ZGX SERIES
AC/DC POWER SOURCE & LOAD

The ZGX series is a compact, modular, and fully integrated AC/DC source and electronic load. It utilizes a SiC-based, interleaved topology to achieve an effective switching frequency of 160kHz. The unit is equipped with comprehensive simulation capabilities for power electronics, including grid simulation, regenerative AC/DC loading, BiPolar DC power supply operation, regenerative RLC loading, and power amplification for Hardware-in-the-Loop (HIL) testing.

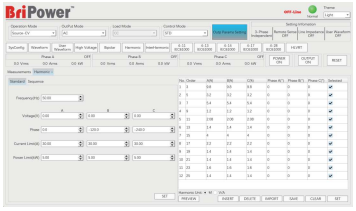
A single ZGX unit provides a maximum rated output power of 22.5kW within a compact 4U chassis with only 670mm depth design. It supports power expansion through a master-slave parallel interface. Its output capabilities are as follows: In AC mode, it can deliver up to 450V(L-N), 35A per phase, with a frequency range from DC to 1kHz. In DC mode, it can output 636V and 105A.

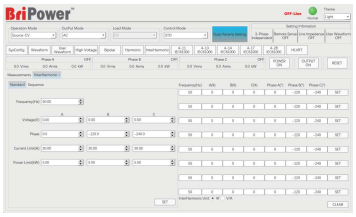
Features

- Single-phase and selectable three-phase 208V, 230V, 380V, 400V (L-L) input
- AC, DC, and AC+DC output
- 4-Quadrant Operation
- Regenerative AC/DC source and load
- Regenerative RLC /RCD electronic load
- BiPolar DC power supply
- Single-phase/three-phase/split-phase/reverse-phase/multi-channel output, each phase independently controllable
- Up to 100th harmonic waveform generation
- Supports low/high voltage ride-through and continuous fault ride-through
- Programmable phase angle jump
- Current-limiting output for short-circuit testing
- TTL trigger signal output with voltage or frequency changes
- Line impedance (RL) simulation
- Fast dynamic response
- High voltage output mode
- True current source
- User-defined waveforms
- Soft-start function, suppresses inrush current
- Low leakage current (<10mA)
- Compact design (67 cm depth), suitable for desktop installation
- Modbus/SCPI communication
- Standard LAN interface
- USB interface on the front panel for file transfer
- Remote Sense
- Fault localization
- Remote emergency stop interface

Harmonic and inter-harmonic waveforms generation

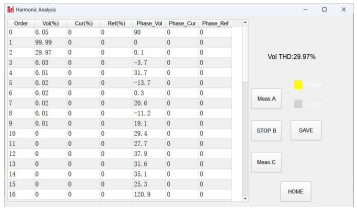
The ZGX series utilizes a dual-DSP control architecture, delivering exceptional waveform generation capabilities that enable precise simulation of harmonics and inter-harmonics. Users can independently configure the amplitude and phase for up to the 100th harmonic relative to a 50Hz or 60Hz fundamental frequency, allowing flexible creation of various periodic distorted test waveforms. To enhance testing efficiency, the series also incorporates 30 preset harmonic distortion waveforms for quick user access, significantly streamlining the configuration process for complex test environments.





Harmonic Analysis

Supports real-time harmonic analysis of output voltage and current for each individual phase (A/B/C). The system provides precise measurements of individual harmonic content (%), phase angles, and Total Harmonic Distortion (THD).



User defined waveform

The ZGX series offers a flexible user-defined waveform function, supporting high-precision import and editing of waveforms with lengths of 1024, 2048, and 4096 points. This feature provides four waveform processing modes: full, 1/4 symmetric, symmetric, and asymmetric, and enables generation of harmonic and vector waveforms based on user-defined inputs. Edited waveform data can be saved and exported at any time, facilitating subsequent invocation and sharing.

High Voltage Mode

The ZGX series offers a High Voltage Mode that doubles the output voltage range compared to standard operation. This mode utilizes the unit's reverse phase output capability, with the phase angle between two outputs set to a 180-degree shift. In AC mode, it delivers 900V L-N from a 450V L-N range; in DC mode, it provides 1272V output based on a 636V range, meeting higher voltage testing requirements.

Regenerative Electronic Load

The ZGX Series power supplies integrate regenerative AC and DC elec tronic load functionality. In AC load mode, four operating modes are pro vided: Constant Resistance (CR), Constant Current (CC), Constant Power (CP), and Rectification. Constant Resistance (CR) mode can simulate three-phase resistive loads, allowing users to set resistance values for each phase individually and supporting sequence simulation function.

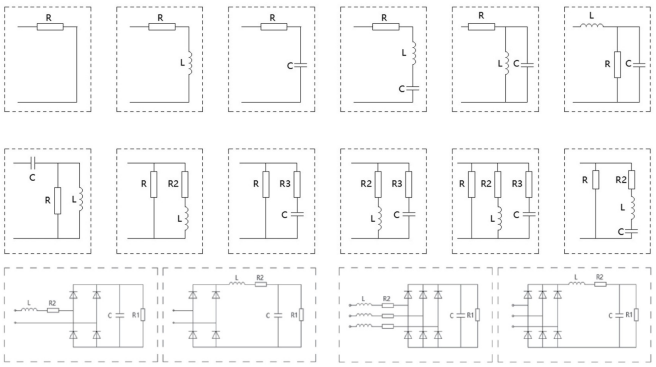
In CC Mode, it supports current and phase angle configuration, with a phase angle range of -360° to +360° to accurately simulate a full range of leading or lagging capacitive and inductive load characteristics; it also supports User-Defined Waveform input for advanced simulation of complex non-linear current loads. In CP Mode, the system utilizes a control architecture based on the independent and direct configuration of Active Power (P) and Reactive Power (Q), enabling intuitive and efficient four-quadrant power decoupled control. Rectification mode is suitable for non linear rectifier load testing, supporting pa rameter configuration under CC or CP mode, and allowing users to set the WF (waveform factor) parameter (range: 0-2.121, CF=WF*1.414)

In DC load mode, Constant Current (CC) and Constant Power (CP) operat ing modes are supported, featuring sequence simulation function, along with configurable output impedance and minimum operating voltage.

RLC/RCD Load

The ZGX series offers advanced RLC load simulation functionality, capable of accurately simulating complex impedance loads composed of resistance (R), inductance (L), and capacitance (C), thereby realistically replicating complex load conditions. The system supports 12 classic RLC topological structures and features independent per-phase programming capability, allowing R, L, and C parameters to be configured individually for each phase. Users can flexibly construct diverse load models according to testing requirements, making it suitable for a wide range of testing scenarios including three-phase power supplies, renewable energy inverters, motor drives, and grid simulation.

In addition, the ZGX provides four types of RCD nonlinear load simulation functions, designed specifically for performance testing and reliability evaluation of devices such as UPS systems, inverter power supplies, and frequency converters. It enables accurate simulation of the dynamic characteristics of nonlinear loads, comprehensively verifying the response performance and stability of the equipment under test in harsh real-world operating conditions.



BiPolar DC Power Supply

The ZGX series supports bipolar DC output functionality, offering both two-port and three-port connection modes to accommodate diverse testing and application requirements.

In two-port mode, users can flexibly select any two phases from the ABC three-phase system as output terminals and set their voltage polarity via software. For instance, phase A can be configured as the positive voltage output and phase B as the negative voltage output. The output polarity can be easily reversed by reconfiguring phase A as negative and phase B as positive, enabling rapid polarity switching.

In three-port mode, phase A serves as the positive voltage output terminal, phase B as the negative voltage output terminal, while the neutral terminals of phases A and B are connected together to serve as the protective earth (PE). This mode supports independent setting of positive and negative output voltages, allowing for either equal or unequal magnitude outputs, thus providing enhanced flexibility in voltage configuration.

High-Speed Dynamic Output Performance

The ZGX series delivers excellent dynamic output performance, with a voltage slew rate greater than 3V/μs and a current slew rate exceeding 0.5A/μs, making it suitable for test applications that require stringent dynamic response.

In DC voltage mode under no-load conditions, both the rise time from 0V to 636V and the fall time from 636V to 0V are less than 200μs. In current mode, the rise time from 0A to 90% of full scale (FS) and the fall time from 90%FS to 0A are each within 120μs.

The ZGX series is designed to meet the rigorous demands of high dynamic testing applications.

Low Leakage current

The ZGX power supply series features low leakage current. Under three-phase 220V (L-N) output conditions, the unit's ground leakage current remains below 10 mA, complying with international and domestic safety standards including IEC 60364-7-722, UL 2231, GB/T 18487.1-2023, and IEC 62752.

This characteristic makes it suitable for electric vehicle onboard charger (OBC) testing, as well as the testing and validation of various highly sensitive electrical equipment. It effectively prevents unintended tripping of RCD protection circuits, ensuring safe and stable testing operations.

Power Hardware-in-the-Loop

The ZGX series operates in four-quadrant mode with an output frequency range from DC to 1 kHz and a small-signal bandwidth of 10 kHz, featuring rapid dynamic response capabilities. An optional analog programming interface (Model: EXDA) is available, providing an output response time of less than 20 µs. Its performance meets the technical requirements for power amplifiers in Power Hardware-in-the-Loop (PHIL) testing applications, making it suitable for such scenarios.

EXDA Analog & Digital IO Extension Box

EXDA Analog & Digital IO Extension Box is an expansion interface unit designed for the BriPower ZGX series power supplies, developed to extend system capabilities in communication, control, and measurement.

The unit offers 8 analog input channels, 4 analog output channels, 4 digital input channels, 4 digital output channels, 3 LAN ports, and 2 COM communication interfaces, with support for functional customization. Analog channels provide a sampling rate of 500kHz and signal transmission delay below 20µs. All interfaces are electrically isolated to ensure signal integrity and system reliability.

In Power Hardware-in-the-Loop(PHIL) applications, EXDA amplifies analog input signals for realtime emulation, driving the ZGX power supply to reproduce corresponding voltage or current waveforms. It simultaneously monitors actual output via analog output channels, enabling closedloop test validation. The unit is suitable for realtime simulation and testing in applications such as renewable energy grid integration, motor drive emulation, and microgrid systems.

Power Expansion

The ZGX series supports master-slave parallel operation for power expansion. A single standard ZGX unit delivers up to 22.5 kW, and the system supports parallel connection of up to 10 units of the same model.Beyond the standard ZGX units (15kW, 20kW, and 22.5kW) which support parallel operation of up to 10 units, we offer factory-configured highpower systems. These systems integrate up to ten 15kW/20kW/22.5kW power modules under a single centralized controller. This architecture allows for secondary expansion, enabling up to 10 of these integrated systems to be paralleled for massive power requirements.

COMTRADE Waveform Playback

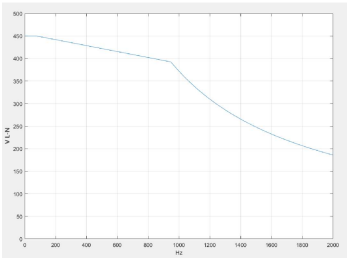
Supports importing standard COMTRADE format files (.cfg and .dat), analyzes transient waveform data and controls the power supply to output corresponding analog voltage/current signals in AC CV/CC mode. It allows users to customize the mapping between signal channels in configuration files and power output phases for flexible signal routing, and set scaling factors for waveform data - the system converts the values in COMTRADE files into voltage/current signals for output in proportion to the set factors. Features include adjustable output scaling factors/ sampling periods, waveform zoom in/out, pan, and one-click reset controls for flexible simulation requirements.

Combined Split-Phase Mode

The -CSP option for the ZGX series enables a high-efficiency power scaling mode for split-phase requirements with simplified connectivity. It aggregates the internal three-phase outputs of an individual unit for current multiplication, pairing it with a second ZGX unit at a 180° phase offset. This configuration delivers a high-power split-phase output (L1-L2-N) suitable for heavyduty testing.

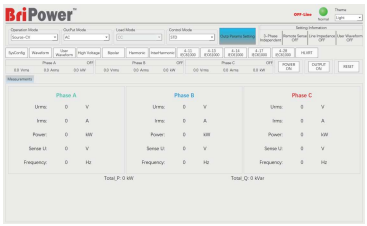
Voltage Derating vs. Frequency

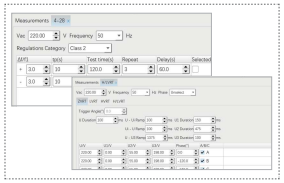
The ZGX series delivers a 450V rated output up to 100Hz, derating to 400V at 800Hz, 385V at 1kHz, and 185V at 2kHz (-HF option) as frequency increases.

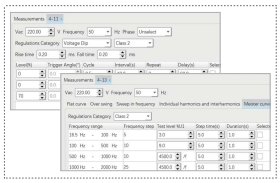


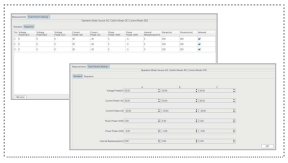
User-Friendly GUI Software

The ZGX series comes standard with a graphical user interface (GUI) software that enables remote control, programming communication, and real-time monitoring. The software provides functions including system configuration, output mode and parameter settings, data measurement, and waveform display. It also integrates test items with IEC 61000-4-11, IEC 61000-4-13, IEC 61000-4-17, and IEC 61000-4-28 standards, and supports high-voltage and lowvolt-age ridethrough (HVRT/LVRT) testing.









Output Ranges

Model			ZGX 5	ZGX 15	ZGX 20	ZGX 22.5
Output Power Range			5KW	15KW	20KW	22.5KW
Output Voltage Range	AC Source and Load		0~450V L-N@0.01~100Hz; 0~400V L-N@100~800Hz; 0~385V L-N@800~1000Hz. 0~185V L-N@1k~2kHz (-HF option)			
	DC Source and Load		0~636V			
Output Current Range	AC Source and Load	Single-Phase Mode	0~30A	0~90A	0~105A	
		3-Phase Mode	-	0~30A/ph	0~35A/ph	
	DC Source and Load	Single Channel	-30A~30A		-35A~35A	
		Three Channels in Parallel	-90A~90A		-105A~105A	
High Voltage Mode - AC (Single-phase mode only)	Output Voltage Range		-	0~900V@0.01~100Hz; 0~800V@100~800Hz; 0~770V@800~1000Hz. 0~370V@1k~2kHz (-HF option)		
	Output Current Range		-	0~30A	0~35A	
High Voltage Mode - DC	Output Voltage Range		-	0~1272V		
	Output Current Range		-	-30A~30A	-35A~35A	
Bipolar DC Output	Output Voltage Range	Positive Voltage	-	636V		
		Negative Voltage	-	-636V		
	Output Current Range		-	-30A~30A	-35A~35A	

General Specifications

AC input	
Voltage	1ø, 220VL-N, 230VL-N; 3ø, 3P+GND, 380VL-L, 400VL-L
Frequency	47-63Hz
Efficiency	≥90%
Power Factor @ Rated Power	>0.99
THDi	<1%
Output	
Output Mode	AC, DC or AC+DC
Load Regulation	0.1%FS
Line Regulation	0.10%
AC Mode	
Frequency Range	0.01 ~ 1000Hz
Phase Angle	Phase B/C relative to phase A, 0.0~360.0°
THD	<0.5% @DC~400Hz; <1% @400~1000Hz (measured at 250VL-N, Resistive Load)
Harmonic Generation	100th@50/60Hz; 25th@400Hz
Voltage Slew Rate	≤3V/us
Current Slew Rate	≤0.4A/us
Small-Signal bandwidth	10kHz
Power Accuracy	0.2%FS
Voltage Accuracy	0.1%FS
Current Accuracy	0.4%FS(<30Hz); 0.2%FS(30~350Hz); 0.3%FS(350.01~500Hz); 0.3%+(0.7%*kHz)FS(500.01~1000Hz)
Frequency Accuracy	0.01%+0.01Hz
Phase Accuracy	<1° (@50Hz)
Power Resolution	0.001kW
Voltage Resolution	0.1V
Current Resolution	0.01A
Frequency Resolution	0.01Hz (~100Hz), 0.05Hz (>100Hz)
Phase Resolution	<0.1°
Leakage Current	<10mA @230V L-N
DC Mode	
Operating Mode	CV, CC, CP, CR, Bipolar DC Output
Voltage Accuracy	0.1%FS
Voltage Resolution	0.1V
Current Accuracy	0.1%FS
Current Resolution	0.01A
Voltage Ripple	0.1%FS

Measurement	
AC Source Measurement Accuracy	0.2%FS
AC Voltage Measurement Accuracy	0.1%FS
AC Current Measurement Accuracy	0.1%FS(<30Hz); 0.2%FS(30~350Hz); 0.1%+0.3%FS(350.01~500Hz); 0.3%+(0.7%*kHz)FS(500.01~1000Hz)
DC Voltage Measurement Accuracy	0.1%FS
DC Current Measurement Accuracy	0.1%FS
Frequency Measurement Accuracy	0.01%+0.01Hz
RLC/RCD Load	
R	Range: 0.1~1000Ω. Resolution: 0.1Ω. Accuracy: ±0.1%FS
L	Range: 0.01~500mH. Resolution: 0.01mH. Accuracy: ±0.1%FS
C	Range: 0.001~50mF. Resolution: 1uF. Accuracy: ±0.1%FS
Others	
Standard Interfaces	LAN
Protection	OVP, OCP, OPP, OTP
IP Ingress protection	IP21
Cooling	Forced Air Cooling
Temperature	Operating: 0~40℃ Storage: -20~85℃
Operating Humidity	20-90%RH (None Condensing)
Dimensions (W *D * H, mm)	440*670*178
Weight (kg)	ZGX 5: <40kg ZGX 15: About 47kg ZGX 20: About 50kg ZGX 22.5: About 50kg

1. When a single-phase input is used, the rated three-phase output power of the ZGX 15, ZGX 20, and ZGX 22.5 models is reduced to 5.0 kW, 6.6 kW, and 7.5 kW, respectively.
2. The optional 208/230V L-L, three-phase input is offered exclusively on the ZGX5 and ZGX15.

Options

-S	Slave Unit, only available for ZGX15 and ZGX20
-EXDA	Analog & Digital IO Extension Box
-HF	Expand the frequency to 2000Hz
-CSP	Combined Split-Phase Mode

AC Input Configuration

/380, Input Voltage 380VLL±10%, 3P+PE

/400, Input Voltage 400VLL±10%, 3P+PE

/480, Input Voltage 480VLL±10%, 3P+PE

/208, Input Voltage 208VLL±10%, 3P+PE

/230, Input Voltage 230VLL±10%, 3P+PE