POWLAND

Hybrid solar inverter

Inverter POWLAND SMS-5kW 24V WiFi

User manual

Information, specifications, LCD settings



Manufacturer’s original manual, English translation. Structure, tables and illustrations are kept as in the original.

This edition contains sections of the supplied printed manual: information, specifications and LCD settings.

SUPPORT. If you have technical questions not answered in this manual, contact the seller.

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1. Information

This document applies to the following device:

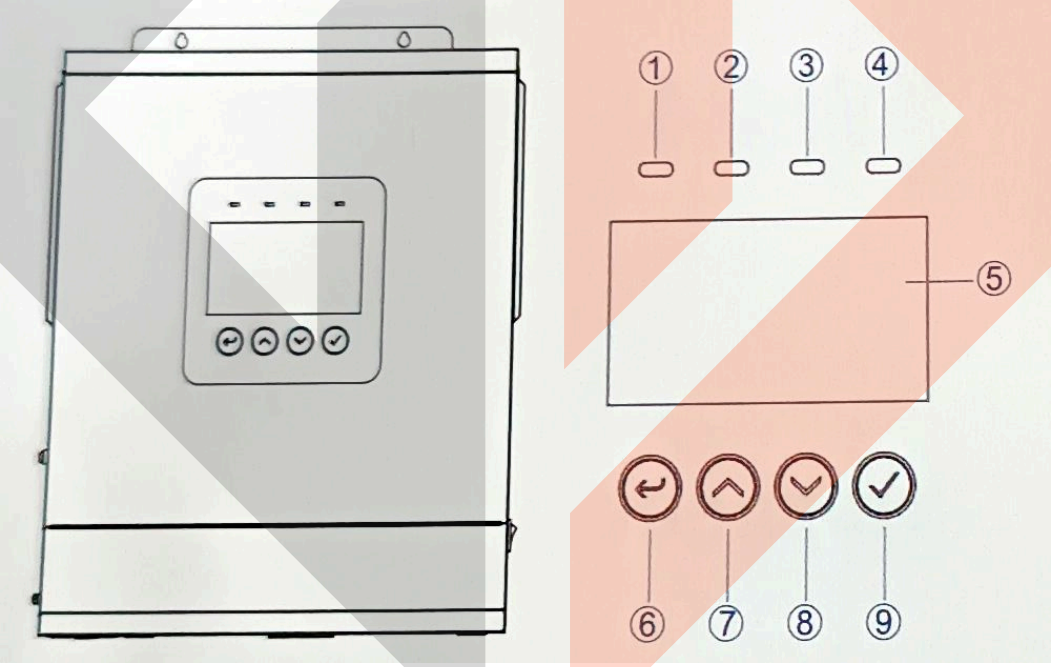
- 5000 W inverter

2. Introduction

2.1 Features

- Rated power 5 kW / 5 kVA, power factor 1
- MPPT range 60–450 V, PV open-circuit voltage up to 500 V
- High-frequency design: small size and weight
- Pure sine wave AC output
- Powers loads from solar and grid at the same time
- CAN / RS485 for BMS comms
- Can run without a battery
- Remote monitoring via WiFi (option)
- Two AC outputs (option)
- Grid feed-in

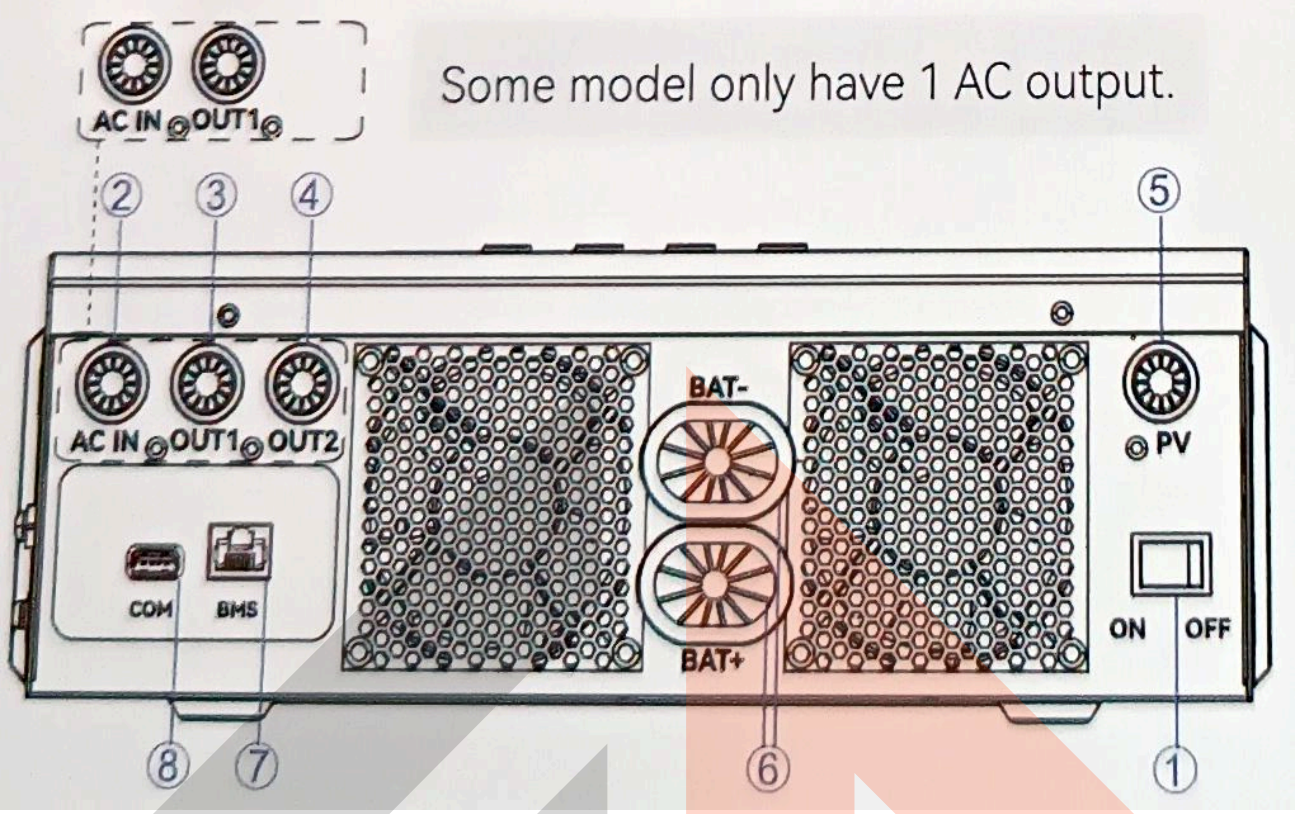
2.2 Product overview



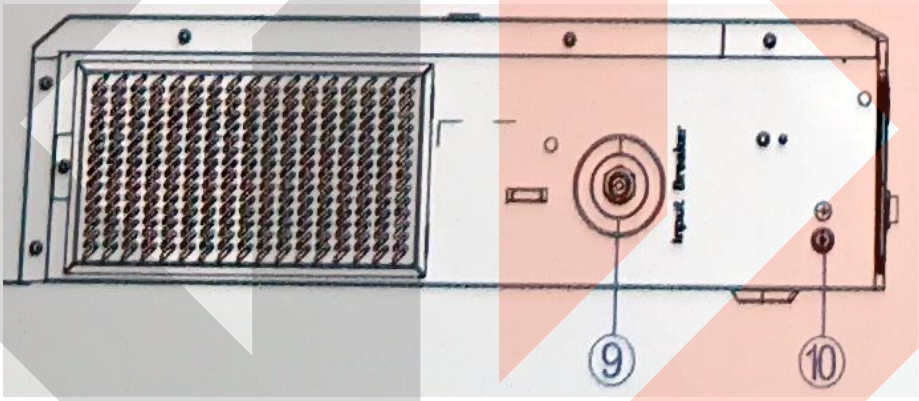
Front view and indicator/control panel

№	Device	№	Device
①	Grid (AC) indicator	⑥	ESC button (exit)
②	Inverter running indicator	⑦	UP button
③	Charge indicator	⑧	DOWN button
④	Fault indicator	⑨	ENTER button (confirm)
⑤	LCD display		

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Bottom view. Text in the dashed frame: “Some models have only 1 AC output” (AC IN and OUT1 only).



Side view

№	Device	Symbol
①	Power switch	ON / OFF
②	AC input (grid)	AC IN
③	AC output 1	OUT1
④	AC output 2	OUT2
⑤	PV input	PV
⑥	Battery input	BAT− / BAT+
⑦	BMS port	BMS
⑧	COM port	COM
⑨	AC input breaker (side panel)	Input Breaker
⑩	Protective earth	PE

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3. Package contents

№	Item	Qty	Description	Note
1	Inverter	1		
2	Datasheet	1	in English	
3	User manual	1	in English	
4	Ferrule lugs	10	E6010	For AC input, AC output, PV input
5	Ring lug (OT)	1		For PE

4. Technical specifications

AC input	
Rated input voltage (VAC)	208/220/230/240; L+N+PE
Voltage range (VAC)	90–280 (APP/GEN mode); 170–264 (UPS mode)
Frequency (Hz)	50/60 (auto-detect)
AC output	
Rated power (kVA/kW)	5 (if output voltage is set to 208 V, rated power drops to 90%)
Peak power (kVA)	10
Voltage (VAC)	208/220/230/240
Power factor (PF)	1
Frequency (Hz)	50/60 ±0.1%
Transfer time (ms)	10 (APP/UPS mode) / 20 (GEN mode)
Waveform	Pure sine wave
Overload capacity (on battery)	1 min at 102–120% load, 10 s at >120% load
Max. efficiency (on battery)	93.5% at 24 V
Charger (PV/AC)	
Solar controller type	MPPT
Max. PV input current / power	27 A / 9000 W
MPPT range, operating voltage (VDC)	60–450
PV start voltage (VDC)	80
Max. PV open-circuit voltage (VDC)	500
Max. PV charge current (A)	160
Max. AC charge current (A)	160
Max. charge current (PV+AC) (A)	160
Battery	
Rated voltage (VDC)	24
Battery type	Lithium and lead-acid
General data	
User interface	LCD display
Comm. ports	RS485 / CAN / RS232
Monitoring	WiFi (option)

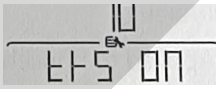
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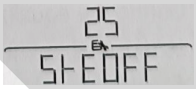
4.2.2 LCD settings

Press and hold ENTER for 2 seconds to enter settings mode. Use UP or DOWN to choose a setting program. Then press ENTER to confirm, or ESC to exit.

Display labels are shown in Latin letters as the segment display shows them (e.g. “n” for “M”, “u” for “V”, “9” for “Q”). The program number is shown above the label.

Program	Description	Display	Value / options
01	Output voltage	**`OPU 230`**	230 V (default). Options: 208 V, 220 V, 230 V, 240 V.
02	Output frequency	**`OPF 50`**	50 Hz (default). Options: 50 Hz, 60 Hz.
03	Output source priority	**`OPP GPb`**	**Grid first (default).** The grid powers the load first. Solar charges the battery. If solar is not enough to charge the battery, the grid also charges it. If the grid is not enough for the whole load, solar is added. If solar and grid are not enough, the battery is added. If solar, grid and battery are not enough for the load, the inverter goes to standby and charges the battery.
		`OPP PGb`	**Solar first.** Solar powers the load first. If there is enough solar, the battery charges from solar. If solar is not enough for the whole load, the grid is added; any surplus charges the battery. If solar and grid are not enough, the battery is added. If solar, grid and battery are not enough for the load, the inverter goes to standby and charges the battery.
		`OPP PbG`	**PBG priority.** Solar powers the load first. If there is enough solar, the battery charges from solar. If solar is not enough for the whole load, the battery is added. If solar and battery are not enough, the grid is added. If solar, grid and battery are not enough for the load, the inverter goes to standby and charges the battery.
		`OPP ntS`	**MKS.** The generator powers the load first. With generator, PV and battery, it works like PBG. With generator and battery (no PV), it works like GPB. With generator and PV (no battery), it works like GPB.
04	Input mode	**`nOd APP`**	**APP: appliances (default).** For household appliances. Typical transfer time 10 ms.
		`nOd UPS`	**UPS.** For computers and other devices. Typical transfer time 10 ms.
		`nOd GEn`	**GEN.** For a generator connected to AC IN. Typical transfer time 20 ms.
05	Charging source priority	**`CHP PnG`**	**PNG: PV and grid (default).** Charging from PV and grid at the same time.
		`CHA OPu`	**OPV: PV only.** Charging from PV only.

Program	Description	Display	Value / options
		CHP PuF	**PVF: PV first.** With both grid and PV, charges from PV. With PV only, from PV. With grid only, from the grid.
06	Grid charging current		Default 80 A. Options: 2/10/20/30/40/50/60/70/80/90/100/110/120/130/140/150/160 A.
07	Max. charge current	**nCC 120**	Total charge current from the solar and grid chargers. Default 120 A. Options: 2/10/20/30/40/50/60/70/80/90/100/110/120/130/140/150/160 A.
08	Return to first page (Menu Default)	**ndF On**	ON: if a page other than the first is open and nothing is pressed for 1 minute, the display returns to the first page. OFF: if a page other than the first is open and nothing is pressed for 1 minute, the display stays on the current page.
09	Auto restart after overload		ON (default).
10	Auto restart after overheating		ON (default).
11	Input loss warning	**nIP On**	Turns the grid or PV loss warning on/off. Default ON: if grid input is lost, the buzzer sounds for 5 seconds. OFF: the buzzer stays silent after grid loss.
12	Power saving mode	**PuS OFF**	Default OFF. ON: on battery, if the load is below 25 W, the system stops output for a while, then resumes. If the load stays below 25 W, the stop–resume cycle repeats. If the load exceeds 35 W, the system resumes continuous normal output.
13	Switch to bypass on overload	**OLG OFF**	Default OFF. ON: in PBG (PV priority) or MKS (generator priority) mode, on overload the system immediately switches to bypass (output fed from the grid).
14	Silent mode	**nUt OFF**	Buzzer on/off. Default OFF. ON: the buzzer never sounds, including warnings and faults. Applies in all modes. Does not affect key sounds.
15	Back-to-grid voltage	**btG 23.0**	AGM (lead-acid) or FLD (flooded): default 23 V, range [22, 26 V]. LIB (lithium NMC): default 23.8 V, range [20, 25 V]. FEL (lithium iron phosphate): default 24.8 V, range [20, 25 V]. CUS (custom): default 23.8 V, range [20, 25 V].
16	Back-to-battery voltage	**btb 26.0**	AGM or FLD: default 26 V, range [24, 29 V]. LIB: default 27.2 V, range [23, 29 V]. FEL: default 26.2 V, range [23, 29 V]. CUS: default 27.2 V, range [23, 29 V].
17	Battery type	**bAt AGn**	AGM (default)
		bAt FLd	Flooded
		bAt LIb	Lithium (NMC lithium)

Program	Description	Display	Value / options
		bAt FEL	FEL (lithium iron phosphate)
		bAt CUS	User-Defined
18	Battery low voltage	**bAL 22.0**	Battery low voltage warning threshold. LIB: default 23.8 V, range [20.6, 25 V]. CUS starts with the same values as LIB. FEL: default 24 V, range [20.6, 25 V]. AGM or FLD: not adjustable, initial value 22 V.
19	Battery cut-off voltage	**bAU 21.0**	AGM or FLD: not adjustable, default 21 V. LIB: adjustable, default 23 V, range [20, 24 V]. CUS starts with the same values as LIB. FEL: adjustable, default 21 V, range [20, 24 V].
20	Constant voltage (CV) charge voltage	**bCu 28.2**	AGM or FLD: not adjustable; default AGM 28.2 V, FLD 29 V. CUS: range [24, 30 V]. CV voltage must be higher than float voltage. LIB: default 28.2 V, range [24, 30 V]. FEL: default 27.6 V, range [24, 30 V]. CV voltage must be higher than float voltage.
21	Float charge voltage	**bFL 27.0**	AGM or FLD: not adjustable, default 27 V. CUS: default 27.6 V, range [24, 30 V]. LIB: default 27.6 V, range [25, 29 V]. FEL: default 27.2 V, range [25, 29 V]. CV voltage must always be higher than float voltage.
22	Grid low voltage limit	**LLu 154**	APP/GEN input mode: range 90 V to 154 V, default 154 V. UPS input mode: range 170 V to 200 V, default 185 V.
23	Grid high voltage limit	**LHu 264**	APP/GEN input mode: range 264 V to 280 V, default 264 V. UPS input mode: fixed 264 V.
24	Backlight auto-off	**Atb On**	Default ON. ON: backlight turns off after 1 minute without key presses.
25	Inverter soft start		Setting: OFF. ON: inverter output voltage ramps smoothly from 0 to the set value. OFF: output voltage jumps from 0 to the set value at once. Condition: set in single-inverter mode.
26	Reset to factory settings	**Std OFF**	Restores all settings to factory values. Before setting, the screen shows OFF. If set to ON, the system restores defaults; then the screen shows OFF again. Applies at once in grid and standby modes; not adjustable in battery mode.
29	Battery disconnect warning	**SbA OFF**	Turns the battery disconnect warning on/off. Setting: OFF. OFF: no warning when the battery is disconnected.
31	Equalization charge voltage	**E9u 29.2**	FEL: default 28 V, range [24, 30 V]. AGM/FLD/LIB/CUS: default 29.2 V, range [24, 30 V].

Program	Description	Display	Value / options
32	Equalization charge time	**E9t OFF**	Can be set to OFF or enabled. In the equalisation stage the controller charges the battery at maximum until it reaches the equalisation voltage, then holds it at constant voltage. The battery stays in equalisation until the set time has passed. Range [5, 900], step 5 minutes. Default OFF.
33	Equalization charge delay	**E9O 120**	Can be set to OFF or enabled. If the equalisation time has passed but the battery has not reached the equalisation voltage, the controller extends equalisation until it does. If the delay has passed and the voltage is still lower, the controller stops equalisation and returns to float charge. Default 120 minutes, range [5, 900], step 5 minutes.
34	Equalization charge interval	**E9I 30**	If a connected battery is detected in the float stage with equalisation enabled, the controller starts equalisation once the set interval has passed. Default 30 days, range [1, 90], step 1 day.
35	Immediate equalisation charge	**E9n OFF**	Default OFF, function disabled. ON: in the float stage with equalisation enabled and a battery connected, equalisation starts immediately.
36	Grid export function		Sets whether the inverter exports energy to the grid. If set to “INT”, the inverter can export to the grid depending on the output source priority. PGB mode, battery charge sufficient: while the grid is present, PV exports as much as possible; surplus PV charges the battery. PGB mode, battery charge insufficient: PV charges the battery as much as possible; surplus PV is exported to the grid. GPB and PBG modes: while the grid is present, PV charges the battery as much as possible; surplus PV is exported. MKS mode: the inverter does not export to the grid.
37	Max. grid feed-in power	**GtP 5.0**	Power exported to the grid. Default 5.0 kW, range [0, 5.0] kW, step 0.5 kW.
38	Second output cut-off voltage	**dbu 24.0**	If enabled, the inverter’s second output is on by default. On battery, when battery voltage drops below the set value, the second output turns off. When it rises above the set value plus 1 V per extra cell, the second output turns on. Default 24 V, range [22, 30] V. If the set value is above CV voltage minus 1 V per cell, the recovery voltage becomes the CV voltage. Note: no effect on models without a second output.
39	Second output run time	**dbt FUL**	If enabled, the inverter’s second output is on by default. On battery, when the discharge time reaches the set value, the second output turns off. Default OFF, function disabled. Range [5, 900] minutes. FUL: second output run time is unlimited. Note: no effect on models without a second output.

Program	Description	Display	Value / options
40	Second output cut-off SOC	**dbS 20**	If enabled, the inverter's second output is on by default. On battery, when the battery SOC is below the set value, the second output turns off. When it is 5% above the set value, the second output turns on. Default 20, range [5, 90] and OFF. Note: no effect on models without a second output.
44	BMS communication	**bnS OFF**	Default OFF, function disabled. If a specific BMS protocol is set, the inverter talks to the lithium battery BMS via the main control board and receives battery data. If comms fail after enabling, warning 56 appears and the inverter is not controlled by BMS data. **CVT:** CVTE protocol (485) **PYL:** PYLON protocol (485 and CAN) **GRO:** GROWATT protocol (485 and CAN) **VOL:** VOLTRONIC protocol (485) **IRO:** China Tower protocol (485) **PAR:** PACE RTU protocol (485)
45	BMS ID	**bnI AtO**	Number of the BMS to talk to. Values: AtO or a number [0, 15]; A–F mean 10–15. Default automatic (AtO): the system polls BMS IDs from lowest to highest, locks onto the first ID that answers correctly and then talks only to that BMS.
46	Low-SOC cut-off	**bSU 20**	Inverter shutdown at low battery SOC. Default 20, range [5, 50]. When the lithium battery SOC on battery reaches the set value, the inverter shuts down and shows warning 68. Warning 68 clears when SOC returns to the set value +5%. In standby the inverter can switch to battery only when SOC reaches the set value +10%; otherwise warning 69 appears. With the function on, warning 69 appears when SOC reaches the set value +5% and clears when SOC returns to the set value +10%. OFF: the inverter does not shut down, start or warn based on SOC. If comms fail after enabling, the inverter stops acting on SOC and clears related warnings.
47	High SOC: switch to battery	**Stb 90**	SOC at which the inverter switches to battery mode. Default 90, range [10, 100]. In PBG priority, when the lithium battery SOC in grid mode reaches the set value, the inverter switches to battery. Once enabled, the inverter switches to battery only when SOC is above the set value and battery voltage is above the back-to-battery voltage. OFF: the inverter does not switch from grid to battery based on SOC. If comms fail after enabling, the inverter stops acting on SOC and clears related warnings.

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Program	Description	Display	Value / options
48	Low SOC: switch to grid	**StG 50**	SOC at which the inverter switches to grid mode. Default 50, range [10, 90]. In PBG priority, when the lithium battery SOC on battery reaches the set value, the inverter switches to grid. Once enabled, it switches to grid when SOC is below the set value or battery voltage is below the back-to-grid voltage. OFF: the inverter does not switch from battery to grid based on SOC. If comms fail after enabling, the inverter stops acting on SOC and clears related warnings. If this value is above STB, STB and STG stop working after the next power-on.
61	Max. battery discharge current	**ndC 190**	Default 190 A. OFF: the inverter does not limit battery discharge current. A numeric value is the current limit. Range [10, 190 A], step 5 A. If discharge current exceeds the limit, warning 60 appears. If it lasts 5 seconds, fault 14 occurs and the inverter enters fault mode. If set to OFF and current exceeds 190 A for a long time, there is a risk of overheating.