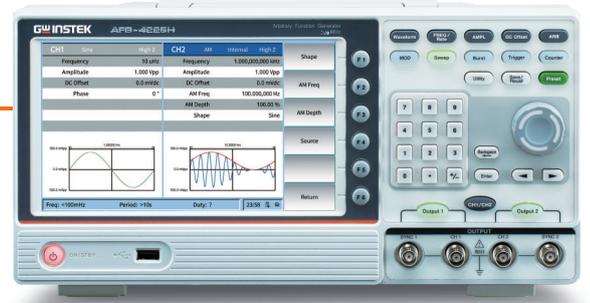


# AFG-4000 Series

## 任意波函數信號產生器



**GW INSTEK**  
Simply Reliable

型號	AFG-4125E	AFG-4125AE*	AFG-4225E	AFG-4235	AFG-4260	AFG-4280	AFG-4210H	AFG-4225H
通道數	單通道		雙通道					
頻率範圍(Sine)	25 MHz		25 MHz	35 MHz	60 MHz	80 MHz	100 MHz	250 MHz
取樣率 (Sa/s)	125 M		500 M					1.25 G
震幅解析度	14 bits		16 bits					
記憶體深度	16 k/CH		10 M/CH					
觸控面板	無		提供					
通訊介面	USB(Host, Device)		USB(Host, Device), LAN					

\*AFG-4125AE 提供功率放大器功能

### 特點

- \* 提供單通道25 MHz, 雙通道25/35/60/80/100/250 MHz 選擇
- \* 內建 Sine, Square, Triangle, Ramp, Pulse, Noise, Harmonic 與任意波選擇
- \* 最小解析度 1  $\mu$ Hz
- \* 取樣率: AFG-4225H: 1.25 GSa/s; AFG-4235/4260/4280/4210H: 500 MSa/s; AFG-4125E/4125AE/4225E: 125 MSa/s
- \* 振幅解析度: AFG-4125E/4125AE/4225E: 14 bits; AFG-4235/4260/4280/4210H/4225H: 16 bits
- \* 記憶體深度: AFG-4225E/4235/4260/4280/4210H/4225H: 10 M/每通道; AFG-4125E/4125AE: 16 k/每通道
- \* 內建調變: AM, DSB-AM, FM, PM, PWM, ASK, PSK, BPSK, QPSK, FSK, 3FSK, 4FSK, OSK, SUM
- \* 內建掃頻, 突波, 與頻率計數器功能
- \* AFG-4125AE 內建功率放大器功能
- \* 通訊介面: AFG-4235/4260/4280/4210H/4225H 提供 USB, LAN; AFG-4125E/4125AE/4225E提供USB Interface
- \* 8" TFT LCD 顯示, 800 x 480 解析度
- \* 多點觸控顯示: AFG-4235/4260/4280/4210H/4225H 提供 (25 MHz 機種除外)

### 應用範圍

- \* 教育機構
- \* 汽車電子
- \* 電子產品及零件

AFG-4000系列, 提供25 to 250 MHz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。

最高頻寬250 MHz機種提供1.25 GSa/s Sample rate; 中階機種35 MHz to 100 MHz 提供500 MSa/s Sample Rate; 25 MHz 入門機種的取樣率為125 MSa/s; 在解析度部分, 35 MHz to 250 MHz 機種為16-bit 解析度。

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-4125AE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, 35 MHz以上的機種更是配備觸控螢幕功能。通訊介面部分, 35 MHz 以上的機種內建 USB 與 LAN 的通訊介面。全系列機種內建 146種任意波波提供編輯與產出。



Website



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規格										
Models	AFG-4125E	AFG-4125AE	AFG-4225E	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	500 MSa/s									
Sample Rate (*1)	125 MSa/s		15 MHz		30 MHz		1.25 GSa/s			
Repetition Rate (Arbitrary Wave)	2 to 16 K points		14 bits		2 to 10 M points		16 bits			
Waveform Length	2 to 16 K points		14 bits		2 to 10 M points		16 bits			
Amplitude Resolution	< 10 ns		< 8 ns		8 ns		< 5ns			
Minimum Rise and Fall Time	From point 2 to 16,384		From point 2 to 10,240,000		From point 2 to 10,240,000		From point 2 to 10,240,000			
User-defined Output Section	From point 2 to 16,384		From point 2 to 10,240,000		From point 2 to 10,240,000		From point 2 to 10,240,000			
User-defined Output Marker Section	From point 2 to 16,384		From point 2 to 10,240,000		From point 2 to 10,240,000		From point 2 to 10,240,000			
Output Mode	1 to 1,000,000 cycles or infinite mode									
Frequency Characteristics	1 μHz or 10 significant figures									
Sine	25 MHz		35 MHz		60 MHz		80 MHz		250 MHz	
Square	5 MHz		15 MHz		30 MHz		100 MHz		50 MHz	
Pulse	5 MHz		15 MHz		30 MHz		100 MHz		25 MHz	
Triangle, Ramp	1 MHz		3 MHz		60 MHz BW		100 MHz BW		5 MHz	
Noise (-3 dB)	25 MHz BW		35 MHz BW		60 MHz BW		80 MHz BW		120 MHz BW	
Harmonic Wave	12.5 MHz		17.5 MHz		30 MHz		40 MHz		50 MHz	
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(*2)	±1 ppm									
Output Amplitude	Into 50 Ω	1 mVpp to 10 Vpp, for ≤ 25 MHz; 1 mVpp to 5 Vpp, for ≤ 60 MHz; 1 mVpp to 2.5 Vpp, for ≤ 100 MHz					1 mVpp to 10 Vpp, for ≤ 40 MHz; 1 mVpp to 5 Vpp, for ≤ 80 MHz; 1 mVpp to 2.5 Vpp, for ≤ 120 MHz; 1 mVpp to 1 Vpp, for ≤ 250 MHz			
	Open-circuit	2 mVpp to 20 Vpp, for ≤ 25 MHz; 2 mVpp to 10 Vpp, for ≤ 60 MHz; 2mVpp to 5 Vpp, for ≤ 100 MHz					2 mVpp to 20 Vpp, for ≤ 40 MHz; 2 mVpp to 10 Vpp, for ≤ 80 MHz; 2 mVpp to 5 Vpp, for ≤ 120 MHz; 2 mVpp to 2 Vpp, for ≤ 250 MHz			
Bandwidth Flatness	≤10 MHz: ±0.2 dB; ≤60 MHz: ±0.3 dB; ≤100 MHz: ±0.5 dB; (relative to 100 kHz Sine wave, 1 Vpp, 50 Ω)									
Accuracy	±(2% of setting + 1 mVpp) (1 kHz sine, 0 V offset, >10 mVpp)									
Resolution	0.1 mVpp or 4 digits (The amplitude ≥ 1 Vpp is 1 mVpp)									
Output Impedance	50 Ω (Typical)									
Output Protection	Short circuit protection, the output will be automatically turned off when overloaded									
DC Offset	Range	± (10 Vpk - Amplitude Vpp / 2), (High resistance)								
	Accuracy	± (3 % of setting) + 5 mV + amplitude Vpp * 0.5 %							± (1 % of setting) + 5 mV + amplitude Vpp * 0.5 %	
	Resolution	0.1 mVpp or 4 digits (The amplitude > 1 Vpp is 1 mVpp)								
Sine Wave Characteristics	DC to 1 MHz: <65 dBc; 1 MHz to 10 MHz: <60 dBc; 10 MHz to 60 MHz: <55 dBc; 60 MHz to 100 MHz: <50 dBc Typical (0 dBm)									
Harmonic Distortion(*3)	DC to 1 MHz: <65 dBc; 1 MHz to 10 MHz: <60 dBc; 10 MHz to 120 MHz: <50 dBc; 120 MHz to 250 MHz: <45 dBc Typical (0 dBm)									
Total Harmonic Distortion	< 0.05%, 10 Hz to 20 kHz, 1 Vpp									
Non-harmonic Distortion	≤10 MHz: <70 dBc; >10 MHz: <70 dBc + 6 dB/sound interval; Typical (0 dBm)									
Phase Noise	10 MHz: ≤-110 dBc/Hz Typical (0 dBm, 10 kHz offset)									
Square Wave Characteristics										
Rise/Fall Time	< 30 ns		< 8 ns		< 8 ns		< 5 ns			
Overshoot	Typical (100 kHz, 1 Vpp) < 5 %, (1 Vpp, 50 Ω)									
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	≥ 48 ns		≥ 18 ns		≥ 12 ns		≥ 7 ns			
Duty Cycle	0.1 % to 99.9 % (limited by the frequency setting)									
Rise and Fall Time	≥ 32 ns (limited by the pulse width setting)		≥ 8 ns (limited by the pulse width setting)		Typical (100 kHz, 1 Vpp) ≤ 3 %		≥ 7 ns (limited by the pulse width setting)			
Overshoot	Typical (100 kHz, 1 Vpp) < 5 %									
Jitter	< 2 ns									
Noise Wave Characteristics	Gaussian white noise									
Types	25 MHz BW									
Bandwidth (-3 dB)	25 MHz BW		35 MHz BW		60 MHz BW		80 MHz BW		120 MHz BW	
Harmonic Wave Characteristics										
Harmonic Number	≤16									
Frequency Range	1 μHz to 12.5 MHz		1 μHz to 17.5 MHz		1 μHz to 30 MHz		1 μHz to 40 MHz		1 μHz to 50 MHz	
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 type: Linear, logarithmic, Step									
Burst Function	Support type: count (1 to 1000,000 cycles), Infinite, gated									
Counter Function	Support frequency range: 100 mHz to 200 MHz									
Power Amplifier Function	Support									
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	Type	8-inch color LCD display								
	Resolution	800 Horizontal x 480 Vertical pixels								
	Color	65,536 colors, 16 bits, TFT								
	Touch Screen Capacitive								Multi-touch	
Communication Interface	USB Host, USB Device									
Power	Source	100 to 240 V (±10%), 50/60 Hz								
	Power Consumption	Less than 50 VA								
	Fuse	250V, F2AL								
Operating Environment	Temperature to Satisfy	18 °C to 28 °C								
	Operating Temperature	0 °C to 40 °C								
	Relative Humidity	Less than 35 °C: ≤ 90 % relative humidity; 3 °C to 40 °C: ≤ 60% relative humidity								
	Installation Category	CAT II								
	Operating Altitude	Operating 3,000 meters; Non-operation 12,000 meters								
Storage Temperature	-20 °C to 60 °C, Humidity: ≤70 %									
Pollution Degree	IEC 61010 degree 2, Indoor use									
Safety Designed	EN61010-1									
Cooling Method	Smart fan cooling									
Dimensions & Weight	340 (W) x 177 (H) x 90 (D) mm; Approx. 2.5 kg									

Note: \*1. The User's available range of the sample rate is from 1 μSa/s to 75 MSa/s. (AFG-4125E / 4125AE / 4225E is from 1 μSa/s to 30 MSa/s).

\*2. Not specifically labeled, the load defaults to 50 Ω. \*3. DC offset set to zero.

The specifications apply when the AFG-4000 is powered on for at least 30 minutes to warm-up to a temperature of 20 °C to 30 °C, unless specified otherwise.

規格若有局部變更，恕不另行通知！ AFG-4000CD1DS\_202502

購買資訊	
AFG-4125E	25MHz 單通道任意波函數信號產生器
AFG-4125AE	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-4225E	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

標準配件	
USB Cable x 1, Power Cord x 1	
AFG-4125E/4125AE: Test Lead, BNC to Alligator Clips Cable x 1	
AFG-4225E/4235: Test Lead, BNC to Alligator Clips Cable x 2	
AFG-4260/4280/4210H/4225H: Test Lead, BNC Cable x 2	
選購配件	
GTL-101	Test Lead, BNC (P/M) to Alligator, approx. 1100mm
GTL-110	BNC Cable, BNC (P/M) to BNC (P/M), approx. 1000mm

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