HOPPECKE
POWER FROM INNOVATION

# Assembly instructions

## sun.fusebox

## Foreword

Dear Customer,

Thank you very much for having decided in favour of a product bearing our brand name.

Please read this documentation carefully before working on the **sun.fusebox** or its components. It contains important information on the safe and correct installation of the **sun.fusebox**.

The documentation is aimed at qualified electricians for the installation of the battery system.

Amendments to this documentation are subject to change without prior intimation. Our products undergo continuous advanced development. This is why there may be deviations between the figures given in this documentation and the product purchased by you. These assembly instructions are subject to change without notice.

Store this documentation such that it is immediately available to all those who need to carry out work in connection with the battery system or its components.



**Assembly instructions for**
**sun.fusebox** 160 A/300 A

Layout, design and printing: Koerdt Promo4you GmbH, 59929 Brilon, Germany

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## 1 Means of representation

The following symbols and signal words are used in this document:

**DANGER!**
Denotes an immediate hazard with a high level of risk that could lead to death or severe physical injury if it is not prevented.

**WARNING!**
Denotes a potential hazard with a medium level of risk that could lead to death or severe physical injury if it is not prevented.

**CAUTION!**
Denotes a potential hazard that could lead to slight or minor physical injury if it is not prevented.

ATTENTION! Denotes a hazard that could damage the product, other objects or the environment if it is not prevented.

Denotes instructions that are important in ensuring optimal use of the product.

## 2 Safety instructions

When working with the battery system and its components, observe the following safety instructions.

### 2.1 General safety instructions

**DANGER!**
Danger due to high levels of electrical voltage and currents, short circuits and electric arcs. Electric shocks and severe burns possible.

- All work on the **sun.fusebox** and the associated battery system must be carried out by an electrician.
- Never place tools or other metallic objects in the **sun.fusebox** housing or on a battery.
- Be sure to remove watches and jewellery before carrying out any work on the batteries.
- Do not touch any exposed battery parts, connectors, terminals or poles.
- Use insulated, non-sparking tools.

## 2.2 Designated use

The **sun.fusebox** is a battery fuse circuit breaker. It safeguards the connection lines between the battery and the charger. The **sun.fusebox** can also be used to disconnect the battery system from all input and output circuits.

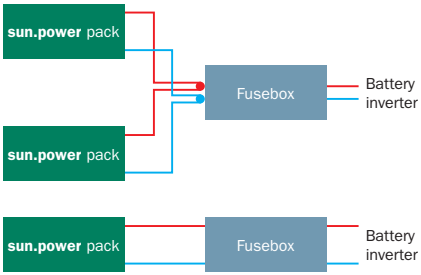


*Figure 1: Application example*

The **sun.fusebox** is available in different model versions with respect to the current capacity and the number of charger units that can be connect:

| | |
|---|---|
| **sun.fusebox** Model NH00 | For safety protection up to 160 A and 220 VDC |
| | Connection options: 2x battery + 1x charger unit |
| **sun.fusebox** Model NH1 | For safety protection up to 250 A and 220 VDC |
| | Connection options: 3x battery + 3x charger unit |
| **sun.fusebox** Model NH2 | For safety protection up to 400 A and 220 VDC |
| | Connection options: 2x battery + 1x charger unit |

## 3 Scope of delivery

HOPPECKE Batterien GmbH packs its deliveries with the maximum possible care so that they arrive at your premises in immaculate condition. However, we therefore recommend that you examine the delivery for any transportation damage directly on its arrival.

If the delivery is incomplete or damage in transit has taken place:

- ➤ Write a brief defect report on the delivery note before signing.
- ➤ Request the freight forwarder to check the consignment and note down the name of the person carrying out the check.
- ➤ Write a defect report and send this to the suppliers within seven days.
- ➤ Check the delivery for completeness using the following lists.

### 3.1 Scope of delivery for sun.fusebox Model NH00

| Material | Quantity |
|---|---|
| Housing 360 x 270 x 170 mm (L x W x D) with NH00 fuse circuit breaker, incl. wiring diagram | 1 |
| Fuse inserts NH00 160 A | 2 |
| Fastening materials: 4x screws, 4x dowels | 1 |
| Cable glands M32 | 6 |
| Sealing plugs M32 | 2 |
| Locknuts M32 | 6 |

*Figure 2: Scope of delivery for **sun.fusebox** Model NH00*

### 3.2 Scope of delivery for sun.fusebox Model NH1

| Material | Quantity |
|---|---|
| Casing 640 x 440 x 179 mm (L x W x T) with NH1 overload protection breaker | 1 |
| Fuse links NH1 (current value can vary) | 6 |
| Mounting kit | 1 |
| Cable glands, suitable for cable set | * |
| Blanking plugs, suitable for cable set | * |
| Lock nuts, suitable for cable set | * |

* The number of cable glads, blanking plugs and lock nuts is matched to the requirement of the cable set

*Figure 3: Scope of delivery for **sun.fusebox** NH1*

### 3.3 Scope of delivery for sun.fusebox Model NH2

| Material | Quantity |
|---|---|
| Housing 540 x 270 x 170 mm (L x W x D) with NH02 fuse circuit breaker, incl. wiring diagram | 1 |
| Fuse inserts NH02 300 A | 2 |
| Fastening materials: 6x screws, 6x dowels | 1 |
| Cable glands M40 | 6 |
| Sealing plugs M40 | 2 |
| Locknuts M40 | 6 |

*Figure 4: Scope of delivery for **sun.fusebox** Model NH2*

## 4 Assembly

ATTENTION! Do not install the **sun.fusebox** against or near combustible building materials. The safety distance to the battery system must be checked before installation of the sun.fusebox. The required safety distance can be found in the installation instructions of the battery system.

### 4.1 Equipment for assembly and connection

The following is required for the assembly and connection of the **sun.fusebox**:

| Equipment | NH00 | NH1 | NH2 |
|---|---|---|---|
| Torque wrench | Min. 10 Nm | Min. 30 Nm | Min. 30 Nm |
| Flat and cross head (Pozi) screwdrivers | X | X | X |
| Ratchet with extension and the following sockets for hex head bolts | 13 mm socket | 13 and 17 mm sockets | 17 mm socket |
| Safety boots | X | X | X |

### 4.2 Wall assembly

The **sun.fusebox** is designed for wall assembly.

➤ Model NH1 supplied with separate fixing brackets included. Fix the fixing brackets to all the casing corners.

➤ Mark the position of the drill holes using the casing or fixing brackets.

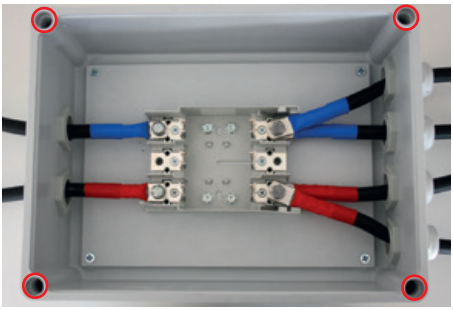

*Figure 5: Attachment openings*

➤ Drill the holes as per the marking, and insert the dowels contained in the delivery.

➤ Use the supplied screws to attach the **sun.fusebox** to a suitable wall (must be suitable for dimensions and weight).

## 5 Connection

**DANGER!**
Danger due to high levels of electrical voltage and currents, short circuits and electric arcs. Electric shocks and severe burns possible.
The fuse inserts must not be used during installation. The fuse circuit breaker must be open during all work on the **sun.power** pack.

**CAUTION!**
Insufficient qualification and errors when laying the cables.
Large amounts of current flow via the battery cables, meaning that the cables and their connections become very hot, which can lead to burns and fires.
- The electrical connection must be performed by an electrician.
- Only use the supplied cables from the HOPPECKE-approved cable sets.
- Do not lay the battery supply line concealed or in a plastic armoured conduit.
- When tightening the cable lugs, observe the specified torques.

When carrying out wall assembly of the **sun.fusebox**, please take into account the lengths of the supplied cables.

Before connecting the **sun.fusebox**:
- Open the isolator and remove the isolator handle.
- Remove the covers from the connection compartment.

*Figure 6: Connection compartment covers*

### 5.1 Connection of the sun.fusebox NH00

#### 5.1.1 Connecting the battery side


*Figure 7: Connecting the battery cable to the **sun.fusebox** NH00*

➤ Screw the four cable glands into the bores in the housing. The two outer bores on the battery side must be sealed using the supplied sealing plugs. Then guide the battery cable (length 1.5 m) with the red heat-shrink tubing through the cable gland, and attach the cable lug onto the connection compartment for the fuse circuit breaker on the battery side. The cable lug must be attached to a torque of 10 Nm.

➤ Guide the battery cable with the blue heat-shrink tubing through the additional opening, and attach the cable lug onto the free contact of the fuse circuit breaker so that the central contact remains open.

#### 5.1.2 Parallel connection

*Figure 8: Parallel connection of the **sun.fusebox** NH00*

A similar procedure must be followed for parallel variants.

➤ Connect two battery cables to one of the connections on the fuse circuit breaker. It must be ensured that the upper and lower cable lugs are connected such that they are rotated relative to each other (see figure 8). Additional cable glands must be used instead of sealing plugs for the parallel variants. The cable set for the second battery is fed through these cable glands.

### 5.1.3 Connecting the battery inverter side

➤ Connect the two further cables onto the contacts of the fuse circuit breaker on the battery inverter side, and then onto the battery inverter.
➤ Ensure that the positive and negative terminals are not reversed.

- The connection screws for attaching the cable lugs to the fuse circuit breaker of the **sun.fusebox** NH00 must be tightened to 10 Nm.
- When attaching the cable lugs, it must be ensured that the supporting surface is as large as possible. Connection screws must be fixed using shims.
- All connecting cables to and from the **sun.fusebox** must be laid such that no mechanical forces can be transmitted to the connections.
- Tighten the inserted cable glands in order to ensure strain relief for the connecting cables.

### 5.2 Connection of the sun.fusebox Model NH1

➤ Attach the „High Voltage“ sticker centrally on the cover of the casing.

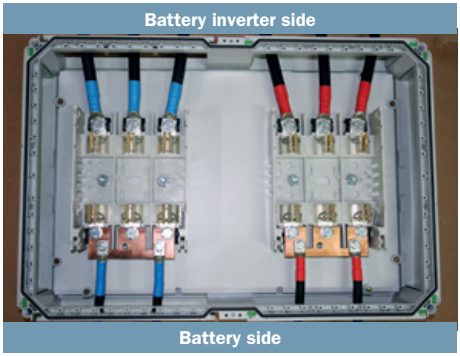


*Figure 9: Connection **sun.fusebox** NH1*

➤ Break out the appropriate knock-outs of the casing, according to the number and cross-section of the cables.
➤ Screw in the cable glands (supplied optionally) in place of the broken knock-outs in the casing. Then, run the battery cable with red heat-shrink tubing through the cable gland to the +ve side and fasten the cable, in the terminal compartment of the fuse circuit breaker, to the copper busbars. The cable lug must be tightened with a torque of 27 ± 1 Nm.
➤ Run the battery cable with the blue heat-shrink tubing through the cable gland to the -ve side and fasten the cable to the copper busbars in the terminal compartment of the fuse circuit breaker.

### 5.2.1 Connecting to the battery inverter side

➤ Break out the appropriate knock-outs of the casing, according to the number and cross-section of the cables.
➤ Screw in the cable glands (supplied optionally) in place of the broken knock-outs in the casing.
➤ Using the cable lugs, connect the two further cables to the contacts of the fuse circuit breaker on the charger unit side and then afterwards to the charger unit.
➤ The cable lug must be tightened with a torque of 30 to 35 Nm to the fusebox.
➤ Make sure the „Positive“ and Negative“ poles are correct.

- Ensure the maximum contact surface when tightening the cable lugs. The terminal screws are to be fastened with a washer.
- All connection cables to and from the sun.fusebox must be routed so that mechanical forces cannot be transmitted to the terminals.
- Tighten the cable glands used to ensure the connecting cable is relieved of any strain.

### 5.3 Connection of the sun.fusebox NH2

#### 5.3.1 Connecting the battery side

*Figure 10: Fixing the nuts*

➤ Firstly insert the supplied M10 nuts into the designated fixings (see figure 10) and attach these underneath the left and right flat connection of the connection compartment on the battery inverter side and the battery side.


*Figure 11: Connecting the **sun.fusebox** NH2*

➤ Screw the four cable glands into the bores in the housing. The two outer bores on the battery side must be sealed using the supplied sealing plugs. Then guide the battery cable (length 1.5 m) with the red heat-shrink tubing through the cable gland, and attach the cable lug onto the connection compartment for the fuse circuit breaker on the battery side. The cable lug must be attached to a torque of 30 Nm.

➤ Guide the battery cable with the blue heat-shrink tubing through the additional opening, and attach the cable lug onto the free contact of the fuse circuit breaker so that the central contact remains open.

### 5.3.2 Parallel connection

*Figure 12: Parallel connection of the **sun.fusebox** NH2*

A similar procedure must be followed for parallel variants.

➤ Connect two battery cables to one of the connections on the fuse circuit breaker. It must be ensured that the upper and lower cable lugs are connected such that they are rotated relative to each other (see figure 12). Additional cable glands must be used instead of sealing plugs for the parallel variants. The cable set for the second battery is fed through these cable glands.

### 5.3.3 Connecting the battery inverter side

➤ Use the cable lugs to connect the two further cables onto the contacts of the fuse circuit breaker on the battery inverter side, and then onto the battery inverter.
➤ Ensure that the positive and negative terminals are not reversed.

- The **sun.fusebox** NH2 connection screws for attaching the M10 cable lugs must be tightened to a torque of 30 Nm.
- When attaching the cable lugs, it must be ensured that the supporting surface is as large as possible. Connection screws must be fixed using shims.
- All connecting cables to and from the **sun.fusebox** must be laid such that no mechanical forces can be transmitted to the connections.
- Tighten the inserted cable glands in order to ensure strain relief for the connecting cables.

### 5.4 Completing connection work

➤ Fit the covers onto the connection compartment With the **sun.fusebox** 160 A, the knock outs on the connection compartment covers must be snapped out.
➤ Insert the correct fuse inserts (contained in the delivery) into the isolator handle.
➤ Insert the isolator handle including the fuse inserts back into the isolator.

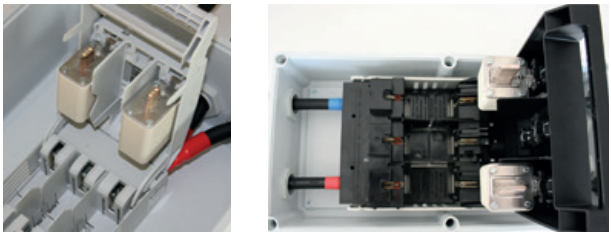

*Figure 13: Inserting the fuse inserts*

➤ Quickly close the isolator handle.
➤ Close the cover of the **sun.fusebox**.
➤ Fix the rating plate (supplied) clearly visible on the right external side of the casing.

*Figure 14: Wiring diagram*

## 6 Maintenance

**Replacing the NH safety fuse**

➤ Open the cover of the sun.fusebox.
➤ Snap the isolator handle open.
➤ Remove the NH safety fuse.
➤ Insert the NH safety fuse into the isolator handle.

**CAUTION!**
Pay attention to the rating of the fuse. When selecting a fuse that is too large there is a danger, in the event of a fault, that the fuse trips too late or not at all. When choosing a fuse that is too small, the possibility of tripping during normal operation may occur.

➤ Snap the isolator handle close.
➤ Close the cover of the sun.fusebox.

## 7 Technical Data

| | **sun.fusebox** Model NH00 | **sun.fusebox** Model NH1 | **sun.fusebox** Model NH2 |
|---|---|---|---|
| Model size | NH 00 | NH 1 | NH 2 |
| Dimensions (L x H x W) | 360x270x170 mm | 640x440x179 mm | 540x270x170 mm |
| Weight | 3.5 kg | 12.5 kg | 9 kg |
| Ambient temperature | -25 to +55 °C | | |
| Humidity | max. 95 % (not condensing) | | |
| Protection class | IP 65/IP 51 when blanking plugs used | | |
| Fixing | Wall mounting | | |
| Rated voltage | 220 VDC | | |
| Nominal current safety fuse | to 160 A | to 250 A | to 400 A |
| Incoming cable entries | 4 x M32 | up to 10x M25/32/40 | 4 x M40 |
| Outgoing cable entries | 2 x M32 | up to 10x M25/32/40 | 2 x M40 |

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# CE Declaration of Conformity

For the following products

**HOPPECKE sun.fusebox 160A,**
**HOPPECKE sun.fusebox 300A,**
**HOPPECKE sun.fusebox 3x200A**

it is confirmed that they **conform** to the following relevant **regulations**, in particular the **safety and protection requirements**:

| | |
|---|---|
| **2006/95/EC** | The Directive 2006/95/EC of the European Parliament and of the Council of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits |
| **93/68/EEC** | Directive of the European Community on modification of CE marking |

The following relevant harmonized European and international standards have been used for rating the products in respect of their **electromagnetic compatibility**:

| | | |
|---|---|---|
| **EN 61439-1:2011** | Low-voltage switchgear and controlgear assemblies | General rules |
| **EN 61439-2:2011** | Low-voltage switchgear and controlgear assemblies | Power switchgear and controlgear assemblies |

This declaration shall apply to all identical copies of the above mentioned products.

Hoppecke, August 15th 2014

Dr. Marc Zoellner
Chief Executive Officer

i.V. Dr. Klaus Gutzeit
Dr. Klaus Gutzeit
Head of Product Management
CE representative

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# Assembly instructions

## sun.fusebox

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