Certificate of compliance

Applicant: **SUNGROW POWER SUPPLY CO., LTD.**
No.1699 Xiyou Rd, New & High Technology Industrial Development Zone, Hefei, 230088
P.R.China

Product: **Energy Storage Converter**

Model: **SC125CX**
SC110CX
SC125CX-V241
SC125CX-V242
SC65CX
SC50CX

The device is designed to work as a generation unit of the type: B, C and D

Inverter for three-phase parallel connection to the public grid or via transformer to a MV and HV distribution network.

Applied rules and standards:

EN 50549-2:2019/A1:2023
Requirements for generating plants to be connected in parallel with distribution networks - Part 2: Connection to a MV distribution network - Generating plants 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
4.12 Remote information exchange **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 B, C and D plants.

Note
This certificate proofs the conformity of a generating unit based on NC RFG. However, some requirements, such as frequency sensitive mode (FSM), reactive power capacity etc. can be applicable on the generating plant level, which assessment can be out of the scope of this certificate. Consequently, it is possible that the conformity assessment of a generating unit does not cover all aspects of the above-mentioned standardization documents, typically when a requirement is rather evaluated on a plant level.

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.

Report number: **SGR-ESH-P23121834-R2**
Certification Program: **NSOP-0032-DEU-ZE-V10**
Certificate number: **U25-0448**
Date of issue: **2025-05-09**

Certification body

Domenik Koll
Head of Energy Systems Germany

Accreditation

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

Accredited certification body by Deutsche Akkreditierungsstelle GmbH (DAkkS) according to ISO/IEC 17065. The accreditation is valid only for the scope listed in the annex of the accreditation certificate D-ZE-12024-01-00. The Deutsche Akkreditierungsstelle GmbH (DAkkS) is signatory of the multilateral arrangements of EA, ILAC and IAF for mutual recognition.

Without the written consent of Bureau Veritas Consumer Products Services Germany GmbH excerpts of this certificate of conformity shall not be reproduced.

Type Approval and declaration of compliance with the requirements of EN 50549-2 and Commission Regulation (EU) 2016/631 of 14 April 2016				
Manufacturer	**SUNGROW POWER SUPPLY CO., LTD.** No.1699 Xiyou Rd, New & High Technology Industrial Development Zone, Hefei, 230088 **P.R.China**			
Product type	Energy Storage Converter			
Static converter model	**SC125CX**	**SC125CX-V241**	**SC125CX-V242**	**SC110CX**
Input DC (battery)				
DC voltage range [V]	600-1000	600-1000	600-1000	600-1000
Max. DC voltage [V]	1000	1000	1000	1000
Max. DC current per DC input [A]	212,5	212,5	212,5	205,8
Output AC				
Rated AC voltage [V]	3L/N/PE,230/400, 50/60Hz	3L/N/PE,230/400, 50/60Hz	3L/N/PE,230/400, 50/60Hz	3L/N/PE,230/400, 50/60Hz
Rated output current [A]	181,0	181,0	181,0	159,0
Max. output current [A]	208,9	208,9	208,9	183,8
Nom. converter output (P_{NINV}) [kW]	125,0	125,0	125,0	110,0
Rated apparent power [kVA]	137,5	137,5	137,5	121,0
Static converter model	**SC100CX**	**SC65CX**	**SC50CX**	**--**
Input DC (battery)				
DC voltage range [V]	600-1000	600-1000	600-1000	--
Max. DC voltage [V]	1000	1000	1000	--
Max. DC current per DC input [A]	187,1	121,6	93,6	--
Output AC				
Rated AC voltage [V]	3L/N/PE,230/400, 50/60Hz	3L/N/PE,230/400, 50/60Hz	3L/N/PE,230/400, 50/60Hz	--
Rated output current [A]	145,0	93,8	72,1	--
Max. output current [A]	167,1	108,6	83,5	--
Nom. converter output (P_{NINV}) [kW]	100,0	65,0	50,0	--
Rated apparent power [kVA]	110,0	71,5	55,0	--

Interface protection system and interface switch (Network and system protection "NS-protection")	
Type of protection	integrated NS-protection
Assigned to generation unit type	SC125CX SC110CX SC125CX-V241 SC125CX-V242 SC65CX SC50CX
Integrated interface switch	Type of switching equipment 1: Relay (Model HF167F-270) Type of switching equipment 2: Relay (Model HF167F-270)
	Note: The output is switched off by the inverter bridge and two relay in series in each line and neutral.
Firmware version	MDSP_DIOPSIDE-B_V11_V01_A

Note

The settings of the inverters are password protected adjustable.

In case the above stated 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 50549-2:2019/A1:2023 and 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.

Name of parameter set		EN50549-2&EN50549-10		
specific technical requirement (e.g. grid codes)		EN50549-2		
Clause(s) / subclause(s) of EN 50549-2:2019	**Parameter[a]**	**Remarks/ additional information[b]**	**configurable value range**	**default value**
4.3.2 Interface switch	Single fault tolerance for interface switch		yes | no	yes
4.4.2 Operating frequency range	47,0 – 47,5 Hz Duration		0 s – 20 s	0s
	47,5 – 48,5 Hz Duration		30 – 90 min	30 min
	48,5 – 49,0 Hz Duration		30 – 90 min	30 min
	49,0 – 51,0 Hz Duration		not configurable	unlimited
	51,0 – 51,5 Hz Duration		30 – 90 min	30 min
	51,5 – 52,0 Hz Duration		0 – 15 min	0 s
4.4.3 Minimal requirement for active power delivery at underfrequency	Reduction threshold		not configurable 49,0 Hz – 49,5 Hz	Electronic inverter, no power reduction take place 49,5 Hz
	Maximum reduction rate		not configurable 2 – 10% P_M/Hz	≤ 2 % 10% P_M/Hz
4.4.4 Continuous operating voltage range	Upper limit		not configurable 1,0 U_n – 2,0 U_n	1,15 U_n 1,10 U_n
	Lower limit		not configurable 0,9 U_n – 1,0 U_n	0,85 U_n, 0,90 U_c
4.5.2 Rate of change of frequency (ROCOF) immunity	ROCOF withstand capability (defined with a sliding measurement window of 500 ms) non-synchronous generating technology (inverter): synchronous generating technology:		not configurable 0 – 10 Hz/s yes no	 2 Hz/s 1 Hz/s

4.5.3.2 Under-voltage ride through (UVRT) Generating plant with non-synchronous generating technology (inverter)	Voltage-Time- Diagram		see Figure 6 of EN 50549-2:2019	Time [s]	U [p.u.]
				0,00	0,20
				0,15	0,20
				1,50	0,85
				180	0,85
				180	0,90
	Fast fault current		Rated value	SC125CX: 181,0 A SC125CX-V241: 181,0 A SC125CX-V242: 181,0 A SC110CX: 159,0 A SC100CX: 145,0 A SC65CX: 93,8 A SC50CX: 72,1 A (rated current)	
	Active power recovery after a short circuit		configurable	Start at 90% U_n	
	Fault recovery of active power (times calculated from the removal of the short circuit)		configurable	≤ 1 s	
	Value for recovered active power		configurable	≥ 90 %	
	Accuracy for recovery of active power		not configurable	≤ 10 %	
	Reactive power contribution has priority		yes | no	Yes	
4.5.4 Over-voltage ride through (OVRT)	Voltage-Time- Diagram		not configurable see Figure 8 of EN 50549-2:2019	Time [s]	U [p.u.]
				0,0	1,25
				0,1	1,25
				0,1	1,20
				5,0	1,20
				5,0	1,15
				60,0	1,15
				60,0	1,10
	Active power recovery after a short circuit		configurable	Start at 90% U_n	
	Fault recovery of active power (times calculated from the removal of the short circuit)		configurable	≤ 5 s	
	Value for recovered active power		configurable	≥ 90%	
	Accuracy for recovery of active power		not configurable	≤ 10%	

4.6.1 Power response to overfrequency	Threshold frequency f1		50,2 Hz – 52,0 Hz	50,2 Hz
	Droop		2% – 12%	5%
	Power reference		P_M | P_{max}	P_M for other non-synchronous generating technology (inverter)
	Intentional delay		0 s – 2 s	0 s
	Deactivation threshold fstop		50,0 Hz – f_1	deactivated
	Deactivation time tstop		0 s – 600 s	-
	Acceptance of staged disconnection		yes | no	yes
4.6.2 Power response to underfrequency	Threshold frequency f1		49,8 Hz – 46,0 Hz	49,8 Hz
	Droop		2 % – 12%	5%
	Power reference		P_M | P_{max}	P_{max}
	Intentional delay		0 s – 2 s	0 s
4.7.2.2 voltage support by reactive power - Capabilities	Active factor / Reactive power (%P_d) range overexcited		0,90 – 1 / 48% P_d - 0 0,95 – 1 / 33% P_d - 0	0,80 – 1 / 75% P_d - 0
	Active factor / Reactive power (%P_d) range underexcited		0,90 – 1 / 48% Pd - 0 0,95 – 1 / 33% Pd - 0	0,80 – 1 / 75% P_d - 0
4.7.2.3 voltage support by reactive power - Control modes	Enabled control mode		Q setp. Q(U) Q(P) cos φ setp. cos φ (P)	activated deactivated deactivated deactivated deactivated
4.7.2.3.2 voltage support by reactive power - Set point control modes	Q set point and excitation		0% – 48% P_D, 0% – 33% P_D	0
	cos φ set point and excitation		1,0 – 0,8	1
4.7.2.3.3 voltage support by reactive power - Voltage related control modes	Characteristic curve		cos φ (P) Q(P)	indicate default characteristic
	Time constant		3 s – 60 s	10 s
	Min cos φ		0,0 – 1	0,9
	Lock-in power		0% – 20%	deactivated
	Lock-out power		0% – 20%	deactivated
4.7.2.3.4 voltage support by reactive power - Power related control mode	Characteristic curve		Q(U) P(U)	Q(U) (three-phase inverter) 0,00…-0,60 0,92…-0,60 0,94…0,0 1,06…0,0 1,08…0,60 1,20…0,60 P(U) deactivated
only EN 50549-2:2019, 4.7.4.2.1 Voltage support	Enabling		enable | disable	disabled
	Static voltage range overvoltage		100% U_c – 120% U_c	110% U_c

during faults and voltage steps – General	Static voltage range undervoltage		80% U_c – 100% U_c	90% U_c
/ Generating Plant with non-synchronous generator (inverter)	Insensitivity range of ΔU50per		0% – 15%	5%
	Gradient k1		0 – 6	2
	Gradient k2		0 – 6	2
	Fast fault current		Rated value	SC125CX: 181,0 A (rated current)
only EN 50549-2:2019, 4.7.4.2.1.2 Optional Modes / Generating Plant with non-synchronous generator	Active power priority		enable | disable	disable
	Reactive current limitation [% rated current]		0% – 100%	disable
	Zero current threshold		20% U_c – 100% U_c	disable
4.7.4.2.2 Zero current mode for converter connected generating technology / Generating Plant with non-synchronous generator	Enabling		enable | disable	disable
	Static voltage range overvoltage		100% U_n – 120% U_n	120% U_n
	Static voltage range undervoltage		20% U_n – 100% U_n	50% U_n

4.9.3 Requirements on voltage and frequency protection	Threshold for protection as dedicated device [in A or kW, kVA]		= 270 A, 1000 Vac for HF167F-270/12-HPTFL(AD2) Note: Rated current of internal safety device!	Internal safety device
	Undervoltage threshold stage 1		0,2 U_n – 1 U_n	0,85 U_n
	Undervoltage operate time stage 1		0,1 s – 100 s	10,0 s
	Undervoltage threshold stage 2		0,2 U_n – 1 U_n	0,50 Un
	Undervoltage operate time stage 2		0,1 s – 5 s	0,1 s
	Overvoltage threshold stage 1		1,0 U_n – 1,2 U_n	1,20 U_n
	Overvoltage operate time stage 1		0,1 s – 100 s	10,0 s
	Overvoltage threshold stage 2		1,0 U_n – 1,3 U_n	1,25 U_n
	Overvoltage operate time stage 2		0,1 s – 5 s	0,1 s
	Overvoltage threshold 10 min mean protection		1,0 U_n – 1,15 U_n	1,10 U_n
	Overvoltage operate time 10 min mean protection		0,04 s – 10,00 s	10 min (update every 3s)
	Underfrequency threshold stage 1		47,0 Hz – 50,0 Hz	47,5 Hz
	Underfrequency operate time stage 1		0,1 s – 100 s	2,0 s
	Underfrequency threshold stage 2		47,0 Hz – 50,0 Hz	47,0 Hz
	Underfrequency operate time stage 2		0,1 s – 5 s	0,1 s
	Overfrequency threshold stage 1		50,0 Hz – 52,0 Hz	51,5 Hz
	Overfrequency operate time stage 1		0,1 s – 100 s	2,0 s
	Overfrequency threshold stage 2		50,0 Hz – 52,0 Hz	52,0 Hz
	Overfrequency operate time stage 2		0,1 s – 5,0 s	0,1 s
	Loss of mains according EN 62116 (LoM)		0 s – 6000 s	ROCOF 2,0 Hz/s (0,5 s) active 2 s (5 s)

only EN 50549-2:2019, 4.9.3 Requirements on voltage and frequency protection	Positive sequence under-voltage protection threshold		20% – 100%	
	Positive sequence under-voltage protection operate time		0,2 s – 100 s	
	Negative sequence over-voltage protection threshold		1% – 100%	
	Negative sequence over-voltage protection operate time		0,2 s – 100 s	
	Zero sequence over-voltage protection threshold		1% – 100%	
	Zero sequence over-voltage protection operate time		0,2 s – 100 s	
4.10.2 Automatic reconnection after tripping	Lower frequency		47,0 Hz – 50,0 Hz	49,5 Hz
	Upper frequency		50,0 Hz – 52,0 Hz	50,2 Hz
	Lower voltage		50% U_n – 100 % U_n	85% U_n, 90% U_c
	Upper voltage		100% U_n – 120% U_n	110% U_n
	Observation time		10 s – 600 s	60 s
	Active power increase gradient		6% – 3000% / min	10% / min
4.10.3 Starting to generate electrical power	Lower frequency		47,0 Hz – 50,0 Hz	49,5 Hz
	Upper frequency		50,0 Hz – 52,0 Hz	50,1 Hz
	Lower voltage		50% – 100% U_n	85% U_n, 90% U_c
	Upper voltage		100% – 120% U_n	110% U_n
	Observation time		10 s – 600 s	60 s
	Active power increase gradient		6% – 3000% / min	disabled
4.11.1 Ceasing active power	activation option	yes | no	yes A Modbus signal via RS485 or Ethernet can be used to change or stop the active output. In the case of RS485, a modbus transceiver from RS485 to Ethernet is required.	
4.11.2 Reduction of active power on set point	activation option	yes | no	yes A Modbus signal via RS485 or Ethernet can be used to change or stop the active output. In the case of RS485, a modbus transceiver from RS485 to Ethernet is required.	
4.12 Remote information exchange	available communication standards	yes | no	yes The inverter uses data logger in the smart communication box which can collect information of the inverter, the transformer, and other devices in the system, and upload it to the background monitoring system or iSolarCloud.	

[a] If additional parameters have been evaluated during the test, these shall be added as additional lines in the table.

[b] This column should be used for manufacturer specific parameter descriptions.