HDG3000B Series

HDG3000B sets arbitrary waveform generator, pulse generator, function generator, harmonic generator, frequency meter 5 functions in one. It uses the DDS (Direct Digital Synthesizer) technology, and can generate stable, pure, and low-distortion output signal. Humanized interface design and keyboard layout give users extraordinary experience. Rich configuration interfaces can easily achieve computer control of the instrument, which provides users with more solutions for measurement.

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- Frequency range: 1μHz ~ 100MHz/80MHz/60MHz/40MHz/25MHz/15MHz.
- Up to 300MSa/s sampling rate, no distortion of analog waveforms.
- 16-bit vertical resolution ensures the accuracy of waveform amplitude.
- Equip with dual channels with equal performance, equivalent to two independent signal sources.
- The storage depth of up to 2M ensures the creation of more waveform cycles and better waveform details.
- A 4.3-inch color TFT LCD screen, a clear and intuitive user interface.
- Rich modulation function, support for AM, DSB - AM, FM, PM, ASK, FSK and PSK, BPSK, QPSK, 3 FSK, 4 FSK, OSK and PWM, etc.
- 1μHz frequency resolution: When the impedance is high, the amplitude range is 2mV~20Vpp. When the impedance is 50Ω, the amplitude range is 1mV~10Vpp.
- Built-in 80MHz high-resolution frequency meter.
- Standard communication interface: front USB 2.0 high speed (USB Host) and rear USB 2.0 full speed (USB Device).
- More than 160 kinds of arbitrary signals, such as exponential rise, exponential decline, ECG signal, Gaussian, semi-positive vector, Lorentz, dual-tone multi-frequency, DC voltage, etc.
- Built-in 16 harmonic generator function, output with specified frequency, amplitude and phase of harmonics, usually used in harmonic detection equipment or harmonic filter equipment test.

Model	Channels	Max Output Frequency	Max Sampling Rate	Vertical Resolutio
HDG3012B	2CH	15MHz	300MSa/s	16Bits
HDG3022B	2CH	25MHz	300MSa/s	16Bits
HDG3042B	2CH	40MHz	300MSa/s	16Bits
HDG3062B	2CH	60MHz	300MSa/s	16Bits
HDG3082B	2CH	80MHz	300MSa/s	16Bits
HDG3102B	2CH	100MHz	300MSa/s	16Bits

Model	HDG3102B	HDG3082B	HDG3062B	HDG3042B	HDG3022B	HDG3012B
Channel	2					
Wavelength	2M					
Frequency range	100MHz	80MHz	60MHz	40MHz	25MHz	15MHz
Sampling rate	300MSa/s					
Voltage resolution	16Bits					
Waveform						
Standard waveform output	sine wave, square wave, triangular wave, pulse wave, noise, harmonics					
Arbitrary waveform output	160 kinds of arbitrary waveforms, including exponential rise, exponential fall, ECG signal, Gauss, half vector, Lorentz, dual tone μlti-frequency, DC voltage, etc					
Frequency property						
Sine wave	1 μHz ~ 100 MHZ	1 μHz ~ 80 MHZ	1 μHz ~ 60 MHZ	1 μHz ~ 40 MHZ	1 μHz ~ 25 MHZ	1 μHz ~ 15 MHZ
Square wave	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ

Pulse wave	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ
Triangle wave	1 μHz ~ 2 MHZ	1 μHz ~ 2 MHZ	1 μHz ~ 2 MHZ	1 μHz ~ 2 MHZ	1 μHz ~ 2 MHZ	1 μHz ~ 2 MHZ
Harmonic	1 μHz ~ 50 MHZ	1 μHz ~ 40 MHZ	1 μHz ~ 30 MHZ	1 μHz ~ 20 MHZ	1 μHz ~ 10 MHZ	1 μHz ~ 5 MHZ
Noise (3 db)	100 MHZ bandwidth					
Arbitrary wave	1 μHz ~ 20 MHZ	1 μHz ~ 20 MHZ	1 μHz ~ 20 MHZ	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ	1 μHz ~ 15 MHZ
Resolution	1μHz					
Precision	±1ppm, 18~28℃					
Square wave property						
Rise/Fall time	Typical (1kHz, 1Vpp)					
	≤9ns					
Overshoot	Typical (100kHz, 1Vpp)					
	≤5%					
Duty cycle	0.001% ~ 99.999%;					
	The range varies with the frequency					
Asymmetry	1% of the period plus 4ns					
Triangular wave property						
Linear	≤ 1% of peak output (typical, 1kHz, 1Vpp, symmetry 100%)					
Symmetry	0% ~ 100%					
Impulse wave property						
Cycle	67ns~1Ms	67ns~1Ms	67ns~1Ms	67ns~1Ms	67ns~1Ms	67ns~1Ms
Pulse	≥16ns	≥16ns	≥16ns	≥16ns	≥16ns	≥16ns
Rise/Fall time	≥9ns (limited by current frequency setting and pulse width setting)					
Overshoot	Typical (1kHz, 1Vpp)					
	≤5%					
Arbitrary wave property						
Wavelength	2M					
Vertical resolution	16 Bits					
Sampling rate	1μSa/s~62.5 MSa /s, 1μSa/s resolution					
Time of rise/fall	Ns of 9 or higher					
Overshoot	Typical (1Vpp)					
	≤5%					
Harmonic property						
Harmonic frequency	≤16					
Harmonic type	Even harmonics, odd harmonics, all harmonics					
Harmonic amplitude	All harmonic amplitude can be set.					
Harmonic phase	All harmonic amplitude can be set.					
Amplitude property (50Ω terminal)						
Amplitude range	≤10MHz: 1mVpp ~ 10Vpp;					
	≤55MHz: 1mVpp ~ 5.5Vpp;					
	≤80MHz:1mVpp ~ 3.5Vpp;					
	≤100MHz:1mVpp ~ 2Vpp;					
Precision	Typical (1kHz sine wave, 0V offset, > 10mVPP)					
	± 1% setting value ± 5mVpp					

Amplitude flatness (relative to 1kHz sine wave, 1Vpp, 50Ω)	≤5MHz: ±0.1dB;
	≤15MHz: ±0.2dB;
	≤25MHz: ±0.3dB
	≤40MHz: ±0.5dB
	40MHz: ±1.0dB
Unit	Vpp, mVpp, Vrms, dBm(50Ω impedance)
Resolution	1mVpp
Offset property (50Ω terminal)	
Scope	±5Vpkac+dc
Precision	±(1% of the setting value + 5mV + 1% of the amplitude)
Waveform output	
Impedance	50 Ω
Modulation property	
Modulation type	AM, DSB-AM, FM, PM, ASK, FSK, PSK, BPSK, QPSK, 3FSK, 4FSK, OSK, PWM
AM	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal, external and other channels
Modulation wave	Sine wave, square wave, triangle wave, noise, sampling wave, exp drop, half vector, Lorentz, dual audio, gaussian, ecg
Modulation frequency	2mHz~1MHz
Modulation depth	0% ~ 120%
DSB-AM	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal, external and other channels
Modulation wave	Sine wave, square wave, triangle wave, noise, sampling wave, exp drop, half vector, lorentz, dual audio, gaussian, ecg
Modulation frequency	2mHz~1MHz
Modulation depth	0% ~ 120%
FM	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal, external and other channels
Modulation wave	Sine wave, square wave, triangle wave, noise, sampling wave, exp drop, half vector, lorentz, dual audio, gaussian, ecg
Modulation frequency	2mHz~1MHz
PM	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal, external and other channels
Modulation wave	Sine wave, square wave, triangle wave, noise, sampling wave, exp drop, half vector, lorentz, dual audio, gaussian, ecg
Modulation frequency	2mHz~1MHz
Phase deviation	0 ° ~ 360 °
ASK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal and external
Modulation wave	50% duty cycle square wave
Modulation frequency	2mHz~1MHz
FSK	

Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal and external
Modulation wave	50% duty cycle square wave
Modulation frequency	2mHz~1MHz
PSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	Internal and external
Modulation wave	50% duty cycle square wave
Modulation frequency	2mHz~1MHz
BPSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	internal
Data source	PN15, PN21, 01, 10
Modulation frequency	2mHz~1MHz
QPSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	internal
Data source	PN15, PN21
Modulation frequency	2mHz~1MHz
3FSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	internal
Modulation wave	50% duty cycle square wave
Modulation frequency	2mHz~1MHz
4FSK	
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)
Modulation source	internal
Modulation wave	50% duty cycle square wave
Modulation frequency	2mHz~1MHz
OSK	
Carrier	Sine wave
Modulation source	Internal, external
Shock time	8 ns - 4.99975 ms
Modulation frequency	2mHz~1MHz
PWM	
Carrier	Square wave
Modulation source	Internal, external and other channels
Modulation wave	Sine wave, square wave, triangle wave, noise, sampling wave, exp drop, half vector, Lorentz, dual audio, gaussian, ecg
Modulation frequency	2mHz~50KHz
Duty cycle deviation	0% ~ 50%
External modulation input	
Input range	AM, DSB-AM, FM, PM, OSK, PWM: 75mVRMS ~ ± 5Vac + dc
	ASK, FSK, PSK: TTL level

Input bandwidth	50KHz					
Input impedance	10 KΩ					
Sweep frequency property						
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)					
Type	Linear					
Direction	Upward					
Frequency sweep time	1ms ~ 50Ks					
Hold/return time	0ms ~ 50Ks					
Trigger source	Internal, external, manual					
Tag	Synchronize the model's falling edge					
Burst property						
Carrier	Sine wave, square wave, triangular wave, pulse wave, harmonic wave, arbitrary wave (except DC)					
Carrier frequency	1 μHz ~ 100 MHZ	1 μHz ~ 80 MHZ	1 μHz ~ 60 MHZ	1 μHz ~ 40 MHZ	1 μHz ~ 25 MHZ	1 μHz ~ 15 MHZ
Burst counting	1 ~ 2000 000 000					
Start/stop phase	0 ° ~ 360 °					
Internal cycle	2 μs ~ 500 s					
Door control source	External trigger					
Trigger source	Internal, external, manual					
Frequency meter						
Measurement functions	Frequency, period, positive/negative pulse width, duty cycle					
Frequency	1 μHz ~ 80 MHZ					
Gate time	10ms~16s					
Input signal range	0 ~ 3.3 V					
Trigger property						
Trigger input						
Level	TTL - compatible					
Slope	Up or down (optional)					
Pulse width	>100ns					
Trigger output						
Level	TTL - compatible					
The pulse width	>60ns					
Maximum frequency	1MHz					
Reference clock						
External reference input						
Lock range	10 MHz ± 50 Hz					
Level	Low level: 0~400mV, high level: 2.5V~5V					
Locking time	< 2 s					
Input impedance	50 Ω, DC coupling					
Internal reference output						
Frequency	10 MHz + 50 Hz					
Level	3.3 Vpp					
Output impedance (typical value)	50 Ω, DC coupling					
Synchronous output						

Level	TTL - compatible
Impedance	50Ω, nominal value
General features	
Interface	USB Host, USB Device
Display	4.3-inch color TFT LCD screen
Voltage	100-120VAC_{RMS}(±10%),45Hz to 440Hz, CAT Ⅱ
	120-240VAC_{RMS}(±10%),45Hz to 66Hz, CAT Ⅱ
Power	<30W
Fuse	T, 0.5 A, 250 v, 5 x20mm
Environment	
Temperature range	Operation: 10℃ ~ 40℃
	Non-operation: -20℃ ~ 60℃
Humidity range	≤+104℉(≤+40°C): Relative humidity ≤90%
	106℉~122℉ (+41°C ~50°C): Relative humidity ≤60%
Altitude	Operation: below 3000 meters
	Non-operation: below 15000 meters
Mechanical specifications	
Dimensions (W × H × D)	308mm x 232mm x 110mm
Weight	3.09 KG