# General Warranty

We warrant that the product will be free from defects in materials and workmanship for a period of 3 years from the date of purchase of the product by the original purchaser from our company. The warranty period for accessories such as probes, battery is 12 months. This warranty only applies to the original purchaser and is not transferable to a third party.

If the product proves defective during the warranty period, we will either repair the defective product without charge for parts and labour, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by our company for warranty work may be new or reconditioned like new. All replaced parts, modules and products become the property of our company.

In order to obtain service under this warranty, the customer must notify our company of the defect before the expiration of the warranty period. Customer shall be responsible for packaging and shipping the defective product to the designated service centre, a copy of the customers proof of purchase is also required.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care.

We shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than our company representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of not our supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

Please contact the nearest Sales and Service Offices for services.

**Excepting the after-sales services provided in this summary or the applicable warranty statements, we will not offer any guarantee for maintenance definitely declared or hinted, including but not limited to the implied guarantee for marketability and special-purpose acceptability. We should not take any responsibilities for any indirect, special or consequent damages.**

※：The illustrations, interface, icons and characters in the user manual may be slightly different from the actual product. Please refer to the actual product.

# Table of Contents

# 1. General Safety Requirements

**Before any operations, please read the following safety precautions to avoid any possible bodily injury and prevent this product or any other products connected from damage. In order to avoid any contingent danger, this product is only used within the range specified.**

Check AC power input setting according to the standards in your own country (see page 8, *AC Power Input Setting*).

Only the qualified technicians can implement the maintenance.

**To avoid Fire or Personal Injury:**

- **Use Proper Power Cord.** Use only the power cord supplied with the product and certified to use in your country.
- **Product Grounded.** This instrument is grounded through the power cord grounding conductor. To avoid electric shock, the grounding conductor must be grounded. The product must be grounded properly before any connection with its input or output terminal.
- **Check all Terminal Ratings.** To avoid fire or shock hazard, check all ratings and markers of this product. Refer to the user's manual for more information about ratings before connecting to the instrument.
- **Do not operate without covers**. Do not operate the instrument with covers or panels removed.
- **Use Proper Fuse.** Use only the specified type and rating fuse for this instrument.
- **Avoid exposed circuit**. Do not touch exposed junctions and components when the instrument is powered.
- **Do not operate if in any doubt.** If you suspect damage occurs to the instrument, have it inspected by qualified service personnel before further operations.
- **Use your instrument in a well-ventilated area.** Make sure the instrument installed with proper ventilation, refer to the user manual for more details.
- **Do not operate in wet conditions.**
- **Do not operate in an explosive atmosphere.**
- **Keep product surfaces clean and dry.**

# 2. Safety Terms and Symbols

## Safety Terms

**Terms in this Manual.** The following terms may appear in this manual:

**Warning:** Warning indicates the conditions or practices that could result in injury or loss of life.

**Caution:** Caution indicates the conditions or practices that could result in damage to this product or other property.

**Terms on the Product.** The following terms may appear on this product:

**Danger:** It indicates an injury or hazard may immediately happen.

**Warning:** It indicates an injury or hazard may be accessible potentially.

**Caution:** It indicates a potential damage to the instrument or other property might occur.

## Safety Symbols

**Symbols on the Product**. The following symbol may appear on the product:


Hazardous Voltage


Refer to Manual


Protective Earth Terminal


Chassis Ground


Test Ground

# 3. Front/Rear Panel and User Interface

## Front Panel Overview

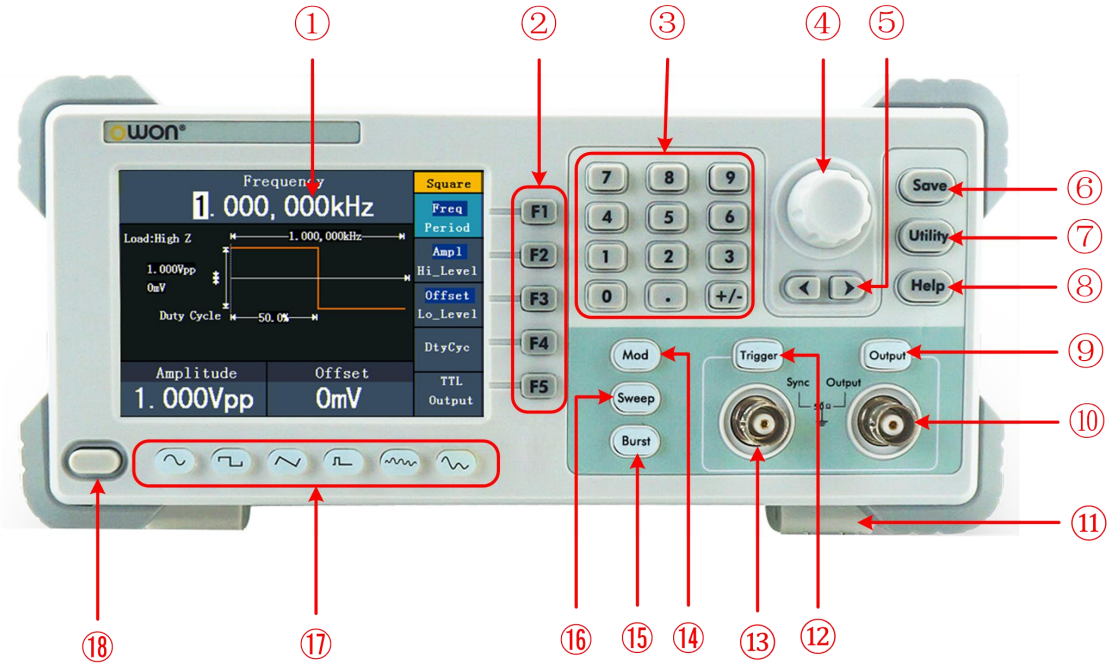



Figure 3- 1 Front panel overview (the model with "F" is shown)

| | | |
|---|---|---|
| ① | **LCD** | Display the user interface. |
| ② | **Menu selection buttons** | Include 5 buttons: F1 ～F5, activate the corresponding menu. |
| ③ | **Number keys** | Input parameters, include: number, point and plus/minus sign. |
| ④ | **Knob** | Change the current highlighted number, also can be used to select file location or switch the character of the soft keyboard when entering file name.<br>In Sweep and N-Cycle Burst, if you choose Source as "Manual", every time you press this knob, the generator will be triggered once (only for the model with "F"). |
| ⑤ | **Direction key** | Move the cursor of the focused parameter or select the file locations . |
| ⑥ | **Save button** | Manage the waveform files in the file system. |
| ⑦ | **Utility button** | Set the auxiliary system function. |
| ⑧ | **Help button** | View the build-in help information. |
| ⑨ | **Output key** | Activate or deactivate the output signal. The button is lit when it is in the On state. |

| | | |
|---|---|---|
| ⑩ | **Main output terminal** | Output main signal. |
| ⑪ | **Foot stool** | Make the instrument to be tilted for ease of operation. |
| ⑫ | **Trigger key** | Activate or deactivate the sync signal output. The button is lit when it is in the On state. |
| ⑬ | **Sync output terminal** | Output sync signal (see P12, "To Set the Sync Output"). |
| ⑭ | **Modulation** | **(Only for the model with "F")** Generate the Modulated waveforms. |
| ⑮ | **Burst** | **(Only for the model with "F")** Generate burst for Sine, Square, Ramp, Pulse or Arbitrary waveform. |
| ⑯ | **Sweep** | **(Only for the model with "F")** Sweep Sine, Square or Ramp waveform. |
| ⑰ | **Waveform selection buttons** | Include: Sine , Square , Ramp , Pulse , Noise and Arbitrary waveform. When a waveform is selected, the backlight of the button turns on. |
| ⑱ | **Power button** | Turn on/off the generator. |

# Rear Panel Overview

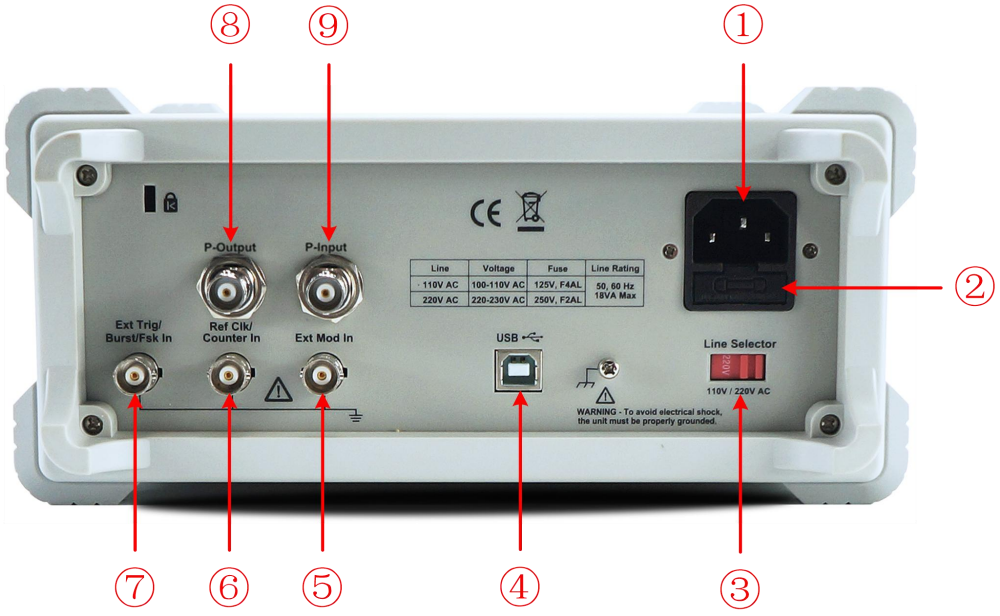



Figure 3- 2 Rear panel overview (the model with "F" is shown)

| | | |
|---|---|---|
| ① | **Power socket** | AC input connector. |
| ② | **Fuse** | The rating is: |

| | | |
|---|---|---|
| | | 100 - 120 V \| 250 V, F1AL<br>220 - 240 V \| 250 V, F0.5AL |
| ③ | **Power switch** | Switch between 110 V and 220 V. |
| ④ | **USB (type B) connector** | This can be used to connect a USB type B controller. Connect with an external device, such as connected to a PC and controlled via PC software. |
| ⑤ | **Ext Mod In Connector** | **(Only for the model with "F")** External modulation input, use it as external signal source. |
| ⑥ | **Ref Clk/Counter In connector** | **(For the model without "F" is Ref Clk In)** To accept an external clock signal, or to accept the input signal of counter (Accepting input signal of counter is only for the model with "F"). |
| ⑦ | **Ext Trig/Burst/Fsk In connector** | **(Only for the model with "F")** This signal can be used as external signal source in Sweep, Burst and FSK mode. |
| ⑧ | **P-Output connector** | Signal output for the Power Amplifier. See page 12, *To Use the Power Amplifier (Optional)* |
| ⑨ | **P-Input connector** | Signal input for the Power Amplifier. See page 12, *To Use the Power Amplifier (Optional)* |

# User Interface

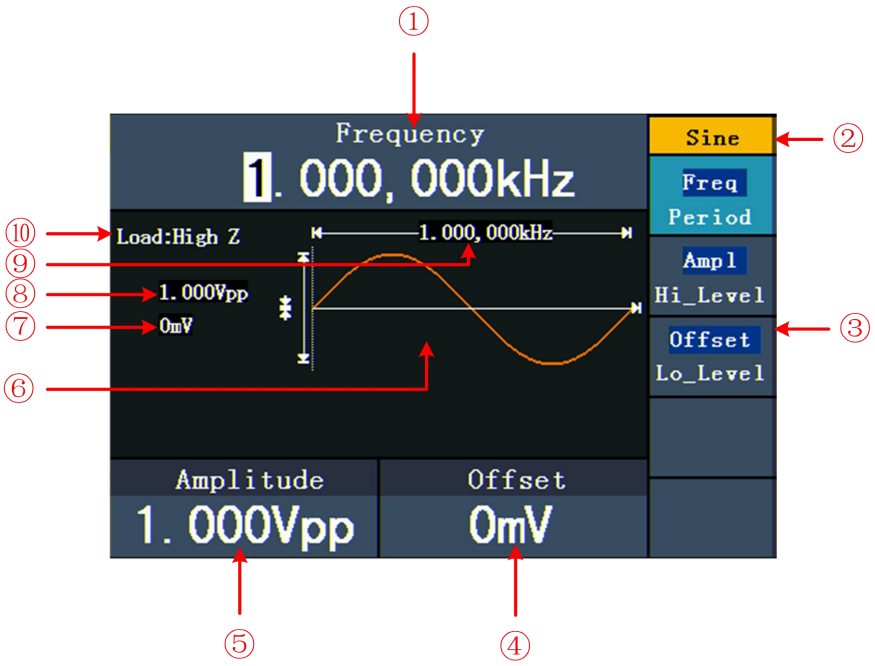



Figure 3-3 User interface (take Sine for instance)

| |
|---|
| ① Parameter 1, display parameter and edit the focused parameter. |
| ② Current signal type or mode. |
| ③ The setting menu of current signal or mode. |
| ④ Parameter 3, display parameter and edit the focused parameter. |
| ⑤ Parameter 2, display parameter and edit the focused parameter. |
| ⑥ Display current waveform. |
| ⑦ Offset/low level, depends on the highlighted menu item on the right. |
| ⑧ Amplitude/high level, depends on the highlighted menu item on the right. |
| ⑨ Frequency/period, depends on the highlighted menu item on the right. |
| ⑩ Load, High Z represents high resistance. |

# 4. General Inspection

After you get a new Waveform Generator, it is recommended that you should make a check on the instrument according to the following steps:

1. **Check whether there is any damage caused by transportation.**

   If it is found that the packaging carton or the foamed plastic protection cushion has suffered serious damage, do not throw it away first till the complete device and its accessories succeed in the electrical and mechanical property tests.

2. **Check the Accessories**

   The supplied accessories have been already described in the *Appendix A: Enclosure* of this Manual. You can check whether there is any loss of accessories with reference to this description. If it is found that there is any accessory lost or damaged, please get in touch with our distributor responsible for this service or our local offices.

3. **Check the Complete Instrument**

   If it is found that there is damage to the appearance of the instrument, or the instrument can not work normally, or fails in the performance test, please get in touch with our distributor responsible for this business or our local offices. If there is damage to the instrument caused by the transportation, please keep the package. With the transportation department or our distributor responsible for this business informed about it, a repairing or replacement of the instrument will be arranged by us.

# Foot Stool Adjustment

Unfold the foot stools on the bottom of the generator, as ⑪ in *Figure 3-1*.

# 5. Power-On Check

## AC Power Input Setting

Adopt 100 - 110 VAC or 220 - 230 VAC power source. Users should regulate the voltage scale of the **Power Switch** according to the standards in their own country (see *Figure 3- 2*) at the rear panel.

To change the voltage scale of the instrument, do the following steps:

**(1)** Turn off the power button at the front panel and remove the power cord.

**(2)** Regulate the **Power Switch** to the desired voltage scale.

## Power On

**(1)** Connect the instrument to the AC supply using the supplied power cord.

**Warning:**
To avoid electric shock, the instrument must be grounded properly.

**(2)** Press down the **power button** at the front panel, the screen shows the boot screen.

# 6. Quick Start

## Channel Output On/Off

Press **Output** to turn on/off signal output. The button is lit when it is in the On state. You can configure the signal with the outputs off to minimize the chance of sending a problematic signal.

## To set signals

The waveform generator is available to set and output Sine, Square, Ramp, Pulse, Noise and Arbitrary signals. Press Waveform selection buttons on the front panel: Sine, Square, Ramp, Pulse, Noise, Arbitrary to enter waveform setting interface. Different waveform has different parameters.

**E.g.**: Press button. Press **F1** button, the chosen menu item is highlighted, the focused parameter is displayed in **Parameter 1**. Press **F1** button to switch between Frequency/Period.

**Two methods to change the chosen parameter:**

- Turn the **knob** to change the value of cursor position. Press ◀ / ▶ direction key to move the cursor.
- Press a number key in the front panel, an input box will pop up; keep going to input the value. Press ◀ direction key to delete the last number. Press **F1** - **F3** to choose the unit, or press **F4** to go to next page and choose other units. Press **F5** to cancel the input.

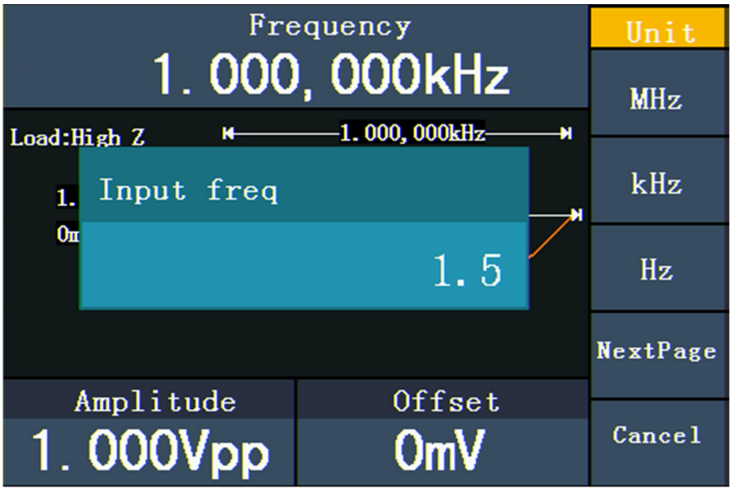



Figure 6-1: Set the frequency using number keys

Parameters of waveforms

| Waveforms | Menu Items |
|---|---|
| Sine | Freq/Period, Ampl/Hi_Level, Offset/Lo_Level |
| Square | Freq/Period, Ampl/Hi_Level, Offset/Lo_Level, DtyCyc,TTL Output |
| Ramp | Freq/Period, Ampl/Hi_Level, Offset/Lo_Level, Symmetry |
| Pulse | Freq/Period, Ampl/Hi_Level, Offset/Lo_Level, P_Width/DtyCyc |
| Noise | Ampl/Hi_Level, Offset/Lo_Level |
| Arbitrary | Freq/Period, Ampl/Hi_Level, Offset/Lo_Level, Built-in Wform, Editable Wform |

## To Generate the Modulated Waveform (Only for the model with "F")

Press the **Mod** button to generate modulated waveform. The waveform generator can modulate waveform using AM (Amplitude Modulation), FM (Frequency Modulation), PM (Phase Modulation), and FSK (Frequency Shift Keying). To turn off the modulation, press the **Mod** button.

Parameters of modulated waveforms:

| Types | Parameters |
|---|---|
| AM | Source Internal (ModShape, AM Freq, Mod Depth) / Source External |
| FM | Source Internal (ModShape, Mod Freq, FM Dev) / Source External (FM Dev) |
| PM | Source Internal (ModShape, PM Freq, Phase Dev) / Source External (Phase Dev) |
| FSK | Source Internal (FSK Rate, Hop Freq) / Source External (Hop Freq) |

## To Generate Sweep (Only for the model with "F")

In the frequency sweep mode, the generator "steps" from the start frequency to the stop frequency at the sweep rate you specify. Sweep can be generated by Sine, Square or Ramp Waveforms.

When the output signal is Sine, Square or Ramp waveform, press the **Sweep** button to enter the Sweep mode. The parameters as Sweep Time, Linear/Log, Sta_Freq/Ctr_Freq, StopFreq/FreqSpan and Source are allowed to be set.

## To Generate Burst (Only for the model with "F")

Press the **Burst** button to generate versatile waveforms in burst. Burst can last for certain times of waveform cycle (N-Cycle Burst), or to be controlled by external gated signals (Gated Burst). Bust can apply to Sine, Square, Ramp, Pulse and Arbitrary waveforms (Noise can not be used).

Parameters as Burst Period, Start Phase, Cycles/Infinite and Source are allowed to be set in N-Cycle mode; while Start Phase and Polarity are available in Gated mode.

# To Manage File

Press **Save** function button to enter the file system. You can view the waveform files, create a new folder, and perform the file operations such as delete, rename, copy and paste.

## To Edit the File Name

In file system, the user can edit the name of a file or a folder. When the system needs the user to input a name, an input keyboard will appear.

**(1)** Turn the **knob** or press ◀ / ▶ direction key to move the cursor left and right in the keyboard. Press **F3** to switch between capital and small of the characters.

**(2)** Press **F1** to enter the current character. Press **F2** to delete the last character .

**(3)** Press **F4** to finish editing and save the file. Press **F5** to cancel the save operation.

**Note**: The length of file name is up to 15 characters.

# To Set the Utility Function

Press **Utility** function key to enter the Utility Menu. You can set the parameters of the Generator such as: Display Parameter, Counter Parameter (only for the model with "F"), Output Parameter and System Setting. Press **Utility** again to exit the Utility Menu.

Utility Menu items

| Menu Item | Explanations |
|---|---|
| **Disp Setup** | |
| Bright | Set the parameter of LCD brightness. |
| Sepr | Set the separator of the displayed parameter. |
| Scrn Svr | Time range is 1 - 999 minutes. |
| **Counter (Only for the model with "F")** | |
| Freq/Period | View the measure result of frequency or period. |
| PWidth/DutyCyc | View the measure result of positive width or duty. |
| Set | Enter measurement setting menu. |
| **Output Setup** | |

| | |
|---|---|
| Load | Used to match the displayed voltage with the expected load. The load range is 1 Ω - 10 KΩ. |
| **System** | |
| Language | Switch display languages. |
| Power On | Switch between Default/Last |
| Set to Default | Set all the settings to default. |
| Beep | On is to activate the sound when the system informs you. |
| Sys info | View the Version and Serial number. |
| CLK Src | Switch between Internal/External. |

# To Set the Sync Output

The Generator provides Sync output through the **Sync output terminal** on the Front Panel. All standard output functions (except DC and Noise) have a corresponding Sync Signal.

Press **Trigger** button to activate or deactivate the Sync Signal on the **Sync output terminal** on the front panel. When it is deactivated, the output Voltage of the **Sync output terminal** is Level Low.

**Note**:
When the amplitude is relatively low, disabling Sync Signal can reduce the distortion in output.

# To Use the Power Amplifier (Optional)

The Power Amplifier module is optional for the generator, can be used in power circuit test, power components measurement, constant voltage output, magnetization characteristic measurement, scientific research and education.

**Features**:

- Gain: X10;
- Virtual Value of Sine Output Power: 10W;
- Input Impedance: 50 kΩ;
- The integrated output protection circuit (overcurrent protection and internal temperature abnormal protection) provided with ensures the instrument is working stably and safely;
- Full power bandwidth: DC – 100 kHz.

## How to Use:

Connect the input signal to the **P-Input** connector on the rear panel; the **P-Output** connector outputs the amplified signal.

## To Use Built-in Help

**(1)** Press **Help** function button, the catalog will display in the screen.

**(2)** Press **F1** or **F2** to choose help topic, or just turn the **knob** to choose.

**(3)** Press **F3** to view the details about the topic; press **F5** to go back to the catalog.

**(4)** Press **Help** again to exit the help, or just do other operations.

# 7. Communication with PC

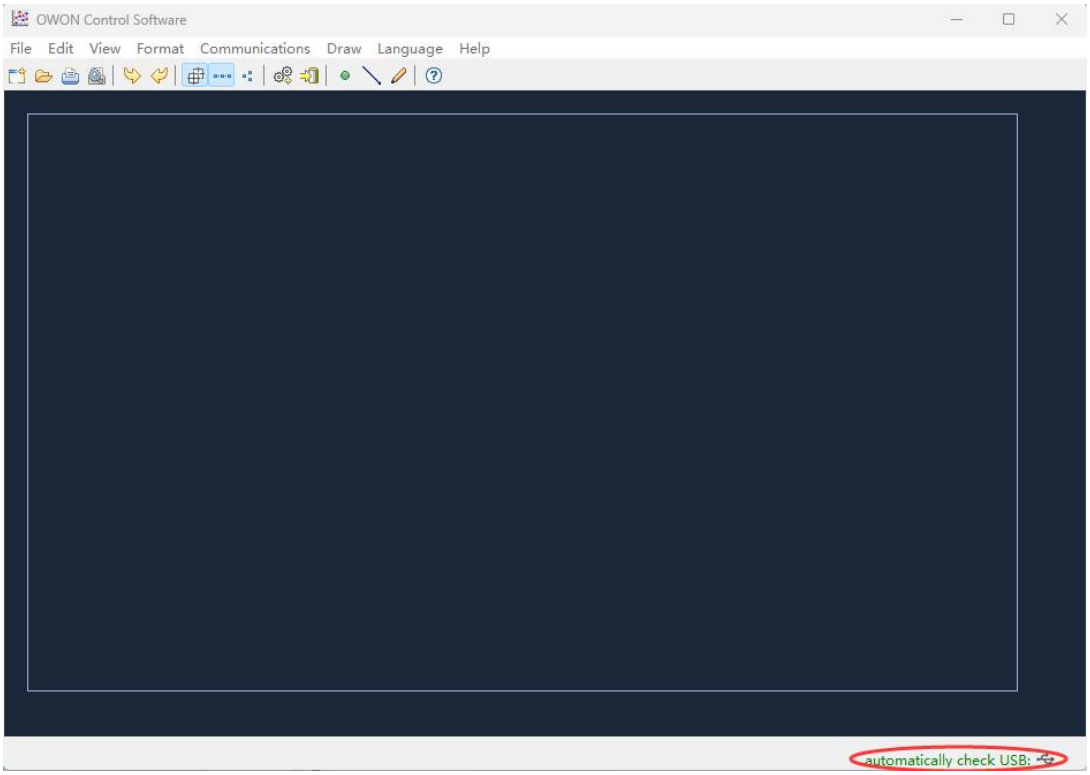
The Waveform Generator supports communications with a PC through USB port. You can use the ultrawave communication software to set the parameters, control the output of the Waveform Generator.

Here is how to connect with PC. Install the ultrawave communication software on the PC.

(1) **Connection:** Use a USB data cable to connect the **USB (type B) connector** on the rear panel of the Waveform Generator to the USB port of a PC.

(2) **Install the driver:** When the Waveform Generator is turned on, click the ultrawave installation package,a dialog will appear on the PC screen and guide you to install the USB driver. The driver is in the "USBDRV" folder under the directory where the ultrawave communication software is installed, such as "C:\Program Files\OWON\ultrawave\USBDRV".

(3) **Port setting of the software:** Run the ultrawave software; click "Communications" in the menu bar, choose "Ports-Settings", in the setting dialog, choose "Connect using" as "USB". After connect successfully, the connection information in the bottom right corner of the software will turn green,as shown in the following picture.



# 8. Appendix

## Appendix A: Enclosure

- A power cord that fits the standard of the destination country
- A USB cable
- A CD (PC link application software)
- A Quick Guide
- A BNC/Q9 cable

## Appendix B: General Care and Cleaning

**General Care**

Do not store or leave the instrument where the liquid crystal display will be exposed to direct sunlight for long periods of time.

**Caution:** To avoid any damage to the instrument, do not exposed it to any sprays, liquids, or solvents.

**Cleaning**

Inspect the instrument as often as operating conditions require.
To clean the instrument exterior, perform the following steps:

1. Wipe the dust from the instrument surface with a soft cloth. Do not make any scuffing on the transparent LCD protection screen when clean the LCD screen.
2. Disconnect power before cleaning your instrument. Clean the instrument with a wet soft cloth not dripping water. It is recommended to scrub with soft detergent or fresh water. To avoid damage to the instrument, do not use any corrosive chemical cleaning agent.

⚠ **Warning:** Before power on again for operation, it is required to confirm that the instrument has already been dried completely, avoiding any electrical short circuit or bodily injury resulting form the moisture.