Switching device for Sunny Backup systems

AUTOMATIC SWITCH BOX L

Installation Guide
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</tbody>
</table>
1 Notes on this Manual

This manual describes the assembly and installation of the Automatic Switch Box. This manual replaces the assembly and installation instructions in the technical description of the Sunny Backup 5000, version 2.0.

Store this manual where it will be accessible at all times.

1.1 Validity

This manual is valid for the type AS-BOX-L Automatic Switch Box.

1.2 Target Group

This manual is for qualified personnel. The tasks described in this manual may only be performed by qualified personnel.

1.3 Additional Information

Additional information regarding the Sunny Backup system and the Automatic Switch Box can be found in the FAQ section at www.SMA.de/en.

Additional Sunny Backup system certificates can be found on the Internet at www.SMA.de/en.
1.4 Symbols Used

The following types of safety precaution and general information are used in this manual:

---

**DANGER!**

DANGER indicates a hazardous situation which, if not avoided, will result in certain death or serious injury.

---

**WARNING!**

WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

---

**CAUTION!**

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury!

---

**NOTICE!**

NOTICE indicates a situation that can result in property damage if not avoided.

---

**Information**

Information provides tips that are valuable for the optimal installation and operation of your product.
2 Safety

2.1 Appropriate Usage

The Automatic Switch Box is a changeover facility for Sunny Backup systems. Sunny Backup regulates and controls the Automatic Switch Box and acts as an island grid in case of a power outage. During a power outage, the Automatic Switch Box safely separates the connected PV system and the connected consumer loads from the public grid and connects them to the island grid.

You have the option of integrating a generator into the Sunny Backup system if you selected the "Generator connection" feature when you ordered the Automatic Switch Box. The generator connection can be ordered as an option but cannot be retrofitted.

If a generator is integrated into the Sunny Backup system, the Automatic Switch Box switches it to the island grid in case of a power outage.

Connection requirements

The Sunny Backup system is only certified for TN grids and may not be installed in TT grids.

The Automatic Switch Box may only be operated in conjunction with three Sunny Backups. In this case, one of the three Sunny Backups is configured as the master and the other two as slaves. Consult the Sunny Backup 5000 manual for more details. The Sunny Backup master evaluates the data recorded in the Automatic Switch Box, coordinates all switching operations and controls all components of the Sunny Backup system.

Do not exceed the maximum connection power of the individual outgoing lines (e.g. maximum AC PV power to be connected: 30 kW) in the Automatic Switch Box.

Do not use the Automatic Switch Box for purposes other than those described here. Alternative uses, modifications, and the installation of components void the warranty claims and operation permit.
The Automatic Switch Box principle in a Sunny Backup system
2.2 Safety Instructions

DANGER!
Electric shock due to high voltages in the Automatic Switch Box when connecting the device. Death or serious injuries.

- All work on the Automatic Switch Box must be performed by a qualified personnel.
- Work on the Automatic Switch Box should only be carried out as described in this manual.
- Observe all specified safety precautions.

Problems while performing the described activities
If you have problems while performing any of the activities described in this manual, contact SMA Solar Technology (see chapter 10 "Contact" (page 45)).
3 Unpacking

3.1 Scope of Delivery

Check the delivery for completeness. Check the packaging and the Automatic Switch Box for externally visible damage. Contact your supplier in case of damage to the packaging. Contact your dealer if you find any damage to the Automatic Switch Box or if there are parts missing.

<table>
<thead>
<tr>
<th>Object</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>Automatic Switch Box</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>Switch cabinet key</td>
</tr>
<tr>
<td>C</td>
<td>1</td>
<td>Communication cable (black)</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>Control and sensor cable (red)</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>Installation Guide</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
<td>Fuse (63 A)</td>
</tr>
<tr>
<td>G</td>
<td>1</td>
<td>Sticker (hazard warning for consumer load system)</td>
</tr>
<tr>
<td>H</td>
<td>8</td>
<td>4 sealing washers and 4 washers (diameter: 6 mm)</td>
</tr>
<tr>
<td>I</td>
<td>8</td>
<td>4 sealing washers and 4 washers (diameter: 8 mm)</td>
</tr>
</tbody>
</table>
Optional packing list

The optional packing list is included in the delivery for the "Generator connection" ordering option.

<table>
<thead>
<tr>
<th>Object</th>
<th>Quantity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3</td>
<td>Fuse (35 A)</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
<td>Headed sleeve (for 35 A fuse)</td>
</tr>
</tbody>
</table>

3.2 Identifying the Product

Identify the Automatic Switch Box by the serial number and the device type (type/model) on the type label. The type label is on the right side of the enclosure.
4 Mounting the Device

4.1 Selecting the Mounting Location

**DANGER!**

Risk of explosion or fire during the installation of the Automatic Switch Box in non-permissible areas. Death or serious burns.

Despite careful engineering, electrical devices can cause fires.

- Do not mount the Automatic Switch Box on flammable construction materials.
- Do not mount the Automatic Switch Box near highly flammable materials.
- Do not mount the Automatic Switch Box in potentially explosive areas.

- The mounting location and method must be suitable for the weight (approx. 41 kg) and dimensions.
- Mount on a solid surface.
- The mounting location must be accessible at all times.
- The ambient temperature must be between –25 °C and +50 °C.
- Mount vertically.
- Never mount the device with a forward or backward tilt.
- Do not mount in a horizontal position.
- The connection area may not point upwards.

![Diagram of correct and incorrect mounting positions](image-url)
4.2 Mounting the Product on a Wall

CAUTION!
Risk of injury from falling Automatic Switch Box during transport. Physical injury (fractures or crushing) and/or damage to the Automatic Switch Box.
- Take the Automatic Switch Box’s weight (approx. 41 kg) into account.

1. Mark the position of the drill holes.

2. Drill the holes (recommended diameter: 6 mm) at the marked position.

3. Open the Automatic Switch Box with the enclosed switch cabinet key.
ATTENTION!

Intrusion of dust and moisture due to a faulty seal. Destruction of the Automatic Switch Box.

- Observe the following order for mounting:
  - Apply sealing ring (C).
  - Apply washer (B).
  - Fix the sealing ring and the washer with a suitable screw (A).

4. Attach the Automatic Switch Box to the wall using suitable screws, washers, and sealing rings.

5. Check that the unit is securely in place.

☑ The Automatic Switch Box is now mounted securely on the wall.
5 Electrical Connection

ATTENTION!
Damage to the cables from over-bending or excessive loading. Destruction of the Automatic Switch Box.
- Note the bending radii of the cables used.
- Trap cables accordingly (e.g. using a cable anchoring rail).

ATTENTION!
Touching the components inside the Automatic Switch Box can result in electric discharge. Irreparable damage.
- Ground yourself before touching a component.

Spring-type terminals
Connect cables to a spring-type terminal as shown in the graphic.
5.1 Overview of the Connection Area

5.1.1 Interior view
5.1.2 Exterior view

<table>
<thead>
<tr>
<th>Object</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Screw type fuse element &quot;F5 Backup Loads&quot; for connecting consumer loads (L1, L2, L3)</td>
</tr>
<tr>
<td>B</td>
<td>Connection terminal &quot;X3/Backup Loads&quot; for connecting consumer loads (N, PE)</td>
</tr>
<tr>
<td>C</td>
<td>Connection terminal &quot;X4/PV System&quot; for connecting the PV system</td>
</tr>
<tr>
<td>D</td>
<td>Connection terminal &quot;X5/PV Meter&quot; for connecting the feed-in meter</td>
</tr>
<tr>
<td>E</td>
<td>Connection terminal &quot;X1/Load Meter&quot; for connecting the consumption meter</td>
</tr>
<tr>
<td>F</td>
<td>Connection terminal &quot;X2/SBU 5000&quot; for connecting the Sunny Backup</td>
</tr>
<tr>
<td>G</td>
<td>Connection terminals &quot;X7/Feed in Signal&quot; for feed-in from the battery</td>
</tr>
<tr>
<td>H</td>
<td>Optional connection terminal &quot;X6/Generator&quot; for connecting the generator (N, PE)</td>
</tr>
<tr>
<td>I</td>
<td>Optional screw type fuse element &quot;F6 Generator&quot; for connecting the generator (L1, L2, L3)</td>
</tr>
<tr>
<td>J</td>
<td>RJ45 sockets for control and sensor cable</td>
</tr>
<tr>
<td>K</td>
<td>RJ45 sockets for communication cable</td>
</tr>
</tbody>
</table>

![Diagram showing connection points with dimensions]
5.2 Connecting the Consumer Loads

The cables of the consumer loads are led through fuse elements in the Automatic Switch Box. These fuses protect the outgoing cables in the island grid operation from overload. Note that in island grid operation, both the Sunny Backup and the PV system can power the loads and the upstream fuse on the grid side has no function. Determine the required fuse size according to layout type of the cable and installation conditions, and install the appropriate fuse plugs. The maximum useable D02 fuse plugs with a nominal current of 63 A are included in the scope of delivery.

- **Lead fuse selectivity**
  In unfavorable constellations (e.g. the same fuse value twice in a row), it may be impossible to achieve selectivity between the lead fuses to be inserted and the up- or downstream fuses. The complexity of the Sunny Backup system with several feeding sources make this unavoidable.

- **Wire sleeves**
  When using fine-strand cables, also use wire sleeves.
  This only applies to cables connected to the "F5 Backup Loads" fuse element.

**Cable requirements**

The cable type and laying method must be suitable for the application and location of use.

<table>
<thead>
<tr>
<th>Object</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cable cross-section</td>
<td>Max. 16 mm²</td>
</tr>
<tr>
<td>B</td>
<td>Strip insulation</td>
<td>18 - 20 mm</td>
</tr>
</tbody>
</table>
5.2.1 Sizing the lead fuse

Load disconnection unit
Use only line circuit breakers as load disconnection units!
A screw type fuse element, e.g. D system (Diazed) or D0 system (Neozed) is not a load disconnection unit and therefore may not be used as one.
Upon disconnection under load, the screw type fuse elements of the Automatic Switch Box may be destroyed, or its function may be inhibited by contact burning. They only protect the cables.

Use the table to select the condition that applies to you and observe the corresponding SMA Solar Technology recommendation.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>The rating of the back-up fuse in the distribution is equal to the nominal current of the Automatic Switch Box during grid operation (63 A).</td>
<td>• Insert a fuse with a nominal current of 63 A into the &quot;F5 Backup Loads&quot; fuse element.</td>
</tr>
</tbody>
</table>
| The rating of the back-up fuse in the distribution is lower than the nominal current of the Automatic Switch Box during grid operation (63 A). | • Install a fuse with the same nominal current as in the distribution into the "F5 Backup Loads" fuse element.  
• Use Sunny Backup parameter 232.02 GdCurNom to set the maximum grid current to the value of the back-up fuse. |
| The rating of the back-up fuse in the distribution is higher than the nominal current of the Automatic Switch Box (63 A). | • Insert a fuse with a maximum of 63 A into the "F5 Backup Loads" fuse element in accordance with the installation.  
• Install a fuse with max. 63 A in the distribution. |
5.2.2 Connecting Consumer Loads

1. Select a suitable opening for the consumer loads cable and poke a hole through it with a pointy tool.
   The cable has to be tightly enclosed by the opening after it is inserted.

2. Pull the consumer loads cable through the cable opening into the interior of the Automatic Switch Box.

3. Connect PE and N to the "X3/Backup Loads" connection terminal according to the label. The second connection terminal "N" is not assigned.

4. Connect L1, L2, and L3 to the "F5 Backup Loads" fuse elements according to the labels.
☑ The consumer loads are connected.
5.3 Connecting the PV System

Cable protection

The Automatic Switch Box does not replace the distributor box or fuse box of the PV system. For purposes of fuse protection and isolation, install a line circuit breaker between the Automatic Switch Box and the PV system. Be sure to observe all standards applicable at the installation site.

Connecting other energy sources

Instead of a PV system, you can connect other energy sources (e.g. small wind turbine systems) to the Automatic Switch Box. In any case, make sure that a counter with the corresponding tariff is connected to the Automatic Switch Box.

The utility grid operator will not permit a mixture of energy sources (connecting a PV system and a small wind turbine system) because the feed tariffs of various energy sources differ.

Cable requirements

The cable type and laying method must be suitable for the application and location of use. Select the cable according to the upstream fuse on the grid side.

For a Sunny Backup system with a generator, also pay attention to the rating of the generator feed-in. If the generator feed-in at the "X6/Generator" connection terminal has a greater rating than the supply cable from the feed-in meter (upstream of "X5/PV Meter"), then you must dimension the output cable from the PV System (X4/PV system) to this higher fuse value.

<table>
<thead>
<tr>
<th>Object</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cable cross-section</td>
<td>Max. 16 mm²</td>
</tr>
<tr>
<td>B</td>
<td>Strip insulation</td>
<td>13 - 15 mm</td>
</tr>
</tbody>
</table>
Connection procedure

1. Check that connection cables comply with the maximum connectable AC PV power of 30 kW.
2. Select a suitable opening for the cable of the PV system and poke a hole through it with a pointy tool.
   The cable has to be tightly enclosed by the opening after it is inserted.
3. Pull the cable of the PV system through the opening into the Automatic Switch Box.
4. Connect PE conductor to the "X4/PV system" connection terminal according to the label.
5. Connect N to the "X4/PV system" connection terminal according to the label.
6. Connect L1, L2, and L3 to the "X4/PV system" connection terminal according to the label.
☑ The PV system is now connected to the Automatic Switch Box.
5.4 Connecting the Feed-in Meter

Cable protection
For purposes of fuse protection and isolation, a line circuit breaker must be installed between the Automatic Switch Box and the feed-in meter. Be sure to observe all standards applicable to the installation site.

Connection requirements
The Sunny Backup system is only certified for TN grids and may not be installed in TT grids. Comply with all connection regulations of your utility operator.

PV systems without a feed-in meter
The Sunny Backup system can also be used in PV systems without a feed-in meter. If you do not connect a feed-in meter to the Automatic Switch Box, you must bridge the feed-in meter (X5/PV Meter) and the consumption meter (X1/Load Meter) outside of the Automatic Switch Box.
Principle of an Automatic Switch Box in a Sunny Backup system with an external bridge between the feed-in meter and the consumption meter
Cable requirements
The cable type and laying method must be suitable for the application and location of use.

Cable cross-section
The required cross-section of the cables depends on the upstream fuse.

<table>
<thead>
<tr>
<th>Object</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cable cross-section</td>
<td>Max. 16 mm$^2$</td>
</tr>
<tr>
<td>B</td>
<td>Strip insulation</td>
<td>13 - 15 mm</td>
</tr>
</tbody>
</table>
Connection procedure

1. Select a suitable opening for the feed-in meter cable and poke a hole through it with a pointy tool.
   The cable has to be tightly enclosed by the opening after it is inserted.
2. Pull the cable of the feed-in meter through the opening into the Automatic Switch Box.
3. Connect PE to the "X5/PV Meter" connection terminal according to the label.
4. Connect N to the "X5/PV Meter" connection terminal according to the label.
5. Connect L1, L2 and L3 to the "X5/PV Meter" connection terminal according to the label.
☑ The feed-in meter is now connected to the Automatic Switch Box.
5.5 Connecting the Consumption Meter

DANGER!
Electric shock due to missing protective function of the residual current device (RCD) Death or serious burns.

Residual current devices (RCD) connected between the grid and Automatic Switch Box would lose their protective function due to the Backup System.

- Do not connect a residual current device (RCD) between the grid and the Automatic Switch Box.
- Do connect a residual current device (RCD) between consumer loads and the Automatic Switch Box.

DANGER!
Electric shock due to an incorrectly grounded neutral conductor. Death or serious burns.

The Sunny Backup system requires a grounded neutral conductor in order to form a TN grid in a power outage and be able to apply the appropriate protective measures.

- Do not install any switching elements in the grounded neutral conductor to the Automatic Switch Box.

DANGER!
Electric shock due to inappropriate connection to ground of the grid-side PEN conductor. Death or serious burns.

- Ground the grid-side PEN conductor inside the house connection box.
  Example: Connection of the house connection box to the earth circuit connector.
Cable requirements
The cable type and laying method must be suitable for the application and location of use.

Cable cross-section
The required cross-section of the cables depends on the upstream fuse.

<table>
<thead>
<tr>
<th>Object</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cable cross-section</td>
<td>Max. 16 mm²</td>
</tr>
<tr>
<td>B</td>
<td>Strip insulation</td>
<td>18 - 20 mm</td>
</tr>
</tbody>
</table>

ATTENTION!
Overload of the Automatic Switch Box due to missing back-up fuse. Destruction of the Automatic Switch Box.

- Use max. one 63 A fuse as back-up fuse in the distribution.
Connection procedure

1. Select a suitable cable opening for the cable of the consumption meter and poke a hole through it with a pointy tool. The cable has to be tightly enclosed by the opening after it is inserted.

2. Pull the cable of the consumption meter through the opening into the Automatic Switch Box.

3. Connect PE to the "X1/Load Meter" connection terminal according to the label.

4. Connect N to the "X1/Load Meter" connection terminals according to the label. The second connection terminal "N" is not assigned.

5. Connect L1, L2, and L3 to the "X1/Load Meter" connection terminals according to the label.

☑ The consumption meter is now connected.
5.6 Connecting the Sunny Backup

Safeguarding the Sunny Backup
Sunny Backups are protected with one C32 A line circuit breaker per phase inside the Automatic Switch Box.

Cable requirements
The cable type and laying method must be suitable for the application and location of use.

Cable cross-section
SMA Solar Technology recommends cables with a cross-section of 6 mm$^2$. 

<table>
<thead>
<tr>
<th>Object</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cable cross-section</td>
<td>Max. 6 mm$^2$</td>
</tr>
<tr>
<td>B</td>
<td>Strip insulation</td>
<td>13 - 15 mm</td>
</tr>
</tbody>
</table>
**Connection procedure**

1. Select suitable cable openings for the cables of the Sunny Backup and poke holes through them with a pointy tool. The cable has to be tightly enclosed by the opening after it is inserted.
2. Pull each cable through the respective opening into the Automatic Switch Box.
3. Connect PE and N of the Sunny Backup master to the "X2/SBU5000" connection terminal according to the label.
5. Connect PE and N of the Sunny Backup slave 1 to the "X2/SBU5000" connection terminal according to the label.
6. Connect L of the Sunny Backup slave 1 to L2.
7. Connect PE and N of the Sunny Backup slave 2 to the "X2/SBU5000" connection terminal according to the label.
8. Connect L of the Sunny Backup slave 2 to L3.

☑ The cable for the connection of the Sunny Backup is now connected.
5.7 Connecting an External Signal

Utility operator consent
Battery feed-in into the public grid may only be performed with the consent of the responsible power supplier.

The grid feed from the battery can be started or stopped through a "X7/Feed-In Signal" floating contact. For example, the relay output of a ripple control receiver which can receive signals from the power supplier can be connected to this terminal.

Cable requirements
The cable type and laying method must be suitable for the application and location of use.

<table>
<thead>
<tr>
<th>Object</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cable cross-section</td>
<td>Max. 2.5 mm²</td>
</tr>
<tr>
<td>B</td>
<td>Strip insulation</td>
<td>10 - 12 mm</td>
</tr>
</tbody>
</table>
Connection procedure

1. Select a suitable cable opening for the cable of the feed-in signal and poke a hole through it with a pointy tool.
   The cable has to be tightly enclosed by the opening after it is inserted.
2. Pull the cable through the opening into the Automatic Switch Box.
3. Connect PE to the "X7/Feed-In Signal" connection terminal according to the label.
4. Connect the cables to "IN" and "L1".
   ☑ The external signal for battery feed-in is now connected.
5.8 Generator connection (optional)

Cable requirements

<table>
<thead>
<tr>
<th>Object</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Cable cross-section</td>
<td>Max. 16 mm²</td>
</tr>
<tr>
<td>B</td>
<td>Strip insulation</td>
<td>18 - 20 mm</td>
</tr>
</tbody>
</table>

**ATTENTION!**

Cable overload due to incorrect design. Destruction of the cable.

- Select the required cable cross section according to the nominal power of the generator.
- The design of the output fuse of the generator may affect the design of the cable to the PV system.
- If the generator does not have an output fuse, implement the cable connection to the Automatic Switch Box in a ground-fault proof and short-circuit proof manner. As an alternative - especially for long cable distances - you can install an additional fuse box close to the generator.

The cable type and laying method must be suitable for the application and use location.

**Wire sleeves**

When using fine-strand cables, also use wire sleeves.

This only applies for the cable connected to the "F6 Generator" fuse element.

5.8.1 Sizing the lead fuse

**Sizing the lead fuse**

Size the lead fuse in accordance with the requirements of the generator. You can use a lead fuse of 40 A at the most. Use type D02 lead fuses.

D02 fuse plugs with a nominal current of 35 A are included in the scope of delivery. However, you must verify that they meet the requirements.
5.8.2 Connecting a generator (optional)

1. Select a suitable opening for the cable of the generator and poke a hole through it with a pointy tool.
   The cable has to be tightly enclosed by the opening after it is inserted.
2. Pull the cable of the generator through the opening into the Automatic Switch Box.
3. Connect PE to the "X6/Generator" connection terminal according to the label.
4. Connect N to the "X6/Generator" connection terminal according to the label.
5. Connect L1, L2, and L3 to the fuse element "F6 generator" according to the label. Torque: 4 Nm +/- 20 %
   ☑ The generator is now connected.
5.9 Communication

The Automatic Switch Box transfers voltage measurement signals and current measurement signals to Sunny Backups. These signals are transferred via the control cables and sensor cables (red). The Automatic Switch Box is controlled by the Sunny Backup via a CAN bus with the communication cable (black).

Before you can connect the control, sensor and communication cables in the Automatic Switch Box, you have to guide the cables into the Automatic Switch Box through the two-part cable openings. To do this, proceed as in chapter 5.9.1 "Guiding cables into the Automatic Switch Box" (page 36). Then connect the cables as described in chapter 5.9.2 "Connecting the control and sensor cables" (page 38) and chapter 5.9.3 "Connecting the communication cable" (page 39).

5.9.1 Guiding cables into the Automatic Switch Box

1. Loosen the screws of the fastening plate of the two-part cable opening inside the Automatic Switch Box.
2. Remove the fastening plate and place it to the side.
3. Remove cable opening from the housing.
4. Loosen screws of the two-part cable opening.
5. Remove the half without the T-shaped fastening pieces.
6. Lay a communication cable as well as a control and sensor cable with sufficient length from the opening to the desired connection through the part of the cable opening with the T-shaped fastening pieces. Fix them in place with cable ties.
7. Bolt the halves back together. Fasten the screws finger-tight.
   The cables and the placeholder (plastic rod) have to be fitted tightly between both sides of the two-part cable opening. Otherwise, a proper seal of the enclosure cannot be guaranteed.
8. Insert cable opening including cable into the housing from the outside.
9. Attach fastening plate of the two-part cable opening and fasten the screws finger-tight.
10. Repeat steps 1 - 9 for the remaining control and sensor cables. A two-part cable opening is available for this.

☑ Cables are guided into the Automatic Switch Box.
5.9.2 Connecting the control and sensor cables

Connection procedure

1. Plug the control and sensor cable for the Sunny Backup master into the "Mstr/L1 BackupVtgCur" socket.
2. Plug the control and sensor cable for the Sunny Backup slave 1 into the "Slv1/L2 BackupVtgCur" socket.
3. Plug the control and sensor cable for the Sunny Backup slave 2 into the "Slv2/L3 BackupVtgCur" socket.

☑ The control and sensor cables are connected.
5.9.3 Connecting the communication cable

Connection procedure
Plug the communication cable (black) for the Sunny Backup master into the "ComSyncIn" socket on the circuit board inside the Automatic Switch Box. Leave the termination resistor plugged into the "ComSyncOut" socket.

✓ The communication cable is connected.
6 Commissioning the Product

1. Check the following requirements before commissioning:
   - Automatic Switch Box is mounted securely to the wall.
   - All cables are correctly and completely connected.
   - All cables are tightly enclosed by the cable openings.
   - The Automatic Switch Box has no voltage present.

2. Loosen screw caps of all fuse elements.

3. Insert headed sleeves into the fuse element "F6 generator".

4. Insert fuses into the screw caps.

5. Install screw caps, including fuse, into the fuse elements.

6. Switch on the circuit breaker in the Automatic Switch Box.

7. Lock Automatic Switch Box with the switch cabinet key.

8. Attach the included sticker (hazard warning for consumer load system) to a readily visible place in or on the distribution that the Sunny Backup system is connected to. The hazard warning calls attention to the Sunny Backup system and is intended to ensure that the Sunny Backup system is also stopped during work that requires disconnection.

☑ The Automatic Switch Box is ready for operation.
7 Opening and Closing

7.1 Opening the Product

ATTENTION!

Touching the components inside the Automatic Switch Box can result in electric discharge. Irreparable Damage.

- Ground yourself before touching a component.

1. Shut down the Sunny Backup system as described in the Sunny Backup 5000 manual.
2. Switch off the external line circuit breaker and prevent it from being reactivated.
3. Detach the Automatic Switch Box from all voltage sources.
4. Verify that no voltage is present in the system.
5. Open the enclosure lid with the switch cabinet key.

☑ The Automatic Switch Box is open.

7.2 Closing the Product

1. Close the enclosure lid with the switch cabinet key.
2. Switch on the external line circuit breaker.

☑ The Automatic Switch Box is closed.
8 Decommissioning

8.1 Disassembling the Product

CAUTION!
Risk of injury from Automatic Switch Box falling during transport. Physical injury (fractures or crushing) and/or damage to the Automatic Switch Box.

- Take the Automatic Switch Box’s weight (approx. 41 kg) into account.

DANGER!
Electric shock from working under voltage. Death or serious burns.

Observe the following requirements before removal:
- Completely disconnect the Sunny Backup system and ensure that it does not switch back on.
- Ensure that no voltage is present in the system.
- Ground and short-circuit (up to 1000 V).
- Cover or shield any adjacent voltage-carrying parts.

1. Open the Automatic Switch Box as described in Section 7.1 "Opening the Product" (page 41).
2. Remove all cables from the Automatic Switch Box.
3. Unscrew the fixing screws of the Automatic Switch Box.
4. Remove the Automatic Switch Box.
5. Lock Automatic Switch Box with the switch cabinet key.

✓ The Automatic Switch Box is disassembled.

8.2 Storing the Product

Store the Automatic Switch Box in a dry place where the ambient temperature is always between −25°C and +50°C.

8.3 Disposing of the Product

Dispose of the Automatic Switch Box at the end of its service life in accordance with the disposal regulations for electronic waste applicable at the installation site at that time.
9 Technical Data

**General**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>AS-BOX-L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of phases</td>
<td>3-phase</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>202 to 253 V</td>
</tr>
<tr>
<td>Nominal frequency</td>
<td>45 to 55 Hz</td>
</tr>
<tr>
<td>Number of Sunny Backups</td>
<td>3 x Sunny Backup 5000</td>
</tr>
<tr>
<td>Mounting type</td>
<td>Suspended</td>
</tr>
<tr>
<td>Permitted grid structure (grid side/load side)</td>
<td>TN-C / TN-S</td>
</tr>
</tbody>
</table>

**Consumer load connection**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal output power/current during grid operation</td>
<td>44 kW / 3 x 63 A</td>
</tr>
<tr>
<td>Maximum cable cross section (suitable for connection)</td>
<td>16 mm²</td>
</tr>
<tr>
<td>Fuse (maximum to be used)</td>
<td>D02 (63 A)</td>
</tr>
<tr>
<td>Clamping position</td>
<td>Fuse/spring-type terminals</td>
</tr>
</tbody>
</table>

**Consumption meter connection**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal output power/current</td>
<td>44 kW / 3 x 63 A</td>
</tr>
<tr>
<td>Maximum cable cross section (suitable for connection)</td>
<td>16 mm²</td>
</tr>
<tr>
<td>Clamping position</td>
<td>Spring-type terminals</td>
</tr>
</tbody>
</table>

**PV system connection**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal output power/current</td>
<td>30 kW / 3 x 44 A</td>
</tr>
<tr>
<td>Maximum cable cross section (suitable for connection)</td>
<td>16 mm²</td>
</tr>
<tr>
<td>Clamping position</td>
<td>Spring-type terminals</td>
</tr>
</tbody>
</table>

**Feed-in meter connection**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal output power/current</td>
<td>30 kW / 3 x 44 A</td>
</tr>
<tr>
<td>Maximum cable cross section (suitable for connection)</td>
<td>16 mm²</td>
</tr>
<tr>
<td>Clamping position</td>
<td>Spring-type terminals</td>
</tr>
</tbody>
</table>
## Sunny Backup connection

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal output power/current</td>
<td>15 kW / 3 x 22 A</td>
</tr>
<tr>
<td>Maximum cable cross section (suitable for connection)</td>
<td>6 mm²</td>
</tr>
<tr>
<td>Fuse</td>
<td>C 32 A</td>
</tr>
<tr>
<td>Clamping position</td>
<td>Fuse/spring-type terminals</td>
</tr>
</tbody>
</table>

## Generator connection (optional)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal output power/current</td>
<td>30 kW / 3 x 44 A</td>
</tr>
<tr>
<td>Maximum cable cross section (suitable for connection)</td>
<td>16 mm²</td>
</tr>
<tr>
<td>Fuse (maximum to be used)</td>
<td>D02 (35 A)</td>
</tr>
<tr>
<td>Clamping position</td>
<td>Fuse/spring-type terminals</td>
</tr>
</tbody>
</table>

## Power consumption

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal consumption during the day</td>
<td>114 W</td>
</tr>
<tr>
<td>Internal consumption at night</td>
<td>69 W</td>
</tr>
</tbody>
</table>

## Certificates

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent disconnection device per</td>
<td>Yes, in combination with the Sunny Backup 5000</td>
</tr>
<tr>
<td>DIN VDE 0126-1-1</td>
<td></td>
</tr>
<tr>
<td>EC Declaration of Conformity</td>
<td>Enclosed, download area <a href="http://www.SMA.de/en">www.SMA.de/en</a></td>
</tr>
</tbody>
</table>

## Mechanical data

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions (W x H x D in mm)</td>
<td>600 x 760 x 210</td>
</tr>
<tr>
<td>Weight</td>
<td>41 kg</td>
</tr>
</tbody>
</table>

## Ambient Conditions

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient temperature</td>
<td>-25 to +50 °C</td>
</tr>
<tr>
<td>Air humidity</td>
<td>0 to 100 %</td>
</tr>
</tbody>
</table>

## Protection Rating

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection class according to DIN EN 60529</td>
<td>IP65</td>
</tr>
</tbody>
</table>
10 Contact

If you have technical problems with our products, please contact our Service Line. We need the following information in order to provide you with the necessary assistance:

- Type of Automatic Switch Box
- Serial number of the Automatic Switch Box
- Type and number of the connected Sunny Backup(s)
- Type and number of the connected PV inverter
- Type of connected consumer loads

SMA Solar Technology AG
Sonnenallee 1
34266 Niestetal, Germany
www.SMA.de

Service Line
Inverters:  +49 561 9522 1499
Communication:  +49 561 9522 2499
Fax:  +49 561 9522 4699
E-Mail:  serviceline@SMA.de
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- Operating the product in an unintended environment
- Operating the product whilst ignoring relevant, statutory safety regulations in the deployment location
- Ignoring safety warnings and instructions contained in all documents relevant to the product
- Operating the product under incorrect safety or protection conditions
- Altering the product or supplied software without authority
- The product malfunctions due to operating attached or neighboring devices beyond statutory limit values
- In case of unforeseen calamity or force majeure

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