Solar-Log™ Smart Metering

1 Monitoring power consumption

The Solar-Log$^{500/1000}$ not only records power production, the Solar-Log$^{500/1000}$ can also register power consumption, also often called "smart metering". To do this, you must connect the Solar-Log™ with the S0 output of a digital meter reader via the integrated S0 interface (on the upper left side of the device). Information on making the connection can be found in the chapter "Installation instructions".

2 Own power consumption

Specifically on the topic of your own individual power consumption and in particular for your "individual power rate", additional functions have been added to the Solar-Log^{1000} which can be uploaded to existing devices via a software update. For the functions described below, at least firmware 2.3.0-30 is required on the Solar-Log™.

- Calculation and display of current balance with smiley display
- Optimisation of individual power consumption by switching external consumers

3 Power balance

If a meter reader in the Solar-Log^{1000} is configured with the "consumption meter" model, an additional "Power balance" dialogue box is available on the touchscreen.
In this dialogue box, the current power values are shown and the surplus power is calculated. Depending on the surplus amount, a "smiley" indicates whether it makes sense or not to switch on consumers manually at that moment.

The values for the power production update themselves approximately every 20 seconds, and those for the consumption approximately every 60 seconds. On the upper right, the small boxes show the status of the external switches - more on this below.
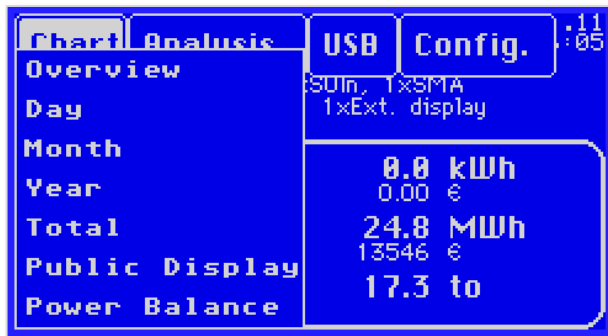
4   Optimising your own power consumption

In order to ensure that your own power consumption is targeted to periods in which sufficient power is being produced, the Solar-Log^{1000} offers the possibility to switch on up to 4 consumers automatically and switch them off again when appropriate. The devices are switched on and off via network outlets (available as accessories) or via the internal relay of the Solar-Log^{1000}. Please note that this relay may only be connected to a low voltage.

The devices are controlled based on the current power surplus, i.e. "production minus consumption". If there is no consumption meter connected, the device can still be controlled, but only independently of the actual power production.

In order to avoid rapid fluctuations in the calculation of the power surplus, e.g. as a result of very sudden solar radiation, the device always works with 5 minute average values.

4.1 Definition of external switches

External consumers are generally switched on and off via so-called "network outlets". These are special outlets that have a network connection (Ethernet) by which they are switched by the Solar- Log™.

The Solar-Log™ currently supports the following switches:

- the Solar-Log's built-in relay
- network outlet Allnet3075/3076 (cable-based)
- network outlet Allnet3000RF (radio-based, small range)

We plan to extend the Solar-Log™ for use with further switch models by way of firmware updates. On the touchscreen, in the dialogue box "Config / Extended / External switches", the switches can be defined:
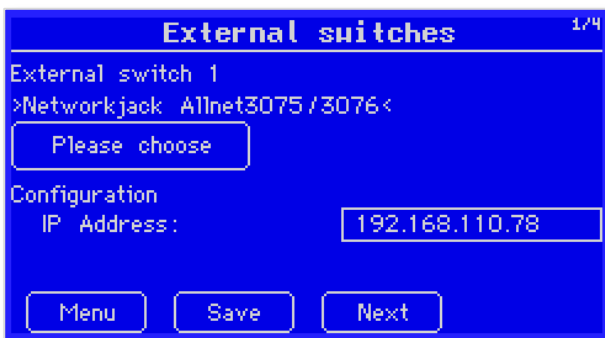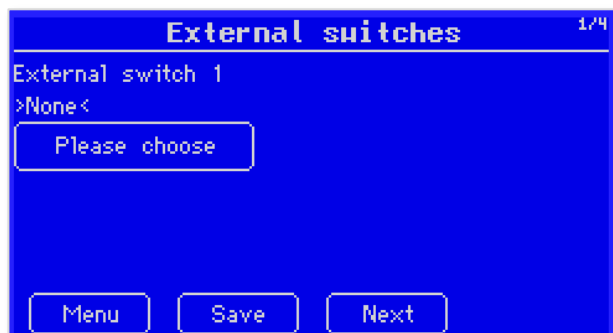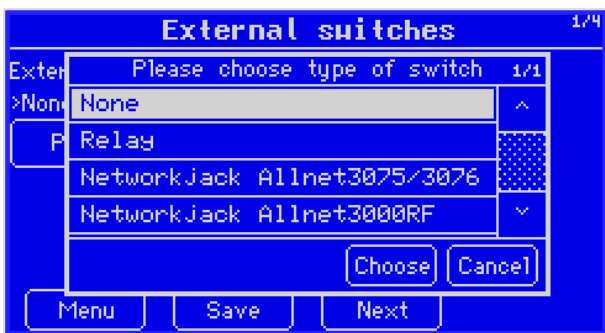
Depending on the switch model selected, various additional addresses must be entered, e.g., the IP address for the network outlet. Please note that the IP addresses of the outlets must be positioned in the same address area in which the Solar-Log™ is also located. To set the IP address for the network outlet, please read the accompanying manual or ask a network expert.

4.2 Controlling external switches
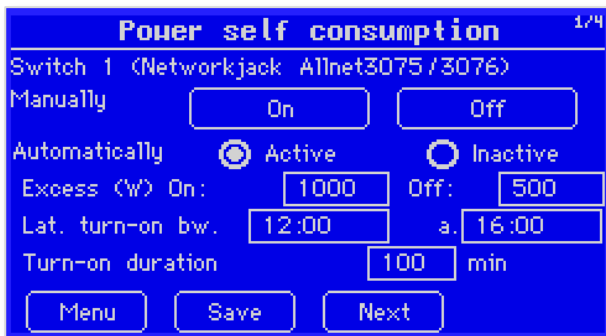
After defining the switches, the controls must be configured. These settings are made in the dialogue box "Analysis / Self consumption".

There is the possibility to manually switch the switches "On" or "Off", as well as to define automatic switching.

The automatic function depends on the current surplus production, a switch-on time and a switch-on period, which also work in combination with each other. Therefore, e.g., a washing machine can be switched on at a certain power surplus level or, if this value is not reached due to bad weather, at a certain time.

The threshold values "On" and "Off" define the switch-on and switch-off values, depending on the current power surplus. If an appliance needs to run permanently after being switched on (e.g., a washing machine), the "Off" threshold value must be set to "-9999". However, it is always switched off when the switch-off time has been reached (see below).

Via the "Latest switch on" parameter, a period of time can be defined within which the appliance always switches on, even if the "On" threshold value is not reached (Example: the washing cycle must be finished by the evening, in any case). The exact switch-on time is redefined daily via a random generator within the selected period to avoid network load as a result of consumers switching on at the same time ("All appliances switch on at 12 noon!").

The control logic can be shown as follows:

Switching on
      As soon as the switch-on threshold has been exceeded OR
      As soon as the switch-on time has been reached
Switching off
      As soon as the switch-off time falls below level OR
      As soon as the switch-off time has been reached (switch-on time + period)

To switch off the time control function completely, i.e., only one appliance is driven depending on the power surplus, the period must be set to 00:00 to 00:00, and the switch-on period to 0 also.

If only 1 external switch on the Solar-Log™ is configured, the power surplus is always drawn on for the automatic switching function. If there are several switches, the surplus is no longer used; only the actual power produced is used. The reason for this lies in the fact that the power consumption of the consumers is generally not equally high during the switching period (e.g. washing machine); instead, it changes continually. For several consumers of this kind, the calculated power surplus would thus continuously fluctuate such that optimum control would become impossible.

Solar-Log™
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