



Movable Grid Compliance Test Device for Wind, PV and ESS

Grid Simulator of GS 1000 Series



Grid Simulator- A Test Device Adapted to Multiple Scenarios



Support for testing of all model types of grid-forming new energy units

Technical Indicators

Series	GS1000	
Input/Output voltage	380V~35kV	
Single capacity	4~100+ MVA	
Input power factor	0.99	
Output voltage range	0~140%(customized)	
Output frequency range	45~66Hz(customized)	
Cooling method	Air cooling	
IP grade	IP55(storage) / IP33(operation)	
Temperature limit	-30~45℃	
Altitude	5000m	
Dimensions (W*D*H)	4MVA	Container 4pcs, single max size 6700×2438×3200mm
	6MVA	Container 3pcs, single max size 9000×2438×3200mm
	8MVA	Container 3pcs, single max size 9600×2438×3200mm
	10~11MVA	Container 3pcs, single max size 10600×2438×3200mm
	12MVA	Container 3pcs, single max size 12192×2438×3200mm
	15MVA	Container 3pcs, single max size 13716×2700×3400mm
	100+ MVA	Shelf dimensions 23000x2600x3450mm

Features

GS1000 Grid Simulator is widely applied in grid compliance test for wind, PV, ESS and other scenarios. Not only having test functions like highly grid adaptability, fault ride-through, but also featured with weak grid simulation, broadband frequency sweep, damping control, and active load simulation. The product strongly supports the stability of grid-connected analysis.



Reliable

- Energy feedback cascade topology, modular design.
- High IP grading, exceptional vibration resistance.
- Bypass system, stable operation without manual monitoring.



Flexible

- Containerized structure for easy transportation
- Designed for harsh environments such as high altitude, salt spray, and extreme temperatures
- Supports multi-power-level system integration for flexible capacity expansion
- Supports customized solutions for 100MW-level test platforms



Human-machine Friendly

- Concise and comprehensive interface.
- Highly standardized test output process, customized online waveform programming.
- Follow the latest standards, significantly improve the quality and efficiency of test.



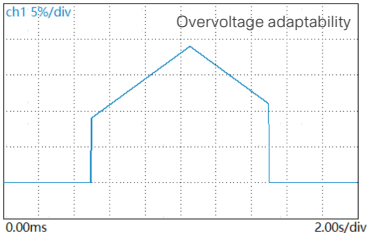
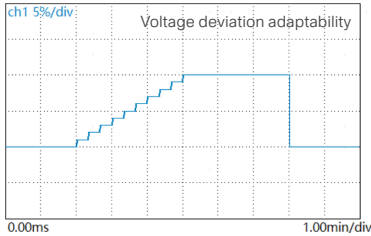
Exceptional Performance

- Low output impedance, output short circuit protection.
- Cover multiple test scenarios like wind, PV, ESS.
- Provide solutions for conventional standard tests, stress tests, scientific research tests, etc.

Functions

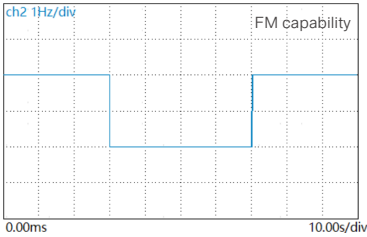
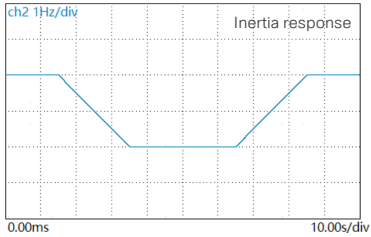
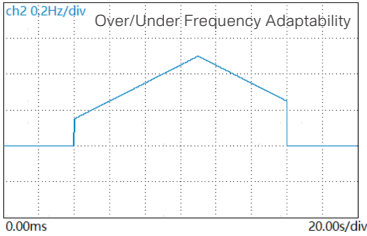
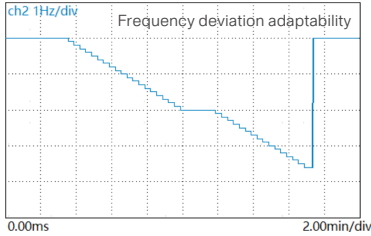
Output voltage regulation

Regulation range is 0-1.4Un, accuracy is $\pm 0.2\%$, minimum adjusting step is 0.1%Un, voltage change rate from 0.1%Un to 10%Un/ms. Voltage output range can be customized.



Output frequency regulation

Regulation range is 45-66Hz, accuracy is $\pm 0.005\text{Hz}$, minimum adjusting step is 0.01Hz, frequency change rate from 0.01 Hz/s to 1000Hz/s. Frequency output range can be customized.



Output three-phase voltage imbalance

Regulation range is 1-15%, accuracy $\pm 0.5\%$, minimum adjusting step is 0.1%. Two setting modes: voltage imbalance, three-phase voltage independent.

set value(%)	imbalance degree(%)	
	Unload	Load>0.5PN
2.0%	1.93%	2.02%
4.0%	3.94%	4.01%

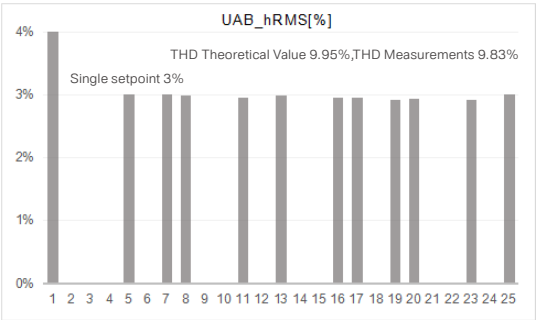
Output voltage flicker

Regulation range is 0.01~10, accuracy is ± 0.1 . Two setting modes: short term flicker Pst, voltage fluctuation amount.

Pst Value	short term flicker Pst(%)	
	Unload	Load>0.5PN
1	1.01	1.096
3	3.01	3.091
5	5.05	5.117

Output harmonics

Voltage harmonics output range is 2~50 times, inter-harmonics output range is 5~1000Hz, accuracy is $\pm 0.2\%$. With exceptional harmonics control, system can output harmonics wave precisely.



Inter-harmonics voltage adaptability

Inter-harmonics frequency (Hz)	Setpoint(%)	Measurements(%)		Inter-harmonics frequency (Hz)	Setpoint(%)	Measurements(%)	
		no-load	>30%PN			no-load	>30%PN
5	0.16	0.201	0.172	55	0.16	0.191	0.183
10	0.16	0.203	0.164	60	0.16	0.188	0.163
15	0.16	0.203	0.171	65	0.16	0.155	0.157
20	0.16	0.201	0.188	70	0.16	0.145	0.176
25	0.16	0.200	0.167	75	0.16	0.158	0.151
30	0.16	0.152	0.156	80	0.16	0.162	0.175
35	0.16	0.167	0.170	85	0.16	0.155	0.168
40	0.16	0.162	0.164	90	0.16	0.162	0.153
45	0.16	0.170	0.204	95	0.16	0.155	0.158

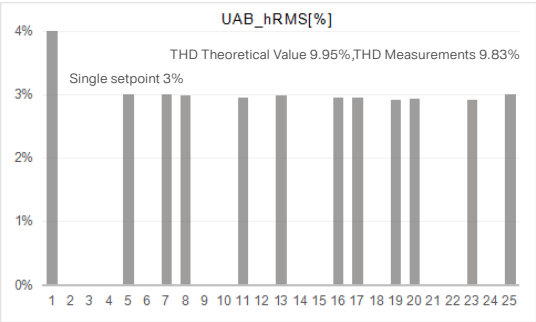
Harmonics voltage adaptability

Harmonics frequency	Setpoint(%)	Measurements(%)		Harmonics frequency	Setpoint(%)	Measurements(%)	
		no-load	>30%PN			no-load	>30%PN
5	2.4	2.42	2.38	2	1.2	1.20	1.23
7	2.4	2.42	2.36	4	1.2	1.20	1.20
11	2.4	2.41	2.35	8	1.2	1.21	1.18
13	2.4	2.42	2.38	10	1.2	1.21	1.18
17	2.4	2.41	2.31	14	1.2	1.20	1.18
19	2.4	2.42	2.09	16	1.2	1.20	1.18
23	2.4	2.40	2.47	20	1.2	1.20	1.11
25	2.4	2.39	2.40	22	1.2	1.20	1.23

Note: The above data is extracted from the test report issued by the authoritative certification agency.

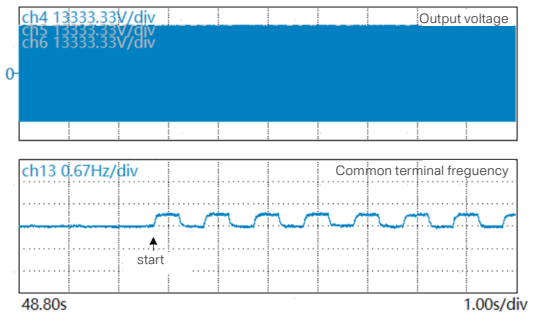
Output harmonics

- Voltage harmonics output range is 2-50 times.
- Inter-harmonics output range is 5-1000Hz, accuracy is ±0.2%.



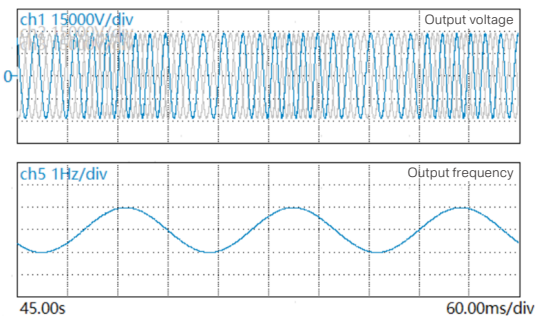
Anti-islanding test

- Simulate the RLC AC load in the island, support island automatic acquisition, power setting and RLC setting.
- Display the figure of merit in real time, and automatically calculate the RLC recommended value.



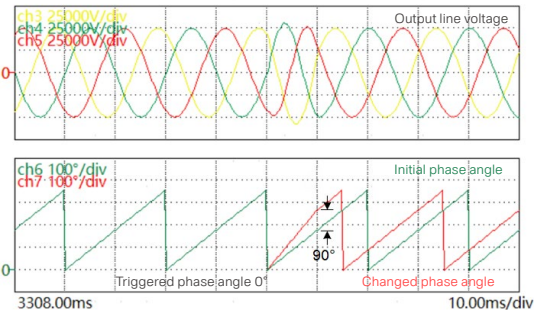
Damping control

- Simultate system frequency oscillation in two types: sine wave and square wave, oscillation frequency range: 0.1~100Hz ,the oscillation amplitude 0~5Hz.



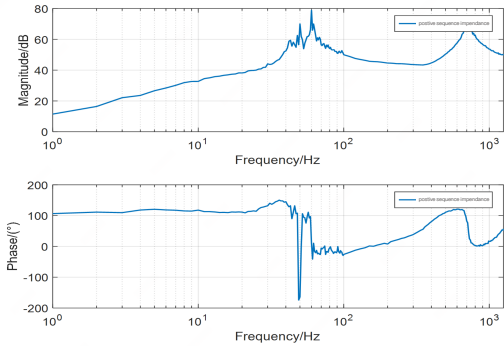
Phase angle ride-through

- Trigger phase jump at specified or random angle:-180°~180°
- Original anti-saturation algorithm can eliminate magnetic saturation of transformers and WTG.



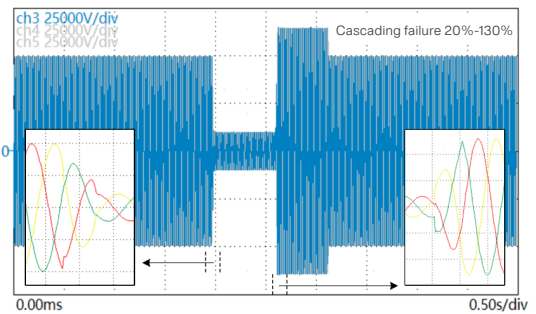
Impedance scanning

- Support positive/negative/positive-negative sequence sweep, sweep range is 1-3000Hz.
- Quickly generate analysis of perturbation voltage spectrum and impedance characterization for the device.



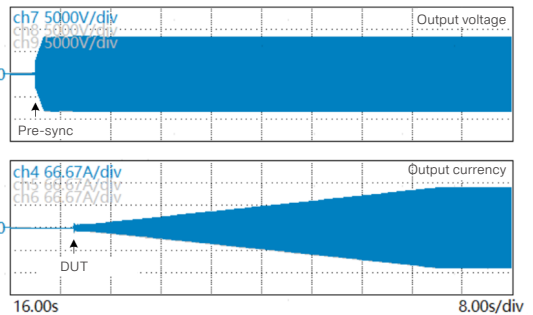
Voltage fault ride through

- Apply in high/low/zero voltage ride through test
- Single/two/three phase voltage fault.
- Support fault ride through at a specific angle.



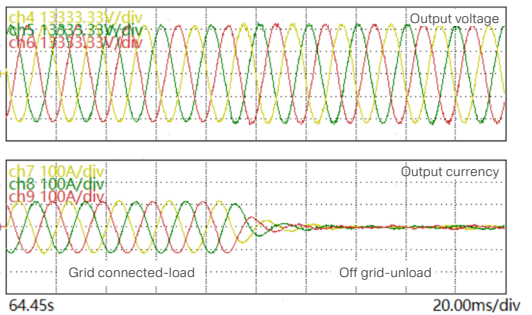
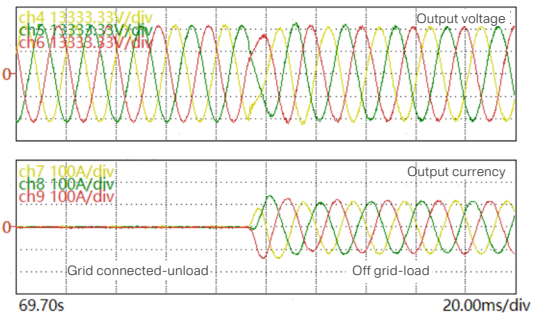
Load simulation

- Ability of automatic voltage pre-sync, no transient current impulse when load connect to container test device.



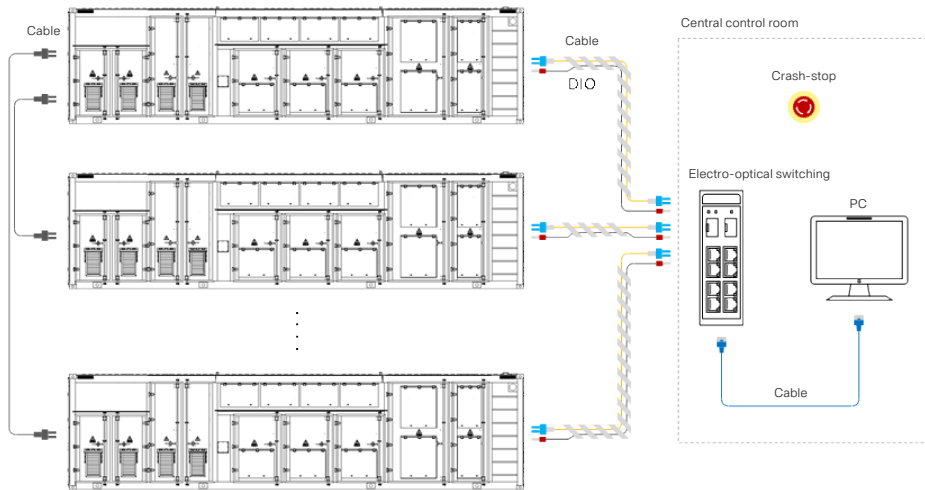
Switching simulation

- Simulate grid-connected to off-grid switching of GFM system.
- Simulate grid and load when DUT off-grid.
- Support the online setting of active and reactive power of the load, display real-time frequency of the common connection point.



Y+X Parallel capacity expansion

- Support the parallel of different power level systems.
- Sampling frequency of the core control algorithm is up to 20kHz. When paralleled, the data interaction is completed within 10us.



Applications



Pu'er Hani Photovoltaic Power Plant, Yunnan
Single-unit 6MW



A hybrid solar and wind power plant in Xinjiang, China
Single-unit 10MW



Grid-connected Test @ Jilin, Northeast China
Single-unit 10MW



Energy Storage and Grid-forming Energy Base, Ningxia
Single-unit 10MW



FRT Test @ Hebei, Northern China
Dual-unit parallel 10 MW+10 MW



FRT Test @ Inner Mongolia, Northern China
Dual-unit parallel 10 MW+11 MW



Lianzhu Wind Farm, Yuxi, Yunnan
Asymmetric dual-unit parallel connection 6 MVA+10 MVA



Barkol Kazakh Wind Farm, Northwest China
Asymmetric dual-unit parallel connection 10 MVA+11 MVA

RE100 EP100

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