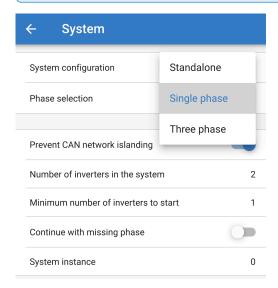# 1. Parallel programming

Inverters must be installed correctly before configuration.

To set up a parallel system, open the first unit in VictronConnect. Open the Settings - System menu.
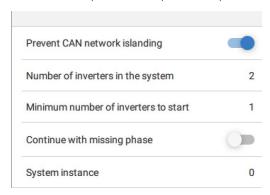
> ⚠️ AC output power will be disconnected for a few seconds when switching System configuration modes. Make sure the system is configured BEFORE connecting inverter AC output to the loads.

The factory default setting is Standalone (a single unit).

To set up a parallel system on a single phase, change the System configuration to "Single phase".

To set up parallel for three phase systems, select "Three phase". This setting is the same for a three phase system with a single inverter on each phase, or multiple on each phase.

Prevent CAN network islanding toggle

This enables the CAN networking islanding detection, and enables the 'Number of inverters in the system' setting.

Number of inverters in the system

Enter the total number of units installed in the system.

In case the CAN network is split into segments this setting is used to determine the largest and shut down the smaller segment to prevent them from continuing on their own unsynchronised.

This results in a more reliable system than if the smaller segment tried to continue on its own unsynchronised (which will lead to overload or other less graceful shutdown issues caused by an unsynchronised AC output sine wave).

Minimum number of inverters to start

Minimum number of inverters that must be present per phase when starting the system.

This is set by the installer to ensure that there are sufficient units to start up the expected system load powering on at once.

You may want to require all, or all minus one (to still allow for a system restart if a single unit is offline), or only 1 for maximum redundancy presuming there is no large start up loads.

Once the system starts it will not shutdown if the number of inverters operational per phase drops below this setting (as long as the remaining inverters do not overload and can continue to power the load).

If the 'Prevent CAN networking islanding' setting is enabled, the system will remain online until the number of inverters falls below the 'Number of inverters in the system' value divided by 2 + 1 (which is the threshold for the CAN network island protection).

If the 'Prevent CAN network islanding' setting is disabled, then the system will not shut down automatically even if only a single inverter per phase remains online.

For further details about redundancy and the implications of "Continue with a missing phase" setting - see the 3 phase programming chapter.

System Instance

Units with the same instance number work together on the AC side.

Changing the System instance setting allows multiple groups of Inverters to be on the same VE.Can bus, but not synchronised, and segmented into different AC outputs, without interference.

Continue with the same programming settings on the rest of the units.

> These System settings must be programmed individually, and set correctly on all connected inverters for synchronised operation.

Note on redundancy and continuous output during firmware updates

The AC synchronisation mechanism used for parallel and 3 phase has a 'protocol' version embedded.

Units can work together even with different firmware versions, as long as they are running the same protocol version.

This allows for continuous uninterrupted supply even when updating firmware, as the units will individually update one at a time, while others continue to synchronise and provide the stable AC output.

If Victron needs to change the 'protocol' version number, it will be clearly noted in the firmware change log. Always read this before updating.

In the event that there are multiple protocol versions running on the same VE.Can bus, all units will indicate error #71 until they are all updated to the same version.

> Capacity will be reduced during firmware updating as units are individually turned off and restarted to update their firmware.

To maintain this same AC output stability in a 3 phase system, there must be at least 2 units on each phase.

There is an additional setting for 3 phase systems that controls if the other two phases shut down if one of the phases is offline. See 3 phase programming for more information.