Certificate of compliance

Applicant:	**Danyang Weisheng Electronics Co., Ltd** **No. 88, Qiliang North Road,** **Danyang Development Zone, Zhenjiang City,** **Jiangsu Province**
Product:	**Photovoltaic and battery inverter (Hybrid-Inverter)**
Model:	**Cube-5200**

The device is designed to work as a generation unit of the type: A

Inverter for single-phase parallel connection to the public grid. The network monitoring and disconnection device is an integral part of the above-mentioned model.

Applied rules and standards:

EN 50549-1:2019/A1:2023
Requirements for parallel connection of installations with distribution networks - Part 1: Connection to an LV distribution network - Production of installations up to and including Type B

4.4 Normal operating range
4.5 Immunity to disturbances
4.6 Active response to frequency deviation
4.7 Power response to voltage variations and voltage changes
4.8 EMC and power quality
4.9 Interface protection
4.10 Connection and starting to generate electrical power
4.11 Ceasing and reduction of active power on set point
4.13 Requirements regarding single fault tolerance of interface protection system and interface switch

EN 50549-10:2022
Requirements for generating plants to be connected in parallel with distribution networks - Part 10: Tests for conformity assessment of generating units

Compliance with the parameters in Annex C of the standard
(see appendix parameter table)

Commission Regulation (EU) 2016/631 of 14 April 2016
Establishing a network code on requirements for grid connection of generators (NC RFG).
Type approval for generation units to use in Type A plants.

At the time of issue of this certificate, the safety concept of an aforementioned representative product corresponds to the valid safety specifications for the specified use in accordance with regulations.

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Certification Program: **NSOP-0032-DEU-ZE-ES-V11**
Certificate number: **U26-0316**
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Certification body

Georg LORITZ
Lab Supervisor Energy Systems

Accreditation

EUROPEAN RECOGNITION
DAkkS Deutsche Akkreditierungsstelle D-ZE-12024-01-00

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Type Approval and declaration of compliance with the requirements of EN 50549-1 and Commission Regulation (EU) 2016/631 of 14 April 2016	
Manufacturer	Danyang Weisheng Electronics Co., Ltd No. 88, Qiliang North Road, Danyang Development Zone, Zhenjiang City, Jiangsu Province
Product type	Photovoltaic and battery inverter (Hybrid-Inverter)
Static converter model	Cube-5200
Input DC (photovoltaic)	
MPP voltage range [V]	16-60
Max. input voltage [V]	60
Max. input current [A]	8*16
Max. input power [W]	2500
AC Input / Output (On-Grid)	
Rated AC voltage [V]	220V / 230V / 240V, L+N+PE, 50 Hz
Max. input current [A]	11
Max. output current [A]	11
Max. active power output [W]	2500
Max. apparent power output [VA]	2500
Max. input power [W]	2500
EPS (AC)	
AC Nominal Output Voltage	220V / 230V / 240V, L+N+PE, 50 Hz
Max. Output Power [W]	2500
Max. Output Current [A]	11
Battery Date	
Battery Type	LiFePO4
Battery information	51,2 V, 100 Ah, 5120Wh
Battery voltage range [V]	41,6 – 58,4
Firmware version of the BMS	P16S100A-52447-1.00
Max. Charge/Discharge Current [A]	62/62

Interface protection system and interface switch (Network and system protection "NS-protection")	
Type of protection	integrated NS-protection
Assigned to generation unit type	Cube-5200
Integrated interface switch	Type of switching equipment 1: galvanic separation HF-Transformer Type of switching equipment 2: Relay (Model HF3FF)
	Note: The output is switched off by the inverter bridge and one relay in line and neutral.
Software	
Firmware version	V1.01

Note

The settings of the product are password protected adjustable.

In case the generators are used with an external protection device, the protection settings of the inverters are to be adjusted according to the manufacturer's declaration.

The above stated generators are tested according to the requirements in the EN 50549-1 and the Commission Regulation (EU) 2016/631 of 14 April 2016. Any modification that affects the stated tests must be named by the manufacturer/supplier of the product to ensure that the product meets all requirements.

Type Approval and declaration of compliance with the requirements of EN 50549-1 and Commission Regulation (EU) 2016/631 of 14 April 2016

Name of parameter set		8				
Clause(s) / subclause(s) of EN 50549-1:2019+A1:2023	Parameter	Remarks / additional information	configurable value range	Step size	unit	default value
4.3.2 Interface switch	Single fault tolerance for interface switch required	Requirement met	---	---	---	---
4.4.2 Operating frequency range	Internal parameter not configurable	Requirement acc. EN 50549-1, table 1 can be met	not configurable	0.01	Hz	47.5
	Internal parameter not configurable	Requirement acc. EN 50549-1, table 1 can be met	not configurable	0.01	Hz	51.50
4.4.3 Minimal requirement for active power delivery at under frequency	UnderFrequency StartFrequency1	Requirement acc. EN 50549-1, clause 4.4.3 can be met	---	---	Hz	49.5
4.4.4 Continuous operating voltage range	Internal parameter not configurable	Requirement acc. EN 50549-1, table 1 can be met	not configurable	0.1	V	195.5
	Internal parameter not configurable	Requirement acc. EN 50549-1, table 1 can be met	not configurable	0.1	V	253.0
4.5.2 Rate of change of frequency (ROCOF) immunity	---	ROCOF withstand capability ≥ 2Hz/s	not configurable	---	Hz/s	2
4.5.3.2 Generating plant with non- synchronous generating technology (FRT)	LowThroughRev Time	---	Not configurable	---	---	≤ 1s
	LVRT_Enable	Enable under voltage ride through	1：Enable, 0：Disable	---	---	1
	LVRT_V1	LVRT-voltage level1	0.0-100.0	0.1	%Un	85.0
	LVRT_V2	LVRT-voltage level2	0.0-100.0	0.1	$\%U_n$	5.0
	LVRT_T1	LVRT-time level1	0.00-60.00	0.01	s	3.00
	LVRT_T2	LVRT-time level2	0.00-60.00	0.01	s	0.25
	LVRT_Vin	LVRT-entry voltage	0.0-100.0	0.1	$\%U_n$	85.0
	LVRT_Vout	LVRT-exit voltage	0.0-100.0	0.1	$\%U_n$	90.0

	LVRT_ZCM	LVRT-zero current mode	1：Enable， 0：Disable	---	---	1
	LVRT_ZCTV	LVRT-zero current trigger voltage	0.0-100.0	0.1	%U_n	50.0
4.5.4 Over-voltage ride through (OVRT)	HVRT_Enable	Enable over voltage ride through	1：Enable， 0：Disable	---	---	0
	HVRT_V1	HVRT-voltage level1	0.0 - 150.0	0.1	%Un	115.0
	HVRT_V2	HVRT-voltage level2	0.0 - 150.0	0.1	%U_n	120.0
	HVRT_V3	HVRT-voltage level3	0.0 - 150.0	0.1	%U_n	125.0
	HVRT_T1	HVRT-time level1	0.00 - 60.00	0.01	s	60.00
	HVRT_T2	HVRT-time level2	0.00 - 60.00	0.01	s	5.00
	HVRT_T3	HVRT-time level3	0.00 - 60.00	0.01	s	0.10
	HVRT_Vin	HVRT-entry voltage	100.0 - 150.0	0.1	%Un	115.0
	HVRT_Vout	HVRT-exit voltage	100.0 - 150.0	0.1	%U_n	110.0
	HVRT_ZCM	HVRT-zero current mode	1：Enable， 0：Disable	---	---	1
	HVRT_ZCTV	HVRT-zero current trigger voltage	100.0-150.0	0.1	%U_n	120.0
4.6.1 Power response to over frequency (LFSM-O)	OverFrequencyStartPoint	Threshold frequency f1	50.00 - 52.00	0.01	Hz	50.20
	P-OF-F1	---	47.50-52.50	0.01	Hz	50.00
	P-OF -P1	---	0.0-100.0	0.1	%	100.0
	P-OF-F2	---	47.50-52.50	0.01	Hz	50.20
	P-OF -P2	---	0.0-100.0	0.1	%	100.0
	P-OF-F3	---	50.00-55.00	0.01	Hz	52.70
	P-OF -P3	---	0.0-100.0	0.1	%	0.0
	P_OF_F_R	---	47.50-52.50	0.01	Hz	50.20
	P_OF_Tin	Intentional delay	0-50	1	s	0
	P_OF_Tout	Deactivation time tstop	0-50	1	s	0

	P_OF_PrefSet	Power reference	0-1000	1	---	1000
	P_OF_SSRin	---	6-6000	1	%Pn/min	6000
	P_OF_RRout	---	6-6000	1	%Pn/min	10
4.6.2 Power response to under frequency (LFSM-U)	P-LF-F1	---	47.50-52.50	0.01	Hz	50.00
	P-LF -P1	---	0.0-10.0	0.1	%	0.0
	P-LF-F2	---	47.50-52.50	0.01	Hz	49.80
	P-LF -P2	---	0.0-10.0	0.1	%	0.0
	P-LF-F3	---	45.00-52.50	0.01	Hz	47.30
	P-LF -P3	---	0.0-100.0	0.1	%	100.0
	P-LF-F_R	---	47.50-52.50	0.01	Hz	49.80
	P_LF_Tin	Intentional delay	0-10	1	s	0
	P_LF_Tout	Deactivation time tstop	0-10	1	s	0
	P_LF_PrefSet	Power reference	0-1000	1	---	1000
	P_LF_SSRin	---	6-6000	1	%Pn/min	6000
	P_LF_RRout	---	6-6000	1	%Pn/min	6000
4.7.2.2 voltage support by reactive power - Capabilities	Reactive power range	---	-1087 - 1087	1	Var	0
	PFSet	---	-0.90 - 1.00 – 0.90	0.01	---	1.00
4.7.2.3 Control modes	VQEnable	---	Q setpoint Q(U) cosφ setpoint cosφ(P)	---	---	Q setpoint
4.7.2.3.2 Set point control modes (Q setpoint and excitation)	Reactive power setting value	---	-1087 - 1087	1	Var	0
	tau	PT1-filtering time constant	0.00 - 60.00	0.01	s	3.33
4.7.2.3.2 Set point control modes (cosφ setpoint and excitation)	cosφ setting value	---	-0.90 - 1.00 - 0.90	0.01	---	1.00
	tau	PT1-filtering time constant	0.00 - 60.00	0.01	s	3.33
4.7.2.3.3 Voltage related control modes - Q(U)	QU -U1	---	90.0-110.0	0.1	%	93.0
	QU -Q1	---	-100.0 - 100.0	0.1	$\%Q_n$	100.0

	QU -U2	---	90.0-110.0	0.1	%	94.0
	QU -Q2	---	-100.0 - 100.0	0.1	%Q_n	0.0
	QU -U3	---	90.0-110.0	0.1	%	100.0
	QU -Q3	---	-100.0 - 100.0	0.1	%Q_n	0.0
	QU -U4	---	90.0-110.0	0.1	%	106.0
	QU -Q4	---	-100.0 - 100.0	0.1	%Q_n	0.0
	QU -U5	---	90.0-110.0	0.1	%	108.0
	QU -Q5	---	-100.0 - 100.0	0.1	%Q_n	-100.0
	tau	PT1-filtering time constant	0.0 - 60.0	0.1	s	10.0
	QU_Pin	---	0.0 – 20.0	0.1	%	deactivated
	QU_Pout	---	0.0 – 20.0	0.1	%	deactivated
	QU_PFmin	---	0.00 – 1.00	0.01	---	0.40
4.7.2.3.4 Power related control mode - cosφ(P)	Cosφ-P Ctrl	Cos ϕ (P) curve Mode 1: Cosφ-P 0: Disable	[0 / 1]	---	---	0
	Cosφ-P-P1	---	0.0-100.0	0.1	%Sn	10.0
	Cosφ-P-F1	---	-0.90 – 0.90	0.01	---	0.90
	Cosφ-P-P2	---	0.0-100.0	0.1	% Sn	20.0
	Cosφ-P-F2	---	-0.90 – 0.90	0.01	---	1.00
	Cosφ-P-P3	---	0.0-100.0	0.1	% Sn	50.0
	Cosφ-P-F3	---	-0.90 – 0.90	0.01	---	1.00
	Cosφ-P-P4	---	0.0-100.0	0.1	% Sn	80.0
	Cosφ-P-F4	---	-0.90 – 0.90	0.01	---	1.00
	Cosφ-P-P5	---	0.0-100.0	0.1	% Sn	90.0
	Cosφ-P-F5	---	-0.90 – 0.90	0.01	---	-0.90
	tau	PT1-filtering time constant	0.0 - 60.0	0.1	s	2.0
	Cosφ-P-Vin	---	0.0 - 110.0	0.1	%Un	deactivated

	Cosφ-P-Vout	---	0.0 - 110.0	0.1	%Un	deactivated
4.7.4.2.2 Zero current mode for converter connected generating technology	LVRT_ZCTV	---	0.0-100.0	0.1	$\%U_n$	50.0
	HVRT_ZCTV	---	100.0-125.0	0.1	$\%U_n$	120.0
4.9.2 Requirements on voltage and frequency protection	LowVoltageProtectPoint1	Undervoltage threshold stage 1	180.0 - 207.0	0.1	V	193.5
	LowVoltageTripTime1	Undervoltage operate time stage 1	100 - 100000	10	ms	10000
	LowVoltageProtectPoint2	Undervoltage threshold stage 2	92.0 - 161.0	0.1	V	114.0
	LowVoltageTripTime2	Undervoltage operate time stage 2	100 - 5000	10	ms	120
	HighVoltageProtectPoint1	Overvoltage threshold stage 1	253.0-276.0	0.1	V	276.0
	HighVoltageTripTime1	Overvoltage operate time stage 1	100 - 100000	10	ms	10000
	HighVoltageProtectPoint2	Overvoltage threshold stage 2	276.0 – 288.5	0.1	V	288.5
	HighVoltageTripTime2	Overvoltage operate time stage 2	100 - 5000	10	ms	200
	OverVoltageProtectVoltage10Minute	Overvoltage threshold 10min mean protection	230.0 – 264.5	0.1	V	253.0
	LowFrequencyProtectPoint1	Underfrequency threshold stage 1	47.49 – 50.00	0.01	Hz	47.49
	LowFrequencyTripTime1	Underfrequency operate time stage 1	100 - 100000	10	ms	2000
	LowFrequencyProtectPoint2	Underfrequency threshold stage 2	46.99 –47.50	0.01	Hz	46.99
	LowFrequencyTripTime2	Underfrequency operate time stage 2	100 - 5000	10	ms	120
	HighFrequencyProtectPoint1	Overfrequency threshold stage 1	50.00 – 51.51	0.01	Hz	51.51
	HighFrequencyTripTime1	Overfrequency operate time stage 1	100 - 100000	10	ms	2000
	HighFrequencyProtectPoint2	Overfrequency threshold stage 2	51.00 - 52.50	0.01	Hz	52.01

	HighFrequencyTripTime2	Overfrequency operate time stage 2	100 - 5000	10	ms	120
4.10.2 Automatic reconnection after tripping	OnGirdWaitTime2	---	10.0 - 600.0	0.1	s	60.0
	ReconnectUpwardSlope	---	6 - 3000	10	s/100%Pn	660
	ConnectVoltageMaxThreshold2	---	230.0 - 276.0	0.1	V	253.0
	ConnectVoltageMinThreshold2	---	190.0 - 230.0	0.1	V	195.5
	ConnectFrequencyMaxThreshold2	---	50.00 – 50.50	0.01	Hz	50.20
	ConnectFrequencyMaxThreshold2	---	47.00 - 50.00	0.01	Hz	49.50
4.10.3 Starting to generate electrical power	OnGirdWaitTime1	---	10.0 - 600.0	0.1	s	60.0
	ReconnectUpwardSlope	---	6 - 3000	10	s/100%Pn	660
	ConnectVoltageMaxThreshold1	---	230.0 - 276.0	0.1	V	253.0
	ConnectVoltageMinThreshold1	---	115.0 - 230.0	0.1	V	195.5
	ConnectFrequencyMaxThreshold1	---	50.00 - 52.00	0.01	Hz	50.10
	ConnectFrequencyMinThreshold1	---	47.00 - 50.00	0.01	Hz	49.50
4.11.1 Ceasing active power	---	---	---	---	---	RS485
4.11.2 Reduction of active power on set point	ActivePowerControlPower	---	0.0 - 100.0	0.1	%	100.0
	ActivePowerSlope	---	6 - 3000	10	s/100%Pn	660
4.12 Remote information exchange	---	---	---	---	---	---