Legal Provisions

The information contained in these documents is the property of SMA Solar Technology AG. No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, be it electronic, mechanical, photographic, magnetic or otherwise, without the prior written permission of SMA Solar Technology AG. Internal reproduction used solely for the purpose of product evaluation or other proper use is allowed and does not require prior approval.

SMA Solar Technology AG makes no representations or warranties, express or implied, with respect to this documentation or any of the equipment and/or software it may describe, including (with no limitation) any implied warranties of utility, merchantability, or fitness for any particular purpose. All such representations or warranties are expressly disclaimed. Neither SMA Solar Technology AG nor its distributors or dealers shall be liable for any indirect, incidental, or consequential damages under any circumstances.

The exclusion of implied warranties may not apply in all cases under some statutes, and thus the above exclusion may not apply.

Specifications are subject to change without notice. Every attempt has been made to make this document complete, accurate and up-to-date. Readers are cautioned, however, that product improvements and field usage experience may cause SMA Solar Technology AG to make changes to these specifications without advance notice or per contract provisions. SMA Solar Technology AG shall not be responsible for any damages, including indirect, incidental or consequential damages, caused by reliance on the material presented, including, but not limited to, omissions, typographical errors, arithmetical errors or listing errors in the content material.

SMA Warranty

You can download the current warranty conditions from the Internet at www.SMA-Solar.com.

Trademarks

All trademarks are recognized, even if not explicitly identified as such. Missing designations do not mean that a product or brand is not a registered trademark.

SMA Solar Technology AG

Sonnenallee 1
34266 Niestetal
Germany
Tel. +49 561 9522-0
Fax +49 561 9522-100
www.SMA.de
Email: info@SMA.de
As of: 6/18/2020
Copyright © 2020 SMA Solar Technology AG. All rights reserved.
# Table of Contents

1 Information on this Document........................................................................................................... 6
   1.1 Validity ........................................................................................................................................ 6
   1.2 Target Group .......................................................................................................................... 6
   1.3 Levels of Warning Messages .................................................................................................. 6
   1.4 Symbols in the Document ...................................................................................................... 7
   1.5 Typographical Elements in the Document ........................................................................ 7
   1.6 Designations in the Document .............................................................................................. 7
   1.7 Additional Information ........................................................................................................ 7
2 Safety ................................................................................................................................................ 9
   2.1 Intended Use ......................................................................................................................... 9
   2.2 Safety Information ............................................................................................................... 10
   2.3 Cyber Security .................................................................................................................... 13
   2.4 Personal Protective Equipment .......................................................................................... 13
3 Product Overview ............................................................................................................................ 14
   3.1 Design of the Inverter ......................................................................................................... 14
   3.2 Devices of the Inverter ....................................................................................................... 14
   3.3 Operating and Display Elements ....................................................................................... 15
       3.3.1 Function of the Switches ............................................................................................... 15
           3.3.1.1 Key Switch ............................................................................................................. 15
           3.3.1.2 AC Disconnection Unit ......................................................................................... 16
           3.3.1.3 DC Switchgear ..................................................................................................... 16
       3.3.2 Touch Display ............................................................................................................... 17
           3.3.2.1 Design .................................................................................................................. 17
           3.3.2.2 Explanation of Symbols ....................................................................................... 17
       3.3.3 LEDs of the SC-COM ................................................................................................. 21
           3.3.3.1 LEDs on the Enclosure ......................................................................................... 21
           3.3.3.2 LEDs on the Network Port .................................................................................. 22
           3.3.3.3 LEDs on the Optical Fiber Terminals ................................................................. 23
       3.3.4 User Interface ............................................................................................................... 24
           3.3.4.1 Design of the User Interface ............................................................................... 24
           3.3.4.2 Tree View and Device View ............................................................................... 24
           3.3.4.3 Status Symbols .................................................................................................. 25
   3.4 Symbols on the Product ........................................................................................................ 25
4 Disconnecting and Reconnecting .................................................................................................... 26
   4.1 Safety When Disconnecting and Reconnecting Voltage Sources ........................................ 26
   4.2 Disconnecting the Inverter .................................................................................................. 26
       4.2.1 Switching off the Inverter ......................................................................................... 26
       4.2.2 Disconnecting the DC Side ....................................................................................... 26
       4.2.3 Disconnecting the AC Side ....................................................................................... 27
       4.2.4 Disconnecting the Supply Voltage at the Inverter from Voltage Sources ............ 27
   4.3 Reconnecting the Inverter .................................................................................................. 28
       4.3.1 Reconnecting the Supply Voltage at the Inverter ...................................................... 28
       4.3.2 Reconnecting the AC Side ....................................................................................... 29
       4.3.3 Reconnecting the DC Side ....................................................................................... 29
       4.3.4 Restarting the Inverter ............................................................................................ 29
5 Troubleshooting ............................................................................................................................. 30
   5.1 Safety during Troubleshooting .......................................................................................... 30
# Table of Contents

5.2  Reading Off Disturbance Messages ................................................................. 30
    5.2.1  Reading Off Error Messages via Touch Display ........................................ 30
    5.2.2  Reading Off Disturbance Messages via the User Interface ......................... 31
    5.2.3  Displaying the Event Report ....................................................................... 31
      5.2.3.1  Enabling Automatic Read-Out of Events ............................................. 31
      5.2.3.2  Displaying and Downloading the Event Report .................................. 31

5.3  Acknowledging Disturbance Messages ............................................................ 31
    5.3.1  Acknowledging Disturbance Messages via the Key Switch ......................... 31
    5.3.2  Acknowledging Disturbance Messages via the User Interface .................... 32

5.4  Remedial Action in Case of Disturbances ......................................................... 32
    5.4.1  Inverter Behavior in Case of Disturbances ............................................... 32
    5.4.2  Content and structure of the error tables ................................................... 34
    5.4.3  Error Numbers 01xx to 13xx - Disturbance on the Utility Grid .................. 34
    5.4.4  Error Numbers 34xx to 40xx - Disturbance on the PV Array ..................... 35
    5.4.5  Error Numbers 0xxx to 9xxx - Disturbance on the Inverter ....................... 37
    5.4.6  Displaying Disturbance Messages for Active Power Limitation .................. 40
    5.4.7  Displaying Disturbance Messages for the Reactive Power Setpoint ............. 41

6  Maintenance ........................................................................................................... 42

6.1  Safety during Maintenance ................................................................................. 42

6.2  Maintenance Schedule and Consumables .......................................................... 43
    6.2.1  Notes on Maintenance Work ........................................................................ 43
    6.2.2  Maintenance Work Every 24 Months ......................................................... 43

6.3  Repair Schedule and Spare Parts ....................................................................... 44
    6.3.1  Information on Repair Work ......................................................................... 44
    6.3.2  Demand-Based Annual Repairs ................................................................. 45
    6.3.3  Repairs every 10 Years ............................................................................... 45
    6.3.4  Repairs every 12 Years ............................................................................... 45

6.4  Maintenance Work ............................................................................................. 45
    6.4.1  Maintenance work with supply voltage present ......................................... 45
      6.4.1.1  Checking the Fans ............................................................................... 45
      6.4.1.2  Checking the Heating Elements and Hygrostat ................................. 46
      6.4.1.3  Inverter with Low-Temperature Option: Cleaning the Heating Elements .... 47
      6.4.1.4  Inverter with Low-Temperature Option: Checking the Heating Elements ... 48
      6.4.1.5  Checking the Function of the UPS ....................................................... 50

7  Maintenance Work in Disconnected State ............................................................. 51
    6.4.2.1  Performing the Visual Inspection ............................................................ 51
    6.4.2.2  Analyzing the Temperature Indicators .................................................... 51
    6.4.2.3  Cleaning the Ventilation Plate .............................................................. 53
    6.4.2.4  Cleaning the Air Duct, Ventilation Grids and Air Intake .......................... 53
    6.4.2.5  Cleaning the Interior .............................................................................. 55
    6.4.2.6  Checking the Seals ................................................................................. 56
    6.4.2.7  Checking the Latches, Door Stops and Hinges ........................................ 56
    6.4.2.8  Checking the Inverter Surface .............................................................. 57
    6.4.2.9  Checking the Fuses/Disconnection Blades ............................................. 58
    6.4.2.10  Checking the Bolted Connections of the Power Cabling ....................... 58
    6.4.2.11  Checking the Labels ............................................................................. 59

6.5  Repair Work ....................................................................................................... 61
    6.5.1  Reading off the Replacement Interval Meter .............................................. 61

7  Periodic Actions .................................................................................................... 62

7.1  Mounting and Disassembly Work ...................................................................... 62
    7.1.1  Disassembling and Mounting the Panels .................................................... 62
    7.1.2  Disassembling and Mounting the Protective Covers .................................. 63
    7.1.3  Disassembling and Mounting the Ventilation Grids .................................... 64
# Table of Contents

7.2 Entering the Password via the Touch Display ................................................................. 65
7.3 Parameter Overview ...................................................................................................... 65
  7.3.1 Accessing the Parameter Overview ......................................................................... 65
  7.3.2 Saving Parameter Changes ...................................................................................... 66
7.4 User Interface ............................................................................................................... 66
  7.4.1 Logging Into the User Interface ............................................................................... 66
  7.4.2 Logging Out of the User Interface .......................................................................... 66

8 Appendix ........................................................................................................................ 67
  8.1 Installation Information ............................................................................................... 67
    8.1.1 Torques .................................................................................................................. 67
  8.2 Type Label .................................................................................................................. 67

9 Contact .......................................................................................................................... 68
1 Information on this Document

1.1 Validity

This document is valid for the following device types:

<table>
<thead>
<tr>
<th>Device type</th>
<th>Production version</th>
<th>OCU firmware version</th>
<th>DSP firmware version</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC 500CP-10 (Sunny Central 500CP XT)</td>
<td>E7</td>
<td>02.00.01.R</td>
<td>02.00.01.R</td>
</tr>
<tr>
<td>SC 630CP-10 (Sunny Central 630CP XT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 720CP-10 (Sunny Central 720CP XT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 760CP-10 (Sunny Central 760CP XT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 800CP-10 (Sunny Central 800CP XT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 850CP-10 (Sunny Central 850CP XT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 900CP-10 (Sunny Central 900CP XT)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SC 1000CP-10 (Sunny Central 1000CP XT)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The production version is indicated on the type label.
The firmware version can be read off from the user interface.
Illustrations in this document are reduced to the essential and may deviate from the real product.

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 the product 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 Levels of Warning Messages

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

<table>
<thead>
<tr>
<th>▶️ DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicates a hazardous situation which, if not avoided, will result in death or serious injury.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>▶️ WARNING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicates a hazardous situation which, if not avoided, could result in death or serious injury.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>▶️ CAUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.</td>
</tr>
</tbody>
</table>
1.4 Symbols in the Document

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>![i]</td>
<td>Information that is important for a specific topic or goal, but is not safety-relevant</td>
</tr>
<tr>
<td>![☐]</td>
<td>Indicates a requirement for meeting a specific goal</td>
</tr>
<tr>
<td>![✓]</td>
<td>Desired result</td>
</tr>
<tr>
<td>![✗]</td>
<td>A problem that might occur</td>
</tr>
</tbody>
</table>

1.5 Typographical Elements in the Document

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

1.6 Designations in the Document

<table>
<thead>
<tr>
<th>Complete designation</th>
<th>Designation in this document</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium-voltage transformer</td>
<td>MV transformer</td>
</tr>
<tr>
<td>Sunny Central Communication Controller</td>
<td>SC-COM, communication unit</td>
</tr>
<tr>
<td>Sunny Central CP XT</td>
<td>Sunny Central or inverter</td>
</tr>
</tbody>
</table>

1.7 Additional Information

For more information, please go to www.SMA-Solar.com.
<table>
<thead>
<tr>
<th>Title and information content</th>
<th>Type of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Requirements for medium-voltage transformers and transformers for internal power supply for SUNNY CENTRAL and SUNNY CENTRAL STORAGE&quot;</td>
<td>Technical Information</td>
</tr>
<tr>
<td>&quot;PUBLIC CYBER SECURITY - Guidelines for a Secure PV System Communication&quot;</td>
<td>Technical information</td>
</tr>
</tbody>
</table>

For information on maintenance activities of the DC switchgear and AC disconnect unit please visit www.abb.com:

<table>
<thead>
<tr>
<th>Component</th>
<th>Document number</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC switchgear, AC disconnection unit: T-Max</td>
<td>1SDH000707R0001</td>
</tr>
<tr>
<td>DC switchgear: E-Max</td>
<td>1SDH000460R0003</td>
</tr>
</tbody>
</table>
2 Safety

2.1 Intended Use

The Sunny Central is a PV inverter which converts the direct current generated in the PV modules into grid-compliant alternating current. An external MV transformer fitted downstream feeds the generated alternating current into the utility grid.

The product is suitable for indoor and outdoor use.

The enclosure complies with degree of protection IP54. The inverter is classified under Class 4C2 as per EN 60721-3-4 and is suitable for operation in a chemically active environment.

The maximum permissible DC input voltage of the inverter must not be exceeded.

The inverter must only be operated in conjunction with a suitable MV transformer.

- The MV transformer must be designed for voltages that arise during pulsed mode of the inverter.
- For the Sunny Central 500CP XT/630CP XT/720CP XT/760CP XT/800CP XT the maximum voltage to ground is: ±1450 V
- For the Sunny Central 850CP XT/900CP XT/1000CP XT the maximum voltage to ground is: ±1600 V
- Do not connect more than one inverter to one winding of the MV transformer.
- The neutral conductor on the low-voltage side of the MV transformer must not be grounded.

You can find further information on suitable transformers in the technical information "Requirements for Medium-Voltage Transformers and Transformers for Internal Power Supply for the SUNNY CENTRAL".

Do not deactivate or modify settings that affect grid management services without first obtaining approval from the grid operator.

Use this product only in accordance with the information provided in the enclosed documentation and with the locally applicable standards and directives. Any other application may cause personal injury or property damage.

Alterations to the product, e.g. changes or modifications, are only permitted with the express written permission of SMA Solar Technology AG. 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.

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

The enclosed documentation is an integral part of this product. Keep the documentation in a convenient place for future reference and observe all instructions contained therein.

All work on the product must only be performed using appropriate tools and in compliance with the ESD protection regulations.

Suitable personal protective equipment must be worn by all persons working on or with the product.

Unauthorized persons must not operate the product and must be kept at a safe distance from the product.

The product must not be operated with open covers or doors.

The product must not be opened when it is raining or when humidity exceeds 95%.

The product must not be operated with any technical defects.

The type label must remain permanently attached to the product.
2.2 Safety Information

This section contains safety information that must be observed at all times when working on or with the product. 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 from electric shock due to live voltage
High voltages are present in the live components of the product. Touching live components results in death or serious injury due to electric shock.
- Wear suitable personal protective equipment for all work on the product.
- Do not touch any live components.
- Observe all warning messages on the product and in the documentation.
- Observe all safety information of the module manufacturer.
- After switching off the inverter, wait at least 15 minutes before opening it to allow the capacitors to discharge completely (see Section 4.2, page 26).

**DANGER**

Danger to life due to electric shock when live components or DC cables are touched
When exposed to sunlight, the PV modules generate high DC voltage which is present in the DC cables. Touching live DC cables results in death or lethal injuries due to electric shock.
- 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.

**DANGER**

Danger to life from electric shock due to damaged product
Operating a damaged product can lead to hazardous situations that result in death or serious injuries due to electric shock.
- Only operate the product when it is in a flawless technical condition and safe to operate.
- Check the product regularly for visible damage.
- Make sure that all external safety equipment is freely accessible at all times.
- Make sure that all safety equipment is in good working order.
- Wear suitable personal protective equipment for all work on the product.
DANGER

Danger to life from electric shock even if the inverter is disconnected on the AC and DC sides
The precharge unit of the order option "Q at Night" will carry live voltage even if the AC contactor and the DC switchgear are open. Touching live components results in death or serious injury due to electric shock.

- Do not touch any live components.
- Switch off the inverter.
- After switching off the inverter, wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Ensure that no voltage is present.
- Do not remove protective covers.
- Observe the warning messages.
- Wear suitable personal protective equipment for all work on the product.

WARNING

Danger to life from electric shock when entering the PV field
Ground-fault monitoring does not provide protection from personal injury. PV modules which are grounded with ground-fault monitoring discharge voltage to ground. Entering the PV field can result in lethal electric shocks.

- Ensure that the insulation resistance of the PV field exceeds the minimum value. The minimum value of the insulation resistance is: 1 kΩ.
- Before entering the PV field, switch the PV modules to insulated operation.
- Configure the PV power plant as a closed electrical operating area.

WARNING

Danger to life due to electric arc if there are tools inside the product
When reconnecting or during operation, an electric arc can occur if there are tools in the product creating a conductive connection between the live components. This can result in death or serious injury.

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

WARNING

Danger to life from electric shock if the product is not locked
If the product is not locked, unauthorized persons will have access to live components carrying lethal voltages. Touching live components can result in death or serious injury due to electric shock.

- Always close and lock the product.
- Remove the keys.
- Store the keys in a safe place.
- Ensure that no unauthorized persons have access to the closed electrical operating area.
## Safety

### WARNING

**Danger to life due to blocked escape routes**

In hazardous situations, blocked escape routes can lead to death or serious injury. Opening the doors of two products located opposite each other can block the escape route. It is imperative that the escape route is freely accessible at all times.

- An escape route must be available at all times. Make sure the minimum passage width of the escape route meets local standards.
- Do not place any objects in the escape route area.
- Remove all tripping hazards from escape routes.

### CAUTION

**Risk of burns due to hot components**

Some components of the product can get very hot during operation. Touching these components can cause burns.

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

### NOTICE

**Property damage due to dust intrusion and moisture penetration**

Dust or moisture intrusion can damage the product and impair its functionality.

- Do not open the enclosure during rainfall or when humidity exceeds the specified thresholds. The humidity thresholds are: 15% to 95%.
- Only perform maintenance work when the environment is dry and free of dust.
- Operation of the product is only permitted when it is closed.
- Connect the external supply voltage after mounting and installing the product.
- If the installation or commissioning process is interrupted, mount all panels.
- Close and lock the enclosure.
- The product must always be closed for storage.
- Store the product in a dry and covered location.
- The temperature at the storage location must be in the specified range. The temperature range is: −25°C to +70°C.

### NOTICE

**Damage to electronic components due to electrostatic discharge**

Electrostatic discharge can damage or destroy electronic components.

- Observe the ESD safety regulations when working on the product.
- Wear suitable personal protective equipment for all work on the product.
- Discharge electrostatic charge by touching grounded enclosure parts or other grounded elements. Only then is it safe to touch electronic components.
2.3 Cyber Security

Most operating activities such as monitoring and control of systems can be done locally by the PV system operator or service personnel without the need for data communication via public Internet infrastructure. These operating activities, including data communication between PV system operator/service personnel and data logger, inverter or additional equipment, can be accessed by using local displays, keypads or using local access of the webserver of a device in the LAN of the PV system or of the building.

In other use cases of systems, the PV systems are also part of the global communication system, which is based on Internet infrastructures.

The data communication via Internet is an up-to-date, economically viable and customer-friendly approach in order to enable easy access for the following modern applications such as:

- Cloud platforms (e.g. Sunny Portal)
- Smartphones or other mobile devices (iOS or Android apps)
- SCADA systems, which are remotely connected
- Utility interfaces for grid management services

Alternatively, selected and secured communication interfaces may be used. These solutions are no longer state of the art and are very expensive to use (special communication interfaces, separate wide area networks and more).

When using the Internet infrastructure, the systems connected to the Internet are entering a basically unsecure area. Potential attackers constantly seek vulnerable systems. Usually, they are criminally motivated, have a terrorist background or aim to disrupt business operations. Without taking any measures to protect systems and other systems from such misuse, a data communication system should not be connected to the Internet.


2.4 Personal Protective Equipment

Always wear suitable protective equipment

When working on the product, always wear the appropriate personal protective equipment for the specific job.

The following personal protective equipment is regarded to be the minimum requirement:

☐ In a dry environment, safety shoes of category S3 with perforation-proof soles and steel toe caps
☐ During precipitation or on moist ground, safety boots of category S5 with perforation-proof soles and steel toe caps
☐ Tight-fitting work clothes made of 100% cotton
☐ Suitable work pants
☐ Individually fitted hearing protection
☐ Safety gloves

Any other prescribed protective equipment must also be used.
3 Product Overview

3.1 Design of the Inverter

Figure 1: Design of the Inverter

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Inverter cabinet</td>
</tr>
<tr>
<td>B</td>
<td>Interface cabinet</td>
</tr>
<tr>
<td>C</td>
<td>Connection area</td>
</tr>
</tbody>
</table>

3.2 Devices of the Inverter

Figure 2: Inverter Components

<table>
<thead>
<tr>
<th>Position</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Touch Display</td>
<td>Different kinds of inverter data can be viewed on the touch display. The touch display is only used to view data. The display screen is activated by touching the touch display.</td>
</tr>
<tr>
<td>B</td>
<td>Service interface</td>
<td>The service interface allows access to the user interface.</td>
</tr>
<tr>
<td>C</td>
<td>Key switch</td>
<td>The key switch is used to switch the inverter on and off.</td>
</tr>
<tr>
<td>D</td>
<td>DC switchgear</td>
<td>The DC switchgear disconnects the inverter from the PV array.</td>
</tr>
</tbody>
</table>
3 Product Overview

SMA Solar Technology AG

3.3 Operating and Display Elements

3.3.1 Function of the Switches

3.3.1.1 Key Switch

The key switch is used to switch the inverter on and off.

<table>
<thead>
<tr>
<th>Position</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>SC-COM</td>
<td>The SC-COM is the communication unit of the inverter. The SC-COM establishes the connection between the inverter and the system operator.</td>
</tr>
<tr>
<td>F</td>
<td>AC disconnection unit</td>
<td>With the AC disconnection unit, the electrical connection between the inverter and MV transformer can be disconnected manually. In the event of residual current, the AC disconnection unit disconnects the connection between the inverter and MV transformer automatically.</td>
</tr>
<tr>
<td>G</td>
<td>AC contactor</td>
<td>The AC contactor disconnects the electrical connection between the inverter and MV transformer automatically.</td>
</tr>
</tbody>
</table>

![Switch positions of the key switch](image)

Figure 3: Switch positions of the key switch

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Switch position Stop</td>
</tr>
<tr>
<td>B</td>
<td>Switch position Start</td>
</tr>
</tbody>
</table>

Switch position Start

If the key switch is turned to Stop, a motor drive switches the DC switchgear on and the inverter switches from the operating state "Stop" to the operating state "Grid monitoring". Provided that there is sufficient irradiation and a valid utility grid connection, the inverter switches to feed-in operation. If there is insufficient irradiation and the input voltage is therefore too low, the inverter remains in the operating state "Grid monitoring".

Switch position Stop

If the key switch is turned to Stop while the inverter is in the operating state "Grid monitoring", a motor drive switches the DC switchgear off. The inverter switches to the operating state "Stop". If the key switch is turned to Stop while the inverter is in the operating state "MPP load operation", the inverter switches to the operating state "Shutdown". Once shutdown is complete, the AC contactor and the DC switchgear are opened automatically and the inverter switches to the operating state "Stop".
3.3.1.2 AC Disconnection Unit
The AC disconnection unit disconnects the inverter from the MV transformer.

![AC Disconnection Unit Diagram]

Figure 4: Switch positions of the AC disconnection unit from ABB

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Switch position on</td>
<td>The AC disconnection unit is closed.</td>
</tr>
<tr>
<td>B</td>
<td>Central switch position</td>
<td>The AC disconnection unit was tripped and is open.</td>
</tr>
<tr>
<td>C</td>
<td>Switch position off</td>
<td>The AC disconnection unit is open.</td>
</tr>
</tbody>
</table>

3.3.1.3 DC Switchgear
The DC switchgear disconnects the inverter from the PV power plant.

![DC Switchgear Diagram]

Figure 5: Indicators on the DC load-break switch

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Spring status indicator</td>
</tr>
<tr>
<td>B</td>
<td>Position indicator</td>
</tr>
<tr>
<td>C</td>
<td>ON button</td>
</tr>
<tr>
<td>D</td>
<td>OFF button</td>
</tr>
</tbody>
</table>
3.3.2 Touch Display

3.3.2.1 Design

The touch display is used to display instantaneous values and parameter settings. Tapping the symbols on the touch display activates the corresponding functions. If the touch display has not been touched for five minutes, the display is locked and the logged-in user will be logged out. By tapping the characters "S", "M" or "A", you can unlock the display again.

The touch display is divided into three areas.

![Figure 6: Design of the touch display](image)

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Status info line</td>
<td>Number of the active menu, login status and time</td>
</tr>
<tr>
<td>B</td>
<td>Information field</td>
<td>Area of the main menu</td>
</tr>
<tr>
<td>C</td>
<td>Navigation line</td>
<td>Navigation area</td>
</tr>
</tbody>
</table>

3.3.2.2 Explanation of Symbols

Information field

You can access the following sub-menus and screens from the information field:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Designation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="E-today line graph" /></td>
<td>E-today line graph</td>
<td>Diagram 103: Representation of energy fed in during the current day in kWh.</td>
</tr>
<tr>
<td><img src="image" alt="Bar chart" /></td>
<td>Bar chart</td>
<td>Diagram 104: Representation of energy fed in during the last 14 days in kWh.</td>
</tr>
<tr>
<td>Symbol</td>
<td>Designation</td>
<td>Explanation</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| ![DC side symbol](image) | DC side | Representation of the instantaneous values - PV power in W - Insulation resistance in Ω - PV current in A - PV voltage in V - Diagram of string-current monitoring  
  - Diagram 132 to 133: Group currents of the individual Sunny String-Monitors  
  - Diagram 140 to 146: String currents of the individual Sunny String-Monitors |
| ![String-current monitoring of the DC side symbol](image) | String-current monitoring of the DC side | Representation of the instantaneous values of the string-current monitoring of the individual Sunny String-Monitors |
| ![Switch on DC or AC side closed](image) | Switch on DC or AC side closed | If you see this symbol between the "DC side" symbol and the "Inverter data" symbol, the DC switchgear is closed.  
If you see this symbol between the symbol "Inverter data" and the symbol "AC side", the AC contactor is closed. |
| ![Switch on DC or AC side open](image) | Switch on DC or AC side open | If you see this symbol between the "DC side" symbol and the "Inverter data" symbol, the DC switchgear is open.  
If you see this symbol between the symbol "Inverter data" and the symbol "AC side", the AC contactor is open. |
| ![Status of switches on DC or AC side unknown](image) | Status of switches on DC or AC side unknown | If you see this symbol between the "DC side" symbol and the "Inverter data" symbol, the switch status of the DC switchgear is not known.  
If you see this symbol between the symbol "Inverter data" and the symbol "AC side", the switch status of the AC contactor is unknown. |
| ![Inverter data symbol](image) | Inverter data | Representation of the following inverter data:  
- Device type  
- Operating state  
- Symbol for utility grid menu  
- Symbol for temperature display  
- Symbol for fan display |
### Symbol Designation Explanation

**AC side**
- Representation of the following instantaneous values:
  - Active power in W
  - Reactive power in VAr
  - Power frequency in Hz
  - AC current in A
  - AC voltage in V

**grid**
- First menu page:
  - Active mode of active power limitation
  - Target active power in kW
  - Actual active power in kW
- Second menu page:
  - Active mode of reactive power setpoint
  - Target reactive power in VAr
  - Target displacement power factor $\cos \phi$
  - Target excitation type of the displacement power factor
  - Actual reactive power in VAr
  - Actual displacement power factor $\cos \phi$
  - Actual excitation type of the displacement power factor

### Settings Menu

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Designation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Settings Symbol]</td>
<td>Language selection</td>
<td>Select this symbol to open the language selection menu.</td>
</tr>
<tr>
<td>![Brightness Symbol]</td>
<td>Brightness setting</td>
<td>Select this symbol to open the brightness setting menu.</td>
</tr>
<tr>
<td>![Time Symbol]</td>
<td>Time setting</td>
<td>Select this symbol to open the time setting menu.</td>
</tr>
<tr>
<td>![Format Symbol]</td>
<td>Format selection</td>
<td>Select this symbol to open the format selection menu.</td>
</tr>
<tr>
<td>![Password Symbol]</td>
<td>Password entry</td>
<td>Select this symbol to open the password entry menu.</td>
</tr>
</tbody>
</table>

### Navigation line

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Designation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Back Symbol]</td>
<td>Back</td>
<td>Select this symbol to go back to the previous page.</td>
</tr>
<tr>
<td>![Homepage Symbol]</td>
<td>Homepage</td>
<td>Select this symbol to go to the homepage.</td>
</tr>
<tr>
<td>Symbol</td>
<td>Designation</td>
<td>Explanation</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| ![Symbol](image) | Settings | • Language selection  
• Brightness setting  
• Time setting  
• Format selection  
• Password entry |
| ![Symbol](image) | Information | • OS: version of the operating system  
• App.: version of the application software  
• SC-COM version: SC-COM software version  
• Ser.No.: inverter serial number  
• Hardware: hardware version and serial number of the SC-COM |
| ![Symbol](image) | Error | • ErrNo: error number  
• TmsRmg: time until reconnection  
• Msg: error message  
• Dsc: corrective measure |
| ![Symbol](image) | Service | • Telephone receiver: Contact Service.  
• Tool: Contact your installer. |
3.3.3 LEDs of the SC-COM

3.3.3.1 LEDs on the Enclosure

<table>
<thead>
<tr>
<th>LED designation</th>
<th>Status</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>POWER</td>
<td>glowing green</td>
<td>The SC-COM is supplied with voltage.</td>
</tr>
<tr>
<td></td>
<td>off</td>
<td>The SC-COM is not supplied with voltage.</td>
</tr>
<tr>
<td>SD1</td>
<td>flashing green</td>
<td>Read or write access to system drive</td>
</tr>
<tr>
<td>SD2</td>
<td>flashing green</td>
<td>Read or write access to internal data drive</td>
</tr>
<tr>
<td>CF</td>
<td>flashing green</td>
<td>Read or write access to external SD memory card</td>
</tr>
<tr>
<td>H1</td>
<td>flashing green</td>
<td>The SC-COM is transmitting data to Sunny Portal/FTP server.</td>
</tr>
<tr>
<td></td>
<td>glowing green</td>
<td>The most recent data transmission to Sunny Portal/FTP server was successful.</td>
</tr>
<tr>
<td></td>
<td>glowing red</td>
<td>The most recent data transmission to Sunny Portal/FTP server has failed.</td>
</tr>
<tr>
<td></td>
<td>off</td>
<td>Data transmission to Sunny Portal/FTP server is deactivated.</td>
</tr>
</tbody>
</table>
### LED designation

<table>
<thead>
<tr>
<th>LED designation</th>
<th>Status</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2</td>
<td>flashing green</td>
<td>The SC-COM is communicating with the devices connected within the system.</td>
</tr>
<tr>
<td></td>
<td>glowing green</td>
<td>Internal communication has taken place in the last five minutes.</td>
</tr>
<tr>
<td></td>
<td>glowing red</td>
<td>An error has occurred in the internal communication.</td>
</tr>
<tr>
<td></td>
<td>off</td>
<td>No internal communication for more than five minutes.</td>
</tr>
<tr>
<td>H3</td>
<td>flashing red</td>
<td>The SC-COM is starting up.</td>
</tr>
<tr>
<td></td>
<td>glowing red</td>
<td>An error has occurred in the SC-COM.</td>
</tr>
<tr>
<td></td>
<td>glowing green</td>
<td>The SC-COM is ready for use.</td>
</tr>
<tr>
<td>H4</td>
<td>glowing green</td>
<td>An internal memory card exists and less than 92% of its storage capacity is used.</td>
</tr>
<tr>
<td></td>
<td>glowing red</td>
<td>The internal memory card is full and the oldest saved data is being overwritten.</td>
</tr>
<tr>
<td></td>
<td>flashing red</td>
<td>92% of the storage capacity of the internal memory card is used.</td>
</tr>
<tr>
<td>H5</td>
<td>glowing green</td>
<td>An external memory card exists and less than 92% of its storage capacity is used.</td>
</tr>
<tr>
<td></td>
<td>glowing red</td>
<td>The external memory card is full.</td>
</tr>
<tr>
<td></td>
<td>flashing red</td>
<td>92% of the storage capacity of the external memory card is used.</td>
</tr>
<tr>
<td></td>
<td>off</td>
<td>There is no external memory card.</td>
</tr>
<tr>
<td>H6</td>
<td>-</td>
<td>Not assigned</td>
</tr>
<tr>
<td>H7</td>
<td>-</td>
<td>Not assigned</td>
</tr>
<tr>
<td>H8</td>
<td>flashing green</td>
<td>Application is running.</td>
</tr>
</tbody>
</table>

#### 3.3.3.2 LEDs on the Network Port

![LEDs on the network port](image)

**Figure 8: LEDs on the network port**

<table>
<thead>
<tr>
<th>Position</th>
<th>LED</th>
<th>Color</th>
<th>Status</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Speed</td>
<td>yellow</td>
<td>on</td>
<td>100 MBit data transfer rate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>off</td>
<td>10 MBit data transfer rate</td>
</tr>
<tr>
<td>B</td>
<td>Link/Activity</td>
<td>green</td>
<td>on</td>
<td>Connection (Link) established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>flashing</td>
<td>The SC-COM is transmitting or receiving data (Activity).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>off</td>
<td>No connection established.</td>
</tr>
</tbody>
</table>
### 3.3.3.3 LEDs on the Optical Fiber Terminals

The SC-COM is also available with pre-wired optical fiber connections. If the optical fibers are connected to the splice box of the inverter, the status of the connection will be indicated by the LEDs of the SC-COM.

![Figure 9: LEDs for the status of the optical fiber connection](image)

<table>
<thead>
<tr>
<th>Position</th>
<th>LED</th>
<th>Color</th>
<th>Status</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Link / Activity</td>
<td>green</td>
<td>on</td>
<td>Connection (Link) established.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>flashing</td>
<td>The SC-COM is transmitting or receiving data (Activity).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>off</td>
<td>No connection established.</td>
</tr>
</tbody>
</table>
3.3.4 User Interface

3.3.4.1 Design of the User Interface

Via the user interface, you can set the communication of the devices of your PV power plant, configure the inverter parameters and read off error messages and operating data.

![User Interface Diagram]

Figure 10: Design of the user interface (example)

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Tree view or device view</td>
</tr>
<tr>
<td>B</td>
<td>Status bar</td>
</tr>
<tr>
<td>C</td>
<td>Logout button</td>
</tr>
<tr>
<td>D</td>
<td>Navigation bar</td>
</tr>
<tr>
<td>E</td>
<td>Content area</td>
</tr>
</tbody>
</table>

3.3.4.2 Tree View and Device View

You can call up data of the individual devices of your PV power plant in the tree view or the device view. Depending on which view you have selected, the devices are sorted differently.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Designation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Tree View Icon]</td>
<td>Tree view</td>
<td>In the tree view, the user interface shows the devices in the order in which they are connected to the data bus.</td>
</tr>
<tr>
<td>![Device View Icon]</td>
<td>Device view</td>
<td>In the device view, the user interface shows all devices sorted by device type. The number shown in parentheses indicates the number of devices of a device type.</td>
</tr>
</tbody>
</table>
### 3.3.4.3 Status Symbols

Depending on the status of the device communication, the device symbols are displayed in the tree or device view with various status symbols.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>The inverter is ready for operation.</td>
</tr>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>There is an error in the inverter.</td>
</tr>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>An error has occurred in the communication with the inverter.</td>
</tr>
</tbody>
</table>

### 3.4 Symbols on the Product

The following gives an explanation of all the symbols found on the inverter and on the type label.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Designation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>CE marking</td>
<td>The product complies with the requirements of the applicable EU directives.</td>
</tr>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>Protection class I</td>
<td>All electrical equipment is connected to the grounding conductor system of the product.</td>
</tr>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>Degree of protection IP54</td>
<td>The product is protected against interior dust deposits and splashing water from all angles.</td>
</tr>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>Beware of a danger zone</td>
<td>This warning symbol indicates a danger zone. Be particularly vigilant and cautious when working on the product.</td>
</tr>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>Beware of dangerous voltage</td>
<td>The product operates at high voltages. All work on the product must be carried out by qualified persons only.</td>
</tr>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>Beware of hot surface</td>
<td>The product can get hot during operation. Avoid contact during operation. Allow the product to cool down sufficiently before carrying out any work. Wear personal protective equipment such as safety gloves.</td>
</tr>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>Use hearing protection.</td>
<td>The product generates loud noises. When working on the product, wear hearing protection.</td>
</tr>
<tr>
<td><img src="image" alt="Symbol" /></td>
<td>Observe the documentation.</td>
<td>Observe all documentation supplied with the product.</td>
</tr>
</tbody>
</table>
4 Disconnecting and Reconnecting

4.1 Safety When Disconnecting and Reconnecting Voltage Sources

**DANGER**

**Danger to life from electric shock due to live voltage**
High voltages are present in the live components of the product. Touching live components results in death or serious injury due to electric shock.

- Wear suitable personal protective equipment for all work on the product.
- Do not touch any live components.
- Observe all warning messages on the product and in the documentation.
- Observe all safety information of the module manufacturer.
- After switching off the inverter, wait at least 15 minutes before opening it to allow the capacitors to discharge completely (see Section 4.2, page 26).

**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.

**CAUTION**

**Risk of burns due to hot components**
Some components of the product can get very hot during operation. Touching these components can cause burns.

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

4.2 Disconnecting the Inverter

4.2.1 Switching off the Inverter

1. Turn the key switch to **Stop**.
2. Remove the key. This will protect the inverter from inadvertent reconnection.
3. Wait 15 minutes before opening the doors. This allows the inverter capacitors to discharge.

4.2.2 Disconnecting the DC Side

1. Switch off the inverter (see Section 4.2.1, page 26).
2. Disconnect all poles of the DC voltage in the DC main distribution or DC subdistribution (see documentation of the main or subdistribution).
3. Ensure that the DC switchgear in the inverter is open.
4. Ensure that no voltage is present on the load side of the DC switchgear.
5. Cover or isolate any adjacent live components.
6. Remove the protective covers over the fuses.
7. Remove all fuses and disconnection blades from all fuse holders of the inverters. Use an LV/HRC fuse extractor.
4.2.3 Disconnecting the AC Side
1. Switch off the inverter (see Section 4.2.1, page 26).
2. Disconnect the DC side (see Section 4.2.2, page 26).
3. Externally disconnect the AC voltage of the MV transformer.
4. Switch off the AC disconnection unit in the inverter.
5. Ensure that no voltage is present.
6. Cover or isolate any adjacent live components.

4.2.4 Disconnecting the Supply Voltage at the Inverter from Voltage Sources
1. If the supply voltage is only to be disconnected upstream from the circuit breaker, switch the circuit breaker of the supply voltage off.
2. If the supply voltage is also to be disconnected downstream from the supply voltage circuit breaker, switch the external circuit breaker of the supply voltage off.
   Tip: The external circuit breaker of the supply voltage is usually located in a subordinate distribution station.
3. Disconnect any additional external voltage.
4. Switch the motor-protective circuit-breakers of the grid monitoring off.
5. Open the measurement and disconnect terminals.

6. Ensure that no voltage is present.
7. Cover or isolate any adjacent live components.

4.3 Reconnecting the Inverter

4.3.1 Reconnecting the Supply Voltage at the Inverter

1. Close the measurement and disconnect terminals.

2. Switch on the motor-protective circuit-breakers of the grid monitoring.

3. Connect any additional external voltage.
4. If the supply voltage has been disconnected downstream from the circuit breaker, switch the external circuit breaker of the supply voltage on.
   Tip: The external circuit breaker of the supply voltage is usually located in a subordinate distribution station.
5. If the supply voltage has been disconnected upstream from the circuit breaker, switch the circuit breaker of the supply voltage on.

### 4.3.2 Reconnecting the AC Side

1. Reconnect the supply voltage and external voltages (see Section 4.3.1, page 28).
2. Reconnect the AC voltage of the MV transformer.
3. Switch on the AC disconnection unit in the inverter.

### 4.3.3 Reconnecting the DC Side

1. Insert all fuses and disconnection blades into all fuse holders of the inverter. Use an LV/HRC fuse extractor.
2. Screw on the protective covers over the fuses (torque: 5 Nm).
3. Switch on the DC voltage in the DC main distribution or DC subdistribution (see documentation of the main or subdistribution).

### 4.3.4 Restarting the Inverter

- Turn the key switch to **Start**.
## 5 Troubleshooting

### 5.1 Safety during Troubleshooting

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DANGER</strong></td>
<td>Danger to life from electric shock due to high voltages on the product</td>
<td>• Observe all safety information when working on the product.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Wear suitable personal protective equipment for all work on the product.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• If you cannot remedy the disturbance with the help of this document, contact the Service (see Section 9 &quot;Contact&quot;, page 68).</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td>Danger to life from electric shock due to live external supply voltage</td>
<td>• Disconnect the external supply voltage.</td>
</tr>
<tr>
<td><strong>WARNING</strong></td>
<td>Hearing impairment due to high-frequency noises of the product</td>
<td>• Wear hearing protection.</td>
</tr>
<tr>
<td><strong>CAUTION</strong></td>
<td>Risk of burns due to hot components</td>
<td>• Observe the warnings on all components.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• During operation, do not touch any components marked with such warnings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• After switching off the product, wait until any hot components have cooled down sufficiently.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Wear suitable personal protective equipment for all work on the product.</td>
</tr>
<tr>
<td><strong>CAUTION</strong></td>
<td>Danger of crushing and collision when carelessly working on the product</td>
<td>• Wear personal protective equipment for all work on the product.</td>
</tr>
</tbody>
</table>

### 5.2 Reading Off Disturbance Messages

#### 5.2.1 Reading Off Error Messages via Touch Display

If an error occurs, a warning symbol is shown on the touch display.
5 Troubleshooting

Procedure:

• Select the warning symbol.

☑ The touch display lists the error number, waiting time, error message and the necessary corrective measure to eliminate the disturbance.

5.2.2 Reading Off Disturbance Messages via the User Interface

1. Log into the user interface (see Section 7.4.1, page 66).
2. To display the error number, select the instantaneous value \texttt{ErrNo} in the instantaneous value view.
3. To display the delay time, select the instantaneous value \texttt{TmsRmg} in the instantaneous value view.
4. To display the error message, select the instantaneous value \texttt{Msg} in the instantaneous value view.
5. To display the corrective measure, select the instantaneous value \texttt{Dsc} in the instantaneous value view.

5.2.3 Displaying the Event Report

5.2.3.1 Enabling Automatic Read-Out of Events

1. Log into the user interface (see Section 7.4.1, page 66).
2. Select \texttt{Sunny Central > Recording}.
3. In the field \texttt{Collect automatically fault logs}, select \texttt{yes}.
4. Select the button \texttt{Save}.

5.2.3.2 Displaying and Downloading the Event Report

The event report keeps a log of various events, e.g. errors and warnings. All events can be downloaded in a CSV file. Upon delivery, the automatic transfer of the events is deactivated.

Procedure:

1. Log into the user interface (see Section 7.4.1, page 66).
2. In order to have the event report of the inverter displayed manually, proceed as follows:
   • Select \texttt{Sunny Central > Recording}.
   • In the field \texttt{Manually requesting fault memory}, select \texttt{Request}.
   • In the field \texttt{Manually requesting event memory}, select \texttt{Request}.
3. Select \texttt{Sunny Central > Events}.
4. To download the events as CSV file, carry out the following steps:
   • Select the button \texttt{Download}.
   • Choose the save location.
   • Select the button \texttt{Save}.

5.3 Acknowledging Disturbance Messages

5.3.1 Acknowledging Disturbance Messages via the Key Switch

\textbf{i} Dealing with disturbances

Disturbance messages should only be acknowledged once the underlying causes have been eliminated.

If the causes of the disturbance have not been eliminated, the disturbance will still be detected after acknowledgment and the disturbance message will reappear.

Procedure:

1. If an insulation error has occurred, switch the insulation monitoring device back on.
2. Turn the key switch to \texttt{Stop} and then back to \texttt{Start} after two seconds.
5.3.2 Acknowledging Disturbance Messages via the User Interface

Dealing with disturbances

Disturbance messages should only be acknowledged once the underlying causes have been eliminated. If the causes of the disturbance have not been eliminated, the disturbance will still be detected after acknowledgment and the disturbance message will reappear.

You will only be able to acknowledge error messages via the user interface after entering the installer password.

Procedure:

1. If an insulation error has occurred, switch the insulation monitoring device back on.
2. Log into the user interface (see Section 7.4.1, page 66).
3. Select the parameter Ackn in the device displaying the error, and set to Ackn.
4. Select the button [Save].

5.4 Remedial Action in Case of Disturbances

5.4.1 Inverter Behavior in Case of Disturbances

If a disturbance occurs during operation, this may be caused by a warning or an error. There are two levels assigned to each disturbance which influence the display and system behavior. Only in the case of certain disturbances will the inverter behavior differ depending on the level. The level is increased from 1 to 2 if the disturbance occurs five times within two hours or without interruption for two hours.

Inverter behavior in the disturbance levels 1 and 2:

- **Waiting time**
  
  The inverter switches to the operating state "Disturbance" and opens the AC contactor and DC switchgear. The inverter does not feed into the grid for the defined waiting time.

  The waiting time specifies how long the disturbance will be shown on the touch display and saved as a disturbance. Once the waiting time has elapsed, the disturbance is no longer shown on the touch display. The inverter then checks whether the cause of the disturbance has been rectified.

  If the cause of the disturbance still exists after the waiting time has expired or the disturbance has been acknowledged, the inverter remains in the operating state "Disturbance."

- **Waiting for acknowledgement**
  
  The inverter switches to the operating state "Disturbance" and opens the AC contactor and DC switchgear. The inverter does not feed into the grid until the disturbance is acknowledged.

  The cause of the disturbance must be detected on-site. To this end, read off the fault memory and event messages of the inverter and note down the error numbers.

  The cause of the disturbance must be remedied. You will find the corrective measures on the following pages. For further information, contact us (see Section 9, page 68).

  It must be ensured that the inverter and its components are in a proper and safe condition. For this purpose, a visual inspection should be carried out with special attention to discolorations, contaminations and signs of wear.

  The disturbance may be acknowledged only after the elimination of all causes and the completion of the visual inspection.

  Once the disturbance has been acknowledged, it is no longer shown on the touch display. The inverter then checks whether the cause of the disturbance has been rectified.

  If the disturbance is no longer pending, it is deleted from the memory. If the cause of the disturbance still exists after the disturbance has been acknowledged, the inverter remains in the operating state "Disturbance."
• **Day change**
  The inverter switches to the operating state "Disturbance" and opens the AC contactor and DC switchgear. The inverter does not feed in.
  The disturbance is automatically reset when the day changes. Once the disturbance has been reset, it is no longer shown on the touch display. The inverter then checks whether the cause of the disturbance has been rectified.
  If the disturbance is no longer pending, it is deleted from the memory. If the cause of the disturbance still exists after the day has changed or the disturbance has been acknowledged, the inverter remains in the operating state "Disturbance".

• **System-specific**
  The inverter switches to the operating state "Disturbance" and opens the AC contactor and DC switchgear. The inverter does not feed in. How long the inverter remains in this state depends on the system-specific influencing factors.
  Once the time has elapsed, the disturbance is no longer shown on the touch display. The inverter then checks whether the cause of the disturbance has been rectified. If the disturbance is no longer pending, it is deleted from the memory. If the cause of the disturbance still exists after the disturbance has been acknowledged, the inverter remains in the operating state "Disturbance."

• **Warning**
  A warning does not affect inverter behavior. The cause of the warning must be determined and remedied.
  In the operating state "Disturbance", the touch display shows a warning symbol, error number, waiting time, error message and the required measure to eliminate the disturbance message.
  Once the cause of the disturbance has been rectified and the disturbance is no longer displayed, it is deleted from the fault memory. To view previous disturbances after they have been deleted from the fault memory, an event report is filed on the SD memory card. The event report logs the time and type of disturbance. The event report can also be displayed on the user interface.
  Depending on the type of disturbance, a reset may be performed. When this happens, the relays are checked and the supply voltage of the control system is switched off. This process takes less than one minute. While the control system is booting, the regular waiting times for grid monitoring are complied with.
5.4.2 Content and structure of the error tables

You will find the following information in the error tables in the following sections:

<table>
<thead>
<tr>
<th>Error no.</th>
<th>Explanation</th>
<th>S1</th>
<th>S2</th>
<th>R</th>
<th>Corrective measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1301</td>
<td>Left-hand rotating magnetic field is connected.</td>
<td>30 s</td>
<td>Q</td>
<td>-</td>
<td>• Check phase position.</td>
</tr>
<tr>
<td>3803</td>
<td>DC current of PV array is too high.</td>
<td>1 min</td>
<td>D</td>
<td>x</td>
<td>• Check DC input current.</td>
</tr>
<tr>
<td>0104</td>
<td>Grid voltage is too high.</td>
<td>W</td>
<td>C</td>
<td>-</td>
<td>• Check grid voltage.</td>
</tr>
</tbody>
</table>

Position

A

Behavior of the inverter: disturbance level S1, disturbance level S2

- s / min: waiting time
- C: system-specific
- D: day change
- Q: waiting for acknowledgement
- W: warning

B

Reset

5.4.3 Error Numbers 01xx to 13xx - Disturbance on the Utility Grid

After a grid failure, the inverter monitors the utility grid for a specific period before reconnecting. When the inverter monitors the utility grid after a grid error, the grid monitoring time is complied with. Certain errors, such as grid errors, cause the inverter to shut down. In this case, the instantaneous value $T_{msRmg}$ indicates the time for which the inverter monitors the utility grid before reconnecting. This grid monitoring time can be defined in parameter $GdErrTm$.

<table>
<thead>
<tr>
<th>Error no.</th>
<th>Explanation</th>
<th>Inverter behavior</th>
<th>Corrective measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>0103*</td>
<td>Grid voltage is too high. Overvoltage detected by redundant monitoring.</td>
<td>30 s 30 s -</td>
<td>• Check the grid voltage.</td>
</tr>
<tr>
<td>0104*</td>
<td>Grid voltage is too high. Overvoltage detected by standard monitoring.</td>
<td>C C -</td>
<td>• Check the grid connections.</td>
</tr>
<tr>
<td>0203*</td>
<td>Grid voltage is too low. Undervoltage detected by redundant monitoring.</td>
<td>30 s 30 s -</td>
<td>• Check stability of the utility grid.</td>
</tr>
<tr>
<td>0204*</td>
<td>Grid voltage is too low. Undervoltage detected by standard monitoring.</td>
<td>30 s 30 s -</td>
<td>• Make sure the external fuses work properly.</td>
</tr>
<tr>
<td>0205*</td>
<td>Not permitted grid frequency change or grid synchronization not possible</td>
<td>30 s 30 s -</td>
<td>• Make sure the AC cable connections are tight.</td>
</tr>
</tbody>
</table>
### Error Numbers 34xx to 40xx - Disturbance on the PV Array

<table>
<thead>
<tr>
<th>Error no.</th>
<th>Explanation</th>
<th>Inverter behavior</th>
<th>Corrective measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>3403</td>
<td>PV array voltage is too high.</td>
<td>15 min 30 min</td>
<td>• Check the DC voltage.</td>
</tr>
<tr>
<td>3404</td>
<td>Open-circuit voltage is too high. Disturbance detected by standard monitoring.</td>
<td>15 min 30 min</td>
<td>• Check the module wiring and system design.</td>
</tr>
<tr>
<td>3406</td>
<td>The DC voltage is too high.</td>
<td>15 min 30 min</td>
<td></td>
</tr>
<tr>
<td>Error no.</td>
<td>Explanation</td>
<td>Inverter behavior</td>
<td>Corrective measures</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
<td>-------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>3501</td>
<td>The insulation monitoring device has measured a too low grounding resistance.</td>
<td>C C R</td>
<td>• Check the PV array for ground faults.</td>
</tr>
<tr>
<td>3502</td>
<td>The GFDI has tripped.</td>
<td>C C R</td>
<td>• Check the PV array for ground faults.</td>
</tr>
<tr>
<td>3504</td>
<td>The insulation monitoring device has detected an insulation error.</td>
<td>W W R</td>
<td>• Check the PV array for ground faults.</td>
</tr>
<tr>
<td></td>
<td>If the parameter <strong>IsoErrIgn</strong> is set to <strong>On</strong>, this error is ignored.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3507</td>
<td>A ground fault has occurred on the ungrounded terminal of the PV array.</td>
<td>Q Q R</td>
<td>• Check the PV array for ground faults.</td>
</tr>
<tr>
<td>3510</td>
<td>The inverter has detected an insulation error on the inverter bridge.</td>
<td>Q Q R</td>
<td>• Check the PV array for ground faults.</td>
</tr>
<tr>
<td>3511</td>
<td>The inverter has detected an insulation error.</td>
<td>W W R</td>
<td>• Check the PV array for ground faults.</td>
</tr>
<tr>
<td>3512</td>
<td>The Remote GFDI has detected a permanent ground fault.</td>
<td>Q Q R</td>
<td>• Check the PV array for ground faults.</td>
</tr>
<tr>
<td>3515</td>
<td>A ground fault detected by Soft Grounding has been ignored.</td>
<td>W W R</td>
<td>• Check the PV array for ground faults.</td>
</tr>
<tr>
<td>3517</td>
<td>Insulation measuring is being performed.</td>
<td>W W R</td>
<td>• Check the grounding and equipotential bonding.</td>
</tr>
<tr>
<td>3520</td>
<td>An insulation fault has occurred and has been fixed.</td>
<td>W W R</td>
<td>• Check the DC input current.</td>
</tr>
<tr>
<td>3601</td>
<td>Leakage current to ground has occurred in the PV array or the threshold defined in parameter <strong>RisoCtlWarn</strong> has been reached.</td>
<td>W W R</td>
<td>• Check the module wiring and system design.</td>
</tr>
<tr>
<td>3803</td>
<td>The PV array current is too high.</td>
<td>1 min D R</td>
<td>• Check the functionality of the entire string.</td>
</tr>
<tr>
<td>4003</td>
<td>Reverse currents detected in the PV array or DC connection polarity reversed.</td>
<td>30 s Q R</td>
<td>• Check the module wiring and system design.</td>
</tr>
</tbody>
</table>

**SMA Solar Technology AG**

**5 Troubleshooting**

**SCCPXT-E7-WA-en-37**

**Maintenance Manual**
## 5.4.5 Error Numbers 6xxx to 9xxx - Disturbance on the Inverter

<table>
<thead>
<tr>
<th>Error no.</th>
<th>Explanation</th>
<th>Inverter behavior</th>
<th>Corrective measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>6002</td>
<td>Calibration data cannot be loaded.</td>
<td>Q</td>
<td>Q</td>
</tr>
<tr>
<td>6113</td>
<td>Data block cannot be loaded from EEPROM or channel list has changed (e.g. after firmware update).</td>
<td>W</td>
<td>W</td>
</tr>
<tr>
<td>6115</td>
<td>Setting of hardware thresholds on D/A converters is not possible.</td>
<td>5 min</td>
<td>5 min</td>
</tr>
<tr>
<td>6116</td>
<td>Real-time clock has not initialized.</td>
<td>W</td>
<td>W</td>
</tr>
<tr>
<td>6117</td>
<td>Device address not recognized.</td>
<td>5 min</td>
<td>5 min</td>
</tr>
<tr>
<td>6119</td>
<td>Data structure for communication between operation control unit and digital signal processor is invalid.</td>
<td>5 min</td>
<td>5 min</td>
</tr>
<tr>
<td>6120</td>
<td>Watchdog tripping error</td>
<td>30 s</td>
<td>W</td>
</tr>
<tr>
<td>6121</td>
<td>No response from watchdog</td>
<td>30 s</td>
<td>W</td>
</tr>
<tr>
<td>6122</td>
<td>Ten internal monitoring errors have occurred in succession.</td>
<td>W</td>
<td>5 min</td>
</tr>
<tr>
<td>6128</td>
<td>General error</td>
<td>5 min</td>
<td>5 min</td>
</tr>
<tr>
<td>6404</td>
<td>Overcurrent at line conductor L1, L2 or L3</td>
<td>C</td>
<td>Q</td>
</tr>
<tr>
<td>6405</td>
<td>Overvoltage in the DC link of the inverter bridge</td>
<td>30 s</td>
<td>5 min</td>
</tr>
<tr>
<td>6410</td>
<td>24 V supply voltage is invalid.</td>
<td>5 min</td>
<td>5 min</td>
</tr>
<tr>
<td>6417</td>
<td>15 V supply voltage is invalid.</td>
<td>5 min</td>
<td>5 min</td>
</tr>
<tr>
<td>6418</td>
<td>Overtemperature of the inverter bridge</td>
<td>5 min</td>
<td>15 min</td>
</tr>
<tr>
<td>6422</td>
<td>Inverter bridge in undefined state</td>
<td>30 s</td>
<td>5 min</td>
</tr>
<tr>
<td>6423</td>
<td>Overtemperature in the switch cabinet</td>
<td>5 min</td>
<td>30 min</td>
</tr>
<tr>
<td>6425</td>
<td>Synchronization error with utility grid</td>
<td>30 s</td>
<td>5 min</td>
</tr>
<tr>
<td>6427</td>
<td>Sensor error of DC voltage measurement</td>
<td>30 s</td>
<td>C</td>
</tr>
<tr>
<td>6440</td>
<td>The MV transformer is no longer hermetically sealed.</td>
<td>30 s</td>
<td>5 min</td>
</tr>
<tr>
<td>Error no.</td>
<td>Explanation</td>
<td>Inverter behavior</td>
<td>Corrective measures</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------------------</td>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>6441</td>
<td>Sensor error during measurement of DC voltage</td>
<td>30 s 30 s x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6443</td>
<td>Unspecified error in digital signal processor</td>
<td>30 s x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6447</td>
<td>Self-test of inverter bridge failed</td>
<td>Q Q x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6448</td>
<td>Insulation monitoring provides non-permitted values</td>
<td>W W x</td>
<td>• Check insulation monitoring.</td>
</tr>
<tr>
<td>6451</td>
<td>Measured AC voltage of the inverter is less than utility grid voltage.</td>
<td>W W x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6452</td>
<td>Measured AC voltage of the utility grid is less than inverter voltage.</td>
<td>W W x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6453</td>
<td>AC voltage of grid limit monitoring is faulty.</td>
<td>W W x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6454</td>
<td>AC current is faulty.</td>
<td>W W x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6455</td>
<td>AC voltage is faulty.</td>
<td>W W x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6456</td>
<td>Pre-charging circuit of DC link is defective.</td>
<td>W W x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6457</td>
<td>Capacitor self-test has failed.</td>
<td>Q Q x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6461</td>
<td>Insulation monitoring device has not adopted threshold.</td>
<td>1.5 min 1.5 min x</td>
<td>• Check the insulation monitoring device and cabling.</td>
</tr>
<tr>
<td>6471</td>
<td>Online capacitor self-test has failed.</td>
<td>Q Q x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6472</td>
<td>Endless loop between online and offline capacitor test</td>
<td>Q Q x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6486</td>
<td>Inadmissible deviations between AC power and DC power has been detected.</td>
<td>W W x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>6487</td>
<td>AC ground fault has been detected.</td>
<td>Q Q x</td>
<td>• Check the overvoltage protection.</td>
</tr>
<tr>
<td>6501</td>
<td>Interior temperature of inverter is too high.</td>
<td>30 s 1 min x</td>
<td>• Check function of the fans.</td>
</tr>
<tr>
<td>6502</td>
<td>Temperature of inverter bridge is too high.</td>
<td>30 s 1 min x</td>
<td>• Clean the fans.</td>
</tr>
<tr>
<td>6508</td>
<td>Outside temperature is too high.</td>
<td>30 s 1 min x</td>
<td>• Clean clogged fan inlets and ventilation plates.</td>
</tr>
<tr>
<td>6512</td>
<td>Minimum operating temperature not reached</td>
<td>W W x</td>
<td></td>
</tr>
<tr>
<td>Error no.</td>
<td>Explanation</td>
<td>Inverter behavior</td>
<td>Corrective measures</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>---------------------------------------------------------</td>
</tr>
<tr>
<td>6605</td>
<td>The fast stop was tripped due overtemperature in the switch cabinet.</td>
<td>30 s 1 min</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>7001</td>
<td>Cable break or short circuit at inverter temperature sensor</td>
<td>W W</td>
<td>• Check the wiring of the temperature sensor.</td>
</tr>
<tr>
<td>7002</td>
<td></td>
<td>W W</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>7004</td>
<td></td>
<td>W W</td>
<td>• Check the wiring of the temperature sensor.</td>
</tr>
<tr>
<td>7006</td>
<td></td>
<td>W W</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>7501</td>
<td>Interior fan is defective.</td>
<td>W W</td>
<td>• Check function of the fans.</td>
</tr>
<tr>
<td>7502</td>
<td></td>
<td>W W</td>
<td>• Clean the fans.</td>
</tr>
<tr>
<td>7503</td>
<td>Inverter bridge fan is defective.</td>
<td>W W</td>
<td>• Clean clogged fan inlets and ventilation plates.</td>
</tr>
<tr>
<td>7507</td>
<td>Motor-protective circuit breaker of fan has tripped.</td>
<td>W W</td>
<td></td>
</tr>
<tr>
<td>7510</td>
<td>Interior fan is defective.</td>
<td>W W</td>
<td></td>
</tr>
<tr>
<td>7600</td>
<td>Communication between touch display and communication unit is interrupted.</td>
<td>W W</td>
<td>• Check cabling between touch display and communication unit.</td>
</tr>
<tr>
<td>7601</td>
<td>Internal inverter error</td>
<td>30 s 1 min</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>7602</td>
<td>Internal communication error has occurred or communication is interrupted.</td>
<td>30 s 1 min</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>7605</td>
<td></td>
<td>30 s 1 min</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>7704</td>
<td>Faulty switching status of the DC switchgear</td>
<td>30 s Q</td>
<td>• When disconnecting the inverter, check that all motor-driven circuit breaker switches are set to the OFF position. If not, set all switches to OFF.</td>
</tr>
<tr>
<td>7706</td>
<td>The AC disconnection unit is open or was tripped.</td>
<td>30 s Q</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>7707</td>
<td>Faulty switching status of the AC disconnection unit</td>
<td>30 s Q</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>7708</td>
<td>Faulty switching status of Remote GFDI</td>
<td>W W</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>7709</td>
<td>90% of switch cycles of the DC switchgear reached.</td>
<td>10 s 10 s</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>7710</td>
<td>100% of switch cycles of the DC switchgear reached.</td>
<td>30 s 30 s</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>Error no.</td>
<td>Explanation</td>
<td>Inverter behavior</td>
<td>Corrective measures</td>
</tr>
<tr>
<td>----------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>7714</td>
<td>Maximum number of GFDI switch cycles reached.</td>
<td>30 s 30 s R</td>
<td>• Replace the GFDI.</td>
</tr>
<tr>
<td>7801</td>
<td>The surge arrester is defective or the back-up fuse of the surge arrester was tripped.</td>
<td>W W x</td>
<td>• Check the surge arrester.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Check the back-up fuse of the surge arrester.</td>
</tr>
<tr>
<td>7901</td>
<td>Reverse current has occurred in PV array.</td>
<td>1 min D x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>8701</td>
<td>External active power setpoints are smaller than 2 mA and therefore invalid. The last valid value or, after a day change, ( P_{\text{max}} ) is used. Once valid setpoints are available again, these will be used.</td>
<td>W W</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>8702</td>
<td>Several digital active power setpoints are available.</td>
<td>W W x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>8703</td>
<td>Power factor of the external reactive power setpoint is invalid.</td>
<td>W W x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>8704</td>
<td>External active and reactive power setpoints are invalid.</td>
<td>W W x</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>9008</td>
<td>Doors have been opened during operation.</td>
<td>30 s 1 min C</td>
<td>• Contact the SMA Service Line.</td>
</tr>
<tr>
<td>9009</td>
<td>Fast stop has tripped.</td>
<td>30 s 30 s C</td>
<td>• Eliminate error and switch fast stop back on.</td>
</tr>
<tr>
<td>9013</td>
<td>This relates to a grid management shutdown. The error is reset by a signal from the grid operator or from the safety system of the grid interconnection point.</td>
<td>30 s 30 s C</td>
<td>• Eliminate error and switch fast stop back on.</td>
</tr>
<tr>
<td>9019</td>
<td>Defective fast stop</td>
<td>30 s C</td>
<td>• Check the fast stop cabling.</td>
</tr>
</tbody>
</table>

### 5.4.6 Displaying Disturbance Messages for Active Power Limitation

The instantaneous value \( P_{\text{WModFailStt}} \) displays errors or warnings associated with active power limitation.

**Procedure:**

1. Log into the user interface (see Section 7.4.1, page 66).
2. Select the instantaneous value \( P_{\text{WModFailStt}} \).

<table>
<thead>
<tr>
<th>Display</th>
<th>Cause and corrective measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>No mode for active power limitation has been selected.</td>
</tr>
<tr>
<td>OK</td>
<td>A mode for active power limitation has been selected and no error is present.</td>
</tr>
</tbody>
</table>
## Troubleshooting

### Display Cause and corrective measures

<table>
<thead>
<tr>
<th>Display</th>
<th>Cause and corrective measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ComFail</strong></td>
<td>The mode <code>WCtlCom</code> has been selected and the expected signal with a valid active power limitation has been absent for at least five minutes.</td>
</tr>
<tr>
<td></td>
<td><strong>Corrective measures:</strong></td>
</tr>
<tr>
<td></td>
<td>• Ensure that the communication units can be accessed via the Internet.</td>
</tr>
<tr>
<td></td>
<td>• Ensure that the communication units are connected correctly.</td>
</tr>
<tr>
<td></td>
<td>• Ensure that the cabling between the communication units is ok.</td>
</tr>
<tr>
<td><strong>AnInFail</strong></td>
<td>The mode <code>WCnstNomAnIn</code> has been selected and the value measured at the analog input is less than 2 mA.</td>
</tr>
<tr>
<td></td>
<td><strong>Corrective measures:</strong></td>
</tr>
<tr>
<td></td>
<td>• Make sure the cable is correctly connected to the analog input.</td>
</tr>
<tr>
<td><strong>ComInvalid</strong></td>
<td>The mode <code>WCtlCom</code> has been selected and there is invalid content in the power setpoint information.</td>
</tr>
<tr>
<td></td>
<td><strong>Corrective measures:</strong></td>
</tr>
<tr>
<td></td>
<td>• Check the power specification settings.</td>
</tr>
</tbody>
</table>

### 5.4.7 Displaying Disturbance Messages for the Reactive Power Setpoint

The instantaneous value `Q-VArModFailStt` displays errors or warnings relating to the reactive power setpoint.

**Procedure:**

1. Log into the user interface (see Section 7.4.1, page 66).
2. Select the instantaneous value `Q-VArModFailStt`.

<table>
<thead>
<tr>
<th>Display</th>
<th>Cause and corrective measure</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Off</strong></td>
<td>No mode for specifying the reactive power setpoint has been selected.</td>
</tr>
<tr>
<td><strong>OK</strong></td>
<td>A mode for specifying the reactive power setpoint has been selected and no error is present.</td>
</tr>
<tr>
<td><strong>ComFail</strong></td>
<td>The mode <code>VArCtlCom</code> or <code>PFCtlCom</code> has been selected and the expected signal with a valid reactive power setpoint has been absent for at least five minutes.</td>
</tr>
<tr>
<td></td>
<td><strong>Corrective measures:</strong></td>
</tr>
<tr>
<td></td>
<td>• Ensure that the communication units can be accessed via the Internet.</td>
</tr>
<tr>
<td></td>
<td>• Ensure that the communication units are connected correctly.</td>
</tr>
<tr>
<td></td>
<td>• Ensure that the cabling between the communication units is ok.</td>
</tr>
<tr>
<td><strong>AnInFail</strong></td>
<td>The mode <code>VArCnstNomAnIn</code> or <code>PFCnstAnIn</code> has been selected and the value measured at the analog input is less than 2 mA.</td>
</tr>
<tr>
<td></td>
<td><strong>Corrective measures:</strong></td>
</tr>
<tr>
<td></td>
<td>• Make sure the cable is correctly connected to the analog input.</td>
</tr>
<tr>
<td><strong>ComInvalid</strong></td>
<td>The mode <code>VArCtlCom</code> or <code>PFCtlCom</code> has been selected and there is invalid content in the power setpoint information.</td>
</tr>
<tr>
<td></td>
<td><strong>Corrective measures:</strong></td>
</tr>
<tr>
<td></td>
<td>• Check the power specification settings.</td>
</tr>
</tbody>
</table>
6 Maintenance

6.1 Safety during Maintenance

DANGER

Danger to life from electric shock due to live voltage
High voltages are present in the live components of the product. Touching live components results in death or serious injury due to electric shock.

- Wear suitable personal protective equipment for all work on the product.
- Do not touch any live components.
- Observe all warning messages on the product and in the documentation.
- Observe all safety information of the module manufacturer.
- After switching off the inverter, wait at least 15 minutes before opening it to allow the capacitors to discharge completely (see Section 4.2, page 26).

NOTICE

Property damage due to dust intrusion and moisture penetration
Dust or moisture intrusion can damage the product and impair its functionality.

- Do not open the enclosure during rainfall or when humidity exceeds the specified thresholds. The humidity thresholds are: 15% to 95%.
- Only perform maintenance work when the environment is dry and free of dust.
- Operation of the product is only permitted when it is closed.
- Connect the external supply voltage after mounting and installing the product.
- If the installation or commissioning process is interrupted, mount all panels.
- Close and lock the enclosure.
- The product must always be closed for storage.
- Store the product in a dry and covered location.
- The temperature at the storage location must be in the specified range. The temperature range is: **−25°C to +70°C**.

NOTICE

Damage to electronic components due to electrostatic discharge
Electrostatic discharge can damage or destroy electronic components.

- Observe the ESD safety regulations when working on the product.
- Wear suitable personal protective equipment for all work on the product.
- Discharge electrostatic charge by touching grounded enclosure parts or other grounded elements. Only then is it safe to touch electronic components.
6.2 Maintenance Schedule and Consumables

6.2.1 Notes on Maintenance Work

Adverse ambient conditions reduce maintenance intervals

Location and ambient conditions influence the maintenance intervals. Note that cleaning and corrosion protection may be required more frequently depending on the conditions at the installation site.

- If the DC subdistribution is subject to adverse ambient conditions, it is recommended to shorten the maintenance intervals.
- SMA recommends an optical inspection every six months to determine the maintenance requirements.

Maintenance report for maintenance

All maintenance work must be documented in a maintenance report. The maintenance report can be found in the download area at www.SMA-Solar.com.

Consumables and maintenance materials

Only those consumables and maintenance materials not normally included in the standard equipment of an electrically qualified person are listed. It is taken for granted that standard tools and materials such as torque wrenches, one-contact voltage testers and wrenches will be available for all maintenance operations.

Spare parts

Only original parts or parts recommended by SMA Solar Technology AG are to be used as spare parts when replacing components.

Spare parts can be identified via the reference designation and the circuit diagram. The spare-parts list includes the article numbers of each spare part. For information on a specific article number, contact us (see Section 9 "Contact", page 68).

6.2.2 Maintenance Work Every 24 Months

Required maintenance materials and tools:

- A suitable water-free, heat-resistant lubricant
- A testing device approved by the manufacturer of the AC disconnection unit, e.g. TT1 by ABB
- Talcum, petroleum jelly or wax for maintaining the seals
- Use touch-up sticks, paint brushes, cans of spray paint or 2K-PUR acrylic paint in the appropriate RAL color to repair small-area surface damage.
- Use touch-up paint or 2K-PUR acrylic paint in the appropriate RAL color to repair large-area surface damage.
- Use zinc plating with thick-layer passivation to repair damage on the zinc-plated steel frame in the base area, e.g. LZ-09. Observe the relevant instructions of the manufacturer.
- Abrasive cloth
- Degreaser
- A surge arrester testing device approved by the surge arrester manufacturer

Maintenance work depending on the condition of the inverter

Maintenance with DC voltage present

<table>
<thead>
<tr>
<th>Task</th>
<th>See</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading off error messages and warnings</td>
<td>Section 5.2, page 30</td>
</tr>
<tr>
<td>Checking the DC switchgear</td>
<td>Manufacturer documentation (see Section 1.7, page 7)*</td>
</tr>
</tbody>
</table>
### Task

| Checking the AC disconnection unit | Manufacturer documentation (see Section 1.7, page 7)* |

* In deviation to the maintenance interval specified by ABB, the maintenance interval of 24 months stated in this documentation applies.

### Maintenance under voltage-free conditions

<table>
<thead>
<tr>
<th>Task</th>
<th>See</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform the visual inspection</td>
<td>Section 6.4.2.1, page 51</td>
</tr>
<tr>
<td>Analyzing the temperature indicators</td>
<td>Section 6.4.2.2, page 51</td>
</tr>
<tr>
<td>Cleaning the ventilation plate</td>
<td>Section 6.4.2.3, page 53</td>
</tr>
<tr>
<td>Clean the air duct, ventilation grids and air intake.</td>
<td>Section 6.4.2.4, page 53</td>
</tr>
<tr>
<td>Checking the interior</td>
<td>Section 6.4.2.5, page 55</td>
</tr>
<tr>
<td>Checking the fuses/disconnection blades</td>
<td>Section 6.4.2.9, page 58</td>
</tr>
<tr>
<td>Checking the bolted connections</td>
<td>Section 6.4.2.10, page 58</td>
</tr>
<tr>
<td>Cleaning the heating elements of the low-temperature range option</td>
<td>Section 6.4.1.3, page 47</td>
</tr>
<tr>
<td>Check the labels</td>
<td>Section 6.4.2.11, page 59</td>
</tr>
<tr>
<td>Checking the inverter surface</td>
<td>Section 6.4.2.8, page 57</td>
</tr>
</tbody>
</table>

### Maintenance work with supply voltage present

<table>
<thead>
<tr>
<th>Task</th>
<th>See</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checking the DC switchgear</td>
<td>Manufacturer documentation (see Section 1.7, page 7)*</td>
</tr>
<tr>
<td>Check the fans</td>
<td>Section 6.4.1.1, page 45</td>
</tr>
<tr>
<td>Checking the heating element and the hygrostat</td>
<td>Section 6.4.1.2, page 46</td>
</tr>
<tr>
<td>Checking the heating element for low-temperature option</td>
<td>Section 6.4.1.4, page 48</td>
</tr>
<tr>
<td>Checking the function of the UPS</td>
<td>Section 6.4.1.5, page 50</td>
</tr>
</tbody>
</table>

* In deviation to the maintenance interval specified by ABB, the maintenance interval of 24 months stated in this documentation applies.

### 6.3 Repair Schedule and Spare Parts

#### 6.3.1 Information on Repair Work

**Spare parts**

Only original parts or parts recommended by SMA Solar Technology AG are to be used as spare parts when replacing components.

Spare parts can be identified via the reference designation and the circuit diagram. The spare-parts list includes the article numbers of each spare part. For information on a specific article number, contact us (see Section 9 "Contact", page 68).
### 6.3.2 Demand-Based Annual Repairs

<table>
<thead>
<tr>
<th>Task</th>
<th>Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace key switch</td>
<td>In case of severe signs of wear</td>
</tr>
<tr>
<td>Replace surge arrester</td>
<td>If tripped</td>
</tr>
<tr>
<td>Replace labels on the enclosure</td>
<td>If illegible, defective or missing</td>
</tr>
<tr>
<td>Replace GFDI / ABB circuit breaker</td>
<td>After 100 trippings due to short circuit or</td>
</tr>
<tr>
<td></td>
<td>after number of switching cycles: 7000</td>
</tr>
<tr>
<td></td>
<td>• Contact Service.</td>
</tr>
<tr>
<td>Replace Remote Switch Unit of the GFDI</td>
<td>Number of switching cycles: 7000</td>
</tr>
<tr>
<td></td>
<td>• Contact Service.</td>
</tr>
</tbody>
</table>

### 6.3.3 Repairs every 10 Years

<table>
<thead>
<tr>
<th>Task</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace 24 V power supply units</td>
<td>• Contact the Service [see Section 9, page 68].</td>
</tr>
<tr>
<td>Replace 24 V buffer modules</td>
<td>• Contact the Service [see Section 9, page 68].</td>
</tr>
<tr>
<td>Replace the fans of the AC disconnection unit</td>
<td>• Contact the Service [see Section 9, page 68].</td>
</tr>
<tr>
<td>Replace exterior key switch, front element and label</td>
<td>• Contact the Service [see Section 9, page 68].</td>
</tr>
</tbody>
</table>

### 6.3.4 Repairs every 12 Years

Replacement intervals for order option "Q at Night"

The replacement intervals are halved for order option "Q at Night".

<table>
<thead>
<tr>
<th>Task</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace interior fan in the inverter cabinet</td>
<td>• Contact Service.</td>
</tr>
<tr>
<td>Replace the inverter bridge fan</td>
<td>• Contact Service.</td>
</tr>
</tbody>
</table>

### 6.4 Maintenance Work

#### 6.4.1 Maintenance work with supply voltage present

#### 6.4.1.1 Checking the Fans

⚠️ **DANGER**

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).
Procedure:
1. Switch the inverter to \textit{Stop}.
2. Connect the supply voltage (see Section 4.3.1, page 28).

\checkmark The fans start to run for a few moments.

\xmark The fans do not start up?
- Please contact (see Section 9, page 68).

6.4.1.2 Checking the Heating Elements and Hygrostat

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure11}
\caption{Position of the heating element and the hygrostat}
\end{figure}

\begin{table}[h]
\centering
\begin{tabular}{|c|c|}
\hline
Position & Designation \\
\hline
A & Hygrostat \\
\hline
B & Heating element \\
\hline
\end{tabular}
\end{table}

\begin{tabular}{|p{\textwidth}|}
\hline
\textbf{\textcolor{red}{DANGER}} \\
\hline
\textbf{Danger to life due to electric shock or electric arc if live components are touched} \\
- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely. \\
- Disconnect the inverter (see Section 4, page 26). \\
\hline
\end{tabular}

\begin{tabular}{|p{\textwidth}|}
\hline
\textbf{\textcolor{red}{CAUTION}} \\
\hline
\textbf{Risk of burns due to hot components} \\
Some components of the product can get very hot during operation. Touching these components can cause burns. \\
- Observe the warnings on all components. \\
- During operation, do not touch any components marked with such warnings. \\
- After switching off the product, wait until any hot components have cooled down sufficiently. \\
- Wear suitable personal protective equipment for all work on the product. \\
\hline
\end{tabular}

Procedure:
1. Switch the inverter to \textit{Stop}.
2. Connect the supply voltage (see Section 4.3.1, page 28).
3. Set the hygrostat to the minimum value. To do this, pull the selector switch out slightly. 
   Tip: the hygrostat is adjusted correctly if the relay of the hygrostat emits an audible click.
4. Check whether the heating elements are radiating heat after a delay time of five minutes. If the heating elements are not radiating heat, contact us (see Section 9 "Contact", page 68).

5. Reset the hygrostat to the initial value. To do this, press the selector switch back towards the hygrostat. The initial value of the hygrostat is indicated on the hygrostat.

6.4.1.3 Inverter with Low-Temperature Option: Cleaning the Heating Elements

Figure 12: Position of the heating elements and the temperature control

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Heating element with low-temperature range option</td>
</tr>
<tr>
<td>B</td>
<td>Connection plug of the temperature control</td>
</tr>
</tbody>
</table>

⚠️ DANGER

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

Procedure:

1. Disassemble the protective covers (see Section 7.1.2, page 63).
2. Remove dirt and dust from the heating elements.
3. Remove moisture.
4. Mount the protective covers (see Section 7.1.2, page 63).
6.4.1.4 Inverter with Low-Temperature Option: Checking the Heating Elements

![Diagram of heating elements and temperature control]

Table: Position Designation

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Heating element with low-temperature range option</td>
</tr>
<tr>
<td>B</td>
<td>Connection plug of the temperature control</td>
</tr>
</tbody>
</table>

**DANGER**

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

**CAUTION**

Risk of burns due to hot components

Some components of the product can get very hot during operation. Touching these components can cause burns.

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

Procedure:

1. Switch the inverter to **Stop**.
2. Disassemble the protective covers (see Section 7.1.2, page 63).
3. Connect the supply voltage (see Section 4.3.1, page 28).
4. Remove the connection plug of the temperature control.

☑ The inverter switches off with an audible click. After approximately 2 minutes, the inverter audibly switches the supply voltage off.

✖ There is no audible switching sound?
  • Contact SMA Solar Technology AG.

5. Check whether the heating elements are radiating heat after a delay time of 5 minutes.
   If the heating elements are not radiating heat, contact us (see Section 9 "Contact", page 68).

6. Insert the connection plug of the temperature control.

☑ The inverter switches the supply voltage on with an audible click. After approximately 2 minutes, the inverter again emits an audible switching sound.

✖ There is no audible switching sound?
  • Contact SMA Solar Technology AG.

7. Mount the protective covers (see Section 7.1.2, page 63).
6.4.1.5 Checking the Function of the UPS

![Diagram showing UPS position]

Figure 14: Position of the UPS

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Uninterruptible power supply (UPS)</td>
</tr>
</tbody>
</table>

**Danger**

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

Procedure:

1. Switch the inverter to **Stop**.
2. Connect the supply voltage (see Section 4.3.1, page 28).
3. Measure the voltage at the supply voltage output between L1 and N.
   - ✔ The voltage is approximately 230 V.
   - ✗ Voltage deviates significantly?
     - Contact Service.
4. Measure the voltage at the supply voltage output of the UPS at -X400 terminal 5 and -X402 terminal 5.
   - ✔ The voltage is approximately 24 V.
   - ✗ Voltage deviates significantly?
     - Contact Service.
5. Disconnect the supply voltage (see Section 4.2.4, page 27).
6. Measure the time until the communication unit switches off.
   ☑ The communication unit switches off after 15 seconds at the earliest.
   ✗ The communication unit switches off earlier?
   • Contact SMA Solar Technology AG.

6.4.2 Maintenance Work in Disconnected State

6.4.2.1 Performing the Visual Inspection

⚠️ DANGER

Danger to life due to electric shock or electric arc if live components are touched

• Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.

• Disconnect the inverter (see Section 4, page 26).

Procedure:

1. Check the inverter for visual defects such as discoloration, dirt, damage and scratches on the enclosure. If visual defects are present, repair these immediately.

2. Ensure that there are no objects on or around the inverter that are flammable or that could otherwise endanger operational safety.

6.4.2.2 Analyzing the Temperature Indicators

Depending on the type of inverter bridge, the inverter cabinet contains 8 or 17 temperature indicators which monitor the temperature of the inverter bridges.

Figure 15: Position of the temperature indicators (example: inverter bridges with connection terminals at the upper end)

<table>
<thead>
<tr>
<th>Position of the indicators</th>
<th>Type of inverter bridges</th>
<th>Number of indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 17</td>
<td>with connection terminals at the upper end</td>
<td>17</td>
</tr>
<tr>
<td>10 to 17</td>
<td>without connection terminals at the upper end</td>
<td>8</td>
</tr>
</tbody>
</table>
If the temperature exceeds a value indicated on one of the indicator fields, that field will turn black.

![Image of temperature indicators with black fields](image)

**Figure 16: Values on an indicator (example)**

<table>
<thead>
<tr>
<th>Position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>The indicator field for 88°C has turned black. The temperature has reached 88°C.</td>
</tr>
<tr>
<td>B</td>
<td>The indicator field for 93°C has turned black. The temperature has reached 93°C. The value 93 must be entered in the protocol.</td>
</tr>
<tr>
<td>C</td>
<td>The indicator field for 99°C is white. The temperature has not exceeded 99°C.</td>
</tr>
</tbody>
</table>

Each time maintenance work is performed, the values of the temperature indicators must be read off and logged. The highest value of the indicators that turned black must be entered in the maintenance report. The interactive protocol "Temperature Indicators Analysis Protocol" can be downloaded at [www.SMA-Solar.com](http://www.SMA-Solar.com).

**Danger**

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

**Caution**

Risk of burns due to hot components

Some components of the product can get very hot during operation. Touching these components can cause burns.

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

**Requirement:**

☐ The inverter must have been operated under full load for at least six hours before analyzing the values.

**Procedure:**

1. Ensure that the inverter is disconnected from all voltage sources.
2. Open the inverter cabinet.
3. Read off and log the values of each temperature indicator.

4. Analyze the results and take action if necessary:

<table>
<thead>
<tr>
<th>Number of the indicator</th>
<th>Value of the indicator</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 9</td>
<td>88</td>
<td>There is no need for action.</td>
</tr>
<tr>
<td></td>
<td>93 or higher</td>
<td>Contact the Service (see Section “Contact”, page 68).</td>
</tr>
<tr>
<td>10 to 17</td>
<td>88 to 99</td>
<td>There is no need for action.</td>
</tr>
<tr>
<td></td>
<td>104 or higher</td>
<td>Contact the Service (see Section “Contact”, page 68).</td>
</tr>
</tbody>
</table>

6.4.2.3 Cleaning the Ventilation Plate

DANGER

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

Procedure:

1. Disassemble the panels (see Section 7.1.1, page 62).
2. Pull the ventilation plate out of the inverter cabinet. Grip underneath the ventilation plate and press the middle part up while pulling it out.
3. Clean the ventilation plate with a brush or vacuum.
4. Slide the ventilation plate into the inverter cabinet. The ventilation grid in the ventilation plate must face the rear panel.

☑ The ventilation grid ends up flush with the inverter.
✖ The ventilation plate will not go all the way in?
   - Grip the ventilation plate from underneath and press the middle part upwards while sliding it in.
5. Mount the panels (see Section 7.1.1, page 62).

6.4.2.4 Cleaning the Air Duct, Ventilation Grids and Air Intake

DANGER

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).
CAUTION

Danger of crushing due to heavy, unwieldy roof
The inverter roof is heavy and bulky. If you try to move the roof on your own, you run a risk of having limbs crushed. Weight of the roof: 30 kg.
- Wear suitable personal protective equipment for all work on the product.
- Always have two persons disassemble and mount the roof.

NOTICE

Property damage due to rupture of grounding conductors
The components are connected to the inverter via the grounding conductor. If the roof is not disassembled correctly, the grounding conductors may be pulled out.
- Take care not to damage the grounding conductors during disassembly.

Procedure:
1. Disassemble the ventilation grids (see Section 7.1.3, page 64).
2. Vacuum the air duct from the outside or clean it with a brush.
3. Vacuum the ventilation grids or clean them with a brush.
4. Check the ventilation grids for visible damage. Replace the ventilation grids, if required.
5. Pull the front edge of the roof forward and push upward.
6. Gently push the roof to the rear. In doing so, you push the roof out of the guide rails.
7. Check whether the air intake is soiled.
8. Clean air intake if soiled:
• Remove the grounding conductor from the inverter.

• Remove the roof and set it down on a suitable surface.
• Clean air intake with a vacuum cleaner
• Place the roof on the inverter.
• Screw the grounding conductor to the inverter (torque: 14.2 Nm).

9. Slide the roof into the guide rails on the inverter and pull forward.

10. Press the roof down.

11. Mount the ventilation grids (see Section 7.1.3, page 64).

### 6.4.2.5 Cleaning the Interior

**DANGER**

_Danger to life due to electric shock or electric arc if live components are touched_

• Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.

• Disconnect the inverter (see Section 4, page 26).

**Procedure:**

1. Remove dirt and dust from the inverter interior and from all devices.
2. Check the inverter for leaks.
   - If leaks are present, fix them.
3. Remove moisture.
### 6.4.2.6 Checking the Seals

![Section drawing with top view of a door seal (example)](image)

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Seal</td>
</tr>
<tr>
<td>B</td>
<td>Side panel</td>
</tr>
<tr>
<td>C</td>
<td>Sealing area</td>
</tr>
<tr>
<td>D</td>
<td>Hinge</td>
</tr>
<tr>
<td>E</td>
<td>Door</td>
</tr>
<tr>
<td>F</td>
<td>Frame construction</td>
</tr>
</tbody>
</table>

#### Required maintenance material (not included in the scope of delivery):
- ☐ A suitable water-free, heat-resistant lubricant
- ☐ Talcum, petroleum jelly or wax for maintaining the seals

![danger]

**Danger to life due to electric shock or electric arc if live components are touched**

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

#### Procedure:

1. Check whether the seals in the sealing area show any damage. If seals are damaged, contact us (see Section 9 “Contact”, page 68).
2. Apply talcum, petroleum jelly or wax to seals. This will prevent frost damage.
3. After removing the side panels: check whether the side panel seals display any damage in the sealing area. If seals are damaged, contact us (see Section 9 “Contact”, page 68).

### 6.4.2.7 Checking the Latches, Door Stops and Hinges

#### Required maintenance material (not included in the scope of delivery):
- ☐ A suitable, water-free and heat-resistant lubricant, e.g. WD40
- ☐ Non-greasing antifreeze agent, e.g. PS88
6 Maintenance

SMA Solar Technology AG

Maintenance Manual 57SCCPXT-E7-WA-en-37

DANGER

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

Procedure:

1. Check whether the doors latch easily. Open and close the doors several times.
   If the doors do not latch easily, lubricate all moving parts of the latch.
2. Check whether the stops hold the doors in place.
   If the doors cannot be arrested, lubricate the door stops.
3. Check whether the door hinges move easily.
   If the door hinges do not move easily, apply lubricant.
4. Lubricate all moving parts and movement points.
5. Tighten any loose screws with the appropriate torque.
6. If the inverter is installed in regions where below-freezing temperatures occur, apply the non-greasing antifreeze to the profile cylinder of the door lock and the key switch in order to protect them from icing up.

6.4.2.8 Checking the Inverter Surface

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

☐ Abrasive cloth
☐ Degreaser
☐ Use touch-up sticks, paint brushes, cans of spray paint or, alternatively, 2K-PUR acrylic paint in the appropriate RAL color to repair small-area surface damage. Observe the relevant instructions of the paint manufacturer.
☐ Use touch-up paint or alternatively 2K-PUR acrylic paint in the appropriate RAL color to repair large-area surface damage. Observe the relevant instructions of the paint manufacturer.
☐ Use zinc plating with thick-layer passivation to repair the damage on the zinc-plated steel frame in the base area, e.g. LZ.09. Observe the relevant instructions of the manufacturer.

<table>
<thead>
<tr>
<th>Position</th>
<th>RAL color</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof</td>
<td>RAL 7004</td>
<td>Signal gray</td>
</tr>
<tr>
<td>Base</td>
<td>RAL 7004</td>
<td>Signal gray</td>
</tr>
<tr>
<td>Enclosure</td>
<td>RAL 9016</td>
<td>Traffic white</td>
</tr>
</tbody>
</table>

DANGER

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

Procedure:

1. Remove dirt.
2. Check surfaces for damage or corrosion.
   If the surfaces are damaged or corroded, repair them without delay or within three weeks at the latest.

3. To remove small-area surface damage:
   - Sand the surface.
   - Clean the surface with degreaser.
   - Paint the surface.

4. To remove large-area surface damage:
   - Sand the surface.
   - Clean the surface with degreaser.
   - Paint the entire surface.

6.4.2.9 Checking the Fuses/Disconnection Blades

Required maintenance material (not included in the scope of delivery):
☐ A high-temperature resistant, chemically inert special grease

⚠️ DANGER

Danger to life due to electric shock or electric arc if live components are touched
- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

Procedure:

1. Check the fuses/disconnection blades and tension springs for any discoloration or change in appearance.
   If they are discolored or changed in any way, replace them.

2. Check insulation and terminals for any discoloration or change in appearance.
   If insulation and terminals are discolored or changed, contact us (see Section 9 "Contact", page 68).

3. Remove fuses / disconnection blades one by one from the fuse holders. For this, use fuse extractor. It must be possible to remove the fuse without effort.

4. Check whether the contact surfaces of the fuses / disconnection blades are free from hardened grease. Clean contact surfaces if they are covered with hardened grease. Then apply new grease to the surfaces.

5. Insert all fuses and disconnection blades into the fuse holders. For this, use fuse extractor.

6.4.2.10 Checking the Bolted Connections of the Power Cabling

⚠️ DANGER

Danger to life due to electric shock or electric arc if live components are touched
- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).
NOTICE

**Damage to bolted connections through overtightening**
If the permitted torques are exceeded, bolted connections can be damaged. In this case, fault-free operation of the inverter is no longer ensured.

- Only tighten loose bolted connections to the prescribed torque. Torque specifications are indicated in the circuit diagram of the inverter. If there is any information missing, contact (see Section 9 "Contact", page 68).

Procedure:

1. Check that the bolted connections of all assemblies are securely in place.
   
   If bolted connections are loose, tighten them using a torque wrench.

2. Check whether all bolted connections of the power cabling are securely in place.
   
   If bolted connections are loose, tighten them using a torque wrench.

3. Check the insulation and connections for any discoloration or change in appearance.
   
   If insulation and connections are discolored or changed, contact us (see Section 9 "Contact", page 68).

4. Check the bolted connections for damage and contact elements for corrosion.
   
   If bolted connections are damaged or contact elements corroded, replace them.

**6.4.2.11 Checking the Labels**

Inverter labels can be ordered from us as a complete set.

<table>
<thead>
<tr>
<th>SMA order number</th>
<th>Languages included</th>
</tr>
</thead>
<tbody>
<tr>
<td>3F1-050-001-001</td>
<td>en, de, es, fr</td>
</tr>
<tr>
<td>3F1-050-002-001</td>
<td>en, el, it</td>
</tr>
<tr>
<td>3F1-050-003-001</td>
<td>en, ja, ko, zh</td>
</tr>
<tr>
<td>3F1-050-004-001</td>
<td>en, ro, tr</td>
</tr>
</tbody>
</table>
Figure 18: Position of the labels

<table>
<thead>
<tr>
<th>Position</th>
<th>Material number</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>86-029687</td>
<td>Use hearing protection</td>
</tr>
<tr>
<td>B</td>
<td>86-05200</td>
<td>Beware of dangerous voltage</td>
</tr>
<tr>
<td>C</td>
<td>86-79615</td>
<td>Beware of a danger zone</td>
</tr>
<tr>
<td>D</td>
<td>86-10867153</td>
<td>Risk of electrical shock even when the device is disconnected.</td>
</tr>
<tr>
<td></td>
<td>86-003307</td>
<td>5 Safety rules</td>
</tr>
<tr>
<td></td>
<td>86-003314</td>
<td>Risk of lethal electric shock due to active power source</td>
</tr>
<tr>
<td>E</td>
<td>86-003303</td>
<td>Risk of lethal electric shock due to active power source</td>
</tr>
<tr>
<td>F</td>
<td>86-1086701025</td>
<td>Danger of burn injury due to hot fuses below the cover.</td>
</tr>
</tbody>
</table>
### Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

### Procedure:

- Check whether any warning message or label is damaged or missing.
  Replace any warning messages and labels which are missing or illegible. If necessary, you can order labels as a complete set. Contact us (see Section 9, page 68).

### 6.5 Repair Work

#### 6.5.1 Reading off the Replacement Interval Meter

1. Log into the user interface as an installer (see Section 7.4.1, page 66).
2. Select **Data > Devices**.
3. Select the desired device from the list.
4. Select the tab **Instantaneous values**.
5. If the instantaneous value \texttt{CntGfdiSw} exceeds 7000, replace the Remote GFDI (see Section 9 "Contact", page 68).
6. If the error message \texttt{7714} appears on the touch display, replace the GFDI (see Section 9 "Contact", page 68).
7 Periodic Actions

7.1 Mounting and Disassembly Work

7.1.1 Disassembling and Mounting the Panels

⚠️ DANGER

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

NOTICE

Property damage due to rupture of grounding conductors

The components are connected to the inverter via the grounding conductor. If the roof is not disassembled correctly, the grounding conductors may be pulled out.

- Take care not to damage the grounding conductors during disassembly.

Disassembling the panels

1. Remove the screws of the front panels using a Torx screwdriver (head size T30).
2. Detach the grounding straps from the panels.
3. Remove the panels.

Mounting the panels

Requirement:

☐ The protective covers in the connection area must be mounted (see Section 7.1.2, page 63).

Procedure:

1. Attach the grounding straps to the panels of the interface cabinet (torque: 8 Nm to 10 Nm).
2. Ensure that the grounding straps are firmly in place.
3. Attach the panels using a Torx screwdriver (torque: 2 Nm to 3 Nm, head size T30).
7.1.2 Disassembling and Mounting the Protective Covers

Figure 19: Position of the protective covers

<table>
<thead>
<tr>
<th>Position</th>
<th>Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Protective cover</td>
</tr>
</tbody>
</table>

**DANGER**

Danger to life due to electric shock or electric arc if live components are touched

- Switch off the inverter and wait at least 15 minutes before opening it to allow the capacitors to discharge completely.
- Disconnect the inverter (see Section 4, page 26).

Disassembling the protective covers

Requirements:

☐ The panels must be disassembled (see Section 7.1.1, page 62).

Procedure:

- Disassemble the protective covers.

Mounting the protective covers

1. Tighten all protective covers (torque: 5 Nm).
2. Ensure that the protective covers are firmly in place.
7.1.3 Disassembling and Mounting the Ventilation Grids

Disassembling the ventilation grids
1. Release the screws of the right-hand ventilation grid. (head size: T40).
2. Pull the lower side of the right-hand ventilation grid forwards to remove it.
4. Pull the lower side of the left-hand ventilation grid forwards to remove it.

Mounting the ventilation grids
1. Insert the left-hand ventilation grid.
2. Screw the left-hand ventilation grid on (torque: 20 Nm, head size T40).

3. Insert the right-hand ventilation grid.

4. Screw the right-hand ventilation grid on (torque: 20 Nm, head size T40).

7.2 Entering the Password via the Touch Display

**Installer access**

The "Installer" access level is activated by entering the installer password. The access level is reset after 15 minutes.

**Procedure:**

1. Select 🔖.
2. Select 🔍.
3. Confirm your entry by selecting ✅.

☑️ The 🔍 symbol appears in the status info line.

7.3 Parameter Overview

7.3.1 Accessing the Parameter Overview

1. Log into the user interface as an installer.
2. Select **Data > Devices**.
3. Select the desired device from the list.
4. Select the tab **Parameters**.
7.3.2   Saving Parameter Changes

**Requirement:**
☐ You must be logged in on the user interface.

**Procedure:**
1. Change the respective parameter via the field **Value**.
2. To adopt this value for all devices of the same type and with the same firmware version, activate the box **Save for all devices of this device type**.
3. Select the button [Save].
   ☑ The communication unit adjusts the required value on the device(s).
4. Select the button [OK].

7.4   User Interface

7.4.1   Logging Into the User Interface

**Default Network Settings for the Service Interface**

IP address:   192.168.100.2
Subnet mask:  255.255.255.0

Password for the user groups "installer" and "user": sma

ℹ️ **Identical passwords for the user groups**

If your "user" password is the same as your "installer" password, you will automatically be logged in as an installer.

**Requirement:**
☐ JavaScript must be enabled in your web browser (e.g. Internet Explorer).

**Procedure:**
1. Connect the laptop to the service interface of the inverter.
2. Start your web browser.
3. Enter the IP address of the communication unit in the address bar and press the enter key.
   ☑ The user interface opens.
4. To change the language, select the desired language in the field **Language**.
5. For registration select the user level in the field **User**.
6. Enter the password in the field **Password**.
7. Select the button [Login].

7.4.2   Logging Out of the User Interface

Always log out from the user interface when you have finished your work. If you only close the web browser, you will not be logged out. If the user interface is left idle for 15 minutes, you will be logged out automatically.

**Procedure:**
• Select the button [Logout].
8 Appendix

8.1 Installation Information

8.1.1 Torques

Torques of the power connections:

<table>
<thead>
<tr>
<th>Type of terminal lug</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tin-plated aluminum terminal lug on copper bar</td>
<td>37 Nm</td>
</tr>
<tr>
<td>Tin-plated copper terminal lug on copper bar</td>
<td>60 Nm</td>
</tr>
<tr>
<td>Tin-plated aluminum or copper terminal lug on aluminum bar</td>
<td>37 Nm</td>
</tr>
</tbody>
</table>

Torques at panels, covers and grounding conductor:

<table>
<thead>
<tr>
<th>Position</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grounding conductors on the kick plates</td>
<td>8 Nm to 10 Nm</td>
</tr>
<tr>
<td>Mounting the kick plates</td>
<td>2 Nm to 3 Nm</td>
</tr>
<tr>
<td>Grounding conductor on the roof</td>
<td>14.2 Nm</td>
</tr>
<tr>
<td>Mounting the ventilation grids on the roof</td>
<td>20 Nm</td>
</tr>
<tr>
<td>Protective covers</td>
<td>5 Nm</td>
</tr>
</tbody>
</table>

8.2 Type Label

The type label clearly identifies the product. One type label is present in the inverter. The type label is located in the right-hand top corner inside the interface cabinet. You will require the information on the type label to use the product safely and when seeking customer support. The type labels must be permanently attached to the product.

Reading off the serial number

You can identify the serial number without opening the inverter. The serial number can be found on the roof of the inverter at the top left. You can also read off the serial number from the touch display.

Reading Off the Firmware Version

You can read off the version number of the inverter and touch display firmware via the user interface. You can also read off the version number of the touch display firmware on the touch display.
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
- Firmware version
- Event message
- Type of communication
- Type and size of additional energy sources
- Optional equipment, e.g. communication products
- Detailed description of the problem

<table>
<thead>
<tr>
<th></th>
<th>Country</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deutschland</td>
<td>SMA Solar Technology AG Niestetal</td>
</tr>
<tr>
<td></td>
<td>Schweiz</td>
<td>SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Belgien</td>
<td>SMA Benelux BVBA/SPRL Mechelen</td>
</tr>
<tr>
<td></td>
<td>Belgique</td>
<td>Sunny Boy, Sunny Mini Central, Sunny Tripower, Sunny Highpower: +49 561 9522-1499 Monitoring Systems, SMA EV Charger: +49 561 9522-2499 Hybrid Controller: +49 561 9522-3199 Sunny Island, Sunny Boy Storage, Sunny Backup: +49 561 9522-399 Sunny Central, Sunny Central Storage: +49 561 9522-299 SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>België</td>
<td>SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Luxemburg</td>
<td>Sunny Boy, Sunny Mini Central, Sunny Tripower, Sunny Highpower: +49 561 9522-1499 Monitoring Systems, SMA EV Charger: +49 561 9522-2499 Hybrid Controller: +49 561 9522-3199 Sunny Island, Sunny Boy Storage, Sunny Backup: +49 561 9522-399 Sunny Central, Sunny Central Storage: +49 561 9522-299 SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Luxembourg</td>
<td>SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Nederland</td>
<td>Sunny Boy, Sunny Mini Central, Sunny Tripower, Sunny Highpower: +49 561 9522-1499 Monitoring Systems, SMA EV Charger: +49 561 9522-2499 Hybrid Controller: +49 561 9522-3199 Sunny Island, Sunny Boy Storage, Sunny Backup: +49 561 9522-399 Sunny Central, Sunny Central Storage: +49 561 9522-299 SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Česko</td>
<td>SMA Service Partner TERMS a.s</td>
</tr>
<tr>
<td></td>
<td>Magyarország</td>
<td>SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Slowensko</td>
<td>SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Türkiye</td>
<td>SMA Service Partner DEKOM Telekomünikasyon A. Ş</td>
</tr>
<tr>
<td></td>
<td></td>
<td>for Netherlands: +31 30 2492 000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>France</td>
<td>SMA France S.A.S. Lyon +33 472 22 97 00 SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Ελλάδα</td>
<td>SMA Service Partner AKTOR FM. Aθήνα +30 210 8184550 SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Κύπρος</td>
<td>SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>España</td>
<td>SMA Ibérica Tecnología Solar, S.L.U. Barcelona +34 935 63 50 99 SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Portugal</td>
<td>United Kingdom SMA Solar UK Ltd. Milton Keynes +44 1908 304899 SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
<tr>
<td></td>
<td>Australia</td>
<td>SMA Australia Pty Ltd. Sydney Toll free for Australia: 1800 SMA AUS (1800 762 287) International: +61 2 9491 4200 SMA Online Service Center: <a href="http://www.SMA-Service.com">www.SMA-Service.com</a></td>
</tr>
</tbody>
</table>

SMA Solar Technology AG
United Arab Emirates

SMA Middle East LLC
Abu Dhabi
+971 2234 6177
SMA Online Service Center:
www.SMA-Service.com

India

SMA Solar India Pvt. Ltd.
Mumbai
+91 22 61713888

ไทย

Service Partner for String inverter:
Solar Power Engineering Co., Ltd.
333/7,8,9 United Tower Building 4th floor.
Soi Sukhumvit 55 (Thonglor 17), Klongton Nua, Wattana,
10110 Bangkok, Thailand
+66 20598220
smaservice@spe.co.th

Service Partner for Utility:
Tirathai E & S Co., Ltd
516/1 Moo 4, Bangpoo Industrial Estate
Sukhumvit Road, T. Praksa, A. Muang
10280 Samutprakarn, Thailand
+63 1799866
servicepartner.sma@tirathai.co.th

태국

Enerone Technology Co., Ltd
4th Fl, Jungbu Bldg, 329,
Yeongdong-daero, Gangnam-gu,
Seoul, 06188, Korea
+82-2-520-2666

Argentina

SMA South America SPA
Santiago de Chile
+56 2820 2101

Brasil

Chile

Perú

South Africa

SMA Solar Technology South Africa Pty Ltd.
Cape Town
08600SUNNY
(08600 78669)
International: +27 (0)21 826 0699
SMA Online Service Center:
www.SMA-Service.com

Other countries

International SMA Service Line
Niestetal
00800 SMA SERVICE
(00800 762 7378423)
SMA Online Service Center:
www.SMA-Service.com