# e-Power

# **Owner's manual**



Revision: 1.0 Date: 2025-05-08 For safe and optimum performance, the **e-Power system** must be used properly. Carefully read and follow all instructions and guidelines in this manual and give special attention to the **CAUTION** and **WARNING** statements.

## PLEASE KEEP THIS MANUAL FOR FUTURE REFERENCE

Disclaimer While every precaution has been taken to ensure the accuracy of the contents of this guide, Modul-System assumes no responsibility for errors or omissions. Note as well that specifications and product functionality may change without notice. Important Please be sure to read and save the entire manual before using your e-Power Misuse may result in damage to the box or switch panels and/or cause harm or serious injury.

## e-Power version:

| 28220-03  | e-Power 2000                          |
|-----------|---------------------------------------|
| 28220-031 | e-Power 2000 – Remote Display         |
| 28221-03  | e-Power 2000 X-treme                  |
| 28221-031 | e-Power 2000 X-treme - Remote Display |

## **Optional parts:**

## Inverters:

| 28320-03 | e-Inverter 2000 with EU plug |
|----------|------------------------------|
| 28321-03 | e-Inverter 2000 with UK plug |
| 28330-03 | e-Inverter 3000 with EU plug |
| 28331-03 | e-Inverter 3000 with UK plug |

## Charging:

- 28500-03 Solar Panel flexible 210W
- 28501-03 Cables 7m for Solar Panel 210W
- 28225-03 IEC Power Cable EU 3m Orange cable
- 28226-03 IEC Power Cable UK 3m Orange cable
- 28222-03 Inlet Cable to IEC 3m
- 28223-03 Inlet Cable to IEC 7m
- 28224-03 Connection Cable EU plug 3m

## Accessories:

28202-03 Handle for e-Power
28203-03 Stacking brackets for e-Power 4 pcs
28227-03 Internal Stacking brackets
28228-03 Busbars for stacking e-Power and e-Inverter 3kW

## Communication cables:

- 28201-03 RJ45 Modul-Connect connection cable (2 meters)
- 28207-03 RJ45 Splitter
- 28204-03 RJ45 CAN Cable e-Power 0.5m
- 28205-03 RJ45 CAN Cable e-Power 3m

Service Contact Information

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## 1. Introduction

Thank you for purchasing the e-Power system. With our state of the art, easy-to-use design, this product will offer you efficient and reliable battery power.

This manual provides step-by-step instructions for installing the e-Power battery system in a light commercial vehicle (LCV). It includes guidelines on mounting, wiring, and integrating the system with the vehicle's electrical setup to ensure optimal performance and safety. Detailed diagrams, safety precautions, and troubleshooting tips are included to support a smooth and efficient installation process. Whether you're a professional installer or a fleet technician, this guide will help you set up E-Power correctly and securely.

## IMPORTANT SAFETY INFORMATION

This section contains important safety information for the e-Power system. Before using or installing the system, **READ ALL** instructions and cautionary markings found on the unit, the packaging, and within this manual.

Even though the e-Power system operates at low voltage, it still includes powerful lithium-ion batteries and electrical components that must be handled with care. Failure to follow proper safety practices could result in equipment damage, personal injury, or voiding of the warranty.

Please observe the following:

- Installation must be carried out by trained personnel familiar with low-voltage DC systems and battery safety.
- Do not disassemble or modify any part of the e-Power system. There are no userserviceable components inside.
- Keep the system dry and well-ventilated. Avoid exposure to water, excessive heat, or confined spaces without airflow.
- Only use manufacturer-approved accessories. Using incompatible equipment may cause malfunction or reduce battery life.
- The lithium-ion battery pack is classified under UN3480 and must be handled and transported in accordance with applicable regulations.
- Avoid short circuits: Do not connect terminals directly or allow metal objects to contact them.
- Inspect regularly for signs of damage, wear, or unusual performance (e.g., swelling, unusual heat, or odor). If any issues are found, stop using the system and consult a qualified technician.
- If the battery is involved in an accident, exposed to water, or dropped from a height, do not use it—have it professionally inspected or replaced.

By following these precautions, you help ensure safe operation and extend the life of your e-Power system.

# **Installation checklist**

After installation, use this checklist to ensure the e-Power system is set up correctly.

## Is Modul-Connect powered from the e-Power?

Yes -> Is 12V always ON selected? (Section 6.6 Advanced Settings) No -> Is 12V in AUTO mode? (Section 6.6 Advanced Settings)

## Is the e-Power installed in an EV?

- Yes -> Is EV Mode turned ON (Section 6.5 Settings) and Ignition +12v input detection wired (Section 3.3.1 DC Charging of e-Power)?
- No -> Is EV Mode turned OFF (Section 6.5 Settings)

## Is the termination placed furthest way from the e-Power in the CAN chain?

| Yes -> | No action                                      |
|--------|--|
| No ->  | Adjust according to the guidelines (Section 4) |

# Some vehicles do not support drawing 40A from the chassis battery, such as the Volkswagen ID. Buzz. Is the e-Power installed in a vehicle that supports 40A charging?

- Yes -> No action
- No -> Adjust charging limit in (Section 6.5 Settings)

## 2. Product description

e-Power is a high-performance battery system designed for light commercial vehicles, delivering sustainable and long-lasting power for tools and onboard electronics. Developed by Modul-System, it enhances operational efficiency and integrates seamlessly with your vehicle's electrical system.

Package Contents:

- RJ45 Terminator
- 5 × M8 Terminal Bolts
- Terminal Protection Caps

## 2.1 Front of the e-Power

- 1. USB-A charging port (3A)
- 2. USB-C charging port (3A)
- 3. LCD Display
- 4. Navigation wheel
- 5. Return button
- 6. Function buttons
  - a. e-Inverter button
  - b. e-Heater button
  - c. Aux1, configurable button via Modul-Connect
  - d. Aux2, configurable button via Modul-Connect



## 2.2 Rear of the e-Power

- 1. DC IN M8 terminal
- 2. DC in Solar M8 Terminal
- 3. DC OUT M8 Terminal
- 4. DC IN/OUT Earth M8 Terminal
- 5. DC IN/OUT Earth M8 Terminal
- 6. AC IN IEC C13 connector
- 7. Ignition + 12V DC
- 8. CAN1
- 9. CAN2
- 10. Service
- 11. Main power switch



## 3. Installation

This section explains how to properly and securely install the e-Power system in a vehicle.

## 3.1 Choose the Mounting Location

- Select a secure, ventilated area inside the van, such as under the seat, in the load area, or near the bulkhead.
- Ensure the surface is flat and can support the weight of the battery system.
- Keep it away from heat sources, sharp objects, and moving parts.
- The mounting orientation of the e-Power will not significantly affect its performance, but for optimal performance of the LiFePo4 batteries the e-Power must be mounted horizontally as shown in the diagrams. Never mount up-side down.

## 3.2 Secure the e-Power Unit

- Position the unit in the chosen location.
- Use the T-tracks on the unit to secure it in the vehicle.
- Fasten the unit using bolts, ensuring it is firmly in place and does not shift while driving.



## 3.3 Connect the Wiring

- Route the cables safely along the van's existing wiring channels to prevent damage.
- Connect the fused main power cables to the vehicle's electrical system according to the wiring diagram in later section.
- Ensure all connections are tightened with 8Nm torque and insulated to avoid short circuits.
- If not used in conjunction with the e-Power, e-Heater or Modul-Connect, the terminator needs to be placed in the CAN1 or CAN2 port in the rear of the e-Power.

## 3.3.1 DC Charging of the e-Power



Figure 1 DC Charging for electrical vehicles



Figure 2 DC Charging for non-electrical vehicles

#### **Required Components**

- 12V Battery
- Appropriate cables (16–25mm<sup>2</sup> gauge depending on cable length)
- 50A fuse
- M8 Ring terminals
- Brown 0.75 mm<sup>2</sup> cable with a 2A fuse

#### Wiring Procedure

#### Step 1: Prepare the Battery and System

- 1. Ensure the e-Power is powered off in the rear before making any connections.
- 2. Confirm the battery voltage and polarity to prevent incorrect wiring.
- 3. Use appropriately rated cables  $(16-25mm^2)$  for both positive and negative connections.

## Step 2: Connect the Positive Cable

- 1. Attach one end of the positive (red) cable to the DC-IN+ terminal of the e-Powe with an 8Nm torque.
- 2. Route the cable securely to the battery's positive terminal.
- 3. Install a 50A fuse in-line with the positive cable near the supplying battery terminal for protection.
- 4. Connect the other end of the positive cable to the battery's positive terminal with an 8Nm torque.

## Step 3: Connect the Negative Cable

- 1. Attach one end of the negative (black) cable to the DC-IN- terminal of the e-Power with an 8Nm torque.
- 2. Route the cable securely to the battery's negative terminal.
- 3. Firmly connect the other end of the negative cable to the battery's negative terminal with an 8Nm torque.

## Step 4: Connect the ignition cable

For electric vehicle

- 1. Attach one end of the brown 0.75 mm<sup>2</sup> cable with a 2A fuse to the Ignition + 12V DC pin in the rear.
- 2. Attach the other end to the DC-IN+ terminal with an 8Nm torque.

For non-electric vehicles

 Attach one end of the brown 0.75 mm<sup>2</sup> cable with a 2A fuse to the Ignition + 12V DC pin in the rear.
 Attach the other and to a +12v ignition supply from the vahiale's fuse box.

Attach the other end to a +12v ignition supply from the vehicle's fuse box.

#### **Step 5: Verify Connections**

- 1. Double-check all connections to ensure proper polarity.
- 2. Make sure all terminal connections are tight and secure to avoid resistance or sparking.
- 3. Inspect the wiring for any damage or potential short circuits.

#### **Step 6: Power On and Test**

1. Turn on the system, turn on the vehicle ignition and check for proper operation.

- 2. Ensure that the battery is charging and supplying power correctly when +12V ignition is active.
- 3. Monitor the system for any irregularities such as excessive heat or voltage drops.

## 3.3.2 AC Charging



## **Required Components**

• 28225-03 IEC Power Cable EU 3m Orange cable

Or

• 28226-03 IEC Power Cable UK 3m Orange cable

## Wiring Steps

- 1. Ensure AC power is off.
- 2. Plug AC cable into the 230V input socket on the power unit.
- 3. Connect the other end to the AC wall outlet.
- 4. Verify secure connections.
- 5. Power on and check system operation in the menu.

## 3.3.3 Solar Charging



### **Required Components**

- 28500-03 Solar Panel flexible 210W
- 28501-03 Cables 7m for Solar Panel 210W

### Wiring Steps

- 1. Ensure the e-Power is tuned off.
- 2. Connect the positive red cable on the DC IN SOLAR terminal.
- 3. Connect the negative black cable to one of the DC OUT/IN terminals.
- 4. Plug the other end of the red cable to the cable on the panel marked with "+".
- 5. Plug the other end of the black cable to the cable on the panel marked with "-".
- 6. Verify secure connections.
- 7. Power on and check system operation in the menu.

#### 3.4 Test the System

- Turn on the system and check that the power output is functioning correctly.
- Verify all connections and ensure there are no loose cables.

## 3.5 Final Checks & Safety Measures

- Secure and tidy up all cables using cable ties and conduit.
- Ensure that all safety features, such as fuses and circuit breakers, are correctly installed.
- Perform a final inspection to confirm everything is securely mounted and operating as expected.

## 4. Connecting e-Inverter and e-Heater

This chapter explains how to supply power to the e-Inverter and e-Heater from the e-Power unit, as well as how to connect the communication cables.

## 4.1 Powering the e-Inverter and e-Heater



The e-Inverter and e-Heater should be wired to the positive and negative DC IN on the rear of the e-Power.

## 4.1.1 e-Heater power cables

## Fuse or Circuit Breaker:

- **The e-Heater 1000** must be fitted with 1 off in-line 100 amp fuse for the main battery connection on the positive +12 volt supply.
- **The e-Heater 2000** must be fitted with 1 off in-line 200 amp fuse for the main battery connection on the positive +12 volt supply.
- The 100 amp/200 amp DC-rated fuse and holder is required at the DC positive source to protect the cable run.

#### Cables

# If the cord of the heater is damaged, it must be repaired by manufacturer or qualified electrician.

- The e-Heater 1000 must be connected with input (Red) 25mm<sup>2</sup> cables.
- The e-Heater 2000 must be connected with input (Red) 30mm<sup>2</sup> cables if shorter than 3m.

#### e-Inverter 2000

Fuse

Below are Battery cables part number.

| Part number  | Fuse | Dimension | Length | Note   |
|--|------|-----------|--------|--|
| 28415-03 Battery cables 1m for<br>e-Heater 1000              | 100A | 16 mm2    | 0.8m   |  |
| 28416-03 Battery cables 2m for<br>e-Heater 1000              | 100A | 25mm2     | 2m     |  |
| 28422-03 Battery cables 0.8m for e-Heater 2000               | 200A | 35mm2     | 0.8m   |  |
| 28423-03 Battery cables 2m for<br>e-Heater 2000              | 200A | 35mm2     | 2m     |  |
| 28324-03<br>Angled Battery Cables 2m for e-<br>Inverter 2000 | 200A | 35mm2     | 2m     |  |
| 28334-03<br>Angled Battery Cables 2m for e-<br>Inverter 2000 | -    | 70mm2     | 2m     | Due to the internal 300A fuse of the e-<br>Power. A fuse is not needed.  |
| 28227-03 Busbars for e-Power and e-Inverter                  | -    | -         | -      | Used when e-Inverter is stacked on top of<br>e-Power.<br>Note! e-Inverter 2000 requires a 200A<br>fuse instead of positivt busbar. |

## 4.2 Connecting communication cables

To control the e-Inverter and/or e-Heater from the e-Power system, the units must be:

- Connected on CANbus via the RJ45 ports in the rear, and
- CANbus must be terminated

CANbus must be terminated with a 120-ohm resistor at both ends to keep the signal clear and stable. Inside the e-Power, there is already a built-in resistor but there needs to be another resistor at the end of the CAN chain.

Parts need:

- Terminator (included with the e-Power)
- RJ45 cable (28204-03 or 28205-03)
- RJ45 Splitter (28207-03)



The CAN ports (number 8 and 9) in the rear of the units are for connecting the units.

A general rule for the termination is that it needs to go furthest away form the e-Power, to terminate both ends of the CAN chain. However, in the case of the e-Inverter being stacked on top of the e-Power, with short RJ45 cable, alternative 2 can be used.

Alternative 1

- 1. Connect the RJ45 cable into CAN1 or CAN2 in the rear of the e-Power.
- 2. Connect the other end of the cable to the RJ45 splitter and connect the splitter to the CAN port on the e-Inverter/e-Heater.
- 3. Plug in the terminator in the other port on the splitter.



Figure 3 RJ45 cable between the e-Power and e-Inverter with termination at the end



Figure 4 RJ45 cable between the e-Power and e-Heater with termination at the end

## Alternative 2

- 1. Connect the RJ45 cable into CAN1 in the rear of the e-Power.
- 2. Connect the other end of the cable to the CAN port on the e-Inverter.
- 3. Connect the terminator in CAN2.



## 4.2 Connecting multiple units to e-Power

When multiple units are connected to the e-Power, all need to be connected in the same CAN chain.

- 1. Connect the first unit, e.g., the e-Inverter, with an RJ45 cable from the CAN1 on the e-Power to the RJ45 splitter. The splitter then goes into the CAN port on the e-Inverter.
- 2. Connect another RJ45 cable into the free port in the splitter and connect the other end to another splitter.
- 3. The second splitter then goes into the e-Heater's CAN port.
- 4. Lastly, as that termination must be in the end of the CAN chain, the termination must go into the splitter connected to the heater, as that is furthest away from the e-Power.



## 5. Operating the unit

## 5.1 Starting up the unit

## Main Power switch

**ON** – Activates the system, enabling all functions.

- Once the switch is ON, the unit will start automatically.
- If 12V is not set to Always ON, see section 6.6 Advanced settings, there will not be any power coming out of the outputs until it is activated by charging or turning on any of the integrated product's, the e-Inverter and e-Heater.

**OFF** – Completely shuts down the unit; recommended for long-term storage (e.g., vacations) to conserve battery.

- When the rear switch is set to OFF, the unit is completely shut down and consumes minimal power.
- All outputs are disabled, and the unit cannot receive a charge.

• Since the system is fully powered down, it does not keep track of the date and time, requiring them to be re-entered upon startup.

## 5.2 Navigation and Control

## **Navigation & Menu Control Buttons**

Located on the right side of the display, these buttons allow users to interact with the system.

- Directional Pad (Up, Down, Left, Right, OK)
  - Up/Down/Left/Right Arrows Navigate through menu options.
  - OK Button (Centre of the pad) Confirms selections and open the menu from the start screen.
- Back Button ( 🔁 )
  - $\circ$  Returns to the previous page



#### **Function Buttons**

These buttons activate specific features of the system:

- e-Inverter Button (Lightning Icon)
  - Turns the connected e-Inverter on or off, allowing AC power output when needed.
- e-Heater Button (Wavy Lines Icon)
  - Activates the heating function if a heater is connected.
- AUX1 & AUX2 Buttons
  - Toggle auxiliary outputs via Modul-Connect. If not used with Modul-Connect, these buttons will not control anything.

These buttons provide easy control over power distribution, auxiliary devices, and navigation within the system's menu.

## 5.3 Home Screen

This screen provides an overview of the battery's charge level and remaining runtime based on current consumption.

## **Remaining Runtime (Right Circle)**

- Shows the estimated remaining operating time based on the current power consumption.
- Here, the system can run for 10 hours and 23 minutes before depletion.
- This value dynamically adjusts based on realtime energy consumption.



## **Battery Charge Level (Left Circle)**

- Displays the current state of charge (SOC) in percentage.
- In this case, the battery is charged at 10%.
- The battery icon visually represents its charge state.



#### **Bottom Menu Bar**

- The bottom bar shows the current **charging status**, with icons for **solar**, **AC**, **and DC** power sources (solar is active).
- Current Time Displays the system time (Monday 13:05).



## 5.4 Low Battery Warnings

This section describes the **low battery warning system** and the corresponding **power-saving measures** taken by the unit as the battery level decreases.

## At 20% State of Charge (SOC)

- The first warning message appears on the screen, notifying the user that the battery has reached 20%.
- Screen brightness is automatically reduced to conserve power.
- The user is advised to charge the unit to avoid further power depletion.

| Low battery                                   |                                |
|---|--------------------------------|
| Low battery, 20% rem                          | maining                        |
| Please charge the e-<br>e-Power will enter re | Power. If not, the<br>st mode. |
|   | Close                          |

#### At 10% State of Charge (SOC)

- A second warning message is displayed, highlighting that the battery level has dropped to 10%.
- Screen brightness is further reduced to minimize power consumption.
- A sound warning will trigger every minute until the battery reaches 0%.

| ▲ Low battery  |                   |
|--|-------------------|
| Low battery, 10% remaining                                 | ,                 |
| Please charge the e-Power.<br>e-Power will enter rest mode | If not, the<br>e. |
|  | Close             |

• Users should immediately connect the unit to a power source to charge it, thus preventing it shutting down.

#### At 0% State of Charge (SOC) – Deep Sleep Mode

- When the battery reaches 0%, the system will enter Deep Sleep Mode.
- In Deep Sleep Mode, the unit cannot be used until it receives an external charge.
- Users must connect the unit to an external power source to reactivate the system.

When the state of charge becomes low, the system will warn and go into battery saving mode. The clock and calendar of the e-Power till be kept.

## 6.Menu

The menu provides access to the operating status and key settings for the e-Power system.

| MENU |                   |
|------|-------------------|
|      |                   |
|      | Battery status    |
| 111  | e-Heater          |
| *    | Inverter          |
| Ø    | Footprint         |
| ۵    | Settings          |
| ¢:   | Advanced settings |
|      |                   |

## 6.1 Battery Status Menu

This menu provides real-time information about the battery's performance and operational status.

**Operation Status** – Indicates whether the battery is currently active or inactive.

**Remaining Operation** – Displays the estimated time the battery can continue operating under the current load. In this case, it shows 8 hours and 34 minutes remaining.

| MENU > BATTERY STATUS |               |   |  |
|-----------------------|---------------|---|--|
|                       |               |   |  |
| OVERVIEW              |               |   |  |
| Operation status      | active        | I |  |
| Remaining operation   | 8 hr : 34 min | I |  |
| Current capacity      | 95%           | I |  |
| Power                 | 4W            |   |  |
| Voltage               | 13,33V        |   |  |
| Current               | 0,30A         |   |  |
| Number of cycles      | 2             |   |  |
|                       |               |   |  |

Current Capacity – Represents the battery's charge level as a percentage. Here, it is at 95%.

**Power** – Shows the power consumption or output of the battery in watts. The displayed value is 4W.

Voltage - Indicates the current voltage level of the battery. In this case, it is 13.33V.

Current – Displays the current flowing from the battery in amperes. The value shown is 0.30A.

**Number of Cycles** – Represents how many complete charge-discharge cycles the battery has gone through. This battery has undergone 2 cycles

This section provides individual voltage readings for each battery cell. Monitoring cell voltage ensures balanced performance and prolongs battery life.

Cell 1: 3.330V

Cell 2: 3.330V

Cell 3: 3.330V

| CELL VOLTAGE |        |
|--------------|--------|
| Cell 1       | 3,330V |
| Cell 2       | 3,330V |
| Cell 3       | 3,330V |
| Cell 4       | 3,330V |

## Cell 4: 3.330V

Each cell is operating at the same voltage, which indicates uniform charge distribution, an important factor for battery health.

This menu displays temperature readings for different points within the battery system, helping to monitor thermal stability.

- Between Cell 1 and 2: 25.6°C
- Between Cell 2 and 3: 25.6°C
- Between Cell 3 and 4: 25.6°C

| TEMPERATURE BATTERY CELLS |        |
|---------------------------|--------|
| Between Cell 1 and 2      | 25,6°C |
| Between Cell 2 and 3      | 25,6°C |
| Between Cell 3 and 4      | 25,6°C |

These values indicate that the battery is operating within a stable temperature range.

## 6.2 Heater

This menu allows users to control the electric heater's scheduling, temperature settings, and power limits.

#### Schedule

The system provides three schedule slots that can be set to automatically turn the heater on or off at specific times. In this case, all schedules are currently deactivated:

- Schedule 1: OFF
- Schedule 2: OFF
- Schedule 3: OFF

Users can enable and configure these schedules as needed to automate heating cycles.

#### **Set Target Temperature**

• Temperature: 22°C

This setting determines the target temperature for the heater. Once activated, the heater will work to maintain this set temperature.

#### Set Power limit

This setting determines the maximum power level at which the heater operates. The number represents a fraction of the heater's total power capacity:

- 1 → Heater operates at 1/3 of its maximum power
- 2 → Heater operates at 2/3 of its maximum power
- $3 \rightarrow$  Heater operates at full power (3/3)

The < 3 setting indicates that the heater is currently operating at less than full power. Lowering this value can help manage energy consumption, reduce electrical load, and optimize efficiency, especially in situations where full power is unnecessary, or energy-saving is a priority.

| MENU > E-HEATER |       |
|-----------------|-------|
| SCHEDULE        | l I   |
| Schedule 1      | OFF   |
| Schedule 2      | OFF   |
| Schedule 3      | OFF   |
| SET TARGET TEMP |       |
| Temperature     | 22°C  |
| SET POWER LIMIT |       |
| Set limit       | < 3 > |
|                 |       |
|                 |       |
|                 |       |

## 6.3 Footprint

This menu provides an overview of the energy balance, showing the sources of energy charged into the system and the total power consumption.

## Charged

This section displays the total amount of energy charged into the system from various power sources, measured in kilowatt-hours (kWh):

- 230VAC The energy received from an external AC power source (e.g., grid or generator).
- 12V Energy charged through a 12V power input, such as a vehicle alternator.

| MENU > FOOTPRINT |                                       |
|------------------|---------------------------------------|
| CHARGED          | · · · · · · · · · · · · · · · · · · · |
| 230VAC           | kWh                                   |
| 12V              | kWh                                   |
| Solar            | kWh                                   |
| CONSUMPTION      |                                       |
| AC               | kWh                                   |
| DC               | kWh                                   |
| USB-A            | kWh                                   |

• Solar – Energy harvested from a solar panel system.

#### Consumption

This section shows the total power consumed by different system outputs, also measured in kWh:

- AC Total power consumption from AC-powered devices connected to the system.
- DC Power consumed by DC-powered appliances running directly from the battery system.
- USB-A Power used by devices connected via USB-A ports.

By monitoring this menu, users can track energy input versus consumption, optimise power usage, and ensure efficient energy management.

## 6.4 Inverter

This menu provides settings for the inverter operation, specifically focusing on its runtime.

## Settings

• Run Time: 30 MIN

This setting defines how long the inverter will remain active before automatically shutting down. In this case, the inverter is set to operate for 30 minutes before turning off.

| MENU > E-INVERTER |        |   |
|-------------------|--------|---|
| SETTINGS          |        |   |
| Timer             | 30 MIN | I |
|                   |        | I |
|                   |        | I |
|                   |        |   |

## 6.5 Settings

This menu provides configurable parameters for charging, sound, display, and unit behaviour.

| MENU > SETTINGS        |            |  |  |
|------------------------|------------|--|--|
| SOUND                  |            |  |  |
| Power                  | OFF        |  |  |
| Button                 | OFF        |  |  |
| Error                  | OFF        |  |  |
| DISPLAY                |            |  |  |
| Sleep mode             | 30 MIN     |  |  |
| Display mode           | DARK       |  |  |
| Start screen           | Detail     |  |  |
| Brightness             | 90%        |  |  |
| CHARGING – SET CURRENT |            |  |  |
| AC/DC                  | < 20 AMP > |  |  |
| CHARGING - SET VOLTAGE |            |  |  |
| Solar                  | 5V         |  |  |
| UNIT                   |            |  |  |
| Deep sleep             | 60 MIN     |  |  |
|                        |            |  |  |
|                        |            |  |  |

## **Charging – Set Current**

• AC/DC Charging Limit: < 20 AMP >

The built-in charger allows users to set a lower current limit for charging. The total charging current is shared between AC and DC chargers, with each capable of up to 40A individually. If both charging types are active, the total available current is split accordingly.

Maximum Current Settings Table:

| Maximum Current<br>Setting | Only AC<br>Available | Only DC<br>Available | Both AC & DC Available                  |
|----------------------------|----------------------|----------------------|---|
| 80A                        | 40A                  | 40A                  | 80A total (40A from AC, 40A from<br>DC) |
| 60A                        | 40A                  | 40A                  | 60A total (shared between AC & DC)      |
| 40A                        | 40A                  | 40A                  | 40A total                               |
| 20A                        | 20A                  | 20A                  | 20A total                               |

If only one charging type is active, the system will not reduce the charging current unless the limit is set to 20A.

## **DC Charging**

## • EV Mode: ON

This setting controls whether the system operates in EV mode, which optimizes DC charging to support electric vehicle charging needs.

#### **Sound Settings**

Users can toggle sound alerts for different events:

- Power Sound: OFF
- Button Sound: OFF
- Error Sound: OFF

These options allow customization of **audible feedback** for power status, button presses, and error notifications.

### **Display Settings**

- Sleep Mode: 30 MIN
  - The display will enter sleep mode after **30 minutes of inactivity** to save energy.
- Display Mode: DARK
  - The display is set to **dark mode** for improved visibility in low-light conditions.

## • Start Screen: Detail

- The device starts with the **detailed view** when powered on.
- Brightness: 90%
  - The screen brightness is set to **90%**, ensuring a balance between visibility and power efficiency.

#### **Unit Settings**

- Deep Sleep: 60 MIN
  - The device will enter **deep sleep mode** after **60 minutes of inactivity**, further reducing power consumption.

*Date* The date of the unit can be changed here. If schedules are set, they are based on the date and time selected in this section.

*Time* The time of the unit can be changed here. If schedules are set, they are based on the date and time selected in this section.

**Sound** When the sound for button is on, the buttons on the e-Power will feedback with a sound for every press. When sound for error is on, error and low battery warnings will come with a sound.

## 6.6 Advanced settings

This menu provides detailed system information, firmware version details, error codes, and the option for a factory reset.

| MENU > ADVANCED SETTINGS |                  |
|--------------------------|------------------|
| ABOUT                    |                  |
| Serial number            | xxxxxxxx         |
| Manufactured             | DD/MM/YYYY       |
| Hardware                 | хххххххх         |
| FIRMWARE VERSION         |                  |
| Unit                     | *****            |
| Display                  | *****            |
| Power board              | xxxxxxxx         |
| Power board              | xxxxxxxx         |
| 12V OUTPUT               |                  |
| 12V                      | AUTO / ALWAYS ON |
| MANUAL                   |                  |
|                          |                  |
|                          |                  |
|                          |                  |

#### About

This section contains essential device identification and manufacturing details:

- Serial Number A unique identifier for the device (XXXXXXX).
- Manufactured Date The production date of the unit (DD/MM/YYYY).
- Hardware Version Identifies the specific hardware version installed (XXXXXXX).

These details are useful for technical support, warranty claims, or firmware updates.

#### **Firmware Version**

Displays the current firmware versions of different components of the system:

- Unit Firmware version of the main control unit.
- Display Firmware version of the display module.
- Power Board Firmware version(s) for the power board(s).

Having the correct and up-to-date firmware ensures system stability, compatibility, and performance improvements.

### 12V Output

12V Auto Setting

• When set to *Auto*, the 12V output automatically activates when the e-Heater or e-Inverter is turned on via the e-Power system, or when charging is detected. To conserve power, the 12V output will deactivate after a specified period of inactivity.

12V Always-On Mode

• For accessories that require continuous power—such as Modul-Connect systems or lighting—the 12V output can be set to *Always On*, ensuring uninterrupted power regardless of system load or charging status.

## Manual

A QR code is provided for quick access to the product manual. Scanning it with a smartphone or tablet opens the digital version of the manual for detailed reference.

# 7.Understanding the error codes

| Category             | Code | Description                                    | Suggested Action   |
|----------------------|------|--|--|
|                      |      |  |  |
| Charger DC<br>Errors | 1    | Battery input high voltage<br>protection (CH3) | Verify charger and battery compatibility;<br>check for regulator issues      |
|                      | 2    | Battery input low voltage<br>protection (CH3)  | Inspect battery charge level and condition                                   |
|                      | 3    | Battery input high voltage protection (CH2)    | Same as above (CH2-specific)   |
|                      | 4    | Battery input low voltage protection (CH2)     | Same as above (CH2-specific)   |
|                      | 5    | Battery input high voltage protection (CH1)    | Same as above (CH1-specific)   |
|                      | 6    | Charger high temperature protection Battery    | Let unit cool; inspect for dust buildup and cooling performance              |
|                      | 7    | High temperature<br>protection (CH1 / CH2)     | Check temperature sensors and environmental conditions                       |
|                      | 8    | Offline  | Verify communication or power connections to charger                         |
|                      | 9    | Battery low temperature protection (CH1)       | Warm battery to operating temperature range                                  |
|                      | 10   | CH3 offline                                    | Check cable connections and charger power                                    |
|                      | 11   | Output short circuit protection                | Disconnect all outputs and test individually;<br>inspect for shorts          |
|                      | 12   | No battery detected                            | Check battery connections; confirm battery is functional and properly seated |
|                      | 13   | Lithium battery low<br>temperature protection  | Warm battery; ensure temperature is above safety threshold before charging   |
| Charger AC<br>Errors | 1    | AC input low voltage / AC<br>input high        | Measure AC input; verify with grid or generator supply                       |

| Category             | Code | Description                               | Suggested Action   |
|----------------------|------|---|--|
|                      | 2    | Voltage output reverse protection         | Check wiring polarity and ensure correct connections                       |
|                      | 3    | Charger high temperature protection       | Improve cooling; inspect for fan failures or<br>restricted airflow         |
|                      | 6    | Battery high temperature protection (CH1) | Allow battery to cool; ensure proper<br>ventilation                        |
|                      | 7    | Battery low temperature protection (CH1)  | Warm battery before charging   |
|                      | 9    | Battery high voltage protection (CH1)     | Check battery charging circuit; investigate<br>faulty charge controller    |
| BMS Module<br>Errors | 0    | Battery not seen                          | Confirm communication with BMS; inspect connectors and cabling             |
|                      | 4    | Over voltage battery                      | Stop charging; inspect charge controller and verify max voltage            |
|                      | 5    | Under voltage battery                     | Recharge battery; check for deep discharge                                 |
|                      | 6    | Over voltage cell                         | Inspect individual cell voltages; replace faulty cell if needed            |
|                      | 7    | Under voltage cell                        | Same as above; recharge or replace low-<br>voltage cells                   |
|                      | 8    | Over temperature battery                  | Let battery cool; avoid excessive loads or hot<br>environments             |
|                      | 9    | Under temperature<br>battery              | Warm battery to safe operating range                                       |
|                      | 10   | Over current limit                        | Check for current spikes; reduce load or review charging/discharging rates |
| BMS Errors           | 6    | BMS precharge error                       | Inspect precharge circuit; check resistor and relay operation              |
|                      | 8    | BMS start error                           | Restart system; review BMS initialization routine and wiring               |

# 8. Technical Specification

|                             | e-Power 2000                |
|-----------------------------|-----------------------------|
| Battery Size                | 178ah ( 2 294Wh)            |
| DC Charger                  | 40A                         |
| AC Charger                  | 40A                         |
| PV Charging                 | Yes                         |
| AC Charging connection      | IEC                         |
| Charging<br>temperature     | 0-55°C, -30 - 55° (X-treme) |
| DC Output voltage           | 10-14.5V                    |
| Max Current<br>Continuously | 250A                        |
| Max Current (2S)            | 295A                        |
| Battery Type                | LiFePo4                     |
| Certifications              | ECE R10, CE UKCA            |
| IP Rating                   | IP23C                       |
| Dimensions                  | 320mm x 477mm x 202mm       |
| Weight                      | 25kg                        |
| Warranty                    | 3 years                     |