

AGS SERIES GRID SIMULATION SOURCE

OVERVIEW

AGS Series Grid Mimulation Source is a high-precision, high-dynamic, high-standard power that supply simulating overall power grid characteristics. The power grid adaptability test is conducted for the equipment connected to the power grid, which can output stable voltage and frequency, and also provide a power supply environment in accordance with the relevant national standards with power quality-related characteristics such as voltage change, frequency change, harmonic, interharmonic, imbalance, flicker, etc.

In addition to providing a power supply environment for electric equipment, the power supply can also receive the energy returned by the load and feed it back to the power grid, thus saving energy and improving the test environment.

PRODUCT HIGHLIGHTS

- High accuracy: voltage accuracy $\pm 0.1\%$ F.S.; Frequency accuracy 0.01%;
- High dynamic: 10%-90% of the rise time is less than 1mS, meeting the industry 1ms interruption test;
- High standard: Harmonics, interharmonics, fault crossing, etc. are higher than the standard test requirements of South Africa, Germany and British;
- Comprehensive grid characteristics simulation: full range continuous regulation of three-phase voltage, three-phase phase, and frequency; Simulation of harmonic, interharmonic, unbalance, flicker, etc; Fault ride-through meets multinational standards; With time and phase angle triggering function;
- It can simulate voltage harmonics, interharmonics, superimpose 2-50 times harmonics, and the harmonic phase angle can be set; The interharmonics of 1Hz-3000Hz can be superimposed;
- Multiple units of the same model can be paralleled to improve the output capacity so as to facilitate capacity upgrade;
- Output synchronization signal, and accurately obtain the change time and process; Triggering modes are optional;
- It can simulate the low pass/the high pass/the high and low pass and other fault crossing functions, with adjustable A, B and C phases and settable trigger phase angles, meeting multiple national standards such as VDE-AR-N 4105, NRS 097-2-1, G83 and EN50438;
- Multiple communication interfaces: RS485/LAN/CAN.

KEY CHARACTERISTICS

Pure sine wave output

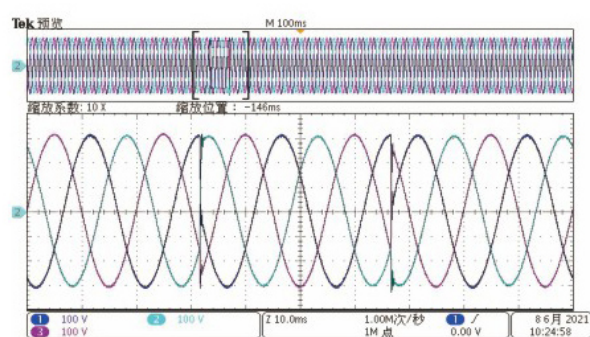
The power supply output has low distortion and the output voltage is close to a standard sine wave, ensuring accurate testing.



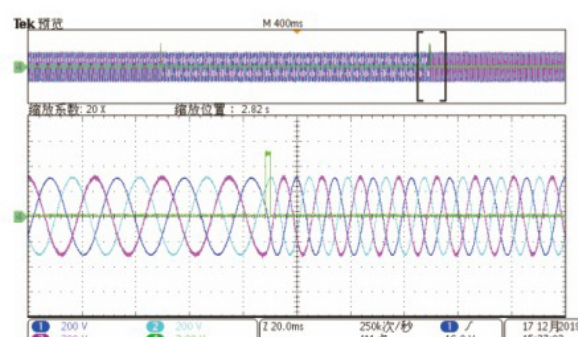


- **Three-phase independent setting**

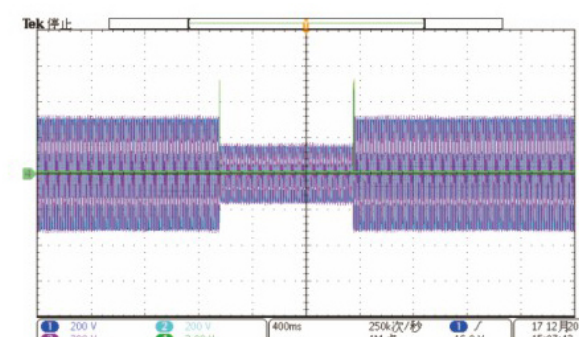
Three-phase power output can be set independently, which can simulate the normal and abnormal characteristics of three-phase balance or unbalance of various power grids. Single-phase and multi-phase outputs can be programmed individually or in combination for voltage, phase, etc.



Sudden phase change



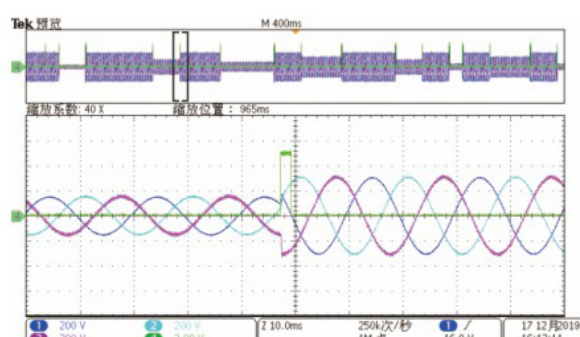
Sudden frequency change



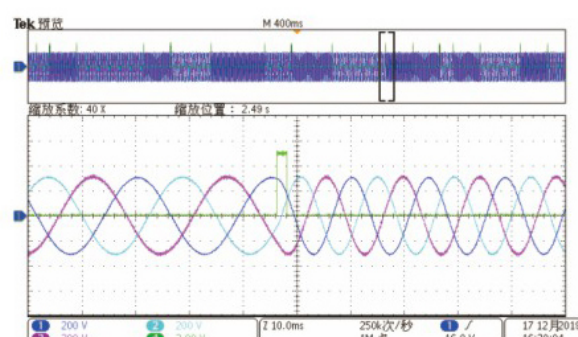
Sudden voltage change

- **Comprehensive grid characteristics**

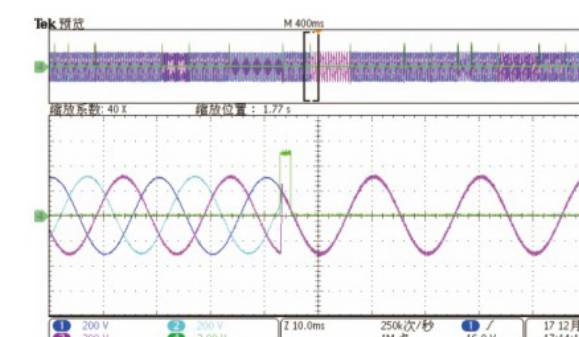
It can simulate the general changes of power grid frequency and general change of voltage and phase, and can simulate the temporary voltage drop, short-time interruption, flicker and frequency drift of mains power supply; Immunity tests that can simulate various voltage dips, short interruptions and voltage variations are used for IEC 61000-4-11/-13/-14/-27/-28 tests; Simulation of a variety of power supply voltage deviation, frequency deviation, three-phase voltage unbalance, voltage fluctuations and flicker, and so on.



Voltage disturbance



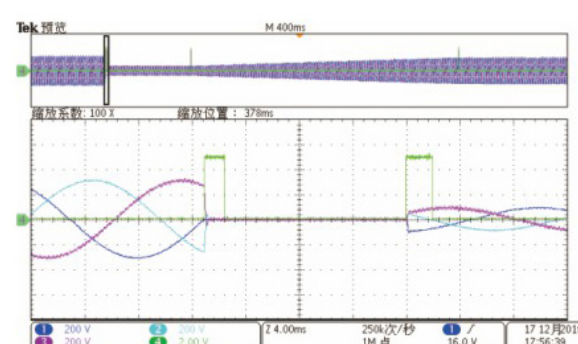
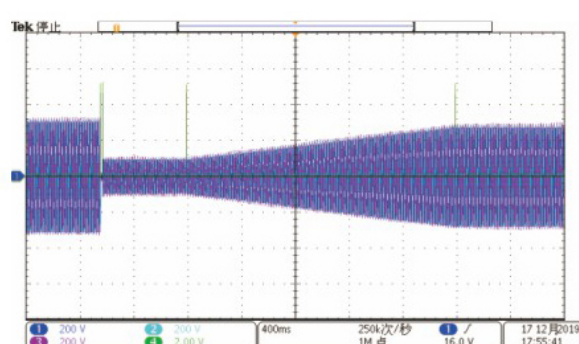
Frequency disturbance



Phase disturbance

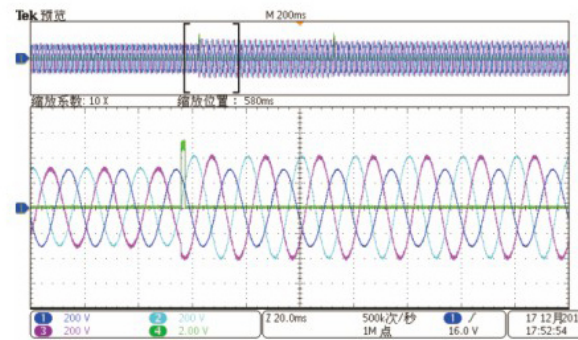
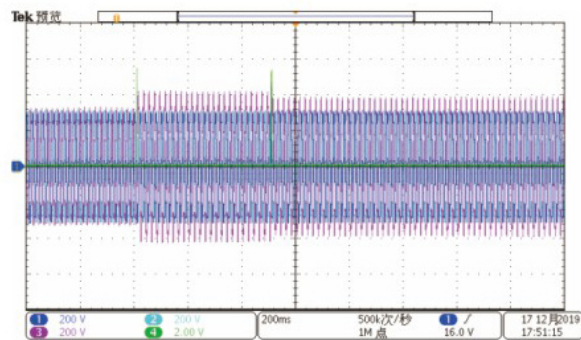
- **High/low voltage ride-through**

The power supply can be conducted with single-phase, two-phase, three-phase high/low power through test; The trigger phase angle of the passing point can be set to meet various standards of the test; The minimum ride-through voltage of power supply is less than 5V, and the typical rise/fall time is 1ms.

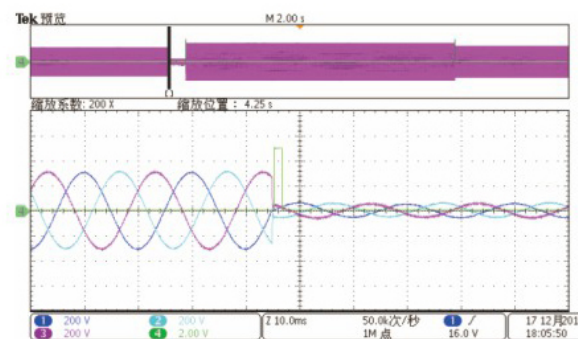
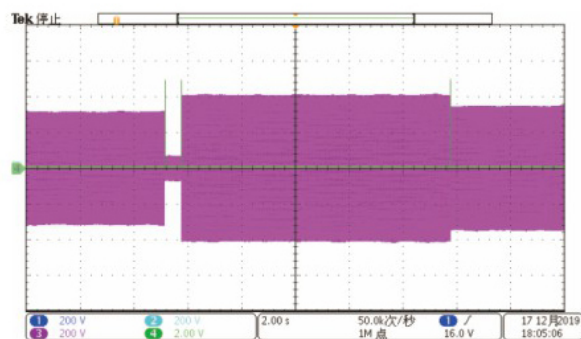


Three-phase low-voltage ride-through

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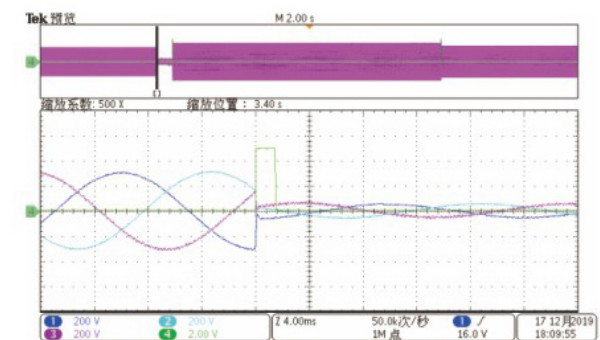
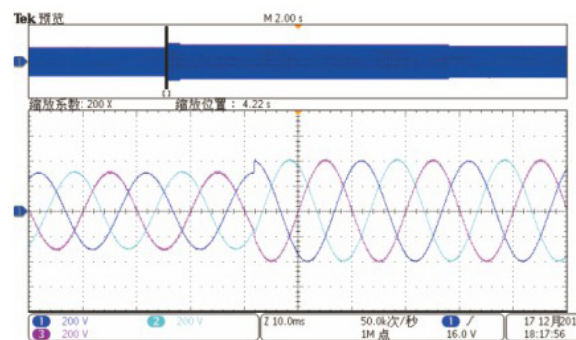
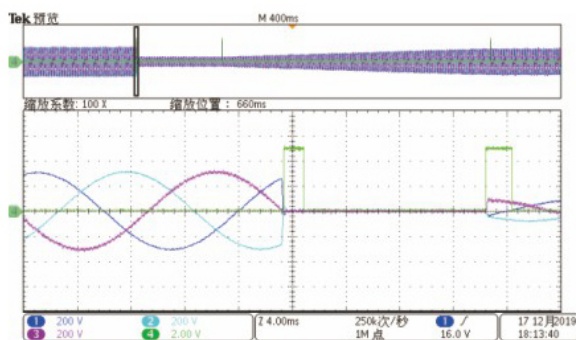


Single-phase high-voltage ride-through



Three-phase high and low voltage ride-through joint test

The trigger phase angle of the crossing point can be set to meet the test of fault ride-through in different countries.

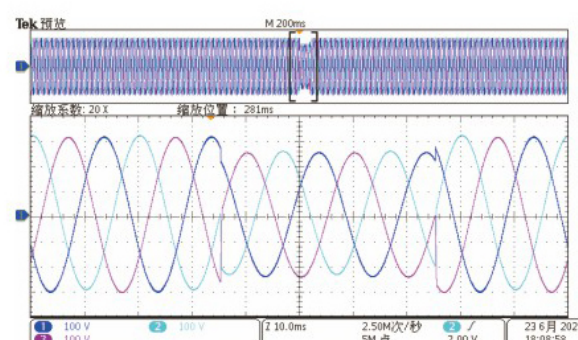
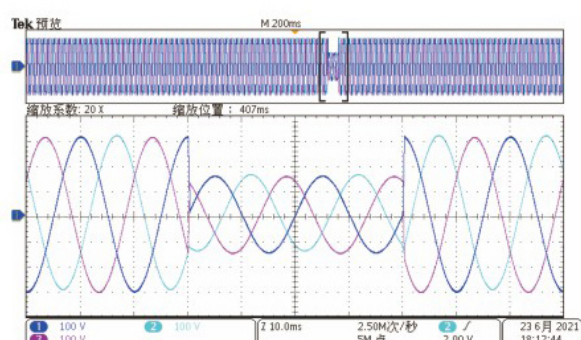


60° low voltage ride-through

90° high voltage ride-through

270° high and low voltage ride-through joint test

Phase A, B and C change simultaneously for low voltage ride-through, and phase B and C commute for low voltage ride-through which meet the regulation test of VDE-AR-N 4105.



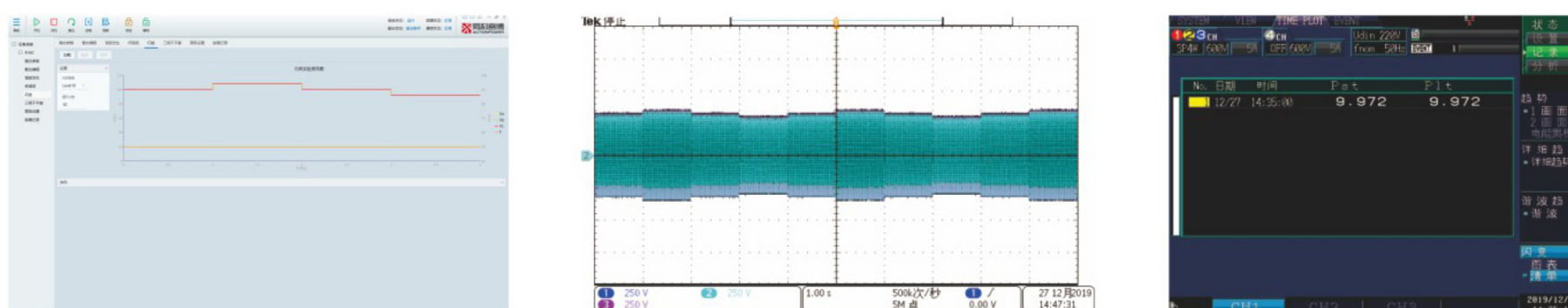
Three-phase phase change low ride-through

B, C phase change low ride-through



• Flicker

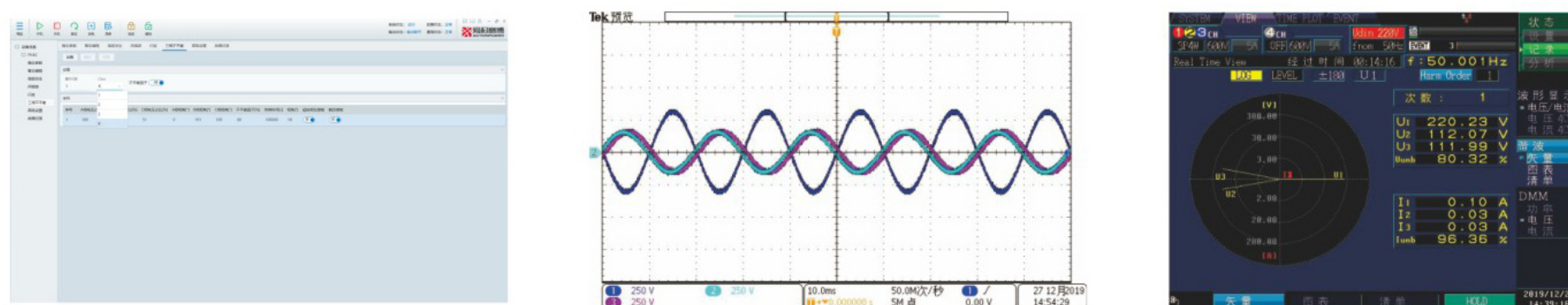
The power supply can directly set the flicker level to easily simulate the flicker characteristics of the power grid, which is used to test the flicker adaptability of the tested object.



Flicker simulation

• Three-phase unbalance

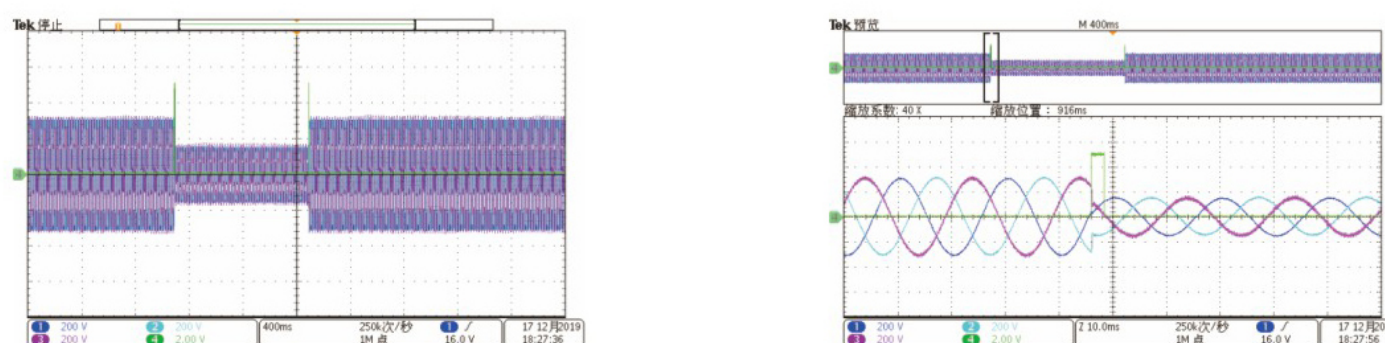
For the power supply, the unbalanced voltage, phase and other information can be set, and the unbalanced factor can be automatically displayed, so that the power supply output is in an unbalanced state; The unbalanced factor can also be set directly, and the voltage, phase and other information under the unbalanced factor can be automatically calculated and output, easily simulating the unbalance characteristics of the power grid, so as to test the adaptability of the voltage unbalance of the tested objects.



Three-phase unbalance

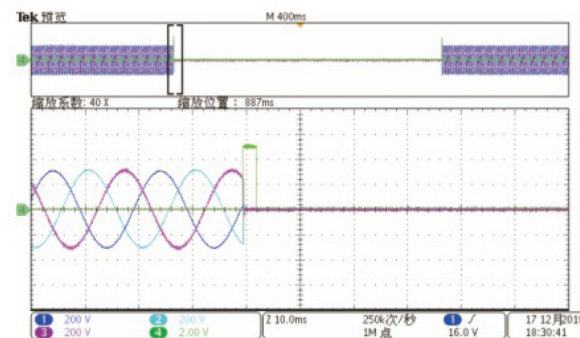
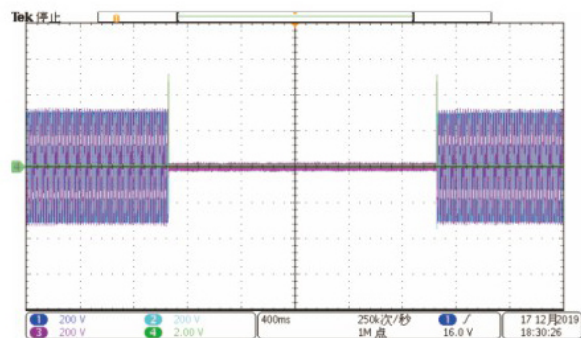
• Sag/interruption/change

The power supply can easily simulate the characteristics of the grid voltage sags/interruptions/changes through parameter setting, which is used to test the grid adaptability of the tested items.

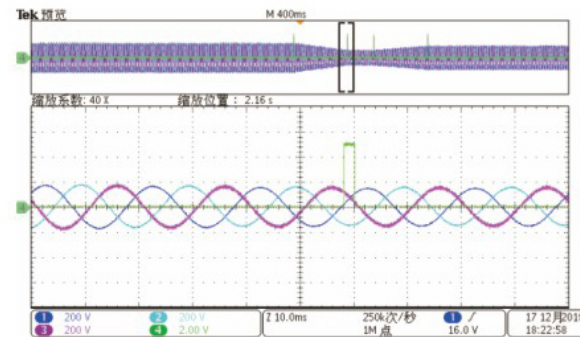
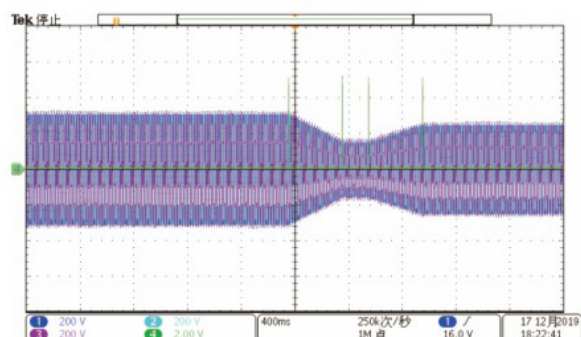


Voltage sag

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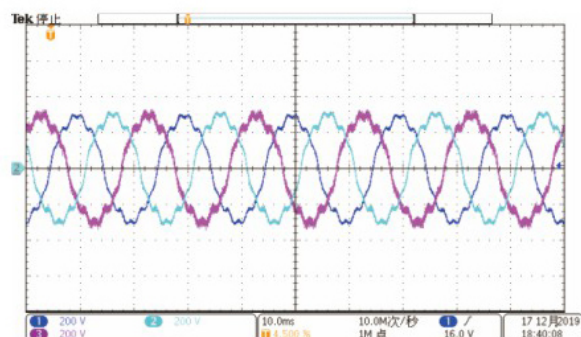
Voltage interruption



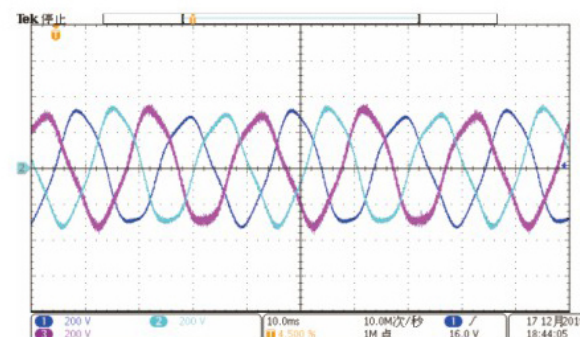
Voltage change

- Harmonic/Inter-harmonic

The power supply allows the superposition of 2-50 harmonics at a fundamental frequency of 50Hz or 60Hz, or superimposed inter-harmonic of 1Hz to 3000Hz to form a distorted waveform of the output voltage. It can be used for testing GB/T 14549-1993 and GB/T 24337-2009.

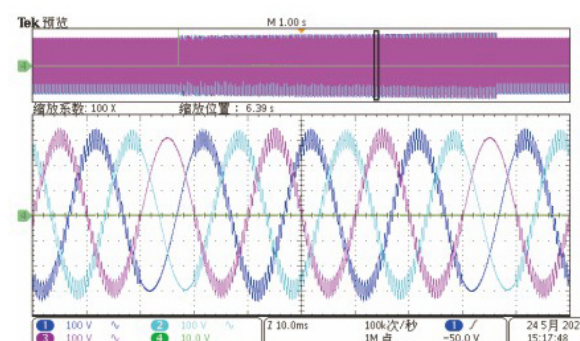
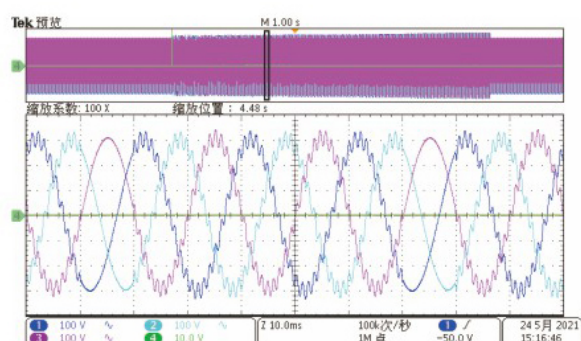


Harmonic superimposed waveform



Inter-harmonic superimposed waveform

Inter-harmonic can be set with start frequency, end frequency, interval time, etc. for inter-harmonic sweeping test which should meet the IEC 61000-4-13 standard.

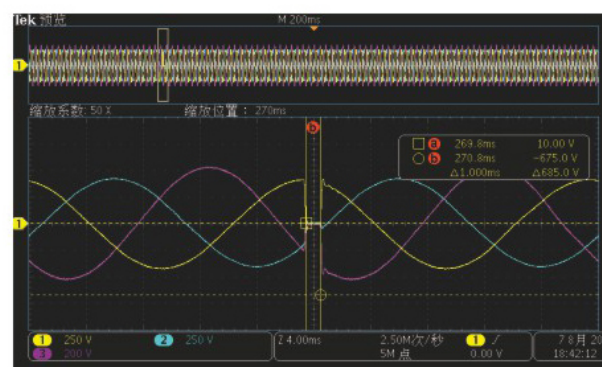


Inter-harmonic sweep frequency



- **1 ms interrupt**

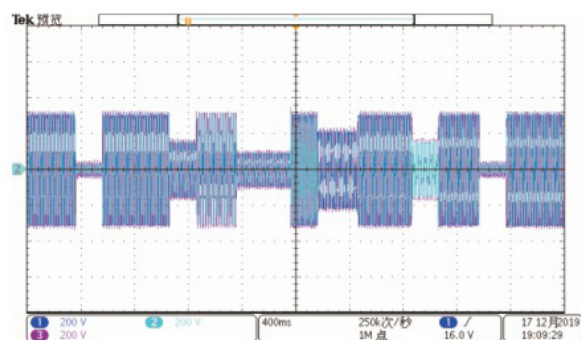
If the dynamic response of the power supply is fast, the 1 ms interruption test can be carried out.



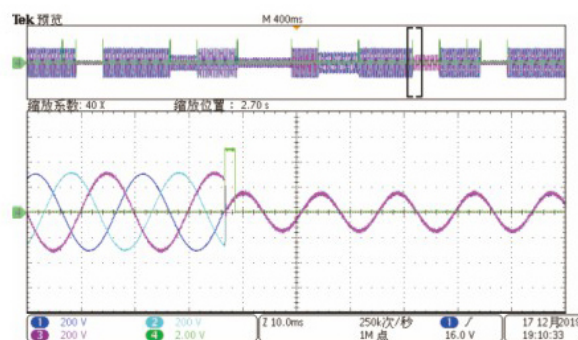
1ms中断波形

- **General programmability**

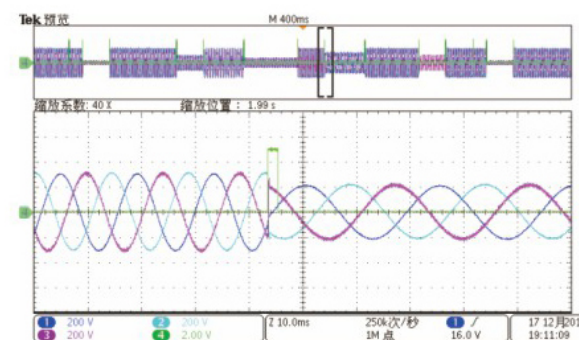
Supports up to 100 nested programming steps and the entire programming can be cycled 999 times. The output voltage, frequency and phase can be programmed and output according to the customer's demand, and can be combined into a multi-sequence complex output mode by change time, maintenance time and the number of programmed steps and cycles, etc. to meet the test of complex working conditions, which can be applied to the test of over/under voltage, over/under frequency, etc. The programming data has memory function and supports data import and export. The power supply can be programmed continuously within the output range, and the waveform is normal without distortion.



Custom waveform



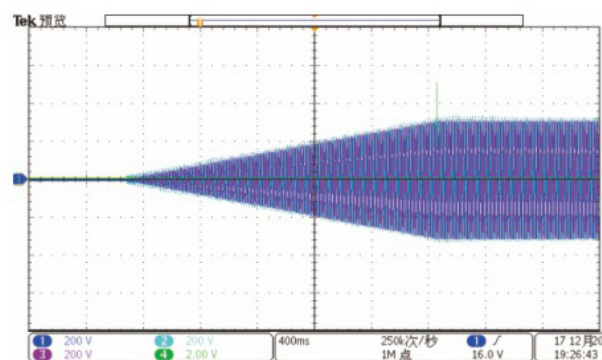
Voltage phase change



Frequency and voltage variation

- **Output slow start function**

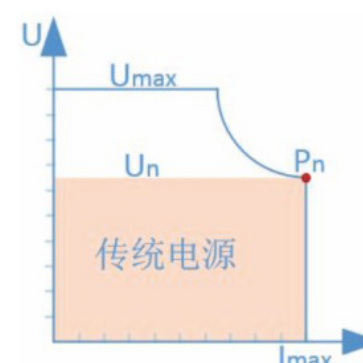
The power supply can be set with a start-up slope of the output voltage to reduce the inrush of the power supply to the test article.



Slow start waveform

- **Wide range output**

The maximum output voltage of the traditional power supply is the same as the rated value. The maximum output voltage of our power supply far exceeds the rated value, which maximizes the output capacity of the power supply.



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- **No pollution from power grid**

The power supply input power factor is as high as 0.99 and the input harmonic current content is lower than 3%F.S., with the minimum interference on the power grid.

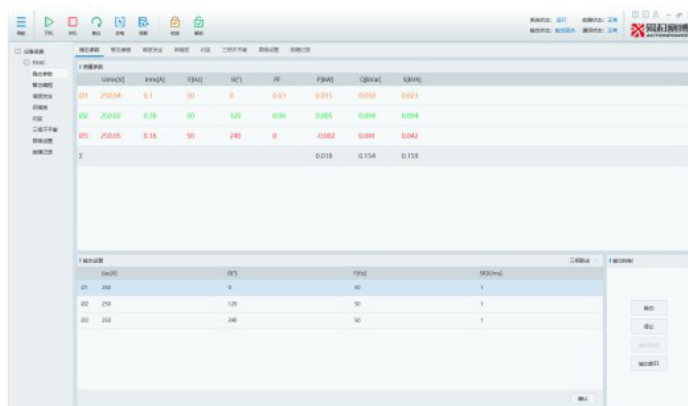


Input electrical parameters

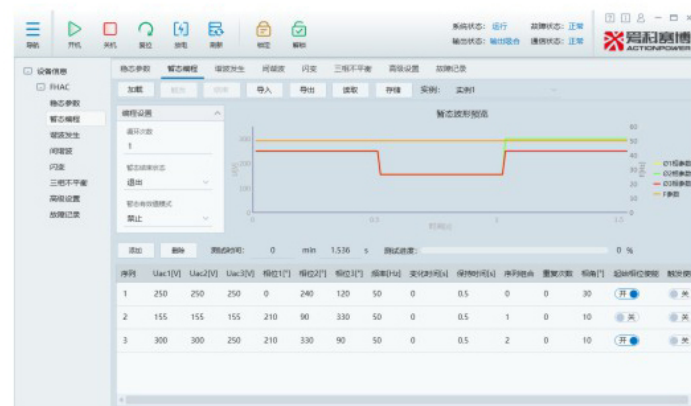
- **Sound protection mechanism**

The power supply has multiple protection mechanisms, with the protection functions of outputting OC, OV, OP and OT, and the output protection value can be set to ensure the safety of the power supply and the load. The fault information of the power supply shall be recorded completely, with up to 200 records, providing fault query instructions, which is convenient for the secondary integration to trace and maintain the fault of the power supply.

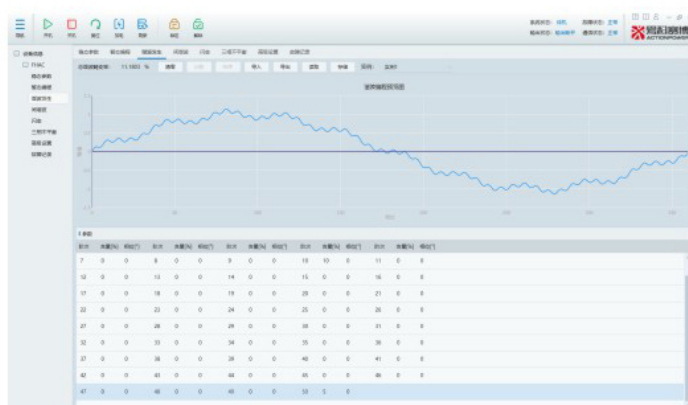
HUMAN-MACHINE INTERFACE



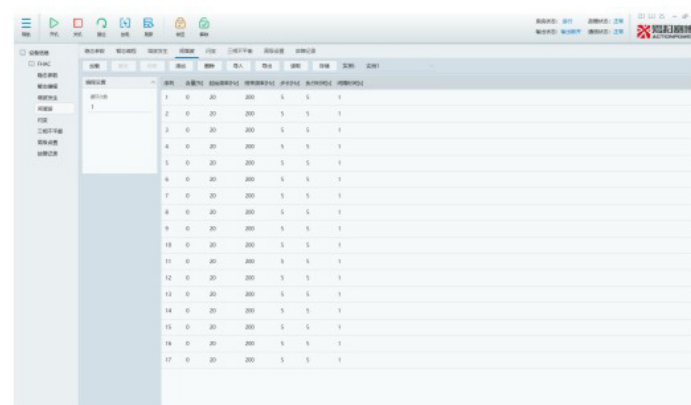
Steady state parameter interface



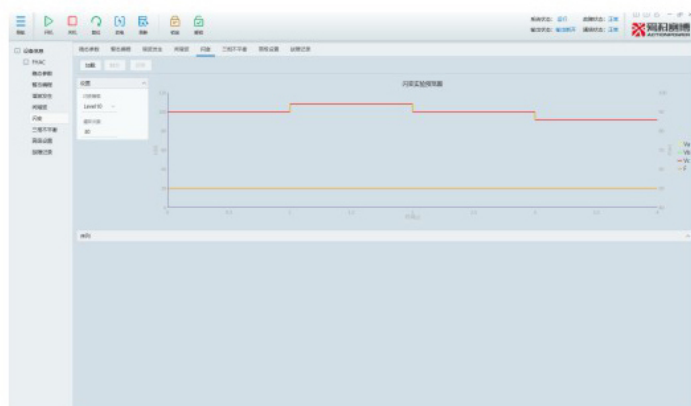
Transient state programming interface



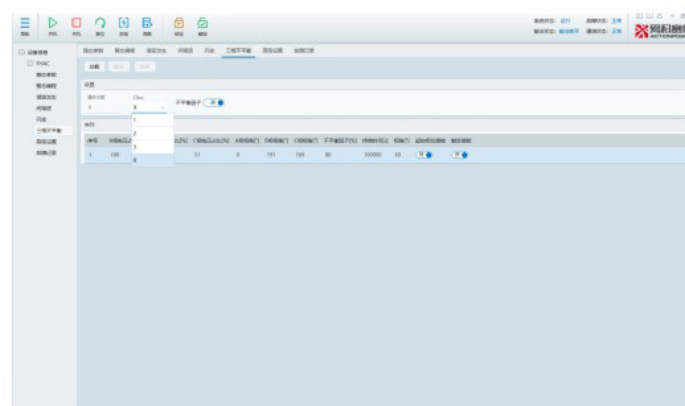
Harmonic interface



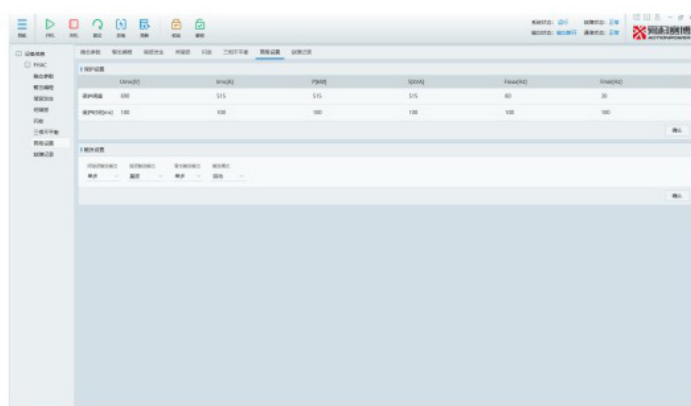
Interharmonic interface



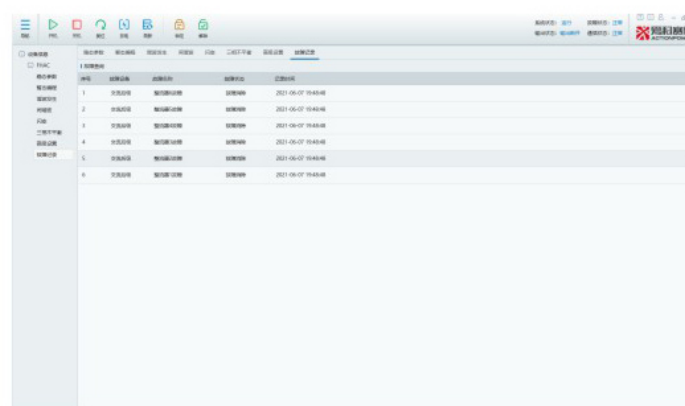
Flicker interface



Three-phase unbalance



Advanced design interface



Fault record interface

|| PRODUCT APPEARANCE



500kVA grid simulation source appearance

AGS SERIES GRID SIMULATION SOURCE

TABLE OF TECHNICAL SPECIFICATION

Product model	AGS-07-7001	AGS-15-7001	AGS-30-7003	AGS-40-7004	AGS-50-7005	AGS-60-7006	AGS-75-7007	AGS-100-7010	
Basic parameters	Output mode	AC							
	Output phase number	Three-phase							
	Rated capacity(kW)	75	150	300	400	500	600	750	1000
	Energy feedback	Receive load energy, which can be fed back to the grid							
	Load power factor	-1~+1							
	Isolation function	Input and output electrical isolation							
	Parallel operation function	Multiple sets of the same model can be connected in parallel							
	Output mode	Three-phase four-wire							
AC output									
Voltage	Voltage range(V _{rms})	L-N/0-700							
	Setting resolution(V)	0.01							
	Accuracy	±0.1% F.S.							
	DC component (mV)	<50							
	Voltage distortion	<0.5% @50Hz/60Hz>=220V no load, <1% @50Hz/60Hz>=220V linear load; <1.0% @other frequency points>=220V no load, <1.5% @other frequency points>=220V linear load ;							
	Load adjustment rate	±0.025% F.S							
	Source adjustment rate	±0.025% F.S							
	Voltage slew rate	AC>1.0V/ μs							
	Dynamic response	<1ms (10%-90%U _{max})							
	Three-phase unbalance	Not exceeding 1/2 of the requirements of GB/T 15543-2008 (negative sequence voltage not exceeding 1% and 2% in short time)							
Current	Rated current (A)@ three-phase	72	143	286	380	476	572	714	1000
	Accuracy	± 0.2% F.S.							
frequency	range(Hz)	40-70							
	Setting resolution(Hz)	0.001							
	Accuracy	0.01%							
Phase	range	A = 0°, B = 240°, C = 120° (Default) ; Programmable range 0°-359.9°Three-phase independently adjustable							
	Accuracy	± 0.3°							
	Setting resolution	0.1°							
Harmonic wave	Times	50 times@50Hz, 50 times@60Hz							
	Content	Maximum of 40% per time for 2~10 times and the total harmonic of 2~10 times shall not exceed 40%; Maximum of 20% per time for 10~20 times and the total harmonic of 10~20 times shall not exceed 20%; 21 ~ 30 times, single maximum 10%, total harmonic no more than 10%; 31 ~ 50 times, single maximum 5%, total harmonic no more than 5%; 49 kinds of harmonics can be superimposed at the same time							



Product model	AGS-07-4501	AGS-15-4502	AGS-30-4505	AGS-40-4506	AGS-50-4508	AGS-60-4509	AGS-75-4512	AGS-100-4516	
Basic parameters	Output mode	交流							
	Output phase number	三相							
	Rated capacity(kW)	75	150	300	400	500	600	750	1000
	Energy feedback	Receive load energy, which can be fed back to the grid							
	Load power factor	-1~+1							
	Isolation function	Input and output electrical isolation							
	Parallel operation function	Multiple sets of the same model can be connected in parallel							
	Output mode	Three-phase four-wire							
AC output									
Voltage	Voltage range(V _{rms})	L-N/0-450							
	Setting resolution(V)	0.01							
	Accuracy	±0.1% F.S.							
	DC component (mV)	<50							
	Voltage distortion	<0.5% @50Hz/60Hz>=220V no load, <1% @50Hz/60Hz>=220V linear load; <1.0% @other frequency points>=220V no load, <1.5% @other frequency points>=220V linear load ;							
	Load adjustment rate	±0.025% F.S							
	Source adjustment rate	±0.025% F.S							
	Voltage slew rate	AC>1.0V/ μs							
	Dynamic response	<1ms (10%-90%U _{max})							
	Three-phase unbalance	Not exceeding 1/2 of the requirements of GB/T 15543-2008 (negative sequence voltage not exceeding 1% and 2% in short time)							
Current	Rated current (A)@ three-phase	114	227	454	606	757	910	1136	1515
	Accuracy	± 0.2% F.S.							
frequency	range(Hz)	40-70							
	Setting resolution(Hz)	0.001							
	Accuracy	0.01%							
Phase	range	A = 0°, B = 240°, C = 120° (Default) ; Programmable range 0°-359.9°Three-phase independently adjustable							
	Accuracy	± 0.3°							
	Setting resolution	0.1°							
Harmonic wave	Times	50次 @50Hz, 50次 @60Hz							
	Content	Maximum of 40% per time for 2~10 times and the total harmonic of 2~10 times shall not exceed 40%; Maximum of 20% per time for 10~20 times and the total harmonic of 10~20 times shall not exceed 20%; 21 ~ 30 times, single maximum 10%, total harmonic no more than 10%; 31 ~ 50 times, single maximum 5%, total harmonic no more than 5%; 49 kinds of harmonics can be superimposed at the same time							

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Harmonic wave	Amplitude error	±5% harmonic content setting value							
	Phase angle range	0°-359.9°							
	Preview function	Harmonic superimposed waveform can be previewed							
	Editing mode	Import, export, read, store							
Interharmonic	Frequency range	1Hz~3000Hz, content <10%							
	Programming steps	100 steps							
	Programming parameters	Content, starting frequency, ending frequency, step length, execution time, interval time, number of cycles, sequence							
	Editing mode	Add, Delete, Import, Export, Store, Read							
Flicker	Flicker level	1.0~10.0, 10 levels in total, one-key to call							
	Adjustment of step size	1							
	Accuracy	±0.2							
	Preview function	The flicker trend chart can be previewed							
Simulation of three-phase unbalance	Adjustment mode	Three-phase voltage and phase; Unbalance factor							
	Adjustment range of unbalance factor(%)	1~100, one click call							
	Adjustment step of unbalance factor(%)	1							
	Accuracy(%)	±0.5%							
High and low voltage ride through	Mode	Combination of low voltage ride-through/high voltage ride-through/high voltage ride-through							
	Configuration parameters	Voltage, frequency, phase, rise time, holding time, trigger phase angle, trigger pulse output							
	Related functions	Meet national standards, VDE-AR-N 4105, NRS 097-2-1, G83, EN50438, etc.							
Transient programming	Programming steps	100 steps							
	Programming parameters for each step	Voltage, frequency, phase, change time, holding time, trigger phase angle, trigger pulse output							
	Range of rise time	100 μs-999s							
	Flat top time range	100 μs-999s							
	Minimum programming time step	100 μs							
	Synchronous signal output	Output a low-voltage trigger signal electrically isolated from other parts of the device, which is synchronized with the change of the power output parameters							
	Editing mode	Import, export, store, read							
	Related function	Three-phase unbalance, sag, interruption, high and low voltage ride-through and other functions, with automatic integrated interface							
	Operating mode	Running, stop, large loop + small loop nested programming							
	Triggering mode	Automatic, manual, external							
Measurement parameters									
Output voltage	Resolution(V _{rms})	0.01							
	Accuracy	±0.1% F.S.							



Product model		AGS-07-4501	AGS-15-4502	AGS-30-4505	AGS-40-4506	AGS-50-4508	AGS-60-4509	AGS-75-4512	AGS-100-4516
Harmonic wave	Amplitude error	±5% harmonic content setting value							
	Phase angle range	0°-359.9°							
	Preview function	Harmonic superimposed waveform can be previewed							
	Editing mode	Import, export, read, store							
Interharmonic	Frequency range	1Hz~3000Hz, content <10%							
	Programming steps	100 steps							
	Programming parameters	Content, starting frequency, ending frequency, step length, execution time, interval time, number of cycles, sequence							
	Editing mode	Add, Delete, Import, Export, Store, Read							
Flicker	Flicker level	1.0~10.0, 10 levels in total, one-key to call							
	Adjustment of step size	1							
	Accuracy	±0.2							
	Preview function	The flicker trend chart can be previewed							
Simulation of three-phase unbalance	Adjustment mode	Three-phase voltage and phase; Unbalance factor							
	Adjustment range of unbalance factor(%)	1~100, one click call							
	Adjustment step of unbalance factor(%)	1							
	Accuracy(%)	±0.5%							
High and low voltage ride through	Mode	Combination of low voltage ride-through/high voltage ride-through/high voltage ride-through							
	Configuration parameters	Voltage, frequency, phase, rise time, holding time, trigger phase angle, trigger pulse output							
	Related functions	Meet national standards, VDE-AR-N 4105, NRS 097-2-1, G83, EN50438, etc.							
Transient programming	Programming steps	100 steps							
	Programming parameters for each step	Voltage, frequency, phase, change time, holding time, trigger phase angle, trigger pulse output							
	Range of rise time	100 μs-999s							
	Flat top time range	100 μs-999s							
	Minimum programming time step	100 μs							
	Synchronous signal output	Output a low-voltage trigger signal electrically isolated from other parts of the device, which is synchronized with the change of the power output parameters							
	Editing mode	Import, export, store, read							
	Related function	Three-phase unbalance, sag, interruption, high and low voltage ride-through and other functions, with automatic integrated interface							
	Operating mode	Running, stop, large loop + small loop nested programming							
	Triggering mode	Automatic, manual, external							
Measurement parameters									
Output voltage	Resolution(V _{rms})	0.01							
	Accuracy	±0.1% F.S.							

AGS SERIES GRID SIMULATION SOURCE

TABLE OF TECHNICAL SPECIFICATION

Product model		AGS-07-7001	AGS-15-7001	AGS-30-7003	AGS-40-7004	AGS-50-7005	AGS-60-7006	AGS-75-7007	AGS-100-7010
Output frequency	Resolution(Hz)	0.001							
	Accuracy	±0.01%							
Output current	Resolution(A)	0.1							
	Accuracy	±0.2% F.S.							
Active power	Resolution(W)	1							
	Accuracy	±0.3% F.S.							
Apparent power	Resolution(VA)	1							
	Accuracy	±0.3% F.S.							
Power factor	Range	-1.00~+1.00							
	Resolution	0.01							
Input									
Wiring mode		Three-phase four-wire ABC+PE							
Frequency(Hz)		47 - 63							
Voltage range(V)		380V±15%							
Power factor		0.99 @above half load							
Efficiency		> 0.92				> 0.94			
Harmonic current		≤3%							
Other parameters									
Protection function		Input overvoltage/undervoltage/overfrequency/underfrequency/phase loss protection; Output overvoltage/overcurrent/overpower protection, internal overtemperature protection, etc.							
Communication interface		RS485、CAN、LAN							
External linkage		External chain input normally open/normally closed; External interlock output normally open/normally closed							
Trigger signal		Trigger input/output							
Operating display		Local touch screen control, remote upper computer control; Display voltage, current, frequency and power							
Insulation and withstand voltage		10M Ω /DC500V; 3600VAC/1min							
Cooling method		Forced air cooling							
Noise		≤70dB							
Operating temperature		0°C~40°C							
Relative humidity		10% to 90% RAH							
Altitude		≤2000m							
Dimension (mm) width × height × depth		1200×1950×1200	1600×1950×1200	2400×1950×1200	2400×1950×1200	2400×1950×1200	3400×1950×1200	3400×1950×1400	3400×1950×1400
Weight (kg)		1400	1800	2560	2770	2960	3670	5080	5810



Product model		AGS-07-4501	AGS-15-4502	AGS-30-4505	AGS-40-4506	AGS-50-4508	AGS-60-4509	AGS-75-4512	AGS-100-4516
Output frequency	Resolution(Hz)	0.001							
	Accuracy	±0.01%							
Output current	Resolution(A)	0.1							
	Accuracy	±0.2% F.S.							
Active power	Resolution(W)	1							
	Accuracy	±0.3% F.S.							
Apparent power	Resolution(VA)	1							
	Accuracy	±0.3% F.S.							
Power factor	Range	-1.00~+1.00							
	Resolution	0.01							
Input									
Wiring mode		Three-phase four-wire ABC+PE							
Frequency(Hz)		47 - 63							
Voltage range(V)		380V±15%							
Power factor		0.99 @above half load							
Efficiency		> 0.92				> 0.94			
Harmonic current		≤3%							
Other parameters									
Protection function		Input overvoltage/undervoltage/overfrequency/underfrequency/phase loss protection; Output overvoltage/overcurrent/overpower protection, internal overtemperature protection, etc.							
Communication interface		RS485、CAN、LAN							
External linkage		External chain input normally open/normally closed; External interlock output normally open/normally closed							
Trigger signal		Trigger input/output							
Operating display		Local touch screen control, remote upper computer control; Display voltage, current, frequency and power							
Insulation and withstand voltage		10M Ω /DC500V; 3600VAC/1min							
Cooling method		Forced air cooling							
Noise		≤70dB							
Operating temperature		0°C~40°C							
Relative humidity		10% to 90% RAH							
Altitude		≤2000m							
Dimension (mm) width × height × depth		1200×1950×1200	1600×1950×1200	2400×1950×1200	2400×1950×1200	3400×1950×1400	3400×1950×1400	3400×1950×1400	6800×1950×1400
Weight (kg)		1400	1800	2630	2920	3860	4410	5310	7720