

Operating a MultiPlus or Quattro in parallel with an Engine Driven Inverter System

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Engine Driven Inverter System or Variable speed AC Generator

A variable speed AC generator, like for instance a Dynawatt or a Dometic Travepower generator, will produce a constant voltage of 230VAC when mounted to the engine of a vehicle or boat. Due to a DC-AC converter mounted to the generator both value and frequency of the generated voltage are (within limits) independent of the engine's speed. A major drawback using this concept is that the power output of these units depends on the engine's speed. In case the engine is running idle or at low speed, the alternator just does not generate power at all ($RPM < 3000$) or performs at a fraction of its maximum rating ($3000 < RPM < 7000$). So, when a large load is switched on while the engine is at low speed, there just may not be enough power available.

Due to the resulting power shortage, these alternator systems may stall or even get damaged beyond repair.

Another issue within mobile applications is the charging of the DC battery in case the original DC alternator was replaced by an AC alternator. One would then need additional equipment to provide solid DC power to charge the vehicle's battery and/or feed other DC loads aboard. This equipment will draw power from the AC alternator as well and using such equipment will therefore have a negative effect on the alternators performance.

A solution for these issues is to install one or more Victron MultiPlus (or Quattro) inverter/chargers in between of alternator and load. A unique feature, found only on the MultiPlus and Quattro models, called 'PowerAssist' enables them to charge the batteries whenever the alternator generates a surplus of energy and is able to generate additional AC power whenever the alternator does not generate enough to feed the full AC load.

This means that when the engine is at moderately high speed, the installed batteries will be charged by the MultiPlus (or Quattro) using the optimum procedure. On the other hand, when the engine is at low speed and the alternator just cannot generate sufficient power by itself, the MultiPlus (or Quattro) will generate the additional AC power required to supply the existing AC load.

The most important requirement for the installation to perform as described is to have knowledge of the engine's actual speed (the alternator's speed). In theory, this could be done by measuring the alternator's AC output but practice has shown that this method is not reliable enough. Being aware of this problem, Victron Energy engineered and created an interface module to measure the actual alternator's speed. Connecting the output of this interface to the MultiPlus (or Quattro) enables the MultiPlus to precisely calculate the power available from the alternator. As a result, the MultiPlus can adjust its own performance to generate the extra AC power needed. No more, no less. This will ensure a power system to perform as expected. At any rpm, with any load.

The graph below globally illustrates the performance of an installation consisting of a Travepower 3,5kW alternator and a MultiPlus 24/3000/70 inverter/charger. Together they provide enough power for heavy loads up to 6500 Watts if needed, but whenever alternator power becomes low, the MultiPlus alone will still provide enough power to feed a 3000 Watt load. As a rule of thumb, the maximum load installed is usually limited by the alternator's maximum performance, so now sufficient AC power will be available all the time!

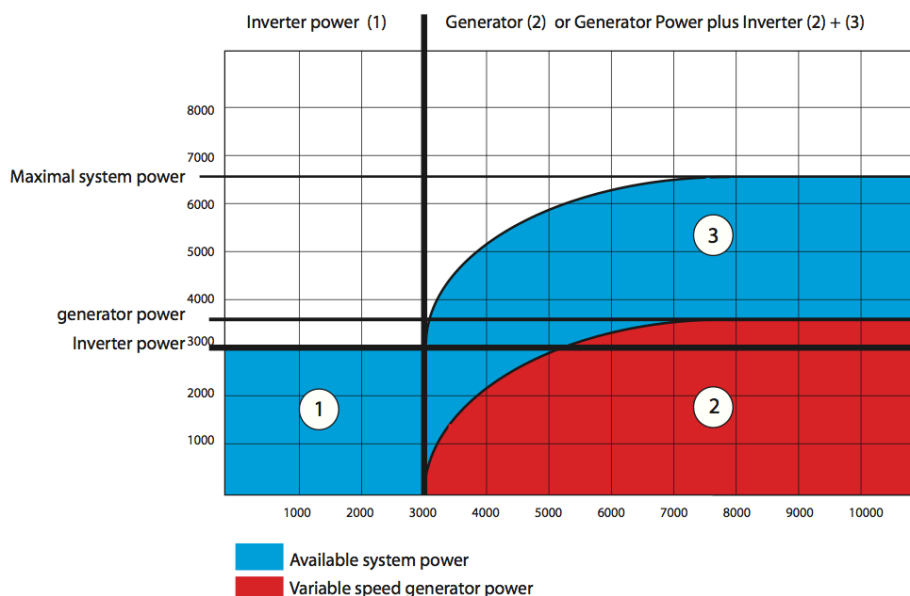
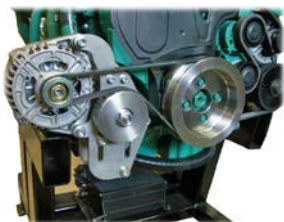


Figure 1 : Increased power performance, showing allowable load (Watt) versus alternator speed (RPM).

Brief installation instructions

Required:

- one or more Victron Energy MultiPlus inverter/charger(s) with firmware 19xx008 or newer.
- a Victron Energy 16A transfer switch (optional).
- a Victron Energy INTERFACE 1140 module (tachometer).
- a remote panel with generator support (a VE.Bus Multi Control or a VE.Bus Digital Multi Control).
note : firmware 1120119 or newer is required when using an external relay as a transfer switch.
- an UTP cable, available from Victron Energy as well.

Steps to perform:

- connect one end of a color-coded twin-wire cable to the tacho connections on the generator and connect the other end to the input of the INTERFACE 1140 module.

Warning :

Very high voltage may be present on these wires, that can be hazardous for humans and animals. Be sure to make solid connections. Cable or wires used may never be subject to mechanical stress.

- Connect an UTP cable between the INTERFACE 1140 output and the MultiPlus.
- When using an external relay as transfer switch, be sure to connect the Remote Panel as shown.

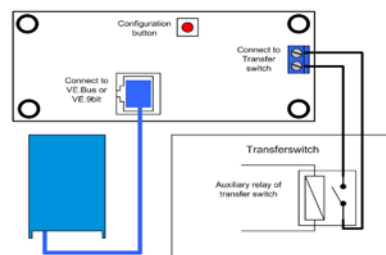


Figure 2: *Using an auxiliary relay*
The auxiliary relay contact must be closed whenever the engine's generator is selected.

Remarks:

- In case a Remote Panel is connected and AC power is drawn from shore, the shore current setting as specified by the Remote Panel is used and measured values from INTERFACE 1140 are ignored.
- When no Remote Panel is connected, the MultiPlus will always use the shore current set point as derived from the INTERFACE 1140 measurements.

The '*Dynamic Current Limiter*' setting must be unchecked and the '*Overruled by Remote*' setting must be checked (both settings are preset this way by default). The value of the '*AC Input Current Limit*' setting will be ignored.

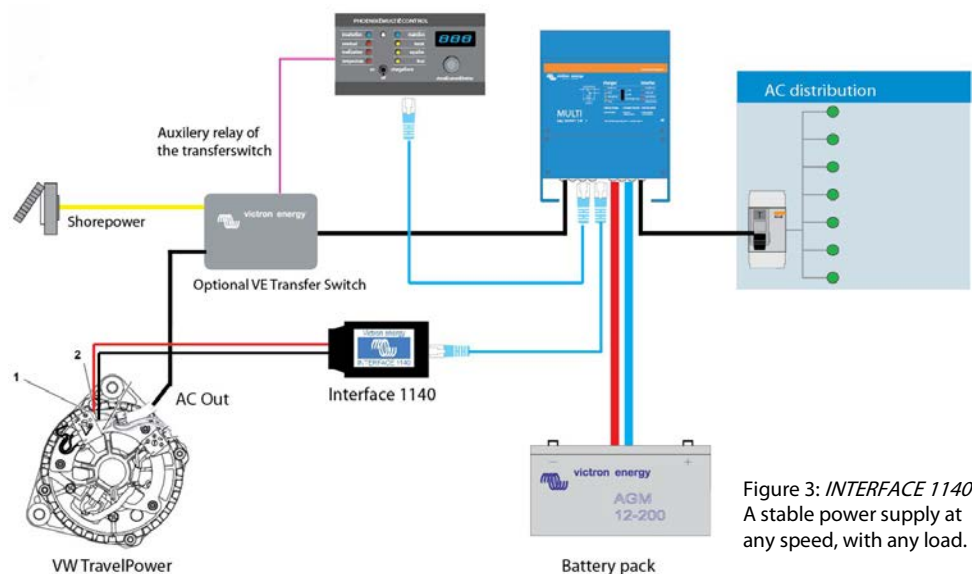


Figure 3: *INTERFACE 1140*
A stable power supply at any speed, with any load.