CONNECTING THE BATTERY TO THE INVERTER

Battery 51.2V 100Ah 5.12kWh rack with display

51.2V 100Ah 5.12kWh rack with display · BMS touchscreen, RS485, Pylontech protocol · connection to our 48V inverters



What we connect

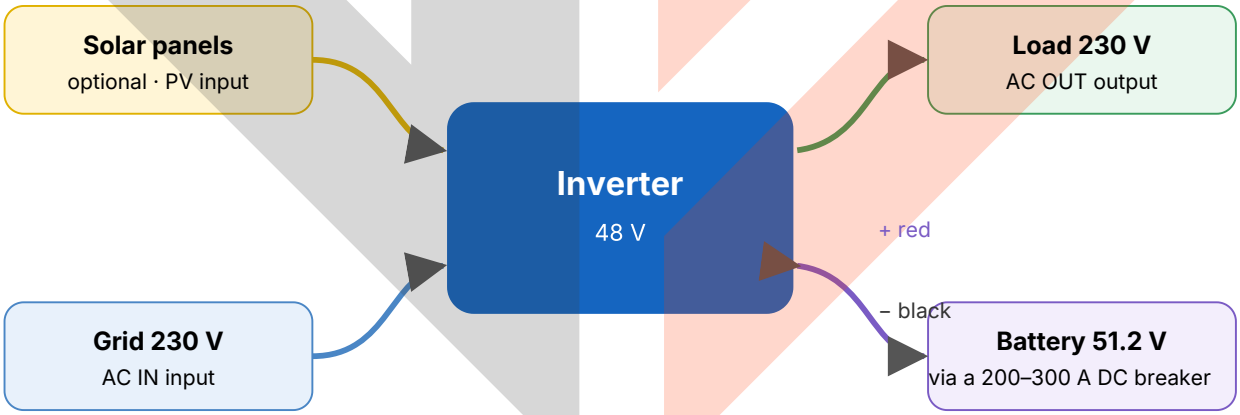
- **Battery 51.2V 100Ah 5.12kWh rack with display**

What else you will need

- Battery–inverter power cables 35–50 mm² (see table), M8 lugs
- RS485 communication cable (RJ45), e.g. “Communication cable 1.3 m”
- DC breaker / fuse 200–300 A (see table)

- 32 A breaker on the grid input, cable 3×4 mm²
- Screwdriver, 13 mm wrench, multimeter

Wiring diagram



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Compatible inverters

Inverter	Power	DC breaker · cable	In this inverter's menu	Charging current
JSDsolar J6500HC 6.5kW 48V	6.5 kW	100 A (fuse) 21 mm²	17 = FEL, 44 = PYL	50 A*
POWGROW SMS-6.5KP 6500W 48V	6.5 kW	150 A 35 mm²	17 = FEL, 44 = PYL	50 A*
GSIKE 6.2kW 48V WiFi	6.2 kW	200 A 35 mm²	05 = Li2	50 A*
GSIKE 11kW 48V WiFi	11.0 kW	250 A 50 mm² (or 2×35 mm²)	F2-01 = Li2	50 A*
EASUN SMS-6.5KP 6.5kW 48V WiFi	6.5 kW	150 A 35 mm²	17 = FEL, 44 = PYL	50 A*

* If the inverter does not allow you to set this much, set its maximum. Menu item numbers differ between inverters: the column "In this inverter's menu" follows the manual of this particular inverter; voltage and current values are in the table below. The battery also suits other 48 V hybrid inverters that support the Pylontech protocol.

Key values for this battery

56.8 V charge voltage (26)	**54.4 V** float voltage (27)	**48.0 V** cut-off (29)
PYL BMS protocol (05)	**50 A** max. charge current (02)	**30 A** 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 switched off: inverter button OFF, battery switch/button OFF, DC breaker off, 230 V grid not connected.
3. Install a DC breaker or fuse rated **200–300 A (see table)** in the positive (red) wire between the battery and the inverter.
4. Connect the power cables (cross-section at least **35–50 mm² (see table),** M8 lugs): **red** from the battery "+" to the inverter "+ BAT", **black** from the battery "−" to "− BAT". Check the polarity twice: swapping "+" and "−" is guaranteed to damage the inverter.
5. Tighten the terminal bolts firmly (without stripping the thread) and fit the protective caps. A loose contact heats up and melts the terminals.
6. Connect the battery and the inverter with the **communication cable (**RJ45): the **RS485** port on the battery → the **BMS / RS485** port on the inverter. Do not plug the cable into the CAN or WiFi port. For the protocol

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settings, see the “Battery communication” section.

7. Switch on the battery (button or switch on the case, if any), 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 32 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.

Battery communication: Pylontech protocol (RS485)

This battery has an RS485 port and “talks” to the inverter: the inverter sees the state of charge in percent (SOC) and takes the correct charge voltages and currents from the BMS by itself.

On the battery:

1. On this battery the protocol is selected on its touchscreen: open the protocol settings in the screen menu (**PROTOCOL)** and check that **PYLON (** Pylontech) is selected for communication with the inverter. If a different protocol is set, select PYLON and confirm.
2. Plug the communication cable to the inverter into the battery’s **RS485 CAN** port. The pair of **RS485** ports on the right is only for linking batteries together.
3. For a single battery, do not change the address or the other BMS settings.

On the inverter:

1. Battery type / BMS protocol: in the items of your particular inverter; see the column “In this inverter’s menu” in the table “Compatible inverters”.
2. Cable from the inverter **BMS / RS485** port to the battery **RS485** port.
3. Switch the inverter off and on. After 10–30 seconds the battery charge should appear on the display in **%.** If only the voltage or a communication error appears instead of percent (often code 61 or a flashing BMS icon), check the cable, port and protocol.
4. Once communication is established, the inverter takes the charge (26, 27) and cut-off (29) voltages from the battery. The values in the table below are a fallback if communication is lost.
5. With BMS communication, the thresholds for switching to the grid and back are set in percent: recommended **20%** switch to grid, **80%** return to battery.

Important about power from the battery. According to the manufacturer’s specification, this battery’s BMS provides up to 100 A of continuous discharge and up to 100 A of charge (standard current 50 A). That is ≈ **4.6 kW** of continuous load from the battery. The inverter delivers full power when there is grid or solar power. If the battery “trips” during a power cut, reduce the number of powerful appliances switched on at the same time.

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Data from the manufacturer's specification

- According to the manufacturer's specification: LiFePO4 51.2 V, 100 Ah (5.12 kWh). Charge voltage 58.4 V, discharge cut-off 40 V, internal resistance up to 30 mΩ.
- Current: standard charge and discharge 50 A, maximum continuous charge and discharge 100 A. Charging ends at a current of 0.02C (2 A).
- Temperature: charge 0…60 °C, discharge −20…60 °C. Below 0 °C the battery does not charge.
- Service life 4500 cycles to 80% capacity. Capacity: at 0.1C at least 100%, at 0.33C at least 96.5%, at 1C at least 91.5% of nominal.
- Up to 15 batteries can be connected in parallel (15P1S); the batteries are not connected in series.
- 3U metal case for a 19-inch rack, about 460×442×140 mm, weight about 43 kg. The battery arrives charged to about 50%: charge it fully before first use.

- At the front: two pairs of power terminals (+ / −), a colour BMS touchscreen (charge in percent, current, voltage, status, alarms, protocol selection), ON/OFF and RESET buttons, RUN, ALM and SOC indicators, RS485 / CAN ports (to the inverter), RS232 (to a computer), RS485 (between batteries) and a DRY CONTACT.
- Communication with inverters via CAN or RS485: Pylontech, Growatt, Deye, Voltronic, Victron, Luxpower, SRNE, Goodwe, Solis, SMA, Sofar, INVT, MUST and other protocols. The protocol is selected on the battery screen.
- Monitoring from a phone via the app (Wi-Fi / Bluetooth) is supported: charge, voltage of each cell, temperature, alarms.
- In the box: battery, manual, power cables, communication cable to the inverter, communication cable between batteries, terminal caps, brackets for stacking batteries on top of each other.

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 / BMS protocol	**PYL**	Pylontech protocol. If there is no PYL item in the menu, choose the lithium protocol that corresponds to Pylontech in your inverter's protocol table.

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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)	**50.0 V**	When the battery discharges to this voltage, the load switches to the grid (if available).
13	Back-to-battery voltage (SBU mode)	**54.0 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)	**56.8 V**	Standard for LiFePO4 16S (51.2 V).
27	Float voltage	**54.4 V**	The battery is not overcharged when it stays on the grid for a long time.
29	Cut-off voltage (Low DC cut-off)	**48.0 V**	The inverter switches off its output so as not to drain the battery to zero and trip the BMS.

The program numbers are given for inverters of this class (the standard hybrid inverter menu). If the number on your screen differs, go by the parameter name and value. 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 50.0 V.
- **Running on a generator:** 03 = APL, 11 = 30 A or less, so as not to overload the generator.

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How long it runs on battery

Load	Example	Runtime
100 W	router, lights, chargers	**≈ 41.5 h**
200 W	fridge + lights	**≈ 20.7 h**
300 W	fridge + lights + TV	**≈ 13.8 h**
500 W	fridge, laptop, pump	**≈ 8.3 h**
1000 W	boiler, kettle briefly, several appliances	**≈ 4.1 h**
2000 W	air conditioner, water heater, electric stove	**≈ 2.1 h**
4000 W	whole house, pump, power tools	**≈ 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: ≈ 54.4–56.8 V when full, ≈ 50.0 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 46.4 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.

Shutdown and maintenance

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

- Every 3 months, check that the terminals are tight and the ventilation openings are clean.
- 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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