Instruction Manual



DC Milliamp Clamp Meter

KEW 2500

KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.

DISTRIBUTOR

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

1. Safety warnings

○ This instrument has been designed, manufactured and tested according to IEC 61010: Safety requirements for Electronic measuring apparatus, and delivered in the best condition after passing quality control tests. This instruction manual contains warnings and safety rules which have to be observed by the user to ensure safe operation of the instrument and to maintain it in safe condition. Therefore, read through these operating instructions before using the instrument.

⚠ WARNING

- Read through and understand the instructions contained in this manual before using the instrument.
- Keep the manual at hand to enable quick reference whenever necessary.
- The instrument is to be used only in its intended applications.
- Understand and follow all the safety instructions contained in the manual.

It is essential that the above instructions are adhered to. Failure to follow the above instructions may cause injury, instrument damage and/or damage to equipment under test. Kyoritsu is by no means liable for any damage resulting from the instrument in contradiction to these cautionary notes.

○ The symbol ⚠ indicated on the instrument, means that the user must refer to the related parts in the manual for safe operation of the instrument. It is essential to read the instructions wherever the symbol appears in the manual.

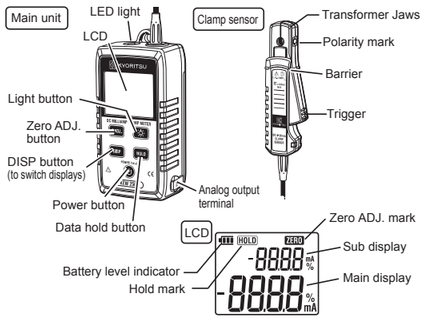
⚠ **DANGER**	: is reserved for conditions and actions that are likely to cause serious or fatal injury.
⚠ **WARNING**	: is reserved for conditions and actions that can cause serious or fatal injury.
⚠ **CAUTION**	: is reserved for conditions and actions that can cause injury or instrument damage.

Please refer to following explanation of the symbols used on the instrument and in this manual.

⚠	User must refer to the explanations in the instruction manual.
⧈	Instrument with double or reinforced insulation
⊘	Application around hazardous live conductors is NOT permitted.
	Crossed-out wheel bin symbol (according to WEEE Directive: 2002/96/EC) indicating that this electrical product may not be treated as household waste, but that it must be collected and treated separately.

- Temperature coefficients: Add 0.1 x specified accuracy/ ºC (above 28ºC or below 18ºC)
- Withstand voltage: AC2210V for 5 sec (between electrical circuit and enclosure)
- Insulation resistance: 100MΩ or more/ 1000V (between electrical circuit and enclosure)
- Conductor size: max. Φ6mm
- Dimension: 111(L) x 61(W) x 40(D)mm
- Weight: approx. 290g (including batteries)
- Accessory: Soft case MODEL9096 x 1 pce; Size AA Alkaline battery LR6 x 4 pcs; Instruction manual (Japanese/ English) x 1 pce
- Optional accessory: Analog output cord MODEL7256

4. Instrument layout



5. Getting started

(1) Power on the instrument, and then check smooth opening and closing of clamp sensor.
(2) Check the remaining battery level before making a measurement. Press the Power button and get the instrument started. When the battery empty indicator appears in the LCD, please replace the batteries with new ones according to 8. Battery replacement in this manual.
(3) Ensure that the Data hold function is not in active status.

⚠ DANGER

- Never make measurements on a circuit in which earth potentials of 300V or higher exist.
- Do not attempt to make measurements 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 measuring range.
- Never open the Battery compartment cover during a measurement.
- Never attempt to make any measurements if the clamp sensor and/or the instrument has any structural abnormality, such as a crack, or if the cover is not securely attached.
- Do not measure AC currents.
- The instrument should be used only in its intended applications or conditions. Otherwise, safety functions equipped with the instrument do not work, and instrument damage or serious personal injury may be caused.

⚠ WARNING

- Never attempt to make any measurements if any abnormal conditions, such as a broken cover or exposed metal parts are present on the instrument and clamp sensor.
- Do not install substitute parts or make any modifications 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 Clamp sensor is disconnected from the object under test, and that the instrument is powered off when opening the Battery compartment cover for battery replacement.

⚠ CAUTION

- Do not expose the instrument to direct sunlight, high temperature, humidity or dew.
- This instrument is not water/ dustproof. Do not use it in a dusty environment or where it will get wet.
- Always power off the instrument after use. Remove the batteries if the instrument is to be stored and will not be in use for a long period.
- Use a damp cloth with neutral detergent or water for cleaning the instrument. Do not use abrasives or solvents.

6. Operating instructions

⚠ WARNING

- Do not clamp onto the un-insulated conductor.
- Always use the dedicated analog output cord MODEL 7256 when utilizing the analog output function.

⚠ DANGER

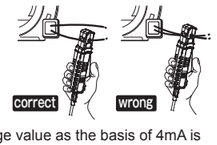
- Keep your fingers and hands behind the barrier during a measurement.

⚠ CAUTION

- To avoid false reading, check that the Clamp sensor is clean before starting to use the instrument.
- Bring the Clamp sensor close to the conductor under test and zero adjust the display in order to minimize the influence of electromagnetic waves.
- Take sufficient care to not to apply shock, vibration or excessive force when opening and closing the clamp sensor. Otherwise, accurate measured results may not be obtained. Please open and close the sensor lightly.

(1) Zero Adjustment
Perform zero adjustment prior to starting a measurement. With the transformer jaws closed and without clamping them onto the conductor, press the Zero ADJ. button.
Then the Zero adjustment mark " ZERO " is shown on the LCD for about one second.
(2) Measurement
Press the Jaw trigger to open the transformer jaws and clamp them onto the conductor under test and take the reading on the display. (See the figure below.)

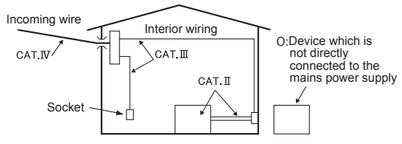
When the current flows in the same direction as indicated by the arrow mark on the jaws, the polarity of the reading is positive and vice versa.



* %(Span) display
The sub-display shows percentage value as the basis of 4mA is 0% and 20mA is 100%. (at 20mA Range only) The percentage is displayed on the main display by pressing the DISP button. In this case, the current value is displayed on the sub-display.

○ 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 overcurrent protection device (distribution panel).



2. Feature

- Instrumentation signal (DC4–20mA) measurement
- DC current (0-100mA) measurement without breaking the electrical circuit.
- LED light for illuminating the measurement spot
- Auto-power-off function
- Percentage span
- Analog output function to output the measured results to the recorder or digital multi-meter.
- Data hold function

The table at the right shows the relationship between %(Span) values and the measured values (mA).
The percentage value is calculated based on the following formula, assuming the measured value as X.
Percentage = (|X| - 4.00) ×6.25

Measured values (mA)	Percentage display (%)
−20.00	100.0
0.00	−25.0
2.00	−12.5
4.00	0.0
12.00	50.0
20.00	100.0
100.0	− − −

* Over-limit indication
When the input exceeds the max measuring range (126.0mA), "OL" or "-OL (for negative values)" is indicated on the display.
When the Range reaches to the 100mA, bars (---) are displayed instead of the percentage value.

7. Other functions

7.1 Data Hold Function
This is a function to freeze the measured value on the display. Press the Data hold button once to freeze the reading. The reading will be held regardless of subsequent variation in input. The Data hold mark " HOLD " is indicated on the display while the instrument is in the Data Hold mode. To exit Data Hold mode, press the Data hold button again.

7.2 Auto-power-off function
The instrument automatically powers off about 10 min after the last operation. This function is disabled while the cord is being connected to the analog output terminal. To disable this function at all times, hold down the Data hold button while powering on the instrument. The LCD shows "P.oFF" for about 1 sec immediately after powering on the instrument. To restore this function, power off once and power on again.

7.3 Backlight & LED light
Press the Light button to turn on or off the LED light and LCD backlight. These lights automatically turn off after two minutes. To disable the automatic light timeout, hold down the Light button while powering on the instrument. The LCD shows "L.oFF" for about 1 sec immediately after powering on the instrument. To restore this function, power off once and power on again.

7.4 Analog output function
DC voltage signal corresponding to the measured result is output from the Analog output terminal. (10mV/mA) It can be checked on a recorder or a digital multi-meter connected to the instrument by using MODEL7256 output cord.

3. Specification

● Measuring range and accuracy (23ºC±5ºC, RH 75% or less)
(1) DC current (auto-range)

Range	Display range	Guaranteed accuracy	Accuracy	Condition
20mA	0.00 to ±21.49mA	0.00 to ±21.49mA	±0.2%rdg±5dgt	After Zero-Adjustment described at clause 6 (1)
100mA	±21.0 to ±126.0mA	±21.0 to ±120.0mA	±1.0%rdg±5dgt	

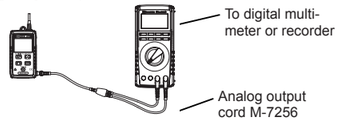
(2) Analog output function
To output DC voltage (10mV/mA) corresponding to the reading.

Range	Display range	Output voltage	Accuracy
20mA	0.00 to ±21.49mA	0.0 to ±214.9mV	Accuracy specified at clause 3 (1) plus (±0.5mV)
100mA	±21.0 to ±126.0mA	±210 to ±1260mV	Accuracy specified at clause 3 (1) plus (±3mV)

* 1300mV is output when the display shows "OL". (-1300mV for "-OL".)
See clause 6 for explanations on OL display.
* Output impedance : approx. 5kΩ

- Applicable standards: IEC61010-1, IEC61010-2-030 Measurement CAT.II 300V Pollution degree 2 IEC61010-2-032 IEC61326 (EMC) IEC60529 IP40
- Display: Liquid crystal display (see also 4. Instrument layout)
- Refresh rate: approx. once/ 0.6 second
- Location for use: In-door use, altitude 2000m or less
- Operating temperature & humidity: -10 to +50℃ RH85% or less (no condensation)
- Storage temperature & humidity: -20 to +60℃ RH85% or less (no condensation)
- Power source: size AA battery x 4 pcs (The use of alkaline LR6 is recommended.)
- Battery life: approx. 60 hours continuous (with Backlight and LED light OFF)
- Auto-power-off: Power off function operates in 10 min. after the last switch operation. This function is disabled when a cord is being connected to the OUTPUT terminal.

* When connecting the Analog output cord to the instrument, the sub-display shows "OUT" for 1 sec.
When making measurements for long periods of time:
- leave the instrument for the warm-up period of several tens of minutes after powering it on, and then start a recording.
- readings will vary when the ambient temperature changes. In this case, the temperature coefficients specified at clause 3 and fluctuations at zero (about 20 counts fluctuate when temperature changes by 10ºC) should be taken into consideration.



8. Battery replacement

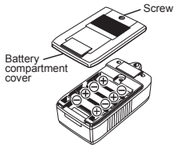
⚠ WARNING

- Ensure that the Clamp sensor is disconnected from the object under test, and that the instrument is powered off when opening the Battery compartment cover for battery replacement.

⚠ CAUTION

- Do not mix new and old batteries or mix different types of batteries.
- Install batteries in correct polarity as marked inside.

Replace batteries with the new ones when the empty battery mark " ⊏ " is displayed on the LCD. The LCD does not show anything, even the empty battery mark, when the batteries are completely exhausted.



[How to replace batteries]
(1) Power off the instrument.
(2) Loosen the screw at the backside of the instrument and remove the Battery compartment cover.
(3) Remove all the old batteries and install new ones, four size AA batteries, in correct polarity. The use of alkaline batteries (LR6) is recommended.
(4) Reattach the Battery compartment cover and tighten the screw.