USER MANUAL · ENGLISH

Inverter POWLAND SMS-12KW 12kW 48V WiFi

Hybrid solar inverter 12 kW / 48 V with Wi-Fi: two solar inputs, two outputs, connectors, connection, LiFePO4 settings



This guide was prepared by the seller. Connectors and specifications are taken from photos of the bottom panel and the label on this inverter's housing. The menu and program numbers are the same as in the whole POWLAND SMS inverter series (same screen and buttons).

1. What this device is

Hybrid (off-grid) 12 kW inverter for a 48 V system: pure sine wave inverter, two MPPT solar controllers and a mains charger in one case. Runs the whole house during outages: boiler, water heater, pumps, air conditioner, kitchen appliances.

- Grid / generator input 230 V (operates in the 90–280 V range)
- Two solar inputs PV1 and PV2: two panel groups, e.g. on two roof slopes
- Battery 48 V (LiFePO4 51.2 V, 16S)
- Two outputs: MAIN OUT1 (main loads) and SECOND OUT2 (secondary)
- BMS port (RJ45) for a lithium battery, WIFI port (USB) for the Wi-Fi monitoring module

2. Technical specifications

Model	**ISolar-SMS-12KW-Wifi-PL**
Rated power	**12 000 VA / 12 000 W**
Output	230 V AC, 50/60 Hz, pure sine wave, rated current 52 A; two outputs (OUT1, OUT2)
Battery	**48 V DC**, operating range 40–60 V (LiFePO4 51.2 V, 16S)
Grid / generator input	90–280 V AC, 50/60 Hz; bypass current up to 70 A
Grid charging	up to 160 A
Solar inputs	2 × MPPT (PV1, PV2); Voc up to 500 V; MPPT operating voltage 60–450 V
PV current and power	two inputs: 2 × 22.5 A, up to 15 000 W in total; one input: up to 27 A / 9000 W
Solar charging	up to 160 A
Parallel operation	not supported
Ports	BMS (RJ45), WIFI (USB)
Protection, temperature	IP21 (indoors only), from –10 to +60 °C
Battery current at 12 kW	about 250 A (hence heavy-gauge cables)

Data from the label on the inverter housing.

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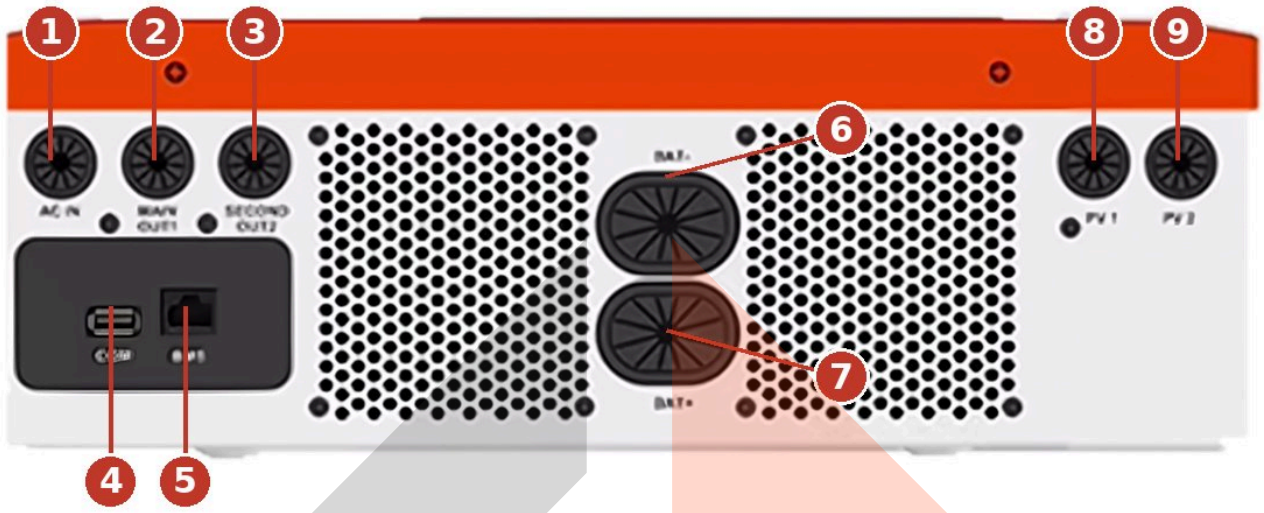
3. Connectors: bottom panel



№	Connector	What it is	What connects where
1	**AC IN**	Grid / generator cable entry to the AC IN terminals (L, N, PE)	Via a 80 A breaker, 16 mm² cable (grid bypass current up to 70 A according to the label); do not confuse with the outputs
2	**MAIN OUT1**	Main output 230 V (terminals L, N, PE)	Main loads: boiler, pumps, fridge, lighting. Rated output current 52 A: 63 A breaker, 10 mm² cable
3	**SECOND OUT2**	Second output 230 V (terminals L, N, PE)	Secondary loads (water heater, air conditioner). The inverter can switch this output off when the battery is low, to save charge for OUT1
4	**WIFI**	USB connector for the Wi-Fi module (may be labelled COM in promotional photos)	Wi-Fi module for monitoring from a phone
5	**BMS**	RJ45 port for communication with the lithium battery BMS	Battery communication cable (RS485 / CAN), the protocol is selected in the menu
6	**BAT–**	Entry for the 48 V battery “minus” power cable	Black cable from the battery “–”
7	**BAT+**	Entry for the 48 V battery “plus” power cable	Red cable from the battery “+” via a 300 A DC breaker; 70 mm² cables (or 2×35 mm²)
8	**PV1**	Solar panel input, group 1 (MPPT 1)	Via a separate PV DC breaker. String Voc up to 500 V, MPPT operating voltage 60–450 V, current up to 22.5 A (if only one input is used, up to 27 A)
9	**PV2**	Solar panel input, group 2 (MPPT 2)	Second group of panels (another roof slope), separate PV DC breaker; same limits: up to 500 V, up to 22.5 A
—	**ON / OFF**	Power switch (on the side wall)	Switch on after connecting the battery and its DC breaker

Ratings from the inverter label: 12 000 W, output 230 V 52 A, grid bypass up to 70 A, battery 48 V (40–60 V), PV up to 500 V. Cable cross-sections and breakers are the seller’s calculation for 12 kW / 48 V (up to ~250 A from the battery).

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4. Wiring sequence

1. All breakers off, inverter switch OFF.
2. **Battery.** Cables 70 mm² (or two 35 mm² per pole) with lugs, via a 300 A DC breaker: red “+” to “BAT+”, black “−” to “BAT−”. Reversed polarity damages the inverter. Keep the cables as short as possible and equal for “+” and “−”.
3. **BMS comm cable** (if the battery has an RS485/CAN port) into the BMS port (RJ45); in the menu program 17 = FEL and program 44 = battery protocol (section 6).
4. **Main loads** to MAIN OUT1 (L, N, PE) via a 63 A breaker, cable 10 mm² (rated output current 52 A).
5. **Secondary loads** (water heater, air conditioner) to SECOND OUT2 via their own breaker. Programs 38–40 switch OUT2 off when the battery discharges, so that the charge lasts for OUT1.
6. **Grid** to AC IN (L, N, PE) via a 80 A breaker, cable 16 mm² (bypass current up to 70 A). If the house supply is weaker, limit grid charging with program 06. Do not mix up AC IN and the outputs.
7. **Solar panels:** two groups to PV1 and PV2, each via its own PV DC breaker. String Voc including frost no more than 500 V, string operating voltage within 60–450 V, current up to 22.5 A per input. Up to 15 000 W of panels in total on two inputs (up to 9000 W if one input is used).
8. **Earthing** of the case is mandatory.
9. Switch on the battery and DC breaker, then the inverter ON switch, set up the menu (section 6), then grid, PV and loads.

Safety. Make all connections with the battery, grid and PV switched off. Battery short-circuit current is very high. Installation is best left to an electrician.

Power and battery BMS. 12 kW from a 48 V battery is about 250 A. One 51.2 V 100Ah battery (BMS 100 A) gives only ~5 kW: for full power use several batteries in parallel or a large battery with a BMS of 200 A or more, and limit the discharge current to the BMS value in program 61.

5. How to enter settings

1. Hold **ENTER** 2 seconds: the program number appears.
2. **UP / DOWN:** choose the program, **ENTER:** the value flashes.
3. **UP / DOWN:** change, **ENTER:** save, **ESC:** exit.

The letter T on the screen looks like “├” (such codes are marked * in the table).

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6. Settings for LiFePO4 51.2 V

№	Program	What to set
01 / 02	Output	230 V, 50 Hz
03	Output priority	PbG: max. solar and battery; GPb: if backup is the priority
04	Input mode	APP; UPS for computers; GEn with a generator
05	Charging priority	PnG (solar + grid) or OPu (solar only)
06	Grid charging current	30–40 A, no more than the battery allows
07	Max. charge current	per battery datasheet: 50 A for 100Ah, 100 A for 314–360Ah (inverter can do up to 160 A)
17	Battery type	**FEL** — LiFePO4
44 / 45	BMS communication	battery protocol (PYL: Pylontech, GRO: Growatt); address AtO. Without BMS cable: OFF
20 / 21	Charge / float voltage	56.8 V / 54.4 V
18 / 19	Low-voltage warning / cut-off	49.6 V / 48.0 V
15 / 16	To grid / back to battery	50.0 V / 54.0 V
38–40	Second output OUT2	switch off at 50 V or SOC 30–40 %, so charge is kept for OUT1
46–48	By SOC (BMS link only)	cut-off at 20 %, to battery at 90 %, to grid at 50 %
61	Max. discharge current	no more than your battery's BMS current (total for parallel units)
32	Equalization charge	OFF: not used for LiFePO4

Exact charge current and protocol for your battery are in the "Connection: inverter + battery" guide on the kit page.

7. Main menu programs of the SMS series

№	Code	Parameter	Options
01	OPU	**Output voltage**	208 / 220 / 230 / 240 V
02	OPF	**Output frequency**	50 / 60 Hz
03	OPP	**Output priority**	GPb: grid first; PGb: solar first; PbG: solar → battery → grid
04	nOd	**Input mode**	APP: household appliances; UPS: computers; GEn: generator on AC IN
05	CHP	**Charging priority**	PnG: solar and grid together; OPu: solar only; PuF: solar first, grid only without sun
06	TCC*	**Grid charging current**	in menu steps, up to your inverter's maximum
07	nCC	**Max. charge current (solar + grid)**	in menu steps, up to your inverter's maximum
09	LTS*	**Auto restart after overload**	ON / OFF
10	TTS*	**Auto restart after overheating**	ON / OFF
11	nIP	**Alarm on grid or PV loss**	ON / OFF

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№	Code	Parameter	Options
14	nUt	**Silent mode**	ON / OFF
15	btG	**Battery voltage to switch to grid**	for FEL see section 6
16	btb	**Return-to-battery voltage**	for FEL see section 6
17	bAt	**Battery type**	AGn: AGM; FLd: flooded; LIb: lithium NMC; FEL: LiFePO4; CUS: own values
18	bAL	**Low-voltage warning**	for FEL see section 6
19	bAU	**Low-voltage cut-off**	for FEL see section 6
20	bCu	**Charge voltage (CV)**	for FEL see section 6
21	bFL	**Float voltage**	for FEL see section 6
26	Std	**Reset to factory settings**	ON: reset (on grid or standby, not on battery)
32	E9t	**Equalization charge time**	OFF or minutes
36	GTI*	**Export surplus to the grid**	OFF / INT
38	dbu	**Second output: shutdown by battery voltage**	battery voltage
39	dbt	**Second output: run time on battery**	minutes; FUL: no limit
40	dbS	**Second output: shutdown by SOC**	% or OFF
44	bnS	**BMS comms protocol**	PYL (485/CAN), GRO (485/CAN), VOL, IRO, CVT, PAR (485), OFF
45	bnI	**BMS address**	AtO: automatic; 0–15
46	bSU	**Low-SOC cut-off**	% or OFF
47	Stb	**SOC to return to battery (PbG)**	% or OFF
48	StG	**SOC to switch to grid (PbG)**	% or OFF
61	ndC	**Max. battery discharge current**	A or OFF

Program numbers are the same for the whole POWLAND SMS series. See factory values on the inverter screen. *: the letter T looks like "├" on the screen.

8. Common situations

What you see	What to do
No BMS link	Check the cable in the BMS port, the protocol in program 44 and the protocol switch on the battery
Will not turn on	Check the DC breaker, polarity and whether the battery is on (the BMS may have tripped)
Overload / switches off under load	Load above 12 kW or above what the battery BMS gives; move some loads to OUT2 or add a battery
OUT2 turned off	Programs 38–40 triggered (battery discharge): this is normal, the output comes back after charging
No solar charging	PV breaker off, reversed polarity or string voltage outside 60–450 V
Grid input breaker trips	Heavy grid charging together with the load: reduce program 06

If a fault code stays on the screen, contact the seller.

Maintenance. Every 3 months check terminal tightness and that the vents are clean. Do not open the inverter: dangerous voltage remains inside even when switched off.

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