

Certificate of compliance

Applicant: Sonnen GmbH
Am Riedbach 1
87499 Wildpoldsried
Germany

Product: Hybrid-Wechselrichter

Model: sonnenBatterie 10 hybrid-2
sonnenBatterie 10 hybrid-4

Use in accordance with regulations:

The Inverter(s) with automatic network monitoring and system protection unit with three-phase grid monitoring according to VSE NA/EEA-NE7 - CH 2020 for systems with a three-phase parallel feed-in via inverters into the public mains supply. The automatic network monitoring and system protection unit is an integral part of the inverter(s) listed above. This serves as a replacement for the disconnection device with insulating function, which the distribution network provider can access at any time.

Applied rules and standards:

VSE NA/EEA-NE7 – CH 2020 Type A2 (> 800 W to ≤ 250 kW non-synchronous and others)

Grid connection for power generation plants to the low-voltage grid
Technical requirements for connection and parallel operation in NE7

- 5.2 Frequency and voltage ranges
- 5.3 Reactive power control (static grid support)
- 5.4 Active power control - P(U) characteristic curve
- 5.7 Dynamic network support and voltage-time behaviour in u(t) characteristics
- 5.8 Frequency response
- 6.2 Connection conditions / synchronisation
- 7.3 Section switch
- 7.4 Mains and system protection (NS-protection)
- 7.5 Interfaces, control, regulation and measurement

DIN VDE V 0124-100:2020 (5.5.2.1 Functional safety of network and system protection)

Grid integration of generator plants - Low-voltage - Test requirements for generator units to be connected to and operated in parallel with low-voltage distribution networks

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: 23TH0372-NA/EEA-NE7_2020_0

Certification Program: NSOP-0032-DEU-ZE-V10

Certificate number: U25-0354

Date of issue: 2025-05-23

Certification body

Accreditation



Domenik Koll
Head of Energy Systems Germany



Annex

Extract from the test report for unit certification
„Determination of electrical properties“

Nr. 23TH0372-NA/EEA-NE7_2020_0

Description of the power generation unit

Manufacturer / applicant	Sonnen GmbH Am Riedbach 1 87499 Wildpoldsried Deutschland
---------------------------------	--

Type of power generation unit	Hybrid-Wechselrichter
--------------------------------------	-----------------------

Name of PGU	sonnenBatterie 10 hybrid-2	sonnenBatterie 10 hybrid-4	--	--
--------------------	-------------------------------	-------------------------------	----	----

Input DC (Photovoltaic)

MPP voltage range [V]	85 – 850	85 – 850	--	--
Max. input voltage [V]	0 – 1000	0 – 1000	--	--
Max. input current per MPPT [A]	2 x 15	4 x 15	--	--

Input DC (Batterie)

Max. input voltage [V]	85 – 700	85 – 700	--	--
Max. input current per input [A]	1 x 25	1 x 25	--	--

Output AC

Rated AC voltage [V]	230/ 50 Hz	230/ 50 Hz	--	--
Rated output current [A]	14,49	14,49	--	--
Fast fault current I_k [A]	16	16	--	--
Active power (P_{NINV}) [W]	10000	10000	--	--
Apparent power [VA]	10000	10000	--	--

In On-grid battery mode AC

P_{sn} (nominal discharge power) [W]	10000	10000	--	--
P_{cn} (nominal charging power) [W]	10000	10000	--	--
P_{smax} (max. discharge power) [W]	10000	10000	--	--
P_{cmax} (max. charging power) [W]	10000	10000	--	--
Type	Bidirectional	Bidirectional		

In Off-grid battery mode AC

P_{sn} (nominal discharge power) [W]	10000	10000		
P_{smax} (max. discharge power) [W]	10000	10000		

Annex

Extract from the test report for unit certification
 „Determination of electrical properties“

Nr. 23TH0372-NA/EEA-NE7_2020_0

Grid- and System Protection (NS-Protection)

Firmware version	Internal NS-Protection
Interface switch (setup of disconnection device)	Type switching device 1: Relay (Model 62.23-0200S)
	Type switching device 2: Relay (Model 62.23-0200S)
	Note: The output is protected against single faults by the inverter bridge and two relays in series in each phase and neutral.

Software

Firmware version	HMI APP V1.0.0 PU APP V2.6.0 PU PAR Default V10.0.29 ENS1 APP V3.1.0 DualHTS1 APP 3.2.0 DualHTS2 APP 3.2.0
------------------	---

Annex

Extract from the test report for unit certification „Determination of electrical properties“

Nr. 23TH0372-NA/EEA-NE7_2020_0

Active- / Apparent power

(results at nominal grid voltage)

Name of PGU:	sonnenBatterie 10 hybrid-4	--	--	--
$P_{E_{max}}$ [kW] at $\cos \varphi = 1$	10020	--	--	--
$S_{E_{max}}$ [kVA] at $\cos \varphi = 1$	10021	--	--	--
$P_{E_{max}}$ [kW] at $\cos \varphi_{\text{under-excited}} = 0,9$	9045	--	--	--
$S_{E_{max}}$ [kVA] at $\cos \varphi_{\text{under-excited}} = 0,9$	10045	--	--	--
$P_{E_{max}}$ [kW] at $\cos \varphi_{\text{over-excited}} = 0,9$	9127	--	--	--
$S_{E_{max}}$ [kVA] at $\cos \varphi_{\text{over-excited}} = 0,9$	10121	--	--	--

Note:

At $\cos \varphi = 1$ the active power is equal to the rated apparent power.

For the implementation of a reactive power set point assignment, the active power is reduced if necessary.

Reactive power supply

(results at nominal grid voltage)

Name of PGU:	sonnenBatterie 10 hybrid-4			
Active power	40 – 60 % $P_{E_{max}}$		$S_{E_{max}}$	
$\cos \varphi_{\text{under-excited}}$	0,898		0,897	
$\cos \varphi_{\text{over-excited}}$	0,903		0,903	
$\cos \varphi_{\text{setpoint}}$	0,900		0,900	
$\cos \varphi_{\text{under-excited}}$	0,901		0,900	
$\cos \varphi_{\text{over-excited}}$	0,950		0,950	
$\cos \varphi_{\text{setpoint}}$	0,950		0,950	

Reactive power transfer function – standard $\cos \varphi (P)$ -characteristic curve

Name of PGU:	sonnenBatterie 10 hybrid-4									
Active power $P_{E_{max} \text{ setpoint}}$ [%]	10	20	30	40	50	60	70	80	90	100*
Active power $P_{E_{max}}$ [%]	--	20,32	30,39	40,40	50,40	60,31	70,22	80,19	89,96	92,83
$\cos \varphi_{\text{setpoint of } P_{E_{max}}}$	--	1,000	1,000	1,000	1,000	0,979	0,960	0,940	0,920	0,914
$\cos \varphi_{\text{measured}}$	--	0,999	1,000	0,998	1,000	0,983	0,963	0,942	0,922	0,917

According to VDE 0124-100, an accuracy of $\cos \varphi$ 0,01 is required for testing the Reactive power transfer function. The standard $\cos \varphi (P)$ -characteristic curve is respected.

*For the implementation of a reactive power set point assignment, the active power is reduced.

Annex

Extract from the test report for unit certification
„Determination of electrical properties“

Nr. 23TH0372-NA/EEA-NE7_2020_0

Switching operations

sonnenBatterie 10 hybrid-4		L1	L2	L3
Switch-on without specification (to the primary energy source)	k_i	0,07	0,07	0,07
Unfavorable case when switching the generator step	k_i	N/A	N/A	N/A
Switch-on at auxiliary conditions (of the primary energy source)	k_i	0,69	0,70	0,70
Switch-off at auxiliary conditions (of the primary energy source)	k_i	0,83	0,84	0,84
Worst value of all switching operations	k_i	0,83	0,84	0,84

Flicker for rated current $\leq 75A$ according to DIN EN 61000-3-3 (VDE 0838-3)

Impedance:	$R_A = 0,24\Omega \text{ } jX_A = 0,15\Omega \text{ /}$
Line impedance angle ψ_k	32°
System flicker coefficient c_ψ	3,64
Short-time flicker P_{st}	0,131

Harmonics

The self-generation units sonnenBatterie 10 hybrid-2, sonnenBatterie 10 hybrid-4 are comply with DIN EN 61000-3-2 (VDE 0838-2).