

# **RIGOL**

## **Quick Guide**

# **DSG800 Series RF Signal Generator**

**Sept. 2018**

**RIGOL (SUZHOU) TECHNOLOGIES, INC.**



# Guaranty and Declaration

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## Contact Us

If you have any problem or requirement when using our products or this manual, please contact **RIGOL**.

E-mail: [service@rigol.com](mailto:service@rigol.com)

Website: [www.rigol.com](http://www.rigol.com)

# Safety Requirement

## 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.

### **Ground the Instrument.**

The instrument is grounded through the Protective Earth lead of the power cord. To avoid electric shock, connect the earth terminal of the power cord to the Protective Earth terminal before connecting any input or output terminals.

### **Connect the Probe Correctly.**

If a probe is used, the probe ground lead must be connected to earth ground. Do not connect the ground lead to high voltage. Improper way of connection could result in dangerous voltages being present on the connectors, controls or other surfaces of the oscilloscope and probes, which will cause potential hazards for operators.

### **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 Overvoltage Protection.**

Ensure that no overvoltage (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 Objects Into the Air Outlet.**

Do not insert objects into the air outlet, as doing so may cause damage to the instrument.

### **Use Proper Fuse.**

Please use the specified fuses.

**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 **RIGOL** authorized personnel before further operations. Any maintenance, adjustment or replacement especially to circuits or accessories must be performed by **RIGOL** 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 and the fan 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.

**Use the Battery Properly.**

Do not expose the battery (if available) to high temperature or fire. Keep it out of the reach of children. Improper change of a battery (lithium battery) may cause an explosion. Use the **RIGOL** specified battery only.

**Handle with Caution.**

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

## Safety Terms and Symbols

### Safety Notices in this Manual:



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**WARNING**

Indicates a potentially hazardous situation or practice which, if not avoided, will result in serious injury or death.

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**CAUTION**

Indicates a potentially hazardous situation or practice which, if not avoided, could result in damage to the product or loss of important data.

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### Safety Terms on the Product:

**DANGER** It calls attention to an operation, if not correctly performed, could result in injury or hazard immediately.

**WARNING** It calls attention to an operation, if not correctly performed, could result in potential injury or hazard.

**CAUTION** It calls attention to an operation, if not correctly performed, could result in damage to the product or other devices connected to the product.

### Safety Symbols on the Product:



Hazardous Voltage



Safety Warning



Protective Earth Terminal



Chassis Ground



Test Ground

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## Allgemeine Sicherheits Informationen

Überprüfen Sie die folgenden Sicherheitshinweise sorgfältig um Personenschäden oder Schäden am Gerät und an damit verbundenen weiteren Geräten zu vermeiden. Zur Vermeidung von Gefahren, nutzen Sie bitte das Gerät nur so, wie in diesem Handbuch angegeben.

### **Um Feuer oder Verletzungen zu vermeiden, verwenden Sie ein ordnungsgemäßes Netzkabel.**

Verwenden Sie für dieses Gerät nur das für ihr Land zugelassene und genehmigte Netzkabel.

### **Erden des Gerätes.**

Das Gerät ist durch den Schutzleiter im Netzkabel geerdet. Um Gefahren durch elektrischen Schlag zu vermeiden, ist es unerlässlich, die Erdung durchzuführen. Erst dann dürfen weitere Ein- oder Ausgänge verbunden werden.

### **Anschluss eines Tastkopfes.**

Die Erdungsklemmen der Sonden sind auf dem gleichen Spannungspegel des Instruments geerdet. Schließen Sie die Erdungsklemmen an keine hohe Spannung an.

### **Beachten Sie alle Anschlüsse.**

Zur Vermeidung von Feuer oder Stromschlag, beachten Sie alle Bemerkungen und Markierungen auf dem Instrument. Befolgen Sie die Bedienungsanleitung für weitere Informationen, bevor Sie weitere Anschlüsse an das Instrument legen.

### **Verwenden Sie einen geeigneten Überspannungsschutz.**

Stellen Sie sicher, daß keinerlei Überspannung (wie z.B. durch Gewitter verursacht) das Gerät erreichen kann. Andernfalls besteht für den Anwender die Gefahr eines Stromschlages.

### **Nicht ohne Abdeckung einschalten.**

Betreiben Sie das Gerät nicht mit entfernten Gehäuse-Abdeckungen.

### **Betreiben Sie das Gerät nicht geöffnet.**

Der Betrieb mit offenen oder entfernten Gehäuseteilen ist nicht zulässig. Nichts in entsprechende Öffnungen stecken (Lüfter z.B.)

### **Passende Sicherung verwenden.**

Setzen Sie nur die spezifikationsgemäßen Sicherungen ein.

### **Vermeiden Sie ungeschützte Verbindungen.**

Berühren Sie keine unisolierten Verbindungen oder Baugruppen, während das Gerät in Betrieb ist.

**Betreiben Sie das Gerät nicht im Fehlerfall.**

Wenn Sie am Gerät einen Defekt vermuten, sorgen Sie dafür, bevor Sie das Gerät wieder betreiben, dass eine Untersuchung durch **RIGOL** autorisiertem Personal durchgeführt wird. Jedwede Wartung, Einstellarbeiten oder Austausch von Teilen am Gerät, sowie am Zubehör dürfen nur von **RIGOL** autorisiertem Personal durchgeführt werden.

**Belüftung sicherstellen.**

Unzureichende Belüftung kann zu Temperaturanstiegen und somit zu thermischen Schäden am Gerät führen. Stellen Sie deswegen die Belüftung sicher und kontrollieren regelmäßig Lüfter und Belüftungsöffnungen.

**Nicht in feuchter Umgebung betreiben.**

Zur Vermeidung von Kurzschluß im Geräteinneren und Stromschlag betreiben Sie das Gerät bitte niemals in feuchter Umgebung.

**Nicht in explosiver Atmosphäre betreiben.**

Zur Vermeidung von Personen- und Sachschäden ist es unumgänglich, das Gerät ausschließlich fernab jedweder explosiven Atmosphäre zu betreiben.

**Geräteoberflächen sauber und trocken halten.**

Um den Einfluß von Staub und Feuchtigkeit aus der Luft auszuschließen, halten Sie bitte die Geräteoberflächen sauber und trocken.

**Schutz gegen elektrostatische Entladung (ESD).**

Sorgen Sie für eine elektrostatisch geschützte Umgebung, um somit Schäden und Funktionsstörungen durch ESD zu vermeiden. Erden Sie vor dem Anschluß immer Innen- und Außenleiter der Verbindungsleitung, um statische Aufladung zu entladen.

**Die richtige Verwendung des Akku.**

Wenn eine Batterie verwendet wird, vermeiden Sie hohe Temperaturen bzw. Feuer ausgesetzt werden. Bewahren Sie es außerhalb der Reichweite von Kindern auf. Unsachgemäße Änderung der Batterie (Anmerkung: Lithium-Batterie) kann zu einer Explosion führen. Verwenden Sie nur von **RIGOL** angegebene Akkus.

**Sicherer Transport.**

Transportieren Sie das Gerät sorgfältig (Verpackung!), um Schäden an Bedienelementen, Anschlüssen und anderen Teilen zu vermeiden.



## Sicherheits Begriffe und Symbole

### Begriffe in diesem Guide:



#### **WARNING**

Die Kennzeichnung WARNING beschreibt Gefahrenquellen die leibliche Schäden oder den Tod von Personen zur Folge haben können.



#### **CAUTION**

Die Kennzeichnung Caution (Vorsicht) beschreibt Gefahrenquellen die Schäden am Gerät hervorrufen können.

### Begriffe auf dem Produkt:

**DANGER** weist auf eine Verletzung oder Gefährdung hin, die sofort geschehen kann.

**WARNING** weist auf eine Verletzung oder Gefährdung hin, die möglicherweise nicht sofort geschehen.

**CAUTION** weist auf eine Verletzung oder Gefährdung hin und bedeutet, dass eine mögliche Beschädigung des Instruments oder anderer Gegenstände auftreten kann.

### Symbole auf dem Produkt:



Gefährliche  
Spannung



Sicherheits-  
Hinweis



Schutz-erde



Gehäusemasse



Erde

## Care and Cleaning

### Care

Do not store or leave the instrument where it may be exposed to direct sunlight for long periods of time.

### Cleaning

Clean the instrument regularly according to its operating conditions.

1. Disconnect the instrument from all power sources.
2. Clean the external surfaces of the instrument with a soft cloth dampened with mild detergent or water. Avoid having any water or other objects into the chassis via the heat dissipation hole. When cleaning the LCD, take care to avoid scarifying it.



#### CAUTION

To avoid damage to the instrument, do not expose it to caustic liquids.

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#### WARNING

To avoid short-circuit resulting from moisture or personal injuries, ensure that the instrument is completely dry before connecting it to the power supply.

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## Environmental Considerations

The following symbol indicates that this product complies with the WEEE Directive 2002/96/EC.



### Product End-of-Life Handling

The equipment may contain substances that could be harmful to the environment or human health. In order to avoid the release of such substances into the environment and harm to human health, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately. Please contact your local authorities for disposal or recycling information.

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# Document Overview

## Format Conventions in this Manual

### 1. Key:

The key at the front panel is denoted by the format of "Text Box + Key Name (Bold)" in the manual. For example, **FREQ** denotes the **FREQ** key.

### 2. Menu:

The menu is denoted by the format of "Character Shading + Menu Word (Bold)" in the manual. For example, **LF** denotes the low frequency menu item under **FREQ**.

### 3. Connector:

The connector at the front or rear panel is denoted by the format of "Square Brackets + Connector Name (Bold)" in the manual. For example, **[RF OUTPUT 50Ω]**.

### 4. Operation Step:

The next step of operation is denoted by an arrow "→" in the manual. For example, **FREQ** → **LF** denotes pressing **FREQ** at the front panel and then pressing **LF**.

## Content Conventions in this Manual

DSG800 series RF signal generator includes two models (DSG815 and DSG830). This manual introduces the basic operations of the instrument by taking DSG830 as an example. For the detailed information, refer to *DSG800 User's Guide*.

## Manuals of this Product

The manuals of this product include the quick guide, user's guide, programming guide, data sheet and etc. The latest versions of the manuals can be downloaded from [www.rigol.com](http://www.rigol.com).

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# Quick Start

## General Inspection

### 1. **Inspect the shipping container for damage**

Keep the damaged shipping container or cushioning material until the contents of the shipment have been checked for completeness and the instrument has passed both electrical and mechanical tests.

The consigner or carrier shall be liable for the damage to instrument resulting from shipment. **RIGOL** is not responsible for free maintenance/rework or replacement of the unit in such cases.

### 2. **Inspect the instrument**

In case of any damage, or defect, or failure, notify your **RIGOL** sales representative immediately.

### 3. **Check the accessories**

Please check the accessories according to the packing lists. If the accessories are incomplete or damaged, please contact your **RIGOL** sales representative immediately.

# Front Panel Overview

The front panel of DSG800 series RF signal generator is as shown in the figure below.

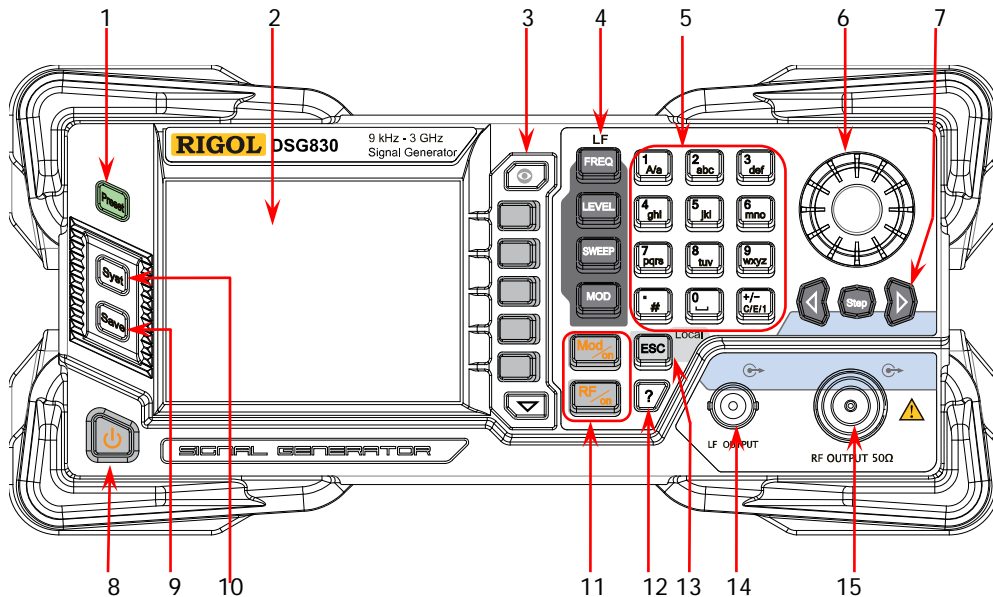


Figure 1 Front Panel

## 1. Restore to Preset Key

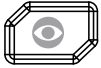


Restore the instrument to the preset state (the factory default state or user-stored state).

## 2. LCD

3.5 inch TFT high-resolution (320×240) color LCD. The current settings and state of the instrument can be clearly displayed. For the detailed information, refer to "**User Interface**".

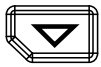
### 3. Menu Control Keys



Display switching key. In the menu page of any function, you can press this key to open the parameter information display interface of the current function. At this point, you can use the knob or direction keys to switch the parameter tabs to view the parameter information of different functions. Pressing this key again will switch to the function menu corresponding to the parameter tab currently selected. In addition, you can press any function key to exit the parameter information display interface.



Menu softkeys corresponding to the menus displayed at the left of the softkeys respectively. Pressing the softkey will activate the corresponding menu.



Menu page up/down key.

### 4. Function Keys



Set the frequency parameters of the RF output signal as well as the related parameters of LF output.



Set the amplitude parameters of the RF output signal and provide the flatness calibration function.



Set the sweep type, sweep manner, sweep mode and etc.



Set the related parameters of amplitude modulation (AM), frequency modulation (FM), phase modulation (ØM), pulse modulation and pulse generator as well as I/Q modulation and I/Q modulation source.

## 5. Numeric Keyboard

The numeric keyboard supports Chinese characters, English uppercase /lowercase characters, numbers and commonly used symbols (include the decimal point, #, space and positive/negative sign +/-). It is mainly used to edit the file or folder name and set the parameters.

The multiplexing keys of the numbers and letters are used to directly input the desired numbers or letters.



Used to switch among Chinese, English and number input modes.

When setting a parameter, the input mode is fixed at number and this key is used to input the sign ("+" or "-") of the value.



In number input mode, press this key to input 1.  
In English input mode, press this key to switch between uppercase and lowercase letter inputs.

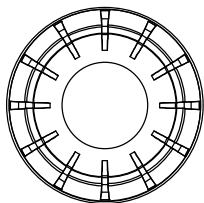


The multiplexing key of 0 and space.  
In number input mode, press this key to input 0.  
In Chinese or English input mode, press this key to input a space.



In number input mode, press this key to insert a decimal point at the current cursor position.  
In English input mode, press this key to input "#".  
In Chinese input mode, this key is invalid.

## 6. Knob



When setting a parameter, the knob is used to modify the value at the cursor or modify the parameter value at the current step.

When editing a filename, it is used to select the desired character.

For the storage function, it is used to select the current directory or file.

In the parameter information display interface, it is used to switch the parameter tabs.



## 7. Direction Keys/Step Key



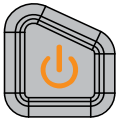
When setting a parameter, **Step** is used to set the step of the parameter currently selected; the direction keys are used to enter the parameter editing state and move the cursor to the specified digit.

For the storage function, the direction keys are used to collapse and expand the directory currently selected.

When editing a filename, the direction keys are used to select the desired character.

In the parameter information display interface, the direction keys are used to switch the parameter tabs.

## 8. Power Key



It is used to turn on or off the RF signal generator. You can use the following method to enable or disable this key.

Press **Syst** → **Pwr Status** to select "Default" or "Open".

When "Default" is selected, you need to press this key to start the instrument after the instrument is powered on.

When "Open" is selected, the instrument will start automatically after it is powered on.

Besides, this key provides the delayed switching function (namely, the instrument can be turned on or off only when you press this key and hold it down for a certain period of time) to avoid the shut-down of the instrument due to misoperation.

## 9. Store and Recall Key



Store and recall various types of files (such as the instrument state).

## 10. System Setting Key



Set the system-related parameters.

## 11. Output Control Keys



Used to turn on or off the RF output.

- Press this key; the backlight of the key and the RF label in the function status area in the user interface are illuminated. At this point, the RF output is turned on and the **[RF OUTPUT 50Ω]** connector outputs RF signal according to the current configuration.
- Press this key again; the backlight of the key turns off and the RF label in the function status area in the user interface is grayed out. At this point, the RF output is turned off.



Used to turn on or off the RF modulation output.

- When a modulation function (AM, FM, ØM, Pulse Mod, or I/Q Mod) is turned on, press this key; the backlight of the key and the MOD label in the function status area in the user interface are illuminated. At this point, the RF modulation output is turned on and the **[RF OUTPUT 50Ω]** connector outputs the modulated RF signal according to the current configuration (the backlight of **RF/on** must be illuminated).
- Press this key again and the backlight of the key turns off. At this point, the RF modulation output is turned off.

## 12. Built-in Help System



To get the help information of any front panel key or menu softkey, press this key and then press the desired key.

## 13. Exit Key



When setting a parameter, this key is used to clear the number in the editing window and exit the parameter input state.

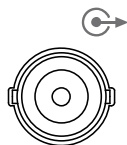
When editing a filename, this key is used to clear the characters in the input bar.

In the keyboard test state, this key is used to exit the current test state.

When the instrument is working in the remote mode, you can press this key to return to the local mode.

After you select the next level of menu, this key is used to exit the current menu and return to the previous menu.

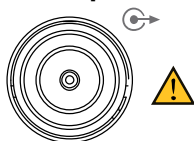
#### 14. LF Output Connector



LF OUTPUT

When the LF output is turned on, this connector is used to output the LF signal.

#### 15. RF Output Connector



RF OUTPUT 50Ω

When the backlight of **RF/on** is illuminated, this connector is used to output the RF signal and RF sweep signal.

When the backlights of **RF/on** and **Mod/on** are both illuminated, this connector is used to output the RF modulated signal.



#### **CAUTION**

To avoid damaging the instrument, the reverse DC voltage on the RF output connector cannot exceed 50 V and the reverse power cannot exceed +30 dBm (1W) in the 1 MHz to 3 GHz frequency segment.

# Rear Panel Overview

The rear panel of DSG800 series RF signal generator is as shown in the figure below.

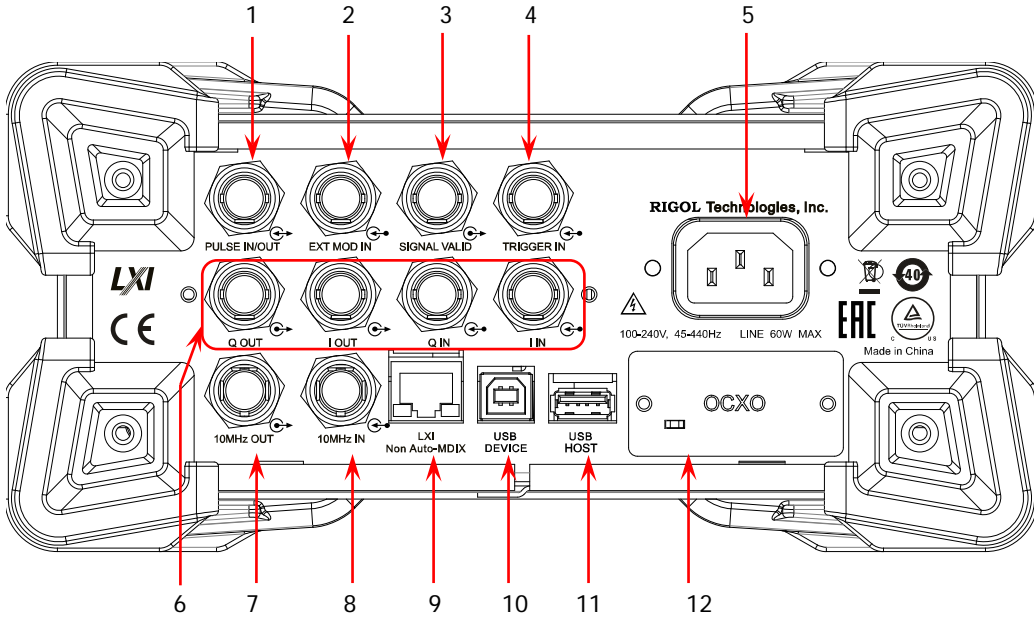
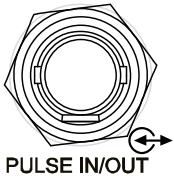


Figure 2 Rear Panel

## 1. Pulse Signal Input/Output Connector



The function of this connector is determined by the current working mode of pulse modulation.

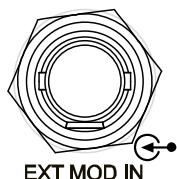
### PULSE IN:

When the pulse modulation source is "Ext", this connector is used to input the external pulse signal.

### PULSE OUT:

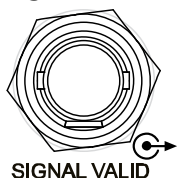
When the pulse modulation source is "Int" and the pulse output is turned on, this connector is used to output the pulse signal generated by the internal generator. This output signal is related to the pulse "Mode" and can be set to "Single" or "Train".

## 2. External Modulation Input Connector



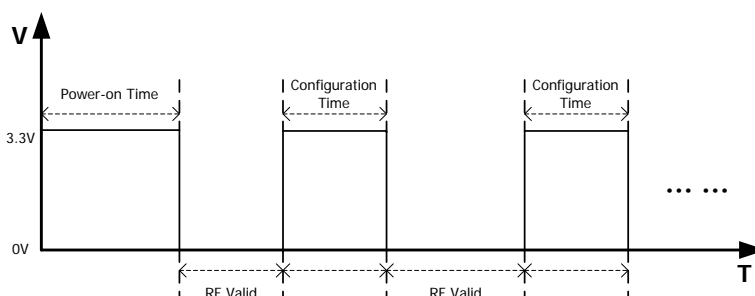
When the modulation source of AM or FM/ØM is set to "Ext", this connector is used to input the external modulating signal.

## 3. Signal Valid Output Connector



When the RF output frequency or amplitude is modified, after a certain response and processing time of the internal circuit of the instrument, the instrument outputs RF signal with the specified frequency and amplitude via the RF output connector at the front panel. During this process, the **[SIGNAL VALID]** connector outputs a pulse sync signal, indicating that the RF output signal is valid.

- High Level (+3.3 V): indicate that the RF signal is in configuration.
- Low Level (0 V): indicate that the RF signal is stable (namely, the signal is valid).



## 4. External Trigger Input Connector



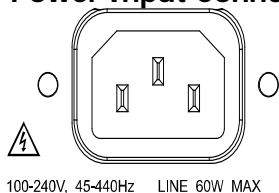
When the trigger mode of **[SWEEP]** is "Ext", this connector is used to input the external trigger signal. You can press **Trig Slope** to set the polarity of the trigger signal to "Pos" or "Neg".

When the trigger mode of I/Q modulation baseband output is "Ext", this connector is used to input the external trigger signal.

When the pulse modulation source is "Int" and the trigger mode is "Ext Trig", this connector is used to input the external trigger signal.

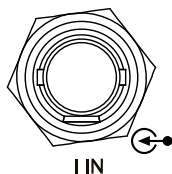
When the pulse modulation source is "Int" and the trigger mode is "Ext Gate", this connector is used to input the external gated signal.

**5. Power Input Connector**

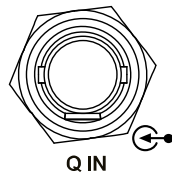


Power input connector.  
 This RF signal generator can accept 100 V to 240 V, 45 Hz to 440 Hz AC power supplies. The power consumption of the instrument cannot exceed 60 W.

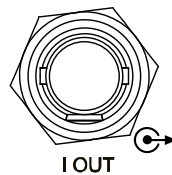
**6. I/Q Modulating Signal Input/Output Connectors (Option DSG800-IQ)**



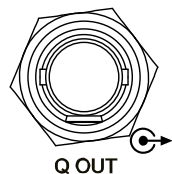
When the I/Q modulation source is "Ext", it is used to input the I (In-Phase) baseband signal of I/Q modulation.



When the I/Q modulation source is "Ext", it is used to input the Q (Quadrature Phase) baseband signal of I/Q modulation.

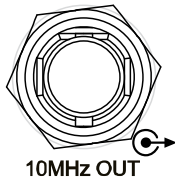


It is used to output the I (In-Phase) components of I/Q modulation of the built-in baseband generator.



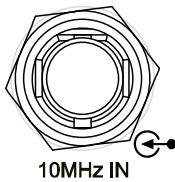
It is used to output the Q (Quadrature Phase) components of I/Q modulation of the built-in baseband generator

## 7. Reference Signal Output Connector



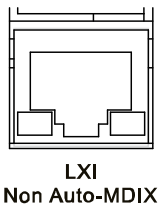
It is used to output the internal 10 MHz reference clock signal which is used to synchronize the generator with other instruments. For more information about the specifications of the clock signal output from this connector, refer to the data sheet of this product.

## 8. Reference Signal Input Connector



It is used to input the external 10 MHz reference clock signal which is used to synchronize the generator with other instruments. For more information about the specifications of the external clock signal input from this connector, refer to the data sheet of this product.

## 9. LAN



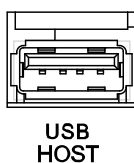
The instrument complies with LXI Core 2011 Device standard. It supports WebServer, Socket and other remote control modes. This interface is used to connect the RF signal generator to the PC or network for remote control.

## 10. USB DEVICE



The instrument complies with USBTMC class protocol. This interface is used to connect the PC for remote instrument control.

## 11. USB HOST



This interface is used to connect the USB storage device to update the system or store the system states and etc.

## 12. OCXO (Option OCXO-B08)



OCXO is an oven controlled crystal oscillator. It is a frequency reference source with higher temperature stability.

**Note:** Sixty minutes of warm-up is required for the OCXO to reach its rated frequency.

For the ordering information of this option, please refer to the data sheet of this product.

## To Use DSG800 for the First Time

### To Connect the Power Supply


Please connect the RF signal generator to AC power supply using the power cable supplied in the accessories. This RF signal generator can accept 100 V to 240 V, 45 Hz to 440 Hz AC power supplies. The power consumption of the instrument cannot exceed 60 W. When the RF signal generator is connected to AC power supply via this connector, the instrument selects the correct voltage range automatically and users do not need to select the voltage range manually.



#### CAUTION

To avoid electric shock, use standard plugs.

### Power-on Inspection

After the power supply is correctly connected, press the power key  at the front panel to turn on the RF signal generator. During the start-up, the instrument performs initialization and self-test. After that, the instrument enters the default interface.

### To Set the System Language

DSG800 series RF signal generator supports multiple system languages. You can press **Syst**→ **Language** to switch the system language.



## User Interface

In this manual, DSG830 is taken as an example to illustrate the user interface of DSG800 series RF signal generator, as shown in the figure below.

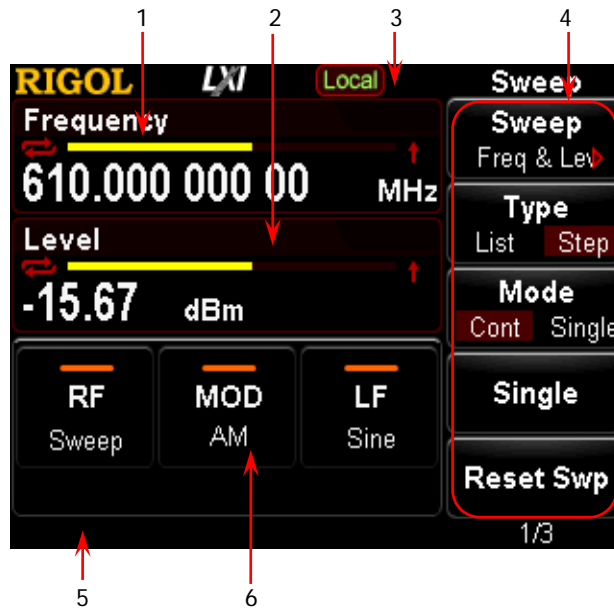




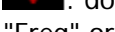


Figure 3 User Interface




### 1. Frequency Area




Display the current frequency settings of the RF signal generator.

- : continuous sweep label. It is displayed when the sweep manner is "Freq" or "Freq & Lev" and the sweep mode is "Cont".
- : single sweep label. It is displayed when the sweep manner is "Freq" or "Freq & Lev" and the sweep mode is "Single".
- : forward sweep label. It is displayed when the sweep manner is "Freq" or "Freq & Lev" and the sweep direction is "Fwd".
- : downward sweep label. It is displayed when the sweep manner is "Freq" or "Freq & Lev" and the sweep direction is "Down".
- : frequency sweep progress bar. It is displayed when the sweep manner is "Freq" or "Freq & Lev".

### 2. Amplitude Area





Display the current level settings of the RF signal generator.

- : displayed when the flatness calibration is turned "On".
- : continuous sweep label. It is displayed when the sweep manner is "Level" or "Freq & Lev" and the sweep mode is "Cont".
- : single sweep label. It is displayed when the sweep manner is "Level" or "Freq & Lev" and the sweep mode is "Single".

- : forward sweep label. It is displayed when the sweep manner is "Level" or "Freq & Lev" and the sweep direction is "Fwd".
- : downward sweep label. It is displayed when the sweep manner is "Level" or "Freq & Lev" and the sweep direction is "Down".
- : amplitude sweep progress bar. It is displayed when the sweep manner is "Level" or "Freq & Lev".

### 3. Status Bar

Indicate the current system states of the RF signal generator.

- : the RF signal generator is working in the remote control mode.
- : the RF signal generator is working in the local operation mode.
- : displayed when a USB storage device is detected.
- : displayed when the instrument parameter information interface is opened.

### 4. Menu Display Area









The menu items displayed in this area correspond to the softkeys at the right of the screen respectively. Pressing any softkey can enable the corresponding menu function.

### 5. Message Display Area






Display the operation error messages and prompt messages. You can press **Syst** → **Information** → **System Msg** to view the messages. When multiple messages are generated, you can use the direction keys or knob to select the desired message.

### 6. Function Status Area

Display the current states of the functions of the RF signal generator. The status icons that might be displayed in the function status area are as shown in the table below.

Icon	Explanation	Icon	Explanation
	The RF output is not turned on and no sweep manner is selected.		The LF output is not turned on and Sine waveform is selected.
	The RF output is not turned on and only a single sweep manner is selected.		The LF output is not turned on and Square waveform is selected.
	The RF output is turned on and no sweep manner is selected.		The LF output is turned on and Sine waveform is selected.
	The RF output is turned on and only a single sweep manner is selected.		The LF output is turned on and Square waveform is selected.

	The RF modulation output is not turned on and only AM is turned on.		The RF modulation output is turned on and AM is turned on.
	The RF modulation output is not turned on and only FM is turned on.		The RF modulation output is turned on and FM is turned on.
	The RF modulation output is not turned on and only ØM is turned on.		The RF modulation output is turned on and ØM is turned on.
	The RF modulation output is not turned on and only Pulse is turned on.		The RF modulation output is turned on and Pulse is turned on.
	The RF modulation output is not turned on and only IQ is turned on.		The RF modulation output is turned on and IQ is turned on.
	The RF modulation output is not turned on; AM and FM are turned on.		The RF modulation output is turned on; AM and FM are turned on.
	The RF modulation output is not turned on; AM and ØM are turned on.		The RF modulation output is turned on; AM and ØM are turned on.
	The RF modulation output is not turned on; AM and Pulse are turned on.		The RF modulation output is turned on; AM and Pulse are turned on.
	The RF modulation output is not turned on; FM and Pulse are turned on.		The RF modulation output is turned on; FM and Pulse are turned on.
	The RF modulation output is not turned on; FM and IQ are turned on.		The RF modulation output is turned on; FM and IQ are turned on.
	The RF modulation output is not turned on; ØM and Pulse are turned on.		The RF modulation output is turned on; ØM and Pulse are turned on.
	The RF modulation output is not turned on; ØM and IQ are turned on.		The RF modulation output is turned on; ØM and IQ are turned on.
	The RF modulation output is not turned on; IQ and Pulse are turned on.		The RF modulation output is turned on; IQ and Pulse are turned on.
	The RF modulation output is not turned on; AM, FM and Pulse are turned on.		The RF modulation output is turned on; AM, FM and Pulse are turned on.
	The RF modulation output is not turned on; AM, ØM and Pulse are turned on.		The RF modulation output is turned on; AM, ØM and Pulse are turned on.

	and Pulse are turned on.		ØM and Pulse are turned on.
	The RF modulation output is not turned on; FM, IQ and Pulse are turned on.		The RF modulation output is turned on; FM, IQ and Pulse are turned on.
	The RF modulation output is not turned on; ØM, IQ and Pulse are turned on.		The RF modulation output is turned on; ØM, IQ and Pulse are turned on.
	The RF modulation output is not turned on and none of the modulation functions is turned on.	--	--

**Tip:** Press **MOD** and the AM/FM/ØM/PUL/I/Q modulation icons are displayed in the function status area. If a modulation function is turned on (or off), the corresponding icon will be illuminated (or grayed out).

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## To Use the Built-in Help System

The DSG800 built-in help system provides the help information of all the function keys and menu softkeys at the front panel. Users can view the help information of any key when operating the instrument.

### 1. Acquire the built-in help information

Press **[?]** and press the desired function key or menu softkey; the help information of the key will be displayed in the instrument interface.

### 2. Page up/down

When the help information is displayed in multiple pages, you can use the direction keys or knob to switch the help information page.

### 3. Turn off the current help information

When help information is displayed in the instrument interface, pressing any key (except the direction keys and knob) at the front panel will turn off the help information currently displayed.

### 4. Acquire the help information of a menu softkey

Press **[?]** and the prompt message about how to acquire the help information is displayed in the instrument interface. Then, press the desired menu softkey and the help information of the menu item corresponding to this menu softkey is displayed in the instrument interface.

### 5. Acquire the help information of any function key

Press **[?]** and the prompt message about how to acquire the help information is displayed in the instrument interface. Then, press the desired function key and the help information of the function of the key is displayed in the instrument interface.

# Basic Operations

## To Output a RF Signal

Output a RF signal with 1 GHz frequency and -20 dBm amplitude from the [RF OUTPUT 50Ω] connector.

### 1. Restore to the factory setting

Press **Syst** → **Reset** → **Preset Type** → "Factory" and then press **Preset** to restore the instrument to the factory setting.

### 2. Frequency setup

Press **FREQ**, use the numeric keyboard to input the frequency value (1) and select the desired unit (GHz) from the pop-up unit menu.

- The frequency units available are GHz, MHz, kHz and Hz.
- You can press **Backspace** to delete the number at the left of the cursor.
- You can also press the left/right direction key to enter the parameter editing state and move the cursor to the specified digit; then, rotate the knob to modify the value.
- After the frequency is set, you can rotate the knob to modify the frequency at the current step.
- You can press **FREQ** and then press **Step** to set the step.

### 3. Amplitude setup

Press **LEVEL**, use the numeric keyboard to input the amplitude value (-20) and select the desired unit (dBm) from the pop-up unit menu.

- The amplitude units available are dBm, -dBm, mV, uV and nV.
- You can press **Backspace** to delete the number at the left of the cursor.
- You can also press the left/right direction key to enter the parameter editing state and move the cursor to the specified digit; then, rotate the knob to modify the value.
- You can also rotate the knob to modify the amplitude at the current step.
- You can press **LEVEL** and then press **Step** to set the step.

### 4. Turn on the RF output

Press **RF/on**; the backlight of the key and the RF label displayed in the function status area in the user interface are illuminated. At this point, the RF output is turned on and the [RF OUTPUT 50Ω] connector outputs RF signal according to the current configuration.


## To Output a RF Sweep Signal

This section introduces how to output a RF sweep signal by configuring continuous linear step sweep. Set the frequency range to (1 GHz to 2 GHz), the amplitude range to (-20 dBm to 0 dBm), the number of sweep points to 10 and the dwell time to 500 ms.

### 1. Restore to the factory setting

Press **Syst** → **Reset** → **Preset Type** → "Factory" and then press **Preset** to restore the instrument to the factory setting (by default, the sweep mode is continuous, the sweep type is step and the sweep space is linear).

### 2. Step sweep parameter setup

Press **SWEEP** and use the menu page up/down key  to open the 2/3 page of the menu; then, press **Step Swp** to enter the step sweep parameter setting menu.

- Start Frequency  
Press **Start Freq**, use the numeric keyboard to input the start frequency value (1) and select the desired unit (GHz) from the pop-up unit menu.
- Stop Frequency  
Press **Stop Freq**, use the numeric keyboard to input the stop frequency value (2) and select the desired unit (GHz) from the pop-up unit menu.
- Start Level  
Press **Start Lev**, use the numeric keyboard to input the start level value (-20) and select the desired unit (dBm) from the pop-up unit menu.
- Stop Level  
Press **Stop Lev**, use the numeric keyboard to input the stop level value (0) and select the desired unit (dBm) from the pop-up unit menu.
- Sweep Points  
Press **Points**, use the numeric keyboard to input the number of sweep points (10) and then press **Enter**.
- Dwell Time  
The dwell time indicates the duration of a sweep step.  
Press **Dwell Time**, use the numeric keyboard to input the time value (500) and select the desired unit (ms) from the pop-up unit menu.

### 3. Turn on the RF sweep

Press **SWEEP** → **Sweep** and select "Freq & Lev" to turn on the frequency and amplitude sweep functions at the same time.

At this point, the RF signal generator sweeps from the start frequency and level to the stop frequency and level continuously at certain step according to the current settings. The frequency and amplitude sweep progress bars as well as the continuous sweep label are displayed in the frequency and amplitude areas in the user interface respectively; in addition, the Sweep label in the function

status area is illuminated.

#### **4. Turn on the RF output**

Press **RF/on**; the backlight of the key and the RF label displayed in the function status area in the user interface are illuminated. At this point, the RF output is turned on and the **[RF OUTPUT 50Ω]** connector outputs RF sweep signal according to the current configuration.



## To Output a RF Modulated Signal

This section introduces how to output an AM modulated signal by taking amplitude modulation (AM) as an example. Set the carrier frequency to 800 MHz, the carrier amplitude to -20 dBm, the AM modulation depth to 60% and the modulation frequency to 20 kHz.

### 1. Restore to the factory setting

Press **Syst** → **Reset** → **Preset Type** → "Factory" and then press **Preset** to restore the instrument to the factory setting (by default, the modulation source is internal and the modulation waveform is sine).

### 2. Set the carrier frequency and amplitude

#### (1) Carrier Frequency

Press **FREQ**, use the numeric keyboard to input the frequency value (800) and select the desired unit (MHz) from the pop-up unit menu.

#### (2) Carrier Amplitude

Press **LEVEL**, use the numeric keyboard to input the amplitude value (-20) and select the desired unit (dBm) from the pop-up unit menu.

### 3. Set the AM modulation parameters

(1) Press **MOD** → **AM** to enter the amplitude modulation parameter setting menu.

(2) Press **Depth**, use the numeric keyboard to input the value of the modulation depth (60) and select the desired unit (%) from the pop-up unit menu.

(3) Press **Freq**, use the numeric keyboard to input the frequency value (20) and select the desired unit (kHz) from the pop-up unit menu.

(4) Press **Switch** and select "On" to turn on the AM function.

### 4. Turn on the RF modulation output

Press **Mod/on** and the backlight is illuminated. Then, press **RF/on** and the backlight is illuminated. The MOD, AM and RF labels in the function status area in the user interface are illuminated. At this point, the RF modulation output is turned on and the **[RF OUTPUT 50Ω]** connector outputs RF modulated signal according to the current configuration.

**Note:** The backlights of **RF/on** and **Mod/on** must be both illuminated.

## Remote Control

DSG800 supports to build communication with the PC via the USB or LAN interface to realize remote control. The remote control is realized on the basis of the SCPI (Standard Commands for Programmable Instruments) command set. This section introduces how to control the RF signal generator remotely via the USB interface by sending SCPI commands using the common PC software Ultra Sigma provided by **RIGOL**. For the detailed information of the commands, refer to *DSG800 Programming Guide*.

**Note:** When the instrument is in remote mode, **Rmt** is displayed in the user interface and all the front panel keys (except **ESC**) are locked. At this point, you can press **ESC** to exit the remote mode.

### 1. Install Ultra Sigma

Acquire Ultra Sigma as well as install the software and the desired components correctly according to the instructions. You can download the newest version of the software from [www.rigol.com](http://www.rigol.com).

### 2. Control via USB

#### (1) Connect the device

Connect the RF signal generator (USB DEVICE) and PC (USB HOST) using a USB cable.

#### (2) Install the USB drive

This RF signal generator is a USBTMC device and the **Found New Hardware Wizard** dialog box will be displayed after the RF signal generator is correctly connected to the PC (the RF signal generator will be automatically configured to the USB interface) and both of them are started. Please install the "USB Test and Measurement Device (IVI)" drive program according to the instructions.

#### (3) Search for the device resource

Start Ultra Sigma and the software will search for the RF signal generator resource currently connected to the PC automatically. You can also click **USB-TMC** to search for the resource.

#### (4) View the device resource

The resource found will be displayed under the "RIGOL Online Resource" directory and the model number and USB interface information of the instrument will also be displayed.

For example, DSG830

(USB0::0x1AB1::0x6666::DSG8A170200001::INSTR).

**(5) Communication test**

Right-click the resource name "DSG830 (USB0::0x1AB1::0x6666::DSG8A170200001::INSTR)" and select "SCPI Panel Control" to open the remote command control panel through which you can send commands and read data.

# Troubleshooting

The chapter lists the commonly encountered failures of DSG800 and their solutions. When you encounter those problems, please solve them following the corresponding steps. If the problem remains still, please contact **RIGOL** and provide your device information (**Syst** → **Information** → **System Info**).

## 1. The screen of the RF signal generator is still dark (no display) after the power key is pressed:

- (1) Check whether the fan is running;
  - If the fan is running but the screen is dark, the screen connecting wire might be loose.
  - If the fan is not running, the instrument does not start successfully and please go to step (2).
- (2) Check whether the power is correctly connected and whether the power key is really on.
- (3) Check whether the fuse is burned out. If the fuse needs to be replaced, please contact **RIGOL**.
- (4) Restart the instrument after finishing the above inspections.
- (5) If it still does not work correctly, please contact **RIGOL**.

## 2. The screen is too dark and cannot be seen clearly:

- (1) Check whether the brightness setting value of the LCD is too low.
- (2) Press **Syst** → **Display** → **Brightness** and use the numeric keys or knob to adjust the brightness of the LCD of the RF signal generator to a proper value.

## 3. The RF signal generator is locked:

- (1) Check whether the RF signal generator is in remote control mode (in remote control, **Rmt** is displayed in the status bar of the user interface). Pressing **ESC** can exit the remote control mode and unlock the front panel.
- (2) Check whether the RF signal generator is in local mode with the screen being locked (when the screen is locked, front panel operations are not available). Pressing **ESC** can unlock the screen and exit the locking state.
- (3) If progress bar is displayed on the screen of the RF signal generator, some operation is in progress. For example, when saving a file, the progress bar will be displayed indicating that the save operation is in progress. During the operation, the front panel is locked.
- (4) Pressing **Preset** or restarting the RF signal generator can also unlock the instrument.

#### 4. The setting is correct but the waveform output is incorrect:

- (1) There is no RF output
  - Check whether the signal connecting cable is tightly connected to the corresponding **[RF OUTPUT 50Ω]** connector.
  - Check whether the connecting cable has internal damage.
  - Check whether the connecting cable is tightly connected to the test instrument.
  - Check whether the backlight of **[RF/on]** is illuminated. If not, press this key to illuminate the backlight. At this point, the RF label in the function status area in the user interface is illuminated and the RF output is correctly turned on.
  - Check whether the output amplitude of the RF signal is too small. Adjust the output amplitude properly.
- (2) The RF output is not modulated
  - Check whether the signal connecting cable is tightly connected to the corresponding **[RF OUTPUT 50Ω]** connector.
  - Check whether the connecting cable has internal damage.
  - Check whether the connecting cable is tightly connected to the test instrument.
  - Check whether the backlights of **[Mod/on]** and **[RF/on]** are both illuminated and check whether the modulation **Switch** is turned on.
  - Check whether the modulation parameter settings are proper and adjust the parameters appropriately.
  - If external modulation source is used, make sure that the external source is correctly connected and outputs signal. At the same time, the external source should work within the specified range of the RF signal generator.

#### 5. The sweep is abnormal:

- (1) The sweep stagnates

The sweep progress bar is displayed in the frequency area/amplitude area in the user interface indicating that the sweep is in progress. If the sweep stagnates, please check:

  - At least one manner of sweep is turned on. Press **[SWEEP]** → **Sweep** to select "Freq", "Level" or "Freq & Lev".
  - If single sweep mode is selected, press **Single** to meet the trigger condition and the instrument performs a sweep.
  - If the sweep trigger mode is not set to auto, press **[SWEEP]** → **Trig Mode** → **Auto** to check whether the sweep stagnates due to the loss of the sweep trigger.
  - If the point trigger mode is not set to auto, press **[SWEEP]** → **Point Trig** → **Auto** to check whether the sweep stagnates due to the loss of the point trigger.
  - Check whether the dwell time is too large or too small that the sweep cannot be seen.

- Make sure that at least two points are set in the step sweep or list sweep.
- (2) The dwell time of list sweep is incorrect
  - Press **SWEEP** → **List Swp** to enter the sweep list menu.
  - Press **Load** to load the desired sweep list and press **View** to check whether the dwell time in the sweep list is correct.
  - If the dwell time is incorrect, re-edit the sweep list and load it to the instrument. If the dwell time is correct, turn to the next step.
  - Press **SWEEP** → **Type** to make sure that "List" sweep is selected. If "Step" sweep is currently selected, the RF signal generator sweeps according to the dwell time of step sweep.
- (3) The list sweep information recalled from the register is lost
  - The list sweep information cannot be stored in the status register of the instrument as a part of the instrument state.
  - The RF signal generator can only use the list currently loaded for sweep.
- (4) In list or step sweep, the amplitude does not change
  - Make sure that the sweep manner is set to "Level" or "Freq & Lev".
  - If the sweep manner is currently set to "Freq", the amplitude will not change.

#### **6. The USB storage device cannot be recognized:**

- (1) Check whether the USB storage device can work normally when being connected to other instrument or PC.
- (2) Make sure that the USB storage device used is a Flash type. This instrument does not support hardware USB storage device.
- (3) Restart the instrument and insert the USB storage device to check whether it can work normally.
- (4) If the USB storage device still cannot be used normally, please contact **RIGOL**.

#### **7. No response or incorrect response when a key is pressed:**

- (1) After starting the instrument, check whether all the keys are irresponsive.
- (2) Press **Syst** → **Self-Test** → **Key Test** to enter the keyboard test interface. Press the function keys at the front panel sequentially and check whether some key gives no response or incorrect response when it is pressed.
- (3) If the above failures occur, the keyboard connecting wire might be loose or the keyboard is damaged. Please do not disassemble the instrument and contact **RIGOL**.

#### **8. The instrument does not pass the performance specification test:**

- (1) Check whether the RF signal generator is within the calibration period (1 year).
- (2) Check whether the RF signal generator is warmed up for at least 40 minutes before the test.

- 
- (3) Check whether the RF signal generator is working under the specified environment temperature.
  - (4) Check whether the test is being performed in a highly magnetic environment.
  - (5) Check whether the power supplies of the RF signal generator and test system have strong interference.
  - (6) Check whether the performance of the test device meets the requirement.
  - (7) Check whether the test device is within the calibration period.
  - (8) Check whether the test device is working under the required conditions of the corresponding manual.
  - (9) Check whether all the connections are tight.
  - (10) Check whether the cables have internal damage.
  - (11) Make sure that the operations conform to the settings and processes required by the performance verification guide.
  - (12) Check whether the error calculation is correct.
  - (13) Get a correct understanding of the definitions of "Typical Value" and "Nominal Value".
    - Typical Value: the performance specifications of this product under the specified conditions.
    - Nominal Value: the approximate quantity of the product during application.