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## TECHNICAL PRODUCT INFORMATION

### Test & measurement instruments

- high - quality
- moderate prices
- excellent precision

#### **Your contact:**

Technical support, services, demo & rental equipment, price information  
& quotes, consulting:

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# Regenerative Grid Simulator

RoHS  
Compliant



PAS series is developed for renewable energy related applications. It can simulate the various grid conditions and related test standards. Especially for the voltage and frequency transient simulation test feature, which is very suitable for production, quality verification, research and development. It is also built with Low Voltage Ride Through (LVRT) and High Voltage Ride Through (HVRT) test function and gradual mode programmable capability.

PFV Series is a new generation of programmable AC power supply, with four quadrant energy feedback function. This unit not only provides power to the EUT, but also sinks the power back to the grid system which is very useful for grid-tied devices testing applications. The maximum output power for PAS series is up to 2000kVA, and the PFV series is up to 400kVA. The output voltage range is 0~300V(L-N) and the standard output frequency is 45~65Hz continuously adjustable (optional 40~70Hz).

## Product Features

- PAS has built-in low voltage ride through (LVRT) & high voltage ride through (HVRT) mode which can be easily used for simulating the abnormality test according to different test standards.
- PAS/PFV equip with energy feedback feature that feeds energy back into the grid system for saving energy and sinking the power from grid-tied devices.
- PAS series is suitable for standard verification. For example: UL1741, IEEE 1547, BDEW and CEI0-16, etc.
- Three phase independent voltage adjustment is suitable for three phase unbalance testing or multiple single phase test units. It also equips with phase angle adjustment.
- With input PFC, PAS's input PF is up to 0.99.
- Optional harmonics waveform synthesis function.

## Output Power

30kVA~2000kVA

## Interfaces

Standard	RS-232	RS-485
Option	GPIO	Ethernet
	USB	

## Applications

- Laboratory/Certification Bureau
- Electric Vehicles
- Renewable Energy
- Motor & Compressor

## QR Code



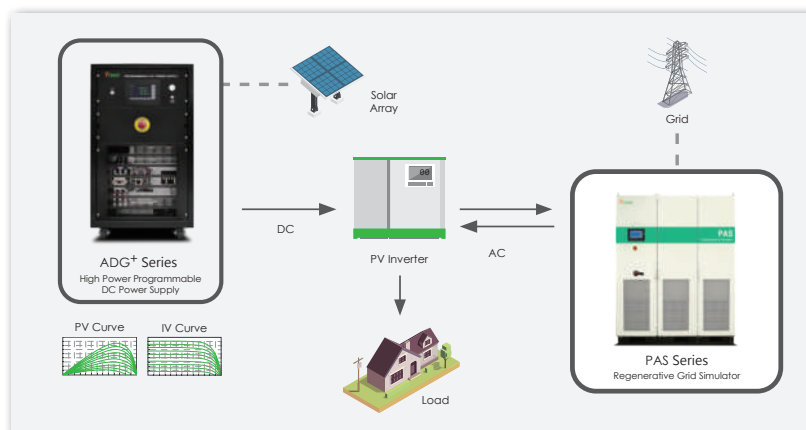
Product  
Info.



Product  
Video

## Regenerative Function

### PV Inverter Testing Application



PAS series is a four-quadrant AC power source. Even in 2000kVA output power, it is capable to both sink and source over 90% efficiency from the DUT. It is suitable for PV Inverter test, EV charger test or other grid-tied devices test. Build in with Low Voltage Ride Through (LVRT) and High Voltage Ride Through (HVRT) test graph and it is very suitable for IEEE-1547 or BDEW related standards compliance test.

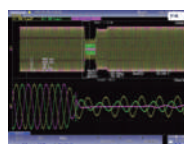
## HVRT and LVRT Function

### Three Phase Independent Output Voltage Setting

Independent setting for three phase high/low voltage ride through to simulate voltage drop and surge.



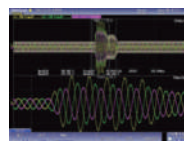
Low Voltage Ride Through Setting



LVRT Output Waveform



High Voltage Ride Through Setting



HVRT Output Waveform

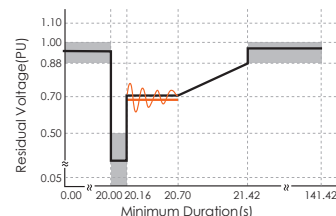
### Low Voltage Ride Through Test - IEEE Std 1547.1-2020



Setting for LVRT



LVRT Output Waveform

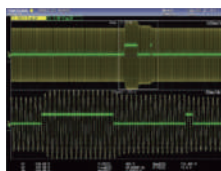


LVRT Test Standard IEEE Std 1547.1-2020

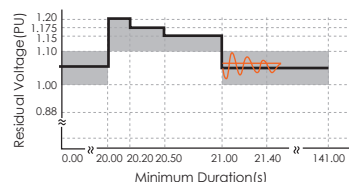
### High Voltage Ride Through Test - IEEE Std 1547.1-2020



Setting for HVRT



HVRT Output Waveform



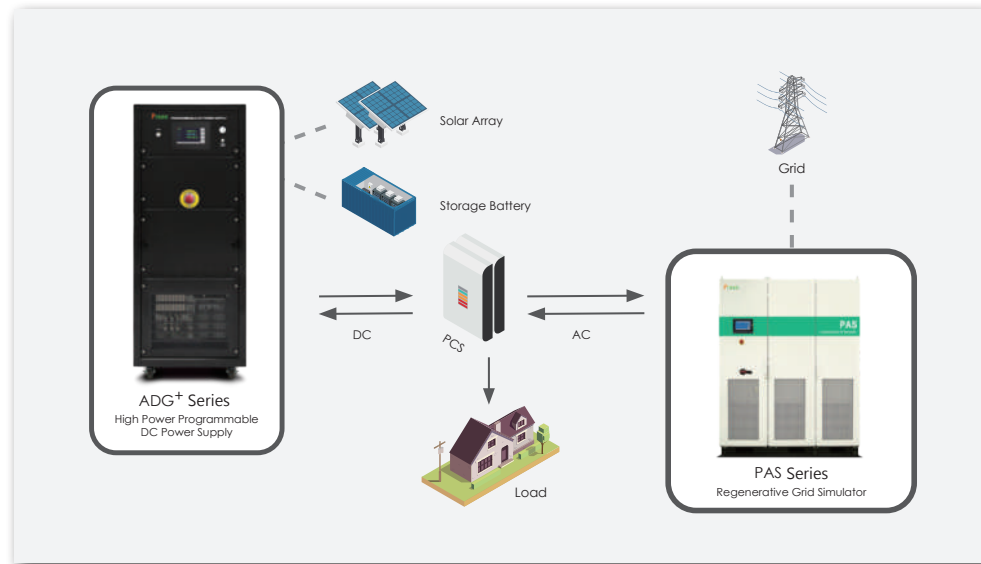
HVRT Test Standard IEEE Std 1547.1-2020

PAS built-in HVRT/LVRT function can simulate the situation when the abnormality is ruled out from the main AC grid. Simulations such as voltage drop, voltage restore or rising time and remaining time can all be programmed.

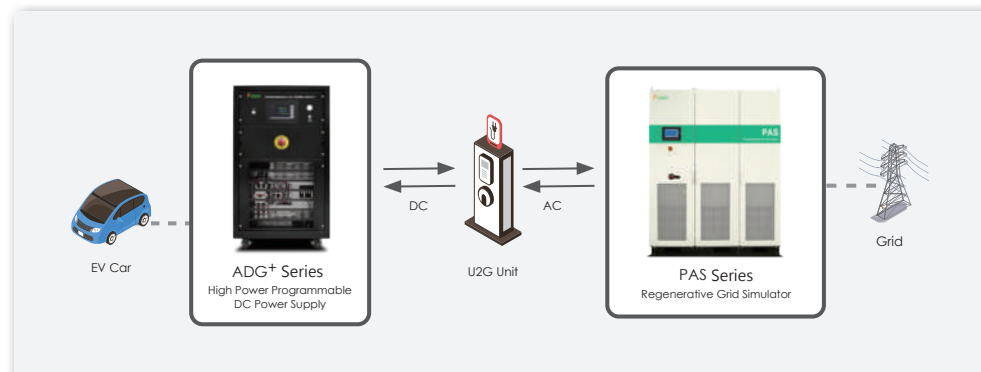
## Ideal For Grid Simulation Applications

The PAS series is a grid simulator particularly designed and developed for renewable energy related applications. It has been widely applied for the testing applications of smart inverters, battery charging/discharging, Power Conditioning System (PCS) and Vehicle-to-grid (V2G). The PAS series not only provides power to the EUT, but also sinks the power back to the grid system, which is suitable for grid testing application.

### ■ Power Conditioning System (PCS) Testing Application



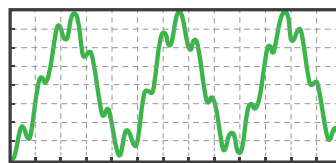
### ■ Vehicle-to-grid (V2G) Testing Application



## Harmonics Waveform Synthesis Function (Opt.)



Harmonics Waveform Synthesis Function Setting



Simulating Harmonics Waveform

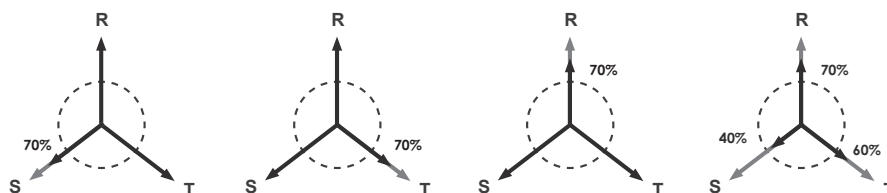
PAS series harmonics waveform synthesis function can allow user to program multiplex distorted harmonic waveform of up to 25 steps. It can simply set up voltage and adjust start phase of each step base on fundamental frequency 50Hz or 60Hz.

## Regenerative 2000kW Power Supply



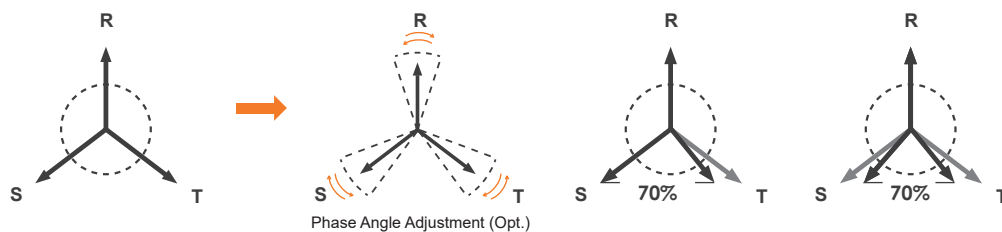
Preen has successfully installed the 2000kW, smart inverter ATS in Taiwan's leading testing center for solar, renewable energy and PV inverter testing application.

## Three Phase Independent Adjustment



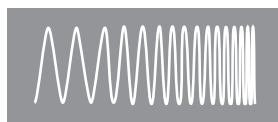
The Three Phase Independent Adjustment function of PAS series can simulate advanced power line disturbance such as three-phase voltage imbalance or lost-phase, which can further meet up with standard of IEC61000-4-34 and GB/T 17626-34. To set output voltage of each phase independently, user can simply press the screen icon to switch between imbalance or unbalanced voltage setting for three phase independent voltage adjustment.

## Phase Angle Adjustment (Opt.)

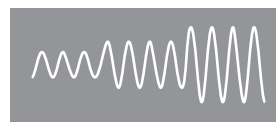


The PAS series is able to set the phase angle between three phases via the optional phase angle adjustment, for example, user can set phase angle from 120° to 70°, to simulate phase shift for different power conditions.

## GRADUAL and STEP Function



Frequency Gradual Function



Voltage Step Function

PAS / PFV series have multiple programmable functions to precisely and effectively simulate various power line disturbances such as voltage or frequency ramp up or ramp down, transient and step changes.

## SPECIFICATIONS

### PFV Series & PAS-F Series Three-Phase Output (30kVA - 1000kVA)

Model	PFV-33030   PFV-33045   PFV-33060   PFV-33075   PFV-33100   PFV-33120   PFV-33150   PFV-33200   PFV-33300   PFV-33400   -   -   -												
	PAS-F-33030	PAS-F-33045	PAS-F-33060	PAS-F-33075	PAS-F-33100	PAS-F-33120	PAS-F-33150	PAS-F-33200	PAS-F-33300	PAS-F-33400	PAS-F-33600	PAS-F-33800	PAS-F-331000
INPUT													
Phase	3Ø / 3 Wire + G												
Voltage <sup>*1</sup>	380V±15%												
Frequency	47-63Hz												
Max. Current <sup>*2</sup>	58.7A	88.1A	117.4A	146.8A	195.7A	234.9A	293.6A	391.4A	587.1A	782.8A	1174.3A	1565.7A	1957.1A
Power Factor	≥0.99(Max. Power)												
OUTPUT													
Power (VA)	30kVA	45kVA	60kVA	75kVA	100kVA	120kVA	150kVA	200kVA	300kVA	400kVA	600kVA	800kVA	1000kVA
Phase	3Ø / 4 Wire + G												
Voltage Ranges PFV Series	Low(V)	0V-150.0V(L-N)											
	High(V)	0V-300.0V(L-N)											
Voltage Ranges PAS-F Series	0V-300.0V(L-N)												
Voltage Resolution	0.1V												
Voltage Accuracy	0.15% F.S.+4 counts												
Frequency Range	Standard : 45-65Hz   Option : 40-70Hz												
Frequency Resolution	0.1Hz												
Frequency Accuracy	±0.1% F.S												
Max. Current (RMS) PFV Series	Low(A)	83.3A	125A	166.7A	208.3A	277.8A	333.3A	416.7A	555.6A	833.3A	1111.1A	-	-
	High(A)	41.6A	62.5A	83.3A	104.1A	138.9A	166.6A	208.3A	277.8A	416.7A	555.6A	-	-
Max.Current(RMS) PAS-F Series	41.6A	62.5A	83.3A	104.1A	138.9A	166.6A	208.3A	277.8A	416.7A	555.6A	833.3A	1111.1A	1388.8A
Line Regulation	≤ 1%												
Load Regulation	≤ 1% (Resistive Load)												
Total Harmonic istortion(THD)	≤ 2% (Resistive Load)												
Response Time	≤ 2ms												
Crest Factor	≥ 3												
MEASUREMENT													
Voltage Range	0V-300.0V												
Voltage Resolution	0.1V												
Voltage Accuracy	0.1%F.S.+2counts												
Frequency Range	Standard : 45 ~ 65Hz   Option : 40-70Hz												
Frequency Resolution	0.01Hz												
Frequency Accuracy	±0.01% F.S												
Current Range(RMS)	0-9999A												
Current Resolution(RMS)	0.1A												
Current Accuracy(RMS)	0.1% F.S.+2 counts												
Power Range	0-1000kW												
Power Resolution	0.1kW												
Power Accuracy	0.2% F.S.+2 counts												
GENERAL													
Regenerative Function	YES												
Low Voltage Ride Through(LVRT) High Voltage Ride Through(HVRT)	PAS Series : YES , PFV Series : NO												
Three-phase independent adjustment	YES												
Phase Angle Setting	YES												
Efficiency	≥ 92% at Max. Power												
HMI	Touch Screen, 7" Color TFT LCD												
Protection	Input : Input N.F.B, Over Voltage, Under Voltage Output : Over Voltage, Over Current, Reverse Current, Over Temperature												
Remote Interface	Standard : RS-485, RS-232   Option : GPIB, Ethernet, USB												
Operating Temperature	0°C ~ 45°C												
Humidity	0~90% ( Non condensing )												
Altitude	< 1,500m												
Dimensions (H x W x D) <sup>*3</sup>	2000 x 1200 x 800 mm /78.74x 47.24 x 31.49 inch		2200 x 1200 x 800 mm /86.61x 47.24 x 31.49 inch		2200 x 1600 x 800 mm / 86.61 x 62.99 x 31.49 inch				2050 x 3530 x 1520mm / 80.71 x 138.97 x 59.84 inch			2050 x 5635x 1520mm / 80.71 x 221.85 x 59.84 inch	
Weight	860kg	1000kg	1150kg	1315kg	1415kg	1495kg	1585kg	1895kg	2685kg	3485kg	5270kg	6640kg	8530kg
	1892lbs	2200lbs	2530lbs	2893lbs	3113lbs	3289lbs	3487lbs	4169lbs	5907lbs	7667lbs	11594lbs	14608lbs	18766lbs

\*1 Please contact for other voltage specification.    \*2 The rated input voltage is 380V.    \*3 Including wheels.

\* All specifications are subject to change without notice.

**ORDERING INFORMATION :****PAS-F Series Three-Phase Output (30kVA - 1000kVA)**

Model Number	Description
PAS-F 33030	Regenerative Grid Simulator (30kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33045	Regenerative Grid Simulator (45kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33060	Regenerative Grid Simulator (60kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33075	Regenerative Grid Simulator (75kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33100	Regenerative Grid Simulator (100kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33120	Regenerative Grid Simulator (120kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33150	Regenerative Grid Simulator (150kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33200	Regenerative Grid Simulator (200kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33300	Regenerative Grid Simulator (300kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33400	Regenerative Grid Simulator (400kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33600	Regenerative Grid Simulator (600kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 33800	Regenerative Grid Simulator (800kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 331000	Regenerative Grid Simulator (1000kVA/300V/45-65Hz, Including LVRT Testing)
PAS-F 001	Soft Start Function
PAS-F 002	GPIO Interface
PAS-F 003	Ethernet Interface
PAS-F 004	USB Interface
PAS-F 005	Output Frequency 40-70Hz
PAS-F 006	Output Voltage 0-350V(L-N)

**PFV Series Three-Phase Output (30kVA - 400kVA)**

Model Number	Description
PFV-33030	High Power Programmable AC Power Source (30kVA/300V/45-65Hz, Including Regenerative Function)
PFV-33045	High Power Programmable AC Power Source (45kVA/300V/45-65Hz, Including Regenerative Function)
PFV-33060	High Power Programmable AC Power Source (60kVA/300V/45-65Hz, Including Regenerative Function)
PFV-33075	High Power Programmable AC Power Source (75kVA/300V/45-65Hz, Including Regenerative Function)
PFV-33100	High Power Programmable AC Power Source (100kVA/300V/45-65Hz, Including Regenerative Function)
PFV-33120	High Power Programmable AC Power Source (120kVA/300V/45-65Hz, Including Regenerative Function)
PFV-33150	High Power Programmable AC Power Source (150kVA/300V/45-65Hz, Including Regenerative Function)
PFV-33200	High Power Programmable AC Power Source (200kVA/300V/45-65Hz, Including Regenerative Function)
PFV-33300	High Power Programmable AC Power Source (300kVA/300V/45-65Hz, Including Regenerative Function)
PFV-33400	High Power Programmable AC Power Source (400kVA/300V/45-65Hz, Including Regenerative Function)
PFV-001	Soft Start Function
PFV-002	GPIO Interface
PFV-003	Ethernet Interface
PFV-004	USB Interface