PV Inverter

SUNNY MINI CENTRAL 7000HV

User Manual

SMC70HV-BEN110920 | TBEN-SMC70HV | Version 2.0

EN

Table of Contents

1 Information on this Manual

1.1 Validity

This manual applies to the following device types:

- SMC 7000HV-11
- SMC 7000HV-11/IT

1.2 Target Group

This manual is for the operator.

1.3 Additional Information

You will find additional information on the device-specific technical data in the installation manual provided.

You will find additional information on special subjects (e.g. description of the operating parameters) in the download area at www.SMA.de/en.

1.4 Symbols Used

The following types of safety notes and general information are used in this manual:

DANGER!

"DANGER" indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING!

"WARNING" indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION!

"CAUTION" indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE!

"NOTICE" indicates a situation that can result in property damage if not avoided.

Information

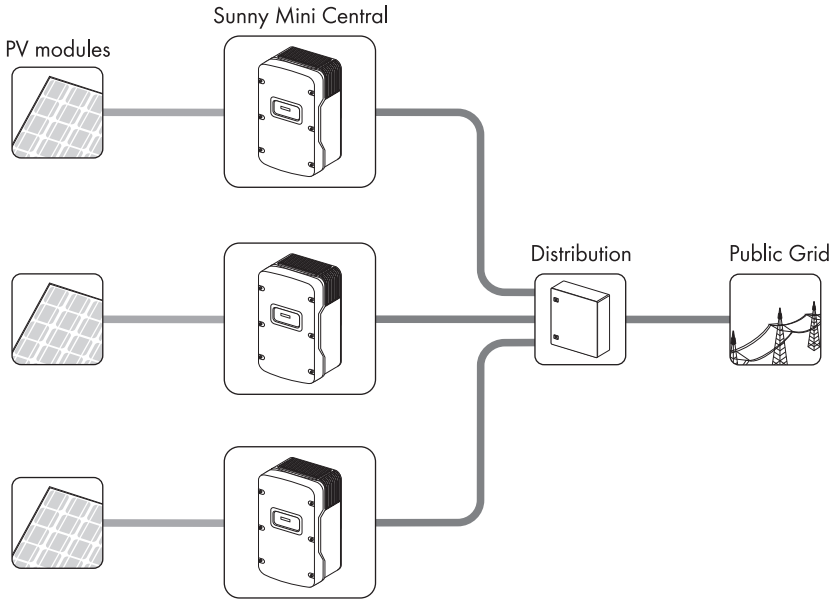
Information provides tips that are valuable for the optimal installation and operation of your product.

2 Safety

2.1 Appropriate Usage

The Sunny Mini Central is a PV inverter that converts the direct current of the PV array into alternating current and feed this into the power distribution grid.

Operating Principle of a PV Plant with a Sunny Mini Central



The Sunny Mini Central may only be operated with PV arrays (modules and cabling) of protection class II. Do not connect any sources of energy other than PV modules to the Sunny Mini Central.

Do not use the Sunny Mini Central for purposes other than those described here. Alternative uses, modifications to the Sunny Mini Central or the installation of components not expressly recommended or sold by SMA Solar Technology AG void the warranty claims and operating licence. Contact the SMA Serviceline if you need clarification regarding proper use of the inverter.

This manual is a part of the Sunny Mini Central. Observe all of the activities described in this manual. Keep this manual in a convenient place for future reference.

2.2 Safety Instructions

DANGER!

Electric shock caused by high voltage in the inverter.

Even when no external voltage is present, there can still be high voltages in the device.

- Electrical installation, repairs and modification may be carried out by qualified personnel only.
- The appliance is not to be used by children or persons with reduced physical, sensor or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children should be supervised to ensure that they do not play with the appliance.

CAUTION!

Danger of burns due to hot enclosure parts.

- Only touch the enclosure lid and display during operation.

NOTICE!

Damage to the inverter through overvoltage, if the yellow LED flashes 4 times.

- Inform your installer immediately if the yellow LED flashes and the inverter shows the display warning "!PV-Overvoltage! !DISCONNECT DC!".

2.3 Explanation of Symbols

2.3.1 Symbols on the Inverter

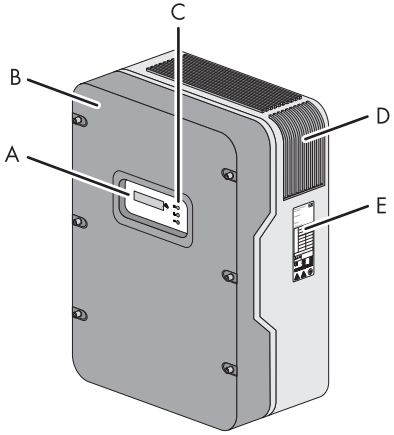
Symbol	Explanation
	Operation Display.
	Ground fault or varistor defective. Please inform your installer.
	An error has occurred. Inform your installer **immediately**.
	You can operate the display by tapping. 1 x tap: The background light switches on or the display scrolls one message further.

2.3.2 Symbols on the Type Label

Symbol	Explanation
	Warning of dangerous electrical voltage. The inverter operates with high voltages. All work on the inverter may only be carried out by an trained electrically skilled person.
	Warning of hot surface. The inverter can become hot during operation. Avoid contact during operation.
	Observe all documentation that accompanies the inverter.
	The inverter must not be disposed of together with household waste. Further disposal information can be found in the installation manual provided.
CE	CE mark. The inverter complies with the requirements of the applicable EC guidelines.

Symbol	Explanation
	The inverter has a transformer.
	Direct Current (DC).
	Alternating Current (AC).
	Protection rating IP65. The inverter is protected against the penetration of dust particles and against water jets from any angle.
	RAL quality mark for solar products. The inverter complies with the requirements of the German Institute for Quality Assurance and Labeling.
	Australian mark of conformity.
	Chinese mark of conformity.
	Korean mark of conformity.

3 Product Overview



Position	Description
A	Display
B	Enclosure lid
C	LEDs Green LED = Operation Red LED = Ground fault or varistor defective Yellow LED = Error
D	Ventilation grid
E	Type label for the identification of the inverter via the serial number (Serial No.).

4 Display

4.1 Operation

The display shows the actual values of your plant. The displayed values are updated every 5 seconds.

You can operate the display by tapping.

1 x tap:

The background light switches on or the display scrolls one message further.

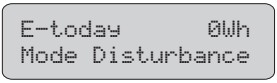
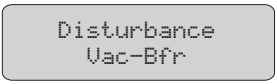
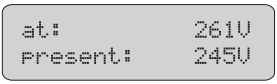
4.2 Display Messages during Operation

Upon fault-free disconnection of the inverter form the power distribution grid the remaining messages are displayed alternately after approx. 1 minute. Each message appears for 5 seconds, and then the cycle restarts from the beginning.

Display message	Description
E-today 0Wh Mode MPP	Energy generated on the actual day Status message "MPP"
Pac 903W Vpv 360V	Actual feed-in power Voltage of the PV array
Qac 200VAr PF 0.987	After a further 5 seconds or after tapping the actual values of the reactive power Qac and of the shift factor cos φ (PF) are displayed.
E-total 0Wh h-total 0h	Energy produced so far Total number of operating hours in feed-in operation

4.3 Display Messages during a Disturbance

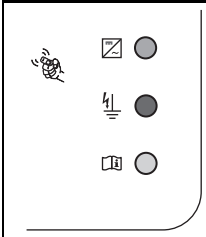
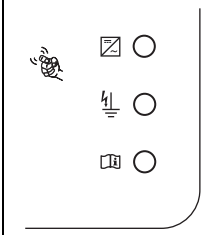
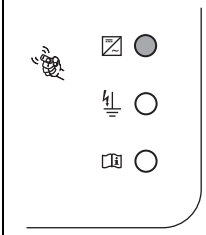
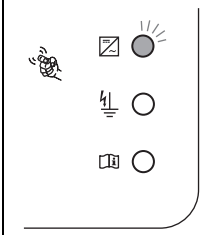
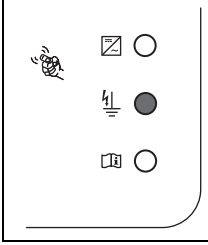
In the event of a disturbance the inverter displays the status "Disturbance" and a disturbance message. Please inform your installer.

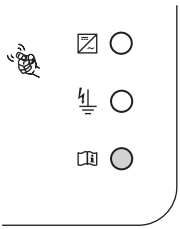
Display message	Description
	Energy generated on the actual day Status message "Disturbance"
	Operating state Disturbance message
	Measured value at the time of the disturbance Actual measured value (only displayed if a measured value is responsible for the disturbance)

4.4 DC Overvoltage

Display message	Description
	The DC input voltage is too high at the inverter. Inform your installer **immediately**!

5 LED States

Status		Description
	All LEDs are on	The inverter is initializing.
	All LEDs are off	The DC input voltage at the inverter is too low for grid feeding.
	Green LED on	The inverter is feeding in to the power distribution grid.
	Green LED is flashing	The inverter is monitoring the power distribution grid and is waiting for the DC voltage to reach a defined limit in order that it can begin grid feeding. Operation interrupted. Power limitation in the inverter.
	Red LED on	A grounding error has occurred or one of the thermally monitored varistors on the DC input side is defective. Please inform your installer.

Status		Description
	Yellow LED on	The inverter has switched to the operating state "Dauerhafte Betriebshemmung" (Permanent Shutdown). This can have several causes. Please inform your installer.
	Yellow LED flashing	The inverter displays a disturbance. This can have several causes. Please inform your installer.

6 Visual Check and Cleaning

Check the inverter and cables for any visual signs of external damage. Contact your installer if you find any damage. Do not perform any repair work yourself.

Ask your installer to check for correct inverter operation at regular intervals.

7 Troubleshooting

7.1 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 inverter has disconnected from the power distribution grid or is limiting its power over a 10 minute average to 5kVA. The inverter is a part of a 3 phase system with 2 further inverters and equipped with the SMA Power Balancer for the avoidance of unbalanced loads.
Derating	Overheating in the inverter. The inverter reduces its output to prevent overheating. To avoid unnecessary yield penalties the layout of the PV plant should be checked. Please inform your installer.
Disturbance, warning	Disturbance. This message occurs for safety reasons and ensures that the inverter does not connect to the power distribution grid. Please inform your installer.
Error	An error has been detected. Please inform your installer.
grid monitoring	Grid monitoring This display occurs during the start phase, before the inverter is connected to the power distribution grid, predominantly in the morning and evening when irradiation is too low and after an error.
MPP	The inverter is operating in MPP mode. MPP is the standard display message when operating under normal irradiation conditions.
MPP Peak	The inverter is operating in MPP mode above its nominal power.
MPP-Search	The inverter is calculating the MPP
Off Grid	The inverter is in Island mode. This mode is specially design for operation in an island grid system.
Offset	Offset adjustment of the measurement electronics.
Riso	Measurement of the isolation resistance of the PV plant.
Stop	Operation interrupted.
V-Const	Constant voltage operation.
waiting	The conditions for connecting are not (yet) fulfilled.

7.2 Measuring channels

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

Measuring channel	Description
Balancer	Displays the current operating mode of the inverter that is set to the operating parameter "PowerBalancer".
Error	Identification of the actual disturbance / error
E-total	Total amount of energy fed in
Event-Cnt	Number of events that have occurred
Fac	Grid frequency
h-On	Total operating hours
h-total	Total number of operating hours in feed-in operation
Iac	Grid current
Ipv	DC current
Is	Apparent current
Mode	Display of the actual operating mode.
Pac	Generated AC power
PF	Displacement power factor cos φ
Phase	The phase to which the inverter is connected.
Power On	Total number of grid connections
Qac	Reactive power
Riso	Isolation resistance of the PV plant before entering into the power distribution grid.
Sac	Apparent power
Serial Number	Serial number of the inverter
Vac	Grid voltage
Vpv	PV input voltage
Vpv-Setpoint	PV target voltage

8 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 DC disconnection unit of the inverter. The Electronic Solar Switch must be securely inserted into the bottom of the inverter and must only be removed by an electrically skilled person.

MPP (Maximum Power Point)

Operating point of the inverter from current / voltage of the PV array. The actual position of the MPP changes constantly, depending on the level of irradiation and cell temperature.

PV

Abbreviation for photovoltaics.

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 > 5 kVA (in Italy > 6 kVA) during three-phase grid feed-in. For this 3 Sunny Mini Centrals are connected via a control line to a 3 phase feed-in unit.

Unbalanced load

The unbalanced load is 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 unbalanced load 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.

9 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
- Serial number of the inverter
- Type and number of PV modules connected
- Blink code or display message of the inverter
- Optional equipment (e.g. communication devices)

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