EN

1 Extended technical Data

1.1 KACO blueplanet 87.0 TL3

AC-Power				
Inverter power nominal	87 kVA			
Inverter power maximal	87 kVA			
Rated current (In)	132,3 A			
Short circuit current (Ik'' First cycle RMS value)	137 A			
Short circuit current continuous (max output fault current)	134 A			
Power electronics type	IGBT-MLI (self-commutated)			
Rated operating voltage	380 V			
cos phi nominal	≈ 1			
Grid connection	Three-phase			
Impedance bei 165 Hz *	$R_{165\ Hz} \approx 360{,}0\ \Omega$, $X_{165\ Hz} \approx 100{,}0\ \Omega$			
Impedance bei 175 Hz *	$R_{175\ Hz} \approx 47{,}0\ \Omega$, $X_{175\ Hz} \approx 360{,}0\ \Omega$			
* Scheme in parallel				

Operating behaviour in the event of a short circuit at the inverter output				
Maximum peak current (Ip)	1,40 x 132,3 A			
Maximum peak current (Ik")	1,02 x 132,3 A			

Power quality characteristics				
Max. number of switching operations, N_{10}	10			
Max. number of switching operations, N_{120}	120			
Case of switching operation	Cut-in at 10 % of rated power			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,05	0,05	0,05	0,05
Voltage change factor	1,42	1,42	1,42	1,42
Maximum incrush current factor	0,08			
Maximum incrush current factor (transient only)	0,02			
Case of switching operation	Cut-in at 100 % of rated power			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,12	0,11	0,11	0,11
Voltage change factor	1,42	1,42	1,42	1,42
Maximum inrush current factor	0,33			
Maximum inrush current factor (transient only)	0,02			

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Case of switching operation	Service disconnection at rated power			
Description of the service disconnection procedure	Disconnection by the DC-switch			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,80	0,60	0,34	0,13
Voltage change factor	1,42	1,42	1,42	1,42
Maximum inrush current factor	0,94			
Maximum inrush current factor (transient only)	0,04			
Worst case over all switching operations	0,94			
Worst case over all switching operations (transient only)	0,04			
Note: $S_{k,\,fic}/S_n$ in the fictitious grid was set to	20			

Flicker				
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,96	0,94	0,92	0,88
Short term flicker	0,048	0,047	0,046	0,0044
Note: $S_{k,\,fic}/S_n$ in the fictitious grid was set to	20			

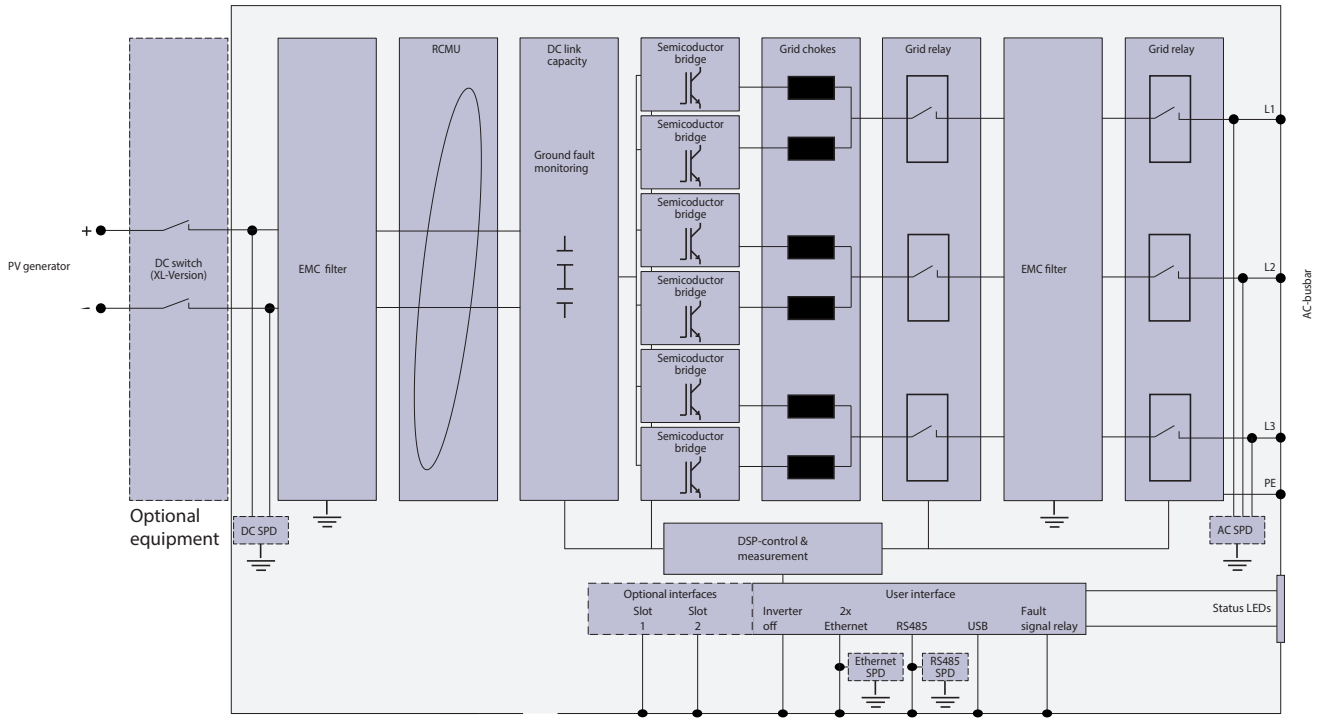

Fig. 1: Block schema blueplanet 87.0-165 TL3

	[A]	[% de In]
1	125,346	94,96
2	0,235	0,18
3	0,086	0,07
4	0,068	0,06
5	0,347	0,32
6	0,049	0,06
7	0,391	0,30
8	0,064	0,06
9	0,048	0,04
10	0,057	0,08
11	0,236	0,18
12	0,07	0,07
13	0,212	0,16
14	0,072	0,07
15	0,053	0,04
16	0,070	0,09
17	0,180	0,14
18	0,054	0,07
19	0,165	0,13
20	0,074	0,06
21	0,055	0,04
22	0,083	0,08
23	0,149	0,11
24	0,058	0,06
25	0,147	0,11
26	0,077	0,06
27	0,054	0,04
28	0,087	0,07
29	0,115	0,09
30	0,059	0,05
31	0,121	0,09
32	0,078	0,06
33	0,054	0,04
34	0,082	0,07
35	0,090	0,07
36	0,057	0,05
37	0,090	0,07
38	0,069	0,05
39	0,049	0,04
40	0,074	0,06
41	0,061	0,05
42	0,049	0,04
43	0,067	0,05
44	0,057	0,04
45	0,041	0,03
46	0,062	0,05

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	[A]	[% de In]
47	0,039	0,03
48	0,038	0,03
49	0,044	0,03
50	0,045	0,03

Tab. 1: Harmonics 50 Hz

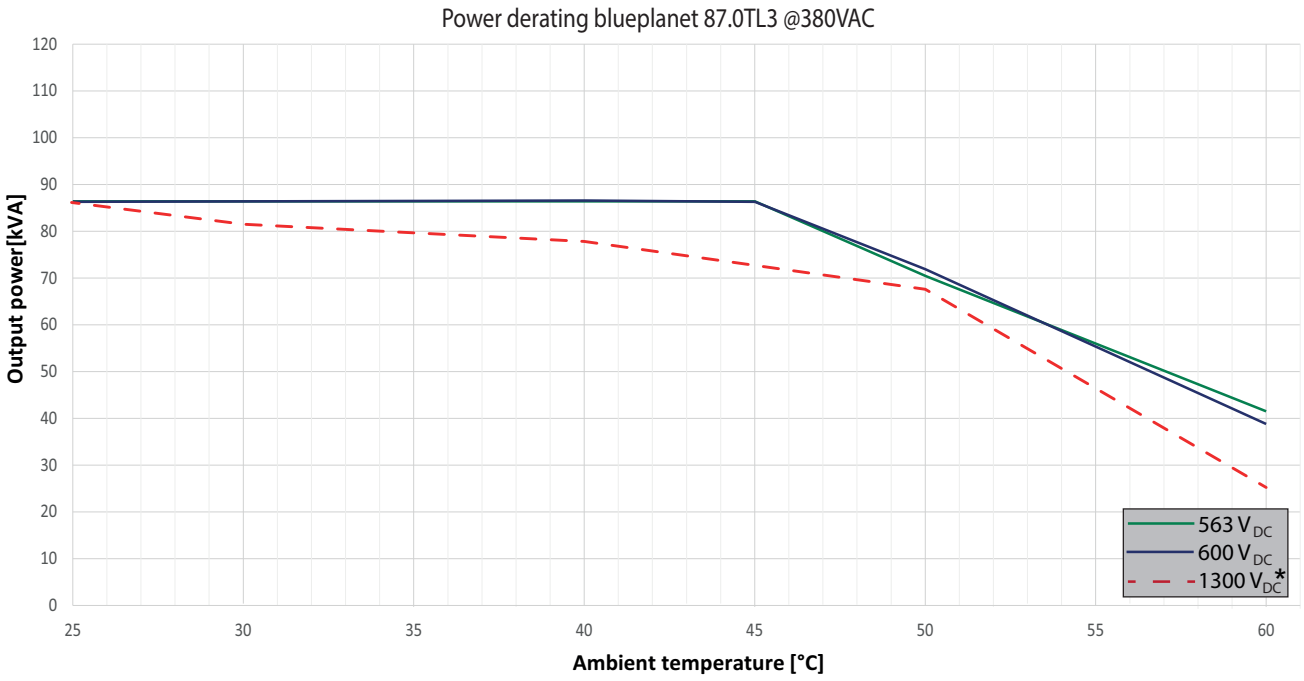

Fig. 2: Power derating blueplanet 87.0 TL3

*) Due to the thermal characteristics of solar modules an operational DC voltage of 1300VDC is not to be expected at higher ambient temperatures in the vast majority of system designs.

Efficiency characteristic

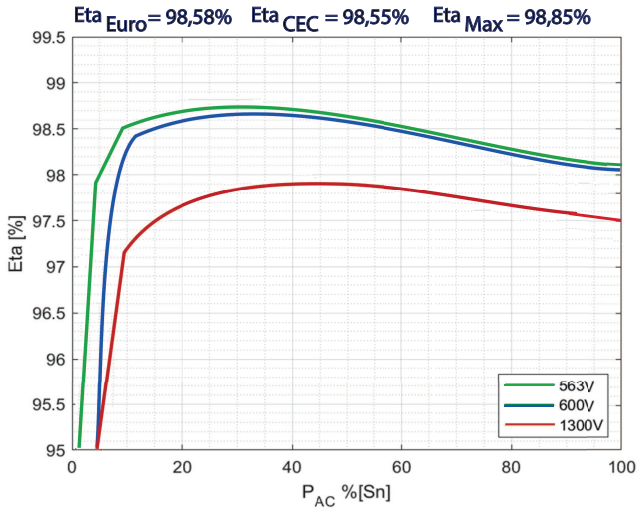

Fig. 3: 2D Diagram blueplanet 87.0TL3

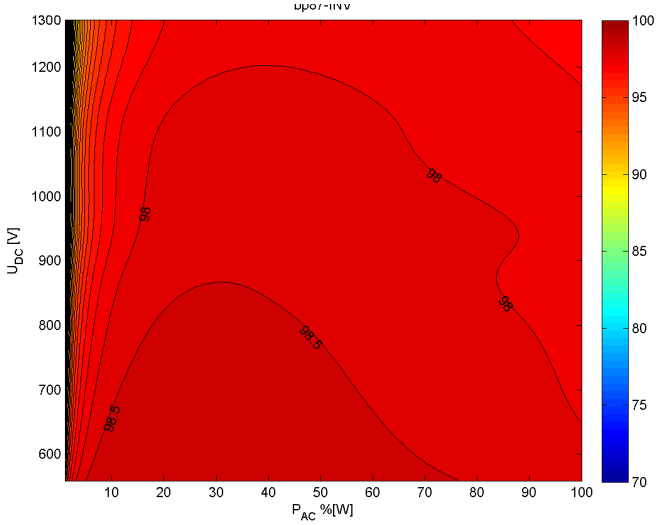

Fig. 4: 3D Diagram blueplanet 87.0TL3

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1.2 KACO blueplanet 92.0 TL3

AC-Power	
Inverter power nominal	92 kVA
Inverter power maximal	92 kVA
Rated current (In)	132,3 A
Short circuit current (Ik'' First cycle RMS value)	137 A
Short circuit current continuous (max output fault current)	134 A
Power electronics type	IGBT-MLI (self-commutated)
Rated operating voltage	400 V
cos phi nominal	≈ 1
Grid connection	Three-phase
Impedance bei 165 Hz *	$R_{165\ Hz} \approx 360{,}0\ \Omega$, $X_{165\ Hz} \approx 100{,}0\ \Omega$
Impedance bei 175 Hz *	$R_{175\ Hz} \approx 47{,}0\ \Omega$, $X_{175\ Hz} \approx 360{,}0\ \Omega$
* Scheme in parallel	

Operating behaviour in the event of a short circuit at the inverter output	
Maximum peak current (Ip)	1,40 x 132,3 A
Maximum peak current (Ik")	1,02 x 132,3 A

Power quality characteristics				
Max. number of switching operations, N_{10}	10			
Max. number of switching operations, N_{120}	120			
Case of switching operation	Cut-in at 10 % of rated power			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,05	0,05	0,05	0,05
Voltage change factor	1,36	1,36	1,36	1,36
Maximum incrush current factor	0,01			
Maximum incrush current factor (transient only)	0,02			
Case of switching operation	Cut-in at 100 % of rated power			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,22	0,21	0,20	0,19
Voltage change factor	1,36	1,36	1,36	1,36
Maximum inrush current factor	0,30			
Maximum inrush current factor (transient only)	0,02			

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Case of switching operation	Service disconnection at rated power			
Description of the service disconnection procedure	Disconnection by the DC-switch			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,92	0,69	0,38	0,14
Voltage change factor	1,36	1,36	1,36	1,36
Maximum inrush current factor	0,08			
Maximum inrush current factor (transient only)	0,04			
Worst case over all switching operations	0,91			
Worst case over all switching operations (transient only)	0,04			
Note: $S_{k,\,fic}/S_n$ in the fictitious grid was set to	20			

Flicker				
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	1,00	0,98	0,96	0,94
Short term flicker	0,05	0,049	0,048	0,047
Note: $S_{k,\,fic}/S_n$ in the fictitious grid was set to	20			

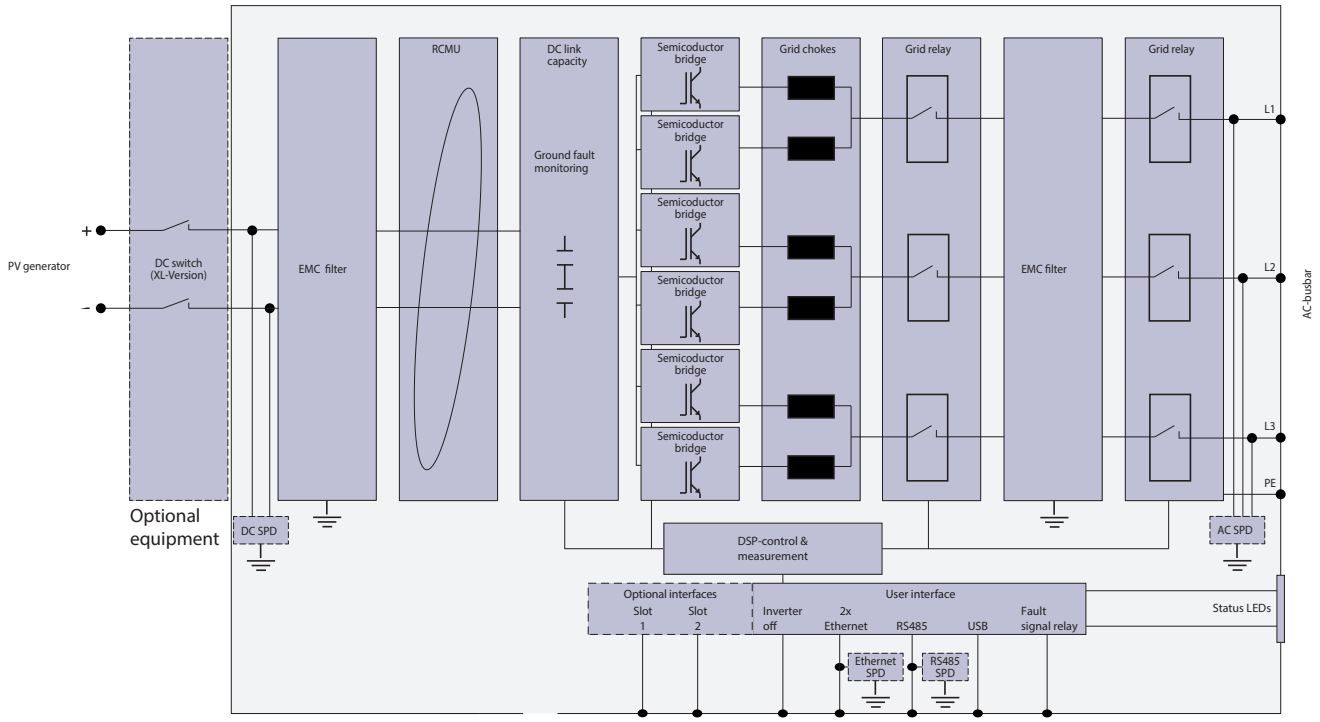

Fig. 5: Block schema blueplanet 87.0-165 TL3

	[A]	[% de In]
1	129,780	98,32
2	0,254	0,19
3	0,092	0,07
4	0,072	0,05
5	0,339	0,33
6	0,064	0,06
7	0,403	0,31
8	0,064	0,05
9	0,046	0,04
10	0,059	0,07
11	0,210	0,17
12	0,052	0,08
13	0,235	0,18
14	0,066	0,06
15	0,046	0,04
16	0,067	0,08
17	0,193	0,15
18	0,061	0,07
19	0,163	0,12
20	0,069	0,06
21	0,043	0,04
22	0,076	0,08
23	0,153	0,12
24	0,061	0,07
25	0,155	0,12
26	0,072	0,06
27	0,045	0,04
28	0,077	0,07
29	0,129	0,10
30	0,061	0,06
31	0,124	0,09
32	0,074	0,06
33	0,042	0,04
34	0,076	0,06
35	0,100	0,08
36	0,059	0,05
37	0,101	0,08
38	0,064	0,05
39	0,043	0,03
40	0,069	0,06
41	0,075	0,06
42	0,048	0,04
43	0,078	0,06
44	0,053	0,04
45	0,038	0,03
46	0,059	0,05

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	[A]	[% de In]
47	0,051	0,04
48	0,040	0,03
49	0,052	0,04
50	0,042	0,03

Tab. 2: Harmonics 50 Hz

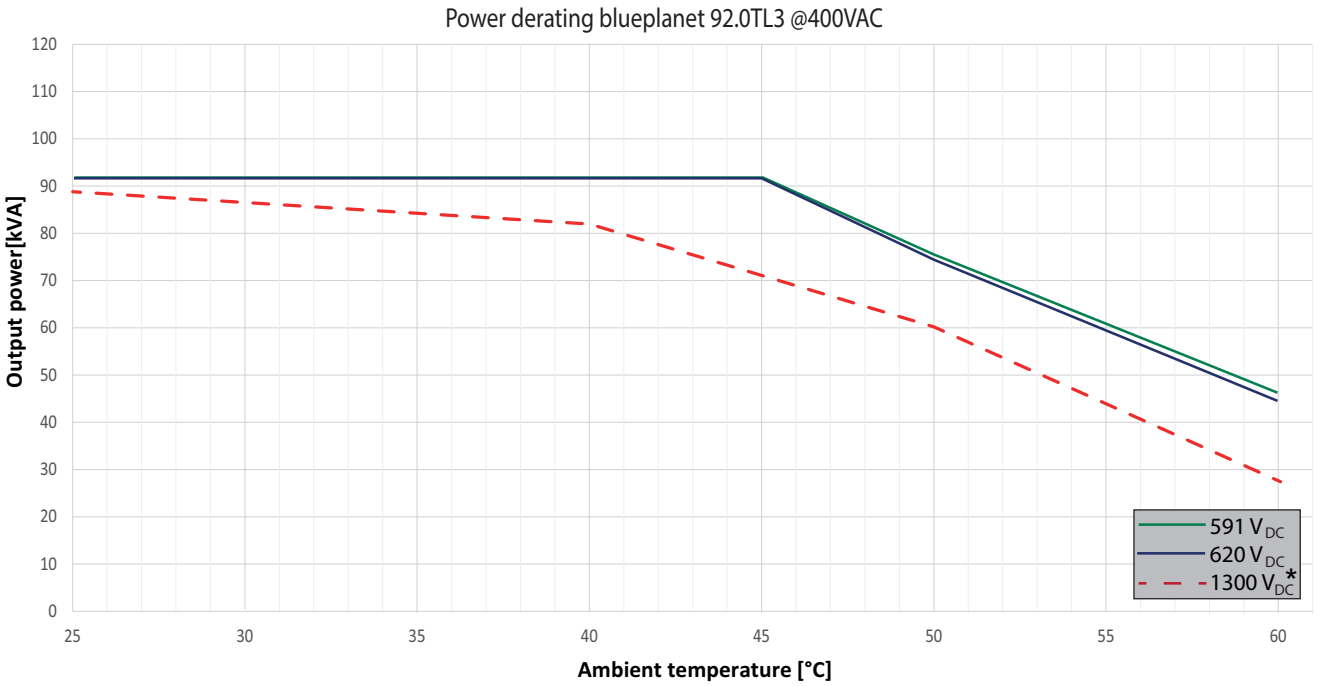

Fig. 6: Power derating blueplanet 92.0 TL3

*) Due to the thermal characteristics of solar modules an operational DC voltage of 1300VDC is not to be expected at higher ambient temperatures in the vast majority of system designs.

Efficiency characteristic

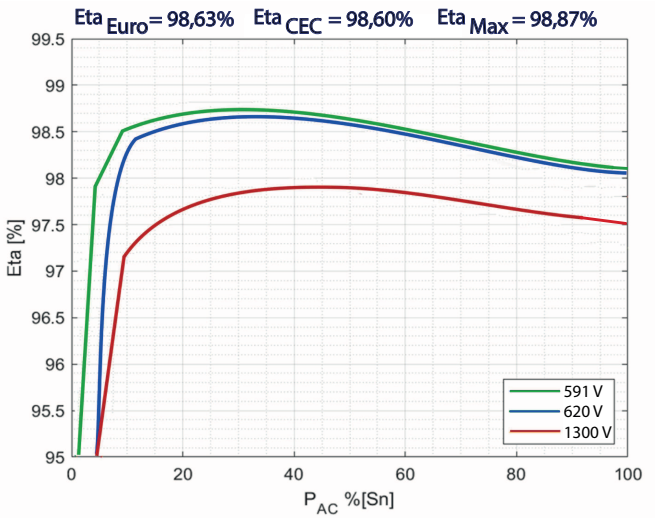

Fig. 7: 2D Diagram blueplanet 92.0 TL3

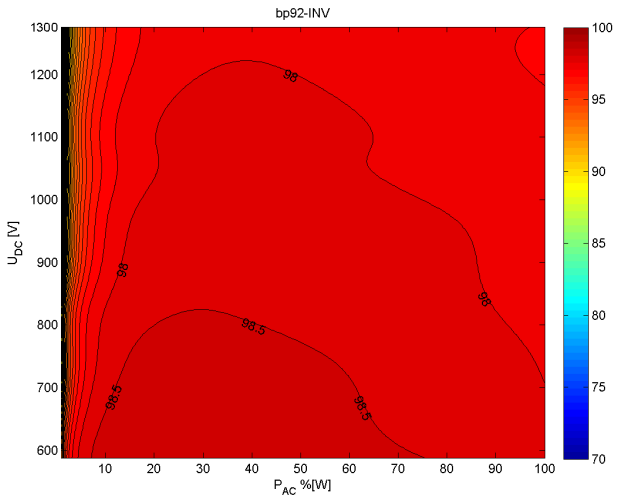

Fig. 8: 3D Diagram blueplanet 92.0TL3

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1.3 KACO blueplanet 110 TL3

AC-Power				
Inverter power nominal	110 kVA			
Inverter power maximal	110 kVA			
Rated current (In)	132,3 A			
Short circuit current (Ik'' First cycle RMS value)	137 A			
Short circuit current continuous (max output fault current)	134 A			
Power electronics type	IGBT-MLI (self-commutated)			
Rated operating voltage	480 V			
cos phi nominal	≈ 1			
Grid connection	Three-phase			
Impedance bei 165 Hz *	$R_{165\ Hz} \approx 360{,}0\ \Omega$, $X_{165\ Hz} \approx 100{,}0\ \Omega$			
Impedance bei 175 Hz *	$R_{175\ Hz} \approx 47{,}0\ \Omega$, $X_{175\ Hz} \approx 360{,}0\ \Omega$			
* Scheme in parallel				

Operating behaviour in the event of a short circuit at the inverter output				
Maximum peak current (Ip)	1,40 x 132,3 A			
Maximum peak current (Ik")	1,02 x 132,3 A			

Power quality characteristics				
Max. number of switching operations, N_{10}	10			
Max. number of switching operations, N_{120}	120			
Case of switching operation	Cut-in at 10 % of rated power			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,04	0,03	0,03	0,03
Voltage change factor	0,26	0,23	0,19	0,18
Maximum incrush current factor	0,029			
Maximum incrush current factor (transient only)	0,02			
Case of switching operation	Cut-in at 100 % of rated power			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,05	0,05	0,05	0,05
Voltage change factor	0,97	0,71	0,38	0,24
Maximum inrush current factor	0,028			
Maximum inrush current factor (transient only)	0,02			

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Case of switching operation	Service disconnection at rated power			
Description of the service disconnection procedure	Disconnection by the DC-switch			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,56	0,41	0,33	0,31
Voltage change factor	1,06	0,75	0,42	0,49
Maximum inrush current factor	0,904			
Maximum inrush current factor (transient only)	0,04			
Worst case over all switching operations	0,904			
Worst case over all switching operations (transient only)	0,04			
Note: $S_{k,\,fic}/S_n$ in the fictitious grid was set to	20			

Flicker				
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	1,12	1,32	1,50	1,57
Short term flicker	0,056	0,066	0,075	0,0785
Note: $S_{k,\,fic}/S_n$ in the fictitious grid was set to	20			

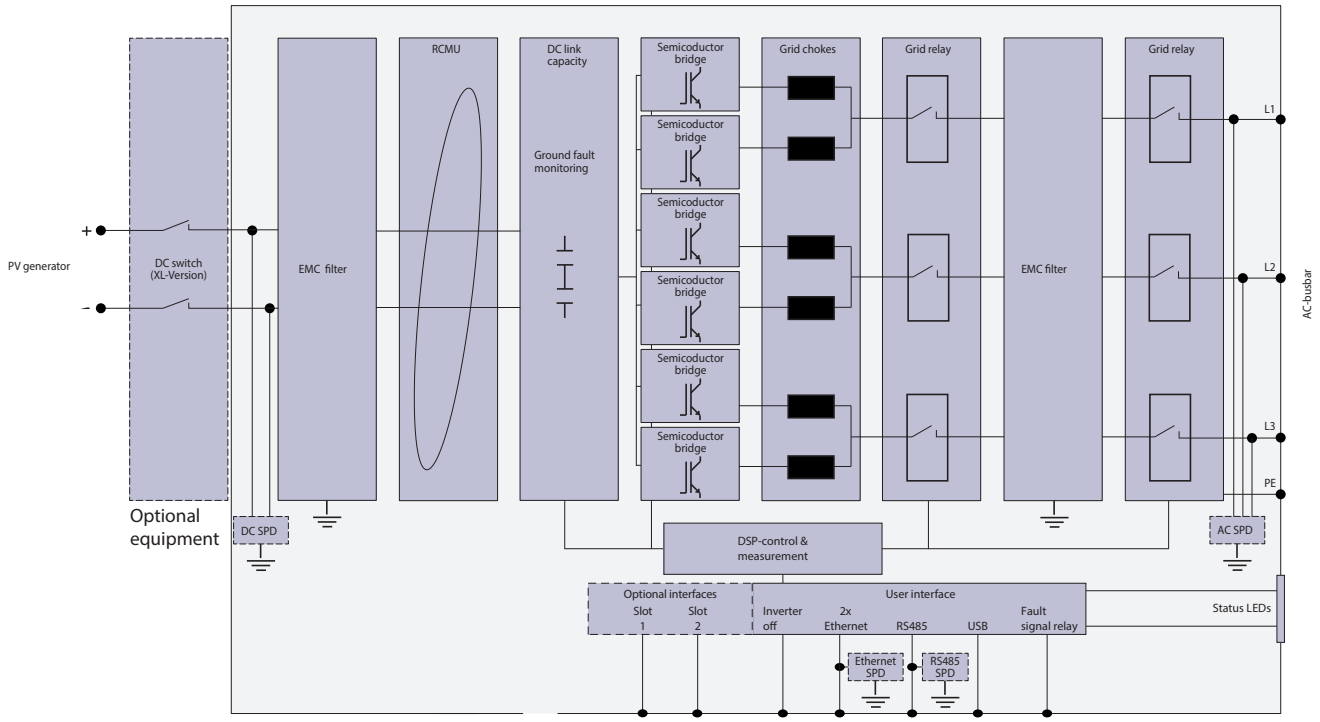

Fig. 9: Block schema blueplanet 87.0-165 TL3

	50 Hz		60 Hz	
	[A]	**[% de In]**	**[A]**	**[% de In]**
1	126,433	95,78	118,112	89,28
2	0,260	0,20	0,260	0,20
3	0,125	0,09	0,115	0,09
4	0,072	0,06	0,097	0,07
5	0,370	0,40	0,404	0,59
6	0,097	0,07	0,068	0,07
7	0,302	0,35	0,355	0,41
8	0,100	0,08	0,045	0,05
9	0,064	0,05	0,035	0,03
10	0,054	0,06	0,041	0,04
11	0,294	0,23	0,274	0,21
12	0,083	0,09	0,069	0,08
13	0,198	0,17	0,236	0,19
14	0,089	0,07	0,050	0,05
15	0,058	0,04	0,026	0,02
16	0,094	0,07	0,048	0,05
17	0,239	0,18	0,220	0,17
18	0,079	0,08	0,070	0,08
19	0,146	0,14	0,202	0,16
20	0,072	0,06	0,055	0,06
21	0,048	0,04	0,029	0,02
22	0,107	0,08	0,059	0,06
23	0,195	0,15	0,189	0,15
24	0,082	0,08	0,077	0,08
25	0,137	0,11	0,171	0,13
26	0,085	0,06	0,052	0,05
27	0,050	0,04	0,017	0,01
28	0,101	0,08	0,059	0,05
29	0,165	0,13	0,151	0,12
30	0,092	0,07	0,074	0,07
31	0,140	0,11	0,139	0,10
32	0,102	0,08	0,054	0,05
33	0,052	0,04	0,016	0,01
34	0,088	0,07	0,051	0,05
35	0,116	0,09	0,111	0,09
36	0,093	0,07	0,069	0,05
37	0,131	0,10	0,099	0,07
38	0,100	0,08	0,048	0,04
39	0,055	0,04	0,014	0,01
40	0,078	0,06	0,044	0,04
41	0,091	0,07	0,079	0,06
42	0,085	0,06	0,051	0,04
43	0,100	0,08	0,070	0,06
44	0,083	0,06	0,039	0,03
45	0,051	0,04	0,011	0,01

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	50 Hz		60 Hz	
	[A]	[% de In]	[A]	[% de In]
46	0,068	0,05	0,036	0,03
47	0,070	0,05	0,052	0,04
48	0,076	0,06	0,045	0,04
49	0,066	0,05	0,047	0,04
50	0,063	0,05	0,033	0,03

Tab. 3: Harmonics 50 Hz and Harmonics 60 Hz

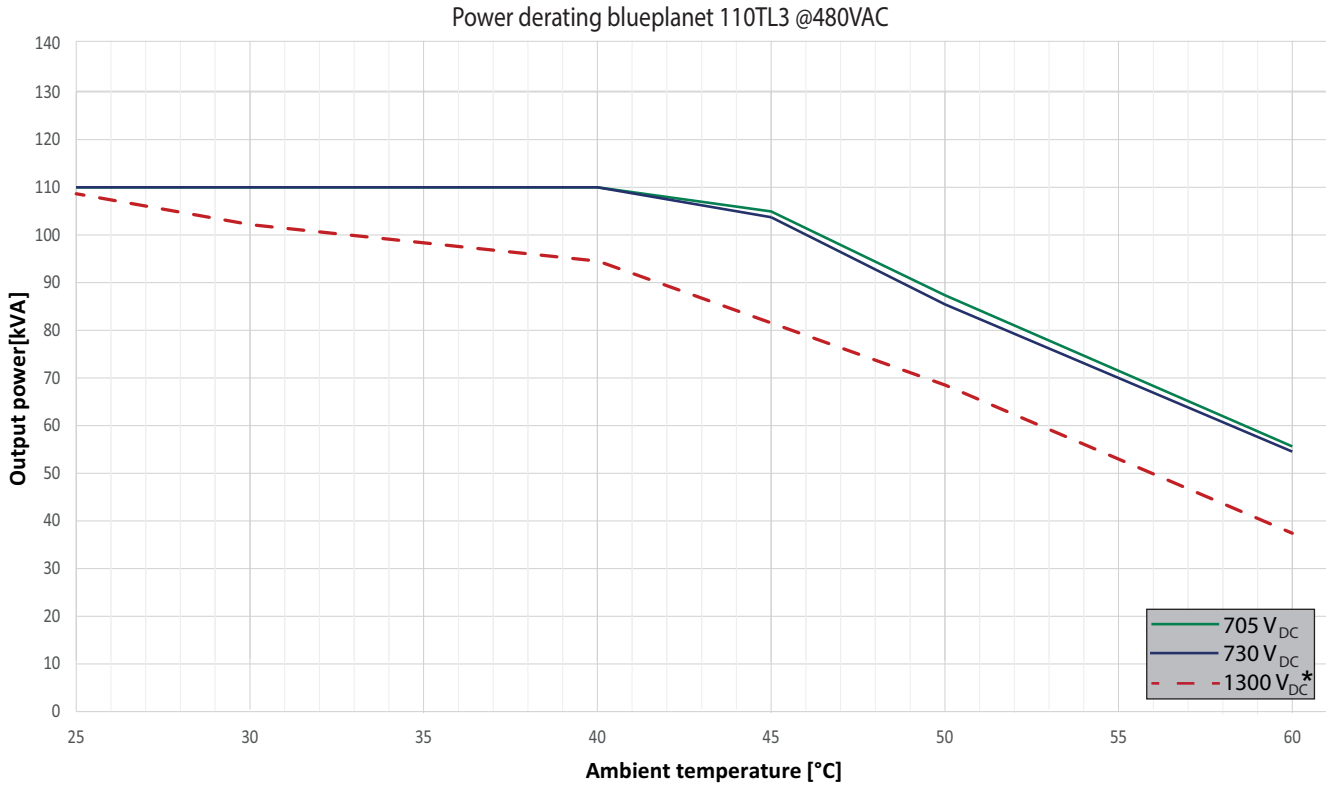

Fig. 10: Power derating blueplanet 110.0 TL3

*) Due to the thermal characteristics of solar modules an operational DC voltage of 1300VDC is not to be expected at higher ambient temperatures in the vast majority of system designs.

Efficiency characteristic

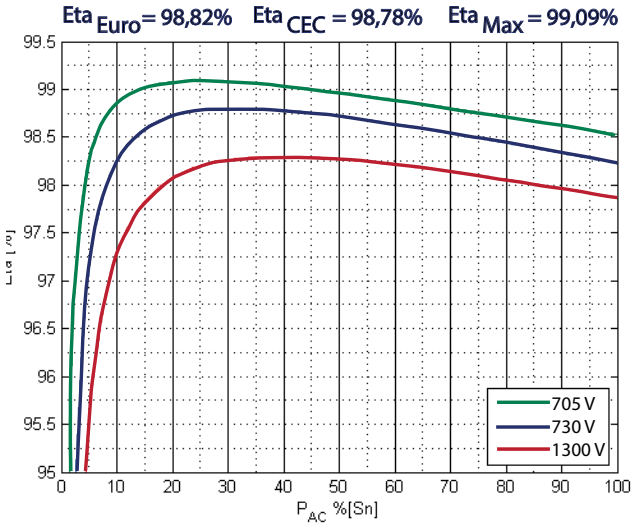

Fig. 11: 2D Diagram blueplanet 110 TL3

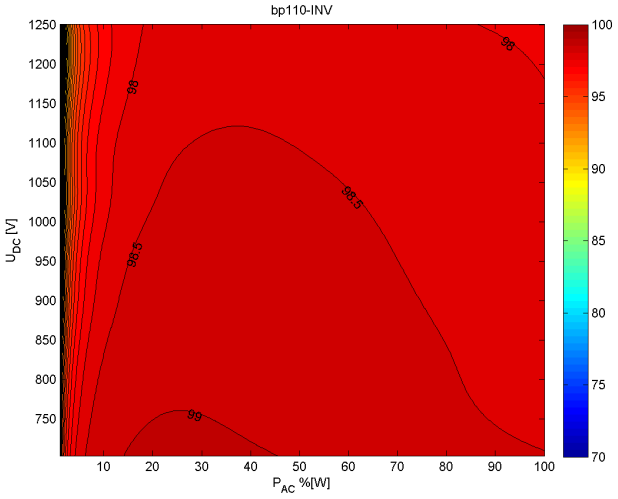

Fig. 12: 3D Diagram blueplanet 110 TL3

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1.4 KACO blueplanet 105 TL3

AC-Power				
Inverter power nominal	99,9 kVA			
Inverter power maximal	105 kVA			
Rated current (In)	152 A			
Short circuit current (Ik'' First cycle RMS value)	150.8 A			
Short circuit current continuous (max output fault current)	150 A			
Power electronics type	IGBT-MLI (self-commutated)			
Rated operating voltage	400 V			
cos phi nominal	≈ 1			
Grid connection	Three-phase			
Impedance bei 165 Hz *	$R_{165\ Hz} \approx 360{,}0\ \Omega$, $X_{165\ Hz} \approx 100{,}0\ \Omega$			
Impedance bei 175 Hz *	$R_{175\ Hz} \approx 47{,}0\ \Omega$, $X_{175\ Hz} \approx 360{,}0\ \Omega$			
* Scheme in parallel				

Operating behaviour in the event of a short circuit at the inverter output				
Maximum peak current (Ip)	260,8 A			
Maximum peak current (Ik")	150,8 A			

Power quality characteristics				
Max. number of switching operations, N_{10}	10			
Max. number of switching operations, N_{120}	120			
Case of switching operation	Cut-in at 10 % of rated power			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,0253	0,0383	0,0467	0,0493
Voltage change factor	0,0050	0,0050	0,0050	0,0050
Maximum inrush current factor	0,100			
Maximum inrush current factor (transient only)	0,020			
Case of switching operation	Cut-in at 100 % of rated power			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,1609	0,1566	0,1497	0,1433
Voltage change factor	0,0397	0,0397	0,0397	0,0397
Maximum inrush current factor	0,379			
Maximum inrush current factor (transient only)	0,020			

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Case of switching operation	Service disconnection at rated power			
Description of the service disconnection procedure	Disconnection by the DC-switch			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,3319	0,2547	0,1526	0,0726
Voltage change factor	0,0788	0,0788	0,0788	0,0788
Maximum inrush current factor	0,000			
Maximum inrush current factor (transient only)	0,000			
Worst case over all switching operations	0, 331			
Worst case over all switching operations (transient only)	0,040			
Note: $S_{k,\,fic}/S_n$ in the fictitious grid was set to	20			

Flicker				
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,62	0,93	1,13	1,18
Short term flicker	0,33	0,49	0,60	0,63
Note: $S_{k,\,fic}/S_n$ in the fictitious grid was set to	20			

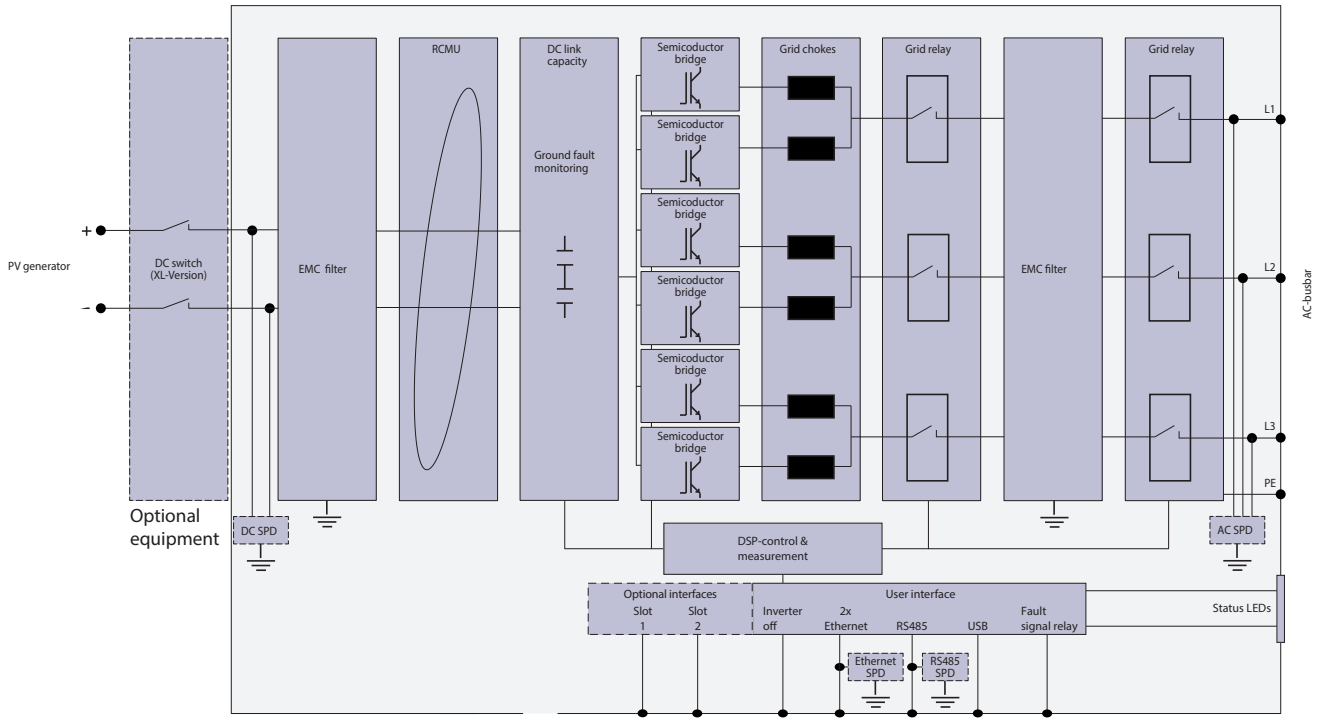

Fig. 13: Block schema blueplanet 87.0-165 TL3

	[A]	[% de In]
1	150,219	98,83
2	0,346	0,23
3	0,112	0,07
4	0,141	0,09
5	0,555	0,37
6	0,114	0,07
7	0,466	0,31
8	0,080	0,05
9	0,074	0,05
10	0,088	0,06
11	0,243	0,16
12	0,123	0,08
13	0,246	0,16
14	0,086	0,06
15	0,091	0,06
16	0,118	0,08
17	0,223	0,15
18	0,120	0,08
19	0,220	0,15
20	0,082	0,05
21	0,080	0,05
22	0,117	0,08
23	0,185	0,12
24	0,096	0,06
25	0,193	0,13
26	0,065	0,04
27	0,078	0,05
28	0,108	0,07
29	0,159	0,10
30	0,076	0,05
31	0,152	0,10
32	0,056	0,04
33	0,065	0,04
34	0,084	0,06
35	0,150	0,10
36	0,056	0,04
37	0,137	0,09
38	0,052	0,03
39	0,055	0,04
40	0,057	0,04
41	0,133	0,09
42	0,053	0,03
43	0,117	0,08
44	0,044	0,03
45	0,032	0,02
46	0,035	0,02

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	[A]	[% de In]
47	0,107	0,07
48	0,054	0,04
49	0,092	0,06
50	0,035	0,02

Tab. 4: Harmonics 50 Hz

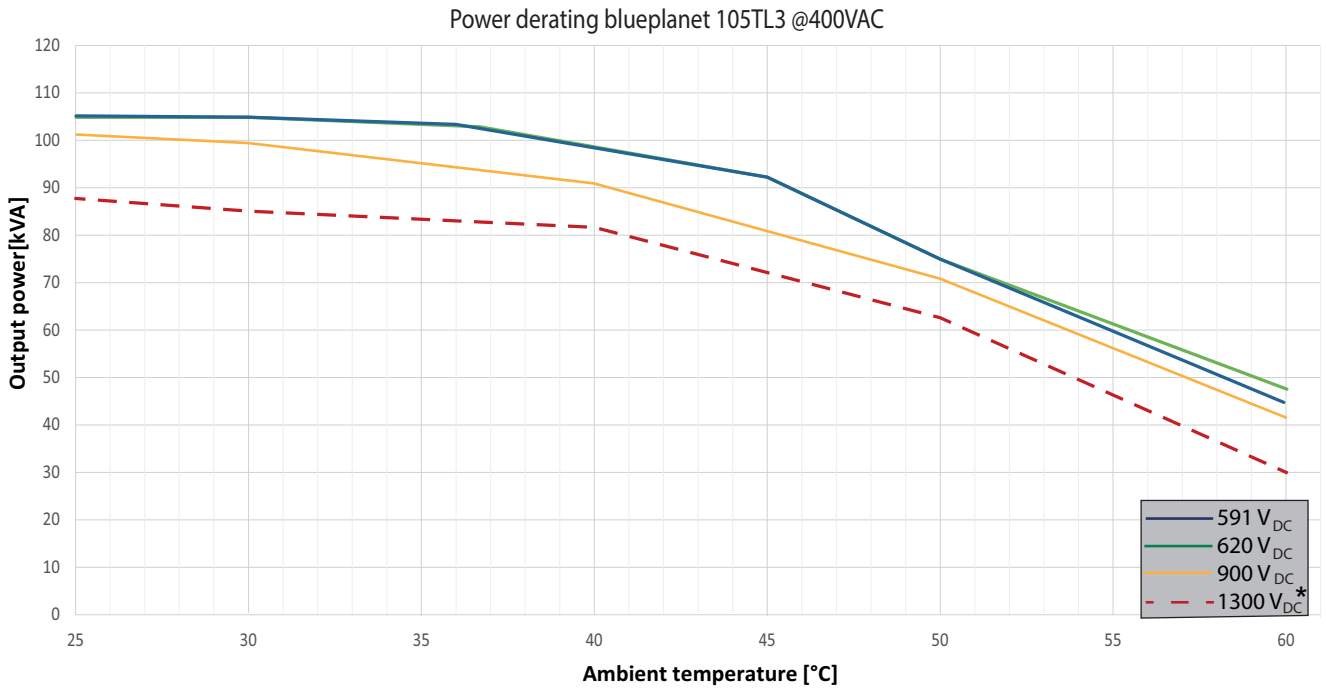

Fig. 14: Power derating blueplanet 105TL3

*) Due to the thermal characteristics of solar modules an operational DC voltage of 1300VDC is not to be expected at higher ambient temperatures in the vast majority of system designs.

Efficiency characteristic

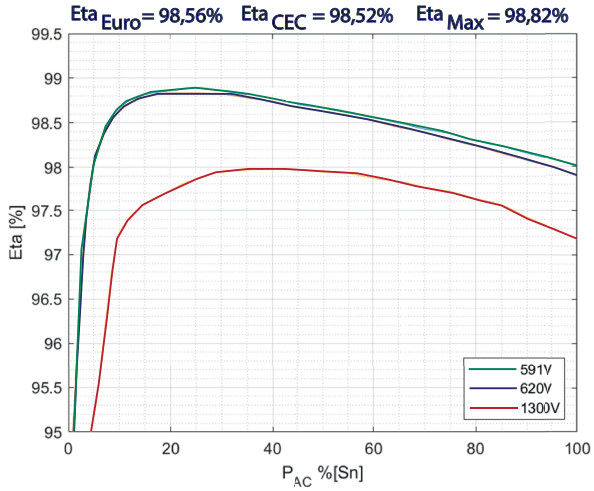

Fig. 15: 2D Diagram blueplanet 105 TL3

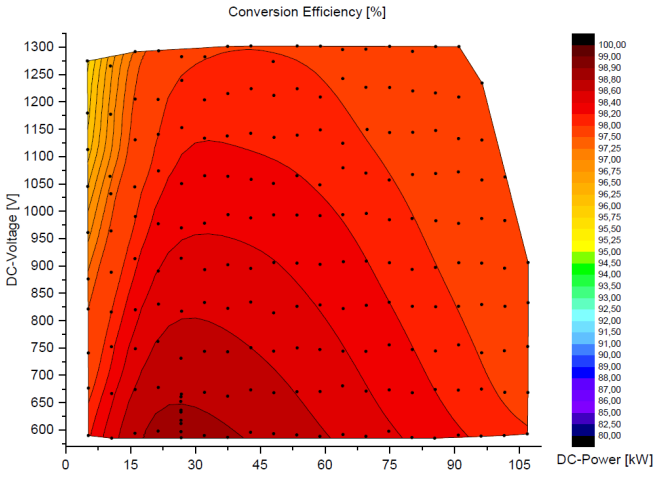

Fig. 16: 3D Diagram blueplanet 105 TL3

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1.5 KACO blueplanet 125 TL3 US

AC-Power				
Inverter power nominal	125 kVA			
Inverter power maximal	125 kVA			
Rated current (In)	152 A			
Short circuit current (Ik'' First cycle RMS value)	150.8 A			
Short circuit current continuous (max output fault current)	150 A			
Power electronics type	IGBT-MLI (self-commutated)			
Rated operating voltage	480 V			
cos phi nominal	≈ 1			
Grid connection	Three-phase			
Impedance at 165 Hz *	$R_{165\ Hz} \approx 360{,}0\ \Omega$, $X_{165\ Hz} \approx 100{,}0\ \Omega$			
Impedance at 175 Hz *	$R_{175\ Hz} \approx 47{,}0\ \Omega$, $X_{175\ Hz} \approx 360{,}0\ \Omega$			
* Scheme in parallel				

Operating behaviour in the event of a short circuit at the inverter output				
Maximum peak current (Ip)	260,8 A			
Maximum peak current (Ik")	150,8 A			

Power quality characteristics				
Max. number of switching operations, N_{10}	10			
Max. number of switching operations, N_{120}	120			
Case of switching operation	Cut-in at 10 % of rated power			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,0187	0,0279	0,0340	0,0358
Voltage change factor	0,0053	0,0053	0,0053	0,0053
Maximum inrush current factor	0,435			
Maximum inrush current factor (transient only)	0,020			
Case of switching operation	Cut-in at 100 % of rated power			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,1370	0,1318	0,1250	0,1211
Voltage change factor	0,0382	0,0382	0,0382	0,0382
Maximum inrush current factor	0,435			
Maximum inrush current factor (transient only)	0,020			

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Case of switching operation	Service disconnection at rated power			
Description of the service disconnection procedure	Disconnection by the DC-switch			
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,3285	0,2505	0,1469	0,0642
Voltage change factor	0,0757	0,0757	0,0757	0,0757
Maximum inrush current factor	0,000			
Maximum inrush current factor (transient only)	0,000			
Worst case over all switching operations	0,328			
Worst case over all switching operations (transient only)	0,040			
Note: $S_{k,\,fic}/S_n$ in the fictitious grid was set to	20			

Flicker				
Grid impedance angle	30°	50°	70°	85°
Flicker step factor	0,46	0,69	0,84	0,88
Short term flicker	0,21	0,32	0,38	0,40
Note: $S_{k,\,fic}/S_n$ in the fictitious grid was set to	20			

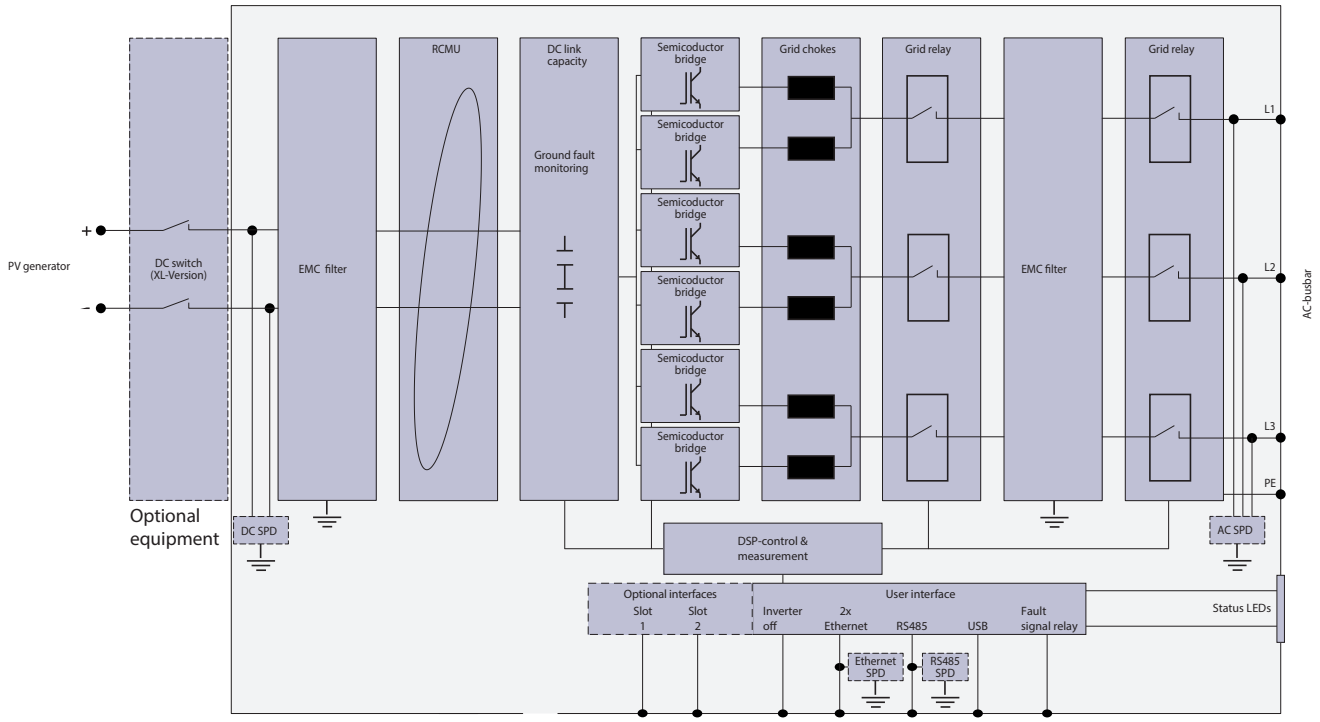

Fig. 17: Block schema blueplanet 87.0-165 TL3

	50 Hz	
	[A]	**[% de In]**
1	146,545	96,41
2	0,216	0,14
3	0,084	0,06
4	0,142	0,09
5	0,628	0,41
6	0,127	0,08
7	0,570	0,37
8	0,087	0,06
9	0,077	0,05
10	0,110	0,07
11	0,277	0,18
12	0,128	0,08
13	0,252	0,17
14	0,084	0,06
15	0,082	0,05
16	0,136	0,09
17	0,231	0,15
18	0,121	0,08
19	0,218	0,14
20	0,070	0,05
21	0,084	0,06
22	0,142	0,09
23	0,186	0,12
24	0,107	0,07
25	0,174	0,11
26	0,062	0,04
27	0,076	0,05
28	0,116	0,08
29	0,173	0,11
30	0,090	0,06
31	0,168	0,11
32	0,058	0,04
33	0,061	0,04
34	0,080	0,05
35	0,161	0,11
36	0,083	0,05
37	0,151	0,10
38	0,056	0,04
39	0,054	0,04
40	0,044	0,03
41	0,144	0,09
42	0,079	0,05
43	0,132	0,09
44	0,050	0,03
45	0,035	0,02

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	50 Hz	
	[A]	**[% de In]**
46	0,041	0,03
47	0,106	0,07
48	0,075	0,05
49	0,089	0,06
50	0,051	0,03

Tab. 5: Harmonics 50 Hz

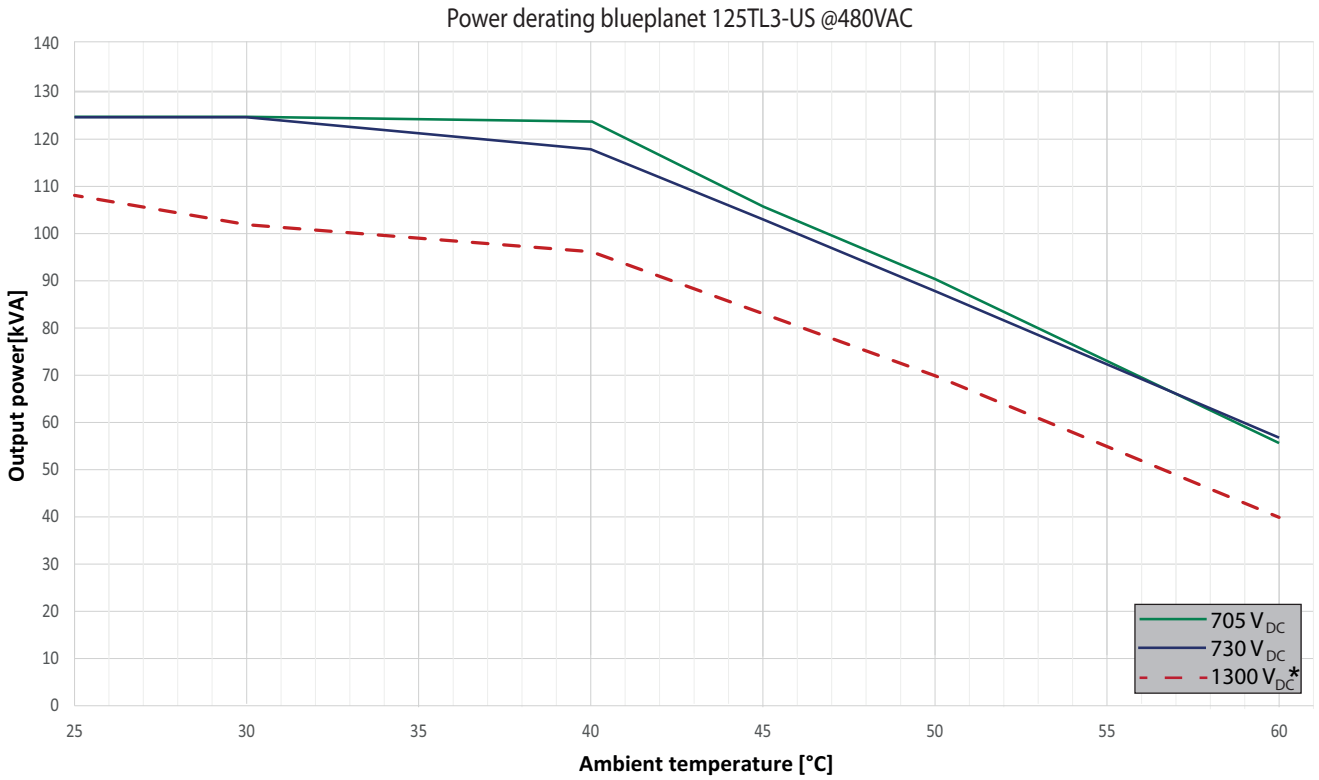

Fig. 18: Power derating blueplanet 125 TL3 US

*) Due to the thermal characteristics of solar modules an operational DC voltage of 1300VDC is not to be expected at higher ambient temperatures in the vast majority of system designs.

Efficiency characteristic

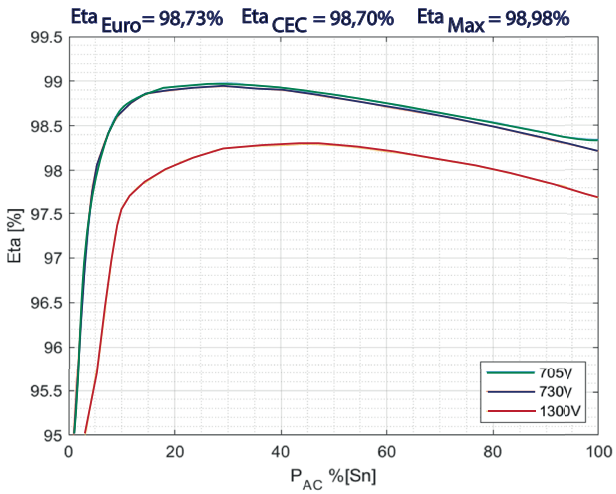

Fig. 19: 2D Diagram blueplanet 125 US

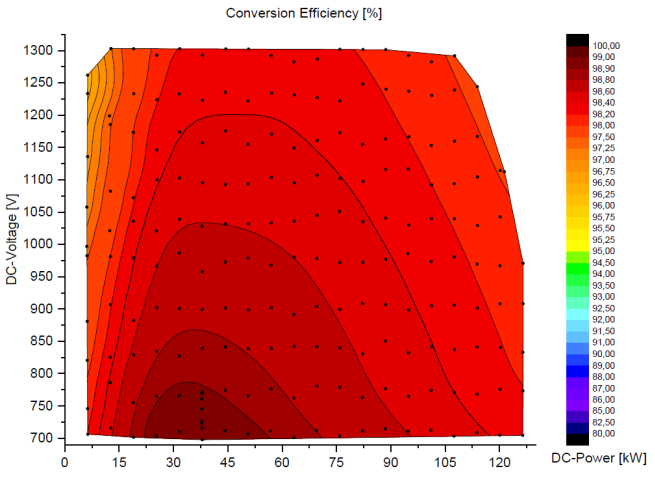

Fig. 20: 3D Diagram blueplanet 125 US

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KACO new energy.

Werner-von-Siemens-Allee 1 · 74172 Neckarsulm · Germany · Tel. +49 7132 896-0 · info@kaco-newenergy.de · www.kaco-newenergy.de