# Model 800 Wireless HV Phase Tester

*User Manual*

**Dear Customer,**

Thank you for purchasing the
Model 800 Wireless HV PHASE DETECTOR!
Please read this manual carefully before using the device.
Please keep this manual for reference.

**Amblyonix Industrial**
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# Table of Contents



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# Before Using the Device

This manual outlines the proper use of the **Model 800 Wireless HV Phase Tester**.
This device uses wireless transmission technology. For your safety, please read and follow the safety instructions properly before using.

| Electrical Safety Symbols | | |
|---|---|---|
| **Lightning bolt**  | **Do not use**  | **Caution**  |
| This symbol indicates risks of high voltage, electric shocks, or live wires. | This symbol indicates unsafe use. Do not touch or use the item. | This symbol indicates a warning to avoid potential risk or danger. |

- You must comply with the country's electrical safety regulations for preventive tests for tools and products.
- You must not use the device in harsh environments such as flammable, explosive, or wet environments.
- You must use the device in accordance with the provisions to ensure safe use.
- You must pay attention to training and examination for staff who work with high-voltage electric lines or near the high-voltage lines.
- You must check the batteries regularly.
    * The X-type and Y-type detectors must use two 1.5V AAA batteries.
    * The handset must use two 1.5V AA batteries.
    * You must avoid using mixed old and new batteries.
    * You must remove the batteries when the device is not in use.
- You must remove the X-type and Y-type detectors from the insulating rods when performing voltage and pressure tests on the insulating rods.
- You must remember that contact between the insulating rod head parts and any metal is strictly prohibited.
- You must not disassemble the instrument without our company's permission.
    * We do not provide any maintenance or replacement warranty for device failure caused by disassembling equipment without our explicit written authorization.
    * We will not be liable for any physical or property damage caused by disassembly of the equipment without our permission.

**Note:** To improve the function of the device, we update the specifications constantly. There is a possibility that the device you are using varies slightly from the contents of this user manual.

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# 1. The Model 800 Wireless HV Phase Tester

## 1.1 Overview

The **Model 800 Wireless HV Phase Tester** is a double-shielded tester that incorporates an innovative digital circuit design. You can use the device on electric lines and sub-stations to

- check the presence of electric power
- measure frequency
- measure phase and phase sequence, and
- verify phase calibration.

The device is compatible with different voltage levels, ranging from 480V to 110KV .

The **Model 800 Wireless HV Phase Tester** is in full compliance with Electromagnetic Compatibility (**EMC)** standards. It has strong anti-interference and is suitable for various electromagnetic interference situations. It is convenient for checking the grid structure of three-phase power lines. It can accurately identify the real-time phasing relationships between three-phase power lines by using two measurement assemblies.

## 1.2 How the Model 800 Wireless HV Phase Tester works

This section explains how the **Model 800 Wireless HV PHASE Tester** works.

***Transmitter***

1. The X-type and Y-type detectors detect whether there is voltage on the line.
2. After checking if the line is energized, the X-type and Y-type detectors automatically send signals via wireless signal transmission to the handset.

***Receiver***

3. The handset receives signals, then decodes and compares the final results.
4. The screen of the handset displays the final results.
    - in-phase or out-of-phase
    - frequency
    - phase angle
    - vector diagrams, and
    - other data and charts.

# 2. Product Information

## 2.1 What's included in the box?

- Handheld terminal
- X-type detector
- Y-type detector
- 2 Hooks
- 2 Terminal tips
- 2 220KV Insulated rods
- 4 1.5V AAA batteries
- 2 1.5V AA batteries
- User Manual
- Warranty Card

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## 2.2 Model 800 Wireless HV Phase Tester Features

This section highlights the features of the **Model 800 Wireless HV Phase Tester**.

**Measuring voltage**

The device is compatible with different voltage levels, ranging from 480V to 110KV.

**Accuracy**

Proofreading errors ≤±3°, Quantitative measurements ≤5°

**Sample rate**:

10 times/second

**Date and time settings**

Adjust the date and time to browse and view historical data.

**Backlight time settings**

Set the backlight time to OFF, ON, or within 1-999 seconds.

**Auto power off settings**

Set the auto power off to N/A, or within 1-999 minutes.

**Phase threshold**

Set by system default, >20° out of phase within 0-90° phase thresholds.

**Field calibration function**

Conduct field calibration of the conductor to be measured to ensure the phase angle accuracy.

**Wireless transmission distance**

The transmission distance between the handset and the X-type and Y-type detectors is ≤150m.

**Interactive interface**

The handset is easy to use with a unique interactive interface that displays easy-to-read charts and data.

**FCC antenna design**

The device has a strong antenna, so the signals pass through walls, doors, or other barriers.

**EMC standards full compliance**

The device is double shielded, has strong anti-interference, and is in full compliance with **EMC** standards.

**Qualitative measurement**

The handset displays real-time phase angle differences, with an error rate of ≤5°.

**Quantitative measurement**

The handset collects information through digital signals transmitted by the detectors.

**Phase calibration**

The device checks the forward and reverse phase sequencing based on the X-type detector's phase position.

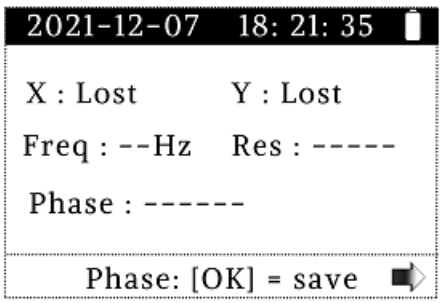
## 2.3 Model 800 Wireless HV Phase Tester Technical Specifications

This table shows the technical specifications of the **Model 800 Wireless HV Phase Tester**.

| | |
|---|---|
| **Accuracy** | Quantitative measurements ≤ 5° |
| **Angle Resolution** | 1° |
| **Display** | LCD will display clearly even in bright sunlight. |
| **Handset Weight** | 0.31 kg |
| **In-phase** | Phase shift ≤20°<br>Threshold within 0-90° can be set. |
| **Out of Phase** | Phase shift >20°<br>Threshold within 0-90° can be set. |
| **Measuring Voltage** | 480V-110KV |
| **Operating Temperature** | -35°C ---+ 50°C |
| **Phase Sequence Measurement** | Determined through 120° clockwise / 240° counterclockwise . |
| **Power Supply** | Handset: two 1.5V AA batteries. |
| | X-type and Y-type detectors: two 1.5V AAA batteries for each detector. |
| **Relative Humidity** | ≤95% RH No Condensation |
| **Sample Rate** | 10 times per second |
| **Storage Temperature Range** | -40°C ---+ 55°C |
| **Wireless Transmission Distance** | Sight distance 150 m |
| **X– type Detector Weight** | 0.16 kg |
| **Y– type Detector Weight** | 0.16 kg |

## 2.4 Model 800 Wireless HV Phase Tester Handheld Interface

This section shows the display screen of the Model 800 Wireless HV Phase Tester.



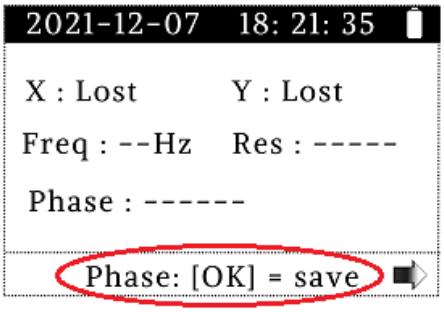

**_____Date / Time / Battery Level**

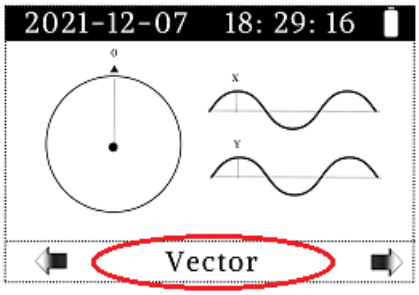
**_____Results Display Window**

**_____Function Menu Prompt**

### 2.4.1 Main Menu

The main menu shows options in the title bar of the user interface.




- **Phase** shows the results of standard tests such as frequency, phase, phase angle.
- **Vector Diagram** displays the phase angle deviation vector charts.
- **Save** saves the test data by pressing OK.
- **Data Explorer** allows the user to view historical data in a timely manner.
- **System Settings** allows the user to configure the date and time, backlit, shutdown, threshold, and calibration.

## 2.5 Changing the Batteries

The **Model 800 Wireless HV Phase Tester** is a battery-powered device.
The handset machine in the boot state retains the remaining power.

- You must change the batteries if the device shows obvious instability.
- You must avoid using mixed old and new batteries.
- You must change the X-type and Y-type detector batteries at the same time.
- You must remove the batteries when the device is not in use.

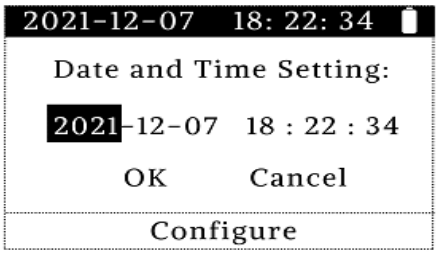
***Handset***
Remove the back cover of the handset, and then change the batteries with two 1.5V AA batteries.

***X type and Y type Detectors***
Remove the back cover of the X-type and Y-type detectors, and then change the batteries of each detector with two 1.5V AAA batteries.

# 3. Configuring the User Interface

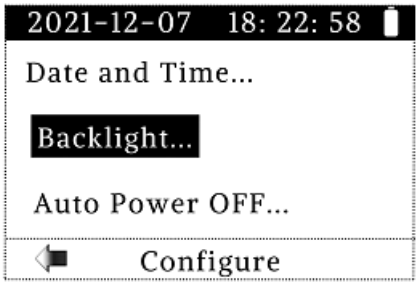
This section provides steps to configure the **Model 800 Wireless HV Phase Tester** user interface.

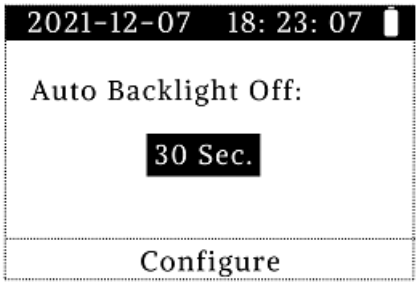
## 3.1 Configuring the Date and Time


1. Press ON/OFF to switch on the handset.
2. Press ▶ to move the cursor to the right.
3. Select **System Settings** to go to the **Configure** screen.
4. On the **Configure** screen, select **Date and Time Setting**, and then press OK.
5. Press ▲ to increase and to ▼ decrease the value.
6. After configuring, press OK to save the correct date and time.
7. Press ESC to return to the **Configure** screen.

## 3.2 Configuring the Backlight Time




1. On the **Configure** screen, press ▼ to move the cursor down.
2. Select **Backlight time** setting and then press OK.
3. Press ◄, ►, ▲, ▼ to scroll through the options
   - **ON**
   - **OFF**
   - **1-999 seconds**.
4. After configuring, press OK to save the preferred backlight setting.
5. Press ESC to return to the **Configure** screen.

## 3.3 Configuring the Auto Power Off


1. On the **Configure** screen, press the ▼ to move the cursor down.
2. Select **Auto Power OFF** setting and then press OK.
3. Press ◄, ►, ▲, ▼ to scroll through the options
   - **N/A**, or
   - **1-999 minutes**.
4. After configuring, press OK to save the preferred power settings.
5. Press ESC to return to the **Configure** screen.

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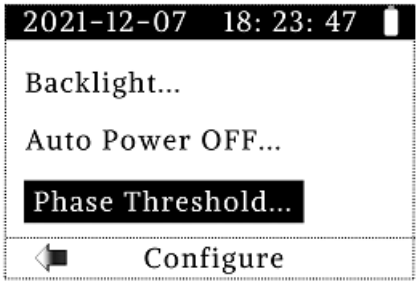
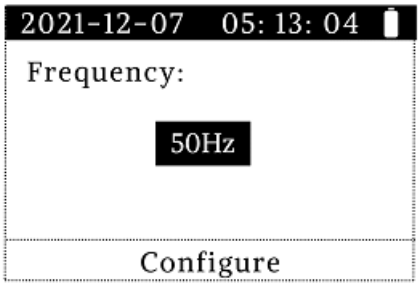
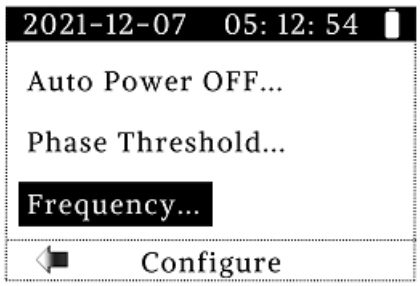
## 3.4 Configuring the Phase Threshold

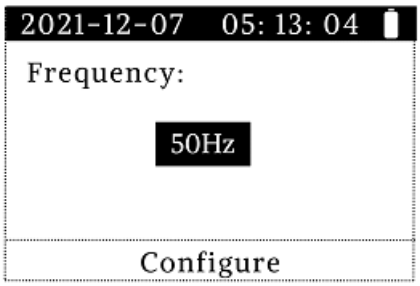



1. On the **Configure** screen, press ▼ to move the cursor down.
2. Select **Phase Threshold** setting and then press OK .
3. Press ◄ , ► , ▲ , ▼ to scroll through the options.
   **Note:** The default threshold is 20 degrees.
4. After configuring, press OK to save the preferred phase threshold setting.
5. Press ESC to return to the **Configure** screen.

## 3.5 Configuring the Frequency




1. On the **Configure** screen, press ▼ to move the cursor down.
2. Select **Frequency** setting and then press OK.
3. Press ◄ , ► , ▲ , ▼ to scroll through the options
   - **50 Hz**, or
   - **60 Hz**.
4. After configuring, press OK to save the preferred frequency setting.
5. Press ESC to return to the **Configure** screen.

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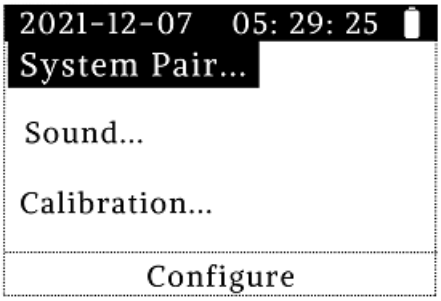
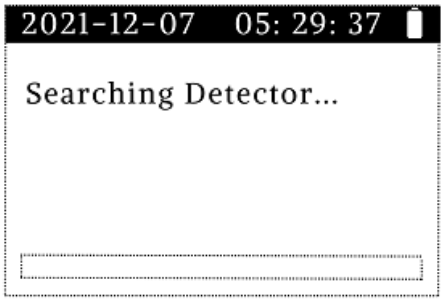
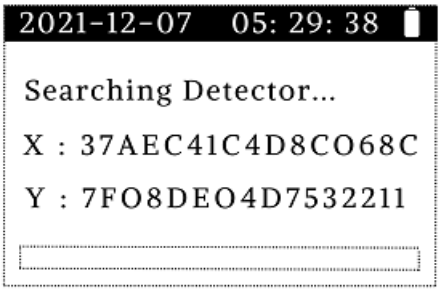
## 3.6 Configuring the System Pair



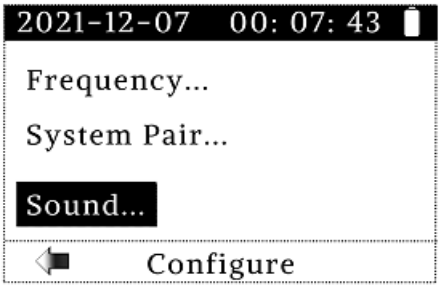

**Note:** By default, the device factory setting has been completed. However, you can reset the system pairing of the X-type and Y-type detectors with the handset.

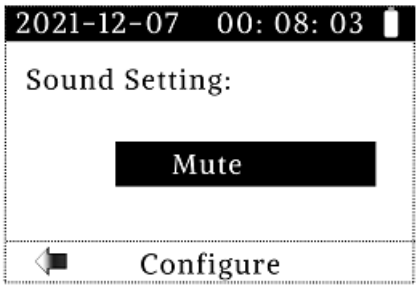
1. Attach the hooks of the X-type and Y-type detectors on the same energized conductor while LED lights are on.
2. Switch on the handset, and then check if the displayed signal is normal.
3. Press to move the cursor to the right.
4. Select **System Settings** to go to the **Configure** screen.
5. On the **Configure** screen, press the to move the cursor down.
6. Select **System Pair** setting and then press OK.
   **Searching Detector** appears on the screen.
7. Wait for a minute, until the device automatically pairs the X and Y detectors' system with the handset.




After pairing is complete, the display automatically returns to the **Configure** screen.

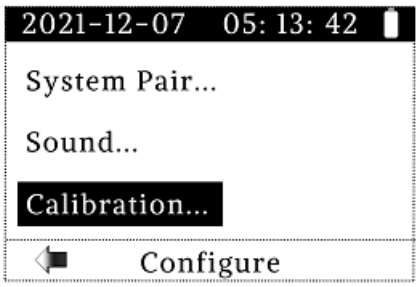
## 3.7 Configuring the Sound Setting

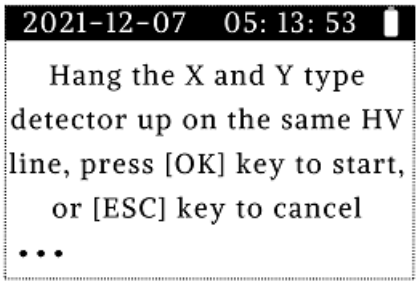



1. On the **Configure** screen, press ▼ to move the cursor down.
2. Select **Sound** setting**,** and then press OK.
3. On the **Sound Setting** screen, press ◄ , ► , ▲ , ▼ to scroll through the options
   - **Mute**, or
   - **ON**.
4. After configuring, press OK to save the preferred sound setting.
5. Press ESC to return to the **Configure** screen.

## 3.8 Configuring the Calibration




1. On the **Configure** screen, press ▼ to move the cursor down.
2. Select **Calibration** setting, and then press OK.
   An instruction appears on the screen.
3. Hang the X-type and Y-type detectors on the same power line.
4. Press OK to start, or ESC to cancel the configuration.
   After pressing OK, **Calibrating** status appears.
5. Press OK to save the calibration results.

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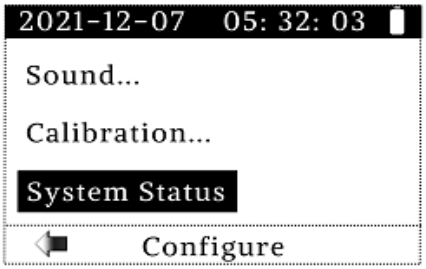
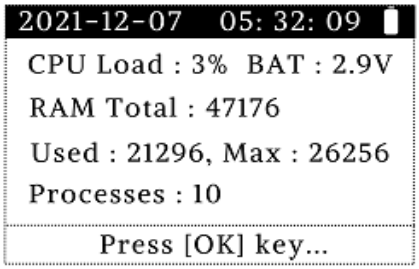
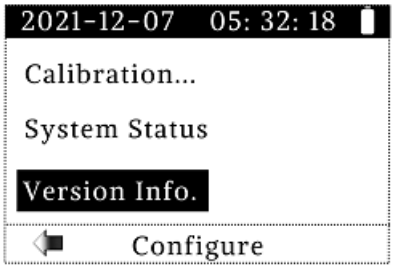
## 3.9 Viewing the System Status

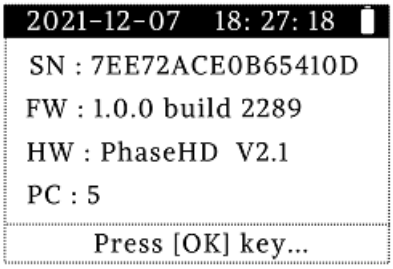



1. On the **Configure** screen, press to move the cursor down.
2. Select **System Status**.
3. Press OK to display the current system status.
   **System status** appears on the screen.
4. After viewing the system status, press OK.
5. Press ESC to return to the **Configure** screen.

## 3.10 Viewing the Version Info




1. On the **Configure** screen, press to move the cursor down.
2. Select **Version Info**.
3. Press OK to display the current version.
   Information about the device appears on the screen.
4. After viewing the version information, press OK.
5. Press ESC to return to the **Configure** screen.

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# 4. During the Test Procedures

This section provides safety instructions during the test in a live working environment.
Please read and follow the instructions properly to ensure safe and proper use of the device.

- Make sure to set the phase calibration properly to ensure the accuracy of the phase angle.
- You must not allow the insulating rod head parts to have contact with metals.
- You must use insulated sticks during phase testing on live equipment.
- During the test, you must keep the X-type and Y-type detectors and the handset within the communication range. The transmission distance must not be greater than 150 meters.

## 4.1 Safety Standards

This section shows the safety standards for using the **Model 800 Wireless HV Phase Tester.**

1. Safe distance between your body and the energized electrical during the test procedures in a live working environment:

| Voltage Grade | 10KV | 35KV | 66KV | 110KV |
|---|---|---|---|---|
| Safe Distances | 0.4M | 0.6M | 0.7M | 1.0M |

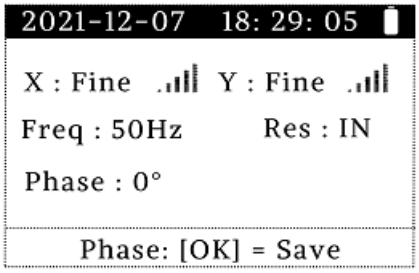
2. Minimum length of effective insulation of the insulating rods during live working environment:

| Voltage Grade | 10KV | 35KV | 66KV | 110KV |
|---|---|---|---|---|
| Insulation rods' minimum length of effective insulation | 0.7M | 0.9M | 1.0M | 1.3M |

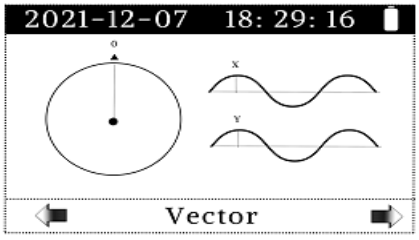
# 5. Test Procedures

## 5.1 Standard Phase Test

This section provides steps to test phase relationships between three-phase connection lines using the **Model 800 Wireless HV Phase Tester**.




1. Attach the hook of the X-type detector to the first energized wire that you need to measure.
2. Attach the hook of the Y-type detector to the second energized wire.
   **Note:** When the X-type detector glows a constant green LED light and the Y-type detector glows a constant red LED light that means they are communicating or transmitting signals.
3. Press ON OFF to switch on the handset.
4. Select **Phase**, and then press OK to save the automated measurement results on the main interface. The handset main interface displays
   - **X** and **Y:** shows **Fine**
   - **Frequency**: shows frequency **60 Hz**
   - **Result**: shows **Diff**
   - **Phase**: shows real-time, **120 degrees**
5. Press ▶ to move the cursor to the right to go to **Vector** functions.
   Phase angle deviation vectors appear.

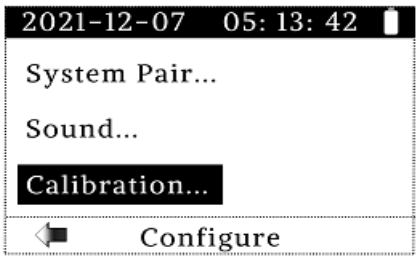


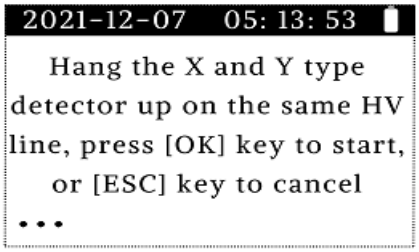

6. Move the hook of the Y-type detector to the third energized wire.
   The Y-type detector glows a constant red LED light.
   The handset main interface receives the signals and displays a new **Phase**, which is 240 degrees .
7. Press OK to save the result to the main interface.

**Note:** If the **Result** shows **IN phase**, the phase relationship between the two wires matches.
If the **Result** shows **OUT of phase**, the phase relationship between two wires differs.

## 5.2 Field Calibration

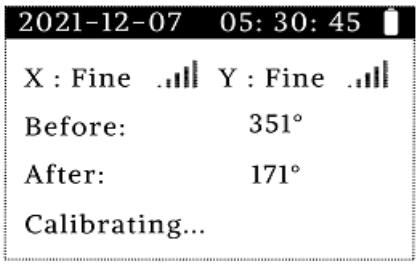
Field calibration is a unique function of the **Model 800 Wireless HV Phase Tester**. The main goal of calibrating the sensors is to establish a starting reference point and ensure accurate measurement.

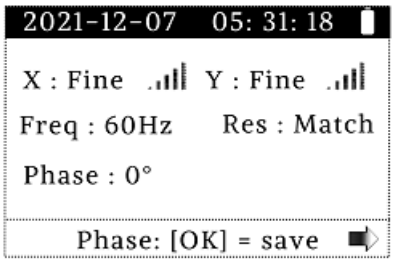



1. Attach the hooks of the X-type and Y-type detectors on the same power line.
2. Switch on the handset, and then press to move the cursor to the right.
3. Select **System Settings** to go to the **Configure** screen.
4. On the **Configure** screen, press to move the cursor down.
5. Select **Calibration**, and then press to enter.

   The handset receives the signals from the X-type and Y-type detectors automatically. A **Calibrating** status appears.




6. Wait for a few seconds for the display to automatically return to the **Configure** screen.
7. When calibration is complete, press to go back to **Phase**.
8. Press to save the calibration result.
9. Press to return to the main interface.

## 5.3 Other Tests

### 5.3.1 X-type and Y-type Probe Test

**Important:** You must test the X-type and Y-type detectors properly to get accurate measurement results.

Attach the hooks of the X-type and Y-type detectors to the wire that you need to measure. When the X-type detector glows a constant green LED light and the Y-type detector glows a constant red LED light that means they are transmitting signals.

| If... | Then.. |
|---|---|
| the X-type and Y-type detectors do not show signals | check and replace the batteries.<br><br>**Note:** After replacing the batteries, the X-type detector glows green and the Y-type detector glows red. |
| the X-type and Y-type detectors still fail after replacing the batteries | contact our After-sales department to schedule a repair. |

### 5.3.2 Insulating Rods Test

**Important:** You must periodically check if the insulating rods are safe to use and have not become electrically conductive.

An insulation safety test must be done periodically to ensure that the insulating rods or fiberglass poles are free from contaminants. During the tests, you must remove the hooks, brackets, and X-type and Y-type detectors from the insulating rods to avoid damage.

**Note:** OSHA Publication 1910.269 (j) (2) (iii) (E) (1) states that tools such as fiberglass poles shall be tested at 75,000 volts per foot of length for one minute. For a complete guide, please refer to the publication.

# 6. After-Sales Services

The **Model 800 Wireless HV Phase Tester** is under warranty for a period of one year from the date of purchase. In situations where warranty service is required, you must contact our After-sales department or visit our website for more information.

**Warranty inclusions:**

- Replacement of Parts
- Maintenance
- Technical Services

**Warranty conditions:**

- We do not provide maintenance and replacement warranty for device failure caused by disassembling equipment without our explicit written authorization.
- We are not responsible for any physical or property damage caused by
    * negligence
    * abuse
    * misuse, or
    * improper installation.

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