Instruction Manual

KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.

K2001

Digital Multimeter with AC/DC Clamp Sensors

MAJOR TECH

1. SAFETY WARNINGS

This instrument has been designed and tested according to IEC Publication 61010: Safety Requirements for Electronic Measuring Apparatus. This instruction manual contains warnings and safety rules which must be observed by the user to ensure safe operation of the instrument and to retain it in safe condition. Therefore, read through these operating instructions before starting 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.
- Be sure to use the instrument only in its intended applications and to follow measurement procedures described in the manual.
- Be sure to understand and follow all safety instructions contained in the manual.

Failure to follow the above instructions may cause injury, damage to the instrument and/or damage to equipment under test.

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

Following symbols are used on the instrument and in the instruction manual. Attention should be paid to each symbol to ensure your safety.

Refer to the instructions in the manual.
This symbol is marked where the user must refer to the instruction manual so as not to cause personal injury or instrument damage.

Indicates an instrument with double or reinforced insulation.

Indicates that this instrument can clamp on bare conductors when measuring a voltage corresponding to the applicable Measurement category, which is marked next to this symbol.

Indicates AC (Alternating Current).

Indicates DC (Direct Current).

Indicates AC and DC.

⚠ DANGER

- Never make measurement on circuits with a maximum voltage difference of 600VAC/DC or greater between conductors (300VAC/DC or greater between a conductor and ground).
- Do not attempt to make measurement in the presence of flammable gasses. Otherwise, the use of the instrument may cause sparking, which leads to an explosion.
- Never attempt to use the instrument if its surface or your hand is wet.
- Do not exceed the maximum allowable input of measuring ranges.
- Never open the battery compartment cover while making measurement.
- Never try to make measurement if any abnormal conditions, such as broken Transformer jaws or case is noted.
- The instrument is to be used only in its intended applications or conditions. Otherwise, safety functions equipped with the instrument doesn't work, and instrument damage or serious personal injury may be caused.

⚠ WARNING

- Never attempt to make any measurement, if any abnormal conditions are noted, such as broken case, cracked test leads and exposed metal parts.
- Do not turn the Function Selector Switch while the test leads are connected to the circuit under test.
- Do not install substitute parts or make any modification to the instrument. Return the instrument to Kyoritsu or your distributor for repair or re-calibration.
- Do not try to replace the batteries if the surface of the instrument is wet.
- Always disconnect the clamp sensor and the test leads from the circuit under test and switch off the instrument before opening the battery compartment cover for battery replacement.

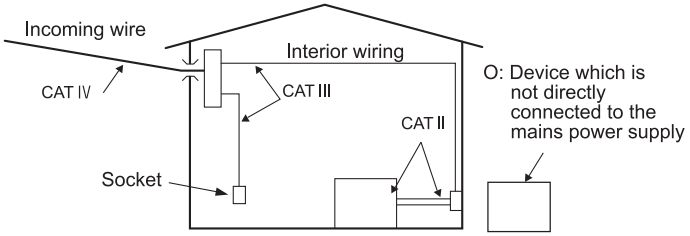
⚠ CAUTION

- Make sure that the Function Selector Switch is set to an appropriate position before making measurement.
- Always make sure to place the test leads in the test lead holder before making current measurement.
- Do not expose the instrument to the direct sun, extreme temperatures or dew fall.
- Be sure to set the Function Selector Switch to the "OFF" position after use. When the instrument will not be used for a long period of time, place it in storage after removing the batteries.
- Use a damp cloth and detergent for cleaning the instrument. Do not use abrasives or solvents.

Measurement Category:

To ensure safe operation of measuring instruments, IEC 61010 establishes safety standards for various electrical environments, categorized as O to CAT.IV, and called measurement categories. Higher-numbered categories correspond to electrical environments with greater momentary energy, so a measuring instrument designed for CAT.III environments can endure greater momentary energy than one designed for CAT.II.

O : Circuits which are not directly connected to the mains power supply.
CAT.II : Electrical circuits of equipment connected to an AC electrical outlet by a power cord.
CAT.III : Primary electrical circuits of the equipment connected directly to the distribution panel, and feeders from the distribution panel to outlets.
CAT.IV : The circuit from the service drop to the service entrance, and to the power meter and primary over-current protection device (distribution panel).



2. FEATURES

- Permits AC/DC current measurement up to 60A using a clamp sensor that comes standard with the instrument
- Clamp sensor for ease of use in crowded cable areas and other tight places
- Permits current measurement with an open current-clamp sensor that does not require opening and closing operations by the user
- Auto-power-save function
- Buzzer for easy continuity checking
- Data hold function to freeze the readings
- LCD with a 3400 count full scale bar graph
- Shock absorbing holster for ease of storage
- Designed to international safety standard IEC61010-1: measurement category CAT.Ⅲ, 300V and pollution degree 2.

3. SPECIFICATIONS

●Measuring Ranges and Accuracy (at 23℃±5℃, relative humidity75% or less)

AC Current ～A

MODEL	Range	Measuring Range	Accuracy
2000	60A	0-60.0A	± 2.0%rdg ± 5dgt(50/60Hz)
2001	100A	0-100.0A	± 2.0%rdg ± 5dgt(50/60Hz)

DC Current ⎓ A

MODEL	Range	Measuring Range	Accuracy
2000	60A	0- ± 60.0A	± 2.0% rdg ± 5dgt
2001	100A	0- ± 100.0A	± 2.0% rdg ± 5dgt

AC Voltage ～V Input impedance: 10MΩ

Range	Measuring Range	Accuracy
3.4V	0-600V (Auto-ranging)	± 1.5%rdg ± 5dgt(50-400Hz)
34V		
340V		
600V		

DC Voltage ⎓V Input impedance: 10MΩ

Range	Measuring Range	Accuracy
340mV	0- ± 600V (Auto-ranging)	± 1.5%rdg ± 4dgt
3.4V		
34V		
340V		
600V		

Resistance Ω／·))

Range	Measuring Range	Accuracy
340 Ω	0-33.99M Ω (Auto-ranging)	± 1.0%rdg ± 3dgt
3.4k Ω		Buzzer beeps below 30 ± 10Ω
34k Ω		(Continuity buzzer works on 340Ω range only)
340k Ω		
3.4M Ω		± 5%rdg ± 5dgt
34M Ω		± 15%rdg ± 5dgt

Frequency Hz

Range	Measuring Range	Accuracy
Current	0-3.399kHz 3.4kHz-10kHz (Auto-ranging)	± 0.1%rdg ± 1dgt
Voltage	0-3.399kHz 3.4kHz-33.99kHz 34kHz-300kHz (Auto-ranging)	± 0.1%rdg ± 1dgt

※Electromagnetic compatibility (IEC 61000-4-3)
RF field ≦ 1 V/m
ACV/DCV/OHMS/FREQUENCY total accuracy = specified accuracy
ACA/DCA total accuracy = specified accuracy+5dgt
RF transmitters such as mobile telephones may not be used in close proximity.

●Safety Standard
IEC 61010-1
measurement CAT.Ⅲ, 300V, pollution degree 2
measurement CAT.Ⅱ, 600V, pollution degree 2
IEC 61010-031
IEC 61010-2-032, IEC 61010-2-033
IEC 61326-1 (EMC), EN 50581 (RoHS)

●Operating System
Dual integration

●Display
Liquid crystal display with maximum reading of 3399 as well as units and annunciators
Bar graph with maximum points of 33

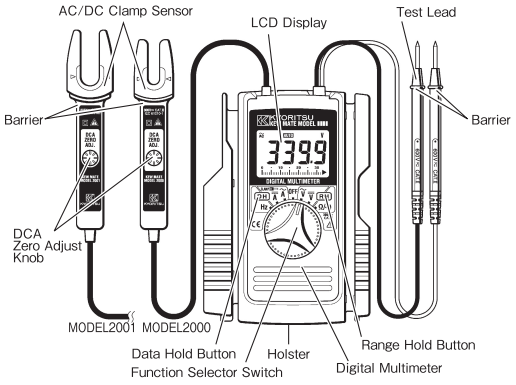
●Over Input Indication
"OL" on the LCD (Ω ranges only)

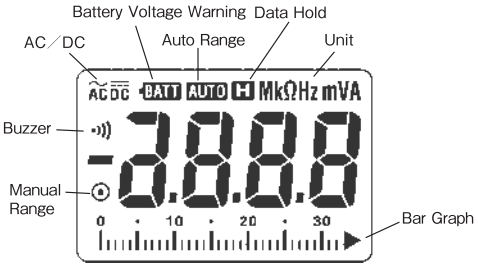
●Auto-ranging Operation
Shifts to the next higher range when bar graph increases to 33 points
Shifts to the next lower range when bar graph decreases to 3 points

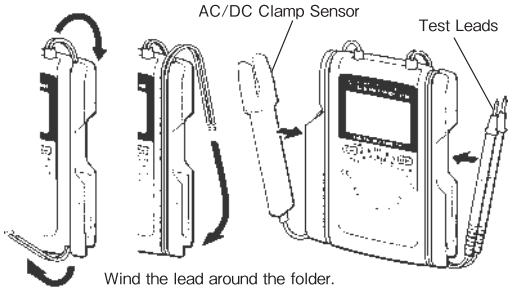
●Sample RateNumeric reading: about 400ms,
bar graph: about 20ms

●Location for use	Indoor use, Altitude up to 2000m
●Accuracy-insured Temperature and Humidity Ranges	23℃±5℃, relative humidity 75% or less (without condensation)
●Operating Temperature and Humidity Range	0-40℃, relative humidity 85% or less (without condensation)
●Storage Temperature and Humidity Range	-20-60℃, relative humidity 85% or less (without condensation)
●Source	Two 1.5VDC R03 (UM-4) batteries
●Current Consumption	Approx. 10mA
●Power-save Function	Shifts to the power-save state about 10 minutes after the last switch operation (current consumption: approx. 10μA)
●Overload Protection	AC/DC current ranges: MODEL2000 AC/DC 72A for 10 seconds AC/DC current ranges: MODEL2001 AC/DC 120A for 10 seconds AC/DC voltage ranges: AC/DC 720V for 10 seconds Resistance ranges: AC/DC 720V for 10 seconds Frequency ranges: AC/DC 720V for 10 seconds
●Withstand Voltage	AC3470V for 5 sec. between electrical circuit and housing case
●Insulation Resistance	10MΩ or greater at 1000V between electrical circuit and housing case
●Conductor Size	MODEL2000 Approx. 6mm diameter max. MODEL2001 Approx. 10mm diameter max.
●Dimensions MODEL2000	128(L)×87(W)×24(D)mm MODEL2001 128(L)×92(W)×27(D)mm
●Weight	MODEL2000 Approx. 210g MODEL2001 Approx. 220g
●Accessories	Two R03 (UM-4) batteries Instruction Manual

4. INSTRUMENT LAYOUT







5. PREPARATIONS FOR MEASUREMENT

(1) Checking battery voltage

Set the Function Selector Switch to any position other than the OFF position.
If the marks on the display is clearly legible without symbol **"BATT"** showing, battery voltage is OK. If the display blanks or **"BATT"** is indicated, replace the batteries according to section **8: Battery Replacement**.

NOTE

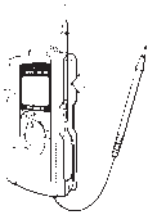
When the instrument is left powered on, the auto-power-save function automatically shut the power off; The display blanks even if the Function Selector Switch is set to a position other than the OFF position in this state. To power on the instrument, turn the Function Selector Switch or press the Data Hold Button. If the display still blanks, the batteries are exhausted. Replace the batteries.

(2) Make sure that the Function Selector Switch is set to the appropriate range.

Also make sure that data hold function is not enabled. If inappropriate range is selected, desired measurement cannot be made.

(3) Install Test Lead to the Holster on the side of body

It is possible to measure with seeing the LCD Display keep Test Lead installing to the Holster.



6. HOW TO MAKE MEASUREMENT

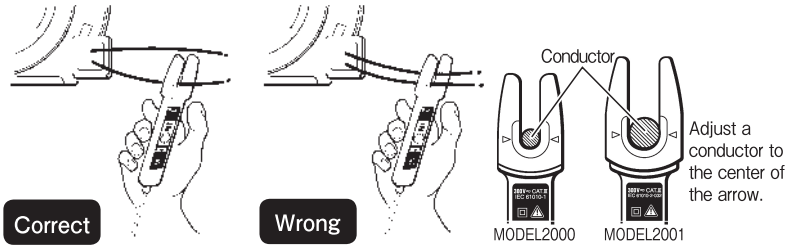
6-1 Current Measurement

⚠ DANGER

- In order to avoid possible shock hazard, never make measurement on circuits with a maximum voltage difference of 600VAC/DC or greater between conductors (300VAC/DC or greater between a conductor and ground).
- Do not make measurement with the test leads connected to the circuit under test. Never make measurement with the battery compartment cover removed.
- Keep your fingers and hands behind the barrier during measurement.

⚠ CAUTION

- When handling the clamp sensor, exercise caution not to apply excessive shocks or vibration to the sensor.
- Maximum measurable conductor size is MODEL2000 6mm / MODEL2001 10mm in diameter.



6-1-1 DC Current Measurement

(1)The Function Selector Swith to the "⎓A" position.
("DC" and "AUTO" marks are shown on the top of the display.)

(2)Turn the 0(Zero) ADJ knob to set the reading of the multimeter to zero. (If this zero adjustment is made incorrectly, measurement errors will result.)

(3)Adjust one of the conductors to the center of the clamp sensor's arrow.
(When the position of the conductor is not at the center of the arrow, the error occurs.)
Measured value is shown on the display.

Note: When current flows from the upside to the underside of the instrument, the polarity of the reading is positive (+). Otherwise, the polarity of the reading is negative (-).

6-1-2 AC Current Measurement

(1)Set the Function Selector Switch to "〜A."
("AC" and "AUTO" marks are shown on the top of the LCD.)

(2)Adjust one of the conductors to the center of the clamp sensor's arrow.
(When the position of the conductor is not at the center of the arrow, the error occurs.)
Measured value is shown on the display.

Note: Unlike DC current measurement, zero adjustment is not necessary. There is not polarity indication either.

6-2 Voltage Measurement

⚠ DANGER

- In order to avoid possible shock hazard, never make measurement on circuits with a maximum voltage difference of 600VAC/DC or greater between conductors (300VAC/DC or greater between a conductor and ground).
- Do not make measurement with the battery compartment cover removed.
- Keep your fingers and hands behind the barrier during measurement.

6-2-1 DC Voltage Measurement

(1)Set the Function Selector Switch to "⎓V."
("DC" and "AUTO" marks are shown on the top of the LCD.)

(2)Connect the red test lead to the positive (+) side of the circuit under test and the black test lead to the negative (-) side. Measured voltage value is shown on the display.
When the connection is reversed, "-" is shown on the display.

6-2-2 AC Voltage Measurement

(1)Set the Function Selector Switch to "〜V."
("AC" and "AUTO" marks are shown on the LCD.)

(2)Connect the test leads to the circuit under test.
Measured voltage value is shown on the display.

6-3 Resistance Measurement

⚠ DANGER

- Never make measurement on circuits that are live.
- Never make measurement with the battery compartment cover removed.
- Keep your fingers and hands behind the barrier during measurement.

(1)Set the Function Selector Switch to "Ω／·)) ."
(2)Check that the display shows over-range. Short the test leads and check that the buzzer beeps and the display reads zero.
(3)Connect the test leads to the circuit under test. Measured resistance value is shown on the display. When the measured value is below about 30Ω, the buzzer beeps.

Note: When the test leads are shorted, the display may read a small resistance value. This is the resistance of the test leads.
If there is an open in either of the test leads, "OL" is shown on the display.
On the 340Ω range, " ·)) " is shown on the left side of the LCD.

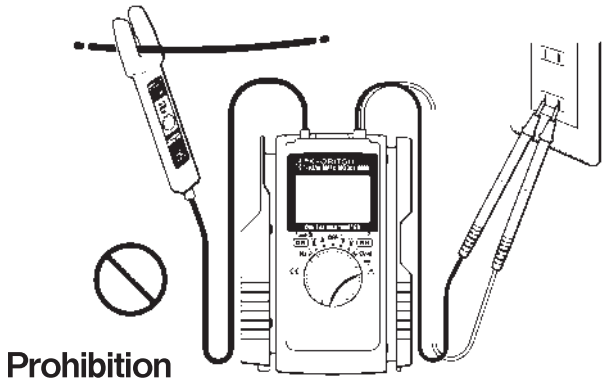
6-4 Frequency Measurement

⚠ DANGER

- In order to avoid possible shock hazard, never make measurement on circuits with a maximum voltage difference of 600VAC/DC or greater between conductors (300VAC/DC or greater between a conductor and ground).
- Do not make measurement with the test leads connected to the circuit under test. Never make measurement with the battery compartment cover removed.
- Do not make current measurement with the test leads connected to the circuit under test.
- Keep your fingers and hands behind the barrier during measurement.

(1)Set the Function Selector Switch to "Hz."
(2)Measuring frequency of current:
Adjust one of the conductors to the center of the clamp sensor's arrow. Measured value is shown on the display.
Measuring frequency of voltage:
Connect the test leads to the circuit under test. Measured frequency is shown on the display.

Note: Measuring range of current frequency is 0-10kHz with minimum measurable input of MODEL2000 15A(Typ) /MODEL2001 25A(Typ).
Measuring range of voltage frequency is 0-300kHz with minimum measurable input of 30V(Typ).
When measuring frequency, do not attach the clamp sensor and the test leads to the circuit under test simultaneously.



7. OTHER FUNCTIONS

7-1 Auto-Power-Save Function

NOTE

A small amount of current is consumed even in the power-save state. Make sure to set the Function Selector Switch to the OFF position when the instrument is not used.

This function helps to avoid unwanted exhaustion of the batteries because of leaving the instrument powered on and extend battery life. The instrument automatically shifts to the power-save state about 10 minutes after the last Function Selector Switch or other switch operation.
To return to the normal state: Turn the Function Selector Switch or press the Data Hold Button twice to exit the power-save state and enable measurement functions.

7-2 Data Hold Function

This is a function to freeze a measured value on the display. Press the Data Hold Button once to hold the current reading. In this data hold state, the reading is held even if input varies. "H" and " ◙ " marks are shown on the LCD instead of "AUTO" mark.
To exit the data hold state, press the Data Hold Button again.

7-3 Range Hold Function

The instrument defaults to auto-ranging ("AUTO" is shown on the LCD). Pressing the Range Hold Button enables manual selection among measurement ranges (" ◙ " mark is shown on the LCD instead of "AUTO" mark)
Press the Range Hold Button to select a higher range.
To switch from manual range selection to auto-ranging, press down the Range Hold Button for about one seconds, or turn the Function Selector Switch to another position before setting it back to the current range.

8. BATTERY REPLACEMENT

⚠ WARNING

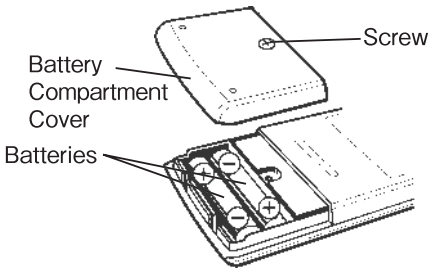
- In order to avoid possible shock hazard, always disconnect the test leads from the circuit under test and set the Function Selector Switch to the OFF position before trying to replace the batteries.

⚠ CAUTION

- Do not mix new and old batteries.
- Install batteries in the orientation as shown inside the battery compartment, observing correct polarity.

When the battery voltage warning mark "BATT" is shown on the top left corner of the LCD, replace the batteries. Note that the display blanks and "BATT" mark is not shown if the batteries are completely exhausted.

(1)Set the Function Selector Switch to "OFF."
(2)Remove the instrument from the holster.
(3)Loosen the battery-compartment-cover-fixing screw on the lower back of the instrument.
(4)Replace the batteries with two new R03 (UM-4) 1.5V batteries.
(5)Put the battery compartment cover back in place and tighten the screw.



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