RIGOL

DG900 Pro 系列

函数/任意波形发生器

数据手册

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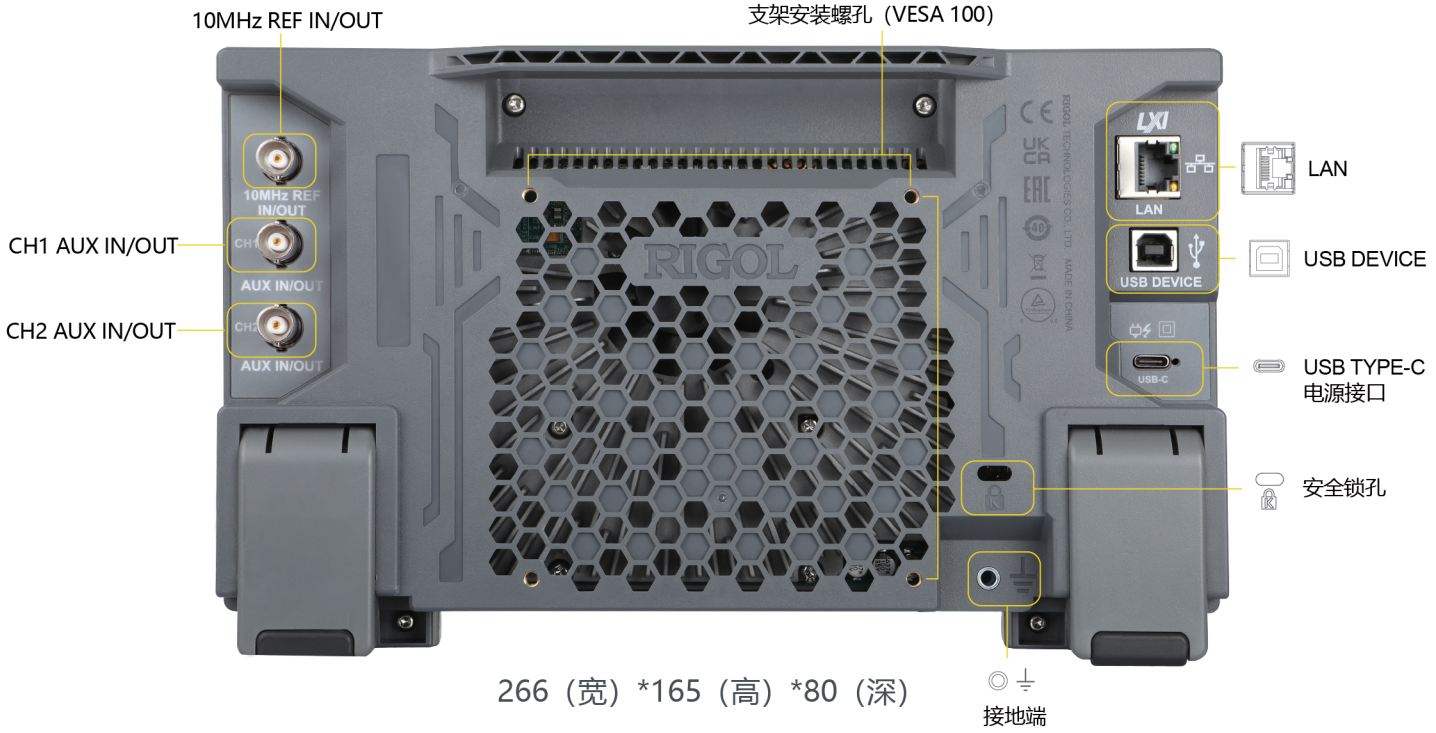
函数/任意波形发生器

外观精巧，功能丰富



满足多种应用场景

体积小巧，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。

产品特色

高性能

16 bits垂直分辨率，1.25 GSa/s最高采样率，200 MHz最高输出频率，上升时间低至3 ns。

频率计

标配7位频率计，最高测量频率1 GHz，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16 Mpts/CH（选配32 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

Features

Features

- Maximum sampling rate 1.25 GSa/s
- Maximum output frequency 200 MHz
- Vertical resolution 16 bit
- Arbitrary wave editing function, the maximum arbitrary wave length is up to 16 Mpts/CH (optional 32 Mpts/CH)
- Built-in harmonic generator up to 20th order
- Independent signal frequency measurement channel, maximum measurement frequency 1 GHz
- 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

DG900 Pro series function/arbitrary waveform generator has a maximum sampling rate of 1.25 GSa/s, a standard maximum storage depth of 16 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, cost-effective dual-channel 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℃±5℃).

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	DG902Pro	DG912Pro	DG922Pro
highest frequency	70MHz	150MHz	200MHz
Number of channels	2 channels		
Sampling Rate	1.25GSa/s		
vertical resolution	16 bit		
Waveform storage depth	Standard 16 Mpts/CH, optional 32 Mpts/CH		

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			
	DG902Pro	**DG912Pro**	**DG922Pro**
sine wave	1μHz~70MHz	1μHz~150MHz	1μHz~200MHz
square wave	1μHz~60MHz		
sawtooth wave	1μHz~3MHz	1μHz~5MHz	1μHz~5MHz
pulse wave	1μHz~50MHz		
arbitrary wave	1μHz~30MHz	1μHz~50MHz	1μHz~50MHz

Frequency characteristics			
	DG902Pro	**DG912Pro**	**DG922Pro**
harmonic	1 mHz~75 MHz	1 mHz~100 MHz	1 mHz~100 MHz
sequence	1 μSa/s~312.5 MSa/s		
Noise (-3 dB)	Typical (0 dBm), >250 MHz bandwidth		
Output frequency resolution	1 μHz or 12 bits		
frequency accuracy	±10-6Setting value (except arbitrary waveform and sequence), 0℃ to 40℃ ±10-6Setting value ±1 μHz (arbitrary waveform and sequence), 0℃ to 40℃		

Output characteristics

Output characteristics	
Amplitude range (to 50 Ω)	⩽ 50 MHz: 1 mVpp~10 Vpp ⩽ 100 MHz: 1 mVpp~5 Vpp ⩽ 200 MHz: 1 mVpp~2 Vpp
Amplitude range (to high impedance)	⩽ 50 MHz: 2 mVpp~20 Vpp ⩽ 100 MHz: 2 mVpp~10 Vpp ⩽ 200 MHz: 2 mVpp~4 Vpp
Amplitude accuracy[1]	±(1% of setting value +2 mVpp) (to 50 Ω) ±(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[2]	Vpp, Vrms, dBm, V
offset range	±5 Vpk(ac+dc) (to 50 Ω) ±10 Vpk(ac+dc) (to high impedance)
Offset accuracy	±(1% of |set value| + 2 mVdc + 0.5% of amplitude (Vpp)) (to 50 Ω) ±(1% of |set value| + 5 mVdc + 1% of amplitude (Vpp)) (to high impedance)
offset resolution	1 mV or 4 bits
Output impedance	50Ω±1%
Protect	Overload automatically disables waveform output

Signal characteristics

Signal characteristics		
Sine wave (50Ω)	harmonic distortion	Typical value (0 dBm) 10 Hz~< 10 MHz: < -60 dBc ⩾ 10 MHz~< 50 MHz: < -50 dBc ⩾ 50 MHz: < -40 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~< 50 MHz: < -60 dBc ⩾ 50 MHz: < -50 dBc + 6 dBc/octave
	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) <100MHz: <-75dBc ⩾100MHz: <-70dBc
	amplitude flatness	Typical values (1 kHz sine wave, 1 Vpp) < 10 MHz: ±0.1 dB ⩾ 10 MHz~< 50 MHz: ±0.2 dB ⩾ 50 MHz~< 100 MHz: ±0.5 dB ⩾ 100 MHz: ±1.0 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

Signal characteristics		
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
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
	Phase	- 360°~+360°, 0.01° resolution
noise	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

Modulation characteristics		
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
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

Modulation characteristics		
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	4μs~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 μSa/s~312.5 MSa/s
Sampling rate accuracy	10^{-6}Sa/s
Sampling rate resolution	1 μSa/s or 12 bits
Sequence wavetable length	32 pts/CH~16 Mpts/CH (optional 32 Mpts/CH)
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 ⩾ 50 MHz~60 MHz: ±2.5 dB
harmonic distortion	Typical (1.25 GSa/s (312.5 MSa/s data rate, interpolated)) 64 points/cycle: <- 45 dBc
Spurious (non-harmonic)	Typical value (amplitude 1Vpp, sampling clock 1.25 GSa/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 500 MHz~1 GHz: 5 bits
trigger level		0V
Input coupling method	50Ω load	DC coupling
	1 MΩ load	AC/DC coupling

frequency meter		
Input amplitude	50Ω load	DC~500 MHz: 100 mVpp~2 Vpp 500 MHz~1 GHz: 300 mVpp~2 Vpp
	1 MΩ load	500 mVpp~5 Vpp（Vac+dc）
Input destruction level	50Ω load	4 Vpp
	1 MΩ load	5 Vpp
Enter frequency range	50Ω load	0~250 MHz range 250MHz~500 MHz range 500 MHz~1 GHz range
	1 MΩ load	0~250 MHz range
Effective signal frequency	50Ω load	DC~1GHz
	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

Auxiliary input/output features		
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 kΩ
	Input coupling	AC coupling
	Required input voltage amplitude	100mVpp~5Vpp
	Lock range	10 MHz±100 Hz
Internal reference output	impedance	50Ω
	Output coupling	AC coupling
	level	Typical (50 Ω 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 ±12×(1±5%) V (< 10 kHz). Destruction voltage: ±18(Vac + 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 ±2.5× (1±5%) V (<10 kHz). Destruction voltage: ±3.5 (Vac +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℃~+40℃
	non-work	- 20℃~+60℃
Humidity range	Work	0℃~+40℃, ⩽80% relative humidity (no condensation)
	non-work	- 20℃~40℃, ⩽90% relative humidity (no condensation)
		Below 60℃, ⩽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

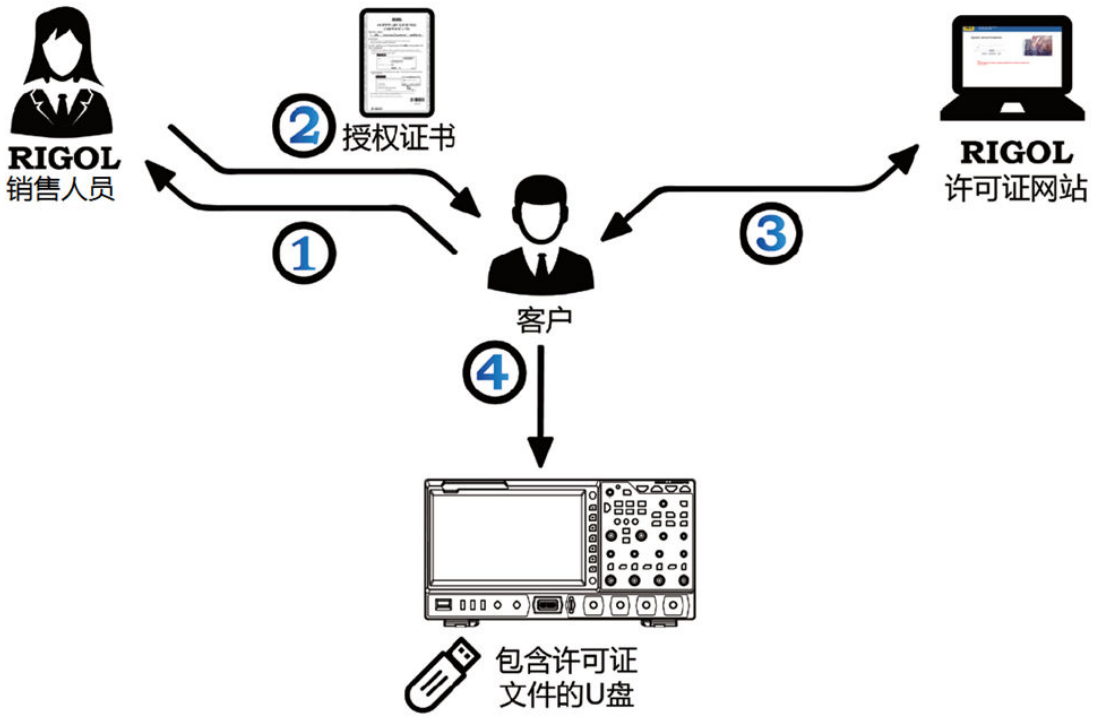
Ordering information

Ordering information	Order number
Host model	
70 MHz bandwidth, 1.25 GSa/s sampling rate	DG902Pro
150 MHz bandwidth, 1.25 GSa/s sampling rate	DG912Pro
200 MHz bandwidth, 1.25 GSa/s sampling rate	DG922Pro
Standard accessories	
Power adapter that complies with the country's standards	— —
USB data cable	— —
A BNC cable	CB-BNC-BNC-MM-100
Upgrade options	
32 Mpts/CH storage depth upgrade option	DG900Pro-3RL
Optional accessories	
40 dB attenuator (50 Ω, 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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