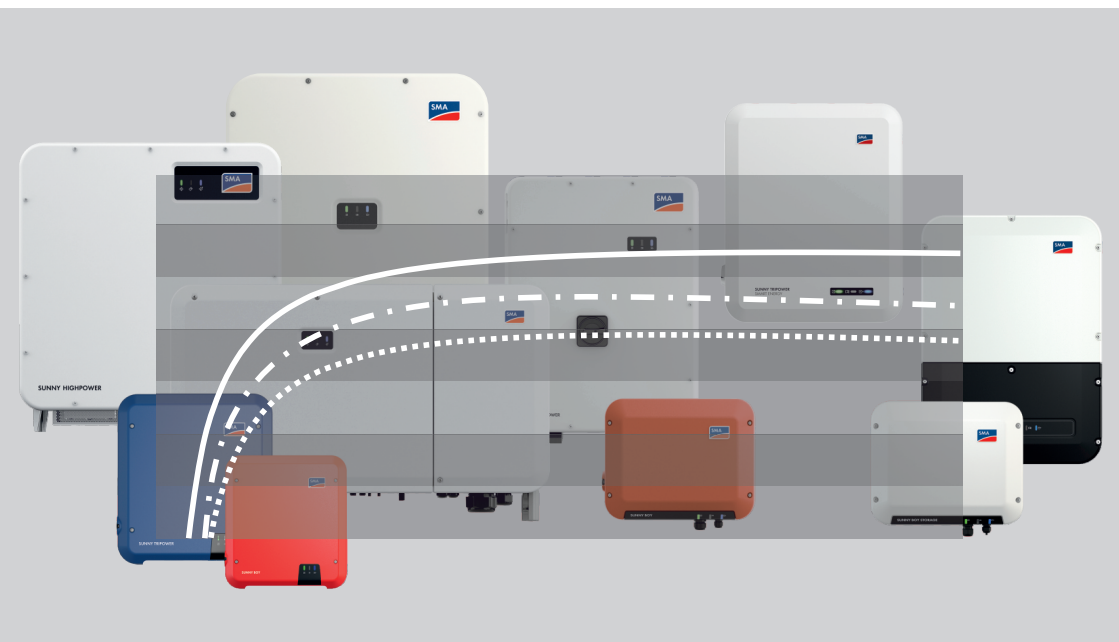




Efficiency and Derating

**SUNNY BOY / SUNNY BOY STORAGE / SUNNY ISLAND / SUNNY TRIPower /
SUNNY TRIPower STORAGE X / SUNNY TRIPower SMART ENERGY /
SUNNY HIGHPOWER**

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1 Information on this Document

1.1 Validity

This document describes in graphic and tabular form the efficiency profile and the derating behavior in accordance with DIN EN 50524:2010 of the following SMA inverters (status: 01/2023, subject to technical changes). The efficiency measurements were performed according to the requirements IEC 61683:1999, EN 61683:2000 and DIN EN 61683:2000.

Sunny Boy

- SB1.5-1VL-40 / SB2.0-1VL-40 / SB2.5-1VL-40
- SB3.0-1AV-41 / SB3.6-1AV-41 / SB4.0-1AV-41 / SB5.0-1AV-41 / SB6.0-1AV-41

Sunny Boy Storage

- SBS2.5-1VL-10
- SBS3.7-10 / SBS5.0-10 / SBS6.0-10

Sunny Island

- SI4.4M-13 / SI6.0H-13 / SI8.0H-13

Sunny Tripower

- STP 12-50 / STP 15-50 / STP 20-50 / STP 25-50
- STP 50-41
- STP 110-60
- STP3.0-3AV-40 / STP4.0-3AV-40 / STP5.0-3AV-40 / STP6.0-3AV-40 / STP8.0-3AV-40 / STP10.0-3AV-40

Sunny Tripower Storage X

- STPS30-20 / STPS50-20

Sunny Tripower Smart Energy

- STP5.0-3SE-40 / STP6.0-3SE-40 / STP8.0-3SE-40 / STP10.0-3SE-40

Sunny Highpower

- SHP 100-21 / SHP 150-21 / SHP 172-21 / SHP 180-21

1.2 Target Group

The information in this document is intended for installers and operators of PV systems with SMA inverters as well as for PV system planners.

2 Data Explanation

Efficiency Profile - Curve and Measured Values

The efficiency is the ratio of output power to input power and is given as a percentage value. This document describes the inverter efficiency in graphic and tabular form. The efficiency is given for the minimum MPP voltage, the rated input voltage and the maximum MPP voltage.

Maximum and European Weighted Efficiency

The maximum efficiency is the highest inverter efficiency at rated input voltage. The European weighted efficiency is calculated by weighing different partial load efficiencies and the full load efficiency at the rated input voltage according to the frequency in which they occur.

The calculation formula is: $\eta_{EU} = (0.03 \times \eta_{5\%}) + (0.06 \times \eta_{10\%}) + (0.13 \times \eta_{20\%}) + (0.1 \times \eta_{30\%}) + (0.48 \times \eta_{50\%}) + (0.2 \times \eta_{100\%})$

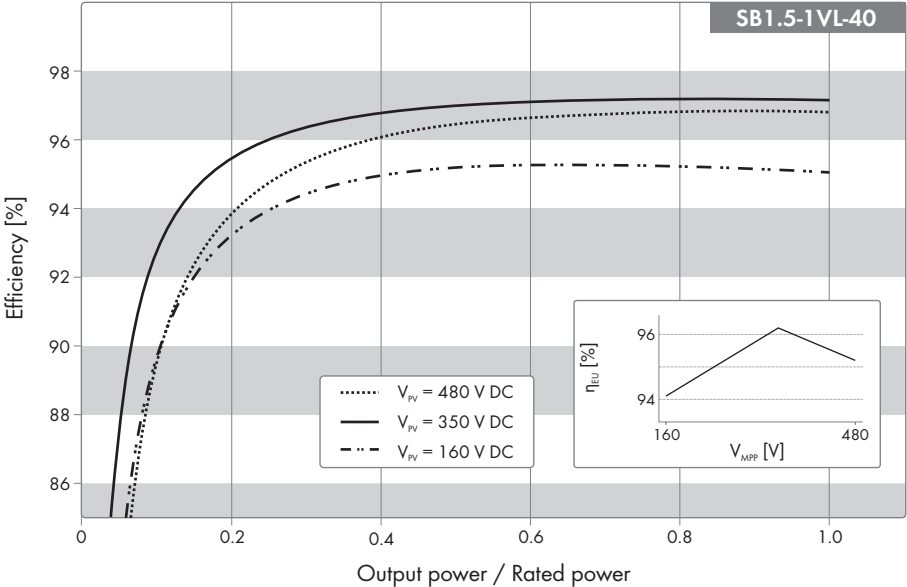
Derating Behavior

Safety mechanisms are implemented in the inverter protecting the inverter against damage due to too high ambient temperatures or too high output currents. This behavior reduces the inverter output power ("derating"). In this document, the derating behavior of the inverters is shown in graphic form. The derating behavior is given for the minimum MPP voltage, the rated input voltage and the maximum MPP voltage.

3 Sunny Boy

3.1 SB1.5-1VL-40

3.1.1 Efficiency



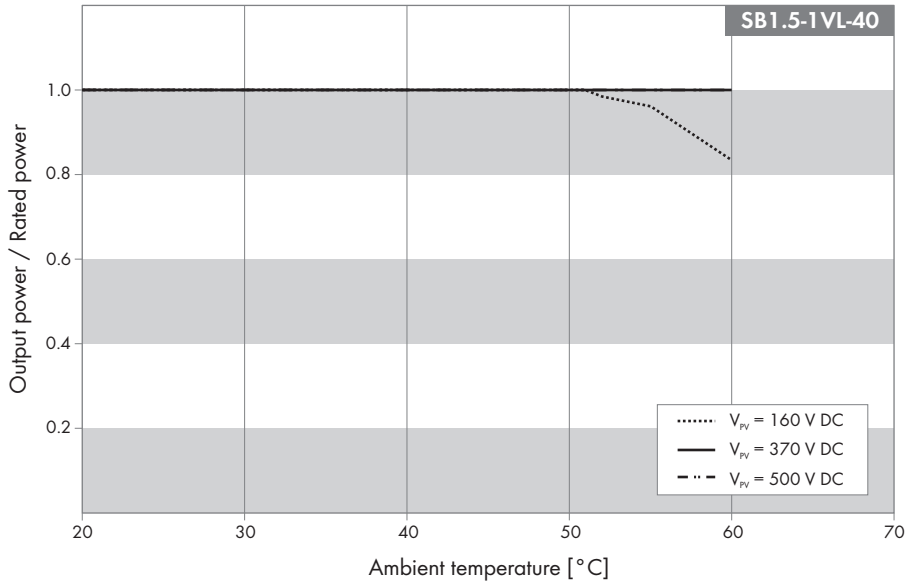
Maximum efficiency, η_{max}	97.2%
European weighted efficiency, η_{EU}	96.2%

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 160 V	Rated input voltage 350 V	Maximum MPP voltage 480 V
5%	83.2%	87.5%	81.6%
10%	89.6%	92.7%	89.4%
20%	93.3%	95.5%	93.9%
25%	94.0%	96.0%	94.8%
30%	94.4%	96.4%	95.4%
50%	95.2%	97.0%	96.4%

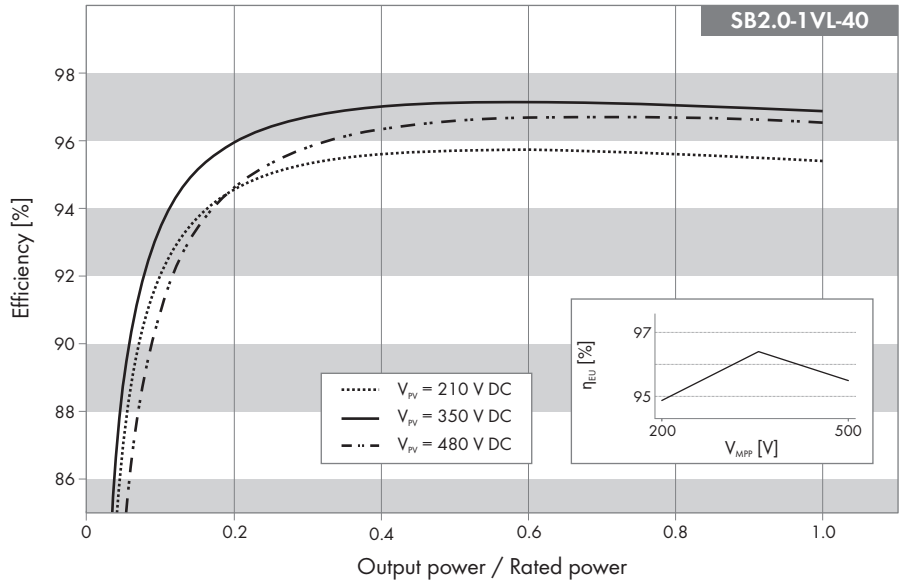
Standardized output power	Efficiency		
	Minimum MPP voltage 160 V	Rated input voltage 350 V	Maximum MPP voltage 480 V
75%	95.3%	97.2%	96.8%
100%	95.1%	97.2%	96.8%

3.1.2 Derating Behavior



3.2 SB2.0-1VL-40

3.2.1 Efficiency

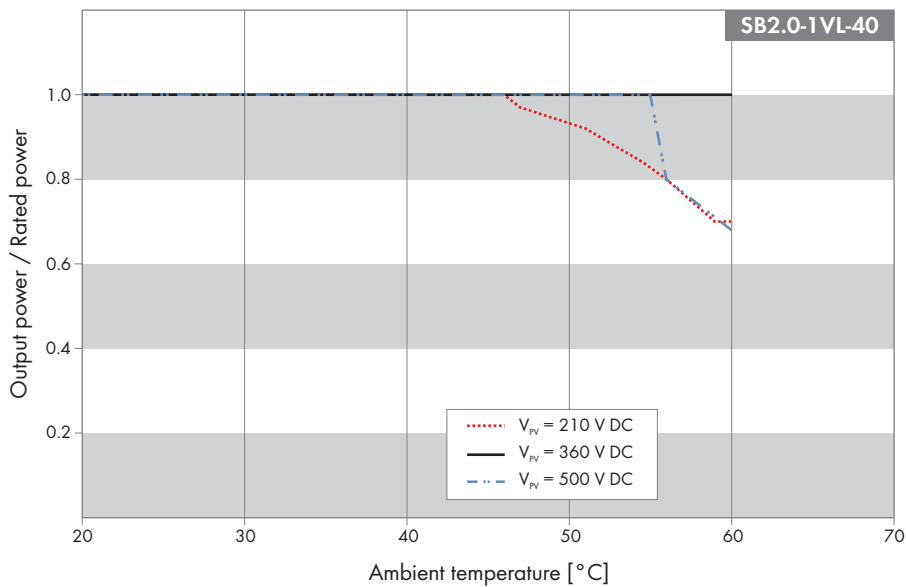


Maximum efficiency, η_{max}	97.1%
European weighted efficiency, η_{EU}	96.4%

Efficiency Profile

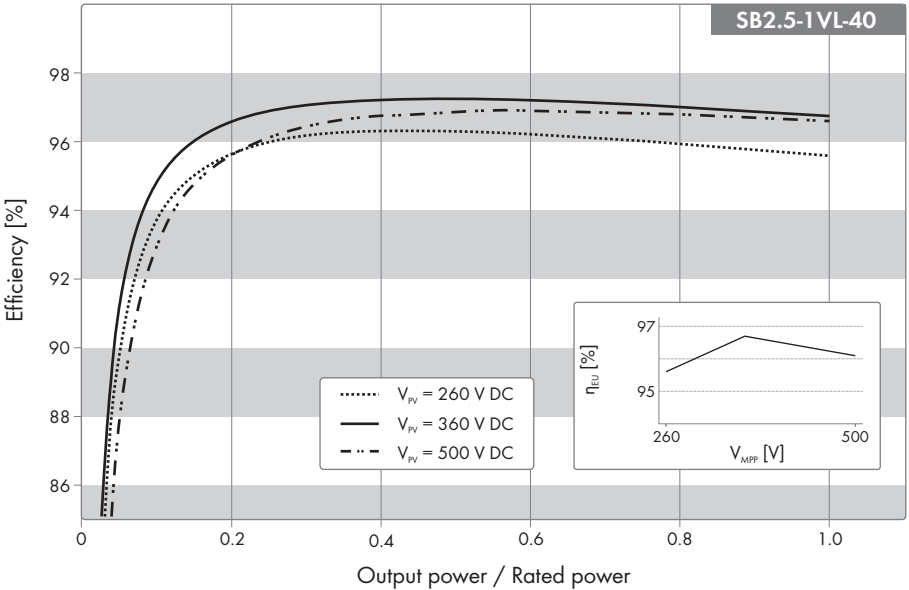
Standardized output power	Efficiency		
	Minimum MPP voltage 210 V	Rated input voltage 350 V	Maximum MPP voltage 480 V
5%	87.0%	88.6%	84.0%
10%	92.0%	93.4%	90.9%
20%	94.5%	95.9%	94.6%
25%	95.0%	96.4%	95.3%
30%	95.3%	96.7%	95.8%
50%	95.7%	97.1%	96.6%
75%	95.6%	97.1%	96.7%
100%	95.4%	96.9%	96.5%

3.2.2 Derating Behavior



3.3 SB2.5-1VL-40

3.3.1 Efficiency



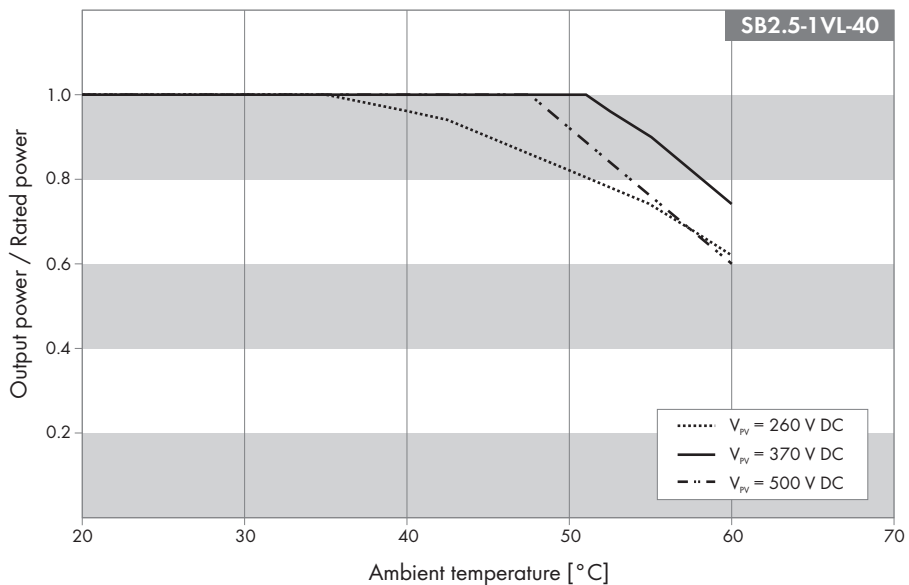
Maximum efficiency, η_{max} 97.2%

European weighted efficiency, η_{EU} 96.7%

Efficiency Profile

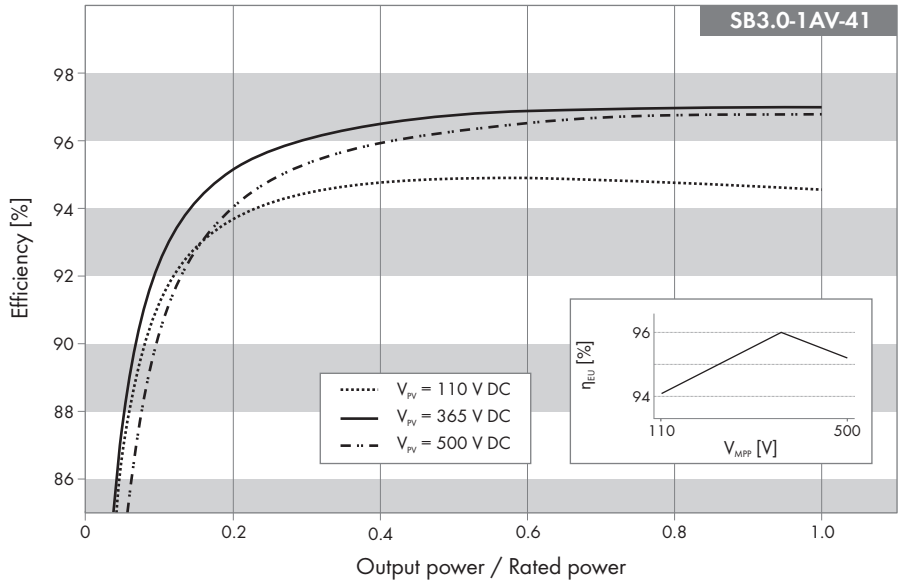
Standardized output power	Efficiency		
	Minimum MPP voltage 260 V	Rated input voltage 360 V	Maximum MPP voltage 500 V
5%	89.8%	91.2%	87.8%
10%	93.7%	94.8%	92.9%
20%	95.6%	96.6%	95.6%
25%	96.0%	96.9%	96.1%
30%	96.1%	97.0%	96.4%
50%	96.3%	97.2%	96.9%
75%	96.0%	97.0%	96.8%
100%	95.6%	96.7%	96.6%

3.3.2 Derating Behavior



3.4 SB3.0-1AV-41

3.4.1 Efficiency



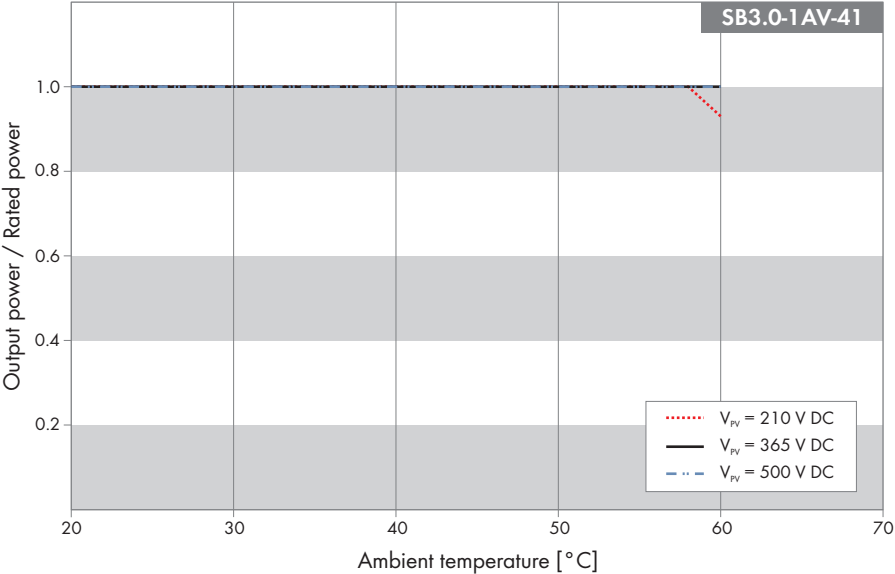
Maximum efficiency, $\eta_{\max}$ 97.1 %

European weighted efficiency, η_{EU} 96.3 %

Efficiency Profile

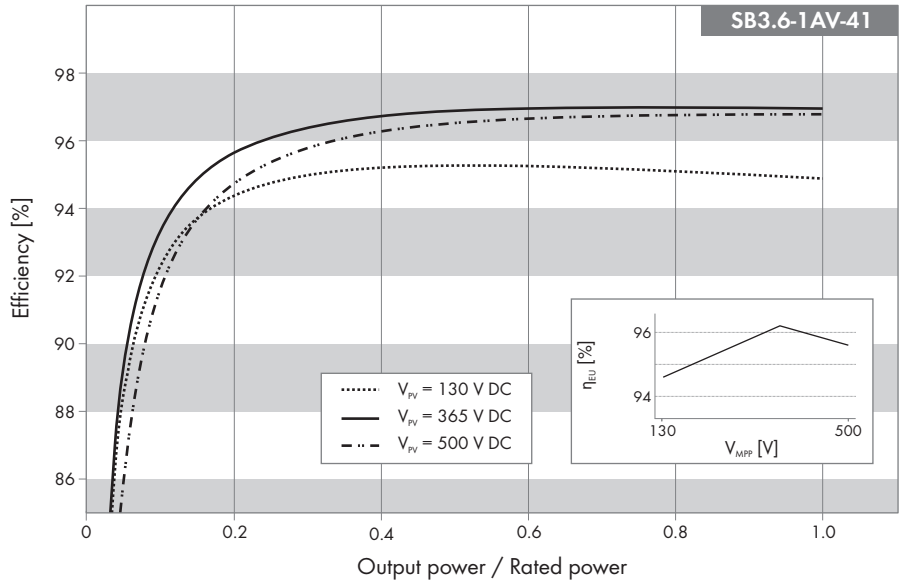
Standardized output power	Efficiency		
	Minimum MPP voltage 110 V	Rated input voltage 365 V	Maximum MPP voltage 500 V
5 %	86.8 %	89.1 %	84.6 %
10 %	91.4 %	93.3 %	91.0 %
20 %	93.8 %	95.7 %	94.6 %
25 %	94.3 %	96.1 %	95.3 %
30 %	94.6 %	96.4 %	95.7 %
50 %	95.0 %	97.0 %	96.6 %
75 %	95.0 %	97.1 %	97.0 %
100 %	94.7 %	97.1 %	97.0 %

3.4.2 Derating Behavior



3.5 SB3.6-1AV-41

3.5.1 Efficiency

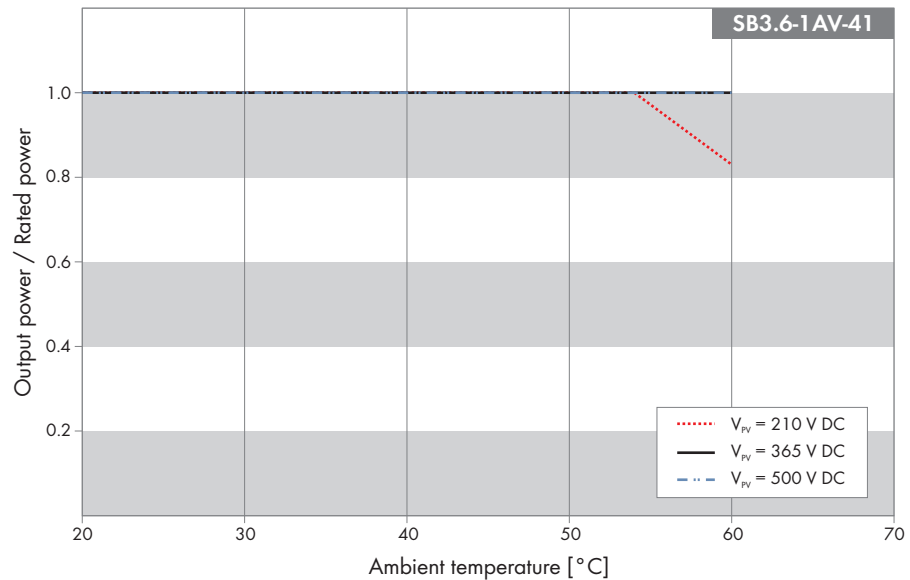


Maximum efficiency, $\eta_{\max}$	97.1 %
European weighted efficiency, η_{EU}	96.5 %

Efficiency Profile

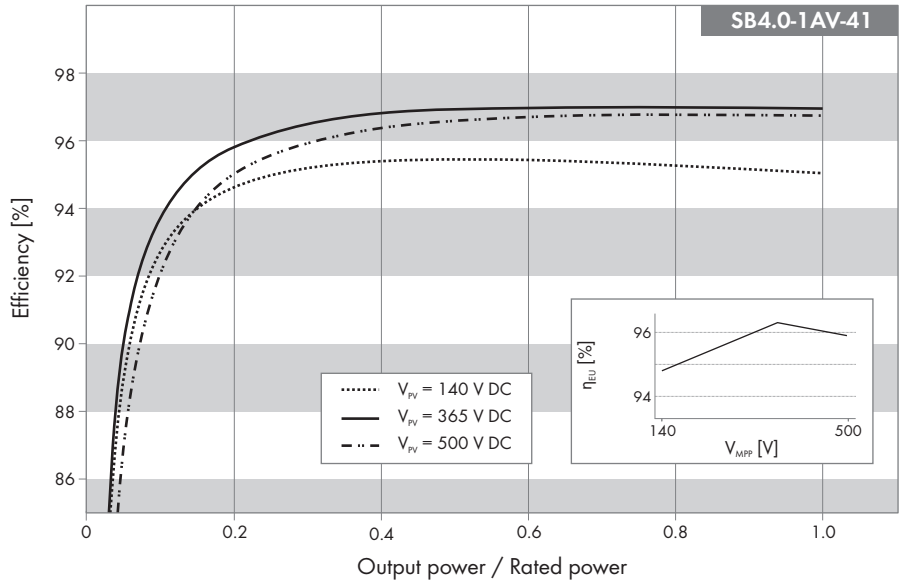
Standardized output power	Efficiency		
	Minimum MPP voltage 130 V	Rated input voltage 365 V	Maximum MPP voltage 500 V
5 %	88.7 %	90.5 %	86.9 %
10 %	92.5 %	94.2 %	92.3 %
20 %	94.5 %	96.1 %	95.2 %
25 %	94.9 %	96.5 %	95.8 %
30 %	95.1 %	96.7 %	96.2 %
50 %	95.4 %	97.1 %	96.8 %
75 %	95.3 %	97.1 %	97.0 %
100 %	95.1 %	97.0 %	97.0 %

3.5.2 Derating Behavior



3.6 SB4.0-1AV-41

3.6.1 Efficiency

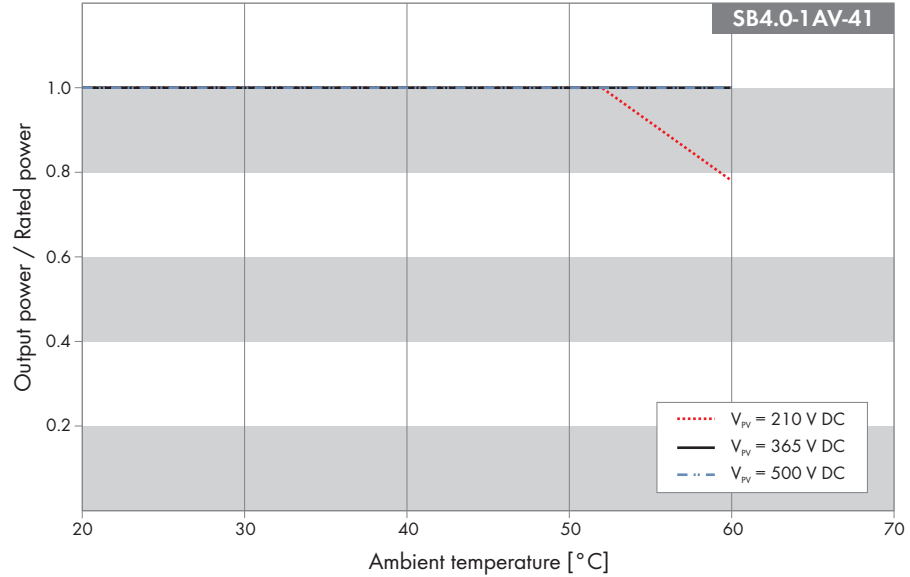


Maximum efficiency, $\eta_{\max}$	97.1 %
European weighted efficiency, η_{EU}	96.6 %

Efficiency Profile

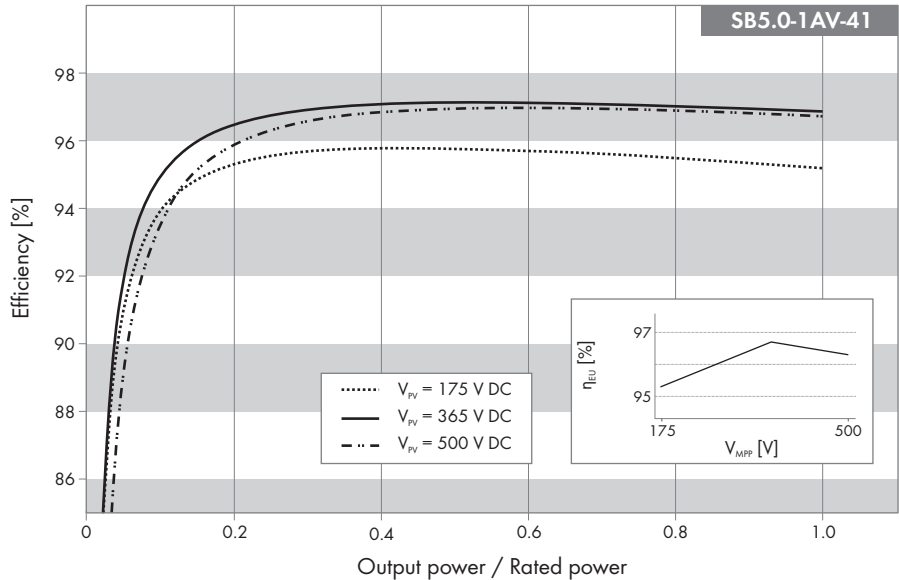
Standardized output power	Efficiency		
	Minimum MPP voltage 140 V	Rated input voltage 365 V	Maximum MPP voltage 500 V
5 %	89.2 %	91.0 %	87.7 %
10 %	92.8 %	94.5 %	92.8 %
20 %	94.6 %	96.3 %	95.5 %
25 %	95.0 %	96.6 %	96.0 %
30 %	95.2 %	96.8 %	96.3 %
50 %	95.4 %	97.1 %	96.9 %
75 %	95.2 %	97.1 %	97.0 %
100 %	95.0 %	97.0 %	97.0 %

3.6.2 Derating Behavior



3.7 SB5.0-1AV-41

3.7.1 Efficiency

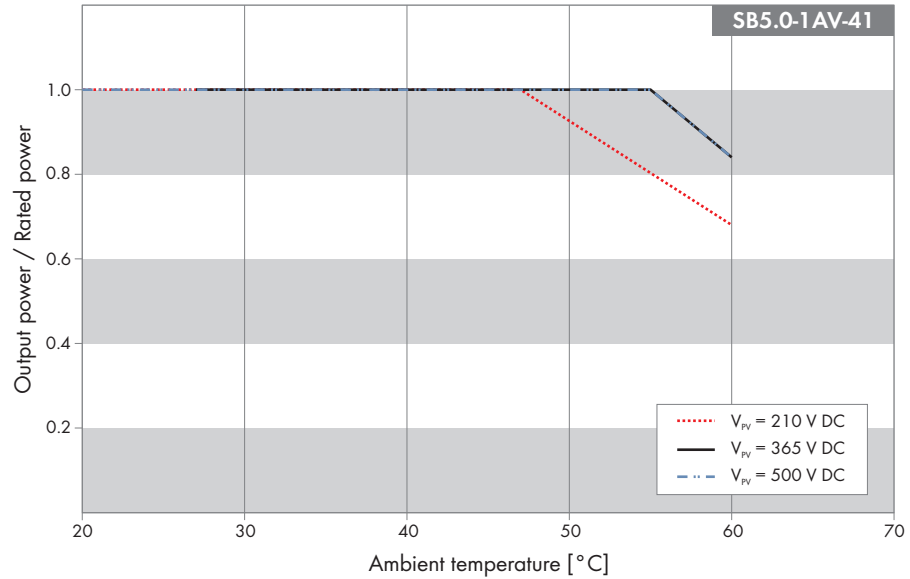


Maximum efficiency, $\eta_{\max}$	97.1 %
European weighted efficiency, η_{EU}	96.7 %

Efficiency Profile

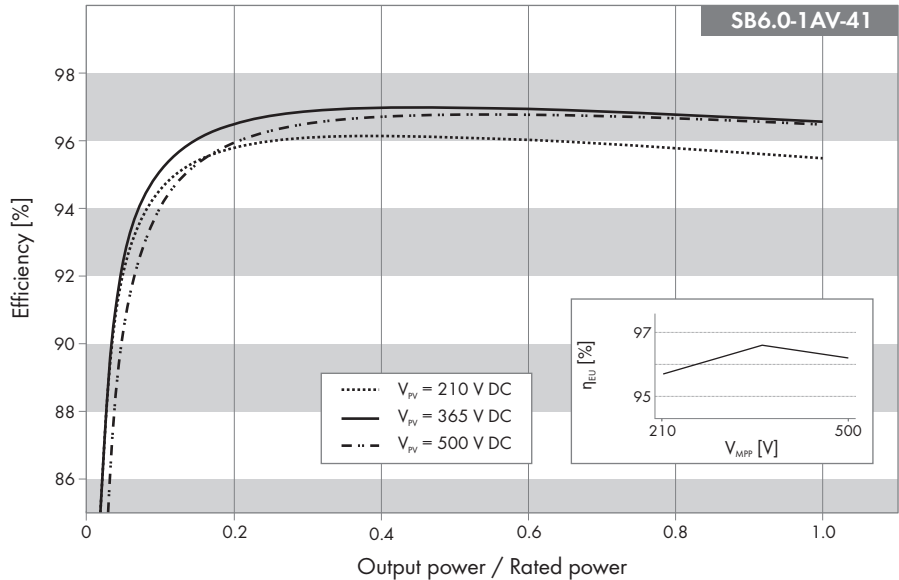
Standardized output power	Efficiency		
	Minimum MPP voltage 175 V	Rated input voltage 365 V	Maximum MPP voltage 500 V
5 %	90.9 %	92.4 %	89.7 %
10 %	93.9 %	95.2 %	93.8 %
20 %	95.4 %	96.6 %	96.0 %
25 %	95.6 %	96.8 %	96.4 %
30 %	95.8 %	97.0 %	96.6 %
50 %	95.9 %	97.1 %	97.0 %
75 %	95.7 %	97.0 %	97.0 %
100 %	95.4 %	96.8 %	96.8 %

3.7.2 Derating Behavior



3.8 SB6.0-1AV-41

3.8.1 Efficiency

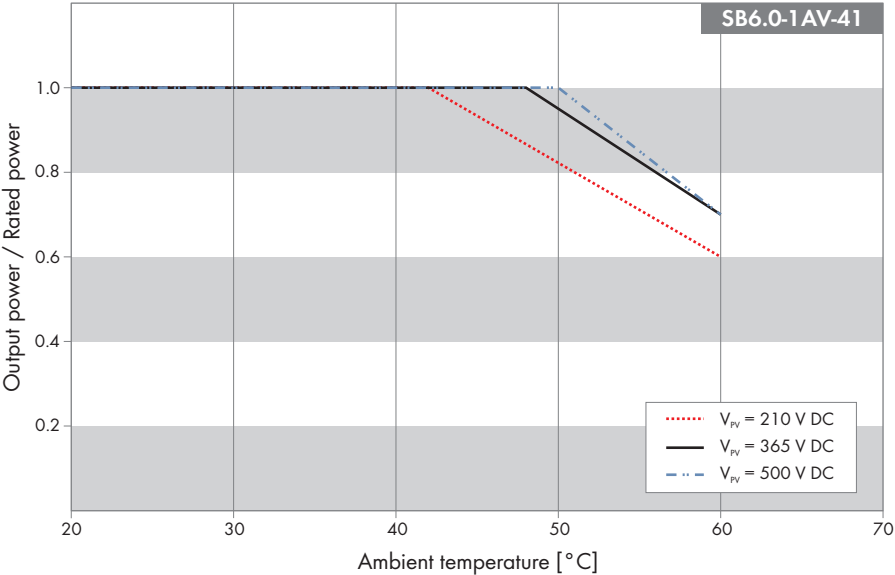


Maximum efficiency, $\eta_{\max}$	97.1 %
European weighted efficiency, η_{EU}	96.8 %

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 210 V	Rated input voltage 365 V	Maximum MPP voltage 500 V
5 %	92.2 %	93.3 %	91.0 %
10 %	94.7 %	95.7 %	94.6 %
20 %	95.9 %	96.8 %	96.3 %
25 %	96.1 %	97.0 %	96.6 %
30 %	96.2 %	97.1 %	96.8 %
50 %	96.3 %	97.1 %	97.0 %
75 %	96.0 %	96.9 %	96.9 %
100 %	95.7 %	96.6 %	96.7 %

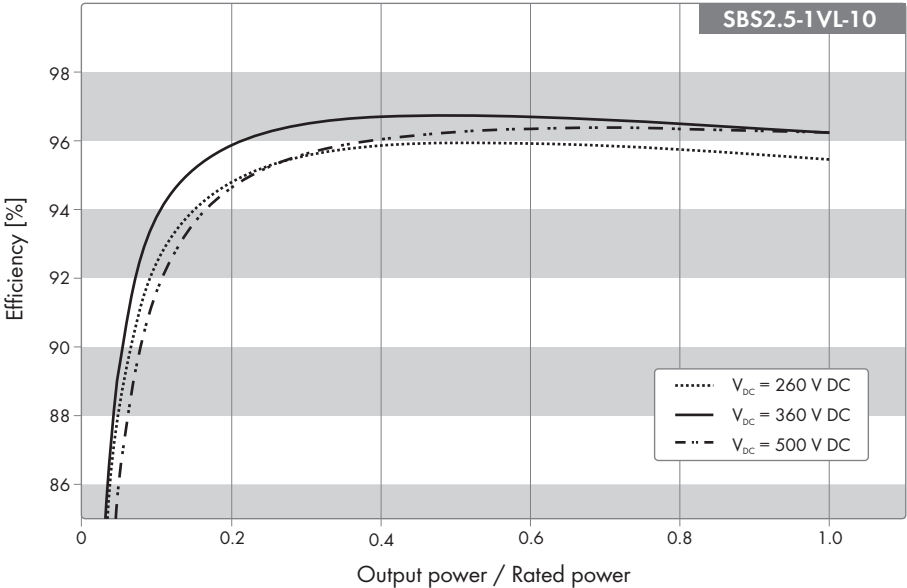
3.8.2 Derating Behavior



4 Sunny Boy Storage

4.1 SBS2.5-1VL-10

4.1.1 DC Efficiency



Maximum efficiency, $\eta_{\max}$ 96.7%

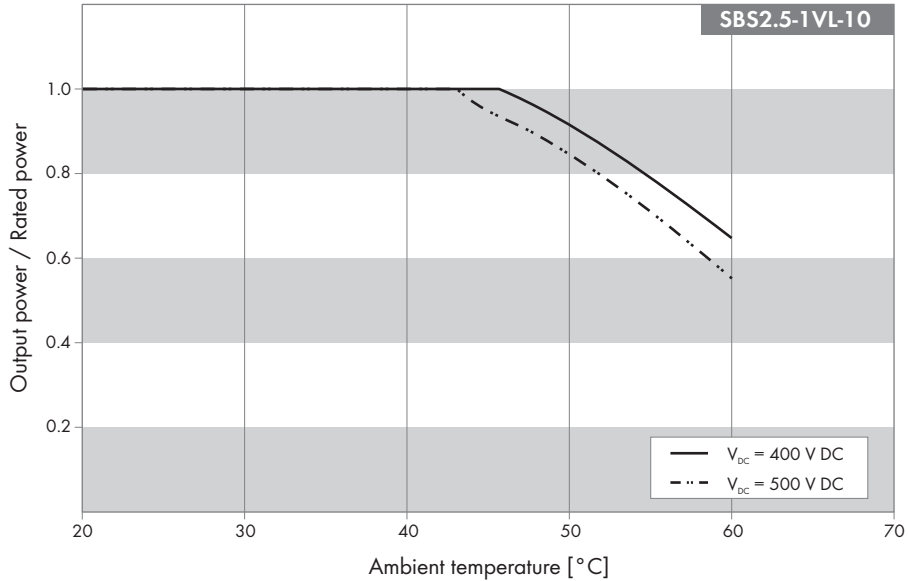
European weighted efficiency, η_{EU} 96.1%

Efficiency Profile

Standardized output power	Efficiency		
	Minimum DC voltage 260 V	Rated input voltage 360 V	Maximum DC voltage 500 V
5%	87.9%	89.2%	85.7%
10%	92.3%	93.6%	91.5%
20%	94.8%	95.8%	94.6%
25%	95.3%	96.2%	95.2%
30%	95.5%	96.5%	95.6%
50%	95.9%	96.7%	96.2%

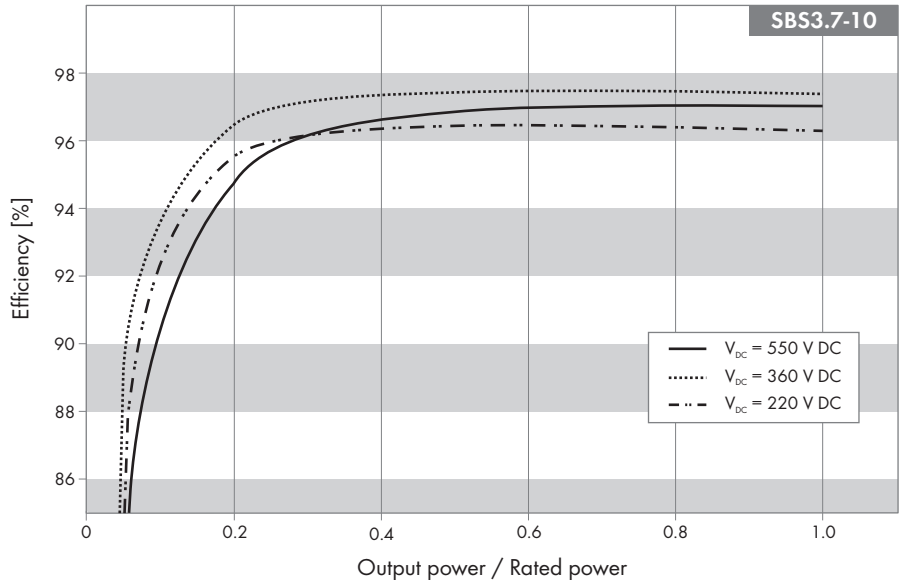
Standardized output power	Efficiency		
	Minimum DC voltage 260 V	Rated input voltage 360 V	Maximum DC voltage 500 V
75%	95.8%	96.5%	96.3%
100%	95.4%	96.2%	96.2%

4.1.2 Derating Behavior



4.2 SBS3.7-10

4.2.1 DC Efficiency

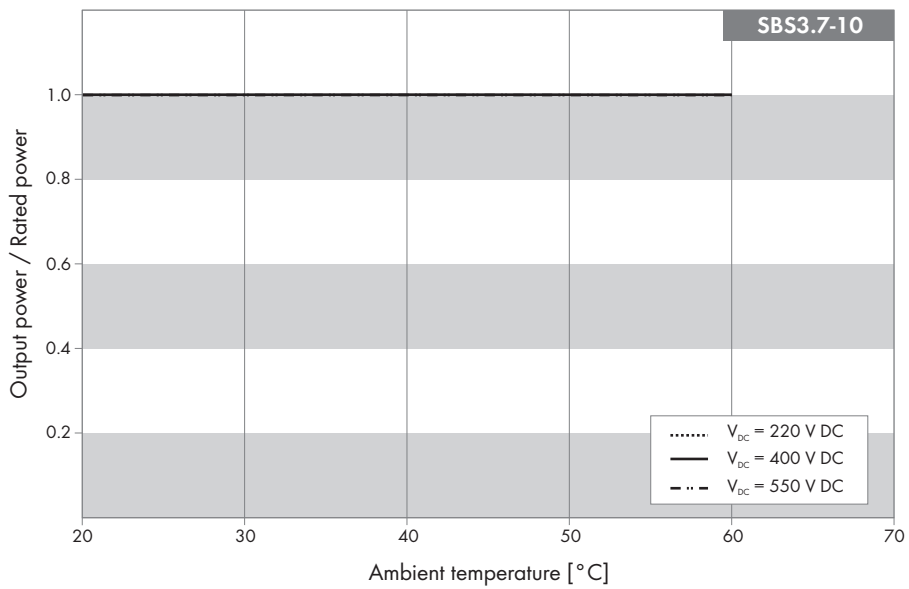


Maximum efficiency 97.5 %

Efficiency Profile

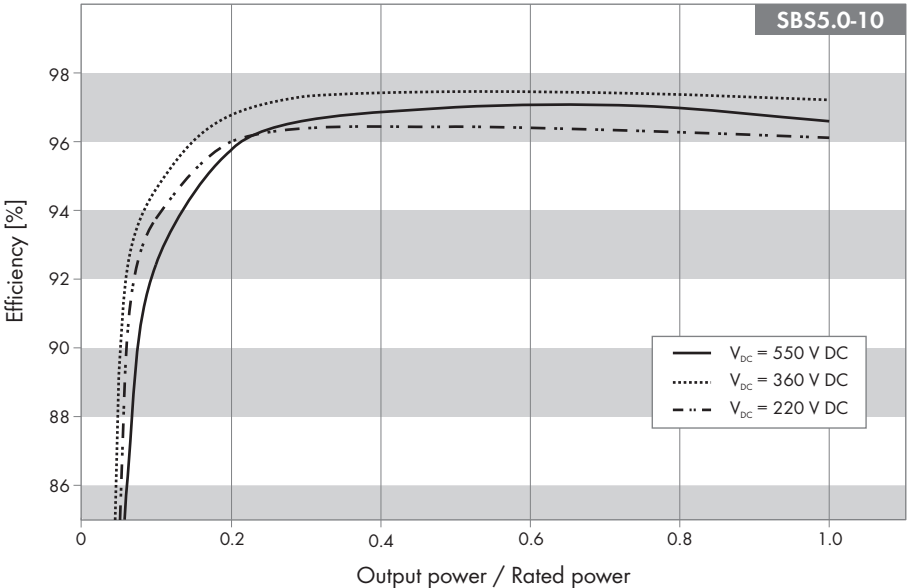
Standardized output power	Efficiency		
	Minimum DC voltage 220 V	Rated input voltage 360 V	Maximum DC voltage 550 V
10 %	92.7 %	93.6 %	88.6 %
20 %	95.5 %	96.5 %	94.7 %
30 %	96.1 %	97.1 %	96.1 %
50 %	96.4 %	97.4 %	96.8 %
75 %	96.4 %	97.5 %	97.0 %
100 %	96.3 %	97.4 %	97.0 %

4.2.2 Derating Behavior



4.3 SBS5.0-10

4.3.1 DC Efficiency

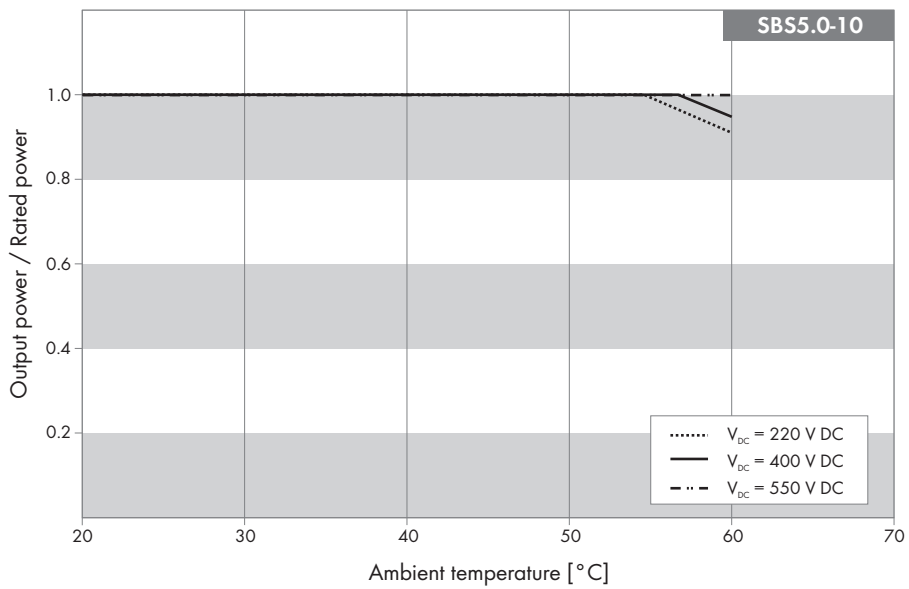


Maximum efficiency 97.5 %

Efficiency Profile

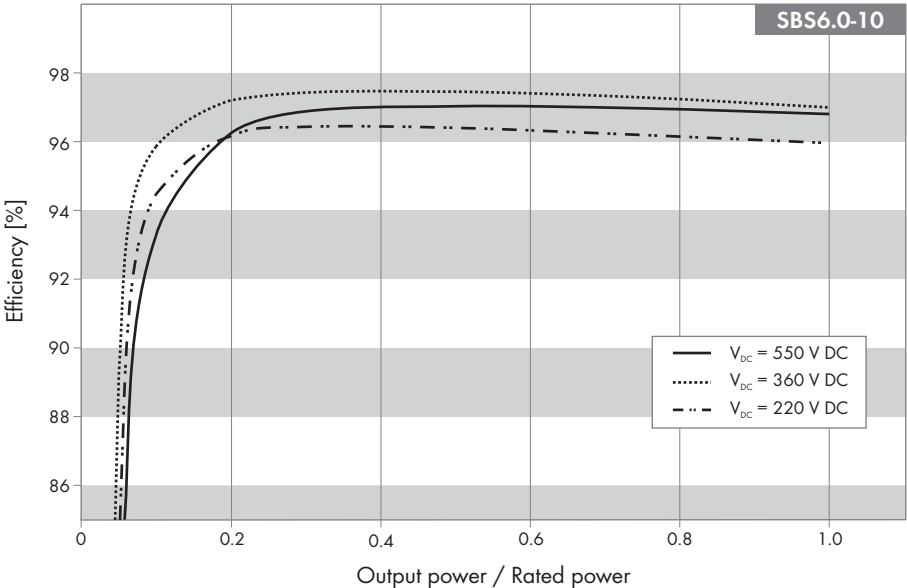
Standardized output power	Efficiency		
	Minimum DC voltage 220 V	Rated input voltage 360 V	Maximum DC voltage 550 V
10 %	93.8 %	94.6 %	92.4 %
20 %	96.0 %	96.9 %	92.4 %
30 %	96.4 %	97.3 %	96.5 %
50 %	96.4 %	97.5 %	97.0 %
75 %	96.3 %	97.4 %	97.0 %
100 %	96.1 %	97.2 %	96.6 %

4.3.2 Derating Behavior



4.4 SBS6.0-10

4.4.1 DC Efficiency

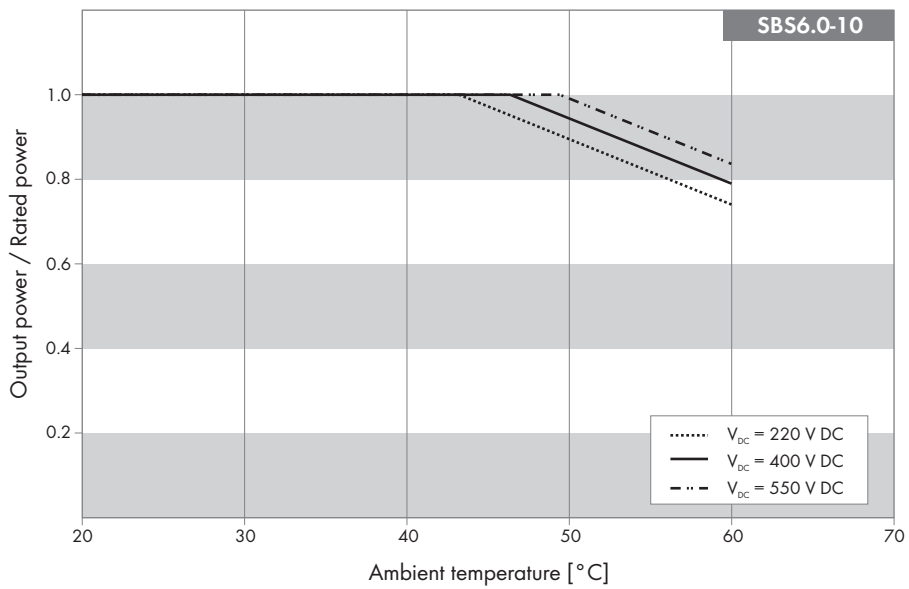


Maximum efficiency 97.5 %

Efficiency Profile

Standardized output power	Efficiency		
	Minimum DC voltage 220 V	Rated input voltage 360 V	Maximum DC voltage 550 V
10 %	94.5 %	95.8 %	93.3 %
20 %	96.2 %	97.2 %	96.2 %
30 %	96.4 %	97.4 %	96.8 %
50 %	96.4 %	97.5 %	97.0 %
75 %	96.2 %	97.3 %	97.0 %
100 %	96.0 %	97.0 %	96.8 %

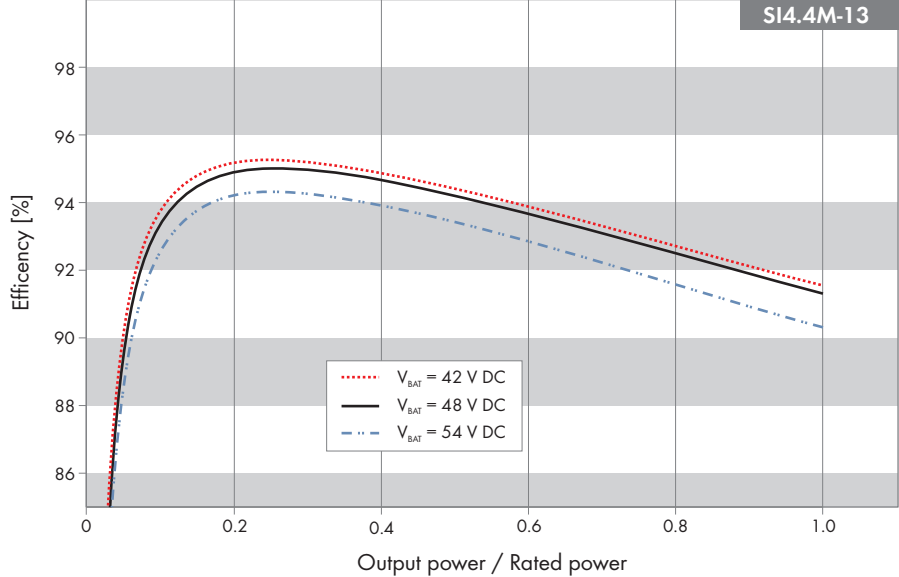
4.4.2 Derating Behavior



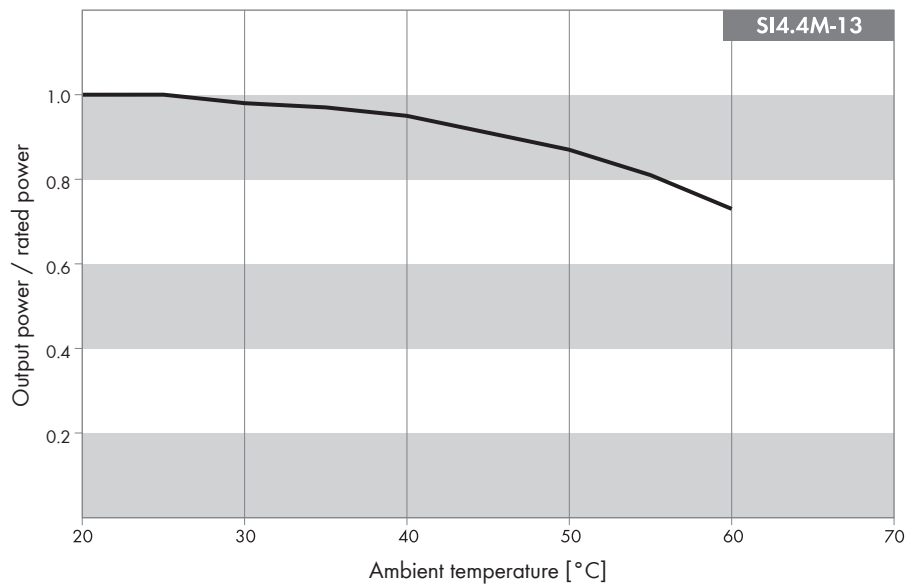
5 Sunny Island

5.1 SI4.4M-13

5.1.1 Efficiency

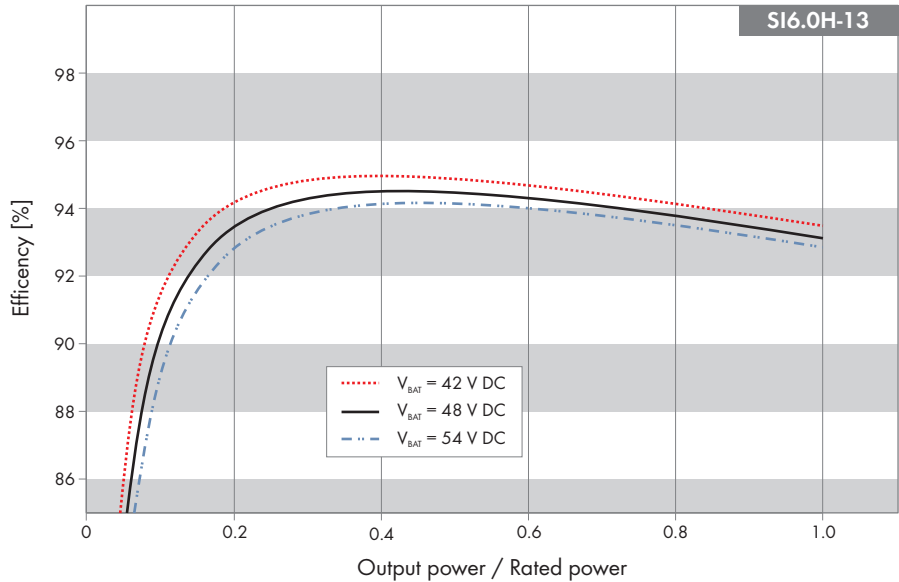


5.1.2 Derating Behavior

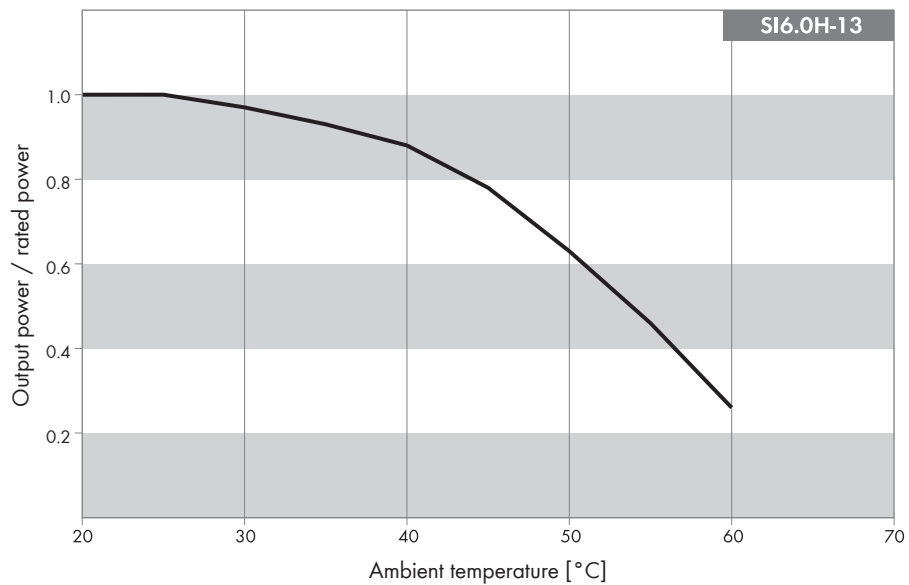


5.2 SI6.0H-13

5.2.1 Efficiency

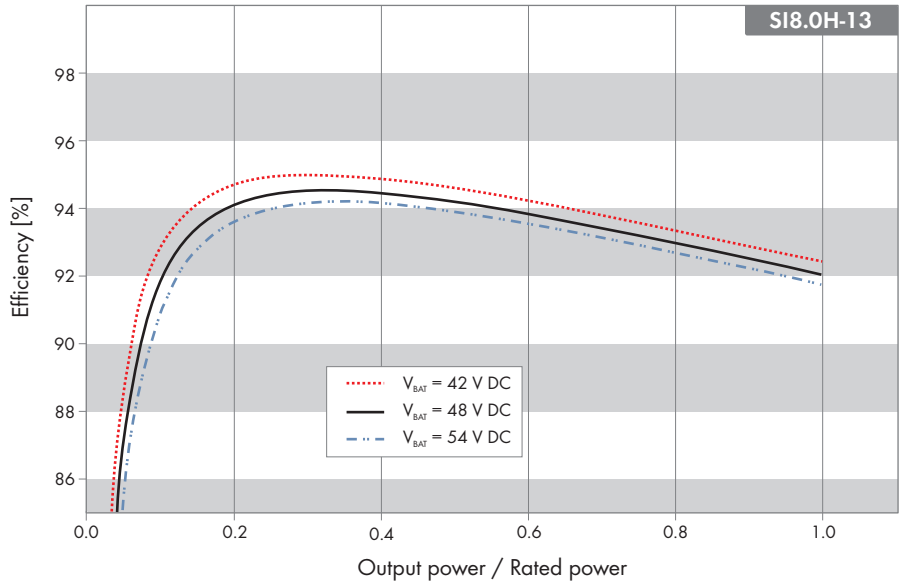


5.2.2 Derating Behavior

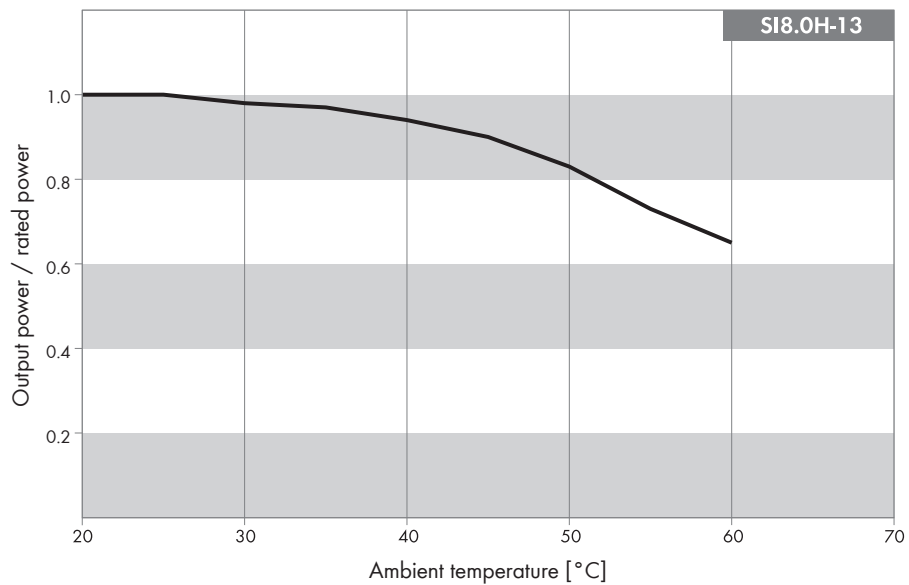


5.3 SI8.0H-13

5.3.1 Efficiency



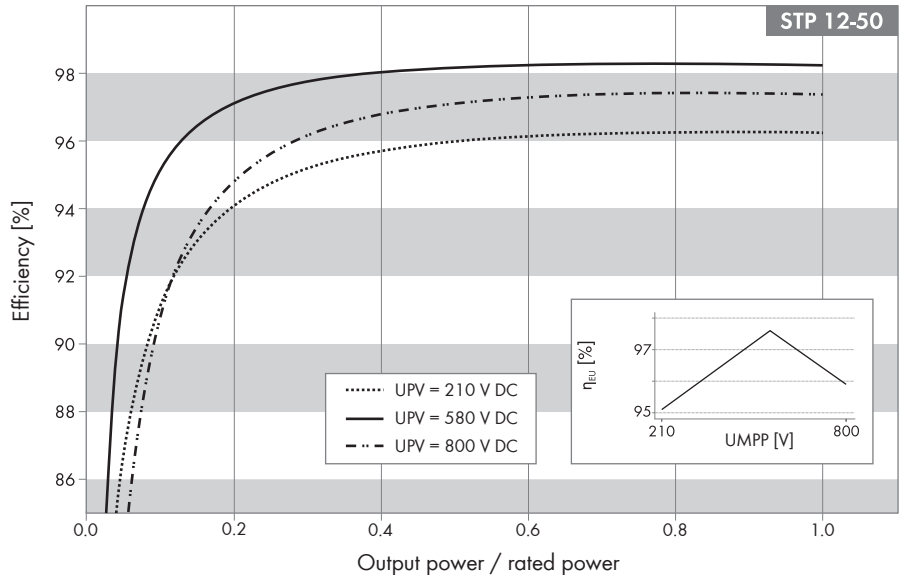
5.3.2 Derating Behavior



6 Sunny Tripower

6.1 STP 12-50

6.1.1 Efficiency



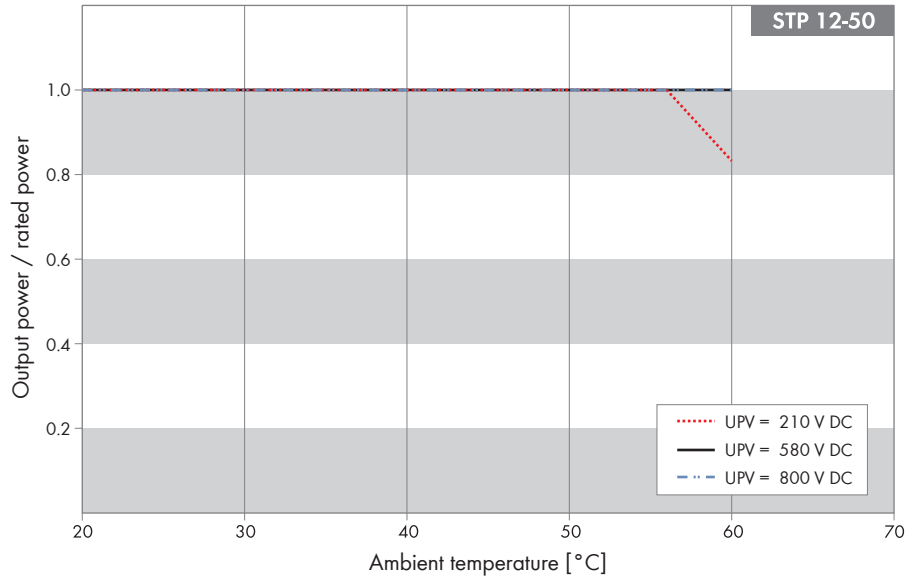
Maximum efficiency, η_{max}	97.6 %
European weighted efficiency, η_{EU}	98.2 %

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 210 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	86.5 %	91.2 %	83.4 %
10 %	91.1 %	95.1 %	90.7 %
20 %	94.1 %	97.91 %	94.8 %
25 %	94.7 %	97.5 %	95.6 %
30 %	95.1 %	97.7 %	96.1 %
50 %	96.0 %	98.1 %	97.1 %

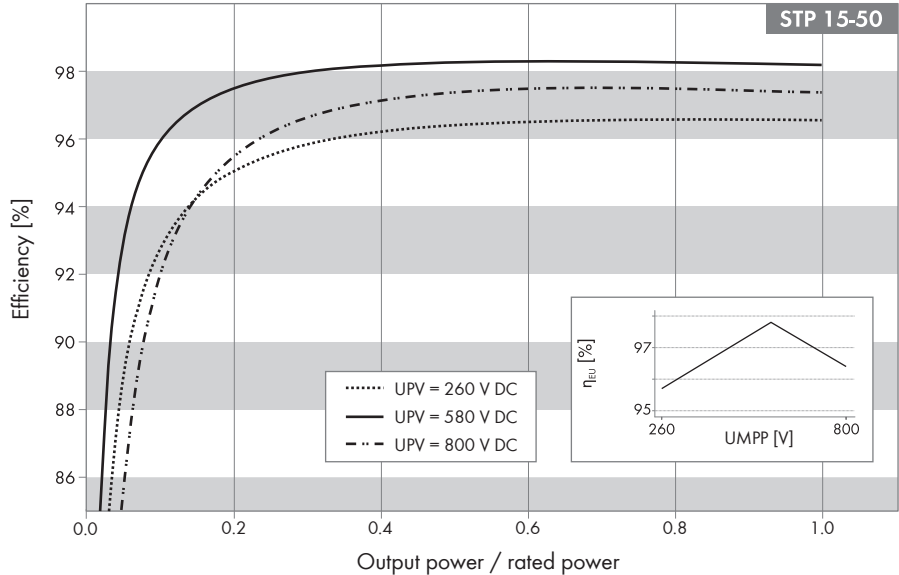
Standardized output power	Efficiency		
	Minimum MPP voltage 210 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
75 %	96.2 %	98.2 %	97.4 %
100 %	96.2 %	98.2 %	97.3 %

6.1.2 Derating Behavior



6.2 STP 15-50

6.2.1 Efficiency

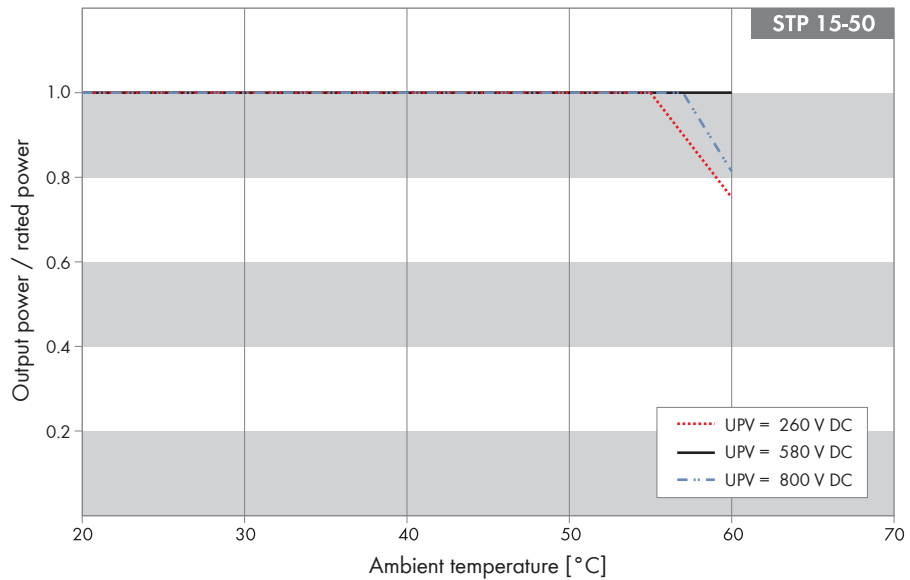


Maximum efficiency, η_{max}	98.2 %
European weighted efficiency, η_{EU}	97.8 %

Efficiency Profile

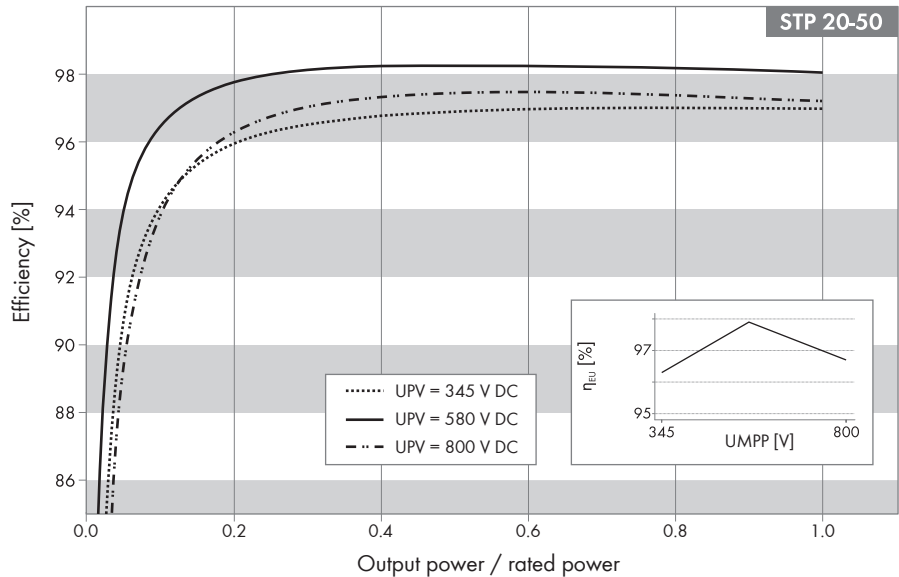
Standardized output power	Efficiency		
	Minimum MPP voltage 260 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	88.9 %	92.9 %	85.5 %
10 %	92.7 %	95.9 %	91.9 %
20 %	95.1 %	97.5 %	95.5 %
25 %	95.5 %	97.8 %	96.2 %
30 %	95.8 %	98.0 %	96.6 %
50 %	96.4 %	98.3 %	97.4 %
75 %	96.6 %	98.3 %	97.5 %
100 %	96.6 %	98.2 %	97.4 %

6.2.2 Derating Behavior



6.3 STP 20-50

6.3.1 Efficiency



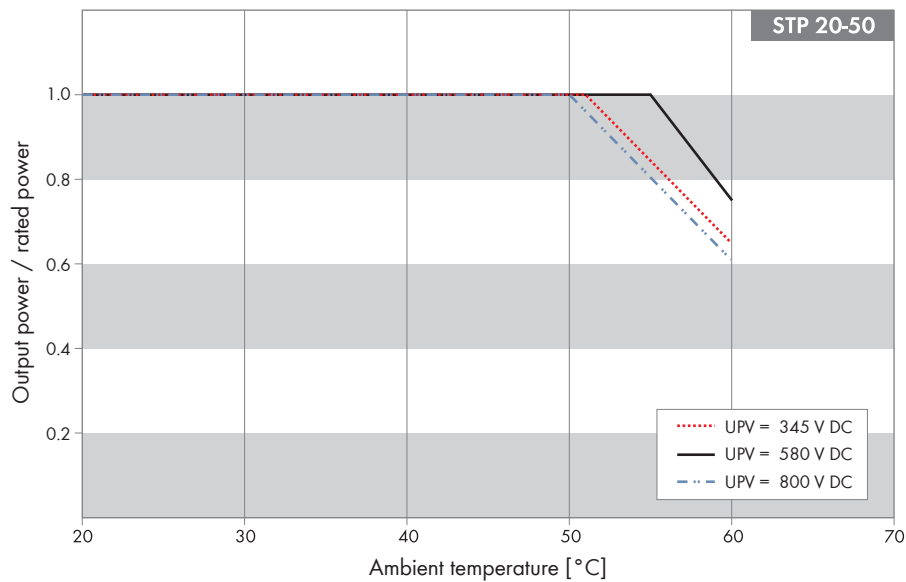
Maximum efficiency, η_{max} 98.2 %

European weighted efficiency, η_{EU} 97.9 %

Efficiency Profile

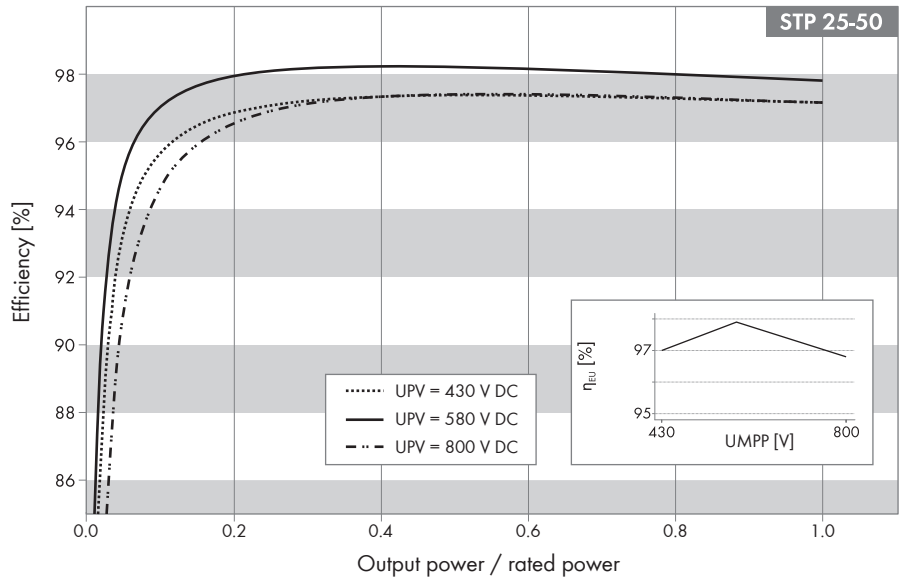
Standardized output power	Efficiency		
	Minimum MPP voltage 345 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	90.6 %	93.9 %	89.2 %
10 %	94.1 %	96.5 %	93.8 %
20 %	95.9 %	97.7 %	96.3 %
25 %	96.3 %	98.0 %	96.7 %
30 %	96.5 %	98.1 %	97.0 %
50 %	96.9 %	98.3 %	97.4 %
75 %	97.0 %	98.2 %	97.4 %
100 %	97.0 %	98.0 %	97.2 %

6.3.2 Derating Behavior



6.4 STP 25-50

6.4.1 Efficiency



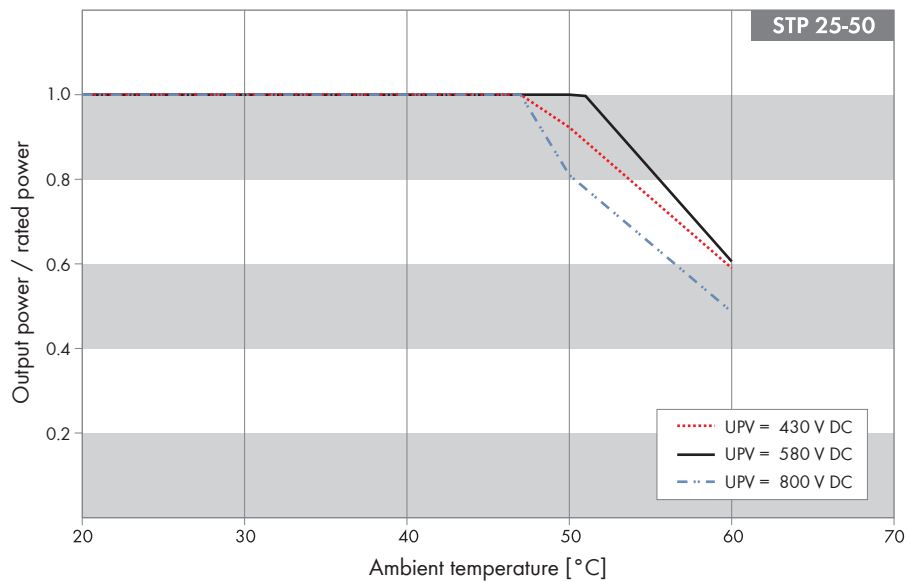
Maximum efficiency, η_{max} 98.2 %

European weighted efficiency, η_{EU} 98.0 %

Efficiency Profile

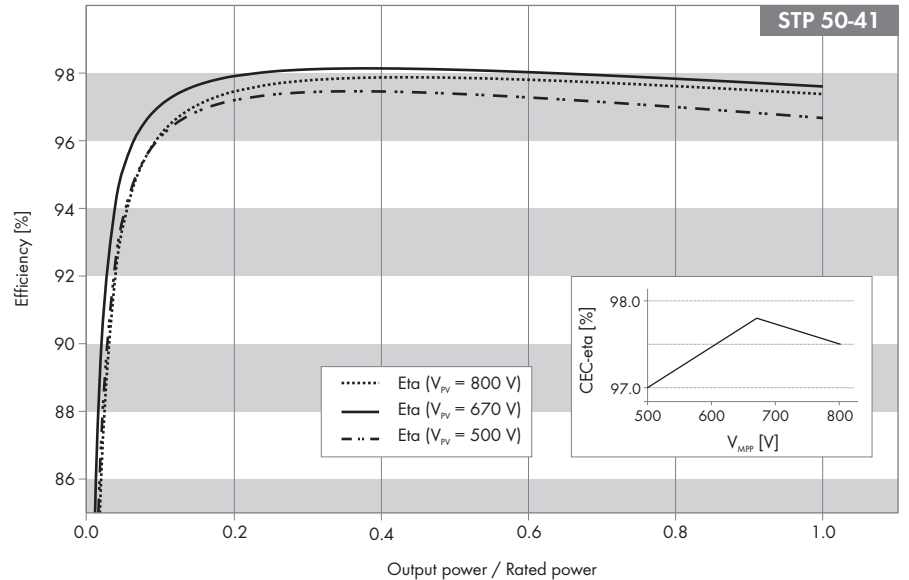
Standardized output power	Efficiency		
	Minimum MPP voltage 430 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	93.2 %	95.1 %	90.8 %
10 %	95.7 %	97.0 %	94.6 %
20 %	96.9 %	97.9 %	96.5 %
25 %	97.1 %	98.1 %	96.9 %
30 %	97.2 %	98.2 %	97.1 %
50 %	97.4 %	98.2 %	97.4 %
75 %	97.3 %	98.1 %	97.3 %
100 %	97.2 %	97.8 %	97.1 %

6.4.2 Derating Behavior



6.5 STP 50-41

6.5.1 Efficiency

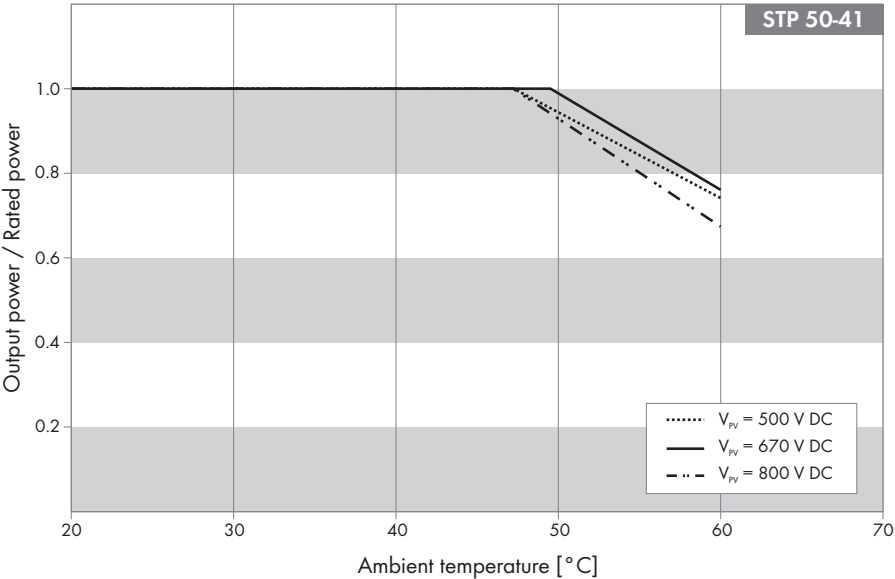


Maximum efficiency, $\eta_{\max}$	98.1 %
European weighted efficiency, η_{EU}	97.8 %

Efficiency Profile

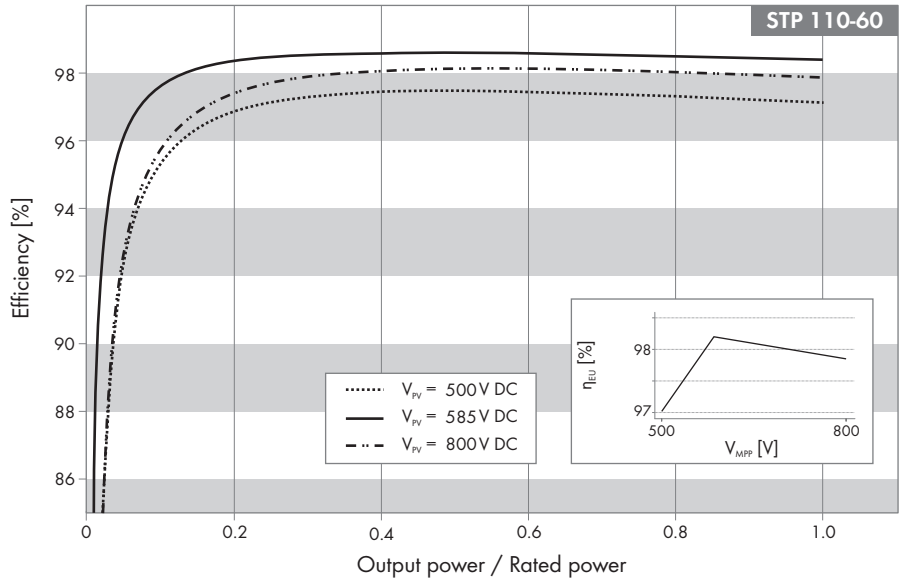
Standardized output power	Efficiency		
	Minimum MPP voltage 500 V	Rated input voltage 670 V	Maximum MPP voltage 800 V
5 %	93.7 %	95.2 %	93.5 %
10 %	96.1 %	97.0 %	96.2 %
20 %	97.2 %	97.9 %	97.4 %
25 %	97.3 %	98.0 %	97.6 %
30 %	97.4 %	98.1 %	97.8 %
50 %	97.4 %	98.1 %	97.8 %
75 %	97.1 %	97.9 %	97.6 %
100 %	96.7 %	97.6 %	97.4 %

6.5.2 Derating Behavior



6.6 STP 110-60

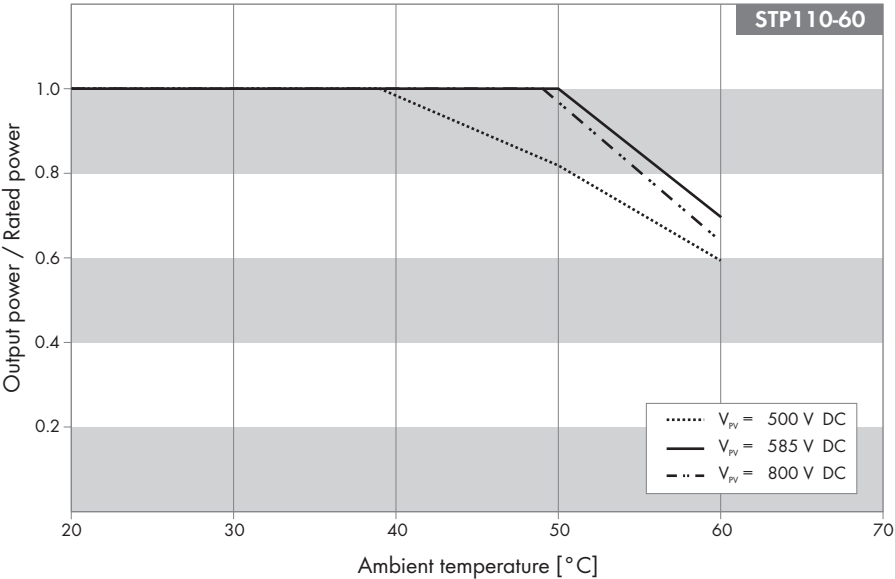
6.6.1 Efficiency



Efficiency Profile

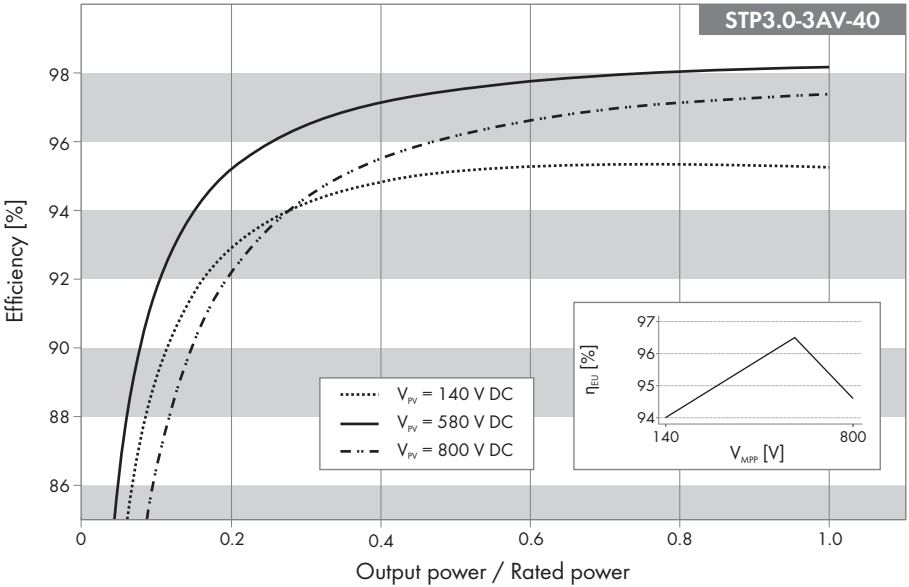
Standardized output power	Efficiency		
	Minimum MPP voltage 500 V	Rated input voltage 585 V	Maximum MPP voltage 800 V
5 %	92.3 %	96.2 %	92.4 %
10 %	95.4 %	97.6 %	95.7 %
20 %	96.9 %	98.3 %	97.4 %
25 %	97.2 %	98.5 %	97.7 %
30 %	97.3 %	98.5 %	97.9 %
50 %	97.5 %	98.6 %	98.1 %
75 %	97.4 %	98.5 %	98.1 %
100 %	97.1 %	98.4 %	97.9 %

6.6.2 Derating Behavior



6.7 STP3.0-3AV-40

6.7.1 Efficiency when operating in TN or TT systems



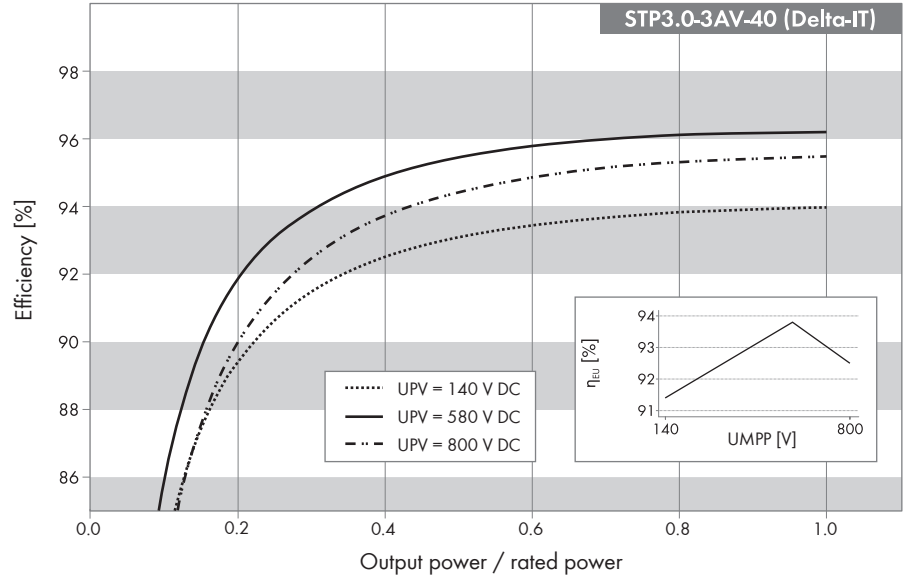
Maximum efficiency, $\eta_{\max}$ 98.2 %

European weighted efficiency, η_{EU} 96.5 %

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 140 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	82.8 %	86.0 %	77.6 %
10 %	89.1 %	91.6 %	86.4 %
20 %	92.9 %	95.2 %	92.2 %
25 %	93.7 %	96.0 %	93.5 %
30 %	94.2 %	96.5 %	94.4 %
50 %	95.1 %	97.5 %	96.2 %
75 %	95.3 %	98.0 %	97.0 %
100 %	95.2 %	98.2 %	97.4 %

6.7.2 Efficiency when operating in a Delta IT system

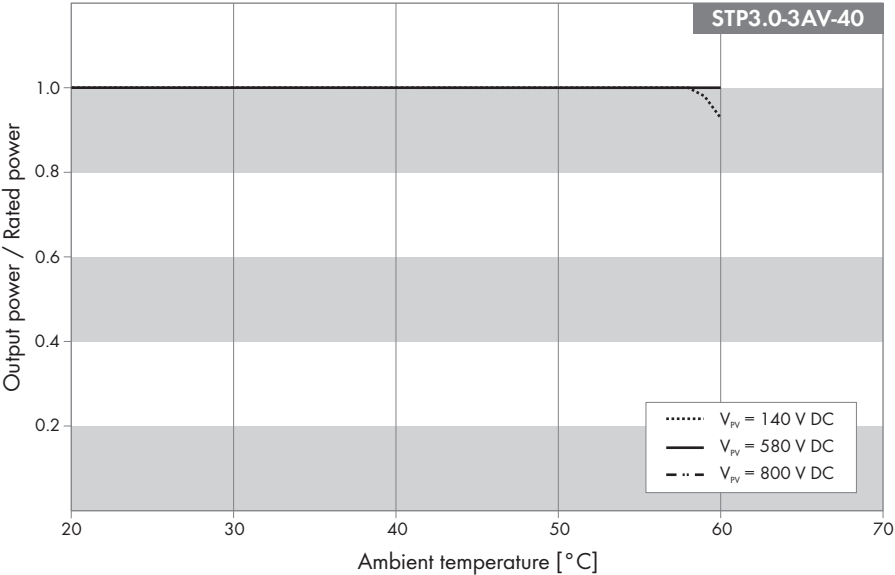


Maximum efficiency, η_{max}	96.2 %
European weighted efficiency, η_{EU}	93.8 %

Efficiency Profile

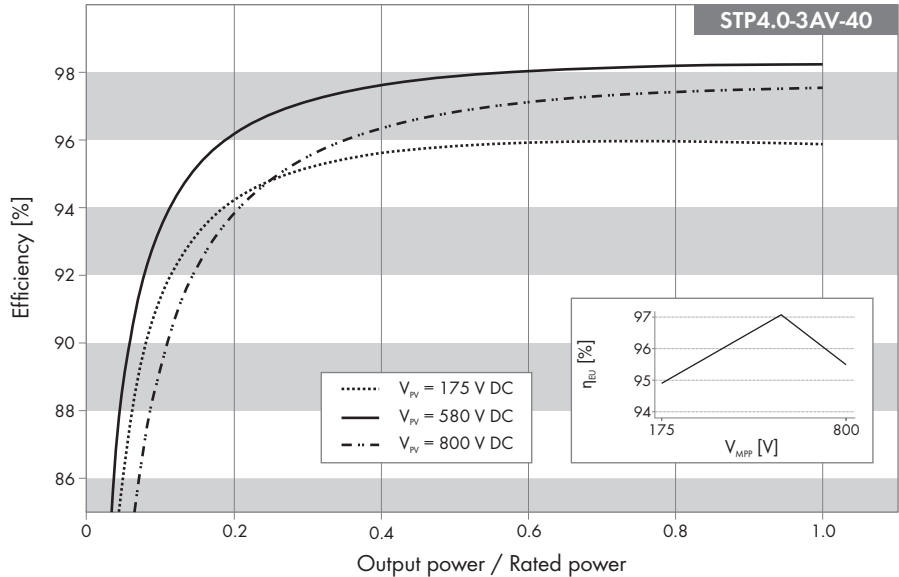
Standardized output power	Efficiency		
	Minimum MPP voltage 140 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	73.8 %	75.9 %	71.7 %
10 %	83.6 %	85.9 %	83.0 %
20 %	89.4 %	91.8 %	90.0 %
25 %	90.7 %	93.0 %	91.5 %
30 %	91.5 %	93.9 %	92.5 %
50 %	93.1 %	95.5 %	94.4 %
75 %	93.8 %	96.1 %	95.2 %
100 %	94.0 %	96.2 %	95.5 %

6.7.3 Derating Behavior



6.8 STP4.0-3AV-40

6.8.1 Efficiency when operating in TN or TT systems

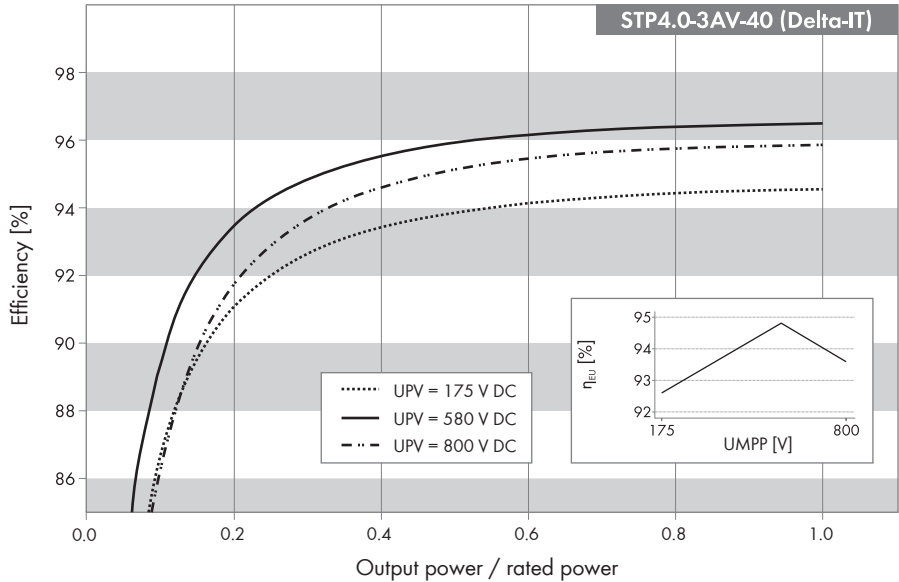


Maximum efficiency, η_{max}	98.2%
European weighted efficiency, η_{EU}	97.1%

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 175 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5%	85.9%	88.6%	81.6%
10%	91.2%	93.3%	98.1%
20%	94.2%	96.1%	93.8%
25%	94.8%	96.7%	94.8%
30%	95.2%	97.1%	95.5%
50%	95.8%	97.9%	96.8%
75%	96.0%	98.2%	97.4%
100%	95.9%	98.2%	97.6%

6.8.2 Efficiency when operating in a Delta IT system

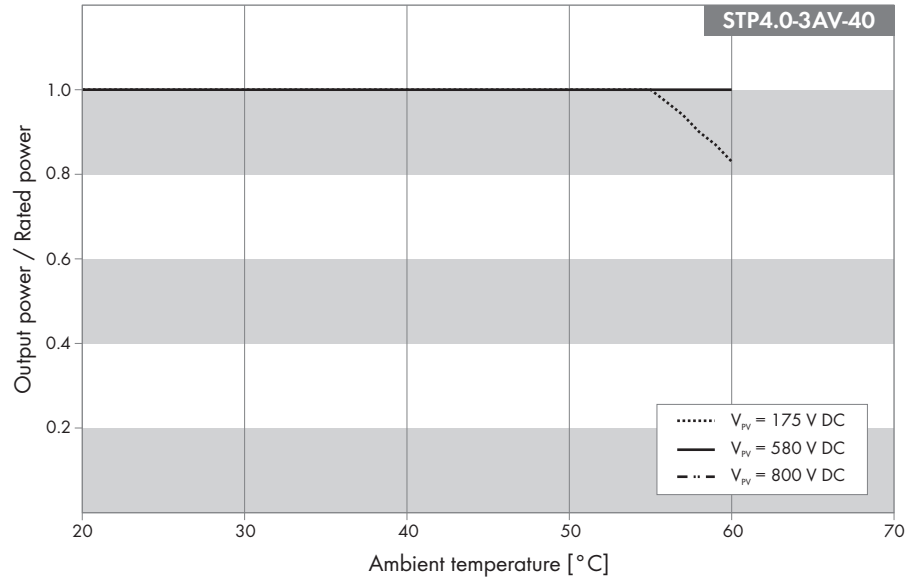


Maximum efficiency, η_{max}	96.5 %
European weighted efficiency, η_{EU}	94.8 %

Efficiency Profile

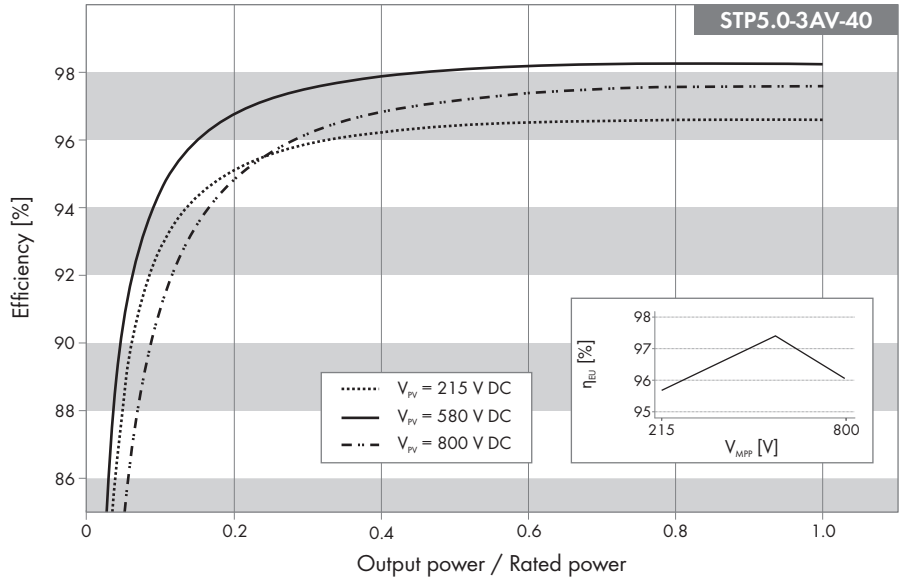
Standardized output power	Efficiency		
	Minimum MPP voltage 175 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	78.7 %	82.1 %	76.7 %
10 %	86.6 %	89.4 %	86.2 %
20 %	91.1 %	93.5 %	91.7 %
25 %	92.0 %	94.3 %	92.9 %
30 %	92.6 %	94.9 %	93.7 %
50 %	93.9 %	95.9 %	95.1 %
75 %	94.4 %	96.4 %	95.7 %
100 %	94.6 %	96.5 %	95.9 %

6.8.3 Derating Behavior



6.9 STP5.0-3AV-40

6.9.1 Efficiency when operating in TN or TT systems

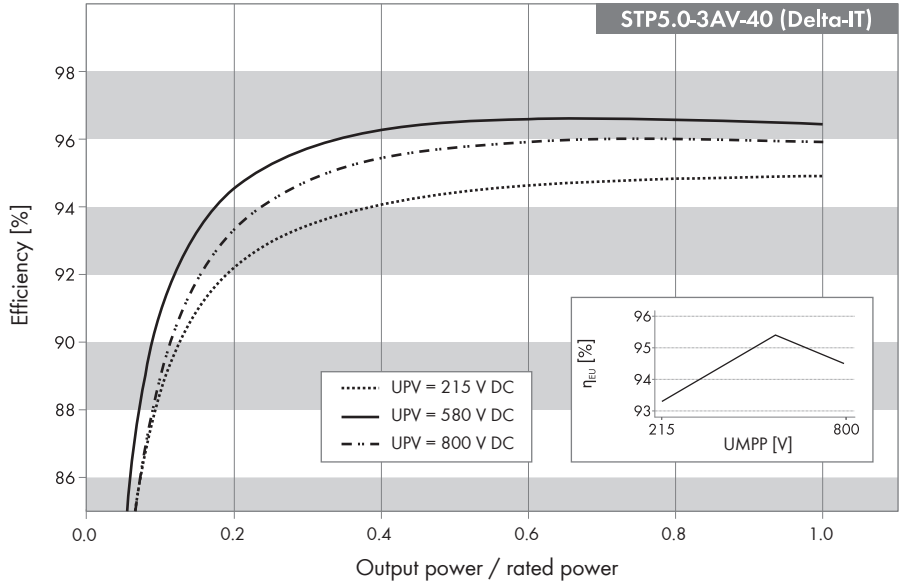


Maximum efficiency, $\eta_{\max}$	98.2%
European weighted efficiency, η_{EU}	97.4%

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 215 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5%	88.2%	90.4%	84.4%
10%	92.7%	94.4%	90.9%
20%	95.1%	96.7%	94.8%
25%	95.6%	97.2%	95.6%
30%	95.9%	97.5%	96.2%
50%	96.4%	98.1%	97.2%
75%	96.6%	98.2%	97.5%
100%	96.6%	98.2%	97.6%

6.9.2 Efficiency when operating in a Delta IT system

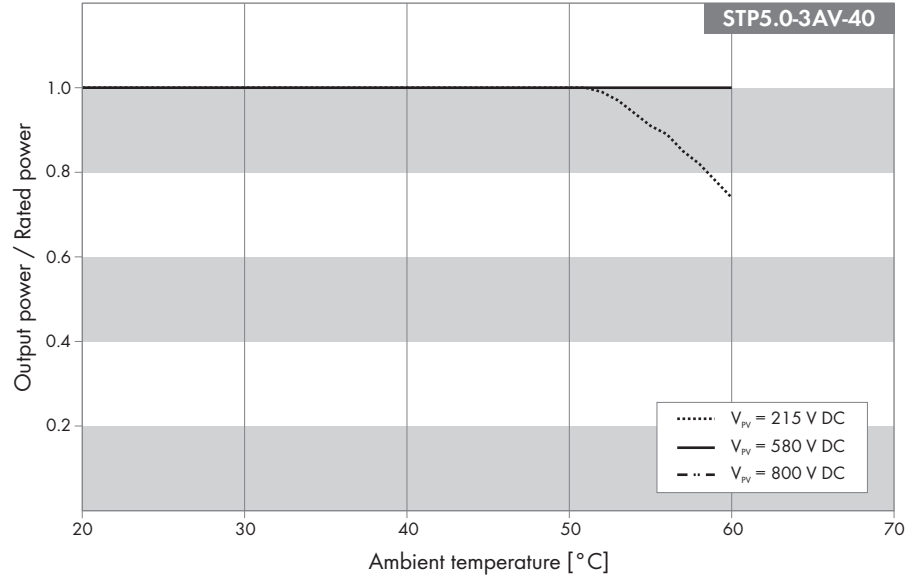


Maximum efficiency, η_{max}	96.6 %
European weighted efficiency, η_{EU}	95.4 %

Efficiency Profile

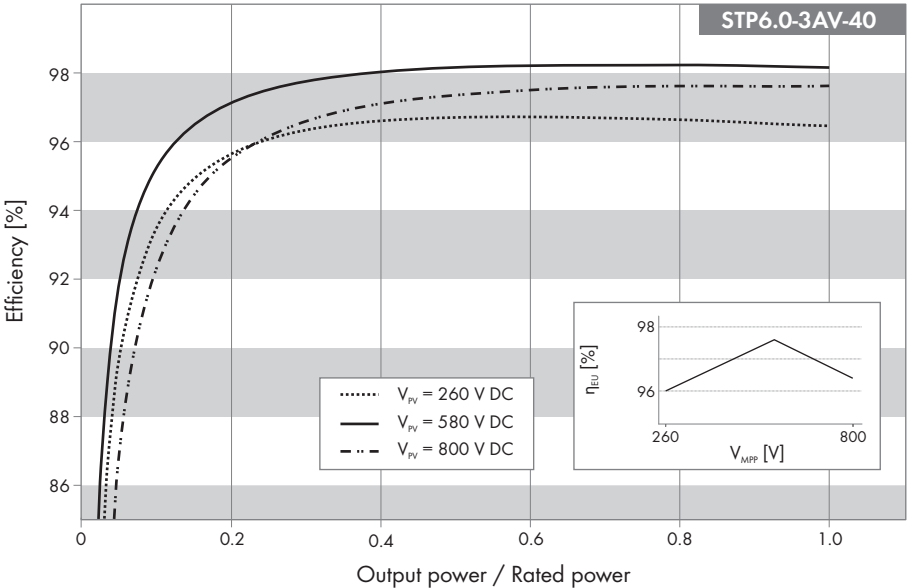
Standardized output power	Efficiency		
	Minimum MPP voltage 215 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	81.7 %	83.9 %	81.0 %
10 %	88.4 %	90.8 %	88.9 %
20 %	92.2 %	94.5 %	93.3 %
25 %	92.9 %	95.3 %	94.2 %
30 %	93.4 %	95.7 %	94.8 %
50 %	94.4 %	96.5 %	95.8 %
75 %	94.8 %	96.6 %	96.0 %
100 %	94.9 %	96.4 %	95.9 %

6.9.3 Derating Behavior



6.10 STP6.0-3AV-40

6.10.1 Efficiency when operating in TN or TT systems



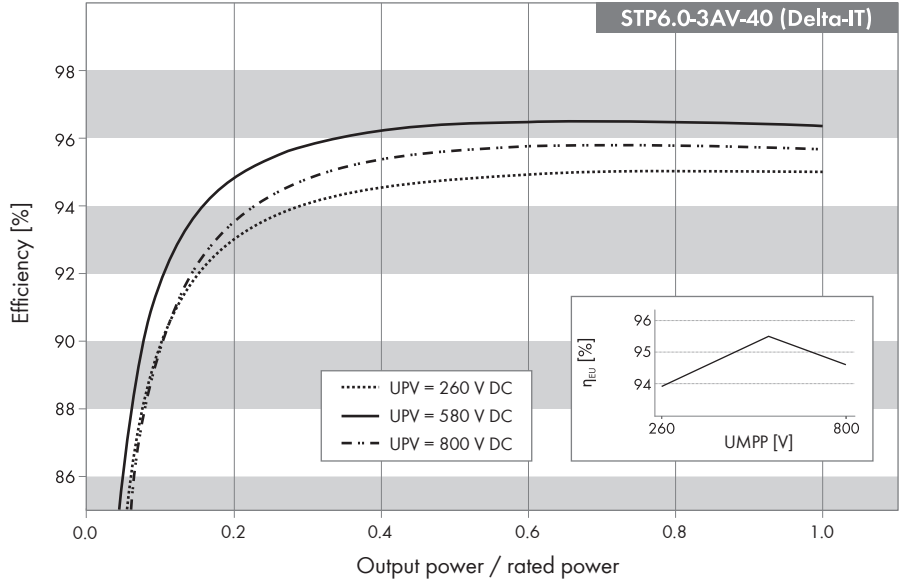
Maximum efficiency, η_{max} 98.2%

European weighted efficiency, η_{EU} 97.6%

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 260 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5%	89.3%	91.6%	86.4%
10%	93.4%	95.2%	92.2%
20%	95.6%	97.1%	95.5%
25%	96.1%	97.5%	96.1%
30%	96.3%	97.8%	96.6%
50%	96.7%	98.2%	97.4%
75%	96.7%	98.2%	97.6%
100%	96.5%	98.2%	97.6%

6.10.2 Efficiency when operating in a Delta IT system

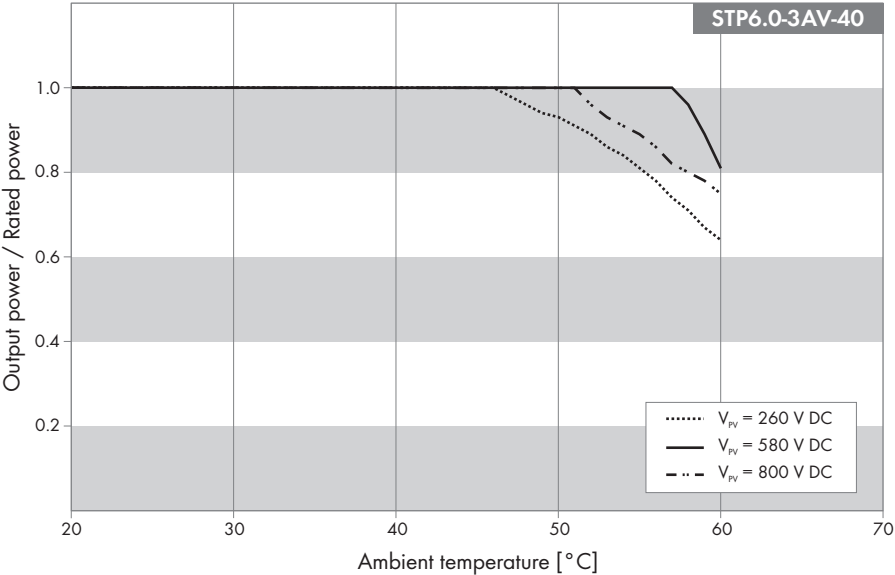


Maximum efficiency, η_{max}	96.5 %
European weighted efficiency, η_{EU}	95.5 %

Efficiency Profile

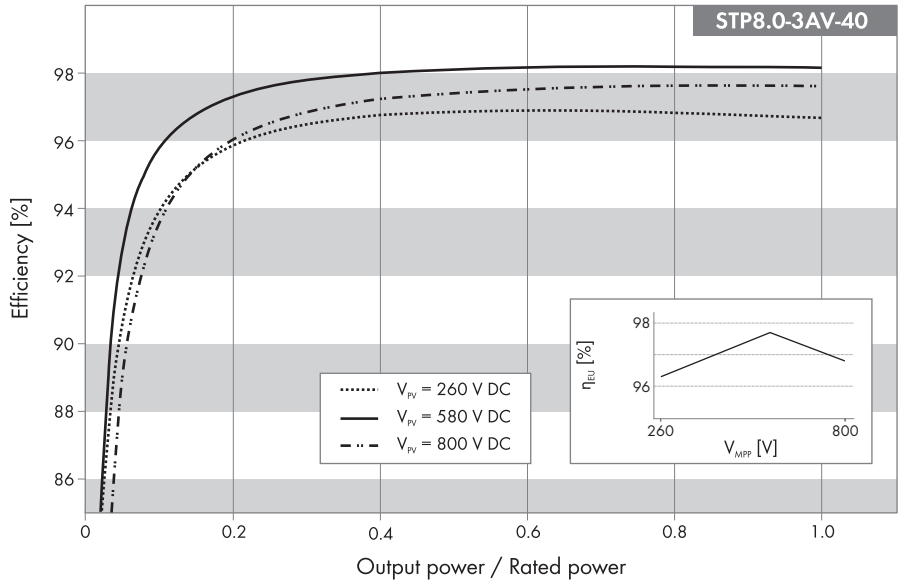
Standardized output power	Efficiency		
	Minimum MPP voltage 260 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	83.9 %	86.0 %	82.7 %
10 %	89.8 %	91.7 %	89.7 %
20 %	93.0 %	94.8 %	93.6 %
25 %	93.7 %	95.4 %	94.3 %
30 %	94.1 %	95.8 %	94.8 %
50 %	94.8 %	96.4 %	95.6 %
75 %	95.0 %	96.5 %	95.8 %
100 %	95.0 %	96.3 %	95.7 %

6.10.3 Derating Behavior



6.11 STP8.0-3AV-40

6.11.1 Efficiency when operating in TN or TT systems



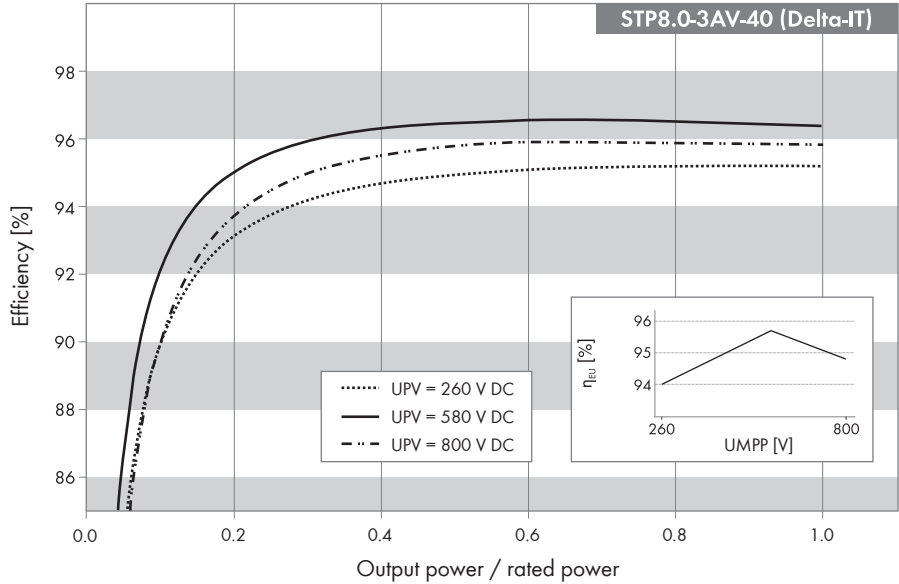
Maximum efficiency, η_{max} 98.3%

European weighted efficiency, η_{EU} 97.7%

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 260 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5%	90.6%	92.7%	88.8%
10%	93.9%	95.8%	93.6%
20%	95.9%	97.4%	96.1%
25%	96.3%	97.7%	96.6%
30%	96.6%	97.9%	96.9%
50%	96.9%	98.2%	97.5%
75%	96.9%	98.3%	97.7%
100%	96.7%	98.2%	97.7%

6.11.2 Efficiency when operating in a Delta IT system

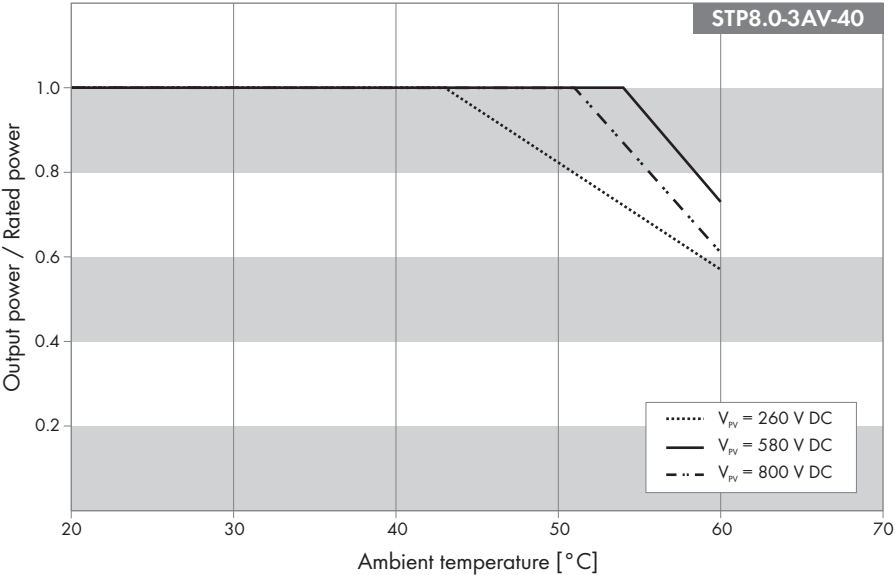


Maximum efficiency, η_{max}	96.6 %
European weighted efficiency, η_{EU}	95.7 %

Efficiency Profile

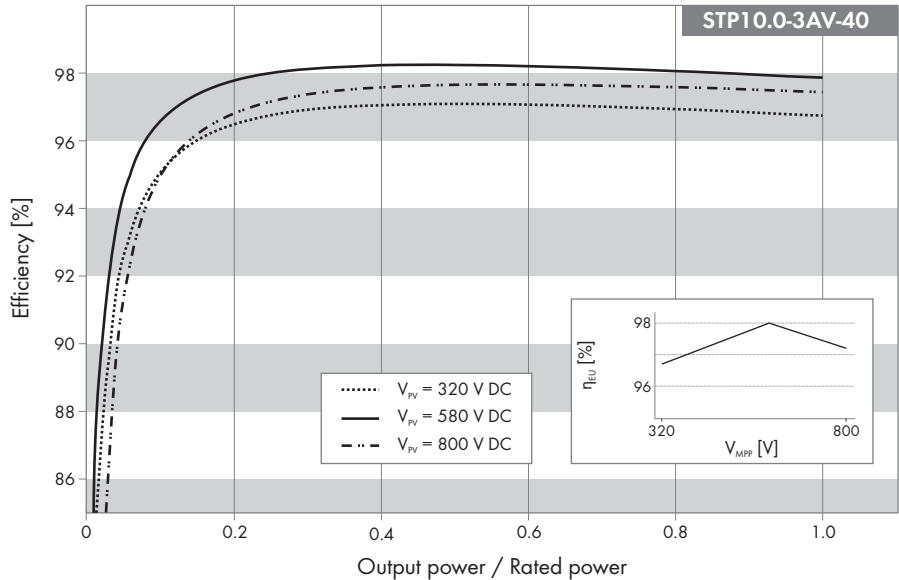
Standardized output power	Efficiency		
	Minimum MPP voltage 260 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	83.9 %	86.6 %	82.9 %
10 %	89.9 %	92.1 %	89.9 %
20 %	93.1 %	95.1 %	93.8 %
25 %	93.8 %	95.6 %	94.5 %
30 %	94.2 %	96.0 %	95.0 %
50 %	95.0 %	96.5 %	95.8 %
75 %	95.2 %	96.6 %	96.0 %
100 %	95.2 %	96.4 %	95.9 %

6.11.3 Derating Behavior



6.12 STP10.0-3AV-40

6.12.1 Efficiency when operating in TN or TT systems

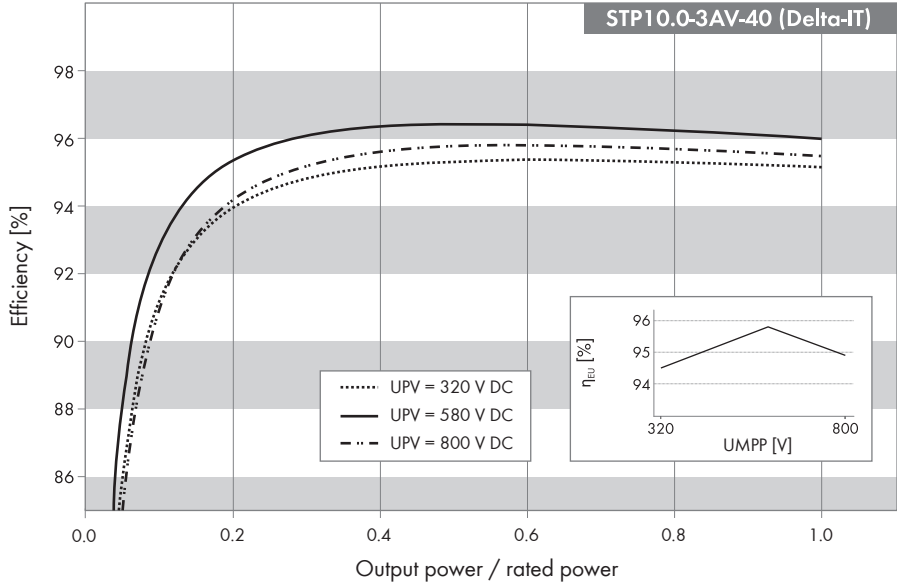


Maximum efficiency, $\eta_{\max}$	98.3%
European weighted efficiency, η_{EU}	98.0%

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 320 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5%	92.5%	94.4%	91.3%
10%	95.1%	96.6%	95.0%
20%	96.5%	97.8%	96.9%
25%	96.8%	98.1%	97.2%
30%	97.0%	98.2%	97.4%
50%	97.2%	98.3%	97.7%
75%	97.0%	98.2%	97.7%
100%	96.8%	97.9%	97.5%

6.12.2 Efficiency when operating in a Delta IT system

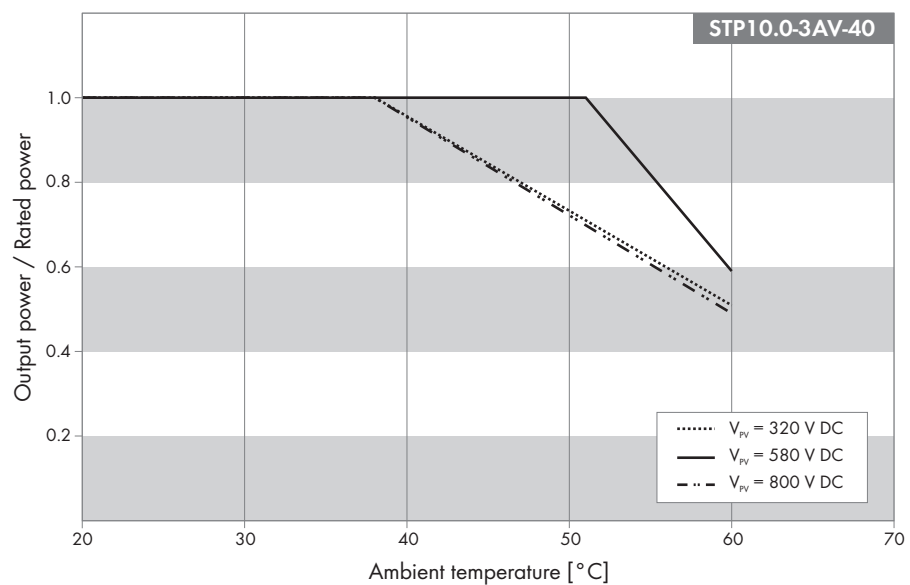


Maximum efficiency, η_{max}	95.8 %
European weighted efficiency, η_{EU}	96.5 %

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 320 V	Rated input voltage 580 V	Maximum MPP voltage 800 V
5 %	85.9 %	88.0 %	84.8 %
10 %	91.2 %	92.9 %	90.9 %
20 %	94.0 %	95.4 %	94.2 %
25 %	94.5 %	95.9 %	94.9 %
30 %	94.9 %	96.1 %	95.2 %
50 %	95.4 %	96.5 %	95.8 %
75 %	95.4 %	96.4 %	95.8 %
100 %	95.2 %	96.1 %	95.5 %

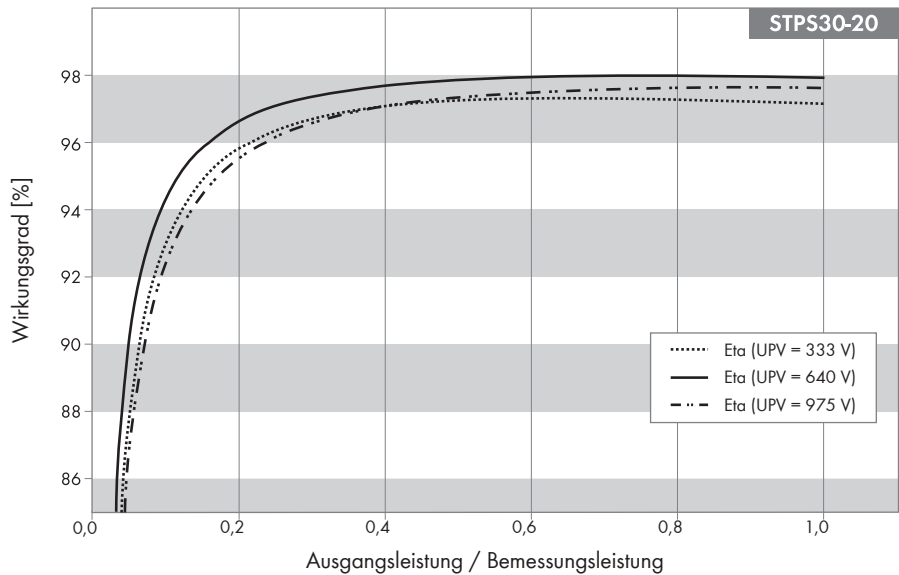
6.12.3 Derating Behavior



7 Sunny Tripower Storage X

7.1 STPS30-20

7.1.1 Efficiency



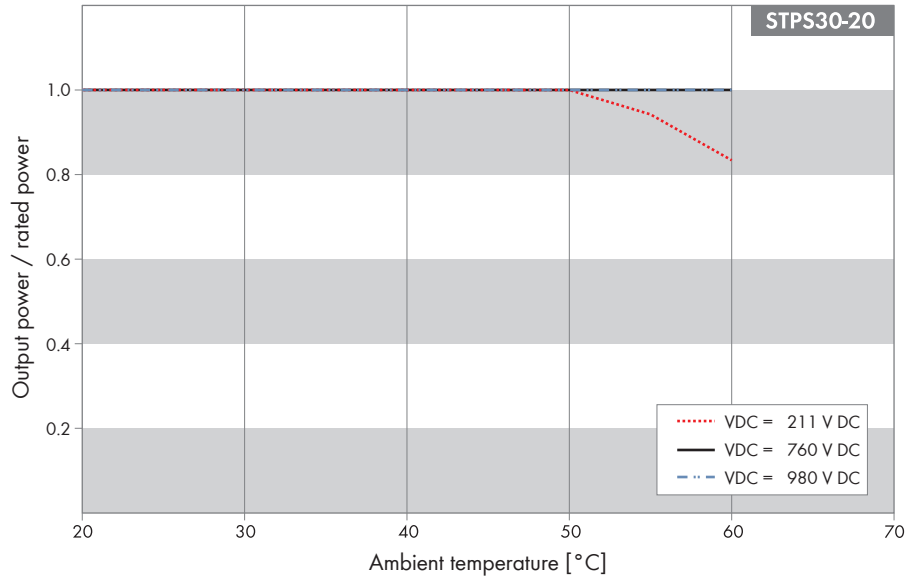
Maximum efficiency, η_{max}	98%
European weighted efficiency, η_{EU}	97.2%

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 333 V	Rated input voltage 640 V	Maximum MPP voltage 975 V
5%	87.6%	89.8%	86.4%
10%	92.9%	94.3%	92.3%
20%	95.8%	96.6%	95.5%
25%	96.4%	97.1%	96.2%
30%	96.7%	97.4%	96.6%
50%	97.3%	97.9%	97.4%

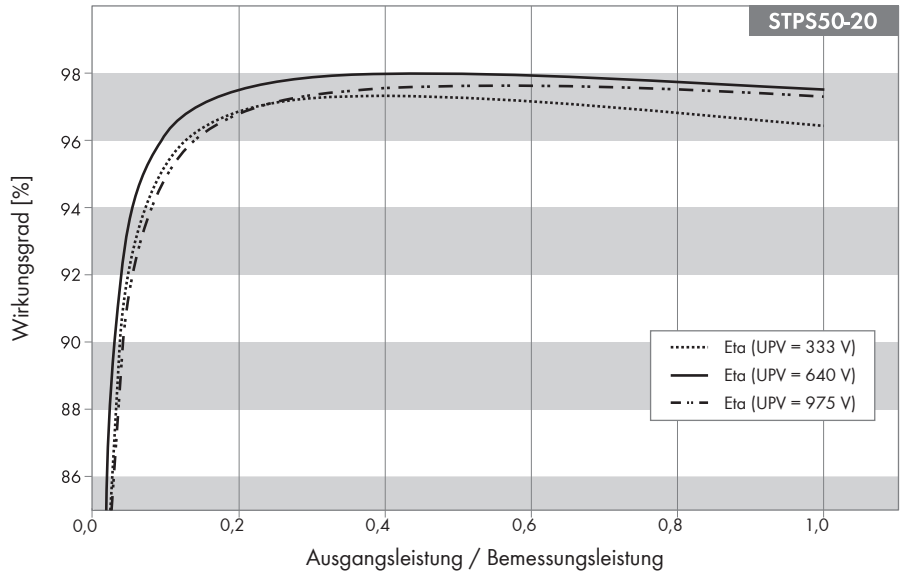
Standardized output power	Efficiency		
	Minimum MPP voltage 333 V	Rated input voltage 640 V	Maximum MPP voltage 975 V
75%	97.3%	98.0%	97.6%
100%	97.2%	97.9%	97.6%

7.1.2 Derating Behavior



7.2
STPS50-20

7.2.1
Efficiency

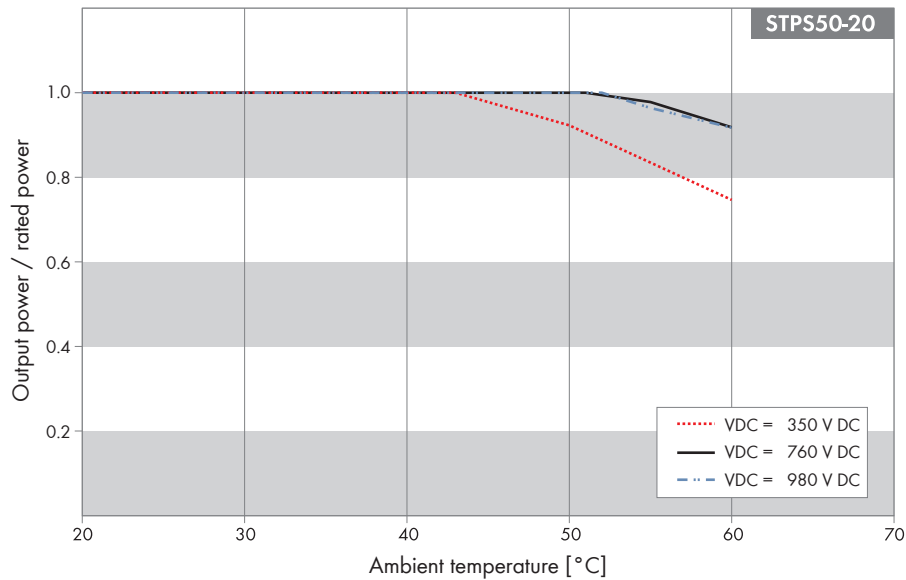


Maximum efficiency, η_{max}	97.6%
European weighted efficiency, η_{EU}	98.0%

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 333 V	Rated input voltage 640 V	Maximum MPP voltage 975 V
5%	91.8%	93.3%	91.1%
10%	95.2%	96.1%	94.9%
20%	96.9%	97.5%	96.8%
25%	97.1%	97.7%	97.1%
30%	97.3%	97.9%	97.4%
50%	97.3%	98.0%	97.6%
75%	96.9%	97.8%	97.6%
100%	96.4%	97.5%	97.3%

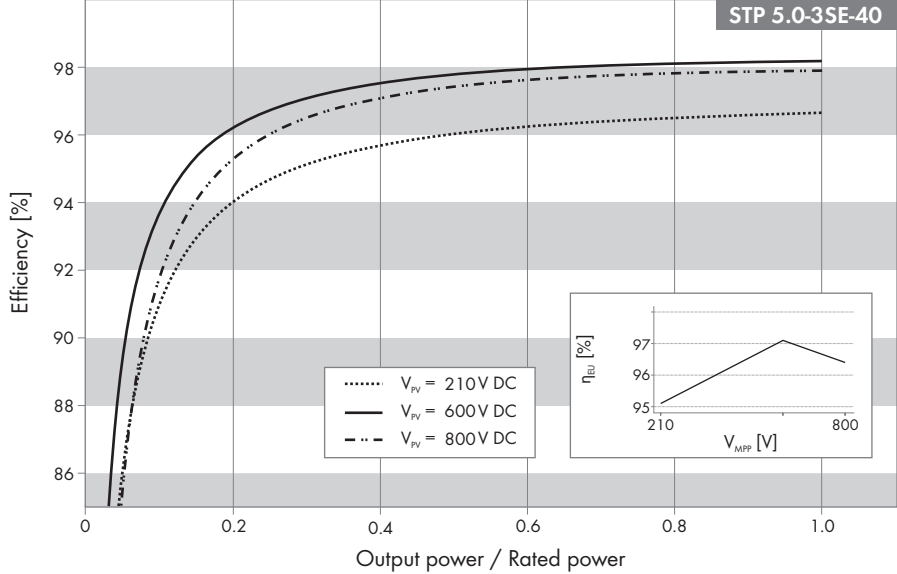
7.2.2 Derating Behavior



8 Sunny Tripower Smart Energy

8.1 STP5.0-3SE-40

8.1.1 Efficiency



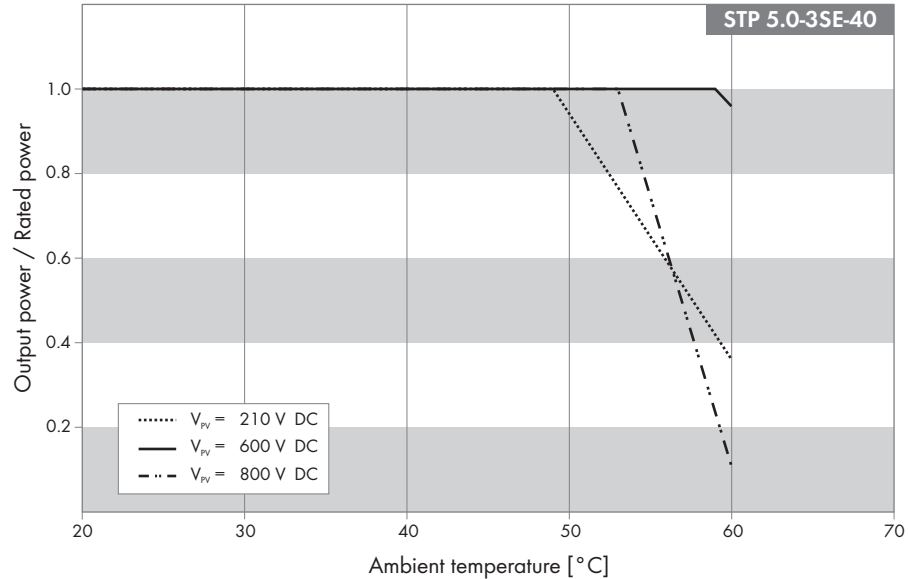
Maximum efficiency, $\eta_{\max}$	98.2 %
European weighted efficiency, η_{EU}	97.3 %

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 210 V	Rated input voltage 600 V	Maximum MPP voltage 800 V
5 %	85.7 %	89.2 %	85.2 %
10 %	90.9 %	93.6 %	91.7 %
20 %	94.0 %	96.2 %	95.3 %
25 %	94.7 %	96.7 %	96.0 %
30 %	95.1 %	97.1 %	96.5 %
50 %	96.0 %	97.8 %	97.4 %

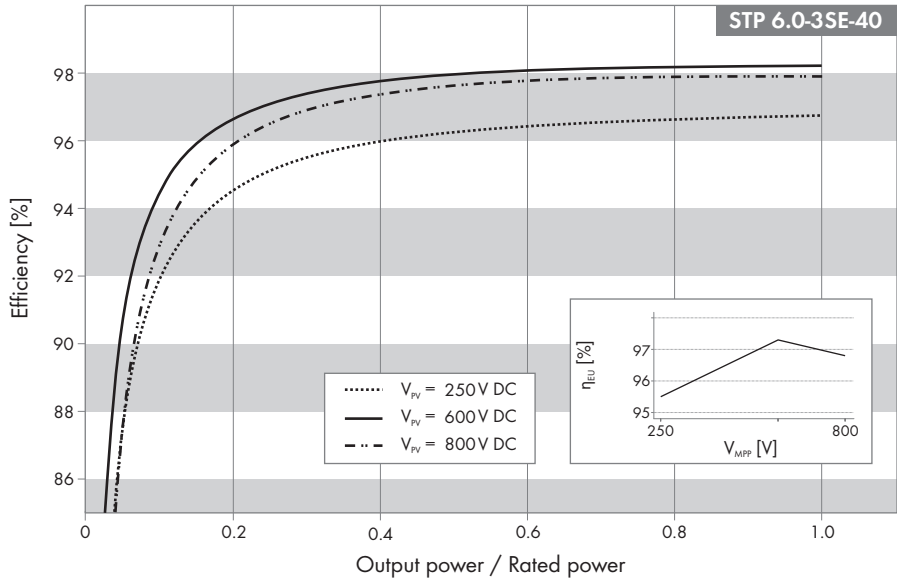
Standardized output power	Efficiency		
	Minimum MPP voltage 210 V	Rated input voltage 600 V	Maximum MPP voltage 800 V
75 %	96.4 %	98.1 %	97.8 %
100 %	96.6 %	98.2 %	97.9 %

8.1.2 Derating Behavior



8.2 STP6.0-3SE-40

8.2.1 Efficiency



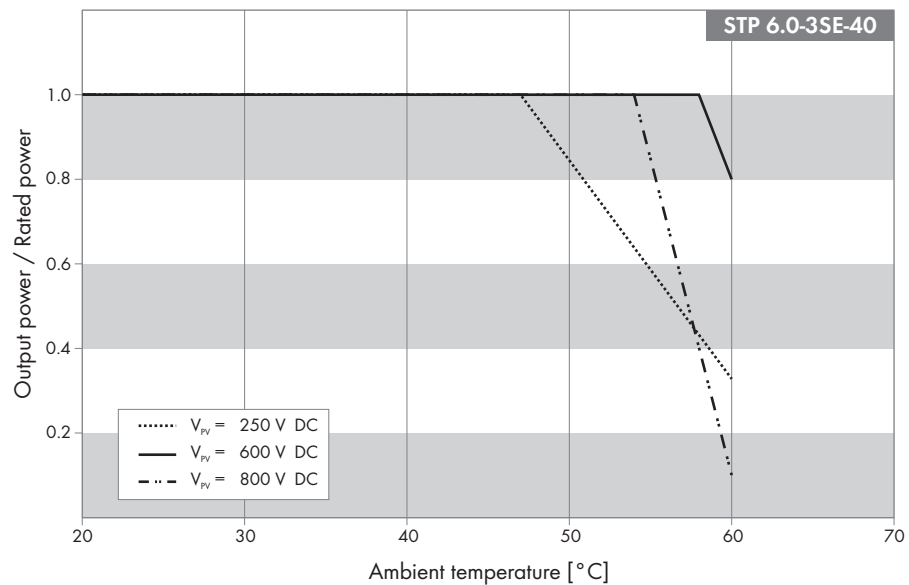
Maximum efficiency, $\eta_{\max}$ 98.2 %

European weighted efficiency, η_{EU} 97.5 %

Efficiency Profile

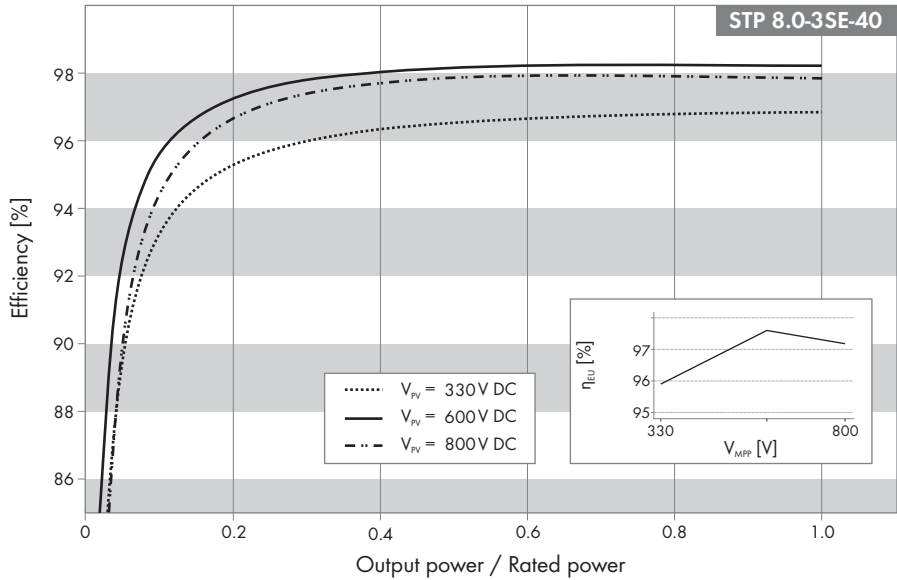
Standardized output power	Efficiency		
	Minimum MPP voltage 250 V	Rated input voltage 600 V	Maximum MPP voltage 800 V
5 %	87.3 %	90.6 %	87.2 %
10 %	91.9 %	94.5 %	92.8 %
20 %	94.5 %	96.6 %	95.9 %
25 %	95.1 %	97.1 %	96.5 %
30 %	95.5 %	97.4 %	96.9 %
50 %	96.2 %	97.9 %	97.6 %
75 %	96.6 %	98.2 %	97.9 %
100 %	96.7 %	98.2 %	97.9 %

8.2.2 Derating Behavior



8.3 STP8.0-3SE-40

8.3.1 Efficiency



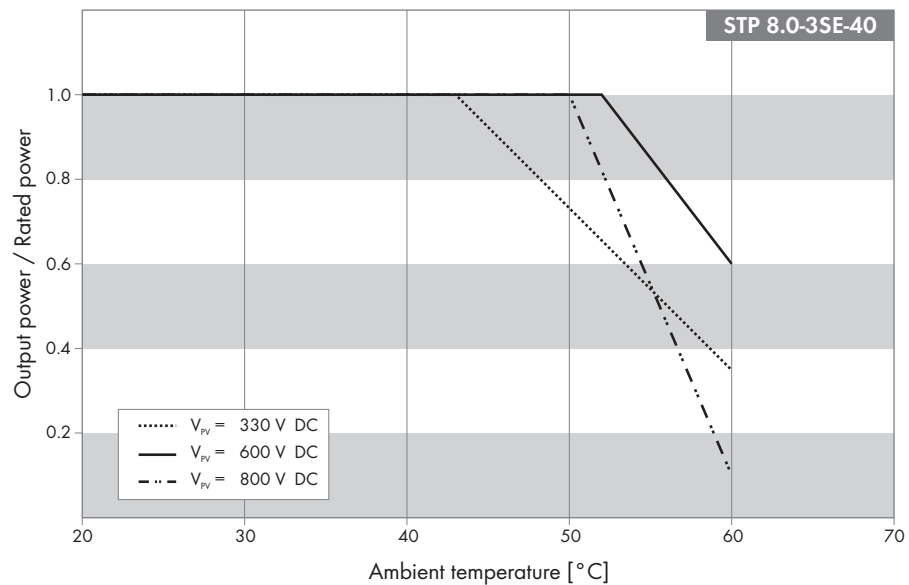
Maximum efficiency, η_{max} 98.2 %

European weighted efficiency, η_{EU} 97.8 %

Efficiency Profile

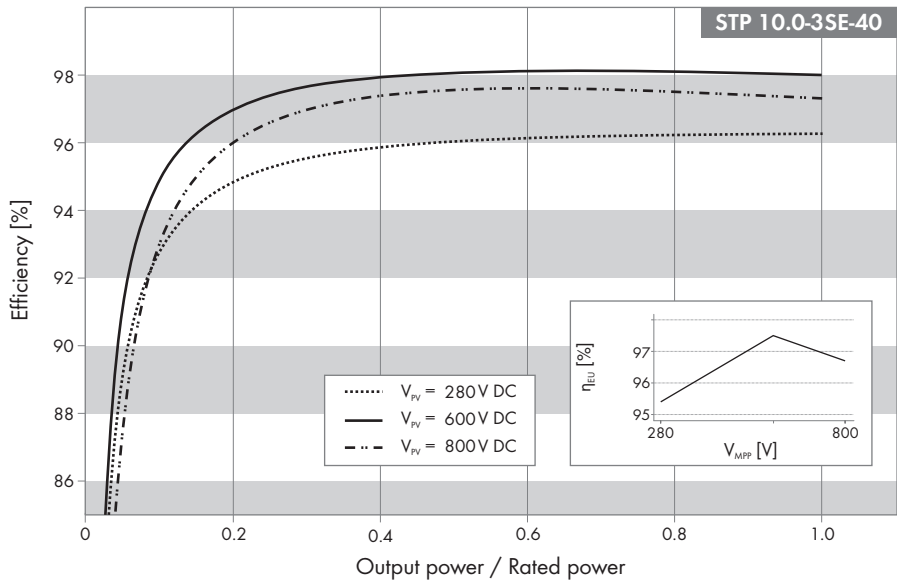
Standardized output power	Efficiency		
	Minimum MPP voltage 330 V	Rated input voltage 600 V	Maximum MPP voltage 800 V
5 %	89.5 %	92.4 %	90.0 %
10 %	93.2 %	95.5 %	94.3 %
20 %	95.2 %	97.2 %	96.6 %
25 %	95.7 %	97, 5%	97.1 %
30 %	96.0 %	97.7 %	97.3 %
50 %	96.5 %	98.1 %	97.8 %
75 %	96.7 %	98.2 %	97.9 %
100 %	96.8 %	98.2 %	97.8 %

8.3.2 Derating Behavior



8.4 STP10.0-3SE-40

8.4.1 Efficiency

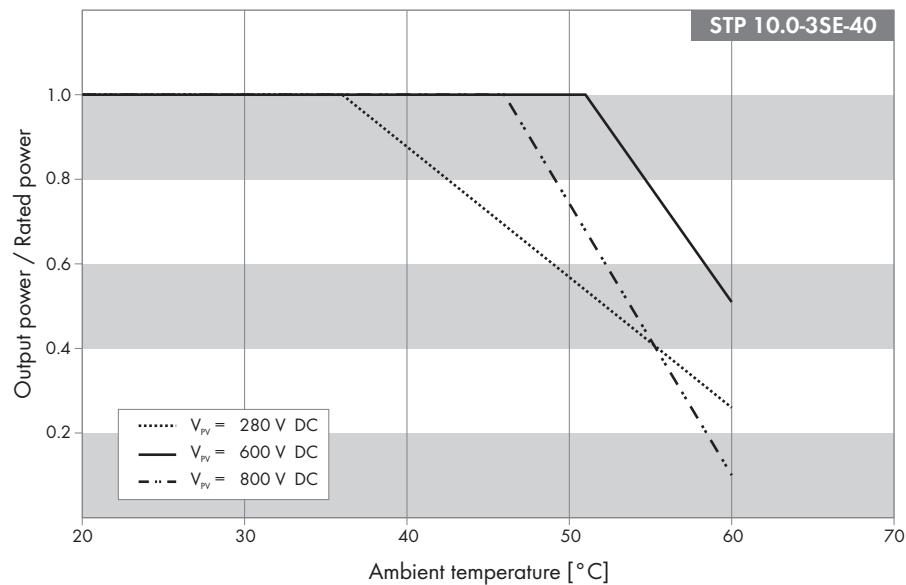


Maximum efficiency, $\eta_{\max}$	98.1 %
European weighted efficiency, η_{EU}	97.5 %

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 280 V	Rated input voltage 600 V	Maximum MPP voltage 800 V
5 %	89.0 %	90.9 %	87.3 %
10 %	92.8 %	94.8 %	92.9 %
20 %	94.8 %	97.0 %	96.0 %
25 %	95.2 %	97.4 %	96.6 %
30 %	95.5 %	97.6 %	97.0 %
50 %	96.0 %	98.1 %	97.5 %
75 %	96.2 %	98.1 %	97.5 %
100 %	96.3 %	98.0 %	97.3 %

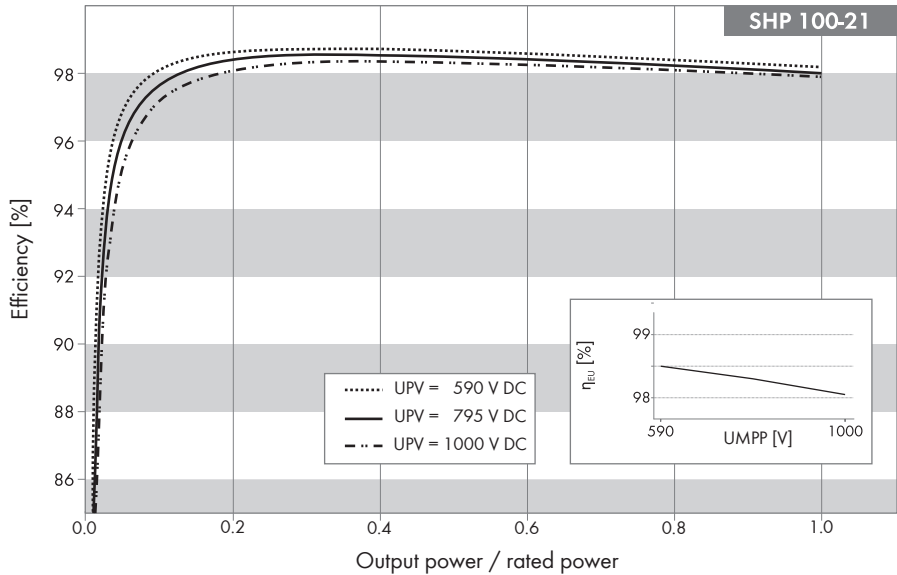
8.4.2 Derating Behavior



9 Sunny Highpower

9.1 SHP 100-21

9.1.1 Efficiency



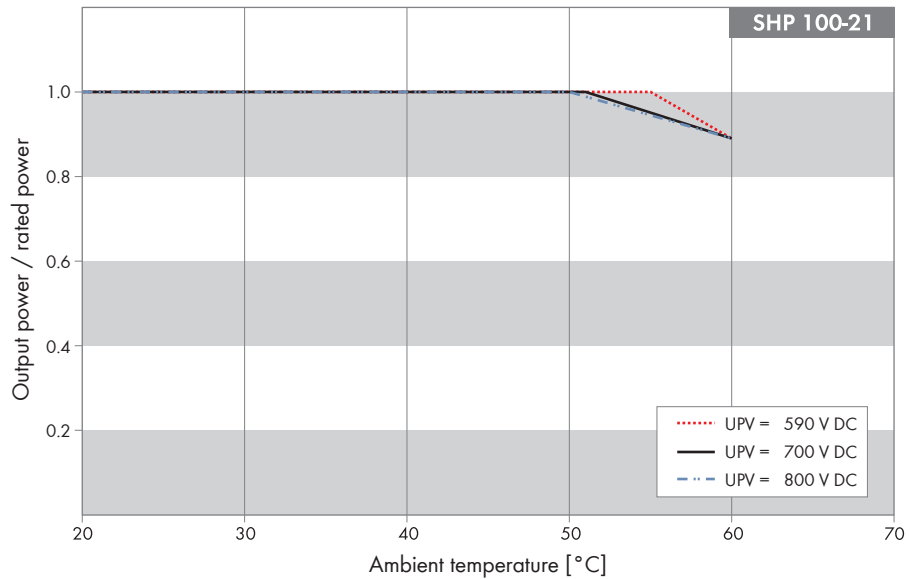
Maximum efficiency, η_{max}	98.8 %
European weighted efficiency, η_{EU}	98.5 %

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 590 V	Rated input voltage 795 V	Maximum MPP voltage 1000 V
5 %	97.0 %	96.0 %	95.3 %
10 %	98.2 %	97.6 %	97.2 %
20 %	98.7 %	98.4 %	98.1 %
25 %	98.8 %	98.5 %	98.2 %
30 %	98.8 %	98.5 %	98.3 %
50 %	98.7 %	98.5 %	98.3 %

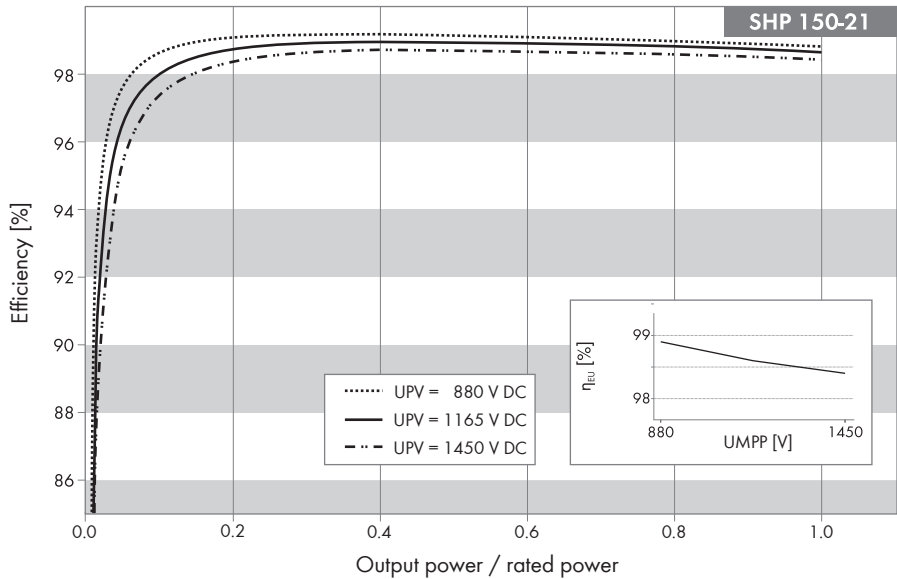
Standardized output power	Efficiency		
	Minimum MPP voltage 590 V	Rated input voltage 795 V	Maximum MPP voltage 1000 V
75 %	98.5 %	98.3 %	98.2 %
100 %	97.2 %	98.0 %	97.9 %

9.1.2 Derating Behavior



9.2 STP 150-21

9.2.1 Efficiency

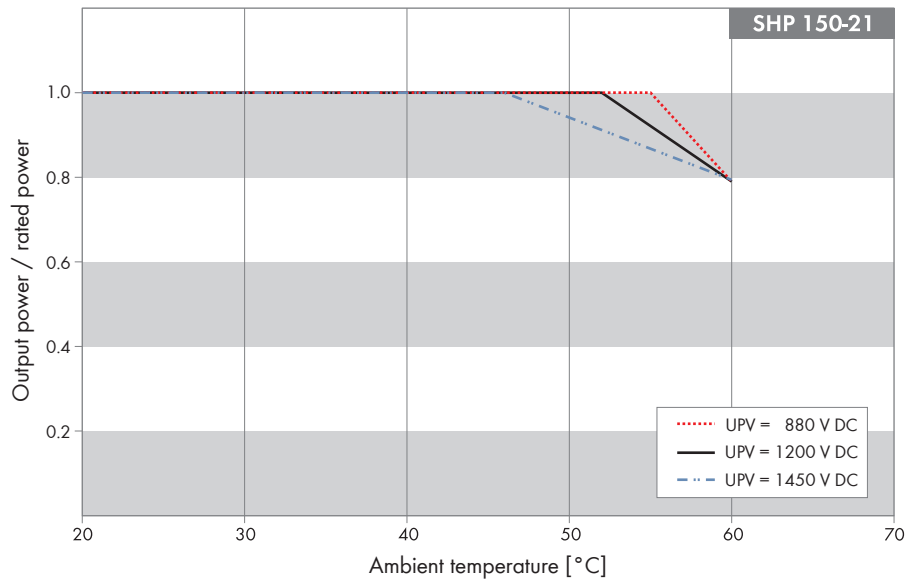


Maximum efficiency, η_{max}	99.1%
European weighted efficiency, η_{EU}	98.8%

Efficiency Profile

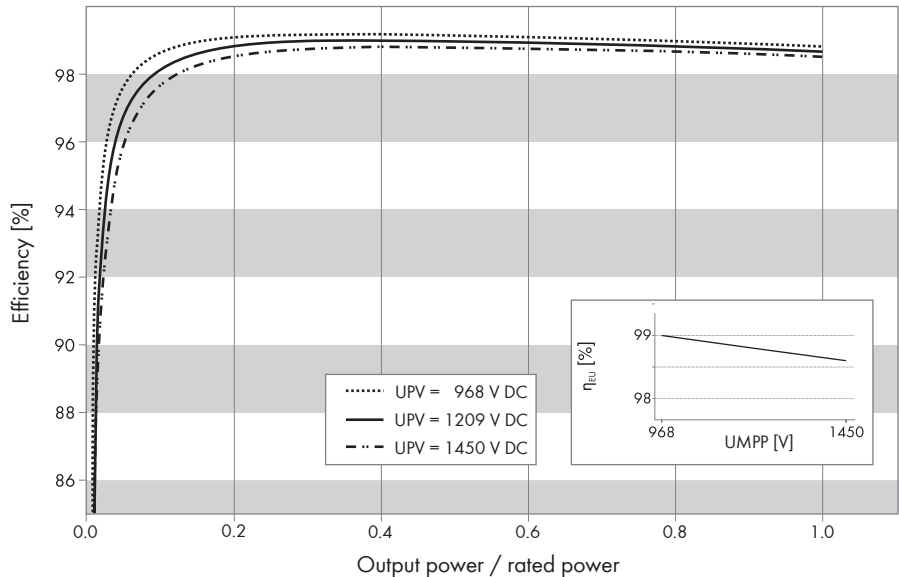
Standardized output power	Efficiency		
	Minimum MPP voltage 880 V	Rated input voltage 1165 V	Maximum MPP voltage 1450 V
5%	97.5%	96.5%	95.2%
10%	98.6%	98.0%	97.3%
20%	99.0%	98.7%	98.3%
25%	99.1%	98.8%	98.5%
30%	99.1%	98.8%	98.6%
50%	99.1%	98.9%	98.7%
75%	99.0%	98.7%	98.6%
100%	98.8%	98.6%	98.4%

9.2.2 Derating Behavior



9.3 SHP 172-21

9.3.1 Efficiency



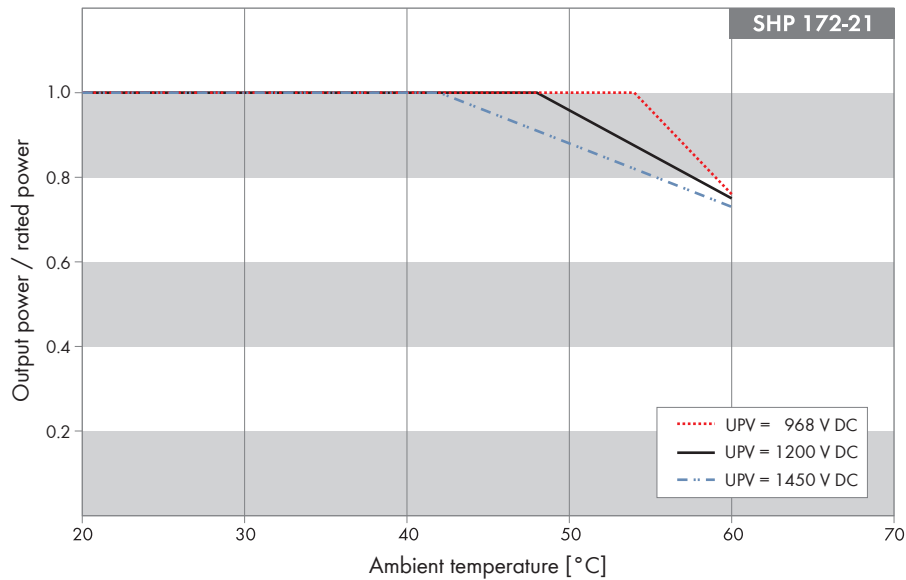
Maximum efficiency, η_{max} 99.2 %

European weighted efficiency, η_{EU} 99.0 %

Efficiency Profile

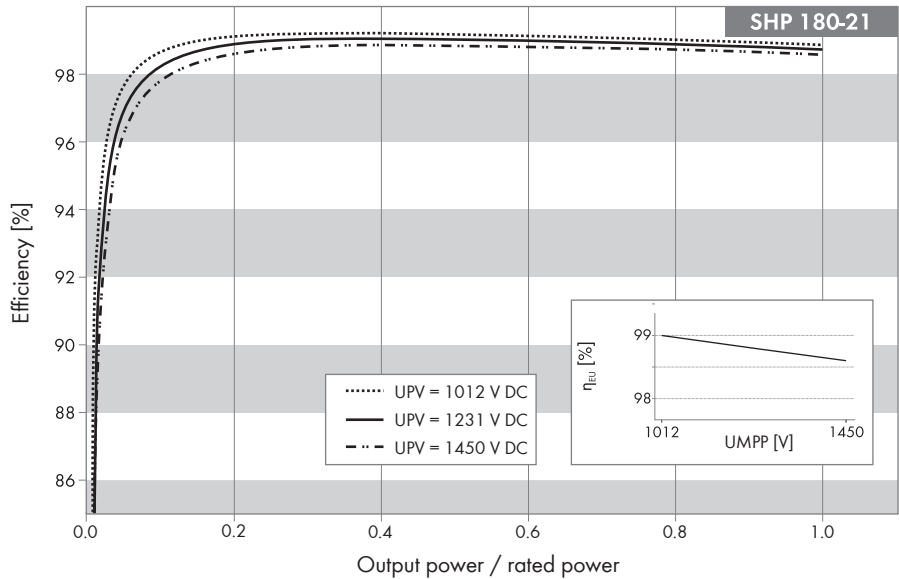
Standardized output power	Efficiency		
	Minimum MPP voltage 968 V	Rated input voltage 1209 V	Maximum MPP voltage 1450 V
5 %	97.7 %	96.7 %	95.9 %
10 %	98.7 %	98.1 %	97.7 %
20 %	99.1 %	98.8 %	98.5 %
25 %	99.2 %	98.9 %	98.7 %
30 %	99.2 %	98.9 %	98.7 %
50 %	99.2 %	99.0 %	98.8 %
75 %	99.0 %	98.8 %	98.7 %
100 %	98.9 %	98.6 %	98.5 %

9.3.2 Derating Behavior



9.4 SHP 180-21

9.4.1 Efficiency

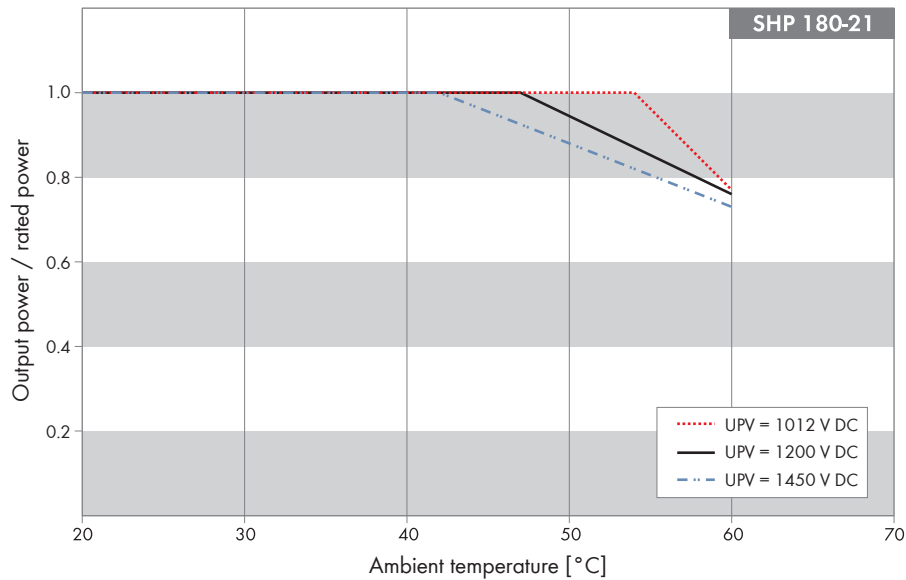


Maximum efficiency, η_{max}	99.2 %
European weighted efficiency, η_{EU}	99.0 %

Efficiency Profile

Standardized output power	Efficiency		
	Minimum MPP voltage 1012 V	Rated input voltage 1231 V	Maximum MPP voltage 1450 V
5 %	97.7 %	96.8 %	96.1 %
10 %	98.7 %	98.2 %	97.8 %
20 %	99.1 %	98.8 %	98.6 %
25 %	99.2 %	98.9 %	98.7 %
30 %	99.2 %	99.0 %	98.8 %
50 %	99.2 %	99.0 %	98.9 %
75 %	99.1 %	98.9 %	98.8 %
100 %	98.9 %	98.7 %	98.6 %

9.4.2 Derating Behavior



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