

Product certificate number

No: 2616/0510/E2-CER

Manufacturer

INGETEAM POWER TECHNOLOGY
Pol. Industrial El Juncarillo Nave1
31293 Sesma, Navarra, Spain

Trademark

Ingeteam

Type

PowerMax B series

Tested models

**INGECON SUN 1190TL B430 / INGECON SUN 1220TL B440 / INGECON SUN 1250TL B450 /
INGECON SUN 1170TL B450 / INGECON SUN 1275TL B460 / INGECON SUN 1400TL B540 /
INGECON SUN 1500TL B578 / INGECON SUN 1560TL B600 / INGECON SUN 1600TL B615 /
INGECON SUN 1640TL B630 / INGECON SUN 1665TL B640 / INGECON SUN 1690TL B650 /
INGECON SUN 1715TL B660 / INGECON SUN 1740TL B670 / INGECON SUN 1770TL B680 /
INGECON SUN 1800TL B690**

Variant models

**INGECON SUN 830TL B300 / INGECON SUN 860TL B310 / INGECON SUN 890TL B320 /
INGECON SUN 915TL B330 / INGECON SUN 940TL B340 / INGECON SUN 970TL B350 /
INGECON SUN 1000TL B360 / INGECON SUN 1025TL B370 / INGECON SUN 1050TL B380 /
INGECON SUN 1070TL B385 / INGECON SUN 1080TL B390 / INGECON SUN 1110TL B400 /
INGECON SUN 1140TL B410 / INGECON SUN 1165TL B420 / INGECON SUN 1195TL B460 /
INGECON SUN 1220TL B470 / INGECON SUN 1247TL B480 / INGECON SUN 1273TL B490 /
INGECON SUN 1300TL B500 / INGECON SUN 1325TL B510 / INGECON SUN 1350TL B520 /
INGECON SUN 1376TL B530 / INGECON SUN 1430TL B550 / INGECON SUN 1455TL B560 /
INGECON SUN 1480TL B570 / INGECON SUN 1532TL B590 / INGECON SUN 1667TL B680**

Type of generating unit

Static Power Converter

Technical Data

Nominal Power	See page 6
Nominal Voltage	See page 6
Nominal Frequency	50 / 60 Hz
Firmware version	APP: ABK1000 BOOT: ABI1006 LCD APP: ABK1001 LCD BOOT: ABK1003
Number of phases	Three phase
Isolation Transformer	NO

Standard

EN 50530: 2010. Overall efficiency of grid connected photovoltaic inverters.

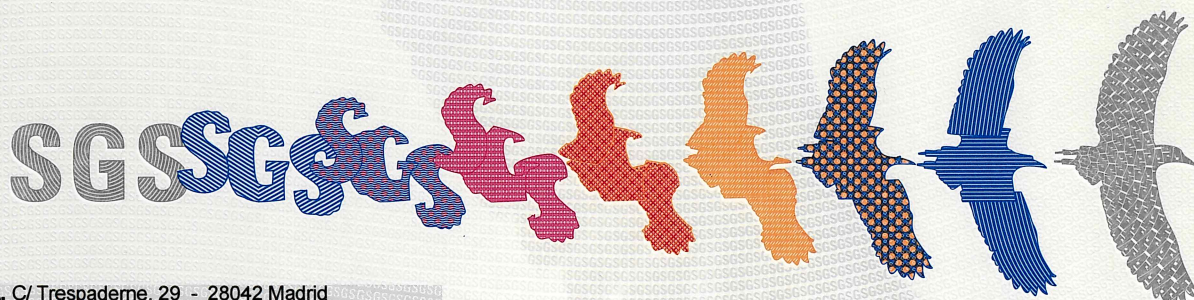
The above-mentioned generating unit is certified according the SGS internal procedure PE.T-ECPE-34 based on the requirements of the UNE-EN ISO / IEC 17065.

This certificate cancels and supersedes the certificate number 2616/0510/E1-CER/E1.

This certificate is valid until: 12th of September of 2022, first issued on 12th of September of 2016.

Madrid, 08th of May 2019


Daniel Arranz Muñoz
Certification Manager



Summary of efficiency results measured for the tested model:

- Static MPPT efficiency for a characteristic irradiation curve of a c-Si PV Generator

INGETEAM 800TL B320								
Test condition	5%Sn	10%Sn	20%Sn	30%Sn	50%Sn	75%Sn	100%Sn	Summary
Minimum rated input voltage ⁽¹⁾	99,6%	99,8%	99,9%	99,9%	99,9%	99,8%	99,8%	99,9%
Nominal input voltage ⁽²⁾	99,6%	99,8%	99,8%	99,8%	99,8%	99,8%	99,7%	99,8%
90% of the maximum rated input voltage ⁽³⁾	99,8%	99,8%	99,8%	99,8%	99,8%	99,8%	99,7%	99,8%

(1) 625 V; (2) 722,5 V; (3) 820 V

- Static MPPT efficiency for a characteristic irradiation curve of a thin-film PV Generator

INGETEAM 800TL B320								
Test condition	5%Sn	10%Sn	20%Sn	30%Sn	50%Sn	75%Sn	100%Sn	Summary
Minimum rated input voltage ⁽¹⁾	99,2%	99,7%	99,8%	99,8%	99,8%	99,8%	99,7%	99,8%
Nominal input voltage ⁽²⁾	99,5%	99,7%	99,8%	99,8%	99,8%	99,8%	99,6%	99,7%
90% of the maximum rated input voltage ⁽³⁾	99,8%	99,9%	99,9%	99,9%	99,9%	99,8%	99,8%	99,9%

(1) 625 V; (2) 722,5 V; (3) 820 V

It can be considered a Static MPPT efficiency of 99,8%, calculated as the average among all summary results offered above. These summary results are obtained taking as reference equations and weighting factors stated in the annex D of the standard EN 50530:2010, for the calculation of the European efficiency.

- Dynamic MPPT efficiency

INGECON SUN 800TL B320								
Ramp Gradient (W/m²/s)	0,5	1	2	3	5	7	10	14
Irradiance changes 100 <-> 500 W/m²	99,83%	99,82%	99,74%	99,72%	99,54%	99,39%	99,24%	99,15%
Ramp Gradient (W/m²/s)	20	30	50					
Irradiance changes 100 <-> 500 W/m²	99,06%	98,91%	98,55%					
Ramp Gradient (W/m²/s)	10	14	20	30	50	100		
Irradiance changes 300 <-> 1000 W/m²	99,74%	99,69%	99,72%	99,65%	99,27%	99,51%		
Ramp Gradient (W/m²/s)	0,1							
Irradiance changes 2 <-> 100 W/m²	95,37%							

These efficiency results are considered as a representative sample of the expected behavior for the variant models under the scope of this certificate.



- Overall efficiency

INGECON SUN 1190TL B430								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	97,44%	98,30%	98,63%	98,85%	98,74%	98,61%	98,54%	98,11%
Nominal input voltage ⁽²⁾	96,76%	97,54%	98,62%	98,53%	98,72%	98,74%	98,54%	98,12%
90% of the maximum rated input voltage ⁽³⁾	96,22%	97,52%	98,23%	98,51%	98,47%	98,59%	98,54%	98,10%

(1) 623 V; (2) 680 V; (3) 738 V

INGECON SUN 1220TL B440								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	97,35%	98,34%	98,65%	98,58%	98,77%	98,62%	98,57%	98,14%
Nominal input voltage ⁽²⁾	96,88%	98,15%	98,65%	98,57%	98,77%	98,62%	98,56%	98,16%
90% of the maximum rated input voltage ⁽³⁾	96,52%	97,49%	98,42%	98,56%	98,63%	98,62%	98,46%	98,15%

(1) 638 V; (2) 688 V; (3) 738 V

INGECON SUN 1250TL B450								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	97,18%	98,36%	98,34%	98,60%	98,79%	98,67%	98,50%	98,19%
Nominal input voltage ⁽²⁾	96,92%	98,36%	98,31%	98,60%	98,55%	98,65%	98,57%	98,19%
90% of the maximum rated input voltage ⁽³⁾	96,64%	97,64%	98,67%	98,59%	98,54%	98,65%	98,52%	98,19%

(1) 652 V; (2) 695 V; (3) 738 V

INGECON SUN 1275TL B460								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	97,45%	97,73%	98,71%	98,92%	98,81%	98,81%	98,65%	98,96%
Nominal input voltage ⁽²⁾	96,95%	98,39%	98,70%	98,62%	98,57%	98,67%	98,62%	98,98%
90% of the maximum rated input voltage ⁽³⁾	96,69%	98,01%	98,42%	98,62%	98,56%	98,67%	98,62%	98,23%

(1) 666 V; (2) 702 V; (3) 738 V

INGECON SUN 1170TL B450								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	96,75%	97,84%	98,19%	98,31%	98,36%	98,42%	98,32%	98,07%
Nominal input voltage ⁽²⁾	95,19%	96,95%	97,61%	97,82%	97,94%	98,06%	97,96%	97,71%
90% of the maximum rated input voltage ⁽³⁾	93,60%	96,13%	97,19%	97,37%	97,56%	97,75%	97,64%	97,46%

(1) 660 V; (2) 885,5 V; (3) 1170 V

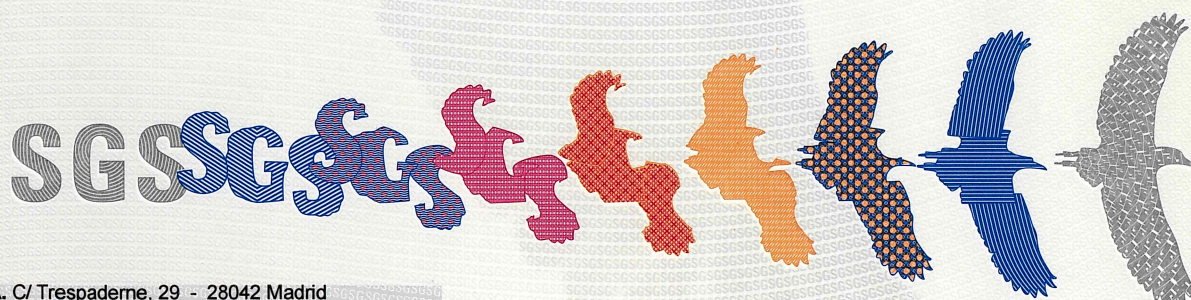
INGECON SUN 1400TL B540								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	95,82%	97,74%	98,15%	98,32%	98,43%	98,51%	98,50%	98,27%
Nominal input voltage ⁽²⁾	95,64%	97,13%	97,80%	97,97%	98,10%	98,23%	98,20%	98,01%
90% of the maximum rated input voltage ⁽³⁾	94,32%	96,60%	97,50%	97,70%	97,86%	98,02%	98,00%	97,85%

(1) 786 V; (2) 948,5 V; (3) 1170 V

These overall efficiency results are representatives for the referred models with a testing frequency of 50Hz.

All efficiency results are calculated between the product of the Static Efficiency of the MPPT obtained after the representative model tested according to EN 50530: 2010, INGECON SUN 800TL B320, for the Conversion Efficiency results obtained for the testing of this family according to IEC 61683:1999.

These overall efficiency results offered can be considered as representative samples of the expected behavior for the variant models not tested that are under the scope of this certificate.



- Overall efficiency

INGECON SUN 1500TL B578								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	96,38%	97,20%	98,31%	98,41%	98,49%	98,56%	98,46%	98,25%
Nominal input voltage ⁽²⁾	94,19%	97,18%	98,05%	98,17%	98,23%	98,29%	98,25%	98,06%
90% of the maximum rated input voltage ⁽³⁾	94,42%	96,77%	97,72%	97,93%	98,01%	98,12%	98,07%	97,95%

(1) 840 V; (2) 975,5 V; (3) 1170 V

INGECON SUN 1560TL B600								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	96,31%	97,62%	98,31%	98,38%	98,46%	98,50%	98,50%	98,31%
Nominal input voltage ⁽²⁾	95,59%	97,21%	97,97%	98,16%	98,22%	98,32%	98,29%	98,11%
90% of the maximum rated input voltage ⁽³⁾	94,92%	96,76%	97,72%	97,92%	98,02%	98,17%	98,14%	98,00%

(1) 870 V; (2) 990,5 V; (3) 1170 V

INGECON SUN 1600TL B615								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	96,27%	97,55%	98,32%	98,45%	98,50%	98,62%	98,59%	98,43%
Nominal input voltage ⁽²⁾	95,47%	97,02%	98,04%	98,20%	98,26%	98,40%	98,35%	98,16%
90% of the maximum rated input voltage ⁽³⁾	94,32%	96,75%	97,77%	97,99%	98,09%	98,28%	98,23%	98,07%

(1) 889 V; (2) 1001,5 V; (3) 1170 V

INGECON SUN 1640TL B630								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	96,37%	97,44%	98,25%	98,38%	98,51%	98,63%	98,60%	98,42%
Nominal input voltage ⁽²⁾	94,20%	96,56%	98,03%	98,17%	98,28%	98,39%	98,36%	98,21%
90% of the maximum rated input voltage ⁽³⁾	94,37%	96,81%	97,79%	97,96%	98,13%	98,26%	98,24%	98,16%

(1) 910 V; (2) 1013 V; (3) 1170 V

INGECON SUN 1665TL B640								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	97,00%	98,35%	98,89%	98,99%	99,03%	99,00%	98,90%	98,80%
Nominal input voltage ⁽²⁾	96,36%	97,97%	98,65%	98,78%	98,85%	98,84%	98,74%	98,58%
90% of the maximum rated input voltage ⁽³⁾	95,37%	97,54%	98,46%	98,63%	98,74%	98,73%	98,66%	98,54%

(1) 925 V; (2) 1047,5 V; (3) 1170 V

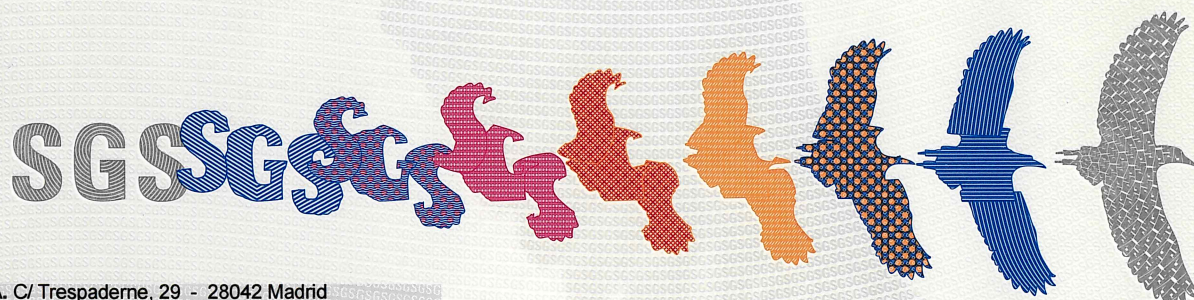
INGECON SUN 1690TL B650								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	97,15%	98,43%	98,86%	98,97%	99,01%	99,03%	98,96%	98,91%
Nominal input voltage ⁽²⁾	96,15%	97,92%	98,66%	98,80%	98,87%	98,86%	98,75%	98,59%
90% of the maximum rated input voltage ⁽³⁾	95,70%	97,70%	98,55%	98,70%	98,79%	98,79%	98,70%	98,56%

(1) 940 V; (2) 1055 V; (3) 1170 V

These overall efficiency results are representatives for the referred models with a testing frequency of 50Hz.

All efficiency results are calculated between the product of the Static Efficiency of the MPPT obtained after the representative model tested according to EN 50530: 2010, INGECON SUN 800TL B320, for the Conversion Efficiency results obtained for the testing of this family according to IEC 61683:1999.

These overall efficiency results offered can be considered as representative samples of the expected behavior for the variant models not tested that are under the scope of this certificate.



- Overall efficiency

INGECON SUN 1715TL B660								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	96,84%	98,23%	98,97%	99,04%	99,08%	99,05%	98,97%	98,86%
Nominal input voltage ⁽²⁾	96,25%	97,96%	98,67%	98,80%	98,87%	98,92%	98,79%	98,64%
90% of the maximum rated input voltage ⁽³⁾	95,82%	97,74%	98,51%	98,67%	98,76%	98,79%	98,71%	98,59%

(1) 954 V; (2) 1062 V; (3) 1170 V

INGECON SUN 1740TL B670								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	96,79%	98,28%	98,86%	98,99%	99,06%	99,06%	98,99%	98,88%
Nominal input voltage ⁽²⁾	96,09%	97,91%	98,60%	98,77%	98,86%	98,94%	98,81%	98,66%
90% of the maximum rated input voltage ⁽³⁾	96,01%	97,83%	98,63%	98,77%	98,85%	98,88%	98,76%	98,63%

(1) 968 V; (2) 1069 V; (3) 1170 V

INGECON SUN 1770TL B680								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	96,80%	98,26%	98,86%	99,02%	99,03%	99,07%	99,01%	98,91%
Nominal input voltage ⁽²⁾	96,11%	97,90%	98,70%	98,82%	98,93%	98,88%	98,79%	98,65%
90% of the maximum rated input voltage ⁽³⁾	96,10%	97,86%	98,57%	98,74%	98,82%	98,91%	98,80%	98,67%

(1) 982 V; (2) 1076 V; (3) 1170 V

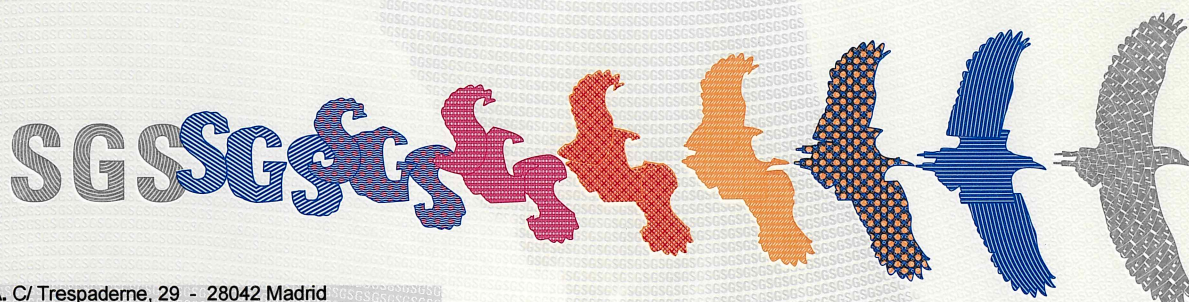
INGECON SUN 1800TL B690								
Test condition	5%Sn	10%Sn	20%Sn	25%Sn	30%Sn	50%Sn	75%Sn	100%Sn
Minimum rated input voltage ⁽¹⁾	96,90%	98,34%	98,90%	99,04%	99,07%	99,11%	99,05%	98,93%
Nominal input voltage ⁽²⁾	96,19%	97,94%	98,73%	98,83%	98,95%	98,95%	98,85%	98,69%
90% of the maximum rated input voltage ⁽³⁾	96,13%	97,90%	98,65%	98,79%	98,89%	98,89%	98,79%	98,67%

(1) 997 V; (2) 1083,5 V; (3) 1170 V

These overall efficiency results are representatives for the referred models with a testing frequency of 50Hz.

All efficiency results are calculated between the product of the Static Efficiency of the MPPT obtained after the representative model tested according to EN 50530: 2010, INGECON SUN 800TL B320, for the Conversion Efficiency results obtained for the testing of this family according to IEC 61683:1999.

These overall efficiency results offered can be considered as representative samples of the expected behavior for the variant models not tested that are under the scope of this certificate.



Full list of nominal characteristics:

Ingecon Sun PowerMax B (1000 Vdc models)			
INGECON SUN PowerMax	Rated Voltage (Vac)	MPPT Range (Vdc)	Rated Power (kW)
830TL B300	300	440 - 820	830
860TL B310	310	454 - 820	860
890TL B320	320	468 - 820	890
915TL B330	330	482 - 820	915
940TL B340	340	496 - 820	940
970TL B350	350	510 - 820	970
1000TL B360	360	524 - 820	1000
1025TL B370	370	539 - 820	1025
1050TL B380	380	552 - 820	1050
1070TL B385	385	560 - 820	1070
1080TL B390	390	567 - 820	1080
1110TL B400	400	580 - 820	1110
1140TL B410	410	595 - 820	1140
1165TL B420	420	610 - 820	1165
1190TL B430	430	623 - 820	1190
1220TL B440	440	638 - 820	1220
1250TL B450	450	652 - 820	1250
1275TL B460	460	666 - 820	1275
f [Hz]		50 / 60	
Vdc Max		1050 V	
Idc Max		2000 A	
Iac Max		1600 A	

Ingecon Sun PowerMax B (1500 Vdc models)			
INGECON SUN PowerMax	Rated Voltage (Vac)	MPPT Range (Vdc)	Rated Power (kW)
1170TL B450	450	655 - 1300	1170
1195TL B460	460	669 - 1300	1195
1220TL B470	470	683 - 1300	1220
1247TL B480	480	697 - 1300	1247
1273TL B490	490	711 - 1300	1273
1300TL B500	500	726 - 1300	1300
1325TL B510	510	740 - 1300	1325
1350TL B520	520	754 - 1300	1350
1376TL B530	530	768 - 1300	1376
1400TL B540	540	768 - 1300	1400
1430TL B550	550	797 - 1300	1430
1455TL B560	560	810 - 1300	1455
1480TL B570	570	825 - 1300	1480
1500TL B578	578	837 - 1300	1500
1532TL B590	590	853 - 1300	1532
1560TL B600	600	868 - 1300	1560
1600TL B615	615	889 - 1300	1600
1640TL B630	630	910 - 1300	1640
1665TL B640	640	925 - 1300	1665
1690TL B650	650	940 - 1300	1690
1715TL B660	660	954 - 1300	1715
1740TL B 670	670	968 - 1300	1740
1770TL B 680	680	982 - 1300	1770
1800TL B 690	690	997 - 1300	1800
f [Hz]		50 / 60	
Vdc Max		1500 V	
Idc Max		1850 A	
Iac Max		1500 A	

