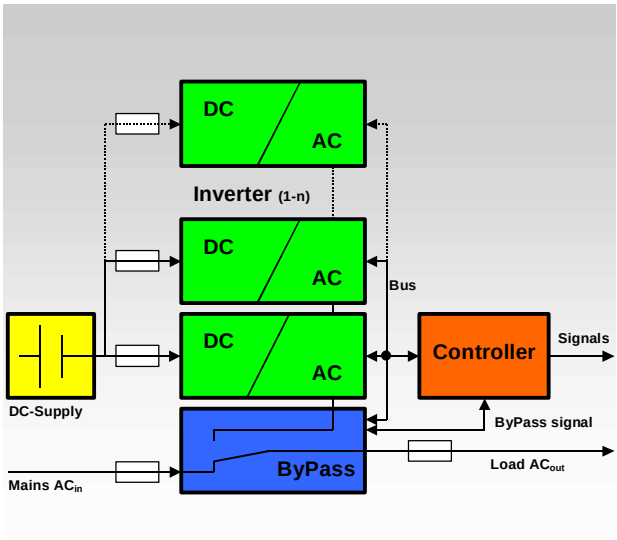

LavaLINE® System Overview

The system includes one controller and up to twelve inverters in parallel. The series inverters are available in 2kVA and 4kVA output power versions.

The controller is mandatory for systems operation. The controller is able to either manage a single inverter, or several inverters with even differing output power classes, due to an automatic recognition function by the controller.

An optional electronic bypass can be connected to the controller, the controller will automatically detect bypass error messages and assure the power supply of the connected load by switching over to mains (in OnLine mode) or inverter output (in OffLine mode).

The system is redundant. The bus communication among all devices and the AC output of each single device is built in a manner that assures exchange of a single inverter at any given time without having to shut down the entire system.

LavaLINE® Controller

Three RISC processors control the core of the system. They measure DC input voltage, mains and inverter voltage (momentary and effective) and mains frequency. DC input voltage, AC output voltage and output power of the entire system are displayed.

Several system limits are user configurable to assure optimal performance according to the environment the system is used in. The system configuration can be altered manually with four push-buttons and the display on the front panel. The user friendly menu interface makes alteration an easy-to-do task. The second option is to use an OS independend standard terminal program and change the system's limits via the RS-232 interface. The communication is text based, with short commands for the controller, which eases the integration of protocols into existing custom software.

Once limits have been set or defaults have been altered, they are saved to controller's nonvolatile memory, so that these custom specific values are available again on following startups of the system.

On system startup the controller checks the number and output power values of all attached inverters. These values are used to calculate the maximum total output power, or mains overload, of the entire system. In case redundancy is required, the calculated mains overload limit can be altered to the limit minus output of one inverter. It is also saved to nonvolatile memory.

In addition to these limits, inverter overload, undervoltage and overvoltage can be user configured for the output side of the system.

The DC supply limits are also variable, as defined below:

First Start (1): To startup the entire system, the "First Start" limit has to be reached and exceeded on the battery terminals.
UVP (2): The inverters are shut down when undervoltage protection level "UVP" is reached, in order to avoid deep discharge of the battery cells.

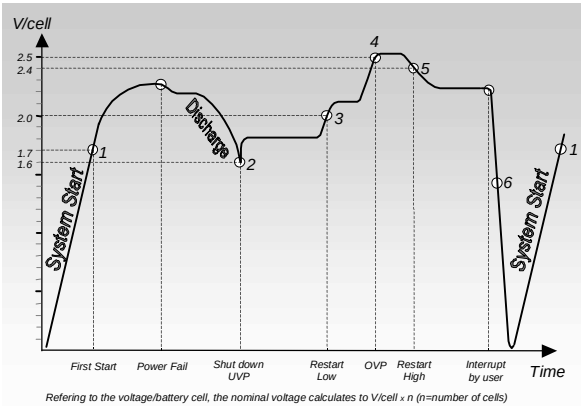

Diagram 1.1: Battery surveillance

Restart Low (3): After inverter shut down due to "UVP", the DC level has to come up to "Restart Low" level again. The inverters are enabled again.
OVP (4): At voltage level "OVP", all inverters are shut down (overvoltage protection).
Restart High (5): If inverters were shut down due to "OVP", decreasing the DC voltage to "Restart High" causes the inverters to be enabled again.
Reset (6): If the inverters are breaking off from battery (for example, the user switches off the battery switch) the terminal voltage drops below "Reset" limit, the limit for the system to operate again is reseted to "First Start" level.

In order to assure operation within all limits, the controller remains enabled at all times, exeeding these limits.

The controller can be connected to an optional bypass module (please see ByPass). With the bypass the system can be operated in either OnLine mode (load is supplied by inverters) or in OffLine mode (load is supplied by mains). The configuration is to be set in the controller module.

The bypass ist redundant to the controller. In case of a controller failure the bypass assures the power supply of the connected load.

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