



Optimising asymmetrical PV configuration for TripleLynx

Important! In asymmetrical installations manually set the PV power.

Introduction

The TripleLynx inverters operate with either two or three independent PV inputs.

The inverter will derate its power output (AC), by changing the point of operation on the DC side, when:

- The max. total DC power is exceeded
- The max. 6kW per DC string is exceeded
- The inverter is required to perform power derating caused by PLA

The factory settings include a preset DC power capacity per input, which is 6 kW per PV input. To avoid exceeding the maximum DC power allowed, the inverter will reduce the value evenly. Hence;

TripleLynx inverter type	No. of PV inputs	Overall DC limit for the inverter	Default DC power limit per PV input	DC power limit per PV input
TLX 10 k	2	10.3 kW	5.15 kW	6.0 kW
TLX 12.5 k	3	12.9 kW	4.3 kW	6.0 kW
TLX 15 k	3	15.5 kW	5.16 kW	6.0 kW

When the levels of the generated PV power differ from one input to the next, the PV configuration is defined as asymmetric.

When the PV configuration is asymmetric, the user should manually set the installed PV power to utilise the potential of 6kW per input to increase performance, and avoid unintentional loss.

The installed PV power is defined as the generated PV-to-Grid power. To calculate these values use the module [kWp] STC values and divide by the PV-to-Grid ratio (Kpv-ac) please see the inverter reference manual sec. 4.2.1 for details.

Set PV input values for asymmetrical layouts

To enter the PV input values:

1. Enter the installed PV power of each input via the display of the inverter.
2. Access the display at security level 1, under [Set-up → Setup details → Installed PV power]
3. The entering of PV areas is optional.

Allocate values for each PV input, ensuring that;

- a. the correct amount of installed PV power is entered
- b. the overall DC-limitation of the inverter is not exceeded
- c. each value does not exceed the maximum 6 kW DC power per PV input

Danfoss Solar Inverters A/S

Jyllandsgade 28
 DK-6400 Sønderborg
 Denmark
 Tel: +45 7488 1300
 Fax: +45 7488 1301
 E-mail: solar-inverters@danfoss.com
 www.solar-inverters.danfoss.com



Please refer to the examples on the following pages for a detailed description of how to utilise the inverter best.

Troubleshooting

If the red LED lights up and the display shows event ID 209 or 210, then check the maximum PV power using the display, to see if it exceeds the limit. Decrease the amount of PV power installed per input to the max. PV power limit.

Applicability

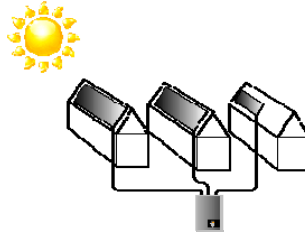
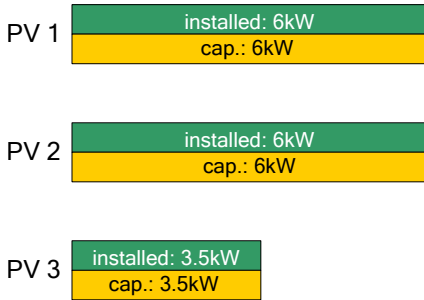
This note is applicable to TripleLynx inverters with serial numbers from XXXXXXXX4309 onwards.

See also: Product and Application Note of 2009-11-18, TripleLynx Software Update



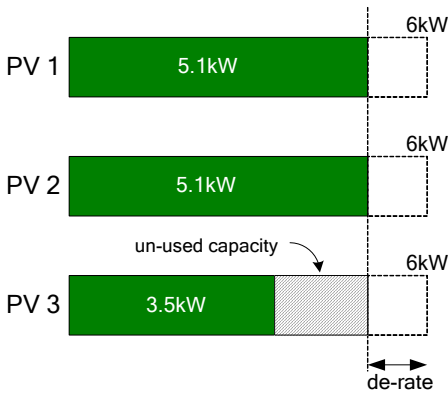
Example 1

TLX 15k with 15 kW asymmetrical installed PV power.



Total installed PV power: $6+6+3.5 = 15.5 \text{ kW}$
 Module output (example): $6+6+3.5 = 15.5 \text{ kW}$

Figure 1 Installed PV and Irradiation capacity



For default PV input settings (PV input 1-3 = 6 kW) the inverter allocates the power capacity evenly: $(15.5/18) \times 6\text{kW} = 5.1\text{kW}$ per input string.

This results in unused capacity for PV inputs 1 & 2: $(6.0-5.1) \times 2 = 1.8 \text{ kW}$

PV input 3 cannot produce above the installed irradiation capacity and therefore cannot utilise its total default allocation.

The difference: $5.1-3.5 = 1.6 \text{ kW}$.

Figure 2 Inverter output with default settings

Total production is: $5.1+5.1+3.5 = 13.7 \text{ kW}$.

The remaining 1.6kW capacity of the inverter is not utilised.

Correct setting

When values for installed PV power are set manually to (6, 6 and 3.5 kW),

PV 1 and 2 operate at: $(15.5/15.5) \times 6 \text{ kW} = 6 \text{ kW}$.

PV 3 operates at: $(15.5/15.5) \times 3.5 \text{ kW} = 3.5 \text{ kW}$.

Result:

Total production is: $6+6+3.5 = 15.5 \text{ kW}$, matching the total capacity of the inverter.

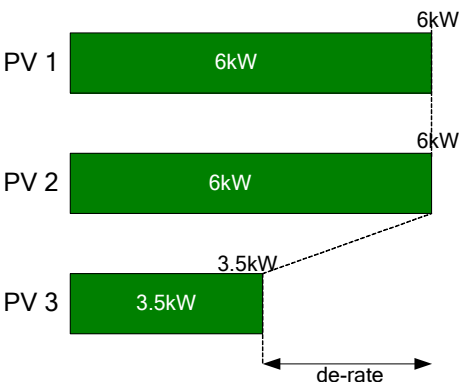


Figure 3 Inverter output after setting correct vales

Danfoss Solar Inverters A/S

Jyllandsgade 28
 DK-6400 Sønderborg
 Denmark
 Tel: +45 7488 1300
 Fax: +45 7488 1301

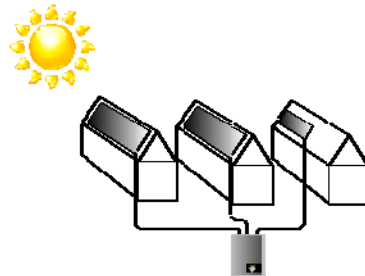
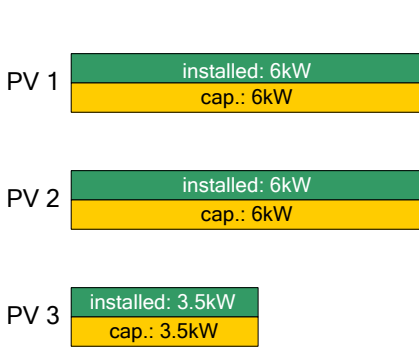
E-mail: solar-inverters@danfoss.com

www.solar-inverters.danfoss.com



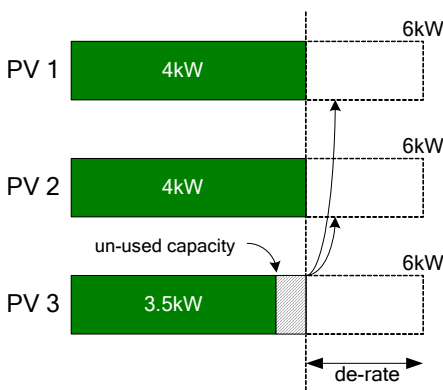
Example 2

TLX 15k de-rates to 12 kW, caused by power level adjustment (PLA).



Total installed PV power: $6+6+3.5 = 15.5\text{kW}$
 Module output (example): $6+6+3.5 = 15.5\text{kW}$

Figure 4 Installed PV and irradiation capacity



Symmetric de-rating to 12kW caused by PLA with default settings (PV input 1-3 = 6 kW)

The inverter will allocate the power evenly:

$$(12/18) \times 6\text{kW} = 4\text{kW per input string.}$$

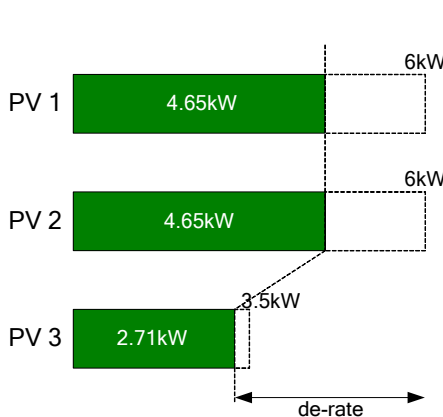
PV input 3 cannot produce above installed irradiation capacity and therefore cannot utilise its total default allocation.

The difference: $4.0-3.5 = 0.5\text{ kW.}$

Total production is: $4+4+3.5 = 11.5\text{ kW.}$

The remaining 0.5kW capacity of the inverter is not utilised.

Figure 5 Inverter output during derating with default values



Correct setting

Asymmetric de-rating to 12 kW caused by PLA with correct configured settings (PV input 1 and 2 = 6 kW, PV 3 = 3.5 kW)

PV 1 and 2 are de-rated to: $(12/15.5) \times 6\text{ kW} = 4.65\text{ kW}$

PV 3 is de-rated to: $(12/15.5) \times 3.5\text{ kW} = 2.71\text{ kW}$

Result: Total production is: $4.65+4.65+2.71 = 12\text{kW}$ matching the PLA requirement.

Figure 6 Inverter output after setting correct values

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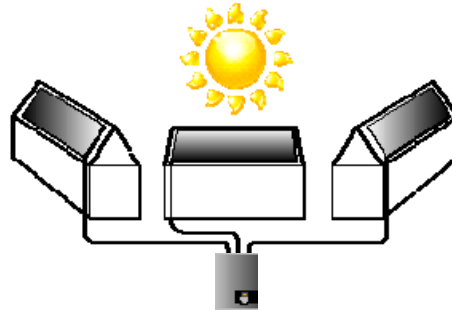
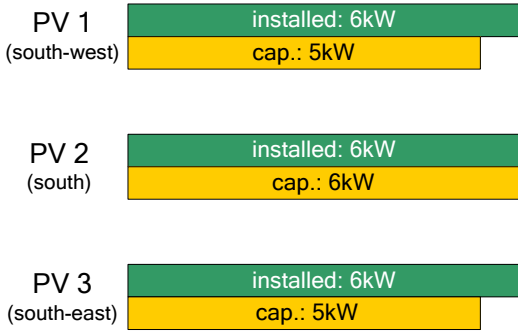
Jyllandsgade 28
 DK-6400 Sønderborg
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 Fax: +45 7488 1301

E-mail: solar-inverters@danfoss.com

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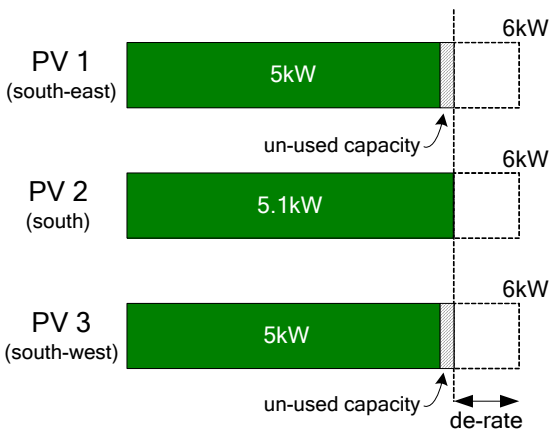


TLX 15 k with 3 x 6 kW installed PV power, with different orientation.
 Snapshot at 12 noon



Total installed PV power: $3 \times 6\text{kW} = 18\text{kW}$
 Module output (example), at 12:00h: $5+6+5 = 16\text{kW}$

Figure 7 Installed PV and irradiation capacity



The inverter de-rates to 15.5 kW.
 PV inputs 1 to 3 de-rate to: $(15.5/18) \times 6\text{ kW} = 5.1\text{ kW}$
 Total production with the current irradiation capacity is:
 $5+5.1+5 = 15.1\text{kW}$.

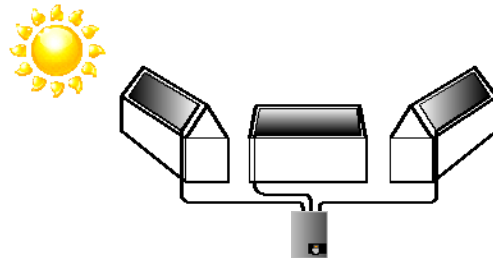
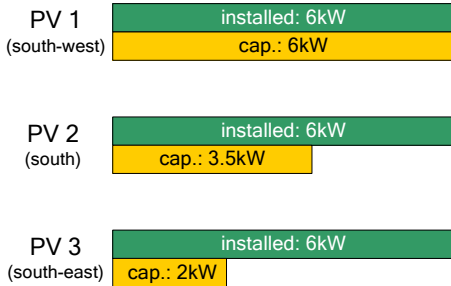
The remaining 0.4kW capacity of the inverter is not utilised.

Figure 8 Inverter output power

Result: It is not possible to utilise the full capacity of the inverter due to the system layout.

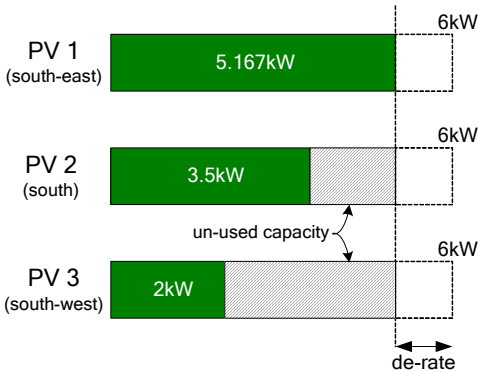


TLX 15 k with 3 x 6 kW installed PV power, with different orientation.
 Snapshot at 2 pm.



Total installed PV power: 3 x 6kW = 18kW
 Module output (example), at 14:00h: 6+3.5+2 = 11.5kW

Figure 9 Installed PV and irradiation capacity



The inverter de-rates to 15.5 kW.

PV inputs 1 to 3 de-rate to: $(15.5/18) \times 6 \text{ kW} = 5.1 \text{ kW}$

Total production with the current irradiation capacity will be:
 $5.1+3.5+2 = 10.6\text{kW}$.

The remaining 0.9kW capacity of the inverter is not utilised.

Figure 10 Inverter output power

Result: It is not possible to utilise the full capacity of the inverter due to the system layout.

Note:

- The unused capacity from PV 2 and 3 cannot be transferred over to PV 1, even though the maximum total capacity has not been reached.
- When 6kW PV power is installed on each input, the inverter must under all circumstances de-rate each string input to 5.1kW.