Application of APM Programmable AC Source in Solar Inverter

At present, Photovoltaic Power generation is widely promoted and applied, and most of the photovoltaic power plant systems are unattended and unmaintained. As the core component of the photovoltaic power generation system, the photovoltaic grid-connected inverter needs to be conducted with rigorous testing and verifying, before the product goes to market. The following is a brief introduction of the application of programmable AC power supply in the Over-/Under-voltage and Over-/Under-Frequency test on the photovoltaic inverter.

Over-/Under-voltage test:

When the inverter is running normally, the voltage tolerance of the PV grid-connected inverter and the grid interface should meet the requirements of GB/T 12325. The grid voltage response requirements for the PV grid-connected inverter are as follows:

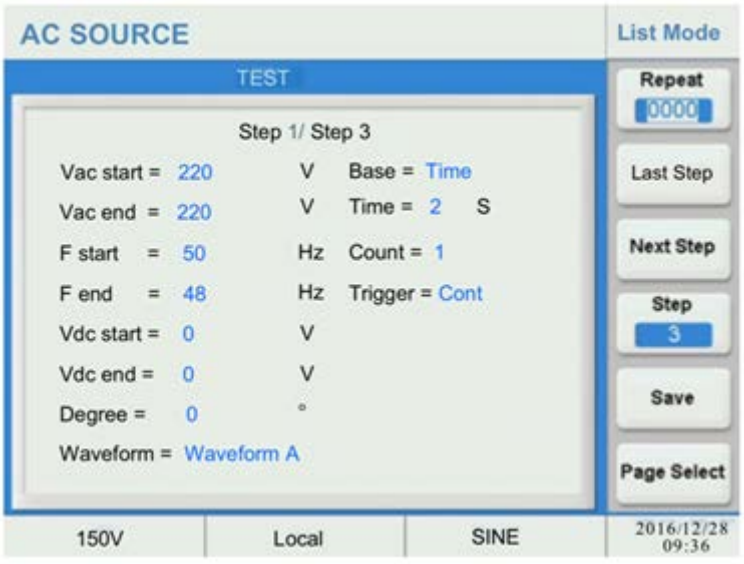
The grid voltage response requirements		
The AC output Voltage of Inverter	Maximum trip protection Time	Recovery Time
V＜50%V nominal	0.1s	——
50%V nominal ⩽V＜85%V nominal	2.0s	——
85%V nominal ⩽V＜110%V nominal	Continue working	——
110%V nominal＜V＜135%V nominal	2.0s	——
135%V nominal ⩽ V	0.05s	——
Maximum trip protection Time means the time when the abnormal state occurs until the inverter Stops supplying power to the grid		

The main function of the Programmable AC Power Sources is to simulate the power grid, which providing rapid and accurate voltage and frequency changes for testing photovoltaic grid-connected inverters. If the under-voltage test item (V <50% V nominal), the voltage drops from the nominal voltage to less than 50% of the nominal voltage, the time required is 1ms. It can be set in the List mode on the APM Tech Power Supply (as shown in the figure below) V(ac start)=220V, V(ac end)=109V, Time=1mS; Save after editing the voltage change step, trigger the List program to start , the AC Source automatically
Performs output.

Over and Under Frequency Test:
Test whether the inverter can work normally within the specified frequency range (under normal voltage conditions); in the specified frequency range section, after the inverter runs normally for a specified time, stop the grid AC power Source; Beyond the specified frequency range It is considered that the grid frequency is abnormal, and the grid-connected inverter stops working. Its frequency response time must meet the requirements of the following table.

Frequency range	Maximum trip protection Time
Grid Frequency＜48Hz	Inverter stops running wthin 0.2s
48Hz＜Grid Frequency＜49.5Hz	Inverter stops after running 10 mins
49.5Hz＜Grid Frequency＜50.2Hz	Running Normally
50.2Hz＜Grid Frequency＜50.5Hz	Inverter stops after running 2 mins, At this time, the inverter in the state of outage can not be connected to the grid
Grid Frequency ⩾ 50.5Hz	Inverter stops running wthin 0.2s, At this time, the inverter in the state of outage can not be connected to the grid

For example, under-frequency test items (grid frequency <48Hz), the frequency drops from the rated frequency to 48Hz, and the time required is 2S (the standard requires a frequency change rate of 1Hz/S). It can be set in the list mode of the APM Technologies programmable AC power supply (as shown below) F(ac start)= 50Hz, F(ac end)= 48Hz, Time=2S, save after editing the frequency change step, and trigger the start of the List program , Programmable AC power supply automatically performs output.



APM Technologies programmable AC power supply is a multi-functional power supply equipment, which can not only output pure AC power, pure DC power, AC/DC mixed power, but also accurately measure electrical parameters. It is featured with high power density, high reliability, high precision, and is compatible with screen touch and manual operation interface of buttons. It can simulate the normal or abnormal power input of electrical equipment to meet the input test requirements of electrical equipment. It is suitable for many fields such as electronics, lighting, aviation, and can also be applied to enterprise test production.