



**What is the Network and System Protection (NS Protection) and what is it needed for?**

In Germany, the requirement for a NS Protection for so-called decentralized energy generation systems (e.g. balcony PV systems) results from the VDE-AR-N 4105 standard, which specifies the conditions under which a decentralized energy generation system can be connected to the public energy supply grid.

Comparable standards exist for all European countries.

The task of a NS Protection is to monitor the grid frequency and grid voltage and to safely switch off the decentralized energy generation system in the event of a fault (e.g. grid failure). The monitoring and shutdown must be carried out redundantly, i.e. twice/double, because a single fault must not lead to the loss of the safety function (functional safety).

## **Implementation of the NS Protection in the Solarnative PowerStick Balcony**

Many manufacturers implement the requirement for the NS Protection using an additional electromechanical switching unit (relay, contactor). The reasons for this are often to be found in the respective inverter topology, which requires large energy storage devices (capacitors) on the grid connection side (AC side). Without an electromechanical switching unit that forces a "hard disconnection" from the grid, the inverter's energy storage could lead to the formation of a local grid (island grid) and the continued operation of the inverter in the event of a grid failure. In this case, a dangerous voltage would still be present at the electrical connection of the balcony power plant, even though there is no public grid.

By regulation, the function of electromechanical switching units (relays, contactors) must be tested before each connection of the decentralized generation system to the public grid. This test can be perceived acoustically by the typical clicking noises of a relay/contactor.

Due to its special switching topology, the Solarnative PowerStick Balcony can dispense with electromechanical switching units when technically implementing the requirements of the NS Protection. Unlike the majority of inverters available on the market, the Solarnative PowerStick Balcony does not have a large energy storage unit on the grid connection side (AC side), which rules out the formation of an isolated grid.

The circuit topology also includes redundant monitoring and switching points that assume the function of the NS Protection.

Accordingly, no switching noises ("clicking") from electromechanical switching units can be heard when connecting and disconnecting the Solarnative PowerStick from the mains. The conformity of the Solarnative PowerStick Balcony with the requirements for the NS Protection in accordance with VDE AR-N4105 has been verified and certified by TÜV Rheinland by means of appropriate tests.

The certificate and excerpts from the test report for the integrated NS Protection in the Solarnative PowerStick Balcony can be viewed at [WWW.SOLARNATIVE.COM](http://WWW.SOLARNATIVE.COM).