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
- Type and number of PV modules connected
- Blink code or display message of the inverter
- Optional equipment (e.g. communication devices)

SMA Solar Technology AG
Sonnenallee 1
34266 Niestetal, Germany
www.SMA.de

SMA Serviceline

Inverters:	+49 561 9522 1499
Communication:	+49 561 9522 2499
Fax:	+49 561 9522 4699
E-Mail:	Serviceline@SMA.de

Installer contact

PV Inverter

SUNNY BOY 1300TL/1600TL/2100TL

User Manual

SB13_21TL-BA-BEN121021 | IME-SB21TL | Version 2.1

EN

EXPLANATION OF SYMBOLS

Symbols on the Inverter

Operation Display.

Ground fault or varistor defective.
Please inform your installer.

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 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 inverters and the cables for visible external damage. Contact your installer if you find any defects. Do not perform any repair work yourself.

Maintenance and Cleaning
Ask your installer to check for correct 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.

OPTIONAL: Electronic Solar Switch (ESS)
The Electronic Solar Switch is an optional part of the inverter's DC disconnection unit. If the inverter is equipped with an Electronic Solar Switch, the ESS must be securely inserted into the bottom of the inverter. The Electronic Solar Switch may only be removed by qualified personnel.

Grid impedance
The grid impedance is a characteristic grid specification, which is determined both by the grid infrastructure, and by the number of power suppliers and power consumers. If the supply for the grid section should drop due to a grid shutdown of the preceding energy suppliers (medium-voltage transformers), the grid impedance will change abruptly. In order to detect this and to prevent the formation of an unwanted off-grid system, SMA Grid Guard monitors the grid impedance and disconnects the inverter from the grid in the event of a sudden impedance variation.

MPP (Maximum Power Point)
Operational point of the inverter, dependent on current/voltage of the PV generator. The actual position of the MPP changes constantly, depending on the level of solar irradiation and the cell temperature.

PV
Abbreviation for photovoltaics.

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 PRECAUTIONS

DANGER!

Electric shock caused by high voltage at the inverter.

Even when no external voltage is present, there can still be high voltages in the device. The following work may be carried out by qualified personnel only:

- Electrical installation
- Repairs
- Modification

CAUTION!

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

- Only touch the lid and display during operation.

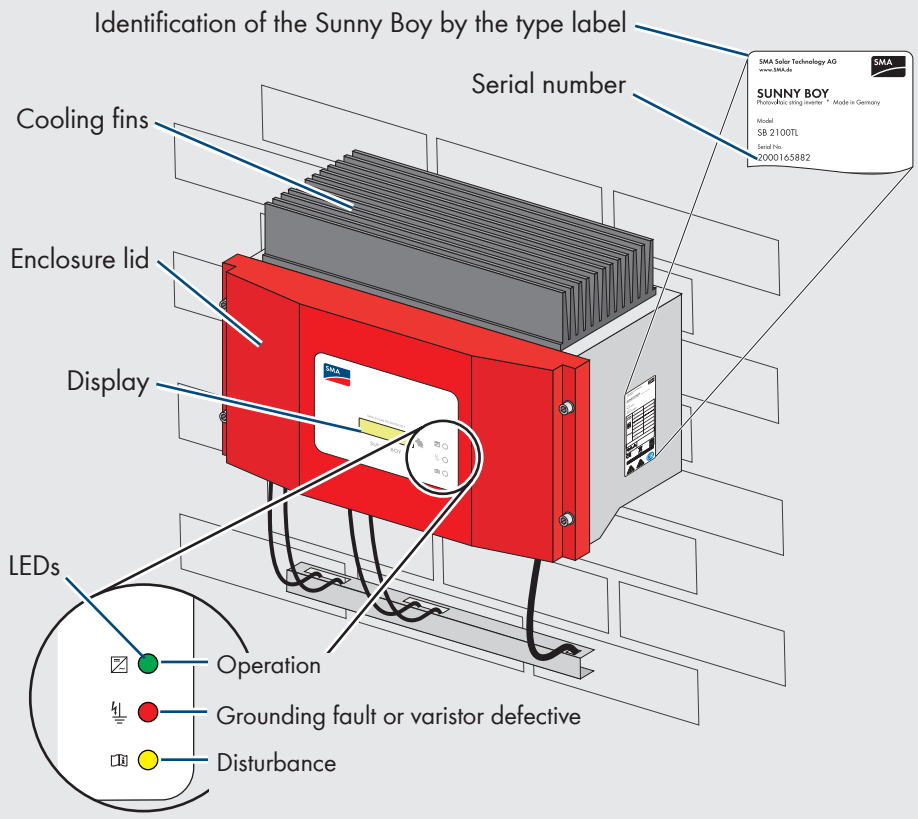
NOTICE!

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

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

```
!PV-Overvoltage!
!Disconnect DC!
```

PRODUCT OVERVIEW



LED MODES

Status	Designation	Function
All LEDs flashing	Start phase	The inverter is in the start phase.
All LEDs are on	Initialization	The inverter initializes.
All LEDs are off	Disconnection	The DC input voltage at the inverter is too low for feed-in.
Green LED is permanently on	Feed-in operation	The inverter is feeding into the power distribution grid.
Green LED 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.
	Stop	Operation interrupted.
	Derating	The inverter limits its active power.
Red LED on	Warning	A ground fault has occurred or one of the thermally monitored varistors on the DC input side is defective. Inform your installer.
Yellow LED is permanently on	Disturbance	The inverter is operating in the "Operation constantly disabled" state. This can have several causes. Inform your installer.
Yellow LED flashing	Disturbance	The inverter displays a disturbance. This can have several causes. Inform your installer.

DISPLAY

Operation

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

```
903W
360V
```

1 x tap: The backlight is switched on. The backlight shuts off automatically after 2 minutes.
1 x tap again: The display switches to the next notification.
2 x taps in succession*: In turn, the display shows the inverter type, the firmware version of the internal processors, and the country standard that is set.

Display Messages

Operation

Upon error-free connection of the inverter to the grid, after approximately one minute, the display starts alternating between the messages shown below. Each message appears for five seconds, then the cycle starts over.

```
E-today      0Wh
Mode         MPP
```
Energy generated on the current day
Operating state

```
Pac        903W
Vpv        360V
```
Current feed-in capacity
Voltage of the PV array

```
E-total      0Wh
h-total        0h
```
Total amount of energy fed in
Total number of operating hours in feed-in operation

Disturbance

In the event of a disturbance, the inverter displays the status "Disturbance" and an error message. Inform your installer.
The following messages will be issued:

```
E-today      0Wh
Mode Disturbance
```
Energy generated on the current day
Operating state "Disturbance"

```
  Disturbance
   Vac-Bfr
```
Operating state
Error message

```
at:        261V
present:   245V
```
Measured value at the time of the disturbance
Current measured value (only displayed if a measured value is responsible for the disturbance)

DC overvoltage

```
!PV-Overvoltage!
!Disconnect DC!
```
There is a too high DC input voltage connected to the inverter.
Immediately inform your installer.

* From firmware version 4.00

MEASURING CHANNELS

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

Measuring channel	Description
dZac	Change of the grid impedance
Error	Identification of the current disturbance/error
E-total	Total amount of feeding-in energy
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
Mode	Display of the current operating mode
Pac	Generated AC power
Power On	Total number of grid connections
Riso	Insulation resistance of the PV system to the grid connection
Serial number	Inverter serial number
Vac	Grid voltage
Vpv	PV input voltage
Vpv-Setpoint	PV target voltage

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
Derating	Inverter is overheated. The inverter will reduce its output to prevent overheating. To avoid unnecessary output losses, the design of the PV plant should be checked. Please inform your installer.
Error	An error has been detected. Please inform your installer.
grid mon.	Grid monitoring. This message appears during the startup phase, before the inverter connects to the grid; it usually appears in the morning and evening when there is little solar irradiation an after an error has occurred.
MPP	The inverter is operating in MPP mode. MPP is the standard display message when operating under normal irradiation conditions.
offset	Offset adjustment of measurement electronics.
Riso	Measurement of the insulation resistance of the PV system.
Disturbance	Disturbance. This message appears for safety reasons and prevents the inverter from connecting to the grid. Please inform your installer.
Stop	Operation interrupted.
V-Const	Constant voltage operation.
waiting	The conditions for connecting are not (yet) fulfilled.