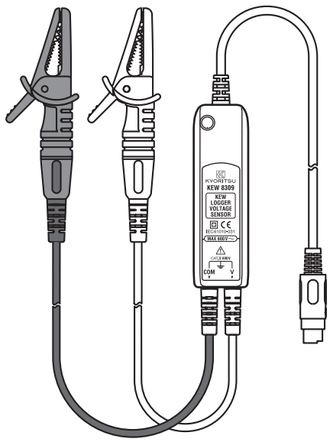
INSTRUCTION MANUAL



VOLTAGE SENSOR

VOLTAGE SENSOR Series
KEW 8309

KYORITSU ELECTRICAL
INSTRUMENTS WORKS, LTD.

DISTRIBUTOR

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1. SAFETY WARNINGS

○ This instrument has been designed and tested according to IEC61010: 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, instrument damage and/or damage to equipment under test.

○ 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 AC600V.
- 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 Measuring Terminals are made of metal and they are not completely insulated. Be especially careful about the possible shorting where the measured conductor is not insulated.
- Never attempt to use the instrument if it's surface or your hand are wet.
- Remove the Measuring terminals from the circuit under test before connecting/removing the Output connector.
- Do not exceed the maximum allowable input of any measuring range.
- Verify proper operation on a known source before use or taking action as a result of the indication of the instrument.

⚠ WARNING

- Never attempt to make any measurement if any abnormal conditions, such as a broken cover or exposed metal parts are present on the instrument.
- Do not install substitute parts or make any modification to the instrument. Return the instrument to your local KYORITSU distributor 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

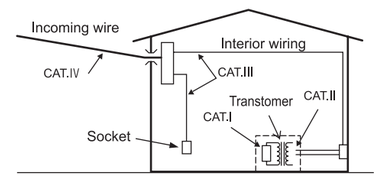
- Do not step on or pinch the cord, or it may damage the jacket of cord.
- Put the instrument on a stable place where is free from vibrations or shocks.
- Firmly fix the Sensor unit and Measuring terminal so that they don't fall off due to the weight of test leads.
- Keep away Floppy Disks, Mag Cards, PCs and Displays from the magnet, which is attached to the backside of the instrument.
- Do not expose the instrument to direct sunlight, high temperatures, humidity or dew.
- Not to 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.

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.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 0energy than one designed for CAT.II.

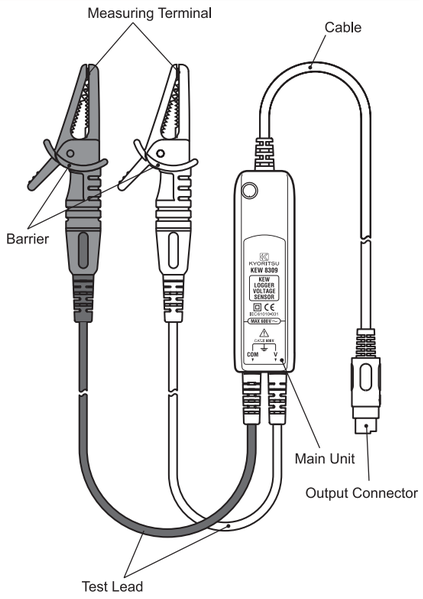
CAT.I : Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.
CAT.II : Primary electrical circuits of equipment connected to an AC electrical outlet by a power cord.
CAT.III : Primary electrical circuits of the equipment connected directly to the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



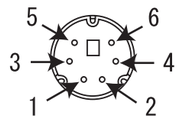
2. FEATURES

- Sensor for AC voltage measurement up to AC 600V.
- Designed to meet the following safety standards.
  IEC 61010 - 1 measurement category(CAT.) III 600V
  IEC 61010 - 031 (for hand-held Probe assemblies)
- Installed differential amplifier enables measurement of floating voltage.

3. INSTRUMENT LAYOUT



4. DIN Plug pin assignment



1:DC Power Pin / Positive
(+3 ～ +5V)
2:DC Power Pin / Negative
(-3 ～ -5V)
3: GND Pin
5: Output Signal Pin
6: Sensor Signal Pin
(Resistance between 3Pin and 6Pin:3.3kΩ)
4: No use

■ Above figure shows the pin assignment seeing the Voltage sensor from output terminal part. The figure of the pin assignment of connection terminal is symmetrical to above figure.

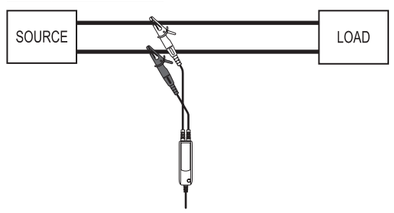
5. OPERATING INSTRUCTIONS

This sensor works on a power provided via Output Connector. Rated voltage should be applied to the positive/negative DC Power Pins to get correct indication.

1. Connect the Output Connector of the Sensor to the input terminal of the measuring instrument.
2. Connect the V and COM Measuring terminals to the conductor under test.
3. Take the readings on the measuring instrument.

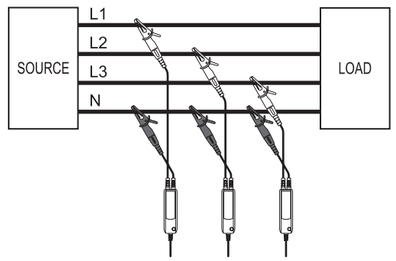
Example of connection

● Single-phase 2-wire



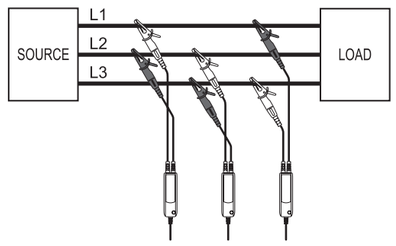
● Three-phase 4-wire

Measurement example with Three KEW 8309



● Three-phase 3-wire

Example of Floating Voltage measurement with Three KEW 8309



6. SPECIFICATIONS

- Max. input voltage:
  AC600Vrms(sin), 848.4V Peak
- Input system:
  Differential input (can measure floating voltage)
- Output voltage:
  AC 0～60mV (output/input : 0.1mV/V)
- Measuring ranges and accuracy

Measuring Range	Accuracy (Frequency range)
6～600V	±1.0%rdg ±0.1mV (50/60Hz)

- Temperature and Humidity Ranges(guaranteed accuracy):
  23℃±5℃,relative humidity 85% or less (no condensation)
- Operating Temperature and Humidity Ranges:
  -10～50℃,relative humidity 85% or less (no condensation)
- Storage Temperature and Humidity Ranges:
  -20～60℃,relative humidity 85%or less (no condensation)
- Supply Voltage (from Output Connector)
  DC±3V～±5V
- Input impedance:
  Approx.3.4MΩ
- Output impedance:
  Approx.180Ω
- Location for use:
  Altitude up to 2000m, Indoors
- Standards (Safety):
  IEC/EN 61010- 1:2001 CAT.III 600V, pollution degree 2
  IEC/EN 61010-031:2002
  IEC 61326 (EMC)
- Withstand Voltage:
  5350V (rms 50/60Hz) for 5 sec., between measuring terminal and enclosure.
- Insulation Resistance:
  50MΩ or greater at 1000V, between measuring terminal and enclosure.
- Dimensions (excluding protrusions), Weight:
  87(L) x 26(W) x 17(D)mm, Approx.135g
- V,COM Cable length:
  Approx.1m
- Test Lead Length:
  Approx. 0.9m
- Output connector:
  MINI DIN 6PIN
- Accessories:
  Instruction manual
- Option:
  7148 (Extension cable)