Conext™ Core XC and XC-NA Series: DC to AC Over-paneling Application Note

AP-XC-056-EN
Revision B

Overview

This Application Note discusses the maximum possible technical over-paneling (DC to AC) ratio that the Conext Core XC and XC-NA Series inverters can accept, examines the design constraints, and provides methods for calculating maximum over-paneling.

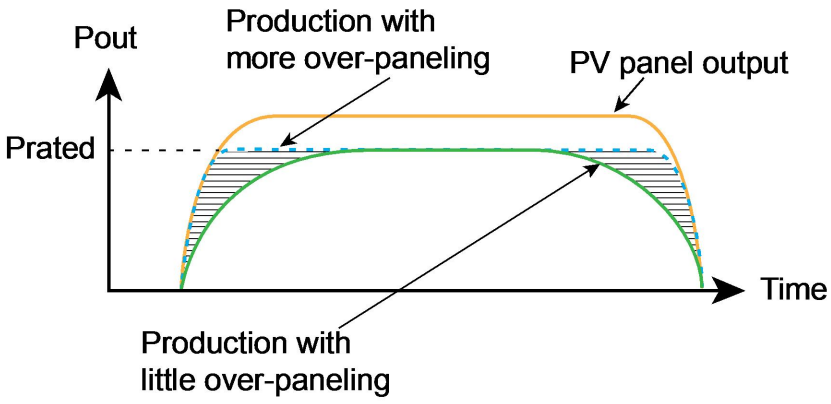
The optimum over-paneling for maximizing the return on investment depends on various factors, including but not limited to, PPA rates, panel costs, climactic conditions, and is outside of the scope of this document.

Reasons for Over-paneling

In the past, PV system designers ensured that the maximum yield was obtained from the costly PV panels installed. The inverter spent very little time power limiting when the output of the array was beyond the inverter's output capacity.

In recent years, systems are being designed with higher ratios of DC to AC power so that the inverters are able to produce maximum rated power for longer periods during the day. This means that sometimes the inverter has to power limit when the PV panels are generating excessive power. *Figure 1* compares power outputs with and without over-paneling.

Figure 1 Over-paneling power output



There are two main reasons for having higher DC to AC ratios:

- With the recent drop in PV panel prices, similar or better levelized cost of energy (LCOE) can be achieved with higher DC to AC ratios.
- Some power plants, that are approved to generate a fixed amount of power and cannot exceed their limit, want to maximize their DC panel sizing so that they can produce maximum power during the day.

Over-paneling Constraints

The Conext Core XC and XC-NA Series inverters' over-paneling ratio is constrained by the following product specifications:

- Short circuit current, $I_{stc} \leq 1600$ A
- DC input open voltage, $V_{oc} \leq 1000$ V

As long as the above conditions are applied during the DC system design, the Conext Core XC and XC-NA Series inverters remain compliant.

Maximum Over-paneling

The maximum over-paneling possible for the Conext Core XC and XC-NA Series inverters is dependent on the PV panel and temperature range of the installation site. The following table provides an example of maximum over-paneling for a site:

SunPower™	DC Over-paneling Ratio		
SPR-320E	**XC680**	**XC630**	**XC540**
Temperature 0 to +50 °C (32 °F to +122 °F)	1.687	1.820	2.124
Temperature -40 to +50 °C (-40 °F to +122 °F)	1.57	1.69	1.97

Note: The above calculations are based on 45 °C (113 °F) panel surface temperatures and are presented for comparison purposes only. A complete site analysis is required to determine the best possible over-paneling while avoiding over-voltage, over-current, and excessive cost. For assistance in calculating over-paneling for your project, contact Schneider Electric.

Over-paneling Effect on Inverter's Life and Warranty

When the DC array is oversized, the inverter produces maximum rated power for longer periods in a day. This means that the internal temperature of the inverter stays high for longer periods.

Generally, the lifetime calculations for most field replaceable units of the Conext Core XC and XC-NA Series inverters have been done with the assumption that the inverters produce full power at ambient temperature of 45 °C (113 °F) for 8 hours per day, 365 days a year. As long as the Conext Core XC and XC-NA Series inverters are over-paneled without exceeding the above conditions, the warranties on the inverters are not affected.

If your project exceeds the above conditions, contact Schneider Electric to find out if your inverter's warranty is affected.

Exclusion for Documentation

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Contact Information

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