kaise
KF-20 Analog
Multitester

kaise KF-20 Analog Multitester Instruction Manual

Contents

kaise

kaise KF-20 Analog Multitester

Product Information

Specifications

- DC Voltage (DC-V): 0.3 / 3 / 12 / 30 / 120 / 300 / 1200V
- AC Voltage (AC-V): 12 / 30 / 120 / 300 / 1200V
- DC Current (DC-mA): 60A / 3mA / 30mA / 300mA
- Resistance: 5K / 500K / 5M
- Battery Test: 1.5V R20P / R14P / R6P
- Hi Range: 1.5V 250mA
- Lo Range: 1.5V 50mA

General Specifications

- Accuracy
- Overload Protection
- Power Supply
- Accessories: Test Lead (100-51), Holster, Spare Battery (1.5V R6P), Instruction Manual
- Optional Accessories: 100-41 Test Lead Kit, 100-62 Test Lead Set, 940 Alligator Clips, 948 Alligator Clips, 793 Coil-Type Contact Pin

Safety Precautions

Warnings

- 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.
- This instrument is applicable for Low Energy Circuit measurements only. Do not use for High Power Line (High Energy Circuit) measurements such as Distribution Transformers, Bus Bars, and Large Motors.
- Even for Low Energy Circuits of electric/electronic appliances, High Voltage Measurements are very dangerous. Do not touch the Multitester, Test Leads, or any part of the circuit. Shock hazard could occur when the current between the circuit, which involves more than 33V rms or 46.7V DC or peak, and ground goes up to 0.5mA or more.

Product Usage Instructions

1. **Unpacking and Inspections**
   Inspect the instrument and accessories for transport damage. If there is any damage or missing items, ask your local dealer for replacement. Confirm that the following items are contained in the package:
   1. Analog Multitester
   2. Test Lead (100-51)
   3. Holster
   4. Spare Battery (1.5V R6P)
   5. Instruction Manual
2. **Safety Measurements**
   To prevent electrical shock hazards and damage to the instruments, read the instruction manual carefully before using the Multitester. Pay close attention to warnings and symbols indicating potential hazards.
3. **Maximum Performance**
   To obtain the maximum performance of this instrument, read the Instruction Manual carefully and take safe measurements following the provided guidelines.

FAQ

Q: Can I measure High Power Lines with this Multitester?
A: No, it is highly advised not to measure High Power Lines that might exceed 2kVA as it can be very dangerous and may result in serious injury or damage to the instrument.

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 Multitester. WARNINGS with the symbol ⚠ on the Multitester 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 damage.

WARNING
Do not measure a High Power Line that might exceed 2kVA. Measurement on High Power Lines 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. When measuring high voltage, even for low-power lines (Low-energy circuits), take extra care to avoid electrical shock hazards and/or damage to the instrument.

INTRODUCTION

Thank you for purchasing KAISE “MODEL KF-20 ANALOG MULTITESTER”. To obtain the maximum performance of this instrument, read this Instruction Manual carefully, and take safe measurements.

UNPACKING AND INSPECTIONS

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

1. Analog Multitester 1 pce.
2. Test Lead (100-51) 1 set
3. Holster 1 pce.
4. Spare Battery (1.5V R6P) 1 pce.
5. Instruction Manual 1 pce.

SPECIFICATIONS

MEASUREMENT SPECIFICATIONS

DC Voltage (DC-V)	0.3 / 3 / 12 / 30 / 120 / 300 / 1200V
AC Voltage (AC-V)	12 / 30 / 120 / 300 / 1200V
DC Current (DC-mA)	60μA / 3mA / 30mA / 300mA
Resistance (Ω)	5KΩ / 500KΩ / 5MΩ
1.5V Battery Test Hi Range Lo Range	1.5V R20P / R14P / R6P 1.5V 250mA 1.5V 50mA

GENERAL SPECIFICATIONS

Accuracy	DC : ±3 f.s., AC : ±4 f.s. Ω : ±3 f.s.length
Overload Protection	×1 and 300mA range: protected by an internal diode and 0.3A / 250V fuse
Power Supply	1.5V R6P (AA) battery ×1
Dimensions & Weight	136(H)×90(W)×30 (D)mm, 215g
Accessories	100-51 Test Lead ×1 set Holster ×1 1.5V R6P (AA) Battery (built-in and spare) ×1 each Spare Fuse (0.3A/250V)× 1 (inside the rear case) Instruction Manual
Optional Accessories	100-41 Test Lead Kit, 100-62 Test Lead Set 940 Alligator Clips, 948 Alligator Clips 793 Coil-Type Contact Pin

SAFETY PRECAUTIONS

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

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. High Power Line Measurements Prohibited**
  This instrument is applicable for Low Energy Circuit measurements only. Do not use for High Power Line (High Energy Circuit) measurements such as Distribution Transformers, Bus Bars, and Large Motors.
- **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 the Multitester, Test Leads, or any part of the circuit. Generally, a shock hazard could occur when the current between the circuit, which involves more than 33V rms or 46.7V DC or peak, and the ground goes up to 0.5mA or more.
- **WARNING 4. Dangerous Voltage Measurement Procedures**
  For dangerous voltage measurements, strictly observe the warnings below. (refer to fig.1)
  1. Turn off the circuit to be measured.
  2. Plug the black test lead into the "- (COM)" terminal and the red test lead into the "+" terminal.
  3. Attach black and red alligator clips to test lead pins.
  4. Set the RANGE Switch to the desired DC or AC voltage range.
  5. Connect the black alligator clip to the – (earth) side and the red alligator clip to the + (positive) side of the measuring circuit.
  6. Do not hold Multitester and test leads in your hands. Keep a safety distance from the power source or

circuit to be measured so as not to touch the dangerous voltage.

7. Turn on the circuit to be measured, and read the meter.
8. Turn off the circuit again. Detach alligator clips after confirming the meter returns to “0”.

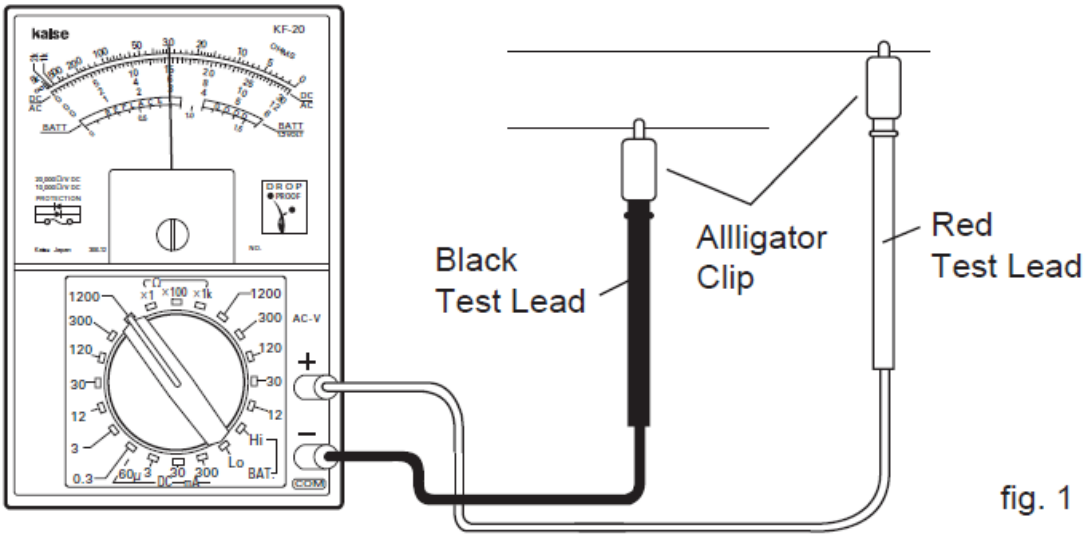


fig. 1

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

1. Set the RANGE Switch to the desired DC or AC voltage range.
2. Attach the alligator clip to the black test lead pin, and connect to the – (earth) side of the measuring circuit.
3. Do not hold the Multitester in your hands. Keep a safety distance from the power source or circuit to be measured so as not to touch the dangerous voltage.
4. Connect the red test lead to the + (positive) side, and read the meter.
5. Detach the red test lead from the circuit first, then detach the black alligator clip.

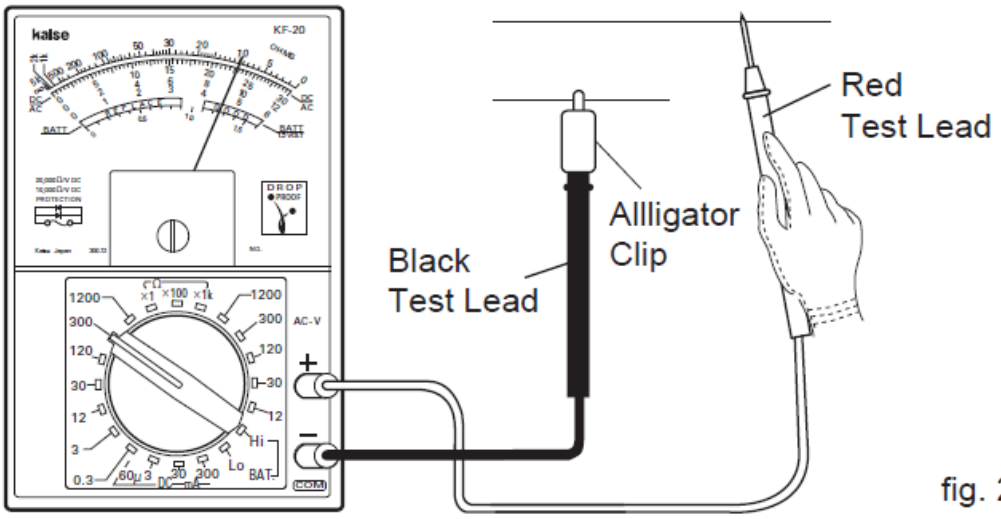


fig. 2

WARNING 5. Correct Selection of RANGE Switch
Always confirm that the RANGE Switch is set to the correct position. Do not measure voltage in DC-mA, Ω, and BAT. ranges.

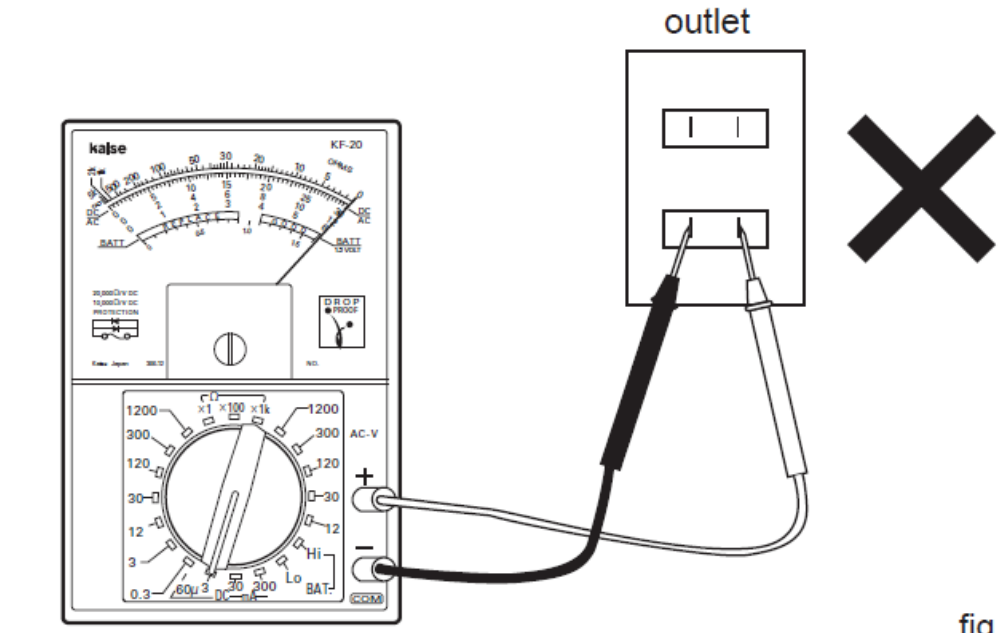


fig. 3

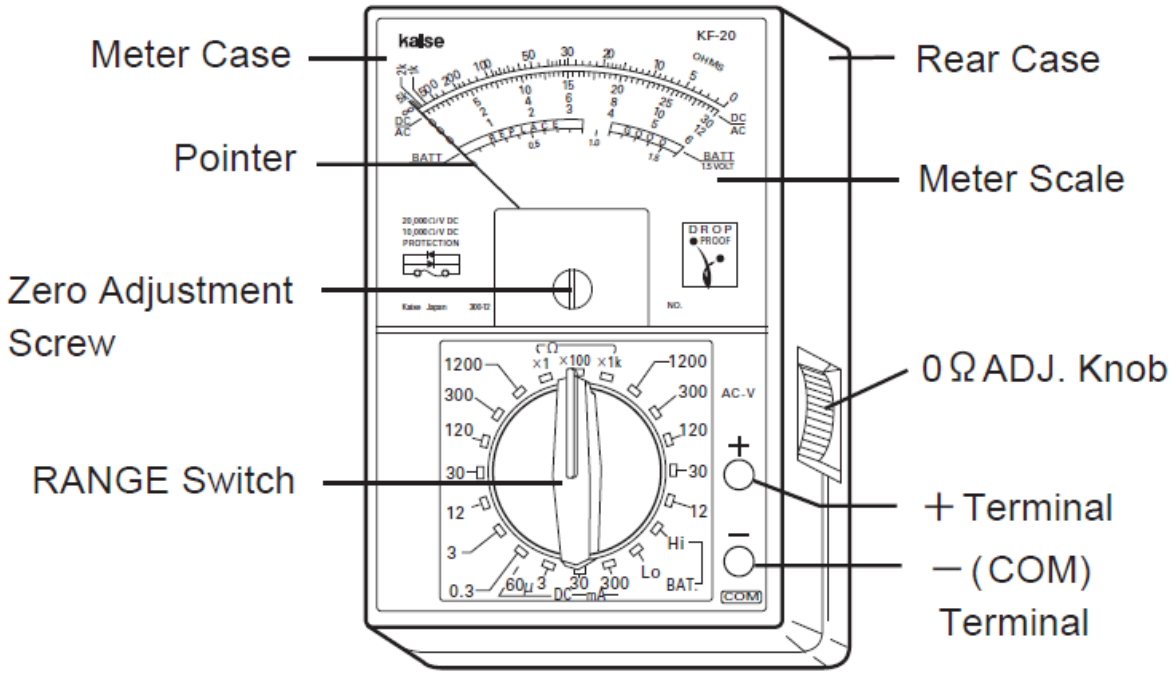
WARNING 6. Maximum Measurement Range Observance
Measurement exceeding the specified maximum values of each measurement range is prohibited.

WARNING 7. Test Lead Detachment
Detach test leads from the measuring circuit before rotating the RANGE Switch or opening the rear case for battery or fuse replacement.

GENERAL WARNINGS AND CAUTIONS

- **WARNING 1.** Children and 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 hazards.
- **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 benzene. If necessary, use silicon oil or antistatic fluid.
- **CAUTION 2.** Avoid the multitester from hard mechanical shock or vibration, high temperature, and strong magnetic field.
- **CAUTION 3.** Remove the batteries when the multitester is out of use for a long time. The exhausted batteries might leak electrolytes and corrode the inside.

NAME ILLUSTRATION



100-51 Test Lead

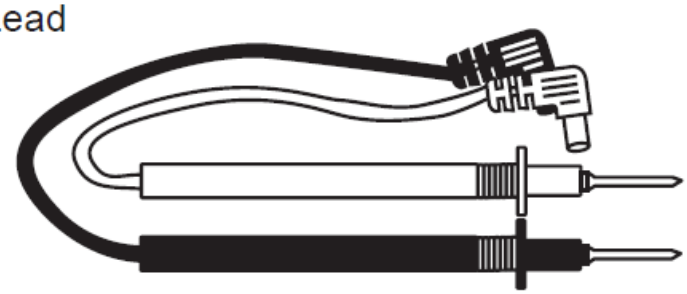


fig. 4

MEASUREMENT PROCEDURES

PREPARATION FOR USE

1. **INSTRUCTION MANUAL**
   Read the INSTRUCTION MANUAL carefully to understand the specifications and functions correctly. SAFETY PRECAUTIONS is highly important for safety measurement.
2. **BATTERY**
   KF-20 contains 1 x 1.5V R6P (AA) battery. Replace it referring to 6-1. BATTERY REPLACEMENT when exhausted.
3. **FUSE**
   KF-20 contains 1 x fast-acting 0.3A/250V (φ5x20mm) fuse to protect Resistance and Current measurement ranges. For replacement, refer to 6-2. FUSE REPLACEMENT .
4. **ZERO ADJUSTMENT**
   Before measurement, confirm that the meter points to “0”. If not, adjust the pointer with Zero Adjustment Screw to take accurate measurements.
5. **TEST LEAD**
   Insert the black test lead into the – (COM) terminal and the red test lead into the + terminal.
6. **RANGE SWITCH**
   1. **Range Selection**

- Set the switch to a desired measurement range.
  To measure uncertain voltage or current, firstly measure the approximate value at the highest range, then change the switch into the suitable range.
- For correct voltage and current measurements, select the range to point to the right side of the meter scale. (between center scale and maximum scale)
- For correct resistance measurement, select the range to point around the center of the OHMS scale.

2. **Confirmation of the Range**
   Always confirm that the RANGE Switch is set to the proper measurement range. To avoid serious damage to the instrument, do not measure voltage in DC-mA, Ω and BAT ranges.
   WARNING
   Detach test leads from the circuit before rotating the RANGE Switch to avoid electric shock hazards and serious damage to the instrument.

7. **Meter Scale Reading**

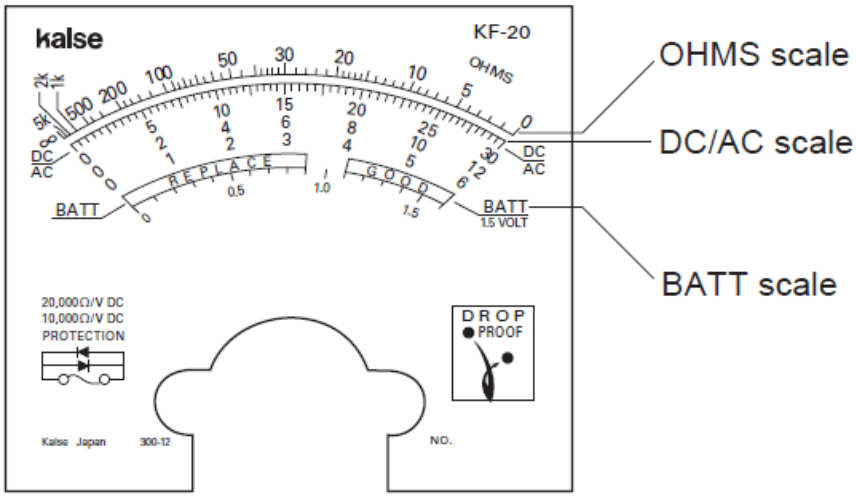


fig. 5

- **DC/AC scale (for AC/DC Voltage, DC Current measurements: V, μA, mA)**
  Select a suitable scale from “0 – 6”, “0 – 12”, or “0 – 30” applying a certain multiple. Reading examples:
  - DC 0.3V range: Read “0 – 30” scale multiplying by 1/100.
  - DC 120V range: Read the “0 – 12” scale multiplying by 10.
  - DC 60uA range: Read the “0 – 6” scale multiplying by 10.
  - DC 300mA range: Read “0 – 30” scale multiplying by 10.
- **OHM scale (for Resistance measurement: Ω)**
  Multiply the scale value depending on the measurement range. Reading examples:
  - “x 1” range: Read the scale directly.
  - “x 100” range: Multiply the scale value by 100.
  - “x 1k” range: Multiply the scale value by 1,000.

8. **Notes for the Measurement**
   For accurate measurement, read the following notes carefully.
   1. Before measurement, confirm that the meter points to “0”. (zero-adjusted)
   2. Select the proper range referring to 5-1. 6-(1) Range Selection .
   3. Read the meter from directly over the pointer.
   4. Measurement in a strong magnetic field or on an iron plate causes reading errors or meter sensitivity wrong.

5. Once-a-year periodical calibration is necessary to maintain tolerance accuracy and to take safety measurements.

9. **Protection Circuit**

   The internal protection circuit against overcurrent for meter movement and the internal circuit is installed. But, the instrument should be defective by such as over input measurement, or applying a voltage to resistance or current range.

DC VOLTAGE MEASUREMENTS (DC-V)

WARNINGS

- Do not measure high power lines that might exceed 2kVA.
- Do not exceed the maximum input value of each range.
- Confirm that the RANGE Switch is set to the correct position.
- Read SAFETY PRECAUTIONS carefully for safety measurement.

1. Plug Black Test Lead into the “- (COM)” terminal and Red Test Lead into “+” terminal.
2. Set RANGE Switch to a desired DC-V range.

   NOTE:
   - To measure uncertain voltage, firstly measure the approximate value at the 1200V range, then change the switch into the suitable range.
   - Detach test leads from the circuit before rotating the RANGE Switch.
3. Connect the black test lead to the (earth) side and the red test lead to the (positive) side of the measuring circuit.
   - **NOTE:** Connect the multitester IN PARALLEL to the circuit.
   - **NOTE:** Use alligator clips for dangerous voltage measurement.
4. Read the meter on the DC/AC scale referring to 5-1. 7. Meter Scale Reading .
5. Detach test leads from the circuit.

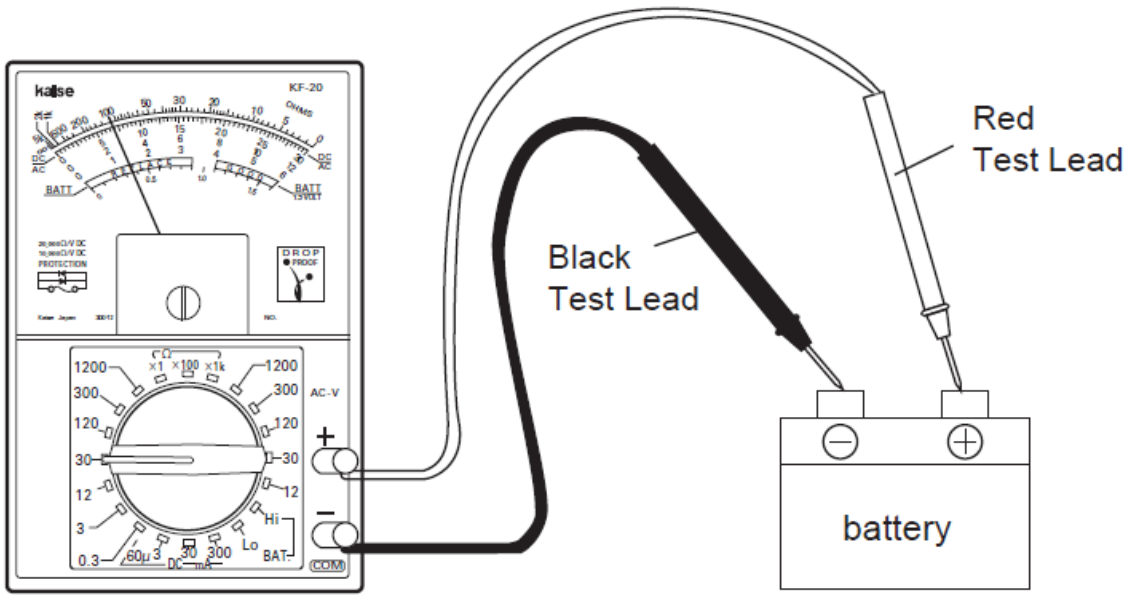


fig. 6

AC VOLTAGE MEASUREMENTS (AC-V)

WARNINGS

- Do not measure high power lines that might exceed 2kVA.
- Do not exceed the maximum input value of each range.
- Confirm that the RANGE Switch is set to the correct position.
- Read SAFETY PRECAUTIONS carefully for safety measurement.

1. Plug Black Test Lead into the “- (COM)” terminal and Red Test Lead into “+” terminal.
2. Set RANGE Switch to a desired AC-V range.

   NOTE:

   - To measure uncertain voltage, firstly measure the approximate value at the 1200V range, then change the switch into the suitable range.
   - Detach test leads from the circuit before rotating the RANGE Switch.
3. Connect the black test lead to the (earth) side and the red test lead to the (positive) side of the measuring circuit.
   - **NOTE:** Connect the multitester IN PARALLEL to the circuit.
   - **NOTE:** Use alligator clips for dangerous voltage measurement.
4. Read the meter on the DC/AC scale referring to 5-1. 7. Meter Scale Reading .
5. Detach test leads from the circuit.

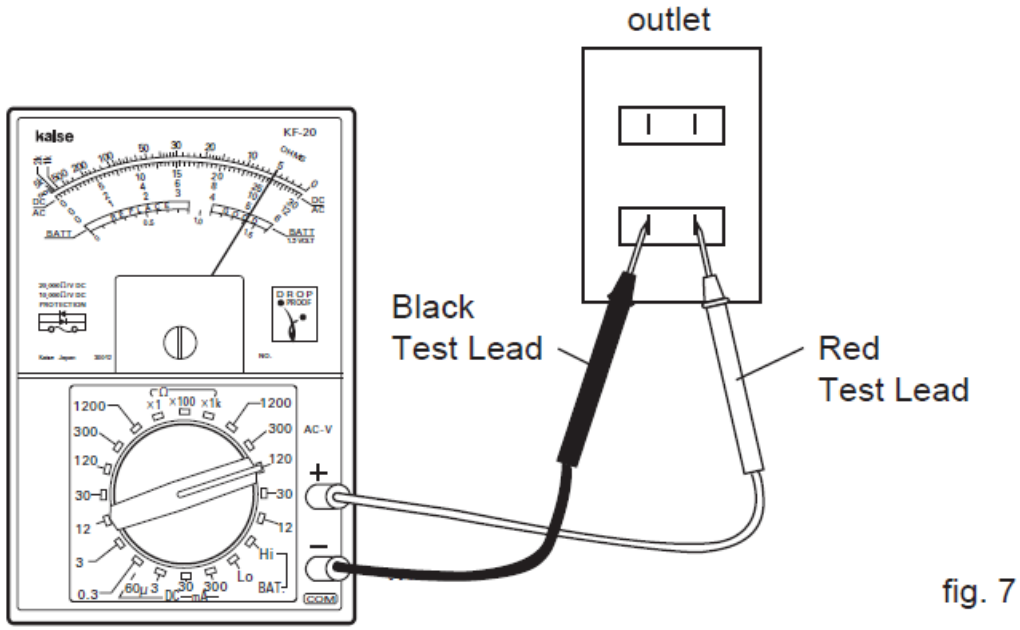


fig. 7

DC CURRENT MEASUREMENTS (DC-mA)

WARNINGS

- Do not measure over 300mA DC.
- Do not exceed the maximum input value of each range.
- Confirm that the RANGE Switch is set to the correct position.
- Read SAFETY PRECAUTIONS carefully for safety measurement.

1. Plug Black Test Lead into the “- (COM)” terminal and Red Test Lead into “+” terminal.
2. Set RANGE Switch to a desired DC-mA range.

   WARNINGS

   - 300mA range is protected by 0.3A/250V fuse, but 60uA, 3mA, and 30mA ranges are not.
   - Do not measure voltage in the DC-mA range.
   - Do not measure the wall outlet or car battery by mistake.
3. Turn off the circuit to be measured and discharge the capacitors.
4. Connect the black test lead to the (earth) side and the red test lead to the (positive) side of the measuring circuit.
   - **NOTE:** Connect the multitester IN SERIES to the circuit.
   - **NOTE:** Using alligator clips is recommended for safety measurement.
5. Turn on the circuit to be measured.
6. Read the meter on the DC/AC scale referring to 5-1. 7. Meter Scale Reading .
7. Turn off the measured circuit again and discharge the capacitors.
8. Detach test leads from the circuit.

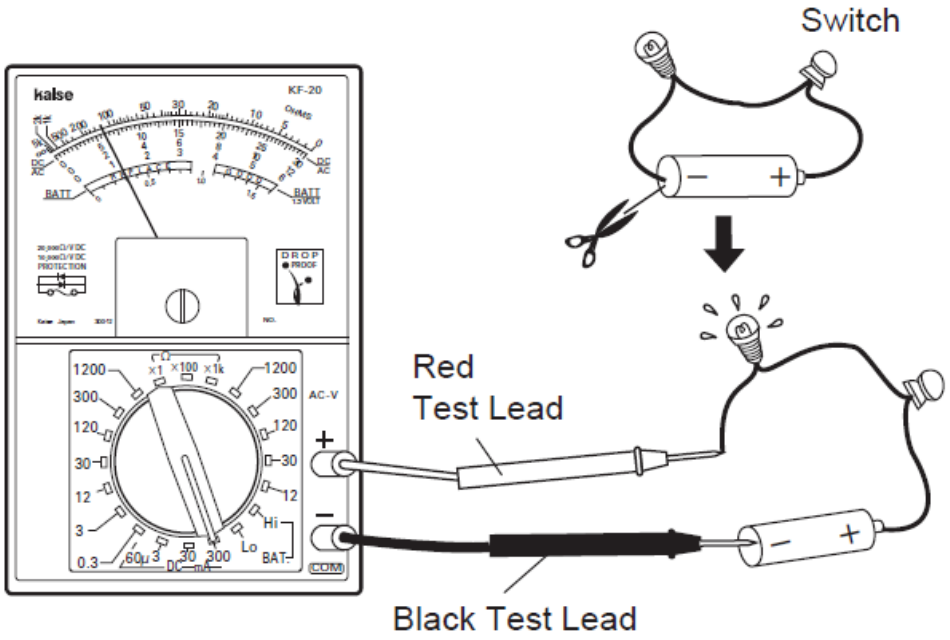


fig. 8

RESISTANCE MEASUREMENTS (Ω)

WARNINGS

- Do not measure voltage in Ω range.
- When measuring the in-circuit resistor, turn off the circuit to be measured and discharge the capacitors.

1. Plug Black Test Lead into the “- (COM)” terminal and Red Test Lead into “+” terminal.
2. Set RANGE Switch to a desired Ω range.
3. When measuring the in-circuit resistor, turn off the circuit to be measured and discharge the capacitors. 0Ω Adjustment
4. Short-circuit metal pins of the test lead. Turn 0Ω ADJ. Knob until the meter points to “0Ω”.
   - **NOTE:** 0Ω Adjustment is necessary for each time the Ω range is selected.
   - **NOTE:** 0Ω Adjustment does not work if the battery is exhausted. Replace it referring to 6-1. BATTERY

REPLACEMENT .

5. The connect test leads to the resistor being measured detaching one side from the circuit.
6. Read the meter on the OHMS scale referring to 5-1. 7. Meter Scale Reading .
   - **NOTE:** Read the scale directly when measuring in the “x 1” range. In the “x 100” range, multiply the scale by 100, and in the “x 1k” range, multiply by 1,000.
   - **NOTE:** For correct resistance measurement, select the range to point around the center of the OHMS scale.
7. Detach test leads from the resistor.

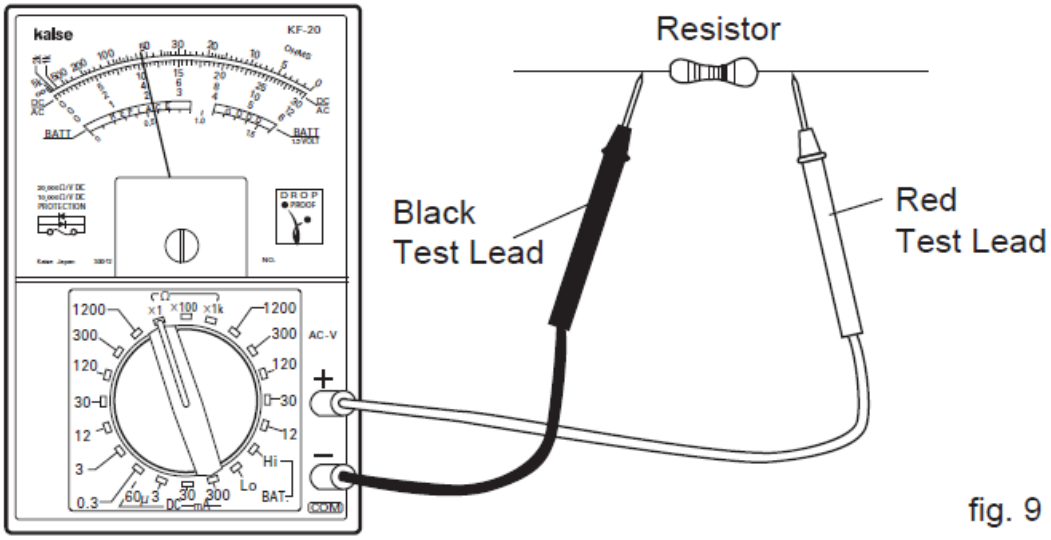


fig. 9

1.5V BATTERY TEST (BATT)

- Battery exhausted level can be tested in Hi (1.5V 250mA), or Lo (1.5V 50mA) ranges.
- **Testable batteries:** 1.5V R20P (D), 1.5V R14P (C), 1.5V R6P (AA), 1.5V R03 (AAA)

WARNINGS

- Do not test non-specified batteries to avoid electric shock hazards and serious damage to the instrument.
- Do not test the car battery.
- Do not measure voltage or current in the BAT range.

1. Plug Black Test Lead into the “- (COM)” terminal and Red Test Lead into “+” terminal.
2. Set RANGE Switch to “Hi” or “Lo” of BAT range.
   NOTE: The “Lo” range applies 50mA, and the “Hi” range applies 250mA to the battery. Confirm the consumption current of the instruments that the battery will be used to select the proper testing range.
   - Popular range selection:
     - 1.5V R20P (D), 1.5V R14P (C): “Hi” range
     - 1.5V R6P (AA), 1.5V R03 (AAA): “Lo” range
3. Connect the black test lead to the (earth) side and the red test lead to the (positive) side.
4. Read the meter on the BATT scale.
   - Meter points “GOOD (blue)”: The tested battery is good.
   - Meter points “REPLACE (red)”: The tested battery is exhausted and needs to be replaced.
     NOTE: Even if meter points “REPLACE (red)” for 1.5V R6P (AA) battery tested in “the Lo” range, it may

be used with low consumption current instruments.

MAINTENANCE

BATTERY REPLACEMENT

WARNINGS

- To avoid electrical shock, detach test leads from the circuit when opening the rear case for battery or fuse replacement.
- Be sure to tighten the screw of the rear case after the battery replacement

Replace the batteries when it is exhausted and “0Ω Adjustment” does not work.

1. Detach test leads from the circuit.
2. Unscrew the rear case.
3. Remove the rear case opening from the meter side and slide upward.
4. Replace an exhausted battery with a new 1.5V R6P (AA) battery in the correct polarity.
5. Close the rear case fitting from bottom to up, and tighten the screw.

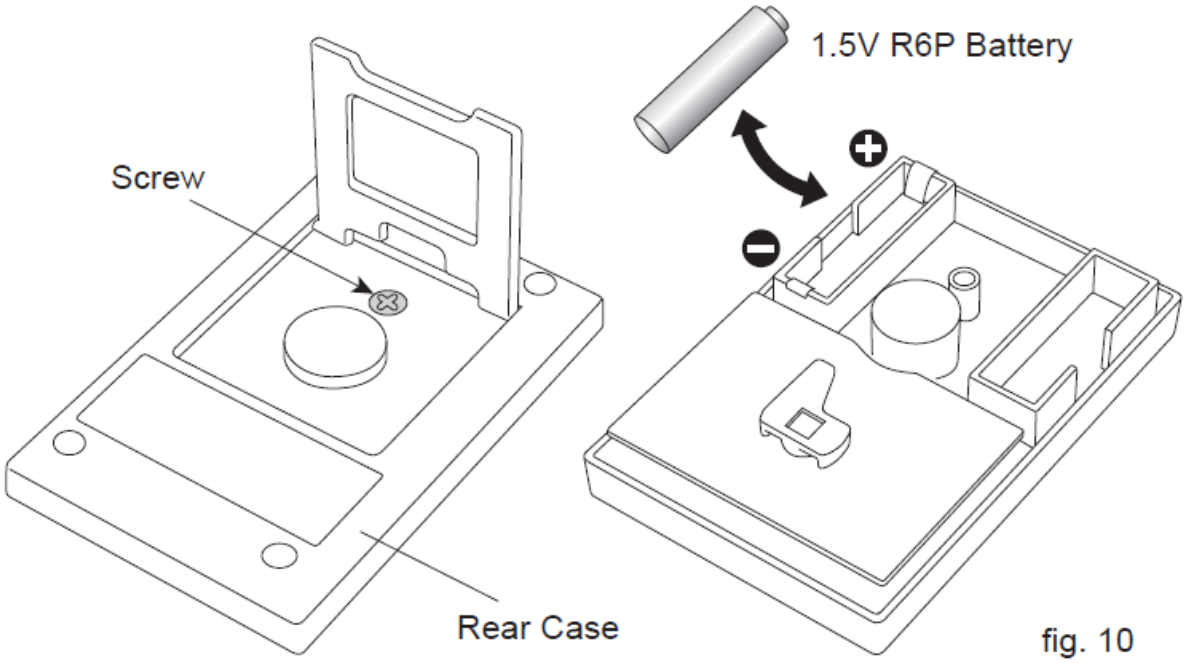


fig. 10

NOTE:
The installed battery is for inspection purposes and might be exhausted earlier than the new battery.

FUSE REPLACEMENT

WARNINGS

- Always use the specified fuse. Do not use the instrument shorting fuse holder or without using the fuse.
- Be sure to tighten the screw of the rear case after the fuse replacement.

DC Current and Resistance measurements cannot be made if the fuse blows out. This instrument contains one spare fuse inside the rear case.

1. Open rear case referring to 6-1. BATTERY REPLACEMENT .
2. Replace a blowout fuse with a new one.
3. Fuse type : Fast-acting 0.3A/250V (φ5x20mm)
4. Close the rear case fitting from bottom to up, and tighten the screw.

PERIODICAL CHECK AND CALIBRATION
Periodical checks and calibration are 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.

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 for repair service.

1. Check the battery connection, polarity, and capacity.
2. Confirm that the RANGE Switch is set to the correct position.
3. Confirm that the body of this instrument and handle insulators of the Test Leads have no cracks or any other damages.
4. Check if any noise affects the instrument. This instrument is fully shielded against noise, but possibly to be affected by very strong noise.

WARRANTY

KF-20 is warranted in its entirety against any defects of material or workmanship under normal use and service within 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-20 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 instead 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 has been subject to misuse, negligence, accident, incorrect repair by users, or any installation or use not by instructions provided by the manufacturer.

KAISE AUTHORIZED DEALER

- 422 Hayashinogo, Ueda City, Nagano Pref., 386-0156 Japan
- **TEL:** +81-268-35-1600 (REP.)
- **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-20 Analog Multitester [pdf] Instruction Manual KF-20, KF-20 Analog Multitester, Analog Multitester, Multitester

References

- User Manual