

Certificate of The Network and System Protection

Zertifikat für den Netz- und Anlagenschutz



Certificate holder / Inhaber des Zertifikats : STRONG Ges.m.b.H.
Teinfaltstraße 8/4.Stock. A-1010 Vienna. Austria

Date of Original Issue/ Datum der ursprünglichen Ausgabe : 2024-09-24

Date of Last Revision / Datum der letzten Überarbeitung : --

Date of Expiry / Verfallsdatum : 2027-09-23

Certificate number / Zertifikatsnummer : PCS-24-1141

Brand / Trademark / Warenzeichen : **SKYWORTH** or **STRONG ENERGY**

It is certified that the product / Es ist zertifiziert, dass das Produkt

Models / Modelle : See page 4

Type of generator / Generatortyp : All-in-One Energy Storage System

Technical Data / Technische Daten : See page 4 to page 5

Test Laboratory / Testlabor : SGS-CSTC Standards Technical Services Co., Ltd. Suzhou Branch

Test Report (s) / Testbericht(e) : SUEE240500005251

Test Standard(s) / Prüfnorm(en) : VDE-AR-N 4105:2018-11 + Correction 1:2020

In compliance with the Network connection rule / In Übereinstimmung mit der Anwendungsregel:

VDE-AR-N-4105:2018-11 + Correction 1:2020-10 "Generators connected to the low-voltage distribution network / Erzeugungsanlagen am Niederspannungsnetz". Technical minimum requirements for connection and parallel operation of power generation systems connected to the low-voltage network / Technische Mindestanforderungen für Anschluss und Parallelbetrieb von Erzeugungsanlagen am Niederspannungsnetz.

Based on tests requirements defined in / Basierend auf Tests Anforderungen definiert in:

VDE V 0124-100: 2020-06 "Network integration of power generation systems – Low voltage / Netzintegration von Erzeugungsanlagen"

Test requirements for power generation units intended for connection to and parallel operation on the low-voltage network / Niederspannung – Prüfanforderungen an Erzeugungseinheiten, vorgesehen zum Anschluss und Parallelbetrieb am Niederspannungsnetz.

This is to certify that the product has been tested and was found to comply with the requirements of the standard(s). / Hiermit wird bescheinigt, dass das Produkt getestet wurde und den Anforderungen der Norm(en) entspricht.

The above-mentioned product is certified according to the requirements of ISO/IEC 17065:2012. / Das oben genannte Produkt ist gemäß den Anforderungen der ISO/IEC 17065:2012 zertifiziert.

Christopher Hee
Certification Officer



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APPENDIX(ANHANG)

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E.7 Requirements for the test report for the NS protection E.7 Anforderungen an den Prüfbericht zum NA-Schutz						
Extract from test report for unit certificate "Determination of electrical properties" Auszug aus dem Prüfbericht für Erzeugungseinheiten „Bestimmung der elektrischen Eigenschaften“					N° SUEE240500005251	
Test report NS protection Prüfbericht NA-Schutz						
Type of NS protection Typ NA-Schutz	Integrated NS protection					
Software Version Software-Version	051001					
Manufacturer Hersteller	Shenzhen Skyworth Energy Storage Technology Co.,. Ltd.					
Measuring Period Messzeitraum	2024-03-24 to 2024-05-12					
	Stirling generators, fuel cells Stirlinggeneratoren, Brennstoffzellen			Inverter(s) Umrichter		
	Synchronous and asynchronous generators with $P_n \leq 50$ kW coupled directly or via inverters direkt oder über Umrichter gekoppelte Synchron- undAsynchrongeneratoren mit $P_n \leq 50$ kW			Directly coupled synchronous and asynchronous generators with $P_n > 50$ kW direkt gekoppelte Synchron- und Asynchrongeneratoren mit $P_n > 50$ kW		
Protective function Schutzfunktion	Set value Einstellwert	Tripping value Auslösewert	Tripping time NS protection ⁽¹⁾ Auslösezeit NA-Schutz	Set value Einstellwert	Tripping value Auslösewert	Tripping time NS protection ⁽¹⁾ Auslösezeit NA-Schutz
Rise-in voltage protection U>> Spannungssteigerungsschutz U >>	1.250*Un	1.248*Un	75 ms	--	--	--
Rise-in voltage protection U> Spannungssteigerungsschutz U >	1.100*Un	--	472.2 s	--	--	--
Voltage drop protection U< Spannungsrückgangsschutz U <	0.800*Un	0.801*Un	3.043 s	--	--	--
Voltage drop protection U<< Spannungsrückgangsschutz U <<	0.450*Un	0.451*Un	351 ms	--	--	--
Frequency decrease protection f< Frequenzrückgangsschutz f <	47.50 Hz	47.50 Hz	72 ms	--	--	--
Frequency increase protection f> Frequenzsteigerungsschutz f >	51.50 Hz	51.49 Hz	88 ms	--	--	--
⁽¹⁾ The tripping time includes the period from the limit violation <i>U/f</i> until the tripping signal to the interface switch. <i>Die Auslösezeit umfasst den Zeitraum von der Grenzwertverletzung U/f bis zum Auslösesignal an den Kuppelschalter.</i> When planning the power generation system, the response time of the interface switch shall be added to the maximum time value obtained as indicatedabove. <i>Bei der Planung der Erzeugungsanlage ist die Eigenzeit des Kuppelschalters zum höchsten oben er- mittelten Zeitwert zu addieren.</i> The disconnection time (sum of tripping time of the NS protection plus response time of the interface switch) shall not exceed 200 ms. <i>Die Abschaltzeit (Summe der Auslösezeit NA-Schutz zzgl. Eigenzeit des Kuppelschalters) darf 200 ms nicht überschreiten.</i>						



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For integrated NS protection <i>Bei integriertem NA-Schutz</i>	
Assigned to power generation unit of type <i>zugeordnet zu Erzeugungseinheit Typ</i>	CRHAST-10K-24000Wh
Type integrated interface switch <i>Typ integrierter Kuppelschalter</i>	Main Relay / ECK150BAAEA
Response time of interface switch for integrated NS protection <i>Eigenzeit des Kuppelschalters bei integriertem NA-Schutz</i>	≤30 ms
Verification of the entire functional chain "integrated NS protection – interface switch" has resulted in successful disconnection <i>Die Überprüfung der Gesamtwirkungskette „integrierter NA-Schutz – Kuppelschalter“ führte zu einer erfolgreichen Abschaltung.</i>	☑



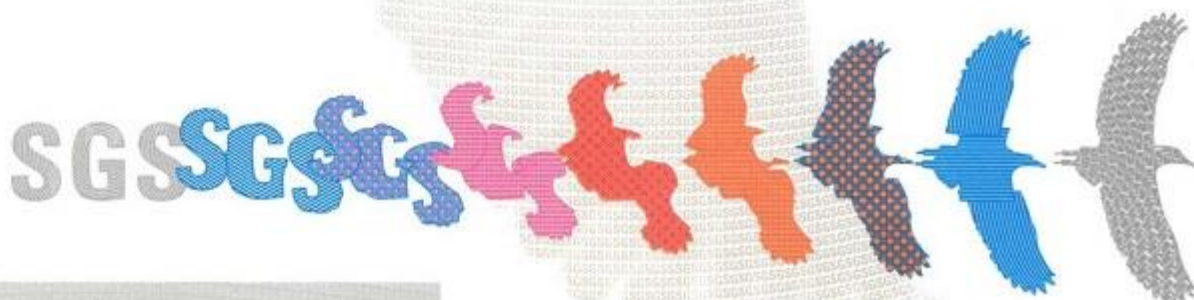
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Full list of product references and nominal characteristics / Vollständige Liste der Produktreferenzen und nominalen Merkmale:

System model:						
Models	Series		8K		10K	
	Brand					
	Number of batteries	4	CRK4ST-8K -9600Wh	CRK4SW-8K -9600Wh	CRH5ST-10K -12000Wh	CRH5SW-10K -12000Wh
		5	CRK5ST-8K -12000Wh	CRK5SW-8K -12000Wh	CRH6ST-10K -14400Wh	CRH6SW-10K -14400Wh
		6	CRK6ST-8K -14400Wh	CRK6SW-8K -14400Wh	CRH7ST-10K -16800Wh	CRH7SW-10K -16800Wh
		7	CRK7ST-8K -16800Wh	CRK7SW-8K -16800Wh	CRH8ST-10K -19200Wh	CRH8SW-10K -19200Wh
		8	CRK8ST-8K -19200Wh	CRK8SW-8K -19200Wh	CRH9ST-10K -21600Wh	CRH9SW-10K -21600Wh
		9	CRK9ST-8K -21600Wh	CRK9SW-8K -21600Wh	CRHAST-10K -24000Wh	CRHASW-10K -24000Wh
		10	CRKAST-8K -24000Wh	CRKASW-8K -24000Wh	/	/
Input (PV)						
Max. input voltage		1000V				
MPPT operating voltage range		160-950V				
Max. input power		15000W				
Max. input current		20A/30A				
Max. short circuit current		30A/40A				
Max. number of PV strings		3(1/2)				
No. of MPPTs		2				



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Input (battery)		
Compatible battery type	Lithium-ion	
Battery voltage range	150-600V	
Nominal Battery voltage (full load)	250-600V	
Max. charge/ discharge current	50A/50A	
Max. charge/ discharge power	15000W/9100W	15000W/11300W
Output (on grid)		
Rated grid voltage	380V/400V/415V; 3WN+PE	
Rated grid frequency	50/60Hz	
Nom. Power (output)	8000W	10000W
Max. power (output)	8800W	11000W
Apparent power (output)	8800VA	11000VA
Nom. current	3*11.6A	3*14.5A
Max. current	3*25.0A	
Output (backup)		
Rated grid voltage	380V/400V/415V; 3WN+PE	
Nom. Power	8000VA	10000VA
Max. power (5mins)	9600VA	12000VA
Max. power (10s)	12000VA	15000VA
General (for inverter)		
Topology	Transformer less	
Cooling	Natural cooling	
Dimensions (W)*(H)*(D)	530*550*213mm	
Weight	32kg	
General (for system):		
Degree of protection	IP65	
Operation temperature range	0~50°C (>45°C derating)	
Weight	215.3kg / 6 batteries (standard package)	
Dimension (W)*(H)*(D)	780*1760*240mm / 6 batteries (standard package)	

