

Derating Curve

3PH 25-50kTL-V3

Revision	2
1. Purpose of the document	2
1.1. Power Limitation of Each MPPT Based on Input Voltage	2
1.2. Power limitation based on temperature	3
1. How to change or apply power limitations	5
1.1. How to apply a constant active power limitation	6
1.2. How to change the power limiting curve based on the mains voltage	9


Revision

Rev.	Date	Author	Description of changes
00	08/01/2025	L. Aita	First issue
01	05/02/2025	F.Mastronardi	Corrected typos and added parameter modification section

1. Purpose of the document

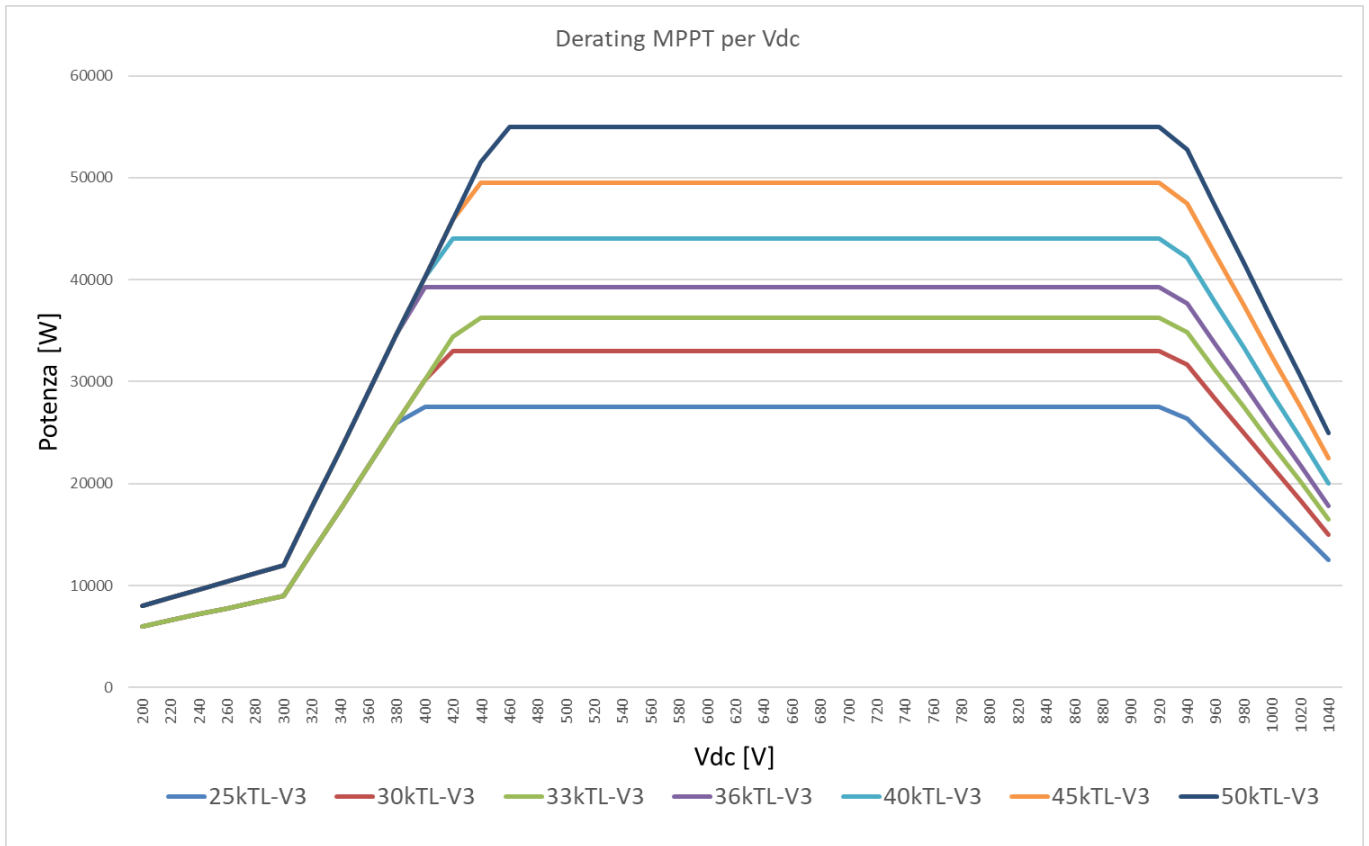
This document collects all power derating curves and the potential changes that apply to them from the last FW during testing. There are three main types of derating:

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

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

1.1. Power limitation of each MPPT based on input voltage

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



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

models	P1(W)	P2(W)	V0(V)	V1(V)	V2(V)	V3(V)
25KW	6000	27500	200	400	920	1040
30KW	6000	33000	200	420	920	1040
33KW	6000	36300	200	440	920	1040
36KW	8000	39300	200	400	920	1040

40KW	8000	44000	200	420	920	1040
45KW	8000	49500	200	440	920	1040
50KW	8000	55000	200	460	920	1040

where:

- V0 is the minimum voltage to deliver the minimum power of the inverter
- V1 is the DC voltage where the slope changes before V2
- V2 is the minimum DC voltage to deliver the maximum power of the inverter
- V3 is the maximum DC voltage to deliver the maximum power of the inverter
- V4 is the DC voltage where the slope changes after V3
- V5 is the maximum working voltage of the inverter

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

1.2. Power limitation based on mains voltage

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

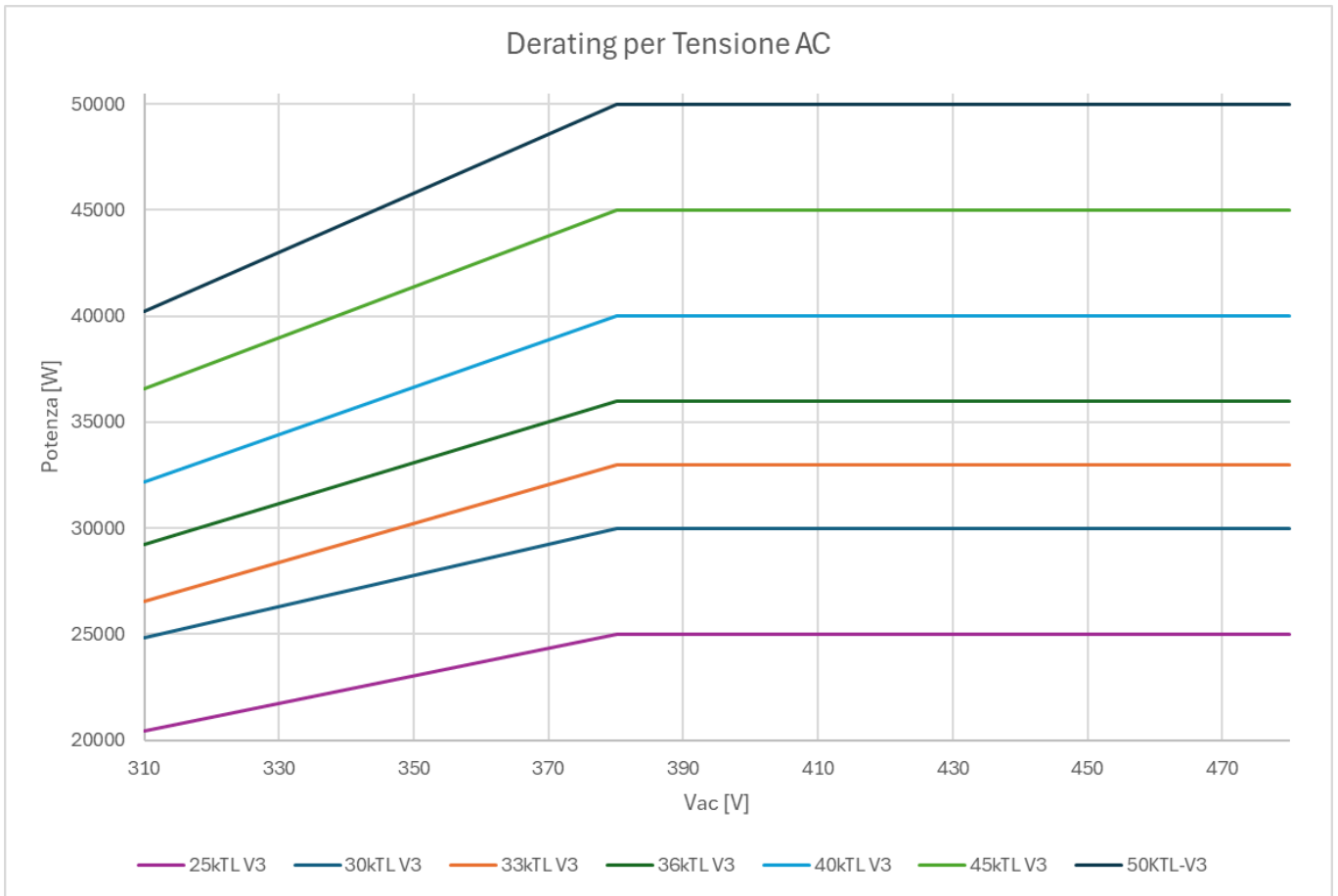


Figure 3 – Output Power Limitation Based on AC Voltage

The V1 and V2 values can be modified by sending specific commands to the inverter via the Azzurro Operators APP, see the dedicated section.

1.3. Power limitation based on temperature

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

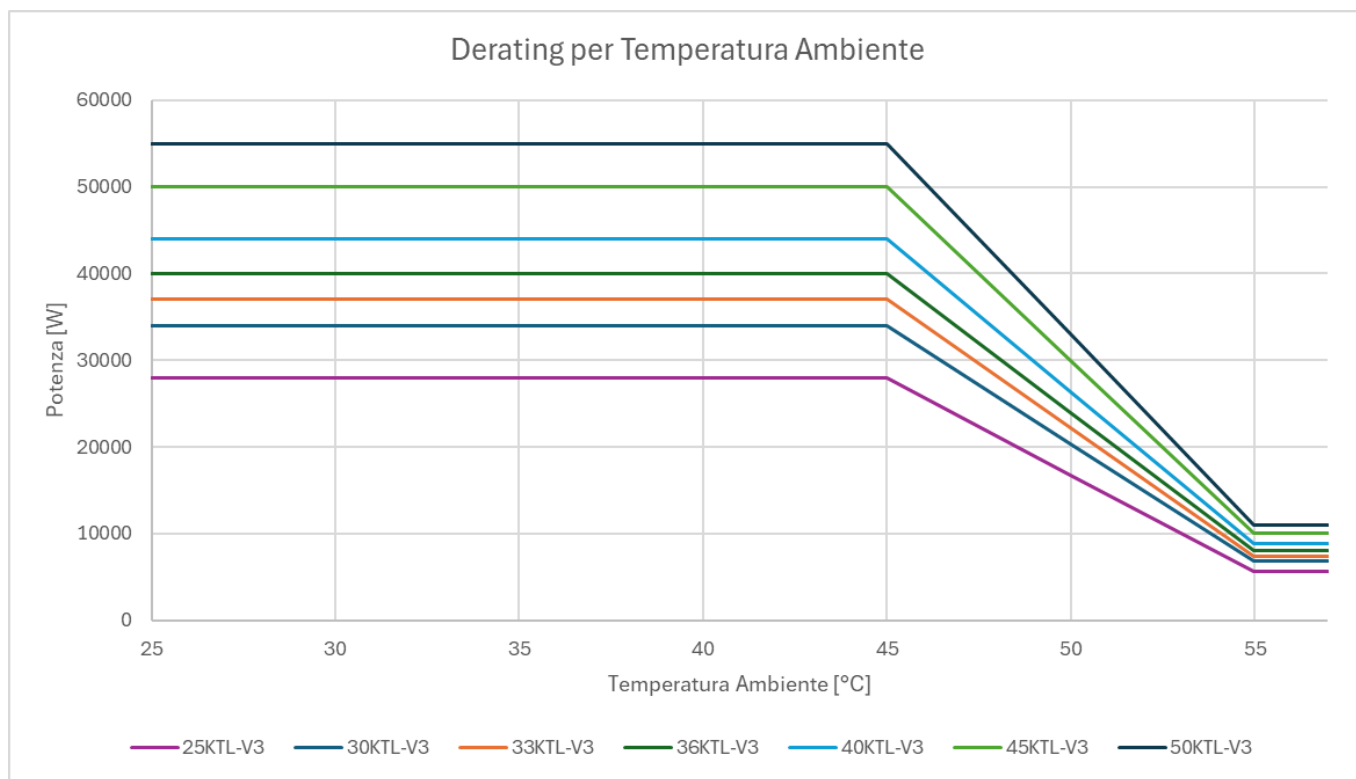


Figure 5 – Active Power Limitation Based on Ambient Temperature

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


models	P1(W)	P2(W)	T1(°C)	T2(°C)	T3(°C)
25KTL-V3	28000	5600	45	55	50
30KTL-V3	34000	6800	45	55	50
33KTL-V3	37000	7400	45	55	50

36KTL-V3	40000	8000	45	55	50
40KTL-V3	44000	8800	45	55	50
45KTL-V3	50000	10000	45	55	50
50KTL-V3	55000	11000	45	55	50

where:

- T1 is the minimum temperature at which derating begins
- T2 is the maximum allowable temperature for power delivery by the inverter
- T3 is the temperature at which the "IDxx OverTemperature" error is reported.
- P1 is the active power rating of the inverter
- P2 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: 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.
Attention	

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.

1.1. How to Apply a Constant Active Power Limitation

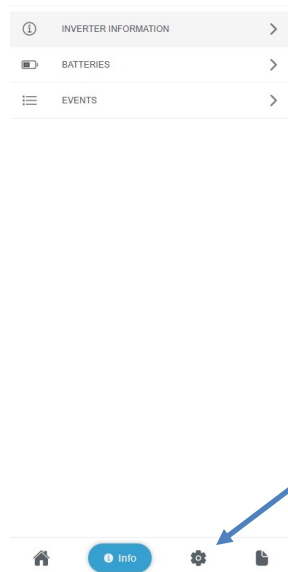
In cases where necessary, it is possible to apply a maximum output power value from the fixed inverter. This upper limit value is in addition to all the limiting curves already highlighted above. The set limitation remains stored even if the inverter is switched off and restarted.

Applying the limitation via display

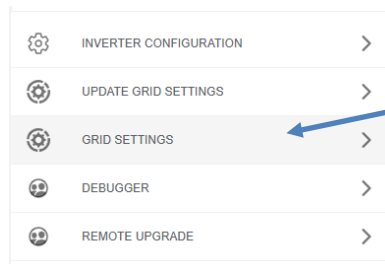
- Enter the inverter menu by selecting the "Settings" item
- Select the item "Power limit"
- Set Enable
- Select the desired limiting % (100%=Inverter power rating; 0%=0W)

Application of the limitation via the Azzurro Operator APP

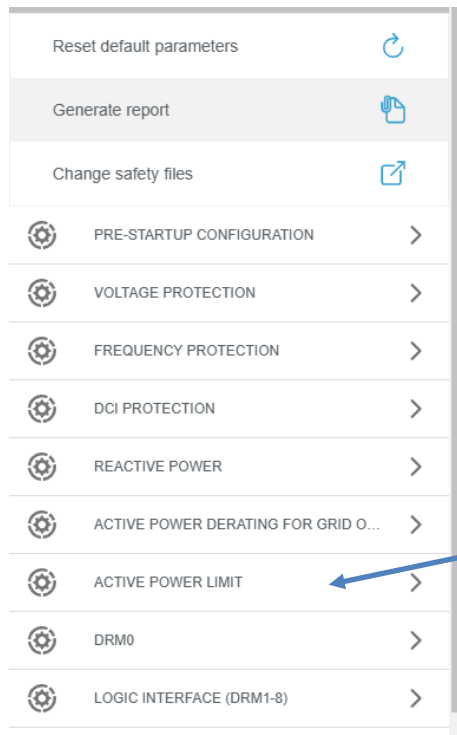
- After connecting to the inverter, select the settings



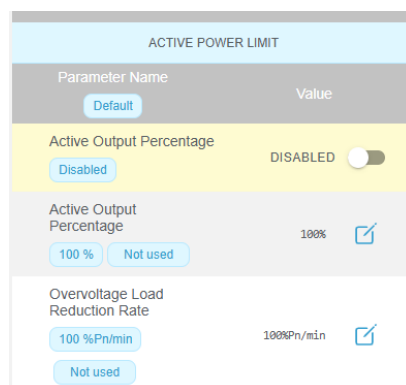
- Select the "Grid settings" menu



- Select the "Active Power Limit" menu



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



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

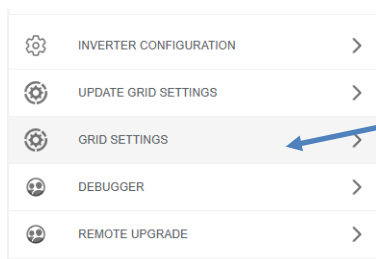
In cases where necessary, it is possible to modify the limiting curve according to the mains voltage. New settings are also stored if the inverter is switched off and restarted.

Curve modification via Azzurro Operator APP













- After connecting to the inverter, select the settings



- Select the "Grid settings" menu



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

Reset default parameters	
Generate report	
Change safety files	
 PRE-STARTUP CONFIGURATION	>
 VOLTAGE PROTECTION	>
 FREQUENCY PROTECTION	>
 DCI PROTECTION	>
 REACTIVE POWER	>
 ACTIVE POWER DERATING FOR GRID O...	>
 ACTIVE POWER LIMIT	>
 DRM0	>
 LOGIC INTERFACE (DRM1-8)	>



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



ACTIVE POWER DERATING FOR GRID OVERVOLTAGE

Parameter Name	Value
Power Derate Leading By High AC Voltage	ENABLED <input checked="" type="checkbox"/>
Start voltage of the derating curve	253V <input type="text"/>
End voltage of the derating curve	253.1V <input type="text"/>
Minimum inverter export power percentage	18% <input type="text"/>
Overvoltage Down Speed in %Pn per minute	98Pn/min <input type="text"/>

Grid overvoltage derating curve
(%) Inverter export power vs (V) Voltage

The graph shows a linear derating curve. The y-axis represents the percentage of inverter export power, ranging from 60% to 100%. The x-axis represents voltage. The curve starts at 100% power at 253V and drops to 18% power at 253.1V.

