

# AFG-4000 Series

## Arbitrary Waveform Generator



**GW INSTEK**  
Simply Reliable



### 特點

- \* 提供25/35/60/80/100/120MHz頻寬、單/雙通道機種
- \* 最小解析度 1 $\mu$ Hz
- \* 提供弦波、方波、三角波、突波、雜訊波、諧波、任意波
- \* 任意波功能
  - 取樣率：
    - AFG-4225H:1.25GSa/s
    - AFG-4235/4260/4280/4210H:500MSa/s
    - AFG-4125/4125A/4225:125MSa/s
  - 14位元解析度
  - 記憶體深度
    - AFG-4235/4260/4280/4210H/4225H:每通道10M點
    - AFG-4125/4125A/4225:每通道16k點
- \* 支援調變功能:AM, DSB-AM, FM, PM, PWM, ASK, PSK, BPSK, QPSK, FSK, 3FSK, 4FSK, OSK, SUM
- \* 提供掃描、門閘與計數器功能
- \* AFG-4125A 內建放大器功能
- \* AFG-4235/4260/4280/4210H/4225H 提供 USB 及 LAN 通訊界面，AFG-4125/4125A/4225 提供 USB 通訊界面
- \* 採用8吋 TFT LCD 觸控螢幕，解析度 800 x 480 (AFG-4125/4125A/4225 無觸控功能)

### 應用範圍

- \* 教育機構
- \* 汽車電子
- \* 電子產品及零件

固緯電子推出任意函數信號產生器 - AFG-4000系列，提供25 ~ 250MHz頻寬，單通道與雙通道設計，且提供全頻段高達1 $\mu$ Hz的高解析度。其內建的正弦波、方波、三角波、突波、雜訊波、諧波等標準信號，並提供1.25GSa/s ~ 125MSa/s, 14-bit, 10M or 16k記憶體深度的任意波功能。

此外，AFG-4000系列提供AM, DSB-AM, FM, PM, PWM, ASK, PSK, BPSK, QPSK, FSK, 3FSK, 4FSK, OSK, SUM等調變信號輸出、信號掃描輸出、Burst以及Counter功能；AFG-4125A更內建了放大器功能。

AFG-4000 系列內建50歐姆/高阻抗切換功能，且配置8-inch高解析度的TFT LCD，35MHz以上的機種更是配備觸控螢幕功能。通訊介面部分，內建USB與LAN的通訊介面。

	AFG-4125	AFG-4125A	AFG-4225	AFG-4235	AFG-4260	AFG-4280	AFG-4210H	AFG-4225H
通道數	1	1	2	2	2	2	2	2
頻率範圍	25MHz		35MHz	60MHz	80MHz	100MHz	250MHz	
方波	5MHz		15MHz	30MHz			50MHz	
突波	5MHz		15MHz	25MHz				
三角波	1MHz		3MHz			5MHz		
雜訊 (-3dB)	25MHz BW		35MHz BW	60MHz BW	80MHz BW	100MHz BW	120MHz BW	
諧波	12.5MHz		17.5MHz	30MHz	40MHz	50MHz	125MHz	
任意波	15MHz		30MHz					
進階功能								
調變功能	AM, DSB-AM, FM, PM, PWM, ASK, PSK, BPSK, QPSK, FSK, 3FSK, 4FSK, OSK, SUM							
其他	Sweep, Burst, RF Counter							
放大器	-	Support						
其他								
顯示	8-inch color LCD display			8-inch color LCD display with Multi-touch				
通訊界面	USB Host, USB Device			USB Host, USB Device, LAN				



Website



Facebook



LinkedIn

規 格										
Models	AFG-4125	AFG-4125A	AFG-4225	AFG-4235	AFG-4260	AFG-4280	AFG-4210H	AFG-4225H		
Channels	1				2					
Waveforms	Sine, Square, Triangle, Ramp, Pulse, Noise, Harmonic wave, Arbitrary wave									
Arbitrary Functions	Built-in									
ARB Function	Built-in									
Sample Rate(*)	125MSa/s			500MSa/s			1.25GSa/s			
Repetition Rate (Arbitrary Wave)	15MHz			30MHz			30MHz			
Waveform Length	2 to 16K points			2 to 10M points						
Amplitude Resolution	14 bits									
Minimum Rise and Fall Time	< 10ns			< 3ns						
Jitter	8ns			3ns						
Non-Volatile Memory	32MB									
User-defined Output Section	From point 2 ~ 16,384			From point 2 ~ 10,240,000						
User-defined Output Marker Section	From point 2 ~ 16,384			From point 2 ~ 10,240,000						
Output Mode	1 ~ 1,000,000 cycles or infinite mode									
Frequency Characteristics										
Sine	25MHz		35MHz		60MHz		80MHz		100MHz	
Square	5MHz		15MHz		30MHz		100MHz		250MHz	
Pulse	5MHz		15MHz		30MHz		100MHz		250MHz	
Triangle, Ramp	1MHz		3MHz		60MHz BW		80MHz BW		100MHz BW	
Noise (-3dB)	25MHz BW		35MHz BW		60MHz BW		80MHz BW		100MHz BW	
Harmonic Wave	12.5MHz		17.5MHz		30MHz		40MHz		50MHz	
Resolution	1 μHz or 10 significant figures									
Accuracy Stability	±2 ppm at 25°C ± 5°C									
Aging	±1 ppm, per 1 year									
Tolerance	±1 ppm									
Output Characteristics(*)										
Output Amplitude	Into 50Ω		1mVpp ~ 10Vpp, for ≤ 25MHz; 1mVpp ~ 5Vpp, for ≤ 60MHz; 1mVpp ~ 2.5Vpp, for ≤ 100MHz				1mVpp ~ 10Vpp, for ≤ 40MHz; 1mVpp ~ 5Vpp, for ≤ 80MHz			
	Open-circuit		2mVpp ~ 20Vpp, for ≤ 25MHz; 2mVpp ~ 10Vpp, for ≤ 60MHz; 2mVpp ~ 5Vpp, for ≤ 100MHz				1mVpp ~ 2.5Vpp, for ≤ 120MHz; 1mVpp ~ 1Vpp, for ≤ 250MHz			
Bandwidth Flatness	<10MHz: ±0.2dB; ≤60MHz: ±0.3dB; ≤100MHz: ±0.5dB; (relative to 100 kHz Sine wave, 1 Vpp, 50 Ω)									
Accuracy	± (1% of setting + 1 mVpp) (1kHz sine, 0V offset, >10mVpp)									
Resolution	0.1mVpp or 4 digits (The amplitude ≥ 1Vpp is 1mVpp)									
Output Impedance	50Ω (Typical)									
Output protection	Short circuit protection, the output will be automatically turned off when overloaded									
DC Offset	± (10 Vpk - Amplitude Vpp / 2), (High resistance)									
Range	± (1% of setting) + 1 mV + amplitude Vpp * 0.5%									
Accuracy	± (1% of setting + 1 mVpp) (Typical value 1kHz sine, 0V offset)									
Resolution	0.1 mVpp or 4 digits (The amplitude > 1 Vpp is 1 mVpp)									
Sine Wave Characteristics										
Harmonic Distortion(*)	DC to 1MHz: <65dBc; 1MHz to 10MHz: <60dBc; 10MHz to 60MHz: <55dBc; 60MHz to 100MHz: <50dBc Typical (0dBm)									
Total Harmonic Distortion	< 0.05%, 10 Hz to 20 kHz, 1 Vpp									
Non-harmonic Distortion	≤10MHz: <70dBc									
Phase Noise	10MHz: ≤-110dBc/Hz Typical (0dBm, 10kHz offset)									
Square Wave Characteristics										
Rise/Fall Time	< 30ns		< 8ns		< 8ns		< 5ns			
Jitter	< 2ns		≤ 5MHz: 2ppm + 300ps, >5MHz: 300ps (rms), typical (1Vpp, 50 Ω)							
Overshoot	Typical (100 kHz, 1 Vpp) < 5%		Typical (100 kHz, 1 Vpp) < 3%							
Duty Cycle	50.00% (fixed)									
Ramp Wave Characteristics										
Linearity	< 0.1% of peak output (typical 1 kHz, 1 Vpp, symmetry 50%)									
Symmetry	0.0% to 100.0%									
Pulse Wave Characteristics										
Period	200 ns to 1000 ks		66.667 ns to 1000 ks		40 ns to 1000 ks		20 ns to 1000 ks			
Pulse Width	≥ 48ns		≥ 18ns		≥ 12ns		≥ 7ns			
Duty cycle	0.1% to 99.9% (limited by the frequency setting)									
Rise and fall time	≥ 32ns (limited by the pulse width setting)									
Overshoot	Typical (100 kHz, 1 Vpp) < 5%		Typical (100 kHz, 1 Vpp) < 3%							
Jitter	< 2ns		≤5MHz: 2ppm + 300ps, >5MHz: 300ps (rms), typical (1Vpp, 50 Ω)							
Noise Wave Characteristics										
Types	Gaussian white noise									
Bandwidth (-3dB)	25MHz BW		35MHz BW		60MHz BW		80MHz BW		100MHz BW	
Harmonic Wave Characteristics										
Harmonic number	≤16									
Frequency Range	1μHz to 12.5MHz		1μHz to 17.5MHz		1μHz to 30MHz		1μHz to 40MHz		1μHz to 50MHz	
Harmonic type	Odd, even, sequential, custom									
Harmonic amplitude	Each harmonic amplitude can be set									
Harmonic phase	Each harmonic phase can be set									
Advanced Waveform Characteristics										
Modulation Function	AM, DSB-AM, FM, PM, PWM, ASK, PSK, BPSK, QPSK, FSK, 3FSK, 4FSK, OSK, SUM									
Sweep Function	Support									
Burst Function	Support									
Counter Function	Support									
Power Amplifier Function	-									
Input/Output Characteristics										
Channel Coupling	Channel copy, amplitude syn, frequency syn, align phase									
Input	External modulation input, External trigger input, External clock input									
Output	Internal clock output, Sync Output									
General Specifications										
Display	8-inch color LCD display									
Type	800 Horizontal x 480 Vertical pixels									
Resolution	65,536 colors, 16 bits, TFT									
Color	Multi-touch									
Touch Screen Capacitive	USB Host, USB Device									
Communication Interface	USB Host, USB Device, LAN									
Power	100 - 240 V (± 10%), 50 / 60 Hz									
Source	Less than 50VA									
Power Consumption	250V, F2AL									
Fuse	18 °C to 28 °C									
Operating Environment	0 °C to 40 °C									
Temperature to Satisfy	Less than 35°C: ≤ 90% relative humidity; 35°C to 40°C: ≤ 60% relative humidity									
Operating Temperature	CAT II									
Relative Humidity	Operating 3,000 meters; Non-operation 12,000 meters									
Installation Category	-20 °C to 60 °C, Humidity: ≤70%									
Operating Altitude	IEC 61010 degree 2, Indoor use									
Storage Temperature	EN61010-1									
Pollution Degree	Smart fan cooling									
Safety Designed	340 (W) x 177 (H) x 90 (D) mm; Approx. 2.5kg									
Cooling Method	GTL-101 x 2, USB communication cable x 1, Power cord x 1; Quick Start Guide x 1, CD (user manual + communication software) x 1									
Dimensions & Weight	IP protection IP2X; Adjustment interval The recommended calibration interval is one year									
Accessories										
Others										

Note: \*1. The User's available range of the sample rate is from 1 μSa/s to 75 MSa/s. (AFG-4125/4125A/ 225 is from 1 μSa/s to 30MSa/s)  
 \*2. Not specifically labeled, the load defaults to 50Ω. \*3. DC offset set to zero.

規格若有局部變更，恕不另行通知！ AFG-4000D1\_C\_DH\_202301

### 購買資訊

AFG-4125 25MHz 單通道任意波函數信號產生器  
 AFG-4125A 25MHz 單通道任意波函數信號產生器及內建前置放大器功能  
 AFG-4225 25MHz 雙通道任意波函數信號產生器  
 AFG-4235 35MHz 雙通道任意波函數信號產生器  
 AFG-4260 60MHz 雙通道任意波函數信號產生器  
 AFG-4280 80MHz 雙通道任意波函數信號產生器  
 AFG-4210H 100MHz 雙通道任意波函數信號產生器  
 AFG-4225H 250MHz 雙通道任意波函數信號產生器

固緯電子實業股份有限公司

固緯電子(蘇州)有限公司

新北市土城區中興路 7-1 號  
 T (02)2268-0389 F (02)2268-0639  
 E-mail: marketing@goodwill.com.tw

江蘇省蘇州市新區珠江路521號  
 T 0512-6661-7177 F 0512-6661-7277  
 E-mail: marketing@instek.com.cn

### 標準配件

使用手冊CD x 1, 電源線 x 1, 測試線

### 選購配件

GTL-246 USB Cable (USB 2.0 A-B Type, approx.. 1200mm)

**GW INSTEK**

Simply Reliable