Dual-Channel Arbitrary Waveform Generator Technical Specifications

All these specifications apply to the Waveform Generator unless otherwise explanation. To reach these specifications, the instrument must have been operating continuously for more than 30 minutes within the specified operating temperature.

All the specifications are guaranteed unless those marked with “typical”.

Waveforms	
Standard Waveforms	Sine, Square, Ramp, Pulse, Noise
Arbitrary Waveforms	Exponential rise, Exponential fall, Sin(x)/x, Staircase, etc. 45 built-in waveforms, User-Definable Waveform
Numbers of channel	2

Frequency Characteristic **Frequency resolution: 1 μHz** **AG1012F,AG1022F Max sampling rate 125 MSa/s, AG2052F ,AG2062F Max sampling rate 300 MSa/s**		
Sine	AG1012(F)	1 μHz—10 MHz
	AG1022(F)	1 μHz—25 MHz
	AG2052F	1 μHz—50 MHz
	AG2062F	1 μHz—60 MHz
Square	AG1012(F) AG1022(F)	1 μHz—5 MHz
	AG2052F	1 μHz—25 MHz
	AG2062F	1 μHz—30 MHz
Ramp	1 μHz—1MHz	
Pulse	AG1012(F) AG1022(F)	1 μHz—5 MHz
	AG2052F	1 μHz—10 MHz
	AG2062F	1 μHz—15 MHz
White Noise	25 MHz bandwidth (-3 dB) (typical)	
Arbitrary	1 μHz—10 MHz	

Amplitude Characteristic				
Output Amplitude	AG1022	High Z	1 μHz to 25 MHz	1mVPP-20VPP
		50 Ω	1 μHz to 25 MHz	1mVPP-10VPP
	AG1012	High Z	1 μHz to 10 MHz	1mVPP-20VPP
		50 Ω	1 μHz to 10 MHz	1mVPP-10VPP
	AG1012F	High Z	1 μHz to 10 MHz	1mVPP-20VPP

		50 Ω	1 μHz to 10 MHz	1mVPP-10VPP
	AG1022F	High Z	1 μHz to 25 MHz	1mVPP-20VPP
		50 Ω	1 μHz to 25 MHz	1mVPP-10VPP
	AG2052F	High Z	1 μHz to 25 MHz	1mVPP-20VPP
			25 MHz to 50 MHz	1mVPP-10VPP
		50 Ω	1 μHz to 25 MHz	1mVPP-10VPP
			25 MHz to 50 MHz	1mVPP- 5VPP
	AG2062F	High Z	1 μHz to 25 MHz	1mVPP-20VPP
			25 MHz to 60 MHz	1mVPP-10VPP
		50 Ω	1 μHz to 25 MHz	1mVPP-10VPP
			25 MHz to 60 MHz	1mVPP - 5VPP
Amplitude Accuracy	1 mVPP or 14 bits			
DC Offset Range (AC+DC)	±5 V (50 Ω) ±10 V (High Z)			
DC Offset Accuracy	1 mV			
Output Impedance	50 Ω (typical)			

Waveform Characteristic		
Sine		
Flatness (when the Amplitude is 1.0 V_{p-p} (+4 dBm), relative to 1 kHz)	AG1012(F) AG1022(F)	1 μHz to 10 MHz：0.2 dB 10 MHz to 25 MHz：0.3 dB
	AG2052F AG2062F	1 μHz to 10 MHz：0.2 dB 10 MHz to 25 MHz：0.3 dB 25 MHz to 50 MHz：0.5 dB
Harmonic Distortion (when the Amplitude is 1.0 V_{p-p})	<-40 dBc	
Total Harmonic Distortion (when the Amplitude is 1 V_{p-p})	10 Hz to 20 kHz： <0.2 %	
Phase Noise	-110 dBc/Hz at 1 MHz frequency, 10 kHz offset, 1 V_{p-p}, typical	
Residue Clock Noise	-57 dBm (typical)	
Square		
Rise/Fall Time	<12 ns (10% - 90%) (typical, 1 kHz, 1 V_{p-p})	
Jitter (rms)	AG1012(F) AG1022(F)	1 ns + 30 ppm

	AG2052F AG2062F	300 ps + 100 ppm of period
Non-symmetry (below 50% Duty Cycle)	1% of period+ 5 ns	
Overshoot	< 5%	
Duty Cycle	AG1012(F) AG1022(F)	20% - 80% (< 1 MHz) 50% (1 MHz - 5 MHz)
	AG2052F AG2062F	20% - 80% (< 1 MHz) 50% (≥ 1 MHz)
Ramp		
Linearity	< 0.1% of peak output (typical, 1 kHz, 1 V_{p-p}, Symmetry 50%)	
Symmetry	0% to 100%	
Pulse		
Pulse Width	AG1012(F) AG1022(F)	40 ns to 1000 ks
	AG2052F AG2062F	20 ns to 1000 ks
Accuracy	10 ns	
Rising/Falling Edge Time	< 12 ns	
Overshoot	< 5%	
Jitter	AG1012(F) AG1022(F)	1 ns + 30 ppm
	AG2052F AG2062F	300 ps + 100 ppm of period
Arbitrary		
Waveform Length	AG1012(F) AG1022(F)	2 – 8k points
	AG2052F AG2062F	2 - 10K points
Sample Rate	AG1012(F) AG1022(F)	125 MSa/s
	AG2052F AG2062F	300 MSa/s
Amplitude Accuracy	14 bits	
Rise/Fall Time, typical	AG1012 AG1022	35 ns (typ.)
	AG1012F AG1022F	< 10 ns
	AG2052F AG2062F	< 8 ns

Jitter (RMS) , typical	AG1012 AG1022	6 ns + 30 ppm
	AG1012F AG1022F AG2052F AG2062F	< 6 ns

Modulated Waveform	
AM	
Carrier Waveforms	Sine
Source	Internal/ External
Internal Modulating Waveforms	Sine,Square,Ramp, White Noise, Arbitrary
Internal AM Frequency	2 mHz - 20 kHz
Depth	0.0% - 100.0%
FM	
Carrier Waveforms	Sine
Source	Internal/ External
Internal Modulating Waveforms	Sine,Square, Ramp,White Noise, Arbitrary
Internal Modulating Frequency	2 mHz - 20 kHz
Frequency Deviation	2 mHz - 20 MHz
PM	
Carrier Waveforms	Sine
Source	Internal/ External
Internal Modulating Waveforms	Sine,Square,Ramp, White Noise, Arbitrary
Internal PM Frequency	2 mHz - 20 kHz
Phase Deviation	0° - 180°
PWM	
Carrier Waveforms	Pulse
Source	Internal/ External
Internal Modulating Waveforms	Sine, Square, Ramp, Arbitrary
Internal Modulating Frequency	2 mHz - 20 kHz
Width Deviation	Pulse width 0.0 ns to 200.00 usec
FSK	
Carrier Waveforms	Sine
Source	Internal/ External
Internal Modulating Waveforms	50% duty cycle square
FSK Rate	2 mHz - 100 kHz
ASK	
Carrier Waveforms	Sine
Source	Internal/ External
Internal Modulating Waveforms	50% duty cycle square

ASK Rate	2 mHz - 100 kHz
PSK	
Carrier Waveforms	Sine
Source	Internal/ External
Internal Modulating Waveforms	50% duty cycle square
PSK Rate	2 mHz - 100 kHz
Sweep	
Type	Linear, Logarithmic
Carrier Waveforms	Sine, Square, Ramp
Direction	Up / Down
Sweep Time	1 ms to 500 s ± 0.1%
Source	Source, External or Manual
Burst	
Waveforms	Sine, Square, Ramp, Pulse, Arbitrary
Types	Count (1 to 50,000 periods), infinite, gated
Start Phase	-360° - +360°
Internal Period	(10 ms - 500 s) ± 1%
Gated Source	External Trigger
Trigger Sources	Source, External or Manual

Counter Specification		
Function		Frequency, period, positive Pulse width, Duty cycle
Frequency Range		Single channel: 100 mHz - 200 MHz
Frequency Resolution		6 digits
Voltage Range and Sensitivity (non-modulation signal)		
DC coupled	DC offset range	±1.5 VDC
	100 mHz - 100 MHz	250 mV_{p-p} - 5 V_{p-p} (AC+DC)
	100 MHz - 200 MHz	450 mV_{p-p} - 3 V_{p-p} (AC+DC)
AC coupled	1 Hz - 100 MHz	250 mV_{p-p} - 5 V_{p-p}
	100 MHz - 200 MHz	450 mV_{p-p} - 4 V_{p-p}
Pulse width and Duty cycle Measure	1 Hz - 10 MHz (250 m V_{p-p} - 5 V_{p-p})	
Input adjust	Input impedance	1 MΩ
	Coupling mode	AC, DC
	High frequency restrain	High frequency noise restrain (HFR) On or Off
	sensitivity	Low, Middle, High
Trigger level range	±2.5 V	

Input/Output		
Channel Coupling, Channel Copy		
Phase Deviation	0 - 360°	
Rear Panel		
Interfaces	USB (type B) connector	
External Modulation Input		
Input Frequency Range	DC-20 kHz	
Input Voltage Range	± 1 Vpk	
Input Impedance	10 kΩ (typical)	
External Trigger Input		
Level	TTL-compatible	
Slope	Rising or falling (selectable)	
Pulse Width	>100 ns	
Trigger Delay	0.0 ns - 60 s	
External Reference Clock Input		
Impedance	1 kΩ, AC coupled	
Requested Input voltage swing	100 mV_{p-p} to 5 V_{p-p}	
Locking range	10 MHz ± 9 kHz	
Counter Input (share the same port as External Reference Clock Input)		
DC coupled	DC offset range	±1.5 VDC
	100 mHz - 100 MHz	250 mV_{p-p} - 5 V_{p-p} (AC+DC)
	100 MHz - 200 MHz	450 mV_{p-p} - 3 V_{p-p} (AC+DC)
AC coupled	1 Hz - 100 MHz	250 mV_{p-p} - 5 V_{p-p}
	100 MHz - 200 MHz	450 mV_{p-p} - 4 V_{p-p}
External Reference Clock Output		
Impedance	50 kΩ, AC coupled	
Amplitude	3.3 V_{p-p}, access 1 MΩ	

Power Amplifier Specification (Optional)	
Input Impedance	50 kΩ
Output Impedance	< 2 Ω
Gain	X 10
Max Input Voltage	2.2 V_{p-p}
Max Output Power	10 W

Max Output Voltage	22 V_{p-p}
Full Power Bandwidth	DC - 100 kHz
Slew Rate	10 V/us
Overshoot	< 7%

Display

Display Type	3.9 inch colored LCD (Liquid Crystal Display)
Display Resolution	480 (Horizontal) × 320 (Vertical) Pixels
Display Colors	65536 colors, 16 bits, TFT screen

Power

Supply	220 - 240 VAC, 100 - 120 VAC, 50/60 Hz, CAT Ⅱ	
Consumption	Less than 35 W	
Fuse	100 - 120 V	250 V, F1AL
	220 - 240 V	250 V, F0.5AL

Environment

Temperature	Working temperature: 0℃ - 40℃ Storage temperature: －20℃ - 60℃
Relative Humidity	≤ 90%
Height	Operating: 3,000 m Non-operating: 15,000 m
Cooling Method	Fan cooling

Mechanical Specifications

Dimension	235 mm × 110 mm × 295 mm (W*H*D)
Weight	Approx. 3 kg

Interval Period of Adjustment:

One year is recommended for the calibration interval period.