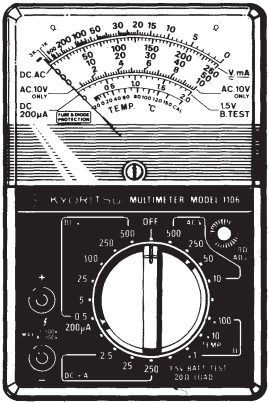


INSTRUCTION MANUAL



ANALOG MULTIMETER

MODEL 1106

KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.

1. SAFETY WARNINGS

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

- ⚠ WARNING**
- Read through and understand instructions contained in this manual before starting using the instrument.
 - Save and keep the manual handy to enable quick reference whenever necessary.
 - This instrument should only be used by suitably trained person and be sure to follow measurement procedures described in the manual. Kyoritsu assumes no responsibility for damage and injury caused by misuse or not following instructions in the manual.
 - Be sure to understand and follow all safety instructions contained in the manual.
Be sure to observe the above instructions.
Failure to follow the above instructions may cause injury, instrument damage and/or damage to equipment under test.

The symbol ⚠ indicated on the instrument means that the user must refer to related parts in the manual for safe operation of the instrument. Be sure to carefully read the instructions following each symbol in the manual.

- ⚠ DANGER** is reserved for conditions and actions that are likely to cause serious or fatal injury.
⚠ WARNING is reserved for conditions and actions that can cause serious or fatal injury.
⚠ CAUTION is reserved for conditions and actions that can cause injury or instrument damage.

- ⚠ DANGER**
- Never make measurement on a circuit in which the electrical potential exceeds AC500V since this instrument is designed for low voltage measurement.
 - Do not make voltage measurements on industry power lines of 250V or higher.
 - Do not attempt to make measurement in the presence of flammable gasses.
Otherwise, the use of the instrument may cause sparking, which can lead to an explosion.
 - Caution should be taken not to short-circuit the power line with the test leads when measuring voltages. It may cause personal injury.
 - Never attempt to use the instrument if its surface or your

hand are wet.
Do not exceed the maximum allowable input of any measuring range.

- ⚠ WARNING**
- Never attempt to make any measurement if any abnormal conditions, such as a broken cover and test leads or exposed metal parts are present on the instrument.
 - Do not install substitute parts or make any modification to the instrument.
Return the instrument to your local KYORITSU distributor for repair or re-calibration in case of suspected faulty operation.
 - Do not try to replace the batteries if the surface of the instrument is wet.
 - Ensure that the test leads are firmly inserted into the terminal.
 - Do not make measurement with the instrument case opened.
 - Ensure that the test leads are removed from the instrument, and that the instrument is switched off when opening the Battery cover for battery replacement.

- ⚠ CAUTION**
- Always set the Function switch to the appropriate position before making measurement.
 - Never rotate the Function switch with the test leads connected to the equipment under test.
 - Set the Function switch to the "OFF" position after use and remove the test leads. Remove the batteries if the instrument is to be stored and will not be in use for a long period.
 - Do not give drop impacts and expose the instrument to direct sunlight, high temperatures, humidity or dew.

2 . FEATURES

- **Designed for Safety**
User oriented safety features throughout the instrument. No exposed metal on the external case and the test leads with shielded banana plugs to give only a couple of examples.
- **Functional Design**
Instrument designed to allow the maximum ease of operation. Slim, compact, lightweight and truly portable.
- **Sloping front panel permits easy reading.**
- **Highly Reliable & Accurate**
Guaranteed to be accurate within ±3% , AC or DC.
Self-shielding core magnet type movement ensures accurate measurements.

6. CAUTION FOR USE

- **Make sure to check the fuse.** With the range switch set to one of the ohm ranges short the tips of the test leads. When the pointer deflects to the right (zero mark on the ohm scale) the fuse is OK. If the pointer does not deflect at all replace the fuse with a new one (0.5A/250V) as it has blown.
- **When the pointer is positioned off the zero mark on the extreme left of the scale turn the zero adjust screw so that it is set to the zero position.** The instrument will not give accurate readings when used without this zero adjustment.
- **Before taking measurements make certain that the range switch has been properly set. Also, make sure to remove the test lead tips from the circuit, under test when switching over the range during measurement.** When the voltage is accidentally applied to the current or ohm ranges the fuse may blow or the instrument may get damaged.

7. HOW TO MAKE MEASUREMENTS

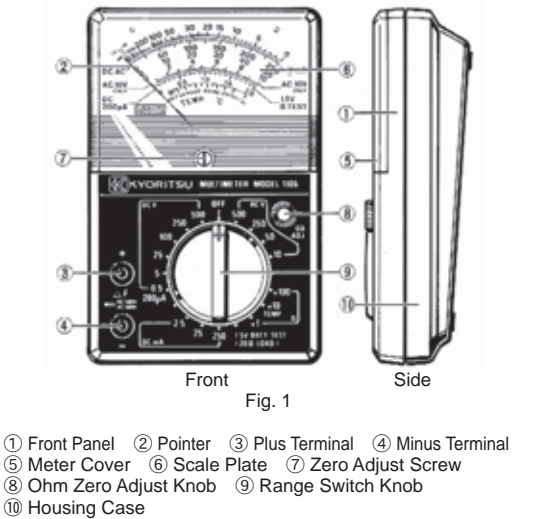
- 7-1 DC Voltage Measurements**
- (1) Plug the red test lead into the plus terminal and the black test lead into the minus terminal.
 - (2) Set the range switch to DC 500V.
 - (3) Connect the red test lead to the plus side of the circuit under test and the black test lead to the minus side.
 - (4) When the reading is below 250V set the range switch to DC 250V and make the measurement. Follow the same measurement procedures with the range switch set to the desired position.
- 7-2 AC Voltage Measurements**
- (1) Plug the red test lead into the plus terminal and the black test lead into the minus terminal.
 - (2) Set the range switch to AC 500V.
 - (3) Connect the test lead to the circuit under test.
 - (4) As in DC voltage measurements set the range switch to the desired position and make the measurement.

- 7-3 DC Current Measurements**
- (1) Plug the red test lead into the plus terminal and the black test lead into the minus terminal.
 - (2) Set the range switch to 250mA DC.
 - (3) Connect the red test lead to the plus side of the circuit under test and the black test lead to the minus side.
 - (4) When the measurement is possible on lower ranges set the range switch to the desired position and make the measurement.

- 7-4 Resistance Measurements**
- (1) Plug the red test lead into the plus terminal and the black test lead into the minus terminal.

- **Available with Temperature Measuring Range**
Temperature probe Model 7060 permits the measurement of temperature from −20 °C to +150 °C on the direct-reading temperature scale.
- **Battery Test Circuit**
Using the 1.5V battery test ranges, you can easily measure the following 1.5V dry batteries:
 - Manganese Batteries**
 - SUM-1 (Eveready 950, IEC R-20 or equivalent)
 - SUM-2 (Eveready 935, IEC R-14 or equivalent)
 - SUM-3 (Eveready 915, IEC R-6 or equivalent)
 - Alkaline Batteries**
 - AM-1 (Eveready E-95, IEC LR-20 or equivalent)
 - AM-2 (Eveready E-93, IEC LR-14 or equivalent)
 - AM-3 (Eveready E-91, IEC LR-6 or equivalent)
 - Mercury Batteries**
 - H-X (or equivalent)
- **Overload Protection**
Protected by fuse and diode against accidental overload.

3. INSTRUMENT LAYOUT

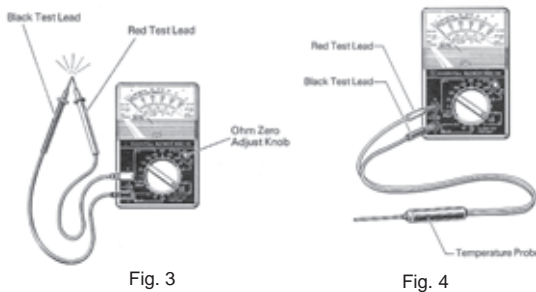


- (1) Front Panel
 - (2) Pointer
 - (3) Plus Terminal
 - (4) Minus Terminal
 - (5) Meter Cover
 - (6) Scale Plate
 - (7) Zero Adjust Screw
 - (8) Ohm Zero Adjust Knob
 - (9) Range Switch Knob
 - (10) Housing Case
- (2) Set the range switch to Ω .
 - (3) Short the test lead tips. When the pointer is not positioned over the zero mark on the ohm scale turn the ohm zero adjust knob so that it is set to the zero position. When the pointer does not still read zero replace the battery with a new one as it is weak.
 - (4) Connect the test leads to both ends of the circuit under test.
 - (5) Set the range switch to the desired position and make the measurement.

Note: Make sure to turn off power when the resistance of a circuit is measured.

- 7-5 1.5V Battery Test**
- (1) Plug the red test lead into the plus terminal and the black test lead into the minus terminal.
 - (2) Set the range switch to 1.5V BATTERY TEST.
 - (3) Connect the red test lead to the plus side of the battery and the black test lead to the minus side for battery tests.
Note: 20Ω load resistor is used for 1.5V battery test.

- 7-6 Temperature Measurements**
- (1) Insert red voltage test lead into plus (+) terminal and black voltage test lead into minus (−) terminal.
 - (2) Set range switch to TEMP position.
 - (3) Short the tips of test leads and turn ohm zero adjust knob so that pointer is positioned on CAL mark of temperature scale (Fig. 3). After completing this procedure, remove test leads.
 - (4) Insert red test lead of temperature probe Model 7060 into plus (+) terminal and black test lead into minus (−) terminal (Fig. 4). Read temperature direct from temperature scale.
Note: Refrain from measuring the temperature of metal parts having a voltage higher than 50V as it is dangerous.



4. SPECIFICATIONS

Standard Measuring Ranges:	
DC Voltage (6 ranges)	0.5/5/25/100/250/500V (5KΩ/V)
AC Voltage (4 ranges)	10/50/250/500V (2.5KΩ/V)
DC Current (4 ranges)	200 μA/2.5/25/250mA
	Terminal Voltage: 500mV approx. for 200 μA/2.5/25mA 800mV approx. for 250mA
Resistance (3 ranges)	X 1 3KΩ (20Ω at mid-scale) X 10 30KΩ (200Ω at mid-scale) X100 300KΩ (2kΩ at mid-scale)

1.5V Battery Test
Following battery cells can be tested:
Manganese Batteries
SUM-1 (Eveready 950, IEC R-20 or equivalent)
SUM-2 (Eveready 935, IEC R-14 or equivalent)
SUM-3 (Eveready 915, IEC R-6 or equivalent)
Alkaline Batteries
AM-1 (Eveready E-95, IEC LR-20 or equivalent)
AM-2 (Eveready E-93, IEC LR-14 or equivalent)
AM-3 (Eveready E-91, IEC LR-6 or equivalent)
Mercury Batteries
H-X (or equivalent)
Temperature −20°C ~ +150°C (with the use of optional probe Model 7060).

Accuracy :
DC Voltage Within ±3% of full scale
AC Voltage Within ±3% of full scale
DC Current Within ±3% of full scale
Within ±5% of full scale for 250mA range only
Resistance Within ±3% of scale length
Accuracy of Temperature Measurements
Using Temperature Probe MODEL 7060
Within ±5°C : 0°C ~ +100°C
Within ±10°C : other ranges

Withstand Voltage:
3000V AC for one minute
Power Source:
One 1.5V SUM-3 (Eveready 915) dry battery or equivalent
Dimensions:
130 (L) × 85 (W) × 38 (D) mm
Weight:
Approx. 175 g
Accessories:

8. FUSE & BATTERY REPLACEMENTS

- Where the fuse has blown remove the housing case and replace it with a new one.
Make sure to use the 0.5A /250V fuse as specified. The use of any other substitute may damage the instrument.
- When the battery is weak the ohm zero adjustment becomes impossible. Accurate resistance and temperature measurements cannot be made without the ohm zero adjustment. Remove the bottom case for replacement of the weak battery with a new one.

9. CLEANING METER COVER

Do not try to remove dirt on the meter cover by rubbing hard with a dry cloth. This can remove anti-electrostatic agent applied to the surface of the surface of the meter cover.

When the meter reading is affected by electrostatic build up on the meter cover.

Wipe the meter cover surface using a cloth dampened with off-the shelf anti-static agent or detergent.

To avoid possible deforming or discoloring, do not use solvents.

To clean the body of the instrument, use cloth dampened with detergent.

⚠ CAUTION
Never use paint thinner, benzene or other solutions containing solvents for cleaning the instrument.
Otherwise, deforming or discoloring of the instrument body or the meter cover may result.

Note:
Handle the instrument with care and follow the instructions in order to maintain it in good condition for a long period of time.

10. Disposing the Product

Waste Electrical and Electronic Equipment (WEEE), Directive 2002/96/EC
This Product complies with the WEEE Directive (2002/96/EC) marking requirement.
The affixed product label (see below) indicates that you must not discard this electrical/electronic product in domestic household waste.
Product Category
With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a "Monitoring and Control instrumentation" product.



- (included)
Test Leads (MODEL 7066)
0.5A Spare Fuse
Instruction Manual
(optional)
Model 7060 Temperature probe, carrying case

5. HOW TO READ SCALES



Fig. 2

Scale Classification	Measuring Range	Scale	How to Read Scale
DC Voltage	ⓑ DC 0.5V	ⓑ 50	×0.01
	5	ⓑ 50	×0.1
	25	ⓑ 250	×0.1
	100	ⓑ 10	×10
	250	ⓑ 250	×1
AC Voltage	Ⓒ AC 10V	Ⓒ 10	×1
	ⓑ AC 50V	ⓑ 50	×1
	250	ⓑ 250	×1
	500	ⓑ 10	×10
DC Current	ⓓ DC 200 μA	ⓓ 2.0	×100
	ⓑ 2.5mA	ⓑ 250	×0.01
	25	ⓑ 250	×0.1
	250	ⓑ 250	×1
Resistance	Ⓐ ×1	Ⓐ	×1
	×10	Ⓐ	×10
	×100	Ⓐ	×100
Temperature	ⓔ Rx10	ⓔ −20~+150°C	×1
BATT. TEST	ⓓ 1.5V BATTERY TEST	ⓓ	—

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