

Correct configuration of nominal voltage to prevent abnormal output voltage of PR/EPS systems.

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I Executive summary:

For PR/EPS systems, incorrect setting of the nominal output voltage would result in misleading the Automatic Voltage Regulation (AVR) to regulate normal incoming voltage into abnormal output voltage.

This document provides an introduction to the AVR feature and the procedures for users to follow in order to prevent this issue.

I How does AVR work?

Automatic Voltage Regulation (AVR) is an advanced technology which is capable of stabilizing incoming voltage when power quality exceeds normal power criteria. If the input voltage is within the predefined voltage range, as shown in Figure 1, there will be no need for any voltage adjustments. If the input voltage exceeds the predefined upper limit, the AVR will automatically lower the output voltage, this is known as “AVR buck”. If the input voltage drops below the lower limit, the AVR will automatically increase the output voltage, this is known as “AVR boost” (please refer to Figure 2).

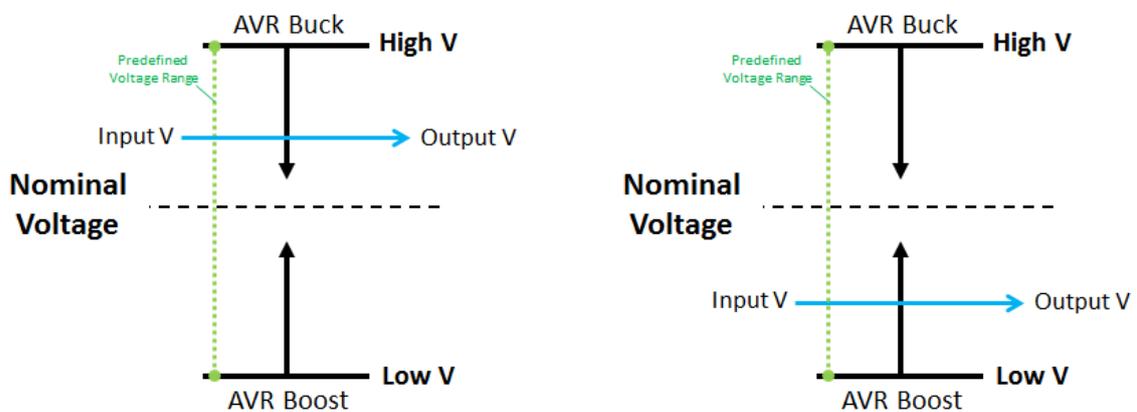


Figure 1- Normal input voltage within predefined range

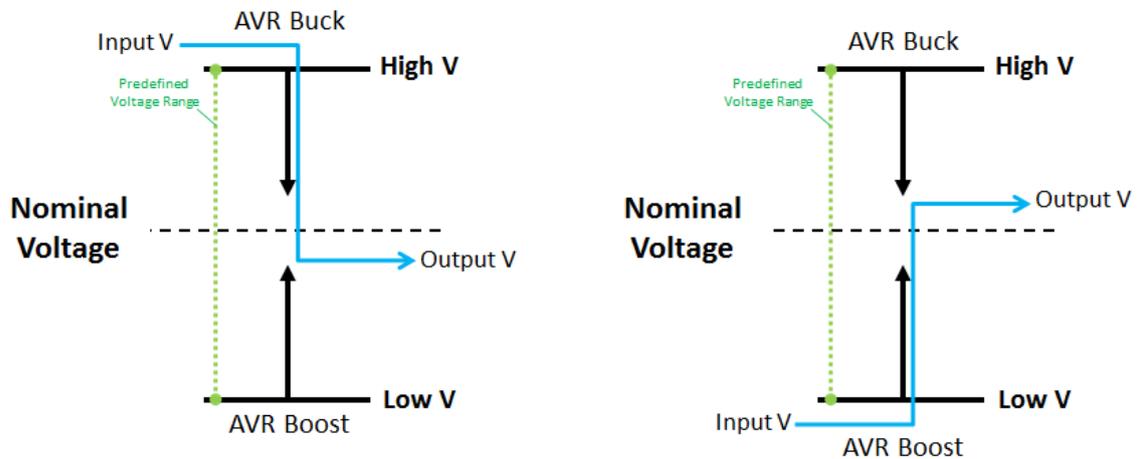


Figure 2- AVR Buck (left) and AVR Boost (right) which adjust input voltage

Abnormal voltage drop due to incorrect voltage setting

Users have reported that the output voltage of PR/EPS abnormally drops even when the input utility was checked and confirmed to be within normal utility range. The potential cause of this issue may pertain to the incorrect setting of the nominal output voltage level.

For certain PR/EPS models, users are allowed to select the nominal output voltage level from 220/230/240Vac. According to each nominal voltage, the AVR range will also adjust accordingly (please refer to Figure 3).

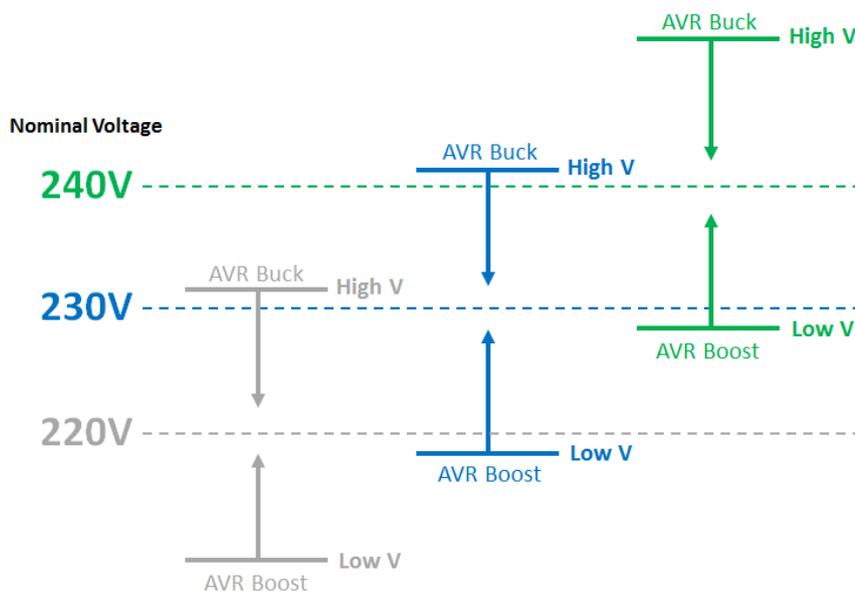


Figure 3- Adjustable nominal voltage and corresponding AVR range

Due to this flexibility, the sudden voltage drop would occur when the nominal output voltage is not correctly configured according to the nominal voltage level of the local utility power.

For example, if local nominal voltage is 240Vac but the output nominal voltage of PR/UPS is configured as 230Vac (please refer to Figure 4), AVR buck would kick in when the input utility voltage slightly rises above AVR predefined range, thus, resulting in sudden output voltage drop which then would most likely exceed the voltage tolerance for normal operation of the connected loads.

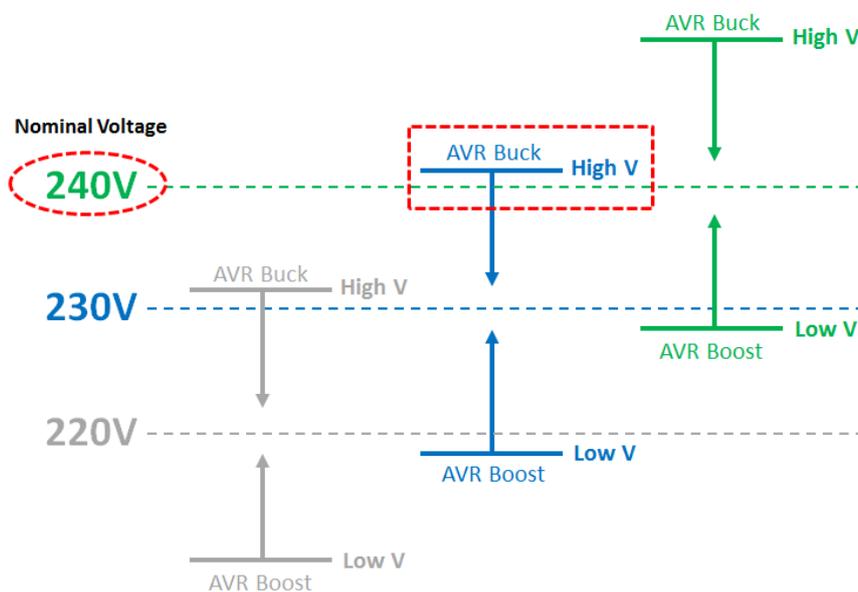


Figure 4- Typical issue: High local nominal voltage and lower AVR range setting

How to prevent this issue?

However, if the nominal output voltage setting is checked in advance and well-adjusted to the correct level, this issue can be prevented. Please follow the procedures below to check and adjust nominal output voltage to the correct setting:

1. Press “Display” button and hold for 10 seconds to switch to “Setup Mode”.

When all 6 status icons (Line Mode/Battery Mode/AVR/Silent Alarm/Overload/Fault) on LCD all illuminate (please refer to below figure 5), that means you are already in “Setup Mode”.

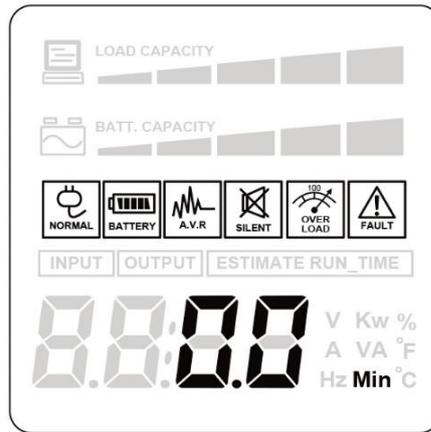


Figure 5- LCD Display when in "Setup Mode"

2. Press "Display" button to switch between items of setup functions. Table 1 shows the available option items that you can select in "Setup Mode".

Table 1- Option items of "Setup Mode"

Items	Unit
Delay Time	Min
Battery Capacity	H
Charging Current	A
Nominal Output Voltage	V
Static Frequency Tolerance	%
Slew Rate	%
Battery Shutdown Voltage	V
Mode Select	None
Firmware Version	
Error Code	

3. Please select "Nominal Output Voltage" (please refer to Figure 6 below), then press "Display" button and hold for 4 seconds to configure the option (when all 6 status icons will start to blink).



Figure 6- LCD display of "Nominal Output Voltage" in "Setup Mode"

4. Check whether the current nominal output voltage is the same as local utility grid voltage. If not, press “Display” button to switch between selectable items (220V, 230V and 240V) and adjust it to the correct voltage level. For example, if the nominal voltage of local utility grid is 240Vac, then set the parameter to “240”.

5. In order to confirm and save the changed parameter, press “Display” button and hold for 4 seconds.

6. When LCD display is back to normal operation status (the “General Mode”), the configuration is done successfully.