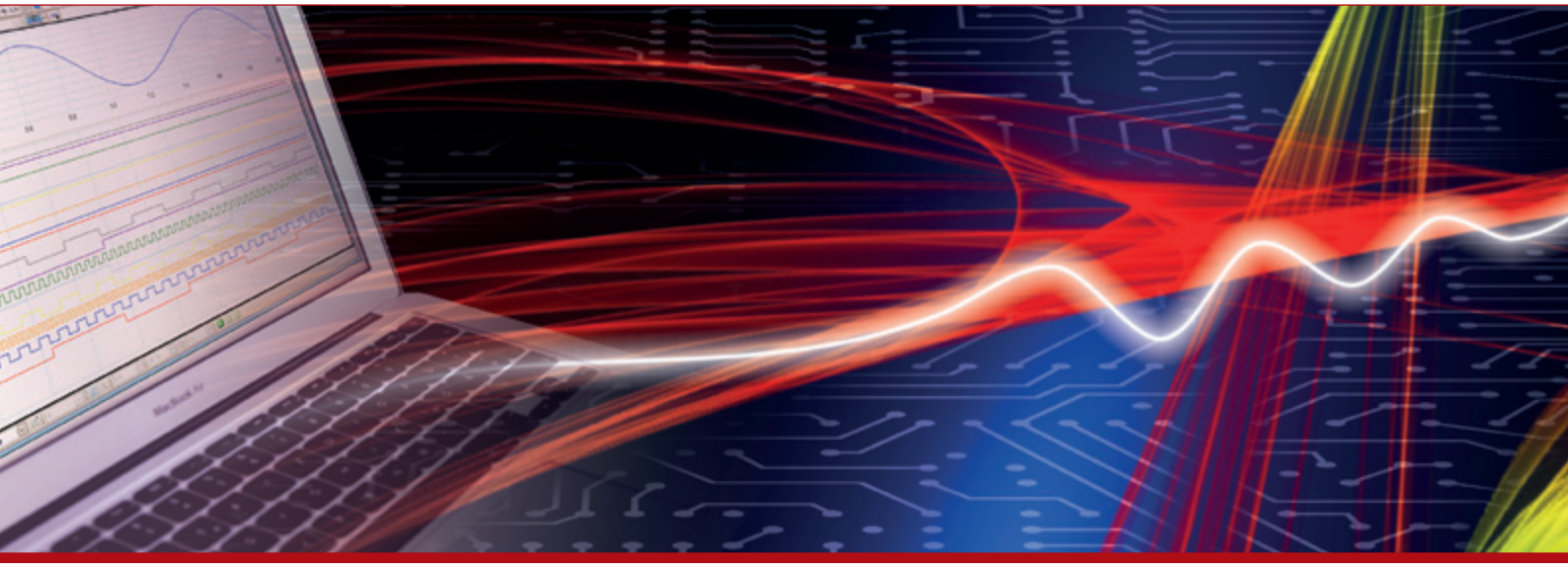
Product Datasheet - Technical Specifications



More information in our Web-Shop at ▸ **www.meilhaus.com**

Your contact

Technical and commercial sales, price information, quotations, demo/test equipment, consulting:

Tel.: **+49 - (0)81 41 - 52 71-0**

E-Mail: **sales@meilhaus.com**

Meilhaus Electronic GmbH
Am Sonnenlicht 2
82239 Alling/Germany
Tel. **+49 - (0)81 41 - 52 71-0** E-Mail **sales@meilhaus.com**

www.meilhaus.com

RIGOL

DG5000 Pro Series

Function/Arbitrary Waveform Generator

Data Sheet

DSB18101-1110

May. 2025

Product Features

Product Features

- 2/4/8-channel output, isolated from the ground
- Max. sample rate: 2.5 GSa/s
- Max. output frequency: 500 MHz
- Vertical resolution: 16 bits
- Square: 170 MHz max. frequency, 0.8 ns min. rise time
- Pulse: 120 MHz max. frequency, 4.2 ns min. pulse width
- Built-in high-order harmonic generator (max. 20th order)
- A maximum Arb waveform length of 64 Mpts/CH (128 Mpts/CH optional)
- Optional functions: Sequence, IQ, Multi-pulse, Pattern, Multi-tone
- 10.1'' HD touch screen, allowing you to configure multi-channel waveforms together from a single screen
- Standard Web Control function for easier remote cooperation

With up to 2.5 GSa/s sample rate and 64 Mpts/CH memory depth (128 Mpts/CH optional), the DG5000 Pro Series Function/Arbitrary Waveform Generator is an all-in-one generator that integrates Function Generator, Arbitrary Waveform Generator, Noise Generator, Pulse Generator, Harmonics Generator, and Analog/Digital Modulator. It is a multi-functional and cost-effective multi-channel function/arbitrary waveform generator.

Specifications

Specifications are valid under the following conditions:

The instrument is within the calibration period and has been running ceaselessly for over 30 minutes under the specified operating temperature (23℃ ± 5℃).

All the specifications are guaranteed except the parameters marked with "Typical".

Technical Specifications

Technical Specifications			
2-Channel Model	DG5252 Pro	DG5352 Pro	DG5502 Pro
4-Channel Model	DG5254 Pro	DG5354 Pro	DG5504 Pro
8-Channel Model	DG5258 Pro	DG5358 Pro	DG5508 Pro
Max. Frequency	250 MHz	350 MHz	500 MHz
Max. Sample Rate	2.5 GSa/s		
Vertical Resolution	16 bits		
Channel Skew	Range: -200 ns to +200 ns Precision: 400 ps		
Waveform Memory Depth	64 Mpts/CH (standard), 128 Mpts/CH (optional)		

Waveform Output

Waveform Output	
Output Mode	Continuous, Modulation, Sweep, Burst, Advanced
Continuous	Sine, Square, Ramp, Pulse, Noise, DC, Arb, Harmonic
Modulation	AM, FM, PM, SUM, ASK, FSK, PSK, PWM
Sweep	Linear, Log, Step
Burst	N-cycle, Gated
Advanced	Standard: Arb, PRBS Optional: Sequence, Multi-pulse, Multi-tone, Pattern, IQ

Output Characteristics

Output Characteristics		
Amplitude (into 50 Ω)	Range	≤100 MHz: 1 mVpp to 10 Vpp ≤250 MHz: 1 mVpp to 5 Vpp ≤350 MHz: 1 mVpp to 2 Vpp ≤500 MHz: 1 mVpp to 1 Vpp
	Accuracy[1]	±(1% of the setting + 1 mVpp)
	Resolution	0.1 mVpp, 0.1 mVrms, 1 mV, 0.1 dBm or 4 digits (whichever is lower)
	Unit[2]	Vpp, Vrms, dBm, V (high level and low level)
Offset (into 50 Ω)	Range	±5 Vpk (ac + dc)
	Accuracy	±(1% of |setting| +1 mV + 0.5% of the amplitude (Vpp))
	Resolution	1 mV or 4 digits
Output Impedance	Typical (0 dBm, 0 Vdc), 50 Ω ± 1%	
Load Impedance Setting	Load (adjustable from 1 Ω to 10 kΩ), High Z	
Isolation	Two-channel model: The channels are isolated from the ground. The maximum isolated DC voltage is ±42 Vpk, and the two channels are not isolated. Four-channel model: Each two adjacent channels (CH1&CH2/CH3&CH4 as a group) are isolated from the ground. The maximum isolated DC voltage is 42 Vpk, and the two channels in each group are not isolated. Eight-channel model: Each two adjacent channels (CH1&CH2/CH3&CH4/ CH5&CH6/CH7&CH8 as a group) are isolated from the ground. The maximum isolated DC voltage is 42 Vpk and the two channels in each group are not isolated.	
Protection	Waveform outputs are automatically disabled when overloaded	

Frequency Characteristics

Frequency Characteristics			
Model	DG5252 Pro/DG5254 Pro/DG5258 Pro	DG5352 Pro/DG5354 Pro/DG5358 Pro	DG5502 Pro/DG5504 Pro/ DG5508 Pro

Frequency Characteristics			
Sine	Continuous/ Modulation: 1 µHz to 250 MHz Burst mode: 126 µHz to 250 MHz	Continuous/ Modulation: 1 µHz to 350 MHz Burst: 126 µHz to 350 MHz	Continuous: 1 µHz to 500 MHz Modulation: 1 µHz to 350 MHz Burst: 126 µHz to 350 MHz
Square	Continuous: 1 µHz to 170 MHz (fast transition enabled); 1 µHz to 120 MHz (fast transition disabled) Modulation: 1 µHz to 120 MHz Burst: 126 µHz to 120 MHz		
Ramp	Continuous: 1 µHz to 5 MHz Modulation: 1 µHz to 2.5 MHz Burst: 126 µHz to 2.5 MHz		
Pulse	Continuous/Modulation: 1 µHz to 120 MHz Burst: 126 µHz to 120 MHz		
Arb	Continuous/Modulation: 1 µHz to 100 MHz Burst: 126 µHz to 100 MHz		
Harmonic	1 mHz to 125 MHz	1 mHz to 175 MHz	1 mHz to 250 MHz
Noise (-3 dB)	Typical (0 dBm), 500 MHz bandwidth		
Frequency Resolution	1 µHz or 12 digits		
Frequency Accuracy	$\pm 10^{-6}$ of the setting (except Arb), 0°C to 50°C $\pm 10^{-6}$ of the setting ± 1 µHz (Arb), 0°C to 50°C		
Clock Accuracy Aging	$\pm 1 \times 10^{-6}$/year		

Continuous Characteristics

Continuous Characteristics		
Sine (into 50 Ω)	Amplitude Flatness	Typical[3] <5 MHz: ±0.1 dB ≥5 MHz to <50 MHz: ±0.2 dB ≥50 MHz to <100 MHz: ±0.5 dB ≥100 MHz to 200 MHz: ±1.0 dB ≥200 MHz: ±2.0 dB
	Harmonic Distortion	Typical (0 dBm amplitude) 10 Hz to <10 MHz: <-60 dBc ≥10 MHz to <50 MHz: <-50 dBc ≥50 MHz to <200 MHz: <-45 dBc ≥200 MHz: <-35 dBc
	Total Harmonic Distortion (THD)	Typical (0 dBm amplitude) 10 Hz to 20 kHz: <0.1%
	Spurious (non-harmonic)	Typical (0 dBm amplitude) 10 Hz to <10 MHz: <-60 dBc ≥10 MHz to <50 MHz: <-55 dBc ≥50 MHz: <-45 dBc + 6 dBc/octave
	Phase Noise	Typical (0 dBm amplitude, 10 kHz offset) 20 MHz: <-105 dBc/Hz
	Residual Clock Noise	Typical (0 dBm amplitude), -60 dBm
	Phase	-360° to +360°, 0.01° resolution

Continuous Characteristics		
Square	Rise/Fall Time	Typical (0 dBm amplitude, 50 Ω load, 10 MHz frequency) Fast transition enabled: 800 ps to 1 ns, settable Fast transition disabled: 1.4 ns
	Overshoot	Typical (fast transition disabled, 0 dBm amplitude, 10 MHz frequency) <5%
	Jitter (rms)	Typical (fast transition disabled, 0 dBm amplitude, 10 MHz frequency) 200 ps
	Duty Cycle	Typical (0 dBm amplitude, 50 Ω load, 10 MHz frequency) Fast transition enabled: 50% ± 1% Fast transition disabled: 0.1% to 99.9% (limited by the period)
	Phase	-360° to +360°, 0.01° resolution
Ramp	Linearity	Typical (1 kHz frequency, 0 dBm amplitude, 99.9% symmetry) ≤0.1% of peak output (10% to 90% amplitude)
	Symmetry	0.1% to 99.9% (limited by the ramp period)
	Phase	-360° to +360°, 0.01° resolution
Pulse	Pulse Width	4.2 ns to 999.9 ks (limited by the pulse period)
	Pulse Width Resolution	100 ps or 5 digits
	Duty Cycle	0.01% to 99.99% (limited by the pulse period)
	Rise/Fall Time	1.4 ns to 1 s (limited by the pulse width)
	Overshoot	Typical (0 dBm amplitude, 10 MHz frequency), <5%
	Jitter (rms)	Typical (0 dBm amplitude, 10 MHz frequency), 200 ps
	Phase	-360° to +360°, 0.01° resolution
Noise	Type	White noise

Continuous Characteristics		
DC	Output Range	-5 Vdc to +5 Vdc (50 Ω)
	Accuracy	±(1% of |DC setting value| + 1 mVdc), 50 Ω
Arb	Type	Built-in waveforms, stored waveforms
	Rise/Fall Time	Typical (0 dBm amplitude), ≤ 3.5 ns
	Jitter (rms)	Typical (0 dBm amplitude, 10 MHz frequency), 200 ps
	Phase	-360° to +360°, 0.01° resolution
Harmonic Output	Harmonic Order	≤20
	Harmonic Type	Order, Combine
	Harmonic Amplitude	The amplitude of each order of the harmonic can be set.
	Harmonic Phase	The phase of each order of the harmonic can be set.

Modulation Characteristics

Modulation Characteristics		
Modulation Type	AM, FM, PM, ASK, FSK, PSK, PWM, SUM	
AM	Carrier Waveform	Sine, Square, Ramp, Arb
	Modulation Source	Internal/External
	External Modulation Port	Front port
	Internal Modulating Waveform	Sine, Square, Triangle, UpRamp, DnRamp, Noise, Arb
	Modulation Depth	0% to 120%
	Internal Modulation Frequency	2 mHz to 1 MHz

Modulation Characteristics		
FM	Carrier Waveform	Sine, Square, Ramp, Arb
	Modulation Source	Internal/External
	External Modulation Port	Front port
	Internal Modulating Waveform	Sine, Square, Triangle, UpRamp, DnRamp, Noise, Arb
	Internal Modulation Frequency	2 mHz to 1 MHz
PM	Carrier Waveform	Sine, Square, Ramp, Arb
	Internal Modulation Source	Internal/External
	External Modulation Port	Front port
	Internal Modulating Waveform	Sine, Square, Triangle, UpRamp, DnRamp, Noise, Arb
	Internal Modulation Frequency	2 mHz to 1 MHz
	Phase Deviation	0° to 360°, 0.01° resolution
ASK/FSK/PSK	Carrier Waveform	Sine, Square, Ramp, Arb
	Modulation Source	Internal/External
	External Modulation Port	Front port, rear port
	Internal Modulating Waveform	Square with 50% duty cycle
	Internal Keying Frequency	2 mHz to 1 MHz
	No. of Levels	2

Modulation Characteristics		
PWM	Carrier Waveform	Pulse
	Modulation Source	Internal/External
	External Modulation Port	Front port
	Internal Modulating Waveform	Sine, Square, Triangle, UpRamp, DnRamp, Noise, Arb
	Internal Modulation Frequency	2 mHz to 1 MHz
	Width Deviation	0% to 49.99% of the pulse period (limited by the pulse width)
SUM	Carrier Waveform	Sine, Square, Ramp, Arb
	Sum Source	Sine, Square, Triangle, UpRamp, DnRamp, Noise, Arb
	Sum Frequency	2 mHz to 1 MHz
	Sum Ratio	0% to 100% of the amplitude setting (Vpp)

Burst Characteristics

Burst Characteristics	
Carrier Waveform	Sine, Square, Ramp, Pulse, Noise, Arb
Burst Count	1 to 1,000,000/Infinite
Internal Burst Period	4 µs to 8000 s
Burst Phase	-360° to +360°, 0.01° resolution
Trigger Delay	0 ns to 85 s (limited by the burst period)
Gate Source	External trigger
Trigger Source	Internal, External leading edge, External trailing edge, Manual, Timer (remote mode only)

Sweep Characteristics

Sweep Characteristics			
Type	Linear, Log, Step		
Carrier Waveform	Sine, Square, Ramp, Arb		
Sweep Time	1 ms to 250,000 s		
Hold/Return Time	0 s to 3600 s		
Orientation	Up/Down		
Trigger Source	Internal, external leading edge, external trailing edge, manual		
Mark	Falling edge of the sync signal (programmable)		
Sweep Start/Stop Frequency Range			
Model	DG5252 Pro/DG5254 Pro/DG5258 Pro	DG5352 Pro/DG5354 Pro/DG5358 Pro	DG5502 Pro/DG5504 Pro/DG5508 Pro
Sine	1 μHz to 250 MHz	1 μHz to 350 MHz	1 μHz to 350 MHz
Square	1 μHz to 120 MHz		
Ramp	1 μHz to 2.5 MHz		
Arb	1 μHz to 100 MHz		

Advanced Mode Characteristics

Advanced Mode Characteristics		
Type	Arb, Sequence, PRBS, Multi-pulse, Multi-tone, Pattern, IQ	
Arb	Sample Rate	1 μSa/s to 1.25 GSa/s
	Jitter (rms) period-period	Typical (0 dBm amplitude), 100 ps
	Waveform Length	32 pts/CH to 64 Mpts/CH (128 Mpts/CH optional)
	Filter Mode	Normal, Step, Edge, Interpolation

Advanced Mode Characteristics		
Sequence (optional)	Sample Rate	1 μSa/s to 1.25 GSa/s
	Length	32 pts/CH to 64 Mpts/CH (128 Mpts/CH optional)
	No. of Steps	1 to 512
	Loop	1 to 256
	Wait/Event	Off, external trigger (rising/falling edge), manual trigger, timer
	Event Jump Destination	Next, First, Last, Specify SN
	Go To Destination	Next, First, Last, End, Specify SN
	Timer	4 μs to 8000 s
	Filter Mode	Normal, Step, Edge, Interpolation
PRBS	Bit Rate	1 μbps to 300 Mbps
	Sequence Length	2^n-1, n=3,4,...,32
	Edge Time	2 ns to 1 μs (limited by the bit rate)
	Jitter (rms)	200 ps
Multi-pulse (optional)	No. of Pulses	2 to 30
	Trigger Source	Off, external trigger (rising/falling edge), manual trigger, timer
	Trigger Delay	5 μs to 1 s
	Timer	5 μs to 8000 s (limited by the trigger delay and the high/low level width)
	High/Low Level Width	20 ns to 150 μs
	Edge Time	2 ns to 1 μs (limited by the minimum high/low level width)
Multi-tone (optional)	No. of Tones	2 to 16

Advanced Mode Characteristics		
Pattern (optional)	Bit Rate	1 μbps to 300 Mbps
	Input Data Type	Pattern, File
	Encoding Type	NRZ, RZ, Manchester
	Data Type	Binary, Hexadecimal (supporting 4B5B encoding), KD Symbol (supporting 8B10B encoding)
	Max. Data Length	Pattern: 4000 characters (binary), 1000 characters (hexadecimal/KD symbol) File: 64M characters (binary), 12M characters (hexadecimal/KD symbol)
	Preset Amplitude	TTL, CMOS5.0, CMOS3.3, CMOS2.5, CMOS1.8, ECL, PECL
IQ (optional)	Symbol Rate	100 Sa/s to 100 MSa/s
	Symbol Length	10 to 20 M
	Modulation Type	BPSK, QPSK, 8PSK, 16QAM, 32QAM, 64QAM, 128QAM, 256QAM
	Code Type	OFF, Differential, Gray, Differential+Gray
	Center Frequency	0 Hz to 500 MHz

AUX IN/OUT Characteristics

AUX IN/OUT Characteristics		
External Modulation Input	Input Range	ASK, FSK, PSK: 3.3 V logic level AM, FM, PM, PWM: ±5 V full range
	Frequency Range	Front-panel SMB: DC to 100 kHz (1 MSa/s) Rear-panel BNC: DC to 10 Mbps
	Input Impedance	10 kΩ
	Connector	ASK, FSK, PSK: BNC (rear panel) or SMB (rear panel), selectable AM, FM, PM, PWM: SMB (front panel)

AUX IN/OUT Characteristics		
External Trigger/ Gated Burst Input	Level	TTL-compatible
	Impedance	10 kΩ
	Edge	Positive/negative(selectable)
	Min. Pulse Width	100 ns
	Trigger Delay Range	0 ns to 85 s
	Trigger Delay Resolution	100 ps or 5 digits
	Jitter (rms)	Typical (trigger input to signal output, Burst mode), 800 ps
	Connector	BNC (rear panel)
Trigger Output	Level	3.3 V CMOS
	Output Impedance	50 Ω
	Jitter (rms)	Typical (Continuous mode), 400 ps
	Connector	SMB (front panel)
Sync Output	Level	TTL-compatible
	Impedance	50 Ω
	Connector	SMB (front panel)
10 MHz Reference Input	Impedance	1 kΩ
	Input Coupling	AC coupling
	Lock Range	10 MHz ± 100 Hz
	Required Input Voltage	100 mVpp to 5 Vpp
	Connector	BNC (rear panel)

AUX IN/OUT Characteristics		
10 MHz Reference Output	Impedance	50 Ω
	Level	Typical (50 Ω), 1.2 Vpp
	Output Coupling	AC coupling
	Connector	BNC (rear panel)

Protection

Protection	
Overvoltage Protection	Occurred when: 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 x (1 ± 5%)V (<10 kHz). Disruptive 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 x (1 ± 5%)V (<10 kHz). Disruptive voltage: ±3.5(Vac + dc)

Characteristics

Characteristics	
Display	10.1-inch touch screen, 1280x800 (screen area) 16:9
Stabilization Time	At least 30-minute warm-up
Internal Non-volatile Memory	128 GB (the actual available memory is less than 128 GB due to factors such as system file occupancy)

Power Supply

Power Supply	
Input Voltage	AC 100 V to 240 V, 50 Hz/60 Hz
Consumption	210 W (max.)
Fuse	5 A, Class T, 250 V

Interface

Interface	
LAN	1 at rear panel, 10/100/1000 BASE-T port, supporting LXI-C

Interface	
Web Control	Support Web Control (input the IP address of the instrument into the Web browser to display the operation interface)
HDMI	1 at rear panel, HDMI (type A) used to connect to an external monitor or projector
USB 3.0 Host	1 at front panel
USB 3.0 Device	1 at rear panel, supporting TMC

Mechanical Characteristics

Mechanical Characteristics	
Dimension	358 mm (W) x 215 mm (H) x 122 mm (D)
Rack Mount Kit	5 U
Weight (package excluded)	DG5252 Pro/DG5352 Pro/DG5502 Pro: about 4.2 kg DG5254 Pro/DG5354 Pro/DG5504 Pro: about 4.6 kg DG5508 Pro/DG5358 Pro/DG5258 Pro: about 5.3 kg

Environment

Environment		
Temperature Range	Operating	0℃ to +40℃
	Non-operating	-20℃ to +60℃
Humidity Range	Operating	0℃ to +40℃, ≤80% RH (without condensation)
	Non-operating	-20℃ to 40℃, ≤90% RH (without condensation)
		below 60℃, ≤80% RH (without condensation)
Altitude	Operating	Below 3,000 m
	Non-operating	Below 12,000 m

Regulation Standards

Regulation Standards	
Electromagnetic Compatibility	Compliant with EMC Directive (2014/30/EU) EN IEC 61326-1:2021 EN IEC 61000-3-2:2019+A1 EN 61000-3-3:2013+A1+A2 BS EN IEC 61326-1:2021 BS EN IEC 61000-3-2:2019+A1 BS EN 61000-3-3:2013+A1+A2 FCC Part 15, Subpart B:2021 ICES-001:2020
Safety	EN 61010-1:2010+A1 IEC 61010-1:2010+A1 BS EN 61010-1:2010+A1 UL 61010-1: 2012 R6.23 CAN/CSA-C22.2 NO. 61010-1-12+GI1+GI2 (R2017) +A1

Warranty and Calibration Interval

Warranty and Calibration Interval	
Warranty	3 years (excluding the accessories)
Recommended Calibration Interval	12 months

NOTE:

[1]: 1 kHz Sine, amplitude >1 mVpp, 0 V offset, unit: Vpp.

[2]: dBm is available only when the load impedance is not set to HighZ; Vrms is not available for Arb; Vpp and V (high level and low level) are available for all waveform types.

[3]: 1 μHz to 200 kHz relative to 1 kHz Sine, >200 kHz relative to 1 MHz Sine; 0 dBm amplitude.

Order Information and Warranty Period

Order Information

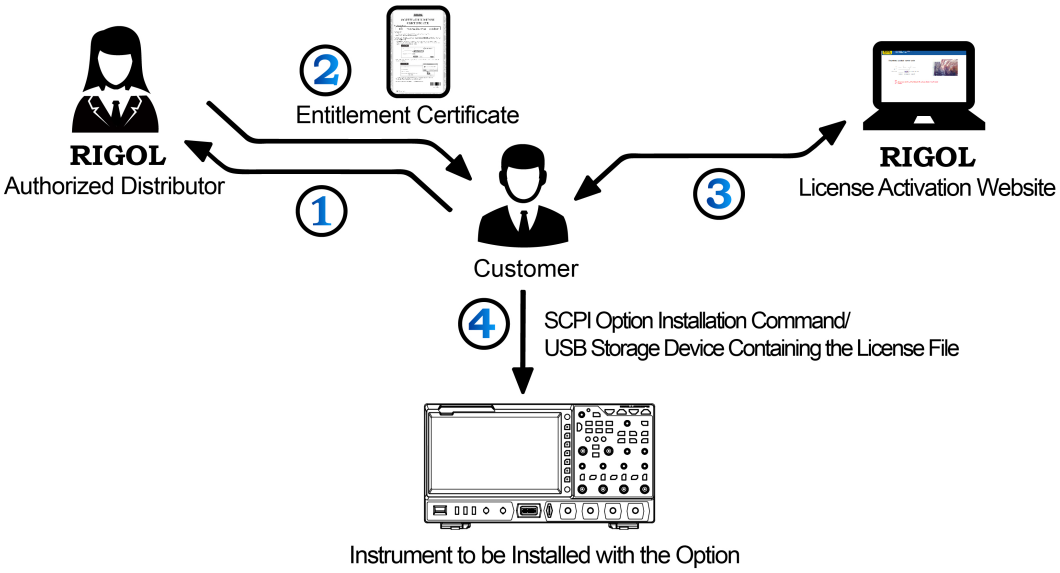
Order Information	Order No.
Model	
250 MHz Bandwidth, 2.5 GSa/s Sample Rate, Dual-channel	DG5252 Pro
250 MHz Bandwidth, 2.5 GSa/s Sample Rate, Four-channel	DG5254 Pro
250 MHz Bandwidth, 2.5 GSa/s Sample Rate, Eight-channel	DG5258 Pro
350 MHz Bandwidth, 2.5 GSa/s Sample Rate, Dual-channel	DG5352 Pro
350 MHz Bandwidth, 2.5 GSa/s Sample Rate, Four-channel	DG5354 Pro
350 MHz Bandwidth, 2.5 GSa/s Sample Rate, Eight-channel	DG5358 Pro
500 MHz Bandwidth, 2.5 GSa/s Sample Rate, Dual-channel	DG5502 Pro
500 MHz Bandwidth, 2.5 GSa/s Sample Rate, Four-channel	DG5504 Pro
500 MHz Bandwidth, 2.5 GSa/s Sample Rate, Eight-channel	DG5508 Pro
Standard Accessories	
Power Cord Conforming to the Standard of the Destination Country	— —
USB Cable	CB-USBA-USBB-FF-150
2/4/8 BNC Cables	CB-BNC-BNC-MM-100
Options	
IQ Modulation Option	DG5000 Pro-IQ
Multi-pulse Output Option	DG5000 Pro-MPUL
Advanced Sequence Function	DG5000 Pro-SEQ

Order Information	Order No.
Multi-tone Option	DG5000 Pro-MTONE
Pattern Option	DG5000 Pro-PJ
128 Mpts/CH (Max.) Arb Length Upgrade Option	DG5000 Pro-2RL
Function Bundle Option DG5000 Pro-IQ/MPUL/SEQ/MTONE/PJ/2RL included	DG5000 Pro-BND
Optional Accessories	
40dB Attenuator (50 Ω, 1 W)	RA5040K
SMB(F) to SMB(F) Cable (1 m)	CB-SMB-SMB-FF-100
SMB(F) to BNC(F) Cable (1 m)	CB-SMB-BNC-FF-100
SMB(F) to BNC(M) Cable (1 m)	CB-SMB-BNC-FM-100
BNC to Alligator Clip Cable	CB-BNC-AC-100-L

Warranty Period

Three years for the mainframe, excluding the accessories.

Option Ordering and Installation Process



1. According to the usage requirements, please purchase the specified function options from **RIGOL Sales Personnel**, and provide the serial number of the instrument that needs to install the option.
2. After receiving the option order, the **RIGOL** factory will mail the paper software product entitlement certificate to the address provided in the order.
3. Log in to **RIGOL** official website for registration. Use the software key and instruments serial number provided in the entitlement certificate to obtain the option license code and the option license file.
4. Install the option by running the SCPI command concerning the option installation. You can also save the option license file to the root directory of the USB storage device. Then insert it to the instrument. After being recognized, follow the instructions to install the option.

NOTE:

If any problems occur during the option installation process, please contact **RIGOL** technical team.