JUNCTEK®

Function/Arbitrary waveform signal generator

Model: JDS8000 series

User Manual

Hangzhou Junce Instruments Co., Ltd.

The pictures in this guide take JDS8000 as an example

JDS8000 series

Function arbitrary signal generator

User's Manual

Rev1.0 June 2022

This manual takes the JSD8060 signal generator as an example to introduce.

Guaranty and Declaration

Trademark Information
JUNCTEK is a registered trademark of Hangzhou Junce Instruments Co., Ltd.

Notices
JUNCTEK products are covered by P.R.C. patents, issued and pending.
This document replaces all previously published documentation.

Contact Us
If you have any problem or requirement when using our products or this manual, please contact JUNCTEK.
E-mail: **junce@junteks.com**
Website: **www.junteks.com**

Safety Requirement

Safety specifications and safe use

General Safety Summary
Please review the following safety precautions carefully before putting the instrument into operation so as to avoid any personal injury or damage to the instrument and any product connected to it. To prevent potential hazards, please follow the instructions specified in this manual to use the instrument properly.

Use Proper Power Cord
Only the exclusive power cord designed for the instrument and authorized for use within the local country could be used.

Connect the Probe Correctly
If a probe is used, do not connect the ground lead to high voltage since it has isobaric potential as the ground.

Observe All Terminal Ratings
To avoid fire or shock hazard, observe all ratings and markers on the instrument and check your manual for more information about ratings before connecting the instrument.

Use Proper Over-voltage Protection
Ensure that no over-voltage (such as that caused by a bolt of lightning) can reach the product. Otherwise, the operator might be exposed to the danger of an electric shock.

Do Not Operate Without Covers
Do not operate the instrument with covers or panels removed.

Do Not Insert Anything Into the Air Outlet
Do not insert anything into the air outlet to avoid damage to the instrument.

Avoid Circuit or Wire Exposure
Do not touch exposed junctions and components when the unit is powered on.

Do Not Operate With Suspected Failures
If you suspect that any damage may occur to the instrument, have it inspected by **JUNCTEK** authorized personnel before further operations. Any maintenance, adjustment or replacement especially to circuits or accessories must be performed by **JUNCTEK** authorized personnel.

Provide Adequate Ventilation
Inadequate ventilation may cause an increase of temperature in the instrument, which would cause damage to the instrument. So please keep the instrument well ventilated and inspect the air outlet regularly.

Do Not Operate in Wet Conditions
To avoid short circuit inside the instrument or electric shock, never operate the instrument in a humid environment.

Do Not Operate in an Explosive Atmosphere
To avoid personal injuries or damage to the instrument, never operate the instrument in an explosive atmosphere.

Keep Instrument Surfaces Clean and Dry
To avoid dust or moisture from affecting the performance of the instrument, keep the surfaces of the instrument clean and dry.

Prevent Electrostatic Impact
Operate the instrument in an electrostatic discharge protective environment to avoid damage induced by static discharges. Always ground both the internal and external conductors of cables to release static before making connections.

Handle with Caution
Please handle with care during transportation to avoid damage to keys, knobs, interfaces, and other parts on the panels.

Notices

1. Make sure that the input power is correct.
2. The shell of the instrument is fragile and easy to corrode. Please don't hit or close to chemicals to avoid corrosion.
3. Working temperature: -10~ 50℃, storage temperature : -20 ~70℃, and keep the instrument in a dry environment.
4. Do not attempt to disassemble the instrument, it will void the warranty. There are no user-serviceable parts inside the instrument. Repairs can only be made through designated repair outlets or sent back to the factory.
5. Please avoid placing unsafe items such as lighted candles, cups with water, and corrosive chemicals on the surface of the instrument to avoid damage to the instrument.
6. The display screen is a fragile device, please do not touch or bump it . Please avoid children playing with the instrument. When there is dirt on the LCD surface, wipe it carefully with a soft cloth.
7. Please do not move the instrument violently to avoid causing irreparable damage to the internal circuit. If the instrument does not work properly, please contact the supplier!

Warranty and after-sales service

To maximize your understanding and use of the features of your new product, we recommend that you take the following steps:
1. Read the safe and effective use guide.
2. Read the warranty terms and conditions.

Warranty conditions

The warranty period of the instrument is one year from the date of shipment. During the warranty period, the company chooses to repair or replace the faulty instrument according to the situation. If maintenance is required, please contact the after-sales service and mail this product to our company.

The following conditions are not covered by the warranty

Improper operation or maintenance by the user; Use the software or power interface provided by the user; Disassemble and repair the instrument without permission.

Contents

Inspection

When you get a new JDS8000 series arbitrary function signal generator, it is recommended that you inspect the instrument according to the following steps.

Inspect the Packaging

If the packaging has been damaged, do not dispose the damaged packaging or cushioning materials until the shipment has been checked for completeness and has passed both electrical and mechanical tests. The consigner or carrier shall be liable for the damage to the instrument resulting from shipment. We would not be responsible for free maintenance/rework or replacement of the instrument.

Check the Contents

Please check the contents according to the packing lists. If the instruments are damaged or incomplete, please contact your JUNCTEK sales representative.

Host	**JDS8000 arbitrary function signal generator**	**1pc**
Accessory	**Power cord**	**1pc**
	USB cable	**1pc**
	BNC to alligator clips test lead	**2pc**
	BNC male plug test lead	**1pc**
	Certificate of conformity	**1pc**
	Quick guide	**1pc**

Inspect the Instrument

In case of any mechanical damage, missing parts, or failure in passing the electrical and mechanical tests, contact your JUNCTEK sales representative.

Chapter Ⅰ Signal Generator Overview

1.The Instrument Introduction

JDS8000 series function arbitrary signal generator can generate sine wave, square wave, triangle wave, pulse wave, arbitrary wave and other waveforms. The frequency can reach up to 80MHz, and it has functions such as modulation, frequency sweep, measurement and voltage control, and can display the output signal, amplitude, phase, duty and frequency at the same time. The instrument has excellent amplitude-frequency characteristics, multi-function, high performance, cost-effective, portable and other characteristics, providing a new choice for education, research and development, production, testing and other industries.

The instrument is compact and beautiful in appearance, and is equipped with a 2.8-inch high-resolution color LCD screen to bring a new visual experience.

2.Dimension

3.Specifications

Frequency Characteristic		
Model	**JDS8060**	**JDS8080**
Sine waveform frequency range	1nHz~60MHz	1nHz~80MHz
Square waveform frequency range	1nHz~15MHz	1nHz~15MHz
Triangle waveform frequency range	1nHz~15MHz	1nHz~15MHz
Pulse waveform frequency range	1nHz~10MHz	1nHz~10MHz
TTL digital waveform frequency range	1nHz~6MHz	1nHz~6MHz
Arbitrary waveform frequency range	1nHz~6MHz	1nHz~6MHz
Pulse width adjustment range	20nS~4S	20nS~4S
Rise time	≤20ns	≤10ns
Fall time	≤20ns	≤10ns
Frequency minimum resolution	1nHz（0.000000001Hz）	
Frequency accuracy	±5ppm 0 to 50℃	
Frequency stability	±3ppm per 1 year	
Waveform Characteristics		
Waveform type	Sine wave, square wave, triangle wave, pulse wave (duty cycle adjustable, pulse width and cycle time precisely adjustable), ramp, CMOS wave, DC level (setting DC amplitude by adjusting bias), partial sine wave, half wave, full wave, positive ladder wave, anti ladder wave, positive ladder wave, anti ladder wave, noise wave, exponential rise, exponential drop, logarithmic rise, logarithmic drop, cinker pulse, multi audio wave Lorentz pulse and 99 user-defined waveforms.	
Wave length	8192 points/channel	
Sampling rate	275MSa/S	
Waveform vertical resolution	14 bits	
Harmonic suppression	≥45dBc(<1MHz); ≥40dBc(1MHz~20MHz)	
Total harmonic distortion	<1%(20Hz~20kHz,0dBm)	
Square wave and pulse wave overshoot	≤5%	
Duty cycle adjustment range	0.01%~99.99%	
Sawtooth waveform linearity	≥98%（0.01Hz-10kHz）	
Output Characteristics		
Amplitude range of the sine waveform	Frequency＜1MHz 1MHz≤Frequency＜11MHz	2mVpp~25Vpp 2mVpp~20Vpp

	11MHz≤Frequency＜31MHz 31MHz≤Frequency＜61MHz 61MHz≤Frequency≤80MHz	2mVpp~10Vpp 2mVpp~5Vpp 2mVpp~3.6Vpp
Amplitude range of square/triangle waveforms	Frequency＜1MHz 1MHz≤Frequency＜11MHz 11MHz≤Frequency≤15MHz	2mVpp~25Vpp 2mVpp~20Vpp 2mVpp~10Vpp
Amplitude resolution	1mVpp	
Amplitude stability	± 1% ±1 mVpp (@ 1 kHz,>10 mVpp)	
Amplitude flatness	● ±1%(0.1dB)<10MHz ● ±2%(0.2dB)<10MHz~50MHz ● ±10%(0.9dB)<50MHz~70MHz	
Waveform output		
Impedance	50Ω±10% (typical)	
Protection	All signal outputs can be on within 60s under load short circuit	
DC Offset		
Adjustment range	-9.99V-12.00V	
Resolution	0.01 V	
Phase characteristics		
Adjustment range	0~359.99°	
Resolution	0.01°	
Measurement and counter function		
Measurement mode		
Measurement function	Frequency, positive/negative pulse width, period, duty cycle	
Coupling method	DC, AC	
Gate time	0.001S-10.000S	
Measurement mode	Low frequency, high frequency	
Frequency measurement range	1Hz~100MHz	
Input signal amplitude range	1Vpp~20Vpp	
Period measurement	10nS~4S	
Pulse Width	4S	
Duty cycle measurement range	0.01%~99.99%	
Counter mode		
Range	0-4294967295	
Coupling method	DC and AC	
Counter method	Manual	
Modulation characteristics		
Modulation type	AM、FM、PM、ASK、FSK、PSK、PWM、BURST	
AM		
Carrier waveform	Sine, square, ramp, arbitrary (except DC)	
Source	Internal/External	
Modulation waveform	Sine, square, ramp, noise, arbitrary	

Depth	0% to 200%
Modulation frequency	1mHz to 1MHz
FM	
Carrier waveform	Sine, square, ramp, arbitrary (except DC)
Source	Internal/External
Modulation waveform	Sine waveform, square waveform, ramp waveform, noise waveform, arbitrary waveform
Modulation frequency	1mHz to 1MHz
Frequency deviation	0.1Hz to 10kHz
PM	
Carrier waveform	Sine, square, ramp, arbitrary (except DC)
Source	Internal/External
Modulation waveform	Sine, square, ramp, arbitrary (except DC)
Phase deviation	0° to 360°
Modulation frequency	1mHz to 1MHz
ASK	
Carrier waveform	Sine, square, ramp, arbitrary (except DC)
Source	Internal/External
Polarity	Positive and negative
Rate	1mHz to 1MHz
ASK amplitude	0% to 200%
FSK	
Carrier waveform	Sine, square, ramp, arbitrary (except DC)
Source	Internal/External
Modulation waveform	Pluse waveform with 50% duty cycle
Polarity	Positive and negative
Rate	1mHz to 1MHz
Frequency hopping	0.1Hz to 80MHz
PSK	
Carrier waveform	Sine, square, ramp, arbitrary (except DC)
Source	Internal/External
Polarity	Positive and negative
Rate	1mHz to 1MHz
PSK phase	0° to 360°
PWM	
Carrier waveform	Pulse
Wave inversion	Regular and reverse
Pulse period	0.02uS to 40S
Pulse Width	0.020uS to 4S
Burst	
Idle	Zero position, positive maximum, negative maximum
Mode	Single, automatic
Trigger source	Manual, CH2 burst, external (AC), external (DC)

Pulse number	1-1048575
External modulation input characteristics	
Input signal amplitude range	0~3Vpp
Input signal frequency range	20Hz~20kHz
Sweep characteristics	
Sweep channel	CH1 or CH2
Carrier waveform	Sine, square, ramp, arbitrary (except DC)
Sweep function	Sweep frequency, sweep amplitude, sweep duty
Sweep mode	Linear, logarithmic
Sweep direction	Increment, decrement, round trip
Start/stop frequency	Consistent with the upper and lower limits of the corresponding carrier frequency
Start/stop amplitude	Consistent with the upper and lower limits of the corresponding carrier amplitude
Start/stop duty cycle	Consistent with the upper and lower limits of the corresponding carrier duty cycle
Sweep time	0.01S-640S
Voltage control characteristics	
Voltage control channel	CH1 or CH2
Carrier wave	Sine wave, square wave, ramp wave, arbitrary wave (except DC)
Voltage control function	Frequency control, amplitude control, and duty cycle control
Sweep mode	Linear, logarithmic
Start/stop frequency	Consistent with the upper and lower limits of the corresponding carrier frequency
Start/stop amplitude	Consistent with the upper and lower limits of the corresponding carrier amplitude
Start/stop duty cycle	Consistent with the upper and lower limits of the corresponding carrier duty cycle
Voltage control voltage range	0V-5V, start point and stop point can be set arbitrarily
General parameters	
Display	
Screen	2.8 inch TFT color LCD screen
Store and load	
Quantity	100 groups
Location	00 to 99 (The data of 00 storage location is loaded by default)
Interface	
Interface method	USB to serial interface
Extension interface	Serial port with TTL level, convenient for secondary development
Communication rate	Standard 115200bps

Protocol	Using the command line, the protocol is open.	
Power		
AC power	Supply voltage	85V-264V， 47-63Hz
	Power consumption	＜30W
	Fuse	250VAC,T3.15A
DC power	Voltage/current	DC5V±0.5V 3A
Environment		
Temperature	-10℃~50℃	
Humidity	Humidity:<80%	

Chapter Ⅱ Instrument Introduction

1. Front Panel Overview

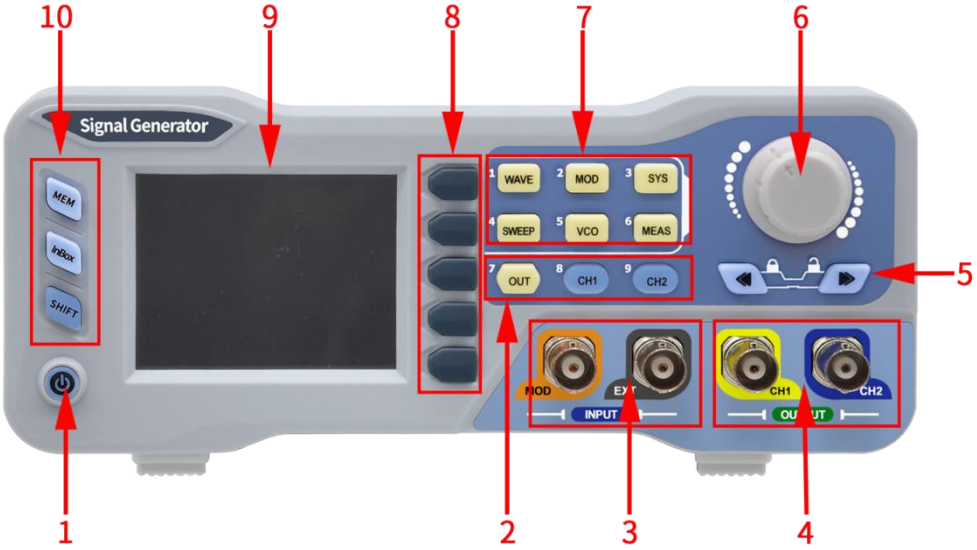

Figure 2-1-1 JDS8000 series front panel

Table 2-1-1 PSG9000 front panel diagram instructions

Label	Introduction	Label	Introduction
1	Power switch	6	Knob
2	Channel Control Keypad	7	Function shortcut keys
3	Signal input connector	8	Function soft keys
4	Signal output connector	9	LCD
5	Arrow keys	10	Shortcut keys

(1) Power switch

The power switch is used to turn on or off the generator .

(2) Channel Control Keypad

➢ CH1 button

Output switch for controlling CH1.

Press the CH1 button, the CH1 channel indicator lights up, and the CH1 output is enabled. At this time, the CH1 connection port outputs the signal with the current configuration.

Press the CH1 button again, the CH1 channel indicator is off, and at this time, the CH1 output is turned off. When the input box is open, it is the number key 8.

- CH2 button

Output switch for controlling CH2.
Press the CH2 button, the CH2 channel indicator lights up, and the CH2 output is enabled. At this time, the CH2 connection port outputs the signal with the current configuration.
Press the CH2 button again, the CH2 channel indicator is off, and at this time, the CH2 output is turned off. When the input box is open, it is the number key 9.

- OUT button

Output switch for simultaneously controlling CH1 and CH2. When the input box is enabled, it is the number key 7.

(3) Signal Input Connectors

- EXT.IN signal input connector

Input signal voltage range 1Vpp~20Vpp.

- MOD.IN modulation input connector

Input signal voltage range 0Vpp~3Vpp.

(4) Signal Output Connectors

- CH1 output connector

BNC connector with 50Ω±10% nominal output impedance.
When CH1 is enabled (the backlight turns on), this connector outputs waveform according to the current configuration of CH1.

- CH2 output connector

BNC connector with 50Ω±10% nominal output impedance.
When CH2 is enabled (the backlight turns on), this connector outputs waveform according to the current configuration of CH2.

(5) Arrow keys

Used to move the cursor to select the digit to be edited when setting parameters.
Used to delete the values at the left of the cursor when inputting values using numeric keyboard.

(6) Knob

Used to increase (clockwise) or decrease (counterclockwise) the value marked by the cursor when setting parameters using knob.
Used to quickly switch waveforms when the waveform bar is activated.

(7) Function shortcut keys

It consists of numeric keys (0 to 9), decimal point (.) and sign key (+/-) to set parameters.

【WAVE】key

Press the【**WAVE**】key on the front panel to activate the waveforms switching of the current channel. When the waveform bar is activated, adjusting the knob can quickly switch waveforms. Press the direction keys to quickly switch between arbitrary waveforms and preset waveforms. At the same time, common waveforms such as sine, square, pulse and ramp are displayed on the right side of the screen. Press the corresponding soft key to quickly select. When the input box is open, it is the number key 1.

As the【**WAVE**】key is in the main interface, it can be used as a waveform key. In other interfaces, press the 【**WAVE**】 key to return to the main interface. For example, press the【**MOD**】 key in the main interface to enter the modulation interface. Press the【**WAVE**】 key in the modulation interface to return to the main interface; however, to enter other interfaces from the modulation interface and return to the main interface again, you need to press the【**WAVE**】key twice to return to the modulation interface first and then return to the main interface.

【MOD】Key

For quick switching between modulation mode interface and main interface.

Press the 【**MOD**】 key to enter the modulation mode. In the modulation mode interface, press the 【Type】 soft key to perform AM, FM, PM, ASK, FSK, PSK, Pulse, burst and other functions to switch between each other by rotating the encoder or pressing the direction keys. When the input box is open, it is the number key 2.

【SYS】Key

For quick switching between the system setting interface and the main interface.

Press the【**SYS**】 key to enter the system setting interface, press the 【PgDn】 soft key to enter the next page of the system setting interface, press the

▲ ▼soft keys to select clear storage, sound, brightness, language, built-in waveform number , arbitrary waveform number, waveform loading method, synchronization, frequency fine-adjusting, factory reset and other items. When the input box is open, it is the number key 3.

【SWEEP】Key

For quick switching between the sweep mode interface and the main interface.

Press the【**SWEEP**】key to enter the sweep frequency interface, press the 【Func】 soft key, and then use the corresponding soft key to switch between the sweep frequency, sweep amplitude and sweep duty functions.

When the input box is open, it is the number key 4.

【VCO】Key

For quick switching between voltage control mode interface and main interface.

Press the **【VCO】** key to enter the voltage control frequency interface, press the **【Func】** soft key and then use the corresponding soft key to switch between the functions of frequency control, amplitude control and duty control. When the input box is open, it is the number key 5.

【MEAS】Key

For quick switching between measurement mode interface and main interface.

Press the **【MEAS】** key, and then press the **【Cnt】** and **【Meas】** soft keys in the measurement mode interface to switch between the measurement function and the counter function. When the input box is open, it is the number key 6.

(8) Function softkeys

Corresponding to the menu on the right side of its screen, pressing this soft key activates the corresponding menu.

When the input box is turned on, the menu on the right side of the screen corresponds to 0, ., +/-, confirm, and exit.

(9) LCD

The 2.8-inch TFT color LCD display shows the menu and parameter settings of the current function.

(10) Function softkeys

【MEM】Key

Press the **【MEM】** button, the message box will display and recall M00, and at the same time enter the input box function, you can press the number key + OK button to recall the parameters; press the **【SHIFT】** + **【MEM】** buttons, the information box display save M00, you can press the number key + OK key to save the parameters.

【InBox】Key

Press the **【InBox】** button, and the corresponding pop-up window will appear on the screen. For example, when the cursor is in the frequency setting, press the **【InBox】** button, the pop-up window will jump out for inputting the frequency value. At this time, the rotating the knob can select the corresponding unit, and the input box is turned on. At the same time, the left side of the menu soft key also corresponds to 0, ., +/-, confirm, and exit.

【SHIFT】Key

To obtain the help information of a front panel key or menu soft key, pressing the key for which you need to get help massage.

2.Rear Panel Overview

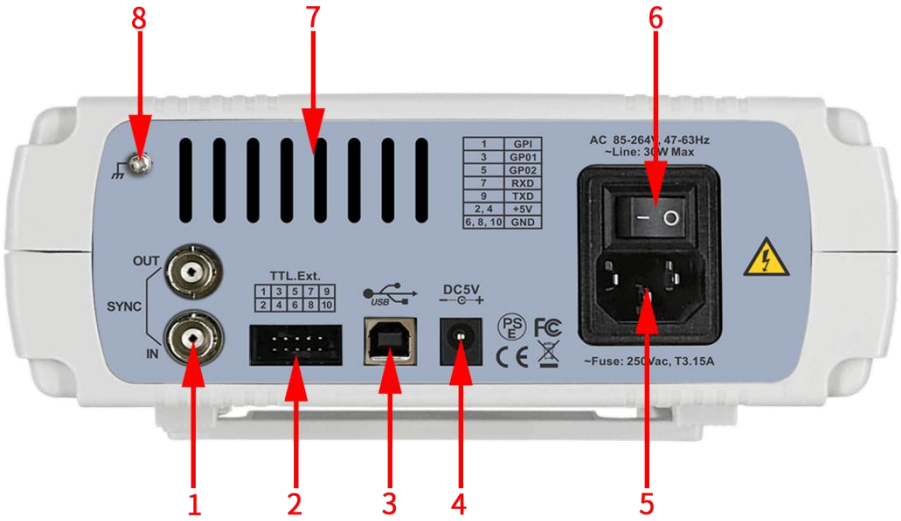

Figure 2-2-1 JDS8000 series rear panel

Table 2-2-1 JDS8000 series rear panel diagram instructions

Label	Instructions	Label	Instructions
1	Sync connectors	5	AC power socket
2	Extension interfaces	6	Switch
3	USB interface	7	Cooling holes
4	DC power socket	8	Chassis Ground

(1) Sync Connectors

Through this connectors, the instrument can synchronize the output of other machines in the same series and be synchronized by other machines in the same series.

(2) Communication Extension Interface:TTL Digital Signal Output and Measurement Interfaces

The serial port with TTL level mode is convenient for users' secondary development.

1	GPI	Digital signal input interface
3	GPO1	Digital signal output interface 1

5	GPO2	Digital signal output interface 2
7	RXD	Serial communication RXD receive data
9	TXD	Serial communication TXD send data
2、4	+5V	VCC
6、8、10	GND	GND

(3) USB Interface

Used to connect the generator to a computer which can control the generator remotely using PC software or by programming.

(4) DC Power Socket

Positive inside and negative outside, voltage/current specifications: DC5V±0.5V 3A.

(5) AC Power Socket

The AC power supply specification of this signal generator is 85-264V, 47-63Hz. The maximum input power cannot exceed 30W. The specification of the fuse is 250V, T3.15A.

(6) Switch

Used to turn the signal generator on or off.

(7) Cooling Holes

Used to dissipate the heat generated inside the instrument.

(8) Chassis Ground

Used to connect with the ground to prevent personal electric shock and ensure the normal operation of the electrical system.

3.Display Interface

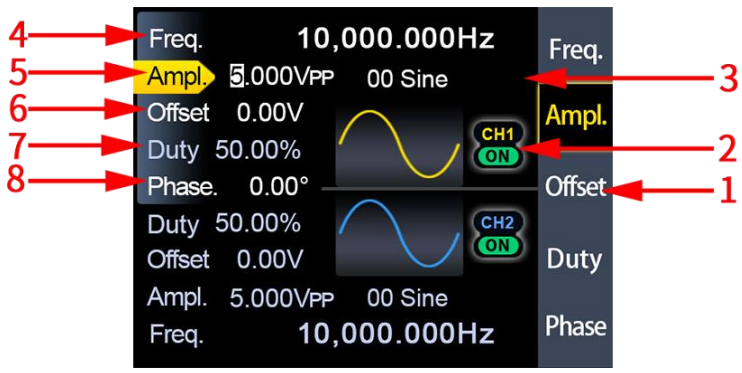

Figure 2-3-1 JDS8000 series display interface diagram

Table 2-3-1 PSG9000 display interface diagram instructions

No.	Instructions	No.	Instructions
1	Soft key menu bar	5	Amplitude
2	Current channel output status	6	Offset
3	Waveform display	7	Duty cycle
4	Frequency	8	Phase

(1) Soft Key Menu Bar

Display the operation menu of the function (interface) selected currently.

(2) Current Channel Output Status

Indicates the current channel selection state and switch state. "ON" means the channel output is turned on, and "OFF" means off.

In the main interface, press【**OUT**】key to control the output state of CH1 and CH2 at the same time.

Note: Two channels can be turned on at the same time, but cannot be selected at the same time.

(3) Waveform Display

Display the waveform currently in the main channel.

(4) Frequency

Press the soft key 【**Freq**】 to highlight the parameter "Frequency". At this time, use the direction keys to move the cursor to select the digit to be edited, and then rotate the knob to modify the value. You can also press the **InBox** key, the input box will pop out, input the value and select the corresponding value. To modify the value, turn the knob to switch the frequency unit (MHz, kHz, Hz, MHz, μHz).

(5) Amplitude

Display the amplitude of the current waveform of the current channel. Press the corresponding 【**Ampl**】 soft key to highlight “Amplitude”, use the direction keys to change the digit, and use the knob to change the parameters. You can also set the value by pressing the **InBox** key and input specific value to modify the set value, the amplitude unit (Vpp).

(6) Offset

Display the waveform DC offset of the current channel. Press 【**Offset**】 to highlight “Offset” and use the direction keys to change the digit and knob to modify this parameter.You can also set the value by pressing the **InBox** key and input specific values, the offset unit (V).

(7) Duty Cycle

Display the waveform duty cycle of the channel. Press 【Duty】 to highlight "Duty" and use direction keys to change the digit and knob to modify this parameter. You can also set the value by pressing the **InBox** key and input specific values, The duty cycle unit（%）.

(8) Phase

Display the phase of the current waveform. After pressing the corresponding 【Phase】 soft key, use the direction keys to change the digit and the knob to modify this parameter.You can also set the value by pressing the **InBox** key and input specific values to adjust the parameters.

Chapter Ⅲ Basic Operations Of the Instrument

1. Power On and Inspection

Two power supply methods

Please use the power cord provided to connect the signal generator to the AC power supply for power supply. The input voltage of the power cord is: AC85-264V, 47-63Hz. It can also be powered by a DC5V±0.5V 3A power adapter.

Power-on

After the power supply is correctly connected, press the power key at the front panel to turn on the generator. During the start-up, the instrument executes initialization and self-test. After that, the default interface is displayed. If the instrument does not start normally, please refer to the introduction in "**Troubleshooting**".

To Set the System Language

After entering the booting interface, you can press the corresponding soft key to select the desired system language. You don't need to select the language when you turn it on again, the main interface can be directly entered.

Booting interface

Language selection interface

2.To Output Basic Waveform

JDS8000 function arbitrary generator can output basic waveforms (include Sine, square, triangle and pulse) from one of the channels separately or from the two channels at the same time. At start-up, the dual channels are configured to output a sine waveform with 10kHz frequency and 5Vpp amplitude by default. Users can configure the instrument to output various basic waveforms.

Output basic waveforms video link:

https://youtu.be/kkEN0Xvnj3o

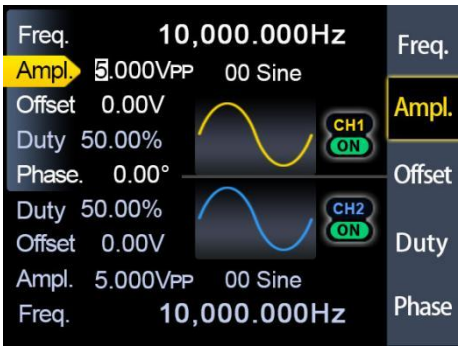

Figure 3-2-1 Waveform interface

(1) To Select the Output Channel

Press the channel control key 【**CH1**】 to select CH1. At this time, the text in the CH1 part of the interface is displayed in white, and the text in the CH2 part is displayed in gray. Click the soft key on the right side of the screen, and the font in the menu bar will be displayed in yellow.

Press 【**CH2**】 key to select CH2. At this time, the text in the CH1 part of the interface is displayed in gray, and the text in the CH2 part is displayed in white. Click the soft key on the right side of the screen, and the menu bar font will be displayed in blue.

(2) To Select Waveforms

Press the【**Wave**】soft key. The soft key menu bar on the right side of the screen displays the waveform. Press the desired waveform soft key or use the knob to change the waveforms to output the desired waveform.

(3) To Set the Frequency

Press the soft key 【**Freq**】 to highlight “Frequency”. At this time, you can press the 【**InBox**】 key to input the value of the desired frequency , and then you can use the knob to select the unit of frequency. You can also use the direction keys and knob to set the value of the parameter: use the direction key to move the cursor to select the digit to be edited, and then rotate the knob to modify the value to adjust the frequency to the desired frequency.

(4) To Set the Amplitude

Press the soft key 【**Ampl**】 to make “Amplitude” highlighted. At this time, you can press the 【**InBox**】 key to input the desired amplitude value . The amplitude range is limited by the frequency setting.

The higher the frequency, the smaller the output amplitude range. For the specific range of amplitude setting, please refer to the technical parameter table in the electronic version of the manual.

(5) To Set offset

Press the soft key 【**Offset**】 to make “Offset” highlighted. Use the direction

keys and the knob or press the 【**InBox**】 key to input specific values in the input box to adjust the parameters, so that the offset is set to the desired value. The amplitude range is affected by the offset setting, the larger the offset, the smaller the amplitude range. When the waveform selects the DC level, the offset is the voltage value of the DC level (the amplitude cannot be 0). Please refer to the specification in the manual for the specific adjustment range.

(6) To Set Duty Cycle

The sine waveform and square waveform cannot adjust the duty cycle, and the duty cycle will be displayed in gray-yellow on the screen. Bias sine waveform and pulse waveform can adjust the duty cycle.

Press the 【**Duty**】 soft key to make the “Duty” highlighted. Use the direction keys and the knob or press the 【**InBox**】 key to input specific values in the input box to adjust the parameters. The default duty cycle is 50%. The waveform is switched to pulse wave, and the duty cycle is continuously adjustable from 0.01 to 99.99%.

(7) To Set Phase

Press 【**CH2**】 key to select CH2, at this time, the blue interface of CH2 is mainly displayed at the lower part of the screen.

On the CH2 interface, press the 【**Phase**】 soft key to highlight “Phase”, and use the direction keys and the knob or press the【**InBox**】key to input specific values in the input box to adjust the parameters. The default phase difference is 0.00°. Before setting the phase difference, please set the frequency synchronization of CH1 and CH2 in the system settings.

(8) Observe the output waveform

Use BNC cable to connect CH1 and CH2 of JDS8000 machine to the oscilloscope and observe the waveform of the oscilloscope. It is recommended to use our standard Q9-Q9 cable to test the square wave, with small overshoot and stable waveform.

(9) Loading and save

Press the【**MEM**】button shortly, the message box will display to load M00, and at the same time enter the input box function, you can press the number keys to input the position to be loaded (00-99 in total 100 positions) and then press the OK key to adjust out parameters.

Press【**SHIFT**】+【**MEM**】key, save M00 is displayed in the message box, you can press number key+OK key to save the parameter.

3.Modulation Mode Interface and Parameter Settings

The JDS8000 series generators can output modulated waveforms in single or dual channels. Modulation is the process of processing the information of the

signal source and adding it to the carrier to make it suitable for channel transmission. It is the technology that changes the carrier with the signal. Carrier wave can be sine waveform, square waveform, pulse waveform, arbitrary waveform (except DC signal waveform). The modulated waveform can come from an internal modulation source or an external modulation source. The modulation types supported by JDS8000 series generators include AM, FM, PM, ASK, PSK, FSK, pulse and burst. The modulation interface is shown as Figure 3-3-1.
Modulation function description video link:
https://youtu.be/TRwlxD8wSOU

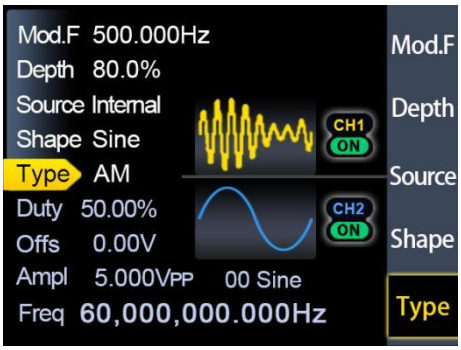

Figure 3-3-1Modulation interface

(1) AM

Amplitude modulation is a modulation method in which the amplitude of the carrier waveform changes according to the change law of the desired transmission signal, but the frequency remains unchanged.

➢ **Select carrier waveforms**

The carrier waveform of amplitude modulation can be sine waveform, square waveform, sawtooth waveform or arbitrary waveform (except DC), the default is sine waveform.
In the waveform interface, press 【Shape】 to select the desired carrier waveform through the knob. DC in pulse waveform, noise waveform and arbitrary waveform cannot be used as carrier. Different settings of several parameters of the carrier waveform (such as frequency, amplitude, offset and start phase, etc.) will affect the output AM modulated waveform. For different carrier waveforms, the setting range of each parameter of the carrier is also different (related to the instrument model you use and the selected carrier waveform).
For the setting method of carrier parameters, please refer to the relevant introduction in the section "Output Basic Waveform".

➢ **To Select AM**

Press【**MOD**】→ double click 【Type】→ 【AM】 to enable the amplitude modulation function or select the amplitude modulation by adjusting the knob.

➢ **To Select Source**

The JDS8000 generator can accept modulation waveforms from internal or external modulation sources.

Press 【Signal Source】 to select “Internal” or “External” modulation source.

- **Internal**

  After selecting the internal modulation source, press the 【Wave】 soft key to select sine waveform, square waveform, triangle waveform, ascending ramp, descending ramp and arbitrary waveform as the modulation source. The default is sine wave.

- **External**

  When the external modulation source is selected, the signal generator accepts the external modulation signal input from the MOD connector on the front panel.

  The frequency range of the external signal is 0~20kHz, and the amplitude range is -5V~+5V.

➢ **Set modulation waveform frequency and carrier frequency**

Press the soft key 【Mod.F】 , when the frequency is on, you can set the frequency of the modulating waveform, press the soft key 【Carr.F】 again, the carrier frequency is on, you can set the frequency of the carrier waveform.

(The modulating waveform frequency can only be used after using the "internal" modulation source)

Use the 【InBox】 button to input the desired frequency value in the input box. The modulation frequency range is 0.001Hz to 1MHz, and the default is 500Hz.

➢ **Set modulation depth**

Modulation depth indicates the degree of amplitude change, expressed as a percentage. The AM modulation depth can be set from 0% to 200%. Press 【Depth】 soft key to set AM modulation depth.

(2) FM

The modulation method in which the carrier frequency is changed according to the modulating signal is called frequency modulation. The magnitude of the frequency change of the modulated waveform is determined by the magnitude of the modulating signal, and the period of change is determined by the frequency of the modulating signal.

➢ **Choose the carrier waveform**

Refer to "Selecting Carrier Waveform" in "Amplitude Modulation". DC in pulse waveform, noise waveform and arbitrary waveform cannot be used as carrier.

➢ **Select FM**

Press 【MOD】 →press 【Type】 →select FM by adjusting the knob or pressing direction keys.

➢ **Select signal source**

The JDS8000 series products can accept modulation wave forms from internal or external modulation sources.

Press 【Source】 to select "Internal" or "External" modulation source.

- **Internal**

  After selecting the internal modulation source, press the 【Shape】 soft key to select sine waveform, square waveform, triangle waveform, ramp-up, ramp-down and arbitrary waveform as the modulation source. Default is sine waveform.

- **External**

  When the external modulation source is selected, the signal generator receives the external modulation signal input from the MOD connector on the front panel.

  The frequency range of the external signal is 20Hz~20kHz, and the amplitude range is -5V~+5V.

➢ **Set modulation wave frequency and carrier frequency**

Press the soft key 【Mod.F】 , when the frequency is on, you can set the frequency of the modulating waveform, press the soft key 【Carr.F】 again, the carrier frequency is on, you can set the frequency of the carrier wave. (The modulating waveform frequency can only be used after using the "internal" modulation source)

Use the【**InBox**】 button to input the desired frequency value in the input box. The modulation frequency range is 0.001Hz to 1MHz, and the default is 500Hz.

➢ **Set frequency deviation**

Frequency deviation refers to the deviation of the frequency of the modulating waveform relative to the carrier frequency. Press 【F.Dev】 soft key to set FM frequency offset.

(3) PM

The modulation method in which the deviation of the phase of the carrier from its reference phase is proportional to the instantaneous value of the modulating signal is called phase modulation or called PM.

➢ **Choose the carrier waveform**

Refer to "**Selecting carrier waveform**" in "**amplitude modulation**".

DC in pulse waveform, noise waveform and arbitrary waveform cannot be used as carrier.

➢ **Select PM**

Press【**MOD**】→press 【**Type**】 →select phase modulation by adjusting the knob or pressing direction keys.

➢ **Select signal source**

The JDS8000 series can accept modulation wave forms from internal or external modulation sources.

Press 【**Source**】 to select "Internal" or "External" modulation source.

- **Internal**

  After selecting the internal modulation source, press the 【**Shape**】 soft key to select sine waveform, square waveform, triangle waveform, ramp-up, ramp-down and arbitrary waveform as the modulation source. Default is sine wave.

- **External**

  When the external modulation source is selected, the signal generator receives the external modulation signal input from the MOD connector on the front panel.

  The frequency range of the external signal is 20Hz~20kHz, and the amplitude range is -5V~+5V.

➢ **Set modulation waveform frequency and carrier frequency**

Press the soft key 【**Mod.F**】 , when the frequency is on, you can set the frequency of the modulating waveform, press the soft key 【**Carr.F**】 again, the carrier frequency is on, you can set the frequency of the carrier waveform. (The modulating wave frequency can only be used after using the "internal" modulation source)

Use the【**InBox**】 button to input the desired frequency value in the input box. The modulation frequency range is 0.001Hz to 1MHz, and the default is 500Hz.

➢ **Set the modulation waveform phase deviation**

Phase deviation refers to the change in the phase of the modulating waveform relative to the carrier phase. Press the soft key 【**P.Dev**】 to set the phase deviation of phase modulation.

Use the 【**InBox**】 button to input the desired deviation value in the input box. The phase deviation can be set from 0° to 359.99°, with a default value of 180°.

(4) ASK

The modulation method in which the amplitude variation of the carrier is controlled by the baseband digital signal is called Amplitude Shift Keying (ASK), also known as digital amplitude modulation.

➢ **Select the carrier waveform**

Refer to "**Selecting carrier waveform**" in "**Amplitude modulation**".
DC in pulse waveform, noise waveform and arbitrary waveform cannot be used as carrier.

➢ **Select ASK**

Press 【MOD】 →press 【Type】 →select ASK by adjusting the knob or pressing direction keys.

➢ **Set the polarity**

Press the soft key 【Polar】 to select the amplitude output controlled by the "positive polarity" or "negative polarity" of the modulating waveform.

- **Internal**

  During internal modulation, if the polarity is set to "positive polarity", when the modulating wave is logic low level, the smaller amplitude between the carrier amplitude and the modulation amplitude is output; when the modulating wave is logic high level, the output carrier amplitude and the larger amplitude between the modulation amplitude. When the polarity is "Negative", the opposite is true.

- **External**

  During external modulation, if the polarity is set to "positive polarity", when the external input signal is logic low level, the smaller amplitude between the carrier amplitude and the modulation amplitude is output; when the external input signal is logic high level, the output The larger amplitude between the carrier amplitude and the modulation amplitude. When the polarity is "Negative", the opposite is true.

➢ **Select signal source**

The JDS8000 series generators can accept modulation waveforms from internal or external modulation sources.
Press 【Source】 to select "Internal" or "External" modulation source.

- **Internal**

  Select the internal modulation source, that is, select a square waveform with a duty cycle of 50% as the modulation waveform. At this point, the frequency at which the output amplitude shifts between the carrier amplitude and the modulation amplitude is determined by the modulation rate.

- **External**

  When the external modulation source is selected, the signal generator accepts the external modulation signal input from the MOD port on the front panel.
  The frequency range of the external signal is 20Hz~20kHz, and the amplitude range is -5V~+5V.

➢ **Set modulation rate and carrier frequency**

Press the soft key 【Rate】, when the frequency is on, you can set the rate of the modulating wave, press the soft key 【Carr.F】 again, the carrier frequency is on, you can set the carrier frequency. (The modulation rate is only available after using the "internal" modulation source)
Use the 【InBox】 button to input the desired frequency value in the input box. The frequency range is 0.001Hz to 1MHz, the default is 500Hz.

➢ **Set ASK amplitude**

Press 【Ampl】 soft key to set the ASK amplitude.
Use the 【**InBox**】 key to input the desired amplitude value in the input box. The range of ASK range is 0%-200%, and the default is 80%.

(5) FSK

The modulation method in which the carrier frequency is controlled by a digital signal is called frequency shift keying (FSK).

➢ **Select the carrier waveform**

Refer to "**Selecting Carrier Waveform**" in "**Amplitude Modulation**". DC in pulse waveform, noise waveform and arbitrary waveform cannot be used as carrier.

➢ **Select FSK**

Press 【**MOD**】→press 【Type】 →select the key frequency by adjusting the knob or pressing direction keys.

➢ **Set the polarity**

Press the soft key 【PolarType】 to select the amplitude output controlled by the “positive polarity” or “negative polarity” of the modulating waveform.

- **Internal**

  During internal modulation, if the polarity is set to "positive polarity", the carrier frequency will be output when the modulating waveform amplitude is a logic low level, and the hopping frequency will be output when the modulating waveform amplitude is a logic high level. When the polarity is "Negative", the opposite is true.

- **External**

  During external modulation, if the polarity is set to "positive polarity", when the external input signal is logic low level, the carrier frequency is output; when the external input signal is logic high level, the hopping frequency is output. When the polarity is "Negative", the opposite is true.

➢ **Select signal source**

The JDS8000 series products can accept modulation waveforms from internal or external modulation sources.
Press 【Source】 to select "Internal" or "External" modulation source.

- **Internal**

  Select the internal modulation source, that is, select a square waveform with a duty cycle of 50% as the modulation waveform. At this point, the frequency at which the output amplitude shifts between the carrier amplitude and the modulation amplitude is determined by the modulation rate.

- **External**

  When the external modulation source is selected, the signal generator accepts the external modulation signal input from the MOD port on the front panel.

  The frequency range of the external signal is 20Hz~20kHz, and the amplitude range is -5V~+5V.

➢ **Set modulation rate and carrier frequency**

Press the soft key 【Rate】, when the frequency is enabled, you can set the rate of the modulating waveform, press the soft key 【Carr.F】 again, the carrier frequency is on, you can set the carrier frequency. (The modulation rate is only available after using the "internal" modulation source)

Use the【**InBox**】button to input the desired frequency value in the input box. The frequency range is 0.001Hz to 1MHz, the default is 500Hz.

➢ **Set hopping frequency**

Press 【Hop.F】 soft key to set the hopping frequency.

Use the 【**InBox**】 button to input the desired frequency value in the input box.

(6) PSK

Phase Shift Keying (PSK): A modulation technique in which the phase of the carrier is used to represent the information of the input signal. Definition of Phase Shift Keying: Time Discrete Each characteristic state of the modulated signal is modulated by an angle represented by a specific difference between the phase of the modulated signal and the phase of the carrier before modulation.

➢ **Choose the carrier waveform**

Refer to "**Selecting carrier waveform**" in "**Amplitude modulation**".

DC in pulse wave, noise wave and arbitrary wave cannot be used as carriers.

➢ **Select PSK**

Press 【**MOD**】 →press 【Type】 →select key phase by adjusting knob or pressing direction keys.

➢ **Set the polarity**

Press the soft key 【Polar】 to select the amplitude output controlled by the “positive polarity” or “negative polarity” of the modulating wave.

- **Internal**

  During internal modulation, if the polarity is set to "positive polarity", when the amplitude of the modulating wave is logic low level, the carrier phase is output; when the amplitude of the modulating waveform is logic high level, the modulation phase is output. When the polarity is "Negative", the opposite is true.

- **External**

  During external modulation, if the polarity is set to "positive polarity", when the external input signal is logic low level, the carrier phase is output; when the external input signal is logic high level, the modulation phase is output. When the polarity is "Negative", the opposite is true.

➢ **Select signal source**

The JDS8000 series generators can accept modulation waveforms from internal or external modulation sources.

Press 【Source】 to select "Internal" or "External" modulation source.

- **Internal**

  Select the internal modulation source, that is, select a square waveform with a duty cycle of 50% as the modulation waveform. At this point, the frequency at which the output amplitude shifts between the carrier amplitude and the modulation amplitude is determined by the modulation rate.

- **External**

  When the external modulation source is selected, the signal generator accepts the external modulation signal input from the MOD port on the front panel.

  The frequency range of the external signal is 20Hz~20kHz, and the amplitude range is -5V~+5V.

➢ **Set modulation rate and carrier frequency**

Press the soft key 【Rate】, when the frequency is on, you can set the rate of the modulating waveform, press the soft key 【Carr.F】 again, the carrier frequency is on, you can set the carrier frequency. (The modulation rate is only available after using the "internal" modulation source)

Use the 【**InBox**】 button to input the desired frequency value in the input box. The frequency range is 0.001Hz to 1MHz, the default is 500Hz.

➢ **Set PSK phase**

Press the soft key 【Phase】 to set the PSK phase.

Use the 【**InBox**】 button to input the desired phase in the input box.

The PSK phase range is 0° to 359.99°.

(7) Pulse function

The digital adjustment of the pulse width and pulse cycle time of the pulse

wave can be realized, which is more accurate than adjusting the duty cycle.

➢ **Choose the carrier waveform**
The pulse modulated waveform can only be a pulse waveform.

➢ **Select pulse**
Press 【**MOD**】 →press 【**Type**】 →select pulse by adjusting the knob or pressing direction keys.

➢ **Set waveform reverse**
Press 【**W.Inv**】 soft key, you can choose normal or invert to control the output.

➢ **Set the pulse width**
Press 【**Width**】 soft key to set the pulse width
Use the 【**InBox**】 button to input the required value in the input box (units can be us, ms, s).
The pulse width ranges from 0.001us to 4s, and the default is 0.100us.

➢ **Set the pulse period**
Press soft key 【**Period**】 to set the pulse period.
Use the 【**InBox**】 button to input the required value in the input box (units can be us, ms, s).
The period length ranges from 0.01us to 40s, and the default is 10.00us.

(8) Burst function
The pulse train of 1-1048575 periods can be set to output, and the burst mode is divided into internal trigger, external input signal trigger (rising edge trigger) and manual trigger. In use, it should be noted that the cycle time of the burst pulse train is less than the cycle time of the burst signal.

➢ **Select the carrier waveform**
Refer to "**Selecting Carrier Waveform**" in "**Amplitude Modulation**".

➢ **Select Burst**
Press 【**MOD**】 →press 【**Type**】 →select burst by adjusting the knob or pressing direction keys.

➢ **Set idle mode**
Press 【**Idle**】 soft key, zero position, positive maximum and negative maximum control output can be selected.

➢ **Select trigger source**
Press soft key 【**T.Src**】 to select trigger mode.

- **Key**

Key trigger: It can be output once by pressing the 【Trig.】 soft key.

- **Internal**

Internal trigger: It can be triggered by the falling edge of the CH2 signal of the signal generator.

- **External AC**

External AC signal trigger

- **External DC**

External DC signal trigger

➢ **Set the number of pulses**

Press soft key 【Num.】 to set the number of pulses.

Use the 【InBox】 key to input the desired number of pulses in the input box. The number of pulses ranges from 1 to 1048575, and the default is 1.

4.Parameter settings in the sweep mode interface

Press 【SWEEP】, and then press the 【Func】 soft key in the frequency sweep mode interface to select the frequency sweep, amplitude sweep and sweep duty cycle functions. The frequency sweep interface is shown in Figure 3-4-1 below.

Sweep functions description video link:

https://youtu.be/-xOi3aESuNE

Figure 3-4-1 Frequency sweep interface

(1) Sweep channel

➢ Sweep channel

The cursor is on the sweep channel, and the knob can be used to switch the sweep channel.

➢ Start frequency and stop frequency

The start frequency and the stop frequency are the upper and lower frequency limits of the frequency sweep, and different units can be selected through the input box.

➢ Sweep time

Press the soft key 【↕】 to make the cursor at the sweep time position and

use the knob to rotate to obtain the desired sweep time. Sweep times range from 0.01s to 640s.

➢ Sweep direction

Press the soft key 【↕】 to make the cursor position in the sweep direction to choose from three directions: round-trip, increment and decrement.

➢ Sweep Mode

Press the soft key 【↕】 to make the cursor position in the sweep mode to select linear and logarithmic modes.

➢ Sweep on

Press the soft key 【 ON 】 , the instrument starts to sweep the frequency, and you can observe the frequency change on the display interface.

(2) Sweep amplitude

Press 【Func】 soft key to select the sweep function.

➢ Sweep channel

When the cursor is on the voltage control channel, you can use the knob to switch the voltage control channel.

➢ Start amplitude and stop amplitude

Start amplitude and stop amplitude are the upper and lower amplitude limits of the amplitude sweep.

➢ Sweep time, sweep method, sweep mode

Please refer to "Sweep Time, Sweep Mode, Sweep Mode" in "Frequency Sweep".

➢ Turn on sweep amplitude

Press the soft key 【 ON 】 , the instrument starts sweeping, and you can observe the change of the amplitude on the display interface.

(3) **Sweep duty cycle**

Press 【Func】 soft key to select the sweep function.

➢ Sweep duty cycle channel

The cursor is on the frequency sweep channel, and the knob can be used to switch the sweep duty cycle channel.

➢ Start duty cycle and stop duty cycle

The start duty cycle and the stop duty cycle are the upper and lower duty cycle limits of the duty sweep.

➢ Sweep time, sweep method, sweep mode

Please refer to "Sweep time, Sweep method, Sweep mode" in "Sweep frequency".

➢ Turn on sweep duty cycle

Press the 【ON】 soft key, the instrument starts to sweep the duty cycle, and you can observe the change of the duty cycle in the display interface.

5.Voltage control mode parameter settings

Press 【VCO】 and press 【Func】 soft key in the voltage control mode interface to select the functions of frequency control, amplitude control and duty cycle control.

The voltage control interface is shown in Figure 3-5-1 below.

Voltage control function description video link：

https://youtu.be/e8im2EzpQuA

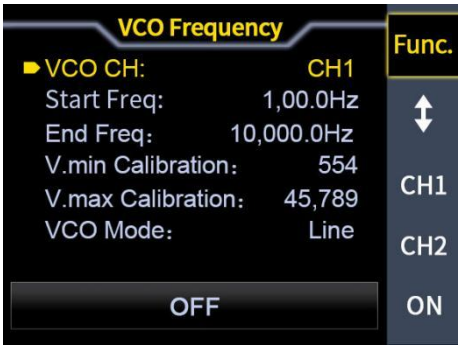

Figure 3-5-1 pressure control interface

(1) Voltage control frequency

In the voltage control interface, press soft key 【Func】 to select frequency control.

➢ Voltage control channel

As the cursor is on the voltage control channel, the knob can be used to switch the voltage control channel.

➢ Start frequency and stop frequency

Refer to "**Start frequency and stop frequency**" in "**Sweep frequency** ".

➢ Minimum voltage calibration and maximum voltage calibration

The maximum and minimum values of the external input signal voltage can be calibrated. The minimum voltage calibration corresponds to the start frequency, and the maximum voltage calibration corresponds to the stop frequency.

➢ Voltage control mode

Press soft key 【↕】 to make the cursor in the position of voltage control mode to select linear and logarithmic mode.

➢ Turn on the voltage control frequency

Press the soft key 【ON】, the instrument starts to control the frequency by voltage, and you can observe the change of the frequency on the display interface.

(2) Voltage control amplitude

In the voltage control interface, press soft key 【Func】 to select amplitude control.

➢ Voltage control channel

As the cursor is on the voltage control channel, and the knob can be used to switch the voltage control channel.

➢ Start amplitude and stop amplitude

Refer to "Start and stop amplitude" in "Sweep amplitude".

➢ Minimum voltage calibration and maximum voltage calibration

The maximum and minimum values of the external input signal voltage can be calibrated. The minimum voltage calibration corresponds to the start amplitude, and the maximum voltage calibration corresponds to the stop amplitude.

➢ Voltage control mode

Press soft key 【↕】 to make the cursor in the position of voltage control mode to select linear and logarithmic mode.

➢ Turn on voltage control amplitude

Press the soft key 【ON】, the instrument starts to voltage control the amplitude, you can observe the change of the amplitude on the display interface.

(3) Voltage control duty cycle

In the voltage control interface, press soft key 【Func】 to select control duty.

➢ Voltage control channel

As the cursor is on the voltage control channel, and the knob can be used to switch the voltage control channel.

➢ Start duty cycle and stop duty cycle

Please refer to "Start duty cycle and stop duty cycle" in "Sweep duty cycle".

➢ Minimum voltage calibration and maximum voltage calibration

The maximum and minimum values of the external input signal voltage can be calibrated. The minimum voltage calibration corresponds to the starting duty cycle, and the maximum voltage calibration corresponds to the stop duty cycle.

➢ Voltage control mode

Press soft key 【↕】 to make the cursor in the position of voltage control mode to select linear and logarithmic mode.

➢ Turn on voltage control amplitude

Press the soft key 【ON】, the instrument starts to control the duty cycle by voltage, and you can observe the change of the duty cycle on the display interface.

6. Measurement mode parameter settings

Press 【MEAS】 ,and press 【Cnt】 and 【Meas】 soft keys in the measurement mode interface to perform the measurement function and the counter function.

Switching can also be performed by rotating the knob. The measurement interface is shown in Figure 3-6-1 below.

Measurement functions description video link:
https://youtu.be/XyYnHUjukdI

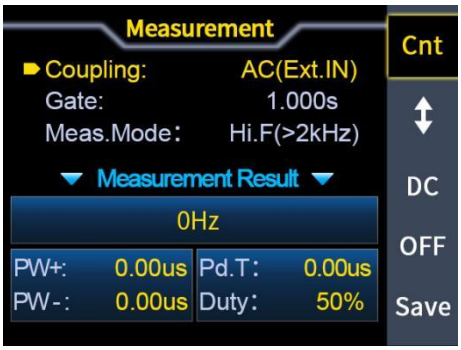

Figure 3-6-1 measurement interface

(1) Measurement function

The frequency, period, positive pulse width, negative pulse width, duty cycle and other parameters of the input signal can be measured. The measurement frequency range is 1Hz-100MHz, the measurement signal amplitude range is 2Vpp-20Vpp, and the input interface is Ext.IN.

➢ Coupling settings

Press the soft key 【↕】 to place the cursor at the coupling position, and adjust the knob to switch the coupling mode between AC (AC) or DC (DC).

➢ Gate time setting

Press the soft key 【⇕】 to make the cursor at the position of the gate.
Use the【**InBox**】 button to input the desired gate time in the input box.
The gate time range is 0.001s to 10s, the default is 1s.

➢ Measurement Mode

Press the soft key 【⇕】 to place the cursor at the position of the measurement mode, and switch the measurement mode to low frequency (<2kHz) or high frequency (>2kHz) by adjusting the knob.

➢ Measurement parameters: frequency, period, positive pulse width, negative pulse width, duty cycle.

(2) Counter function

The number of periods of the input signal can be calculated in real time, and the input signal amplitude range is 2Vpp-20Vpp.

➢ Coupling settings

Press the soft key 【⇕】 to make the cursor at the coupling position, and switch the coupling mode between AC (AC) or DC (DC) by adjusting the knob.

➢ After setting all items, press 【▶】 soft key to start counter function, press 【⏸】 soft key to stop, press 【■】 soft key to restore to default setting.

7. System Settings

Press the【**SYS**】button to enter the system setting interface, and press the 【▲】 【▼】 soft keys to select items such as clear memory, sound, brightness, language, built-in waveforms, arbitrary waveforms, waveform loading mode, and system information.
The system setting interface is shown in Figure 3-7-1 below.

System settings description video link：
https://youtu.be/RfROVh-Ne9U

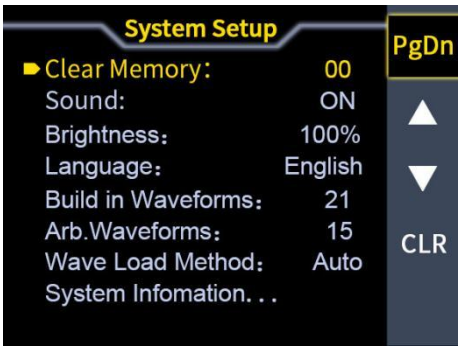

Figure 3-7-1 system interface

Clear memory: used to clear the parameters stored in the current position, rotate the knob to adjust to the specified position.

Sound setting: Press the 【On】 soft key to turn on the sound and press the 【Off】 soft key to turn off the sound.

Brightness adjustment: The numeric keys and knob can be used to quickly adjust the brightness.

Language setting: The knob can be used to select English and Chinese language.

Built-in waveforms: The numeric keys and knob can be used to set the number of built-in waves in the instrument, ranging from 00 to 21.

Arbitrary waveforms: The numeric keys and knob can be used to set the number of arbitrary waves of the instrument, ranging from 01 to 99.

Waveform loading mode: 【Auto】, 【Fast】 can be used to select the waveform loading mode.

System information: Press the 【...】 soft key to view the product model, product serial number, hardware version, firmware version, and FPGA version of the instrument.

Press soft key 【PgDn】 to enter the second page of system settings.

Waveform synchronization: Soft keys 【ON】 and 【OFF】 can be used to turn waveform synchronization on and off. (When synchronizing, the CH1 channel is the operation object, and the parameters of the CH2 channel change with the change of the parameters of the CH1 channel.)

Frequency synchronization: Soft keys 【ON】 and 【OFF】 can be used to turn on and off frequency synchronization.

Amplitude synchronization: The soft keys 【ON】 and 【OFF】 can be used to turn on and off the amplitude synchronization.

Offset synchronization: Soft keys 【ON】 and 【OFF】 can be used to open and close the offset synchronization.

Duty cycle synchronization: Soft keys 【ON】 and 【OFF】 can be used to turn on and off duty cycle synchronization.

External synchronization: Soft keys 【ON】 and 【OFF】 can be used to turn on and off external synchronization.

Restoring factory settings: Press the soft key 【RUN】, select 【RUN】 to restore the factory settings, and “Running...” is displayed in the information box, and the progress bar is full, which means the operation is successful.

Press soft key 【PgDn】 to enter the third page of system settings.

Auto Power On: The soft keys 【ON】 and 【OFF】 can be used to turn on and off the automatic power on. After the automatic power-on function is enabled, the instrument defaults to power-on output.

CH1 amplitude fine-adjusting: When there is a slight difference between the output amplitude of the CH1 channel waveform and the amplitude you measure, you can change the value of the CH1 amplitude fine-adjusting and perform online calibration to obtain an accurate amplitude. The default CH1 amplitude trim value is 50.

CH2 amplitude fine-adjusting: When the output amplitude of CH2 channel waveform is slightly different from the amplitude you measure, you can change the value of CH2 amplitude fine-adjusting and perform online calibration to obtain accurate amplitude. The default CH2 amplitude trim value is 50.

Help information: Rotate the knob or scan the QR code with your mobile phone to view related help information.

8.Voltage control mode parameter settings

Communication protocol and software instruction link:
http://68.168.132.244/JDS8000/Setup_EN.zip

(1) Install software

➢ Step 1: Click the button【**JDS8000 Setup**】 to install the application, click the 【**NEXT**】key*4→【**Install**】key*1→【**Finish**】 key*1 to complete the installation. The application installation interface is shown in Figure 3-8-1 to Figure 3-8-6 below.

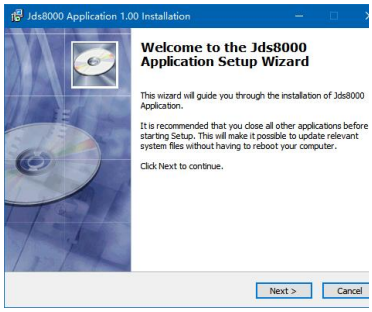

Figure 3-8-1

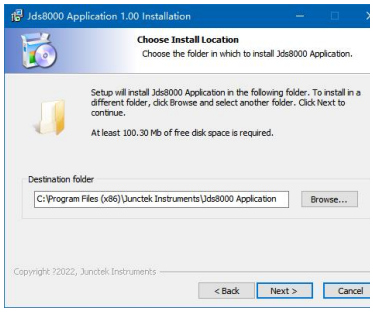

Figure 3-8-2

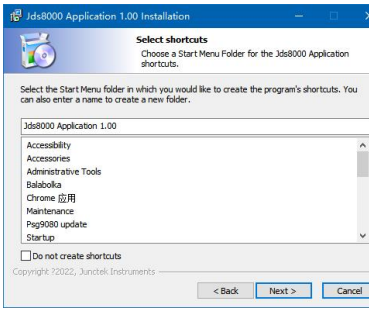

Figure 3-8-3

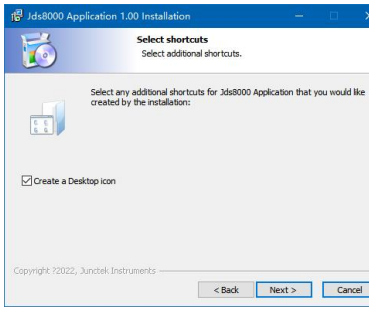

Figure 3-8-4

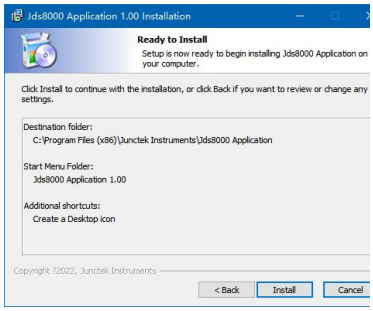

Figure 3-8-5

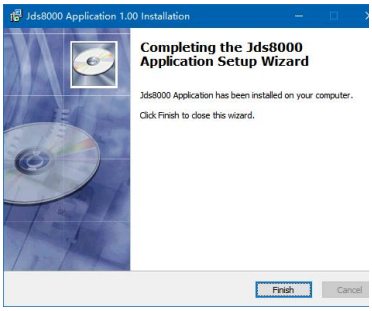

Figure 3-8-6

(2) Connect to the computer

➢ Step 1: Right-click Computer-Properties-Device Manager-Observe the serial port assigned by the computer. The computer serial port allocation interface is shown in Figure 3-8-7 below.

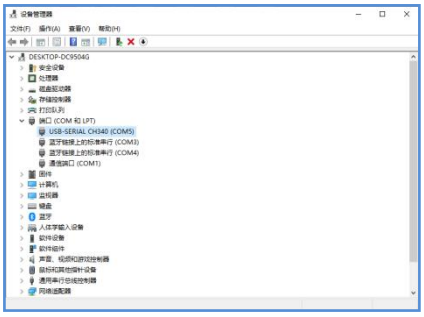

Figure 3-8-7

➢ Step 2: Open the serial port after selecting the corresponding serial port, and then select Connect. The Connect interface is shown in Figure 3-8-8 below.

Figure 3-8-8

➢ Step 3: The connection is successful. The successful connection interface is shown in Figure 3-8-9 below.

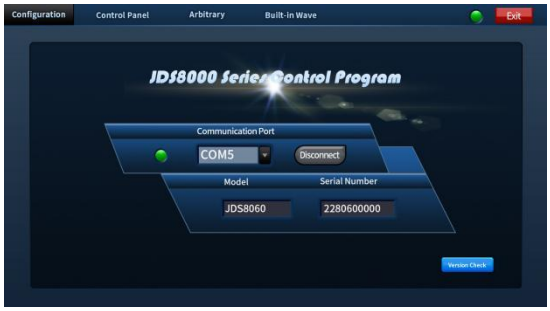

Figure 3-8-9

9.Brief introduction to Android APP

(1) The operation demo video of the Android APP
http://68.168.132.244/JDS8000/MC_CN.mp4

(2) APP download
Google download links:
Coming soon.....
Server download link:http://68.168.132.244/APP/JDS8000.apk
If you can't download it , please ask the customer service staff for the software.

(3) Installation the APP software
This software only supports Android 5.0 and above systems. During the installation process, it will apply for the location service. Please agree and turn on the location service. The Bluetooth module cannot be plugged or unplugged as on power, which will cause damage. This manual corresponds to software version 1.2.1, and different versions may be slightly different. It is recommended to upgrade to the latest software for a better user experience. As shown in the following figure 3-9-1 installation step 1, 3-9-2 installation step 2, 3-9-3 installation step 3.

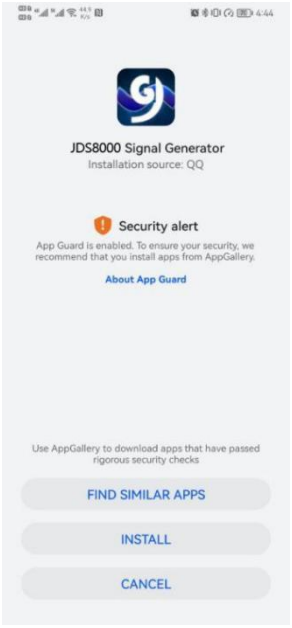

Figure 3-9-1
Installation Step 1

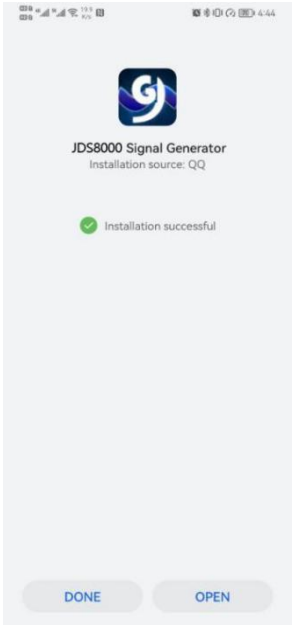

Figure 3-9-2
Installation Step 2

Figure 3-9-3
Installation Step 3

(4) Software update

Click the APP icon, after the APP starts, the system will automatically detect whether the APP version has been updated, and the new version will pop up to remind you to update. The app downloaded from Google Play need to manually detect the new version.

(5) APP interface display

Figure 3-9-4
Main interface

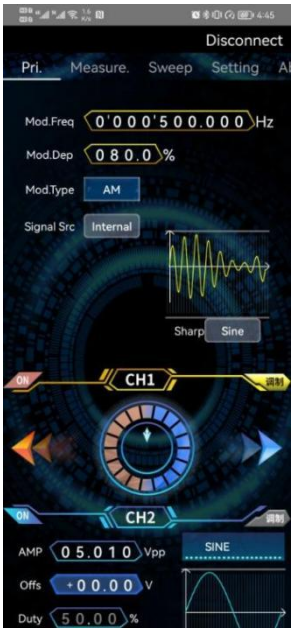

Figure 3-9-5
Modulation interface

Figure 3-9-6
Measurement
interface

Figure 3-9-7
Sweep/voltage control interface

Figure 3-9-8
System setting interface

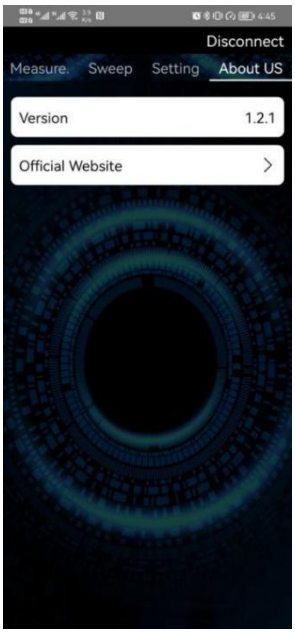

Figure 3-9-9
About us interface

(6) Brief introduction to Android APP

➢ On-line

On the home of the app click search in the upper right corner to search for the corresponding Bluetooth. After clicking the corresponding Bluetooth, the interface will pop up "connected", and the search in the upper right will become disconnected and the machine model will appear, indicating that the connection has been completed.

As shown in the following figure 3-9-9, figure 3-9-10, figure 3-9-11.

Figure 3-9-9 on-line 01

Figure 3-9-10 on-line 02

Figure 3-9-11on-line 03

- Main function operation

Frequency: Click on the frequency value to make the cursor select the digit. You can press the left and right direction keys to change the digit and use the knob to adjust the value. Click the frequency text or press and hold the frequency value, and the "Input Frequency" pop-up box pops up, input the corresponding value. As shown in Figure 3-9-12 below.

Frequency unit: press and hold the frequency unit, the "Hz, kHz, MHz, mHz, uHz" frequency unit will pop up, select the corresponding frequency unit. As shown in Figure 3-9-13 below.

Amplitude: Click the amplitude value to make the cursor select the digit. You can press the left and right direction keys to change the digit and use the knob to adjust the value. Click the amplitude text or press and hold the amplitude value, and the pop-up box "Input AMP" will pop up, and input the corresponding value. As shown in Figure 3-9-14 below.

Offset: Click the offset value to make the cursor select the digit. You can press the left and right direction keys to change the digit and adjust the value with the knob. Click the offset text or press and hold the offset value, the "Input Offset" pop-up box will pop up, input the corresponding value. As shown in Figure 3-9-15 below.

Duty cycle: Click on the value of the duty cycle to make the cursor select the digit. You can press the left and right direction keys to change the digit and use the knob to adjust the value. Click the duty text or press and hold the duty cycle value, and the “Input Duty” pop-up box will pop up, input the corresponding value. As shown in Figure 3-9-16 below.

Phase: Click the phase value to make the cursor select the digit, you can press the left and right direction keys to change the digit and use the knob to adjust the value. Click the phase text or press and hold the phase value, the "Input Phase" pop-up box will pop up, input the corresponding value. As shown in Figure 3-9-16 below. The phase of the CH1 channel refers to the phase difference between the CH1 signal and the external signal, and the phase of the CH2 channel refers to the phase difference between the CH1 signal and the CH2 signal.

Channel output switch: Click the CH1 channel switch to control the CH1 channel signal output ; Click the CH2 channel switch to control the CH2 channel signal output . When the channel output is on, it displays “ON”, and when the channel output is off, it displays “OFF”, as shown in Figures 3-9-17 and 3-9-18 below.

Waveform: Click on the waveform type, the “Waveform Type” pop-up box will pop up, select the corresponding waveform. As shown in Figure 3-9-19 below.

Modulation switch: Click the modulation button to turn on the modulation function. When the modulation function is turned on for the CH1, the modulation button is yellow; when the modulation function is turned on for the CH2, the modulation button is blue; when the modulation function is turned off, the modulation button is gray. As shown in Figures 3-9-20 and 3-9-21 below.

AM: After the modulation function is enabled, click the modulation type to select AM; in AM, you can modify the modulation frequency, modulation depth, signal source, and modulation wave. As shown in Figure 3-9-22 below.

FM: After the modulation function is enabled, click the modulation type to select FM; in FM, you can modify the modulation frequency, frequency deviation, signal source, and modulation wave. As shown in Figure 3-9-23 below.

PM: After the modulation function is enabled, click the modulation type to select PM; in the phase modulation, you can modify the modulation frequency, phase deviation, signal source, and modulation wave. As shown in Figure 3-9-24 below.

ASK: After the modulation function is enabled, click the modulation type to select ASK; in ASK, you can modify the rate, ASK amplitude, signal source, and polarity. As shown in Figure 3-9-25 below.

FSK: After the modulation function is enabled, click the modulation type to select the FSK; in FSK, you can modify the rate, frequency hopping, signal source, and polarity. As shown in Figure 3-9-26 below.

PSK: After the modulation function is enabled, click the modulation type to select the PSK; in PSK, you can modify the rate, PSK phase, signal source, and polarity. As shown in Figure 3-9-27 below.

Pulse: After the modulation function is enabled, click the modulation type to select the pulse; in the pulse, you can modify the pulse period, pulse width, and pulse wave inversion. As shown in Figure 3-9-28 below.

Burst: After the modulation function is enabled, click the modulation type to select the burst; in the burst, you can modify the number of pulses, idle, trigger source, and polarity. As shown in Figure 3-9-29 below.

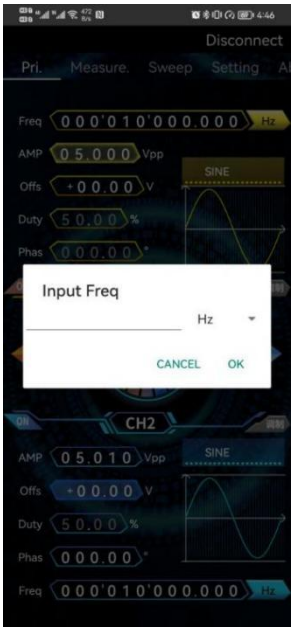

Figure 3-9-12
Frequency

Figure 3-9-13
Frequency unit

Figure 3-9-14
Amplitude

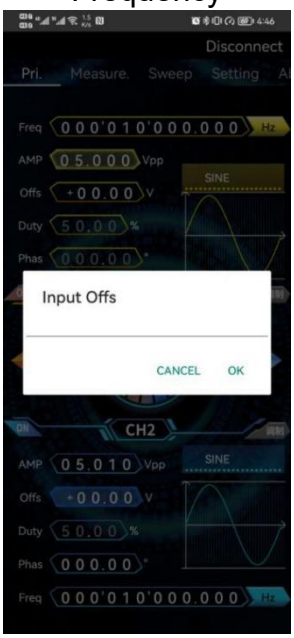

Figure 3-9-15
Offset

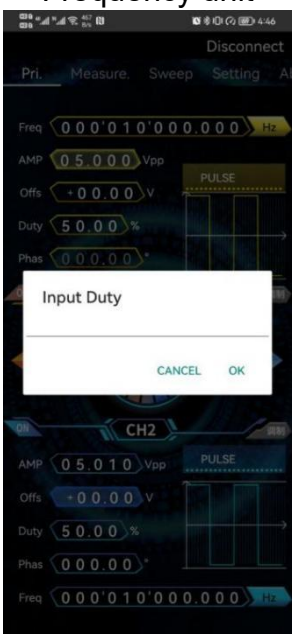

Figure 3-9-16
Duty Cycle

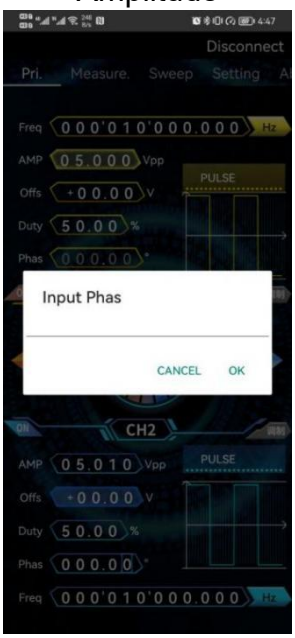

Figure 3-9-16
Phase

Figure 3-9-17 CH1 Channel is on

Figure 3-9-18 CH2 Channel is on

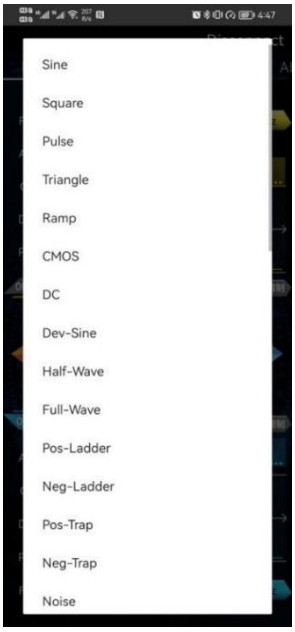

Figure 3-9-19 Waveform

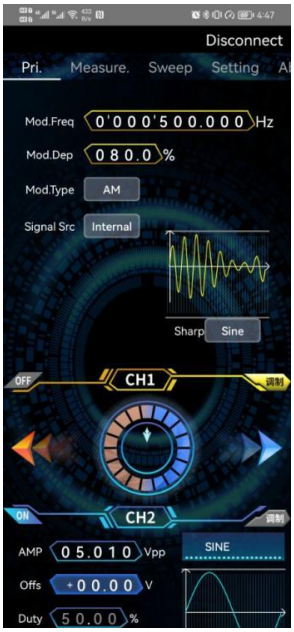

Figure 3-9-20 CH1 Modulation is on

Figure 3-9-21 CH2 Modulation is on

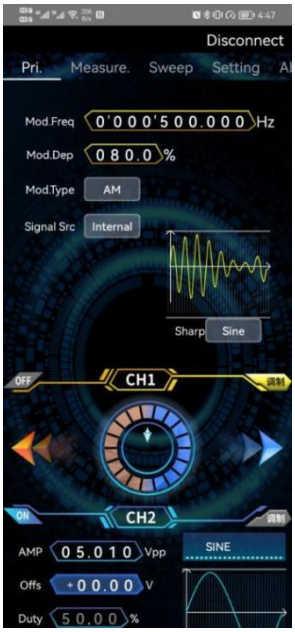

Figure 3-9-22 AM

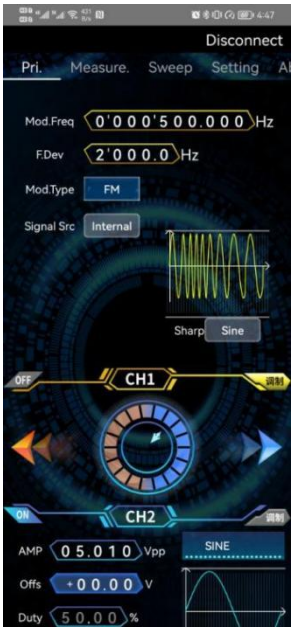

Figure 3-9-23
FM

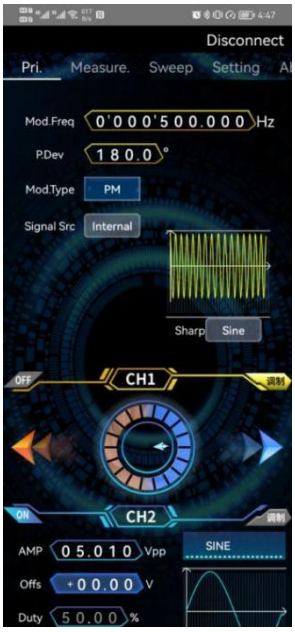

Figure 3-9-24
PM

Figure 3-9-25
ASK

Figure 3-9-26
FSK

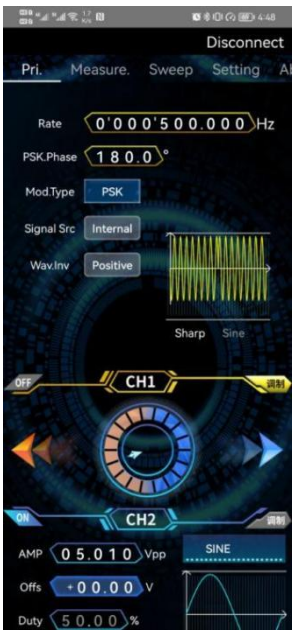

Figure 3-9-27
PSK

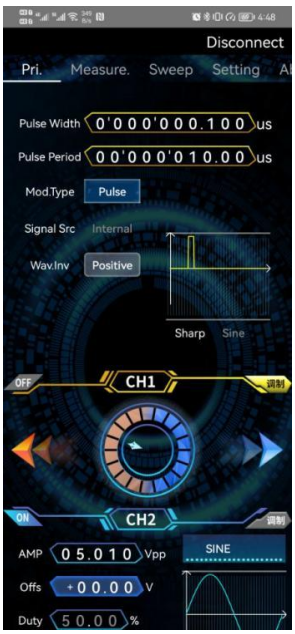

Figure 3-9-28
Pulse

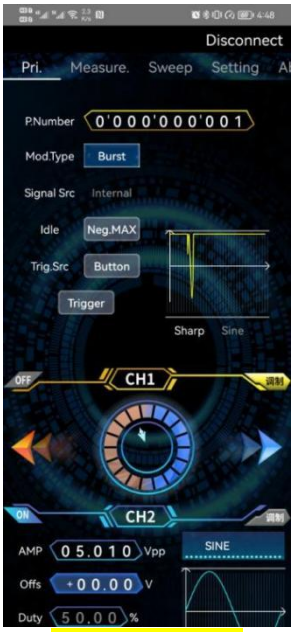

Figure 3-9-29
Burst

➢ Measurement function operation

Measurement mode: Click the switch button in the lower left corner of the measurement mode to enable or disable the measurement function, ON means ON, and OFF means OFF; in the measurement function, the coupling time, gate time, and measurement mode can be modified; the frequency, Positive pulse width, period, negative pulse width, period. As shown in Figure 3-9-30 below.

Counter mode: Click the switch button in the lower left corner of the counter mode to turn on or turn off the counter function, display ON means on, and display OFF means off; in the counter function, the coupling time can be modified; the number of pulses of the signal can be measured. As shown in Figure 3-9-31 below.

Figure 3-9-30
Measurement mode

Figure 3-9-31
Counter mode

➢ Sweep, voltage control function operation

Sweep frequency: After the sweep function is enabled, click sweep type to select sweep frequency; in sweep frequency, sweep channel, sweep time, sweep direction, sweep mode, start frequency, and stop frequency can be set. As shown in Figure 3-9-32 below.

Sweep Amplitude: After the sweep function is enabled, click the sweep type to select the sweep amplitude; in the sweep width, you can set the sweep channel, sweep time, sweep direction, sweep mode, start amplitude, and stop amplitude. As shown in Figure 3-9-33 below.

Sweep duty cycle: After the sweep function is enabled, click the sweep type to select the sweep duty cycle; in the sweep duty cycle, you can set the sweep channel, sweep time, sweep direction, sweep mode, start duty cycle, and stop duty cycle. As shown in Figure 3-9-34 below.

Voltage control frequency: After the voltage control function is turned on, click the voltage control type to select the voltage control frequency; in the voltage control frequency, you can set the maximum voltage calibration, the minimum voltage calibration, the voltage control mode, the start frequency, the stop frequency, the voltage control channel. As shown in Figure 3-9-35 below.

Voltage control amplitude: After the voltage control function is enabled, click the voltage control type to select the voltage control amplitude; in the voltage control amplitude, you can set the maximum voltage calibration, the minimum voltage calibration, the voltage control mode, the start amplitude, the stop

amplitude, and the voltage control channel . As shown in Figure 3-9-36 below.

Voltage control duty cycle: After the voltage control function is enabled, click the voltage control type to select the voltage control duty cycle; in the voltage control duty cycle, you can set the maximum voltage calibration, minimum voltage calibration, voltage control mode, start duty ratio, stop duty cycle, voltage control channel. As shown in Figure 3-9-37 below.

Figure 3-9-32
Sweep frequency

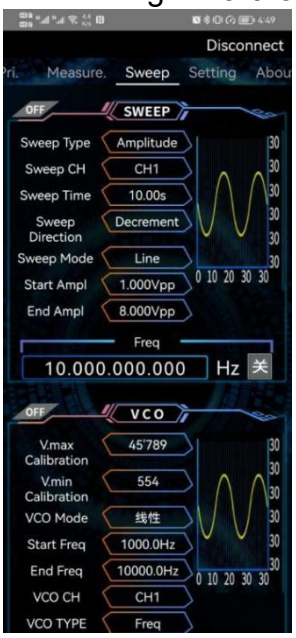

Figure 3-9-33
Sweep amplitude

Figure 3-9-34
Sweep duty cycle

Figure 3-9-35
Voltage control frequency

Figure 3-9-36
Voltage control amplitude

Figure 3-9-37
Voltage control duty cycle

- System setting operation

Load: Click Load, the“Load”pop-up box will pop out, input the corresponding storage location, and the parameters of the storage location can be loaded. As shown in Figure 3-9-38 below.

Save: Click Save, the“Save”pop-up box will pop out, input the location to be stored, and the parameters can be stored in the storage location. As shown in Figure 3-9-39 below.

Clear Memory: Click Clear Memory, the“Clear Memory”pop-up box will pop out, input the parameter storage location to be cleared, and the parameters of the storage location can be cleared and restored to default. As shown in Figure 3-9-40 below.

Arbitrary Waveform Editing: Click Arbitrary Wave Editing, the“Arbitrary Wave Editing”pop-up box will pop out, and you can freely edit arbitrary waveforms and write them into the machine. As shown in Figure 3-9-41 below.

Set synchronization: Click set synchronization, waveform synchronization, frequency synchronization, amplitude synchronization, offset synchronization, duty cycle synchronization, and external synchronization can be set. As shown in Figure 3-9-42 below.

Firmware upgrade: Click on the firmware upgrade, the "Input firmware code" pop-up window will pop up, input the corresponding firmware code, the default is 0 0 0, the instrument will automatically upgrade the firmware, please wait patiently during the upgrade process, do not do other operations, "Success" indicates that the firmware upgrade is successful. As shown in Figure 3-9-43. As shown in Figure 3-9-43.

Parameter fine-adjusting: Click parameter fine-adjusting to set frequency fine-adjusting, CH1 amplitude fine-adjusting, and CH2 amplitude fine-adjusting. As shown in Figure 3-9-44.

Power-on automatic output: Click power-on automatic output, you can set the default output of the instrument when it is powered on. As shown in Figure 3-9-45.

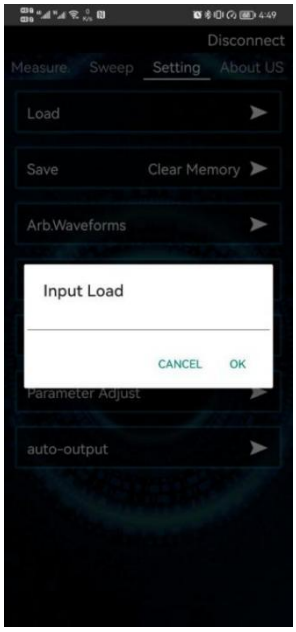

Figure 3-9-38
Load

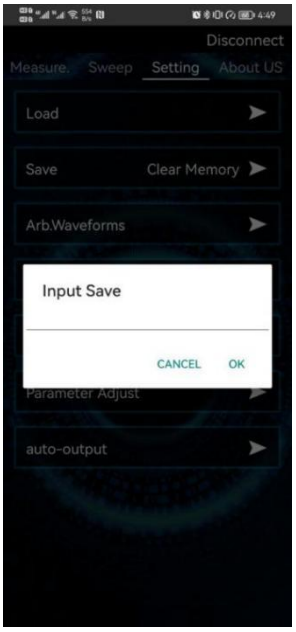

Figure 3-9-39
storage

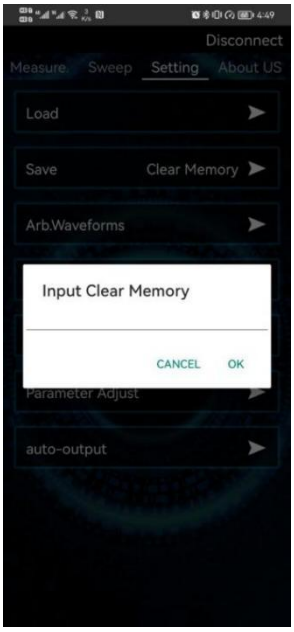

Figure 3-9-40
Clear storage

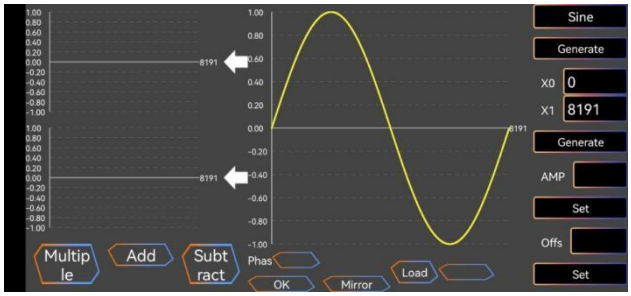

Figure 3-9-41
Edit Arbitrary wave

Figure 3-9-42
Set synchronization

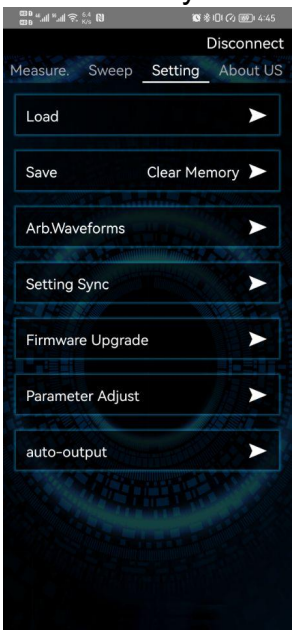

Figure 3-9-43
Firmware update

Figure 3-9-44
Parameter adjusting

Figure 3-9-45
Power on automatic output

➢ About us

Version: You can view the version information of the software, as shown in Figure 3-9-46 below.

Official website: After clicking the official website, you can jump to the official website of our company, as shown in Figure 3-9-47 below.

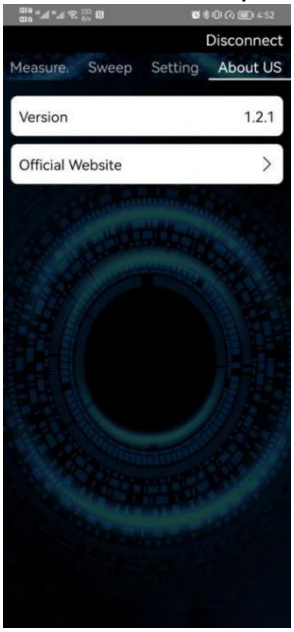

Figure 3-9-46
Versions

Figure 3-9-47
Official website

10. Instructions for IOS App

(1) The operation demonstration video of IOS App

http://68.168.132.244/JDS8000/MC_CN.mp4

(2) APP download

Search the apple store for "jds8000 series signal generator" to download.

(3) Installation the APP software

The software only supports systems above ios9.0. The first time the software links to Bluetooth, it will access Bluetooth. Please agree to visit.

This manual corresponds to software version 1.2. Different versions may be slightly different. It is recommended to upgrade to the latest software to obtain a better use experience.

(4) APP interface display

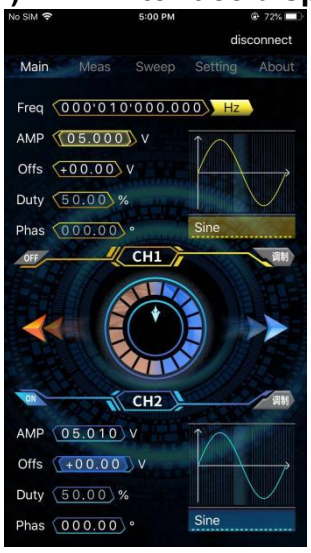

Figure 3-10-1
Main interface

Figure 3-10-2
Modulation interface

Figure 3-10-3
Measurement interface

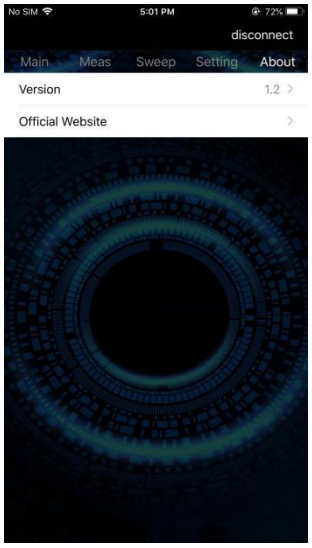

Figure 3-10-4	Figure 3-10-5	Figure 3-10-6
Measurement interface	System interface	About us interface

(5) Operating Instructions for IOS App

The operation of IOS system is the same as that of Android.

Chapter Ⅳ Troubleshooting

The following lists the possible faults and troubleshooting methods of JDS8000 series products during use. When you encounter the following faults, please follow the corresponding steps to deal with it. If you can't deal with it, please contact **JUNCTEK** and provide your equipment information (obtaining method: press the [SYS] button to see to Instrument System Information).

(1) If the power key is pressed, the signal generator is still blank and there is no display:

1) Check whether the power connector is connected properly.
2) Check whether the power key.
3) After the above inspection, restart the instrument.
4) If the instrument still does not work, please contact **JUNCTEK**.

(2) The screen is too dark to see clearly:

1) Check whether the brightness setting of the LCD screen.
2) Press the【**SYS**】key to enter the system setting menu, then press the ▲ ▼ soft key to make the cursor on the brightness, and adjust the knob to make the brightness of the LCD screen to the appropriate state.

(3) The settings are correct but no waveform output:

1) Check whether the BNC cord is correctly connected to the corresponding 【**CH1**】or【**CH2**】channel output connectors.
2) Check the BNC cord for internal damage.
3) Check that the BNC cord is securely connected to the instrument.
4) Check whether the indicator above the signal output connectors CH1 or CH2 is lit.
5) If it is not lit, press the corresponding key to make it lit.
6) After completing the above inspections, then restart the instrument.
7) If the instrument still does not work, please contact **JUNCTEK.**

Chapter V More product information

Press the button【**SYS**】 to get device information, including machine model and factory serial number.
For more information about this product, please refer to the relevant manual (It can be downloaded from the **JUNCTEK** official website: www.junteks.com).
<JDS8000 Series Operation Demonstration Video> provides the operation video of this product.
<JDS8000 series PC software and communication protocol> provides the corresponding PC software of this product and communication protocol.
<JDS8000 Series User's Manual> provides the function introduction and operation method of this product, possible trouble-shootings and processing methods during use.

Chapter Ⅵ Contact us

If you have any questions while using this product or this manual, please contact **JUNCTEK**.
E-mail：junce@junteks.com
Web：www.junteks.com

Appendix1:

Full names and abbreviations of the interface description

Abbreviation	Full name
PgDn	Page down
Type	Type
CNTR.	Counter
MEAS.	Measurement
FUNC	Function
Freq.	Frequency
Ampl.	Amplitude
Offset	Offset
Duty	Duty cycle
Wave	Waveform
Phase	Phase
AM	Amplitude modulation
FM	Frequency modulation
PM	Phase modulation
ASK	Amplitude-shift keying
FSK	Frequency-shift keying
PSK	Phase-shift keying
Source	Signal source
Shape	Modulation waveform
M.Freq	Modulation frequency
Depth	Modulation depth
FM.Dev	Frequency deviation
PM.Dev	Phase deviation
Hop.F	Frequency hopping
Rate	Rate
W.Inv	Wave inverse
Width	Pulse width
Period	Period
Pulse	Pulse
Burst	Burst
Idle	Idle
T.Src	Trigger source
Trig.	Trigger
Num.	Number of pulses
MEAS.	Measurement
CNTR.	Counter

ON	On
OFF	Off
RST	Reset
SAVE	Save
Auto	Automatic
Fast	Fast
About	About
Update	Update
PgDn	Page down
RUN	Run
Yes	Yes
SAVE	Save