Smart Inverter ATS

High-Power Smart Inverter ATS

Multi-Channel Smart Inverter ATS

The Smart Inverter ATS can meet the electrical performance test of relevant grid-connected test standards such as IEEE 1547.1, EN 50530, NB/T 32004, CNS 15382 and CNS 15599.

The system is designed according to the specifications of various standards, and has built in the test items into the system. The tests include the abnormal voltage and frequency test, synchronization test, open phase test, reconnect test and harmonics test. Preen's Smart Inverter ATS can test PV inverter's input voltage up to 2000Vdc, grid tied voltage up to $600V_{(L-L)}$ and output power up to 2000kW. Moreover, all test data are saved in the system for further analysis and comparison.

The Multi-Channel Smart Inverter ATS can effectively simulate multiple solar panels. Each channel can be independently controlled and configured with different sunlight and temperature condition and it is ideal for maximum power point tracking efficiency (MPPT) testing.

Applications

- PV Intverter
- AC & DC EV Charger
- Power Conditioning System
- V2G (Vehicle-to-grid)

QR Code

Product Info.

Product Video

IV Curve Simulation

1500V PV System Simulation

Input Characteristic

- Input Voltage
- Input MPPT Voltage
- Input Current
- Input MPPT Voltage Current
- Input Power
- Input MPPT Power

Protection and Timing Test

- OV/UV Protection
- OVP/UVP Trip Time
- OF/UF Protection
- OFP/UFP Trip Time
- Anti-islanding
- Anti-islanding Trip Time
- Re On-Grid Time

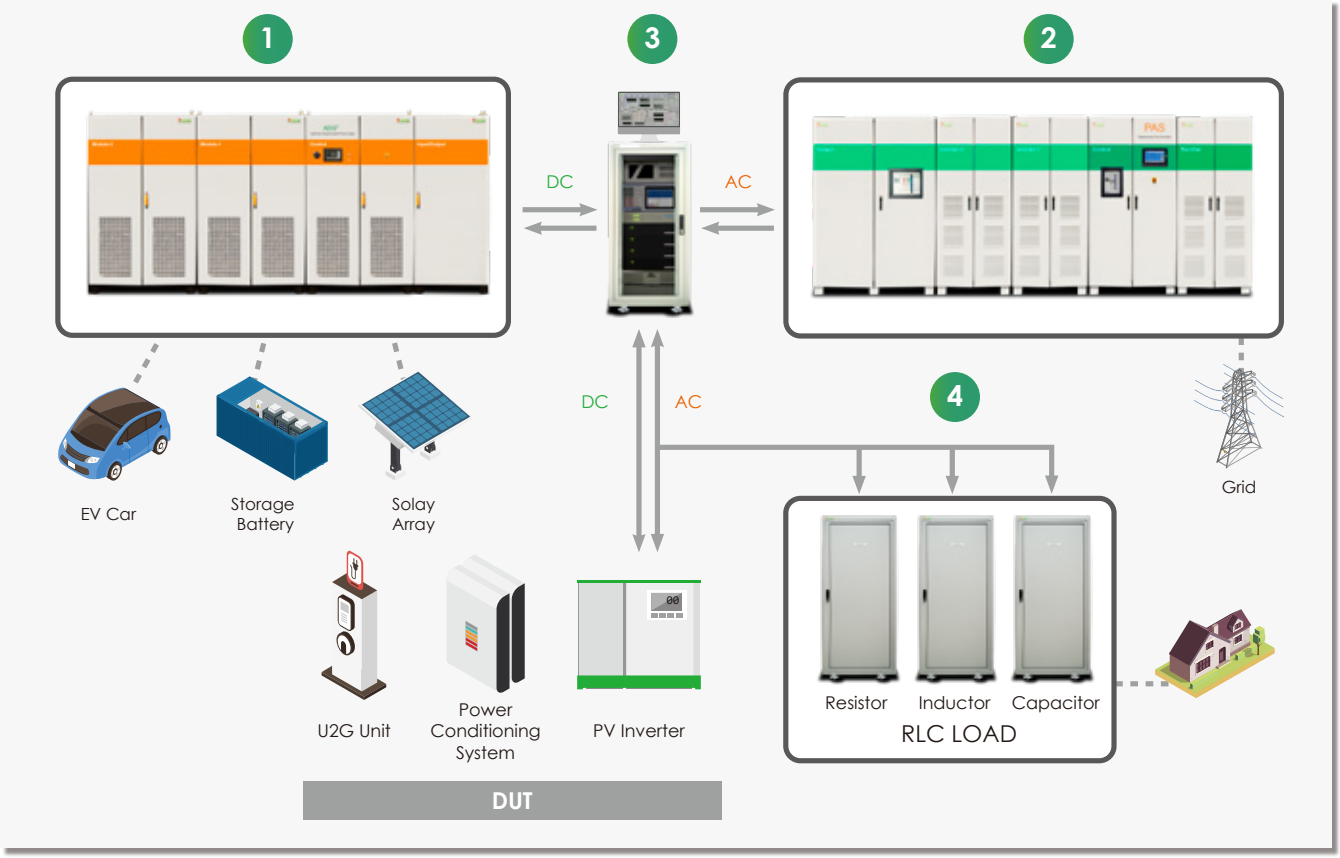
Output Performances

- Output Voltage
- Output Current
- Output Power
- Output Power Factor
- Efficiency
- Low Voltage Ride Through
- High Voltage Ride Through
- DC Injection Current
- THD
- Current Harmonic Test

Other Characteristic

- MPPT Efficiency
- MPPT Time
- MPPT Record
- Hipot Test
- Withstanding Voltage/Insulation Test
- Grounding Impedance Test

Structure of Smart Inverter ATS



Instruments

1 ADG Series, High Power Programmable DC Power Supply (I-V Curve)

- Output Power : 30kW-1800kW
- Output Voltage : 0-2000V.
- Output Current : 0-2500A.
- Solar Array Simulation
  (Built-in EN50530 and I-V Curve Formula)
- Static or Dynamic MPPT Simulation
- I-V Curve Simulation
- Precise Voltage and Current Measurement

2 PAS Series, Regenerative Grid Simulator

- Output Power : 30kVA-2000kVA
- Output Voltage : 0-300V_{L-N} (Option: 350V_{L-N})
- Output Frequency : 45-65Hz (Option : 40-70Hz)
- Simulate the Grid Voltage and Frequency Changes
- Four-quadrant AC Source for Regenerate and Recycle the Power to the Grid
- LVRT and HVRT Testing Simulation
- Harmonic Simulation Function (Option)

3 System Controller

- Industrial Computer
- Digital Oscilloscope
- Digital Power Analyzer

4 RLC Load

- Simulate Anti-islanding
- Testing Output Efficiency, Active Power and Reactive Power of the PV Inverter
- Testing Output Voltage, Current and Power of the PV Inverter

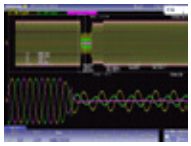
HVRT/LVRT Test

NEW

Three Phase Independent Output Voltage Setting

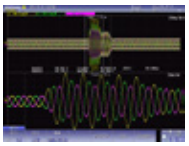
Independent setting for three phase high/low voltage ride through to simulate voltage surge and drop.

Low Voltage Ride Through Setting



LVRT Output Waveform

High Voltage Ride Through Setting

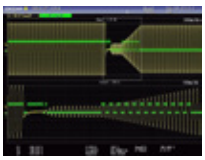


HVRT Output Waveform

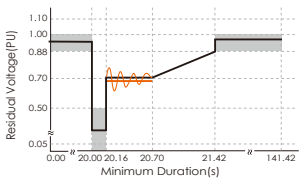
Low Voltage Ride Through Test-IEEE Std 1547.1-2020

Low voltage ride through (LVRT) testing is necessary for testing the grid fault capability of power generation plants. It is one of the key test items to test the capability of electric generators, such as PV inverters, to stay connected in short periods of lower electric network voltage.

Setting for LVRT



LVRT Output Waveform

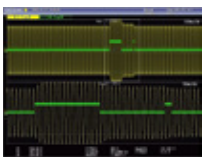


LVRT Test Standard IEEE Std 1547.1-2020

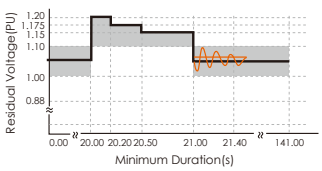
High Voltage Ride Through Test-IEEE Std 1547.1-2020

High voltage ride through (HVRT) testing is necessary for testing the grid fault capability of power generation plants. It is one of the key test items to test the capability of electric generators to stay connected in short periods of higher electric network voltage.

Setting for HVRT



HVRT Output Waveform

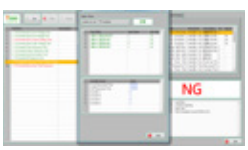


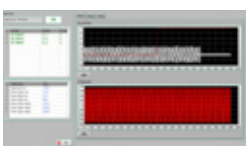
HVRT Test Standard IEEE Std 1547.1-2020

Intuitive Remote Control Software

Main Control System and Measurement Waveform Display

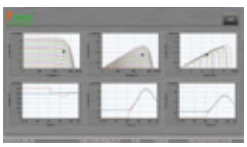
With its intuitive and graphic display, the main control system can show the present AC power, DC power and EUT's testing status, and even continuously monitor and measure EUT's parameters and waveforms.





Solar Array Simulation Function with Multiple Graphic Display

Solar array simulation function is able to show multiple graphic displays on software panel. It can easily realize SAS mode and meet EN 50530 standards requirements for static or dynamic MPPT test through simple parameter setting.

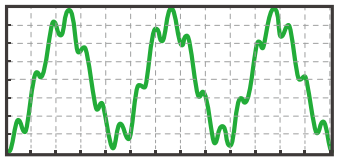


Harmonics Waveform Synthesis Function(Opt.)

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

Setting for the harmonics waveform synthesis function

Display for the harmonics waveform synthesis function



Programmable harmonic waveform synthesis function

Anti-islanding Testing

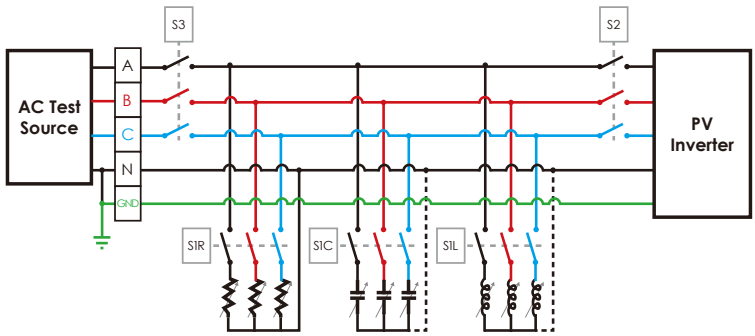
Islanding is resulted from abnormal frequencies and voltages and power quality issues when it is not under strict frequency control. Distributed generators must detect islanding and immediately disconnect from the circuit; referred to as anti-islanding. For this reason, solar inverters that are designed to supply power to the grid are generally required to have some sort of automatic anti-islanding circuitry. With our Smart Inverter test system software, it can easily simulate the occurrence of resonance[*1] that lead to PAS gird simulator to disconnect with gird source to test whether the PV inverter is capable of promptly monitoring islanding situation and instantly cutting off from grid. The standard protection time is no less than 2s.

(*1 : $Q_f = \frac{\sqrt{P_{qL} \times P_{qC}}}{P}$ =1.0±0.05)

PV Inverter Control Test

RLC Load Control Test

Anti-islanding Test



Anti-islanding Test Diagram
(IEEE 1547.1-2020)

Main Test Functions

Smart Inverter test system can meet electrical performance test of relevant grid-connected test standards such as IEEE 1547.1 / EN 50530 / NB/T 32004 / CNS 15382.

Main Test Functions

1. Slow Over Voltage Test
2. Fast Over Voltage Test
3. Slow Under Voltage Test
4. Fast Under Voltage Test
5. Over Frequency Test
6. Under Frequency Test
7. Synchronization Test
8. DC Injection Test
9. Unintentional Islanding Test
10. Open Phase Test
11. Reconnect Test
12. Harmonics Test