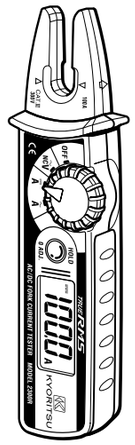
Instruction Manual



TRUE RMS

AC/DC FORK CURRENT TESTER

KEW FORK

MODEL 2300R

KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.,

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03–03 92–1556A

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 to use 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.
- Be sure to understand and follow all safety instructions contained in the manual.

Be sure to observe 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 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.

⚠ DANGER

- Never make measurement on the circuit above AC/DC300V.
- 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.
- Never attempt to use the instrument if its surface or your hand is wet.
- Do not exceed the maximum allowable input of any measurement range.
- Do not open the battery cover and the instrument case when making measurement.

⚠ WARNING

- Never attempt to make any measurement, if the instrument has any structural abnormality noted, such as cracked case or exposed metal parts.
- 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 switch off the instrument before opening the battery compartment cover for battery replacement.

⚠ CAUTION

- Always make sure to check the function selector switch is set to the appropriate range before starting measurement.
- Do not expose the instrument to the direct sun, high temperature and humidity or dewfall.
- Be sure to set the function selector switch to the "OFF" position after use. When the instrument will not be in use for a long period, place it in storage after removing the batteries.
- Use a cloth dipped in water or neutral detergent for cleaning the instrument. Do not use abrasives or solvents.

2. Features

- This instrument, Fork current tester, can measure AC/DC current up to 100A without opening and closing the Jaws.
- True RMS reading for AC current
- Fork shaped sensor for easy measurement at tight places and crowded cable areas.
- NCV function (Non Contact Voltage) enables live wire check
- Auto power off function
- Data hold function
- Pocket size handy tester, adopted over-molding for a better fit
- Carrying case furnished as a standard accessory.
- Designed to international safety standards.
  IEC 61010-2-032 overvoltage CAT.III 300V Pollution degree 2

3. Specification

AC current ～A

Range	Measuring range	Accuracy	CF(Crest factor)
ACA	0 ～100A	±2.0%rdg± 5 dgt （50／60Hz）	CF≦ 2
		±3.0%rdg± 5 dgt （50／60Hz）	2 ＜CF≦2.5

DC current ⎓ A

Range	Measuring range	Accuracy
DCA	0～±100A	±2.0%rdg± 5 dgt

AC voltage ～V

Range	Measuring range	Action
NCV	AC300V or less	Normal condition : Lo At voltage detecting(single wire AC80V or more) : Hi

Note) NCV range is calibrated to detect the voltage, where non-grounded single wire, AC80V or more. However, detecting sensitivity may be affected by the absence of grounded or non-grounded metal tube or metal case. Also it may be affected in the place where influenced by other voltages, how you grip the instrument or the measuring position of sensor.

- **CF(Crest Factor)** CF=2.5 or less
- **Standards** IEC61010-1
  Overvoltage CATIII 300V, pollution degree 2
  IEC61010-2-032
  IEC61326 (EMC standard)
- **Indication** LCD Max. 1049 units, symbols
- **Over range display** "OL" symbol is displayed on the LCD.
  (Only on current range)
- **Response time** Approx. 2sec.
- **Sampling rate** Approx. twice per second
- **Temperature & Humidity range (guaranteed accuracy)** 23℃±5℃
  Relative humidity: 75% or less (no condensation)
- **Operating Temperature & Humidity range** 0 ～ 40℃
  Relative humidity: 85% or less (no condensation)
- **Storage Temperature & Humidity range** -20 ～ 60℃
  Relative humidity: 85% or less (no condensation)
- **Power source** DC3V : R03(UM-4)x2pcs
- **Current consumption** Approx.12mA or less
  To decrease current consumption, detecting circuit is on only for 0.1/0.5sec.
- **Power off function** Power off function operates automatically after a switch remains for 10min.
- **Overload Protection** AC/DC current : AC/DC 120A/ 10sec.
  AC voltage (NCV) : AC360V/ 10sec.
- **Withstand Voltage** AC3700V/ for one min.
  (Between electrical circuit and enclosures.)
- **Insulation Resistance** 10MΩ/1000V
  (Between electrical circuit and enclosures.)
- **Max. diameter of measured object** Max. 10mm
- **Dimensions** 161.3(L) x 40.2(W) x 30.3(D) mm
- **Weight** 110g(including batteries)
- **Accessories** Battery R03 ---------- 2
  Instruction manual ---------- 1
  Carrying case ---------- 1

5. Preparation

(1) Check battery voltage
Set the Function selector switch to the position other than OFF position.
Battery Voltage is enough if indications are displayed clearly and "BATT" mark is not displayed on the LCD. If "BATT" mark is indicated or no indication on the LCD, replace batteries with new one according to battery replacement procedures shown in clause 8 in this document.

⚠ CAUTION

- Indications may not being displayed on the LCD despite the function selector switch is at the position other than OFF position.
  This is because power-off function operated automatically and the instrument turned off. Power off function can be released by turning the function selector switch to OFF, and then set it to the range on which you would like to make a measurement.
  If LCD still blank, batteries are completely exhausted. Please replace batteries.

(2) Check the function selector switch is set to the appropriate range. And also check data hold function is not enabled. If inappropriate range is selected, desired measurement cannot be made.

6. Measurements

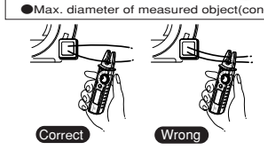
6-1 Current Measurement

⚠ DANGER

- To avoid getting an electrical shock, never make measurement on the circuit in which electrical potential over AC/DC300V exists.
- Do not make measurement with battery cover removed.

⚠ CAUTION

- Max. diameter of measured object(conductor) is Φ10mm.



Place the center of the measured conductor lower than the triangle mark indicated on the fork shaped sensor. (shaded part in the figure)

6-1-1 DC current measurement
(1) Set the function selector switch to " ⎓ A" position.
(" ⎓ " and "A" marks will be displayed on the LCD.)
(2) Press HOLD/0ADJ button for 2sec or more to enable 0ADJ function and adjust the indication on the LCD to be 0.
(Indication shall be adjusted to 0. Otherwise, error occurs.)
(3) Place one measured conductor lower than the triangle mark indicated on the fork shaped sensor and make a measurement. (shaded part in the figure)
Then measured value is displayed on the LCD.
(When the center of the conductor is not lower than the triangle mark indicated on the fork shaped sensor, error occurs.)
Note) When current is flowing from the upside to the underside of the instrument, reading is positive(+), on the contrary, reading to be negative(-) when current is flowing from the underside to the upside of the instrument.

6-1-2 AC current measurement
(1) Set the function selector switch to "～A" position.
("～" and "A" marks will be displayed on the LCD.)
(2) Place one measured conductor lower than the triangle mark indicated on the fork shaped sensor and make a measurement. (shaded part in the figure)
Then measured value is displayed on the LCD.
(When the center of the conductor is not lower than the triangle mark indicated on the fork shaped sensor, error occurs.)

Note) For the measurement of AC current, zero adjustment, which is required for the measurement of DC current, is not necessary. Current flowing direction has no relation to the indication polarity.

6-2 Non contact voltage detection(NCV)
This function is to check the presence of voltage without touching wires or electrodes directly.
Also can check the presence of AC voltage in cable, outlet, fuse and circuit breaker.

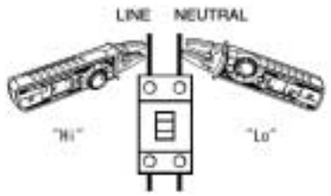
[Details]
While voltage is applied to a cable or outlet, the electric field depending on the voltage is generated. This instrument detects the generated electric field, and verifies the presence of AC voltage. Officially, it is called as an instrument for detecting electrical field. But it is not a familiar term, so we call it as "Non contact voltage detection". General detectors detect voltage by contacting polarized voltage(contacts and terminals). But this instrument is developed to satisfy this function and for safety purpose without contacting voltage.

⚠ DANGER

- To avoid getting an electrical shock, never make measurement on the circuit in which electrical potential over AC/DC300V exists.
- Before a measurement, be sure to check the instrument operation with well-known power supply. If "Err" is displayed on the LCD, do not make a measurement.
- Do not make measurement with battery cover removed.
- Indication on NCV range is a reference value. Make sure to check the voltage with a precise equipment in advance when operator will directly touch or connect wires.
- Indication of voltage may be affected by non-grounded metal tube or metal case, the place where affected by other voltages, handgrip or the measuring position of sensor.

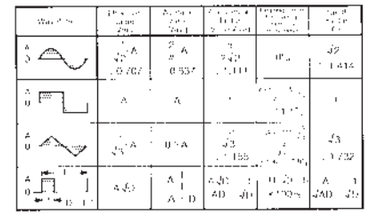
6-2-1 Measurements
(1) Set the function selector switch to "NCV" position.
(2) The sensing mode (100V or 200V) in effect is displayed on the LCD for 1min, and NCV measurement starts.
(3) Position the tip part of fork typed sensor against the measured object.
When voltage is detected, "Hi" will be displayed on the LCD.
(Error could occur depending on the direction, angle and contact surface of the instrument against the measured object. On NCV range, data hold function cannot be used.)

Note) When set the function selector switch to NCV range, self-check function operates and Indicates "Err", if there is some fault or abnormal condition. Do not make a measurement if such indication displayed on the LCD.



6-2-2 Sensing mode
- There are two types of sensing mode: 100V mode and 200V mode.
- Above two modes can be changed over by pressing the data hold button 2sec or more.
  (The selected sensing mode is stored even if switching off the instrument. When setting the function switch to "NCV" again, measurement can be done on the same mode.)
- Factory setting : 200V mode

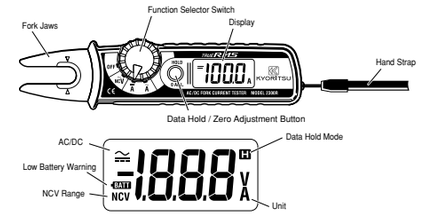
Reference



***Effective Value (RMS)**
Most alternating currents and voltages are expressed in effective values, which are also referred to as RMS (Root-Mean-Square) values. The effective value is the square root of the average of square of alternating current or voltage values. Many clamp meters using a conventional rectifying circuit have "RMS" scales for AC measurement. The scales are, however, actually calibrated in terms of the effective value of a sine wave though the clamp meter is responding to the average value. The calibration is done with a conversion factor of 1.111 for sine wave, which is found by dividing the effective value by the average value. These instruments are therefore in error if the input voltage or current has some other shape than sine wave.

*CF (Crest Factor) is found by dividing the peak value by the effective value.
Examples:
Sine wave: CF=1.414
Square wave with a 1: 4 duty ratio: CF=2

4. INSTRUMENT LAYOUT



(1) 100V mode
Sensitivity on this mode is set sharp, therefore, the presence of AC voltage can be checked only by placing the instrument closer to the measured object, such as an outlet, a plug and parallel cords, as shown in figure.

(2) 200V mode
Sensitivity on this mode is set dull, so the earth side and non-earth side of 100V cable way can de verified. (Where cables are crowded, such as in a distribution board, earth side could not be verified.)
Also can check the presence of AC voltage in 200V cable way, plug, outlet, fuse and circuit breaker.

7. Other functions

7-1 Auto power off function
This function causes the instrument to automatically enter the power-off mode about 10min after the last function selector switch operation.
To release the power-off function, turn off the instrument and then turn on again.

7-2 Data hold function (Only on ACA/DCA range)
This is a function to hold the measured value on the LCD. "H" mark is shown on the LCD while the instrument is in the data hold mode. To exit the data hold mode, press the data hold button again.

Note) The measured value being held will be released when auto power-off function operates while data hold function is operating.

8. Battery replacement

⚠ WARNING

- To avoid getting electrical shock, be sure to set the function selector switch to "OFF" position before trying to replace the batteries.

⚠ CAUTION

- Do not mix new and old batteries.
- Make sure to install battery in correct polarity as indicated inside the battery cover.

When "BATT" mark is shown on the upper left corner of the LCD, replace the batteries.
Note that the battery is completely exhausted, the LCD blanks without "BATT" mark shown.
(1) Se the function selector switch to "OFF" position.
(2) Unscrew the battery cover fixing screws and remove the battery cover on the bottom of the instrument. Then replace new batteries. (R03 x 2pcs)