

SUNNY TRIPOWER CORE1-US
(STP 33-US-41, STP 50-US-41, STP 62-US-41)
Replacing Defective Assemblies

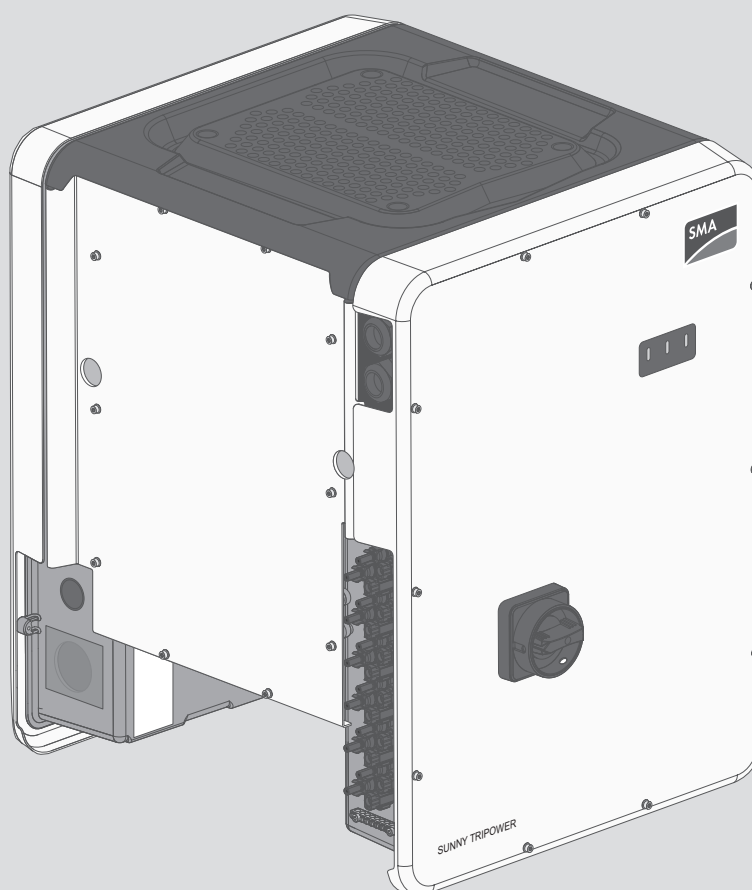


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1 Information on this Document

1.1 Validity

This document is valid for:

- STP 33-US-41 (Sunny Tripower CORE1-US)
- STP 50-US-41 (Sunny Tripower CORE1-US)
- STP 62-US-41 (Sunny Tripower CORE1-US)

1.2 Target Group

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

- Training and approval must be made by SMA Solar Technology AG or subsidiary companies of SMA Solar Technology AG to carry out the activities described in this document
- Knowledge of how to safely disconnect SMA inverters
- Knowledge of how an inverter works and is operated
- Training in how to deal with the dangers and risks associated with installing, repairing and using electrical devices and installations
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of all applicable laws, standards and directives
- Knowledge of and compliance with this document and all safety information

1.3 Content and Structure of this Document

This document describes how to replace components.

This document supplements the documents that are enclosed with each product and does not replace any locally applicable codes or standards. Read and observe all documents supplied with the product.

Illustrations in this document are reduced to the essential information and may deviate from the real product.

1.4 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.

1.5 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
	Desired result
	A problem that might occur
	Example

1.6 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].

1.7 Additional Information

For more information, please go to www.SMA-Solar.com.

Title and information content	Type of information
Operation, configuration and troubleshooting	User manual (eManual)
Mounting, installation, commissioning and decommissioning	Installation manual
"PUBLIC CYBER SECURITY - Guidelines for a Secure PV System Communication"	Technical information
"Short-Circuit Currents"	Technical Information
Information on short-circuit currents of SMA PV inverters	
"Integrated Plant Control and Q on Demand 24/7"	Technical Information
Detailed explanation of functions and description for setting the functions	

2 Safety

2.1 Intended Use

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

Unauthorized or improper use will void guarantee and warranty claims and in most cases terminate the operating license. SMA shall not be held liable for any damage caused by such use.

If the replacement and all activities stated in this document are carried out by persons who are not qualified within the meaning of this documentation, this will void the guarantee and warranty claims and in most cases terminate the operating permit. SMA shall not be held liable for any damage caused directly or indirectly due to such changes by unauthorized persons.

The provided documentation is an integral part of this product. You must read and observe the documentation.

This document does not replace and is not intended to replace any local, state, provincial, federal or national laws, regulations or codes applicable to the installation, electrical safety and use of the product. SMA assumes no responsibility for the compliance or non-compliance with such laws or codes in connection with the installation of the product.

2.2 IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This section contains safety information that must be observed at all times when working on or with the product.

The product has been designed and tested in accordance with international safety requirements. As with all electrical or electronical devices, there are residual risks 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 DC conductors are touched

When exposed to sunlight, the PV modules generate high DC voltage which is present in the DC conductors. Touching live DC conductors results in death or lethal injuries due to electric shock.

- Disconnect the product from voltage sources and make sure it cannot be reconnected before working on the device.
- Do not touch non-insulated parts or cables.
- Do not disconnect the DC connectors under load.
- Wear suitable personal protective equipment for all work on the product.

⚠ DANGER**Danger to life due to electric shock when touching live system components in case of a ground fault**

If a ground fault occurs, parts of the system may still be live. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Disconnect the product from voltage sources and make sure it cannot be reconnected before working on the device.
- Touch the cables of the PV array on the insulation only.
- Do not touch any parts of the substructure or frame of the PV array.
- Do not connect PV strings with ground faults to the inverter.
- Ensure that no voltage is present and wait five minutes before touching any parts of the PV system or the product.

⚠ CAUTION**Risk of burns due to hot enclosure parts**

The enclosure and the enclosure lid may get hot during operation. The DC load-break switch can not become hot.

- Do not touch hot surfaces.
- Wait until the inverter has cooled down before touching the enclosure or enclosure lid.

NOTICE**Damage to the enclosure seal in subfreezing conditions**

If you open the product when temperatures are below freezing, the enclosure seals can be damaged. Moisture can penetrate the product and damage it.

- Only open the product if the ambient temperature is not below -5°C (23°F).
- If a layer of ice has formed on the enclosure seal when temperatures are below freezing, remove it prior to opening the product (e.g. by melting the ice with warm air). Observe the applicable safety regulations.

NOTICE**Damage to the product due to sand, dust and moisture ingress**

Sand, dust and moisture penetration can damage the product and impair its functionality.

- Only open the product if the humidity is within the thresholds and the environment is free of sand and dust.
- Do not open the product during a dust storm or precipitation.
- Close tightly all enclosure openings.
- Only use listed rain-tight or liquid-tight conduit fittings to attach the conduits to the product.

NOTICE**Damage to the inverter due to electrostatic discharge**

Touching electronic components can cause damage to or destroy the inverter through electrostatic discharge.

- Ground yourself before touching any component.

i Electrical installations (for North America)

All installations must conform with the laws, regulations, codes and standards applicable in the jurisdiction of installation (e.g. *National Electrical Code*® ANSI/NFPA 70).

- Before connecting the inverter to the utility grid, contact your local grid operator. The electrical connection of the inverter must be carried out by qualified persons only.
- Ensure that the cables or conductors used for electrical connection are not damaged.

i Grounding conductor test prior to recommissioning

Prior to recommissioning SMA inverters after the installation of SMA components or power assemblies which cannot be replaced intuitively, ensure that the grounding conductor in the inverter is correctly connected. The function of the grounding conductor must be ensured and all locally applicable laws, standards and directives must be observed.

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 shall not be held liable for any damage caused by such changes.

3 Overview of the Assemblies

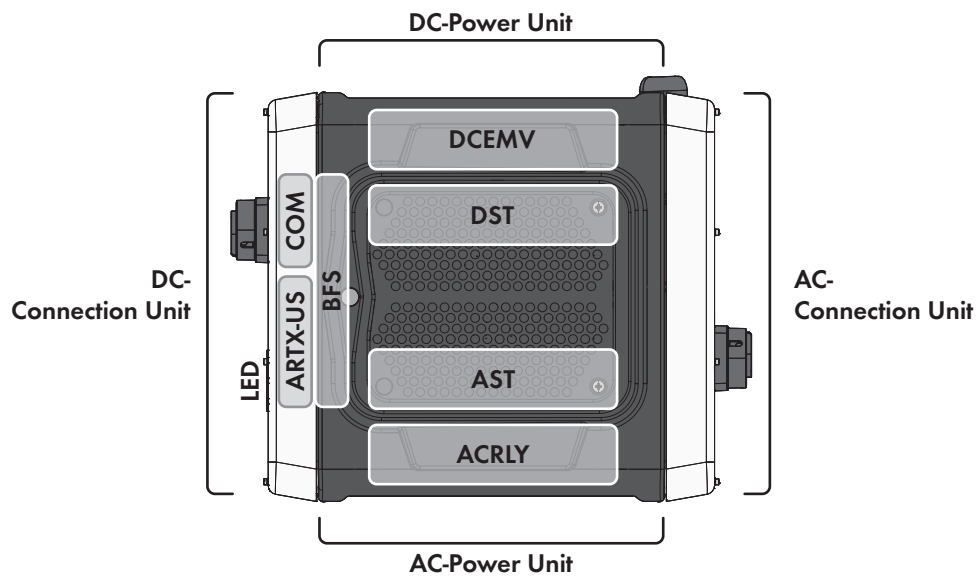


Figure 1: Position of the assemblies in the inverter

4 Replacing Assemblies in the DC Connection Unit

4.1 Scope of Delivery for the DC Connection Unit Assemblies

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

Communication assembly NR-PL-KP20-41-1

Designation	Quantity
PC-KP20.BG1-xx.xx	1
Bolt M4 x 15	3
New label with details for registration in Sunny Portal and the WLAN password (WPA2-PSK) for direct connection to the inverter user interface via WLAN	1

BFS assembly

Scope of delivery for Sunny Tripower 33-US-41: NR-PL-BFS33-US41-1

Scope of delivery for Sunny Tripower 50-US-41: NR-PL-BFS50-US41-1

Scope of delivery for Sunny Tripower 62-US-41: NR-PL-BFS62-US41-1

Designation	Quantity
PL-BFS-xx.xx	1
Bolt M4 x 15	8

DC device plugs

Scope of delivery for Sunny Tripower xx-US: Amphenol connectors (NR-PL-US-DCP-01)

Designation	Quantity
Y-cable for device plug contact (red)	1
Y-cable for device plug contact (blue)	1
Device plug enclosure (plug)	2
Device plug enclosure (jack)	2
Serrated lock washer	4
Nut	4

ARTX-US assembly

Designation	Quantity
PL-ARTX-US-xx.xx	1
Bolt M4 x 15	2
Bolt M6 x 12	4

4.2 Replacing the Communication Assembly

4.2.1 Removing the Communication Assembly

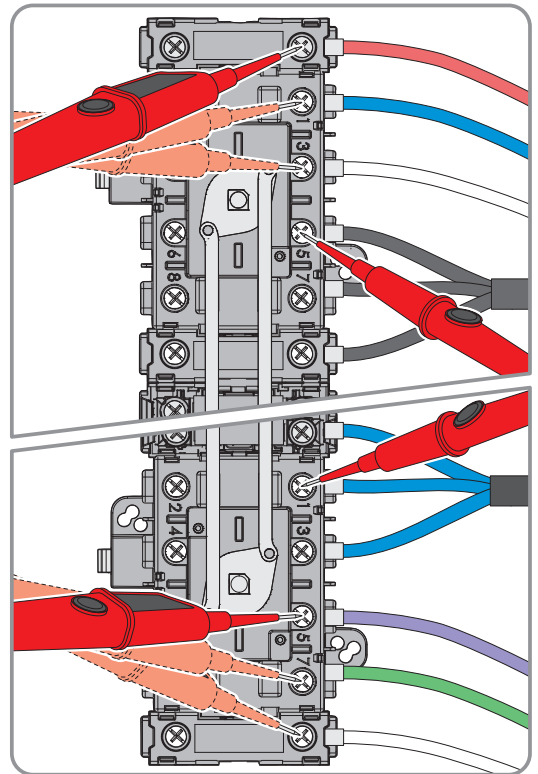
Position	Designation
A	AC switch, only included in STP-50-US-40, STP-33-US-41, STP-50-US-41 and STP-62-US-41

Additionally required aid:

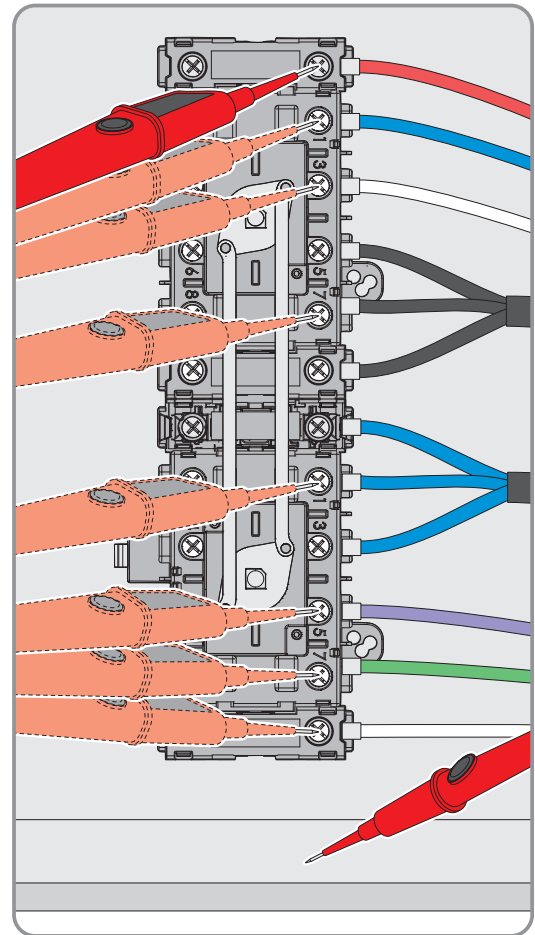
- ☐ 2-pole voltage detector that does not have its own voltage source

Procedure:

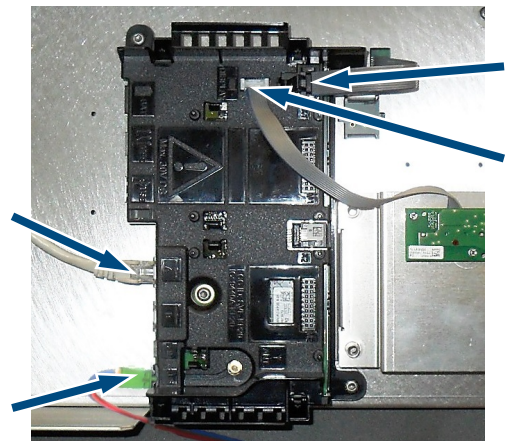
1. Disconnect the inverter from voltage sources (at www.SMA-Solar.com).
2. Make a note of the position of the DC field plugs.
3. Release and remove the DC field plugs.
4. Remove the enclosure lid of the DC-Connection Unit (TX25) by pulling it towards the front.
5. Discharge the DC Connection Unit at the contact points using a voltage detector without intrinsic voltage source. When doing so, ensure that the residual voltage is less than 5 V.
 - On the right-hand side of the DC switch, each pair of contacts DC+ against each contact DC- (red, blue and white conductor against 1 black conductor; gray, green and lilac conductor against 1 blue conductor)



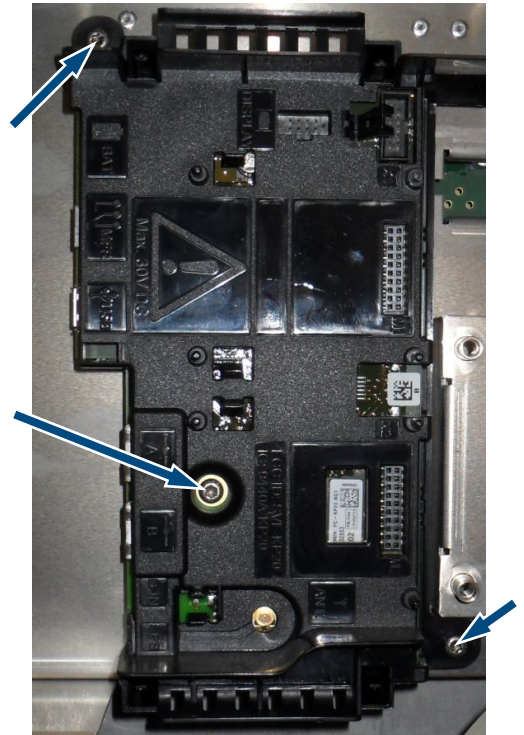
- On the right-hand side of the DC switch, each contact DC+ and DC- against the grounding conductor (red, blue, white, black, gray, green, lilac and blue conductor against grounding conductor)



- Ground yourself prior to replacing the assembly to prevent ESD damage.
- If necessary, remove the communication modules (see the manual of the communication module).
- Remove the cable tie from the ferrite of the ribbon cable **X1**.
- Remove all plugs from the used sockets of the communication assembly.



10. Remove the three screws of the communication assembly (TX20), remove the communication assembly and dispose of the screws.



4.2.2 Installing the Communication Assembly

1. Insert the new communication assembly in the DC Connection Unit.
2. Fasten the communication assembly using the three screws included in the scope of delivery (TX20, torque: $3.5 \text{ Nm} \pm 0.5 \text{ Nm}$ ($30.98 \text{ in-lb} \pm 4.43 \text{ in-lb}$)).
3. Insert all plugs into the respective sockets of the communication assembly.
4. If necessary, install the communication modules (see the manual of the communication module).
5. Attach the enclosure lid before mounting the DC-Connection Unit (see Section 4.6, page 22).
6. Commission the inverter without integration into the local network (see inverter manual). It can take up to 15 minutes before the new assembly has synchronized with the inverter. It can also be that an inverter update is performed.
7. Update the inverter network settings and integrate the inverter into the local network (see inverter manual).

8. Stick the label provided in the scope of delivery over the existing label next to the type label.



9. If necessary, reconfigure the communication modules. For this, start the installation wizard via the user interface of the inverter (see manual of the inverter).

4.3 Replacement of BFS assembly

4.3.1 Removing the BFS Assembly

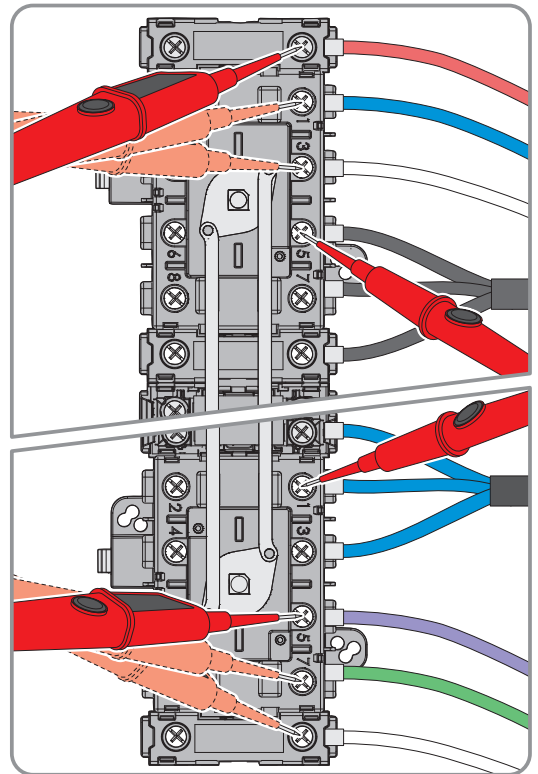
Additionally required material (not included in the scope of delivery):

- ☐ 2-pole voltage detector that does not have its own voltage source

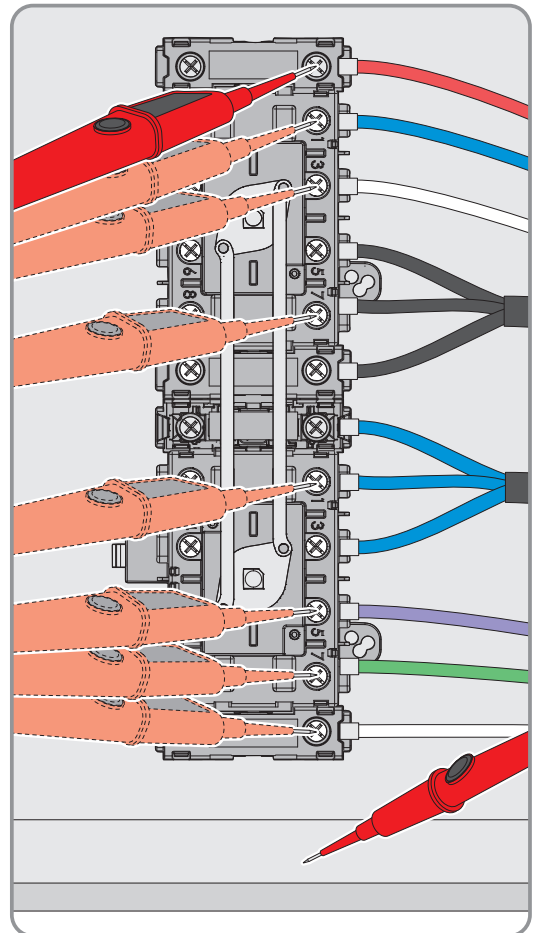
Procedure:

1. Disconnect the inverter from voltage sources (at www.SMA-Solar.com).
2. Make a note of the position of the DC field plugs.
3. Unlock the DC field plugs and remove them.
4. Remove the enclosure lid of the DC-Power Unit (TX25) by pulling it towards the front.
5. Discharge the DC Connection Unit at the contact points using a voltage detector without intrinsic voltage source:
Ensure that the residual voltage is less than 5 V.

- On the right-hand side of the DC switch, each pair of contacts DC+ against each contact DC- (red, blue and white conductor against 1 black conductor; gray, green and lilac conductor against 1 blue conductor)

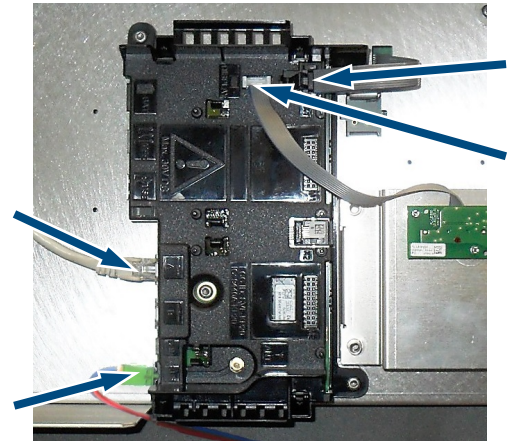


- On the right-hand side of the DC switch, each contact DC+ and DC- against the grounding conductor (red, blue, white, black, gray, green, lilac and blue conductor against grounding conductor)

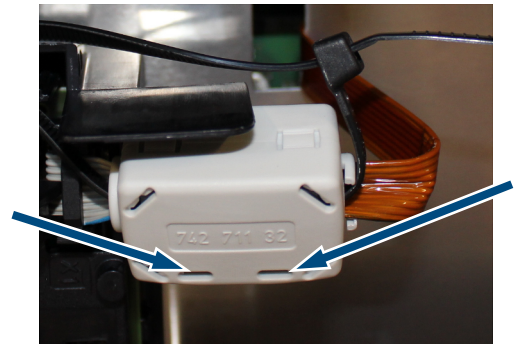


- Ground yourself prior to replacing the assembly to prevent ESD damage.
- Remove the cable tie from the ferrite of the ribbon cable **X1**.

8. Remove all plugs from the used sockets of the communication assembly.



9. Remove the ferrite from the ribbon cable **X1**. To remove the ferrite, insert a small flat-blade screwdriver into the two central holes on the ferrite and slowly open the ferrite.



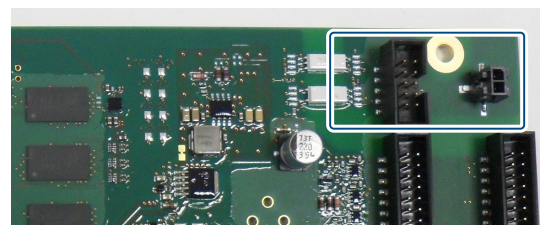
10. Push the ribbon cable **X1** from the communication assembly through the opening in the mounting plate with communication assembly. This will prevent the ribbon cable from being torn off when removing the mounting plate.
11. Remove the four mounting plate connecting screws (TX20).
12. Remove the mounting plate with the communication assembly from the inverter. To do so, use an angled tool on the upper edge of the mounting plate to lever the mounting plate out of the fixing.
13. Remove all plugs from the used jacks of the BFS assembly.
14. Remove the four connecting screws of the BFS assembly (TX20) and dispose of them properly.
15. Remove the BFS assembly from the inverter.

4.3.2 Installing the BFS assembly

There are assemblies on this assembly with a safety extra-low voltage circuit (SELV circuit). To ensure the safety of the circuits, an optical inspection must be carried out before installation.

Procedure:

1. Check the marked area and the area around both pulse transformers for visible dirt before mounting the assembly. If dust or other deposits cover the assembly, it must not be used. Contact the Service department (see Section 9, page 48).



2. Insert the BFS assembly in the inverter and screw into place using four screws from the scope of delivery (TX20, torque: $3.5 \text{ Nm} \pm 0.5 \text{ Nm}$ ($30.98 \text{ in-lb} \pm 4.43 \text{ in-lb}$)).
3. Insert all plugs into the respective jacks of the BFS assembly.
4. Push the ribbon cable **X1** through the respective opening in the communication assembly mounting plate. This will prevent the cable being pinched during mounting.

5. Insert the communication assembly mounting plate in the inverter. Put the mounting plate onto the inverter enclosure spacers. Ensure that the spacers match the respective holes in the mounting plate and that the cables are not trapped beneath the mounting plate.
6. Tighten the four mounting plate connecting screws (TX20, torque: $3.5 \text{ Nm} \pm 0.5 \text{ Nm}$ ($30.98 \text{ in-lb} \pm 4.43 \text{ in-lb}$)).
7. Plug all plugs into the respective jacks on the communication assembly mounting plate.
8. Set the ferrite around the ribbon cable **X1**. When doing so, ensure that the cable is not trapped and damaged.
9. Mount the cover in front of the DC Connection Unit (see Section 4.6, page 22).
10. Commission the inverter without integration into the local network (see inverter manual). It can take up to 15 minutes before the new assembly has synchronized with the inverter. An inverter update of the inverter can also be carried out.
11. After five minutes of feed-in operation, check whether the serial number from the inverter type label is displayed on the user interface. If a different serial number is displayed, contact the SMA Service Line.
12. If a communication network is available, integrate the inverter into the local network (see inverter manual).

4.4 Replacing the ARTX-US Assembly

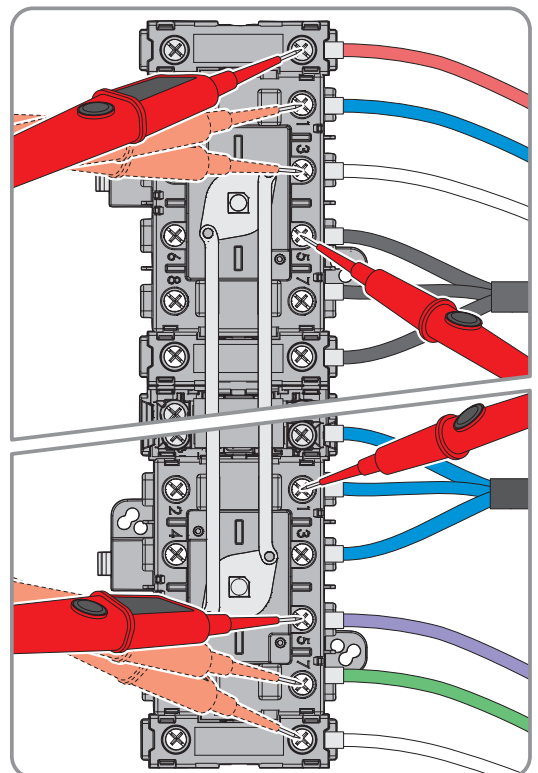
4.4.1 Removing the ARTX-US Assembly

Additionally required material (not included in the scope of delivery):

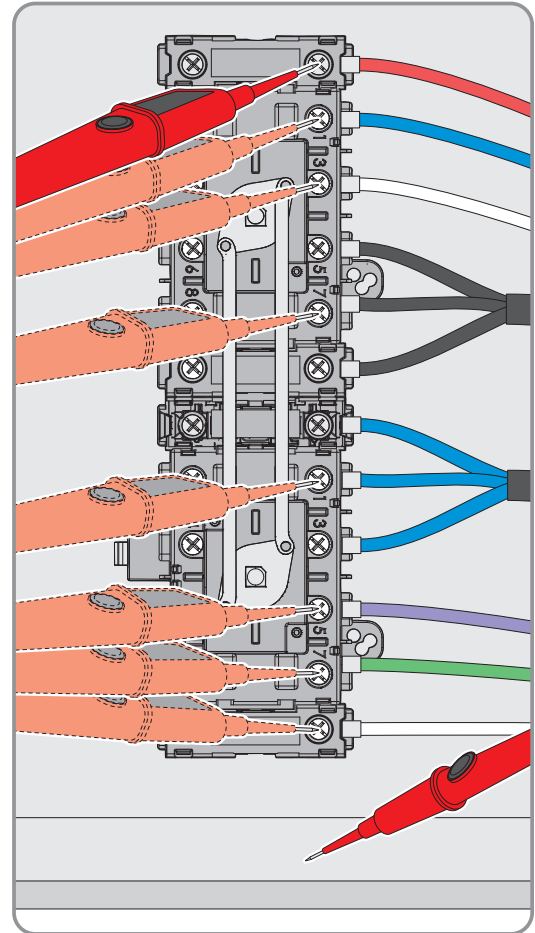
- ☐ 2-pole voltage detector that does not have its own voltage source

Procedure:

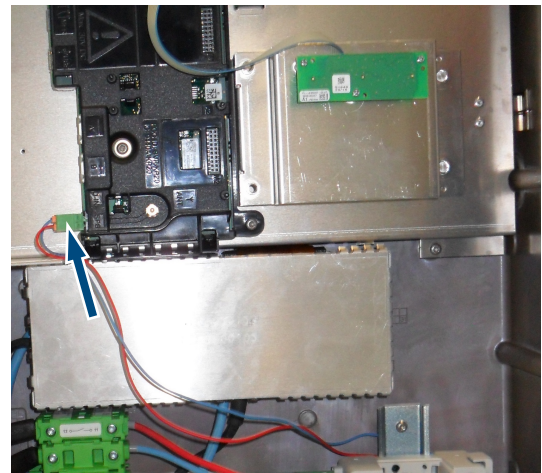
1. Disconnect the inverter from voltage sources (at www.SMA-Solar.com).
2. Make a note of the position of the DC field plugs.
3. Unlock the DC field plugs and remove them.
4. Remove the enclosure lid of the DC-Power Unit (TX25) by pulling it towards the front.
5. Discharge the DC Connection Unit at the contact points using a voltage detector without intrinsic voltage source: Ensure that the residual voltage is less than 5 V.
 - On the right-hand side of the DC switch, each pair of contacts DC+ against each contact DC- (red, blue and white conductor against 1 black conductor; gray, green and lilac conductor against 1 blue conductor)



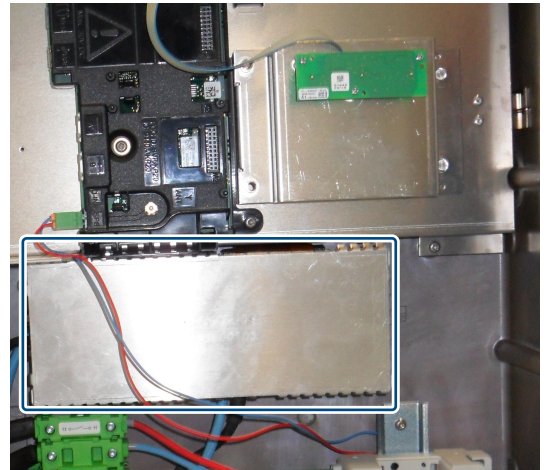
- On the right-hand side of the DC switch, each contact DC+ and DC- against the grounding conductor (red, blue, white, black, gray, green, lilac and blue conductor against grounding conductor)



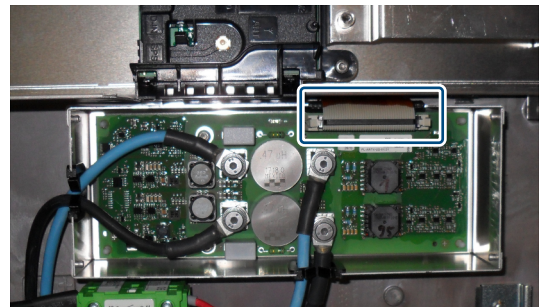
6. Ground yourself prior to replacing the assembly to prevent ESD damage.
7. Remove the enclosure lid from the DC-Connection Unit (TX25) by pulling it towards the front.
8. Remove the surge arrester plug of the communication assembly.



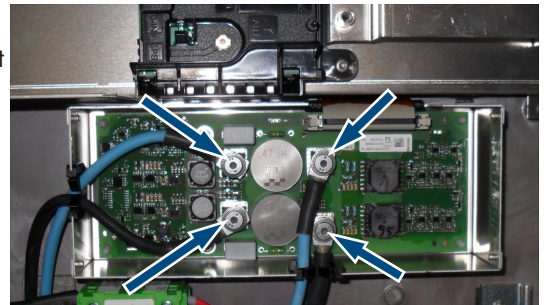
9. Remove the assembly lid.



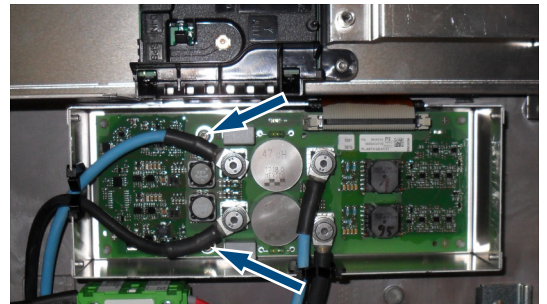
10. Release and remove the ribbon cable connector.



11. Remove bolted connection of the assembly (TX20). If the bolting block and the terminal lug stick together, the contact surfaces must be ground prior to the next connection being made. When doing so, ensure that no grinding filings remain in the device.



12. Remove the two connecting screws of the mounting plate (TX20).



13. Remove the cables from the strain relief in the assembly enclosure.

14. Remove the assembly. Gently press together the four locking tabs of the spacers.

4.4.2 Installing the ARTX-US Assembly

1. Align the assembly and insert it into the assembly enclosure. Put the mounting plate onto the inverter enclosure spacers. Ensure that the spacers match the respective holes in the mounting plate.
2. Tighten the two assembly connecting screws (TX20, torque: 3.5 Nm (31.0 in-lb)).
3. Plug the ribbon cable connector into the assembly and ensure that the lock has snapped into place.
4. Tighten the bolted connections of the assembly (TX20, torque: 6 Nm (53 in-lb)). Ensure that the cable colors correspond with the markings on the assembly.
5. Attach the cables to the strain relief support in the assembly enclosure.

6. Attach the lid to the assembly enclosure.
7. Plug the surge arrester onto the communication assembly.
8. Attach the cover to the DC-Connection Unit (see Section 4.6, page 22).
9. Commission the inverter (see inverter manual).

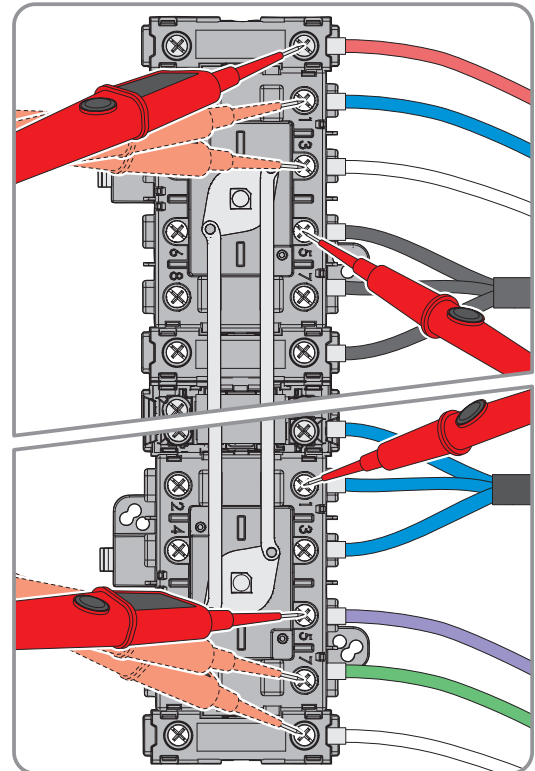
4.5 Replacing the DC Device Plugs

4.5.1 Removing the DC Device Plugs

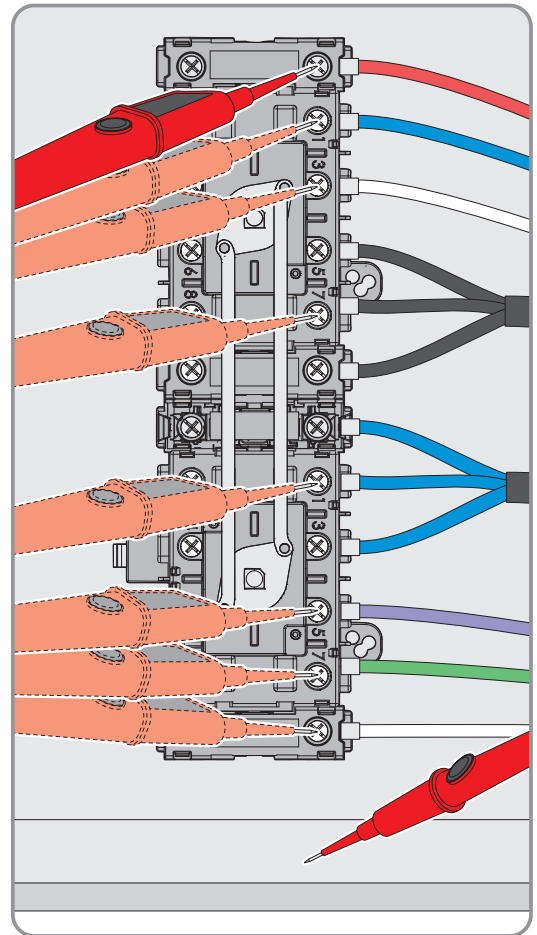
Both DC device plugs that are connected in the inverter via one Y-cable must always be replaced at the same time.

Procedure:

1. Disconnect the inverter from voltage sources (at www.SMA-Solar.com).
2. Make a note of the position of the DC field plugs.
3. Unlock the DC field plugs and remove them.
4. Remove the cover of the inverter on the DC Connection Unit (TX25) and also remove the cover to the front.
5. Discharge the DC Connection Unit at the contact points using a voltage detector without intrinsic voltage source:
Ensure that the residual voltage is less than 5 V.
 - On the right-hand side of the DC switch, each pair of contacts DC+ against each contact DC- (red, blue and white conductor against 1 black conductor; gray, green and lilac conductor against 1 blue conductor)



- On the right-hand side of the DC switch, each contact DC+ and DC- against the grounding conductor (red, blue, white, black, gray, green, lilac and blue conductor against grounding conductor)



6. Cut through both cables of the defective DC device plug between the plug and DC switch and remove the ferrite.
7. Remove the cut cable pair from the DC switch (TX20).
8. Screw apart (hexagon, SW16) and remove the device plug enclosures from the cut cables.

4.5.2 Installing the DC Device Plugs

Both DC device plugs that are connected in the inverter via one Y-cable must always be replaced at the same time. If an error is made during replacement, all of the DC device plugs must be replaced again.

If both polarities are to be replaced, the blue Y-cable is to be used first. This renders incorrect plugging into the device plug impossible.

Requirement:

- ☐ A DC device plug with the appropriate polarity must be available.

DC+**DC-**

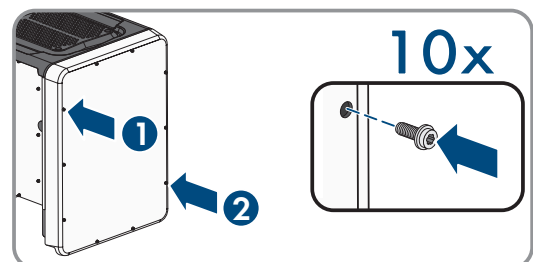
Amphenol plug

**Procedure:**

1. Screw the Y-cable into the DC plug at the position of the removed cable (torque: 1.4 Nm (12.4 in-lb)).
2. Plug the plug enclosure into the respective opening in the inverter. When doing so, use the labeling, the plug color and the polarity on the DC disconnect switch to assure the correct assignment of the Y-cables.
3. Mount the plug enclosure with the serrated lock washer and nut (torque of Amphenol plug: 1.4 Nm (12.4 in-lb), torque of SUNCLIX plug: 1.8 Nm (15.9 in-lb)).
4. Thread the new Y-cable through the ferrite.
5. Plug the DC device plug plugging contact into the plug enclosure. When doing so, ensure the correct polarity.
Note: the contact can no longer be removed once plugged.
6. Ensure that the connectors are securely in place in the plug enclosure.
7. Mount the enclosure lid in front of the DC-Connection Unit (see Section 4.6, page 22).
8. Commission the inverter (see inverter manual).

4.6 Attaching the enclosure lid before mounting the DC-Connection Unit

1. Ensure that all connections for the replaced assembly have been made correctly.
2. Ensure that the DC load-break switch is turned to position **O**.
3. Position the enclosure lid of the DC-Connection Unit on the DC-Connection Unit and first tighten the upper-left and lower-right screws, and then the remaining screws crosswise (TX 25, torque: 6 Nm (53 in-lb)).



4. Commission the inverter (see inverter manual at www.SMA-Solar.com).

5 Replacing Assemblies in the AC-Connection Unit

5.1 Scope of Delivery for the AC-Connection Unit Assemblies

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

AC terminal block PL-AC-TML-US-01

Designation	Quantity
AC terminal	4
Documentation	1

5.2 Removing the AC terminals

Additionally required material (not included in the scope of delivery):

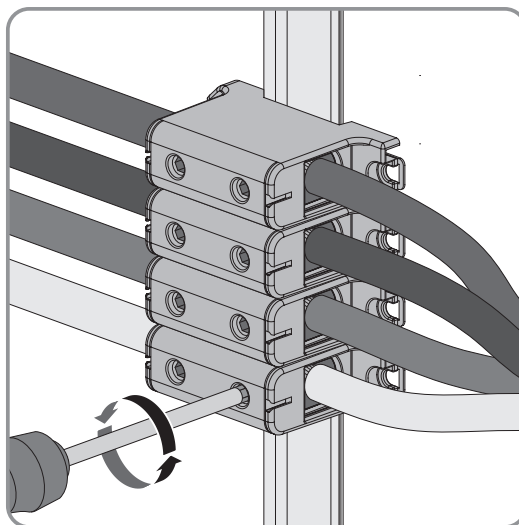
- ☐ In case of PL-AC-TML-US-01: 1 Torx screwdriver (TX30)
- ☐ 1 flat-blade screwdriver (blade width: 3.5 mm (0.14 in))

Requirements:

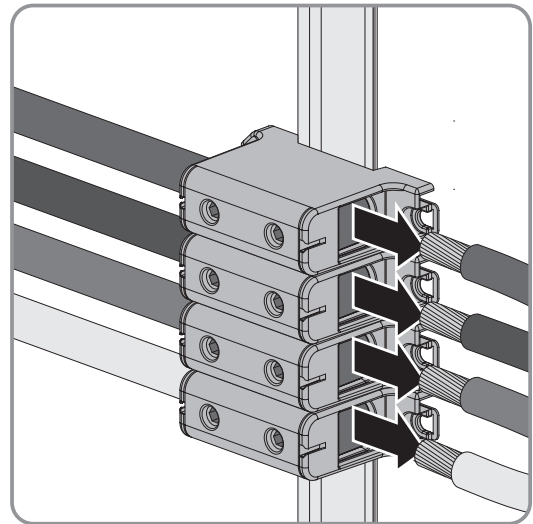
- ☐ The conductors between inverter and AC terminals must be free from damage. The inverter must be replaced if the conductors are damaged.

Procedure:

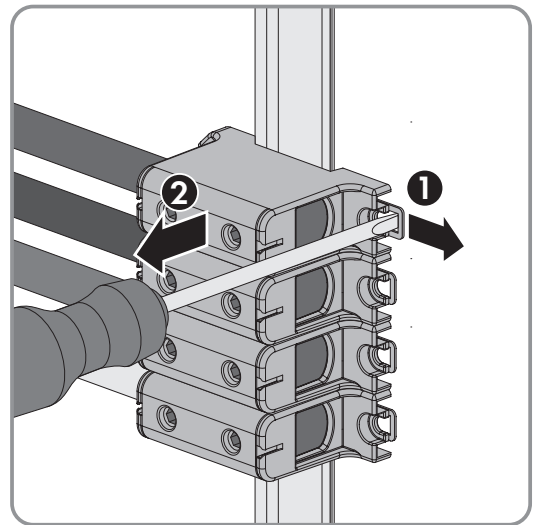
1. Disconnect the inverter from voltage sources (at www.SMA-Solar.com).
2. Remove all screws of the AC terminals (TX30).



3. Pull the AC conductors out of the AC terminals.



4. Unlock the AC terminals with a screwdriver (blade width: 3.5 mm) and remove them from the DIN rail. This disengages the left conductors from the AC terminals.



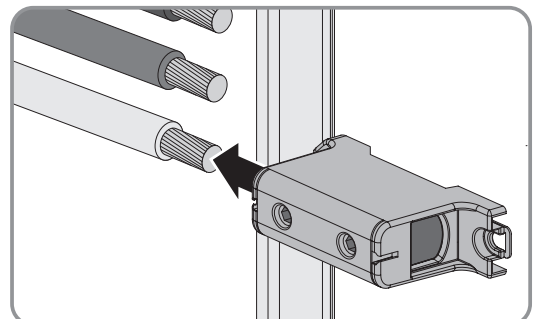
5.3 Installing the AC Terminals

Requirements:

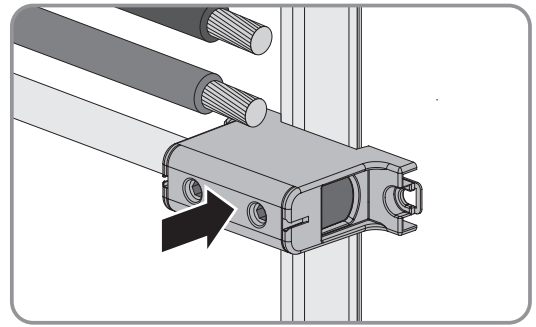
- ☐ The conductors between inverter and AC terminals must be free from damage. The inverter must be replaced if the conductors are damaged.

Procedure:

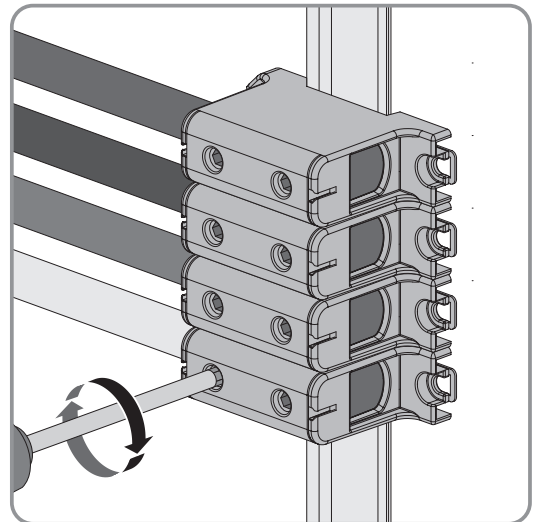
1. Attach the new AC terminals to the left conductors.



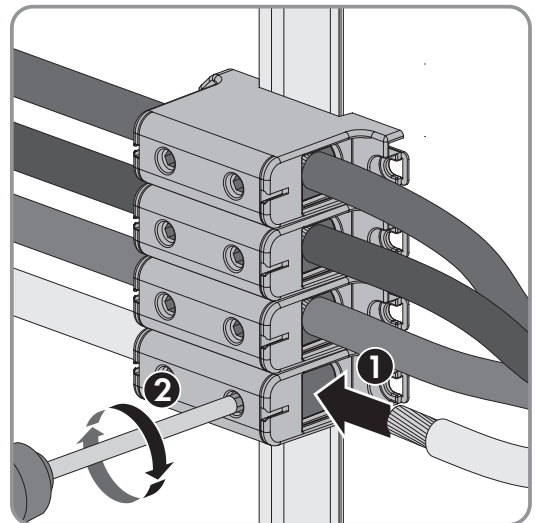
2. Press the AC terminals onto the DIN rail until they snap audibly into place.



3. Tighten the AC terminal screws on the left side (torque: 20 Nm (177.0 in-lb)).



4. Connect the AC conductors to the AC terminals in accordance with the labeling specifications. To do so, position each conductor as far as they will go into the corresponding AC terminal and tighten the AC terminal screw on the right side (TX30, length: 14 Nm (126 in-lb), torque:).



5. Commission the inverter (see inverter manual).

6 Replacing Assemblies in the DC Power Unit

6.1 Scope of Delivery for the DC Power Unit Assemblies

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

DCEMV assembly

Scope of delivery for Sunny Tripower CORE1-US

NR-PL-DCEMV41-1

Designation	Quantity
PL-DCEMV-xx.xx	1
Bolt M4 x 15	4
Bolt M6 x 12	4

DST assembly

NR-PL-DST2-41-1 as a substitute for PL-DST500M-xx.xx

Designation	Quantity
PL-DST50-xx.xx	1
Bolt M4 x 15	22
Bolt M6 x 12	8
Cleaning cloth	4

NR-PL-DST5-01 as a substitute for PL-DST625-xx.xx

Designation	Quantity
PL-DST625-xx.xx	1
Bolt M4 x 15	22
Bolt M6 x 12	8
Cleaning cloth	4

6.2 Replacement of DCEMV Assembly

6.2.1 Removing the DCEMV Assembly

Additionally required material (not included in the scope of delivery):

- ☐ 2-pole voltage detector that does not have its own voltage source

NOTICE

Damage in the inverter due to incorrect removal of assemblies

There are several assemblies mounted one behind the next in the inverter. Bulky components are mounted on the rear of some assemblies. When removing an assembly, the assembly behind this can be damaged due to incorrect removal.

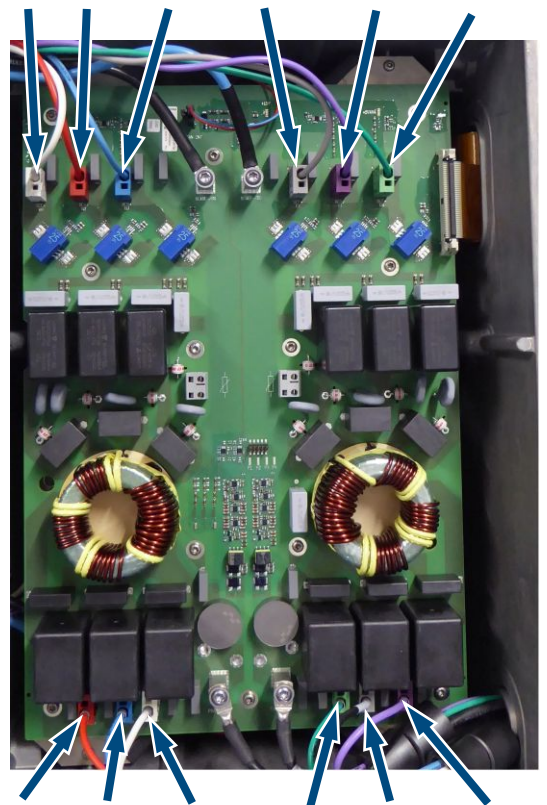
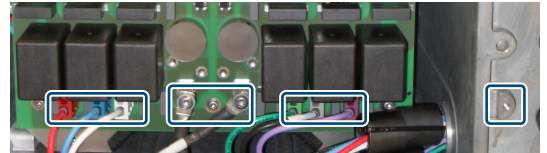
- Remove assemblies that have been disconnected to the front to avoid contact between the assemblies.

Procedure:

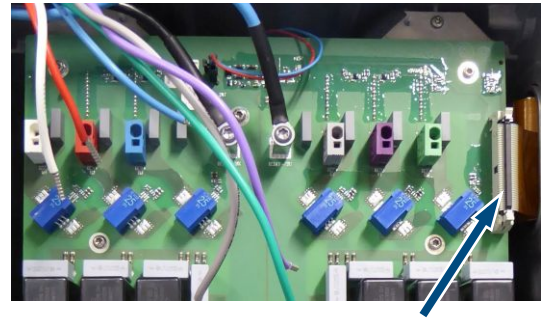
1. Disconnect the inverter from voltage sources (at www.SMA-Solar.com).
2. Make a note of the position of the DC field plugs.
3. Disconnect the DC field plugs.
4. Remove the enclosure lid of the DC-Power Unit (TX25) by pulling it towards the front.
5. Discharge the DCEMV assembly at the contact points using a voltage detector without intrinsic voltage source:

Ensure that the residual voltage is less than 5 V.

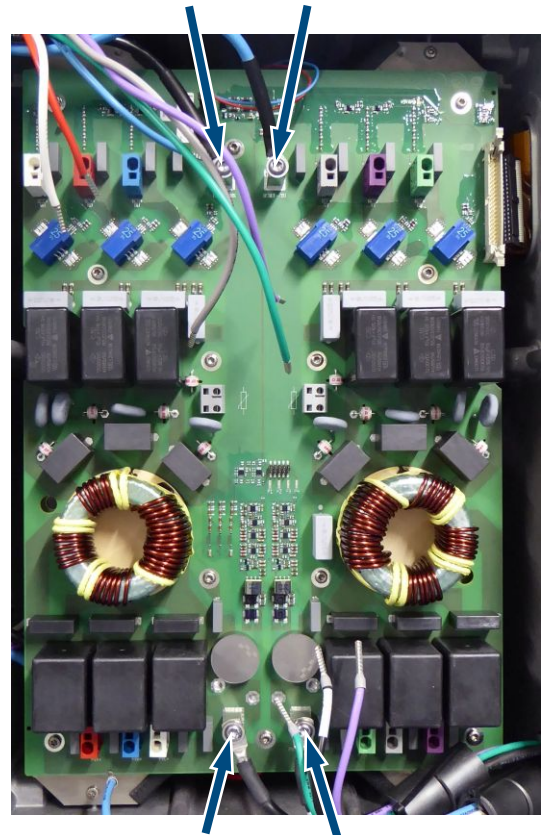
 - Connectors (red, light blue, white, green, black and lilac) against grounding conductor (enclosure)
 - Bolted connections (black, white) against grounding conductor (enclosure)
6. Ground yourself prior to replacing the assembly to prevent ESD damage.
7. Remove all connections (red, light blue, white, green, black and lilac) from the assembly. Use a suitable screwdriver to remove the cables from the terminals and ensure that the ferrites are not damaged.



8. Unplug the ribbon cable connector. Unlock the plug first.

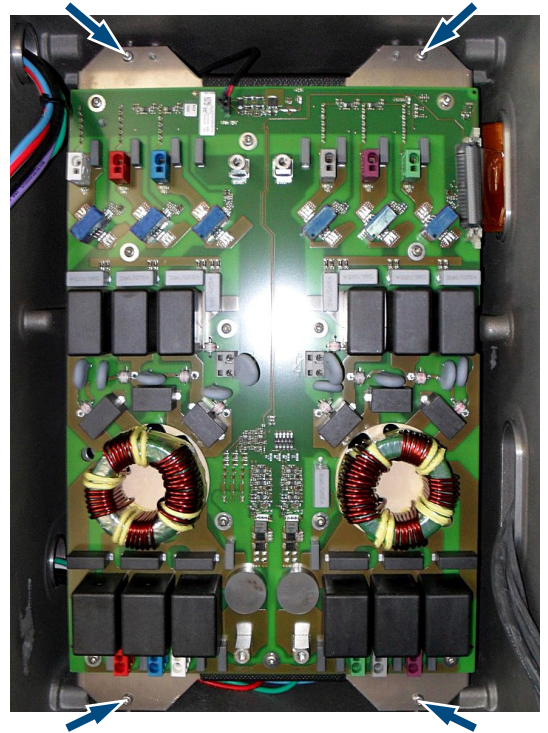


9. Remove bolted connection DC- (TX20). If the bolting block and the terminal lug stick together, the contact surfaces must be ground prior to the next connection being made. When doing so, ensure that no grinding filings remain in the device.



10. Remove the cables from the working area.

11. Remove the four DCEMV assembly mounting plate connecting screws (TX20). Once the screws have been removed, the assembly mounting plate remains held in place by the spacers.



12. Remove the DCEMV assembly from the inverter. When doing so, only hold the assembly by the handling areas and ensure that the fan on the rear side of the DST assembly carrier plate in the inverter is not damaged.

6.2.2 Installing the DCEMV Assembly

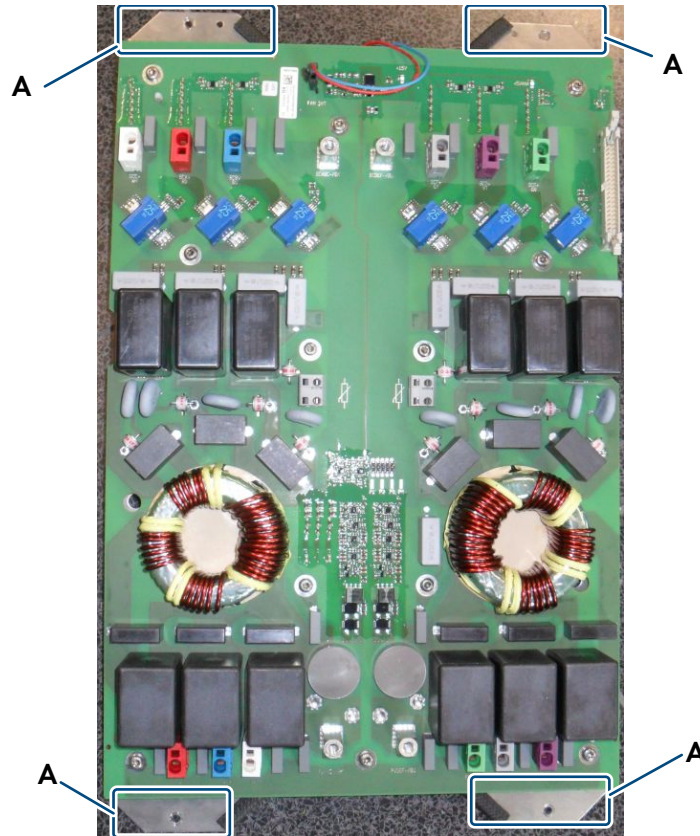


Figure 2: Handling area of DCEMV assembly

Position	Designation
A	Touch only the assembly on the marked areas or on the sheet metal located underneath the assembly.

Additionally the protected edges of the mounting plate behind the assembly can be used for the handling.

The remaining areas may not be touched. The assembly can be damaged through touching.

Procedure:

1. Align the assembly and insert it into the inverter. Touch the assembly only at the handling areas. Ensure that the spacers match the holes in the mounting plate and that the cable is not trapped beneath the mounting plate.
2. Tighten the four assembly connecting screws (TX20, torque: 3.5 Nm (31.0 in-lb)).
3. Establish the connections (red, light blue, white, green, black and lilac) on the assembly and ensure that all cables are securely in position.
4. Plug the ribbon cable connector into the assembly and ensure that the lock has snapped into place.
5. Tighten the DC- bolted connections using the bolts from the scope of delivery (TX20, torque: 6.0 Nm (53.1 in-lb)). Ensure the correct position when doing so (BU = blue, BK = black).
6. Mount the enclosure lid in front of the DC-Power Unit (see Section 6.4, page 37).

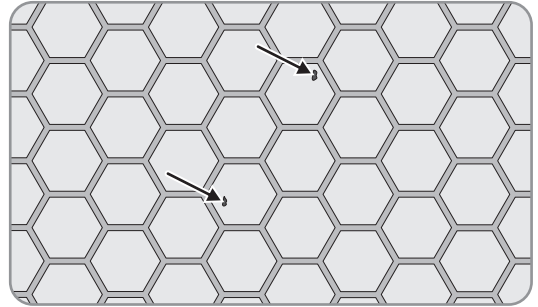
6.3 Replacing the DST Assembly

6.3.1 Checking the New Assembly

To ensure that the replacement of the assembly can be performed, the status of the new assembly is to be checked prior to removal of the defective assembly.

Procedure:

1. Carefully remove the assembly upwards out of the packaging. When doing so, ensure that the thermal grease is not damaged or contaminated.
2. Check the pattern of thermal grease on the rear of the assembly for damage and impurities.
3. If the pattern of thermal grease on the rear side of the assembly shows evidence of damage, the assembly must be replaced. If small impurities (see image) are present, these can be carefully removed using a pointed tool. The pattern must not be destroyed when doing so.



4. Lay the assembly in the packaging until use.

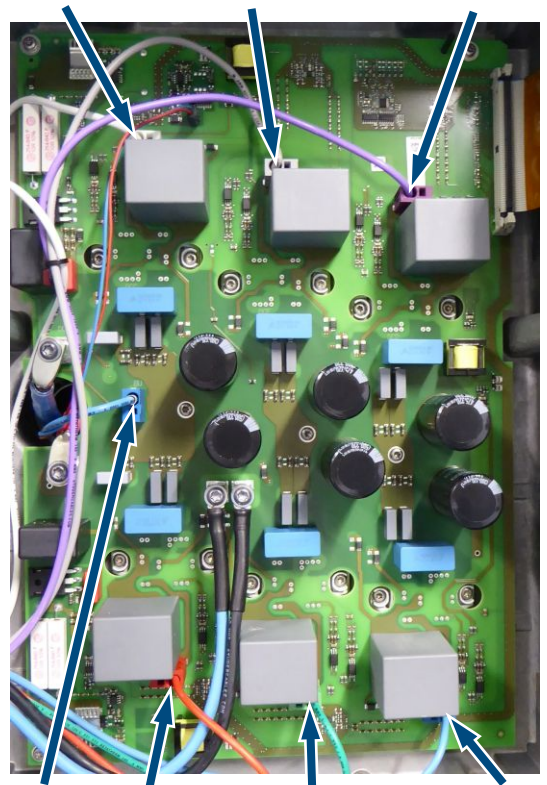
6.3.2 Removing the DST Assembly

Requirement:

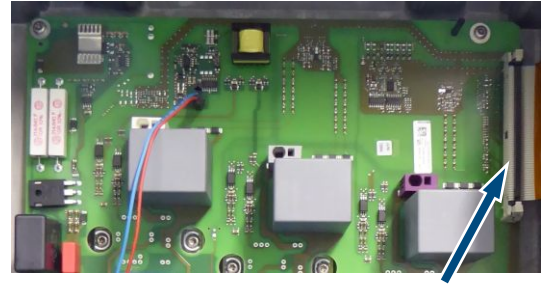
- ☐ The pattern of thermal grease must be undamaged and free from impurities (see Section 6.3.1, page 30).

Procedure:

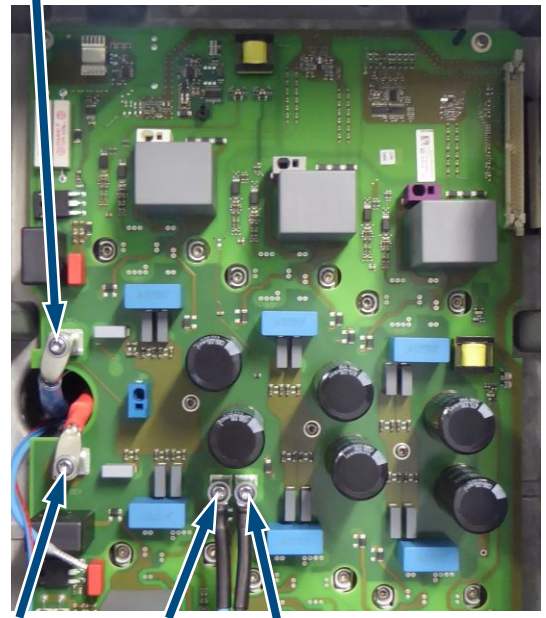
1. Disconnect the inverter from voltage sources (at www.SMA-Solar.com).
2. Remove the DCEMV assembly (see Section 6.2.1, page 26).
3. Remove all connections (red, light blue, white, green, black and lilac) from the assembly. Use a suitable screwdriver to remove the cables from the terminals.



4. Unplug the connections. When doing so, unlock the ribbon cable plug first.



5. Remove the screws from the DST assembly (TX20) at the power connections. If the bolting block and the terminal lug stick together, the contact surfaces must be ground prior to the next connection being made. When doing so, ensure that no grinding filings remain in the device.



6. Remove the connecting screws of the power modules (TX20).



7. Remove the connecting screws of the DST assembly (TX20). The assembly will also remain held in place by the spacers once the screws have been removed.



8. Remove the DST assembly cables from the working area.
9. To remove the assembly from the inverter, first carefully swing the left-hand side of the assembly out of the inverter and lead the assembly past the connections out of the inverter.

6.3.3 Installing the DST Assembly



Figure 3: Handling area of DST assembly

Position	Designation
A	Area that may be used as holding point.

The remaining areas may not be touched. The assembly can be damaged through touching.

Procedure:

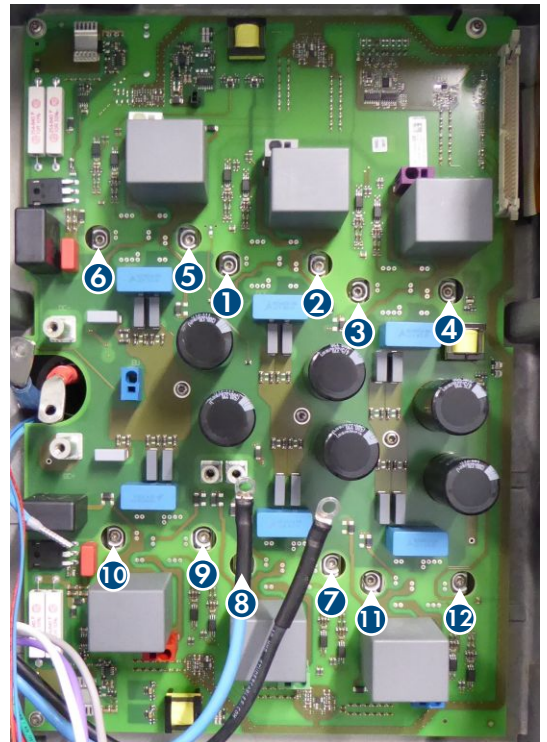
1. Check whether the printed circuit board centering bolts are present and securely in place at the respective positions in the inverter. If any of the printed circuit board centering bolts are missing, use the printed circuit board centering bolts from the defective assembly.



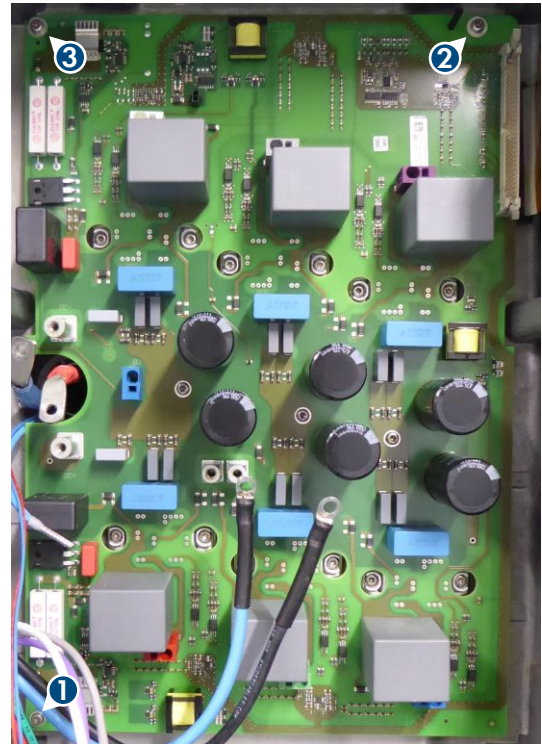
2. Clean the supporting surfaces in the enclosure. To do so, use the cleaning cloths included in the delivery. Cleaning can be made easier using Isopropanol.
3. Carefully remove the assembly upwards out of the packaging. When doing so, only hold the assembly by the handling areas and ensure that the pattern of thermal grease is not damaged or soiled.
4. Align the assembly and insert it into the inverter. Put the assembly onto the PCB centering pins. Ensure that the PCB centering pins match the holes in the assembly.
5. Tighten the three connecting screws of the DST printed circuit board (TX20, torque: 3.5 Nm (31.0 in-lb)). When doing so, follow the sequence shown.



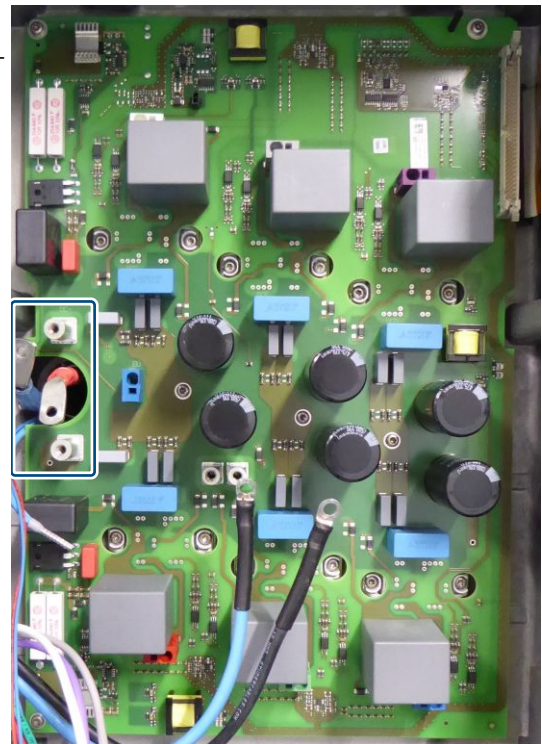
6. Tighten all connecting screws of the power modules (TX20, torque: 2.0 Nm (17.7 in-lb)). When doing so, follow the sequence shown.



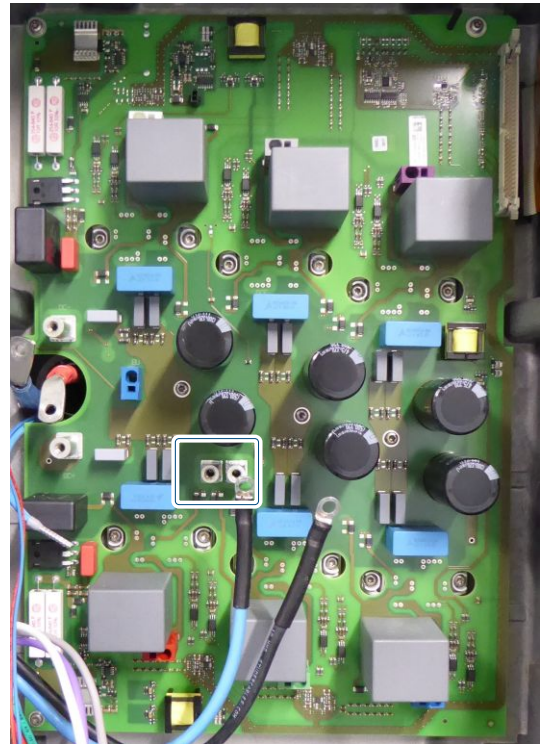
7. Tighten the three connecting screws of the DST printed circuit board (TX20, torque: 3.5 Nm (31.0 in-lb)). When doing so, follow the sequence shown.



8. Tighten the screws on the two DC connections (TX20, torque: 6.0 Nm (53.1 in-lb)). Observe the polarity of DC- (blue) and DC+ (red).



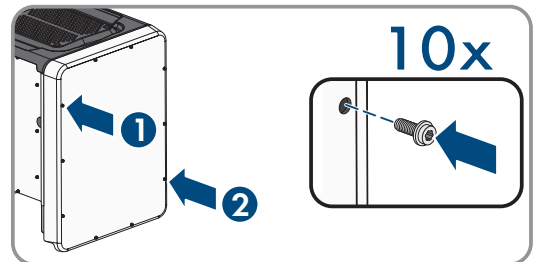
9. Tighten the screws on the two power connections (TX20, torque: 6.0 Nm (53.1 in-lb)). The assignment of the blue and black cable must not be observed since both connections are interconnected.



10. Establish the connections (red, light blue, white, green, black and lilac) on the assembly and ensure that all cables are securely in position.
11. Plug in all plugs on the assembly and ensure that the ribbon cable locks are snapped into place and that the 2-pole plugs are plugged with both contacts.
12. Installing the DC EMV Assembly (see Section 6.2.2, page 30).

6.4 Mounting the Enclosure Lid of the DC-Power Unit

1. Ensure that all connections for the replaced assembly have been made correctly.
2. Position the enclosure lid on the DC-Connection Unit and first tighten the upper-left and lower-right screws, and then the remaining screws crosswise (TX25, torque: 6 Nm (53 in-lb)).



3. Commission the inverter (see inverter manual at www.SMA-Solar.com).

7 Replacing Assemblies in the AC Power Unit

7.1 Scope of Delivery for the AC Power Unit Assemblies

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

AC-RLY assembly NR-PL-ACRLY41-1

Designation	Quantity
PL-ACRLY-xx.xx	1
Bolt M4 x 15	4
Bolt M6 x 12	3

AC power controller assembly

NR-PL-AST1-41-1 as a substitute for PL-AST625-xx-xx

Designation	Quantity
PL-AST625-xx.xx	1
Bolt M4 x 15	24
Bolt M6 x 12	5
Cleaning cloth	4

NR-PL-AST2-41-1 as a substitute for PL-AST50-xx-xx

Designation	Quantity
PL-AST50-xx.xx	1
Bolt M4 x 15	24
Bolt M6 x 12	5
Cleaning cloth	4

7.2 Replacement of ACRLY assembly

7.2.1 Removing the ACRLY Assembly

Additionally required material (not included in the scope of delivery):

- ☐ 2-pole voltage detector that does not have its own voltage source

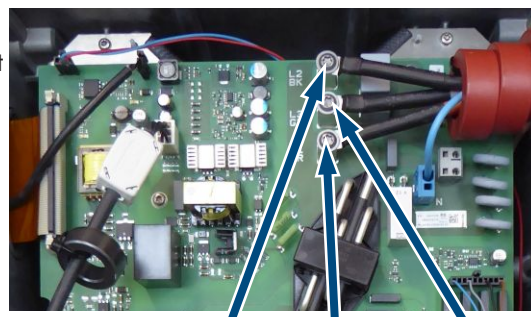
Procedure:

1. Disconnect the inverter from voltage sources (at www.SMA-Solar.com).
2. Make a note of the position of the DC field plugs.
3. Disconnect the DC field plugs.
4. Remove the enclosure lid of the AC-Power Unit (TX25) by pulling it towards the front.

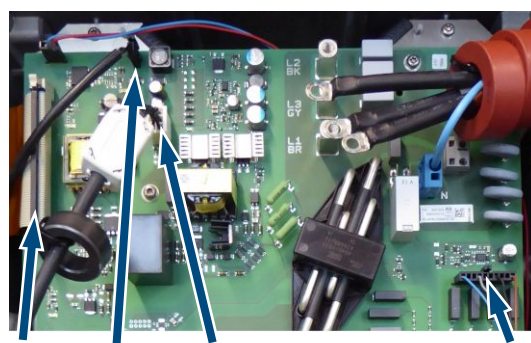
5. Discharge the outputs of the network bridge at the contact points against the enclosure using a voltage detector without intrinsic voltage source. When doing so, ensure that the residual voltage is less than 5 V.



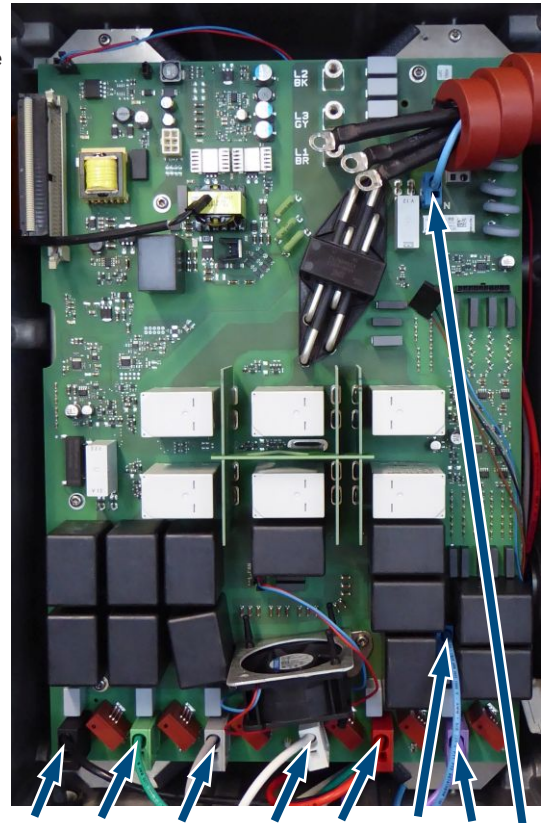
6. Ground yourself prior to replacing the assembly to prevent ESD damage.
7. Remove the screws at the AC connections (TX20). If the bolting block and the terminal lug stick together, the contact surfaces must be ground prior to the next connection being made. When doing so, ensure that no grinding filings remain in the device.



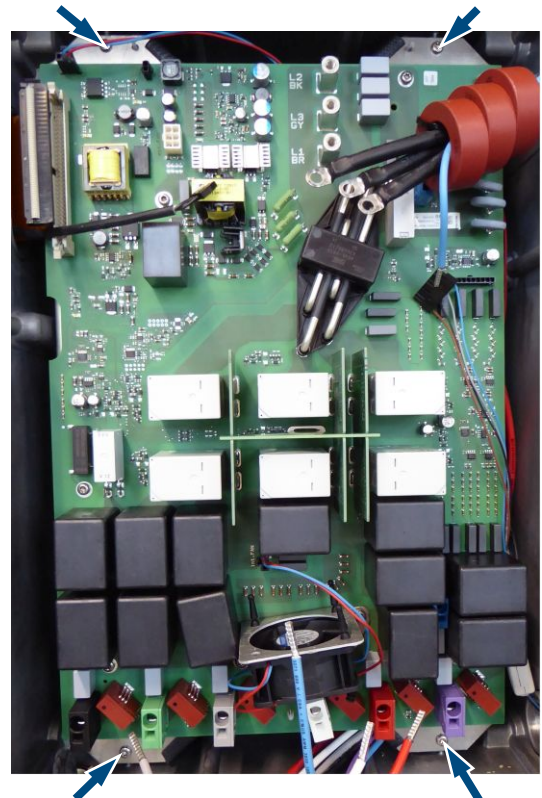
8. Unplug the connections. When doing so, unlock the ribbon cable plug first.



9. Remove connections (black, green, gray, white, red, lilac and blue) from the assembly. Use a suitable screwdriver to remove the cables from the terminals.



10. Remove the cables from the working area.
11. Remove the connecting screws of the ACRLY assembly mounting plate (TX20). Once the screws have been removed, the assembly mounting plate remains held in place by the spacers.



12. Remove the ACRLY assembly from the inverter. When doing so, only hold the assembly by the handling area (see Section 7.2.2, page 41).

7.2.2 Installing the ACRLY Assembly

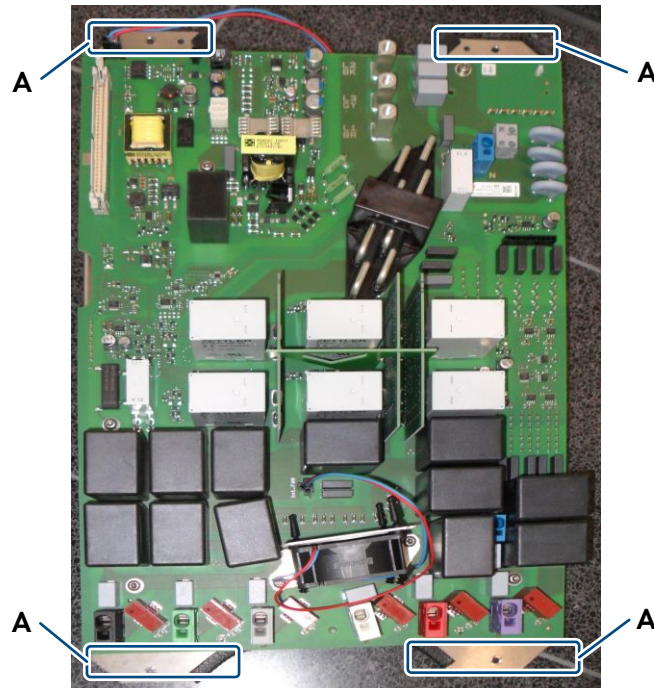


Figure 4: Handling area of ACRLY assembly

Position	Designation
A	Touch only the assembly on the marked areas or on the sheet metal located underneath the assembly.

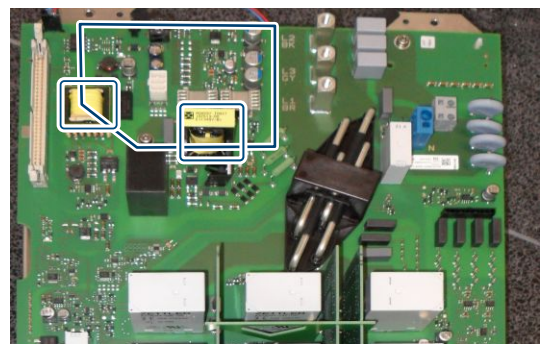
Additionally the protected edges of the mounting plate behind the assembly can be used for the handling.

The remaining areas may not be touched. The assembly can be damaged through touching.

There are assemblies on this assembly with a safety extra-low voltage circuit (SELV circuit). To ensure the safety of the circuits, an optical inspection must be carried out before installation.

Procedure:

1. Check the marked area and the area around both transformers for visible dirt before mounting the assembly. If dust or other deposits cover the assembly, it must not be used. Contact the Service department (see Section 9, page 48).



2. Align the assembly and insert it into the inverter. Touch the assembly only at the handling areas. Ensure that the spacers match the holes in the mounting plate and that the cable is not trapped beneath the assembly.
3. Tighten the connecting screws (TX20, torque: 3.5 Nm (31.0 in-lb)). When doing so, observe the screw sequence.
4. Establish the connections (black, green, gray, white, red, lilac and blue) on the assembly and ensure that all cables are securely in position.
5. Plug all plugs into the assembly and ensure that all cables are connected correctly and are securely in place.

6. Tighten the AC connection screws (TX20, torque: 6.0 Nm (53.1 in-lb)). Ensure the correct position when doing so (BK = black, GY = grey, BN = brown).
7. Mount the cover of the AC Power Unit (see Section 7.4, page 46).

7.3 Replacement of AST assembly

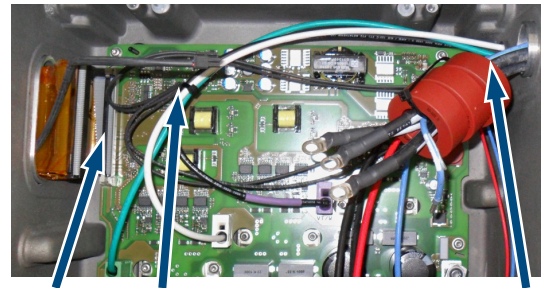
7.3.1 Removing the AST Assembly

Requirement:

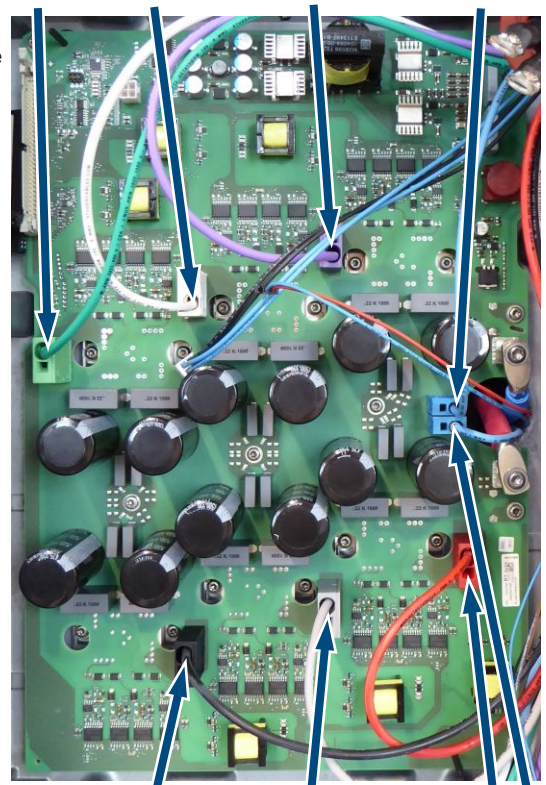
- The pattern of thermal grease must be undamaged and free from impurities (see Section 6.3.1, page 30).

Procedure:

1. Disconnect the inverter from voltage sources (at www.SMA-Solar.com).
2. Remove the ACRLY assembly (see Section 7.2.1, page 38).
3. Unplug the connections. When doing so, unlock the ribbon cable plug first.



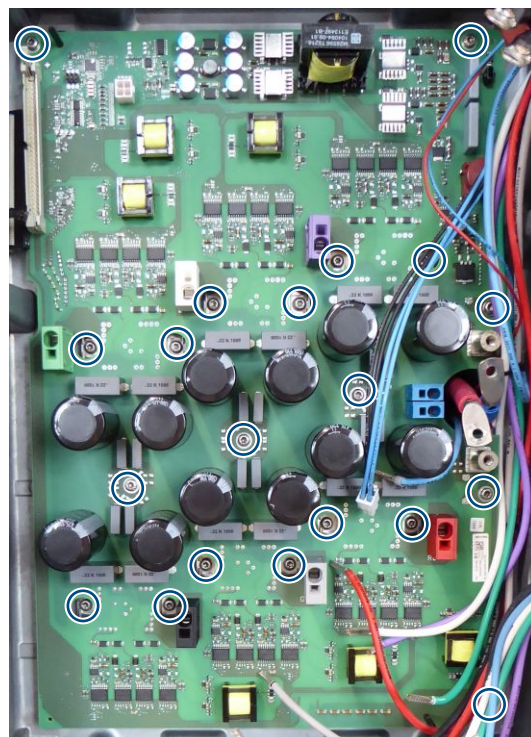
4. Remove connections (green, white, lilac, black, gray, red and two blue) from the assembly. Use a suitable screwdriver to remove the cables from the terminals.



5. Remove the bolted connection from the power connection on the AST assembly (TX20). If the bolting block and the terminal lug stick together, the contact surfaces must be ground prior to the next connection being made. When doing so, ensure that no grinding filings remain in the device.



6. Remove the cables from the working area.
7. Remove the connecting screws of the AST assembly (TX20). The assembly will also remain held in place by the spacers once the screws have been removed.



8. To remove the assembly from the inverter, first carefully swing the left-hand side of the assembly out of the inverter and lead the assembly past the connections out of the inverter.

7.3.2 Installing the AST Assembly

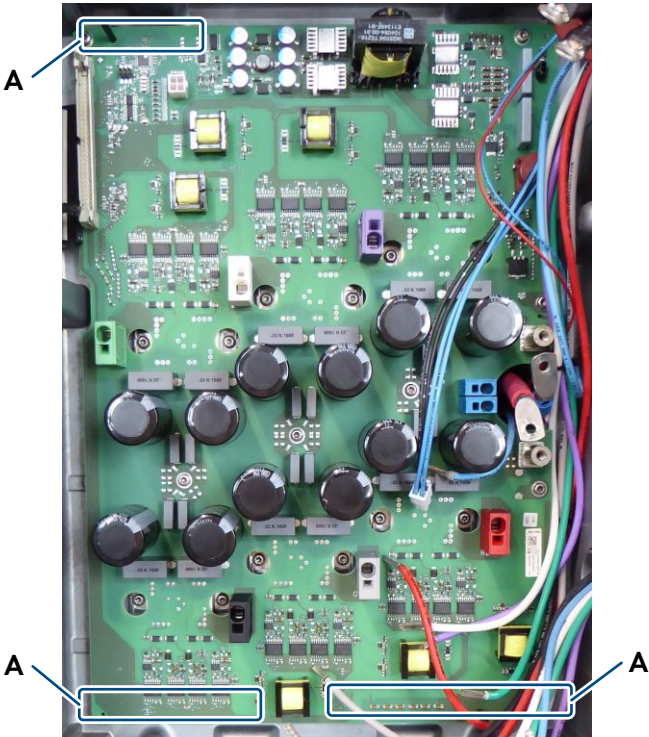


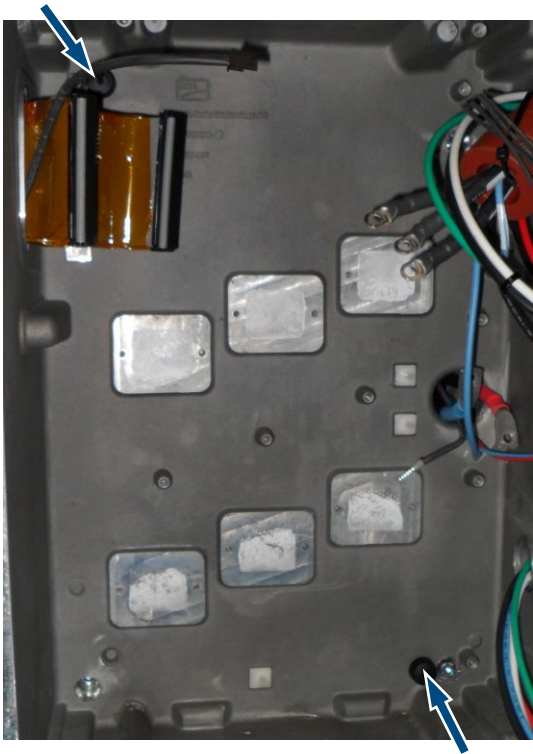
Figure 5: Handling area of AST assembly

Position	Designation
A	Area that may be used as holding point.

The remaining areas may not be touched. The assembly can be damaged through touching.

Procedure:

1. Check whether the printed circuit board centering bolts are present and securely in place at the respective positions in the inverter. If any of the printed circuit board centering bolts are missing, use the printed circuit board centering bolts from the defective assembly.



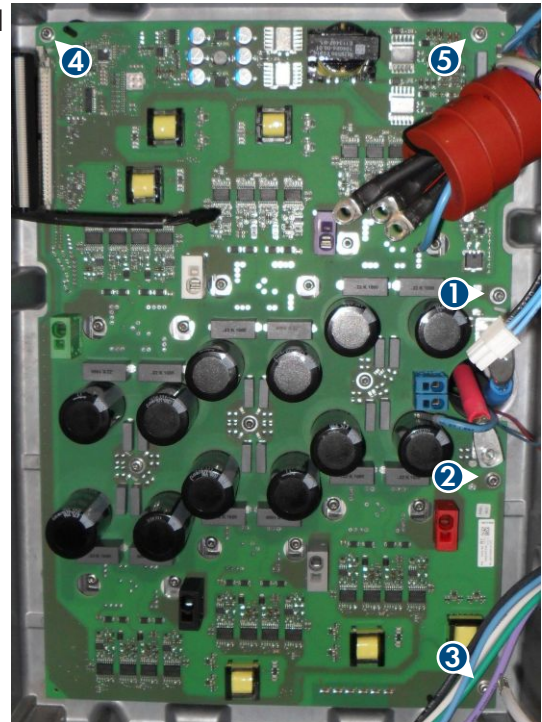
2. Clean the supporting surfaces in the enclosure. To do so, use the cleaning cloths included in the delivery. Cleaning can be made easier using Isopropanol.
3. Carefully remove the AST assembly upwards out of the packaging. When doing so, only hold the assembly by the handling areas and ensure that the thermal grease is not damaged or soiled.
4. To insert the AST assembly into the inverter, first carefully lead the right-hand side of the assembly past the connections into the inverter and insert the assembly in the inverter. Put the assembly onto the PCB centering pins. Ensure that the PCB centering pins match the holes in the assembly.
5. Tighten the three connecting screws of the AST printed circuit board (TX20, torque: 3.5 Nm (31.0 in-lb)). When doing so, observe the specified screw sequence.



6. Tighten all connecting screws of the power modules (TX20, torque: 2.0 Nm (17.7 in-lb)). When doing so, observe the specified screw sequence.



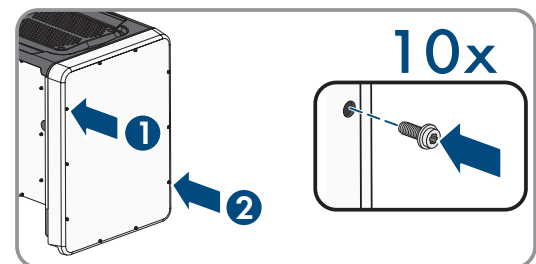
7. Tighten the five connecting screws of the AST printed circuit board (TX20, torque: 3.5 Nm (31.0 in-lb)). When doing so, observe the specified screw sequence.



8. Tighten the screws on the power connections (TX20, torque: 6.0 Nm (53.1 in-lb)).
9. Establish the connections (green, white, lilac, black, gray, red and blue) on the AST assembly and ensure that all cables are securely in position.
10. Plug in all plugs on the AST assembly and ensure that the ribbon cable locks are snapped into place and that the 2-pole plugs are plugged with both contacts.
11. Check whether the AC connections on the ACRLY assembly exhibit corrosion. If corrosion or soiling is present, grind the surface clean.
12. Installing the ACRLY Assembly. (see Section 7.2.2, page 41).

7.4 Mounting the Enclosure Lid of the AC-Power Unit

1. Ensure that all connections for the replaced assembly have been made correctly.
2. Position the enclosure lid on the AC-Connection Unit and first tighten the upper-left and lower-right screws, and then the remaining screws crosswise (TX25, torque: 6 Nm (53 in-lb)).



3. Commission the inverter (see inverter manual at www.SMA-Solar.com).

8 Packing and Returning the Defective Assembly / Disposing of the Defective Assembly

If the defective assembly is to be returned, this will be stated on the order form.

Procedure:

1. If the defective assembly is to be returned:
 - Pack the defective assembly for shipping. Use the original packaging for this, or packaging that is suitable for the weight and size of the assembly.
 - Organize the return shipment to SMA. To do this, contact Service (refer to www.SMA-Solar.com for contact details).
2. If the assembly is not to be returned, dispose of the assembly in accordance with the locally applicable disposal regulations for electronic waste.

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:

- Device type
- Serial number
- Firmware version
- Event message
- Mounting location and mounting height
- Type and number of PV modules
- Optional equipment, e.g. communication products
- Use the name of the system in Sunny Portal (if available)
- Access data for Sunny Portal (if available)
- Special country-specific settings (if available)
- Operating mode of the multifunction relay

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México	SMA Solar Technology de México Mexico City	Internacional: +1 916 625-0870

