

Derating Curve

3PH HYD 5/12kTL ZP3

Revision	2
1. Purpose of the document	2
1.1. Limitation of the power of each MPPT based on the input voltage	2
1.2. Limitation of power based on grid voltage	3
1.3. Power limitation based on temperature	5
2. How to modify or apply power limitations	8
2.1. How to apply a constant active power limitation	8
2.2. How to modify the power limitation curve based on grid voltage	11

Revision

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

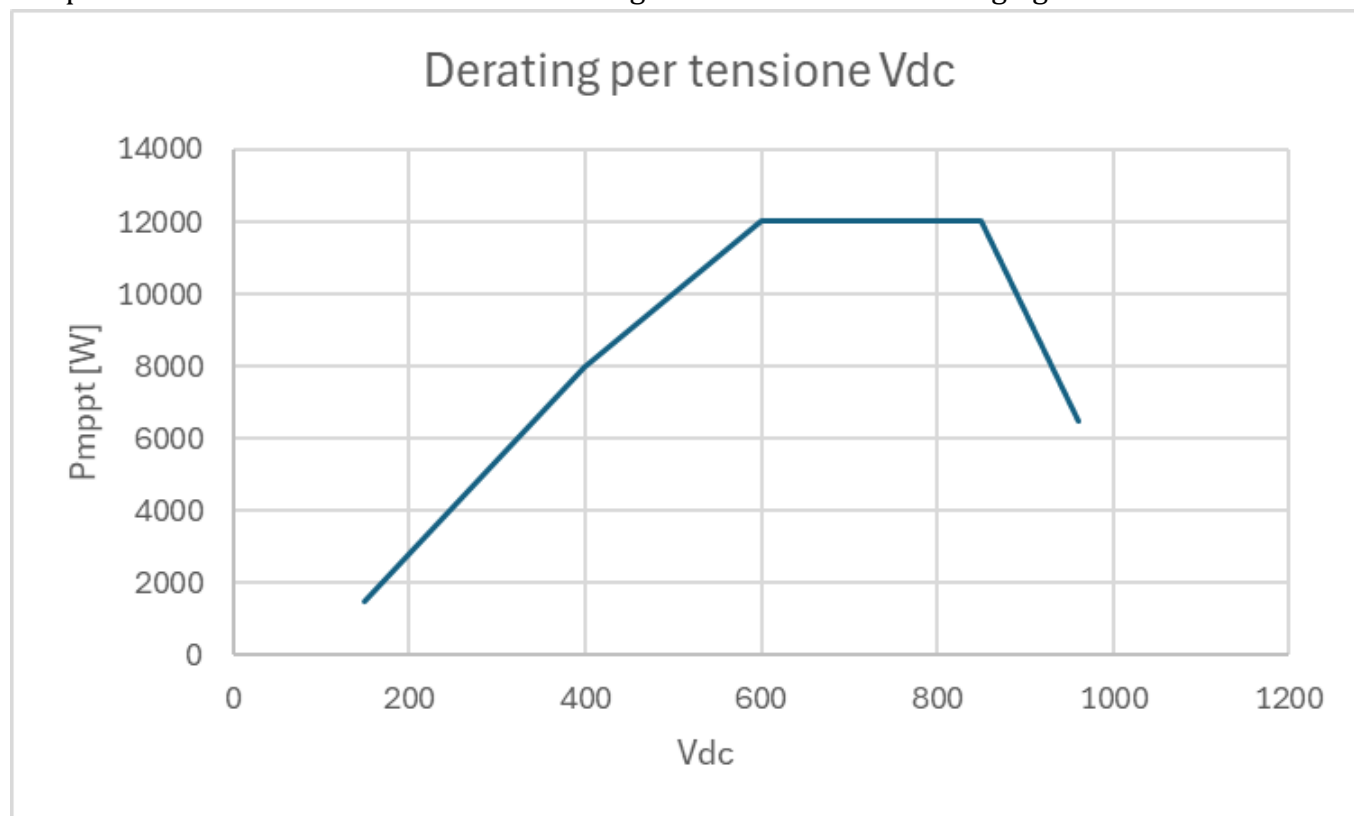
1. Purpose of the docu

This document contains all the power derating curves and the potential modifications applicable to them. There are three main types of derating:

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

1.1. Power limitation of each MPPT based on input voltage/

The power limitation curve based on DC voltage is shown in the following figure:



Below is a table describing the values in the previous image:

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@pec.it - zcsazzurro.com

Reg. P.I.a. 1712110P00002095 - Capitale Sociale € 100.000,00 I.V.
 Reg. Impr. AR n. 53225010481 - REAJAR - 94100
 Azienda Certificata ISO 9001 - Certificato n. 5151 - CN50 -
 15-17776



models	P1(W)	P2(W)	P3(W)	V0(V)	V1(V)	V2(V)	V3(V)
HYD 5kTL ZP3	1500	12000	650	150	600	850	960
HYD 6.5kTL ZP3	1500	12000	6500	150	600	850	960
HYD 8kTL ZP3	1500	12,000	6500	150	600	850	960
HYD 10kTL ZP3	1500	12000	6500	150	600	850	960
HYD12kTL ZP3	1500	12000	6500	150	600	850	960

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
- P1 is the power in V0
- P2 is the nominal power
- P3 is the power in V3

The values cannot be changed by sending commands and are intrinsic operating limits of the inverters

1.2. Power limitation based on mains voltage ()

The power limitation curve based on AC voltage is shown in the following figure:

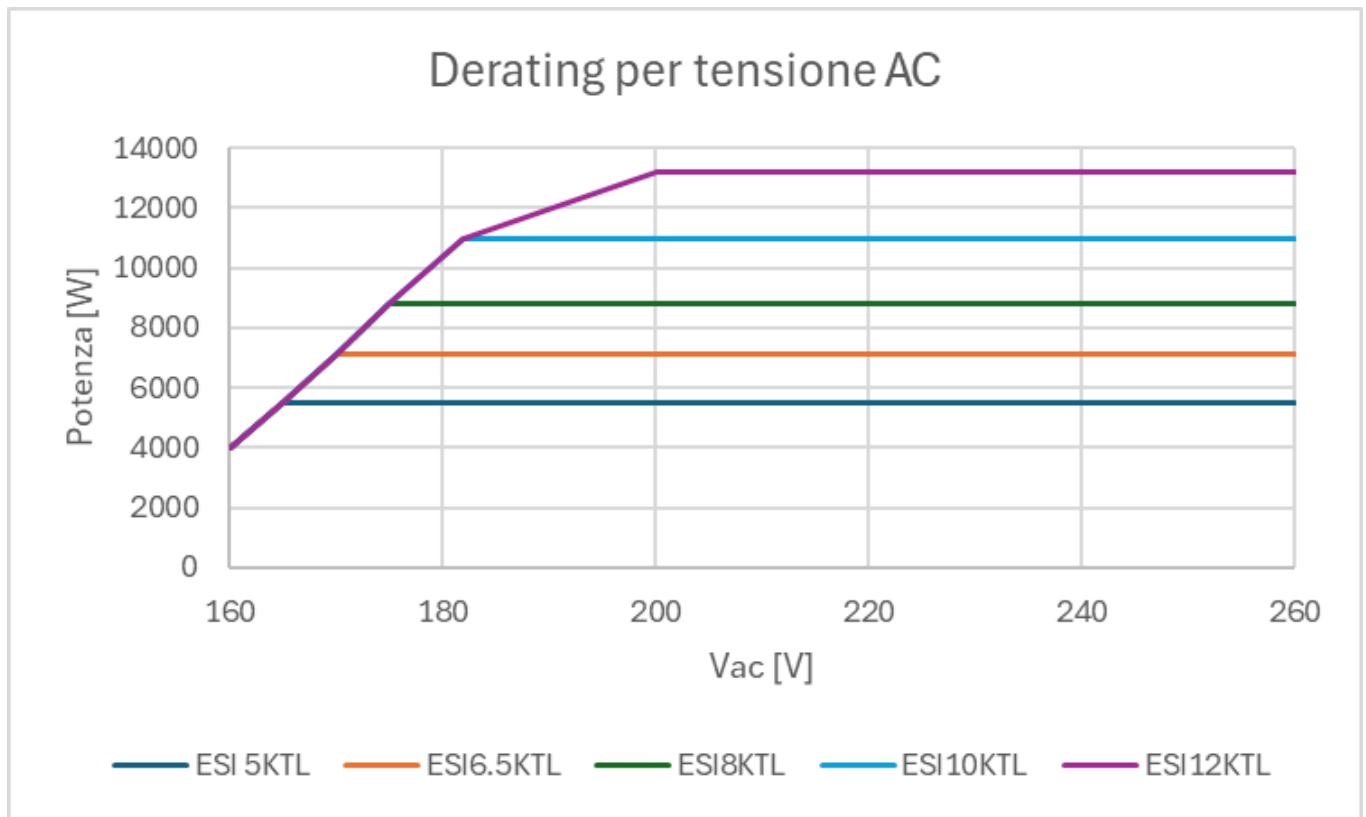


Figure 3 - Output power limitation based on AC voltage

Below is a table describing the values in the previous image:

models	P1(W)	P2(W)	V0(V)	V1(V)	V2(V)
HYD 5kTL ZP3	4000	5500	160	165	260
HYD 6.5kTL ZP3	4000	7150	160	170	260

HYD 8kTL ZP3	4000	8800	160	175	260
HYD 10kTL ZP3	4000	12,000	160	185	260
HYD12kTL ZP3	4000	13200	160	200	260

Note: V0, V2, V3 are defined by current regulations in the various Safety

Files. Where:

- V0 is the minimum AC voltage to deliver the minimum power of the inverter
- 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 nominal active power of the inverter
- P2 is the power at 160Vac

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 power limitation curve based on temperature follows the two figures below:

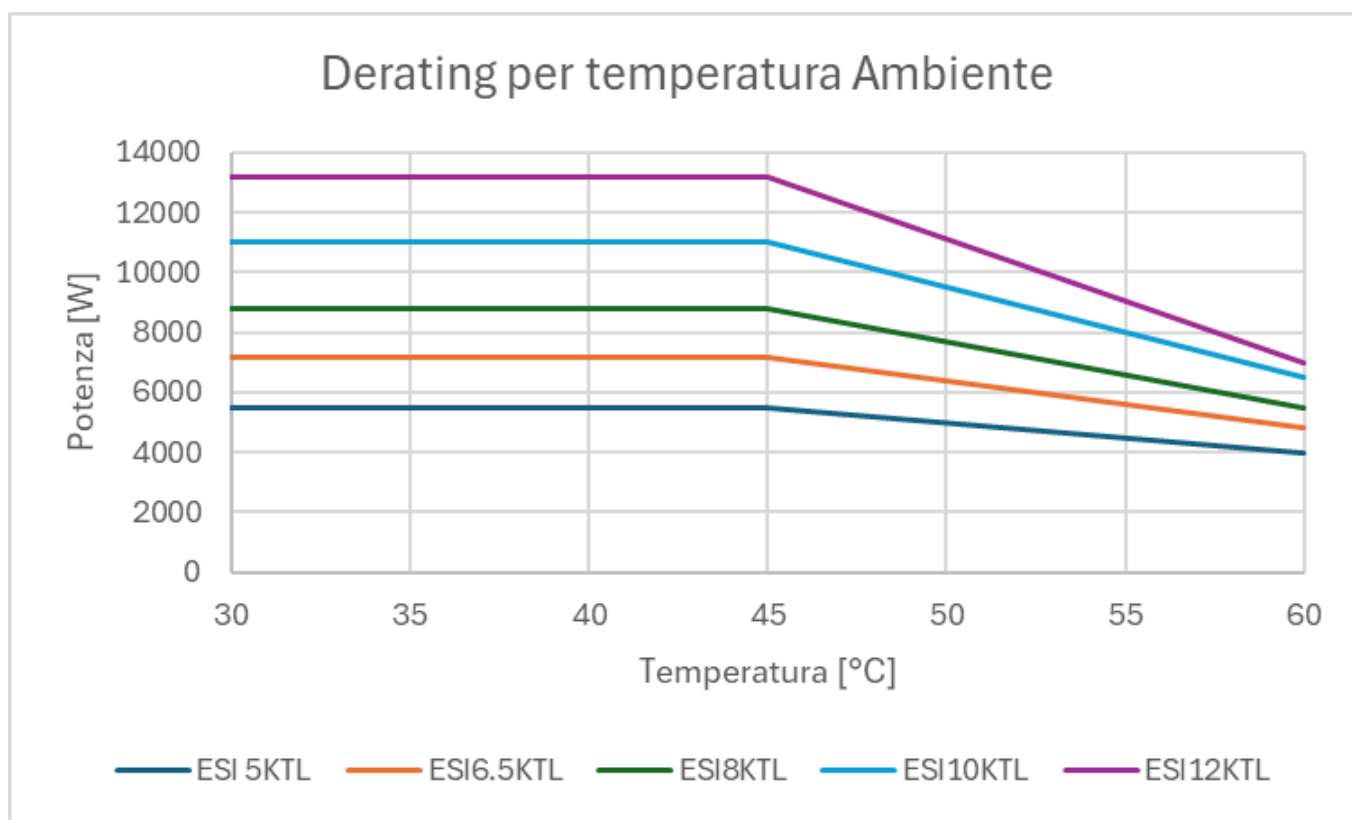


Figure 5 - active power limitation based on ambient temperature

Below is a table describing the values in the previous image related to ambient temperature:

models	P1(W)	P2(W)	P3(W)	T1(°C)	T2(°C)	T3(°C)
HYD 5kTL ZP3	5500	1000	1000	45	60	60
HYD 6.5kTL ZP3	7150	1200	1200	45	60	60
HYD 8kTL ZP3	8800	1600	1600	45	60	60
HYD 10kTL ZP3	12,000	2000	2000	45	60	60
HYD12kTL ZP3	13200	3000	3000	45	60	60

where:

- T1 is the minimum temperature at which derating begins
- T2 is the temperature at which thermal derating ends
- T3 is the maximum temperature allowed for power delivery by the inverter
- P1 is the nominal active power of the inverter
- P2 is the power value at point T2
- P3 is the minimum power allowed by thermal derating

The values cannot be changed by sending commands and are intrinsic operating limits of the inverters

	Warning: The intervention of the temperature limitation is strongly influenced by the installation. The manual of the inverter reports the
---	---

Please note

the minimum distances and correct positioning of the inverter to avoid untimely temperature limitations.

2. How to modify or apply power limitations

Modifiable power limitations can be enabled, disabled or modified in their values via local or remote access (if the inverter is connected via logger to ZCS Azzurro systems).

Local access is possible using:

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

Remote access is possible using:

- **The Azzurro Operators APP** (downloadable from the Play Store or iOS store)

The following document contains sample screenshots of the access and modification sections. These sections are for illustrative purposes only, as the APP and portal are constantly changing and evolving, and the graphic details may differ from the versions in use.

2.1. How to apply a constant active power limit

Where necessary, it is possible to apply a maximum power value to the fixed inverter output. This maximum limit value is added to all the limitation curves already highlighted above. The set limitation remains stored even if the inverter is switched off and restarted.

Applying the limitation via the display

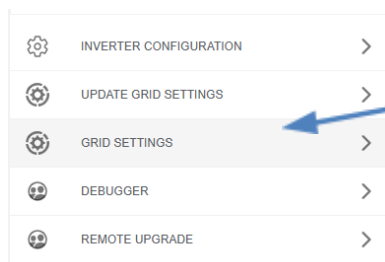
- Enter the inverter menu by selecting "Settings".
- Select the "Power limit" option
- Set to Enable
- Select the desired limitation percentage (100% = nominal power of the inverter; 0% = 0W).

Apply 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

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	>
 DRMO	>
 LOGIC INTERFACE (DRM1-8)	>

- Set the enable, limitation % and settling time values as dHYDderati

ACTIVE POWER LIMIT	
Parameter Name	Value
Default	
Active Output Percentage	DISABLED ☐
Disabled	
Active Output Percentage	100% ☒
100 %	Not used
Overvoltage Load Reduction Rate	100%Pn/min ☒
Not used	

2.2. How to modify the power limitation curve based on the mains voltage

Where necessary, the limitation curve can be modified according to the mains voltage. The new settings are stored even if the inverter is switched off and restarted.

Modifying the curve using the Azzurro Operator APP

- After connecting to the inverter, select the settings



- Select the 'Grid settings' menu

	INVERTER CONFIGURATION	>
	UPDATE GRID SETTINGS	>
	GRID SETTINGS	>
	DEBUGGER	>
	REMOTE UPGRADE	>

- 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 dHYDderati. The graph will show the actual curve set

