Changeover facility for Sunny Backup systems

AUTOMATIC SWITCH BOX XL

Installation Guide

AS-BOX-XL-IEN094410 | 98-2012910 | Version 1.0

EN

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1 Notes on this Guide

This manual describes the assembly and installation of the Automatic Switch Box XL. 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 can be accessed at all times.

1.1 Area of Validity

This manual is valid for the type AS-BOX-XL.

1.2 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.

1.3 Symbols Used

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

DANGER!

DANGER indicates a hazardous situation which, if not avoided, will result in 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.

ATTENTION!

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

Information

Information provides tips that are valuable for the optimal 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 disconnects 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 providing you selected the "Generator connection" feature when ordering 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 if necessary.

Connection requirements

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

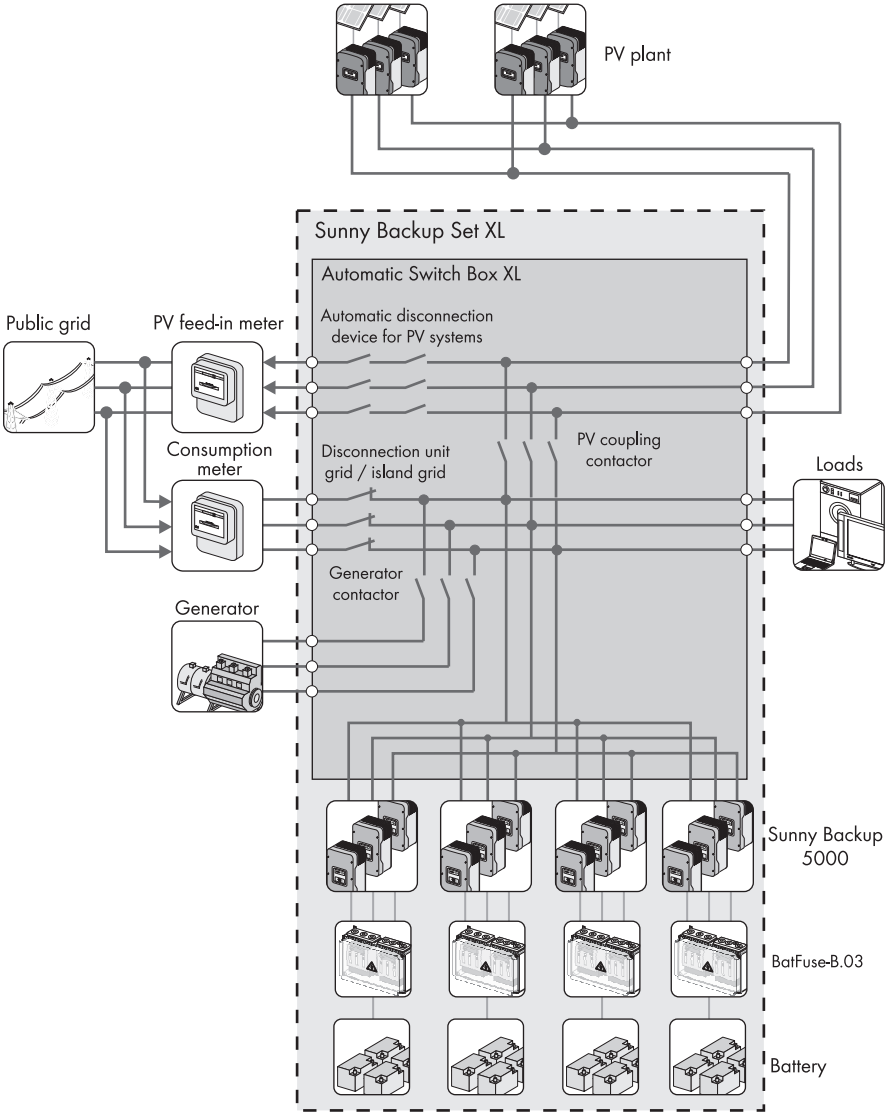
The Automatic Switch Box may only be operated in conjunction with 6, 9 or 12 Sunny Backup (in 2 to 4 clusters).

The Sunny Backup-Master of the Main Cluster evaluates the data recorded in the Automatic Switch Box, coordinates all switching operations and controls all components of the Sunny Backup-System.

The maximum connection power of the individual outgoing lines in the Automatic Switch Box may not be exceeded.

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.

Principle of the Automatic Switch Box in a Sunny Backup-System



2.2 Safety precautions

DANGER!

Danger to life due to high voltages in the Automatic Switch Box.

- All work on the Automatic Switch Box must be performed by qualified personnel.

Problems while performing the described activities

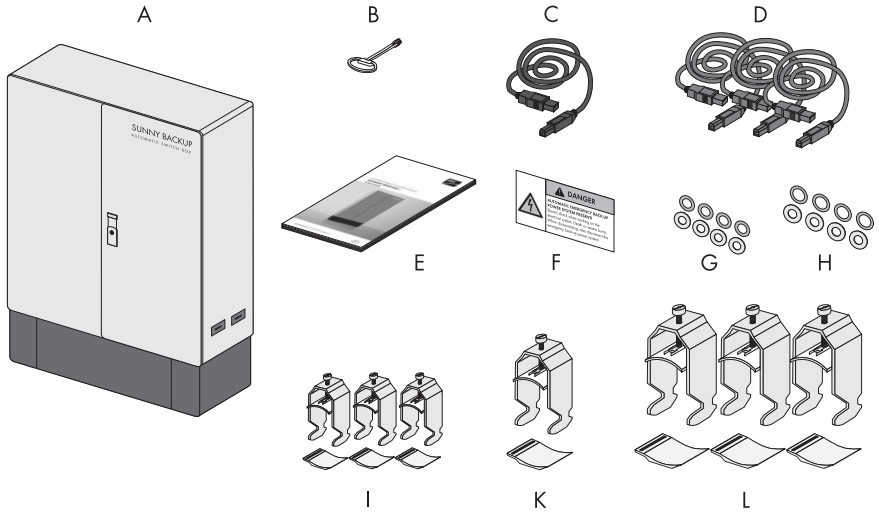
If you have problems while performing any of the activities described in this manual, contact SMA Solar Technology AG (see Section 10 "Contact" (page 49)).

3 Unpacking

3.1 Packing List

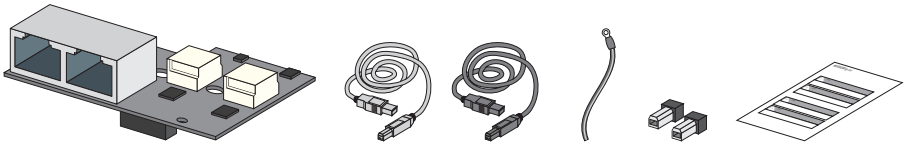
Check that the delivery is complete. Check the packaging and the Automatic Switch Box for any visible external damage. Contact your supplier in case of damage to the packaging. Contact your dealer if you find any damage to the Automatic Switch Box or if there are parts missing.

3.1.1 Automatic Switch Box



Object	Number	Description
A	1	Automatic Switch Box
B	1	Switch cabinet key
C	1	Communication cable (black)
D	3	Control and sensor cable (red)
E	1	Installation Guide
F	8	Sticker (hazard warning for consumer load system)
G	8	4 sealing washers and 4 washers (diameter: 6 mm)
H	8	4 sealing washers and 4 washers (diameter: 8 mm)
I	3	cable clip and counter well (22 mm .... 28 mm)
K	1	cable clip and counter well (52 mm .... 58 mm)
L	3	cable clip and counter well (58 mm .... 64 mm)

3.1.2 Multicluster Piggy-Back (optional)



A B C D E F

Object	Number	Description
A	2 - 4	Multicluster Piggy-Back
B	2 - 4	RJ45 cable (5 m, yellow)
C	2 - 4	RJ45 cable (5 m, gray)
D	2 - 4	Grounding cable
E	4 - 8	Termination resistor
F	1	Technical Description

3.2 Identifying the Automatic Switch Box

Identify the Automatic Switch Box by the serial number (Serial No.) and the device type (Type / Model) on the type label. The type label is on the right side of the enclosure.

4 Installation

4.1 Selecting the installation location

DANGER!

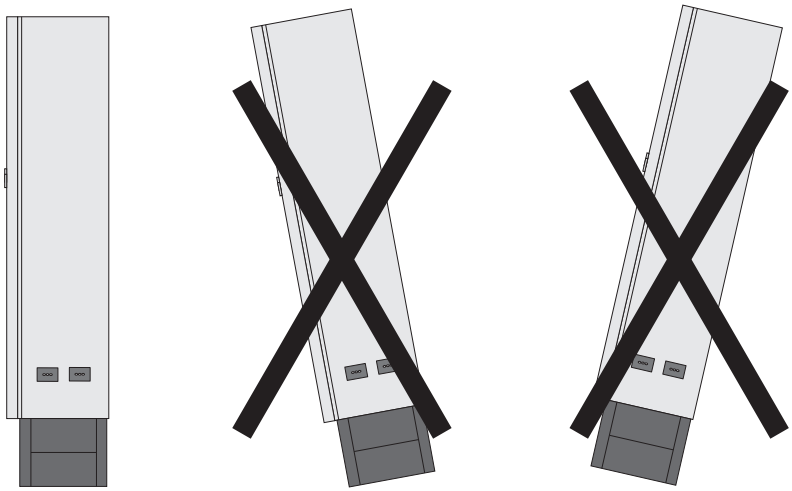
Danger to life due to fire or explosion.

Despite careful construction, 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 inflammable materials.
- Do not mount the Automatic Switch Box in potentially explosive areas.

Comply with the following conditions when selecting the mounting location:

- Install the product on a solid surface, e.g. a concrete base.
- The installation location must be accessible at all times.
- Comply with the appropriate minimum passage widths and escape routes
- Installation is vertical.



Properties of the foundation

The foundation must provide a solid and secure base for the Automatic Switch Box. When selecting the foundation, remember that the Automatic Switch Box weighs 180 kg. Do not install the Automatic Switch Box on an incline. Level out any existing unevenness or subsidence.

4.2 Transport

4.2.1 Transport Options

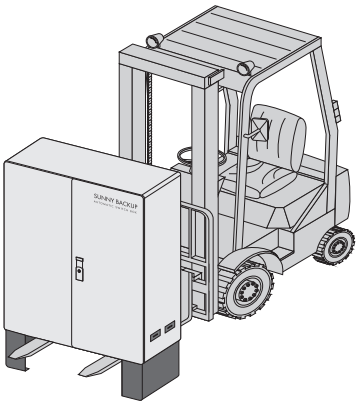
CAUTION!

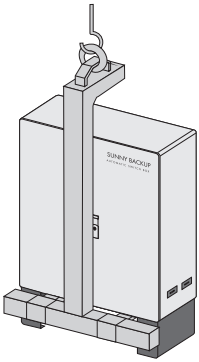
Risk of injury due to the heavy weight of the Automatic Switch Box.

- The means of transportation must be adequate for the weight of the Automatic Switch Box.
- Only transport the Automatic Switch Box upright.
- Take the center of gravity of the Automatic Switch Box into account. It is located in the upper third of the device.

The Automatic Switch Box is delivered on a pallet. To lift the Automatic Switch Box from the pallet, you can use the following transport vehicles:

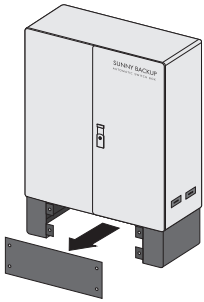
- Forklift or pallet truck
- Crane with appropriate fork





4.2.2 Transporting the Automatic Switch Box

1. Remove all fastening screws from the base panel front and back.
2. Put the screws aside. The screws will be needed later to reattach the base panels.
3. Remove the base panels and set them aside.



4. Bring the fork of the lift truck, pallet truck, or crane into place under the Automatic Switch Box and move the Automatic Switch Box to the installation location.

☑ The Automatic Switch Box is now located at the place of installation.

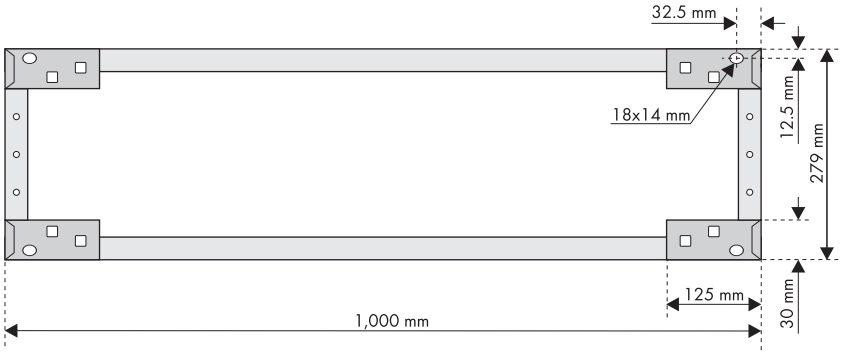
4.3 Installing the Automatic Switch Box

The Automatic Switch Box is fixed onto the foundation by its base. If the Automatic Switch Box is to be installed not in a free-standing position, but next to a wall, you can also fix the rear panel to the wall.

4.3.1 Free-standing Installation

If the Automatic Switch Box is to be mounted in a free-standing position, proceed as follows:

1. Mark the position of the drill holes for fastening the base.



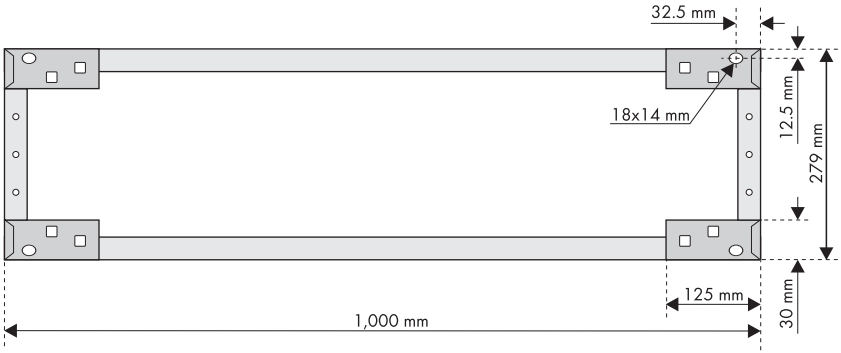
2. Drill the holes in the marked positions
3. Insert appropriate fastening material.
4. Place the Automatic Switch Box on the foundation. Please refer to Section 4.2 "Transport" (page 15).
5. Fasten the Automatic Switch Box to the foundation.

☑ The Automatic Switch Box is now mounted.

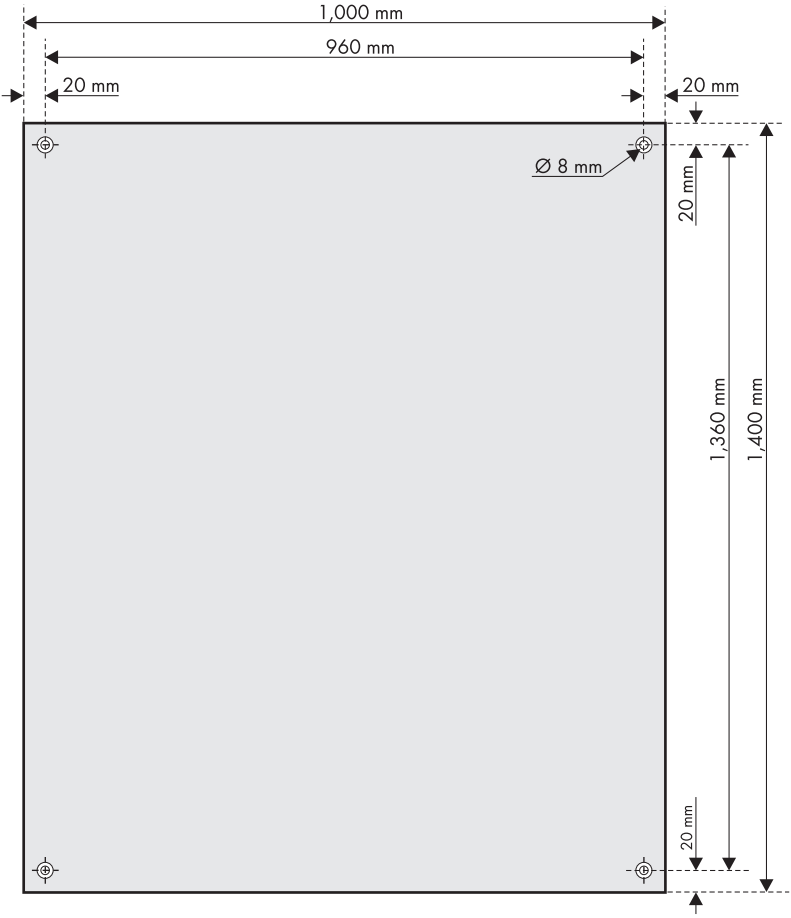
4.3.2 Wall Mounting

If the Automatic Switch Box is to be mounted and fixed to a wall, proceed as follows:

1. Mark the position of the drill holes for fastening the base.



2. Mark the position of the drill holes for fastening the rear panel.

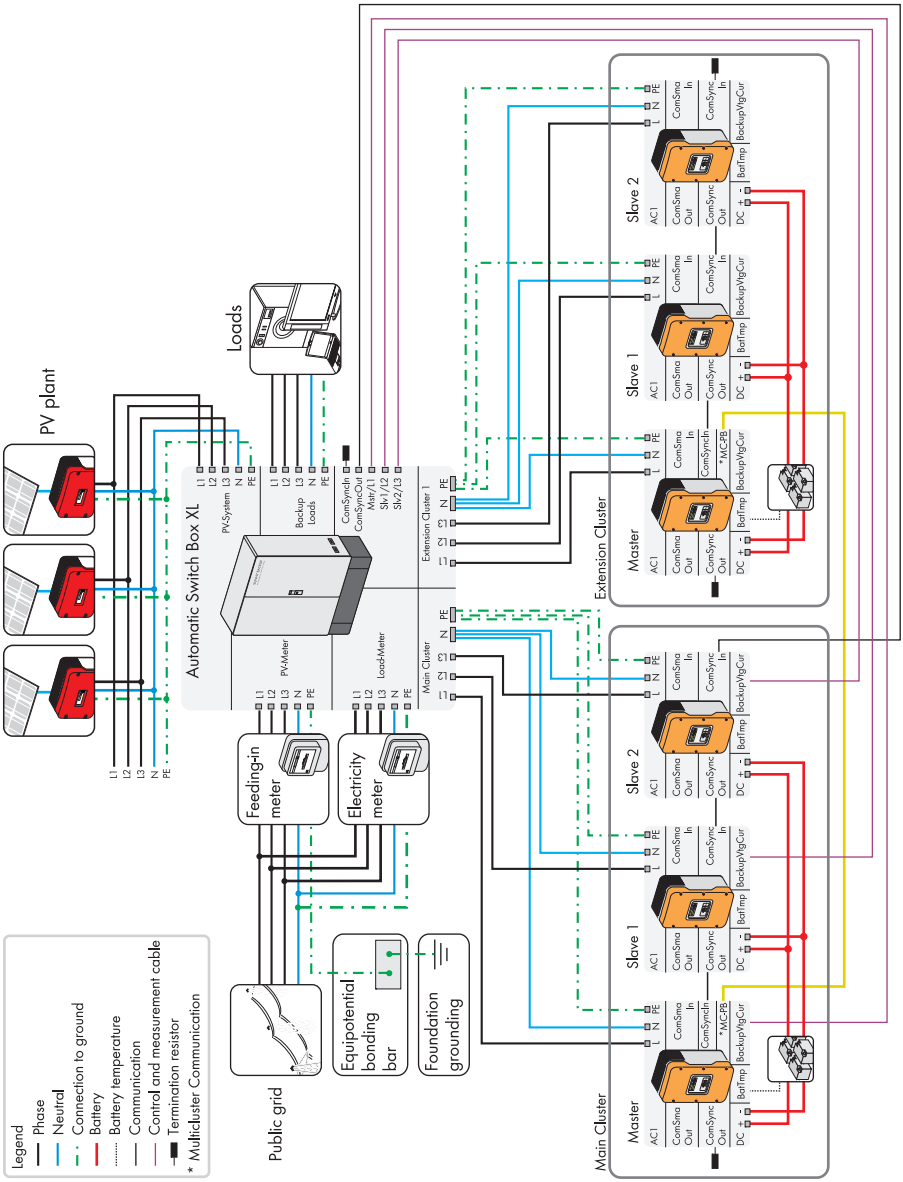


3. Drill holes at the marked positions.
4. Insert appropriate fastening material.
5. Place the Automatic Switch Box on the foundation and against the wall. Please refer to Section 4.2 "Transport" (page 15).
6. Attach the Automatic Switch Box to the wall using 2 suitable screws and the supplied seals and washers.
7. Attach the Automatic Switch Box to the foundation using 2 suitable bolts.

☑ The Automatic Switch Box is now mounted and attached to the wall.

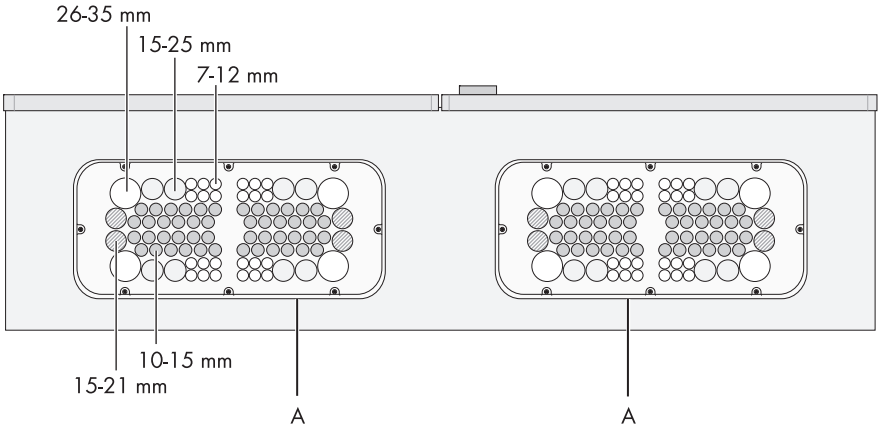
5 Electrical Connection

5.1 System Overview (Sunny Backup XL-System with 2 clusters)



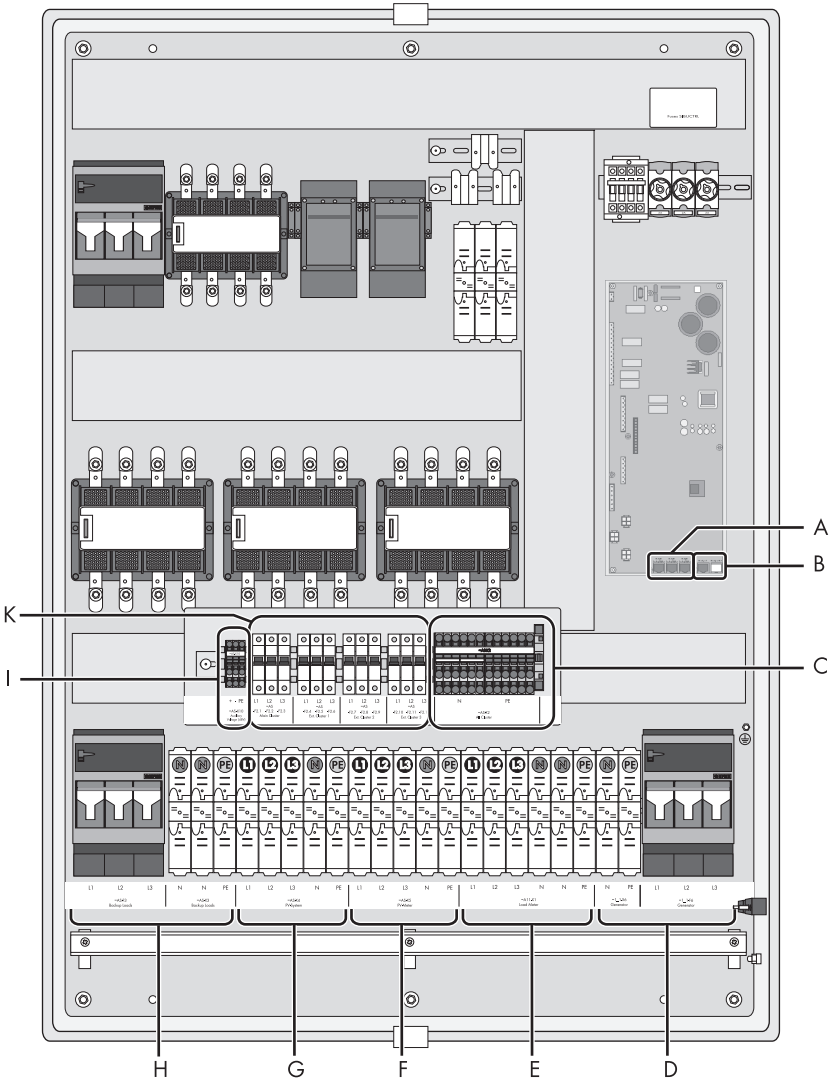
5.2 Overview of the Connection Area

5.2.1 Underside view (without base)



Object	Description
A	Flange plate with membranes for feed-through of connection cables

5.2.2 Interior View



Object	Description
A	RJ45 sockets for connecting the control and sensor cables
B	RJ45 sockets for connecting the communication cable
C	Connection terminals "=AS-X2 All Cluster" to connect the Sunny Backup (N, PE)
D	Optional connection area (terminals "=1_1-X6 Generator" and fuse element "=1_1-F6 Generator") for connection of the generator
E	Connection terminal "=AS-X1/Load Meter" for connecting the consumption meter
F	Connection terminal "=AS-X5 PV Meter" for connecting the feed-in meter
G	Connection terminals "=AS-X4 PV system" for connecting the PV system
H	Connection terminals "=AS-X3 Backup Loads" and fuse element "=AS-F3 Backup Loads" for connecting consumer loads
I	Connection terminals "=AS-X10 Auxiliary Voltage (48 V)" for connecting the battery
J	Line circuit breaker for connecting the Sunny Backup (L)

5.3 Preparing the cables

ATTENTION!

Penetration of moisture and dust can damage the Automatic Switch Box.

If the rubber membranes on the underside of the Automatic Switch Box are overstretched, moisture and dust can penetrate into the Automatic Switch Box.

- When inserting the cables, observe the minimum and maximum diameters of the rubber membranes. See Section 5.3 "Preparing the cables" (page 24).

1. Select a suitable membrane for the insertion of the relevant cable.
2. Pierce the selected membrane with a pointed object. The opening must not be too large.
3. Lead the cable throught the membrane into the interior of the Automatic Switch Box. After insertion, the cable must be tightly enclosed by the membrane.
4. Strip the insulation off the cable and mount a corresponding cable lug.

   Only strip the Sunny Backup and battery cables, but **do not** attach any cable lugs. These cables will be connected to spring-type terminals.
5. Attach cord-end sleeves to the Sunny Backup and battery cables.

   ☑ The cables are now ready.
6. Connect the cables as described in the following sections.

ATTENTION!

Loose cables can damage the Automatic Switch Box.

If there is excessive mechanical strain on the cables, they may come loose from the terminals.

- Trap cables in the Automatic Switch Box on the cable support rail provided for that purpose. Use the supplied cable clips and counter wells.

5.4 Connecting the cables

CAUTION!

Risk of burns when opening and closing the fuse load disconnector (NH load disconnector) under load.

Opening or closing the fuse load disconnector (NH load disconnector) under load causes sparking.

- Wear personal protective equipment.

Connection terminal torques

When connecting the cables, be sure to observe the torques of the individual connection terminals given in Section 9 "Technical Data" (page 46).

5.4.1 Connecting Consumer Loads

The phases L1, L2, and L3 are led through fuse elements in the Automatic Switch Box. The fuses are necessary in order to protect the output cable from overload in island grid operation. Beware that the currents from the Sunny Backup, the PV system, and possibly the generator, may be summated. Determine the required fuse size according to type of cable routing and installation conditions, and insert the appropriate fuse plugs. The maximum usable fuse plugs are factory-installed in the respective fuse element.

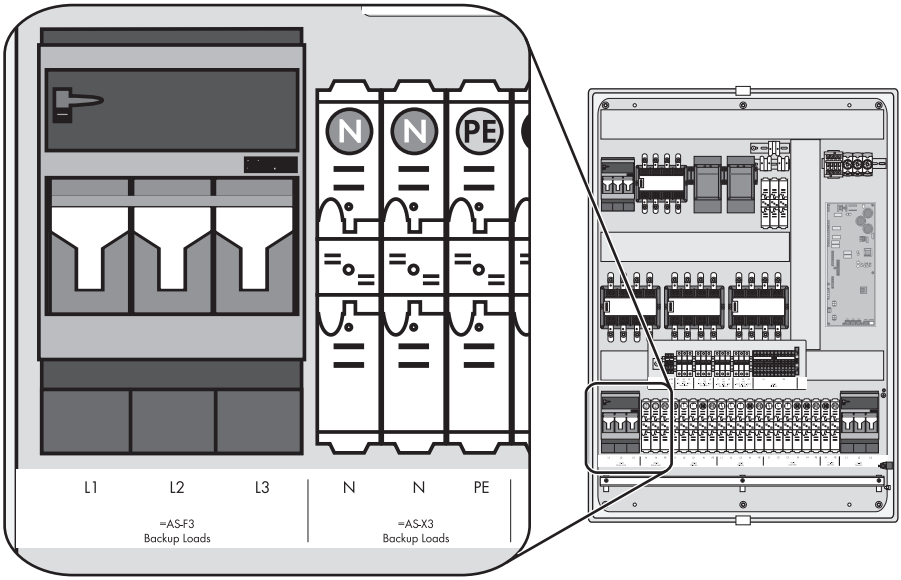
Sizing the thermal fuse

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

Condition	Recommendation
The rating of the back-up fuse in the distribution is **equal to** the nominal current of the Automatic Switch Box during grid operation (160 A).	• Insert a fuse with a nominal current of 160 A into the "=AS-F3 Backup Loads" fuse element.
The rating of the back-up fuse in the distribution is **lower** than the nominal current of the Automatic Switch Box during grid operation (160 A).	• Insert a fuse with the same nominal current as in the distribution into the "=AS-F3 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 (160 A).	• Insert a fuse with max. 160 A into the "=AS-F3 Backup Loads" fuse element in accordance with the installation.

Connection Procedure

1. Prepare the cables as described in Section 5.3 “Preparing the cables” (page 24).
2. Connect PE and N to the "=AS-X3 Backup Loads" connection terminal according to the labels. The second connection terminal "N" is not assigned.
3. Connect L1, L2, and L3 to the fuse element "=AS-F3 Backup Loads" according to the labels.



☑ The consumer loads are now connected.

5.4.2 Connecting the PV System

Cable protection

The Automatic Switch Box does not replace the distributor box or fuse box of the PV system (PV main distributor).

Install a load disconnection unit and a corresponding fuse element between the Automatic Switch Box and the PV system. Be sure to observe all standards and guidelines applicable to 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.

Mixing energy sources (e.g., connection of a PV system and a small wind turbine system) is not permitted by the utility operator, as the feed-in tariff for each energy source is different.

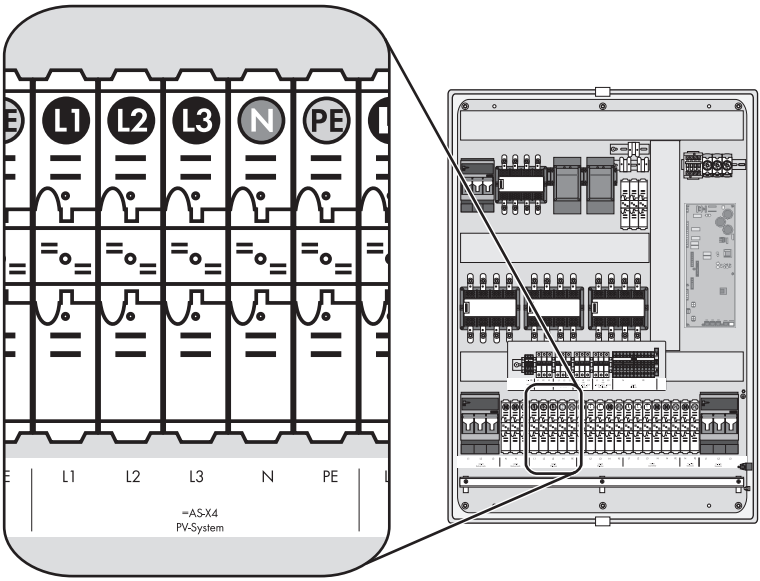
Cable Sizing

The cable type and routing method must be suitable for the application and the deployment location. 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 fuse protection rating of the generator feed-in. If the generator feed-in at the "1_1-F6 Generator" connection terminal has a higher fuse rating than the supply cable from the feed-in meter (upstream of "AS-X5 PV Meter"), you need to dimension the output cable from the PV system (AS-X4 PV System) according to this higher fuse value.

Connection Procedure

1. Prepare the cables as described in Section 5.3 "Preparing the cables" (page 24).
2. Connect PE and N to the "=AS-X4 PV System" terminal according to the labels.
3. Connect L1, L2, and L3 to the "=AS-X4/PV System" terminal according to the labels.



☑ The PV system is now connected to the Automatic Switch Box.

5.4.3 Connecting the Feed-in Meter

Cable protection

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

Connection requirements

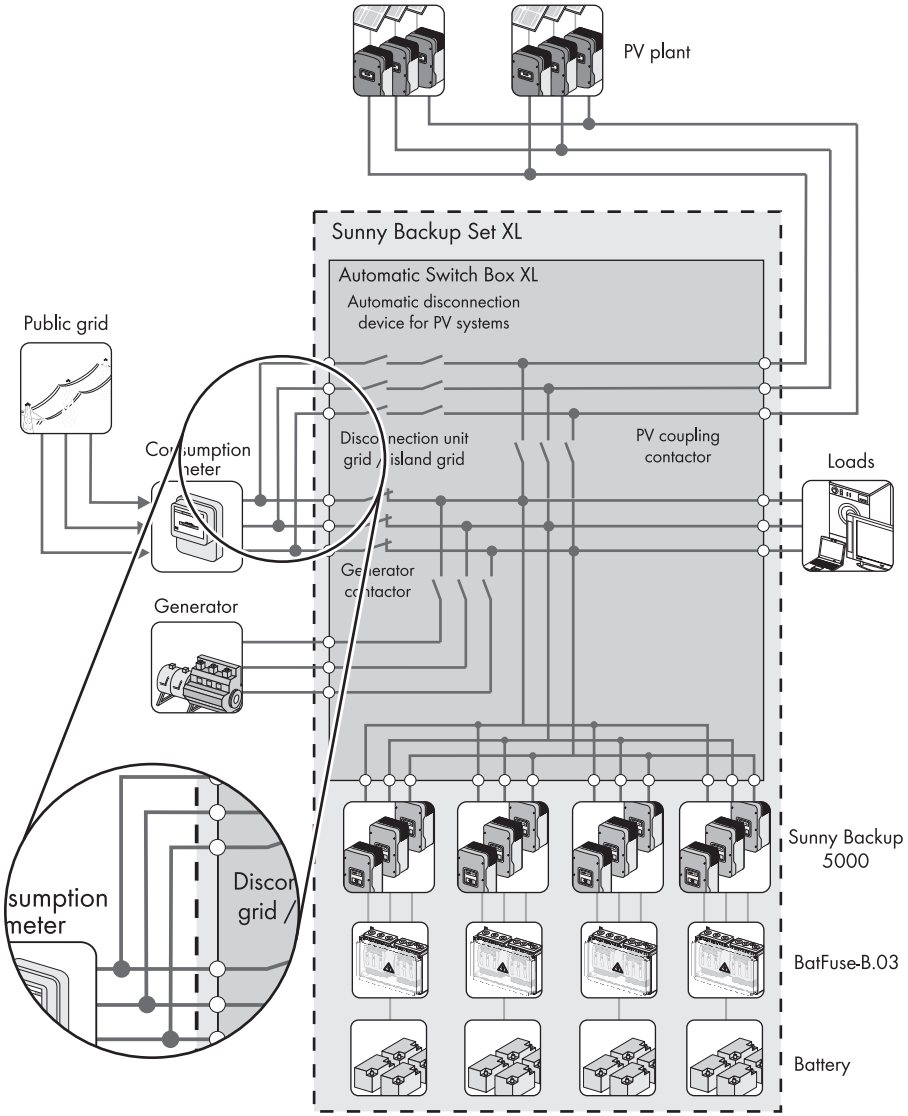
The Sunny Backup-System is only certified for TN grids and may not be installed in TT grids.

Comply with all connection regulations of the 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 (=AS-X5 PV Meter) and the consumption meter (=AS-X1 Load Meter) outside 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



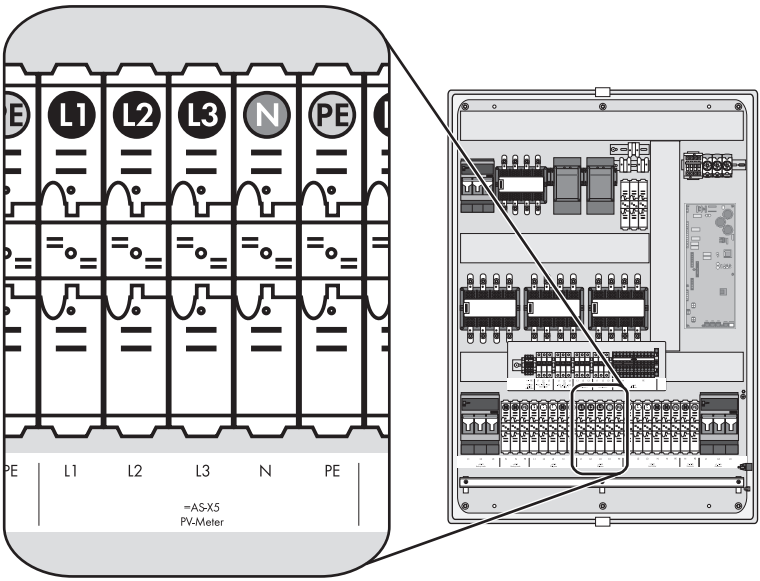
Cable Sizing

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

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

Connection Procedure

1. Prepare the cables as described in Section 5.3 "Preparing the cables" (page 24).
2. Connect PE and N to the "=AS-X5 PV Meter" terminal according to the labels.
3. Connect L1, L2 and L3 to the "=AS-X5 PV Meter" terminal according to the labels.



☑ The feed-in meter is now connected to the Automatic Switch Box.

5.4.4 Connecting the Consumption Meter

DANGER!

Danger to life due to non-protection of the residual current device (RCD)

The protective function of any residual current devices (RCDs) installed between the grid and Automatic Switch Box would be rendered ineffective by 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.

The Sunny Backup-System requires a grounded neutral conductor in order to form a TN grid in a power outage and 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 incorrect grounding of the grid-side PEN conductor.

- Ground the grid-side PEN conductor inside the house connection box.

  Example: Connection from house connection box to the equipotential bonding bar.

Cable Sizing

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

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

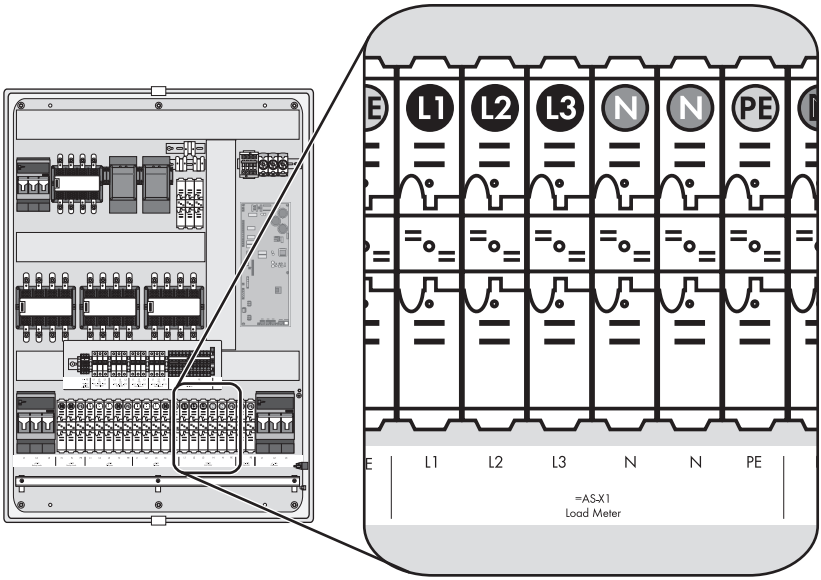
ATTENTION!

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

- Use max. one 160 A fuse as back-up fuse in the distribution.

Connection Procedure

1. Prepare the cables as described in Section 5.3 "Preparing the cables" (page 24).
2. Connect PE and N to the "=AS-X1 Load Meter" terminal according to the labels. The second connection terminal "N" is not assigned.
3. Connect L1, L2 and L3 to the "=AS-X1 Load Meter" terminal according to the labels.



☑ The consumption meter is now connected to the Automatic Switch Box.

5.4.5 Connecting the Battery

The electrical connection from the battery to the Automatic Switch Box is necessary in order to supply voltage to a DC-operated contactor in the Automatic Switch Box.

Cable Sizing

The cable type and routing method must be suitable for the application and the deployment location.

Choose the cable cross-section according to the cable type used, the method of routing and the ambient conditions at the installation site.

Dimension the cable to cope with a transient power of 800 W at low battery voltage.

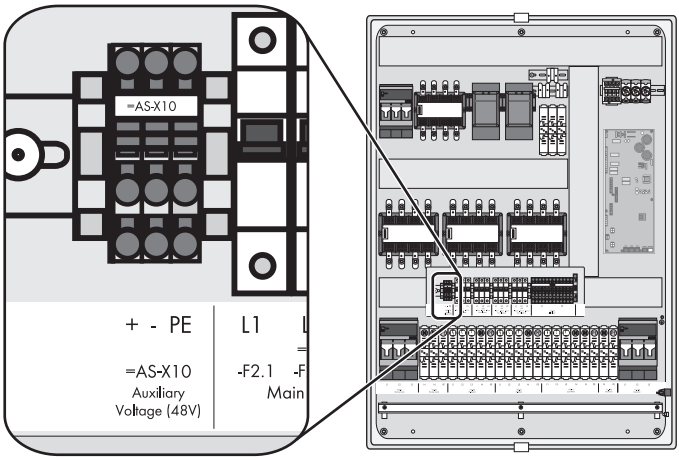
ATTENTION!

Destruction of the cable due to thermal overload.

- Equip battery cable with an external backup fuse, e.g. the integrated BatFuse-B.03 fuses from SMA Solar Technology AG.

Connection Procedure

1. Prepare the cables as described in Section 5.3 "Preparing the cables" (page 24).
2. Connect PE to the "=AS-X10 Auxiliary Voltage (48V)" terminal according to the label.
3. Connect plus pole of cable to the "=AS-X10 Auxiliary Voltage (48V)" terminal according to the label.
4. Connect minus pole of cable to the "=AS-X10 Auxiliary Voltage (48V)" terminal according to the label.



☑ The battery is now connected.

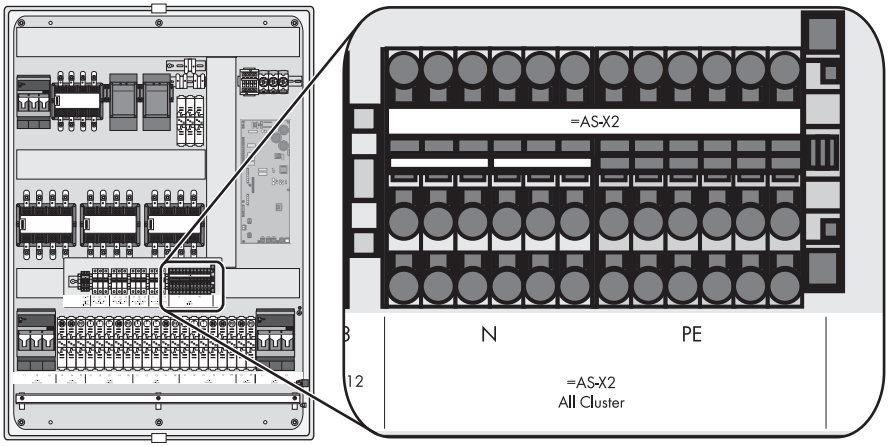
5.4.6 Connecting the Sunny Backup

Fuse protection of the Sunny Backup

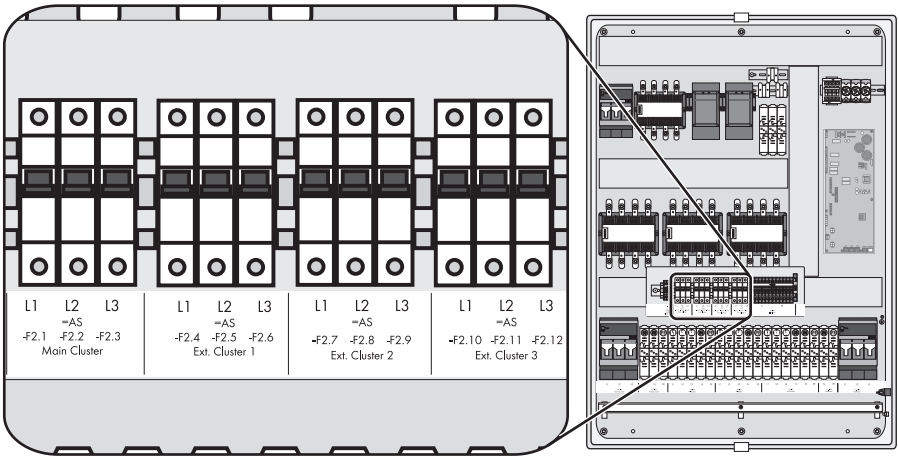
Each Sunny Backup is fused with a 32 A line circuit breaker (tripping characteristic C) inside the Automatic Switch Box.

Connection Procedure

1. Prepare the cables as described in Section 5.3 "Preparing the cables" (page 24).
2. Connect PE and N to the "=AS-X2 All Cluster" terminal according to the labels.



3. Connect Main Cluster:
   - Connect phase L of the Sunny Backup-Master to L1 of the line circuit breaker "=AS-F2.1 Main Cluster".
   - Connect phase L of the Sunny Backup-Slave 1 to L2 of the line circuit breaker "=AS-F2.2 Main Cluster".
   - Connect phase L of the Sunny Backup-Slave 2 to L3 of the line circuit breaker "=AS-F2.3 Main Cluster".
4. Connect Extention Cluster 1:
   - Connect phase L of the Sunny Backup-Master to L1 of the line circuit breaker "=AS-F2.4 Ext. Cluster 1".
   - Connect phase L of the Sunny Backup-Slave 1 to L1 of the line circuit breaker "=AS-F2.5 Ext. Cluster 1".
   - Connect phase L of the Sunny Backup-Slave 2 to L1 of the line circuit breaker "=AS-F2.6 Ext. Cluster 1".



5. Connect Extention Cluster 2 to the line circuit breakers "=AS-F2.7 Ext. Cluster 2" thru "=AS-F2.9 Ext. Cluster 2". To execute the connection proceed as described under item 4.
6. Connect Extention Cluster 3 to the line circuit breakers "=AS-F2.10 Ext. Cluster 3" thru "=AS-F2.12 Ext. Cluster 3". To execute the connection proceed as described under item 4.

☑ The Sunny Backup units are now connected.

5.4.7 Connecting a Generator (Optional)

CAUTION!

Risk of burns when opening and closing the fuse load disconnector (NH load disconnector) under load.

Opening or closing the fuse load disconnector (NH load disconnector) under load causes sparking.

- Wear personal protective equipment.

You can connect a three-phase generator, such as a diesel generator or another grid-forming current generator, to the Automatic Switch Box.

The phases L1, L2, and L3 are led through fuse elements in the Automatic Switch Box. The fuse plugs are designed for a nominal current of 160 A.

Determine the required fuse size according to the cable routing method and installation conditions, and install the appropriate fuse plugs. The maximum usable fuse plugs (160 A) are factory-installed in the respective fuse element.

Cable Sizing

ATTENTION!

Destruction of the cable due to overload.

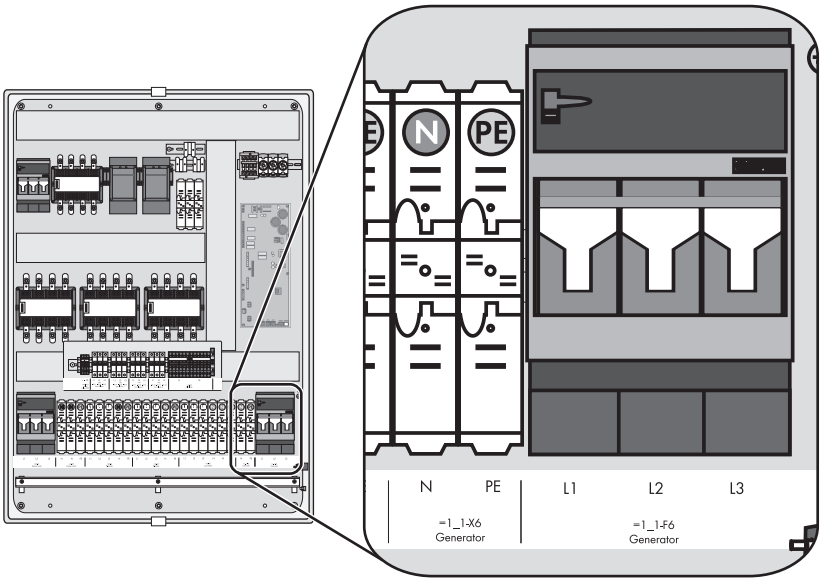
- Select the required cable cross section according to the nominal power of the generator.
- The size of the output fuse of the generator may affect the sizing of the cable to the PV system.
- If the generator does not have an output fuse, execute the cable connection to the Automatic Switch Box with ground-fault and short-circuit protection. As an alternative - especially for long cable distances - you can install additional fusing close to the generator.

The cable type and routing method must be suitable for the application and the deployment location.

Connection Procedure

1. Prepare the cables as described in Section 5.3 "Preparing the cables" (page 24).
2. Connect PE and N to the "=1_1-X6 Generator" terminal according to the labels.
3. Connect L1, L2, and L3 to the "=1_1-F6 Generator" fuse element according to the labels.

☑ The generator is now connected.



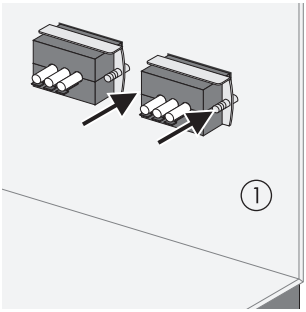
5.5 Communication

The Automatic Switch Box transfers voltage measurement and current measurement signals to the Sunny Backup units. These signals are transferred via the supplied control cables and sensor cables (red). The Automatic Switch Box is controlled by the Sunny Backup-Master in the Main Cluster via a CAN bus.

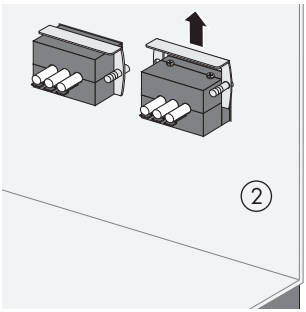
Before you can connect the control, sensor and communication cables in the Automatic Switch Box, you must route the cables into the interior of the Automatic Switch Box through the two-part cable openings. To do this, proceed as described in Section 5.5.1 "Routing cables into the Automatic Switch Box" (page 39). Then connect the cables as described in Section 5.5.2 "Connecting the control and sensor cables" (page 42) and Section 5.5.3 "Connecting the communication cable" (page 42).

5.5.1 Routing cables into the Automatic Switch Box

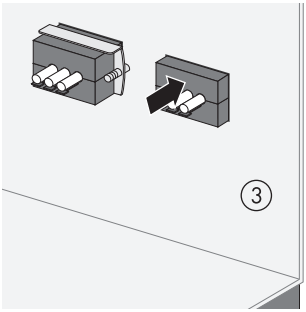
1. Loosen the screws on the mounting plate of the two-part cable opening inside the Automatic Switch Box.



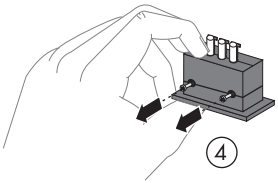
2. Remove the mounting plate and place it aside.



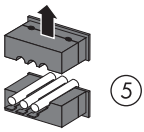
3. Remove cable opening from the enclosure.



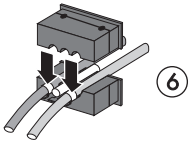
4. Loosen screws of the two-part cable opening.



5. Remove the half without the T-shaped brackets.

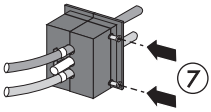


6. Lay a communication cable as well as a control and sensor cable of sufficient length from the opening to the desired connection location through the part of the cable opening with the T-shaped brackets. Fix them in place with cable ties.

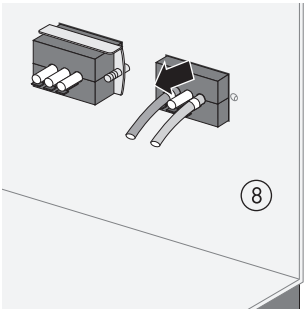


7. Screw the two halves back together. Fasten the screws hand-tight.

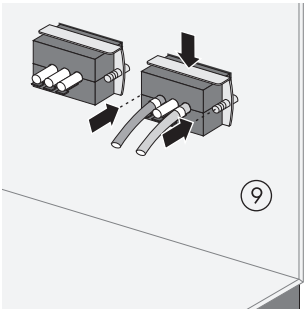
   The cables and the placeholder (plastic rod) must be fitted tightly between both sides of the two-part cable opening. Otherwise, a proper seal of the enclosure cannot be guaranteed.



8. Insert cable opening including cable into the enclosure from the outside.



9. Attach mounting plate of the two-part cable opening and fasten the screws hand-tight.



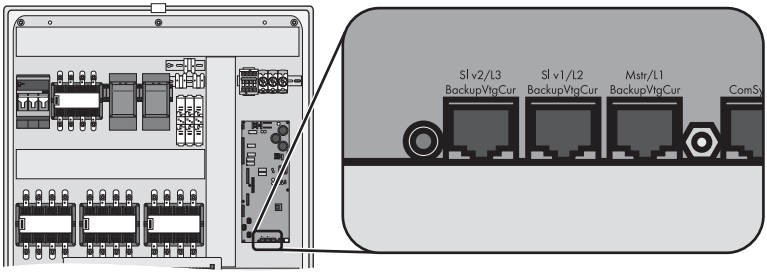
10. Repeat steps 1 - 9 for the remaining control and sensor cables. A second two-part cable opening is supplied for this.

☑ The communication cables have now been routed into the Automatic Switch Box.

5.5.2 Connecting the control and sensor cables

1. Insert the control and measurement cable (red) for the Sunny Backup-Master of the Main Cluster into the "Mstr/L1 BackupVtgCur" socket.
2. Plug the control and sensor cable for the Sunny Backup-Slave 1 of the Main Cluster into the "Slv1/L2 BackupVtgCur" socket.
3. Plug the control and sensor cable for the Sunny Backup-Slave 2 of the Main Cluster into the "Slv2/L3 BackupVtgCur" socket.

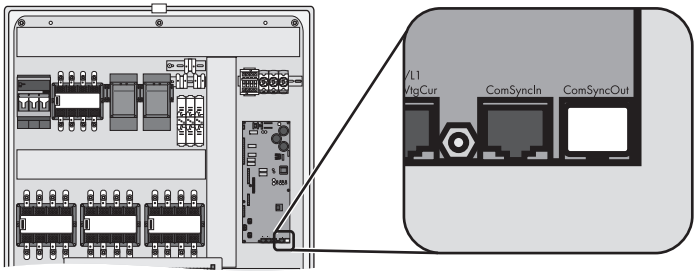
☑ The control and sensor cables are now connected.



5.5.3 Connecting the communication cable

1. Plug the communication cable (black) for the communication between Sunny Backup and the Automatic Switch Box into the "ComSyncIn" socket. Leave the termination resistor plugged into the "ComSyncOut" socket.
2. Connect the end of the communication cable to the "ComSyncIn" socket to a Sunny Backup in the Main Cluster. Since all Sunny Backup units (master and slaves) of the Main Cluster are interconnected via a communication bus, the Automatic Switch Box can be connected to either a slave or the master of the Main Cluster.

☑ The communication cable is now connected.



6 Commissioning the Automatic Switch Box

1. Check the following requirements:
   - The Automatic Switch Box is installed properly.
   - All cables are correctly and completely connected.
   - All cables are tightly enclosed by the membrane at the bottom of the Automatic Switch Box.
   - All cables in the Automatic Switch Box are trapped on the cable support rail provided for that purpose.
   - The base panels on the base of the Automatic Switch Box are attached.
2. Switch on the circuit breaker in the Automatic Switch Box.
3. Lock Automatic Switch Box with the switch cabinet key.
4. Attach the included sticker (hazard warning for consumer load system) in an clearly visible position in or on the distribution to which the Sunny Backup-System is connected.

   The sticker calls attention to the Sunny Backup-System and is intended to ensure that, if any work needs to be carried out which requires disconnection, the Sunny Backup-System is also switched off.

☑ The Automatic Switch Box is now ready for operation.

7 Opening and Closing

7.1 Opening the Automatic Switch Box

ATTENTION!

Electrostatic discharges can damage the Automatic Switch Box.

- Make sure you are grounded before touching any 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 secure against reconnection.
3. Disconnect the Automatic Switch Box from all voltage sources.
4. Open the enclosure with the switch cabinet key.
5. Measure voltage to ensure there is no residual voltage present.

☑ The Automatic Switch Box is now open.

7.2 Closing the Automatic Switch Box

1. Lock the enclosure of the Automatic Switch Box with the switch cabinet key.
2. Start the Automatic Switch Box as described in Section 6 "Commissioning the Automatic Switch Box" (page 43).

☑ The Automatic Switch Box is now closed and in operation.

8 Decommissioning

8.1 Disassembling the Automatic Switch Box

1. Open the Automatic Switch Box as described in Section 7.1 "Opening the Automatic Switch Box" (page 44).
2. Remove all cables from the Automatic Switch Box.
3. Remove all fastening screws from the base panel front and back.
4. Put the screws aside. They will be needed later to reattach the base panels.
5. Unscrew and remove the fastening screws of the Automatic Switch Box.
6. Lock the enclosure of the Automatic Switch Box with the switch cabinet key.
7. Transport the Automatic Switch Box with a forklift, pallet truck, or crane. See Section 4.2 "Transport" (page 15).

   ☑ The Automatic Switch Box is now disassembled.
8. Remount the base panels on the Automatic Switch Box.

8.2 Storing the Automatic Switch Box

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

8.3 Disposing of the Automatic Switch Box

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

Number of phases	3-phase
Nominal voltage	3 x 230 V / 400 V or 3 x 240 V / 415 V
Nominal frequency	50 Hz
Number of Sunny Backup	6 / 9 / 12 x SBU 5000
Mounting type	Standing on a base
Permitted grid structure on grid side	TN-C
Permitted grid structure on load side	TN-S

Consumer load connection

Number	1 (three-phase)
Nominal current	3 x 160 A
Nominal power	110 kW
Diameter of bolt clamp for connecting N and PE	8 mm
Diameter of the screws on the fuse element for connecting L1, L2, and L3	8 mm
Maximum torque of bolt clamp	6 Nm ... 12 Nm
Maximum torque of fuse element	14 Nm
Maximum cable cross section suitable for connection	70 mm²
Maximum fuse plug	160 A
Fuses	NH00

PV system connection

Number	1 (three-phase)
Nominal current	3 x 160 A
Nominal power	110 kW
Diameter of bolt clamps	8 mm
Maximum torque of bolt clamp	6 Nm ... 12 Nm
Maximum cable cross section suitable for connection	70 mm²
Fuses	none

Feed-in meter connection

Nominal current	3 x 160 A
Nominal power	110 kW
Maximum torque	6 Nm ... 12 Nm
Maximum cable cross section suitable for connection	70 mm²
Fuse	none

Consumption meter connection

Nominal current	3 x 160 A
Nominal power	110 kW
Maximum torque	6 Nm ... 12 Nm
Maximum cable cross section suitable for connection	70 mm²
Fuse	none

Battery Connection

Voltage	48 V
Maximum cable cross section suitable for connection	2.5 mm²
Maximum power consumption at U_{Batmin}	800 W

Sunny Backup connection

Number	6 / 9 / 12
Nominal current	3 x 43.4 A / 3 x 65.1 A / 3 x 86.8 A
Nominal power	30 kW / 45 kW / 60 kW
Maximum cable cross section suitable for connection	16 mm²
Fuses	12 x 32A line circuit breakers (tripping characteristic C)

Generator connection

Number	1 (three-phase)
Nominal current	3 x 160 A
Nominal power	110 kW
Diameter of bolt clamp for connecting N and PE	8 mm
Diameter of the screws on the fuse element for connecting L1, L2, and L3	8 mm
Maximum torque of bolt clamp	6 Nm ... 12 Nm
Maximum torque of fuse element	14 Nm
Maximum cable cross section suitable for connection	70 mm²
Maximum fuse plug	160 A
Fuses	NH00

Mechanical data

Width x height x depth	1,000 mm x 1,600 mm x 300 mm
Weight	180 kg

Ambient Conditions

ambient temperature	– 25 °C ... +50 °C
Air humidity	0 % ... 100 %

Protection Rating

Protection rating *	IP65

* according to IEC 60529

10 Contact

If you have technical problems concerning our products, contact the SMA Serviceline. We require 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 connected Sunny Backup
- Type and number of connected PV inverters
- Type of connected consumer loads
- If a generator is connected:
  - Type of connected generators
  - Power of the connected generator
  - Maximum current of the generator

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- 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
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