



ENGLISH

# Datasheet

## Arbitrary Function Generator

Stock No. : Model :

123-3529	<b>AFG-21005</b>	124-0226	<b>AFG-21025</b>	123-3532	<b>AFG-21112</b>
123-3530	<b>AFG-21012</b>	123-3531	<b>AFG-21105</b>	123-3533	<b>AFG-21125</b>



### FEATURES

- 0.1Hz ~ 5/12/25 MHz with in 0.1Hz Resolution
- Sine, Square, Ramp, Noise and Arbitrary Waveform
- 20MSa/s Sampling Rate, 10 bit Vertical Resolution and 4k point Memory for Arbitrary Waveform
- 1% ~ 99% Adjustable Duty Cycle for Square Waveform
- Waveform Parameter Setting Through Numeric Keypad Entry & Knob Selection
- Amplitude, DC Offset and Other Key Setting Information Shown on the 3.5" LCD Screen Simultaneously
- AM/FM/FSK Modulation, Sweep, and Frequency Counter Functions (AFG-21105/21112/21125 only)
- USB Device Interface for Remote Control and Waveform Editing
- PC Arbitrary Waveform Editing Software

## Innovation and Value in Waveform Design

The AFG-21100/21000 Series Arbitrary Function Generators are DDS based signal generators covering the output of Sine, Square, Ramp, Noise and 20MSa/s Arbitrary waveform. The 0.1Hz resolution and 1% ~ 99% adjustable duty cycle of Square(Pulse) waveform greatly extend its application range in various fields.

The AFG-21100/21000 Series includes 6 models in three frequency bands of 5MHz, 12MHz and 25MHz. Besides the features of AFG-21100 Series also carries additional features of AM/FM/FSK Modulation, Sweep and Frequency Counter. The 3.5" color LCD will clearly display the digital waveform parameters set through front panel. The entire Series is equipped with USB Device interface for remote control and importing waveform data from PC.

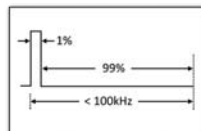
### Built-In Arbitrary Waveform Function

20MSa/s sampling rate, 10 bit vertical resolution and 4k point memory equip AFG-21100/21000 Series the arbitrary waveform capacity. User can create waveform by mean of either point by point input from front panel or PC software.



### 1% Adjustable Duty Cycle of Square Wave

The AFG-21100/21000 Series provides 1% ~ 99% variable duty cycle for its square waveform output. This feature allows generating the pulse waveform to simulate a spike signal or a transient signal.



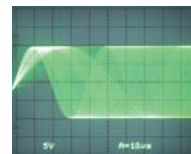
### Amplitude and DC Offset Display

In addition to the setting parameters, the amplitude, DC offset values are also displayed on the LCD screen. Three amplitude units, Vpp, Vrms and dBm, can be selected and exchanged.



### AM/FM/FSK, Sweep, Counter(AFG-21100 only)

All AFG-21100 models are equipped with additional AM/FM/FSK Modulation, Sweep and Frequency Counter functions. The 150MHz frequency counter saves user the cost of purchasing a standalone frequency counter.



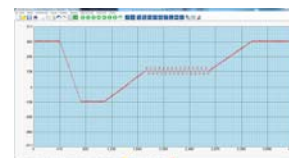
### Fully Digital Entry Design

The fully digital entry design of AFG-21000 Series Series improves the setting uncertainty of conventional Function Generator and therefore significantly increases the accuracy of its waveform output. The 3.5" LCD screen allows user to see the parameter value change in detail when the adjustment is in progress.



### Arbitrary Waveform Editing Software

A free arbitrary waveform editing software is available which is used to edit the arbitrary waveform on PC. After completing the waveform editing, it can be downloaded to AFG through USB interface for waveform output.



## APPLICATIONS

- Audio Products Frequency Characteristics Measurement
- Pulse Signal as Trigger or Synchronization Signal for Electronic Product Testing
- Pulse Noise Simulation
- Reference Clock Signal of Electronic Device
- Vibration Signal Simulation
- Noise Simulation for Communication System Educational Lab



SPECIFICATIONS						
MODELS	AFG-21105   AFG-21112   AFG-21125   AFG-21005   AFG-21012   AFG-21025					
WAVEFORMS	Sine, Square, Ramp, Noise, Arbitrary Waveform					
ARBITRARY FUNCTION	Sample Rate	20MSa/s				
	Repetition Rate	10MHz				
	Waveform Length	4k point				
	Amplitude Resolution	10 bit				
FREQUENCY CHARACTERISTICS	Range	Sine/Square	0.1Hz~5MHz	0.1Hz~12MHz	0.1Hz~25MHz	0.1Hz~5MHz
	Resolution	Ramp	0.1Hz ~ 1MHz			
	Accuracy	Sine, Square, Ramp	0.1Hz			
	Stability		±20ppm			
	Aging		±1 ppm, per 1 year			
	Tolerance		≤1mHz			
OUTPUT CHARACTERISTICS	Amplitude	Range	1mVpp~10Vpp(into 50Ω), 0.1Hz~20MHz; 2mVpp~20Vpp(open-circuit), 0.1Hz~20MHz			
		Accuracy	1mVpp~5Vpp(into 50Ω), 20MHz~25MHz; 2mVpp~10 pp(open-circuit), 20MHz~25MHz			
		Resolution	±2% of setting ±1mVpp;(at 1kHz,>10mVpp)			
		Flatness	0.1mV or 3digits			
		Units	±1%(0.1dB)≤100kHz; ±3%(0.3dB)≤5MHz; ±4%(0.4dB)≤12MHz; ±20%(2dB)≤20MHz; ±5%(0.4dB)≤25MHz; (sine wave relative to 1 kHz)			
		Offset	Range	Vpp, Vrms, dBm		
	Waveform Output	Accuracy	±5Vpk ac+dc(into 50Ω); ±10Vpk ac+dc(open circuit); ±2.5Vpk ac+dc(into 50Ω) for 20MHz~25MHz; ±5Vpk ac+dc(open circuit) for 20MHz~25MHz			
		Impedance	2% of setting + 5mV+ 0.5% of amplitude			
		Protection(main output)	50Ω typical (fixed); >300kΩ (output disabled)			
	SYNC Output	Level	Short-circuit protected; Overload relay auto matically disables main output			
		Impedance	TTL-compatible into >1kΩ			
		Rise or Fall Time	50Ω nominal			
			≤25ns			
SINE WAVE CHARACTERISTICS	Harmonic Distortion	-55 dBc DC ~ 200kHz, Ampl > 0.1Vpp; -50 dBc 200kHz ~ 1MHz, Ampl > 0.1Vpp				
		-35 dBc 1MHz ~ 5MHz, Ampl > 0.1Vpp; -30 dBc 5MHz ~ 25MHz, Ampl > 0.1Vpp				
SQUAREWAVE CHARACTERISTICS	Rise/Fall Time	≤25ns at maximum output (into 50Ωload)				
	Overshoot	< 5%				
	Asymmetry	1% of period+1 ns				
	Variable Duty Cycle	1%-99%≤100kHz; 20.0%~80.0%≤5MHz; 40.0%~60.0%≤10MHz; 50%≤25MHz (1% Resolution for full Frequency Range)				
RAMP CHARACTERISTICS	Linearity	< 0.1% of peak output				
	Variable Symmetry	0%~100%(0.1% Resolution)				
AM MODULATION	Carrier Waveforms	Sine, Square, Triangle				
	Modulating Waveforms	Sine, Square, Triangle				
	Modulating Frequency	2 mHz~20 kHz (Int); DC~20KHz (Ext)		-		
	Depth	0%~120.0%				
	Source	Internal/External				
FM MODULATION	Carrier Waveforms	Sine, Square, Triangle				
	Modulating Waveforms	Sine, Square, Triangle				
	Modulating Frequency	2 mHz~20 kHz (Int); DC~20KHz (Ext)		-		
	Deviation	DC to Max Frequency				
	Source	Internal/External				
SWEEP	Waveforms	Sine, Square, Triangle				
	Type	Linear or Logarithmic				
	Start/Stop Frequency	0.1Hz to Max Frequency		-		
	Sweep Time	1ms~500s				
	Source	Internal/External				
FSK	Carrier Waveforms	Sine, Square, Triangle				
	Modulating Waveforms	50% duty cycle square				
	Internal Rate	2mHz~20kHz		-		
	Modulation Rate	2mHz~100kHz(INT); DC~100kHz(Ext)				
	Frequency Range	0.1Hz~Max Frequency				
	Source	Internal/External				
FREQUENCY COUNTER	Range	5Hz~150MHz				
	Accuracy	Time Base accuracy ± 1 count				
	Time base	±20ppm (23°C±5°C)after 30minutes warm up		-		
	Resolution	100nHz for 1Hz, 0.1Hz for 100MHz				
	Input Impedance	1KΩ/1pf				
	Sensitivity	35mVrms~30Vms (5Hz~150MHz)				
STORE/RECALL	10 Groups of Setting Memories					
INTERFACE	USB (Device)					
DISPLAY	LCD					
POWER SOURCE	AC100 ~ 240V , 50 ~ 60Hz					
POWER CONSUMPTION	25 VA					
OPERATING ENVIRONMENT	Temperature to satisfy the specification: 18~28°C; Operating temperature: 0~40°C					
	Relative Humidity: ≤80%, 0~40°C; ≤70%, 35~40°C; Installation category: CAT II					
OPERATING ALTITUDE	2000 meters					
STORAGE TEMPERATURE	-10~70°C, Humidity: ≤70%					
DIMENSIONS & WEIGHT	266(W)×107(H)×293(D) mm ; Approx. 2.5 kg					

Specifications subject to change without notice. FG-20000GD1DH

### ORDERING INFORMATION

AFG-21005	5MHz Arbitrary Waveform Function Generator
AFG-21012	12MHz Arbitrary Waveform Function Generator
AFG-21025	25MHz Arbitrary Waveform Function Generator
AFG-21105	5MHz Arbitrary Waveform Function Generator
AFG-21112	12MHz Arbitrary Waveform Function Generator
AFG-21125	25MHz Arbitrary Waveform Function Generator

### ACCESSORIES

CD (user manual + software) × 1, Quick Start Guide × 1, Power cord × 1  
AFG-21105/21112/21125 - GTL-101 Test Lead × 2, Instruction Manual × 1, Power cord × 1  
AFG-21005/21012/21025 - GTL-101 Test Lead × 1, Instruction Manual × 1, Power cord × 1

### OPTIONAL ACCESSORIES

GTL-246 USB Cable, USB 2.0 Type A - Type B, 4P

### FREE DOWNLOAD

PC Software FreeWave software Driver USB driver



P. O. Box 99  
Corby  
Northants NN17 9RS  
England  
Tel: +44(0) 1536 201234