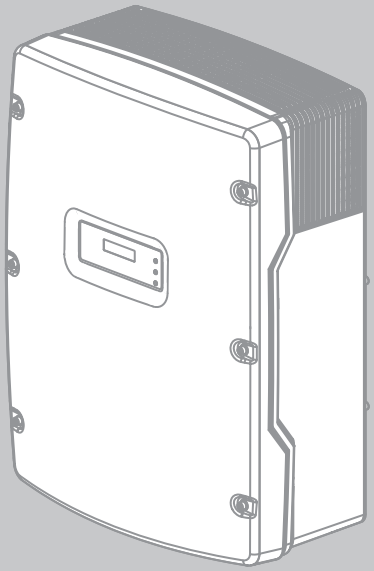
PV Inverter

SUNNY MINI CENTRAL 9000TL / 10000TL / 11000TL with Reactive Power Control

User Manual



SMC9-11TLRP-BA-en-30 | TBEN-SMCTLRP | Version 3.0

EN

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1 Information on this Document

Validity

This document is valid for the following device types:

- SMC 9000TLRP-10
- SMC 10000TLRP-10
- SMC 11000TLRP-10

Target Group

This document is intended for end users.

Additional Information

Links to additional information can be found at www.SMA-Solar.com:

Document title	Document type
Operating parameters	Technical description

Symbols

Symbol	Explanation
⚠ DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury
⚠ WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury
⚠ CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury
NOTICE	Indicates a situation which, if not avoided, could result in property damage
i	Information that is important for a specific topic or goal, but is not safety-relevant
□	Indicates an essential requirement for achieving a specific goal
☑	Desired result
✖	A problem that might occur

Typography

Typography	Usage	Example
bold	• Display messages • Elements of a user interface • Parameters • Connections • Elements to be selected • Elements to be entered	• Select the **Fan test** parameter and set to **1**.

Nomenclature

In this document, the Sunny Mini Central is also referred to as "inverter" or "product".

Abbreviations

Abbreviation	Designation	Explanation
AC	Alternating Current	–
DC	Direct Current	–
EC	European Community	–
LED	Light-Emitting Diode	–
MPP	Maximum Power Point	–
PV	Photovoltaics	–
RP	Reactive Power	–

2 Safety

2.1 Intended Use

The Sunny Mini Central is a transformerless PV inverter, which converts the direct current of the PV array to grid-compliant alternating current and feeds it into the electricity grid.

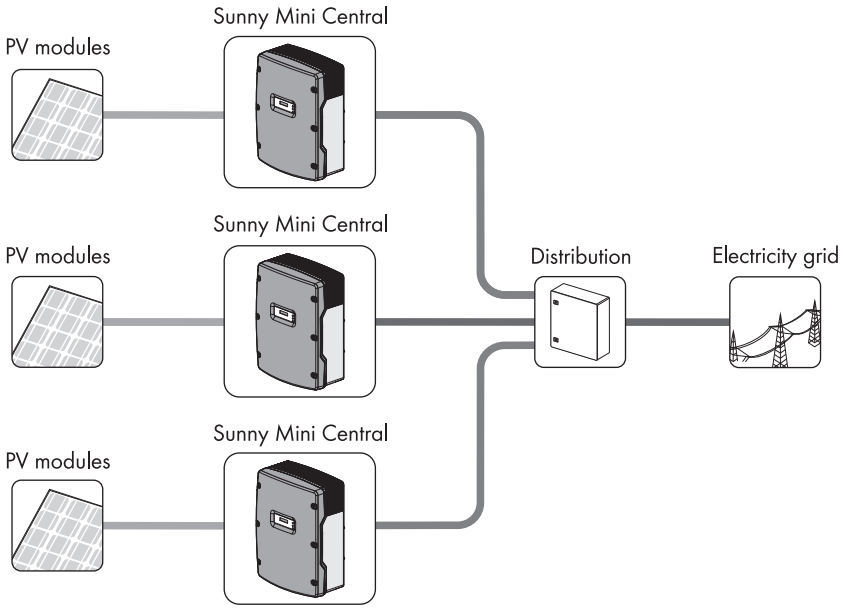


Figure 1: Operating principle of a PV plant with Sunny Mini Central

The Sunny Mini Central is suitable for indoor and outdoor use.

For safety reasons, it is not permitted to modify the product or install components that are not explicitly recommended or distributed by SMA Solar Technology AG.

The Sunny Mini Central may only be used in countries for which it is approved or released by SMA Solar Technology AG and the network operators.

The enclosed documentation is an integral part of this product. Read and follow the documentation to make proper and optimum use of the Sunny Mini Central. Keep the documentation in a convenient place for future reference.

2.2 Safety Precautions

Electric Shock

High voltages that can cause fatal electric shocks are present in the live components of the inverter. The following work must be carried out by an electrically skilled person only:

- Electrical installation
- Repairs
- Modifications

Burn Hazards

Some parts of the enclosure can become hot during operation.

- During operation, touch the inverter on the enclosure lid only.

Inverter Damage

Overvoltage can destroy the inverter.

- If the yellow LED flashes four times and the inverter shows the display message **!PV-Overvoltage! - !DISCONNECT DC!**, inform the installer **IMMEDIATELY**.

3 Product Description

3.1 Sunny Mini Central 9000TL / 10000TL / 11000TL with Reactive Power Control

The Sunny Mini Central is a transformerless PV inverter, which converts the direct current of the PV array to grid-compliant alternating current and feeds it into the electricity grid.

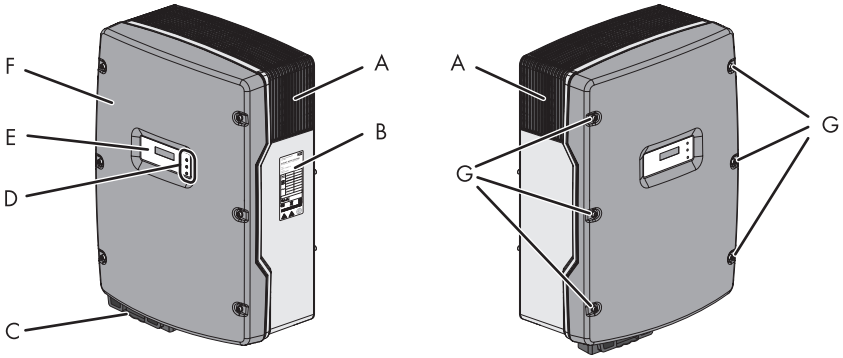


Figure 2: Design of the Sunny Mini Central

Item	Designation
A	Ventilation grid
B	Type label
C	Electronic Solar Switch (ESS)
D	LEDs
E	Display
F	Enclosure lid
G	Enclosure lid screws

Symbols on the Inverter

Symbol	Designation	Explanation
	Tapping	You can operate the display by tapping it: • Tapping once: Switches on display backlight or switches to the next display message. • Tapping twice in quick succession: The inverter shows the display messages from the start-up phase. After two minutes, the backlight switches off automatically.
	Inverter	This symbol defines the function of the green LED. The green LED indicates the operating state of the inverter.
	Earth fault	This symbol defines the function of the red LED. The red LED indicates an earth fault, a defective varistor or a defective string fuse. Inform your installer.
	Observe the documentation.	This symbol defines the function of the yellow LED which indicates a fault or disturbance. Inform your installer.
	QR Code®	The QR Code® refers to the SMA bonus programme (for further information, please see www.SMA-Bonus.com).

3.2 Type Label

The type label uniquely identifies the inverter. The type label is located on the right-hand side of the enclosure.

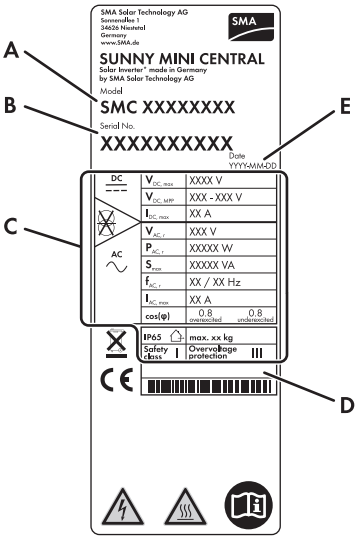


Figure 3: Design of the type label

Item	Designation	Explanation
A	Model	Inverter device type
B	Serial No.	Inverter serial number
C	Device-specific characteristics	-
D	Additional information	Field for additional information, e.g. details of standards
E	Date	Inverter manufacture date (year-month-day)

You will need the information on the type label to ensure safe use of the inverter and when seeking customer support from the SMA Service Line. The type label must be permanently attached to the inverter.

Symbols on the Type Label

Symbol	Designation	Explanation
	Danger to life due to high voltages	The inverter operates at high voltages. All work on the inverter must be carried out by skilled persons only.
	Risk of burns due to hot surfaces	The inverter can get hot during operation. Avoid contact during operation.
	Observe the documentation.	Observe all documentation that is supplied with the inverter.
	Without transformer	The inverter does not have a transformer.
	DC	Direct current
	AC	Alternating current
IP65	Degree of protection	The inverter is protected against dust intrusion and water jets from all angles.
	Outdoor	The inverter is suitable for outdoor installation.
	Proper disposal	Do not dispose of the inverter together with the household waste.
CE	CE marking	The inverter complies with the requirements of the applicable EC directives.
	RAL quality mark for solar products	The inverter complies with the requirements of the German Institute for Quality Assurance and Labelling.
	Australian mark of conformity	The inverter complies with the requirements of the applicable Australian guidelines.

Symbol	Designation	Explanation
	Korean mark of conformity	The inverter complies with the requirements of the applicable Korean guidelines.
	Chinese mark of conformity	The inverter complies with the requirements of the applicable Chinese guidelines.

3.3 Electronic Solar Switch (ESS)

The Electronic Solar Switch is part of the DC disconnection unit of the inverter. The Electronic Solar Switch must be securely plugged in at the bottom of the inverter and may only be removed by an electrically skilled person.

3.4 Display and LEDs

The display and the LEDs of the inverter are located on the enclosure lid and indicate the operating state of the inverter.

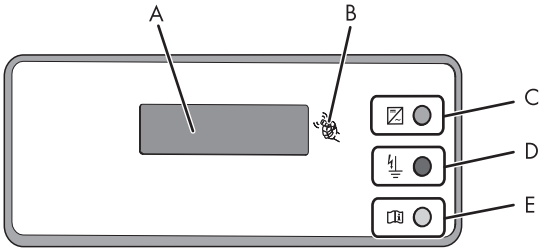


Figure 4: Design of the display

Item	Designation	Explanation
A	Display	Two–line LC text display for displaying operating data
B	Tap symbol	You can operate the display by tapping it (see Section 4.1 "Operating the Display", page 16).
C	Green LED	Indicates the operating state of the inverter.
D	Red LED	Indicates an earth fault, a defective varistor or a defective string fuse
E	Yellow LED	Indicates a fault or disturbance. Read the manual to remedy the fault or disturbance

The display shows the current operating data of the inverter (e.g. status, power, input voltage) and faults or disturbances.

The LEDs indicate the operating state of the inverter, and clarify the messages in the display using different blink codes (see Section 5 "LED Signals", page 18).

3.5 Communication

The inverter is equipped with a slot for connecting an SMA communication interface (e.g., RS485 or *Bluetooth*® Wireless Technology). By means of the communication interface, the inverter can communicate with special SMA communication products (e.g. data logger, software) or other SMA inverters. The inverter parameters can only be set via SMA communication products.

If you have ordered an inverter with a communication interface, it will be delivered with the communication interface built in.

Depending on the type of communication, RS485 or *Bluetooth*, the parameters and messages will be displayed differently in the communication products.

Example: Display of parameter for fan test

- When using RS485 communication: parameter **Fan-Test**
- When using *Bluetooth* communication: parameter **Fan test**

In the inverter display, the parameters and messages are depicted independently of the connected communication interface and may also differ.

4 Display

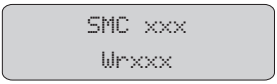
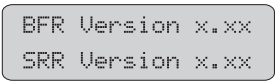
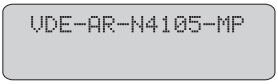
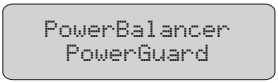
4.1 Operating the Display

You can operate the display by tapping the enclosure lid.

- To switch on the backlight, tap once.
- To switch to the next display message, tap once.
- To display the messages from the start-up phase again, tap twice.

4.2 Display Messages during the Start-Up Phase

- To view the display messages of the start-up phase again during regular operation, see Section 4.1 "Operating the Display", page 16.

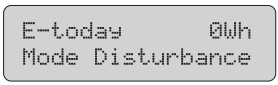
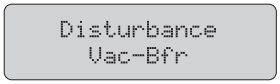
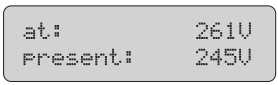
Display message	Description
	Inverter device type
	Firmware version of the internal processors
	Configured country data set (example: **VDE-AR-N4105-MP**)
	Configuration of the SMA Power Balancer (example: **PowerGuard**)

4.3 Display Messages during Operation

When the inverter is in operation, the following messages alternate on the display. Each display message appears for five seconds, then the cycle starts again.

Display message	Description
	Current feed-in power and voltage of the PV array
	Current values for reactive power **Qac** and displacement power factor cos φ (**PF**)
	Energy produced so far and total number of hours in feed-in operation
	Energy generated on the current day and **MPP** status message

4.4 Display Messages during a Fault

Display message	Description
	Energy generated on the current day (example: **0Wh**) and status message (example: **Disturbance**)
	Operating state (example: **disturbance**) and error message (example: **Vac-Bfr**)
	Measured value at the time of the disturbance (example: **261 V**) and current measured value (example: **245 V**)*

* This display message only appears if a measured value is responsible for the fault.

- If an error message is displayed, contact your installer.

4.5 DC Overvoltage

Display message	Description
	The DC input voltage into the inverter is too high. • Contact your installer immediately.

5 LED Signals

Designation	Status	Cause and corrective measures
All LEDs	glowing	The inverter is initialising.
	flashing	The start-up phase is beginning. If the DC voltage is very low in the start-up phase, all three LEDs go out and the start-up phase recommences. If irradiation is very low, all three LEDs flash. This flashing indicates a normal operating state. It does not mean that a fault has occurred.
	off	The ESS is not plugged in or the irradiation level is zero. • Plug in the ESS securely.
Green LED	glowing	Indicates the operating state of the inverter. The specific status message is shown in the display.
	flashing	The DC input voltage is still too low. Once the DC input voltage is sufficiently high, the inverter goes into operation.
Red LED	glowing	Earth fault The specific error or fault message is shown in the display. • Contact your installer.
	flashing	Varistor or string fuse defective The specific error or fault message is shown in the display. • Contact your installer.
Yellow LED	glowing	Probably a fault or warning has been issued. The specific error or fault message is shown in the display. • Contact your installer.
	flashing	Probably a fault or warning has been issued. The specific error or fault message is shown in the display. • Contact your installer.

6 Cleaning the Inverter

- If the inverter is dirty, clean the enclosure lid, the display and the LEDs using only clear water and a cloth.

7 Glossary

Derating

A controlled reduction in performance, usually dependent on component temperatures

SMA Power Balancer

The SMA Power Balancer is a serial feature of the Sunny Mini Central. The SMA Power Balancer prevents the formation of an excessive unbalanced load during three-phase feed-in. This is enabled by connecting three Sunny Mini Centrals to a three-phase feed-in unit via a control cable.

Unbalanced Load

The unbalanced load is the difference between the power being fed into the grid by the individual line conductors. This depends on the configured country data set and may be between 4.6 kVA and 6 kVA.

Varistor

The varistors protect the electronics in the inverter from atmospherically coupled energy peaks, such as those which can occur e.g. when lightning strikes nearby.

8 Contact

If you encounter technical problems, first contact your installer. The following information is required in order to provide you with the necessary assistance:

- Inverter device type
- Inverter serial number
- Type and number of the PV modules connected
- LED signal, error or fault of the inverter
- Optional equipment, e.g. communication products

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