Application Note No. 001

Renac Export Limitation Solution

Version History

- Version 01 (2020-04-13)

  Initial Release

- Version 02 (2021-05-26)

  Added testing and technical advantages

Why we need the Export Limitation Feature

In some countries, local regulations limit the amount of PV power plants that can be fed to the grid or allow no feed-in whatsoever, while allowing the use of PV power for self-consumption. Therefore, without an Export Limitation Solution, PV systems cannot be installed (if no feed-in is permitted) or are limited in size.

In some areas, FITs are very low and the application process is very complicated. So some of end users prefer to use solar energy only for self-consumption instead of selling it.

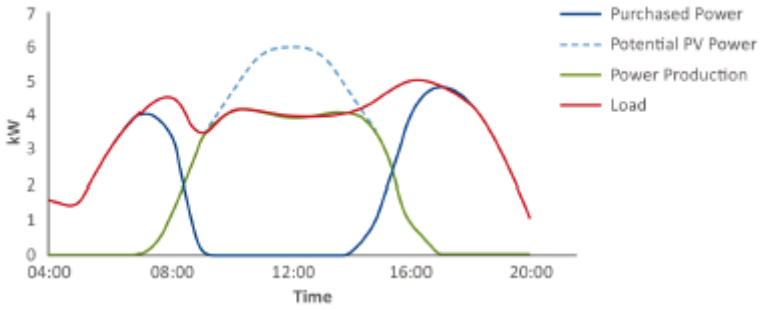
Such cases drove inverter manufacturers to find a solution for zero export& export power limits.

1. Feed-in Limitation Operation Example

The following example illustrates the behaviour of a 6kW system; with a feed-in power limit of 0W- no feed into the grid.

	Potential PV Power	Power Generation	Load Consumption	Feed-in Power
6 AM • No PV production • Loads powered from the grid	0kW	0kW	3kW	-3kW
8 AM • PV generation lower than load consumption • Loads power from PV&grid	1kW	1kW	4.5kW	-3.5kW
10 AM • PV equal to load consumption • No power to /from the grid	3.5kW	3.5kW	3.5kW	0kW
1 PM • PV generation greater than load consumption • PV generation limited to maintain the feed-in limit • No power to /from the grid	6kW	4kW	4kW	0kW

The overall behavior of the example system throughout the day can be seen in the following chart:

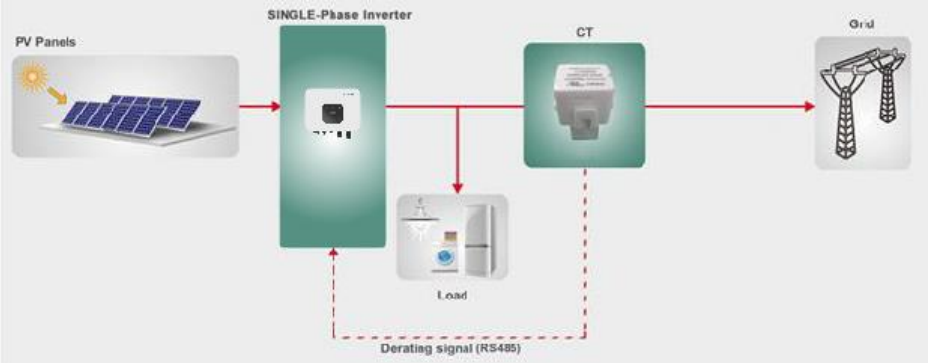


2. Conclusion

Renac offers an export limitation option, integrated into the Renac inverter firmware, which dynamically adjusts PV power production. This allows you to use more energy for self-consumption when the loads are high while maintaining the export limit when the loads are low. Make the system zero-export or limit export power to a certain set value.

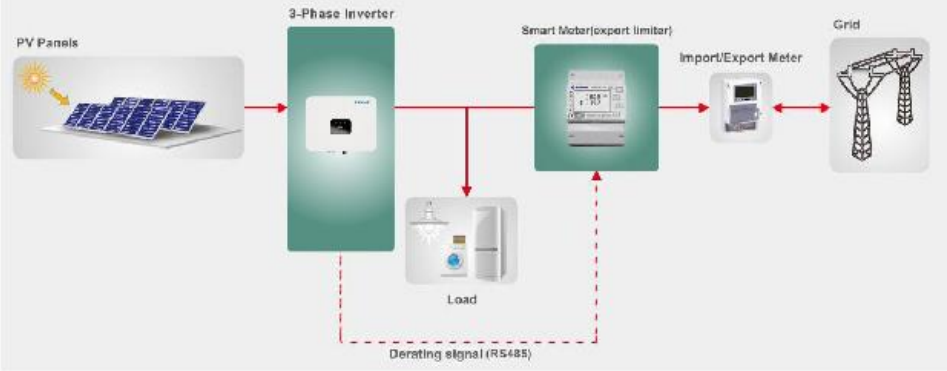
Export Limitation for Renac single phase inverters

1. Purchase the CT and cable from Renac
2. Install the CT at the grid connection point
3. Set the export limit function on inverter



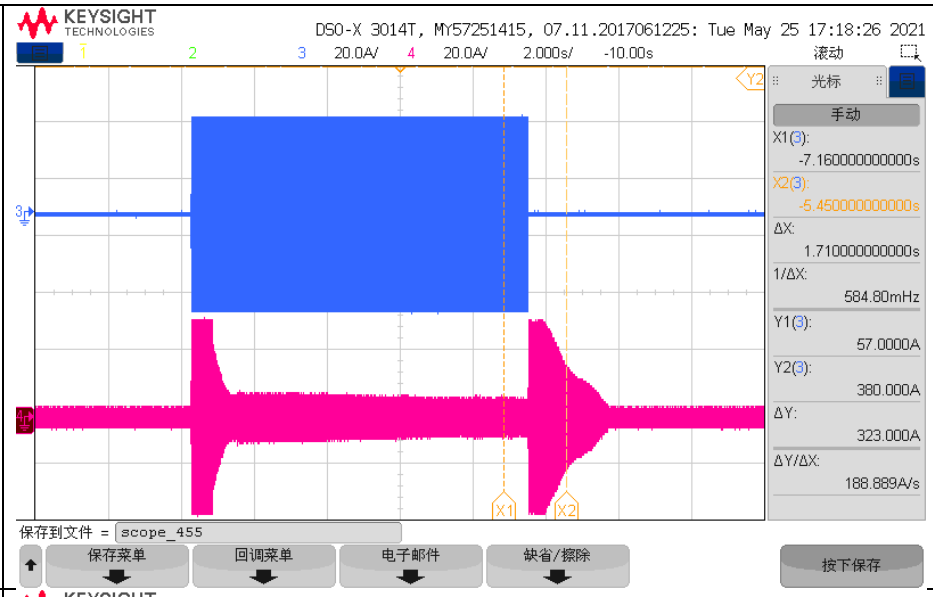
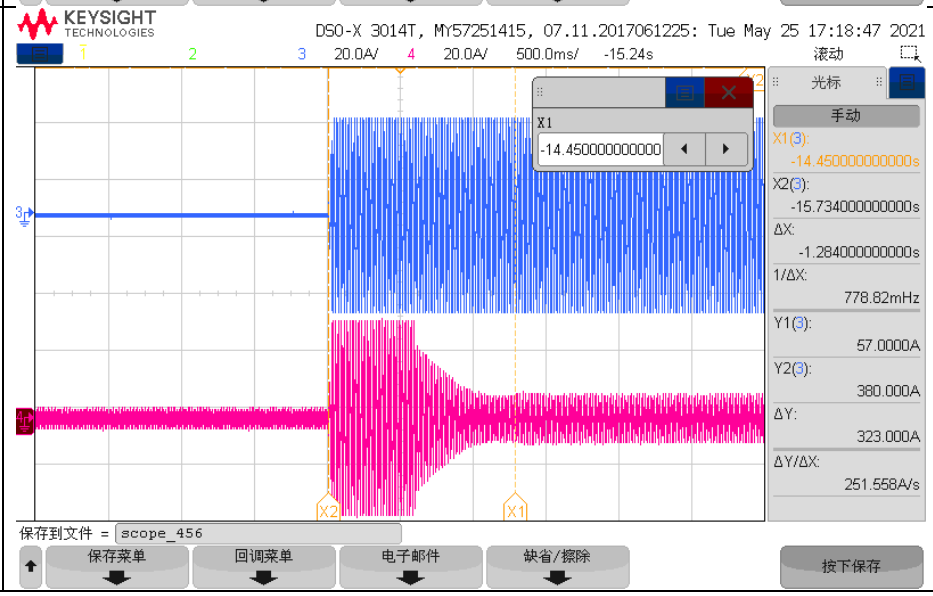
Export Limitation for Renac three-phase inverters

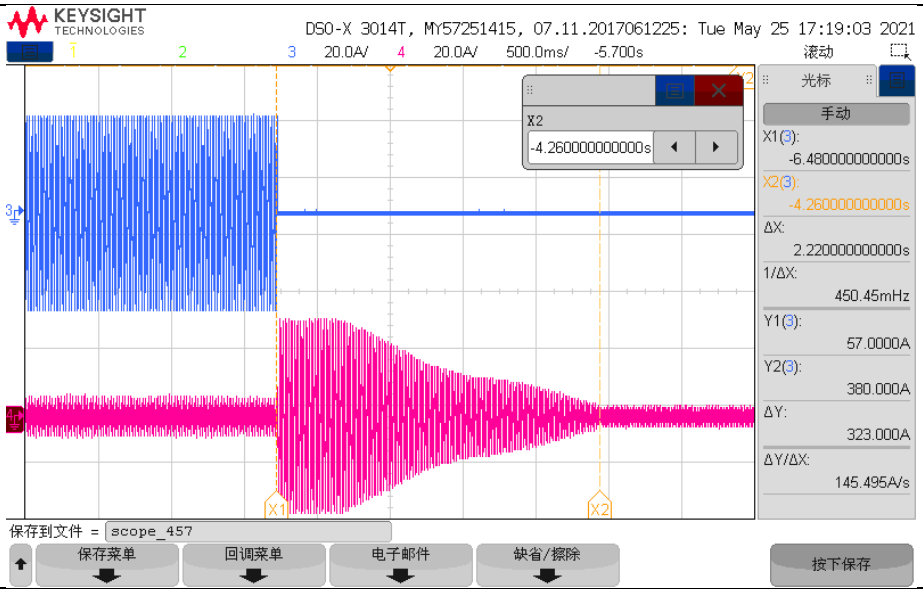
1. Purchase a smart meter from Renac
2. Install the three-phase smart meter at the grid connection point
3. Set the export limit function on the inverter

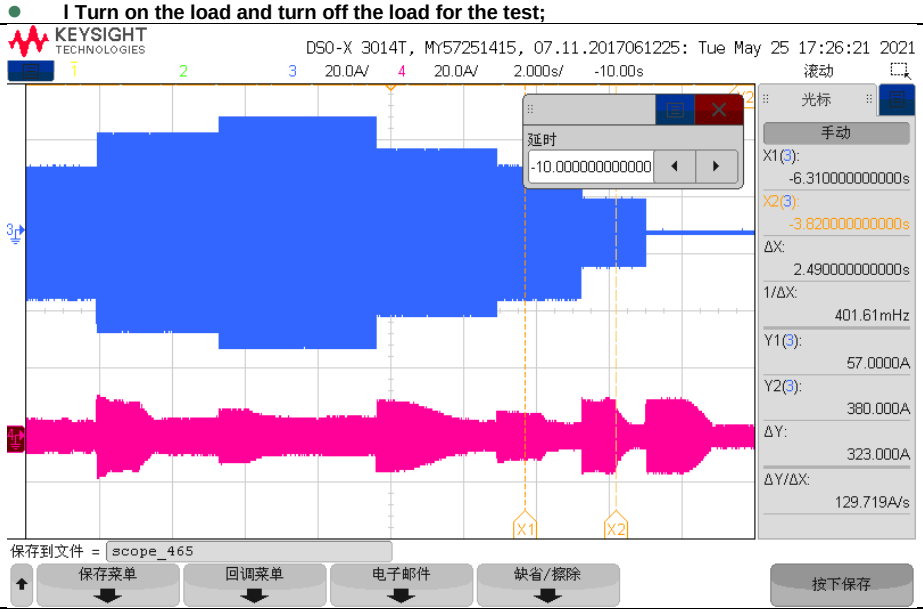


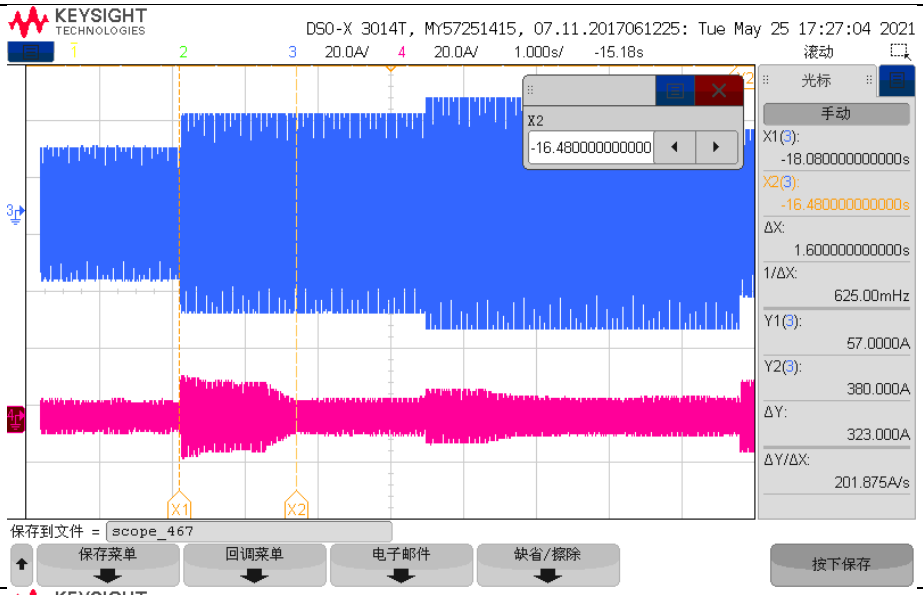
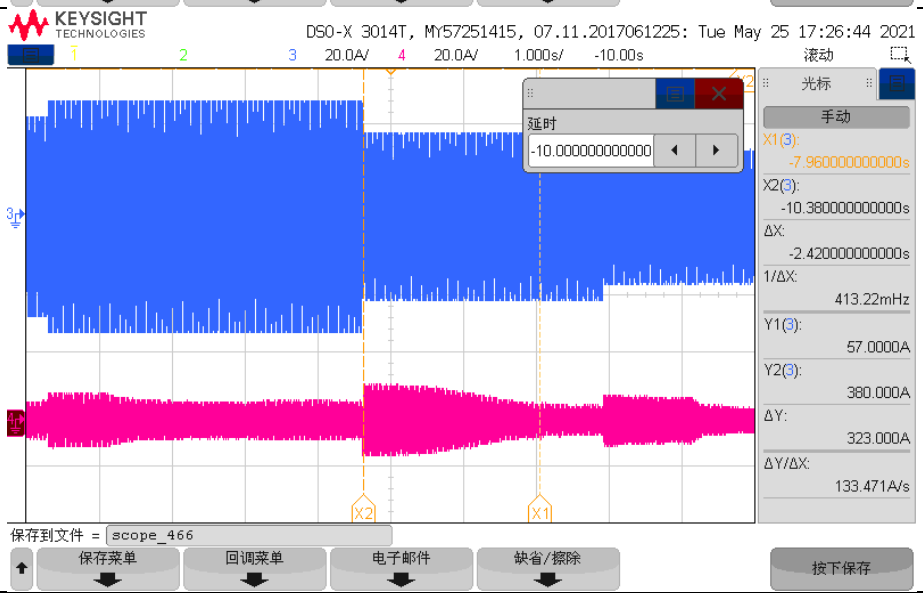
3. Testing report

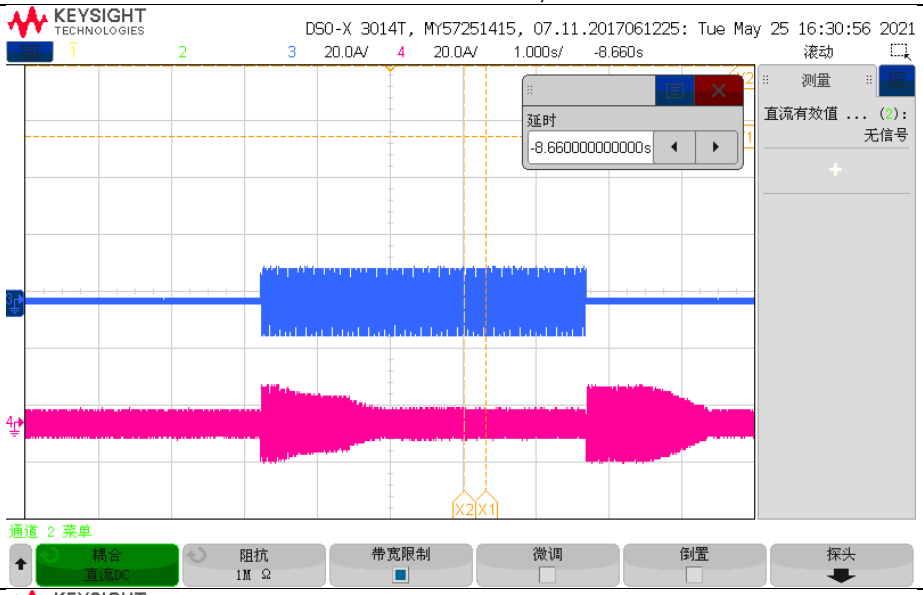
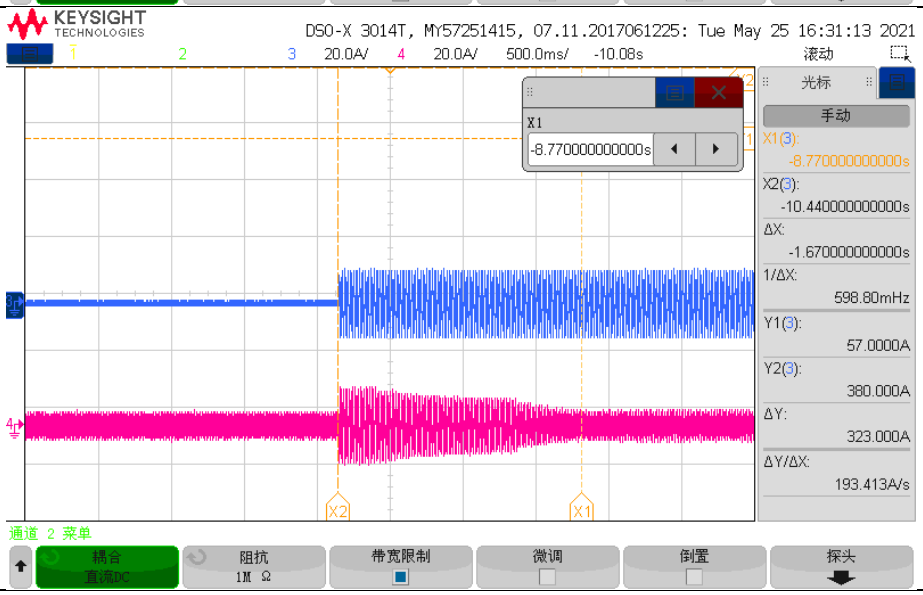
Test 1	CT export limit function test
Software conditions	● **PV: 300V/6kW in parallel** ● **Load: 5.1kW;** ● **The export limit function is enabled;** ● **Turn on the load and turn off the load for testing;**

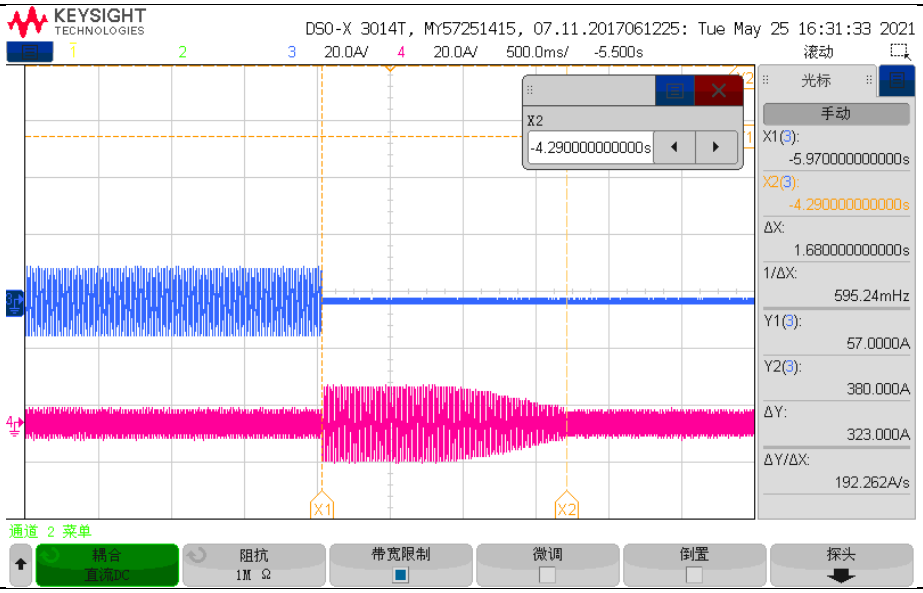
Wave	
Turn on load	

Turn off load	
Channel	CH1：N/A；CH2：N/A；CH3：Load current；CH4：CT side current；
Test description	Turn on the load for about 1.28s, the feed-in power is stable within 20W Turn off the load for about 2.2s, and the feed-in power is stable within 60

Test 2	CT export limit function test
Software conditions	● **PV: 300V/6kW in parallel** ● **Load: 1.7-3.4-5.1-6.0 cycle** ● **The export limit function is enabled;** ● **I Turn on the load and turn off the load for the test;**
Wave	

Turn on load	
Turn off load	
Channel	CH1：N/A；CH2：N/A；CH3：Load current；CH4：CT side current；
Test description	Turn on the load for about 1.6s, and the feed-in power is stable within 20W Turn off the load for about 2.4s, and the feed-in power is stable within 60

Test 3	CT export limit function test
Software conditions	● **PV1: 300V/3.8kWmppt single-channel mode;** ● **Load: 1.7kW;** ● **The export limit function is enabled;** ● **I Turn on the load and turn off the load for the test;**
Wave	
Turn on load	

Turn off load	
Channel	CH1：N/A；CH2：N/A；CH3：Load current；CH4：CT side current；
Test description	Turn on the load for about 1.67s, and the feed-in power is stable within 20W Turn off the load for about 1.68s, the feed-in power is stable within 60W

4. Technical advantages

1. Fast adjustment.

a) After the household load power changes, it can be adjusted quickly, and the response time is about 1-2S.

b) Improved system efficiency and increased self-use rate;

2. Accurate accuracy, up to 99% control accuracy;