solar**edge**

Dichiarazione del produttore

Con la presente SolarEdge Technologies Inc. dichiara che gli inverter di propria produzione collegati tramite RS485 o tramite un Gateway di Controllo e Comunicazione (CCG) ad un contatore di energia WattNode ModBus o SolarEdge Modbus e ai relativi Trasformatori Amperometrici, sono in grado di limitare la potenza in Immissione alla rete ad un valore impostato tramite un menù protetto da password a livello di inverter o a livello di CCG.

Per esempio nel caso di sistemi monofase, un sistema composto da uno o più inverter può essere impostato per non superare i 6 kW di immissione in rete.

In caso di malfunzionamento del contatore il/gli inverter ridurranno in modo permanente la loro esportazione al valore pre-impostato.

Il sistema reagisce in 10 s alle variazioni nella potenza in immisione.

Herzliya, li 28/09/2016

Firma del dichiarante

סולראדג' טכנולוגיות בע"מ
ח.פ./ 513865329

Meir Adest, VP Core Technologies

Declaration of manufacturer

Hereby SolarEdge Technologies Inc. declares that inverters of its own production connected through RS485 or Control and Communication Gateway (CCG) to a WattNode Modbus or SolarEdge Modbus energy meter and relevant Current Transformers, are able to limit the feed-in power to a value set in a password-protected menu in the inverter or in the CCG.

For example in single-phase systems, a system made with one or more inverters can be set to limit feed-in power to 6 kW.

In case the meter fails, the inverter(s) would permanently reduce to the export limit which has been set.

The system reacts in 10 s to any feed-in power variation.

Herzliya, on 28/09/2016   Company Stamp

סולראדג׳ טכנולוגיות בע"מ
ח.פ. 513865329

Meir Adest, VP Core Technologies

Feed-in Limitation Requirements for UK DNOs

The SolarEdge Feed-in Limitation feature utilizes a WattNode Modbus meter and current transformers (CTs) with an RS485 hardwired connection to SolarEdge inverters and/or a Control and Communication Gateway (CCG). A CCG is used as the 'master' when installing multiple inverters. It is not required for a single inverter system.

The limitation is based on the inverter moving the power optimizers' operating points so that the inverter is simply not extracting the energy they do not need from the PV modules. It does not use any load dump such as a water heater.

The Feed-in Limitation value is set within a password protected menu to prevent system owner override.

The SolarEdge Solution complies with current UK DNO requirements as follows:

Requirement: The system must be fail safe. In other words it must limit export if the export limiter fails or it loses its power supply

Compliance: As the WattNode meter is located at the grid connection point, a power failure would naturally isolate the PV system through G83/G59 methods.

If the WattNode meter itself were to fail, the RS485 communications would be lost and the inverters would permanently reduce to the export limit which has been set.

If the CCG were to lose its power supply then the inverters would permanently reduce to any export limit which has been set.

If the communications connections/cable is damaged then the RS485 signal would be lost and the inverters would permanently reduce to the export limit which has been set.

If an individual inverter fails, then that inverter is bypassed and does not affect the other components which would continue to limit the system to the export limit which has been set.

Requirement: The system must not rely on wireless communications (e.g. Bluetooth, Wi-Fi etc.) between the various components of the export limiter system (e.g. the sensors, the export limiter and the inverters).

Compliance: The CTs are hardwired to the WattNode meter and these two components should be located within one secured cabinet. The WattNode meter uses hardwired RS485 to communicate to all inverters/CCGs.

Requirement: The system and the whole installation must meet all relevant power quality requirements (e.g. G5/4 for harmonics, P28 for flicker, P29 for unbalance)

Compliance: As the SolarEdge feed-in limitation does not use any load dumping methods, the harmonics, flicker and phase balancing remain the same as for a non-limited SolarEdge system. All SolarEdge inverters are certified to G83/2 and/or G59/3 standards which incorporate G5/4, P28 and P29 regulations.

Requirement: The system must operate within 1s

Compliance: The SolarEdge system will operate within 1 second so long as the WattNode meter has the annotation 'Opt FP' on the front and the inverter and CCG firmware versions are as follows:

CPU version 3.13xx or above

DSP1 version 1.13.702 or above (for three phase inverters only)

Herzliya
Israel   May 6 2015
PLACE   Date   (Meir Adest)

Appendix: Evidence of Feed-in Limitation Testing

The SolarEdge Feed-in Limitation feature has been tested extensively to verify its compliance with the requirements.

Below is a short description of a test performed in order to demonstrate the reaction time of the Feed-in Limitation under numerous conditions. The tests were performed on both SolarEdge single phase and three-phase inverters, and the results demonstrate the feed in is limited to the desired value with less than 1 second.
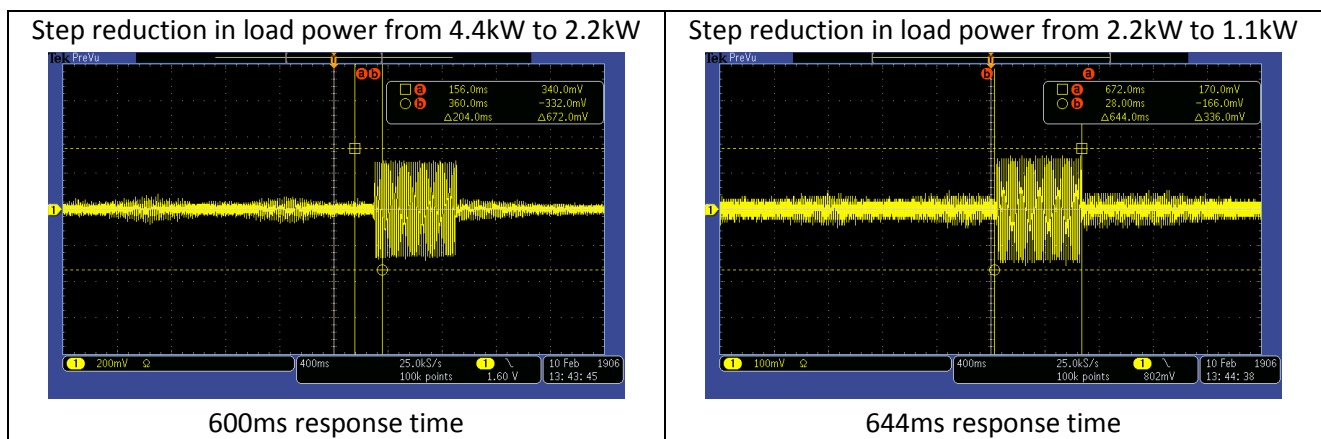
The Test Setup:

The inverter is fed from a DC source emulating the PV array. The output of the inverter is connected to a variable load (containing resistors which could be switch on or off instantaneously) and to an AC source.

The inverter is also connected to a revenue-grade meter, which monitors the net power output (inverter production from PV minus consumption by load).
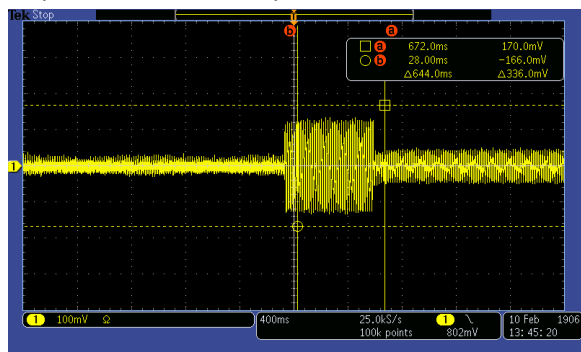
In order to demonstrate the reaction time of the Feed-in Limitation, we attached an oscilloscope with a current probe to the net output. The images from the oscilloscope are provided in the following sections.
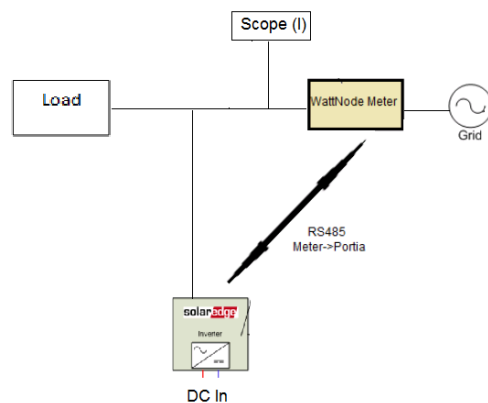
Results from Single-Phase Inverters:
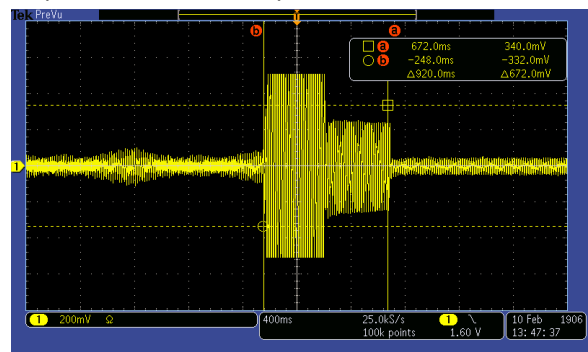
Step reduction in load power from 4.4kW to 2.2kW	Step reduction in load power from 2.2kW to 1.1kW
600ms response time	644ms response time

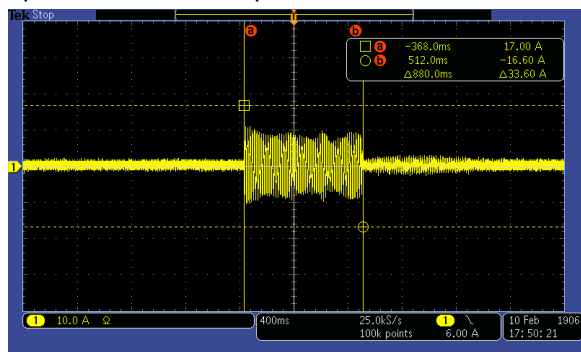| Step reduction in load power from 1.1kW to 0kW	Step reduction in load power from 6.6kW to 0kW
650ms response time	920ms response time

As can be seen from the plots above, in all cases of sudden (instantaneous) changes in the power and load, the inverter adjusted the output power within less than 1 second to maintain the required Feed-in Limitation.
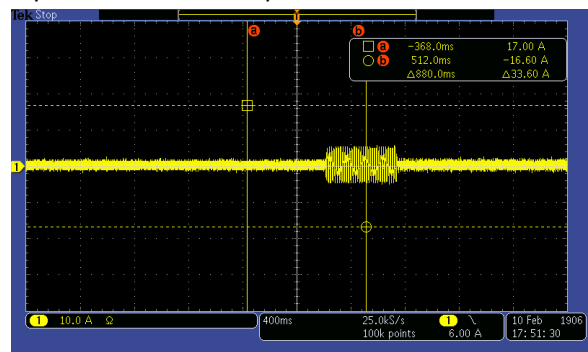
Results from Three-Phase Inverters:

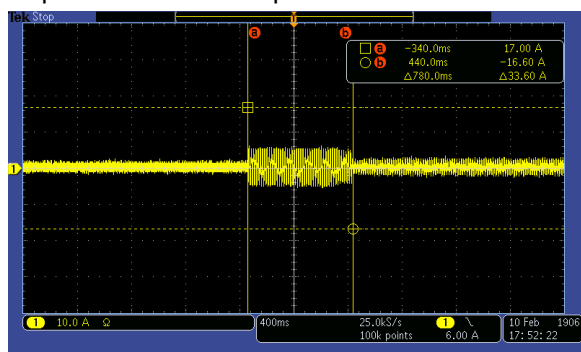| Step reduction in load power from 16.8kW to 8.4kW	Step reduction in load power from 8.4kW to 4.2kW
880ms response time	500ms response time
Step reduction in load power from 4.2kW to 0kW	
780ms response time	

As can be seen from the plots above, in all cases of sudden (instantaneous) changes in the power and load, the inverter adjusted the output power within less than 1 second to maintain the required Feed-in Limitation.