

CERTIFICATE

TÜV NORD CERT GmbH
herewith declares that

Anker Innovations Limited
Room 1318-19, Hollywood Plaza, 610 Nathan Road,
Mongkok, Kowloon
HongKong

is authorized to provide the product mentioned below with the mark as illustrated:

Description of product (details see Annex 2):

Crystalline Silicon Terrestrial Photovoltaic (PV) Modules



Valid from: 2023-01-17

Valid until: 2026-05-07

Certification program:	P12-VA-01 Rev. 17 09.20
Certification fundamental(s):	IEC / EN 61215-1:2016; IEC / EN 61215-1-1:2016; IEC 61215-2:2016 / EN 61215-2:2017 + AC:2017 + AC:2018; IEC 61730-1:2016 / EN IEC 61730-1:2018 + AC:2018; IEC 61730-2:2016 / EN IEC 61730-2:2018 + AC:2018.
Registered No.:	44 780 23 406749 - 019
Manufacturer:	see Annex 1
Test Report No.:	492012285.001
File No.:	PVP01006/23P



TÜV NORD CERT GmbH
Certification Body
Consumer Products



Essen, 2023-01-17

Please also pay attention to the information stated overleaf.

Anlage 1 zum Zertifikat Nr.: / Annex 1 to Certificate No.: 44 780 23 406749 - 019

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Aktenzeichen: / File reference: PVP01006/23P

2023-01-17

Manufacturer:

Manufacturer: **Coded by debtor no. 55496802**

Factory inspection report no.: 862010536.002

Remark:

Factory inspection is mandatory to be performed annually. Please refer to factory inspection report for detailed information.



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Description of product(s):

Module types:

PV Modules with 182mm Mono-crystalline Silicon Half-cut Solar Cells:

156 cells: A5511 (rated maximum power range is 560-605, increment of 5)
144 cells: A5512 (rated maximum power range is 520-555, increment of 5)
132 cells: A5513 (rated maximum power range is 475-510, increment of 5)
120 cells: A5514 (rated maximum power range is 430-465, increment of 5)
108 cells: A5500 (rated maximum power range is 390-415, increment of 5)
96 cells: A5515 (rated maximum power range is 345-370, increment of 5)
84 cells: A5516 (rated maximum power range is 300-325, increment of 5)
72 cells: A5517 (rated maximum power range is 260-280, increment of 5)
60 cells: A5518 (rated maximum power range is 215-230, increment of 5)
48 cells: A5519 (rated maximum power range is 175-185, increment of 5)
42 cells: A5520 (rated maximum power range is 150-160, increment of 5)
36 cells: A5521 (rated maximum power range is 130-140, increment of 5)
30 cells: A5522 (rated maximum power range is 110, 115)
26 cells: A5523 (rated maximum power range is 95, 100)
18 cells: A5524 (rated maximum power range is 65, 70)
16 cells: A5525 (rated maximum power is 60)
14 cells: A5526 (rated maximum power is 50)

Maximum system voltage: 1500V
Fuse rating: 25A
Electrical protection class: Class II
Pollution degree: 1
Material group: I
Design load (positive / negative): 3600Pa / 1600Pa
Safety factors: 1.5
Fire safety class: Class C according to ANSI/UL 1703-2018 (as per ANSI/UL 790-2018)



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Module types:	PV Modules with 166mm Mono-crystalline Silicon Half-cut Solar Cells: 156 cells: A5527 (rated maximum power range is 465-500, increment of 5) 144 cells: A5528 (rated maximum power range is 430-465, increment of 5) 132 cells: A5529 (rated maximum power range is 395-425, increment of 5) 120 cells: A5530 (rated maximum power range is 360-385, increment of 5) 108 cells: A5531 (rated maximum power range is 325-345, increment of 5)
Maximum system voltage:	1500V
Fuse rating:	25A
Electrical protection class:	Class II
Pollution degree:	1
Material group:	I
Design load (positive / negative):	3600Pa / 1600Pa
Safety factors:	1.5
Fire safety class:	Class C according to ANSI/UL 1703-2018 (as per ANSI/UL 790-2018)

Remark:

For detailed product information, please refer to CDF (Constructional Data Form) in Annex 1 of test report.



TÜV NORD CERT GmbH
Certification Body
Consumer Products

Certificate of conformity with the following European Directives

Registered No.:
44 799 23 406749 - 011

Low-Voltage Directive 2014/35/EU

Date of application	File reference	Test report No.	Date of issue	Place of issue
2023-01-03	PVP01006/23P	492012285.001	2023-01-17	Essen

This is to certify that the following products comply to the essential requirements of the above mentioned European Directive and the following standards, taking into account the German national deviations:

Product: Crystalline Silicon Terrestrial Photovoltaic (PV) Modules

Type designation: See Annex 1

Applicant: **Anker Innovations Limited**
Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon,
HongKong

Standard(s): EN IEC 61730-1:2018; EN IEC 61730-1:2018/AC:2018-06
EN IEC 61730-2:2018; EN IEC 61730-2:2018/AC:2018-06

This Certificate of conformity is based on the evaluation of samples of the product. It does not imply an assessment of the production and it does not permit the use of a mark of conformity or of a safety mark of the TÜV NORD CERT GmbH. The holder of this certificate may use this Certificate together with his EC-Declaration of Conformity.



Certification Body
Specialist Manager Consumer Products

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D-45032 Essen
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Description of product(s):

Module types:

PV Modules with 182mm Mono-crystalline Silicon Half-cut Solar Cells:

156 cells: A5511 (rated maximum power range is 560-605, increment of 5)
144 cells: A5512 (rated maximum power range is 520-555, increment of 5)
132 cells: A5513 (rated maximum power range is 475-510, increment of 5)
120 cells: A5514 (rated maximum power range is 430-465, increment of 5)
108 cells: A5500 (rated maximum power range is 390-415, increment of 5)
96 cells: A5515 (rated maximum power range is 345-370, increment of 5)
84 cells: A5516 (rated maximum power range is 300-325, increment of 5)
72 cells: A5517 (rated maximum power range is 260-280, increment of 5)
60 cells: A5518 (rated maximum power range is 215-230, increment of 5)
48 cells: A5519 (rated maximum power range is 175-185, increment of 5)
42 cells: A5520 (rated maximum power range is 150-160, increment of 5)
36 cells: A5521 (rated maximum power range is 130-140, increment of 5)
30 cells: A5522 (rated maximum power range is 110, 115)
26 cells: A5523 (rated maximum power range is 95, 100)
18 cells: A5524 (rated maximum power range is 65, 70)
16 cells: A5525 (rated maximum power is 60)
14 cells: A5526 (rated maximum power is 50)

Module types:

PV Modules with 166mm Mono-crystalline Silicon Half-cut Solar Cells:

156 cells: A5527 (rated maximum power range is 465-500, increment of 5)
144 cells: A5528 (rated maximum power range is 430-465, increment of 5)
132 cells: A5529 (rated maximum power range is 395-425, increment of 5)
120 cells: A5530 (rated maximum power range is 360-385, increment of 5)
108 cells: A5531 (rated maximum power range is 325-345, increment of 5)



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Compliance Document

No. D 005028 0357 Rev. 00

Holder of Certificate: **Anker Innovations Limited**
Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok
Kowloon
HONG KONG

Product: **Converter**
(PV grid-connected inverter)

Model(s): **A5140, A5141**

Parameters: See page 2

Tested according to: VDE-AR-N 4105:2018
DIN VDE V 0124-100 (VDE V 0124-100):2020

This Compliance document confirms the compliance with the listed standards on a voluntary basis. It refers only to the sample submitted for testing and certification and does not certify the quality or safety of the serial products. For details see: www.tuvsud.com/ps-cert

Test report no.: 64290203026601B

Date, 2023-01-19



(Billy Qiu)

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Parameters:

Model:	A5141	A5140
PV input parameters:		
Maximum input power	1200 W	1200 W
Maximum input voltage	60 Vd.c.	60 Vd.c.
Rated input voltage	20 - 60 Vd.c.	20 - 60 Vd.c.
MPPT voltage range	22 - 55 Vd.c.	22 - 55 Vd.c.
Maximum input current	17 Ad.c. x 2	14 Ad.c. x 2
Isc PV	20 Ad.c. x 2	20 Ad.c. x 2
AC output rating		
Rated output voltage	230 Va.c.	230 Va.c.
Rated output frequency	50 Hz	50 Hz
Maximum continuous output current	3.26 Aa.c.	2.61 Aa.c.
Maximum output active power	750 W	600 W
Maximum output apparent power	750 VA	600 VA
Power factor range	0.95 un - 0.95 ov	0.95 un - 0.95 ov

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Unit Certificate		
Manufacturer	Anker Innovations Limited	
Power generation unit type	[Inverter]: <u>A5141, A5140</u> Remark: certified on representative model A5141 of family design products, results of the measurement of A5141 can be transferred to other models based on transferability rule of measurements in DIN VDE V 0124-100 (VDE V 0124-100):2020.	
Technical data	Max. active power $P_{E_{max}}$	750W (A5141)
	Max. apparent power $S_{E_{max}}$	759VA (A5141)
	Rated voltage	230Va.c.
	Rated current (AC) I_r	3.26A (A5141)
	Initial short-circuit AC current	9.6A (A5141)
Network connection rule	VDE-AR-N 4105 “Generators connected to the low-voltage distribution network” Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network	
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100) “Network integration of power generation systems – Low voltage” Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network	
Test report	64.290.20.30266.01BB from 16.01.2023	
The above designated power generation unit meets the requirements of VDE-AR-N 4105		
This unit certificate includes extract report information of E.5 of VDE-AR-N 4105 for the power generation unit(s)		



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Certificate of NS protection	
Manufacturer	Anker Innovations Limited
Type of NS protection	Integrated NS protection
Central NS protection	No
Integrated NS protection	Yes Assigned to power generation unit of type: <u>A5141, A5140</u>
Network connection rule	VDE-AR-N 4105 “Generators connected to the low-voltage distribution network” Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network
Test requirement	DIN VDE V 0124-100 (VDE V 0124-100) “Network integration of power generation systems – Low voltage” Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network
Test report	64.290.20.30266.01BB from 16.01.2023
The network and system protection designated above meets the requirements of VDE-AR-N 4105.	
This certificate of NS protection includes extract report information of E.7 of VDE-AR-N 4105 for the NS protection.	

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E.5 Test report “Network interactions” for power generation units

Extract of the test report for power generation units “Determination of electrical properties”		No.: 64.290.20.30266.01B				
System manufacturer:	Anker Innovations Limited					
Manufacturer indications:	System type (BHKW, PV-WR, ...): PV grid-connected inverter					
A5141	Max. active power $P_{E_{max}}$ (W)	750				
	Max. apparent power $S_{E_{max}}$ (VA)	759				
	Rated voltage (Va.c.)	230				
A5140	Max. active power $P_{E_{max}}$ (W)	598				
	Max. apparent power $S_{E_{max}}$ (VA)	602				
	Rated voltage (Va.c.)	230				
Measurement period	2020-04-26 to 2021-09-26		-----			
Connection without provisions (regarding the primary energy carrier)		$k_i = \underline{0.37}$				
Most adverse case when switching between generator levels		$k_i = \underline{0.64}$				
Connection at nominal conditions (of the primary energy carrier)		$k_i = \underline{0.43}$				
Disconnection at rated power		$k_i = \underline{1.15}$				
Worst value of all switching operations		$k_{imax} = \underline{1.15}$				
Flicker	Network impedance angle Ψ_k	32° ^{a)}	30°	50°	70°	85°
	Initial flicker factor c_ψ	2.15	--	--	--	--
Remark: ^{a)} According to VDE V 0124-100, the worst case is measured at 32° network impedance angle and the other angles are waived.						

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Harmonics and inter-harmonics & Feed-in of direct currents												
Harm on. Nr.	P/P _{E_{max}}											Limit (A)
	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	
0	0.002	-0.010	-0.007	-0.015	-0.011	-0.009	-0.016	-0.007	-0.006	0.003	-0.012	0.5% I _R
1	0.001	0.383	0.597	1.017	1.387	1.584	2.064	2.249	2.742	3.039	3.217	-
2	0.000	0.018	0.010	0.012	0.021	0.018	0.010	0.026	0.034	0.011	0.028	1.08
3	0.000	0.073	0.069	0.054	0.048	0.040	0.033	0.037	0.029	0.026	0.026	2.30
4	0.001	0.006	0.004	0.003	0.005	0.012	0.007	0.018	0.016	0.011	0.012	0.43
5	0.000	0.046	0.046	0.036	0.033	0.034	0.023	0.018	0.021	0.014	0.009	1.14
6	0.002	0.005	0.003	0.006	0.006	0.003	0.006	0.010	0.010	0.007	0.007	0.30
7	0.000	0.031	0.036	0.028	0.031	0.030	0.023	0.009	0.015	0.016	0.010	0.77
8	0.001	0.003	0.002	0.002	0.004	0.005	0.009	0.010	0.012	0.008	0.009	0.23
9	0.001	0.026	0.028	0.025	0.024	0.021	0.018	0.013	0.011	0.011	0.011	0.40
10	0.002	0.004	0.002	0.007	0.001	0.004	0.004	0.004	0.008	0.007	0.009	0.18
11	0.001	0.024	0.024	0.027	0.027	0.022	0.019	0.023	0.012	0.012	0.014	0.33
12	0.001	0.001	0.005	0.004	0.002	0.003	0.003	0.003	0.008	0.009	0.008	0.15
13	0.000	0.025	0.026	0.028	0.027	0.027	0.020	0.027	0.017	0.015	0.014	0.21
14	0.000	0.003	0.003	0.006	0.010	0.005	0.002	0.003	0.010	0.003	0.012	0.13
15	0.001	0.021	0.025	0.029	0.024	0.025	0.021	0.031	0.017	0.016	0.019	0.15
16	0.001	0.004	0.003	0.008	0.011	0.008	0.007	0.001	0.006	0.002	0.011	0.12
17	0.001	0.014	0.020	0.024	0.028	0.025	0.026	0.031	0.016	0.023	0.022	0.13
18	0.002	0.006	0.006	0.010	0.010	0.007	0.006	0.001	0.007	0.009	0.006	0.10
19	0.001	0.009	0.020	0.015	0.026	0.029	0.026	0.031	0.030	0.023	0.027	0.12
20	0.001	0.011	0.005	0.004	0.015	0.001	0.010	0.009	0.011	0.007	0.008	0.09
21	0.000	0.008	0.010	0.024	0.017	0.036	0.021	0.025	0.024	0.027	0.027	0.11
22	0.000	0.013	0.015	0.006	0.007	0.012	0.014	0.007	0.006	0.017	0.013	0.08
23	0.001	0.030	0.037	0.037	0.043	0.048	0.039	0.038	0.006	0.020	0.011	0.10
24	0.001	0.036	0.035	0.036	0.037	0.027	0.046	0.030	0.026	0.035	0.024	0.08
25	0.000	0.024	0.009	0.013	0.020	0.033	0.020	0.031	0.023	0.021	0.020	0.09
26	0.000	0.009	0.002	0.002	0.003	0.010	0.007	0.007	0.004	0.013	0.008	0.07
27	0.001	0.021	0.017	0.008	0.006	0.024	0.028	0.023	0.029	0.032	0.035	0.08
28	0.002	0.004	0.006	0.008	0.007	0.007	0.011	0.007	0.010	0.004	0.008	0.07
29	0.001	0.021	0.017	0.016	0.015	0.012	0.025	0.028	0.034	0.042	0.030	0.08
30	0.001	0.003	0.003	0.012	0.004	0.003	0.008	0.004	0.011	0.004	0.015	0.06
31	0.001	0.023	0.021	0.019	0.014	0.007	0.016	0.021	0.035	0.037	0.036	0.07
32	0.000	0.000	0.004	0.008	0.010	0.004	0.005	0.009	0.010	0.009	0.009	0.06
33	0.000	0.020	0.025	0.027	0.024	0.002	0.011	0.018	0.036	0.030	0.033	0.07
34	0.001	0.001	0.003	0.014	0.015	0.006	0.011	0.007	0.012	0.010	0.015	0.05
35	0.001	0.016	0.017	0.017	0.027	0.005	0.012	0.011	0.028	0.035	0.029	0.06
36	0.001	0.005	0.003	0.013	0.009	0.008	0.008	0.007	0.008	0.005	0.015	0.05
37	0.001	0.011	0.018	0.026	0.026	0.018	0.003	0.007	0.021	0.025	0.030	0.06
38	0.002	0.004	0.005	0.008	0.012	0.010	0.009	0.004	0.011	0.013	0.010	0.05
39	0.002	0.006	0.011	0.019	0.029	0.020	0.012	0.014	0.023	0.020	0.017	0.06
40	0.001	0.007	0.002	0.007	0.008	0.011	0.011	0.012	0.013	0.006	0.012	0.05
THD	0.206%	4.002%	4.042%	3.903%	4.048%	3.837%	3.485%	3.665%	3.701%	3.702%	3.701%	5%

Supplementary information: test according to DIN EN 61000-3-2(VDE 0838-2):2019.

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E.7 Requirements for the test report for the NS protection

Extract of the test report for NS protection				No.: 64.290.20.30266.01B		
"Determination of electrical properties"						
Test report NS protection						
Type of NS protection:	Integrated NS protection			Further manufacturer indications		
Software version:	9200-D			--		
Manufacturer:	Anker Innovations Limited					
Measurement period:	2020-04-26 to 2021-09-26					
	Stirling generators, fuel cells			Inverter(s)		
	Synchronous and asynchronous generators coupled directly or via inverters with Pn ≤ 50 kW			directly coupled synchronous and asynchronous generators with Pn > 50 kW		
Protective function	Setting value	Tripping value	Tripping time NS protection *	Set value	Tripping value	Tripping time NS protection*
Rise-in-voltage protection $U >>$	-	-	-	$1.25 * U_n$	288.3V	169 ms
Rise-in-voltage protection $U >$	-	-	-	$1.10 * U_n$	$1.00U_n - 1.12U_n$ 230V – 257.6V	520 s
	-	-	-		$1.00U_n - 1.08U_n$ 230V – 248.4V	No Disconnection
	-	-	-		$1.06U_n - 1.14U_n$ 243.8V – 262.2V	298 s
Voltage drop protection $U <$	-	-	-	$0.8 * U_n$	182.9 V	3.048 s
Voltage drop protection $U <<$	-	-	-	$0.45 * U_n$	102.7V	303 ms
Frequency decrease protection $f <$	-	-	-	47.5 Hz	47.48 Hz	114 ms
Frequency increase protection $f >$	-	-	-	51.5 Hz	51.52 Hz	135 ms
<p>*: The tripping time includes the period from the limit value violation U/f until the tripping signal to the interface switch.</p> <p>When planning the power generation system, the response time of the interface switch shall be added to the maximum time value obtained as indicated above.</p> <p>The disconnection time (sum of tripping time of the NS protection plus response time of the interface switch) shall not exceed 200 ms.</p>						
<input checked="" type="checkbox"/> For integrated NS protection						



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Assigned to power generation unit of type	Type 2
Type integrated interface switch	Relay
Response time of interface switch for integrated NS protection	Manufacture: ANHUI MINGGUANG LIFE ELECTRONIC CO., LTD. Model: BRT2-SS-205DM Rated current: 8 A Operating time: 10ms
Verification of the entire functional chain "integrated NS protection – interface switch" has resulted in successful disconnection.	Yes