careful attention not to touch any part of the circuit.

⚠ **WARNING 4.** Warning for Dangerous Voltage Measurement For dangerous high voltage measurement, strictly observe the warnings below (see Fig. 1).

- Do not hold the instrument in your hands.
- Keep safety distance from the circuit to be measured and the test leads not to touch the dangerous voltage.
- Attach black and red alligator clips to the test lead pins.
- Shut down the power of the circuit when connecting test leads to the circuit to be measured.
- After measurement, shut down the power of the circuit again and discharge the all capacitors. Then, detach alligator clips (test leads) from the circuit.

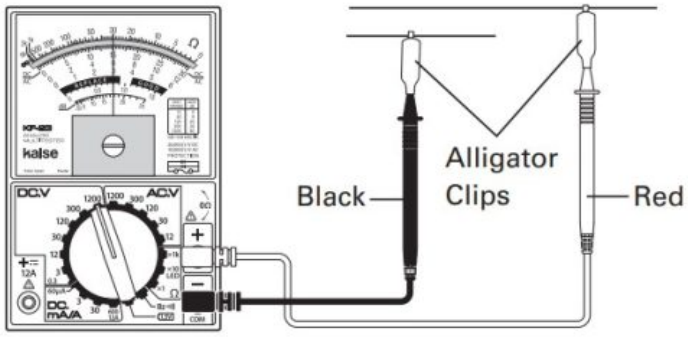

Fig. 1

In case of live-line measurement, strictly observe the warnings below : (see Fig. 2)

- Do not hold the instrument in your hands.
- Keep safety distance from the circuit to be measured not to touch the dangerous voltage.
- Black test lead : Attach black alligator clip and connect to (earth) side of the circuit.
- Red test lead : Connect to (positive) side of the circuit.

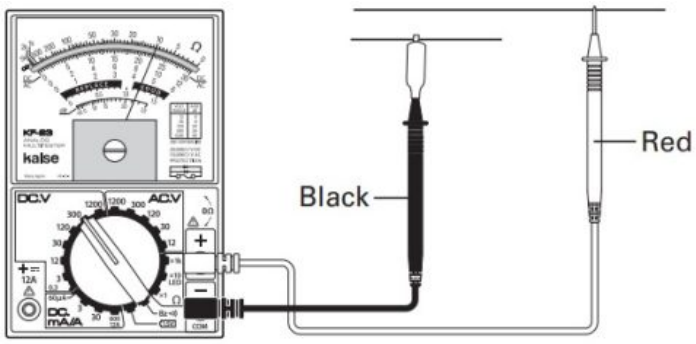

Fig. 2

⚠ **WARNING 5. Warning for 12A DC Measurement**

1. Set RANGE Switch to 600/12A position and insert red test lead to 12A terminal. (Insert black test lead to COM terminal.)
2. 12A DC range is not fuse-protected. Do not measure any current that might exceed 12A to prevent electric shock hazard and serious damage to the instrument.
3. Do not measure any voltage in 12A DC range such as / terminals of car battery directly (fig. 3), or household wall socket (fig. 4).

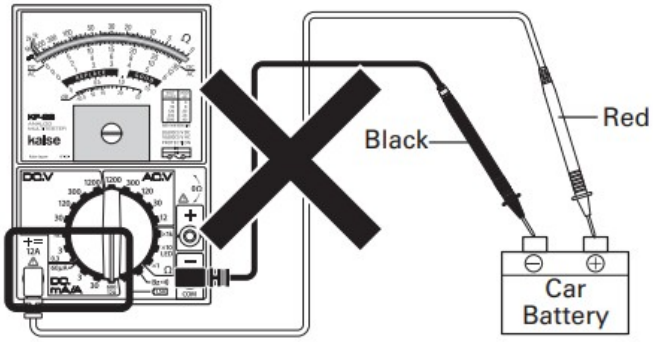

Fig. 3

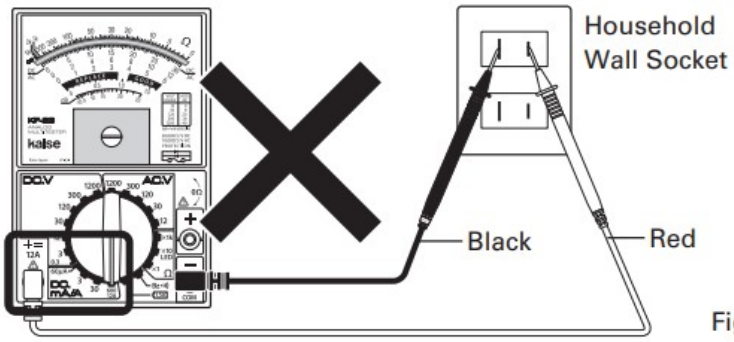

Fig. 4

⚠ **WARNING 6.** Correct Selection of Range Switch Always confirm that RANGE Switch is set to the correct position. Do not measure any voltage except in the DC.V and AC.V ranges.

⚠ **WARNING 7.** Maximum Input Observance
Do not measure any elements that might exceed the specified maximum input values of each measurement ranges.

⚠ **WARNING 8.** Test Lead Detachment
Detach test leads from the measuring circuit before changing RANGE Switch to another position or removing rear case for battery or fuse replacement.

3-2. 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 in naked of barefooted to protect yourself from electrical shock hazard.

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

⚠ **CAUTION 1.**
Away the instrument from hot and humid conditions like in the car. Do not apply hard mechanical shock or vibration.

⚠ **CAUTION 2.**
Do not polish the case or attempt to clean it with any cleaning fluid like gasoline or benzine. If necessary, use silicon oil or antistatic fluid.

⚠ **CAUTION 3.**
Remove the battery when the instrument is out of use for a long time. The exhausted battery might leak electrolyte and corrode the inside.

NAME ILLUSTRATION

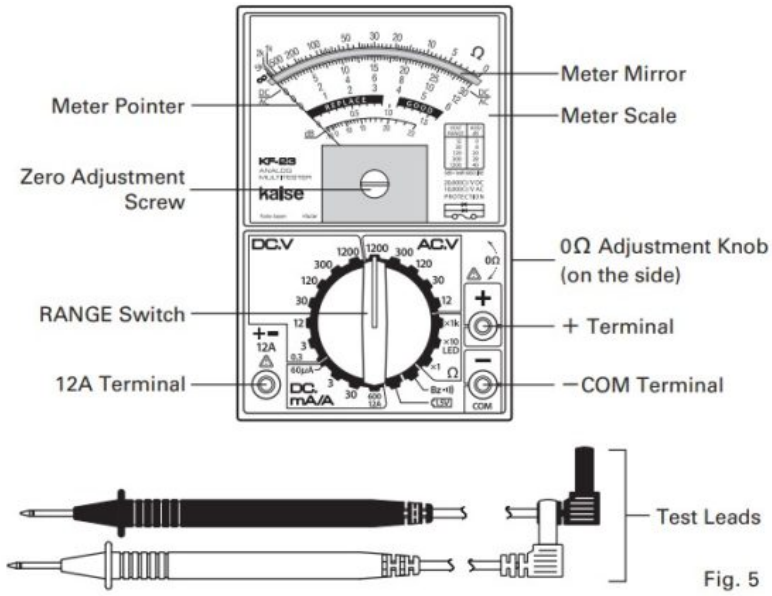

Fig. 5

4-1. RANGE Switch

Set this switch to the range you want to measure. When measuring uncertain voltage or current, firstly set to the highest range to check an approximate value.

After that, gradually swich to the suitable measurement range.

Tips to find the suitable measurement range

Choose the range to show the meter pointer on the right side of the meter scale. (between center and the maximum scale.)

⚠ **WARNING**

- Before starting the measurement, confirm that the RANGE Switch is set to the correct position. Do not measure any voltage except in the DC.V and AC.V ranges to prevent electric shock hazard and serious damage to the instrument.
- To prevent electric shock hazard or serious damage to the instrument, detach test leads from the measuring circuit before changing RANGE Switch to another position.

4-2. Meter Scale (How to read)

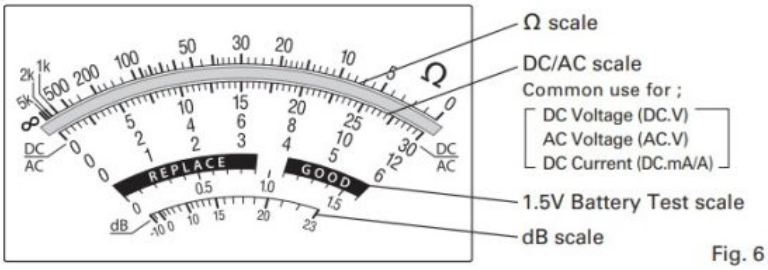

Fig. 6

1. **DC/AC Scale : AC/DC Voltage, DC Current** (V, μA, mA, A)

   Select appropriate scale from “0 – 6”, “0 – 12”, or “0 – 30” according to the selected measurement range applying the certain multiple.

   Examples : 0.3V DC range : Read “0 – 30” scale multiplying by $\frac{1}{100}$.

   120V DC range : Read “0 – 12” scale multiplying by 10.

   60μA DC range : Read “0 – 6” scale multiplying by 10.

   600mA DC range : Read “0 – 6” scale multiplying by 100.

2. **Ω Scale : Resistance (Ω)**

   Multiply the scale value by the measurement range value.

Examples :

×1 range : Read the scale value directly.

×10 range : Multiply the scale value by 10.

×1k range : Multiply the scale value by 1,000.

3. 1.5V Battery Test scale

Read the scale value directly with the test result (GOOD / REPLACE).

3. **dB scale**

   12V AC range : read the scale value directly.

   Add coefficients respectively in the below ranges ;

   30V AC range : add 8, 120V AC range : add 20

   300V AC range : add 28, 1200V AC range : add 40

4-3. Meter Mirror (How to see the pointer)

Read the meter scale from the position that the real meter pointer and its image in the mirror overlap each other. Using this mirror, you can read the meter correctly from straight above the pointer, preventing reading error when seeing the meter from oblique angle.

4-4. Zero Adjustment Screw

Use to take zero adjustment in Voltage and Current measurements. Check if the meter points to “0” line on the left side of DC/AC scale before starting the measurement. If it is not on the line, turn Zero Adjustment Screw until the meter points to “0”. This adjustment is necessary for accurate reading.

4-5. 0Ω Adjustment Knob

Use to take 0Ω adjustment in Resistance. Refer to “5-5. Resistance Measurement (Ω)” for details.

4-6. Input Terminals Test Leads

Insert black test lead to COM terminal, and insert red test lead to or 12A terminal.

NOTE : Insert red test lead to 12A terminal for 12A DC measurement. For the other measurements, connect it to terminal.

MEASUREMENT PROCEDURES

5-1. PREPARATION FOR USE

⚠ **WARNING**

- Do not measure high power line or high power circuit.
- Do not measure any voltage that might exceed the specified maximum input values of each measurement ranges.
- Before starting the measurement, check if the RANGE Switch is set to the correct position.
- Read “3. SAFETY PRECAUTIONS” carefully to prevent electric shock hazard and serious damage to the instrument.

1. **INSTRUCTION MANUAL** ⚠

   Read INSTRUCTION MANUAL carefully to understand the specification and functions properly. “3. SAFETY PRECAUTIONS” is very important for safety measurement.

2. **BATTERY**

   Before starting the measurement, insert 2 pcs of 1.5V R6P battery in reference to “6-1. BATTERY AND FUSE REPLACEMENT”. Replace in the same way when it is exhausted.

3. **FUSE**

   30/600mA ranges and 1Ω range are protected by 0.75A/250V fuse.

For replacement, see “6-1. BATTERY AND FUSE REPLACEMENT”.

4. **NOTES FOR THE MEASUREMENT**

   For accurate measurement, pay attention to the following points.

- Take the meter zero-adjustment.
- Select an appropriate range in reference to “4-1. Range Switch”.
- To prevent reading error, read the meter scale from straight above the meter pointer that the real pointer and its image in the mirror overlap each other. (see “4-3. Meter Mirror)
- Do not measure in the strong magnetic field or on the iron plate to prevent noise affect to the meter reading or meter sensitivity.

5-2. DC VOLTAGE MEASUREMENT (DC.V)

1. Insert black test lead to COM terminal, and insert red test lead to terminal.
2. Set RANGE Switch to a necessary measurement range in DC.V.

   NOTE :

   When measuring uncertain voltage, firstly measure at 1200V range to check an approximate value. After that, gradually swich to the suitable measurement range. Detach test leads from the measuring circuit before changing RANGE Switch.
3. Connect black test lead to (earth) side of the circuit being measured and connect red test lead to (positive) side.

   NOTE : Connect the instrument IN PARALLEL to the circuit.

   NOTE : Use alligator clips for dangerous voltage measurement.
4. Read the measurement value on DC/AC scale in reference to “4-2. Meter Scale”.
5. After measurement, detach test leads from the circuit.

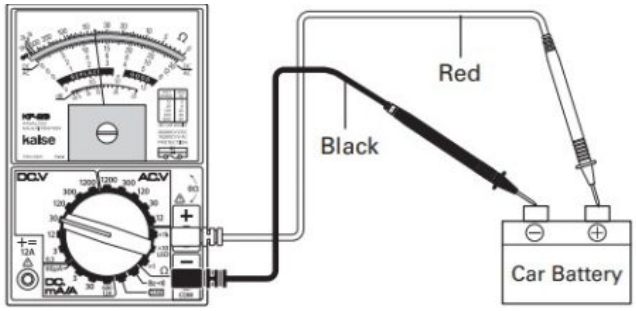

Fig. 7

5-3. AC VOLTAGE MEASUREMENT (AC.V)

1. Insert black test lead to COM terminal, and insert red test lead to terminal.
2. Set RANGE Switch to a necessary measurement range in AC.V.

   NOTE :

   When measuring uncertain voltage, firstly measure at 1200V range to check an approximate value. After that, gradually swich to the suitable measurement range. Detach test leads from the measuring circuit before changing RANGE Switch.
3. Connect black test lead to (earth) side of the circuit being measured and connect red test lead to (positive) side.

NOTE : Connect the instrument IN PARALLEL to the circuit.

NOTE : Use alligator clips for dangerous voltage measurement.

4. Read the measurement value on DC/AC scale in reference to “4-2. Meter Scale”.
5. After measurement, detach test leads from the circuit.

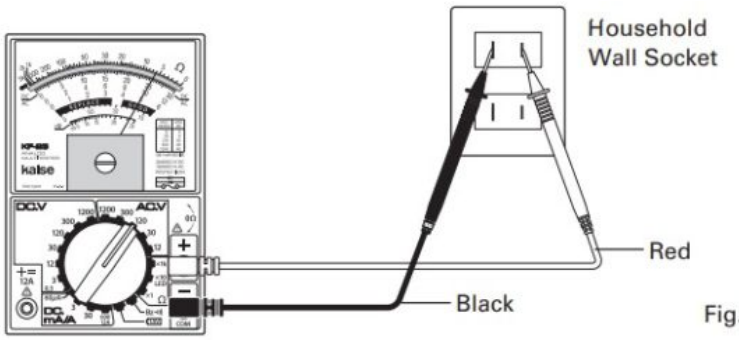

Fig. 8

5-4. DC CURRENT MEASUREMENT (DC.µA/mA/A)

⚠ **WARNING**

- Do not measure any current that might exceed the specified maximum input values of each measurement ranges. 30/600mA ranges are protected by 0.75A/250V fuse, but 60µA/3mA/12A ranges are not protected.
- Do not measure any voltage in current measurement ranges to prevent electric shock hazard and serious damage to the instrument.

⚠ **WARNING FOR 12A DC MEASUREMENT**

- Set RANGE Switch to 600/12A position. Insert RED test lead to 12A terminal.
- 12A DC range is not fuse-protected. Do not measure any current that might exceed 12A to prevent electric shock hazard and serious damage to the instrument.
- Continuous measurement in 12A DC range is restricted up to 30 seconds. More than 1 minute interval is required for the next measurement.
- Do not measure any voltage in 12A DC range such as / terminals of car battery directly, or household wall socket.

1. Insert black test lead to COM terminal, and insert red test lead to terminal.
   NOTE : When measuring 12A DC range, insert red test lead to 12A terminal.
2. Set RANGE Switch to a necessary measurement range in DC.mA/A.
   NOTE : When measuring 12A DC range, set RANGE Switch to 600/12A position.
3. Turn off the power of the circuit to be measured. Open the circuit after discharging the capacitors.
4. Connect black test lead to (earth) side of the circuit being measured and connect red test lead to (positive) side.
   NOTE : Connect the instrument IN SERIES to the circuit.
   NOTE : Use alligator clips for dangerous current measurement.
5. Turn on the power of the circuit being measured.
6. Read the measurement value on DC/AC scale in reference to “4-2. Meter Scale”.
7. Turn off the circuit being measured and discharge the all capacitors. After that, disconnect test leads from the

circuit.

8. After measurement, detach test leads from the circuit.

5-5. RESISTANCE MEASUREMENT (Ω)

⚠ **WARNING**

- Do not measure any voltage in resistance measurement ranges to prevent electric shock hazard and serious damage to the instrument.
- When measuring in-circuit resistance, turn off the circuit to be measured and discharge the all capacitors.

1. Insert black test lead to COM terminal, and insert red test lead to terminal.
2. Set RANGE Switch to a necessary measurement range in Ω.
3. When measuring the resistor connected in a circuit, turn off the circuit and discharge the all capacitors.
4. Take Zero Ω Adjustment.
   Short circuit the black and red test lead pins and turn 0Ω Adjustment Knob until the meter points to “0” on the Ω scale. Take zero Ω adjustment again when changing the measurement range.
   NOTE :
   Zero Ω adjustment does not work when the battery is exhausted.
   Replace the battery and take zero Ω adjustment again.
5. Disconnect one side of the resistor to be measured and connect test leads to the both side.
6. Read the measurement value on Ω scale in reference to “4-2. Meter Scale”.
7. After measurement, detach test leads from the circuit.

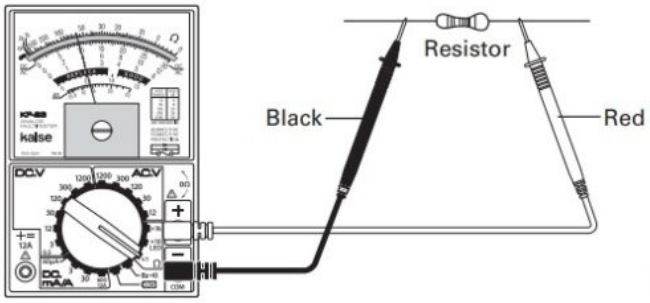

Fig. 9

5-6. CONTINUITY TEST (•)))

⚠ **WARNING**

- Do not measure any voltage in continuity test range to prevent electric shock hazard and serious damage to the instrument.
- When measuring in-circuit continuity, turn off the circuit to be measured and discharge the all capacitors.

1. Insert black test lead to COM terminal, and insert red test lead to terminal.
2. Set RANGE Switch to Bz •)) position.
3. When measuring in-circuit continuity, turn off the circuit to be measured and discharge the all capacitors.
4. Connect test leads to both side of the circuit to be measured. Buzzer sounds when the circuit resistance is 5Ω to 1000Ωor less.

NOTE : Buzzer sound becomes smaller when the battery is exhausted.

5. After measurement, detach test leads from the circuit.

5-7. 1.5V BATTERY TEST (1.5V)

- To prevent electric shock hazard and serious damage to the instrument, do not test high-capacity batteries that exceeds the specified voltage.
- Do not test car battery.
- Do not measure voltage or current in 1.5V range.

You can test exhausted level of the below batteries;
Testable batteries :
1.5V R20P (D), 1.5V R14P (C), 1.5V R6P (AA),
1.5V R03 (AAA)

1. Insert black test lead to COM terminal, and insert red test lead to terminal.
2. Set RANGE Switch to range.
3. Connect black test lead to (earth) side of the battery and connect red test lead to (positive) side.
4. Read the test result on 1.5V Battery Test scale.
   GOOD (blue) zone : The tested battery works good.
   REPLACE (red) zone : The tested battery is exhausted and need replacing.
   NOTE : Even in the REPLACE (red) zone, the battery may be used for the low power consumption instruments.
5. After measurement, detach test leads from the circuit.

5-8. DECIBEL MEASUREMENT (dB)

Measure in the same way as “5-3. AC VOLTAGE MEASUREMENT (AC.V)”.
NOTE : When measuring AC signal which contains superimposed DC elements, add 0.1μF capacitor (rated voltage 500V or more) in series connection.
NOTE : This tester defines 0dB based on 600Ω load circuit impedance at 1mW power consumption (0.7746V for AC Voltage).
This means to read the scale value directly when measuring in 12V AC range at 600Ω circuit impedance. When measuring in 30V, 120V, 300A, and 1200V AC ranges, add coefficients 8, 20, 28, 40 respectively to the scale values.
If the circuit impetance is not 600Ω, you can calculate the actual dB value with the below math formula ;

$X = Y + 10 \log \frac{600}{Z}$	X Actual dB Y Reading value on the dB Scale. Z Circuit impedance (Ω)

5-9. LED TEST (LED)

⚠ **WARNING**

- Do not measure any voltage in LED TEST range to prevent electric shock hazard and serious damage to the instrument.
- When measuring in-circuit LED, turn off the circuit to be measured and discharge the all capacitors.

1. Insert black test lead to COM terminal, and insert red test lead to terminal.

2. Set RANGE Switch to ×10 LED in Ω range.
3. Connect black test lead to side (short pin) of the LED and connect red test lead to side (long pin).
4. Test result is good if the tested LED lights up.
5. If not, LED is damaged or test leads are connected in reverse.
6. After measurement, detach test leads from the circuit.

MAINTENANCE

6-1. BATTERY AND FUSE REPLACEMENT

⚠ **WARNING**

- To prevent electrical shock hazard, finish the measurement when to replace the battery and the fuse.
- Detach test leads from measuring circuit and input terminals.
- Always use the specified fuse. Do not use this instrument shorting fuse holder or without using the fuse.

FUSE SPECIFICATION : 0.75A/250V (φ5.2×20mm)
Battery exhausted : Zero Ω adjustment does not work.
Fuse blow out : Cannot measure current and resistance ranges.
Replace battery or fuse when the unit comes to the above conditions.

1. Finish the measurement and detach test leads from input terminals.
2. Loosen a screw on the rear case and open it from meter side. Then, remove it sliding to the upper side.
3. Replace the exhausted battery into a new 1.5V R6P battery in correct polarity.
4. When replacing the fuse, remove the blowout fuse from the fuse holder and replace it to the new one.
5. Fix the rear case from bottom side and tighten the screw.

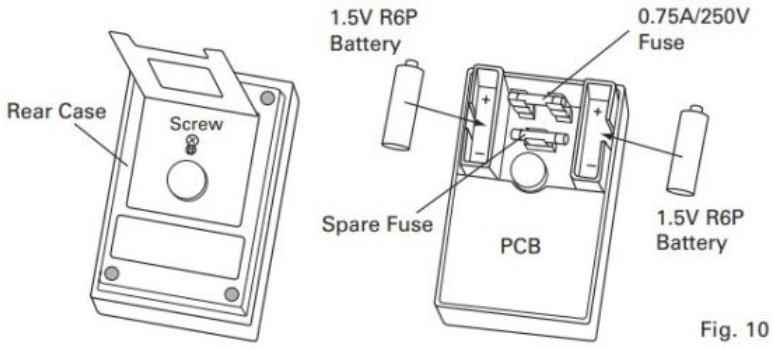

Fig. 10

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

6-2. PERIODICAL CHECK AND CALIBRATION

Periodical check and calibration is necessary to make safety measurements and to maintain the specified accuracy. The recommended check and calibration term is once a year and after the repair service. This service is available at KAISE AUTHORIZED SERVICE AGENCY through your local dealer.

6-3. REPAIR

Repair service is available at KAISE AUTHORIZED SERVICE AGENCY through your local dealer. Pack the instrument securely with your name, address, telephone number and problem details, and ship prepaid to your local dealer.

Check the following items before asking repair service.

1. Check the battery connection, polarity, and capacity.
2. Check if the fuse does not blow out or not drop off from the fuse holder.
3. Confirm that the RANGE Switch is set correctly.
4. Confirm if the over input, exceeding the specified range value, is not applied.
5. Confirm that measured accuracy is adopted in the operating environment.
6. Confirm that the body of this instrument and test leads have no cracks or any other damages.
7. Check if the instrument is not affected by the strong noise generated from the equipment to be measured or measuring surroundings.

WARRANTY

KF-23 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 KF-23 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

KAISE CORPORATION
422 Hayashinogo, Ueda City,
Nagano Pref., 386-0156 Japan
TEL : +81-268-35-1601
/ FAX : +81-268-35-1603
E-mail : sales@kaise.com
http://www.kaise.com
Product specifications and appearance
are subject to change without notice due to
continual improvements.

Documents / Resources

	KAISE KF-23 Analog Multi Tester [pdf] Instructions KF-23, KF-23 Analog Multi Tester, KF-23, Analog Multi Tester, Multi Tester, Tester

References

- [k]
- User Manual