

MANAGE NETWORK VOLTAGE SAGS WITH SANTERNO INVERTER

Integrated solutions and their validation

A COMMON PROBLEM

Electrical grids, both public and private, are subject to transient voltage phenomena: from simple perturbations to real black-outs.

In the European context, electricity grids are regulated by EN50160, which characterizes these phenomena by defining the network voltage sags in depth and duration.

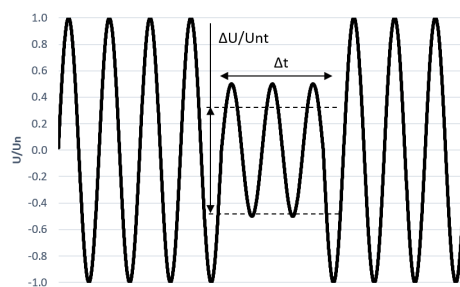


Figure 1 – depth and duration of a voltage sag

MARKET NEED

The need is to overcome the transients of electricity by safeguarding the production processes. Internationally, the functionality that allows you to overcome network sags in a controlled and transparent way is known as LVRT (Low Voltage Ride Through).

THE SANTERNO SOLUTIONS

Santerno has developed specific expertise on connection to electrical grids, both in the industrial and photovoltaic fields. On network voltage transients and the ability to manage them adequately, there are numerous reference standards and grid codes, which often require dedicated developments, tests and certifications.

The experience gained by Santerno allows the products of the SINUS PENTA® line to guarantee continuity of operation, to safeguard production, both in the event of a sudden drop and of a real interruption in the supply of electricity. Obviously we are talking about equipment of significant power, for which double conversion uninterruptible power supply (UPS) systems are difficult to apply or excessively expensive.

Application on inertial loads

These applications have an inertial mechanical load which keeps the electrical motor in mechanical rotation for much longer than the network cycle. In this case, some dedicated control functions are available.

SINUS PENTA® POWER DOWN: function to control the electrical motor stop ramp, also operating when the power supply is totally off. The inverter is properly powered by the kinetic energy recovered from the motor and its load thanks to an appropriate regulation of the stop ramp.

SINUS PENTA® SPEED SEARCHING: function that controls the electrical motor restart when the mains voltage returns : if the motor is still rotating, due to the inertia of the mechanical load the SINUS PENTA® is able to accelerate it smoothly, so as to avoid stress on the mechanical systems.

If the above functions are on during medium-short voltage sags the SINUS PENTA® is able to keep the motor and its load running properly.

Application on low inertia loads

These applications have a mechanical system that is unable to keep the motor rotating mechanically. In these systems, an abrupt network voltage outage, even if short, has a potential critical impact on the system after just a few mains voltage cycles.



Figure 2 –LVRT facility on a 1 MW simulated network

Santerno has developed dedicated systems to support loads by intervening on the capacity of the capacitor bus present inside the inverter.

SINUS PENTA® LVRT: function to overcome the network voltage sag, through dedicated control systems and extension of the capacitor bus capacity inside the inverter.

SINUS PENTA® START-UP CONTROL FUNCTION: electrical motor restart control function upon return of the electrical voltage network in order to avoid stress to the mechanical systems.

PERFORMANCE TEST

In the Castel Guelfo plant, we have adequate systems to test inverters in critical conditions such as those resulting from a voltage grid disturbance.

Network voltage sags simulator:

It is a simulated network generator capable of feeding systems of up to 1 MW of active power indefinitely by simulating network sags configurable in depth and duration.



Electrical motors room with motor-brake pairs:

We have an electrical motors room with motor-brake pairs with powers ranging from 10 to 800 kW.

Test systems like these give us the opportunity to develop extremely sophisticated test protocols, sharing the tests on the machines and the performance evaluation with the certifying body, even with the customer himself.

Figure 3 – electrical motors room with motor-brake pairs, powers ranging from 10 to 800 kW

We are available to identify with our customers the best solution for their specific needs.
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