

Instruction Manual



DC Milliamp Clamp Logger

KEW 2510



**KYORITSU ELECTRICAL
INSTRUMENTS WORKS, LTD.**

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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 starting to use the instrument.

WARNING

- Read through and understand the instructions contained in this manual before starting to use 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 the following explanation of the symbols used on the instrument and in this manual.

	User must refer to the explanations in the instruction manual.
	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.

DANGER

- Never make measurements on a circuit in which earth potentials of 45Vpk 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.
- Keep your hands and fingers behind the safety barrier on clamp sensor during a measurement.

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 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.
- Radio waves at Bluetooth communication may affect the operations of medical electronic devices. Special care should be taken when using Bluetooth communication in the areas where such devices are present.

⚠ CAUTION

- Do not expose the instrument to direct sunlight, high temperature, humidity or dew.
- This instrument is not water/ dust-proof. Do not use it in a dusty environment or where it will get wet.
- Always power off the instrument after use. Remove 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.

○ Measurement Category

To ensure safe operation of measuring instruments, IEC 61010 establishes safety standards for various electrical environments, categorized as 0 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.

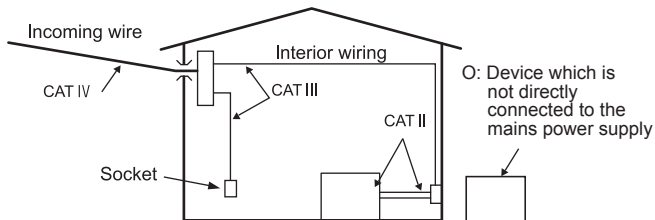
KEW2510 is CAT 0 rated. Do not use in CAT II, III or IV environments.

0: 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

- Measure 4 to 20 mA instrumentation signal
 - Measure 0 to 100 mA DC current without breaking the loop
 - LED light for illuminating the measurement spot
 - Auto-power-off function
 - Percentage (%) span
 - Analog output function to output the measured results to a recorder or digital multi-meter
 - Data hold function
 - Memory function stores up to 192000 records
 - Transfer data to PC via Bluetooth®
 - AC adapter supplied as a standard accessory
-

3. Specifications

- Measuring range and accuracy ($23^{\circ}\text{C} \pm 5^{\circ}\text{C}$, RH 75% or less)

(1) DC current (auto-range)

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

※ Cautions for a long period of measurement or recording:

- About 10 min of warm up is required right after powering on the instrument.
- Temperature coefficient defined later in this manual and also zero point fluctuation – about 20 counts with a 10°C rise in temperature - should be taken into consideration if ambient temperature varies during a recording.

(2) Analog output function

Output DC voltage (10mV/mA) corresponding to a reading.

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

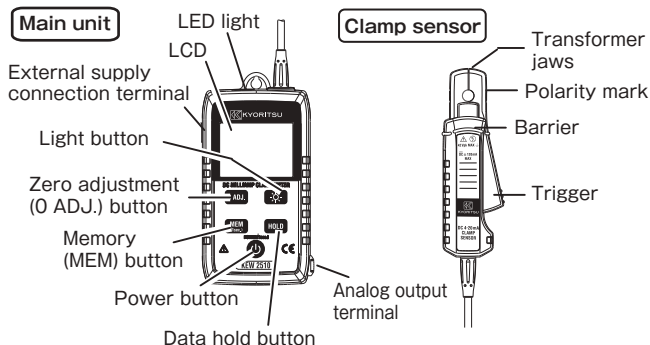
※ 1300mV is output when the display shows " OL ". (-1300mV for "-OL" .)

See clause 6 for explanations on OL display.

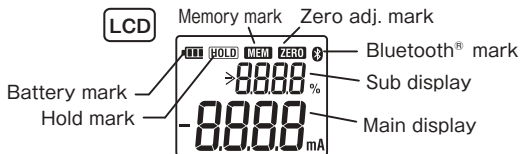
※ Output impedance : approx. 5kΩ

- Applicable standards IEC61010-1
Measurement CAT 0 (Other), Pollution degree 2
IEC61010-2-032
IEC61326-1 (EMC)
IEC60529 IP40
EN50581 RoHS Directive
- Display Liquid crystal display
(See also "4. Instrument layout".)
- Refresh rate Approx. once/ 0.6 second
- Sampling rate Approx. 4ms
(Averaging data in about 0.6 sec.)
- Location for use In-door use, altitude 2000m or less
- Operating temperature & humidity -10 to +50°C RH85% or less (no condensation)
When using AC adapter:
0 to +40°C RH85% or less (no condensation)
- Storage temperature & humidity -20 to +60°C RH85% or less (no condensation)
- Power source Size AA battery x 4 pcs
(Alkaline LR6 is recommended.)
External supply (AC adapter MODEL8320)
- Battery life Approx. 50 hours continuous with alkaline batteries
(with Backlight, LED light and Bluetooth® feature 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
and memory function to record results is activated.
- Temperature coefficient 0.1 x specified accuracy/ °C
(above 28°C or below 18°C)
- Withstand voltage 2210 V AC for 5 sec
(between electrical circuit and enclosure)
- Insulation resistance 100MΩ or more/ 1000V
(between electrical circuit and enclosure)
- Rated voltage 42 Vpk (circuit – ground)
- Conductor size Max. Φ6mm
- Dimension 111(L) x 61(W) x 46(D)mm
- Weight Approx. 310g (including batteries)
- Accessory Soft case MODEL9096.....1 pce
Size AA Alkaline battery LR6.....4 pcs
Instruction manual.....1 pce
AC adapter MODEL8320.....1 pce
CD-ROM (KEW Windows for 2510)....1 pce
Software installation manual.....1 pce
- Optional accessory Analog output cord MODEL7256

4. Instrument layout



Barrier: It is a part providing protection against electrical shock and ensuring the minimum required air and creepage distances.



5. Preparation

- (1) Power on the instrument, and then check smooth opening and closing of clamp sensor.
- (2) When operating the instrument with battery, always check the battery voltage, without connecting the AC adapter, before starting to use the instrument. Battery mark doesn't appear regardless of battery status while the AC adapter is connected to the instrument.
Press Power button and get the instrument started. If empty battery indicator "☐" appears in the LCD, replace the batteries with new ones according to "9. Battery replacement" in this manual.
- (3) Ensure that the Data hold function is not in active status.

6. Getting started

⚠ WARNING

- Do not clamp onto an un-insulated conductor.
- Always use analog output cord MODEL7256, specially designed to this instrument, when using analog output function.

⚠ DANGER

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

⚠ CAUTION

- Dirty clamp sensor may cause false reading. Confirm that clamp sensors are clean before making a measurement.
- When performing zero adjustment in order to minimize the influence of electromagnetic waves, bring a clamp sensor close to the conductor under test.
- Take sufficient care not to apply shock, vibration or excessive force when opening and closing the clamp sensor. Otherwise, accurate results may not be obtained. Please open and close the sensor lightly.

6-1 Zero-adjustment

Perform zero adjustment prior to starting a measurement.

With the transformer jaws closed and without clamping them onto a conductor, press the Zero ADJ. button.

Then the Zero adjustment mark “**ZERO**” is shown on the LCD for about 1 sec.

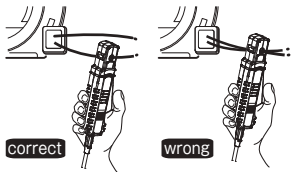
Zero ADJ. button is disabled while;

- the LCD showing “OL”, or
- recording results with memory function.

6-2 Measurement

Press the trigger to open the transformer jaws and clamp them onto a conductor under test and take the reading shown in main display area. (See the figure below.)

- When a 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 table at the right shows the relationship between %(Span) values and measured values (mA). The percentage value is calculated based on the following formula, assuming the measured value as X.

$$\text{Percentage} = (|X| - 4.00) \times 6.25$$

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 a measured value exceeds the max display range (126.0mA), "OL" or "-OL" (for negative values) is indicated on the display.

When the range reaches to 100mA, bars (---) are displayed instead of percentage values.

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 if the cord is being connected to the analog output terminal or while recording measured data with memory function.

To disable this function:

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.

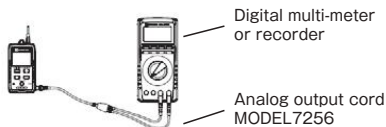
7-3 Backlight & LED light

Press the Light button to turn on/ 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 automatic light timeout, 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.

※When connecting the analog output cord to the instrument, the sub-display shows "OUT" for 1 sec.



7-5 Memory function

Store measured values in the internal memory of KEW2510. Hold down the Memory button 1 sec or longer to start recording. Another long press will stop the recording. The **MEM** mark keeps blinking on the LCD during a recording. Power button doesn't work in this period.

※Max number of records : 192000

※Recording interval : 1/5/10/30/60 sec.

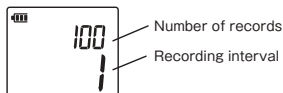
Use the special application software to change the setting of recording interval. Default setting is 60 sec.

Checking recording interval and number of stored results :

Press the Memory button to show the currently selected recording interval on the main display and number of stored record is on the sub display for 1 sec.

Recording interval	Max recording period
1 sec	53 hours
5 sec	11 days
10 sec	22 days
30 sec	66 days
60 sec	133 days

e.g.
100 results stored with
recording interval of 1 sec.:



- ※When number of records exceeds 10000, the sub display doesn't give numerical indication but just shows ">9999".
- ※A short press, 1 sec or less, displays the pre-set recording interval and number of records. Do not press the button 1 sec or longer for confirmation, otherwise recording will start/ end.
- ※Recording stops when number of records reaches to the upper limit of 192000. Recorded data is secured even when a recording is interrupted by the exhausted batteries or when the instrument is powered off for battery replacement.
- ※When starting a new recording, the previous recorded data will be deleted. Use the special application software and download the recorded data to your PC.
- ※When making measurements for a long period 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 10°C) should be taken into consideration.

8. Communication function/ Application software

●Interface

Communication method: Bluetooth® Ver.5.0

Compliant profile : GATT

●System requirements

OS (Operation System) : For the supported OS, please check the version label on the CD case or visit our homepage.

Memory : 1Gbyte or more

Display : 1024 x 768 dots, 65536 colors or more

HDD : 1Gbyte or more (including Framework)

.NET Framework : 4.6.1 or later

●Trademark

- Windows® is a registered trademark of Microsoft in the United States.
- Bluetooth® is a registered trademark of Bluetooth SIG.

● Application software (KEW Windows for 2510)

This special application enables data download, analysis and instrument configuration via PC. Refer to the supplied software installation manual and install the application in your PC. For the details, see the manual for “*KEW Windows for 2510*” by clicking the icon to be created in the desktop after installation.

Bluetooth® mark “” displayed on the instrument indicates the instrument and the installed application software have been connected.

9. AC adapter power supply

WARNING

- Use only MODEL8320 AC adapter with this instrument.
- Confirm the rated power supply of the outlet is not exceeding the rating of the AC adapter.
- Unplug the adapter if it will not be used for a long period.
- Do not put an object on the adapter or cord. Keep them away from a heating object.
- When disconnecting the adapter from an outlet, do so by removing the plug not by pulling the cord.

9-1 How to use AC adapter

1. Remove the cover for external supply, located on the side face of the instrument, and connect the AC adapter.
2. Connect the plug of the AC adapter to an outlet.

9-2 Specifications of AC adapter

- Rated power supply, frequency : 100-240V AC, 47-63Hz
- Rated output voltage : 9 V DC
- Rated output current : 1.66A (max)

Use of AC adapter is recommended for long time recording. It is also recommended to operate the instrument on AC adapter power with batteries installed for backup purpose. The instrument switches power source to batteries in an event of power outage.

※ Confirm battery level without connecting the AC adapter beforehand. Battery indicator doesn't appear while AC adapter is being connected to the instrument.

10. 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.
- Disconnect the AC adapter and analog output cord from the instrument.

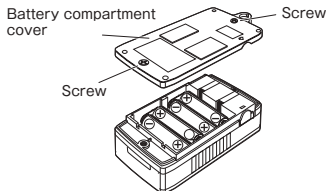
CAUTION

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

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

[How to replace batteries]

- (1) Power off the instrument.
- (2) Loosen two screws 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 cover and tighten the screws.



MEMO

DISTRIBUTOR

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**KYORITSU ELECTRICAL
INSTRUMENTS
WORKS, LTD.**

2-5-20, Nakane, Meguro-ku,
Tokyo, 152-0031 Japan

Phone: +81-3-3723-0131

Fax: +81-3-3723-0152

Factory: Ehime, Japan

www.kew-ltd.co.jp