

KEW8146 KEW8147 KEW8148

LEAKAGE CLAMP SENSOR

LEAKAGE CLAMP SENSOR Series
KEW 8146/8147/8148

KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD., TOKYO, JAPAN

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 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. The operating instructions described in the manual must be observed.
- 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 and or instrument damage.

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 minor injury or instrument damage.

DANGER

- Never make measurement on a circuit in which the electrical potential exceeds AC300V.
- Do not make measurement when thunder rumbling. If the instrument is in use, stop the measurement immediately and remove the instrument from the measured object.
- 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.
- The transformer jaws are made of metal and their tips are not completely insulated. Be especially careful about the possible shorting where the measured object has exposed metal parts.
- Never attempt to use the instrument if it's surface or your hand are wet.
- Do not exceed the maximum allowable input of any measuring range.

WARNING

- Never attempt to make any measurement, if any abnormal conditions are noted, such as broken case, and exposed metal parts.
- Do not install substitute parts or make any modification to the instrument. Return the instrument to the distributor from who you purchased this instrument for repair or re-calibration in case of suspected faulty operation.
- Always keep your fingers and hands behind the barrier on the instrument to avoid the possible shock hazard.

CAUTION

- Do not step on or pinch the cord to prevent the jacket of cord from being damaged.
- The output connector shall be removed or connected without clamping a conductor. Otherwise, it may cause a failure.
- Do not expose the instrument to direct sunlight, high temperatures, humidity or dew.
- Never give shocks, such as vibration or drop, which may damage the instrument.
- Use a damp cloth and detergent for cleaning the instrument. Do not use abrasives or solvents.

5. Operating instructions

DANGER

- Never make measurement on a circuit in which the electrical potential exceeds AC300V in order to avoid possible shock hazard.
- The transformer jaws are made of metal and their tips are not completely insulated. Be especially careful about the possible shorting where the measured object has exposed metal parts.

CAUTION

- Take sufficient care to avoid shock, vibration or excessive force when handling the instrument. Otherwise, precisely adjusted transformer jaws will be damaged.
- When transformer jaws do not fully close, never try to close them by force, but make them free to move and try again. If a foreign substance is stuck in the jaw tips, remove it.
- When making current measurements, keep the transformer jaws fully closed. Otherwise, accurate measurements cannot be taken.
- Hold the inserting part (except for the cable) and disconnect the Output connector from the measuring instrument so as not to cause a break in the cord.
- When measuring current which pulse element is superposed, differences of the indicated value may be caused between ranges, if the peak value exceeds the measurement range to a large extent. In this case, the reading at the bigger range should be taken as a right value. Sensitive transformer jaws are used for Leakage clamp meter. Because of the characteristics of transformer jaws, which can be opened and closed, it is impossible to eliminate the interference of external magnetic field completely. If there is a presence of strong magnetic field, use the instrument at a distance as far as possible from it. Following are the typical things generating magnetic field.

- Conductor fed large current
- Motor
- Equipment which has magnet
- Integrating wattmeter

5-1 Measuring method

- (1) Connect the Output connector to the Input terminal of the measuring instrument.
- (2) Press the Trigger to open the transformer jaws and clamp onto one conductor. In this case, the measured conductor shall be at the center of the jaws.
- (3) Ensure that the tips of transformer jaws are firmly closed.

5-2 Measuring method

- (1) Measuring out of balance leakage current (See Fig.1):Clamp onto all conductors except a grounded wire.
- (2) Measuring earth leakage current (See Fig.2):Clamp onto a grounded wire.

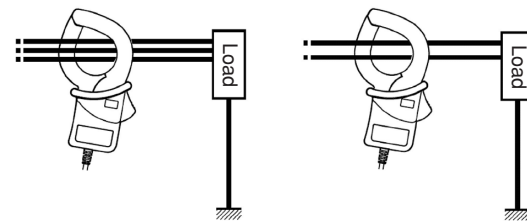


Fig.1 Measuring out of balance leakage current

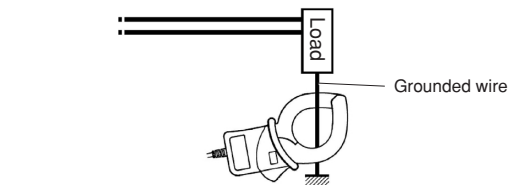


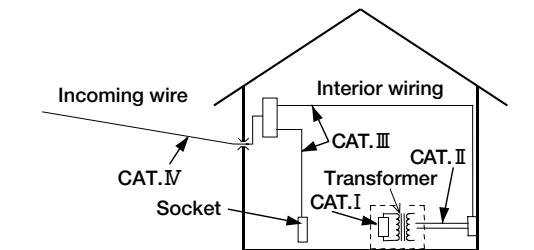
Fig.2 Measuring earth leakage current

Safety symbols

⚠	Refer to the instructions in the manual.
□	Indicates a instrument with double or reinforced insulation
⚡	Indicates that this instrument can clamp on live bare conductors when the voltage to be tested is below Circuit - Ground-to-Earth voltage against the indicated Measurement Category.
~	Indicates AC

○Measurement categories(Over-voltage categories) To ensure safe operation of measuring instruments, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT I to CAT III, 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.

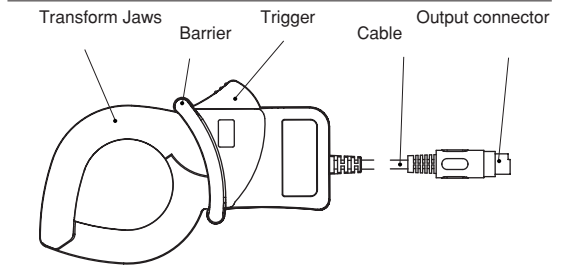
- CAT I : Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.
- CAT II : Primary electrical circuits of equipment connected to an AC electrical outlet by a power cord.
- CAT III : Primary electrical circuits of the equipment connected directly to 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. Features

- Clamp sensor for AC leakage current measurement.
- Can measure up to:
KEW 8146 : 30A
KEW 8147 : 70A
KEW 8148 : 100A
- Designed to international safety standard IEC61010-2-032 CAT. III Pollution Degree 2

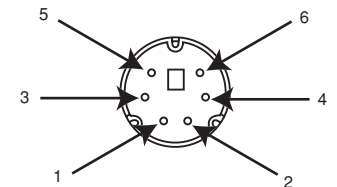
3. Instrument layout



4. DIN Plug pin assignment

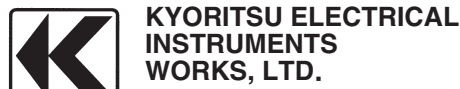
- 3: GND pin
- 5: Output signal pin
- 6: Sensor Signal pin (Resistance between 3Pin and 6Pin: 8146:47kΩ 8147:8.2kΩ 8148:30kΩ)
- 1, 2 and 4: No use

*Lower figure shows the pin assignment seeing the Clamp sensor from output connector side. The figure of the pin assignment of connection terminal is symmetrical to lower figure.



6. Specifications

Model	KEW 8146	KEW 8147	KEW 8148
Rated voltage	AC30Arms(42.4Apeak)	AC70Arms(99.0Apeak)	AC100Arms(141.4Apeak)
Output voltage	AC0~1500mV (50mV/A)	AC0~3500mV (50mV/A)	AC0~5000mV (50mV/A)
Measuring range	AC0~30A	AC0~70A	AC0~100A
Accuracy (Input: sine wave)	0A~15A ±1.0%rdg±0.1mV (50/60Hz) ±2.0%rdg±0.2mV (40~1kHz) 15A~30A ±5.0%rdg(50/60Hz) ±10.0%rdg(45~1kHz)	0A~40A ±1.0%rdg±0.1mV (50/60Hz) ±2.0%rdg±0.2mV (40~1kHz) 40A~70A ±5.0%rdg (50/60Hz) ±10.0%rdg (45~1kHz)	0A~80A ±1.0%rdg±0.1mV (50/60Hz) ±2.0%rdg±0.2mV (40~1kHz) 80A~100A ±5.0%rdg (50/60Hz) ±10.0%rdg (45~1kHz)
Temperature & humidity range (Guaranteed accuracy)	23±5°C, relative humidity: 85% or less (no condensation)		
Operating temperature range	0~50°C, relative humidity: 85% or less (no condensation)		
Storage temperature range	-20~60°C, relative humidity: 85% or less (no condensation)		
Maximum permissible input	AC30Arms continuous(50/60Hz)	AC70Arms continuous (50/60Hz)	AC100Arms continuous (50/60Hz)
Output impedance	Approx. 90 Ω	Approx. 100 Ω	Approx. 60 Ω
Location for use	Altitude up to 2000m, Indoors		
Applicable standards	IEC 61010-1, IEC 61010-2-032 Measurement CAT. III (300Vrms) Pollution degree 2 IEC 61326		
Withstand voltage	AC3540Vrms (50/60Hz) for 5 sec. between Jaw and enclosure between enclosure and output terminal between Jaw and output terminal		
Insulation resistance	50M Ω or greater at 1000V between Jaw and enclosure between enclosure and output terminal between Jaw and output terminal		
Conductor Size	Approx.24mm in diameter (max.)	Approx.40mm in diameter (max.)	Approx.68mm in diameter (max.)
Dimension	100(L)×60(W)×26(D)mm	128(L)×81(W)×36(D)mm	186(L)×129(W)×53(D)mm
Cable length	Approx. 2m		
Output terminal	MINI DIN 6PIN		
Weight	Approx. 150g	Approx. 240g	Approx. 510g
Accessories	Instruction manual Cable marker		
Option	MODEL 7146 (Banana φ4 adjuster plug) MODEL 7185 (Extension cable)		



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