

# Derating Curve

## *3PH 250/350kTL-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 mains voltage	4
1.3. Power limitation based on temperature	5
1. How to change or apply power limitations	7
1.1. How to apply a constant active power limitation	8
1.2. How to change the power limiting curve based on the mains voltage	10


## Revision

Rev.	Date	Author	Description of changes
00	08/01/2025	L. Aita	First issue

### 1. Purpose of the document

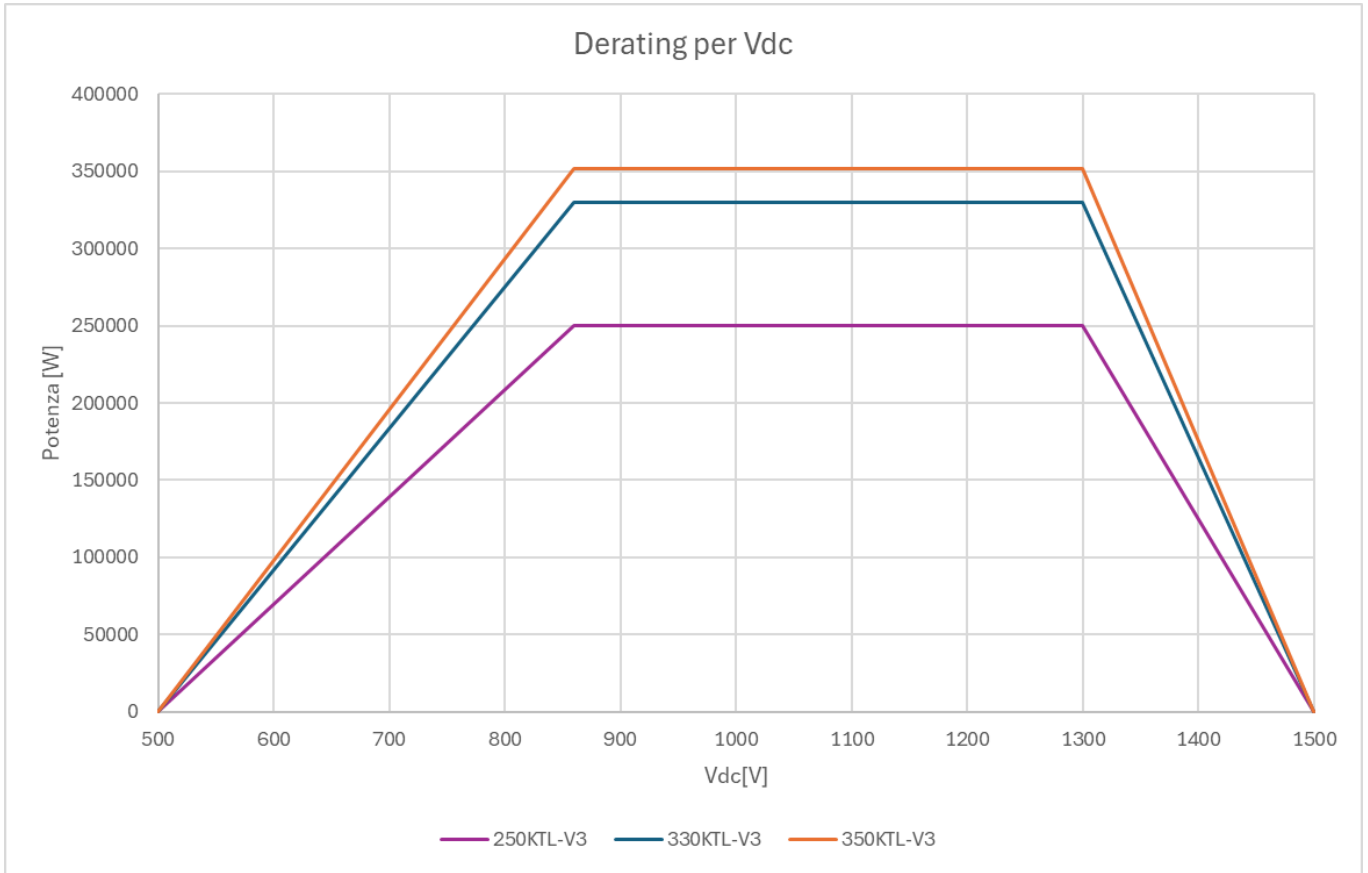
This document collects all power derating curves and the potential changes that apply to them from the last FW during testing. There are three main types of derating:

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

	<p><b>Warning: The various derating curves may change during FW releases subsequent to those tested during the writing of this document.</b></p>
<p><b>Note</b></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)
<b>250KTL-V3</b>	0	250000	500	860	1300	1500
<b>330KTL-V3</b>	0	330000	500	860	1300	1500
<b>350KTL-V3</b>	0	350000	500	860	1300	1500

where:

- V0 is the minimum voltage to deliver the minimum power of the inverter
- V1 is the minimum DC voltage to deliver the maximum power of the inverter
- V2 is the maximum DC voltage to deliver the maximum power of the inverter
- V3 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:

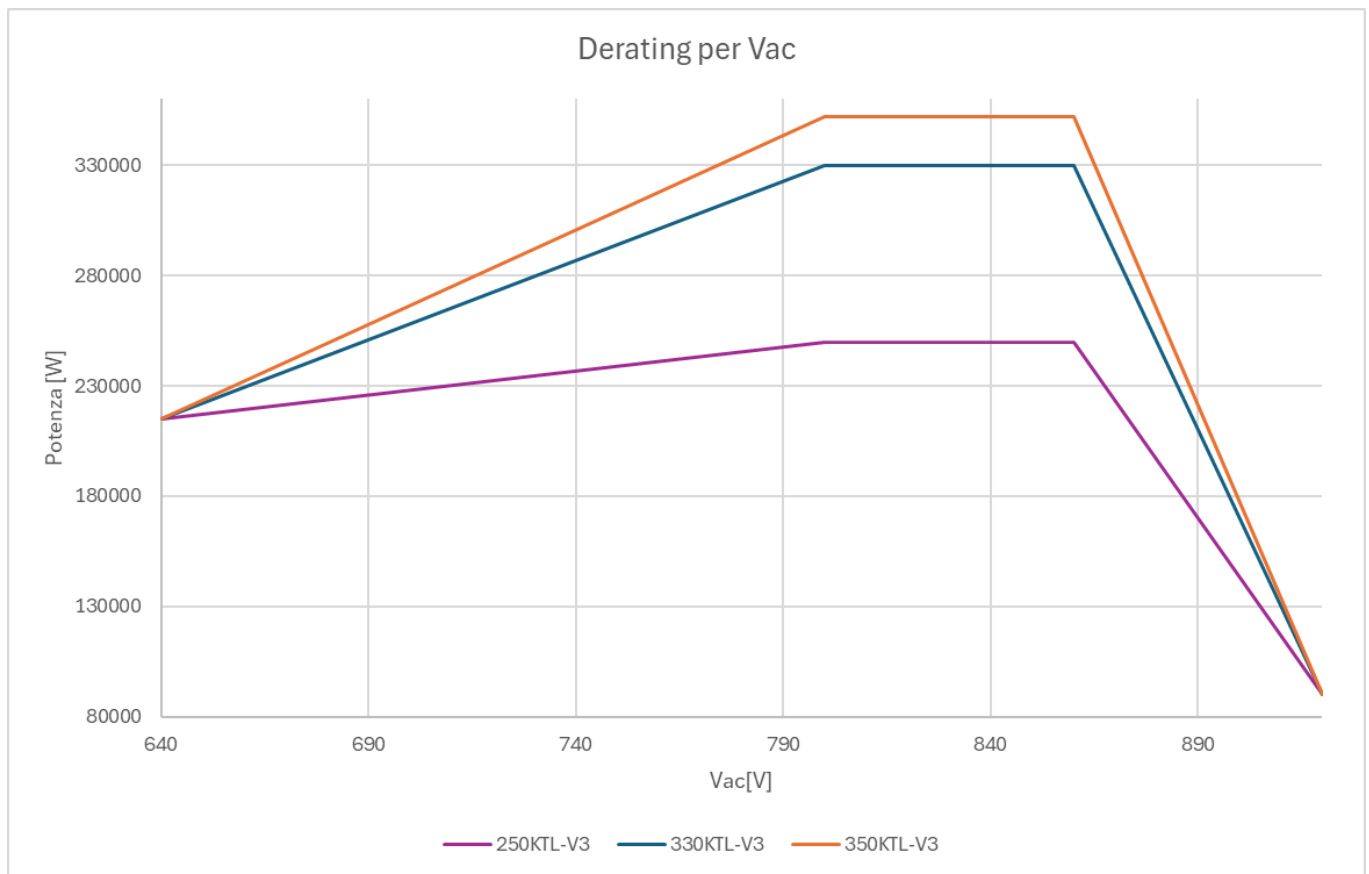


Figure 3 – Output Power Limitation Based on AC Voltage

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

models	P1(W)	P2(W)	P3(W)	V0(V)	V1(V)	V2(V)	V3(V)
<b>250KTL-V3</b>	250000	215000	90000	640	800	860	920
<b>330KTL-V3</b>	330000	215000	90000	640	800	860	920
<b>350KTL-V3</b>	360000	215000	90000	640	800	860	920

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
- V3 is the maximum voltage to deliver the minimum power of the inverter
- P1 is the active power rating of the inverter
- P2 is the power at 640 Vac
- P3 is the 920 Vac power

The V2 and V3 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:

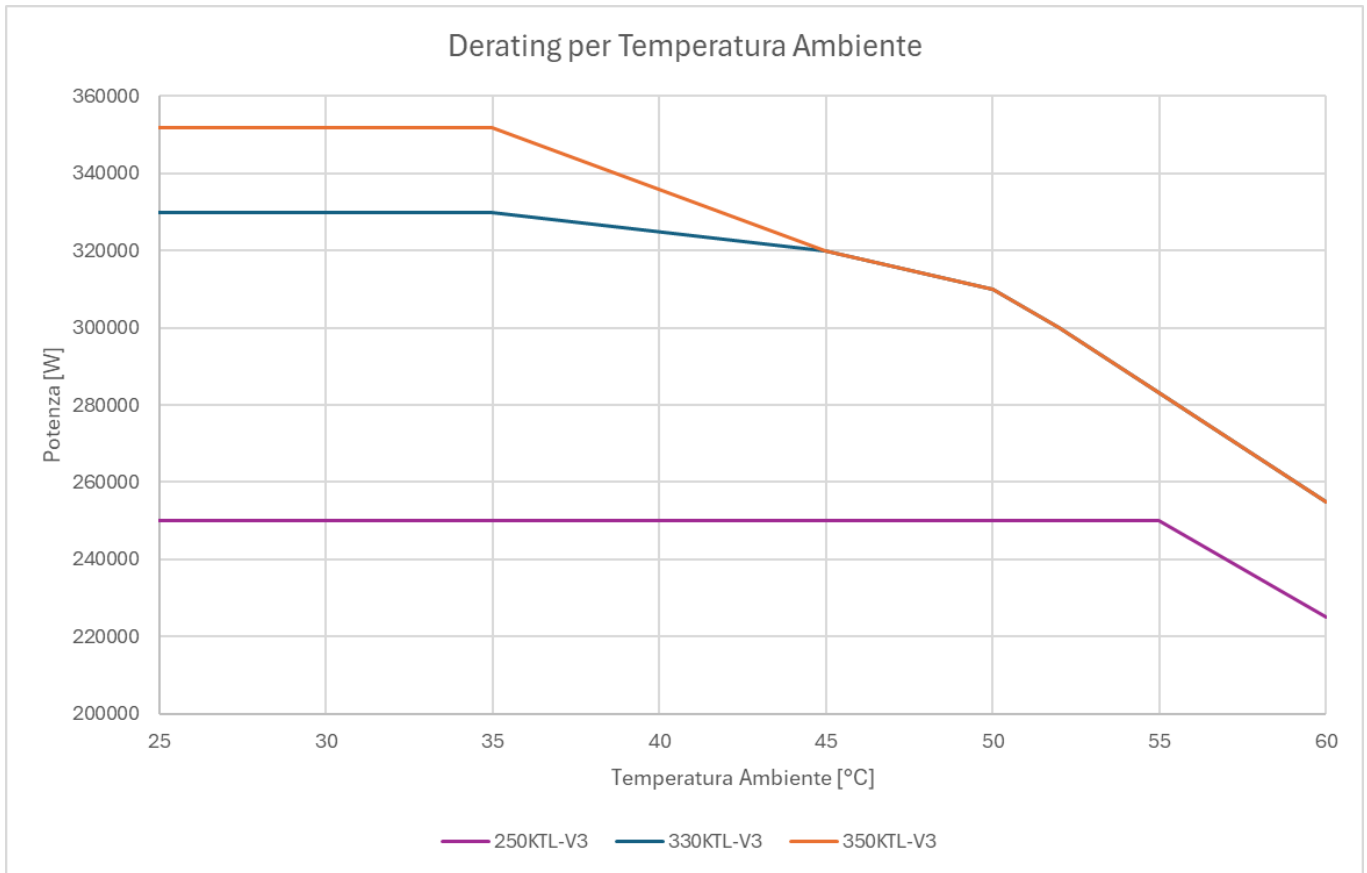


Figure 5 – Active Power Limitation Based on Ambient Temperature

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)
<b>250KTL-V3</b>	250000	225000	55	60	-
<b>330KTL-V3</b>	330000	255000	45	60	-

<b>350KTL-V3</b>	350000	255000	35	60	-
------------------	--------	--------	----	----	---

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

	<p><b>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.</b></p>
<p><b>Attention</b></p>	

### 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

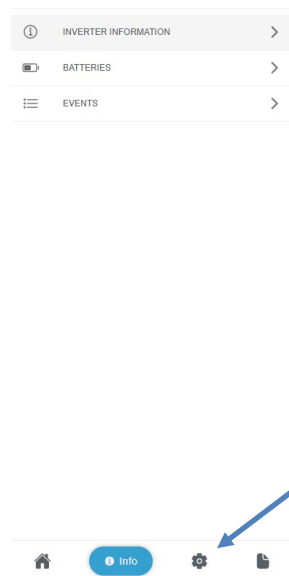
In cases where necessary, it is possible to apply a maximum output power value from the fixed inverter. This upper limit value is in addition to all the limiting curves already highlighted above. The set limitation remains stored even if the inverter is switched off and restarted.

#### 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)

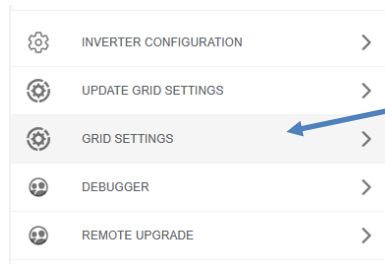
#### Application of the limitation via the Azzurro Operator APP

- After connecting to the inverter, select the settings

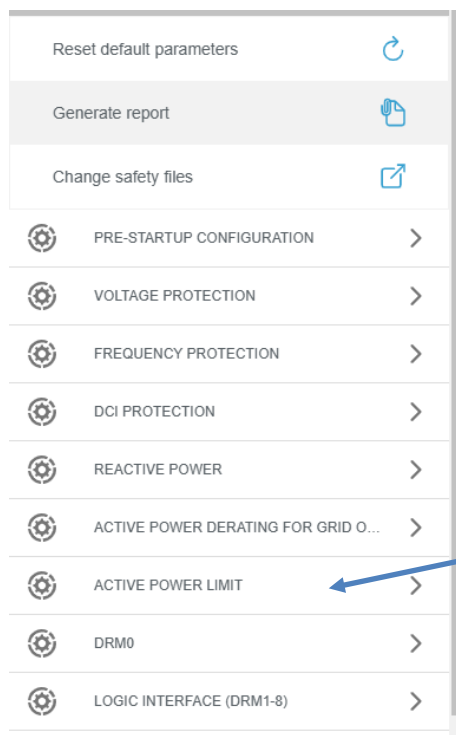


- Select the "Grid settings" menu





- Select the "Active Power Limit" menu



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

ACTIVE POWER LIMIT	
Parameter Name	Value
Active Output Percentage	DISABLED <input type="checkbox"/>
Active Output Percentage	100% <input type="checkbox"/>
Overvoltage Load Reduction Rate	100%Pn/min <input type="checkbox"/>

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

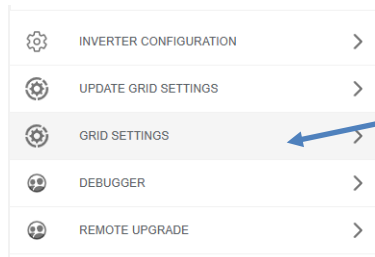
In cases where necessary, it is possible to modify the limiting curve according to the mains voltage. New settings are also stored if the inverter is switched off and restarted.

#### Curve modification via Azzurro Operator APP

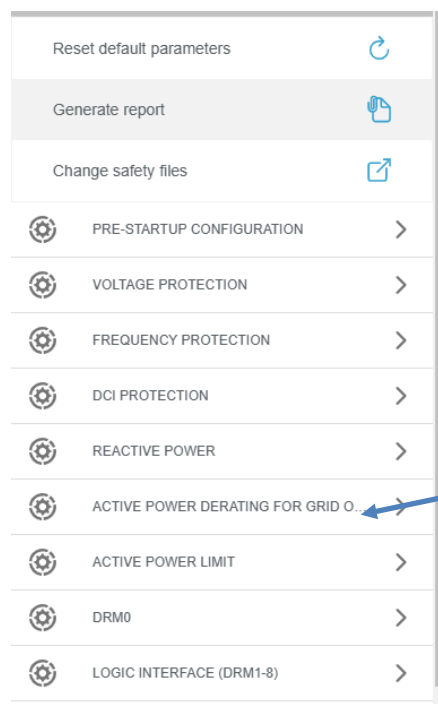
- After connecting to the inverter, select the settings



- Select the "Grid settings" menu



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



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



**ZUCCHETTI**  
Centro Sistemi



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 decrease in inverter export power as voltage increases. 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.

I  
D  
:  
M  
D  
-  
A  
L  
-  
G  
I  
-  
0

Zucchetti Centro Sistemi S.p.A. - Green Innovation Division  
Palazzo dell'Innovazione - Via Lungarno, 167-201  
52028 Terranuova Bracciolini - Arezzo, Italy  
tel. +39 055 91971 - fax. +39 055 9197515  
innovation@zcscompany.com - zcs@nec.it - zcsazzurro.com

Reg. Pile IT12110P00002965 - Capitale Sociale € 100.000,00 I.V.   
Reg. Impr. AR n.03225010481 - REA AR - 94189

