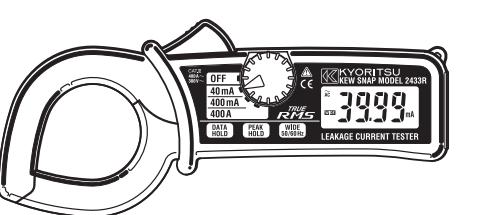


INSTRUCTION MANUAL



**TRUE
RMS**

LEAKAGE CURRENT TESTER

Kew Snap Series

Kew Snap 2433R



KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.,
TOKYO, JAPAN

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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 using 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 and to follow measurement procedures described in the manual.
- Be sure to understand and follow all safety instructions contained in the manual.

Not following 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 of 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.

Following symbols are used on the instrument and in the instruction manual. Attention should be paid to each symbol to ensure your safety.

Refer to the instructions in the manual.

This symbol is marked where the user must refer to the instruction manual so as not to cause personal injury or instrument damage.

Indicates an instrument with double or reinforced insulation.

Indicates that this instrument can clamp on bare conductors when measuring a voltage corresponding to the applicable Measurement category, which is marked next to this symbol.

Indicates AC (Alternating Current).

(1) Set the Range Selector Switch to the desired position. Current to measure should be within the selected measuring range.

(2) Normal measurement (See Fig.1,2): Press the jaw trigger to open the transformer jaws and close them over one conductor only. Measured current value is shown on the display. Earth leakage current or small current that flows through a grounded wire can also be measured by this method.

(3) Measuring out of balance leakage current (See Fig. 3): Clamp onto all conductors except a grounded wire. Measured current value is shown on the display.

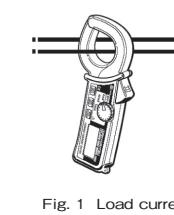


Fig. 1 Load current

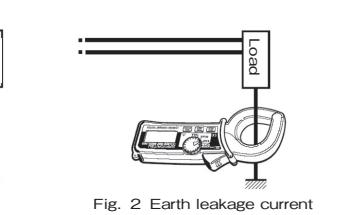


Fig. 2 Earth leakage current

3-phase 3-wire system (In 4-wire system with neutral, clamp onto 4 wires)
Single-phase 3-wire system (In 3-wire system with neutral, clamp onto all 3 wires)

Fig. 3 Measuring out of balance leakage current

6-2 How to Use Frequency Selector Button

When high frequencies from such equipment as inverters are present in the circuit under test, the instrument measures AC current of not only 50Hz or 60Hz of fundamental frequency but also of these high frequencies and harmonics.

To eliminate the effect of such high frequency noise and measure AC current of 50Hz or 60Hz fundamental frequency, a "high-cut" filter circuit is incorporated into the instrument which works when "50/60Hz" frequency response is selected with the Frequency Selector Button. Cut-off frequency of the "high-cut" filter is about 160Hz with attenuation characteristic of approx. -24dB/octave.

When the Frequency Selector Button is pressed, "50/60Hz" mark is shown on the left side of the display. When the Frequency Selector Button is pressed again, frequency response is switched to WIDE mode with "WIDE" mark shown on the display. Output characteristic are shown in Fig.4.

2. FEATURES

- Never make measurement on a circuit having potential of 300VAC or greater.
- Do not attempt to make measurement in the presence of flammable gasses. Otherwise, the use of the instrument may cause sparking which leads 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 equipment under test has exposed metal parts.
- 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.
- Never open the battery compartment cover when making measurement.
- Never try to make measurement if any abnormal conditions, such as broken Transformer jaws or case is noted.
- The instrument is be used only in its intended applications or conditions. Otherwise, safety functions equipped with the instrument doesn't work, and instrument damage or serious personal injury may be caused.

WARNING

- Never attempt to make any measurement, if any abnormal conditions are noted, such as broken case, cracked test leads and 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 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

Make sure that the range selector switch is set to an appropriate position before making measurement.

Do not expose the instrument to the direct sun, extreme temperatures or dew fall.

Be sure to set the range selector switch to the "OFF" position after use. When the instrument will not be in use for a long period of time, place it in storage after removing the batteries. Use a damp cloth and detergent for cleaning the instrument. Do not use alcohol or solvents.

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 : Power distribution units 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).

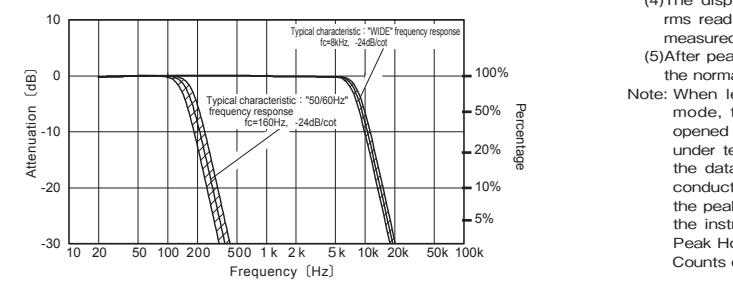
Incoming wire
CAT.IV
Interior wiring
CAT.III
Device which is not directly connected to the mains power supply
Socket

Operating method:
Rms value detection
Operating System:
Sequential comparison
Display:
LCD
Low battery warning:
Overrange Indication:
Response Time:
Sample Rate:
Accuracy-insured
Temperature and Humidity Ranges:
Operating Temperature and Humidity Ranges:
Storage Temperature and Humidity Ranges:
Operable altitude:
Power Source:
Current Consumption:
Measurement Time:
Auto-power-off Function:

Rms value detection
Operating System:
Sequential comparison
Display:
LCD

Low battery warning:
Overrange Indication:
Response Time:
Sample Rate:
Accuracy-insured
Temperature and Humidity Ranges:
Operating Temperature and Humidity Ranges:
Storage Temperature and Humidity Ranges:
Operable altitude:
Power Source:
Current Consumption:
Measurement Time:
Auto-power-off Function:

Operating System:
Sequential comparison
Display:
LCD
Low battery warning:
Overrange Indication:
Response Time:
Sample Rate:
Accuracy-insured
Temperature and Humidity Ranges:
Operating Temperature and Humidity Ranges:
Storage Temperature and Humidity Ranges:
Operable altitude:
Power Source:
Current Consumption:
Measurement Time:
Auto-power-off Function:



Note:
Characteristic of -24dB/octave means that signal magnitude declines to about one sixteenth of that at the initial frequency when frequency doubles. KEW SNAP 2433R have the following two settings for the Frequency Selector Button.

WIDE (20Hz - approx. 8 kHz): Permits measurement of currents of fundamental frequencies as well as currents of high frequencies generated by such equipment as inverters

50/60Hz (20-approx.160Hz) : Filters out high frequency currents and measures current of fundamental frequency only

Recently there has been increased use of power through inverters, switching regulators, etc. When the high frequency noise from such appliances leaks or flows into the ground through capacitors not filtering completely, the earth leakage breaker may trip even though there is no "actual" leakage. In such a case, the instrument does not give leakage current reading if "50/60Hz" frequency response is selected.

Take current readings with the 50/60Hz and WIDE frequency responses respectively to make effective use of the Frequency Selector Button.

6-3 Peak Current Measurement

- Set the Range Selector Switch to the desired position.(Current to measure should not exceed the selected measuring range.)
- Select "WIDE" or "50/60Hz" with the Frequency Selector Button.
- With the transformer jaws clamped onto the conductor under test, press the Peak Hold Button to set the interment to the peak measurement mode.(P" is shown on the display.)

Safety Standard:

IEC 61010-1
IEC 61010-0-032
Measurement CAT. III 300V, pollution degree 2
EMC : EN61326

·EN55022
·EN61000-4-2(performance criterion B)

·EN61000-4-3(performance criterion A)

Environmental standard: EN50581

49VAC(max) for 1 sec

49VDC(max) for 5 sec

metal part of transformer jaws and housing case (except transformer jaw case)

·Data hold function to allow for easy readings in dimly lit or hard-to-reach locations.

·Provides filtering function to remove high frequency generated by inverters.

·Peak hold function to allow for measurement of current variation as short as 10msec.

·Auto-power-off function prevents unnecessary power consumption

·Dynamic range of 4200 counts full scale.

·Large easy-to-read LCD display with letter height of 13mm.

·Operation confirming beeps.

·Insulation barrier at the tip of transformer jaws for improved safety.

2. FEATURES

3. SPECIFICATIONS

Measuring ranges and accuracy (Sine wave)

Range	Resolution	Measuring Range	Accuracy (Frequency range)
40mA	0.01mA	0~40.00mA	0~100A ±1.0%rdg±5dg (50/60Hz) ±2.5%rdg±10dg (20Hz~1kHz)
400mA	0.1mA	0~400.0mA	100~300A ±1.0%rdg±5dg (50/60Hz) ±2.5%rdg±10dg (40Hz~1kHz)
400A	0.1A	0~400.0A	300~400A ±2.0%rdg ±5.0%rdg (40Hz~1kHz)

CF(Crest factor)

CF(Crest factor) = $\sqrt{4(5-0.4f)}$ (f=40Hz~500Hz)

Counts equal to or less than 3 counts are corrected to zero

Accuracy-insured Frequency range of 50/60Hz mode is 50/60Hz

Accuracy-insured Frequency range of 20Hz mode is 20Hz

Accuracy-insured Frequency range of 1kHz mode is 1kHz

Accuracy-insured Frequency range of 40Hz mode is 40Hz

Accuracy-insured Frequency range of 10Hz mode is 10Hz

Accuracy-insured Frequency range of 100Hz mode is 100Hz

Accuracy-insured Frequency range of 200Hz mode is 200Hz

Accuracy-insured Frequency range of 400Hz mode is 400Hz

Accuracy-insured Frequency range of 800Hz mode is 800Hz

Accuracy-insured Frequency range of 1600Hz mode is 1600Hz

Accuracy-insured Frequency range of 3200Hz mode is 3200Hz

Accuracy-insured Frequency range of 6400Hz mode is 6400Hz

Accuracy-insured Frequency range of 12800Hz mode is 12800Hz

Accuracy-insured Frequency range of 25600Hz mode is 25600Hz

Accuracy-insured Frequency range of 51200Hz mode is 51200Hz

Accuracy-insured Frequency range of 102400Hz mode is 102400Hz

Accuracy-insured Frequency range of 204800Hz mode is 204800Hz

Accuracy-insured Frequency range of 409600Hz mode is 409600Hz

Accuracy-insured Frequency range of 819200Hz mode is 819200Hz

Accuracy-insured Frequency range of 1638400Hz mode is 1638400Hz

Accuracy-insured Frequency range of 3276800Hz mode is 3276800Hz

Accuracy-insured Frequency range of 6553600Hz mode is 6553600Hz

Accuracy-insured Frequency range of 13107200Hz mode is 13107200Hz