

# **AFG-100/200 series**

## **USB Modular**

# **Arbitrary Function Generator**

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**GW INSTEK**

Simply Reliable

GOOD WILL INSTRUMENT CO., LTD.

# Outline

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- Product Overview
- Feature, Advantage and Benefit
- Comparison Chart
- Ordering Information

# Product information

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- AFG-125, 25MHz Single channel USB Modular Arbitrary Function Generator
- AFG-225, 25MHz Dual channel USB Modular Arbitrary Function Generator
- AFG-125P, 25MHz Single channel USB Modular Arbitrary Function Generator plus power supply
- AFG-225P, 25MHz Dual channel USB Modular Arbitrary Function Generator plus power supply

## Accessories Supplied

- GTL-101, BNC-Alligator Test Lead \*1 (only AFG-125/125P)
- GTL-101, BNC-Alligator Test Lead \*2 (only AFG-225/225P)
- GTL-105A, Test Lead\*1 (only AFG-125P/225P)
- Quick Start Guide \*1, CD-ROM with AFG software and user manual

## Optional Accessories

- DH2-FH1, Module extension bay & USB Type A to Type A/B cable
- GPA-501, Power Adapter
- GTL-246, USB Type A to Type B cable
- GTL-201A, Ground lead

# Front Panel



AFG-125, 25MHz USB modular Single Channel Arbitrary Function Generator



AFG-225, 25MHz USB modular Dual Channel Arbitrary Function Generator

# Front Panel



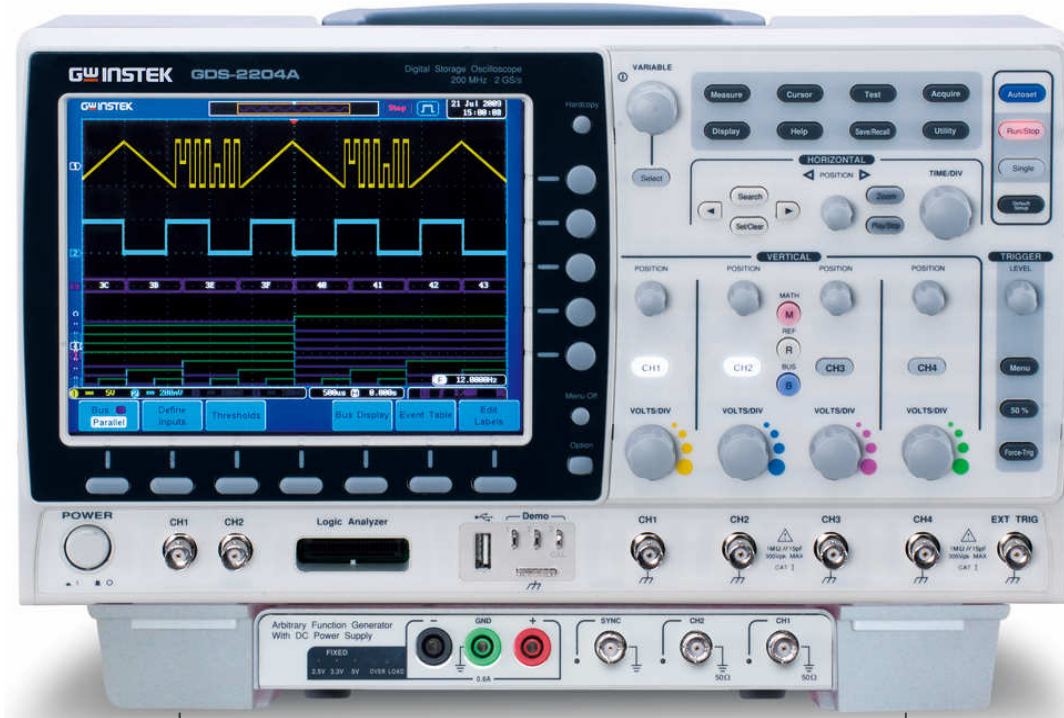
AFG-125P, 25MHz USB modular Single Channel Arbitrary Function Generator



AFG-225P, 25MHz USB modular Dual Channel Arbitrary Function Generator

# Front Panel

- GDS-2000A DSO + AFG-100/200 series AFG



DS2-FH1, Module extension bay

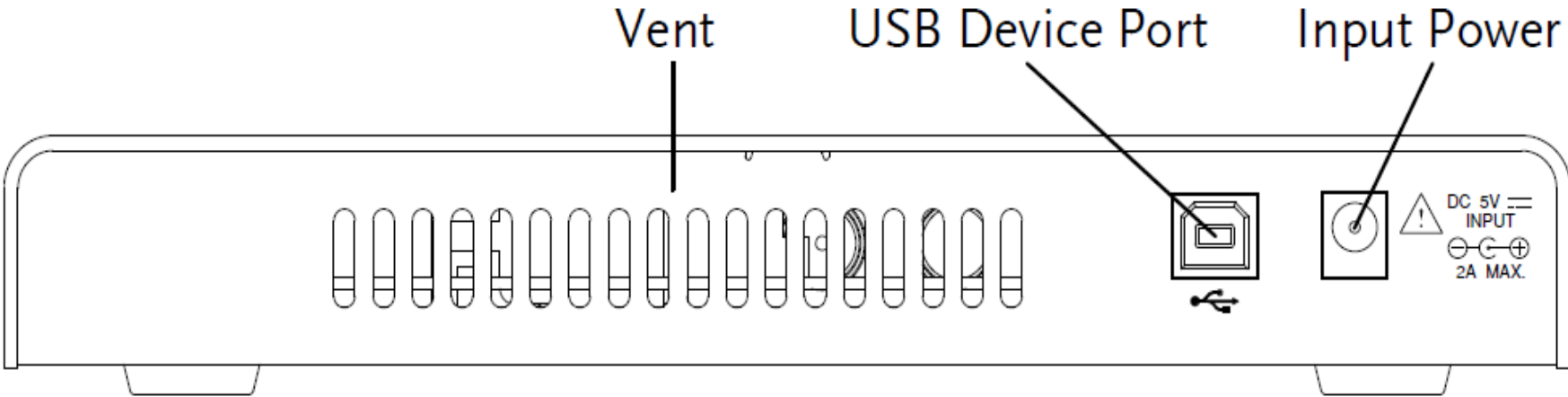


GPA-501, Power Adapter

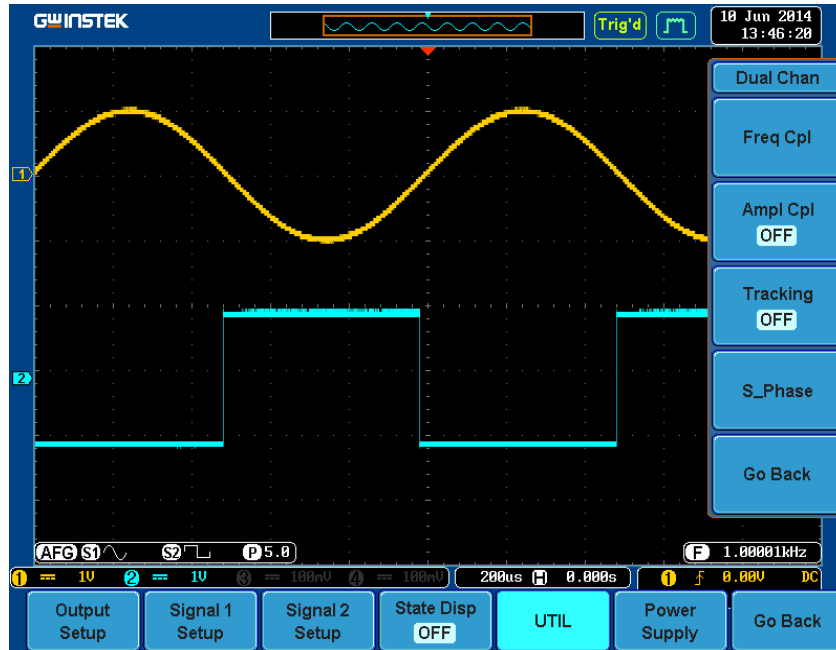


GPA-502, Universal Power Adapter

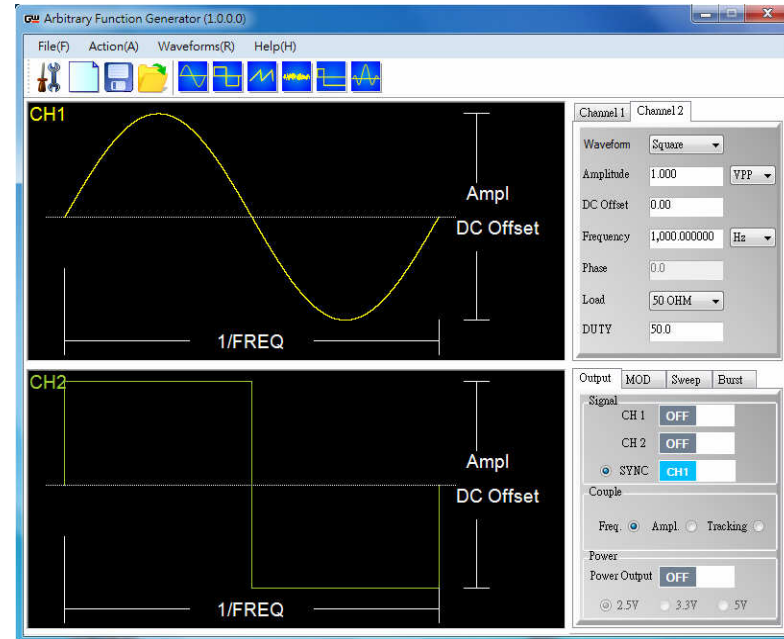
# Real Panel



# Two Types Operation Mode



Collocation with GDS-2000A  
series MSO



Stand-alone operation  
with External PC



# Main Specification

Model	AFG-125	AFG-225	AFG-125P	AFG-225P
Channel number	1	2	1	2
Dual-Channel Output	No	CH1 = Ch2	No	CH1 = CH2
Correlated Function of Dual-Channel	No	Couple, Tracking, Phase, Sum	No	Couple, Tracking, Phase, Sum
DC Power Supply	No	No	Support	Support
Sine / Square	1 $\mu$ Hz ~ 25MHz			
Triangle/Ramp	1 $\mu$ Hz to 1MHz			
Frequency Resolution	1 $\mu$ Hz			
Amplitude Range	1 mVpp to 2.5 Vpp ( into 50 $\Omega$ ) 2 mVpp to 5 Vpp (open-circuit)			
Arbitrary Functions	120MSa/s, 10 bits, 4k-Point			
Modulation	AM/FM/PM/FSK			
Sweep	Log / Linear			
Burst	Gate, N-Cycle			
Interface	USB Device			

# Application

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- Audio products frequency characteristics measurement. (Ex: Amplifier & Filter)
- Pulse signal as trigger or synchronization signal for electronic product testing.
- Reference clock signal of electronic device ( Ex: Phase Lock loop circuit design)
- Vibration signal simulation (Ex: Magnetic Hard Disk )
- Baseband noise simulation for communication system
- Two tone signal for Third order intercept point testing (Ex: Baseband Amplifier)
- Educational Lab

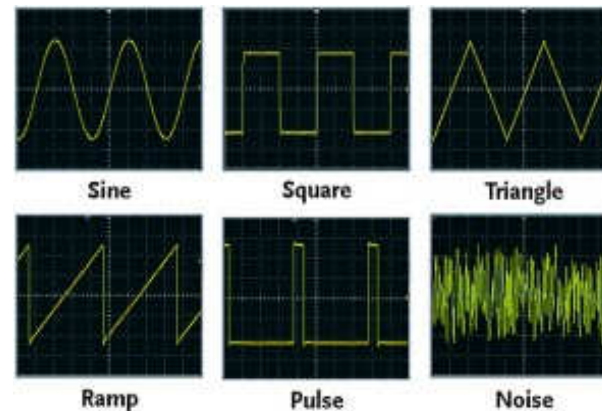
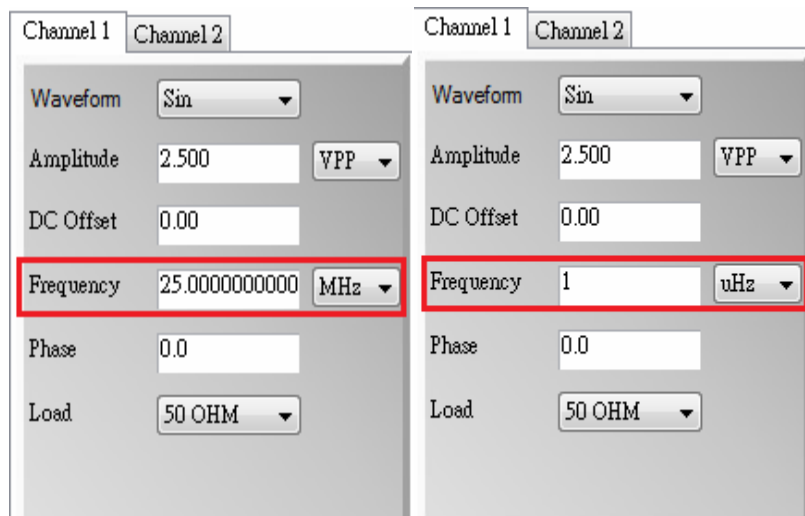
# Outline

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- Product overview
- **Feature, Advantage and Benefit**
- Comparison Chart
- Ordering Information

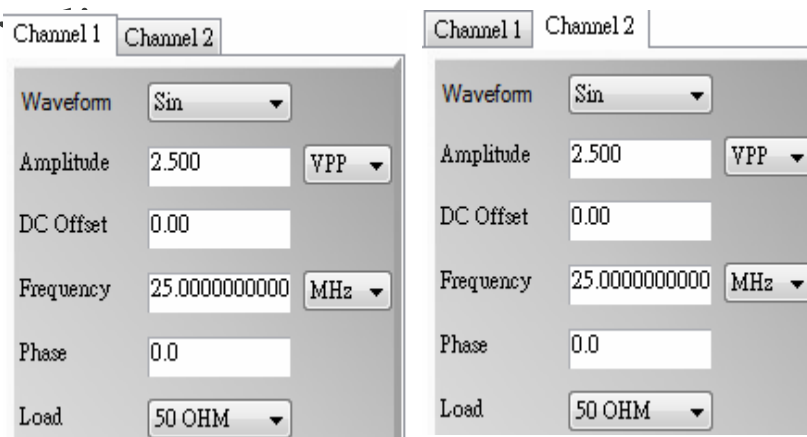
# Features

- **Frequency ranges from 1uHz to 25MHz, and offers multiple standard waveforms**
- The maximum frequency is 25 MHz and offers full-range 1uHz frequency resolution. The built-in functions include Sine, Square, Ramp/Triangle, Pulse, and Noise.



# Features

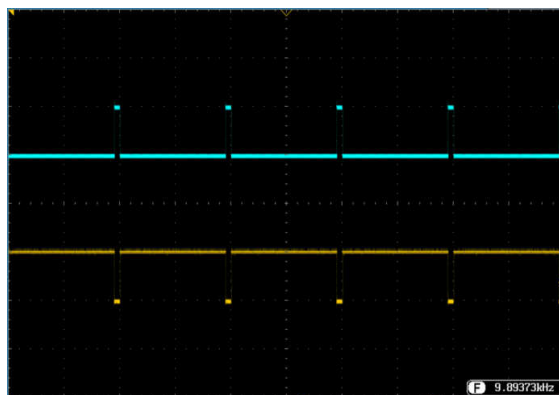
- **Full-Functions equipped Dual-channel Signal Output Capability**
- Most of dual-channel arbitrary waveform generators in this basic level cluster offer one major channel and one minor channel.
- Unlike other dual-channel AFG in this class, AFG-225/225P is fully equipped with equal capabilities on dual outputs.
- This sort of non-full-function dual-channel AFGs cannot meet the requirements of r



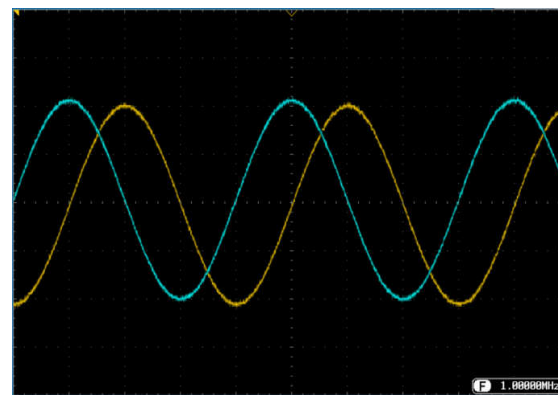
The equivalent function in dual-channel

# Features

- **Correlated Functions of Dual-channel Outputs**
- AFG-225/225P provides four correlated functions which are Couple, Tracking, and Phase functions.
  - Couple function, two signals with a ratio or offset in amplitude or frequency can be generated
  - Tracking function, two differential signals with equal-frequency, equal-amplitude but inverted phase can be produced
  - Phase function is designed to create two signals with specified phase offset



Differential Signals



Quadrature (sine and cosine) signals

# Features

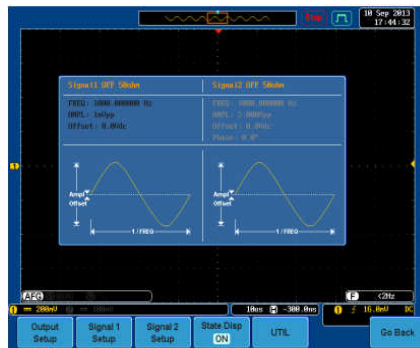
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- **High-flexibility of Arbitrary Waveforms Editing**
- 120MSa/s sampling rate, 10-bit vertical resolution, 4k-point waveform length, regarded as an outstanding arbitrary waveform capability.
- There are four ways for AFG-100/200 series to generate customized arbitrary waveforms
  - Editing waveform via PC software
  - Point-by-point editing on the panel
  - Loading CSV file
  - Loading the captured waveform from GW Instek GDS2000A-Series Oscilloscopes.

# Features

- High-flexibility of Arbitrary Waveforms Editing

## GDS-2000A Operation



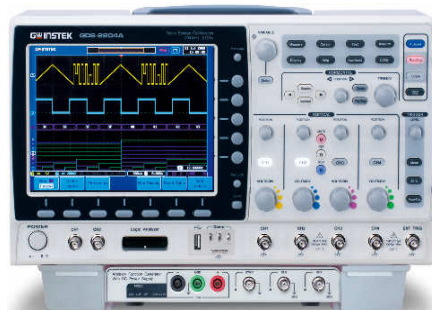
## Supports CSV file upload

```
% sine wave generation program
result=round(2*15*sin(0:0.01:2*pi));
save gensin.csv result /ascii;
% end
```

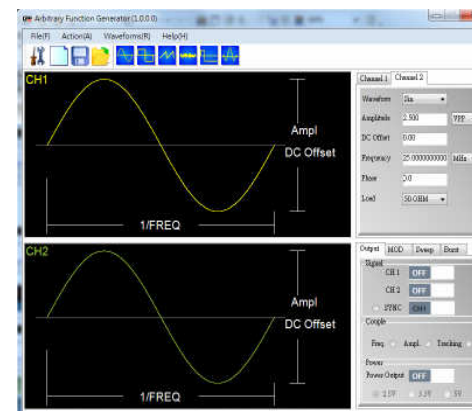
```
Start: 0
Length: 629
Sample Rate: 200000000
0
328
655
983
1310
1638
```

gensin			
	A	B	C
1	Start:		0
2	Length:		629
3	Sample Rate:	200000000	
4		0	
5		328	
6		655	
7		983	
8		1310	

## Direct Waveform Reconstruction (DWR) Capability



## Arbitrary Waveform Editing PC Software





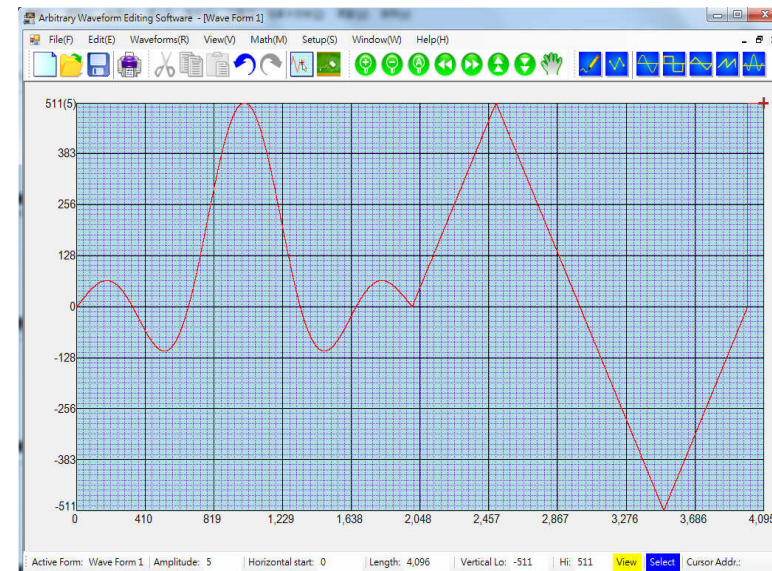
# Features

- **1%~99% Adjustable Duty Cycle of Square Wave**
- AFG-100/200 series provides a 1%~99% variable duty cycle for its Square waveform within 100kHz bandwidth, which is considered practical for the tests such as simulating pulse and transient signals without purchasing extra advanced function generator and pulse generator.

The image shows a screenshot of a function generator's control interface. At the top, there are two tabs: 'Channel 1' and 'Channel 2'. Below the tabs, the 'Waveform' is set to 'Pulse'. The 'Amplitude' is set to '2.500' with a unit dropdown set to 'VPP'. The 'DC Offset' is set to '0.00'. The 'Frequency' is set to '25.0000000000' with a unit dropdown set to 'MHz'. The 'Phase' is set to '0.0'. The 'Load' is set to '50 OHM'. The 'Width' is set to '20' with a unit dropdown set to 'nSEC'. The 'Width' field and its unit dropdown are highlighted with a red border.

# Features

- **Friendly Operating Interfaces and Instant Parameter Display**
- AFG-100/200 series provides friendly operation setting. From editing to output, the process can be manipulated via panel or external PC.



More flexibility of arbitrary waveform storage and extraction

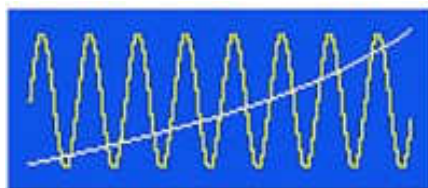
# Features

- **66 Built-in Arbitrary Waveforms**
- 66 frequently used function waveforms in all fields are built in arbitrary waveform memory for user's selection.

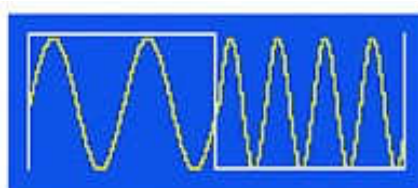


# Features

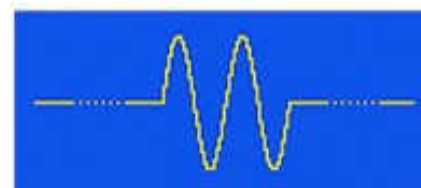
- **Support Multi-change Signal Application**
- AFG-100/200 series built-in Modulation, Sweep, Burst.
- The modulation types contain AM, FM, PM, FSK, SUM(AFG-225/225P)
- Sweep Function includes linear & log mode
- Burst function supports Gate & N-Cycle



Sweep



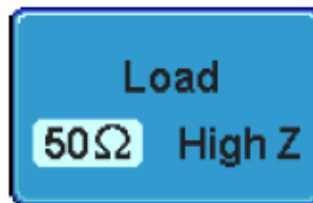
FSK



Burst

# Features

- **Impedance Switch Function**
- AFG-100/200 series provides 50Ω and high impedance switching modes, which can efficiently enhance the accuracy while users reading the results.



Channel 1 Channel 2

Waveform Sin

Amplitude 2.500 VPP

DC Offset 0.00

Frequency 25.0000000000 MHz

Phase 0.0

Load 50 OHM

Channel 1 Channel 2

Waveform Sin

Amplitude 5.000 VPP

DC Offset 0.00

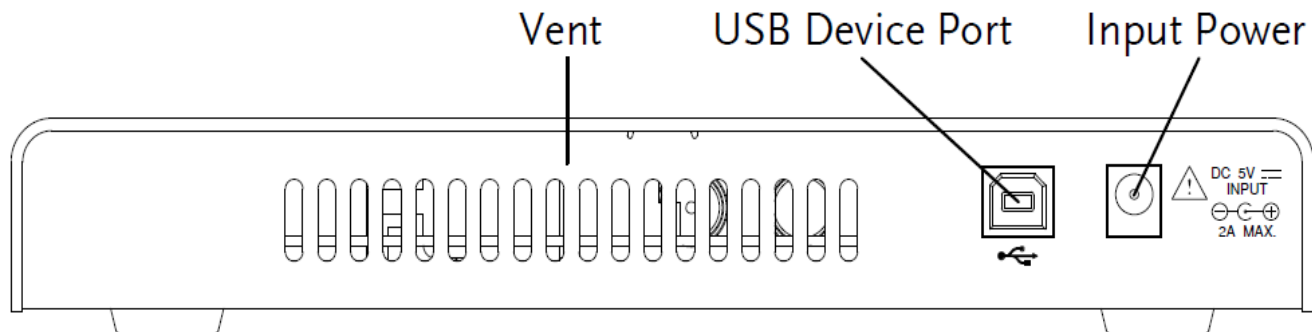
Frequency 25,000.0000000 kHz

Phase 0.0

Load High Z

# Features

- **Provide USB Device Interface**
- USB Device, which is used to connecting with PC, besides controlling through software on PC, USB Device also supports IEEE488.2 & SCPI Command List for users to process customized functional control.



# Feature, Advantage and Benefit

Feature	Advantage	Benefit
Real Dual-Channel AFG Output	Dual-Channel with the same specifications can be used as two respective AFG.	Satisfy the test requirements of differential signal, phase control, server motor... etc.
Three Correlated Functions of Dual-Channel Outputs	Flexibility of Simulating two channel signals is significantly extended.	Satisfy simulations on baseband, noise-added, audio frequency, digital signal and vibration ...etc signals.
1%~99% Adjustable Duty Cycle of Square Waveform	Used as Pulse Signal Generator as the mark, synchronized or noise signals.	Unnecessary to purchase extra pulse signal generator.
120MSa/s, 10-bit , 4k Point Arbitrary Waveform Function	The 60MHz Repetition Rate is the highest amongst in its class.	Satisfy the major requirements of educational purpose and general industries.
Direct Waveform Reconstruction with GW DSO-Series	Directly and easily rebuilds the signal captured from DSO.	The efficiency of signal analysis and trouble-shooting can be significantly enhanced.

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# Competition Chart

AFG-225 and 225P are the simplified versions of AFG-2225. AFG-225 and 225P have most of the AFG-2225 functions. The following chart shows the comparison between the two products.

	AFG-2225	AFG-225/225P
Amplitude under 50 Ohm	10 Vpp	2.5 Vpp
Frequency counter	Yes	No
Modulation input port	Yes	No
Trigger input port	Yes	No
Trigger output port	Yes	No
SYNC port	No	Yes
3 power supply output port	No	AFG-225P only
Display	3.5" TFT LCD	None
Operation mode	Stand-alone operation	Connect with a computer or GDS-2000A Series Oscilloscope

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- AFG-225, 25MHz Dual channel USB Modular Arbitrary Function Generator
- AFG-125P, 25MHz Single channel USB Modular Arbitrary Function Generator plus power supply
- AFG-225P, 25MHz Dual channel USB Modular Arbitrary Function Generator plus power supply

## Accessories Supplied

- GTL-101, BNC-Alligator Test Lead \*1 (only AFG-125/125P)
- GTL-101, BNC-Alligator Test Lead \*2 (only AFG-225/225P)
- GTL-105A, Test Lead\*1 (only AFG-125P/225P)
- Quick Start Guide \*1, CD-ROM with AFG software and User Manual

## Optional Accessories

- DH2-FH1, Module extension bay & USB Type A to Type A/B cable
- GPA-501, Power Adapter
- GTL-246, USB Type A to Type B cable
- GTL-201A, Ground lead

# Ordering for Solution

	<b>AFG-125</b>	<b>AFG-225</b>	<b>AFG-125P</b>	<b>AFG-225P</b>
Stand-alone operation	GPA-501 option GPA-502 option GTL-246 option	GPA-501 option GPA-502 option GTL-246 option	GPA-501 option GPA-502 option GTL-246 option	GPA-501 option GPA-502 option GTL-246 option
Collocation with GDS-2000A series MSO	DS2-FH1 option	DS2-FH1 option	DS2-FH1 option GPA-502 option GPA-501 option	DS2-FH1 option GPA-502 option GPA-501 option

Note: AFG-125P/225P must work with external power adapter GPA-501 option.

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# The End

**Thank your for your attention**