

Certificate of compliance

Applicant: Hoymiles Power Electronics Inc.
No.18 Kangjing Road, Hangzhou, Zhejiang Province,
P.R.China

Product: Micro Storage System

Model: HB-1920-AC-SV

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 body

Accreditation



Domenik Koll
Head of Energy Systems Germany



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

Manufacturer	Hoymiles Power Electronics Inc. No.18 Kangjing Road, Hangzhou, Zhejiang Province P.R.China			
Product type	Micro Storage System			
Static converter model	HB-1920-AC-SV	--	--	--
Input DC (battery)				
DC voltage range [V]	16,8-21,6	--	--	--
Max. DC voltage [V]	21,6	--	--	--
Max. DC current per DC input [A]	70/70	--	--	--
Output AC				
Rated AC voltage [V]	230V, L/N/PE, 50Hz	--	--	--
Rated output current [A]	3,48	--	--	--
Max. output current [A]	3,48	--	--	--
Nom. converter output (P_{NINV}) [kW]	0,8	--	--	--
Rated apparent power [kVA]	0,8	--	--	--
On-grid battery mode AC (feed-in power / charge power)				
P_{sn} (nom. discharge power) [kW]	0,8	--	--	--
P_{cn} (nom. charging power) [kW]	0,8	--	--	--
P_{smax} (max. discharge power) [kW]	0,8	--	--	--
P_{cmax} (max. charging power) [kW]	0,8	--	--	--
Type	Bidirectional	--	--	--
Off-grid battery mode AC (feed-in power)				
P_{sn} (nom. discharge power) [kW]	1,0	--	--	--
P_{smax} (max. discharge power) [kW]	1,0	--	--	--

Batteries that can be used with the above static converter				
Brand	Hoymiles	--	--	--
Technology	LiFePO4	--	--	--
Model	HB-1920-AC-SV	--	--	--
CUS module (kWh)	1,92	--	--	--
Firmware version of the BMS	V1.1	--	--	--
Number of modules	1	--	--	--
Note Batteries are not integrated into the inverter and must be installed according to local regulations.				
Interface protection system and interface switch (Network and system protection “NS-protection”)				
Type of protection	Integrated NS-protection			
Assigned to generation unit type	HB-1920-AC-SV			
Integrated interface switch	Type of switching equipment 1: Relay (Model HF140FF)			
	Type of switching equipment 2: Relay (Model HF140FF)			
	Note: The output is switched off by the inverter bridge and one relay in each line and neutral.			
Software				
Firmware version	V1.08.00			
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

Parameter Table					
Name of parameter set		EN50549-10			
Specific technical requirement		EN 50549-1&EN 50549-10			
Clause of EN 50549-1	Parameter	Remarks / additional information ^b	setting range	default settings used	
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 – 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 Hz Duration		0 – 15 min	0 s	
4.4.3 Minimal requirement for active power delivery at underfrequency	Reduction threshold		not configurable	49,5 Hz	
	Maximum reduction rate		not configurable	10 % PM/Hz	
4.4.4 Continuous operating voltage range	Upper limit		not configurable	110 % Un	
	Lower limit		not configurable	85 % Un	
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: synchronous generating technology:		not configurable	2 Hz/s	
4.5.3.2 Under-voltage ride through (UVRT) Generating plant with non-synchronous generating technology	Maximum power resumption time		not configurable	1 s	
	Voltage-Time-Diagram		see Figure 6 of EN 50549-1:2019	Time[s]	U[p.u.]
				0,00	0,20
				0,15	0,20
				1,50	0,85

4.3.2 Interface switch	Single fault tolerance for interface switch		yes no	yes	
				180	0,85
	Fast fault current		Rated value	HB-1920-AC-SV: 3,48 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	≤ 5 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 50549-1:2019	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	1,15
				60	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%	
	Threshold frequency f1		50,2 Hz – 52 Hz	50,2 Hz	
	Droop		2 % – 12 %	5 %	
4.6.1 Power response to overfrequency	Power reference		P _M P _{max}	P _{max} , for synchronous generating technology and EESS	

4.3.2 Interface switch	Single fault tolerance for interface switch		yes no	yes
	Intentional delay		0 – 2 s	0s
	Deactivation threshold fstop		50,0 Hz – f1	deactivated
	Deactivation time tstop		0 – 600 s	-
	Acceptance of staged disconnection		yes no	yes
4.6.2 Power response to underfrequency	Threshold frequency f1		49,8 Hz – 46 Hz	49,8 Hz
	Droop		2 % – 12 %	5 %
	Power reference		P _M P _{max}	P _{max}
	Intentional delay		0 – 2 s	0s
4.7.2.2 voltage support by reactive power - Capabilities	Active factor / Reactive power (%Pd) range overexcited		0,90 – 1 / 48% P _d - 0 0,95 – 1 / 33% P _d - 0	0,80 – 1 / 66% P _d - 0
	Active factor / Reactive power (%Pd) range underexcited		0,90 – 1 / 48% P _d - 0 0,95 – 1 / 33% P _d - 0	0,80 – 1 / 66% 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 _n , 0 – 33 % P _n	0
	cos φ set point and excitation		1 – 0,9	1
4.7.2.3.3 voltage support by reactive power - Voltage	Characteristic curve		cos φ (P) Q(P)	indicate default characteristic
	Time constant		3 s – 60 s	10 s
	Min cos φ		0,0 – 1	0,4
	Lock-in power		0 % – 20 %	deactivated

4.3.2 Interface switch	Single fault tolerance for interface switch		yes no	yes
related control modes	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) (single-phase inverter) 0,00...-0,6 0,92...-0,6 0,94...0,0 1,06...0,0 1,08...0,6 1,20...0,6 P(U) deactivated
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 % Un – 120 % Un	120 % Un
	Static voltage range undervoltage		20 % Un – 100 % Un	50 % Un
4.9.3 Requirements on voltage and frequency protection	Threshold for protection as dedicated device [in A or kW, kVA]		HB-1920-AC-SV: 12A Note: Rated current of internal safety device!	Internal safety device
	Undervoltage threshold stage 1		0,2 Un – 1 Un	0,85 Un
	Undervoltage operate time stage 1		0,1 s – 100 s	10,0 s
	Undervoltage threshold stage 2		0,2 Un – 1 Un	0,50 Un
	Undervoltage operate time stage 2		0,1 s – 5 s	0,1 s
	Overvoltage threshold stage 1		1,0 Un – 1,2 Un	1,20 Un
	Overvoltage operate time stage 1		0,1 s – 100 s	10,0 s
	Overvoltage threshold stage 2		1,0 Un – 1,3 Un	1,25 Un

4.3.2 Interface switch	Single fault tolerance for interface switch		yes no	yes
	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 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)
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
	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	Lower frequency		47,0 Hz – 50,0 Hz	49,5 Hz
	Upper frequency		50,0 Hz – 52,0 Hz	50,1 Hz

4.3.2 Interface switch	Single fault tolerance for interface switch		yes no	yes
generate electrical power	Lower voltage		50 % Un – 100 % Un	85 % Un
	Upper voltage		100 % Un – 120 % Un	110 % Un
	Observation time		10 s – 600 s	60 s
	Active power increase gradient		6 % – 3000 %/min	disabled
4.11.1 Ceasing active power	activation option		Wi-Fi	
4.11.2 Reduction of active power on set point	activation option		Wi-Fi	
4.12 Remote information exchange	available communication standards		N/A	
^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.				