IN PLAIN WORDS · FOR THE SYSTEM OWNER

User guide

Inverter POWLAND SMS-12KW 12kW 48V WiFi

What the screen shows, which buttons to press and how to tell everything works properly. No jargon.



Contents

1. How your system works — p. 2
2. Buttons and LEDs — p. 3
3. The screen: input and output — p. 4
4. Scrolling readings: V, A, W, Hz… — p. 5
5. Grid pass-through and battery mode — p. 6
6. How to change settings — p. 7
7. Grid charging current — p. 8
8. Low voltage and generator — p. 9
9. If something is wrong — p. 10

Looking is safe!

Viewing readings with the ▲ / ▼ buttons changes nothing and breaks nothing. Settings are changed only in a separate menu (p. 7), which you cannot enter by accident.

Power	Battery	Battery output	Buttons
12 kW	48 V	230 V · 50 Hz	ESC · UP · DOWN · ENTER

Power on

The inverter passes grid power to your home and charges the battery.

Outage

In a split second it switches to battery: the lights stay on.

Sun

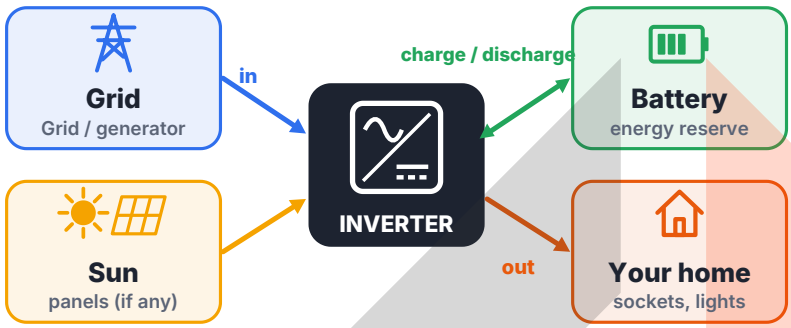
With panels, they power the home in daytime and charge the battery.

Tip: print this guide and keep it next to the inverter so the whole family can use it.

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1 How your system works

The inverter is the energy “dispatcher”. It decides by itself where to take power for the house from: the grid, the sun or the battery. You do not need to switch anything.



INPUT

What **comes into** the inverter: the utility grid (or a generator), solar panels.

OUTPUT

What the inverter **delivers to your home:** sockets, lights, boiler, fridge.

Safe to do

- Look at the screen and LEDs.
- Scroll readings with ▲ / ▼.
- Press ESC: it always means “back”.
- Switch appliances on one by one while watching the load.

What not to do

- Do not open the case or touch terminals and cables.
- Do not switch off the battery breaker while the house runs on battery.
- Do not cover the vents or put things on the inverter.
- Do not run appliances totalling more than 12 kW at once: that is the inverter’s power.

Typical appliance consumption (approx.)

Router, LED lamp	**5–15 W**	Microwave	**1–1.5 kW**
Laptop, TV	**50–150 W**	Iron, hair dryer	**1.5–2.2 kW**
Fridge	**100–200 W**	Electric kettle	**1.8–2.2 kW**
Gas boiler (controls, pump)	**80–200 W**	Water heater, heater	**1.5–2 kW**

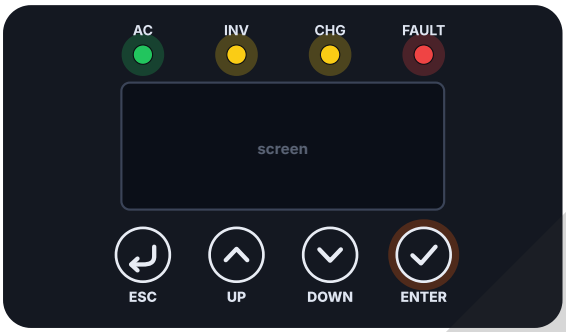
Your inverter is **12 kW.** Add up the power of appliances running at the same time: the total must be lower. Best keep it under 80 % (≈ 9.6 kW). Fridges and pumps draw several times more for a second when starting.

Where the inverter takes energy first (grid, sun or battery) is set by the installer for your system. So in some systems the house may run on sun and battery even when the grid is on. This is normal.

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2 Buttons and LEDs

Left to right: **ESC** (back), **UP** and **DOWN** (scroll), **ENTER** (select / menu). Short press: scroll and select. Long press on ENTER: enter the settings menu.



ENTER is highlighted in orange: it opens the menu (hold 2 s).

Button	Short press	Hold
ESC	Step back. Exit the settings menu.	—
UP	Previous page of readings. In the menu: previous item or value.	—
DOWN	Next page of readings. In the menu: next item or value.	—
ENTER	In the menu: open an item, confirm and save a value.	**2 seconds:** enter settings menu.

1× **Short press:** press and release at once. This scrolls pages and selects items.

2 s **Hold:** press and keep pressed for 2 seconds until the screen changes. This opens the settings menu.

LEDs (indicator lights)

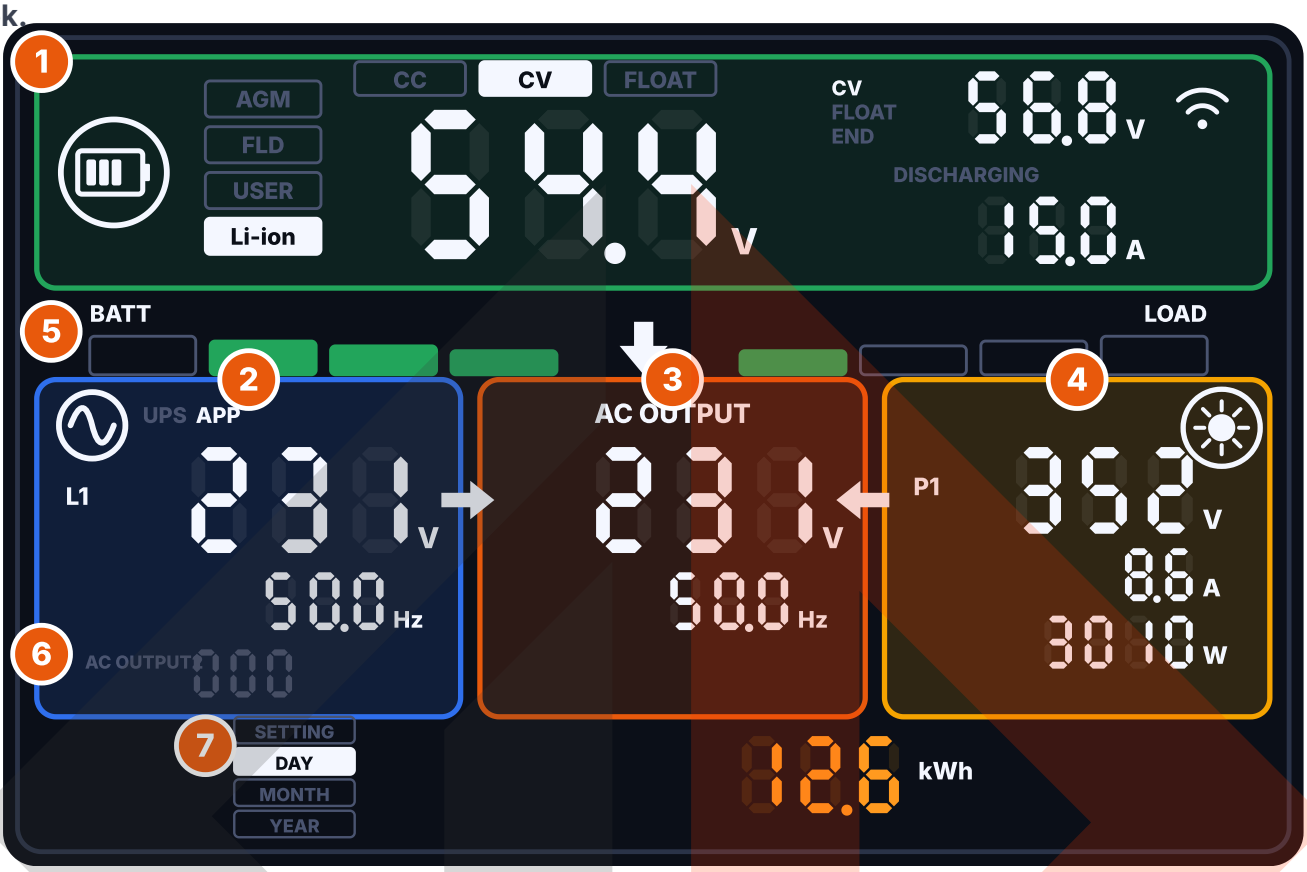
Indicator	Steady	Flashing
AC green	Grid OK, the house runs on the grid.	Grid present, but the inverter has not switched to it yet (running on battery / sun).
INV yellow	The house runs on battery or sun: the inverter itself “makes” 230 V.	—
CHG yellow	Battery full, float charging.	Battery charging.
FAULT red	Fault: code on screen.	Warning: code on screen.

! **Screen gone dark?** All is fine: the backlight turns off to save power. Press **ESC** and the screen lights up again.

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3 The screen: input and output

The numbers in the example are illustrative: yours will differ. What matters is knowing **where to look.**



1 Battery (top)
Battery type, charge stage (CC → CV → FLOAT), large battery voltage in V; on the right, battery current in A. DISCHARGING means the battery is supplying power.

2 Input: grid (bottom left)
The ∿ symbol and UPS / APP label. Grid voltage (V) and frequency (Hz): what comes from the mains.

3 Output: AC OUTPUT (centre)
Voltage going to your home and frequency. It alternates (every 5 s) with power in kVA and kW.

4 Sun: PV (bottom right)
Voltage (V), current (A) and power (W) of the solar panels. Zeros at night: this is normal.

5 BATT and LOAD bars
BATT: how much charge is in the battery (25–100 %). LOAD: how loaded the inverter is (25–100 %).

6 AC OUTPUT2
Voltage of the second output, if something is connected to it.

7 Bottom line
Solar energy (kWh), pages P1–P9 when scrolling, menu item number, error codes. The ⚠ symbol is a warning.

→ **Input (grid)**
bottom left, next to the ∿ symbol and UPS / APP label.

→ **Output (your home)**
centre, under the AC OUTPUT label.

Top: battery; bottom right: solar panels (PV); bottom: orange line with pages P1–P9.

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4 Scrolling readings: V, A, W, Hz...

The main screen shows everything at once: battery, grid, output and sun. With ▲ / ▼ you scroll extra pages P1–P9: they appear in the orange bottom line.

Page	What the bottom line shows
P1	Solar yield today, kWh
P2	Solar yield all time, kWh
P3	Battery voltage (V) and current (A) per its BMS
P4	Battery temperature (°C) and charge (SOC, %)
P5	Rated and remaining battery capacity, Ah
P6	Max. charge and min. discharge battery voltage
P7	Max. battery charge and discharge current
P8	Battery BMS warnings and faults
P9	Inverter firmware version

P3–P8 show data only when the battery is connected to the inverter with a comms (BMS) cable. ERR on these pages means the battery link is lost. The set of pages may differ slightly by firmware version: go by the units.

What the letters mean

V	**volt:** voltage, like water “pressure” in a pipe. Grid: normal 207–253 V. Output on battery: exactly 230 V (or 220 V, as set).
A	**amp:** current, how much “water” flows. Battery current shows how much energy goes into the battery (charge) or out of it (discharge).
W, kW	**watt, kilowatt:** power, how much the house uses right now. 1 kW = 1000 W. Kettle ≈ 2 kW, fridge ≈ 0.1– 0.2 kW.
VA, kVA	**volt-ampere:** apparent power. A little above W: that is normal.
Hz	**hertz:** AC frequency. Normal is 50 Hz.
%	**percent:** inverter load or battery charge. Best keep the load under 80 %.
kWh	**kilowatt-hour:** amount of energy, as on a meter. Solar yield per day, month, in total.
SOC	**State of Charge:** battery charge in %. Shown when the battery is linked to the inverter by a comms cable.
°C	**degree:** inverter or battery temperature.
Ah	**amp-hour:** battery capacity.

+ **Your battery voltage 48 V (lithium iron phosphate, LiFePO4):** usually 50–57.6 V. The closer to the lower value, the less charge. SOC in % shows charge most accurately.

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5 Grid pass-through and battery mode

The most common question: “Why is the output 216 V (or 247 V) and not 230?” The answer is the operating mode.

Grid on: bypass



The inverter passes the grid **straight through:** whatever voltage comes from the grid goes into the house. 216 V at the input means 216 V at the output; 247 V means 247 V. **The inverter does not regulate this voltage,** and charges the battery meanwhile.

How to tell

- Green **AC** LED is on.
- Input (bottom left) and AC OUTPUT (centre) show the **same** voltage.

Power cut: running on Battery



The inverter itself **generates** voltage from battery (and solar) energy: exactly **230 V** (or 220 V, as set by the installer), 50 Hz, pure sine wave. Always stable, no spikes.

How to tell

- Yellow **INV** is on.
- Input shows 0, AC OUTPUT shows exactly **230 V;** DISCHARGING lit next to battery current.

	Power on: pass-through	Power cut: battery
Energy source	the utility grid	battery (and sun)
Voltage in the house	same as the grid: e.g. 216 or 247 V	exactly 230 V (or 220 V)
Voltage regulation	no: the inverter passes the grid as is	yes: the inverter holds a steady voltage
Battery	charging	discharging

Switchover

Happens by itself in 10– 20 milliseconds. Most appliances do not even notice.

Poor grid

If grid voltage goes out of limits (p. 9), the inverter switches to battery and gives a steady 230 V, then switches back.

Is it harmful?

No. In pass-through the house gets the normal grid, just as without an inverter.

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6 How to change settings

Everything is already set by the installer. Only come here if you know exactly what you want to change (e.g. turn off the beeper).

1 Hold **ENTER 2 seconds**
The menu opens: an item number appears on screen (e.g. 01).



2 **UP** / **DOWN**
Choose the item number you need.



3 Tap **ENTER**
The item's value starts flashing.



4 **UP** / **DOWN**
Choose the new value.



5 **ENTER**
Save. The value stops flashing.



6 **ESC**
Exit the menu to the main screen.

What does each number mean?

Menu items and error codes are explained in the user manual for your inverter. On the product page at **minertech.org** it is called "**User manual in English**" (QR code on p. 10).

Tips

- Before changing, photograph the screen with the old value.
- Change one item at a time.
- Do not change battery type or charge voltages without the installer. Grid charge current can be changed yourself: p. 8.
- Lost? Press **ESC** several times. Values not confirmed with ENTER are not saved.

My settings (fill in with the installer)

Output voltage: ☐ 230 V ☐ 220 V

Install date: _____

First energy source: _____

Battery: _____

Installer: _____

Installer's phone: _____

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7 Grid charging current

Charge current sets how fast the battery charges and how much the inverter draws from the grid. You can change it yourself: it is item **06** (options 2, 10, 20 … 160 A).

1 **Hold ENTER 2 s:** the menu opens.



2 **UP / DOWN:** to item **06.**



3 **ENTER:** value flashes.



4 **UP / DOWN** — new current.



5 **ENTER:** save, **ESC:** exit.



30 A on screen is not 30 A from the socket!

This is the current going **into the battery** (low voltage 48 V). From the 230 V socket the inverter draws roughly **4 times less:** 30 A of charge is ≈ 1.8 kW from the grid, i.e. ≈ 7.9 A from the socket.

Grid draw for charging (battery 48 V, efficiency ≈ 90 %)

Charge current on screen	30 A	50 A	60 A	80 A	100 A
Power from grid	≈ 1.8 kW	≈ 3 kW	≈ 3.6 kW	≈ 4.8 kW	≈ 6 kW
Current from 230 V socket	≈ 7.9 A	≈ 13 A	≈ 16 A	≈ 21 A	≈ 26 A

The house also runs on the grid meanwhile: if it uses 1 kW, the grid supplies charging + 1 kW.

Time to charge the battery from the grid (empty to full)

Battery	Battery max.	30 A	50 A	60 A	80 A	100 A
48 V 100 Ah (5 kWh)	**up to 50 A**	≈ 3.5 h	≈ 2 h	—	—	—
48 V 314 Ah (16 kWh)	**up to 100 A**	≈ 10.5 h	≈ 6.5 h	≈ 5.5 h	≈ 4 h	≈ 3.5 h
48 V 360 Ah (18 kWh)	**up to 100 A**	≈ 12 h	≈ 7.5 h	≈ 6 h	≈ 4.5 h	≈ 4 h
48 V 628 Ah (32 kWh)	**up to 100 A**	≈ 21 h	≈ 13 h	≈ 10.5 h	≈ 8 h	≈ 6.5 h

"—": more than the battery maker recommends: do not use. Two identical batteries in parallel: double the capacity, so charging at the same current takes twice as long. Sun in the daytime adds charge and speeds it up.

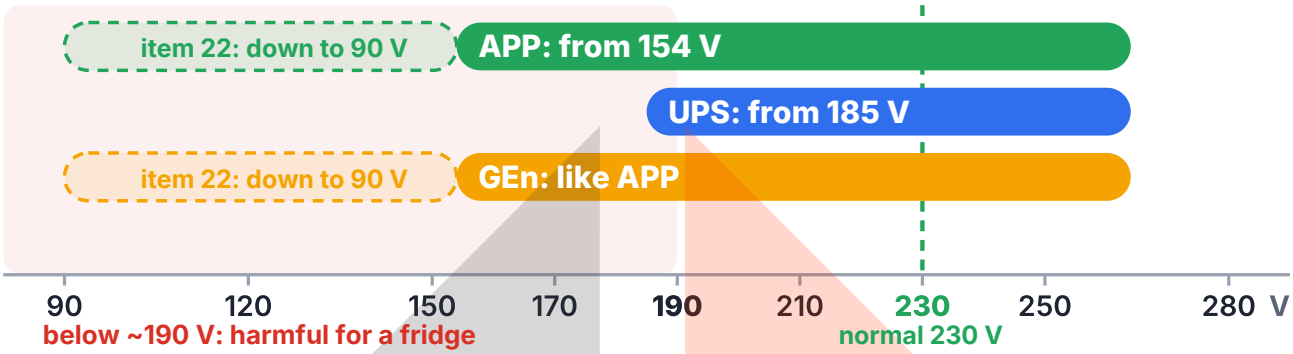
How to choose current

- No more than "Battery max.". Lower current is gentler on the battery and wiring, charging just takes longer.
- Input breaker trips? Reduce the current: charging plus the house must not exceed the breaker (25 A ≈ 5.7 kW, 16 A ≈ 3.7 kW).
- Generator or weak grid: set lower (p. 9).
- Actual current will not exceed item **07:** the overall maximum (sun + grid) set by the installer per the battery datasheet. Do not change item 07.

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8 Low grid voltage and generator

170–190 V is not a reason to buy a whole-house stabiliser straight away. What matters is the right inverter input mode.



The bar is the grid voltage the inverter accepts: it passes it to the house and charges the battery. Left of the bar the inverter switches to battery and does **not charge** it.

Input mode: item 04

Mode	Accepts grid	Use
APP	from 154 V; item 22 can lower it to 90 V	appliances, weak grid (factory)
UPS	from 185 V (item 22: 170–200 V)	computers: on a dip it goes to battery at once
GEn	as APP	generator

Low voltage? Set item **04 = APP.** If it drops below 154 V, lower item **22** (down to 90 V). The inverter keeps supplying the house from the grid and charging the battery. In UPS mode at such voltage it runs on battery and does not charge it. Buttons: as on p. 8.

Fridge: separately

On grid the inverter does not regulate voltage (p. 6): 175 V from the grid is 175 V at the socket. Lights, router, TV and boiler work, but the compressor of a fridge, freezer or air conditioner, or a pump, overheats below ~190 V.

- **Voltage relay** (cut-off) for the fridge: switches it off at low voltage and back on when it recovers.
- Or a **small stabiliser (≈** 1 kVA) just for the fridge, not the whole house.

Charging from a generator

- The generator is connected to the grid input. Mode: item **04 = GEn.**
- Reduce the charge current (p. 8): charging + house no more than ~80 % of the generator's power. Example: 3 kW generator → 30 A (≈ 1.8 kW) and up to ≈ 600 W in the house.
- The inverter does not take the generator instantly: it first checks voltage and frequency. Does not take it at all? Check the mode and reduce the charge current.

Accepts the grid, then drops it?

The line is weak: while charging the voltage sags below the limit, the inverter goes to battery, the voltage recovers, and round it goes. Reduce the charge current (p. 8) and set APP mode. If that helps, no stabiliser is needed. **A powerful inverter (12 kW) is demanding:** on a weak line it may not charge the battery at all. Then use 30–50 A charging, APP mode, and if that does not help, a stabiliser on the inverter input (rated at least charging + house).

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9 If something is wrong

What you see	What to do
Beeps when the power goes off	This is how the inverter reports switching to battery. Everything works. The beep can be turned off in the menu (see the buzzer item in the user manual).
Warning: FAULT flashes, inverter beeps	Look at the code on screen and find it in the user manual (errors and faults section). Most often it is an overload or low battery.
Fault: red FAULT on, no output	Photograph the code on screen, switch off heavy appliances and call a specialist. Do not restart the inverter many times in a row.
Load about 100 % or OVER LOAD shown	Too many appliances on at once. Switch off the most powerful: kettle, water heater, heater, iron.
Screen dark	Press ESC: the backlight comes on with a button press. If the screen does not light at all, check the inverter switch and call us.
No power in the house, but the inverter is running	Check the breakers in the panel (inverter output). If they trip again, call us.
Grid is on, but the inverter runs on battery	Check the inverter input breaker. If it is on, grid voltage is outside the input mode limits (p. 9).
Battery drains faster than usual	Check the load on screen: a heavy appliance may be on. At night without grid, save energy.

Good habits

- Once a day glance at the screen: battery charge, load, no red signal.
- Switch heavy appliances on one at a time, not all together.
- Keep the inverter dry and clean, put nothing on top.
- In winter the battery must be kept warm (above 0 °C) so it can charge.

All manuals are on the website

Scan the QR code with your phone camera to open your inverter's page on **minertech.org.** There you will find the "User manual in English": menu items and error codes explained.

Questions? The specialist's phone numbers and email are at the bottom of every page. Call us and we will help.

inverter page on website

Thank you for choosing backup power! May your home always have light.

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