

## CONTACT

If you have 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
- Circuit connection of the PV modules
- Blink code or display message of the inverter
- Optional equipment (e.g. communication devices)

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### Installer contact



PV Inverter

## SUNNY MINI CENTRAL

9000TL / 10000TL / 11000TL

9000TL / 10000TL / 11000TL with Reactive Power Control

User Manual



SMC9-11TLRP-BEN100610 | IME-SMCTL\_9\_10\_11 | Version 1.0

EN

## EXPLANATION OF SYMBOLS

### Symbols on the Inverter



Operation display.



Ground fault; varistor defective or string fuse defective.



An error has occurred. Please inform your installer **immediately**.



Tap to switch on the display light and switch to the next message.

### Symbols on the Type Label



Beware of dangerous electrical voltage.  
The inverter operates at high voltages. All electrical work on the inverter may be carried out by qualified personnel only.



Beware of hot surface.  
The inverter can become hot during operation. Avoid contact during operation.



Observe enclosed documentation.



The inverter must not be disposed of with the household waste. Further disposal information can be found in the enclosed installation guide.



CE mark. The inverter complies with the requirements of the applicable EC guidelines.



RAL quality mark for solar products. The inverter complies with the requirements of the German Institute for Quality Assurance and Labeling.



Direct Current (DC)



Alternating Current (AC)



The inverter is protected against penetration by dust particles and water jets from any angle.



The inverter is transformerless.

## VISUAL INSPECTION, MAINTENANCE AND CLEANING

### Visual Inspection

Check the inverter and cables for any signs of external damage. Contact your installer if you find any damage. Do not carry out repairs yourself.

### Maintenance and Cleaning

Have your installer check for proper inverter operation at regular intervals.

## GLOSSARY

### AC

Abbreviation for "alternating current".

### DC

Abbreviation for "direct current".

### Derating

A controlled reduction in performance, usually dependent on component temperatures.

### Electronic Solar Switch (ESS)

The Electronic Solar Switch is part of the inverter's DC disconnection unit. The Electronic Solar Switch must be securely inserted into the bottom of the inverter and may only be removed by qualified personnel.

### MPP (Maximum Power Point)

Operational point of the inverter, dependent on current / voltage of the PV generator. The actual MPP changes constantly, depending on, for example, the level of solar radiation and the cell temperature.

### PV

Abbreviation for photovoltaics.

### Reactive Power Control

Inverters with Reactive Power Control are inverters capable of utilizing reactive power. By setting a default value for the displacement factor ( $\cos \varphi$ ) they can feed reactive power to the grid.

### 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 unbalanced load > 5kVA during three-phase grid feeding (in Italy > 6kVA). To this effect, 3 Sunny Mini Centrals are each connected via a control line to a 3-phase feeding unit.

### Unbalanced load

The difference between the power fed into the grid at the individual phase conductors. In Germany, this must not exceed 5 kVA. In Italy the power is restricted to 6 kVA.

### Varistor

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

## SAFETY INSTRUCTIONS

**! DANGER!**  
Electric shock caused by high voltage in the inverter.

Even when no external voltage is applied, high voltages can be present in the inverter. The following work must only be carried out by qualified personnel:

- Electrical installation
- Repairs
- Modification

**! CAUTION!**  
Risk of injury from touching the enclosure during operation.  
Burns to the body.

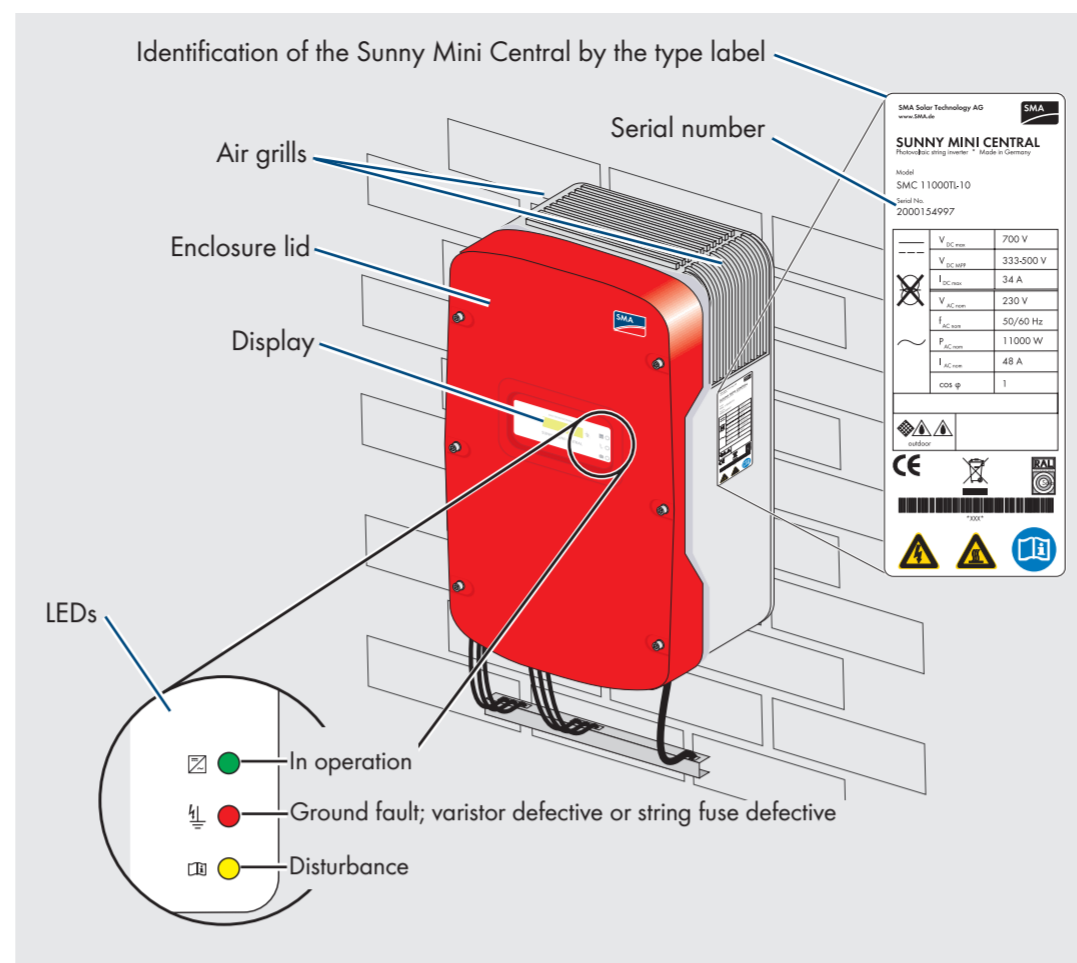
- Only touch lid and display during operation.

**NOTICE!**  
Overvoltage in the inverter if yellow LED flashes 4 times.  
Destruction of the inverter.

- Inform your installer immediately if the yellow LED should start flashing and the following display message appears.

!PU- Overvoltage!  
!Disconnect DC!

## PRODUCT OVERVIEW



## STATUS MESSAGES

Your inverter can be in various operating modes. These are displayed as status messages, which can vary according to the method of communication.

Message	Description
Balanced	The Sunny Mini Central has disconnected from the grid, or is limiting its output to 5 kVA over a 10-minute average. The Sunny Mini Central is part of a three-phase system equipped with two further Sunny Mini Centrals and the SMA Power Balancer to avoid unbalanced load.
Derating	Overtemperature in the inverter. The inverter reduces its output to prevent it from overheating. To avoid unnecessary output losses, the design of the PV plant should be checked. Please inform your installer.
Disturbance	Disturbance. This message appears for safety reasons and prevents the inverter from connecting to the grid. Please inform your installer.
Error	An error has been detected. Please inform your installer.
Grid mon.	Grid monitoring This display appears during the start phase, before the inverter is connected to the grid, predominantly in the mornings and evenings when the solar radiation is low and after an error.
MPP	The inverter is operating in MPP mode. MPP is the standard display when operating with normal solar radiation.
MPP-Search	The inverter is calculating the MPP (Maximum Power Point)
Off Grid	The inverter is in "Island" mode. This mode has been specially conceived for operation in an off-grid power system with a Sunny Island as grid controller.
Offset	Offset adjustment of measurement electronics.
Riso	Measurement of the insulation resistance of the PV system.
Stop	Operation interrupted.
V-Const	Constant voltage operation.
Waiting	The conditions for connecting are not (yet) fulfilled.

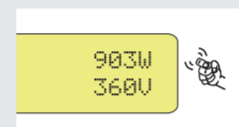
## LED MODES

State	Description	Function
<input checked="" type="checkbox"/> <span style="color: green;">●</span> <input type="checkbox"/> <span style="color: red;">●</span> <input type="checkbox"/> <span style="color: yellow;">●</span>	All LEDs are on	Initialization The inverter is initializing.
<input type="checkbox"/> <span style="color: green;">●</span> <input type="checkbox"/> <span style="color: red;">●</span> <input type="checkbox"/> <span style="color: yellow;">●</span>	All LEDs are off	Deactivation The DC input voltage at the inverter is too low to feed power.
<input checked="" type="checkbox"/> <span style="color: green;">●</span> <input type="checkbox"/> <span style="color: red;">●</span> <input type="checkbox"/> <span style="color: yellow;">●</span>	Green LED is on continuously	Feeding Operation The inverter is feeding power into the public grid.
<input checked="" type="checkbox"/> <span style="color: green;">●</span> <input type="checkbox"/> <span style="color: red;">●</span> <input type="checkbox"/> <span style="color: yellow;">●</span>	Green LED is flashing	Waiting, Grid Monitoring The inverter monitors the grid and waits for the DC voltage to reach a certain level so that it can start feeding the grid.
<input type="checkbox"/> <span style="color: green;">●</span> <input type="checkbox"/> <span style="color: red;">●</span> <input type="checkbox"/> <span style="color: yellow;">●</span>	Stop	Operation interrupted.
<input type="checkbox"/> <span style="color: green;">●</span> <input type="checkbox"/> <span style="color: red;">●</span> <input type="checkbox"/> <span style="color: yellow;">●</span>	Derating	Power restriction in the inverter.
<input type="checkbox"/> <span style="color: green;">●</span> <input checked="" type="checkbox"/> <span style="color: red;">●</span> <input type="checkbox"/> <span style="color: yellow;">●</span>	Red LED on	Error A ground fault is present. Please inform your installer.
<input type="checkbox"/> <span style="color: green;">●</span> <input checked="" type="checkbox"/> <span style="color: red;">●</span> <input type="checkbox"/> <span style="color: yellow;">●</span>	The red LED is blinking	Warning This error can be caused by either of the following: At least one of the varistors is defective: <Check Varistor> display message At least one string fuse is defective: <DC fuse> display message In both cases the inverter continues feeding into the grid. Please inform your installer.
<input type="checkbox"/> <span style="color: green;">●</span> <input type="checkbox"/> <span style="color: red;">●</span> <input checked="" type="checkbox"/> <span style="color: yellow;">●</span>	Yellow LED is on continuously	Disturbance The inverter is operating in "Operation constantly disabled" mode. This can have several causes. Please inform your installer.
<input type="checkbox"/> <span style="color: green;">●</span> <input type="checkbox"/> <span style="color: red;">●</span> <input checked="" type="checkbox"/> <span style="color: yellow;">●</span>	Yellow LED is flashing	Disturbance The inverter displays a disturbance. This can have several causes. Please inform your installer.

## DISPLAY

### Operation

The display shows current values of your system. The displayed values are updated every 5 seconds. The display is operated by tapping on it.



#### Tap once

The backlight is switched on. The backlight shuts off automatically after 2 minutes.

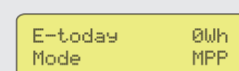
#### Tap again

The display switches to the next notification.

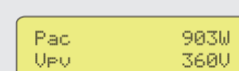
### Display Messages

#### In operation

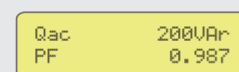
Upon error-free connection of the inverter to the grid, the following messages are shown in turn after approximately one minute. Each message appears for five seconds, then the cycle starts again.



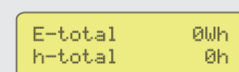
Power produced on the current day  
Operating state



Current feed-in power  
PV generator voltage



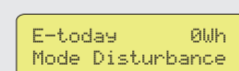
In Sunny Mini Centrals with Reactive Power Control, the current reactive power value Qac and the shift factor cos φ (PF) are displayed after a further 5 seconds or when you tap again.



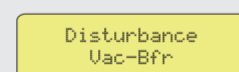
Power produced so far  
Total number of operating hours for feeding operations

#### Disturbance

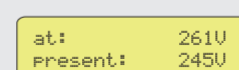
In case of a disturbance, the inverter will display the status "Disturbance" and an error message. Please inform your installer. The following messages will be issued:



Power produced on the current day  
Operating state "Disturbance"

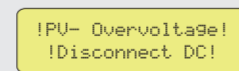


Operating state  
Error message



Measured value at time of disturbance  
Current measured value (only displayed if a measured value is responsible for the disturbance)

#### DC Overvoltage



There is a too high DC input voltage connected to the inverter. **Please** inform your installer immediately.

## MEASURING CHANNELS

If your inverter is equipped with a communication component, then numerous measurement channels and messages can be transmitted for diagnosis.

Measuring channel	Description
Balancer	Displays the currently active operating mode of the Sunny Mini Central, which has been set via the operating parameter "PowerBalancer".
Error	Identification of the current disturbance / error.
E-total	Total amount of energy fed into the grid
Event-Cnt	Number of events that have occurred
Fac	Grid frequency
h-On	Total number of operating hours
h-total	Total number of operating hours for feeding operations
Iac	Grid current
Ipv	DC current
Is	Apparent current (applies only to Sunny Mini Central with Reactive Power Control)
Pac	Generated AC power
PF	Displacement factor cos φ (applies only to Sunny Mini Central with Reactive Power Control)
Phase	The phase to which the inverter is connected.
Power On	Total number of grid connections
Qac	Reactive power (applies only to Sunny Mini Central with Reactive Power Control)
Riso	Insulation resistance of the PV system to the grid connection
Sac	Apparent power (applies only to Sunny Mini Central with Reactive Power Control)
Serial number	Inverter serial number
Mode	Display of the current operating mode
Vac	Grid voltage
Vpv	PV input voltage
Vpv-Setpoint	PV target voltage