Replacement Manual

Spare-part set "Aux Transformer" for SUNNY CENTRAL STORAGE UP(-US) / SUNNY CENTRAL STORAGE UP-XT(-US)

6UP-820-002-003

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SMA Solar Technology AG

Sonnenallee 1

34266 Niestetal

Germany

Tel. +49 561 9522-0

Fax +49 561 9522-100

www.SMA.de

E-mail: info@SMA.de

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1 Information on this Document

1.1 Validity

This document is valid for:

- Auxiliary transformer (Aux Transformer 400 V-120 V/230 V Kit)

1.2 Target Group

The tasks described in this document must only be performed by qualified persons. Qualified persons must have the following skills:

- Knowledge of how to safely disconnect SMA inverters
- Knowledge of how an inverter works and is operated
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of all applicable laws, regulations, standards, and directives
- Knowledge of and compliance with this document and all safety information
- Training in dealing with dangers and risks in electrical installations according to 29 CFR, Chapter XVII, Part 1910 (OSHA), NEC and NFPA 70E

1.3 Levels of Warning Messages

The following levels of warning messages may occur when handling the product.

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

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

⚠ CAUTION
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE
Indicates a situation which, if not avoided, can result in property damage.

1.4 Symbols in the Document

Symbol	Explanation
	Information that is important for a specific topic or goal, but is not safety-relevant
☐	Indicates a requirement for meeting a specific goal
☑	Required result
	Example

1.5 Typographies in the document

Typography	Use	Example
bold	• Messages • Terminals • Elements on a user interface • Elements to be selected • Elements to be entered	• Connect the insulated conductors to the terminals **X703:1** to **X703:6**. • Enter **10** in the field **Minutes**.
>	• Connects several elements to be selected	• Select **Settings > Date**.
[**Button**] [**Key**]	• Button or key to be selected or pressed	• Select [**Enter**].
#	• Placeholder for variable components (e.g., parameter names)	• Parameter **WCtlHz.Hz#**

1.6 Designations in the Document

Complete designation	Designation in this document
Aux Transformer Kit	Product
Sunny Central UP(-US)	Sunny Central, inverter
Sunny Central Storage UP(-US)	Sunny Central Storage, inverter
Sunny Central Storage UP-XT(-US)	Sunny Central Storage, inverter

2 Safety

2.1 Intended Use

The product may only be installed in the following SMA inverters with the "External auxiliary power supply" option:

- SC xxxx UP
- SC xxxx UP-US
- SCS xxxx UP
- SCS xxxx UP-US
- SCS xxxx UP-XT
- SCS xxxx UP-XT-US

Statutory warranty

Use SMA products only in accordance with the information provided in the enclosed documentation and with the locally applicable laws, regulations, standards and directives. Any other application may cause personal injury or property damage.

Alterations to the SMA products, e.g., changes or modifications, are only permitted with the express written permission of SMA Solar Technology AG. Unauthorized alterations as well as failure to observe the documentation will void guarantee and warranty claims and in most cases terminate the operating license. SMA Solar Technology AG shall not be held liable for any damage caused by such changes.

Any use of the product other than that described in the Intended Use section does not qualify as appropriate.

This document does not replace any regional, state, provincial, federal or national laws, regulations or standards that apply to the installation, electrical safety and use of the product. SMA Solar Technology AG assumes no responsibility for the compliance or non-compliance with such laws or codes in connection with the installation of the product.

The documentation supplied is an integral part of SMA products. Keep the documentation in a convenient, dry place for future reference and observe all instructions contained therein.

The product must not be operated with any technical defects.

2.2 IMPORTANT SAFETY INFORMATION

Keep the manual for future reference.

This section contains safety information that must be observed at all times when working.

The product has been designed and tested in accordance with international safety requirements. As with all electrical or electronical devices, some residual risks remain despite careful construction. To prevent personal injury and property damage and to ensure long-term operation of the product, read this section carefully and observe all safety information at all times.

⚠ DANGER

Danger to life due to electric shock when live components or cables of the inverter are touched

High voltages are present in the conductive components or cables of the inverter. Touching live parts and cables of the inverter results in death or lethal injuries due to electric shock.

- Disconnect the inverter from voltage sources and make sure it cannot be reconnected before working on the device.
- After switching off the inverter, wait at least 25 minutes before opening the inverter to allow the capacitors to discharge completely.
- Wear suitable personal protective equipment for all work on the product.
- Do not touch non-insulated parts or cables.

⚠ DANGER

Danger to life due to electric shock in case of a ground fault

If there is a ground fault, components that are supposedly grounded may in fact be live. Touching live parts will result in death or serious injury due to electric shock.

- Before working on the system, ensure that no ground fault is present.
- Wear suitable personal protective equipment for all work on the product.

⚠ DANGER

Danger to life due to high short-circuit current in the battery

Despite careful construction, a short circuit may occur in the inverter under fault conditions. In case of a short circuit in the inverter, the connected battery can supply a very high short-circuit current. The resulting electric arc and pressure wave lead to death or serious injuries.

- Install the inverter in a closed electrical operating area.
- Always close and lock the inverter.
- Before opening the inverter, externally disconnect the inverter on the AC and DC side and secure against reconnection.
- After switching off the inverter, wait at least 25 minutes before opening the inverter to allow the capacitors to discharge completely.

⚠ WARNING

Danger to life due to arc fault caused by fault in the medium-voltage switchgear

If there is a fault in the medium-voltage switchgear, arc faults may occur during operation of the product which can result in death or serious injuries. In the event of arc faults in the medium-voltage switchgear, the pressure escapes to the rear into the medium-voltage transformer compartment.

- Only perform work on the medium-voltage switchgear when it is in a voltage-free state.
- Prior to commissioning and operating the medium-voltage switchgear, close the front panels of the base below the medium-voltage switchgear.
- When performing switching operations, make sure that the hatch of the arc fault opening can be easily opened and is not covered by objects (e.g., ice, vegetation).
- When performing switching operations, open the doors of the medium-voltage cabinet and attach the doors to the designated positions.
- All work and switching operations on the medium-voltage switchgear must only be performed by qualified persons wearing adequate personal protective equipment.
- All other persons are to keep a safe distance from the product when switching operations are performed. The internal arc pressure safety area is to be cordoned off.
- Do not touch or access the roof of the medium-voltage switchgear when medium voltage is connected.
- Do not access the medium-voltage cabinet.

⚠ WARNING

Danger to life from electric shock when entering the system

Damaged insulation in the system can cause lethal currents to ground. Lethal electric shocks can result.

- Ensure that the insulation resistance of the system exceeds the minimum value. The minimum value of the insulation resistance is: 14 kΩ.
- All work on the inverter must only be carried out by qualified persons.
- Before entering the system, switch the system with the ground fault detection system (Remote GFDI) to insulated operation.
- After entering the system, immediately ensure that the inverter does not display an insulation error.
- Disconnect the inverter from the power path and from the control path if no voltage is required for working on the product.
- Wear suitable personal protective equipment for all work on the product.

⚠ WARNING

Danger to life due to electric shock when the internal power supply is switched off

After switching off the internal power supply at the load-break switch **-Q62**, lethal voltages are still present in the cables to load-break switch **-Q62** Only after the power path has disconnected are all cables of the internal energy self-sufficiency de-energized. Touching live components can result in death or serious injury due to electric shock.

- Disconnect the product from the power path and ensure that it cannot be reconnected.
- Do not touch the orange cables in the inside of the product. These cables are used for connecting the external supply voltage and can be dangerous to touch.
- Wear suitable personal protective equipment for all work on the product.

⚠ WARNING

Hearing impairment due to high-frequency noises of the inverter

The inverter generates high-frequency noises when in operation. This can result in hearing impairment.

- Wear hearing protection.

⚠ WARNING

Danger to life due to electric arc if there are tools inside the inverter

When reconnecting and in operation, an electric arc can arise if conductive foreign parts (e.g. tools) are located in the inverter and establish a conductive connection between live components. This can result in death or serious injury.

- Before commissioning or reconnection, verify that no tools are inside the inverter.

⚠ WARNING

California Proposition 65

The product can expose you to hazardous substances including antimony trioxide and diethylhexyl phthalate (DEHP). These chemicals are known to the State of California to cause cancer and birth defects or other reproductive harm.

- For more information, visit https://www.P65warnings.ca.gov.

⚠ CAUTION

Risk of burns due to hot components

Some components of the inverter can become very hot during operation. Touching these components can cause burns.

- Observe the warning messages on all components.
- During operation, do not touch any components marked with such warnings.
- After switching off the inverter, wait until any hot components have cooled down sufficiently.
- Wear suitable personal protective equipment for all work on the product.

⚠ CAUTION

Risk of injury due to sharp edges in the inverter

There are sharp edges in the inverter. You can cut yourself when reaching into the inverter.

- Wear gloves when carrying out any work on the inverter.

⚠ CAUTION

Risk of injury when mounting and removing the auxiliary transformer

An auxiliary transformer weighs 92 kg (203 lb). Injuries may occur if the fan is lifted incorrectly or if the auxiliary transformer falls during mounting or removal.

- Carefully mount and dismount the auxiliary transformer.
- Use a lifting aid for mounting and dismounting. This lifting aid can be ordered from SMA.
- Wear personal protective equipment for all work on the product.

NOTICE

Damage to the inverter due to sand, dust and moisture

Sand, dust and moisture penetration can damage the inverter, thus impairing its functionality.

- Only open the inverter if the humidity is within the thresholds and the environment is free of sand and dust.
- Do not open the inverter during a dust storm or precipitation.
- Close the inverter in case of interruption of work or after finishing work.

i Observe superordinate standards

The repair work on devices and the consideration and application of other standards which correspond to a superordinate standard is the responsibility of the qualified person performing the work. Unauthorized alterations will void guarantee and warranty claims and in most cases terminate the operating license. SMA Solar Technology AG shall not be held liable for any damage caused by such changes.

i Connecting and disconnecting medium voltage

Only a duly authorized person trained in electrical safety is allowed to connect and disconnect the medium voltage.

3 Scope of Delivery

Check the scope of delivery for completeness and any externally visible damage. Contact the Service if the scope of delivery is incomplete or damaged.

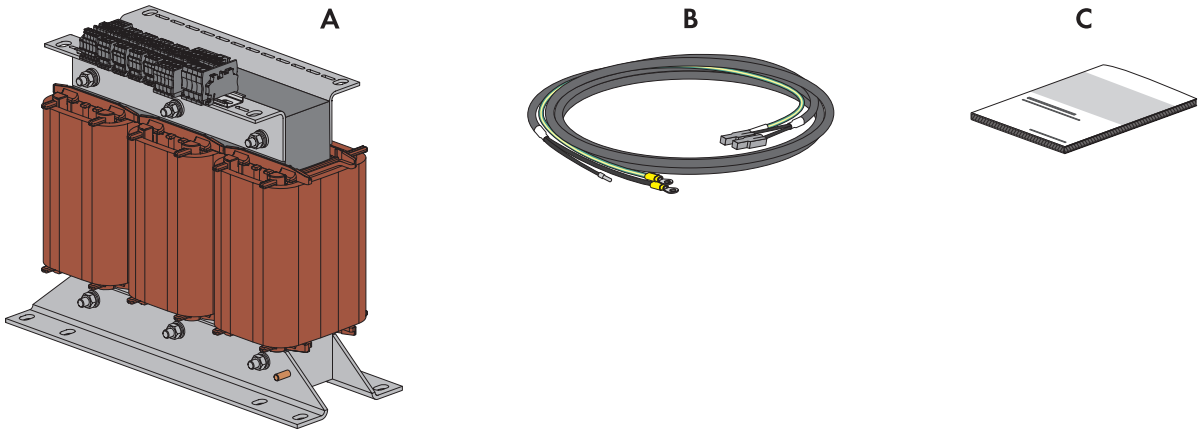


Figure 1: Components included in scope of delivery

Position	Quantity	Designation
A	1	Transformer for internal power supply
B	1	Cable set with connector and grounding cable
C	1	Manual

4 Overview of terminals

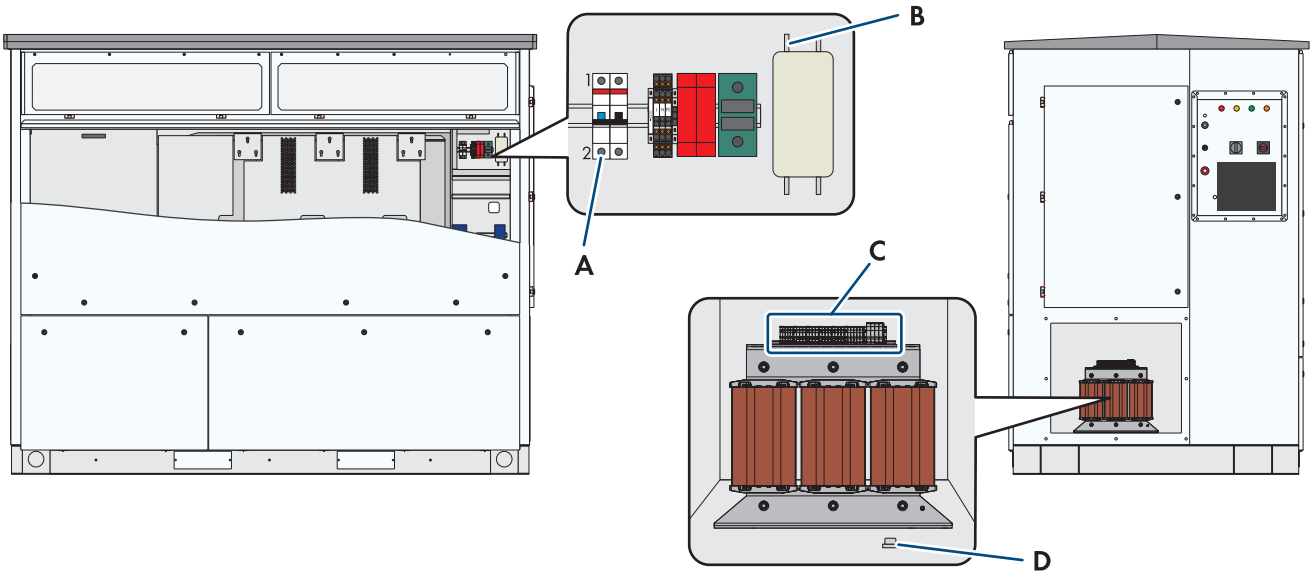


Figure 2: Overview of the terminals for replacing the auxiliary transformer

Position	Designation
A	Fuse **F70** with terminal **F70:2**
B	EMC filtering device with terminal **R70:N**
C	Terminal block of auxiliary transformer
D	Grounding terminal **U60:PE** on the bottom of the inverter

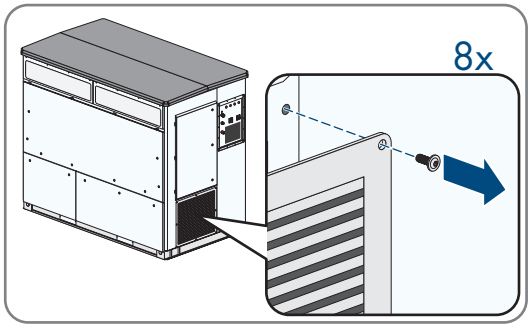
5 Removal of Auxiliary Transformer

Required maintenance material (not included in the scope of delivery):

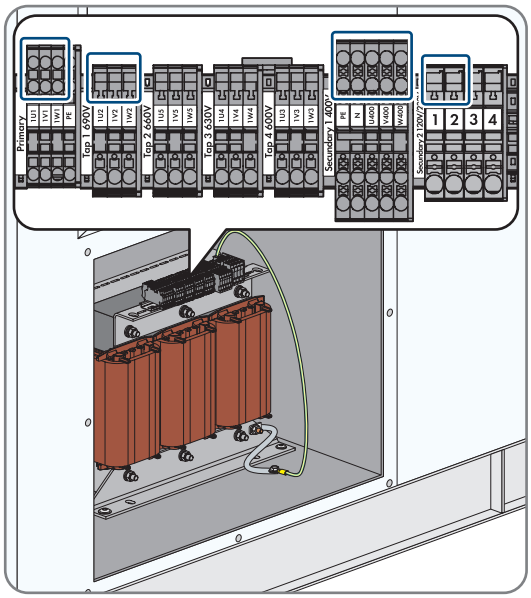
☐ Lifting aid (material number: 6UP-900-004-001)

Procedure:

1. Disconnect the inverter on all poles from voltage source (see inverter manual or MV Power Station manual).
2. Disconnect the medium-voltage transformer from voltage sources (see instructions from the MV Power Station or the manufacturer of the medium-voltage transformer).
3. Switch off fuse **F70** on the right-hand side in the customer installation location of the inverter.
4. Remove the screws from the air outlet grid (TX30) and keep the screw material for mounting.

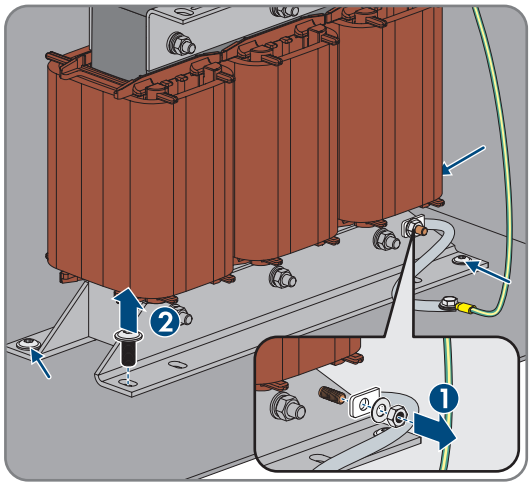


5. Slightly pull the air outlet grid forwards.
6. Remove the ground strap of the air outlet grid in the inverter (AF13) and take off the air outlet grid. Keep the screw material for remounting.
7. Note the position of the connector and terminal blocks.



8. Disconnect the connector **-X362** and **-X363** from the terminal block on the auxiliary transformer.
9. Remove the insulated conductors from the **Primary** terminal block.
10. Disconnect the **-X260** connector from the **Tap** terminal block.
11. Disconnect the **-X261** connector from the **Secondary 400 V** terminal block.

12. Remove the nuts and washers from the base and the grounding strap of the auxiliary transformer. Keep the screw material for remounting.



13. Lift the auxiliary transformer out of the inverter using the lifting aid. Observe the weight of the auxiliary transformer (89 kg (196 lb)).
14. Remove any dust deposits from the inverter.
15. For inverters of production version Q1, Q4 and A1 with option 13_2 (auxiliary power supply 120 V): also replace the cable set 115213-00.01 (see Section 6, page 13).
16. Mount the auxiliary transformer (see Section 7, page 14).

6 Replacing the W662 Cable

The **W662** cable must be replaced in inverters of production version Q1, Q4 and A1 with option 13_2 (auxiliary power supply 120V).

Procedure:

1. Ensure that all poles of the inverter are disconnected from all voltage sources.
2. Remove the PG cable gland from the **W662** cable.
3. Remove the **W662** cable from the cable glands of **F70** and **R70** in the inverter.
4. Disconnect the grounding cable from connection **U60:PE** in the inverter.
5. Pull the **W662** cable out of the inverter.
6. Insert the supplied cable into the inverter. Use the cable route of the previously removed cable.
7. Insert insulated conductor number **2** of the multi-core cable into the cable gland terminal N of the **R70** in the inverter and tighten the cable gland (tightening torque: 1.8 Nm (15.9 in-lb)).
8. Insert insulated conductor number **1** of the multi-core cable into the cable gland terminal 2 of the **F70** in the inverter and tighten the cable gland (tightening torque: 1.3 Nm (11.5 in-lb)).
9. Connect the grounding cable to terminal **U60:PE** in the inverter (AF13, tightening torque: 16 Nm (142 in-lb)).
10. Fit the PG cable gland from cable **W662** (tightening torque: 3.5 Nm (31 in-lb)).
11. Mount the auxiliary transformer (see Section 7, page 14).

7 Mounting the Auxiliary Transformer

Required maintenance material (not included in the scope of delivery):

☐ Lifting aid (material number: 6UP-900-004-001)

Procedure:

1. Use the lifting aid to lift the supplied auxiliary transformer into the inverter and set it down at the installation position. Observe the weight of the auxiliary transformer (89 kg (196 lb)).
2. Fasten the nuts and washers on the base of the auxiliary transformer to the base using the previously removed screw material (TX40, tightening torque: 25 Nm (18.4 ft-lb)).
3. Fasten the nuts and washers on the grounding strap of the auxiliary transformer to the base using the previously removed screw material (AF13, tightening torque: 16 Nm (142 in-lb)).
4. Connect the **-X362** connector to the terminal block **Secondary 2 120 V / 230 V** terminal **1**.
5. Connect the **-X363** connector to the terminal block **Secondary 2 120 V / 230 V** terminal **2**.
6. Connect the insulated conductor **676** to the terminal block **Primary 1U1**.
7. Connect the insulated conductor **677** to the terminal block **Primary 1V1**.
8. Connect the insulated conductor **678** to the terminal block **Primary 1W1**
9. Insert the connector **-X260** into the terminal block **Tap**. Pay attention to the system voltage and select the correct terminal block.
10. Insert the connector **-X261** into the terminal block **Secondary 400 V**.
11. Mount the air outlet grid ground strap to the inverter (AF13, tightening torque: 16 Nm (142 in-lb)). Ensure that the grounding conductor connection is electrically correct.
12. Mount the air outlet grid to the inverter (TX30, tightening torque: 10 Nm (88.5 in-lb)).
13. Connect the medium-voltage transformer (see manual from the MV Power Station or the manufacturer of the medium-voltage transformer).
14. Switch the inverter back on (see inverter manual or MV Power Station manual).
15. Check functionality of auxiliary transformer (see Section 8, page 15).

8 Checking the Functionality of Auxiliary Transformer

1. Ensure that the external supply voltage is connected.
2. Check voltage at terminals **F70:2** and **R70:N**.
3. If the voltage applied is higher or lower than the relevant supply voltage (120 V / 230 V), check the installation of the auxiliary transformer. To do this, reconnect the inverter and the external supply voltage.
4. Switch on **F70** fuse.

9 Contact

If you have technical problems with our products, please contact the SMA Service Line. The following data is required in order to provide you with the necessary assistance:

- Type of device
- Serial number
- Firmware version
- Event message
- Mounting location and mounting height
- Type of communication
- Type and number of PV modules
- Type of the communication products connected
- Use the name of the system in Sunny Portal (if available)
- Access data for Sunny Portal (if available)
- Special country-specific settings (if available)
- Detailed description of the problem

You can find your country's contact information at:

https://go.sma.de/service

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