



# DG800 Pro 系列

## 函数/任意波形发生器

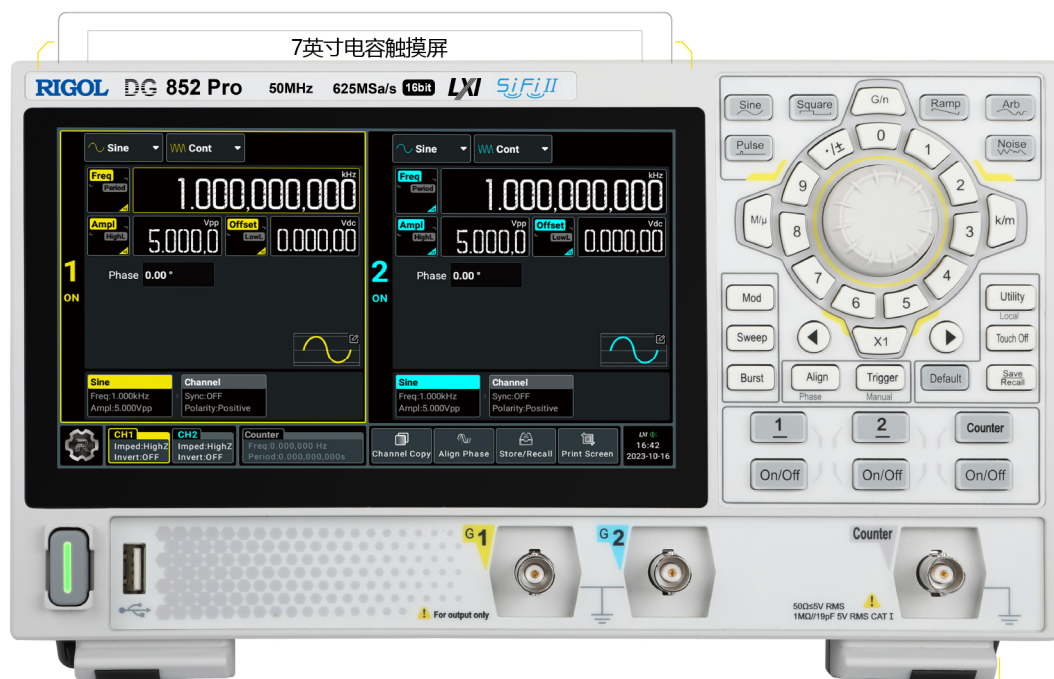
### 数据手册

DSB14000-1110  
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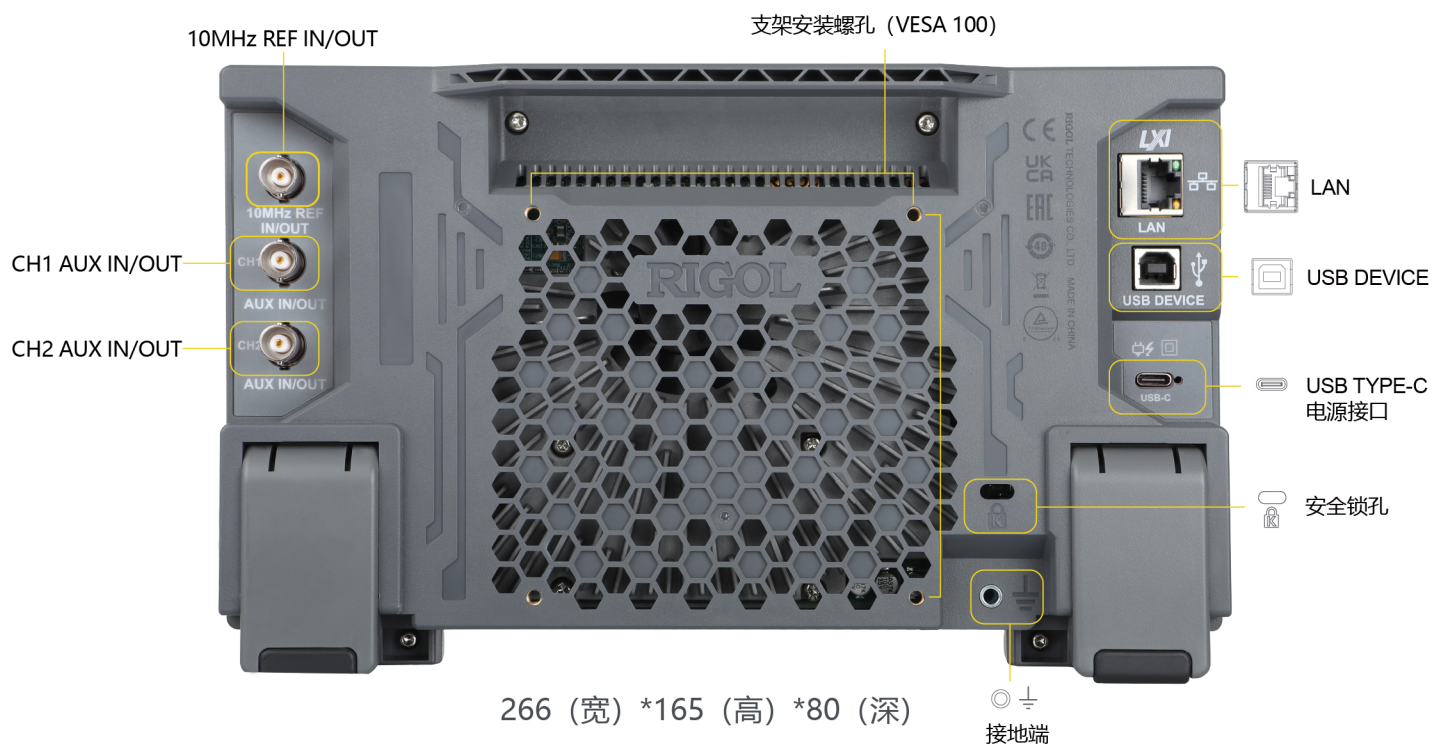
## 函数/任意波形发生器

外观精巧，功能丰富



7英寸电容触摸屏

独立频率计输入通道



10MHz REF IN/OUT

支架安装螺孔 (VESA 100)

CH1 AUX IN/OUT

CH2 AUX IN/OUT

LAN

USB DEVICE

USB TYPE-C  
电源接口

安全锁孔

266 (宽) \*165 (高) \*80 (深)

接地端



## 满足多种应用场景

体积小，方便便携，适合工作台、教室或者测试现场等多种工作环境。

VESA 100×100支架安装螺孔，支持背部连接通用支架，节省桌面空间。

Type-C供电接口，支持移动电源供电，应对现场测试需求。



## 产品特点

### 高性价比

16 bits垂直分辨率，625 MSa/s最高采样率，50 MHz最高输出频率，上升时间低至3 ns，入门级信号源的性能之选。

### 频率计

标配7位频率计，最高测量频率500 MHz，独立的频率计测量输入接口，为频率测量提供更简便精确的方式。

### 丰富的调制功能

支持多种模拟和数字调制：AM、FM、PM、ASK、FSK、PSK和PWM，支持内部/外部调制源，满足不同测试场景。

### 丰富的波形

多种内置波形，囊括了工程应用、医疗电子、汽车电子、数学等各个领域的常用信号。

### 标配序列功能

支持1至64个波形组成的序列，总长度可达2 Mpts/CH（选配8 Mpts/CH）。

### 丰富的接口

标配 USB Host、USB Device、LAN（LXI Core 2011 Device），同时支持WebControl网页控制功能，让远程协作更加便捷。



## 应用



电器和电子实验



系统集成



现场测试



浮地测试

# Features

## Features

- Maximum sampling rate 625 MSa/s
- Maximum output frequency 50 MHz
- Vertical resolution 16 bit
- Arbitrary wave editing function, the maximum arbitrary wave length is up to 2 Mpts/CH (optional 8 Mpts/CH)
- Built-in harmonic generator up to 20th order
- Independent signal frequency measurement channel, maximum measurement frequency 500 MHz
- USB and LAN interfaces provide remote connectivity capabilities
- Type-C power interface supports mobile power supply and can meet on-site testing needs
- Standard Web Control web control function makes remote collaboration more convenient

DG800 Pro series function/arbitrary waveform generator has a maximum sampling rate of 625 MSa/s, a standard maximum storage depth of 2 Mpts/CH, and integrates function generators, arbitrary waveform generators, noise generators, pulse generators, and harmonic generators , analog/digital modulator, frequency meter and other functions in one, it is a multi-functional and cost-effective function/arbitrary waveform generator.

## Technical Parameters

Technical indicators apply under the following conditions:

The instrument is within the calibration cycle and operates continuously for more than 20 minutes at the specified operating temperature ( $23^{\circ}\text{C}\pm 5^{\circ}\text{C}$ ).

Except for those marked with "Typical Values," all specifications mentioned in the manual are guaranteed values.

### Summary of technical indicators

Summary of technical indicators			
model	DG821Pro	DG822Pro	DG852 Pro
highest frequency	25MHz	25MHz	50MHz
Number of channels	1 channel	2 channels	2 channels
Sampling Rate	625MSa/s		
vertical resolution	16 bit		
Waveform storage depth	2 Mpts/CH standard, 8 Mpts/CH optional		

### Waveform output

Waveform output	
Output mode	Continuous wave, modulation, sweep, burst, sequence
Standard waveform	Sine wave, square wave, sawtooth wave, pulse, noise, harmonic
Built-in arbitrary waveform	Sinc, exponential rising, exponential falling, electrocardiogram, Gaussian, semisine, Lorentz, etc., a total of 148 types

### Frequency characteristics

Frequency characteristics			
	DG821Pro	DG822Pro	DG852 Pro
sine wave	1 $\mu$ Hz~25MHz	1 $\mu$ Hz~25MHz	1 $\mu$ Hz~50MHz
square wave	1 $\mu$ Hz~20MHz	1 $\mu$ Hz~20MHz	1 $\mu$ Hz~40MHz
sawtooth wave	1 $\mu$ Hz~1MHz		
pulse wave	1 $\mu$ Hz~10MHz	1 $\mu$ Hz~10MHz	1 $\mu$ Hz~25MHz
arbitrary wave	1 $\mu$ Hz~10MHz	1 $\mu$ Hz~10MHz	1 $\mu$ Hz~15MHz

Frequency characteristics			
	DG821Pro	DG822Pro	DG852 Pro
harmonic	1 mHz~10 MHz	1 mHz~20 MHz	1 mHz~35 MHz
sequence	1 $\mu$ Sa/s~312.5 MSa/s		
Noise (-3 dB)	Typical (0 dBm), >250 MHz bandwidth		
Output frequency resolution	1 $\mu$ Hz or 12 bits		
Accuracy	$\pm 10^{-6}$ Setting value (except arbitrary waveform and sequence), 0°C to 40°C $\pm 10^{-6}$ Setting value $\pm 1$ $\mu$ Hz (arbitrary waveform and sequence), 0°C to 40°C		

#### Output characteristics

Output characteristics	
Amplitude range (to 50 $\Omega$ )	1mVpp~10Vpp
Amplitude range (to high impedance)	2mVpp~20Vpp
Amplitude accuracy <sup>[1]</sup>	$\pm(1\%$ of setting value +2 mVpp) (to 50 $\Omega$ ) $\pm(1\%$ of setting +5 mVpp) (to high impedance)
Amplitude resolution	0.1 mVpp, 0.1 mVrms, 1 mV, 0.1 dBm or 4 bits, whichever is lower
Amplitude unit <sup>[2]</sup>	Vpp, Vrms, dBm, V
offset range	$\pm 5$ Vpk(ac+dc) (to 50 $\Omega$ ) $\pm 10$ Vpk(ac+dc) (to high impedance)
Offset accuracy	$\pm(1\%$ of  set value  + 2 mVdc + 0.5% of amplitude (Vpp)) (to 50 $\Omega$ ) $\pm(1\%$ of  set value  + 5 mVdc + 1% of amplitude (Vpp)) (to high impedance)
offset resolution	1 mV or 4 bits
Output impedance	50 $\Omega$ $\pm 1\%$
Protect	Overload automatically disables waveform output

## Signal characteristics

Signal characteristics		
Sine wave (50Ω)		Typical value (0 dBm)
	harmonic distortion	10 Hz~< 10 MHz: < -60 dBc ≥ 10 MHz: < -50 dBc
	Total harmonic distortion (THD)	Typical value (1 Vpp) 10 Hz~20 kHz: < 0.1%
	Spurious (non-harmonic)	Typical value (1 Vpp) 10 Hz~< 10 MHz: < -65 dBc ≥ 10 MHz: < -60 dBc
	phase noise	Typical values (amplitude 1 Vpp, offset 10 kHz) 20 MHz: < -110 dBc/Hz
	residual clock noise	Typical (0 dBm), -60 dBm
	Crosstalk between channels	Typical values (amplitude 1 Vpp, offset 0 V) <-75dBc
	amplitude flatness	Typical values (1 kHz sine wave, 1 Vpp) < 10 MHz: ±0.1 dB ≥ 10 MHz: ±0.2 dB
	Phase	- 360°~+360°, 0.01° resolution
square wave	rise/fall time	Typical (amplitude ≤2 Vpp, 50Ω load), ≤ 3 ns
	overshoot	Typical value (amplitude 0dBm, frequency >1 kHz), < 5%
	Jitter (rms)	Typical (amplitude 0dBm, frequency >1 kHz), 200 ps
	Phase	- 360°~+360°, 0.01° resolution
sawtooth wave	linearity	Typical values (frequency 1 kHz, amplitude 1 Vpp, 100% symmetry) ≤0.1% of peak output (within the amplitude range of 10%~90%)
	symmetry	0%~100%
	Phase	- 360°~+360°, 0.01° resolution

## Signal characteristics

pulse wave	pulse width	9 ns~pulse period-9 ns
	pulse width resolution	100 ps or 5 bits
	duty cycle	0.01%~99.99%
	rise/fall time	3 ns~0.625*pulse period
	lag time	0ps~Period - [pulse width + 0.8 * (rising edge time + falling edge time)] (continuous mode)
	overshoot	Typical value (amplitude 0dBm, frequency >1 kHz), <5%
	Jitter(rms)	Typical (amplitude 0dBm, frequency >1 kHz), 200 ps
noise	Phase	- 360°~+360°, 0.01° resolution
	type	White Noise
arbitrary wave	rise/fall time,	Typical (amplitude < 1 Vpp), ≤5 ns
	Jitter(rms)	Typical (amplitude 0dBm, frequency >1 kHz), 200 ps
	Phase	- 360°~+360°, 0.01° resolution
Harmonic output	Harmonic order	≤20 times
	Harmonic type	Sequential harmonics, mixed harmonics
	Harmonic amplitude	The amplitude of each harmonic can be set
	harmonic phase	Each harmonic phase can be set

## Modulation characteristics

### Modulation characteristics

Modulation type	AM, FM, PM, ASK, FSK, PSK, PWM, SUM	
AM	carrier wave	Sine wave, square wave, sawtooth wave, arbitrary wave (except DC)
	modulation source	internal or external
	Internal modulation waveform	Sine wave, square wave, triangle wave, upper sawtooth wave, lower sawtooth wave, noise, arbitrary wave
	modulation depth	0%~120%
	Internal modulation frequency	1 mHz~1 MHz



## Modulation characteristics

### FM

carrier wave	Sine wave, square wave, sawtooth wave, arbitrary wave (except DC)
modulation source	internal or external
Internal modulation waveform	Sine wave, square wave, triangle wave, upper sawtooth wave, lower sawtooth wave, noise, arbitrary wave
Internal modulation frequency	1 mHz~1 MHz

### PM

carrier wave	Sine wave, square wave, sawtooth wave, arbitrary wave (except DC)
internal modulation source	internal or external
Internal modulation waveform	Sine wave, square wave, triangle wave, upper sawtooth wave, lower sawtooth wave, noise, arbitrary wave
Internal modulation frequency	1 mHz~1 MHz
phase deviation	0°~360°, 0.01° resolution

### ASK/FSK/PSK

carrier wave	Sine wave, square wave, sawtooth wave, arbitrary wave (except DC)
modulation source	internal or external
Internal keying frequency	1 mHz~1 MHz
Number of keys	2

### PWM

carrier wave	pulse wave
modulation source	internal or external
Internal modulation waveform	Sine wave, square wave, triangle wave, upper sawtooth wave, lower sawtooth wave, noise, arbitrary wave
Internal modulation frequency	1 mHz~1 MHz
width deviation	0%~49.99% of pulse period

### SUM

carrier wave	Sine wave, square wave, sawtooth wave, arbitrary wave (except DC)
Overlay waveform	Sine wave, square wave, sawtooth wave, noise, arbitrary wave, channel waveform
Overlay range	Amplitude (Vpp) 0%~100% of set value

## Burst characteristics

Burst characteristics	
carrier wave	Sine wave, square wave, sawtooth wave, noise, arbitrary wave (except DC)
Burst cycle number	1 to 1,000,000 or unlimited
internal burst period	4 $\mu$ s~8000s
burst phase	- 360°~+360°, 0.01° resolution
Trigger delay	0ns~20s
gating source	external trigger
trigger source	Internal trigger, external rising edge, external falling edge, manual trigger

## Sweep characteristics

Sweep characteristics	
type	linear, logarithmic, step
carrier wave	Sine wave, square wave, sawtooth wave, arbitrary wave (except DC)
Scan time	1ms~250,000s
start/stop frequency	Consistent with the upper and lower limits of the corresponding carrier frequency
Hold/return time	0 s~3600 s
direction	up and down
trigger source	Internal trigger, external rising edge, external falling edge, manual trigger
mark	Falling edge of sync signal (programmable)

## Sequence properties

Sequence properties	
Sampling Rate	1 $\mu$ Sa/s~312.5 MSa/s
Sampling rate accuracy	10 <sup>-6</sup> Sa/s
Sampling rate resolution	1 $\mu$ Sa/s or 12 bits
Sequence wavetable length	32 pts/CH~2 Mpts/CH (optional 8 Mpts/CH)

Sequence properties		
Number of waveforms	64	
Number of cycles	0~256	
horizontal flatness	Typical values (amplitude 1 Vpp, relative to 1 kHz)	
	<5 MHz: ±0.3 dB	
	≥ 5 MHz~25 MHz: ±1 dB	
	≥ 25 MHz~50 MHz: ±2 dB	
harmonic distortion	≥ 50 MHz~60 MHz: ±2.5 dB	
	Typical (625 MSa/s (312.5 MSa/s data rate, interpolated))	
	64 points/cycle: <- 45 dBc	
Spurious (non-harmonic)	Typical value (amplitude 1Vpp, sampling clock 625 MSa/s)	
	<-60dBc	
filter mode	Normal, step, interpolate	
frequency meter		
frequency meter		
Measurement function	Frequency, period, positive pulse width, negative pulse width, duty cycle	
input resistance	50Ω±2%, 1MΩ±5%	
Counting accuracy	0~250 MHz: 7 bits	
	250 MHz~500 MHz: 6 bits	
trigger level	0V	
Input coupling method	50Ω load	DC coupling
	1 MΩ load	AC/DC coupling
Input amplitude	50Ω load	100mVpp~2Vpp
	1 MΩ load	500 mVpp~5 Vpp (Vac+dc)
Input destruction level	50Ω load	4 Vpp
	1 MΩ load	5 Vpp

frequency meter		
Input frequency gear mode	50Ω load	0~250 MHz range
		250 MHz~500 MHz range
	1 MΩ load	0~250 MHz range
Effective signal frequency	50Ω load	DC~500 MHz
	1 MΩ load	DC~250 MHz (DC coupled)
high frequency suppression		60 kHz/none (only 1 MΩ load has this adjustment)
Connector		Front panel, BNC
Auxiliary input/output features		
Auxiliary input/output features		
External modulation input	input range	ASK, FSK, PSK: 3.3 V logic level AM, FM, PM, PWM: ±5V full range
	Frequency Range	DC~100 kHz (1 MSa/s)
	input resistance	10kΩ±10%
External trigger/gated burst input enter	level	TTL compatible
	impedance	10kΩ±10%
	edge	rise/fall (optional)
	Minimum pulse width	100ns
	Trigger delay range	0ns~20s
	trigger delay resolution	100 ps or 5 bits
	Jitter(rms)	Typical (trigger input to signal output, burst mode), 1.5 ns
trigger output	level	Positive going TTL level pulse at 1 kΩ
	Output impedance	50Ω±5%
	Jitter(rms)	Typical (CW output mode), 1.5 ns
Synchronous output	level	TTL compatible
	impedance	50Ω±5%

## 10 MHz reference input/output characteristics

10 MHz reference input/output characteristics		
External reference input	impedance	1 k $\Omega$
	Input coupling	AC coupling
	Required input voltage amplitude	100mVpp~5Vpp
	Lock range	10 MHz $\pm$ 100 Hz
Internal reference output	impedance	50 $\Omega$
	Output coupling	AC coupling
	level	Typical (50 $\Omega$ load), 1.2 Vpp

### configuration time

Instruction configuration time (typical)		
	USB	LAN
Function changes	61ms	61ms
Frequency change (pulse)	2.5 ms	3ms
Frequency changes (except pulses)	3ms	4ms
Amplitude change	65ms	66ms

### Protect

Protect	
Overvoltage protection	Overvoltage protection occurs in the following two situations:
	The instrument amplitude setting is greater than 4 Vpp or the output AC+DC is greater than  2 Vdc , and the input voltage is greater than $\pm 12 \times (1 \pm 5\%) \text{ V}$ (< 10 kHz). Destruction voltage: $\pm 18(\text{Vac} + \text{dc})$ .
	The instrument amplitude setting is less than or equal to 4 Vpp or the output AC+DC is less than  2 Vdc , and the input voltage is greater than $\pm 2.5 \times (1 \pm 5\%) \text{ V}$ (< 10 kHz). Destruction voltage: $\pm 3.5 (\text{Vac} + \text{dc})$ .

### illustrate:

[1]: 1 kHz sine wave, amplitude > 1 mVpp, offset 0 V, unit Vpp

[2]: The dBm unit is only applicable when the load impedance is non-high resistance; the Vrms unit is not applicable to arbitrary waves; Vpp, V (high level and low level) are applicable to all waveform type outputs.

## General technical specifications

### Instrument characteristics

Instrument characteristics	
Display	7-inch touch screen, 1024*600 resolution
stable schedule	Allow at least 20 minutes to warm up

### power supply

power supply	
Power supply interface	USB Type-C interface
Input voltage	USB PD 15 V, 3 A
Power consumption	45 W (maximum)

### Interface specifications

Interface specifications	
LAN interface	1, rear panel, 10/100 BASE-T interface, supports LXI-C
Web remote control	Supported, Web Control interface (enter the IP address of the instrument on the web browser to display the instrument operation interface)
USB Host	1, front panel
USB Device	1 piece, rear panel, supports TMC protocol

### Mechanical specifications

Mechanical specifications	
size	266 mm (width) × 165 mm (height) × 80 mm (depth)
weight	Excluding packaging <1.78 kg
	Including packaging <2.78 kg

## environment

environment		
temperature range	Work	0°C~+40°C
	non-work	- 20°C~+60°C
Humidity range	Work	0°C~+40°C, ≤80% relative humidity (no condensation)
	non-work	- 20°C~40°C, ≤90% relative humidity (no condensation)
		Below 60°C, ≤80% relative humidity (no condensation)
Altitude	Work	Below 3,000 meters
	non-work	Below 12,000 meters

## regulatory standards

regulatory standards		
Electromagnetic Compatibility	Complies with EMC directive (2014/30/EU), meets or exceeds EN 61326-1: 2013, EN 61326-2-1:2013, EN IEC 61000-3-2:2019+A1, EN 61000-3-3: 2013+A1:2019	
	CISPR 11:2009+A1 Class A	
	EN IEC 61000-3-2:2019+A1	Harmonics, Class A
	EN 61000-3-3:2013+A1:2019	Voltage flashes
	EN 61000-4-2:2009	±4.0 kV (contact discharge), ±8.0 kV (air discharge)
	EN 61000-4-3:2006+A1+A2	10 V/m (80 MHz to 1 GHz); 3 V/m (1.4 GHz to 6 GHz)
	EN 61000-4-4:2004+A1	2 kV power cord
	EN 61000-4-5:2006	1 kV (phase-to-neutral voltage); 2 kV (phase-to-ground voltage); 2 kV (neutral-to-ground voltage)
	EN 61000-4-6:2009	10V, 0.15 to 80 MHz
	EN 61000-4-11:2004	Voltage drop: 0% UT during half cycle; 0% UT during 1 cycle; 70% UT during 25 cycles
		Short power outage: 0% UT during 250 cycles

regulatory standards	
safety regulations	EN 61010-1:2010+A1:2019
	IEC 61010-1:2010+A1:2016
	UL 61010-1: 2012 R7.19
	CAN/CSA-C22.2 NO. 61010-1-12 + GI1 + GI2 (R2017) + A1
vibration	Comply with GB/T 6587, type 2 random vibration
	Complies with MIL-PRF-28800F and IEC60068-2-6, Class 3 random vibration
oscillation	Comply with GB/T 6587-2012, type 2 random oscillation
	Complies with MIL-PRF-28800F and IEC 60068-2-27, Class 3 random oscillation
	Non-operating conditions: 30 g, half sine wave, 11 ms duration, 3 oscillations/axis along the spindle, 18 oscillations in total
Warranty and calibration intervals	
Warranty and calibration intervals	
Warranty	3 years (excluding accessories)
Recommended calibration intervals	12 months



# Ordering information and warranty period

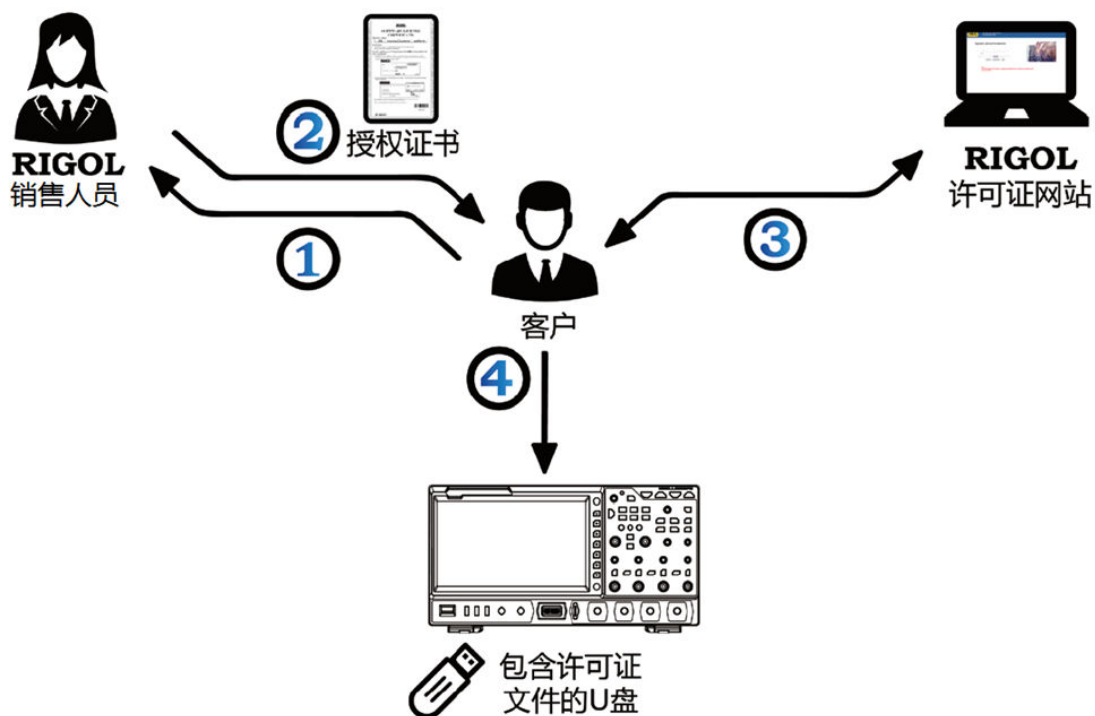
## Ordering information

Ordering information	Order number
<b>Host model</b>	
25 MHz bandwidth, 625 MSa/s sample rate	DG821Pro
25 MHz bandwidth, 625 MSa/s sample rate	DG822Pro
50 MHz bandwidth, 625 MSa/s sample rate	DG852 Pro
<b>Standard accessories</b>	
Power adapter that complies with the country's standards	— —
USB data cable	— —
<b>Upgrade options</b>	
8 Mpts/CH storage depth upgrade option	DG800Pro-3RL
Two-channel upgrade option (DG821 Pro model only)	DG800Pro-DCH
<b>Optional accessories</b>	
40 dB attenuator (50 $\Omega$ , 1 W)	RA5040K

## warranty period

The main unit has a 3-year warranty, excluding accessories.

## Option ordering and installation process



1. According to usage needs **RIGOL sales staff** Place an order to purchase the corresponding functional options and provide the serial number of the instrument host where the options need to be installed.

2. **RIGOL** After the factory receives the option order, it will mail the paper software product authorization certificate to the address provided in the order.

3. Use the software key and instrument host serial number provided in the authorization certificate to **RIGOL** Register on the official website and obtain the option authorization code and option license.

rights document.

4. Download the option authorization file to the root directory of the USB flash drive, and connect the USB flash drive to the instrument correctly. After correctly identifying the USB flash drive, **Option installation** The menu is activated, click

Click this menu to install options.

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