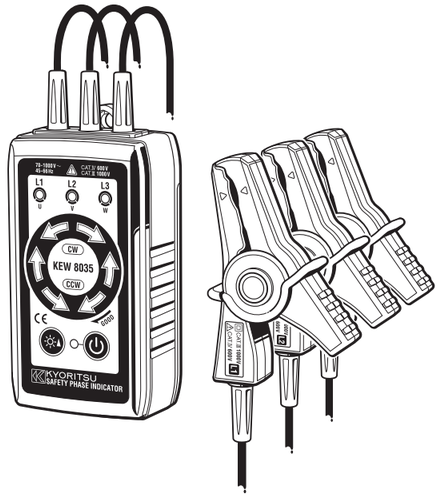
**Instruction Manual**






# Non-Contact Safety Phase Indicator

# KEW 8035

**KYORITSU ELECTRICAL INSTRUMENTS WORKS, LTD.**

**DISTRIBUTOR**

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## 1. Safety Warnings

This instrument has been designed, manufactured and tested according to following standards and delivered in the best condition after passing quality control tests.
- IEC61010-1 Measurement CAT III 1000V/CAT IV 600V Pollution degree 2
- IEC61010-031

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.
- 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.
Kyoritsu is by no means liable for any damage resulting from the instrument in contradiction to this cautionary note.

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**
- Confirm a proper operation of the instrument with a well-known power supply.
- Warning LED might not light up at live status. (earth potential 70V or less). Never touch the wire.
- Voltages may exist when the Live LED is flashing (indicating Earth phase). Never touch with the wires.
- Never make measurement on a circuit in which the earth potential exceeds 1000V to avoid electrical shocks.
- Do not make measurement when thunder is 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.
- Keep your fingers and hands behind the Protective figerguard on the instrument to avoid the possible shock hazard.
- Put insulated protective gears when there is a danger of electrical shock hazard.
- The tip of clip is made of metal and it is 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 is wet.
  Otherwise, electrical shock accident may occur.
- Never open the Battery compartment cover and the instrument case when making a measurement.
- The instrument is to 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.
- Only the qualified person can use the instrument at the secondary side of high voltage power receiving equipments.

**⚠ 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 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.
- Do not try to replace batteries if the surface of the instrument is wet.
- Disconnect the clips from the measured conductors first and power off the instrument before opening the Battery compartment cover for a battery replacement.
- Stop using the test lead if the outer jacket is damaged and the inner metal or color jacket is exposed.

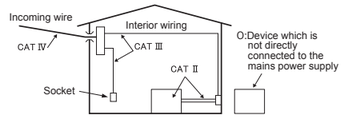
**⚠ CAUTION**
- Do not apply shocks, vibrations or excessive forces onto the Measurement clips.
- Never force to open the Measurement clips when they are frozen.
- This instrument can be operated with safe at temperatures between -10ºC and 50ºC and altitude up to 2000m.
- Keep away from dust and water.
- Precise measurement cannot be made near a charged body or equipment generating electromagnetic waves.
- Measurable conductor size is between dia. 2.4mm and 30mm. Accurate measurements for conductors out of this range cannot be made.
- Measured results are influenced by voltage wires on which twice or more of the measured voltages exist near the point to be clipped.
  The clip point should be far from such voltage wires.
- This instrument cannot identify wiring status correctly when an earth line is connected between phases via delta connection. Check the connection specification of the measured object.
- Incapable of measuring bus bars or shielded wires. Clip onto a covered conductor and make a measurement.
- All the clips should be clipped onto the covered wires and make measurements. Otherwise, it may cause a malfunction.
- Do not touch the Clips during measurements to get accurate results.
- This instrument cannot find the missing line of the earth line.
- Do not pull the cable when removing the Measurement clips from the measured conductors. It may cause a break in cable.
- 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.
- Do not expose the instrument to direct sunlight, high-temperature and humidity or dew.
- Dry and store the instrument if it is wet.
- Do not step on or pinch the cord to prevent the jacket of cable from being damaged.
- Bending or pulling the cord may cause a break in a cord.
- 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.

Safety Symbols

| | |
|---|---|
| ⚠ | Refer to the instructions in the manual to protect the user and instrument. |
| ⧈ | Indicates instrument with double or reinforced insulation |
| ~ | AC |
| | This instrument satisfies the marking requirement defined in the WEEE Directive. This symbol indicates separate collection for electrical and electronic equipment. |

○ 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.

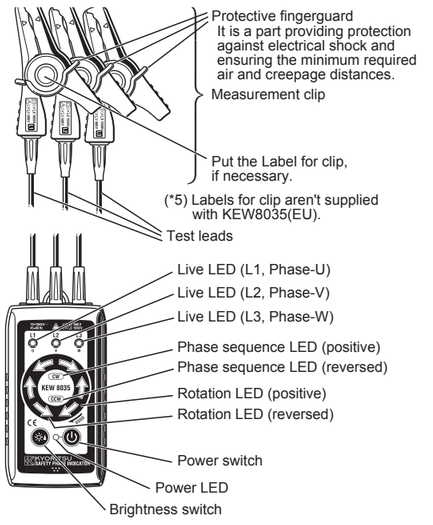
O : Circuits which are not directly connected to the mains power supply.
CAT II : Electrical circuits of equipment connected to an AC electrical outlet by a power cord.
CAT III : Primary electrical circuits of the equipment connected directly to the distribution panel, and feeders from the distribution 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. Features

- This is a Phase indicator and can indicate a presence of live line and phase sequence with the equipped LED and Buzzer while clipping the 3-phase line over the jacket of a conductor.
- Brightness switch is equipped to make the indication visible in dimly lit areas.
- A magnet on the backside of the instrument can fix the instrument onto the distribution board and enables safety and easy measurements.
- Designed to International safety standard IEC 61010-1 (CAT III 1000V/ CAT IV, 600V, Pollution degree 2)

## 3. Instrument layout




## 4. Specification

| Model | KEW8035 |
|---|---|
| Measurement principle | Static induction |
| Voltage range | 3-phase AC70 to 1000V (voltage to earth, continuous sine wave) |
| Frequency range | 45 to 66Hz |
| Operating temperature & humidity range | -10 to 50ºC, relative humidity 80% or less (no condensation) |
| Storage temperature & humidity range | -20 to 60ºC, relative humidity 80% or less (no condensation) (*1) |
| Location for use | Altitude 2000m or less, Indoor use |
| Applicable standards | IEC 61010-1 Measurement CAT III 1000V/CAT IV 600V Pollution degree 2 IEC61010-031 IEC 61326-1,2-2 (EMC standard) IEC 61557-1,7 |
| Environmental standards | EU RoHS directive compliant |
| Dust-proof | IP40 (IEC60529) |
| Withstand voltage | AC6880V (rms 50/60Hz) for 5 sec between the tip of Measurement clip and enclosure |
| Insulation resistance | 10MΩ or more/ 1000V between the tip of Measurement clip and enclosure |
| Power source | DC6V (size AA alkaline battery LR6 or equivalent 1.5V AA × 4pcs) |
| Auto-power-off | 10 min after powering on the instrument |
| Low battery warning | Power LED flashes at 4.0±0.2V or less (*2) |
| Current consumption | 15mA (*3) |
| Continuous use | approx 200 hours (*4) |
| Conductor size | External diameter of the covered conductor Dia.2.4 to 30mm |
| Cable length | approx 70cm |
| Dimension | 112(L) × 61(W) × 36(D)mm |
| Weight | approx 380g (batteries included) |
| Accessories | Instruction manual, battery, Soft case, Label for Clip(*5) |

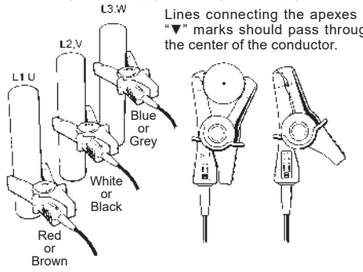
(*1) without batteries
(*2) powers off automatically at 3±0.2V or less
(*3) stand-by state (will be doubled (max) at measurement)
(*4) stand-by state (will be 0.5 times at measurement)
(*5) Labels for clip aren't supplied with KEW8035(EU).

## 5. Checks and Indications

5.1. Preliminary checks

5.1.1. Press the Power switch and power on the instrument. Then all the LEDs flash in order for about 1 sec. Confirm all the LEDs light up and flash. Only the Power LED keeps lighted up in about 1 sec later.

5.1.2. Apex of "▼" mark on the Measurement clip shall indicate the center of the measured conductor. Connect each Measurement clip to 3-phase line as follows: Red to L1, Phase-U, White to L2, Phase-V, Blue to L3, Phase-W.

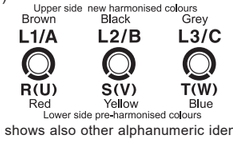



5.1.3. Measure a covered conductor AC70V or more first to confirm each live LED lights up. Do not use the instrument when any of the LED doesn't light up.

5.1.4. Presence of live wires and phase sequence are informed by LED indication and Buzzer sound as soon as connecting the clips.

Note:
The label of KEW8035(EU) shows the harmonised and also the pre-harmonised cable colours (UK):

KEW8035(EU)

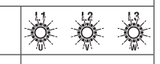
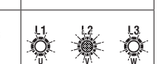
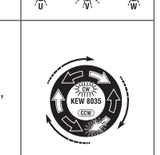
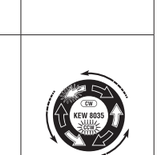



KEW8035(EU) shows also other alphanumeric identifications on the label as:
A B C, R S T and U V W.

5.2. Live wire check

**⚠ DANGER**
- LEDs don't light up when voltage to earth is 70V or less.
- Voltages may exist at Earth phase.

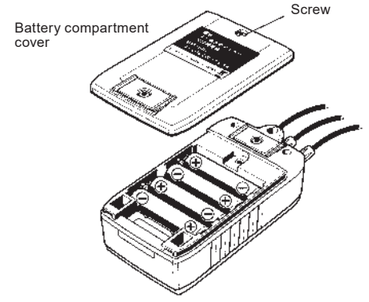
**⚠ CAUTION**
- It is impossible to detect the missing phase of the earth line. Earth line and phase sequence are indicated if the earth line has a missing phase.

| State | Indication | |
|---|---|---|
| Live | Phase with flashing LED is live state. |  |
| Missing line or Earth line | LED doesn't light up for missing line or earth line. | |
| Earth line (Delta connection) | Phase with flashing LED is an earth phase. |  |
| Positive phase | When the green Rotation LED flashes in the order of the direction indicated by the arrow mark (clockwise), the circuit under test has a positive phase. The buzzer sounds intermittently. (pi-pi-pi) |  |
| Reversed phase | When the red Rotation LED flashes in the order of the direction indicated by the arrow mark (counterclockwise), the circuit under test has a reversed phase. The buzzer sounds continuously. (pi---) |  |

5.3. Use the Brightness switch to make the LED indication brighter.
Brightness of all the LEDs (except for the Power LED) is increased while pressing down the switch.

## 6. Battery Replacement

**⚠ CAUTION**
- Power off the instrument and remove the Measurement clips from the measured object when replacing batteries to avoid electrical shocks.
- Do not mix old and new batteries.
- Install batteries in correct polarity as indicated inside the case.
- Use the same model of batteries from the same manufacturer.

When the Power LED on the front side of the instrument is flashing, battery voltage is low. Replace batteries with new ones to continue further measurements.
Low battery voltage may not affect measurement accuracies. The instrument is powered off automatically when batteries are exhausted.

1) Loosen the screw fixing the Battery compartment cover.
2) Slide the Battery compartment cover downwards to remove it.
3) Replace the batteries with new ones. Four size AA LR6 alkaline or equivalent 1.5V AA type batteries should be used.
4) Install the Battery compartment cover and tighten the screw.