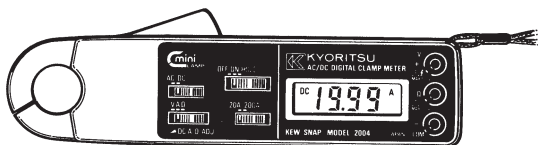


INSTRUCTION MANUAL



MINIATURE AC/DC DIGITAL CLAMP METER

KEW SNAP SERIES
MODEL 2004



**KYORITSU ELECTRICAL
INSTRUMENTS WORKS, LTD.**

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1. Features

- Smallest of AC/DC digital clamp meter with current measurement capability up to 200 A AC and DC.
- 10 mA resolution on 20 A AC and DC ranges.
- Ideal for working in crowded switch boxes and cable areas where access is difficult for other large-sized clamp meters.
- Compact, lightweight and easy to use.
- Covers a broad range of application needs from diagnosing and maintenance of electrical equipment to servicing automotive electrical systems, testing at laboratories and checking DC circuits without interruption of operation.
- A wide frequency response of 40 Hz to 1 kHz for both current and voltage measurement.
- Safety design test leads have shielded banana plugs that fit into recessed input terminals.
- Data hold facility to allow for easy reading in dimly lit or hard to reach places. In such difficult situations the display can be observed away from the conductor.

2. Specifications

Ranges:	AC Current 20 A/200 A (0–19.99 A/0–199.9 A)
	AC Voltage 500 V (0–500 V)
	DC Current 20 A/200 A (0–19.99 A/0–199.9 A)
	DC Voltage 200 V (0–199.9 V)
	Resistance 200 Ω (0–199.9 Ω)
	(Open circuit voltage: Approx. 3 V Short circuit current: Approx. 0.9 mA)
Accuracy:	AC Current 0–19.99 A $\pm 1.0\%$ rdg ± 2 dgt at 50/60 Hz
	0–150.0 A $\pm 1.5\%$ rdg ± 4 dgt at 40 Hz–1 kHz
	150.1–199.9 A $\pm 1.5\%$ rdg ± 2 dgt at 50/60 Hz
	150.1–199.9 A $\pm 2.0\%$ rdg ± 4 dgt at 40 Hz–1 kHz
	150.1–199.9 A $\pm 3.5\%$ rdg at 50/60 Hz and 40 Hz–1 kHz
	AC Voltage 0–500 V $\pm 1.5\%$ rdg ± 2 dgt at 50/60 Hz
DC Current 0–19.99 A $\pm 2.0\%$ rdg ± 4 dgt at 40 Hz–1 kHz	
0–150.0 A $\pm 1.0\%$ rdg ± 2 dgt	
150.1–199.9 A $\pm 1.5\%$ rdg ± 2 dgt	
150.1–199.9 A $\pm 3.0\%$ rdg	

DC Voltage 0—199.9 V $\pm 1.0\%$ rdg ± 2 dgt
Resistance 0—199.9 Ω $\pm 1.5\%$ rdg ± 2 dgt
(Above accuracies are specified for +18°C to +28°C at 80% max. relative humidity)

Frequency

Response: 40 Hz—1 kHz

Withstand

Voltage: 2000 V AC max. between electrical circuit and housing case or metal section of transformer jaws

Conductor

Size: Approx. 19 mm max.

Dimensions: 180 (L) \times 54 (W) \times 32 (D) mm

Weight: Approx. 170 g (battery included)

Power Source: 2 \times 1.5 V SUM-3 battery or equivalent

Accessories: (included) Test Leads Model 7066, 2 \times 1.5 V SUM battery or equivalent, carrying case, instruction manual
(optional) KEW Energizer Model 8021, KEW Multi-trans Model 8004 & 8008

Operating

Principle: Dual Integration system

Display: 3-1/2 digit liquid crystal display with maximum reading of 1999

Range

Selection: Manual

Low Battery

Indication: “B” sign shows

Overrange

Indication: Numeral “1” appears on highest digit (except 500 V AC range)

Response

Time: Approx. 1 second

Sample Rate: Approx. 3 times per second

Data Hold: For all ranges

Operating

Temperature

& Humidity: $-10^{\circ}\text{C} - +50^{\circ}\text{C}$ at 85% max. relative humidity

Storage

Temperature

& Humidity: $-20^{\circ}\text{C} - +60^{\circ}\text{C}$ at 75% max. relative humidity

Current

Consumption: Approx. 15 mA

Battery Life: Approx. 60 hours on continuous use (for manganese battery)

Electronic

Overload

Protection: 500 A AC/DC max. on current ranges
1000 V DC max. on voltage ranges
300 V AC/DC max. on resistance range


Insulation

Resistance: 1000 V/10 M Ω max. between electrical circuit and housing case or metal section of transformer jaws

3. Safety Notes

This instruction manual contains warnings and safety rules that must be observed by the user to ensure safe operation of the instrument and retain it in safe condition.

Please read these operating instructions thoroughly and completely before using the instrument.

The symbol  on the instrument means that the user must refer to the relevant section of this instruction manual for safe operation of the instrument.

Pay particular attention to all  **WARNINGS** and  **CAUTIONS** in this instruction manual.  **WARNING** indicates warnings to avoid an electrical shock and  **CAUTION** indicates cautions to avoid damage to the instrument and make accurate measurements.

WARNINGS

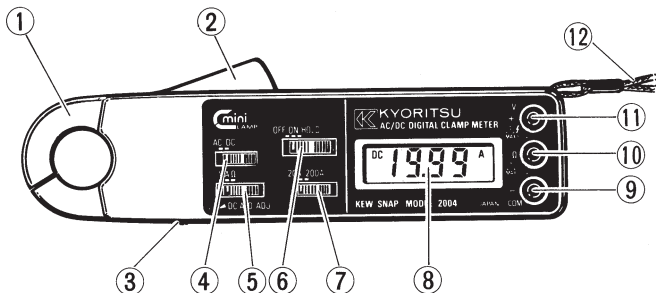
1. **Never open the instrument when making measurements.**
2. **If the instrument shows the following conditions, do not try to make measurements and have the instrument checked for inspection or repair.**
 - Instrument shows visual damage.**
 - Test leads are damaged.**
 - Instrument can not be operated for intended measurements.**
 - Instrument has been stored for long period of time under abnormal conditions.**
 - Instrument has been subjected to severe shocks and vibrations.**
3. **The transformer jaws are made of metal and their tips are not insulated. Be especially careful about the hazard of possible shorting where the equipment under test has exposed metal parts.**
4. **Do not use Model 2004 on a circuit with a voltage of higher than 600V AC as the instrument is not designed for measurement above this voltage.**
5. **Do not make measurements in an explosive atmosphere (i.e. in the presence of flammable gasses or fumes, vapour or dust)**

6. Never ground yourself when conducting electrical tests. Do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material.

CAUTIONS

1. When not in use for a long period of time, place the instrument in storage after removing the batteries.
2. Never make measurements if the instrument, the test leads or your hand is wet.
3. Do not exceed maximum limit for each input.
4. Do not apply voltage across COM and OHM terminals.
5. Do not measure current with test leads inserted into voltage or common terminal.
6. Do not expose the instrument to the direct sun, extremes of temperature and humidity or dew fall.
7. Calibration and repair of any instrument should only be performed by qualified and trained service technicians.
8. Do not install substitute parts or perform any unauthorized modification of the instrument. Return the unit to Kyoritsu Electrical Instruments Works, Ltd., for repair.
9. Use a damp cloth and detergent for cleaning the case of the instrument. Do not use abrasives or solvents.
10. Always set the Range Selector Switch to the OFF position after use.
11. The instrument must be used by a competent, trained person and operated in strict accordance with the instructions. Kyoritsu Electrical Instruments Works, Ltd., will not accept liability for any damage or injury caused by misuse or noncompliance with the instructions or safety procedures. It is essential to read and understand the safety rules contained in the instructions. They must be observed at all times when using the instrument.
12. Users of this equipment and or their employers are reminded that Health and Safety Legislation require them to carry out valid risk assessments of all electrical works so as to identify potential sources of electrical danger and risk of electrical injury such as from inadvertent short circuits. Where the assessments show that the risk is significant then the use of fused test leads constructed in accordance with the HSE guidance note GS38 Electrical Test Equipment for use by Electricians should be used.

4. Instrument Layout



- ① Transformer Jaws**
Picks up current flowing through the conductor.
- ② Jaw Trigger**
Operates the transformer jaws. Press to open the jaws.
- ③ DC A Zero Adj. Knob**
Zero adjusts on DC current ranges.
- ④ AC/DC Slide Switch**
Selects AC or DC for voltage and current measurements.
- ⑤ Function Switch**
Selects voltage, current and resistance.
- ⑥ Power/Data Hold Switch**
Turns power on or off. Also, freezes reading. This allows easy reading in dimly lit or hard to reach places.

- ⑦ **Current Range Selector Switch**
Selects a current range.
- ⑧ **LCD Display**
3-1/2 digit, liquid crystal display with maximum indication of 1999. Function symbols, units and decimal point automatically appear on the display as each of the function and range switches is selected. "B" also appears automatically for low battery warning. "1" is displayed for overrange warning (except for AC voltage ranges).
- ⑨ **COM Terminal**
Accepts black test lead for voltage and resistance measurements. This is also a negative (–) input terminal when DC voltage is measured.
- ⑩ **OHM Terminal**
Accepts red test lead for resistance measurement. Positive (+) voltage output is obtained from this terminal.
- ⑪ **VOLT Terminal**
Accepts the red test lead for voltage measurements. This serves as a positive (+) input terminal when DC voltage is measured.
- ⑫ **Hand Strap**
Prevents the instrument from slipping off the hand during use.

5. Measuring Method

BEFORE USING THE INSTRUMENT, READ THE SAFETY NOTES THOROUGHLY.

5-1. Preparation

- (1) Remove the battery compartment cover and install the batteries. Refer to section 6 for battery replacement.

<p>Note: Replace with new batteries when battery voltage becomes insufficient and symbol “B” appears on the lower left hand of the LCD display.</p>

- (2) Since the power switch is also used to hold a reading it will be locked when the switch is set to HOLD position. In normal measurements make certain that the power switch is in ON position before using the instrument.

5-2. Current Measurements

- Notes:**
- Remove the voltage test leads when inserted into input terminals.
 - The maximum diameter of the conductor to be measured is 19 mm. Do not clamp onto a conductor larger than this. Accurate measurements cannot be made when the instrument is clamped onto a larger conductor and the transformer jaws are not fully closed.
 - To obtain maximum accuracy the transformer jaws are precisely adjusted. Exercise extreme care to avoid shock, vibration or excessive force when using this instrument.

5-2-1. DC Current Measurements (20 A/200 A DC ranges)

- (1) Set all selector switches as indicated in Fig. 1.
- (2) Before taking a DC current measurement, zero adjust the display by turning DC A Zero Adj. knob (3). Make this zero adjustment before every measurement to ensure an accurate reading. Changing a range could cause the instrument to be off zero. Therefore, it is also necessary to zero adjust after changing the range.
- (3) Press the jaw trigger to open the transformer jaws and clamp onto one conductor only. Take the reading as indicated on the display.
- (4) When DC current flows from the upside to the underside of the instrument as shown in Fig. 2, the polarity of the reading is positive (+).

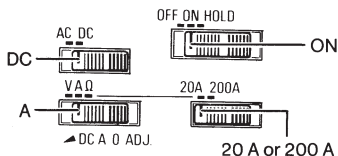


Fig. 1

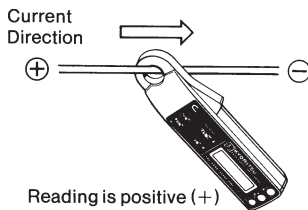


Fig. 2

5-2-2 AC Current Measurements (20 A/200 A)

- (1) Set the selector switches as shown in Fig. 3
- (2) Press the jaw trigger to open the transformer jaws and clamp onto one conductor only. Take the reading as indicated on the display.

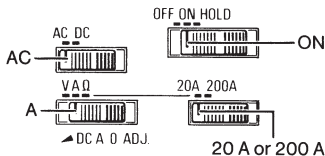


Fig. 3

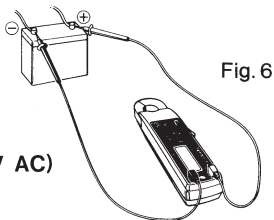
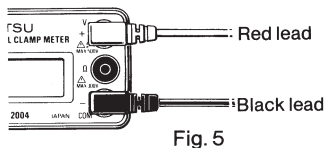
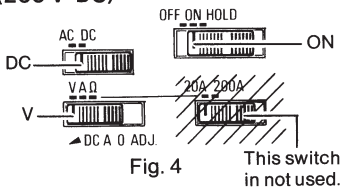
Note: Since the instrument employs the mean value rectifying, r.m.s. reading method a measurement error may possibly be introduced where a measurement is taken of a non-sinusoidal waveform current.

5-3 Voltage Measurements

- Notes:**
- Be careful not to apply excessive inputs. Maximum allowable input voltages are: 200 V DC and 500 V AC.
 - To avoid shock hazard never open the battery compartment cover during voltage measurement.

5-3-1 DC Voltage Measurements (200 V DC)

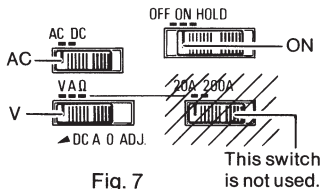
- (1) Set the selector switches as shown in Fig. 4.
- (2) Insert the red test lead into the VOLT terminal (11) of the instrument and the black test lead into the COM terminal (9) as shown in Fig. 5.
- (3) Touch the test lead prods to the circuit under test. The DC voltage measured will be indicated on the display. When a negative (—) reading is obtained a negative Voltage is present in the circuit where the red test lead is contacted as shown in Fig. 6.



5-3-2 AC Voltage Measurements (500 V AC)

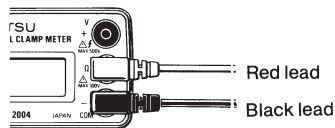
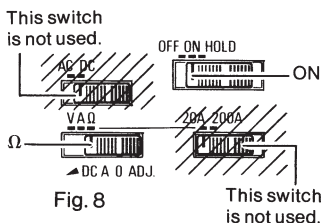
- (1) Set the selector switches as shown in Fig. 7.

- (2) As is with the DC voltage measurements, insert the test leads into the input terminals of the instrument.
- (3) Touch the test lead prods to the circuit under test. The AC voltage measured will be indicated on the display.



5-4 Resistance Measurements (200 Ω range)

- (1) Set the selector switches as shown in Fig. 8.
- (2) Insert the red test lead into the OHM terminal (10) and black test lead into the COM (9) terminal as shown in Fig. 9.
- (3) First, make certain that the display shows overranging with no input connected. With the test leads shorted, make certain that the display reads zero (00.0 ohm). A count of 00.2 ohm or thereabout may sometimes be displayed. This is due to the resistance of the test leads and does not indicate a faulty condition of the instrument.
- (4) Touch the test lead prods to the circuit under test. The resistance measured will be indicated on the display. When the resistance is above 200 ohm an overrange indication will occur.



Note: Do not measure resistance on a live circuit. Terminal voltage is approximately 3 V when the input terminals are open. A positive (+) output voltage is available from OHM terminal. Short circuit current is approximately 0.9 mA.

5-5 Data Hold

When the power/data hold switch is slid from ON to HOLD position, the reading will be held as shown in Fig. 10. This is especially useful for taking a reading in dimly lit or hard-to-reach places. When the switch is slid back to ON position the data hold will be released.

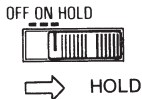


Fig. 10

6. Battery Replacement

If the low battery symbol “ B ” appears replace the battery.

Caution

Do not replace the battery while measuring.

- (1) Remove the test lead from the instrument and set the function/range switch to the off position.
- (2) Loosen the screws of the battery compartment cover at the back of housing. And then slide and remove the battery compartment cover.

Note: Do not loosen the screws completely to the end in order to avoid losing them.

- (3) Replace the battery.
- (4) Push the battery compartment cover into place and fasten the screws firmly.

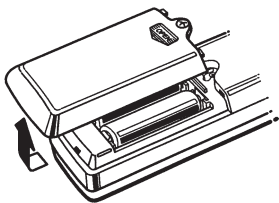


Fig. 11

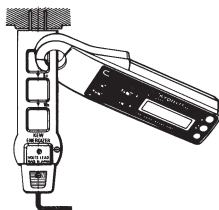
7. Optional Accessories

7-1. Model 8021

Model 8021 ENERGIZER permits Model 2004 to make AC current and voltage measurements of household electrical appliances which are normally furnished with “twin” conductor line cords and plugs for household power outlets.

- (1) As shown below, model 2004 clamped onto “1 ×” position of the ENERGIZER is to measure current flowing through a twin conductor line cord (up to 10 A AC) (Fig. 12)
- (2) To measure a low current more accurately, clamp onto “5 ×” or “10 ×” position. Divide the reading by 5 or 10 to obtain a true current value.

Connection to AC Power Outlet



Connection to Appliance under Test

Fig. 12

- (3) When measuring AC voltage, connect the ENERGIZER to AC power outlet or appliance under test the same way as outlined for AC current measurement. With the test leads plugged into the VOLT and OHM terminals of the instrument, connect one test lead prod to the “VOLTLEAD” terminal on one side of the energizer and the other prod to the “VOLTLEAD” terminal on the other side (Fig. 13). This will permit easy voltage measurement up to 300 V AC without the trouble of cutting off the cord.

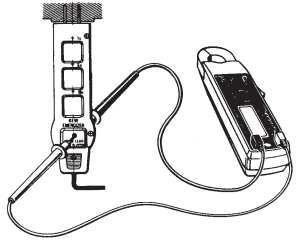


Fig. 13

7-2. Model 8008

Model 8008 MULTI-TRAN is designed to measure AC current up to 2000 A or large bus-bars (up to 150×100 mm) and conductors (up to 100 mm diameter).

- (1) As shown below, open the transformer jaws of Model 2004 and close them over the pickup coil of Model 8008 MULTI-TRAN to measure up to 2000 A AC. Since the input to output ratio is 10 to 1, take the reading on Model 2004 and multiply by 10 (Fig. 14).

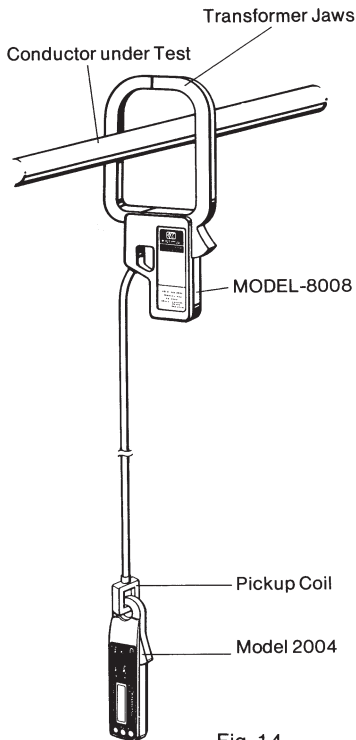
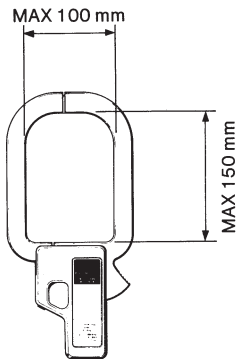


Fig. 14

Model 8004 MULTI-TRAN is also available for AC current measurements up to 1000 A on a conductor of max. 55 mm diameter.

Note: Model 8004 and 8008 are not designed for DC current measurements.

Kyoritsu reserves the right to change specifications or designs described in this manual without notice and without obligations.

DISTRIBUTOR



**KYORITSU ELECTRICAL
INSTRUMENTS
WORKS, LTD.**

No.5-20,Nakane 2-chome, Meguro-ku,
Tokyo, 152-0031 Japan

Phone: +81-3-3723-0131

Fax: +81-3-3723-0152

Factory: Ehime

www.kew-ltd.co.jp