



# TAG5000

## Wireless PHASE COMPARATOR

### USER'S MANUAL



**CAUTION:** Before using this device, read this notice very carefully

## 1. AIM

The TA5000 has been designed for:

- Checking electrical network configurations before connection;
- Network phase mapping.

Actually, the connection of high voltage three-phase lines requires the perfect knowledge of the relative phases of each pairs of conductors to be connected.

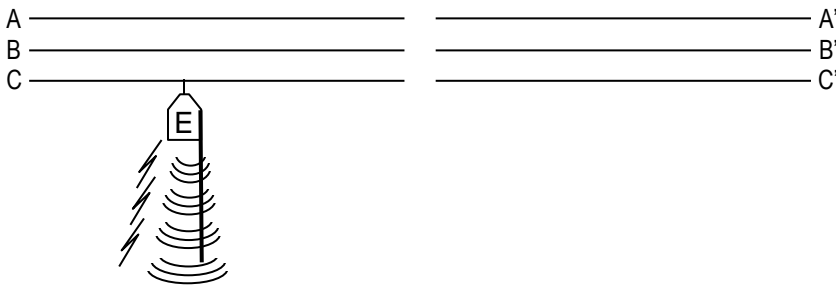
The wireless connection between the 2 modules makes the device both flexible and safe to use.

NB: The device operates on the principle of real time phase comparison thanks to the use of a radio-frequency transmission.  
 It checks the presence of the rated voltage.  
 It indicates phase coincidence within a range of  $\pm 10^\circ$   
 It indicates phase differences above  $\pm 30^\circ$

## 2. CONSTITUTION, PRINCIPLE

The device consists of two modules that can be fitted on insulating sticks. They are equipped with a contact electrode to touch the lines to be tested. One is a transmitter, gray-colored, fitted with an electrode in the shape of a hook intended to suspend the device, the other is a receiver, turquoise colored, fitted with an electrode in the shape of a "Y". Their electrodes serve as antennas for transmitting and receiving the signal.

**The transmitter is dual-purpose, and functions sequentially.**



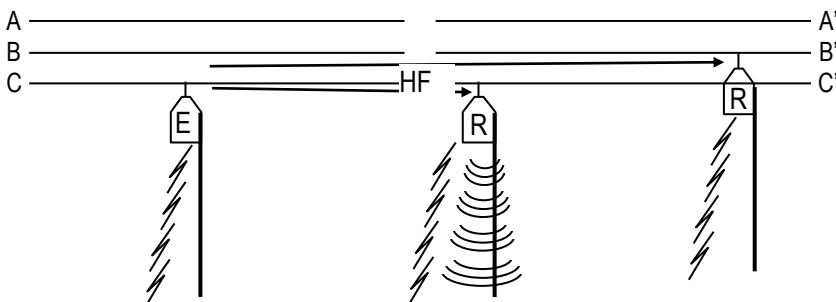
First, it will indicate the presence of a voltage on the touched line, by means of a flashing light and beeping sound.

Secondly, once the voltage test is finished (after 5 to 10 seconds), it switches automatically on to phase measurement. In order to do so, it transmits a permanent radio-frequency signal characteristic of the phase in contact, to the second module. In this case, the line also serves as antenna.

A constantly lit indicator light indicates that the transmitter is in this sequence.

**The receiver has only one purpose**, the measurement of phase coincidence, and consequently it has to be used with the transmitter. In order to make this phase measurement, when the receiver is placed in contact with a conductor its carries out several operations:

- a) It ensures that there is a voltage present,
- b) It decodes the radio-frequency signal coming from the transmitter,
- c) It compares in real-time the signal it is thus receiving with the characteristic of the phase in contact with it,
- d) When there is phase coincidence, the receiver sends a constant, intense light and sound signal. When there is a phase difference, therefore no coincidence between the phases, the receiver sends a weak light signal, indicating only that there is a voltage on the line touched by the receiver.



The transmitter and the receiver include an integrated tests system by which all the modules are tested: electrical components, battery, wiring and antenna. Carrying out the test corresponds to a real line touch.

The transmitter and the receiver do not have an "On/off" button. The device comes on automatically as soon as the live line is touched, and stops as soon as the electrode is no longer in contact with it.

### 3. TEST

#### 3.1. The transmitter only

The transmitter module contains a generator operating at a frequency close to that of the network, which is started as soon as the TEST button is pressed. The signal is generated inside the module and transmitted to the electrode-antenna. It simulates a real line touch.

- Screw the hook-shaped electrode onto the end of the module,
- Press continuously on the button,
- The four lights flash in succession approximately once a second, whilst the buzzer emits a synchronous BEEP
- After a few seconds, the sound signal stops, the flashing lights stop, and only the LED1 indicator light remains permanently on, and this for as long as the TEST button is kept lit.
- If an anomaly is observed in relation to the description above, notably the partial lighting of any indicator lights or the lack of a sound signal, replace the battery.

#### 3.2. The receiver only

The receiver module contains, as the emitter does, a generator operating at a frequency close to that of the network, which is started as soon as the TEST button is pressed. The signal is applied by the inside of the module to the electrode-antenna, and this corresponds to a simulation of a real line touch.

- Screw the Y-shaped electrode onto the end of the module,
  - Press continuously on the TEST button,
  - The LED 1 indicator light comes on permanently, without flashing. When the TEST button is pressed, the BUZZER emits a single, very short BEEP, and the LED 2, LED 3 and LED 4 lights flash once.
- In case of anomaly corresponding to the description above, replace the battery.

#### 3.3. Radio-frequency transmission

The internal generators allow the simulation of a line touch at frequencies close to those of the network:

This choice allows radio-frequency transmission tests with three variants, as long as the two modules are equipped with their electrode (serving as an antenna).

##### a) Complete auto-test

- Hold a module in each hand.
- Switch on the emitter module by pressing the TEST button and wait until it switches automatically to "phase measurement" mode with LED 1 permanently on.
- Whilst holding down the TEST button on the emitter module, now press on the TEST button on the receiver. If the transmission is operating correctly, LED 2, LED 3 and LED 4 and the buzzer of the receiver should come on and off at a regular rate. LED 1 remains constantly on.
- This test may be carried out by two operators, one holding the emitter module vertically, the electrode pointing upwards, and the other holding the receiver in the same position. The range should be at least 3 meters (with a maximum of approximately 10 meters). This is shorter than in normal usage, because there is no line to enhance the propagation of the radio- signal, it is propagated only in the air.

##### b) Test with emitter on the network and the receiver hand-held

- Hook the transmitter onto a live network, and wait a few seconds until it switches to "phase measurement" mode. In this case, the coded radio-frequency signal is carries the network frequency, and no longer the internal generator frequency).
- Press the TEST button on the receiver
- The same process should occur as in § a).
- The range of the transmission should be about 7 meters. This is more than in the previous case, because the transmitter is using the line onto which it is hooked as an antenna extension. It is however still less than the nominal distance, which is obtained when the two units are touching the lines

##### c) Test with emitter and receiver on the network

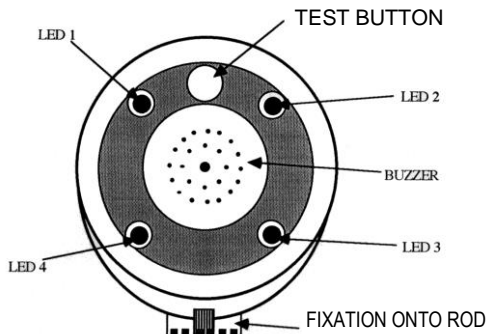
- Hook the emitter onto the live network, wait a few seconds for it to switch to "phase measurement" mode. Hook the receiver onto the same conductor. The sound and light signals must be emitted, i.e. LED 1, LED 2, LED 3 and LED 4 and the receiver's buzzer should operate permanently.
- Then hook the receiver onto another phase. No "in phase" signal should be emitted. A single red LED indicates presence of voltage

## 4. OPERATION

Before and after any use of the device, carry out a full auto-test of the whole device equipped with its electrodes (see § 3.3 – a)

### 4.1. Checking of line voltage presence (Transmitter only).

- (Screw the hook intended to suspend the device onto the end of the module)
- Place the module equipped with its electrode on the end of the switch rod
- Hook the transmitter module onto the line to be tested. In this case, the operator can see the back of the module, which features :
  - four indicator lights: LED 1 to LED 4
  - a test button
  - a buzzer



#### Interpretation:

When the line is touched and in the case of the presence of voltage the sound signal and the four indicator lights come on and off at a certain rate.

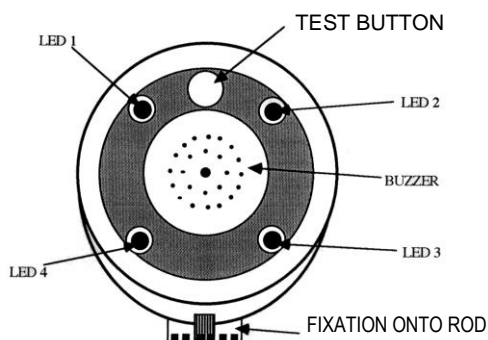
When the electrode touches the line, if the transmitter detects a voltage, it will indicate for 5 to 10 seconds. e. After this, it automatically switches to the phase measurement configuration, which is indicated by LED 1 coming on permanently and the interruption of the sound signal. To prolong this time, all that is necessary is to disconnect the device from the line, wait for the LED 1 to go out, and put the device back so make another voltage measurement for a few seconds or so, etc....

In phase measurement mode, the transmitter transmits a radio-frequency signal over the airwaves which are also transmitted partially along the lines which are playing the role of antennas. This signal will be recognized by the receiver, as soon as the latter is switched on.

### 4.2. Phasing (transmitter + receiver)

The transmitter is hooked on to a line, and it is in "phasing" mode, LED 1 continuously on.

- Place the receiver module, equipped with the appropriate electrode, at the end of the insulating rod
- Put the receiver module in contact with the line to be tested. In this case, the operator sees part of the module which includes, as for the transmitter :
  - four indicator lights : LED 1 to LED 4
  - a TEST button
  - a Buzzer



#### Interpretation:

- The presence of a line voltage starts the receiver automatically; it is indicated by the LED 1 coming permanently on and a short BEEP from the buzzer. The receiver is then ready to receive a coded signal transmitted by the transmitter.
- If the conductors are in phase coincidence, as well as the LED 1 light on, the LED 2, LED 3 and LED 4 indicator lights come on without flashing, and the buzzer transmits a constant sound signal, and this for as long as the conditions are required.
- This permanent visual and sound indication stops immediately, if of course, the voltage disappears on one or (and) the other of the lines touched, if one or (and) the other of the pieces of device is disconnected.

The range of the radio-frequency signal is at least 10 meters, in the normal conditions of use.

## 5. REPLACING THE BATTERIES

The wireless TAG5000 phasing device is powered by two CEI 6LR61 alkaline batteries: one in each of the cases, emitter and receiver. Whenever the checks described in paragraphs 3.1 and 3.2 indicate that the level of the batteries is too low, replace them as follows:

1. Unscrew the electrode
2. Unscrew the nut at the top of the device
3. Push the electronic module by firmly pushing the metal nut at the top of the device
4. Once the electronic module has been removed from its plastic case, remove the metal shielding. The battery is then accessible inside a casing situated to one side of the electronic circuit. Remove the battery by pulling the ribbon and then put the new battery in place.
5. Put the device back together again by reversing the operations above, whilst ensuring that the metal shielding is correctly replaced. Centre the metal nut of the orifice, turn the electronic module slightly until it comes back to its final position and screw the electrode nut back on.

**IMPORTANT NOTE:** When replacing the batteries, it is essential to ensure that the battery polarities are correct, and that they are introduced according to the diagram inside the device battery box.

## 6. TRANSPORT MAINTENANCE STORAGE

To guarantee the correct operation of the phase comparator and ensure it fulfils its essential safety role, it must be kept in good condition at all time.

### • Insulating stick and insulating phase comparator:

- store out of the light in a dry place
- wipe before and after each use with a silicone cloth
- check there are no scratches or traces of knocks

### • Transmitter and Receiver:

Tightness and integrity of the contact antenna and electrode holder.

Check the battery level using the self-test function.

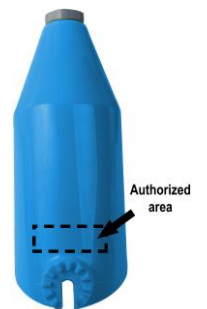
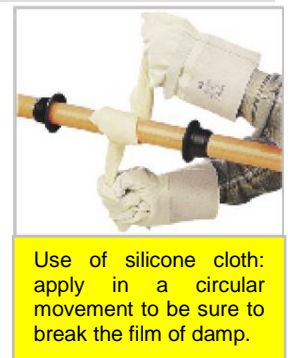
Check there is no condensation (wipe with a silicone cloth).

Note: Do not stick on any labels (risks modifying the properties). When a customized label is required for identification, the label must be nonconductive, hydrophobic and positioned in the **authorized area** (Max dimensions: 20 x 40 mm).

### • Precautions to protect the integrity and tightness of the device:

- Avoid violent knocks: transport in the case provided and avoid dropping.
- Do not use the device if it shows any traces of knocks or cracking.
- Check the O'rings when changing the battery and keep in a dry place.
- Do not use again if there is any sign of internal humidity or oxidation.

The phase comparator, even if it has been kept in the stores, must be checked by the manufacturer after a maximum of 6 years.



## 7. PERIODICAL INSPECTION

The standards related to phases comparators advice that no phase comparator, even those held in storage, should not be used unless re-tested with a maximum period of 6 years.

It is the responsibility of the user to elaborate a maintenance schedule based on national regulations, manufacturer instruction and use conditions.

As a manufacturer, we can advise:

- A visual inspection and, annually battery replacement by the user in case of a regular use.
- At least after 6 years and then every 2 years, a test in a laboratory, by delegation of the manufacturer, to ascertain that their insulating and functioning performances remain within the specified limits.
- In case of intensive use, shock or drop, phase comparator should be tested more frequently by the manufacturer.

## 8. WARRANTY

PENTA FAMECA would know in no manner of engaging its responsibility on operation for the **TAG5000** for use conditions different from those described in this document, and this in an exclusive way.

PENTA FAMECA will apply the legal warranty in line with the general sales condition.

In the event of failure, turn it over to the factory.

PENTA FAMECA declines any responsibility in case of damage or foreign intervention on the device

## 9. ENVIRONMENT

The electric products should not be put at the reject with household waste.

Thank you to recycle them in the points of collection envisaged for this purpose.

Address near the local authorities or of your retailer to obtain councils on recycling.



Your life,  
Our work.

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