DRAFT: VEConfigure: grid codes & loss of mains detection

1. Grid codes and complying to local regulations

All countries have their own legislation and therewith their own requirements with regards of speed of Loss of mains detection, under & over voltages, accepted ramp times, and so forth. To make an installation comply to local regulations, the correct grid-code needs to be selected.

The exact requirements differ widely between the countries. For example the normal Multis, Quattros and MultiCompacts are certified for use in the UK. For other countries, Germany for example, only the MultiGrid are certified to be used. And in yet other countries an external ENS is required and/or the inverter/charger must be configured with the right grid-code. Check the safety certificate on our website to see the allowed models for your area.

2. Loss of mains detection (L.O.M.)

What is L.O.M. detection?

L.O.M. is an automatic process that detects a change and so loss of the mains/network/grid supply. After the detection, the inverter/charger will open its back-feed relay, making sure there is no live AC voltage on its AC-inputs, and anything connected to these inputs.

Why is L.O.M. detection required?

The purpose of L.O.M is to detect that the Multi is no longer connected to the mains. Be that a generator or the grid. In such case, the Multi needs to open its back-feed relay. Not doing that would be unsafe. Imagine an electrician working on the street, and disconnecting a house. He then needs to be able to safely work on the wiring from the house.

How does LO.M. detection relate to overload shutdowns?

To detect a loss of mains, the inverter/charger will constantly try to shift the AC frequency. When connected to a stable grid, with a normal accepted impedance, it will not be possible to do so, and it can therefor detect that the mains is still present. In case the mains was lost, the inverter/charger will be able to shift the frequency at will, without any resulting correction currents.

When connected to a generator, or to a grid with a long extension cable or long ‘last mile’ cable, the pushing and pulling on the grid does create high currents, and as a result the inverter/charger algorithm can become unstable and switch itself off in overload.

LOM detection Type A and Type B

In recent firmwares, LOM detection comes in two flavours: **Type A** and **Type B**.
Type A is the 1st variant we developed. This one has been tested and approved to be compliant with the different grid codes. However in real life it became apparant that this type resulted in some systems in rejection of weaker grids (especially generators).
To solves this we developed **Type B** (formerly called weak LOM). With **Type B** this problem is solved on a lot of systems. However, not all devices/gridcodes have already been re-tested with **Type B** so **Type B** is not officially grid code compliant for these combinations. When **Type B** has officially been approved for your model/gridcode it will be shown in VEConfigure 3 as such.
However when the system is connected to a generator there is no need for grid code compliance so in a Quattro one can safely select **Type B** for the AC Input on which the generator is connected.

3. Configuration in VEConfigure

[add a screenshot here]

Questions

Q: Can I use ESS in a vehicle or a boat?

A: No you cannot. After unplugging the shore cord it can take up to a few seconds for the system to detect the loss of mains and open the back-feed relay. During those seconds, the shore power plug will be `live`: there is 230 Volts AC on the terminals. The exact number of seconds differs per country and depends on the local requirements.

The same applies to other solution where the wiring is not protected against accidental removing, for example a simple cable with end-user removable plug, such as a portable power supply.

Q: Can I use ESS with a generator?

A: Yes you can. Note that the only installation type where that makes sense is a land based installation (no boat, and no vehicle). A Quattro must be used with AC input 1 connected to the generator, and AC input 2 connected to the grid. The role of the generator will be to provide power during a long grid failure.

Some, bigger or better quality generators, will be able to work with LOM **Type B**. For other less stable generators it will be required to disable LOM entirely. In that case make the installation such that it is still safe: no simple extensions cords, use enclosed wiring cabinets with warnings on the outside and/or an external ENS.

Q: I use ESS, but have disabled feed-back, is a grid-code still required?

A: Yes, also in this case there is extra logic necessary to detect a Loss of Mains in all circumstances.

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