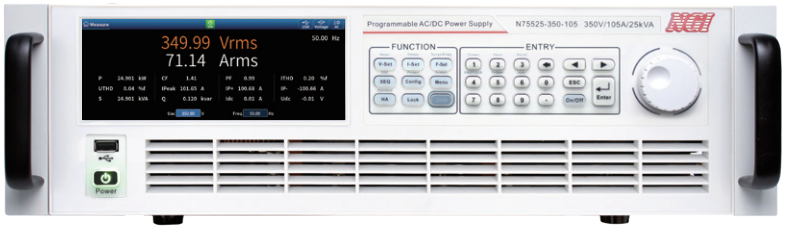
N75500 Series High Performance Regenerative Grid Simulator



Product Introduction

The N75500 Series is a high-performance, high-power programmable grid simulator developed by NGI, featuring regenerative power feedback capability and four-quadrant operation capability. Utilizing high power density design, the product delivers up to 25kVA within a compact 3U chassis, with parallel connection capability for flexible scaling to higher power requirements. The N75500 Series supports single-phase, three-phase, reverse-phase， and split-phase output modes, with wide output voltage ranges: up to 350V L-N (line-to-neutral), 606V L-L (line-to-line), and 700V L-L in reverse phase mode. Output modes encompass AC, DC, AC+DC, and DC+AC, enabling simulation of diverse grid conditions. The product incorporates a dedicated islanding test mode, allowing users to simulate grid non-linear loads by programming R, L, C, active power, and reactive power parameters for comprehensive verification of anti-islanding protection performance. Ideal for new energy vehicles, PV inverters, energy storage systems, power electronics, and R&D laboratory applications.

The N75500 Series features powerful arbitrary waveform editing capability for precise simulation of various grid disturbances and complex waveforms. Its regenerative design feeds test-generated power back to the utility grid, significantly reducing operating energy consumption and test costs.

Application Fields

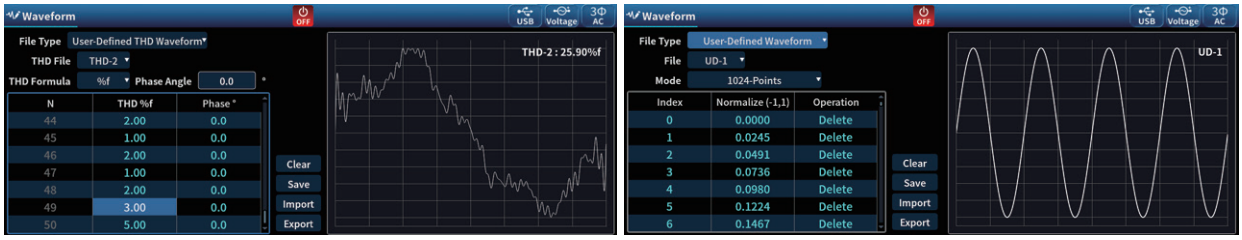
- New Energy and Distributed Generation: Photovoltaic (PV) inverters, energy storage systems, power conversion systems (PCS), wind power converters
- Electric Vehicles and Charging Infrastructure: Unidirectional/bidirectional on-board chargers (OBC), motor drives, AC/DC charging stations, microgrid systems
- Power Electronics and Electrical device: Uninterruptible power supplies (UPS), variable frequency drives (VFD), switch-mode power supplies (SMPS)
- University Research and Certification: Grid-related research projects, grid-connection standard electromagnetic compatibility (EMC) testing

Main Features

- High power density design delivering 25kVA in 3U chassis, with parallel capability for power expansion
- Harmonic simulation and analysis up to 50th order
- Voltage range: 0–350V (L-N)
- Compliant with IEC 61000-4-11/4-13/4-14 and other regulatory test standards
- Output frequency range: 1–500Hz, with adjustable voltage and frequency
- Programmable switch-on/switch-off phase angle: 0~360°
- Harmonic and inter-harmonic waveform synthesis
- Programmable output impedance
- Single-phase, three-phase, reverse-phase, and split-phase output modes
- Four output modes: AC/DC/AC+DC/DC+AC
- Standard USB/CAN/LAN/RS232/RS485 interfaces, optional GPIB (via RS232 conversion)
- Multiple protocol support: Modbus-RTU, SCPI, CANopen
- Programmable voltage and current slew rates for flexible test adaptation
- 6.8-inch high-resolution LCD display for enhanced readability of test information

Comprehensive Grid Fault and Waveform Simulation

Standard Waveform Output: In addition to pure sine wave, the N75500 series features built-in non-standard waveforms including t riangle wave, sawtooth wave, square wave, and trapezoidal wave. It also incorporates built-in test standards for IEC 61000-4-11/4-13/ 4-14/4-27/4-29, enabling evaluation of equipment tolerance under complex grid conditions such as voltage sag/swell, frequency deviation, phase jump, and voltage fluctuation. User-defined waveform output is also supported.



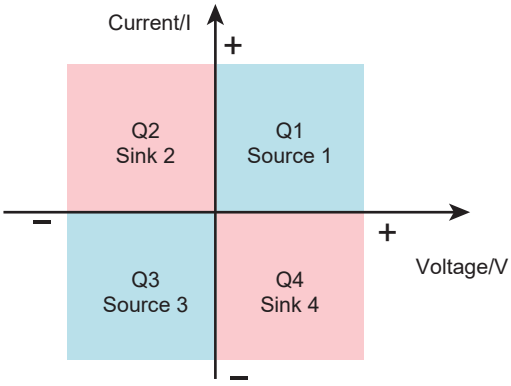
▲ User−defined waveform

Islanding Test Simulation

Anti-Islanding Protection Test: The N75500 series features a professional anti-islanding test mode. Users can configure active power (resistance R) and reactive power (inductance Q/capacitance C), or directly set R, L, C parameters to accurately simulate grid resonance, enabling comprehensive verification of the DUT's islanding detection and protection mechanisms to ensure compliance with safety operation requirements. The N75500 transforms complex anti-islanding testing into a safe, efficient, and automated standardized process, significantly improving user test efficiency.

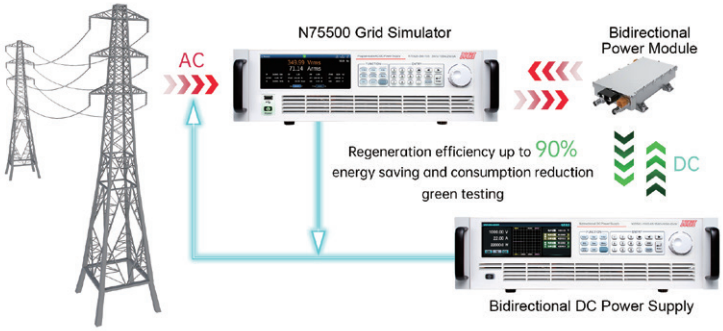
Full Four-Quadrant Grid Simulator

As a full four-quadrant operating unit, the N75500 Series can completely simulate bidirectional energy exchange between the grid and device in any direction. Whether the device absorbs active/reactive power from the grid (Quadrants 1 and 4) or delivers active/reactive power to the grid (Quadrants 2 and 3), precise simulation and measurement are achieved. Ideally suited for testing generators, inverters, rectifiers, and any scenario involving bidirectional power flow.



High-Efficiency Regenerative Function

The N75500 Series not only simulates grid power supply to the DUT, but also absorbs energy delivered by the DUT and efficiently feeds the recovered clean energy back to the local grid (regenerative efficiency up to 90%), significantly reducing test energy consumption and thermal management costs while achieving green energy savings. When operating in energy absorption mode, the N75500 can convert AC or DC output from the DUT (via internal rectification) into pure sine wave current synchronized with the local grid in frequency, phase, then "inject" it back into the grid.



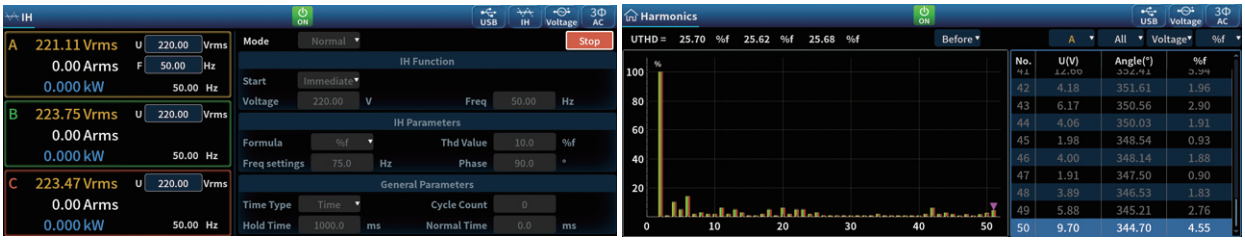
High Power Density, Modular Design

The N75500 Series utilizes high power density design, delivering 25kVA within a 19inch width and 3U height chassis , with parallel expansion capability for flexible scaling to higher power requirements. With 1.7× the output power of conventional AC power sources/grid simulators in equivalent volume, the N75500 Series significantly saves test space in high-power applications, avoiding additional rack installation or laboratory expansion, thereby effectively reducing customer test costs.

3U/25kVA　　3U/15kVA

Harmonic/Inter-Harmonic Simulation

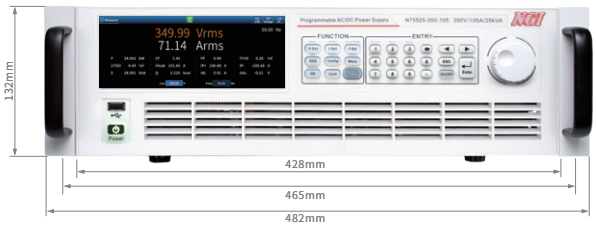
The N75500 Series supports independent amplitude and phase programming, capable of simulating harmonics up to the 50th order (fundamental 50Hz/60Hz) to generate periodic distorted waveforms per test requirements. The unit incorporates 30 groups of pre-stored harmonic distortion waveforms for rapid user recall and testing. Supporting single-phase, three-phase, reverse-phase, and split-phase harmonic output, the N75500 Series fully satisfies IEC harmonic immunity test requirements and serves as a critical tool for EMC immunity testing.

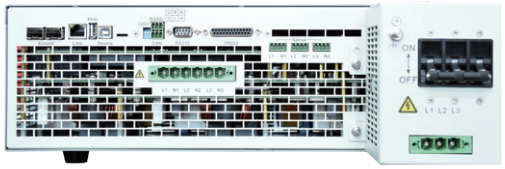


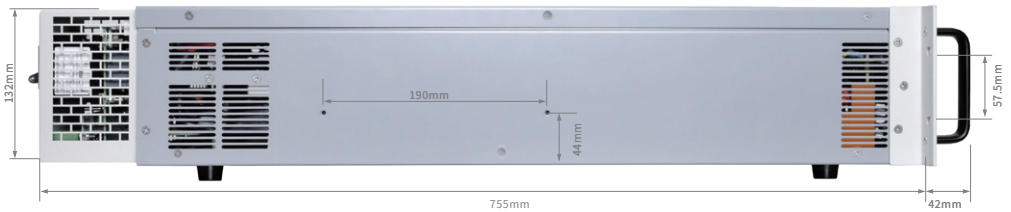
Harmonic Analysis

The N75500 Series provides comprehensive harmonic analysis functionality, supporting high-precision measurement of voltage and current harmonics. The series measures not only total harmonic distortion (THD), but also accurately captures phase displacement of each harmonic relative to the fundamental, with multi-order harmonic synchronous measurement capability. Test results can be intuitively displayed via data lists, vector diagrams, and other formats, enabling rapid problem identification and in-depth power quality analysis for clearer, more efficient harmonic evaluation.

Product Dimension







Technical Data Sheet

Model		N75525-350-105
AC Mode		
AC Output		
Output Voltage	Phase Voltage (single-phase)	0~350VAC
	Phase Voltage (split-phase)	0~350VAC
	Line Voltage (three-phase)	0~606VAC
	Line Voltage (reverse-phase)	0~700VAC
Output Current	RMS (Single-phase)	105A
	Crest Factor	5 (At output frequency of 50 Hz/60 Hz, maximum CF of 5 without exceeding peak current; under full current and full power conditions, maximum CF of 3)
	Peak (Single-phase)	315A
	RMS (three-phase/ reverse-phase/split-phase)	35A
	Peak (three-phase/ reverse phase/split-phase)	105A
Output Power max(AC)	Split-Phase	8.3kVA(20Hz~500Hz)；7kVA（1Hz~19.99Hz）
	Reverse-Phase	16.6kVA
	Single-Phase/Three-Phase	25kVA（20Hz~500Hz）；21kVA（1Hz~19.99Hz）
Output Power max (AC+DC)	Split-Phase	5kVA
	Reverse-Phase	10kVA
	Single-Phase/Three-Phase	15kVA
Voltage Setting		
Range	Single-Phase/ Three-Phase/Split-Phase	0~350VAC
	Reverse-Phase	0~700VAC
Resolution		0.01VAC
Accuracy	1Hz~19.99Hz	＜0.01%+0.1%F.S.
	20Hz~500Hz	
Temp. Drift Coefficient		＜100ppm/℃ F.S.
DC Offset Voltage		＜0.02Vdc (Output voltage set to 220VAC, tested under no-load conditions)
Current Setting		
Range	RMS (single-phase)	105A
	RMS (three-phase/ reverse-phase/split-phase)	35A
Resolution		0.01A
Accuracy	1Hz~19.99Hz	＜0.1%+0.2% F.S.
	20Hz~500Hz	＜0.2%+0.3% F.S.
Temp. Drift Coefficient		＜200ppm/℃ F.S.
Frequency		
Setting Range	Low Frequency	1Hz~19.99Hz
	High Frequency	20Hz~500Hz
Setting Resolution		0.01Hz
Setting Accuracy	1Hz~19.99Hz	0.01%F.S.
	20Hz~500Hz	
Waveform Synthesis	50/60Hz	≤50th order
Phase		
Setting Range		0~360°
Setting Resolution		0.01°
Accuracy		0.1°(1Hz~199.99Hz)；0.3°（200Hz~500Hz)

DC Power Mode		
Voltage Output		
Output Range	Single-Phase	-500~500V DC
	Reverse-Phase	-1000~1000V DC
	Split-Phase	-500~500V DC
Resolution		0.01V
Accuracy		＜0.01%+0.05%F.S.
Temp. Drift Coefficient		＜100ppm/℃ F.S.
Current Output		
Output Range	Single-Phase	-105~105A DC
	Reverse-Phase	-35~35A DC
	Split-Phase	-35~35A DC
Resolution		0.01A
Accuracy		＜0.1%+0.2% F.S.
Temp. Drift Coefficient		＜200ppm/℃ F.S.
Power Output		
Total Power	Single-Phase	25kW
	Reverse-Phase	16.6kW
	Split-Phase	8.3kW
Programmable Impedance		
Resistance Setting Range	Three-Phase	0~1000mΩ
	Single-Phase	0~333.333mΩ
	Reverse-Phase	0~2000mΩ
	Split-Phase	0~1000mΩ
Inductance Setting Range	Three-Phase	0~1000μH
	Single-Phase	0~333.333μH
	Reverse-Phase	0~2000μH
	Split-Phase	0~1000μH
RLC Load		
Active Power (P) Setting Range		Three-Phase 0~8.3kW/Single-Phase 0~25kW/Reverse-Phase 0~16.6kW
Inductive Reactive Power (QL)		Three-Phase 0~8.3kVar/Single-Phase 0~25kVar/Reverse-Phase 0~16.6kVar
Capacitive Reactive Power (QC)		Three-Phase 0~8.3kVar/Single-Phase 0~25kVar/Reverse-Phase 0~16.6kVar
Resistance Setting Range		Three-Phase 1~1000Ω/Single-Phase 0.333~333.333Ω/Reverse-Phase 2~2000Ω
Inductance Setting Range		Three-Phase 1~5000mH/Single-Phase 0.333~1666.666mH/Reverse-Phase 2~10000mH
Capacitance Setting Range		Three-Phase 0.001~5mF/Single-Phase 0.003~15mF/Reverse-Phase 0.0005~2.5mF
Voltage Stability		
Line Regulation		＜0.05% F.S.
Load Regulation		＜0.05% + 0.05% F.S.
THD		＜0.5%（1Hz~100Hz）；＜1%（100.01Hz~500Hz）(Test conditions: pure resistive load, full power)
Voltage Ripple	RMS	＜0.4V (Oscilloscope AC coupling with 20MHz bandwidth limitation)
Dynamic Response		1ms (Measured in DC mode with DUT capacitance ≤10μF)
Voltage Rise Rate		≥ 2V/μs (Full-scale voltage variation, AC tested with >5Hz square wave under medium-speed loop)
Output Isolation		Input to ground: 1500VAC <20mA; Input to output: 3000VAC <20mA; Output to ground: 1000VDC <5mA; 3-phase output phase-to-phase: 500VAC <20mA

AC Power (Readback)		
Voltage Range		0~350V
Resolution		0.01V
Voltage Accuracy		＜0.01%+0.1%F.S.
Temp. Drift Coefficient		＜100ppm/℃ F.S.
Current Range (RMS)		0~105A
Resolution		0.01A
Current Accuracy	1Hz~19.99Hz	＜0.1%+0.2% F.S.
	20Hz~500Hz	＜0.2%+0.3% F.S.
Temp. Drift Coefficient		＜200ppm/℃ F.S.
Current Range (Peak)		0~315A
Resolution		0.01A
Accuracy		＜0.3%+0.6% F.S.
Power Resolution		0.001kW
Power Accuracy		＜0.4%+0.4% F.S.
Harmonic Simulation/Analysis	50/60Hz	50th order
Regenerative Capability		
Maximum Regenerative Power		25kVA
Output Current ITHD		＜5%(ratio of harmonic component sum to fundamental component)
Others		
Efficiency		91%
Protection Functions		OVP、OCP、OPP、OTP、SOCP、MF、Sense
Communication Interface		Standard: USB/CAN/LAN/RS232/RS485; Optional: GPIB (RS232 conversion)
Input Parameters		3-phase 340VAC~480VAC, 47Hz~63Hz, ≤70A
Power Factor		0.99 [1]
Temperature Range		0℃~40℃
Operating Environment		Altitude: <2000m; relative humidity: 5%~90% (no condensation); operating air pressure: 80~110kPa
Programming Response Time		1ms
Sense Compensation Voltage		Maximum compensation voltage: 20V
Dimensions		132.0mm(H)*482.0mm(W)*755.0(D)(with shield)
Net Weight		42kg

Note 1: Input: 380VLL/50Hz, Output: three-phase, 350Vrms/50Hz/full power per phase. Tested at rated output power with purely resistive load.

Note 2: For other specifications, please contact NGI.

Note 3: All specifications are subject to change without notice.