Kewell

A2000

Bidirectional Programmable AC Power Supply

Introduction

01

Application

02

Specification

03

Comparison

04

Case

05

Introduction

01

Application

02

Specification

03

Comparison

04

Case

05

A2000 Bidirectional Programmable AC Power Supply

Version	Voltage Range	Current Range	Power Range
Low voltage (Old)	0-450V	0~342A	45kVA-225kVA
Low voltage (New)	0-470V	0~800A	100kVA-500kVA
High voltage	0-900V	0~400A	100kVA-500kVA

Introduction

01

Application

02

Specification

03

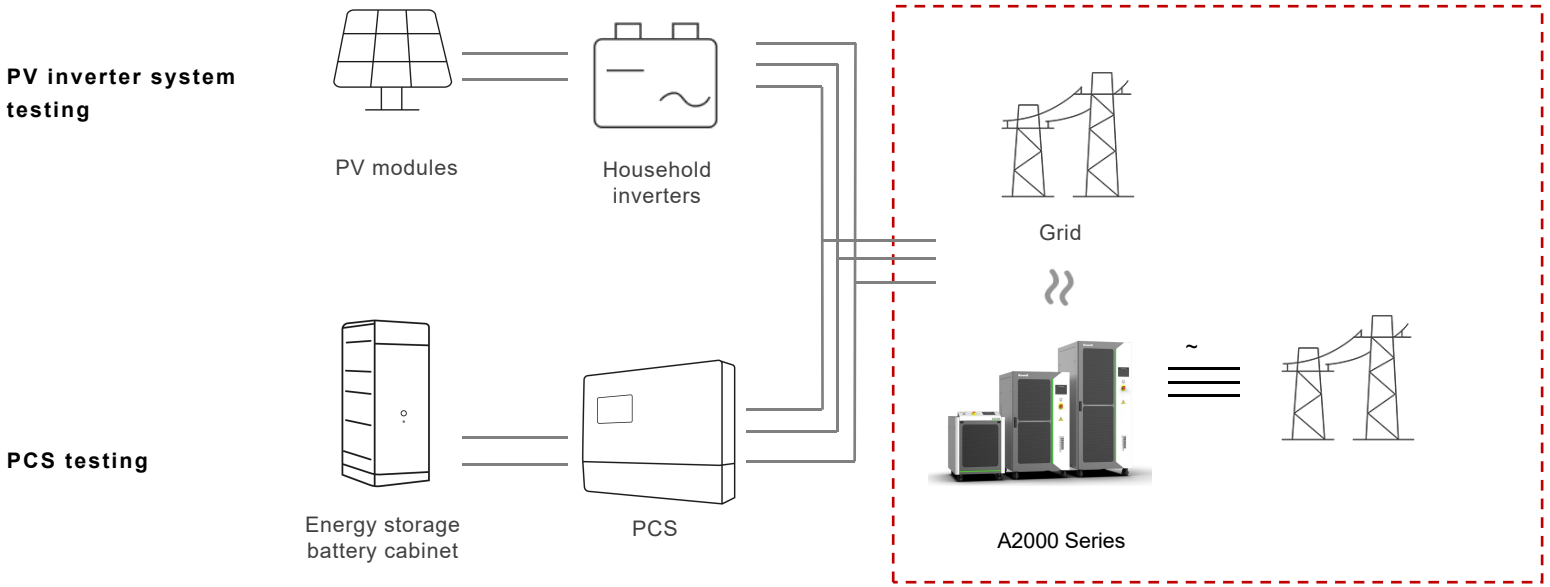
Comparison

04

Case

05

PV & Energy Storage Testing



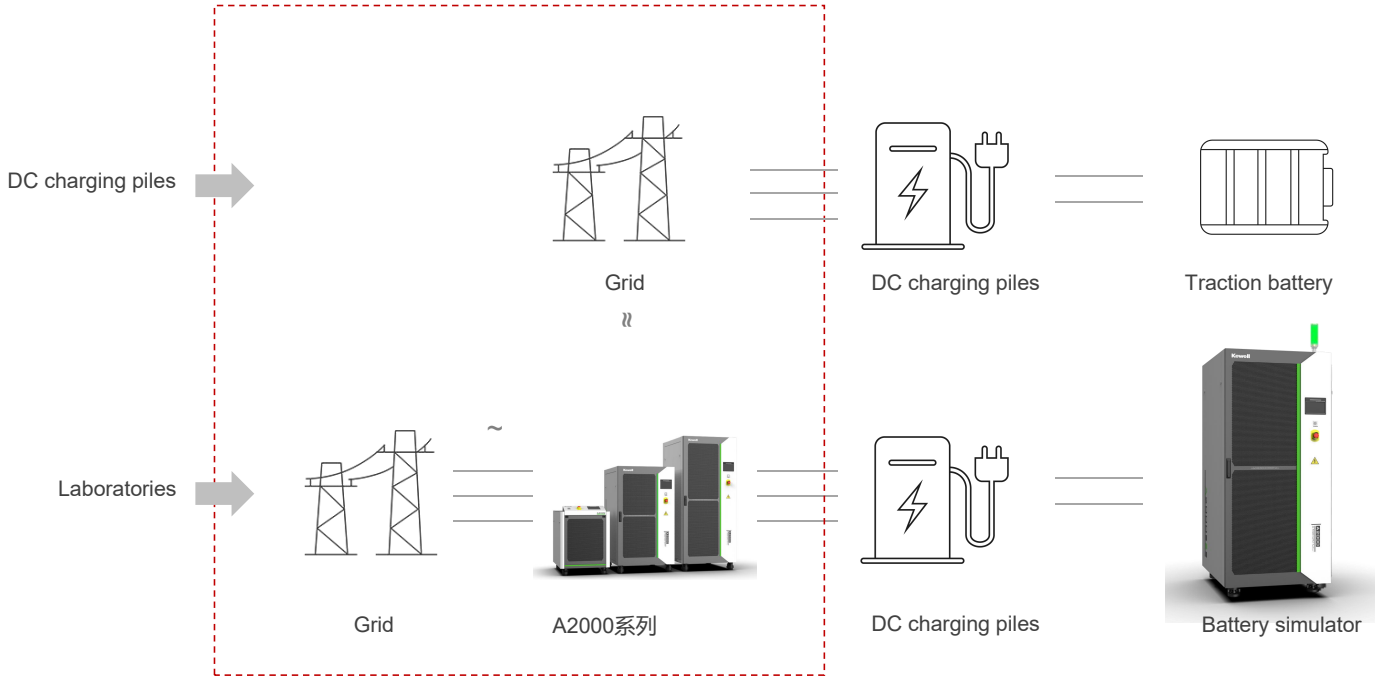
Grid simultor for different voltage level of DUT

Grid power quality

Grid voltage changes

Grid voltage drops

DC Charging Pile Testing



Grid voltages of different countries and regions

Grid power quality

Grid voltage changes

V2G testing

AI Server Power Rack Test

A2000 Series Bi-directional
Programmable AC
Source-Load System

Power Shelf Rack

E5100PG Series
Programmable
DC Electronic Load

or

D2000 Series Bi-directional
Programmable DC
Source-Load System

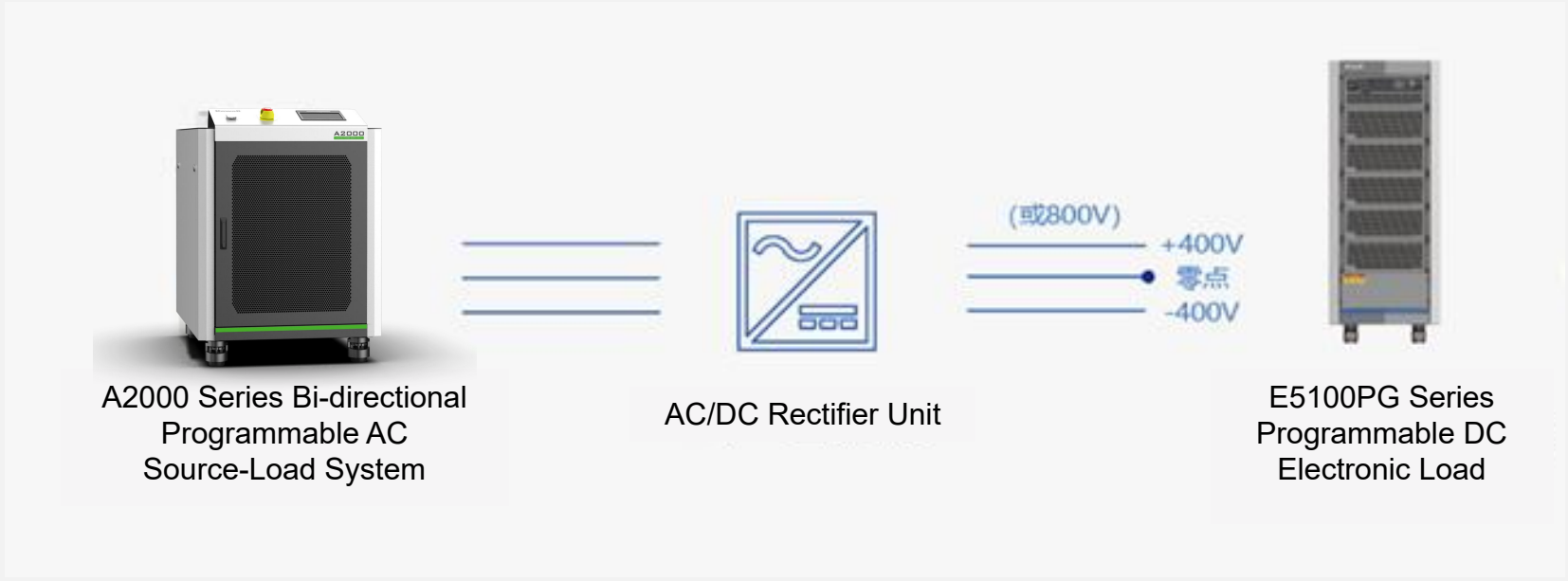
Grid voltages of different countries and regions

Grid power quality

Grid voltage changes

Grid frequency fluctuations

AI Server Power HVDC Test



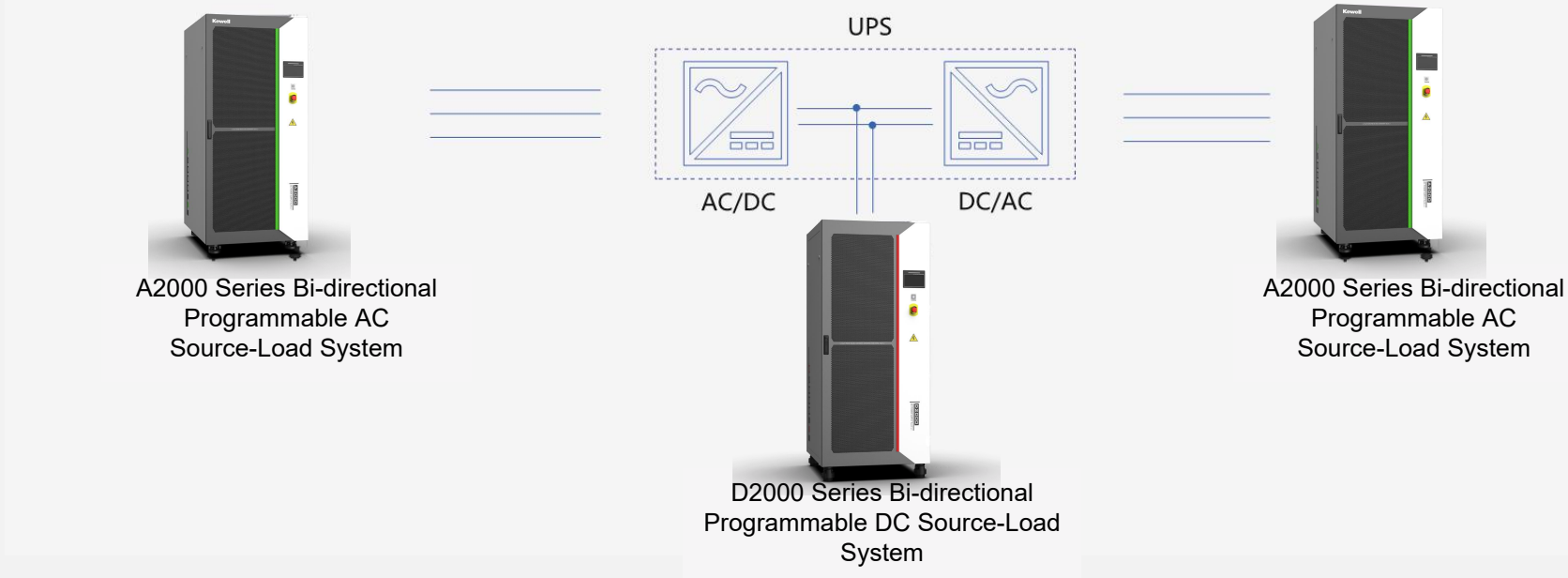
Grid voltages of different countries and regions

Grid power quality

Grid voltage changes

Grid frequency fluctuations

UPS Test



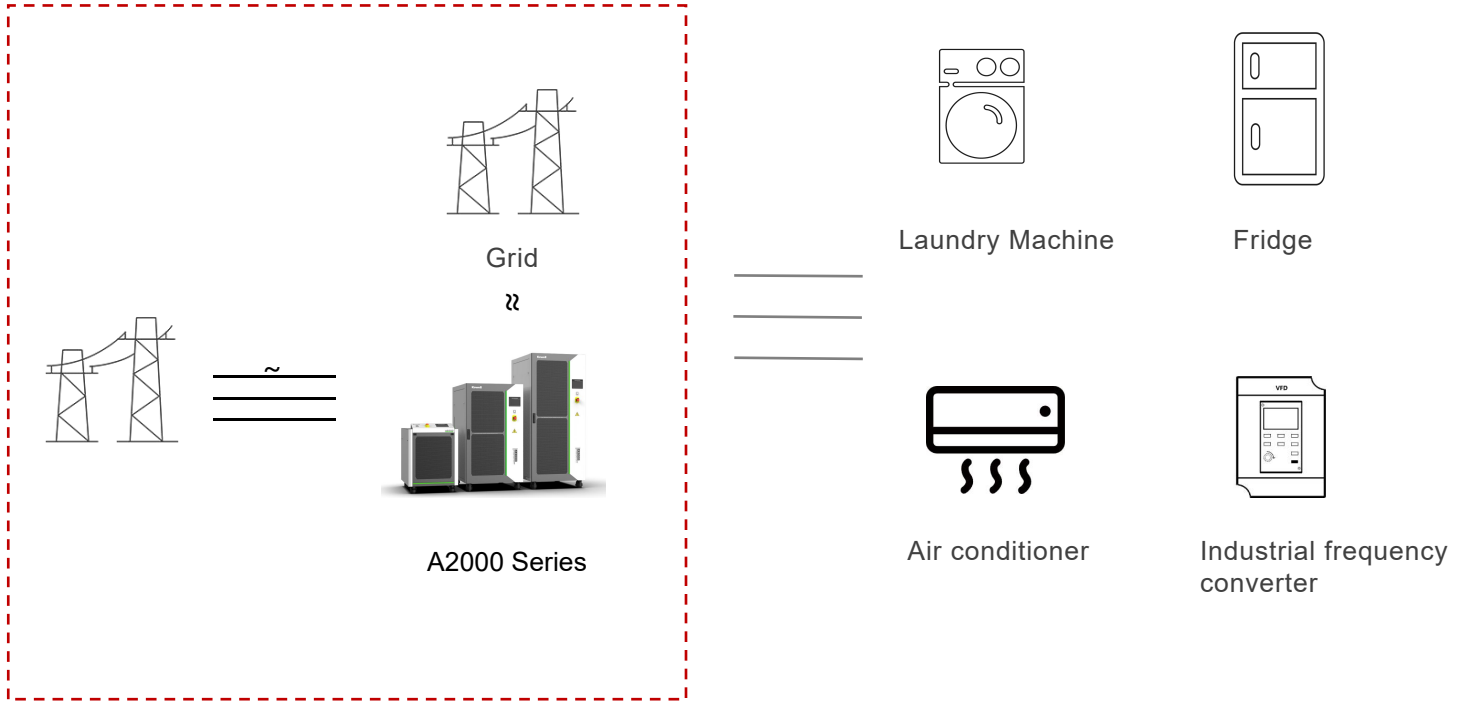
Grid voltages of different countries and regions

Grid power quality

Grid voltage changes

Grid frequency fluctuations

More Applications



Grid voltages of different countries and regions

Grid frequency change

Anomaly in Grid

Introduction

01

Application

02

Specification

03

Comparison

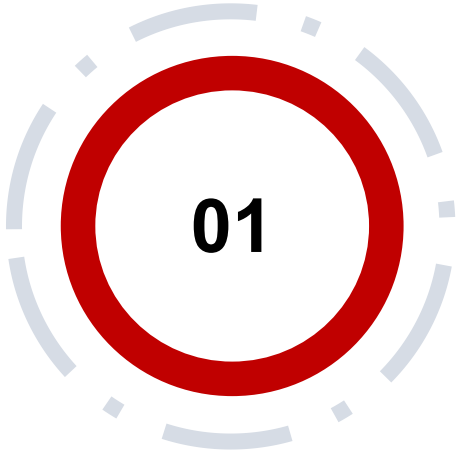
04

Case

05

Why choose KEWELL?

Kewell



Smaller size

Under the same power output, the equipment's volume is reduced by approximately 50%, and its weight is decreased by about 70%. This significantly saves laboratory space and installation costs.

Higher efficiency

Faster test speed, higher energy utilization rate, with an efficiency of up to 93.7%.

Better performance

Faster test speed, higher energy utilization rate, with an efficiency of up to 93.7%. Voltage change rate (1V/μs) can simulate more severe transient events in the power grid.

More reliable service

The modular design and the provision of more industry-specific localized services and technical support enable us to respond quickly to your unique requirements.

Wider Testing Range

Kewell

Model	Rated power [kVA]	Voltage range [V] (L-N)	Rated current [A]	Dimensions (W*D*H) [mm]	Weight [kg]
A2000NG/PG-45K-450-90	45	0~450	90	700*1000*970	270
A2000NG/PG-75K-450-114	75	0~450	114	700*1000*970	270
A2000NG/PG-150K-450-228	150	0~450	228	850*1050*1525	505
A2000NG/PG-225K-450-342	225	0~450	342	850*1050*2000	765

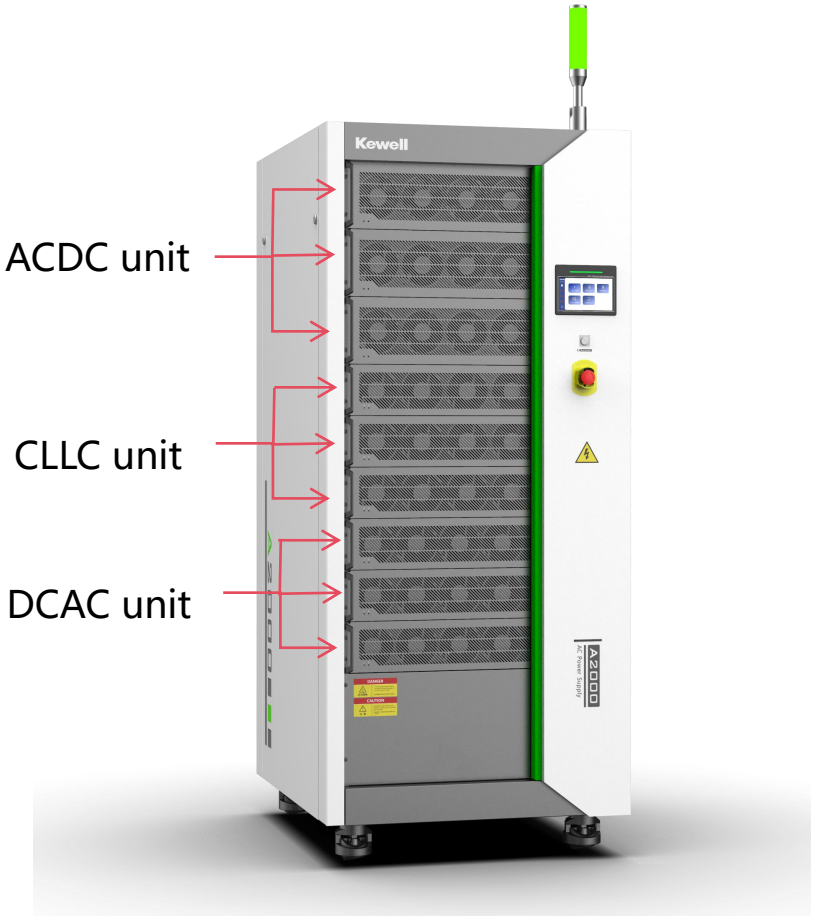
NEW

Model	Rated power [kVA]	Voltage range [V] (L-N)	Rated current [A]	Dimensions (W*D*H) [mm]	Weigh t [kg]
A2000NG-100K-470-160	100	0~470	160	700*1000*970	260
A2000NG-200K-470-320	200	0~470	320	850*1050*1525	460
A2000NG-300K-470-480	300	0~470	480	850*1050*2000	712
A2000NG-400K-470-640	400	0~470	640	850*1050*2000	830
A2000NG-500K-470-800	500	0~470	800	850*1050*2000	1000

Model	Rated power [kVA]	Voltage range [V] (L-N)	Rated current [A]	Dimensions (W*D*H) [mm]	Weigh t [kg]
A2000NG-100K-900-80-HV	100	0~900	80	700*1000*970	260
A2000NG-200K-900-160-HV	200	0~900	160	850*1050*1525	460
A2000NG-300K-900-240-HV	300	0~900	240	850*1050*2000	677
A2000NG-400K-900-320-HV	400	0~900	320	850*1050*2000	830
A2000NG-500K-900-400-HV	500	0~900	400	850*1050*2000	1000

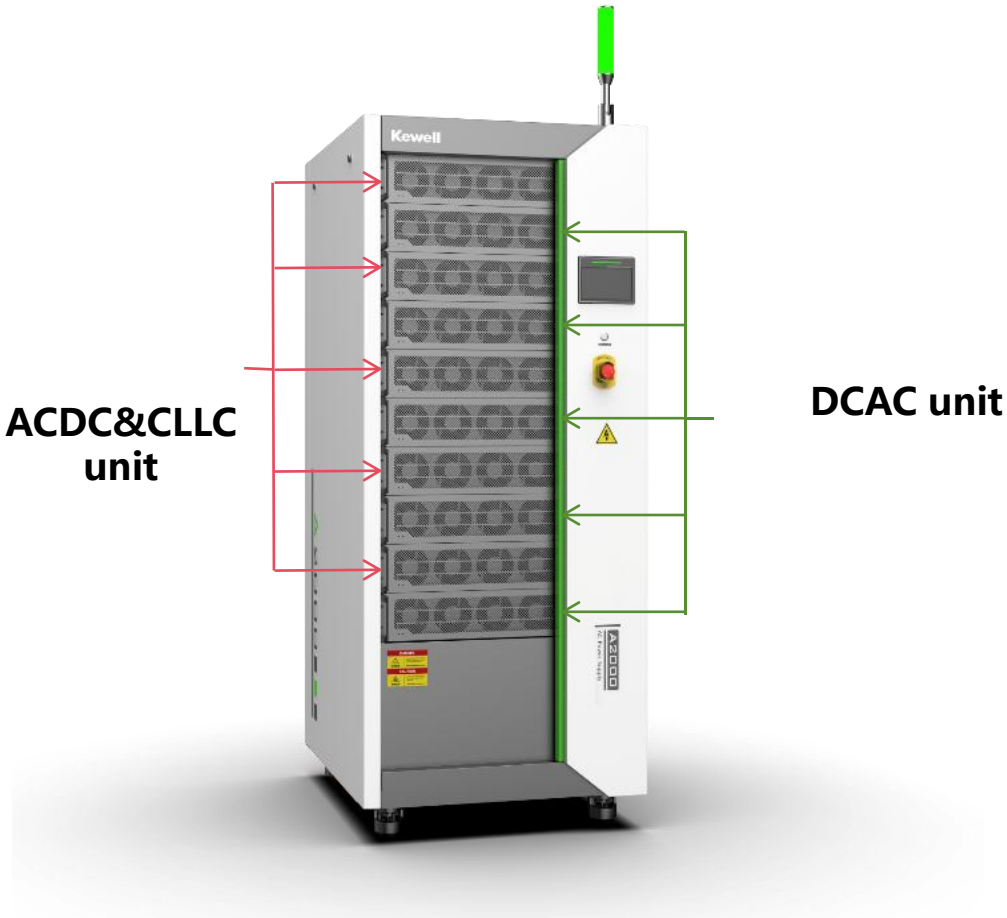
Structure Difference

A2000-450V



- Each module 75kVA.
- Up to 225kVA for single device.

A2000-470V & A2000-900V



- Each module 100kVA.
- Up to 500kVA for single device.

High Power Density

Compare with the same power rating of 100 kVA

X Brand

1120KG

X brand

260KG

Kewell

Volume reduce

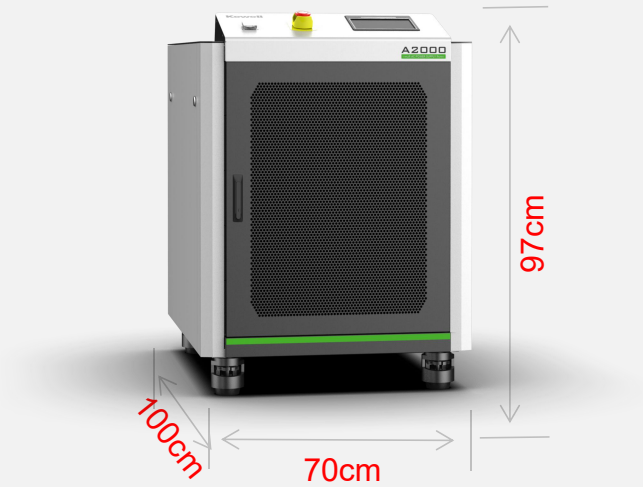
200%

Weight reduce

430%

Max. power density

294kVA/m³



Kewell

Product Highlights

MORE PRECISE AND CONVENIENT

Modularized Design

Users can replace faulty modules on their own, no need of returning the equipment to factory.

Remove faulty modules and the equipment will run normally, avoiding affecting test efficiency

Only 10 minutes to replace one module.

Introduction-A2000(450V)

MORE PRECISE AND CONVENIENT

NORMAL	Fundamental, Cost-effective
PRO	Fully-featured, Multi-scenario

		Normal	Pro
Functions	AC source	●	●
	AC load	×	●
	Communication interfaces RS485/LAN	●	●
Output parameters	Voltage accuracy	±0.1%F.S.	
	Frequency range	40~70 Hz.	
	Output THD	< 0.5%@50Hz/60Hz no-load < 1%@50Hz/60Hz Linear Load	
	Min. transition time (10%-90%Umax)	< 800μs	
	Current accuracy	±0.1%RD+0.2%F.S.	
	Harmonic range	50 Harmonic order@50Hz/60Hz	
	Voltage slew rate	AC > 1V/μs	

	Power/kVA	Voltage/V	Current/A
Low voltage	45-225	0-450	0~342

Introduction-A2000(470V & 900V)

MORE PRECISE AND CONVENIENT

		Normal
Functions	AC source	●
	AC load	●
	RLC load	●
	DC output	Optional
	Communication interfaces	RS485/LAN
Output parameters	Voltage accuracy	±0.1%F.S.
	Frequency range	40~70 Hz.
	Output THD	< 0.5%@50Hz/60Hz no-load < 1%@50Hz/60Hz Linear Load
	Current accuracy	±0.1%RD+0.2%F.S.
	Harmonic range	60 Harmonic order (max 3000Hz)
	Voltage slew rate	AC > 1V/μs

NEW

	Power/kVA	Voltage/V	Current/A
Low voltage	100-500	0-470	0~800
High voltage	100-500	0-900	0~400

Comparing with 75K series(470Vac)

MORE PRECISE AND CONVENIENT

Model	A2000-75k（450Vac）	A2000-100k（470Vac）	A2000-100k（900Vac）
Power Range	45kVA~225kVA 4types	100kVA~500kVA 5types	100kVA~500kVA 5types
Voltage Range	L: 0~450Vac (L-N)	L: 0~470Vac (L-N)	L: 0~900Vac (L-N)
Current	342A(max)	800A(max)	400A(max)
Output Frequency	40~70Hz	40~70Hz	40~70Hz
Dimensions(W*D*H)[mm]	700*1000*970@45kVA,75kW 850*1050*1525@150kW 850*1050*2000@225kW	700*1000*970@100kVA 850*1050*1525@200kVA 850*1050*2000@300kVA ,400kVA,500kVA	700*1000*970@100kVA 850*1050*1525@200kVA 850*1050*2000@300kVA ,400kVA,500kVA
Output	AC	AC / DC / AC+DC	AC / DC / AC+DC
Programming	List/Pulse/Step, Harmonic&Interharmonic, HVRT&LVRT, Unbalance, Flickering, Transient	List/Pulse/Step, Harmonic&Interharmonic, HVRT&LVRT, Unbalance, Flickering, Transient,	List/Pulse/Step, Harmonic&Interharmonic, HVRT&LVRT, Unbalance, Flickering, Transient,
Load Function	CC,CR,CP,List	CC,CR,CP,List,RLC,PQ	CC,CR,CP,List,RLC,PQ

Specification (communication)

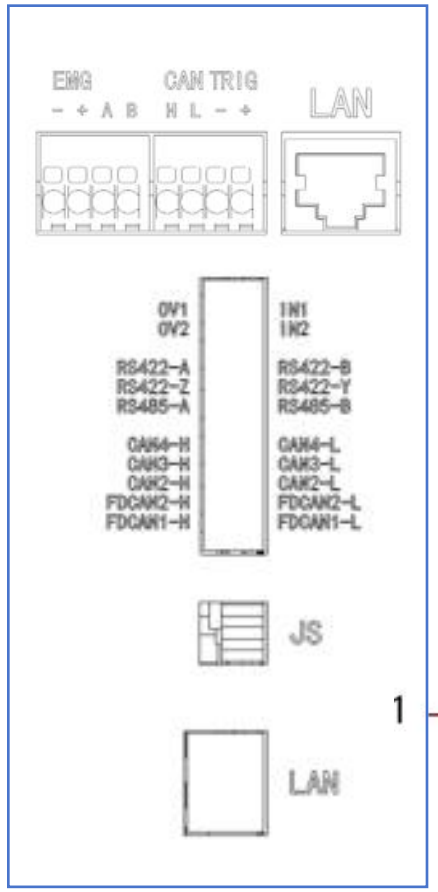
1.EMG:External emergency stop

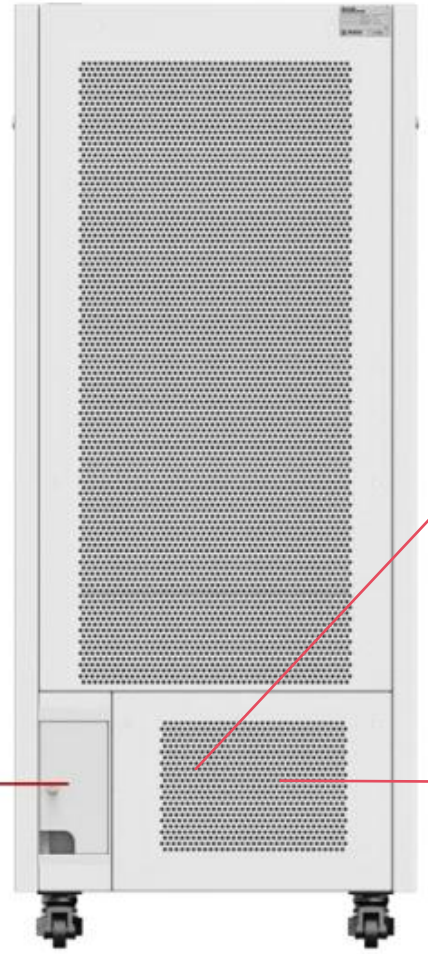
3.LAN:Communication interface

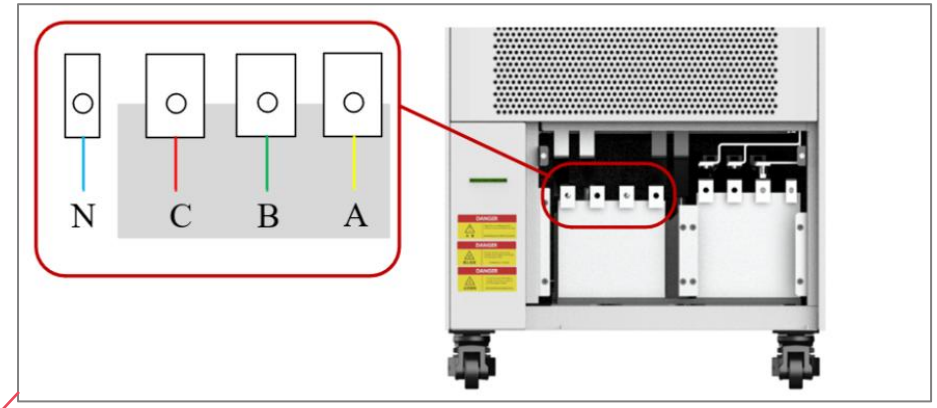
4.JS / TRIG:Level inversion signal

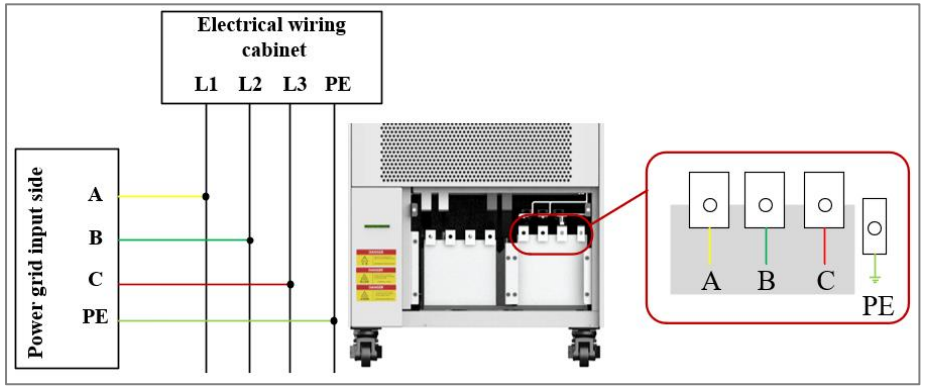
5.RS485:Communication interface

6.RXD/TXD:Multiplexing optical fiber interface



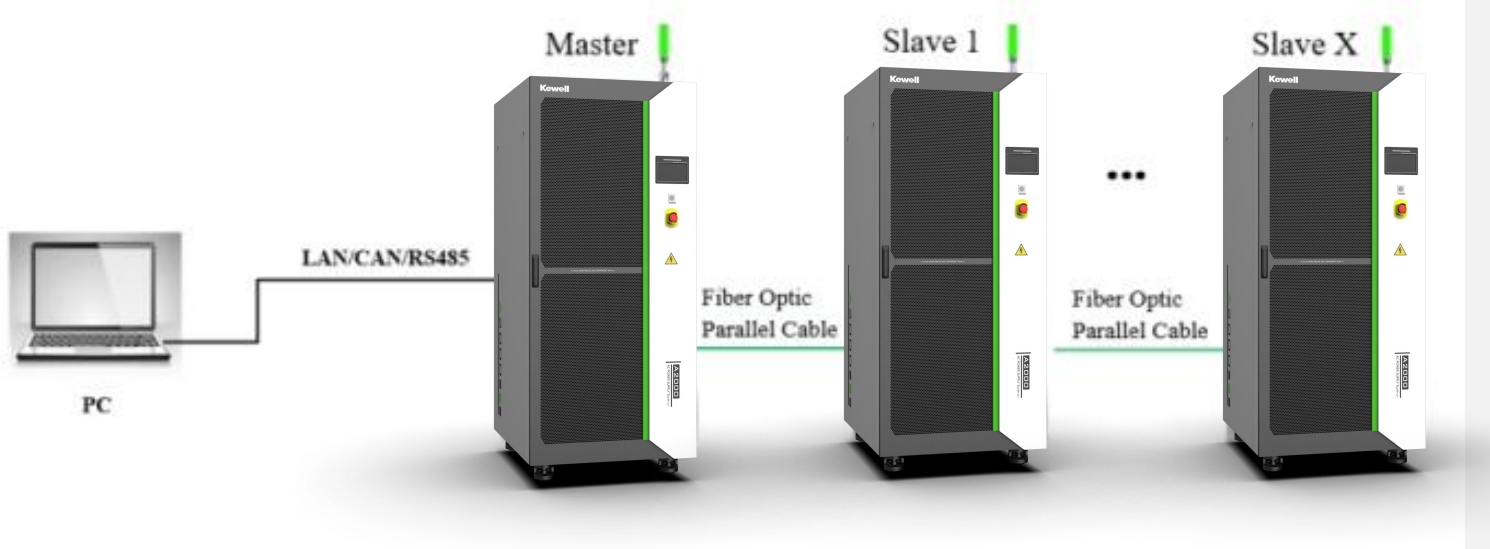






Specification (parallel)

Fiber Parallel Connection



Refer to the fiber interface connection above for parallel communication connection. Define one cabinet as the master and the rest will be the slave(s).

Connection

1. Connect two sets of equipment using the fiber optic parallel interface for paralleling communication.

2. Connect the LAN communication cable to the master for remote communication.

3. The maximum that can be achieved is the connection of up to 6 machines with a capacity of 500kVA, resulting in a total power of 3MW.

Standards

Distributed network has clear requirements for grid-connected generation equipment, such as:

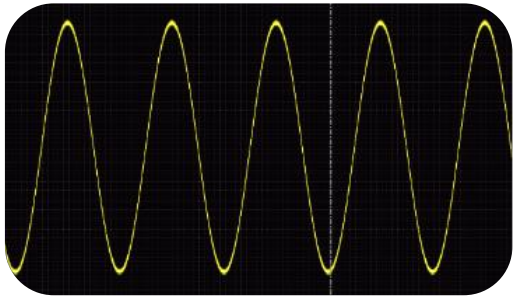
No.	Items	Regulations
1	Continuous operating voltage range	EN 50549-1:2019 4.4.4 IEEE 1547.1-2020 5.4.2&5.4.3 NB/T 32008-2018 8.3.4
2	Requirements on voltage and frequency protection	EN 50549-1:2019 4.9.3 IEEE 1547.1-2020 7.2&7.3 VDE-AR-N 4105:2011 6.5.2 NB/T 32008-2018 9.1.2@9.2
3	Power response to voltage changes	EN 50549-1:2019 4.7.2&4.7.3 IEEE 1547.1-2020 5.14.4&5.14.5&5.14.6&5.14.9&5.14.10 NB/T 32008-2018 8.3.3&8.3.5.3
4	Low-voltage ride through (LVRT)	EN 50549-1:2019 4.5.3 IEEE 1547.1-2020 5.4.4 NB/T 32008-2018 8.3.5.1.1
5	High-voltage ride through (HVRT)	EN 50549-1:2019 4.5.4 IEEE 1547.1-2020 5.4.7 NB/T 32008-2018 8.3.5.1.2
6	Operating frequency range	EN 50549-1:2019 4.4.2 IEEE 1547.1-2020 5.5.1&5.5.2 NB/T 32008-2018 8.3.6

Standards

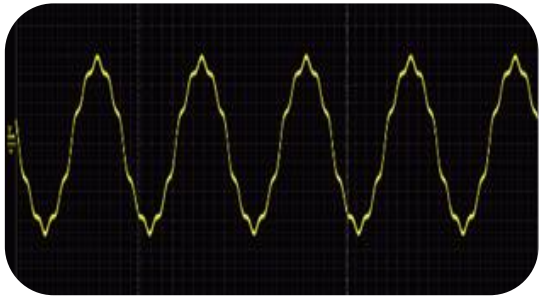
Distributed network has clear requirements for grid-connected generation equipment, such as:

No.	Items	Regulations
7	Power response to overfrequency /underfrequency	EN 50549-1:2019 4.6.1&4.6.2 IEEE 1547.1-2020 5.15.2&5.15.3 VDE-AR-N 4105:2011 5.7.3.3&5.7.3.4 NB/T 32008-2018 8.3.2
8	Voltage fluctuations & flickering adaptability	NB/T 32008-2018 8.3.7.4 VDE-AR-N 4105:2011 5.4.2&5.4.3 GB/T 12326
9	Harmonics adaptability	NB/T 32008-2018 8.3.7.1 VDE-AR-N 4105:2011 5.4.4 GB/T 14549
10	Inter-harmonics adaptability	NB/T 32008-2018 8.3.7.2 VDE-AR-N 4105:2011 5.4.4 GB/T 24337
11	3-phase voltage unbalance adaptability	NB/T 32008-2018 8.3.7..3 VDE-AR-N 4105:2011 5.4.5 IEEE 1547.1-2020 5.4.5 GB/T 15543
12	Open phase	IEEE 1547.1-2020 5.11 NB/T 32004-2018 9.3.2
13	Automatic reconnection after tripping	EN 50549-1:2019 4.10.2 NB/T 32008-2018 9.8

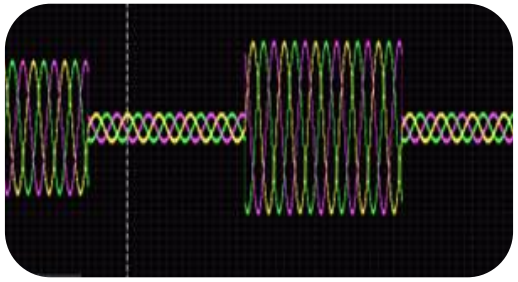
Typical Waveforms



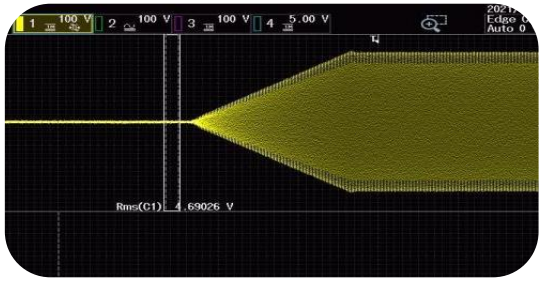
Simulation of power grids in different countries and regions



Harmonic superposition



HVRT & LVRT

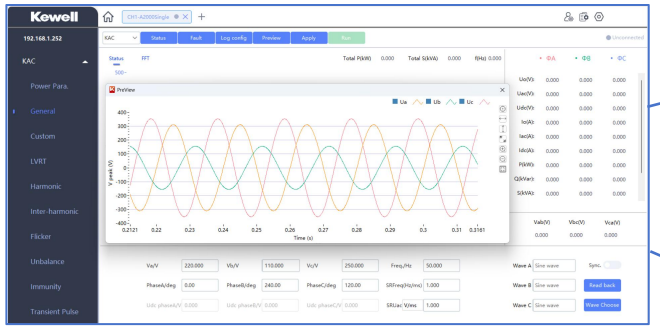


Frequency fluctuations

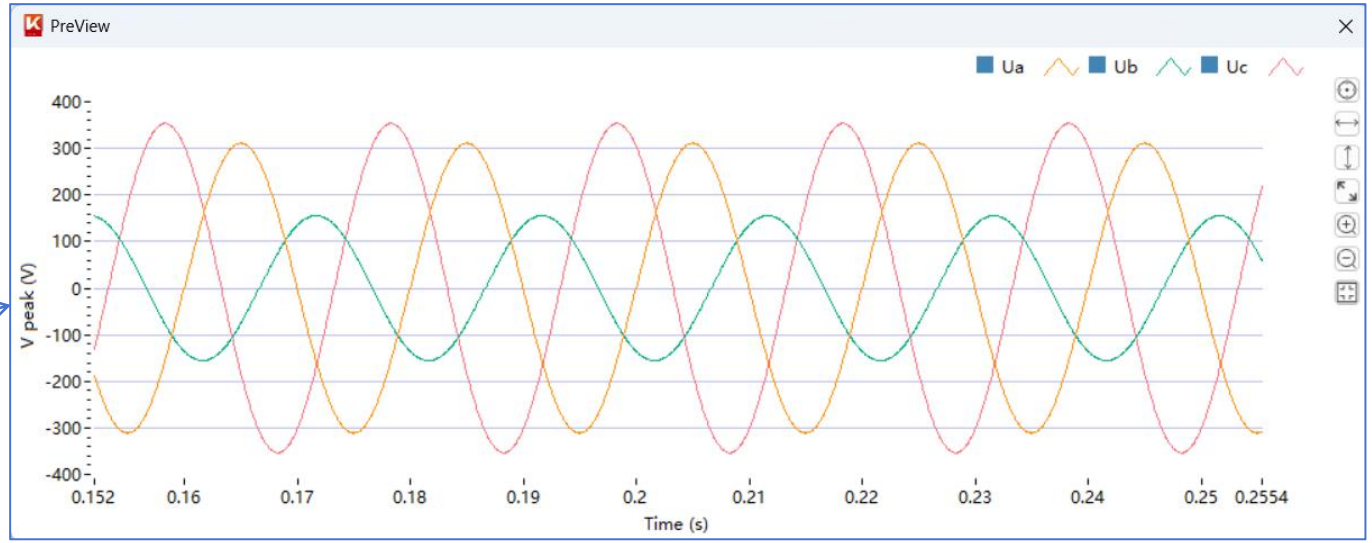
Grid Simulation

1. Simulate grid voltages of different countries and regions
2. Simulate deterioration of grid power quality
3. Simulate grid voltage changes
4. Simulate grid frequency fluctuations

Product Function(AC power supply)



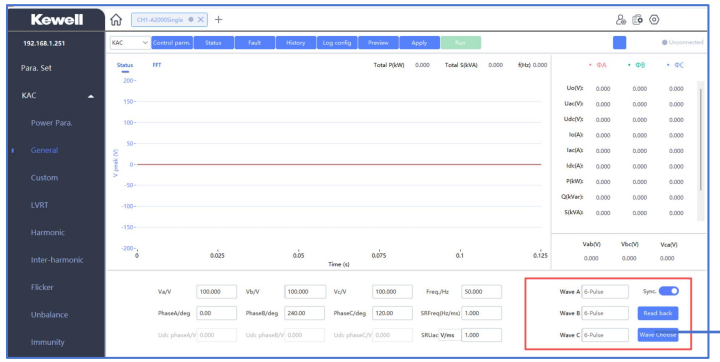
Three-phase independent mode



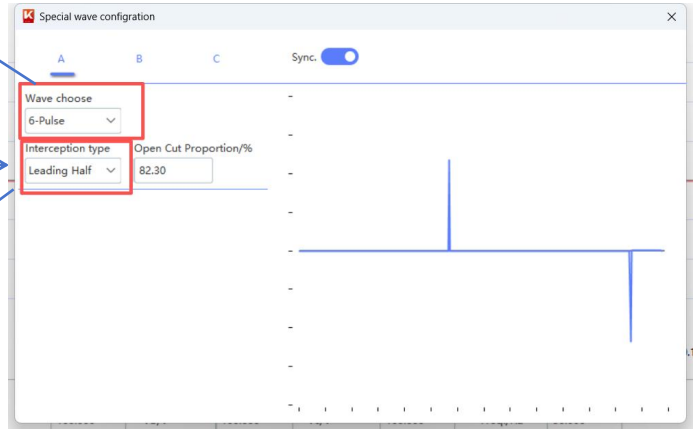
This mode currently supports two output modes: single-phase output and three-phase output. It can provide AC output type. When outputting AC, it can also support independent three-phase output and three-phase synchronous output.

Product Function(AC power supply)

Optional Function

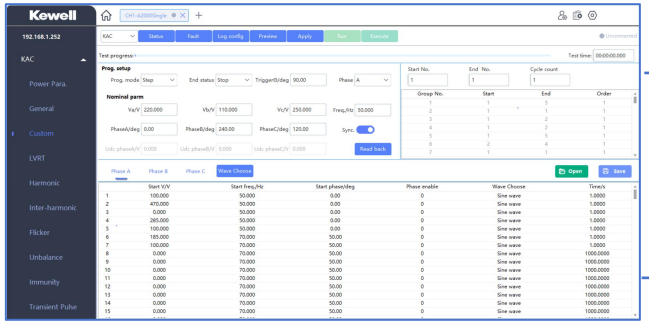


Three-phase independent mode

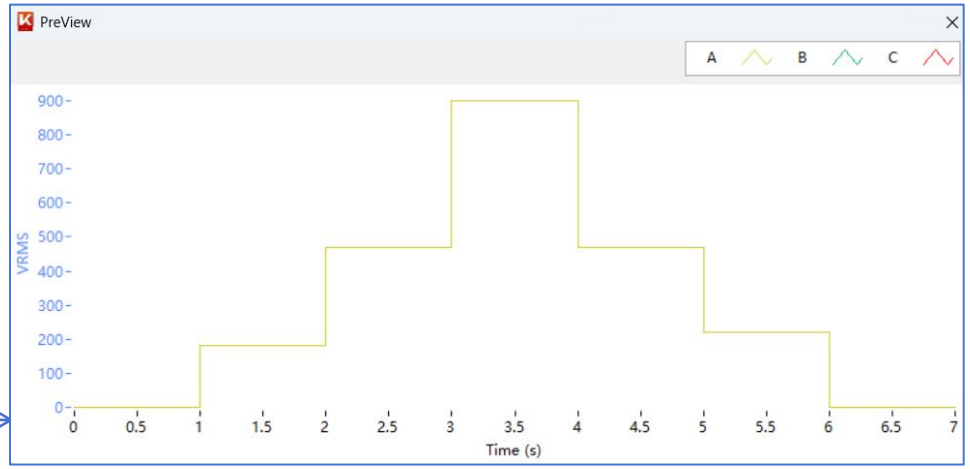


In the communication source mode, the custom waveform function can be selected. In this mode, the output waveform can be set, such as sine wave, clipped sine wave, and other types of waveforms. At the same time, the output waveform can also be adjusted, such as "prehalf", "leading half", etc.

Product Function(Programming Modes)

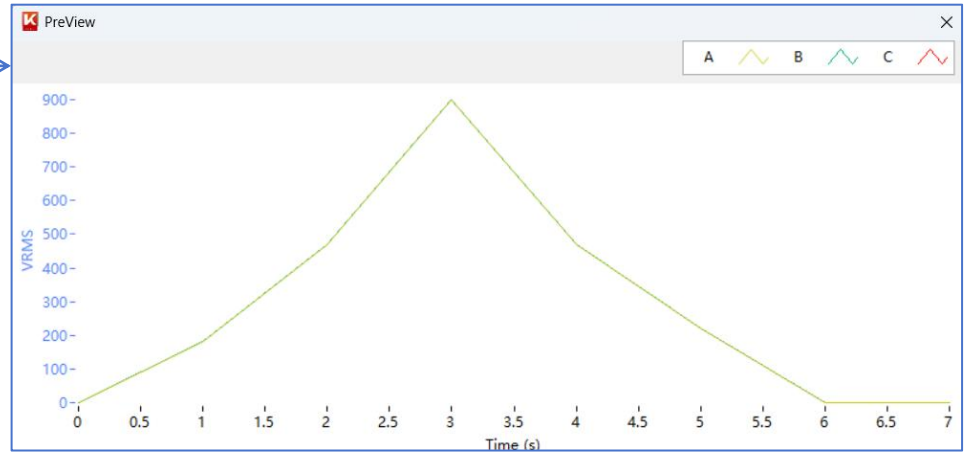


Step mode



180-470-900-470V-220V step change of voltage

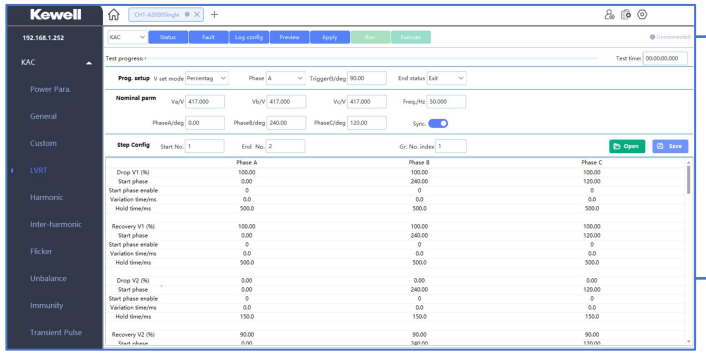
Gradient mode



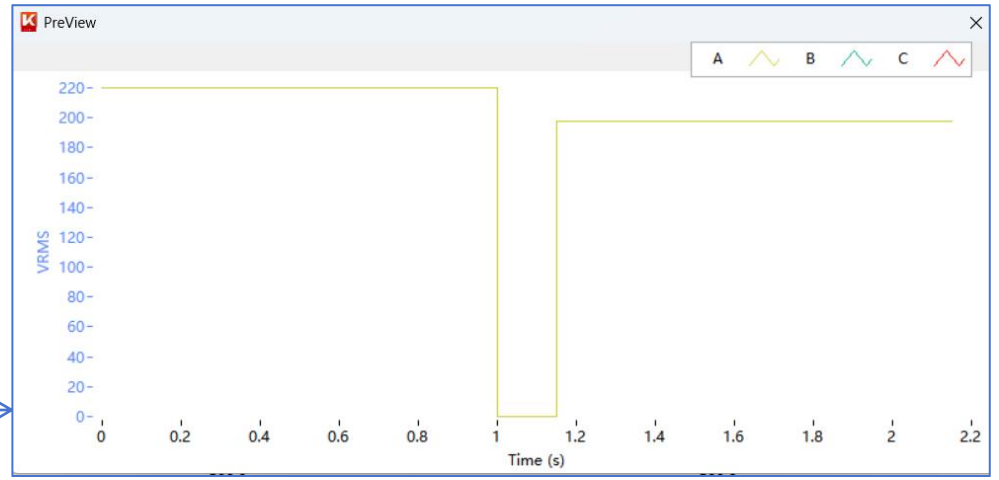
180-470-900-470V-220V gradient change of voltage

Product Function(Voltage Ride-through)

voltage of 417V

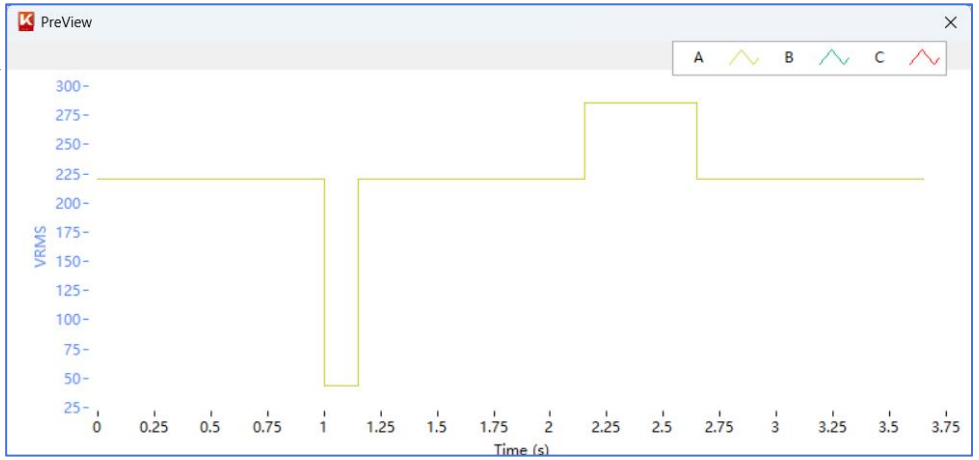


ZVRT



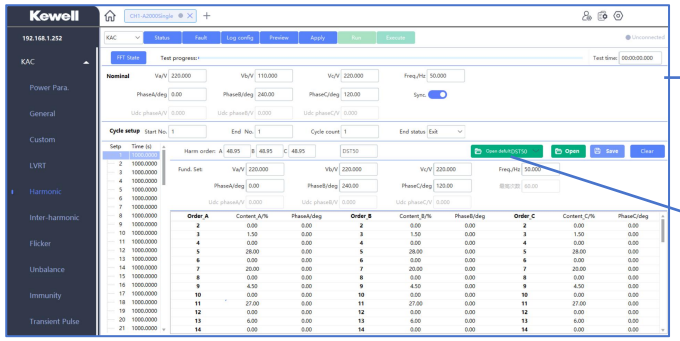
The voltage dropped to 0 for 150 ms and recovered to 90% of the rated voltage in 2 seconds.

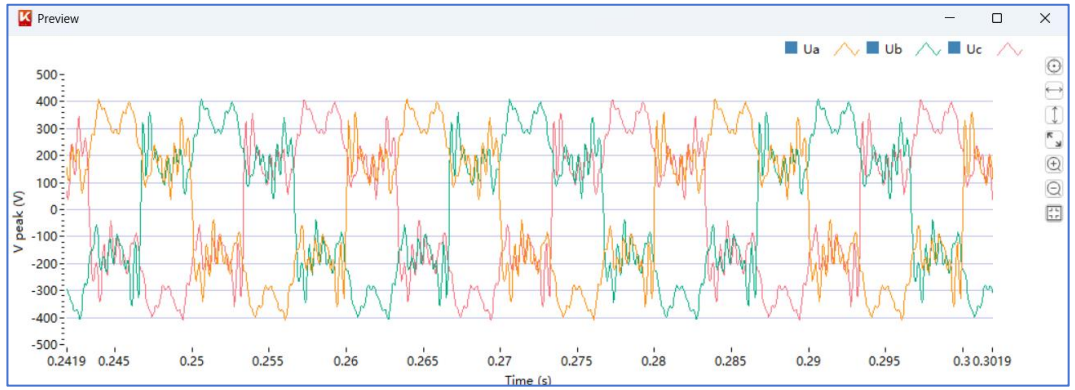
LVRT , HVRT



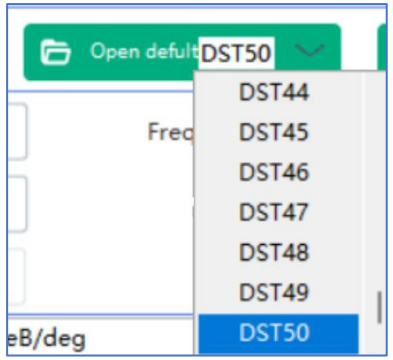
Nominal voltage of 220V, LVRT at 20%, HVRT at 130%

Product Function(Harmonic / Inter-harmonics Superposition)

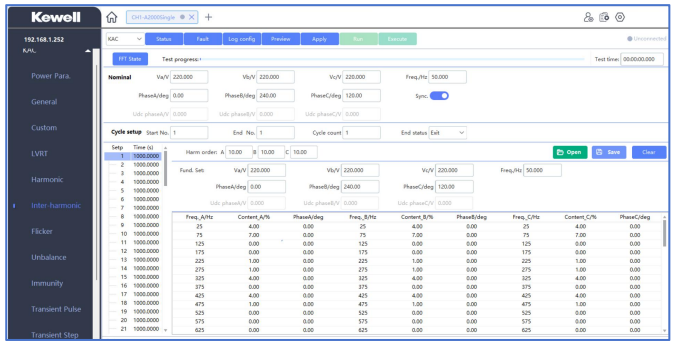


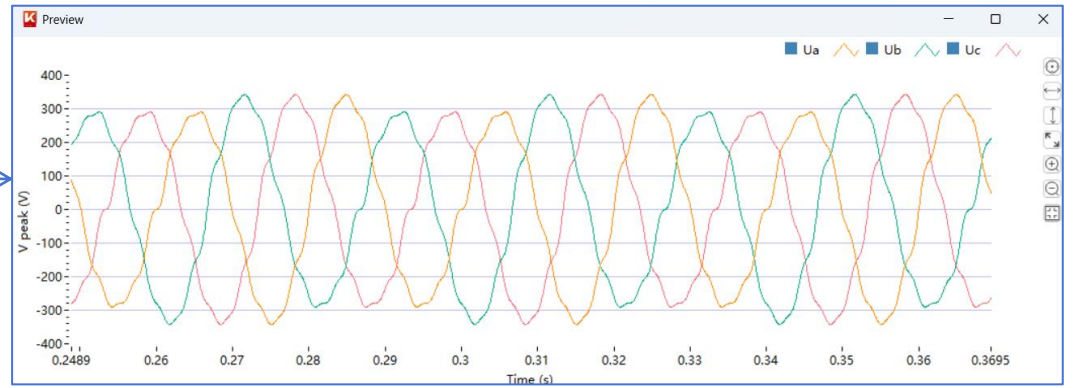


Harmonic superposition



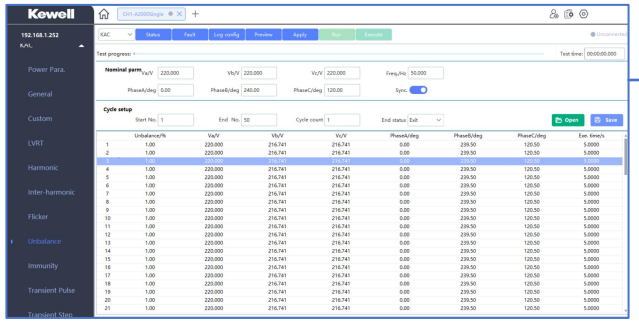
Equipped with fifty types of waveforms, which can be used by customers.



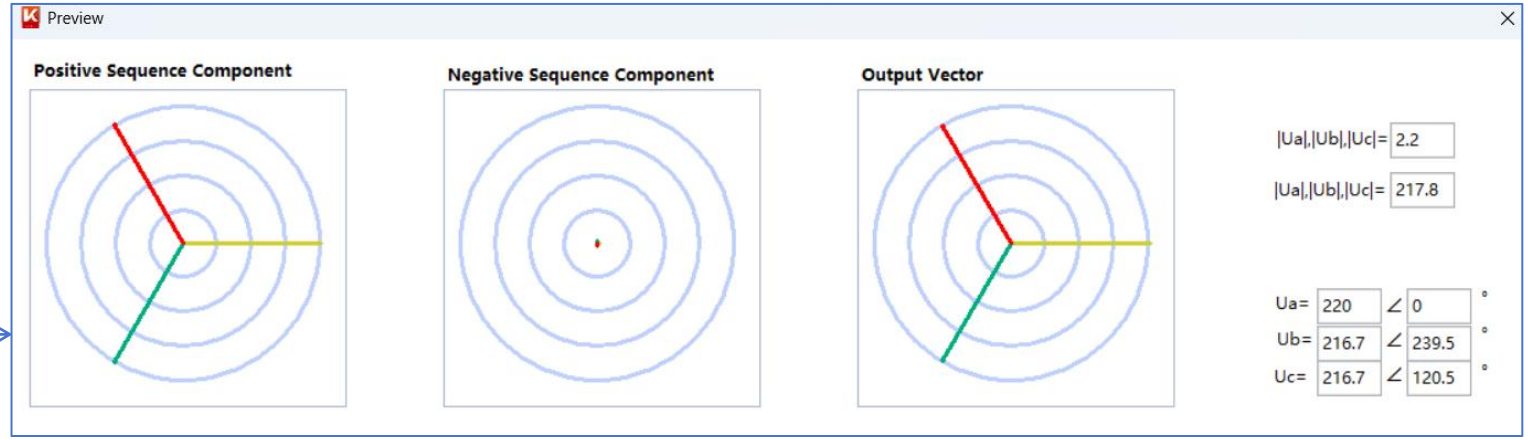


Inter-harmonic content =10%

Product Function(Three-phase Unbalance)



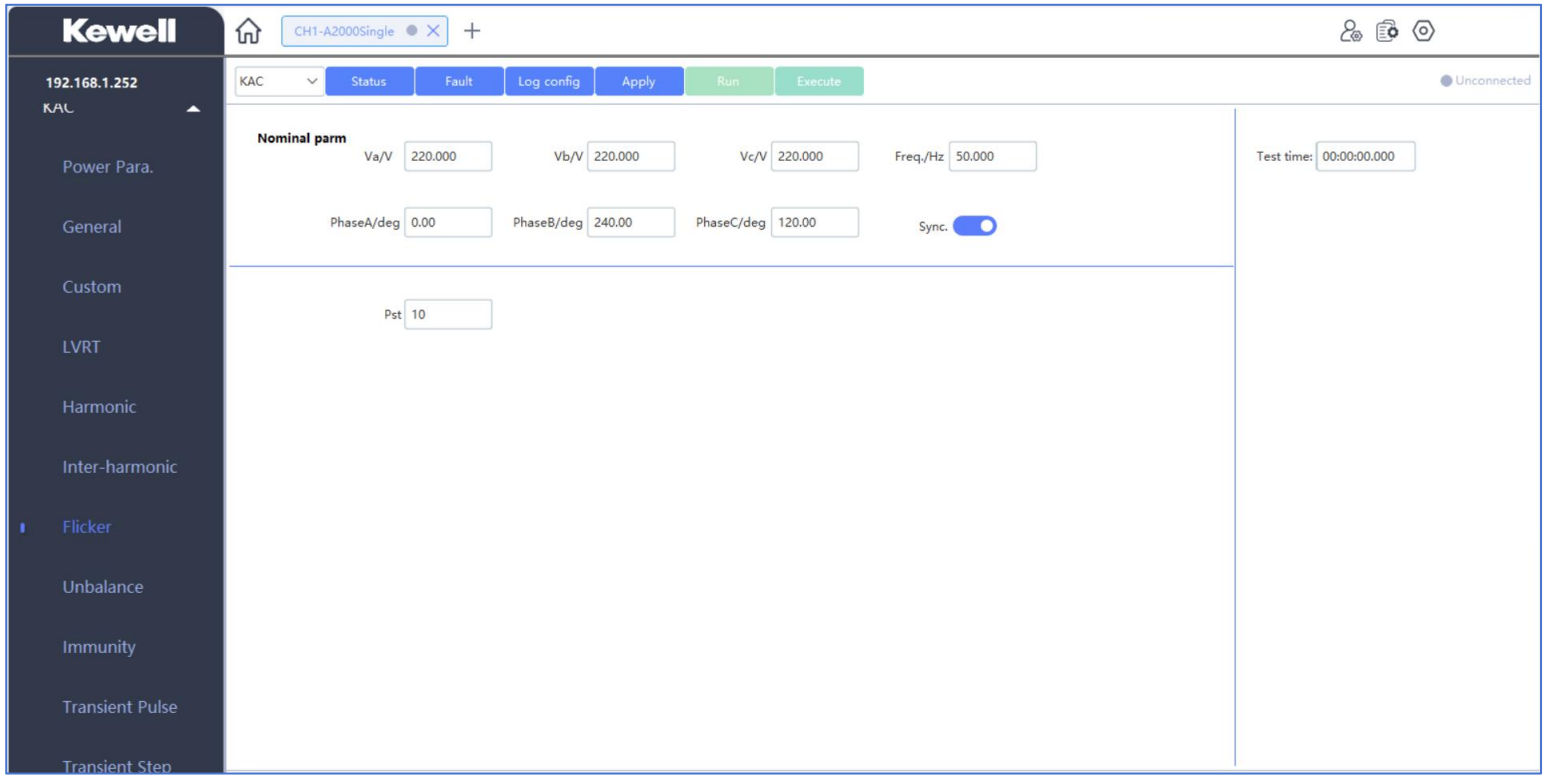
1% unbalance



A2000 is equipped with a simulation function for grid imbalance.
It is equipped with formulas that can calculate **the difference** between the three-phase voltage and the three-phase angle based on the set imbalance degree.

Actual test data

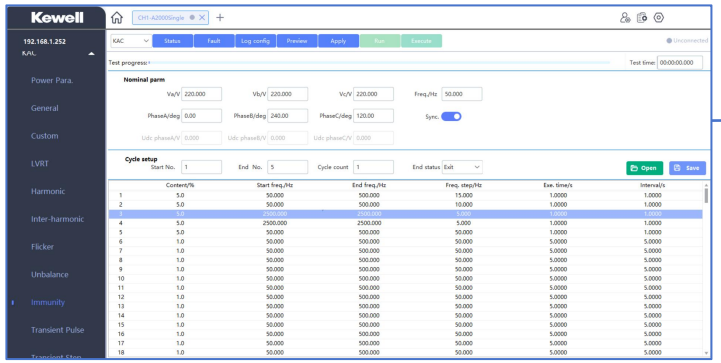
Product Function(Flicker)

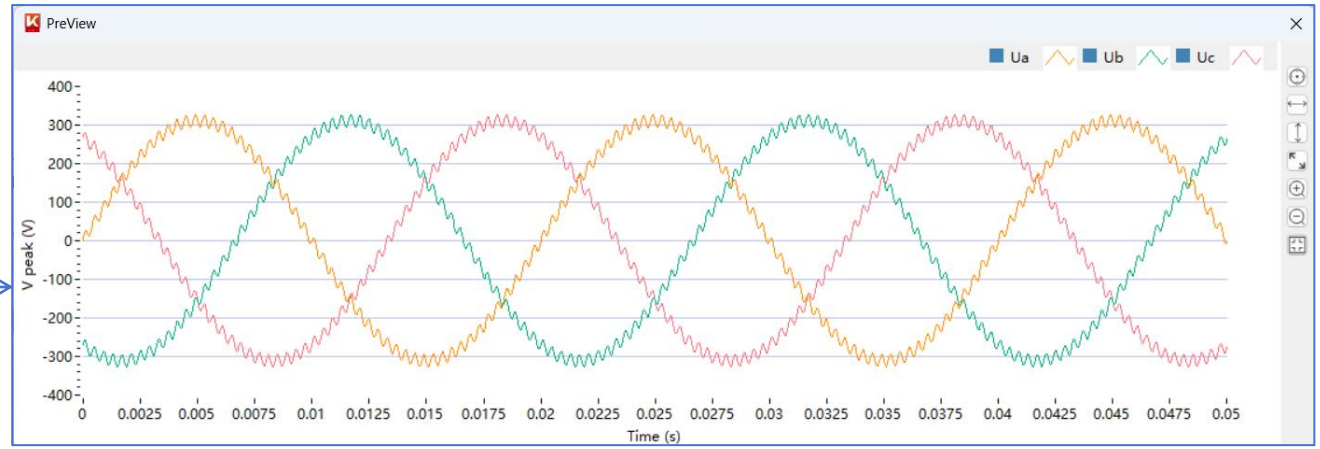


Set flicker value Pst=10

A2000 can set flicker grade (1.0-10.0) to simulate grid flicker characteristics.
This applies to testing inverters and other DUT for adaptability to grid flicker.

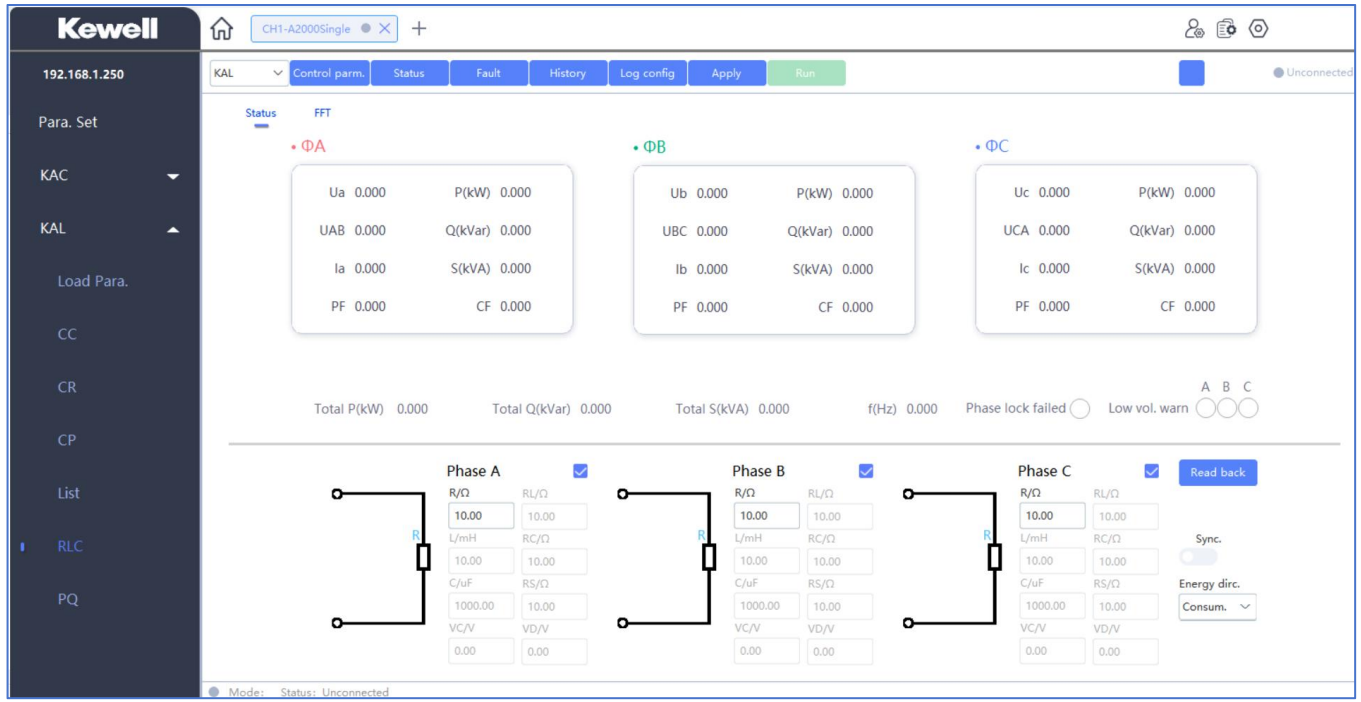
Product Function(Immunity)

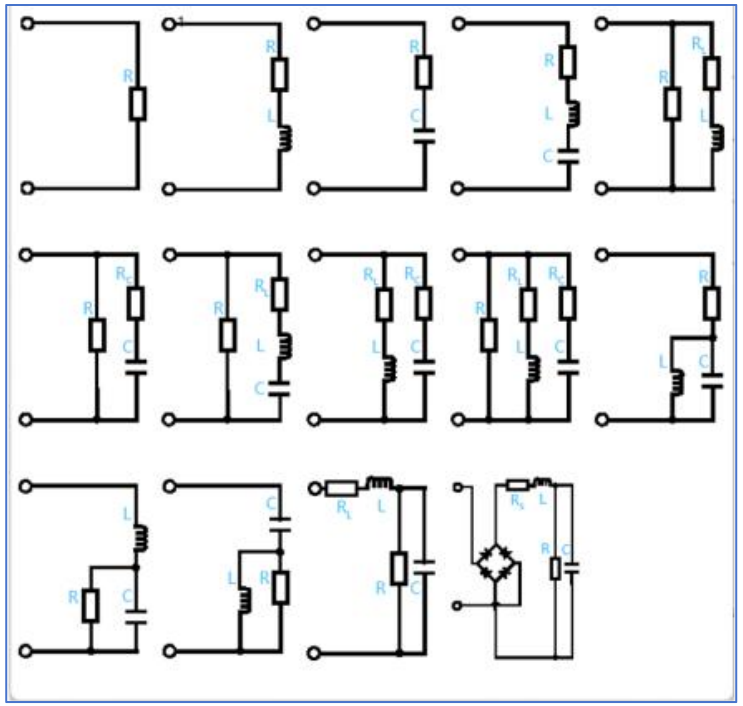




A2000 can be used as the immunity test for inverter and EV chargistation. The maximum frequency can be set up to 3000Hz.

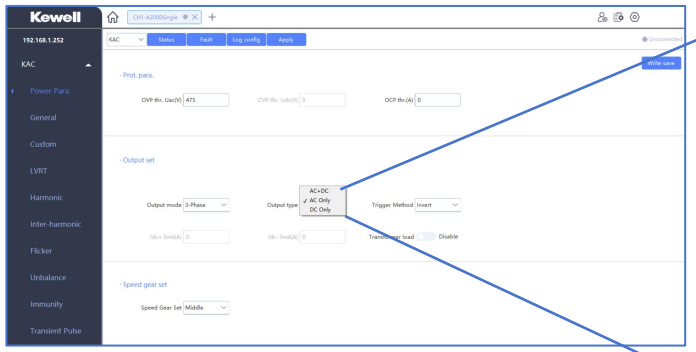
Product Function(Load Mode)

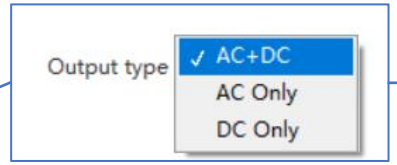


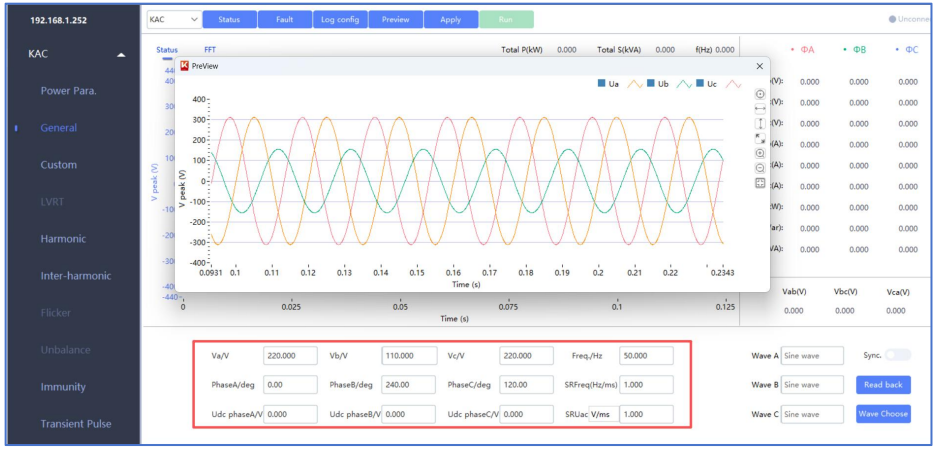


A2000 incorporates **14 built-in RLC** network **models** including R, RL and RC, enabling flexible adjustment of parameters to simulate various load characteristics. This feature is utilized to verify the performance of BOBC, inverters, PCS, and other DUTs in different load impedance modes.

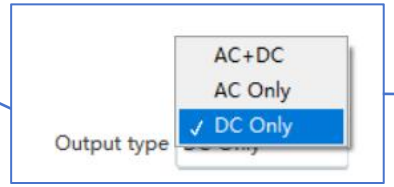
Product Function(DC output)

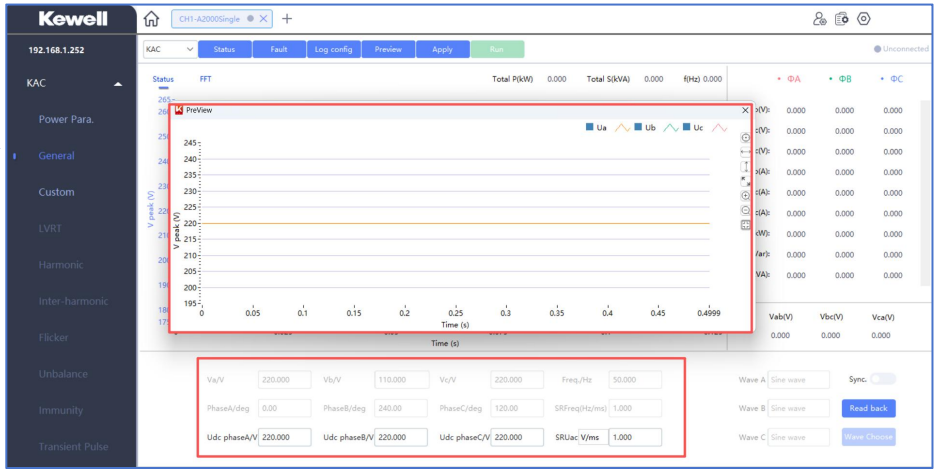






Three-phase independent mode





DC Output is an temporary optional function of the A2000 power supply. After this feature is selected, the power supply has three output options: AC, DC, and AC + DC.

Introduction

01

Application

02

Specification

03

Comparison

04

Case

05

Competitor Comparison

		Kewell	Kewell	Brand C	
Model		A2000NG-100K-470-160	A2000NG-100K-900-80-HV	GE&EL+ 100 vAC/DC	
Output Mode		AC,DC,AC+DC	AC,DC,AC+DC	AC	DC
Rated	Dimension	620*900*970 mm	620*900*970 mm	880 x 875 x 1320 mm	
	Voltage	L-N/0～470V, L-L/0～813V	L-N/0～900V, L-L/0～1557V	0(1) to 295Vrms phase-neutral 0(1) to 510Vrms phase-phase	20-800V
	Current	160A	80A	145A(1CH)	±130A(3CH) / ±390A(1CH)
	Power	100kW	100kW	100kW	100kW
Input Dsts	Input Voltage	323-440V	323-440V	320～460Vac	
	Input Frequency	45-65Hz	45-65Hz	48-62Hz	
	Max. Efficiency	≥ 93.4%	≥ 93.4%	≥ 89% (7.5 & 10), ≥ 91% (15 to 30), ≥ 92% (40 to 200)	
	PF	> 0.99	> 0.99	> 0.98 at rated power	
Output Voltage	Volage Accuracy	≤0.1%F.S.	< ± 0.1%F.S.	< ± 0.1%F.S.	± 0.1%F.S.
	Volage Resolution	0.001V	0.001V	0.001V	
	THD	<0.5%@50Hz/60Hz on-load <1% @40Hz/70Hz on-load	<0.5%@50Hz/60Hz on-load <1% @40Hz/70Hz on-load	< 0.1% rated linear load @ 230Vrms, 50/60Hz < 0.9% rated non linear load @ 230Vrms, 50/60Hz	
	Voltage Slope Rate	AC>1V/us	AC>1V/us	＜4V/μs	＜4V/μs
	Response Time	\	\	10% to 90% Urated < 100μs	10% to 90% Urated < 250μs
Output Current	Current Accuracy	±0.1%rd + 0.2%F.S.	±0.1%rd + 0.2%F.S.	± 0.2% of FS	± 0.2% of FS
	Current Resolution	0.001A	0.001A	0.001A	0.001A
Frequency	Frequency Range	40-70Hz	40-70Hz	15-200Hz	/
	Frequency Accuracy	±0.01%F.S. OR 0.005Hz	±0.01%F.S. OR 0.005Hz	0.01%	/
Harmonics	Times	up to 50th @ 50-60Hz(max. 3000Hz)	up to 50th @ 50-60Hz(max. 3000Hz)	up to 5kHz (up to 50th harmonic)	/
	Max contect	50%	50%	/	/
Flicker & Three-phase Imbalance & Anti-islanding test & RLC load		√	√	/	
Insulation		Yes	Yes	No	

Competitor Comparison

Model	Brand C 61800-100	Kewell A2000NG-100K-470-160
AC Output Rating		
Output Phase	1 or 3 selectable	Three Phase Linkage / Three Phase Independent
Max. Power	105 kVA	100kVA
Per Phase	35 kVA	33.3kVA
Voltage		
Range	0~300V; Option : 0~500V	0~470V
Accuracy	0.1%+0.2%F.S.	±0.1%F.S.
Resolution	0.1V	0.001V
Distortion*1	< 0.5% @ 30~65Hz < 0.8% @ 65~100Hz	<0.5%@50Hz/60Hz <1.0%@40-70Hz
Line Regulation	0.10%	≤0.05%F.S.
Load Regulation	0.20%	≤0.01%F.S.
Max. Current (each phase in 3-Phase Mode)		
RMS	140A	160A
Peak	360A	226A
Frequency		
Range	30Hz ~ 100Hz	40Hz ~ 70Hz
Accuracy	0.01%	±0.01% or 0.005Hz, whichever is higher
Harmonics Synthesis Function		
Harmonics Range	up to 50 harmonics order @ 50/60Hz fundamental frequency	up to 60 harmonic order @50Hz/60Hz fundamental frequency
Input Rating		
Voltage Operating Range	3Ø 380~400V±10%VLL, 47~63Hz	3Ø 323~440V(VLL), 47~63Hz
Power Factor	> 0.95 (Typical)	≥0.99
Others		
Efficiency	80% (Typical)	92.60%
Dimension (H x W x D)	1740 x 780 x 1000 mm / 68.5 x 30.7 x 39.4 inch (include wheel set)	970 x 700 x 1000 mm
Weight	1120 kgs	260 kgs

Competitor Comparison

Model	Brand C 61800-100（800VLN）	Kewell A2000NG-100K-900-80
AC Output Rating		
Output Phase	3 selectable	Three Phase Linkage / Three Phase Independent
Max. Power	105 kVA	100kVA
Per Phase	35 kVA	33.3kVA
Voltage		
Range	0~300V; Option : 0~800V	0~900V
Accuracy	0.2%+0.2%F.S.	±0.1%F.S.
Resolution	0.1V	0.001V
Distortion*1	< 0.8% @ 50/60Hz < 1.1% @ 30~100Hz	<0.5%@50Hz/60Hz <1.0%@40-70Hz
Line Regulation	0.10%	≤0.05%F.S.
Load Regulation	0.20%	≤0.01%F.S.
Max. Current (each phase in 3-Phase Mode)		
RMS	70A	80A
Peak	140A	113A
Frequency		
Range	30Hz ~ 100Hz	40Hz ~ 70Hz
Accuracy	0.01%	±0.01% or 0.005Hz, whichever is higher
Harmonics Synthesis Function		
Harmonics Range	up to 50 harmonics order @ 50/60Hz fundamental frequency	up to 60 harmonic order @50Hz/60Hz fundamental frequency
Input Rating		
Voltage Operating Range	3Ø 380~400V±10%VLL, 47~63Hz	3Ø 323~440V(VLL), 47~63Hz
Power Factor	> 0.95	≥0.99
Others		
Efficiency	≥80%	92.60%
Dimension (H x W x D)	2030 x 1200 x 1215 mm / 79.9 x 47.2 x 47.8 inch (include wheel set)	970 x 700 x 1000 mm
Weight	1900 kgs	260 kgs

Introduction

01

Application

02

Specification

03

Comparison

04

Case

05

Customer case


Kewell
www.kewelltest.com