Generator auto start/stop on CCGX and Venus GX

1. Introduction

An internal relay on a Venus-device (eg CCGX/Venus GX) can be used to automatically start and stop a generator. This relay - or switch - can be 'tripped' by a number of user-defined conditions. This manual will explain what conditions are available to you; and it will guide you through the steps required to set-up this useful functionality.

Firstly, wire the relay to a genset. The relay is located on the back of the CCGX - marked *Relay*. If using a Venus GX, two relays will be seen at the bottom of the unit - only *Relay 1* can be used for the generator automatic start/stop functionality.

Wiring between the CCGX/Venus GX needs to be 'permanent' in order for the generator to keep running; and also to allow automatic 'Stop' when the parameters for auto-stop have been met.

Besides driving the internal relay, the auto start/stop functionality can be also enabled to directly control supported Fischer Panda generators. For more information on how to connect Fischer Panda generators, see GX - Fischer Panda generators.

There are many variations on the generator side for wiring and you should also consult your generator manual or supplier regarding their remote wire start configuration.

2. Enabling the start/stop function

Go to: Setttings → Relay and set the *Function* options to "Generator start/stop"

Relay
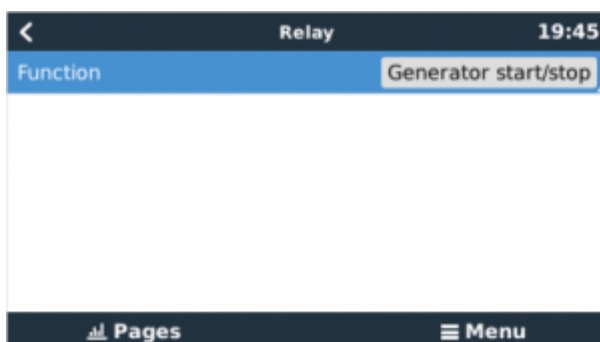
Now that has been enabled, all the settings pertaining to the *Automatic Generator Start/Stop* function will be found in the main Menu under: Settings → Generator start and stop.

Fischer Panda Generators

1. Enable the "AutoStart" function in the Fischer Panda generator control panel.
2. Go to the Fischer Panda genset page and set the *Mode* setting to "Auto start/stop"

Once the Mode is set, all settings will become available under the Auto start/stop menu entry at the bottom of the page.

3. Generator start/stop - Main page

From the Main Menu select Settings > Generator start/stop:

- **Generator state**: Current status of the generator.

- **Error**: Error description.

- **Runtime**: Generator run-time since last start.

- **Total run time**: Accumulated running time since the first start.

- **Time to next test run**: When the 'test run' option is enabled this item shows the time remaining until the next test run.

- **Daily runtime**: Running time history for the last 30 days.

- **Settings**: This is the gateway to all other features.

4. Settings

- **Conditions**: See Conditions

- **Minimum run time**: It's good practice for a generator, once started, to be allowed to reach its operating temperature. When started manually this setting is ignored.

- **Detect generator at AC input**: Enabling this feature will sound an alarm whenever power is *not* detected at the AC input terminal of the Inverter/Charger. This function will bring attention to a wide variety of problems; such as lack of fuel, or a mechanical or electrical fault at the generator. This functionality is not available for VE.Can connected Multi/Quattro.

- **Quiet hours**: See Quiet hours

- **Reset daily run time counters**: Resets the 30 day run-time history.

- **Generator total run time**: Reset, or modify, the total run-time hours.

5. Conditions: User-definable parameters which trigger a generator auto-start.

To get to *Conditions* from the main menu go to: Settings → Generator start and stop → Settings → Conditions
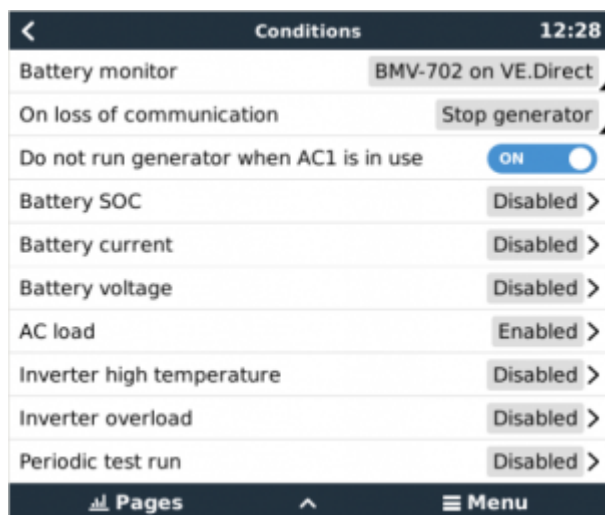
* **Battery monitor**: Select how the battery will be monitored - if at all. The battery monitor data will be used for DC-related conditions.

* **On loss of communication**: If ever there is a communication breakdown between the CCGX/Venus GX and the selected battery monitor, and/or VE. Bus inverter/charger; and parameters have been set which depend on this information - choose between the following actions:

- **Stop the generator**: If the generator is running, it will be stopped. (default)

- **Start the generator**: If the generator is not running, it will be started.

- **Keep running**: If the generator is running at the time of data loss this setting will keep it running.

* **Do not run genset when AC 1 is in use**: This option is ideal for back-up systems where a Quattro has mains/grid electricity connected to its *AC-in 1* terminal, and a Genset connected to its *AC-in 2* terminal. With this option enabled, the Genset will only start after a mains failure. And where a mains failure has occurred, the Genset will automatically be stopped again as soon as mains power is restored. This functionality is not available for VE.Can connected Quattros.

The following parameters may be user-defined to trigger an automatic Generator start/stop:

- Manual
- State of charge (SOC)
- AC load *
- Battery current
- Battery voltage
- Inverter high temperature
- Inverter overload
- Periodic test run

(* The value measured here will be the total AC consumption of the system.)

Condition-parameters are prioritized in the order shown above. When a number of conditions are reached at the same time, only the highest-priority condition will be shown as active. All enabled conditions will be evaluated - even if the generator is already running. When the active condition has been satisfied, an un-met parameter in a lower-priority condition will keep the generator running.
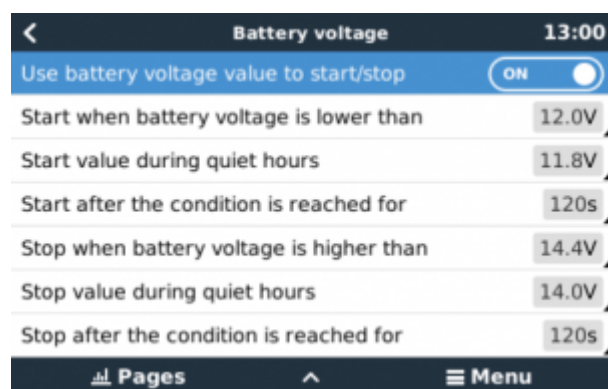
Relays triggered by Battery SOC

- **Use Battery SOC value to start/stop:** Toggle this feature on or off.
- **Start when Battery SOC is lower than:** Set the depletion level for auto-start.
- **Start value during quiet hours:** During Quiet hours it may be desirable to delay an auto-start until it really can't be avoided. If *Quiet hours* has been defined, set a lower, more critical, autostart level.
- **Stop when Battery SOC is higher than:** Set the recharge level for auto-stop.
- **Stop value during quiet hours:** If Quiet hours has been defined, set a lower auto-stop level to achieve a shorter generator run-time.

Relays triggered by Battery Current

- **Use Battery current value to start/stop:** Toggle this feature on or off.
- **Start when Battery current is higher than:** When a high AC demand is experienced which will soon exhaust the battery, the generator can be auto-started to assist in meeting that demand. Set the current-level at which this will occur.
- **Start value during quiet hours:** If Quiet hours has been defined, set a higher, more critical current value.
- **Start after condition is reached for:** Set a delay before auto-start. Some AC device will draw a short-term, high-peak current on start-up. Instigating a delay before auto-start will avoid starting the generator unnecessarily.
- **Stop when battery current is lower than:** Set the current for auto-stop.
- **Stop value during quiet hours:** If Quiet hours has been defined, set a higher current level to achieve shorter generator run-times.
- **Stop after condition is reached for:** Set a delay to ensure that the current-reduction condition is stable.

Relays triggered by Battery Voltage

- **Use battery voltage value to start/stop**: Toggle the feature on or off.

- **Start when battery voltage is lower than**: When battery voltage falls below the value entered the relay will start the generator.

- **Start value during quiet hours**: If Quiet hours has been defined enter a lower (more critical) value to ensure the generator will only auto-start when absolutely necessary.

- **Start after the condition is reached for**: This function allows the user to build-in a delay between the auto-start condition being met and an auto-start being triggered. The importance of this is that a sudden but temporary high AC demand will cause an equally sudden drop in battery voltage. This drop *may* be temporary - in which case a generator start is not required. But if the condition endures for a longer period of time than the value entered here, the generator will be started.

- **Stop when battery voltage is higher than**: When battery voltage rises above the value entered the relay will stop the generator.

- **Stop value during quiet hours**: During Quiet hours it may be desirable to auto-stop the generator sooner. Enter a lower battery voltage value than the one above.

- **Stop after the condition is reached for**: This feature builds in a delay before stopping the

generator after the 'stop' value has been reached. This is to make sure that the voltage rise is stable.

Relays triggered by AC load

AC load triggers work similarly to other triggers but the feature is refined by a *Measurement* setting.

The *Measurement* setting is available on firmware v2.0 and later and has three possible values:

- **Total consumption** (Default option)
- **Inverter total AC out**
- **Inverter AC out highest phase**
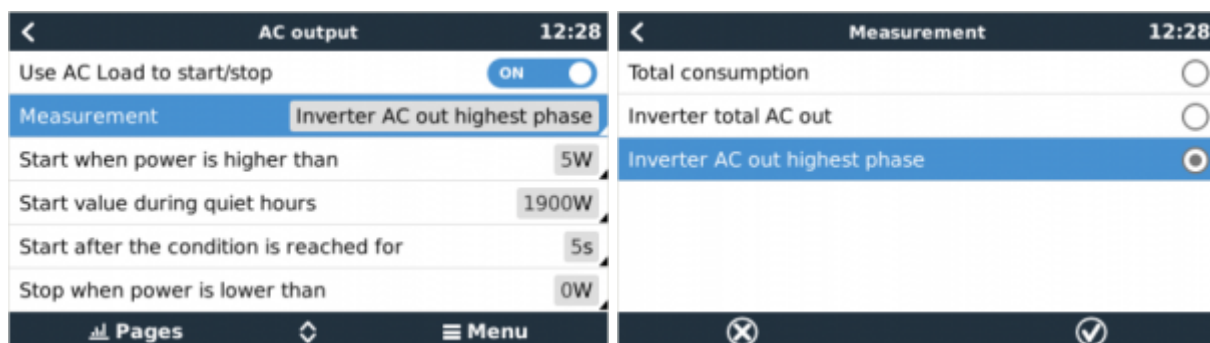
**Relays triggered by Inverter High temperature**

- **Start on high temperature warning:** Toggle this feature on or off.
- **Start when warning is active for:** Set a delay to avoid temperature rises which are temporary, caused by brief high AC demands.
- **When warning is cleared stop after:** Set a delay to ensure that a reduction in inverter temperature - usually caused by lower power demand - is stable.

Relays triggered by Inverter overload

- **Start on overload warning:** Toggle this feature on or off.
- **Start when warning is active for:** Set a delay to ensure that the inverter overload warning has not been triggered by a high-demand of AC power of only short duration.
- **When warning is cleared stop after:** Set a delay to ensure that the reduction in AC power demand is stable.

Automatic periodic 'Test run'

This feature allows automatic generator starts, periodically, as a 'test run'.
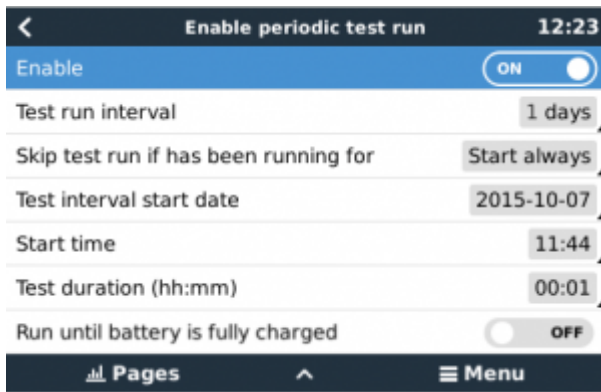
- **Test run interval**: Set the interval between test runs.

- **Skip test run if has been running for**: The test will be skipped if during the test run interval the generator ran for at least as long as it would on a 'test run'.

- **Test interval start date**: The 'test run' interval counter will start from the date entered here. No test runs will be carried out until the date set here has been reached.

- **Start time**: Time of day at which the generator 'test run' will commence.

- **Test duration**: Duration of the test.

- **Run until battery is fully charged**: Enabling this feature will cause the 'test run' to continue until the battery is fully charged - instead of for a fixed amount of time.

Manual-Start Feature

Use the *Manual start* feature to remotely start the generator. You can also implement this feature when the generator is already running - doing so will ensure that the generator won't automatically stop when the condition which caused it to start has been satisfied. In other words, the *Manual start* feature will override the auto-stop parameters.

There are two ways to start the generator manually:

- **Using the Manual start menu**: Go to: Generator start and stop → Manual start; and then toggle the graphic to start the generator.

- **Using the GX 'Home page' Generator graphic**: Press the top-left button on the CCGX, or Venus GX remote console and engage the *Generator* page. Then press the center button. You must first choose how you wish to *stop* the generator - manually, or by entering a run-time. Once you've made your selection a five-second countdown will begin during which you can *abort* the manual-start by pressing the center button.
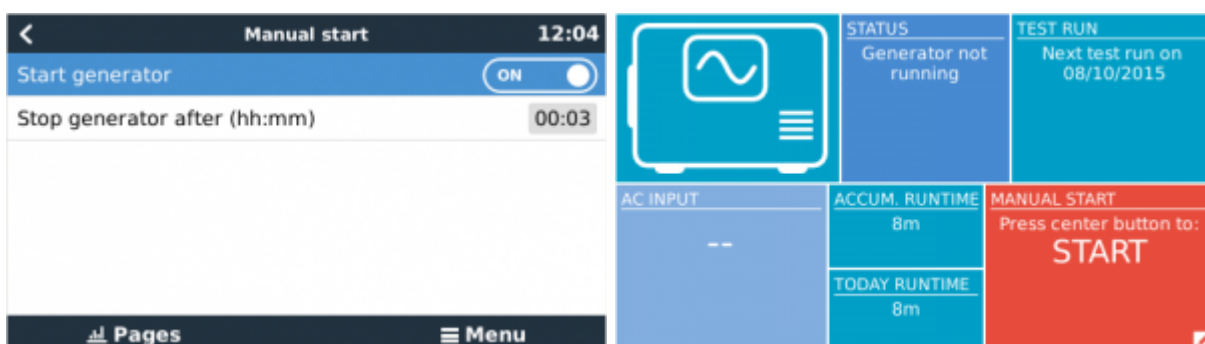
WARNING: If the generator is started manually (remotely) without using the stop timer, it will run until the 'Off' button has also been manually toggled.

The stop timer is available to both methods of manually remote-starting the generator, and using it will ensure that the generator will auto-stop ...and will not be inadvertently forgotten.

Note that stopping the generator manually can only be achieved when no un-met 'run' condition is active. If you wish to force a generator-stop you must first disable the function which is keeping it running - or disable the *Generator start and stop* function.

Quiet hours
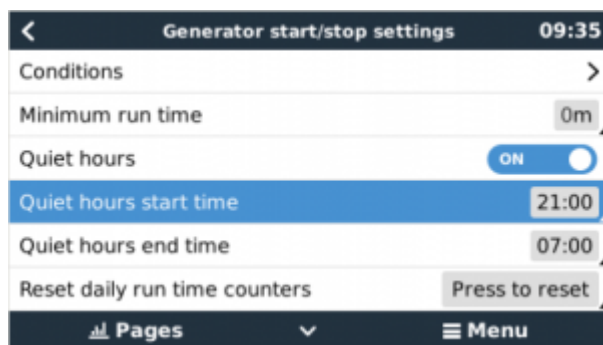
Quiet hours allows you to define a period during which the noise from a running generator would be a nuisance; and to set different values to the conditions which would cause an auto-start during this period - thus ensuring that the generator will only start during a quiet period when it is absolutely necessary.

From the main menu go to: Settings → Generator start/stop → Settings; and then toggle-on the *Quiet hours* feature. Define the *Quiet hours* start- and end- times in the boxes which appear below.

Quiet hours will become the permanent condition (when enabled) if the defined 'start' and 'stop' times are the same.

Using "Quiet hours" as a tool to define two sets of user-preferences

Alternatively, the "Quiet hours" feature can be used to define how you wish your system to respond to different circumstances - for example:

- **Early morning/low SOC**: Battery SOC is often lowest in the morning. Couple this with cloudy weather first thing - or panels which have a westerly bias, and which tend to do better in the afternoon; and you have a circumstance where the generator may auto-start in the morning triggered by a low battery SOC condition - yet later on when the day brightens the solar energy is wasted because the work has already been done by the generator. Setting the *Quiet hours* feature to cover this period, together with lower auto-start conditions, will help to avoid unnecessary generator auto-starts.

- **Holiday home**: Holiday homes which are only inhabited part-time experience much deeper power-draws when they are in use. The *Quiet hours* feature can be used to set much lower auto-start parameters when the house is in use, than when it is empty. Quiet hours should be set to be the *permanent condition* (See above) during occupation; and the *Quiet hours* feature can be toggled 'off' whenever the house is empty.

6. Troubleshooting

Fischer Panda: Generator does not start and "Remote switch control disabled" error is shown

Enable the "AutoStart" function in the Fischer Panda control panel.

Fischer Panda: Auto start/stop function has stopped working after an error

Make sure that the issue is solved, then clear the error, and the auto start/stop function will work again.

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