Derating Curve

3PH 100/110kTL-V3

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Revision

Rev.	*Date*	*Author*	*Description of changes*
00	27/02/2025	L. Aita	First issue

1. Purpose of the document

This document collects all power derating curves and the potential changes that apply to them from the last FW during testing. There are three main types of derating:

- Power reduction based on DC/AC voltage
- Temperature derating

 **Note**	**Warning: The various derating curves may change during FW releases subsequent to those tested during the writing of this document.**

1.1. Power limitation of each MPPT based on input voltage

The power limiting curve based on DC voltage follows the figure below:

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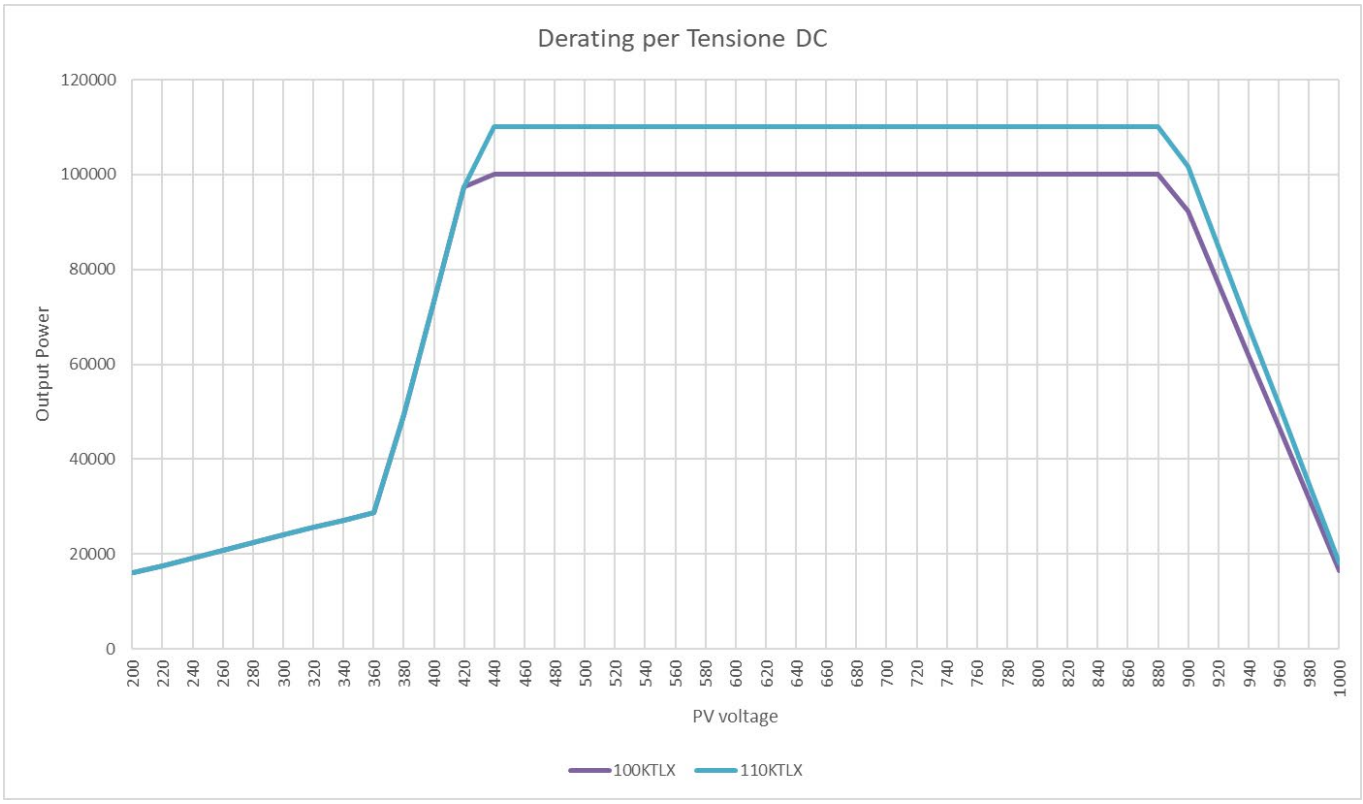

Below is a table describing the values in the image above the rated voltage:

models	P1(W)	P2(W)	P3(W)	V0(V)	V1(V)	V2(V)	V3(V)	V4(V)	V5(V)	V6(V)
100KTL-V4	14400	100000	16400	180	360	420	440	880	900	1000
110KTL-V4	14400	110000	18040	180	360	420	440	880	900	1000

where:

- V0 is the minimum voltage to deliver the minimum power of the inverter
- V1 is the voltage for the first knee (360V)
- V2 is the voltage for the second knee (420V)
- V3 is the minimum DC voltage to deliver the maximum power of the inverter

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- V4 is the maximum DC voltage to deliver the maximum power of the inverter
- V5 is the voltage for the third knee (900V)
- V6 is the maximum working voltage of the inverter
- P1 is the power in V0
- P2 is the rated power
- P3 is the power in V6

The values cannot be modified by sending commands and are intrinsic limits of the operation of the inverters. The output power values can vary significantly depending on the mains voltage.

1.2. Power limitation based on mains voltage

The power limiting curve based on AC voltage follows the figure below:

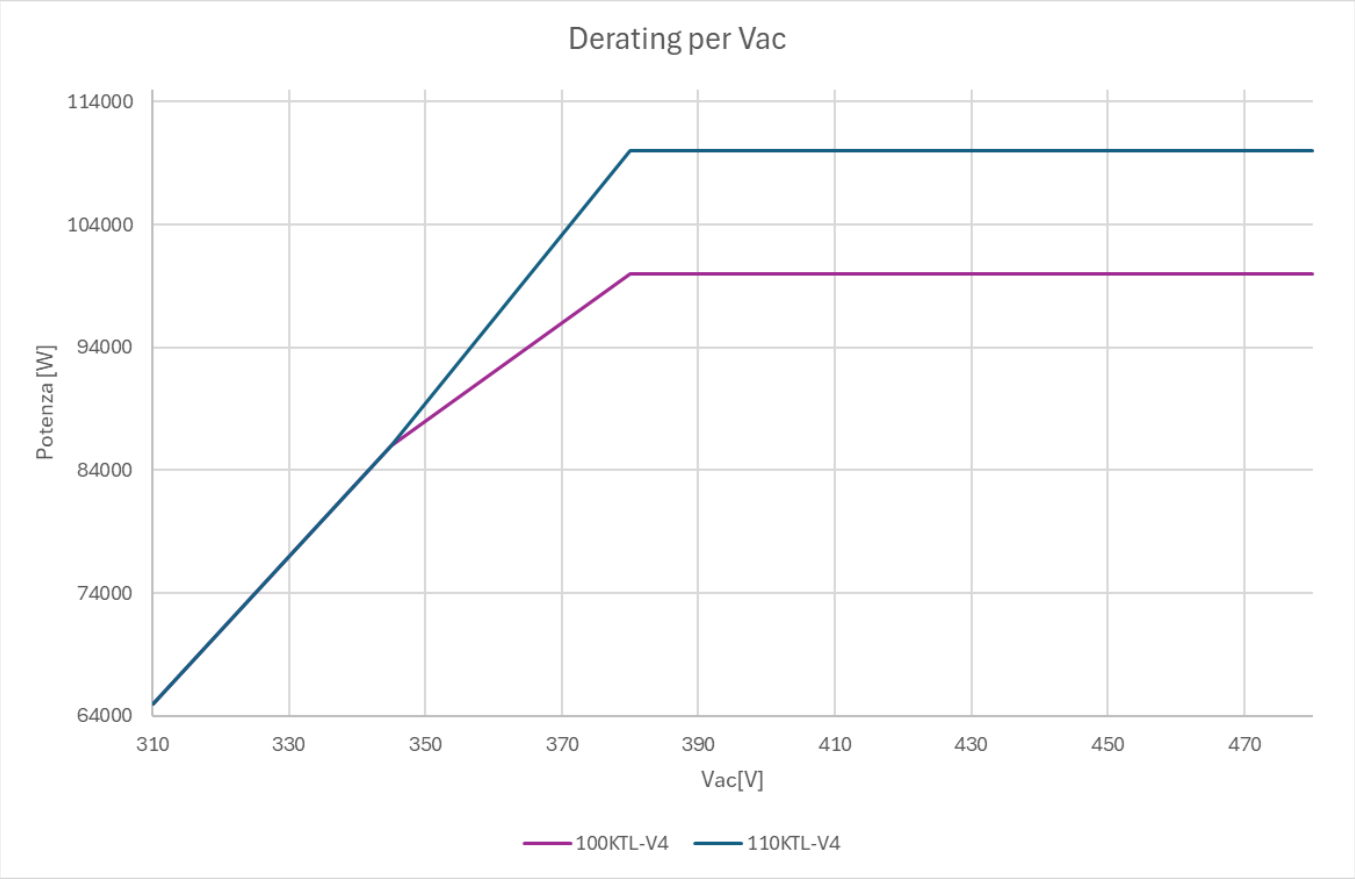

Figure 3 – Output Power Limitation Based on AC Voltage

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Here's a table describing the values in the image above:

models	P1(W)	P2(W)	P3(W)	V0(V)	V1(V)	V2(V)
100KTL-V4	100000	65000	100000	310	380	480
110KTL-V4	110000	65000	110000	310	380	480

Note: V0,V2,V3 are defined by the regulations in force in the various Safety Files.

where:

- V0 is the minimum AC voltage to deliver the minimum inverter power
- V1 is the minimum AC voltage to deliver the maximum power of the inverter
- V2 is the maximum AC voltage to deliver the maximum power of the inverter
- P1 is the active power rating of the inverter
- P2 is the 310 Vac power
- P3 is the power at 480Vac

The V1 and V2 values can be modified by sending specific commands to the inverter via the Azzurro Operators APP, see the dedicated section. The output power values can vary significantly depending on the input voltage.

1.3. Power limitation based on temperature

The temperature-dependent power limiting curve follows the following two figures:

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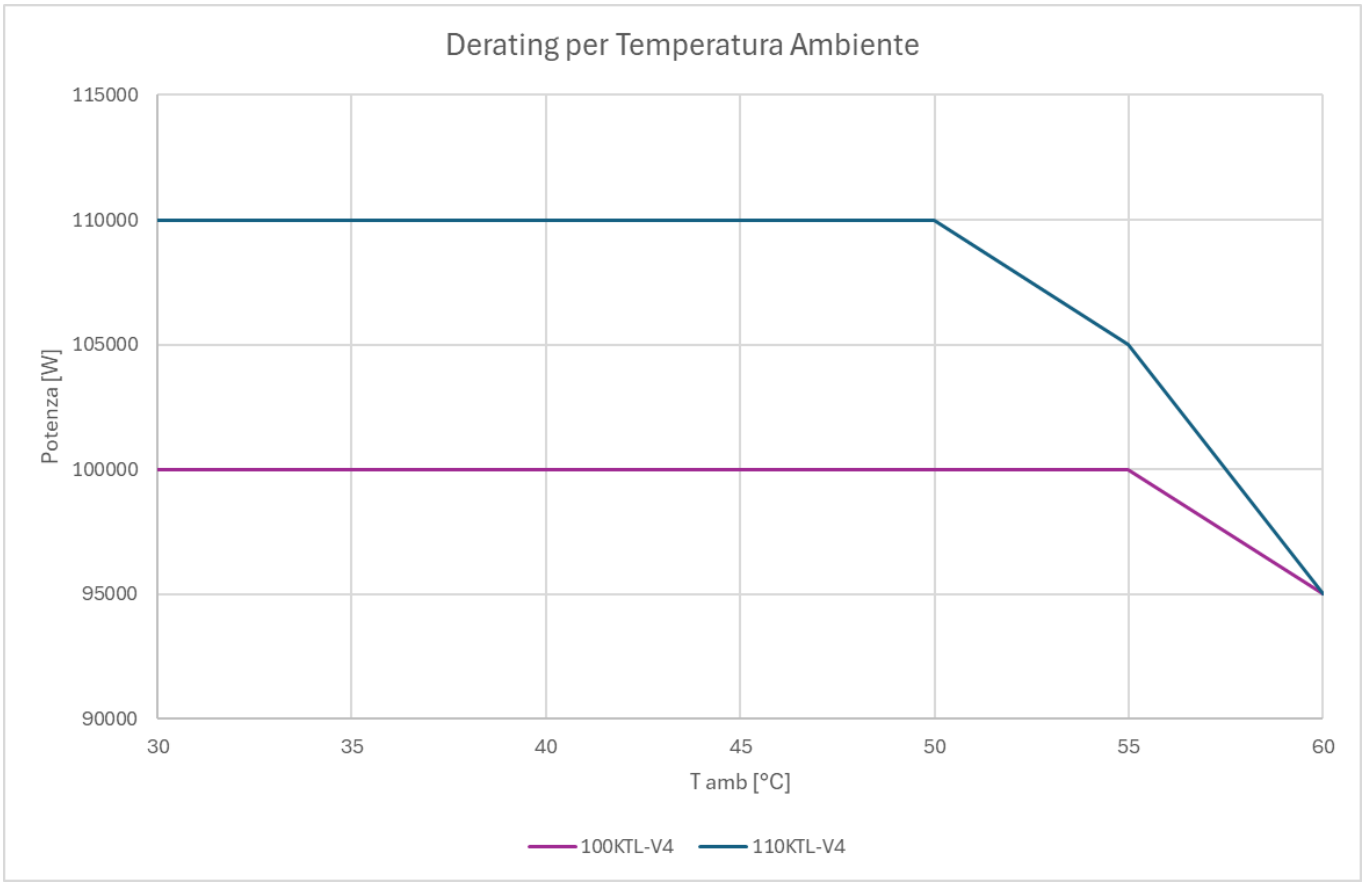

Figure 5 – Active Power Limitation Based on Ambient Temperature

Below, a table describing the values in the image above related to the ambient temperature:

models	P1(W)	P2(W)	P3(W)	T1(°C)	T2(°C)	T3(°C)
100KTL-V4	100000	100000	95000	50	55	60
110KTL-V4	110000	105000	95000	50	55	60

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where:

- T1 is the minimum temperature at which derating begins
- T2 is an intermediate temperature value for which the derating becomes more marked
- T3 is the maximum allowable temperature for power delivery by the inverter
- P1 is the active power rating of the inverter
- P2 is the power value at point T2
- P3 is the minimum power allowed by thermal derating

The values cannot be modified by sending commands and are intrinsic limits of the operation of the inverters

Attention	**Attention: The intervention of the temperature limitation is strongly conditioned by the installation. The inverter manual shows the minimum distances and correct positioning of the inverter to avoid untimely temperature limitations.**

1. How to change or apply power limitations

The modifiable power limitations can be enabled, disabled or changed in their values via local access or remotely (if the inverter is connected via logger to ZCS Azzurro systems).

Local access is possible using:

- **The Azzurro Operators APP** (downloadable on the Play Store or IoS store)
- **Modbus commands sent on RS485 or TCP** via external loggers (modbus register map required to be requested from ZCS)
- **Inverter display** (not all controls are available)

Remote access is possible using:

- **The Azzurro Operators APP** (downloadable on the Play Store or IoS store)

In the rest of the document there will be exemplary screenshots of the access and modification sections, these sections are only indicative as the APP and portal are constantly changing and evolving and the graphic details may differ from the versions in use.

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1.1. How to Apply a Constant Active Power Limitation

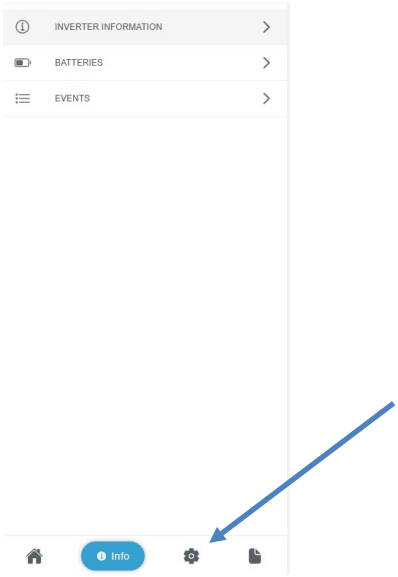
In cases where necessary, it is possible to apply a maximum output power value from the fixed inverter. This upper limit value is in addition to all the limiting curves already highlighted above. The set limitation remains stored even if the inverter is switched off and restarted.

Applying the limitation via display

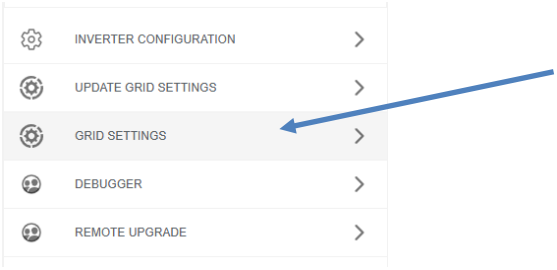
- Enter the inverter menu by selecting the "Settings" item
- Select the item "Power limit"
- Set Enable
- Select the desired limiting % (100%=Inverter power rating; 0%=0W)

Application of the limitation via the Azzurro Operator APP

- After connecting to the inverter, select the settings



- Select the "Grid settings" menu



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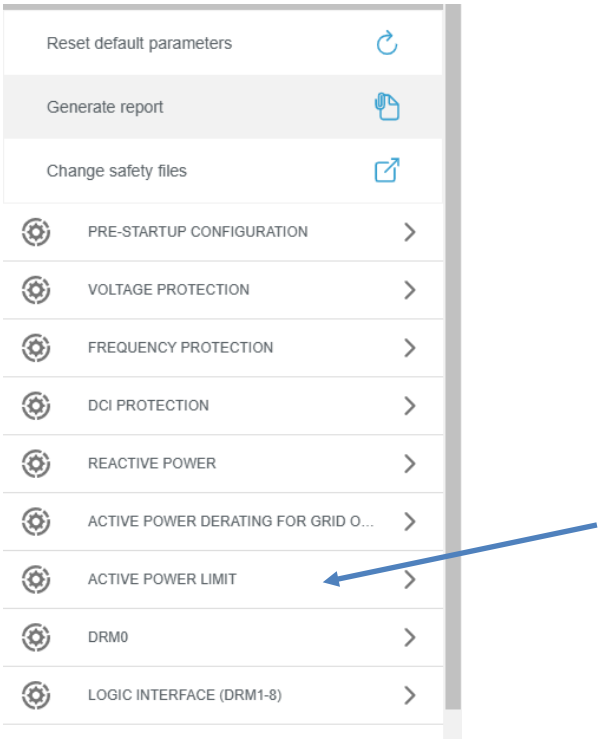
- Select the "Active Power Limit" menu



- Set the values of enable, % throttling, and settling time as desired

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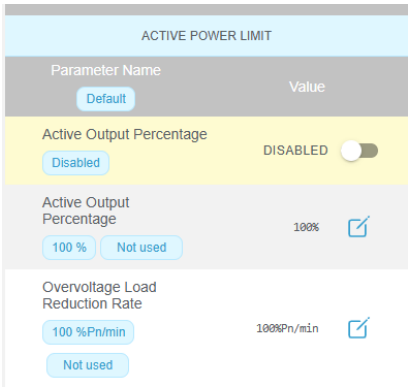
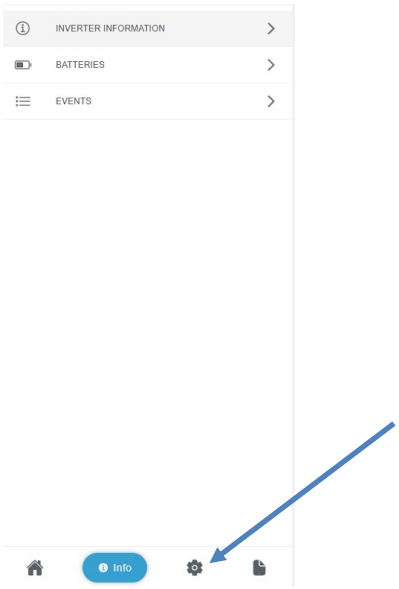


1.2. How to change the power limiting curve based on the mains voltage

In cases where necessary, it is possible to modify the limiting curve according to the mains voltage. New settings are also stored if the inverter is switched off and restarted.

Curve modification via Azzurro Operator APP

- After connecting to the inverter, select the settings



- Select the "Grid settings" menu

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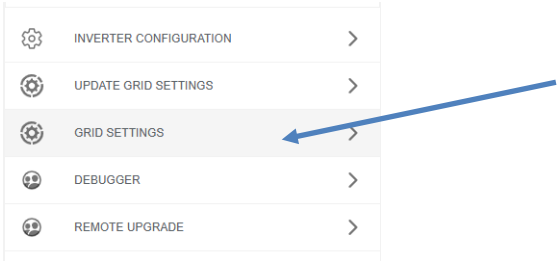
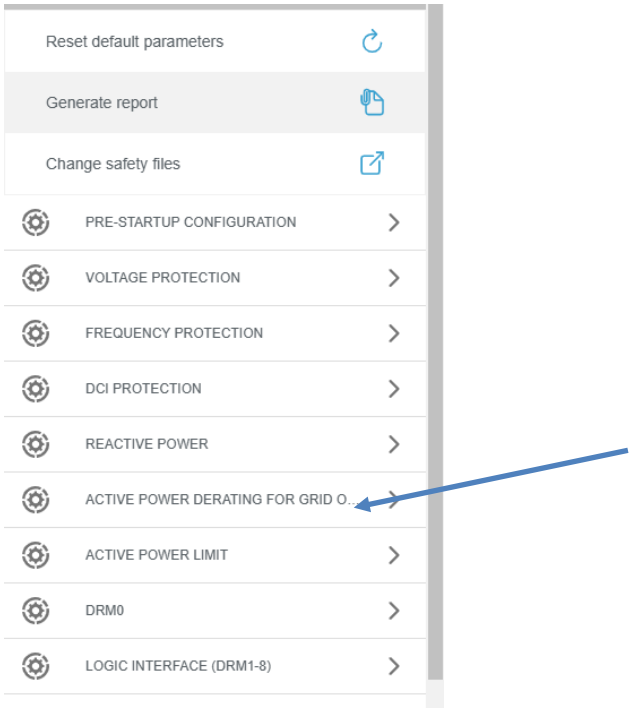


- Select the "Active Power Derating for Grid Overvoltage" menu



- Set the curve values as desired. The graph will show the actual curve set

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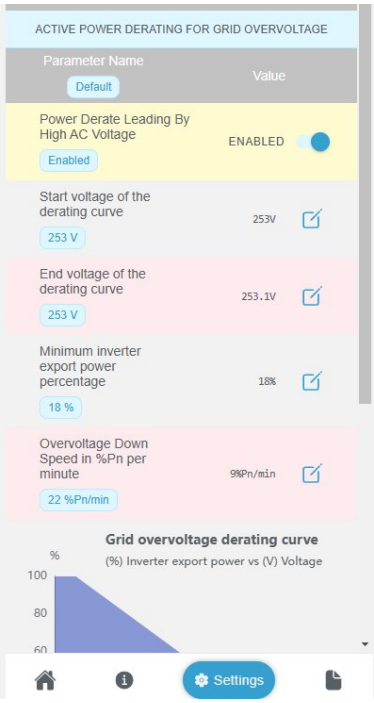

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