CONNECTION AND SETUP GUIDE

# Kit Aninerel ANL-4200T-24L-W-PRO 4.2kW 24V + 2× POWINVER mini 12.8V 100Ah

Inverter Aninerel ANL-4200T-24L-W-PRO 4.2kW 24V + 2 POWINVER mini 12.8V 100Ah batteries in series: 25.6 V 100Ah 2560Wh



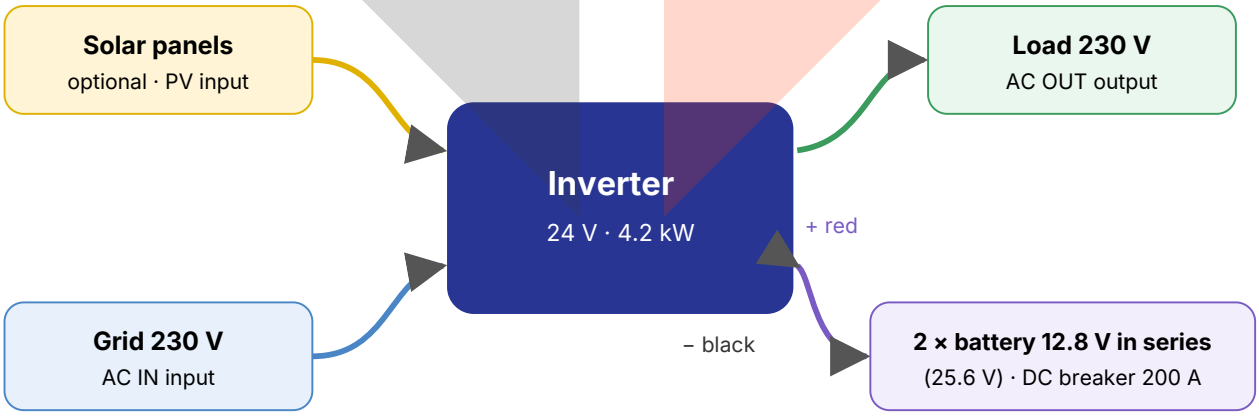

## Kit contents

- **Inverter Aninerel ANL-4200T-24L-W-PRO 4.2kW 24V**
- **Battery POWINVER mini 12.8V 100Ah 1280Wh ×** 2

## What else you will need

- Battery–inverter power cables 35 mm², M8 lugs
- DC breaker / fuse 200 A
- 50 A breaker, 6 mm² cable to the grid input
- Jumper between batteries: 35 mm² cable, M8 lugs
- LiFePO4 12.8 V charger, to charge each battery separately before connecting them
- Screwdriver, 13 mm wrench, multimeter

## Wiring diagram

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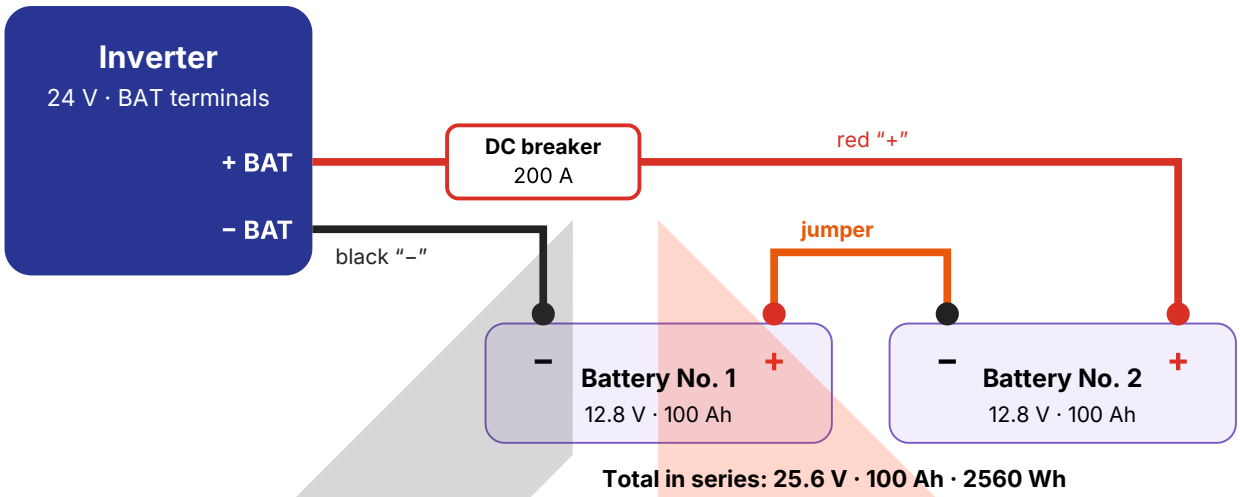
## Two 12.8 V batteries in series = 25.6 V




**Total in series: 25.6 V · 100 Ah · 2560 Wh**

- The inverter is rated for 24 V, and each battery has 12.8 V. So the two batteries are connected **in series**: the voltages add up (12.8 + 12.8 = **25.6 V**), the capacity stays **100 Ah**, and the bank energy is 2 × 1280 = **2560 Wh**.
- **Jumper**: a cable of the same cross-section as the one to the inverter (**35 mm²**), with M8 lugs, as short as possible. It connects the "+" of **battery No. 1** to the "–" of **battery No. 2**.
- **Inverter "–"** (– BAT, black cable) → "–" of **battery No. 1**. **Inverter "+"** (+ BAT, red cable) via the DC breaker **200 A → "+" of battery No. 2**.
- Before connecting to the inverter, measure the voltage between the "–" of battery No. 1 and the "+" of battery No. 2 with a multimeter: it should be ≈ **26–27 V**. If it is ≈ 13 V, the jumper is in the wrong place; 0 V means a break or a battery that is switched off.

**Never connect these batteries in parallel** ("+" to "+", "–" to "–") for a 24 V inverter: you would get only 12.8 V, and the inverter will not start or will show a low-voltage error. Do not connect the "+" and "–" of the same battery: that is a short circuit.

## Before connecting the batteries

- Both batteries must be **the same model and the same capacity**, preferably from the same batch. Do not connect a new battery with an old one: the weaker one will be overcharged and discharged more deeply than the other.
- **Charge each battery separately to 100%** with a LiFePO4 12.8 V charger (charge voltage 14.2–14.6 V).
- 1–2 hours after charging, measure the voltage of each battery: the difference should be **no more than 0.05 V**. If it is larger, top up the one with the lower voltage. Only then connect the batteries to each other.
- Bank charging current: **no more than 50 A** in total (solar + grid), from the grid **30 A**. Discharge is limited by each battery's BMS: **100 A**, which is ≈ 2.3 kW of continuous load from the bank.

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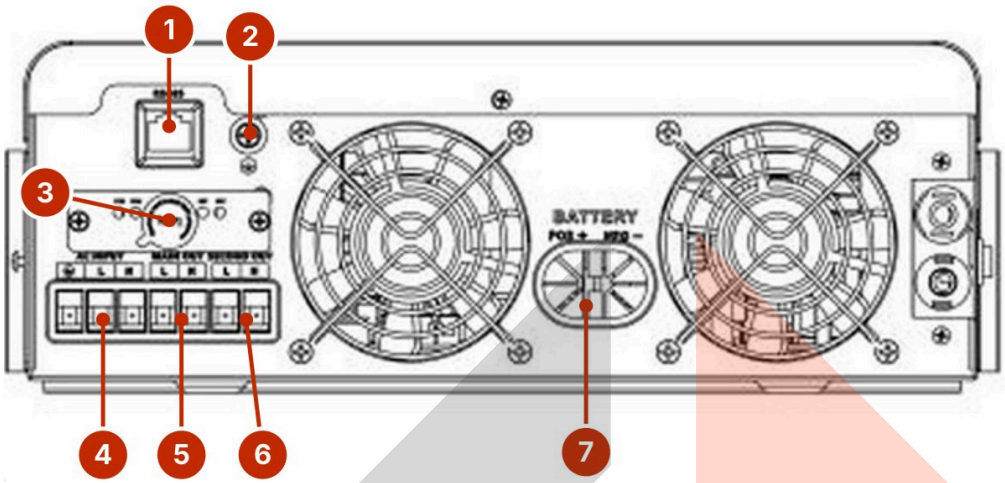
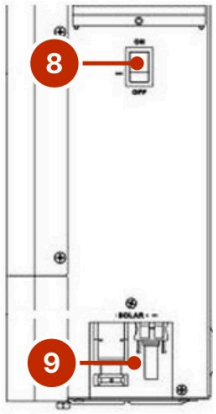
## Inverter connectors: bottom panel and side wall

вигляд знизу




бокова стінка




| № | Connector | What it is | What connects where |
|---|---|---|---|
| 1 | **RS485 (BMS)** | RJ45 port for RS485 communication with the lithium battery BMS. | Battery communication cable, “pin to pin”: pin 1 — RS485-B, 2 — RS485-A, 7 — RS485-A, 8 — RS485-B. Then select LI2 or LI4 in program 05. |
| 2 | **Grounding** | Case earthing screw. | Protective PE wire (yellow-green). The inverter must be connected to a permanent earth. |
| 3 | **Wi-Fi antenna port** | Built-in Wi-Fi Plug Pro module for monitoring via the app. | Screw on the Wi-Fi antenna from the kit (see the Wi-Fi page). |
| 4 | **AC INPUT (⏚ · L · N)** | Grid or generator input. | Via a separate 50 A breaker. 6 mm² cable. PE first, then L (brown/black) and N (blue). |
| 5 | **MAIN OUT (L · N)** | Main output (OP1). | Panel for essential loads. 6 mm² cable. Disconnection from the battery: program 31. |
| 6 | **SECOND OUT (L · N)** | Second output (OP2). | Less important loads. Switches off before the main output (program 29); enabled by program 43; overload warning threshold: program 47. |
| 7 | **BATTERY (POS + · NEG –)** | Battery terminals 24 V (cable entry in the middle). | 50 mm² cable with lugs, 4– 6 N·m; separate DC protection. There is no reverse polarity protection, so check with a tester. |
| 8 | **ON / OFF** | Power switch (on the side wall in the manual’s figure). | Switch on after all cables are connected and the battery is attached. |
| 9 | **PV (SOLAR + · –)** | Solar panel input (on the side wall), sockets for PV connectors; 2 connectors included. | Via a separate DC breaker. 6 mm² cable. Open-circuit voltage no more than 500 V. |

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Figure from the manufacturer's manual (p. 2, "Product overview"); the two round elements on the right of the bottom panel are not described in the manual.

## Key values for this kit

| | | |
|---|---|---|
| **28.4 V**<br>charge voltage (26) | **27.2 V**<br>float voltage (27) | **24.0 V**<br>cut-off (31) |
| **USE**<br>battery type (05) | **50 A**<br>max. charge current (02) | **30 A**<br>grid charging (11) |

## Connection procedure

1. Mount the inverter vertically on a non-combustible wall in a dry place. Leave at least 20 cm of free space above and below for cooling.
2. Make sure everything is off: inverter button OFF, switches/buttons on **both** batteries OFF, DC breaker off, 230 V grid not connected.
3. Place the batteries side by side and connect them **in series** with the jumper: "+" of battery No. 1 → "−" of battery No. 2 (see "Two 12.8 V batteries in series"). A multimeter between the "−" of battery No. 1 and the "+" of battery No. 2 should read ≈ 26–27 V.
4. Install a DC breaker or fuse rated **200 A** in the positive (red) wire between the "+" of battery No. 2 and the inverter "+ BAT".
5. Connect the power cables (cross-section at least **35 mm²**, M8 lugs): **red** from the "+" of battery No. 2 (via the DC breaker) to the inverter "+ BAT", **black** from the "−" of battery No. 1 to "− BAT". Check the polarity twice: swapping "+" and "−" is guaranteed to damage the inverter.
6. Tighten the terminal bolts firmly (without stripping the thread), together with the jumper lugs, and fit the protective caps. A loose contact heats up and melts the terminals.
7. Switch on both batteries (buttons or switches on the cases, if present), then the DC breaker.
8. Switch on the inverter with the ON button. The battery voltage should appear on the display. Enter the settings from the table below.
9. Switch off the inverter and connect the 230 V grid to the **AC IN** terminals (L, N, PE) through a separate 50 A breaker.
10. Connect the load (your socket/distribution board) to the **AC OUT** terminals (L, N, PE). Never mix up AC IN and AC OUT: feeding grid power into the output damages the inverter.
11. If you have solar panels, connect them to the **PV** input last, observing polarity. The open-circuit voltage of the panels (Voc) rises in frosty weather: do not exceed the PV maximum on the inverter label.
12. Switch on the inverter and check: 230 V at the output, the battery charges from the grid (charging icon on the display), the lights stay on when the grid is off.

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**Important: power from the battery.** The BMS of each 12.8 V battery is rated for 100 A continuous current (the exact value is on the label). In a series connection the same current flows through both batteries, so the limit for the 25.6 V bank is also 100 A. That is ≈ **2.3 kW** of continuous load from the battery. The inverter delivers its full 4.2 kW when grid or solar power is available. If the battery "trips" during a power cut, reduce the number of powerful appliances switched on at the same time.

## Inverter settings

Entering the menu: hold the **ENTER** (or **SET**) button for 3 seconds. Use ▲/▼ to select the program number, press ENTER, change the value, press ENTER to save. Exit: **ESC**.

| № | Parameter | Value | Why |
|---|---|---|---|
| 01 | Output source priority | **UTI** (no panels) or **SBU** (with panels) | UTI: we run from the grid and keep the battery full in case of a power cut. SBU: solar first, then battery, then grid. |
| 02 | Maximum charging current (total) | **50 A** | Safe for LiFePO4 100Ah (≈0.5C). Do not set higher: it shortens the battery's life. |
| 03 | AC input voltage range | **UPS** (from the grid) / **APL** (from a generator) | UPS: fast switchover, computers do not restart. APL: if you run on a generator. |
| 05 | Battery type | **USE** (user-defined) | The battery has no communication with the inverter: the charge and cut-off voltages are set manually below. Do not select AGM/FLD: those are for lead-acid batteries. |
| 06 | Auto restart after overload | **LTE** (enabled) | The inverter resumes operation by itself. |
| 07 | Auto restart after overheating | **TTE** (enabled) | The inverter resumes operation by itself. |
| 09 | Output frequency | **50 Hz** | Standard for Ukraine and Europe. |
| 11 | Maximum grid charging current | **30 A** | Moderate grid charging so as not to overload the wiring and the battery. |
| 12 | Back-to-grid voltage (SBU mode) | **25.0 V** | When the battery discharges to this voltage, the load switches to the grid (if available). |
| 13 | Back-to-battery voltage (SBU mode) | **27.0 V** | After recharging to this voltage, the inverter runs from the battery again. |
| 16 | Charging source priority | **SNU** (solar + grid) | The battery charges from both solar and grid. Without panels, it charges from the grid. |
| 26 | Charge voltage (Bulk / CV) | **28.4 V** | Standard for LiFePO4 8S (25.6 V). |

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| | | | |
|---|---|---|---|
| 27 | Float voltage | **27.2 V** | The battery is not overcharged when it stays on the grid for a long time. |
| 31 | Main output cut-off (OP1) | **24.0 V** | The inverter switches off its output so as not to drain the battery to zero and trip the BMS. |

Program numbers follow this inverter manufacturer's manual. After entering the settings, switch the inverter off and on again.

## Which mode to choose

- **Backup during power cuts only (no panels):** 01 = UTI, 16 = SNU. The inverter runs from the grid and the battery is always full; when the power goes out it switches to the battery automatically.
- **You have solar panels and want to save:** 01 = SBU, 16 = SNU (or CSO). Solar power by day, battery at night, the grid only when the battery has dropped to 25.0 V.
- **Running on a generator:** 03 = APL, 11 = 30 A or less, so as not to overload the generator.

## How long it runs on battery

| Load | Example | Runtime |
|---|---|---|
| 100 W | router, lights, chargers | **≈ 20.7 h** |
| 200 W | fridge + lights | **≈ 10.4 h** |
| 300 W | fridge + lights + TV | **≈ 6.9 h** |
| 500 W | fridge, laptop, pump | **≈ 4.1 h** |
| 1000 W | boiler, kettle briefly, several appliances | **≈ 2.1 h** |
| 2000 W | air conditioner, water heater, electric stove | **≈ 1.0 h** |

Approximate: 90% of battery capacity and inverter efficiency ≈90%. A fridge runs in cycles, so the real runtime is longer.

## Check after start-up

- Battery voltage on the display: ≈ 27.2–28.4 V when full, ≈ 25.0 V when discharged.
- Switch off the grid breaker: the load must keep running without interruption.
- After 10–15 min of operation, touch the terminals and cables: they must not be hot. If they heat up, a connection is loose or the cable is too thin.
- A battery below 23.2 V may have gone into BMS protection: charge it from the grid through the inverter.

**Safety.** Make all connections only with the battery, inverter and grid switched off. Do not short-circuit the battery terminals: the short-circuit current of LiFePO4 is very high. Do not install the inverter in a bathroom, outdoors in the rain or near flammable materials. If in doubt, contact an electrician.

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## Shutdown and maintenance

- Switch off in reverse order: load → grid → panels → inverter → DC breaker → battery.

- Every 3 months, check that the terminals (and the jumper between the batteries) are tight and that the ventilation openings are clean.
- Every few months (every 3 months is convenient), check the voltage of **each battery separately** with a multimeter, at rest (≈1 h without charging or load). If the difference is more than **0.2 V**, switch the system off, remove the jumper, charge each battery separately to 100% and only then connect them again.
- If one battery fails, replace it with the same model and capacity and equalise the charge before connecting (see “Before connecting the batteries”).
- If you do not use the kit for a long time, charge the battery to 50–70% and switch it off.

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