

Sunny Data Control Management Software for Sunny Beam and Sunny Boy Control

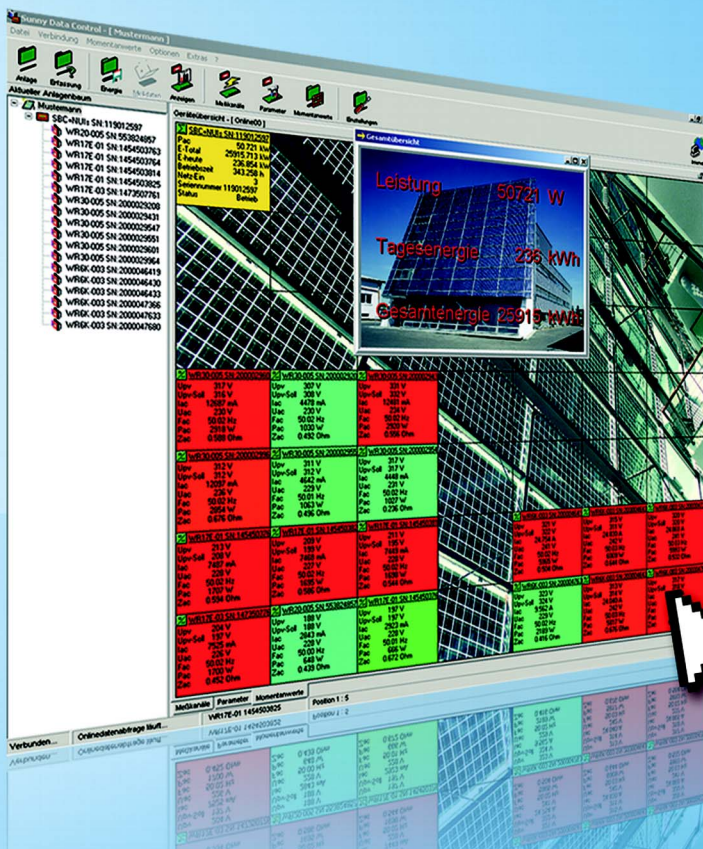


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1 Notes on this Manual

1.1 Target Group

This documentation is intended for installers and users. It includes a description of the system and instructions for the commissioning and operation of the device. Some of the activities described in this document may only be performed by qualified electricians. They are marked with a danger notice.

1.2 Validity

This Sunny Data Control user manual applies to version 3.8 and above. You can display the program version as described in section 2.4 "Identification" (Page 15).

1.3 Symbols Used

In order to ensure optimal use of these instructions, please note the following description of symbols used.

This symbol indicates a notice which, if ignored, will make the procedure or operation more difficult.



This symbol indicates an example, which serves to help explain a working step.



This symbol indicates a cautionary note. Failure to observe this information may result in damage to the device.



This symbol indicates a danger which, if ignored, could lead to serious injury or death.



1.4 Typographic Conventions

This user manual uses the typographic conventions indicated in the following table.

Example of the convention	Description
<Ok>	< > These symbols represent a button.
"Options"	Menu items and commands are shown in quotation marks (in conjunction with "Click on..." or "Select...").
"Options / Settings"	If several menu items must be selected, these are shown separated by a slash (in conjunction with "Click on..." or "Select...").

2 Sunny Data Control

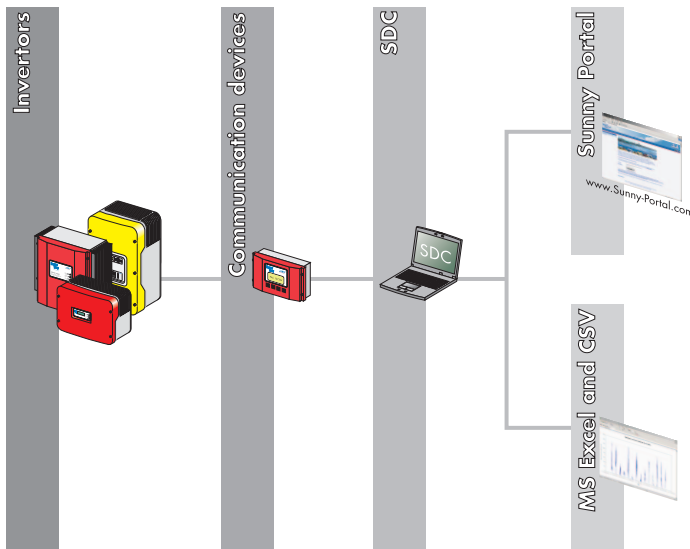
2.1 Scope of Delivery

The program "Sunny Data Control" can be downloaded from www.SMA.de in the download area, or ordered as a CD (SMA order number: SMA-CDROM).

2.2 Applications

Sunny Data Control is a PC program from SMA Technologie AG with which you can realize long-term storage of the data from your photovoltaic plant, and also visualize it. Sunny Data Control queries the data from your communication device (Sunny Boy Control and Sunny Beam) and saves it as Microsoft Excel files or CSV files on your PC.

With Sunny Data Control, for example, you can set up a complete overview of all inverter data (e.g. Pac, E-total, E-today) and display the inverter data in Excel in the form of charts. As an installer you can set the inverters' parameters, and you can send the data to Sunny Portal for visualization and storage. See www.SunnyPortal.com for more information on Sunny Portal.

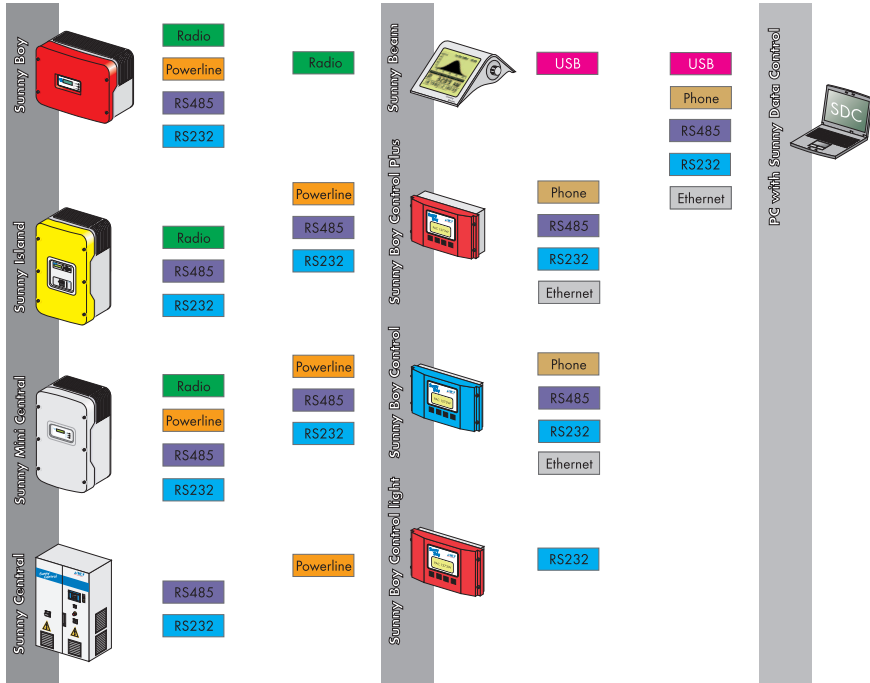


With Sunny Data Control software version 3.81 and above, you can also connect an inverter directly to the PC. This connection is only permissible for the purpose of servicing, and may not be operated on a long-term basis.



PC Connection Possibilities

The following figure provides an overview of the connection possibilities from inverter to PC with Sunny Data Control. You can obtain further information at www.SMA.de, and in section 4 "Connecting the PC to an Inverter" (Page 19).



It is only ever possible to have one type of connection between inverters, and to the communication device.

With an RS232 and USB connection, only one inverter can be connected to one communication device, or one inverter to one PC.

2.3 Functions

Supported communication devices:

- Sunny Boy Control / Plus / Light (firmware version 2.0 and above)
- Sunny Central Control (firmware version 2.0 and above)
- Sunny Beam

Supported inverters for direct connection to the PC (Sunny Data Control software version 3.81 and above):

- Sunny Boys
- Sunny Mini Centrals
- Windy Boy

Possibility to connect one inverter directly to the PC:

- via USB service cable

Functions

- Continuous system monitoring and acquisition of measurement data by means of accessing your Sunny Boy Control
- Remote monitoring via modem
- Export of data for presentation of operating data on the Internet (e.g. via Sunny Portal)
- Graphic PC display of all measurement data and operating modes
- "Online display" with color-coded indication of the present output of each Sunny Boy in your plant
- Configuration of Sunny Boys and adjustment of Sunny Boys' parameters

2.3.1 System Requirements

- Operating system: Windows 98 or above
- Available hard disk space: at least 20 MB
- RS232 interface: COM1 to COM255 (D-Sub 9/25) or Ethernet
- RS232
 - at the PC: COM1 to COM255
 - at the Sunny Boy Control: RS232 Piggy-Back
 - Data cable: up to 15 m
- RS485
 - at the PC: interface converter
 - at the Sunny Boy Control: RS485 Piggy-Back
 - Data cable: up to 1200 m
- Ethernet
 - at the PC: Ethernet card
 - at the Sunny Boy Control: NET socket, NET Piggy-Back
 - Ethernet: up to 100 m
- USB
 - at the Sunny Beam: up to 3 m

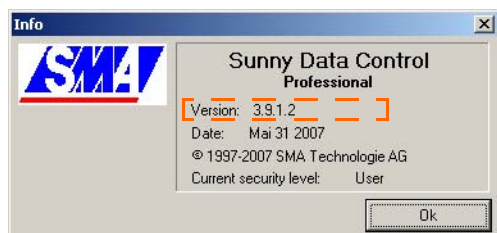
2.4 Identification

2.4.1 Firmware Version

In Sunny Data Control, you can display the Sunny Data Control firmware version via the menu item "?/Info...".

This shows the following information:

1. Program version and date
2. Current security level of the user, see section 13.10 "Changing the Security Level (Installer Password)" (Page 205).



3 Safety Instructions

Please follow all operating and safety instructions in this manual. Failure to follow these instructions could result in damage to the device and cause personal injury.

All work on the inverters may only be performed by qualified electricians! Follow all safety instructions contained in the inverter documentation!



With the Sunny Data Control program, your PV plant's safety-related inverter parameters can be changed. Such parameters may only be changed after consulting your energy supply company.



Operating Instructions

Data collected by Sunny Data Control regarding the power generated by your solar power plant can deviate from the electric meter. The Sunny Data Control data may not be used for billing purposes.



The PC, and thus Sunny Data Control, can be connected to the Internet via an additional router. Adequate security measures must be taken by using upstream hardware and software (firewall).



4 Connecting the PC to an Inverter

This type of connection is only intended for the purpose of servicing, and may not be operated on a long-term basis.



The direct connection occurs via the SMA USB service interface with 1.5 m cable and USB interface for the PC connection (SMA order number: USBPBS).

For further information regarding this connection, please refer to the USB service interface's user manual.

Sunny Data Control supports the direct connection of an inverter to the PC with Sunny Data Control software version 3.81 and above.



5 Connecting the PC to a Communication Device

To connect several inverters to the PC, there are various communication devices at your disposal.

The following table shows the communication devices and the possible connection types.

Communication device	Communication device's interface	PC's interface
Sunny Boy Control / Plus	RS232 Piggy-Back	RS232 connection
		RS232 to USB level converter
	RS485 Piggy-Back	RS485 connection
		RS485 to USB level converter
		RS485 to RS232 level converter
	NET Piggy-Back with analog modem	analog modem
		ISDN modem (with CAPI driver)
		GSM modem
	NET Piggy-Back with ISDN modem	ISDN modem
	NET Piggy-Back with GSM modem	analog modem
		ISDN modem (with CAPI driver)
		GSM modem
	NET Piggy-Back with Ethernet	Ethernet network card
Sunny Boy Control Light	RS232 Piggy-Back	RS232 connection
		RS232 to USB level converter
Sunny Beam	USB	USB connection

Communication device	Communication device's interface	PC's interface
Sunny Central Control	RS232 Piggy-Back	RS232 connection
		RS232 to USB level converter
	RS485 Piggy-Back	RS485 connection
		RS485 to USB level converter
		RS485 to RS232 level converter
	NET Piggy-Back with analog modem	analog modem
		ISDN modem (with CAPI driver)
		GSM modem
	NET Piggy-Back with ISDN modem	ISDN modem
	NET Piggy-Back with Ethernet	Ethernet network card

The following sections describe the various options for connection of the communication devices, provide recommendations for cabling, and include wiring diagrams.

Note on the Sunny Central Control



The Sunny Central Control is a variant of the Sunny Boy Control, which is directly built into the Sunny Central. Throughout this manual, only the Sunny Boy Control is mentioned. All sections which apply to the Sunny Boy Control also apply to the Sunny Central Control.

5.1 Notes on the Use of Level Converters

Level inverters are devices which convert data from one signal type to another, for instance from RS485 to USB. With the aid of these level converters, a Sunny Boy Control / Plus or Sunny Boy Control Light can be connected to a PC which does not have the appropriate interface.

Compatibility with all level converters available on the market cannot be guaranteed.



SMA provides the following level converters. These level converters have been tested, and function with the Sunny Boy Control / Plus and the Sunny Boy Control Light:

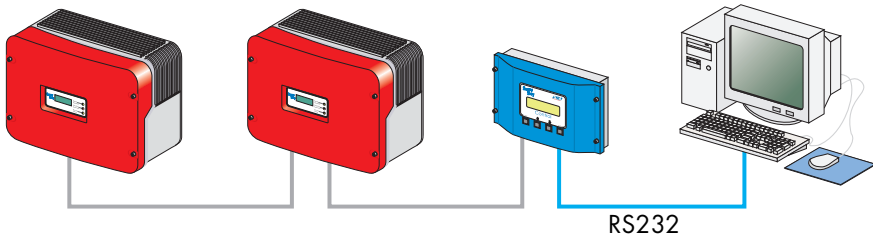
- RS232/RS485 to USB
 - SMA order number: I-7561
- RS485 to RS232
 - SMA order number: I-7520

5.1.1 Connecting the Level Converters

Connection of level converters occurs in the same manner as direct connection to a PC. The various connection plans can be found in the following sections.

5.2 Sunny Boy Control / Plus

5.2.1 Connection via RS232



RS232 communication characteristics:

- A maximum of one Sunny Boy Control / Plus can be connected to a PC.
- The PC must be equipped with an RS232 port. If it is not, please read section 5.1 "Notes on the Use of Level Converters" (Page 23).
- The Sunny Boy Control / Plus requires an RS232 Piggy-Back at the PC (COM 2) port.
Alternatively, at the Sunny Boy Control Plus, the AUX (COM 3) port can be used, if this is equipped with an RS232 Piggy-Back.
- The maximum total cable length is 12 m.

Cabling Recommendations

The connection between the Sunny Boy Control and the PC occurs by means of a commercially available null modem cable. Use the null modem cable provided.

If the length proves insufficient, use a commercially available null modem cable of the required length.

Jumper Functions at the Sunny Boy Control / Plus

With RS232 communication, no jumper must be mounted on the Sunny Boy Control / Plus at the PC (COM 2) port, or on the Sunny Boy Control Plus at the AUX (COM 3) port.

Wiring Diagram

Observe all safety instructions in the Sunny Boy Control / Plus documentation, and in the PC documentation.



Shut down the PC before you connect the Sunny Boy Control / Plus, as otherwise one or both COM ports may become damaged.

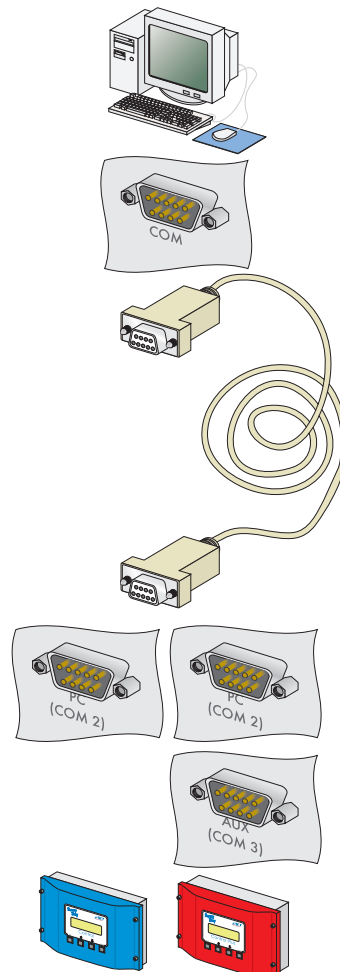


1. Use the provided null modem cable, or a commercially available null modem cable of the required length.
2. Plug the 9-pin D-Sub female connector into a free COM port on your PC.
3. Lay the cable properly so that there is no risk of persons tripping over it.
4. Plug the 9-pin D-Sub female connector into the port on the Sunny Boy Control which is equipped with the RS232 interface.

Sunny Boy Control: PC (COM 2)

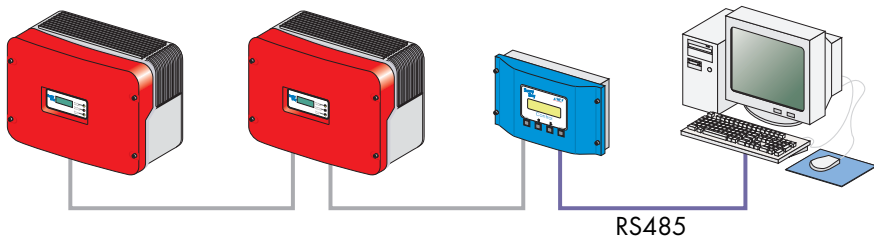
Sunny Boy Control Plus: PC (COM 2) or AUX (COM 3)

5. Make sure that jumpers A, B and C are not mounted at the port used.



Sunny Boy Control Sunny Boy Control Plus

5.2.2 Connection via RS485



RS485 communication characteristics:

- Up to 50 Sunny Boy Control / Plus devices can be connected to a PC.
- The PC must be equipped with an RS485 port. If it is not, please read section 5.1 "Notes on the Use of Level Converters" (Page 23).
- Each Sunny Boy Control requires an RS485 Piggy-Back at the PC (COM 2) port. Alternatively, at the Sunny Boy Control Plus, the AUX (COM 3) port can be used, if this is equipped with an RS485 Piggy-Back.
- The maximum total cable length is 1200 m.

Cabling Recommendations

The cable length and quality can adversely affect the signal quality. To achieve good results, observe the following instructions:

- Use metallic D-Sub female connectors. Female connectors made of plastic, or metallized plastic, can cause faulty data transfer.
- Indoors: use a shielded cable with twisted pair conductors and a cross-section of $2 \times 2 \times 0.25 \text{ mm}^2$ (AWG 24), e.g. of type LiYCY TP.
- Outdoors: use a UV-resistant shielded cable with twisted pair conductors and a cross-section of $2 \times 2 \times 0.25 \text{ mm}^2$ (AWG 24), e.g. of type LiYC11Y TP.

If you protect the cable from UV radiation by means of a suitable cable channel, you can also use a shielded non-UV-resistant cable with twisted pair conductors and a cross-section of $2 \times 2 \times 0.25 \text{ mm}^2$ (AWG 24), e.g. of type LiYCY TP.

We recommend the following cable types:

- Lapp cable: UNITRONIC Li2YCY (TP) $2 \times 2 \times 0.22 \text{ mm}^2$, order no.: 0031 320
- UL-listed Lapp cable: LiYCY TP $2 \times 2 \times 0.22 \text{ mm}^2$, order no.: 83793
- Helucable: PAAR-TRONIC-Li-2YCY $2 \times 2 \times 0.22 \text{ mm}^2$, order no.: 21111

Pin Assignment of the Connection Cable			
Sunny Boy Control		PC	
Signal	Pin	Pin	Signal
Data+	3		Data+
Data-	8		Data-
GND	5		GND

Jumper Functions

Termination

To increase the signal quality of the RS485 data bus, it must be terminated at both ends. Each termination occurs with a 120 W resistor between the two data lines. Terminate the last Sunny Boy Control / Plus by means of a jumper. The position of the jumper is described in the user manual of the Sunny Boy Control / Plus.

Signal Biasing

To increase the signal quality of the RS485 data bus, a maximum of one bias can be connected in the data bus. We recommend connecting the bias at the PC.

Wiring Diagram



Observe all safety instructions in the Sunny Boy Control / Plus documentation, and in the PC documentation.



Shut down the PC before you connect the Sunny Boy Control / Plus, as otherwise one or both COM ports may become damaged.

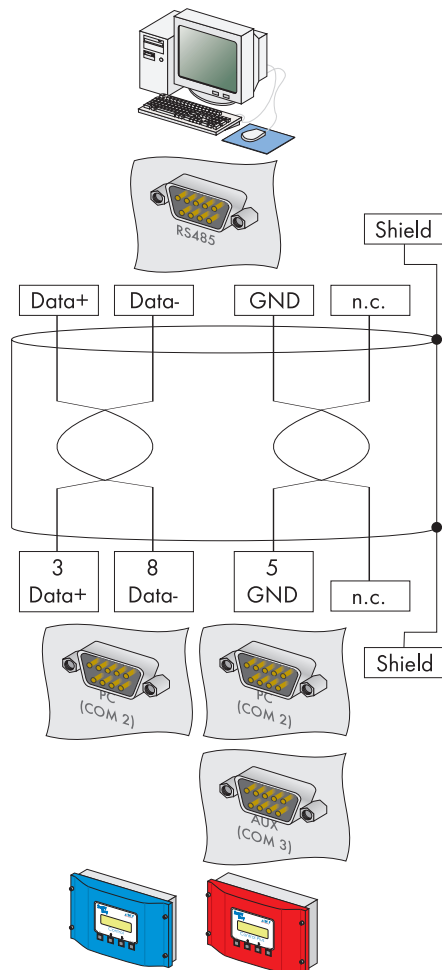
1. Plug the 9-pin D-Sub female connector into a free COM port on your PC. For the pin assignment of the RS485 connection, please refer to the PC's documentation, or the plug-in card's documentation. When connecting the cable, note that Data+ and Data- are a twisted pair. Shorten the wire of the fourth, unused conductor, so that short circuits cannot arise. Take note of the conductors' color coding:

Data+ _____

Data- _____

GND _____

2. If the PC is situated at one of the two ends of the RS485 data bus, terminate the end of the cable as described in the PC's documentation, or in the plug-in card's documentation.
3. Configure the RS485 data bus' bias as described in the PC's documentation, or the plug-in card's documentation.
4. Lay the cable properly so that there is no risk of persons tripping over it.



Sunny Boy Control Sunny Boy Control Plus

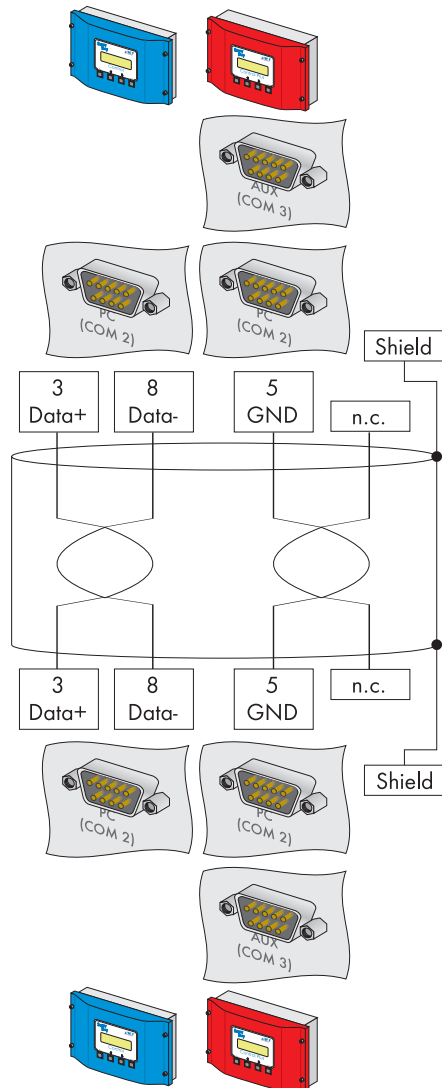
5. Plug the 9-pin D-Sub female connector into the port on the Sunny Boy Control which is equipped with the RS485 interface.

Sunny Boy Control: PC (COM 2)

Sunny Boy Control Plus: PC (COM 2) or AUX (COM 3)

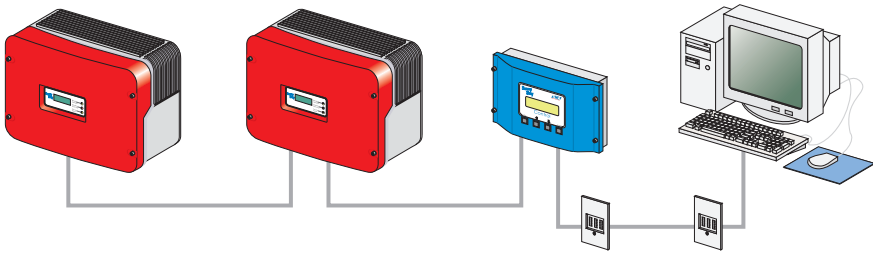
6. Connect the PC's Data+ with the Data+ of the Sunny Boy Control / Plus, and so on. The 3 connections are directly interconnected.
7. At the last Sunny Boy Control / Plus, jumper A must be mounted at the port used. Jumper A must not be mounted on any of the other Sunny Boy Control / Plus devices. Make sure that jumpers B and C are not mounted at the port used.
8. Connect the Data+ of the next Sunny Boy Control / Plus with the Data+ of the Sunny Boy Control / Plus which precedes it, and so on. The 3 connections are directly interconnected.
9. At the last Sunny Boy Control / Plus, jumper A must be mounted at the port used. Jumper A must not be mounted on any of the other Sunny Boy Control / Plus devices. Make sure that jumpers B and C are not mounted at the port used.

Sunny Boy Control Sunny Boy Control Plus



Sunny Boy Control Sunny Boy Control Plus

5.2.3 Connection via the Analog Modem NET Piggy-Back



Analog Modem Communication Characteristics

- As the connection to the Sunny Boy Control / Plus is established via the telephone network, it is only ever possible to connect one Sunny Boy Control / Plus with the PC.
- The PC must be equipped with a modem (analog, ISDN with CAPI driver or GSM).
- The Sunny Boy Control / Plus requires an "analog modem" version of the NET Piggy-Back.

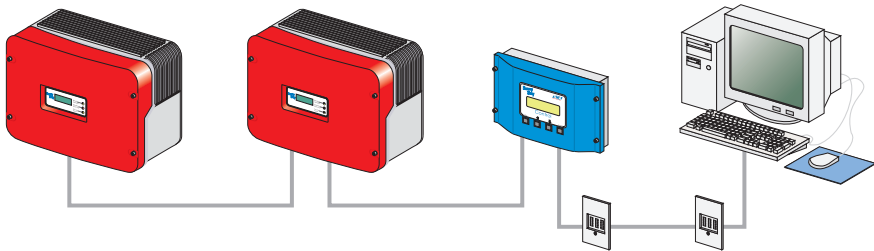


Compatibility with all PC modems available on the market cannot be guaranteed.

Connection

1. Connect the PC to the telephone network as described in the modem's user manual.
2. Connect the Sunny Boy Control / Plus to the telephone network as described in the NET Piggy-Back's user manual.
3. Use the software provided with the PC operating system to establish the connection between the two devices.

5.2.4 Connection via the ISDN NET Piggy-Back



ISDN Modem Communication Characteristics

- As the connection to the Sunny Boy Control / Plus is established via the telephone network, it is only ever possible to connect one Sunny Boy Control / Plus with the PC.
- The PC must be equipped with an ISDN modem.
- The Sunny Boy Control / Plus requires an "ISDN" version of the NET Piggy-Back.

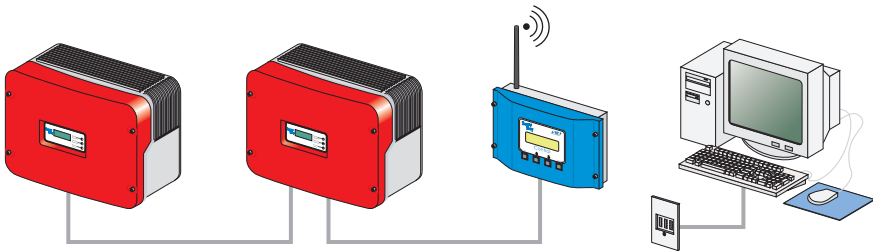
Compatibility with all PC modems available on the market cannot be guaranteed.



Connection

1. Connect the PC to the telephone network as described in the modem's user manual.
2. Connect the Sunny Boy Control / Plus to the telephone network as described in the NET Piggy-Back's user manual.
3. Use the software provided with the PC operating system to establish the connection between the two devices.

5.2.5 Connection via the GSM NET Piggy-Back



GSM Modem Communication Characteristics

- As the connection to the Sunny Boy Control / Plus is established via the telephone network, it is only ever possible to connect one Sunny Boy Control / Plus with the PC.
- The PC must be equipped with a modem (analog, ISDN with CAPI driver or GSM).
- The Sunny Boy Control / Plus requires a "GSM" version of the NET Piggy-Back.

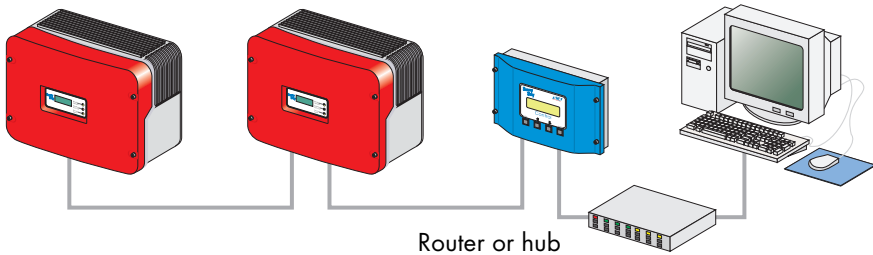


Compatibility with all PC modems available on the market cannot be guaranteed.

Connection

1. Connect the PC to the telephone network as described in the modem's user manual.
2. Connect the Sunny Boy Control / Plus to the telephone network as described in the NET Piggy-Back's user manual.
3. Use the software provided with the PC operating system to establish the connection between the two devices.

5.2.6 Connection via the Ethernet NET Piggy-Back



Ethernet Network Communication Characteristics

- Any number of Sunny Boy Control / Plus devices can be connected to a PC via the Ethernet network. The only limitation is the capability of the PC, whereby the main memory is the limiting factor.
- A Sunny Boy Control / Plus can be connected directly to a PC.
- The PC must be equipped with an Ethernet network card.
- Each Sunny Boy Control / Plus requires an "Ethernet" version of the NET Piggy-Back.

Cabling Recommendations

The cable length and quality can adversely affect the signal quality. To achieve good results, please observe the following instructions.

- For the connection to a hub or router, you require a patch cable.
For the direct connection to a PC, you require a crossover cable.
- Use high quality cable, at least category 5 (SFTP Cat 5) or higher shielded twisted pair cable.
- The maximum permitted cable length for Ethernet cable is 100 m.

Connection to an Ethernet Network

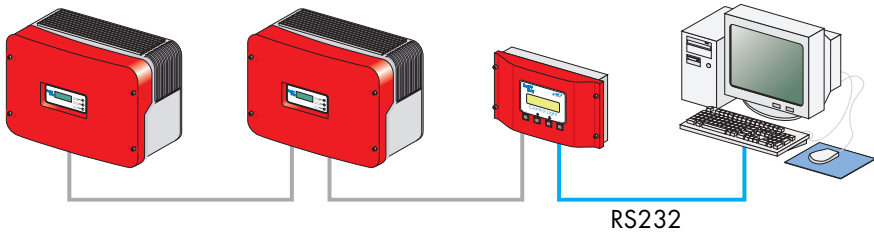
1. Connect the PC to the network as described in the Ethernet network card's user manual.
2. Connect the Sunny Boy Control / Plus to the Ethernet network as described in the NET Piggy-Back's user manual.

Direct Connection to a Single PC

1. Plug one end of the crossover cable into your PC's Ethernet network card.
2. Plug the other end of the Ethernet network cable into the NET socket of the Sunny Boy Control / Plus.
3. Lay the cable properly so that there is no risk of persons tripping over it.

5.3 Sunny Boy Control Light

5.3.1 Connection via RS232



RS232 communication characteristics:

- A maximum of one Sunny Boy Control Light can be connected to a PC.
- The PC must be equipped with an RS232 port. If it is not, please read section 5.1 "Notes on the Use of Level Converters" (Page 23).
- The maximum total cable length is 12 m.

Cabling Recommendations

The connection between the Sunny Boy Control Light and the PC occurs by means of a commercially available null modem cable. Use the null modem cable provided.

If the length proves insufficient, use a commercially available null modem cable of the required length.

Wiring Diagram

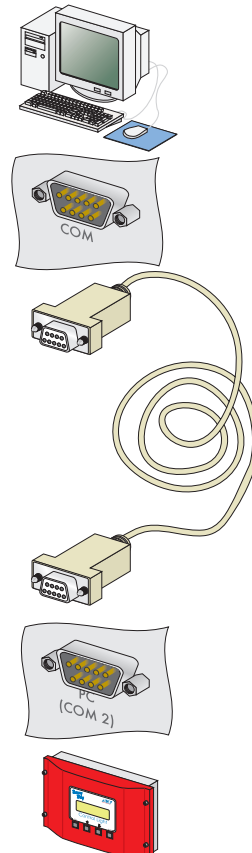


Observe all safety instructions in the Sunny Boy Control / Plus documentation, and in the PC documentation.



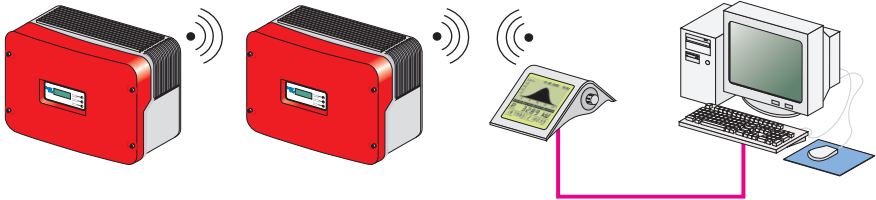
Shut down the PC before you connect the Sunny Boy Control / Plus, as otherwise one or both COM ports may become damaged.

1. Use the provided null modem cable, or a commercially available null modem cable of the required length.
2. Plug the 9-pin D-Sub female connector into a free COM port on your PC.
3. Lay the cable properly so that there is no risk of persons tripping over it.
4. Plug the 9-pin D-Sub female connector into the PC (COM2) port on the Sunny Boy Control Light.



5.4 Sunny Beam

5.4.1 Connection via USB



USB Communication Characteristics

- A maximum of one Sunny Beam can be connected to a PC.
- The PC must be equipped with a USB port.
- The maximum total cable length is 3 m.

Connection

1. Connect the Sunny Beam to the PC as described in the Sunny Beam's user manual.

6 Installation of Sunny Data Control

Sunny Data Control can be downloaded from the SMA web server or ordered as a CD.

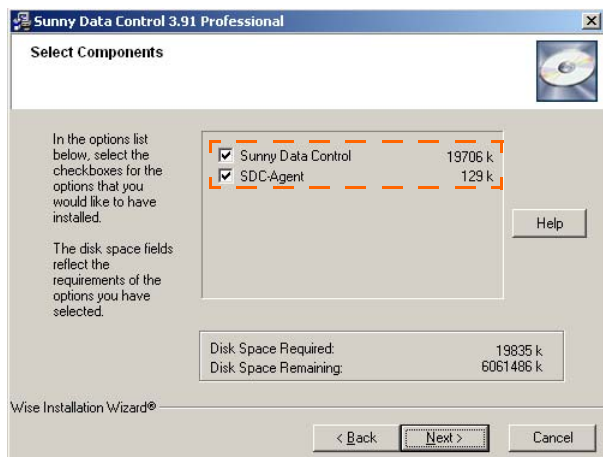
6.1 Installing Sunny Data Control

1. Before installation, close all Windows programs on your PC.
2. Start the Sunny Data Control installation program (setup file) on your PC. The Sunny Data Control installation window opens (see figure to the right).
3. Follow the program's on-screen instructions.



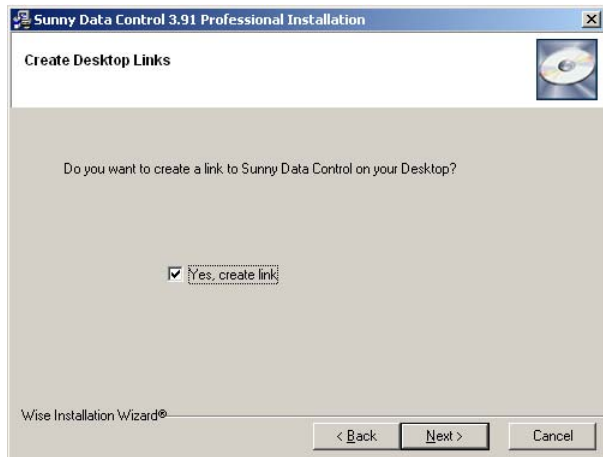
SDC Agent

4. If you also wish to use Sunny Data Control for online presentation of your PV plant, add a check mark next to "SDC Agent" (not necessary for Sunny Portal).



Program Shortcut

5. If a program shortcut (see figure below) for Sunny Data Control is to be created on your PC, leave the check mark in place (see figure to the right).



6. Once the installation is finished, you can launch Sunny Data Control.
7. When you launch Sunny Data Control for the first time, no device is as yet configured to be detected by Sunny Data Control. A message appears, which states that it was not possible to establish a connection to the device. Confirm the message by clicking on <Ok>.

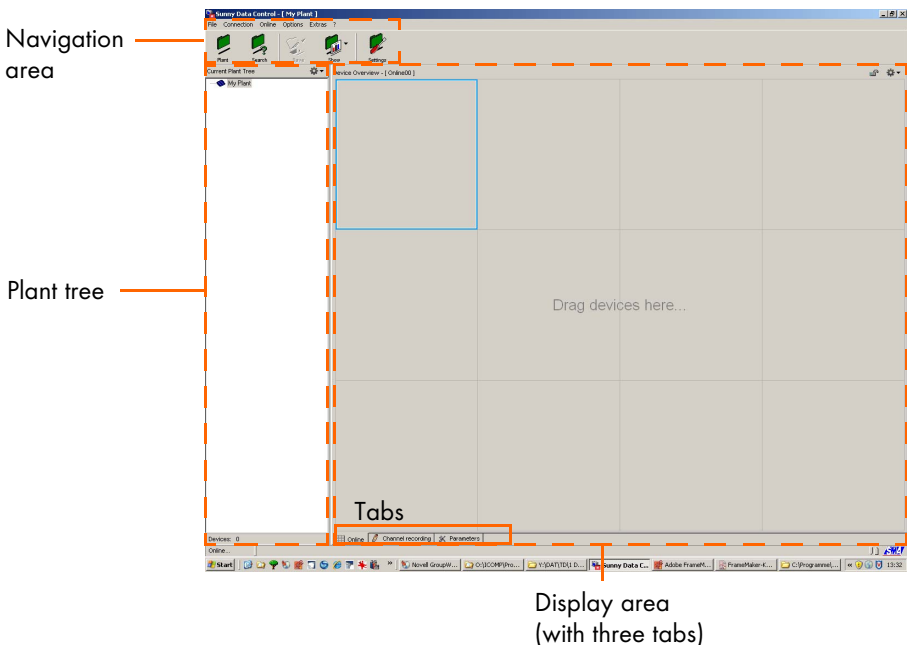


8. If you have not yet connected a device, connect it as described in section 5 "Connecting the PC to a Communication Device" (Page 21).
9. Subsequently, create a plant and establish the communication connection as described in section 8 "Initial Settings" (Page 45).

7 Sunny Data Control User Interface

The Sunny Data Control user interface comprises three areas:

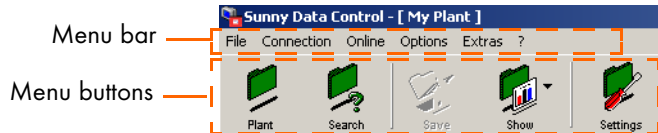
- **Navigation area**
In the navigation area, you can access and use various Sunny Data Control functions.
- **Plant tree**
In the plant tree, the currently selected plant is displayed, along with its devices which you have detected with Sunny Data Control.
- **Display area**
In the display area, three different views can be called up via the three tabs (see figure below).
 - Online (here, the page "Device Overview" is displayed)
 - Channel recording (here, the page "Archive Channels" is displayed)
 - Parameters (here, the page "Parameters" is displayed)



7.1 Navigation Area

The navigation area comprises the menu bar and the menu buttons.

The menu buttons correspond to the most frequently required menu items, and are thus made available to you as convenient menu buttons for quick access. You can also call up these menu items via the menu bar.



The menu bar comprises six main menus:

1. File
2. Connection
3. Online
4. Options
5. Extras
6. ?

The menu buttons correspond to the most frequently required menu items:

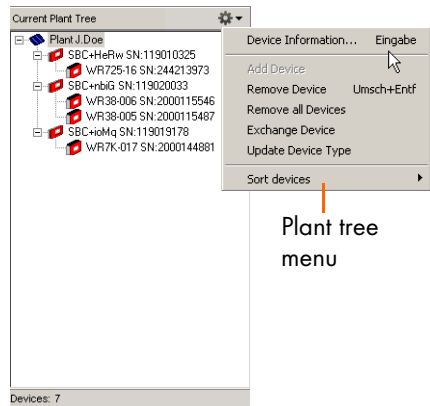
- Plant
Also accessible in the navigation area via "Options / Choose Plant".
- Search
Also accessible in the navigation area via "Options / Device Detection".
- Save
This button can only be selected if the archive channels are currently displayed in the display area. You can call up the archive channels in the display area via the "Channel recording" tab.
- Show
- Settings
Also accessible in the navigation area via "Options / Settings".

7.2 Plant Tree

In the plant tree, the currently selected plant is displayed, along with its devices, which you have detected with Sunny Data Control.

Here, via the plant tree menu, you can, for example, call up the device information of the selected device, remove the selected device, add devices, sort devices, or replace devices.

Some of the actions which you can select in the plant tree menu apply to the currently selected device, while other actions apply to all devices.



Plant tree
menu

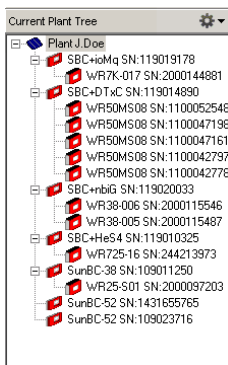
You can call up the plant tree menu for the respective device by clicking on the name of the device with the right mouse button, or by clicking on the icon pictured here to the right (see also figure above):



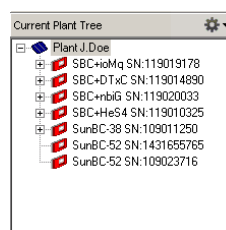
If you call up the plant tree menu via the icon, you must first highlight the respective device by clicking on the device's name.

Expanding and Collapsing the Plant Tree

You can expand and collapse the plant tree by clicking on the nodes (+/- symbols). This function is a practical way to maintain an overview if you have a plant with many devices.



Expanded plant tree



Collapsed plant tree

7.3 Display Area

In the display area, three different pages can be called up via the three tabs (see figure below):

- Online (here, the page "Device Overview" is displayed)
- Channel recording (here, the page "Archive Channels" is displayed)
- Parameters (here, the page "Parameters" is displayed)

You can call up the Device Overview menu ("Online" tab) via the following icon:



(see also figure below), or by clicking on the field of the respective device with the right mouse button. Some of the actions which you can select in the display area menu apply to the currently selected device, while other actions apply to all devices.

Name of the current page (here: Device Overview)

Lock
online display
(device overview)

Three tabs
(here: "Online" tab active)

Device overview menu
("Online" tab)

Single device information
Strg+I
Activate Total Overview
Strg+T
Fade in devices
Fade out devices
Channel Selection
Change font
Strg+F
Maximize online display
Strg+Z
Overview Management
Strg+O
Online
Write Online Data File
Online locked

8 Initial Settings

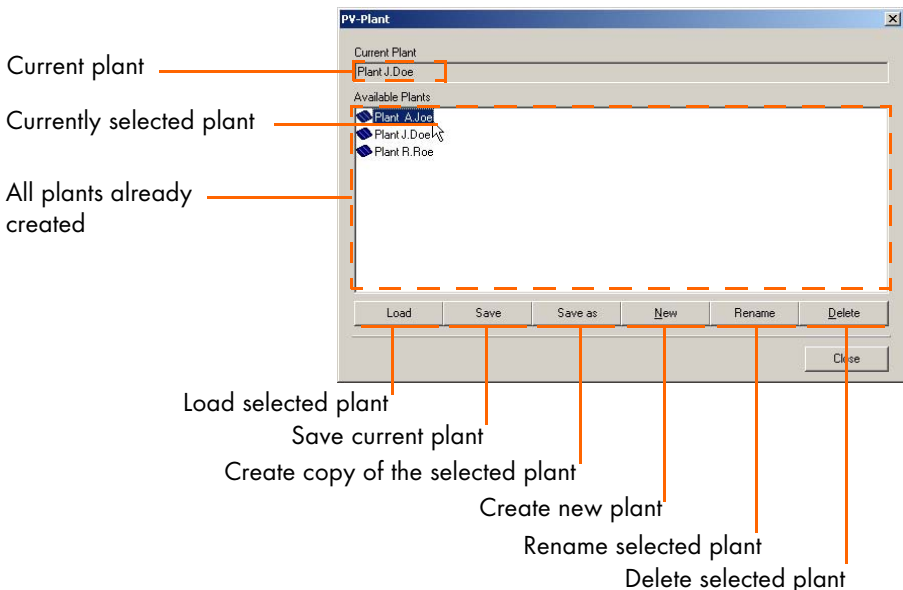
8.1 Creating Plants

With Sunny Data Control, you can create, manage and monitor one or more plants (e.g. as an installer). However, it is only ever possible to display and edit one plant at a time (current plant) in the Sunny Data Control window. If you manage several plants, you must first load the respective plant (see section 8.2 "Loading a Plant" (Page 49)).

Detected devices and settings, such as the communication connection or parameters, always refer to the respective plant, and are saved as settings for the respective plant.

8.1.1 Brief Overview

You can call up the window for creating and selecting plants via the menu item "Options / Choose Plant", or via the "Plant" icon (see figure below). By default, a plant with the name "My Plant" is always created automatically during installation.



8.1.2 Changing Plant Names, Creating / Deleting Plants

Changing the Plant Name

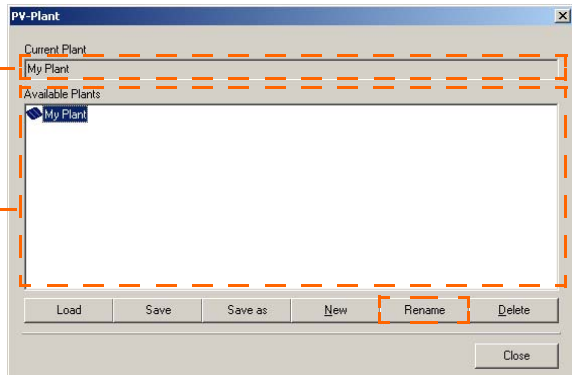
By default, a plant with the name "My Plant" is always created automatically by Sunny Data Control during installation. You can change the plant name which is displayed in Sunny Data Control, create additional plants, or delete plants.

1. Select "Options / Choose Plant", or click on the "Plant" icon (see figure to the right).
The "PV-Plant" window opens.

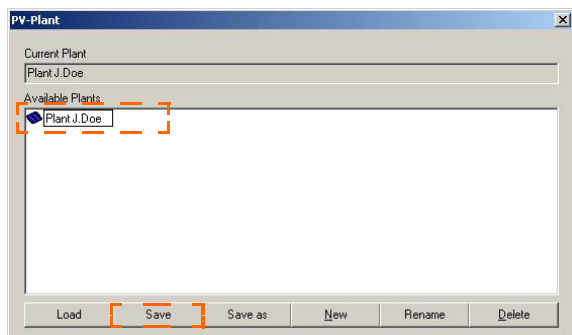


Current plant

All plants already created



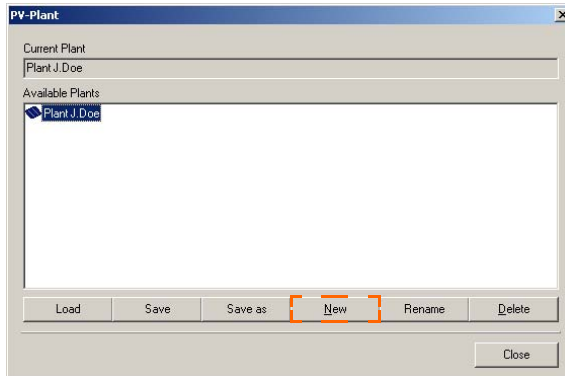
2. In the "Available Plants" field, click on "My Plant", so that it is highlighted.
3. Click on <Rename>. The name of the selected plant can now be written over.
4. Type in the desired name for the plant.



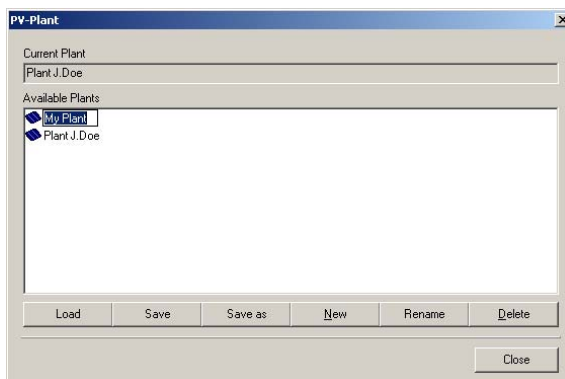
5. Click on <Save> in order to save the new name, or click on the white area of the window.

Creating Plants

1. Select "Options / Choose Plant", or click on the "Plant" icon (see figure to the right).
The "PV-Plant" window opens.



2. Click on <New> to create a new plant. A new plant with the name "My Plant" is created. The name can now be written over.
3. Type in the desired name for the plant.



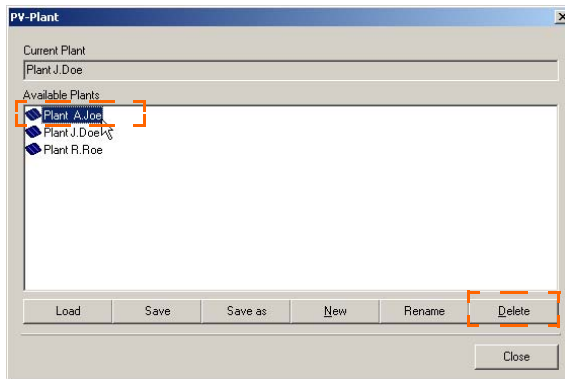
4. Click on <Save> in order to save the new name, or click on the white area of the window. You can create additional plants in the same manner.

Deleting Plants



If you delete a plant, the complete plant is deleted, along with all settings and detected devices! The saved Excel files are retained.

1. Select "Options / Choose Plant", or click on the "Plant" icon (see figure to the right).
The "PV-Plant" window opens.

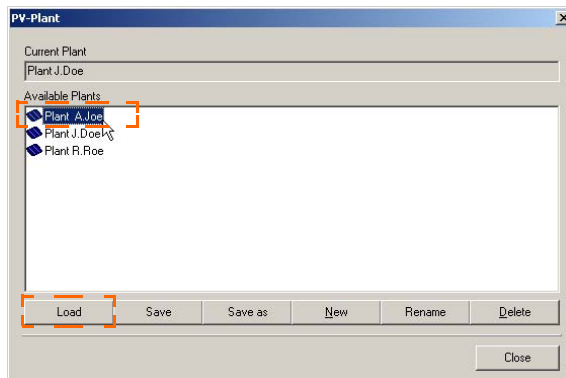


2. Select the plant which you wish to delete by clicking on the name of the plant.
3. The selected plant is immediately deleted, along with all settings and detected devices, when you click on <Delete>. You can delete additional plants in the same manner.

8.2 Loading a Plant

If you have created more than one plant, you must first load the plant which you wish to edit or display. It is only ever possible to display and edit one plant at a time (current plant) in the Sunny Data Control window.

1. Select "Options / Choose Plant", or click on the "Plant" icon (see figure to the right).
The "PV-Plant" window opens.



2. Select the plant which you wish to load by clicking on the name of the plant.
3. Click on <Load> to load the selected plant.

8.3 Setting the Communication Connection

According to your selected type of connection to the PC, you must set the corresponding connection in Sunny Data Control.

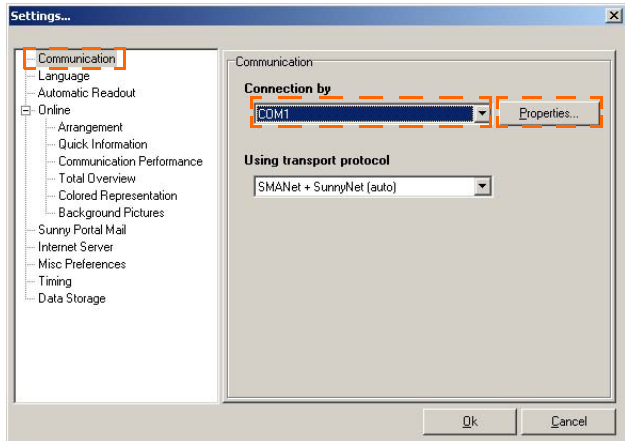
The communication connection setting always refers to the current plant, and can be set differently for each plant.

In Sunny Data Control, you can set the connections listed below, which are described in the sections which follow.

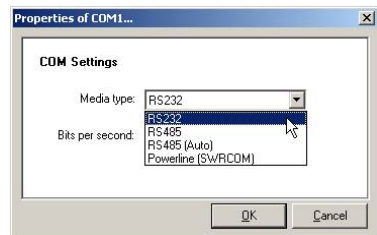
- COM1, 2, 3, etc.
(here, your PC's COM ports are listed: COM1, COM2, etc.)
See section 8.3.1 "COM1 - COM255" (Page 51).
- "Modem"
(here, the type name of the modem installed at your PC is displayed)
See section 8.3.2 "Modem" (Page 52).
- Network
See section 8.3.3 "Network" (Page 53).
- Sunny Beam (USB)
See section 8.3.4 "Sunny Beam (USB)" (Page 56).

8.3.1 COM1 – COM255

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right).
The "Settings..." window opens.
2. Select "Communication".
3. In the drop-down list "Connection by", select the COM port, via which the Sunny Boy Control is connected to your PC. The COM ports are labeled on your PC (1, 2, 3, etc.).
4. Click on <Settings>.



5. The connection settings window opens. In the "Media type:" drop-down list, select the medium via which the Sunny Boy Control is connected to your PC's COM port.



The following medium types can be selected:

- RS232
 - RS485
If you select RS485, you must first deactivate the serial port's FIFO buffer, as described in your operating system's user manual.
 - RS485 (auto)
 - Powerline (SWRCOM)
6. In the "Bits per second:" drop-down list, select the baud rate. For a connection between PC and Sunny Boy Control less than 15 m in length, we recommend transfer with RS232 at 19,200 baud.
 7. Click on <Ok> to apply the settings.
 8. In the "Using transport protocol" drop-down list, select the appropriate transport protocol for the connected device, as described in section 8.3.5 "Setting the Transport Protocol" (Page 57).
 9. Click on <Ok> in the "Settings..." window in order to save the settings.

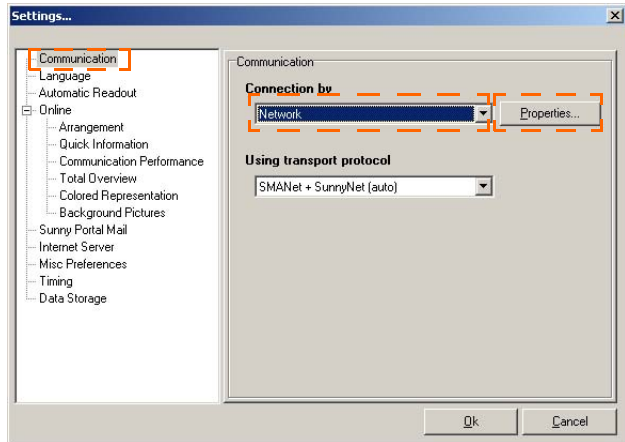
8.3.2 Modem

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right).
The "Settings..." window opens.
2. Select "Communication".
3. In the drop-down list "Connection by", select "Modem".
4. Click on <Settings>.
5. Enter the telephone number.
6. In the "Using transport protocol" drop-down list, select the appropriate transport protocol for the connected device, as described in section 8.3.5 "Setting the Transport Protocol" (Page 57).
7. To save the settings, click on <Ok>.



8.3.3 Network

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right).
The "Settings..." window opens.
2. Select "Communication".
3. In the drop-down list "Connection by", select "Network".
4. Click on <Settings>.

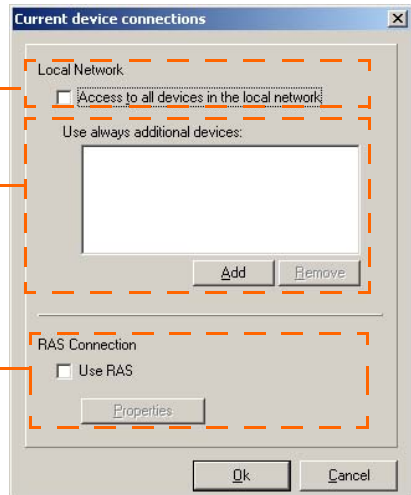


The network settings window opens.

Select whether all devices in the local network are to be detected.

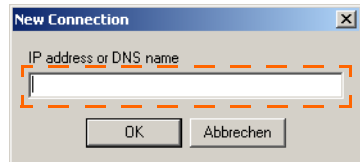
Define which additional devices are to be detected (add IP addresses or DNS names of the devices).

Select whether RAS is to be used (set the telephone number of the external modem).



Local Network

5. If you wish to detect all devices which are connected to your local network, add a check mark alongside "Access to all devices in the local network...".
6. If you wish to detect additional devices, click on <Add>. The window for configuration of a new connection opens.
7. In the field "IP address or DNS name", enter the IP address or DNS name of the device in the network which you wish to detect.



The default IP address of a Sunny Boy Control is 10.170.170.170.

8. Then click on <Ok>. The IP address or DNS name of the device is displayed in the "Use always additional devices:" window (see figure to the right with an example IP address added). You can remove the currently selected device using <Remove>.

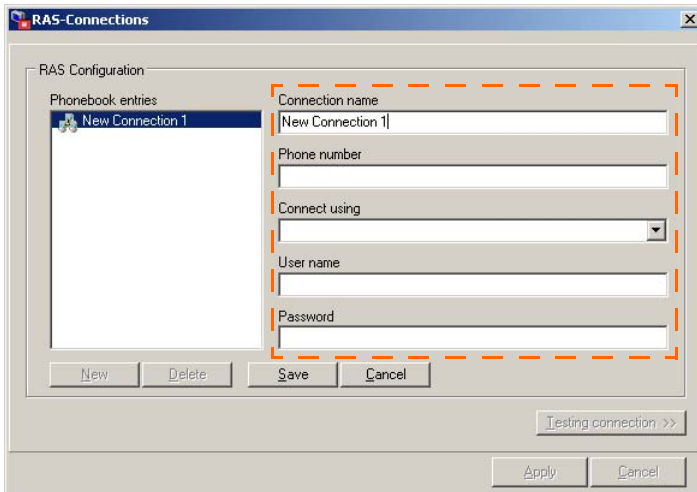


RAS Connection

You can access an external modem (if access to it has been enabled for you) via an RAS connection, in order to query the data from Sunny Data Control on this connection.

If you wish to access an external modem from your PC, the RAS service must be installed and configured on your PC, and on the PC which you wish to access.

9. If you wish to detect devices via an RAS connection, place a check mark in the "Use RAS" check box. The RAS connection configuration window opens (see figure below).



10. Connection name:
In the field "Connection name", enter the name with which you wish to identify this connection (e.g. Smith Family). Choose a descriptive name, so that you can recognize the connection.
11. Telephone number:
In the field "Telephone number", enter the telephone number of the modem (connection) which you wish to access.
12. Connection by:
In the "Connection by:" drop-down list, select the connection.
13. User name:
In the "User name" field, enter the user name which has been conveyed to you by the owner of the connection.
14. Password:
In the "Password" field, enter the password which has been conveyed to you by the owner of the connection.

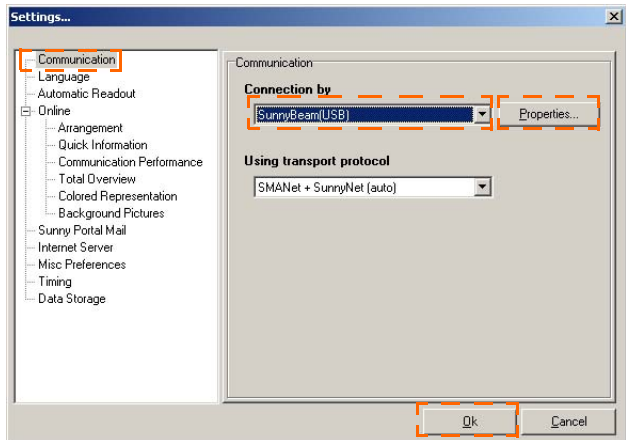
15. If you wish to test whether the connection is functioning, click on <Testing connection>.
16. Click on <Save> to save the settings. The new connection is displayed in the field "Phonebook entries".
17. Click on <Apply>. The "Current device connections" window is displayed once more.
18. In the "Using transport protocol" drop-down list, select the appropriate transport protocol for the connected device, as described in section 8.3.5 "Setting the Transport Protocol" (Page 57).
19. Click on <Ok> to apply the settings.

8.3.4 Sunny Beam (USB)

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right).
The "Settings..." window opens.



2. Select "Communication".
3. In the drop-down list "Connection by", select "Sunny Beam (USB)".



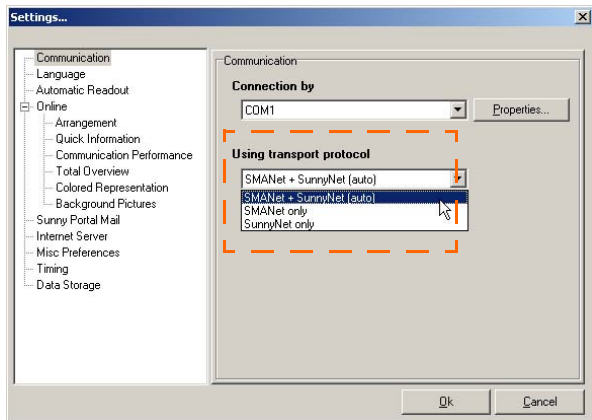
4. If you wish to see which Sunny Beam devices are already detected, click on <Settings>.
5. To save the settings, click on <Ok>.

8.3.5 Setting the Transport Protocol

According to whether you have connected a communication device or an inverter to the PC, set the appropriate transport protocol for the respective device type listed below.

If you are unsure which transport protocol to set, select "SMANet + SunnyNet (auto)".

Sunny Data Control then automatically searches for the correct transport protocol.



Communication Devices

- Sunny Boy Control / Plus / Light
 - The Sunny Boy Control can operate with either transport protocol. The default setting in the Sunny Boy Control is SMA-Net. Select the transport protocol which is set in your Sunny Boy Control.
- Sunny Beam
 - Select "SMANet".

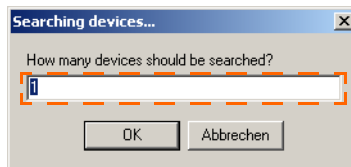
Inverters

- SMA-Net
 - Sunny Boys of type SWR, version BFR 8.22 or above
 - All Sunny Boys of type SB
 - All Sunny Mini Centrals
 - All Sunny Centrals
- Sunny-Net
 - Sunny Boys of type SWR prior to version BFR 8.22

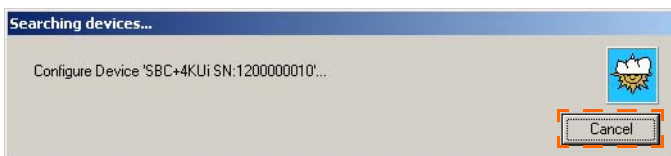
8.4 Detecting Devices

By default, Sunny Data Control detects the following communication devices: Sunny Beam without inverters, Sunny Boy Control with the inverters to which it is connected, and an inverter connected directly to the PC. If necessary, you can narrow the scope of detection, as described in section 8.4.1 "Narrowing the Scope of Device Detection" (Page 59).

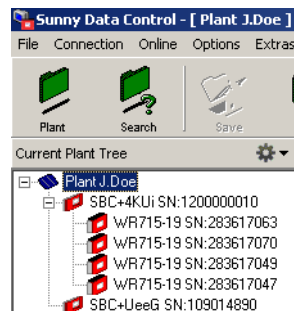
1. If you have created more than one plant, load the plant for which you wish to detect devices. Click on the <Plant> icon, and load the desired plant.
2. Select "Options / Device Detection", or click on the "Search" icon (see figure to the right).
The "Searching devices" window opens.



3. In the field "How many devices should be searched?", enter the number of devices for which you wish to search.
4. Click on <Ok>. The detection process starts. The devices are searched for. Wait until the search is finished. The window (see figure below) closes when the search is complete.
If you wish to cancel the search, click on <Cancel>.



The detected devices are shown in the plant tree (see figure to the right).

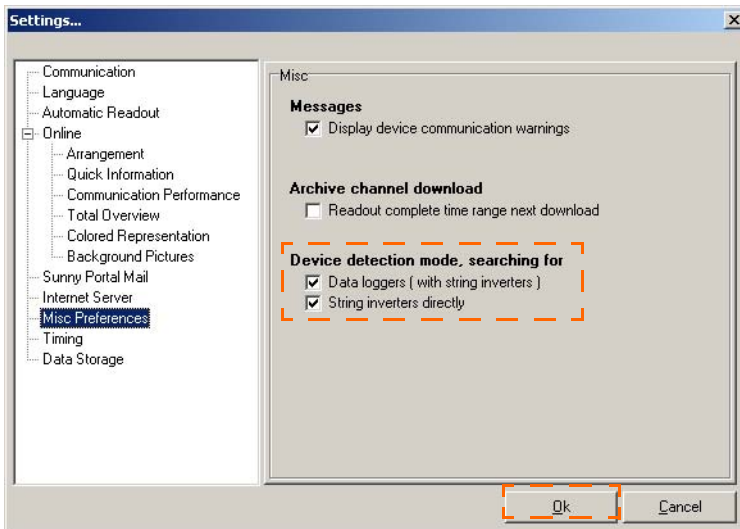


8.4.1 Narrowing the Scope of Device Detection

The scope of device detection can be limited to the communication devices and the inverters connected to them, or to an inverter connected directly to the PC.

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right).

The "Settings" window opens.



2. Select "Misc".
3. Beneath "Device detection mode, searching for", you can select whether the scope of the search is to include data loggers (communication devices) with inverters and/or directly connected inverters.

Add or remove check marks in the appropriate fields.

4. Click on <Ok> to save the settings.
5. Start the device detection process, as described in section 8.4 "Detecting Devices" (Page 58).

9 Setting Parameters (Installer)

Sunny Data Control makes it possible to set parameters for inverters and for the Sunny Boy Control, in order to specify operating modes for individual devices. The type and scope of the displayed parameters depend on the security level. If you are logged in as an installer, you can set more parameters. The security level is set via the menu item "Extras / Security Level". See section 13.10 "Changing the Security Level (Installer Password)" (Page 205). Type in the installer password there.

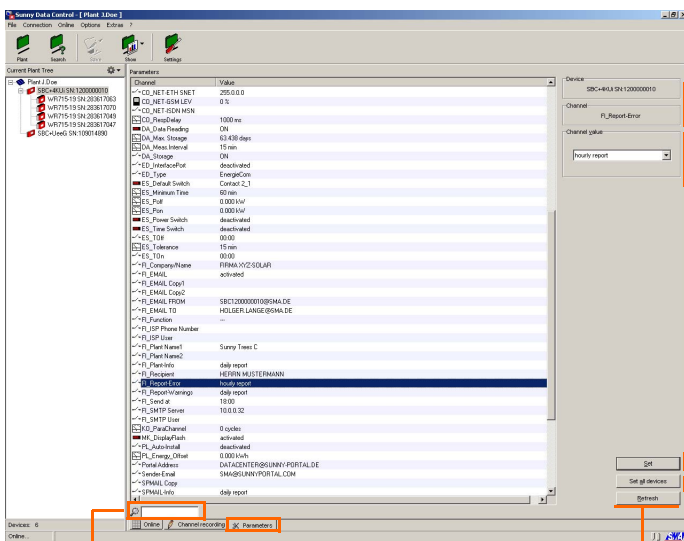
With the Sunny Data Control program, your PV plant's safety-related inverter parameters can be changed. Such parameters may only be changed after consulting your energy supply company.



The "Parameters" window (third tab at the bottom) shows the parameter list of the currently selected device from the plant tree.

Some parameters serve merely as information regarding the factory settings, whereas others are adjustable. If you select an adjustable parameter, you can change the present channel value in the "Channel value" field.

Brief Overview



Selected device and channel

Adjust channel value

Set new channel value

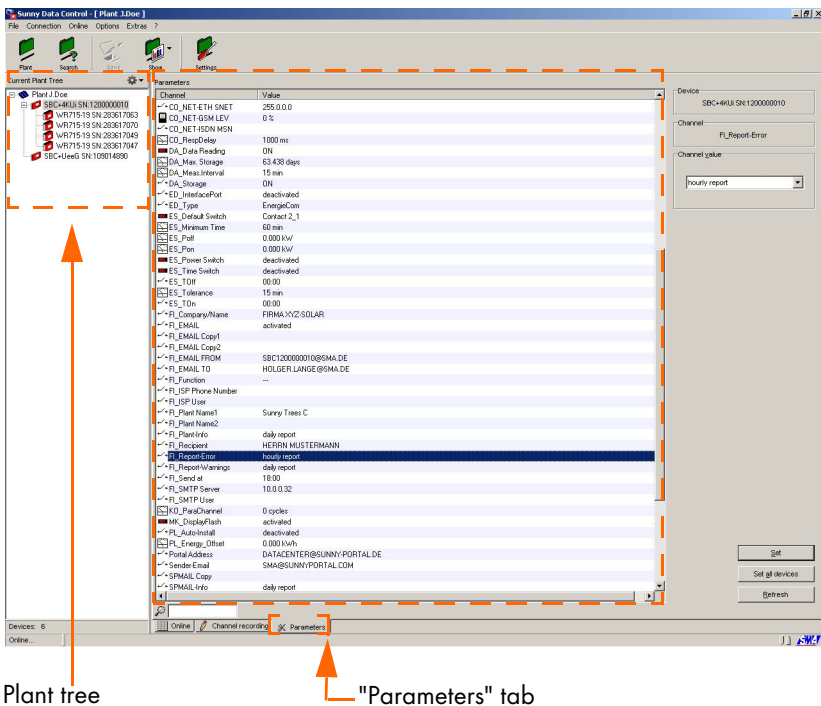
Apply new channel value to all devices of the same type

Search for parameter

"Parameters" tab

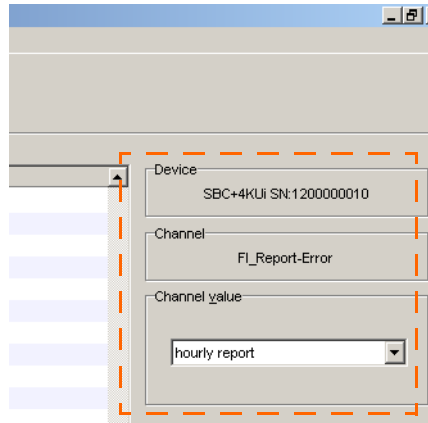
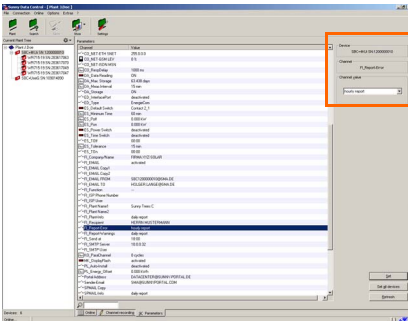
Permanently save parameter settings in device

1. Click on the "Parameters" tab at the lower edge of the screen (see figure below).



2. In the plant tree (see figure above), click on the device for which you wish to adjust parameters.
3. In the "Parameters" list, click on the channel which you wish to adjust.

In the upper right-hand corner of the screen, you can check your selection by means of the displayed data (see figure below).



Enlarged section of depicted example

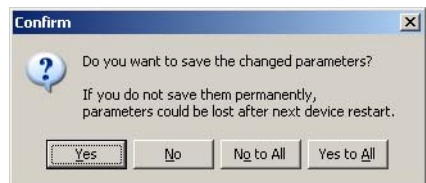
- **Device:**
Displays the name of the selected device.
 - **Channel:**
Displays the name of the selected channel.
 - **Channel value:**
A field is only displayed here if the channel is adjustable. Here, depending on the channel type, you can either enter a value yourself, or set a channel value by selecting one from the drop-down list.
4. Set the desired value in the "Channel value" field.
 5. You can now apply this channel value by means of the buttons in the lower right-hand corner of the screen.

<Set>: Apply value only to the selected device.

<Set all devices>: Apply to all devices of the same type.

<Refresh>: Permanently save the parameter settings in the device.

If you click on <Refresh>, a prompt window opens. If you wish to save the parameter settings permanently in the device, click on <Yes>.

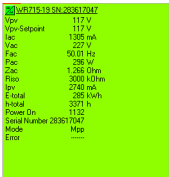
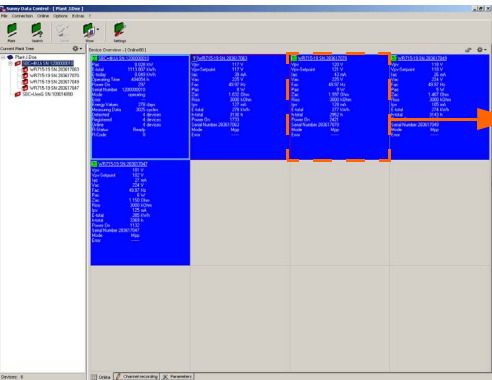


10 Displaying Data

For display of the present operating data, various display options are at your disposal. In order to manage the copious amounts of data which arise, you can combine these options according to the overall size of your plant and the respective display requirements regarding clarity and informative value.

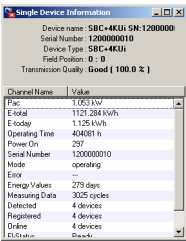
The following options for displaying spot values are at your disposal:

- Device overview (with individual device fields)
- Single device information
- Quick information
- Total overview



Device field

Device overview



Single device information



Quick information



Total overview

You can assign each individual display mode to each selected measuring channel. In so doing, it is also possible to assign several display modes to the same channel.

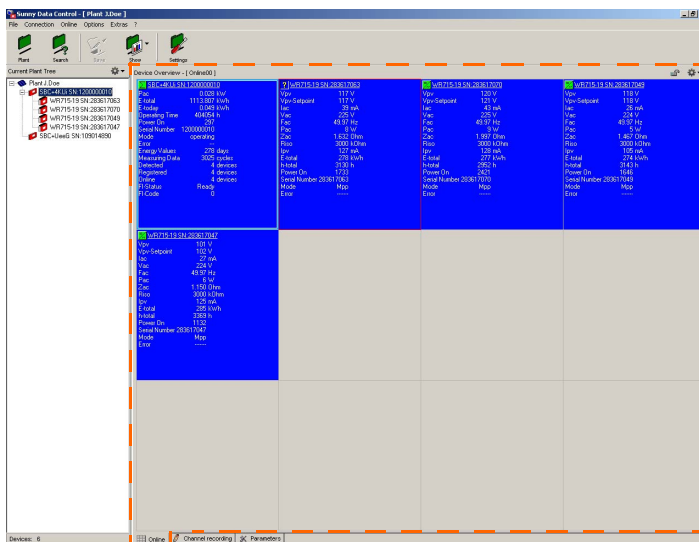
The following sections describe the individual steps necessary for the display of the present operating data.

10.1 Creating a Device Overview

The "Online" window (first tab at the bottom), in which the device overviews are displayed, provides a quick and informative display of the present operating mode of your entire plant. Here, you can set up an overview of your plant's devices, and their respective operating modes.

The "Device Overview" page is subdivided into fields (see figure below). One device can be displayed in each field.

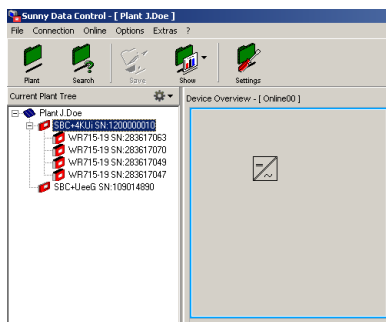
You can create and save several device overviews for each plant. This function is useful, for example, with plants which include many devices, because it provides a clearer overview, and different data views can be saved (see section 10.9 "Overview Management" (Page 92)).



"Online" tab

- Simply drag and drop the device (e.g. Sunny Boy Control or inverter) onto the desired field in which the device is to be displayed.

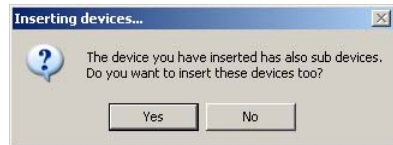
(To drag and drop: click on the name of the device with the left mouse button, hold the mouse button pressed, drag the device into the desired field, and release the mouse button.)



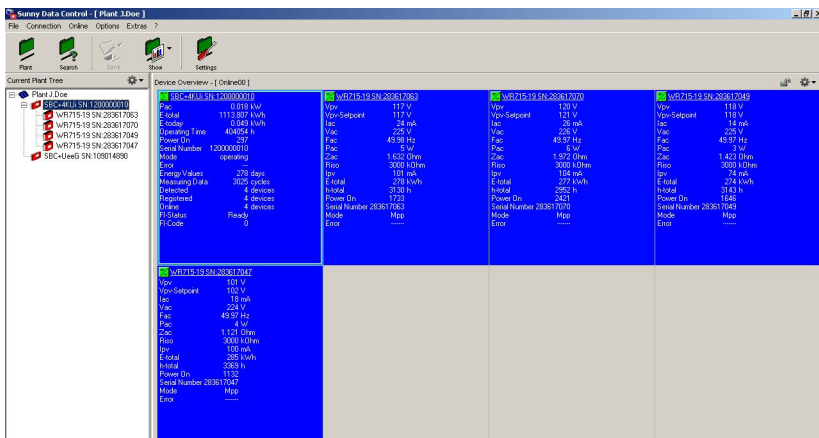
You can only drag each device into the device overview once. You can only drop a device into an empty field.



- If you have dragged a Sunny Boy Control into a field, a prompt window opens. If you want all of the inverters which belong to the Sunny Boy Control to be added to the overview, click on <Yes>. If, for the time being, you only wish to add the Sunny Boy Control, click on <No>.



Depending on whether you have clicked <Yes> or <No> in the prompt window, either just the Sunny Boy Control, or the Sunny Boy Control with all of its inverters, are added to the device overview (see figure below).



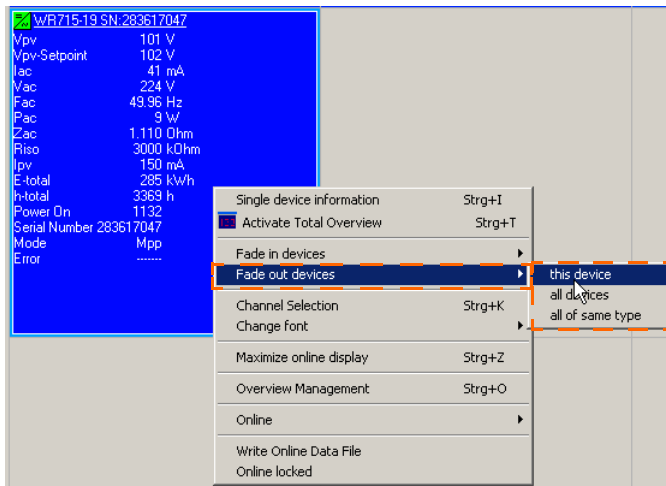
- In this manner, you can drag the other devices from the plant tree into the device overview fields.

Repositioning the Occupied Fields

- You can move the occupied fields within the device overview by dragging the respective occupied field onto an empty field. Thus, you are able to represent the actual structure of your plant pictorially in the overview display, or to combine several devices in groups.

10.1.1 Displaying or Concealing Devices

1. If you wish to remove (conceal) a device which is in the device overview, click on the respective device with the right mouse button.
The Device Overview menu opens.

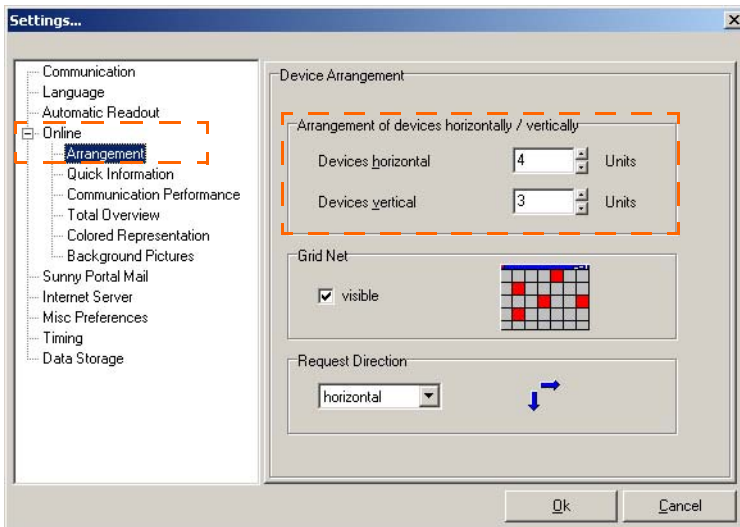


2. Select <Fade out devices>.
You can now select whether you wish to conceal <this device>, <all devices>, or <all of the same type>.
3. If you wish to display the devices again, select <Fade in devices> in the Device Overview menu.

10.1.2 Arranging the Fields

If you wish to display more devices in the device overview than the number of fields allows, you must subdivide the device overview into more fields.

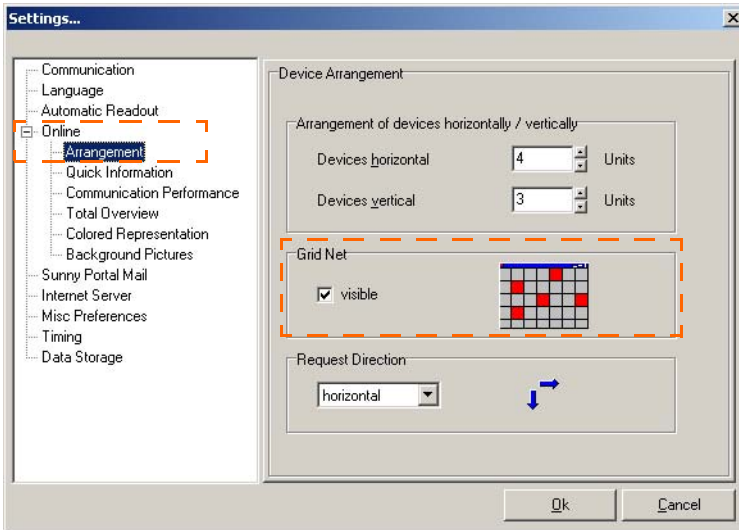
1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.
2. Select "Spotvalue Request / Arrangement".



3. Select "Spotvalue Request / Arrangement".
4. In the area "Arrangement of devices horizontally / vertically", enter the number of fields that you wish to have displayed beside each other (horizontal) or above each other (vertical).
Up to 100 x 100 fields can be displayed. If you wish to increase the number of fields to such an extent that the devices which are already displayed will no longer have sufficient space to be fully displayed in the new device overview, the adjustment of scale is ignored.

10.1.3 Displaying or Concealing the Graticule

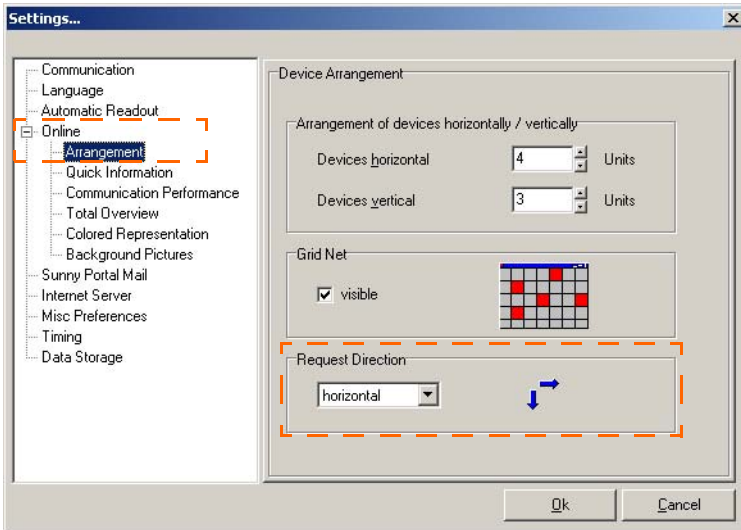
1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.
2. Select "Spotvalue Request / Arrangement".



3. In the "Grid Net" area, add or remove the check mark in the "visible" check box. If you add the check mark, the graticule is visible in the device overview.

10.1.4 Setting the Data Query Sequence

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.
2. Select "Spotvalue Request / Arrangement".



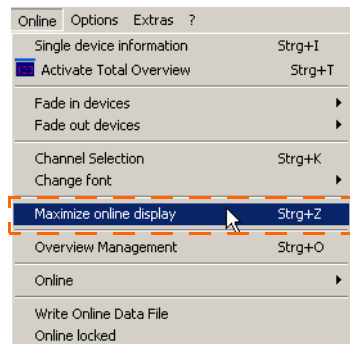
3. In the "Request Direction" drop-down list, set the sequential order for data queries. Horizontal = row by row, vertical = column by column.

10.1.5 Maximizing the Device Overview (Online Display)

You can display the device overview in an enlarged format, covering the entire screen.

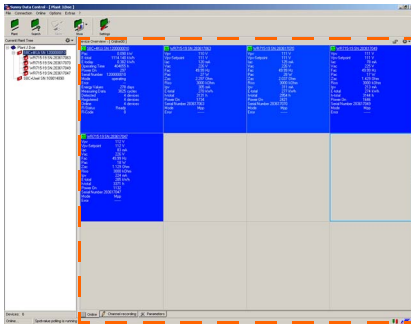
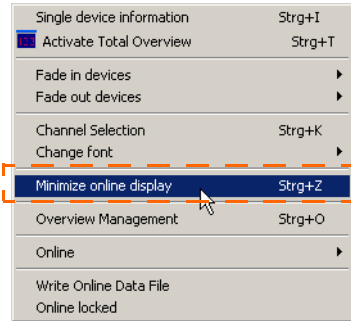
1. Select "Online / Maximize online display" (see figure to the right). The device overview is shown in an enlarged format, covering the entire screen. The plant tree and the menu bar are concealed.

You can also call up this display as follows: click on the device overview with the right mouse button. The device overview menu opens. Select "Maximize online display".

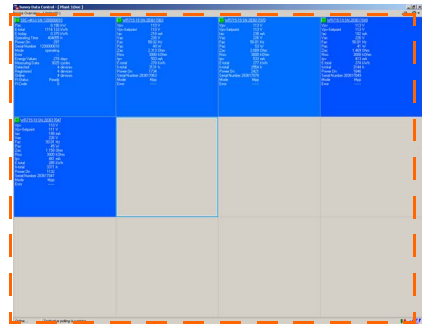


2. To return the enlarged display to its minimized format, click on the device overview with the right mouse button. The device overview menu opens. Select "Minimize online display".

The device overview is again displayed in its smaller format. The plant tree and menu bar are visible again.



Minimized device overview

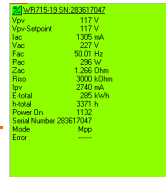
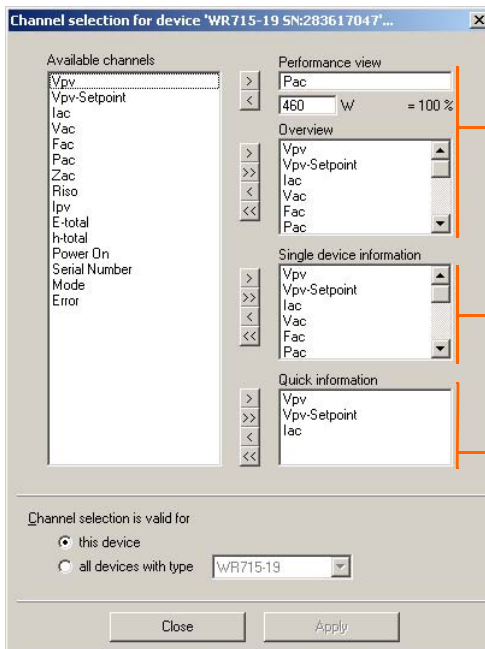


Maximized device overview

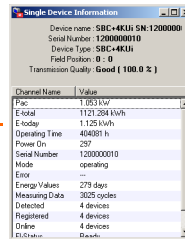
10.2 Selecting Channels for Spot Value Queries

For each device which is displayed in the device overview ("Online" tab), you can define which channels are to be displayed in the various spot value queries (see figures below). The default setting of the overview display, and of the single device view, is to display all available channels. The channel selection can be set for each device type, or for each individual device.

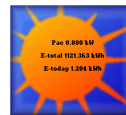
Various spot value queries



Overview display of a device from the device overview



Single device information



Quick information (max. 4 channels can be displayed)

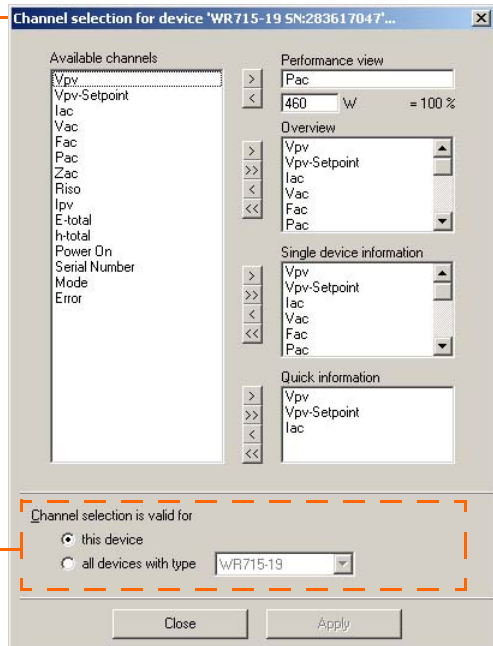
-  Copy selected channels from the left-hand field into the respective field on the right
-  Copy all channels from the left-hand field into the respective field on the right
-  Delete selected channels from the respective field on the right
-  Delete all channels from the respective field on the right

To select several channels, hold down the "Ctrl" key on your keyboard, and click on the channels with the mouse.

1. In the device overview, use the right mouse button to click on the field of the device for which you wish to set the channels for spot value queries. The device overview menu opens.
2. Select "Channel Selection". The window for setting the selected device's channels opens (see figure below).

You can also call up this window as follows: select the device for which you wish to set the channels by clicking on the device's field with the left mouse button in the device overview. Select the menu item "Online / Channel Selection".

Selected device
(clicked on previously)



Select whether the channel selection shall only apply to this device (clicked on previously) or for a particular device type.

3. Under "Channel selection is valid for" (see figure above), select whether you wish to set the channel selection for the selected device only, or for all devices of a particular type.
4. Use the arrow buttons to add or remove the desired channels for the respective spot value queries.

10.3 Setting the Performance Display

The individual device fields in the device overview can change color according to the devices' calculated capacity utilization.

The capacity utilization is calculated on the basis of one channel (default channel: Pac). The color behavior of the device field during spot value querying is determined by this channel, and by the value for 100 % capacity utilization.

You can change the channel, and specify the threshold channel value, which is to indicate that the device is performing at 100 % capacity. The performance display can be defined for individual devices, or for a device type.

1. In the device overview, use the right mouse button to click on the field of the device for which you wish to configure the performance display. The device overview menu opens.

2. Select "Channel Selection". The window for setting the selected device's channels opens (see figure to the right).

You can also call up this window as follows: select the device for which you wish to set the channels by clicking on the device's field with the left mouse button in the device overview. Select the menu item "Online / Channel Selection".

3. Under "Channel selection is valid for" (see figure to the right), select whether you wish to set the performance display for this device only (previously clicked on), or for all devices of a particular type.

Device Overview - [Energy]

WR715-19 SN:20301700 Ppv 0.000 kW E-total 1152.001 kWh E-setpoint 0.701 kWh Operating Time 400133 h Power On 257 Serial Number 1200000010 Mode operating Error Energy Values Measuring Data 321 days Detected 4 devices Registered 4 devices Date 4 devices RI Status 4 devices RI Code Ready RI Code 0	WR715-19 SN:203617003 Vpv-Setpoint 100 V Vpv 100 V Iac 0 mA Vac 228 V Fac 40.99 Hz Pac 0 W Zac 2.282 Ohm Riso 3000 kOhm Ipv 32 mA E-total 283 kWh h-total 2176 h Power On 1752 Serial Number 203617003 Mode Mpp Error	WR715-19 SN:203617007 Vpv 112 V Vpv-Setpoint 113 V Iac 0 mA Vac 227 V Fac 40.99 Hz Pac 0 W Zac 1.061 Ohm Riso 3000 kOhm Ipv 31 mA E-total 261 kWh h-total 2004 h Power On 2468 Serial Number 203617007 Mode Mpp Error
WR715-19 SN:203617009 Vpv 110 V Vpv-Setpoint 110 V Iac 0 mA Vac 226 V Fac 40.99 Hz Pac 0 W Zac 1.915 Ohm Riso 3000 kOhm Ipv 31 mA E-total 278 kWh h-total 2181 Power On 1821 Serial Number 203617009 Mode Mpp Error	WR715-19 SN:203617047 Vpv 100 V Vpv-Setpoint 110 V Iac 0 mA Vac 228 V Fac 40.99 Hz Pac 0 W Zac 1.140 Ohm Riso 3000 kOhm Ipv 32 mA E-total 290 kWh h-total 2015 h Power On 1141 Serial Number 203617047 Mode Mpp Error	

Device overview

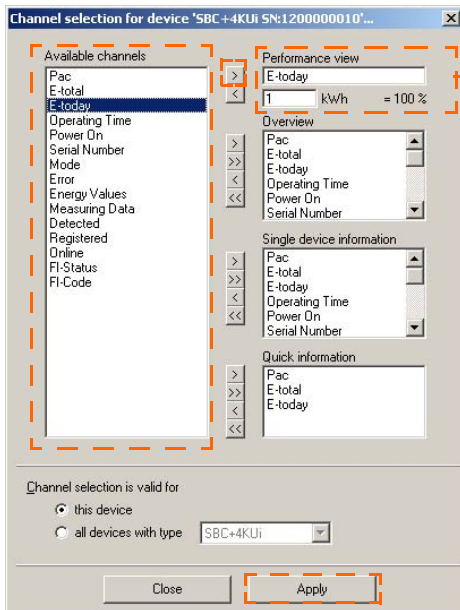
Channel selection for device 'WR715-19 SN:203617047'...

Available channels		Performance view	
Vpv	>	Pac	
Vpv-Setpoint	<	460 W	= 100 %
Iac		Overview	
Vac	>>	Vpv	
Fac	>>	Vpv-Setpoint	
Pac	>>	Iac	
Zac	>>	Vac	
Riso	<<	Fac	
Ipv	<<	Pac	
E-total		Single device information	
h-total	>	Vpv	
Power On	>>	Vpv-Setpoint	
Serial Number	>>	Iac	
Mode	<<	Vac	
Error	<<	Fac	
		Pac	
		Quick information	
	>	Vpv	
	>>	Vpv-Setpoint	
	<	Iac	
	<<		

Channel selection is valid for

☒ this device
☐ all devices with type WR715-19

Close Apply



Example

WR715-19 SN:283617047	
Vpv	117 V
Vpv-Setpoint	117 V
Iac	1305 mA
Vac	227 V
Fac	50.01 Hz
Pac	296 W
Zac	1.266 Ohm
Riso	3000 kOhm
Ipv	2740 mA
E-total	285 kWh
h-total	3371 h
Power On	1132
Serial Number	283617047
Mode	Mpp
Error	-----

Device field

Changes color according to the calculated capacity utilization (depending on the value defined as 100 %)

4. In the "Available channels" list, select the channel which is to form the basis of the capacity utilization calculation, and is to be reflected in the color behavior of the device fields.
5. Add the selected channel to the "Performance view" area by using the arrow button ">".
6. In the field to the left of "= 100 %", enter the value which is to represent 100 % capacity utilization for this channel.
7. Afterwards, click on <Apply> to save your changes.



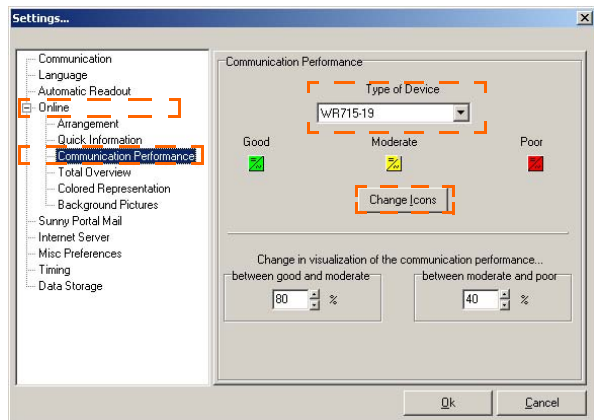
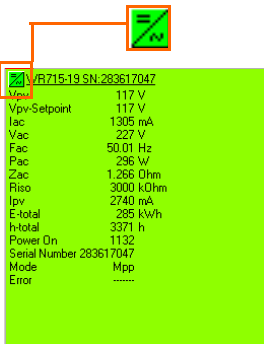
You can set the color scheme of the device fields as described in section 10.5 "Changing the Color Behavior of the Device Fields" (Page 79).

10.4 Setting the Communication Quality

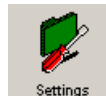
In the device overview, the icon in the upper left-hand corner of each device field indicates the quality of communication from the device to the PC. Depending on the communication quality, the icon changes to the levels "Good", "Moderate", or "Poor".

The following adjustments can be made:

- Changing the icon
- Changing the visualization of communication quality

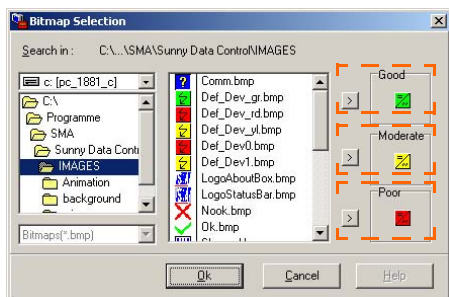


1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.
2. Select "Spotvalue Request / Communication Performance". The "Settings" window opens (see figure above).
3. In the "Type of Device" drop-down list, select the device for which you wish to make the settings.



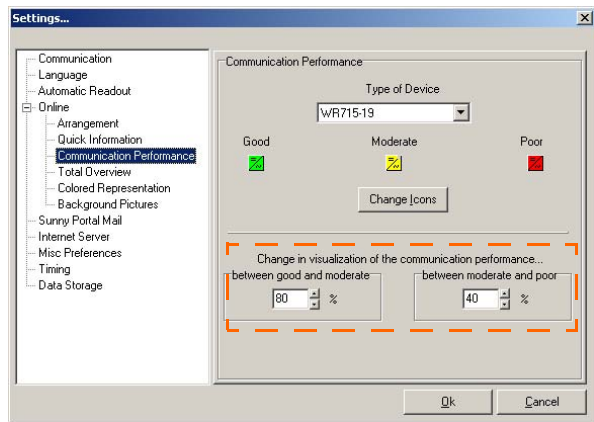
Changing the Icon

4. Click on <Change Icons>. The "Bitmap Selection" window opens.
5. Select the desired icons, and use the arrow buttons to add them to the respective areas (see figure to the right).
6. Click on <Ok> to apply the settings.



Changing the Visualization of Communication Quality

7. To specify when the changes are to occur, enter the threshold values in the area "Change in visualization of the communication performance".



The higher value determines the boundary between "Good" and "Moderate", and the lower value the boundary between "Moderate" and "Poor".

8. Click on <Ok> to save the settings.

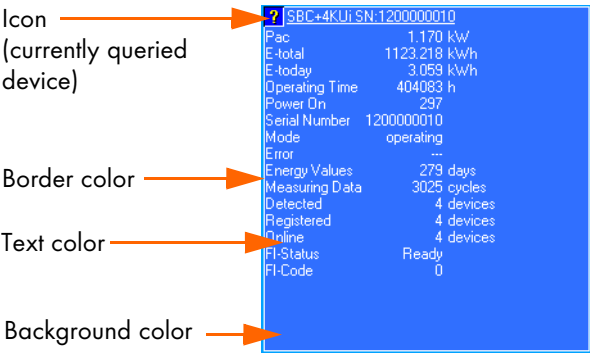
10.5 Changing the Color Behavior of the Device Fields

The following adjustments are possible for the color behavior of the device fields:

- Changing the color scheme
The device fields change color according to capacity utilization. The capacity utilization is calculated on the basis of a channel (default channel: Pac). The color behavior of the device field during spot value querying is determined by this channel, and by the value for 100 % capacity utilization.
You can change the capacity utilization settings as described in section 10.3 "Setting the Performance Display" (Page 75).

- Changing the text color
- Changing the border color of the currently queried device
- Changing the icon for the currently queried device
(default icon is a question mark, see figure below)

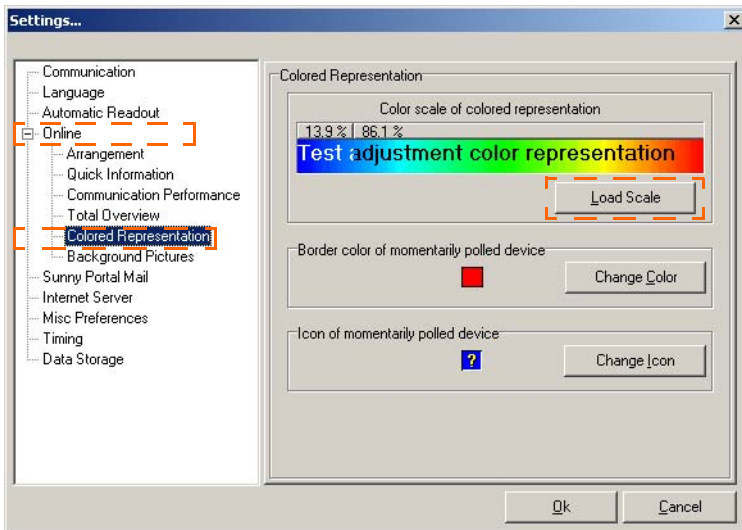
The other icons, which are displayed if the device is not currently being queried, indicate the quality of the communication from the device to the PC, and can also be changed, see section 10.4 "Setting the Communication Quality" (Page 77).



Example:
currently queried device

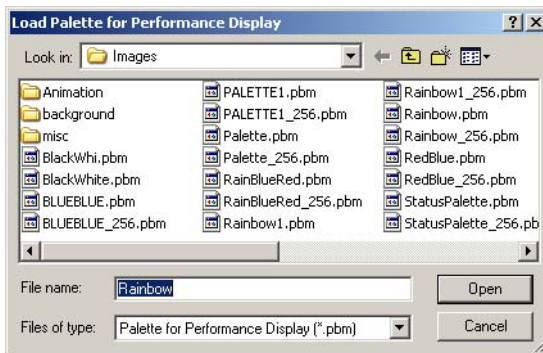
Changing the Color Scheme

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.
2. Select "Spotvalue Request / Colored Representation". The "Settings" window opens (see figure below).



3. Click on <Load Scale>.

The "Load Palette for Performance Display" window opens.



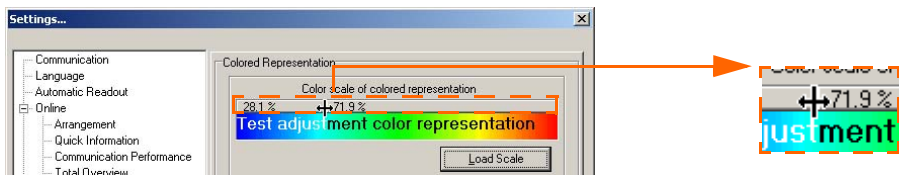
4. Select a color palette from the list, and click on <Open>. To learn how to create your own color palette, see section 13.6 "Creating a Color Palette for Device Fields" (Page 198).

The "Settings" window is displayed with the selected color palette (see figure below).

Changing the Text Color

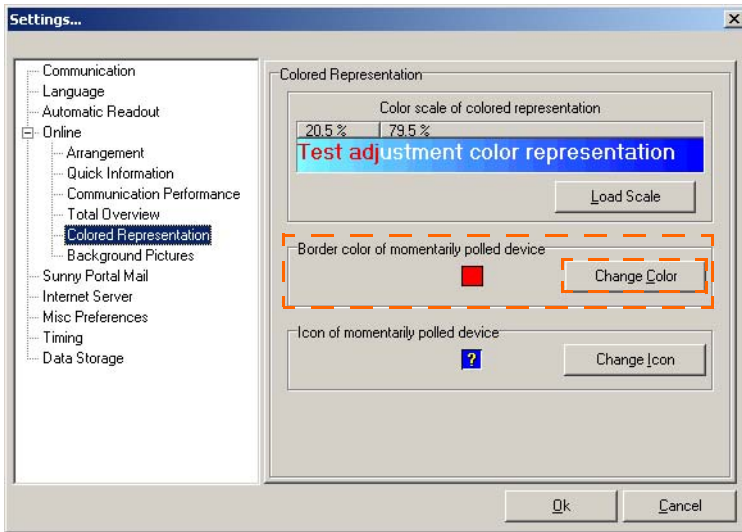
You can define which of the displayed text colors is to be used until which threshold background color is reached. Observe the test text "Test adjustment color representation". You can only use the text colors shown in the test text.

5. Position the cursor over the dividing line above the color palette (see figure below). The cursor changes into a cross.
6. Hold down the right mouse button, and move the dividing line to the right or to the left, according to the threshold background color, up to which the displayed text color is to be used.



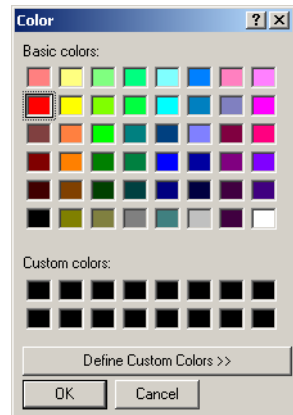
Changing the Border Color of the Currently Queried Device

7. Click on <Change Color>.



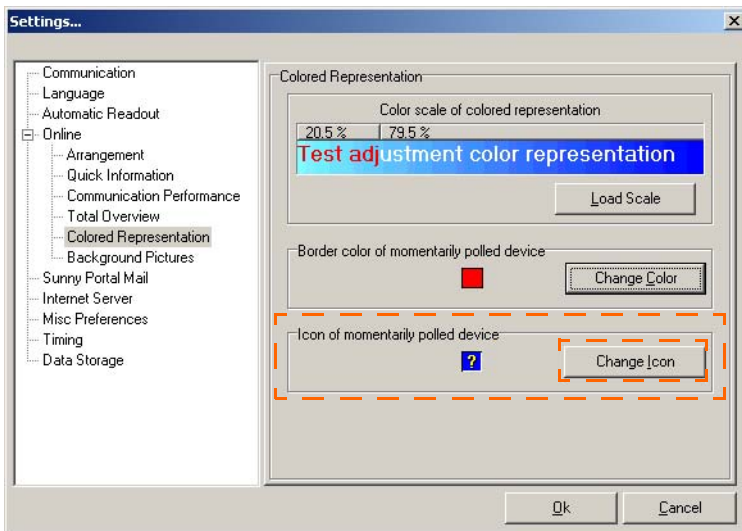
The "Colors" window opens (see figure to the right).

8. Click on the desired color.
9. Click on <Ok> to confirm the settings. The "Settings" window is displayed with the selected border color.

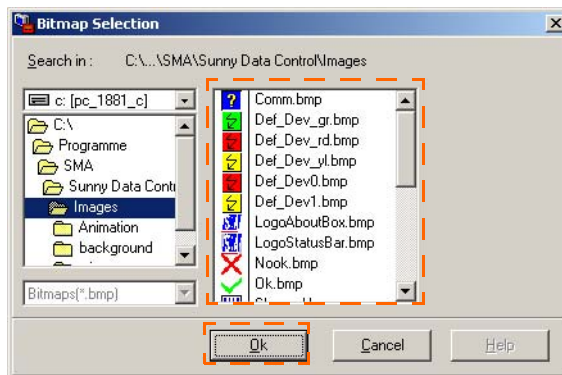


Changing the Icon for the Currently Queried Device

10. Click on <Change Icon>.



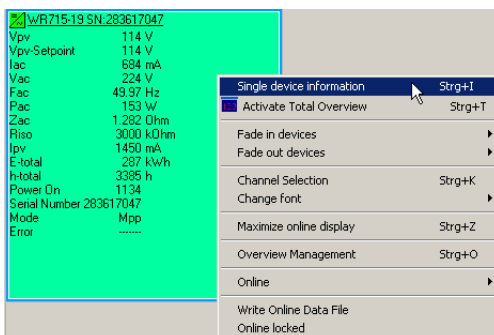
The "Bitmap Selection" window opens.



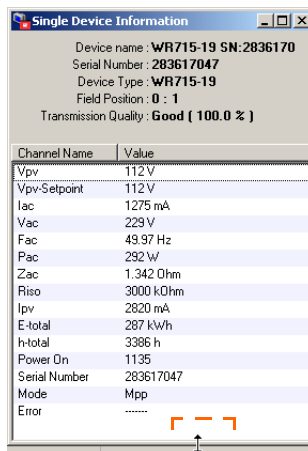
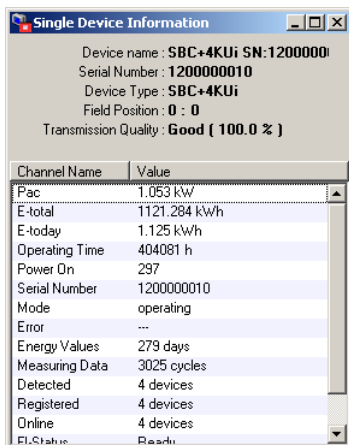
11. Click on the desired graphic.
12. Click on <Ok>. The "Settings" window is displayed once more.
13. Click on <Ok> to save your settings.

10.6 Accessing Individual Device Information

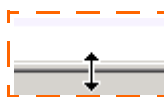
1. In the device overview, click on the selected device with the right mouse button, and select "Single Device Information".



The single device view is displayed (see figure below).



Drag to enlarge window



If you place the cursor on the lower edge of the window, so that the cursor changes into an arrow which points upwards and downwards, you can alter the size of the window. If all entries are displayed, the scroll bar on the side is no longer shown.

The following data are shown in the header of the single device view:

- **Device Name**
Here, the predefined inverter type, and the serial number are displayed. If you change the device name, this name is shown here instead (to change the device name, see section 13.2.1 "Setting the Device Name and Device ID" (Page 192)).
- **Serial Number**
Here, the inverter's serial number is displayed.
- **Device Type**
Here, the inverter's device type is displayed.
- **Field Position**
Here, the position of the device field in the device overview is indicated.
- **Transmission Quality**
Here, the inverter's transmission quality is indicated in percent, and with the words:
 - Good
 - Poor

Beneath the header is a list of the channel names and their values. You can specify which channels are to be displayed in the single device view via the channel selection for spot value queries. See section 10.2 "Selecting Channels for Spot Value Queries" (Page 73).

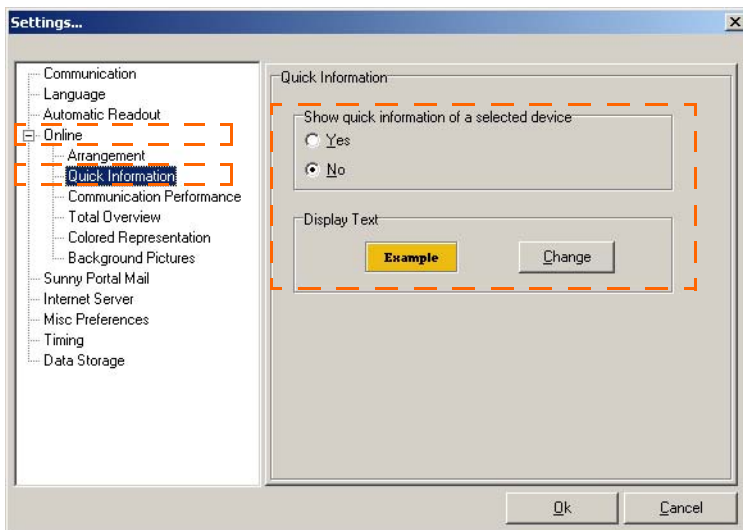
10.7 Setting the Quick Information

If quick information is activated, it is shown in the device overview if you click on a device with the left mouse button and wait briefly.

You can specify which channels are to be shown in the quick information display (see section 10.2 "Selecting Channels for Spot Value Queries" (Page 73)). A maximum of 4 channels can be shown in the quick information display.



1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.
2. Select "Spotvalue Request / Quick Information".

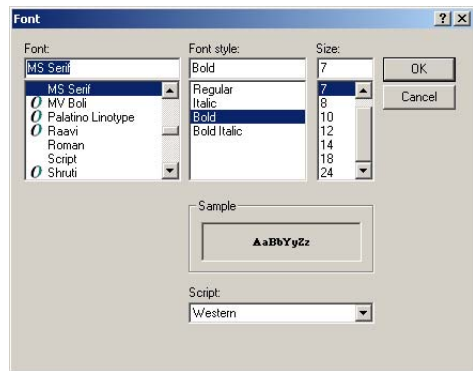


Activating / Deactivating Quick Information

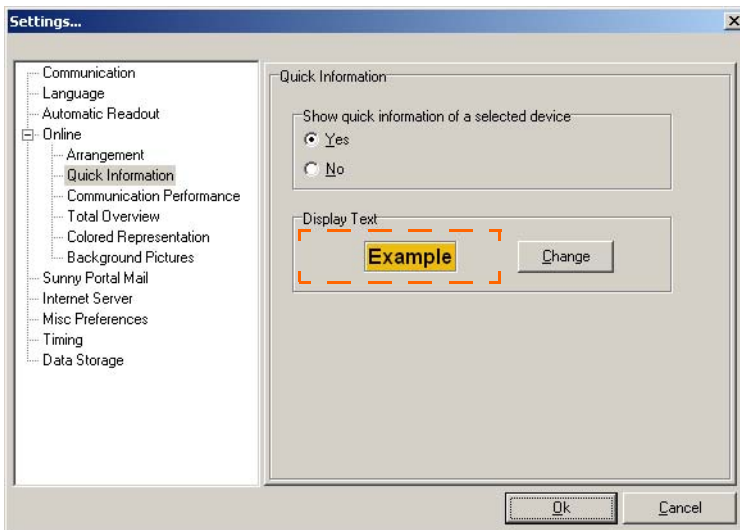
3. Beneath "Show quick information of a selected device" (see figure above), you can activate or deactivate the quick information display by using the radio buttons "Yes" or "No".

Changing the Properties of Quick Information Text

4. In the "Display Text" area, click on <Change>. The window for setting the font opens.
5. Set the font as desired.
6. Click on <OK> in order to return to the "Settings" window, where you can see a preview of the font (see figure below).



Default text properties



Example: Preview with settings "Arial" and font size "12"

Click on <Ok> if you wish to apply the settings. If you wish to alter the settings, click on <Change>.

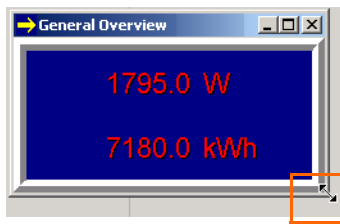


10.8 Configuring the Total Overview

The total overview provides you with a quick overview of your plant's present performance data.

The total overview is updated cyclically. You can select which data are to be displayed from the following list (max. three):

- Total output at present (Pac)
- Total yield (E-total)
- Daily yield (E-today)
(Only if a Sunny Boy Control is also selected as device type for the total overview).

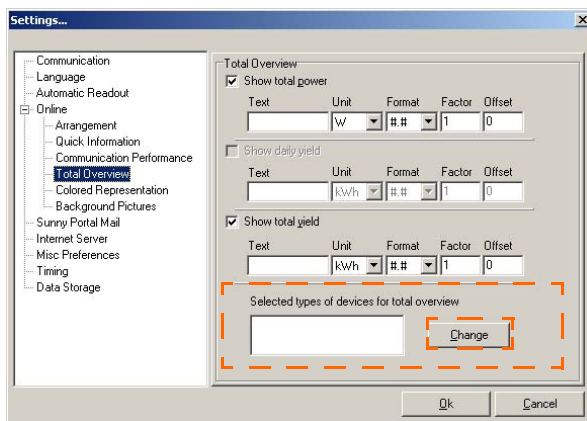


Enlarge the window
(font size adapts
automatically)

Selecting Device Types

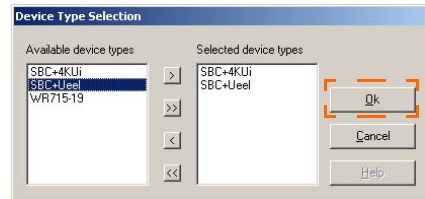
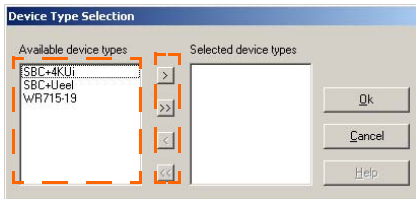
Devices are only included in the total overview if they are currently included in the device overview ("Online" tab), and only if their device type has been selected for the total overview.

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.



2. Select "Spotvalue Request / Total Overview".
3. In the area "Selected types of devices for total overview" (see figure above), click on <Change> in order to set the device types for compilation of the total overview.

The "Device Type Selection" window opens.



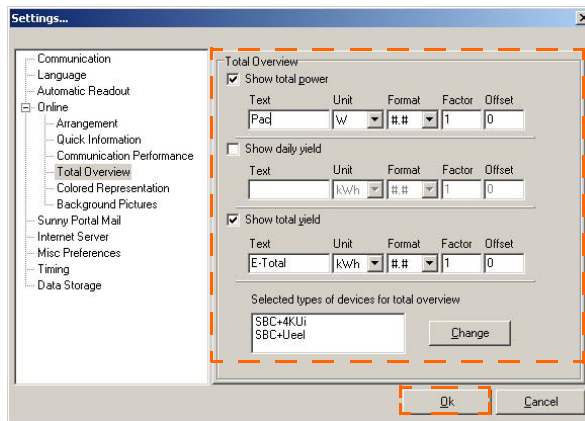
Examples

-  Copy selected channels from the left-hand field into the right-hand field
-  Copy all channels from the left-hand field into the right-hand field
-  Delete selected channels from the right-hand field
-  Delete all channels from the right-hand field

To select several channels, hold down the "Ctrl" key on your keyboard, and click on the channels with the mouse.

4. Select the desired device types, and use the arrow buttons to copy the device types into the "Selected device types" field.
You can also drag and drop the device types into the fields.
5. When finished, click on <Ok> to save your settings.

Configuring the Total Overview Display



Example

1. Select the values which are to be displayed. To do so, click on the check box alongside the desired value (e.g. "Show total power", "Show daily yield") and add or remove the check mark.
2. Configure the display of the total overview as desired. The following settings can be adjusted:
 - **Text:**
Here, you can type in a text for the display (e.g. "Pac" for the total output, and "E-total" for the total yield).
 - **Unit:**
Here, you can choose between the units W, kW and MW in the drop-down list.
 - **Format:**
Here, you can set the number of decimal places with which the values are to be displayed (# = no decimal places... #.### = three decimal places).
 - **Factor:**
Here, you can enter a factor by which the calculated value is to be multiplied.
 - **Offset:**
Here, you can enter a corrective value which is to be added to the calculated value.
3. When finished, click on <Ok> to save the settings.

Activating the Total Overview

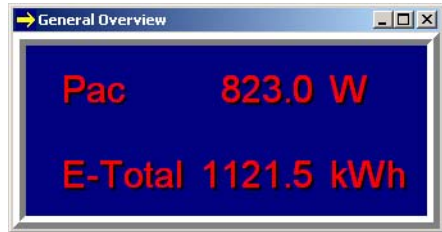
4. Select "Online / Activate Total Overview".
Alternatively, click with the right mouse button in the device overview area, and select "Online / Activate Total Overview".

Deactivating the Total Overview

If you wish to deactivate the total overview, simply close the total overview window.

Display of Change in Measured Value via Arrow Indicator

A small icon with an arrow is situated in the upper left-hand corner of the total overview. This arrow reflects the trend of the present output (Pac) since the last data update.



The measured value has increased since the previous one.



The measured value has remained the same since the previous one.

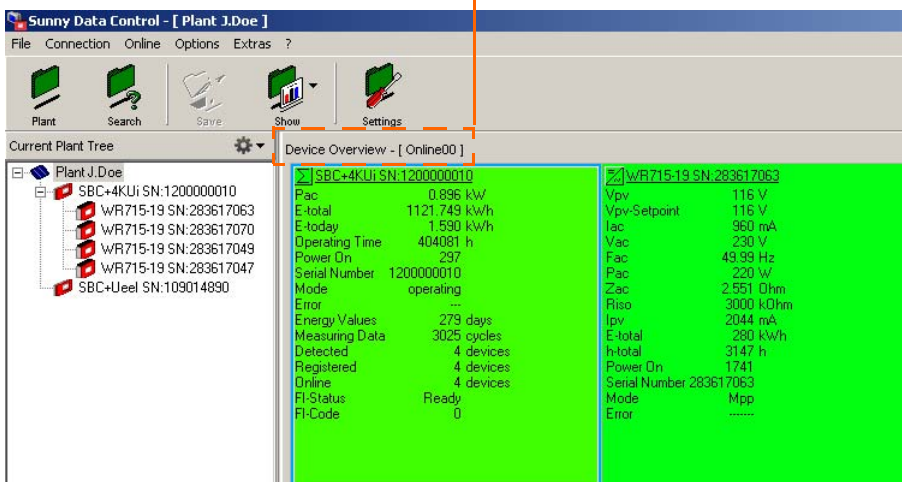


The measured value has decreased since the previous one.

10.9 Overview Management

You can create and save several device overviews for each plant. The configuration data, e.g. devices' channel selections, the size and arrangement of the overview window, etc., are saved together with the device overview, and displayed when accessed.

Name of the current device overview (here: Online00, the default setting)



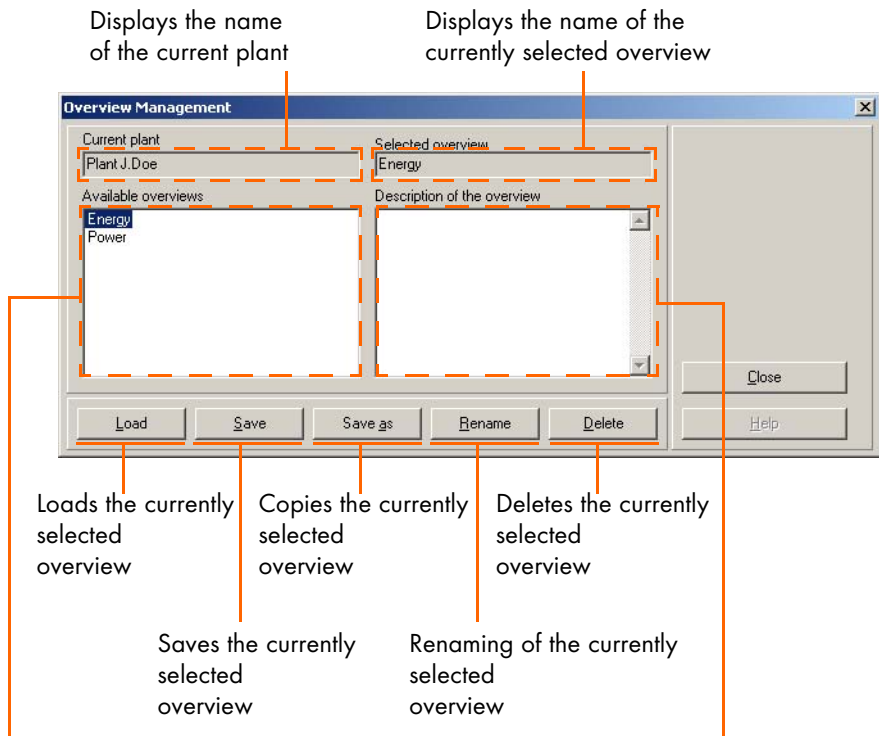
The task of completely setting up an overview window with several devices can in some cases be highly complex. To ensure that this effort only needs to be made once, Sunny Data Control provides you with the option of managing different device overviews.

As described in the following sections, overview management allows the following actions to be conducted:

- Renaming a device overview
- Copying a device overview
- Saving a device overview
- Deleting a device overview
- Loading a device overview

Brief Overview of the Functions

You can call up the overview management window (see example pictured below) via the menu item "Online / Overview Management".



Here, all overviews which have already been created are listed. These overviews can be selected.

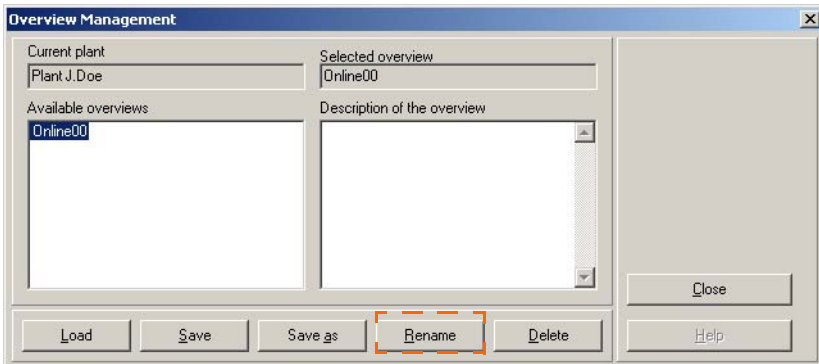
Here, information about the currently selected overview can be entered.

10.9.1 Renaming a Device Overview

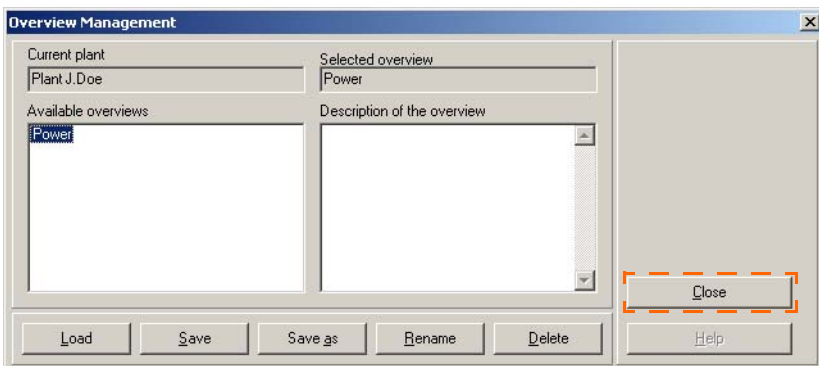
1. Open the window in which the spot value queries are displayed by clicking on the "Online" tab at the lower edge of the screen.
2. Click on "Online / Overview Management". The "Overview Management" window opens (see figure below).

You can also call up the window by clicking anywhere on the screen with the right mouse button and selecting "Overview Management".

All device overviews which have already been created are shown in the "Available Plants" list. The device overview "Online00" is the default, and can be renamed.



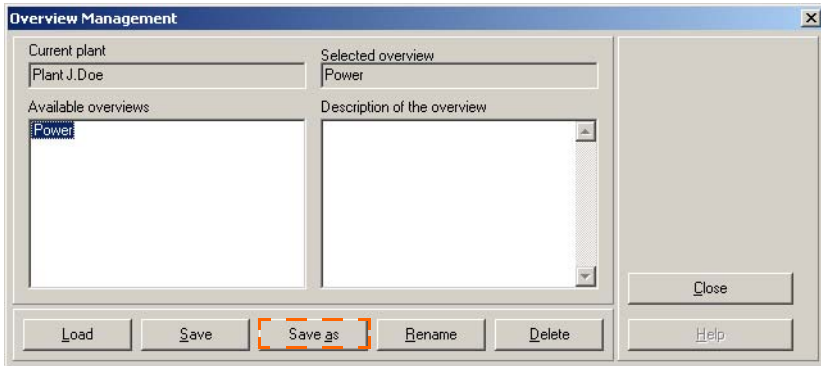
3. Click on the name of the device overview which you would like to rename.
4. Click on <Rename>. A frame appears around the name of the plant, and it can now be written over.
5. Type in the desired name.



6. Click on <Close> to save the setting.

10.9.2 Copying a Device Overview

1. Open the window in which the spot value queries are displayed by clicking on the "Online" tab at the lower edge of the screen.
2. Click on "Online / Overview Management". The "Overview Management" window opens (see figure below).

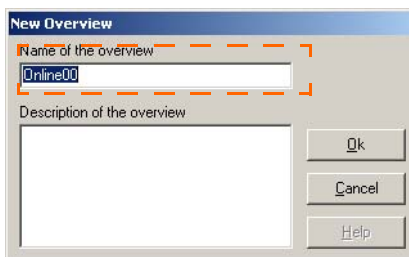


Example

You can also call up the window by clicking anywhere on the screen with the right mouse button and selecting "Overview Management".

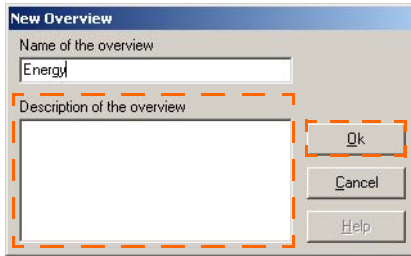
All device overviews which have already been created are shown in the "Available Plants" list.

3. Click on the name of the device overview which you would like to copy.
4. Click on <Save as>. The "New Overview" window opens.



By default, the overview name shown is always "Online00", or "Online01" etc., depending on whether an overview with the name "Online00" etc. already exists.

5. In the field "Name of the overview", type the desired name for the overview.



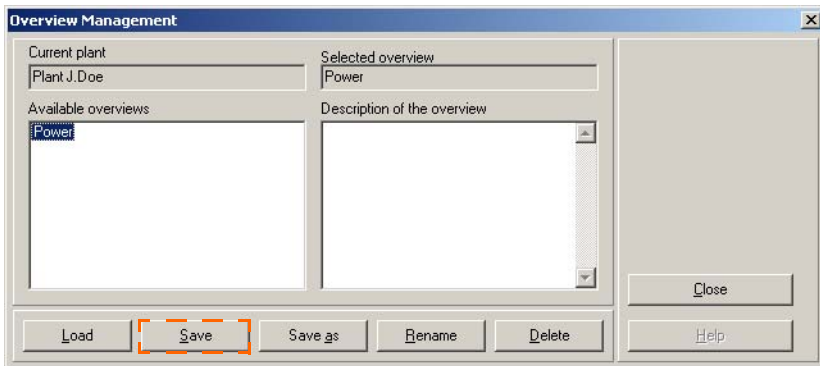
Example

6. In the field "Description of the overview", you can type remarks about the overview. These remarks will also be saved, and provide you with a reference point regarding the saved overview.
7. Click on <Ok> to save the setting.

10.9.3 Saving a Device Overview

If you change a device overview, you must save the settings as follows:

1. Open the window in which the spot value queries are displayed by clicking on the "Online" tab at the lower edge of the screen.
2. Click on "Online / Overview Management". The "Overview Management" window opens (see figure below).



Example

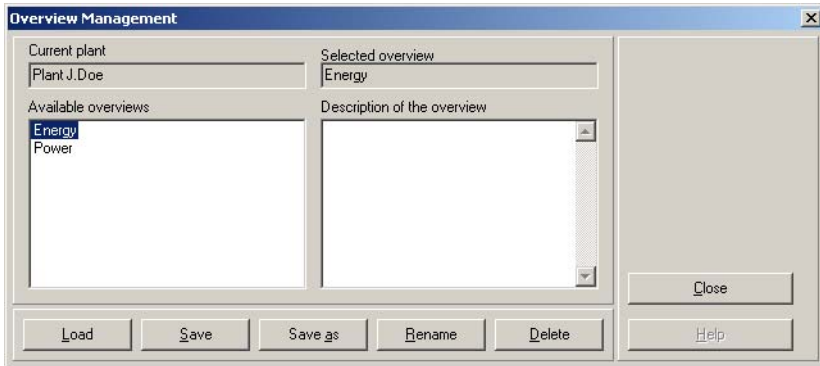
You can also call up the window by clicking anywhere on the screen with the right mouse button and selecting "Overview Management".

All device overviews which have already been created are shown in the "Available Plants" list.

3. Click on the name of the device overview for which you would like to save changes.
4. Click on <Save>.

10.9.4 Deleting a Device Overview

1. Open the window in which the spot value queries are displayed by clicking on the "Online" tab at the lower edge of the screen.
2. Click on "Online / Overview Management". The "Overview Management" window opens (see figure below).

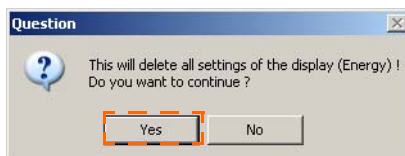


Example

You can also call up the window by clicking anywhere on the screen with the right mouse button and selecting "Overview Management".

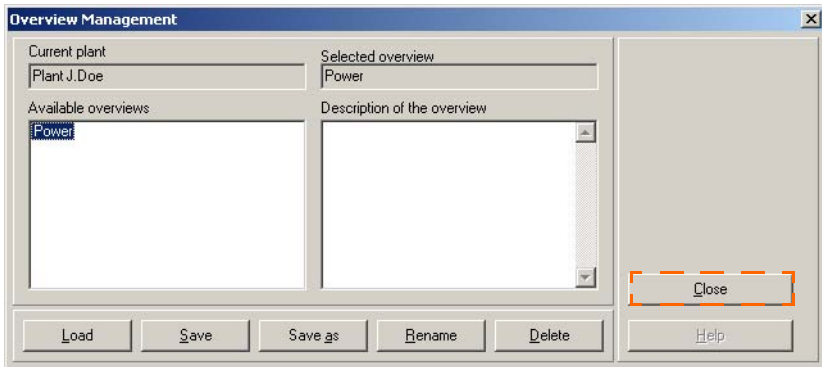
All device overviews which have already been created are shown in the "Available Plants" list.

3. Click on the name of the device overview which you would like to delete.
4. Click on <Delete>. A prompt window opens.



5. Click on <Yes> to confirm the deletion.

The overview management window is displayed once more.

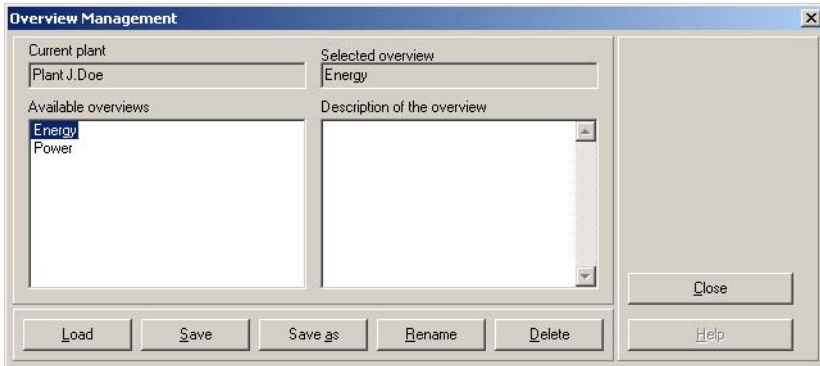


Example

6. Click on <Close> to close the window.

10.9.5 Loading a Device Overview

1. Open the window in which the spot value queries are displayed by clicking on the "Online" tab at the lower edge of the screen.
2. Click on "Online / Overview Management". The "Overview Management" window opens (see figure below).

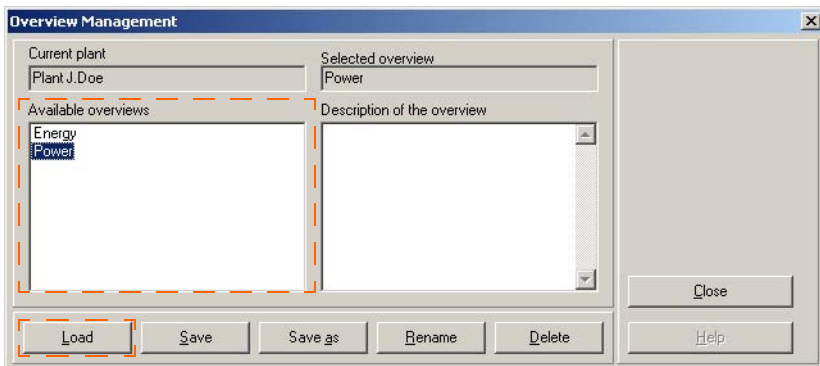


Example

You can also call up the window by clicking anywhere on the screen with the right mouse button and selecting "Overview Management".

All device overviews which have already been created are shown in the "Available Plants" list.

3. Click on the name of the device overview which you would like to load.



Example

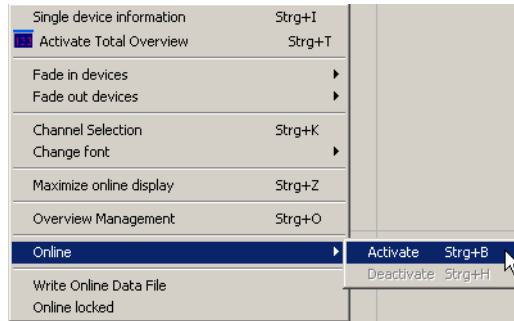
4. Click on <Load> to load the selected device overview.

10.10 Activating / Deactivating Spot Value Querying

You can activate and deactivate the querying of spot values if at least one device is displayed in the device overview.

1. Select "Online / Spotvalue Request" and click on "Activate" or "Deactivate".

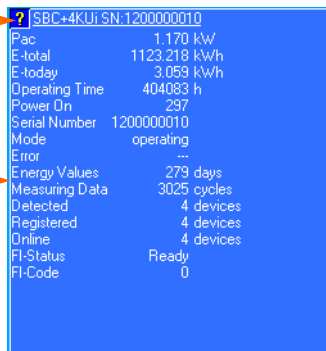
You can also call up this menu as follows: click on the device overview with the right mouse button. The device overview menu opens. Select "Spotvalue Request" and click on "Activate" or "Deactivate".



If spot value querying is active, the icon and border of the currently queried device will flash (see figure below).

Icon
(currently queried
device)

Border



Example
currently queried device

During spot value querying, the text shown below is displayed in the bar at the lower edge of the screen (see figure below).



11 Managing Data and Saving Data Locally

With Sunny Data Control, plant data can be saved in Excel format, and in CSV format. The following sections describe the storage of data in Excel format and in CSV format.

11.1 Reading Out and Saving Data from Sunny Beam

In order to display the essential key data of a PV system, Sunny Beam has been developed as a cordless tabletop device. Initially, there were no plans for the archiving of data. Thus, as indicated below, the subsequent built-in possibility to record data using Sunny Data Control and Sunny Portal is limited.

Data Archiving with Sunny Data Control

With the Sunny Beam, the data gathered from the entire plant during one month can be archived, but not data from the individual inverters. As the values are only stored in Sunny Beam for one month, you must read out the data with Sunny Data Control once a month.

Data	Interval
E-day:	read out once a month
Yield (EUR):	read out once a month
CO2 avoided:	read out once a month

Furthermore, Sunny Beam only saves the daily power output (Pac) for the present day. Once a new day begins, the previous day's Pac data are erased. Thus, Pac data must be read out every evening.

Data	Interval
Pac:	read out every evening (limited utilizability)

Archiving Data with Sunny Portal

With Sunny Data Control, the above-mentioned data can be transferred over to the Sunny Portal.

Because the E-total value can not be recorded using Sunny Beam, the use of this data with Sunny Portal is restricted. Nevertheless, this is indispensable for some views using Sunny Portal. For this reason, it only makes sense to graphically present Sunny Portal's daily energy values (E-day), the avoided CO2 emissions and the yield (EUR) as a monthly overview.

The visualization of the daily output (Pac) is possible. Nevertheless, as already mentioned above, the data must be read out nightly.

11.2 Saving Data in Excel Format

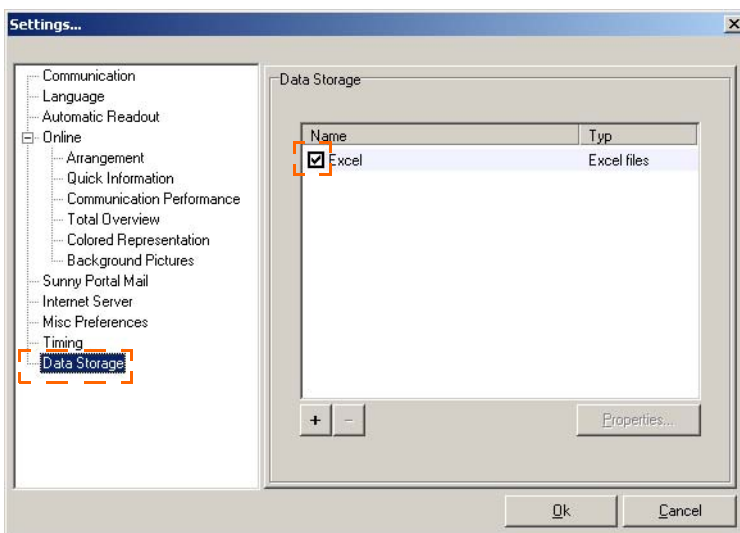
Storage of data in Excel format is the default option, and can be activated and deactivated. The data are saved in the directory in which Sunny Data Control was installed. The default directory is

"C:\Programs\SMA\Sunny Data Control\Plants".

If you wish to save the data in Excel format, all that remains to be done is to select the channels which are to be recorded. This is explained in section 11.4 "Setting up Sunny Boy Control Channel Recording" (Page 115).

Activating or Deactivating Data Storage in Excel Format

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.



2. Select "Data Storage".
3. Add or remove the check mark beside "Excel" (see figure above). If the check mark is in place, the data will be saved in Excel format.
4. Click on <Ok> to save the setting.

11.3 Saving Data in CSV Format

For storage of data in CSV format, various templates are at your disposal. The CSV files can also be created in a user-defined manner. The following settings are user-definable:

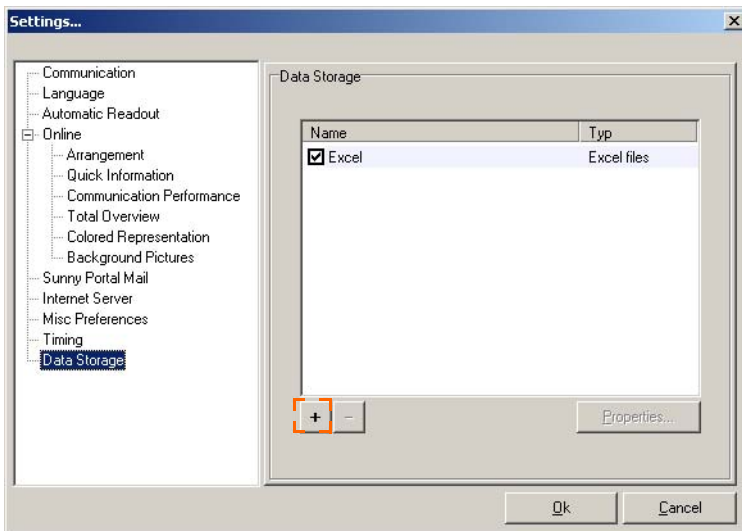
- Storage location
- File names
- Number of rows of measured values
- Line break format
- Delimiter symbol (cell separator)
- Storage of measured values (which channel in which row, etc.)
- Time stamp from time of measurement

11.3.1 Creating a New CSV Type



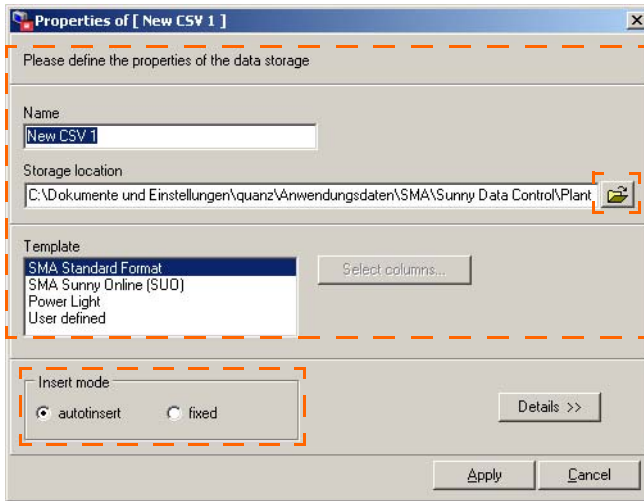
The settings for a created CSV type can no longer be altered once the type has been saved.

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.



2. Select "Data Storage".
3. Click on <+> to set a new CSV type.

The window for configuration of a new CSV type opens.



4. Type the desired name for the CSV type into the "Name" field.
5. By default, the CSV files are saved in the directory:
C:\Documents and Settings\“Name of User“\Application Data\SMA\Sunny Data Control\Plants\“Plant name“\“CSV_1 etc.”

This directory is user-specific, and is set up automatically upon creation of a new CSV type. If you wish to select a different directory, click on the folder icon, and select the desired directory.

Selecting a Template

6. Select a template in the "Template" field.

The templates have the following properties:

- SMA-standard format: Everything freely selectable, except for the file's column header.
- SMA Sunny Online (SUO):
Column header as in Excel / SUO files, predefined values, no column selection.
Column header as in Sunny Data.
- Power Light:
No column header, predefined values, manual column selection.
- User-defined: Everything freely selectable.

Insert Mode

Depending on which template you have selected, you can specify the method of insertion.

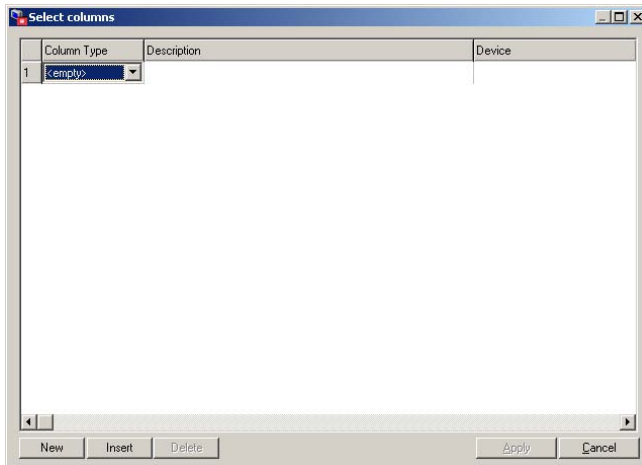
- **fixed:**
The "fixed" mode is used when only certain channels are to be saved.
The columns are specified by the user. The selection of columns is set via the <Select columns> button, as described in the next step.
 - **autotinsert:**
In "autotinsert" mode, the channels which are set under "Channel recording" are saved. The next section describes how to set the channels for channel recording. See section 11.4 "Setting up Sunny Boy Control Channel Recording" (Page 115). The columns are inserted automatically.
7. In the "Insert mode" field, select one of the two modes for writing measured values to CSV files.

Selecting Columns

Depending on which template you have selected, you can now select the columns.

8. Click on <Select columns...>.

The "Select columns" window opens.



9. Click on <New> and select a column type.

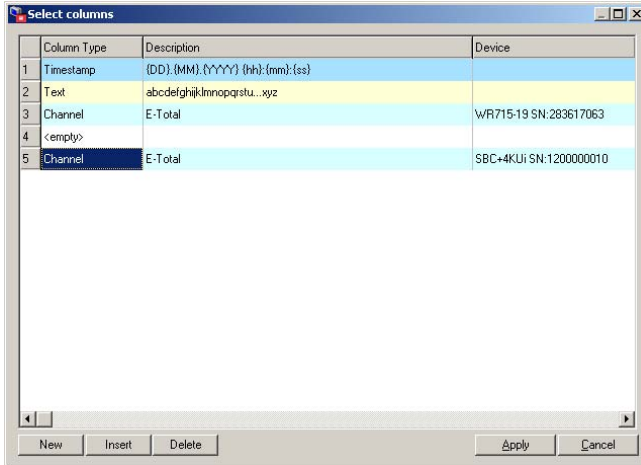
There are four column types:

- <empty> = column remains empty in the CSV file.
- Channel = allocation occurs via selection of a channel.
- Text = the entered text is written in the column.
- Timestamp = the date pattern from the combination field (combo box) is written as an absolute date.

You can insert a new column above a highlighted column with <Insert>.

With <Delete>, you can delete the highlighted column.

With <New>, you can add a new column beneath all the other columns.

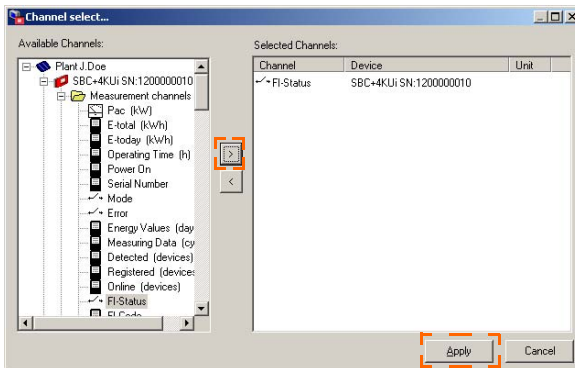


Example

10. Depending on the selected column type, you can make various settings for the column type in the "Description" field.

With the column type "Channel", you can select the channels in the "Description" field. For this purpose, the "Channel selection..." window opens.

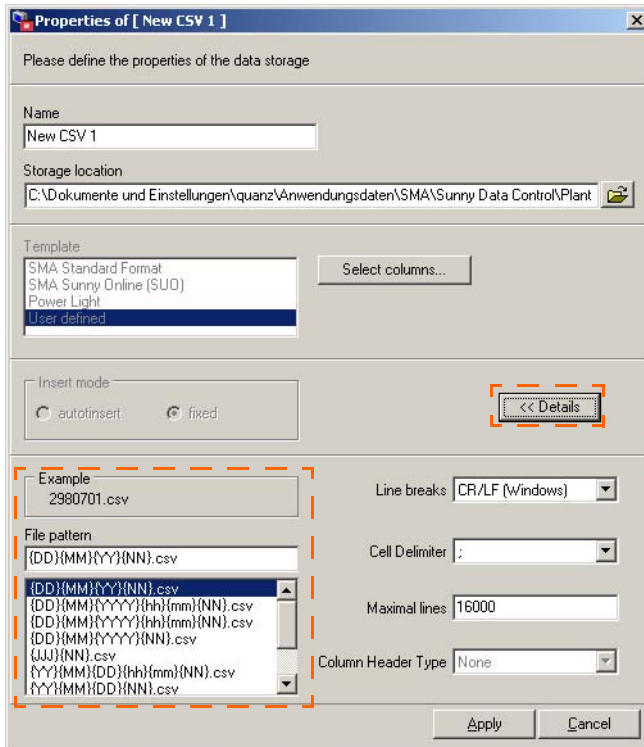
You can add individual channels, or all of a node's channels together, via drag and drop. You can also click on a channel and add it via the arrow button (see figure below).



11. Afterwards, click on <Apply> to save the settings. The "Select columns" window is displayed once more.

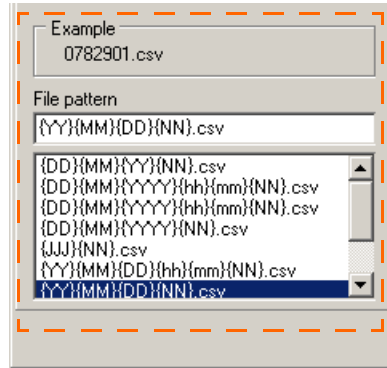
File Name

12. Click on <Details>.



13. Select the desired file name pattern from the "File pattern" list, or use the input symbols listed below to create a new one, by writing in the "File pattern" field.

In the "Example" area, you see an example of the respective selected file name pattern.



Enlarged section

The structure of the file names comprises the input symbols listed below, and the file suffix ".csv".

- {DD} = stands for day (01 to 31 are displayed)
- {MM} = stands for month (01 to 12 are displayed)
- {YYYY} = stands for year (if {YY} is selected, the last two digits of the year are displayed, e.g. "07". If {YYYY} is selected, the year is shown in full, e.g. "2007").
- {NN} = sequential number
- {hh} = stands for hour
- {mm} = stands for minute
- {ss} = stands for second

These input symbols must be between braces { }, so that the input symbols are translated into their respective meanings (e.g. year), and thus the current year will appear at this position in the file name (e.g. {YY} = 07 and {YYYY} = 2007).

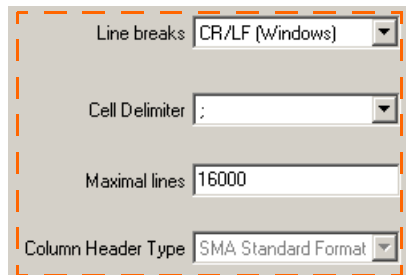
The following additional input symbols are also permissible for the file names:

- _ (underscore)
- . (period)
- - (hyphen)

Further Settings

14. If you have selected the template type "User defined" or "SMA-standard format", you can make the further additional settings for the CSV files. The line break format can be set for all template types.

- Line breaks:
Select the line break format for your PC's operating system:
"CRLF" (0x0d 0x0a) = Windows
"LF" (0x0a) = Mac
"CR" (0x0d) = Unix
- Cell Delimiter:
Select the desired cell delimiter symbol (semicolon, tab (tabulator), or space).
- Maximal lines:
Enter the desired maximum number of lines which are to be displayed in a CSV file. No more than 16,000 lines can be written.
- Column Header Type:
Select the desired column header type (only possible with the "User defined" template).



The screenshot shows a dialog box with a light gray background and a dashed orange border. It contains four settings, each with a label and a dropdown menu:

- Line breaks:** The dropdown menu is open, showing "CR/LF (Windows)" selected.
- Cell Delimiter:** The dropdown menu is open, showing ";" selected.
- Maximal lines:** The text input field contains "16000".
- Column Header Type:** The dropdown menu is open, showing "SMA Standard Format" selected.

Enlarged section

11.3.2 Structure of the Standard CSV Format

Every CSV file contains a fixed file header, and a data block into which the measurement data are written. The file header comprises 8 rows, and has the following structure:

Row 1	Version CSV1 Tool SDC Linebreaks CR/LF Delimiter semicolon Decimalpoint comma Precision 3 Language en Plant Plant-CSV-1 User zdw@SMA.de				
Row 2	empty				
Row 3		device name 1	device name 1	device name 2	device name 2
Row 4		device type	device type	device type	device type
Row 5		serial number	serial number	serial number	serial number
Row 6		channel name 1	channel name 2	channel name 1	channel name 2
Row 7		channel type	channel type	channel type	channel type
Row 8	time stamp format	channel unit	channel unit	channel unit	channel unit
Row 9	date	channel value	channel value	channel value	channel value
Row...	date	channel value	channel value	channel value	channel value

All attributes of the CSV format appear in row 1, separated by pipe symbols.

11.4 Setting up Sunny Boy Control Channel Recording

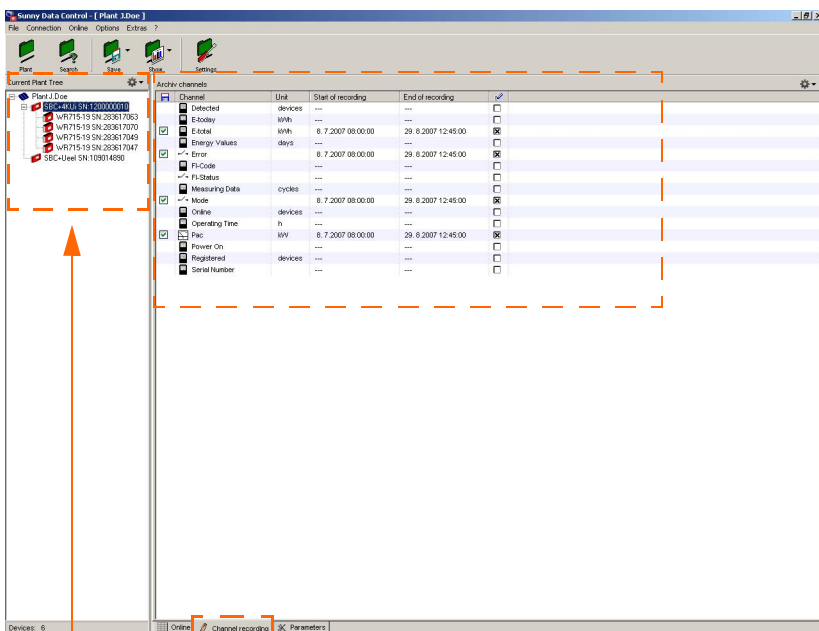
The function "Channel recording" is only available for Sunny Boy Control devices with firmware version 3.05 or above. Sunny Boy Control Light does not support these settings.



With Sunny Data Control, you can select channels which the Sunny Boy Control is to record. By default, the Sunny Boy Control records the channels "Pac", "E-total" and "Upv" from the detected inverters.

With Sunny Data Control, you can then read out, save, and process the recorded channels.

1. Click on the "Channel recording" tab at the lower edge of the screen (see figure below).



Plant tree

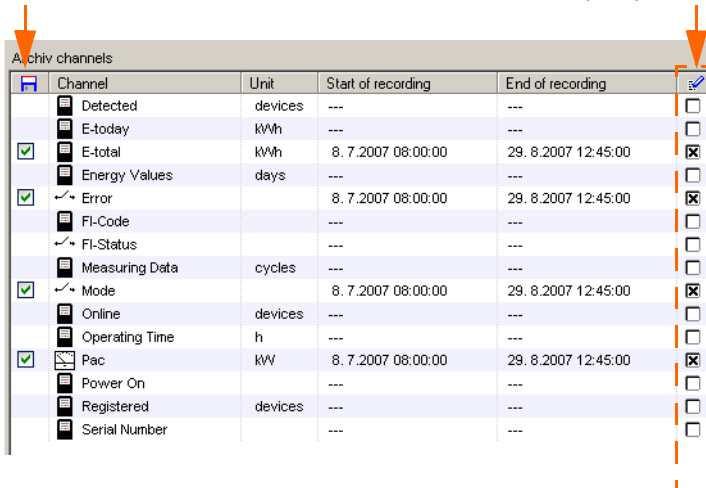
"Channel recording" tab

2. In the plant tree (see figure above), click on the device for which you wish to set channels to be recorded.

A list of the device's archive channels is displayed.

Channel query:
Select the channels
to save at the PC

Channel recording:
Select the channels to
save at the Sunny Boy Control



The screenshot shows a table titled "Archiv channels" with columns: Channel, Unit, Start of recording, End of recording, and two checkboxes. An orange arrow points to the first checkbox (PC), and another orange arrow points to the second checkbox (Sunny Boy Control). The table contains the following data:

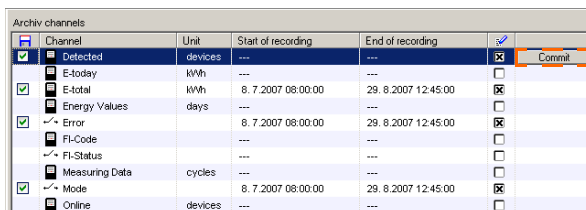
Channel	Unit	Start of recording	End of recording	PC	Sunny Boy Control
Detected	devices	---	---	☐	☐
E-today	kWh	---	---	☐	☐
E-total	kWh	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒	☒
Energy Values	days	---	---	☐	☐
Error	---	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒	☒
FI-Code	---	---	---	☐	☐
FI-Status	---	---	---	☐	☐
Measuring Data	cycles	---	---	☐	☐
Mode	---	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒	☒
Online	devices	---	---	☐	☐
Operating Time	h	---	---	☐	☐
Pac	kW	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒	☒
Power On	---	---	---	☐	☐
Registered	devices	---	---	☐	☐
Serial Number	---	---	---	☐	☐

Example (excerpt from the "Archiv channels" list)

- Click in the channel recording column (beneath the icon shown in the figure to the right) in the check box beside the respective channel and add or remove a cross. If a cross is added, the channel is recorded in the Sunny Boy Control.



If a cross is added or removed, the button <Commit> appears beside the check box (see figure below).



The screenshot shows the same "Archiv channels" table, but now a "Commit" button is visible next to the checkbox for the "E-today" channel, which has a cross in its recording checkbox.

Channel	Unit	Start of recording	End of recording	PC	Sunny Boy Control	Commit
Detected	devices	---	---	☐	☐	
E-today	kWh	---	---	☐	☒	Commit
E-total	kWh	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒	☒	
Energy Values	days	---	---	☐	☐	
Error	---	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒	☒	
FI-Code	---	---	---	☐	☐	
FI-Status	---	---	---	☐	☐	
Measuring Data	cycles	---	---	☐	☐	
Mode	---	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒	☒	
Online	devices	---	---	☐	☐	

- Click on the <Commit> button to apply the new settings, and to transfer them to the Sunny Boy Control.



The first channel values of a newly recorded channel are only accessible after the Sunny Boy Control's recording interval has passed! This is usually 15 min.

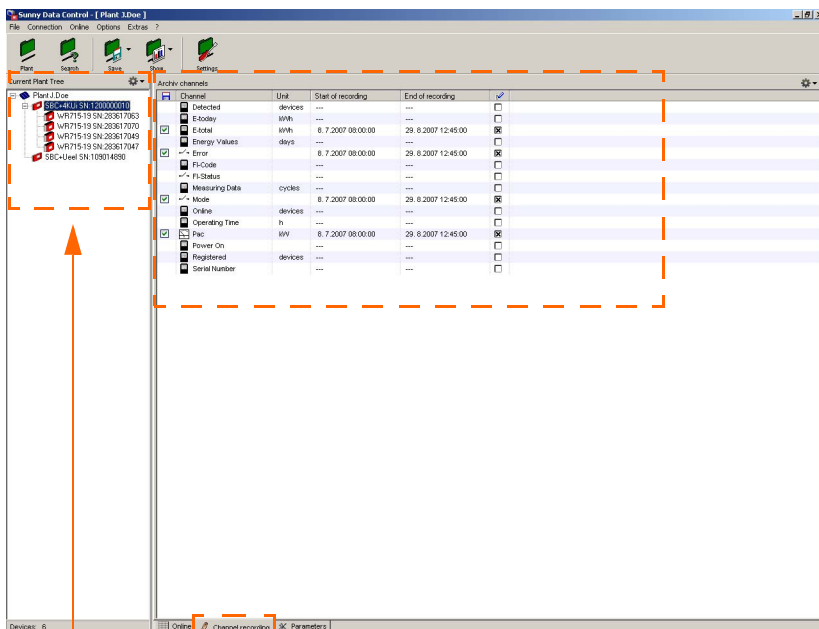
11.5 Reading Out Data Saved on the Sunny Boy Control

The Sunny Boy Control records all channels which you have selected for channel recording (see section 10.2 "Selecting Channels for Spot Value Queries" (Page 73)).

By default, the Sunny Boy Control records the channels "Pac", "E-total" and "Upv" from the detected inverters. First, you must mark the channels which you wish to read out from the Sunny Boy Control, then save them as described below.

Upon the first readout, Sunny Data Control saves all of the data recorded at the Sunny Boy Control, i.e. the complete time range. Afterwards, only new data are read out and saved. How to reset the time ranges, or to read out the entire time range, is described in sections 11.5.3 "Resetting Time Ranges" (Page 121) and 12.2 "Reading Out the Complete Time Range" (Page 141).

1. Click on the "Channel recording" tab at the lower edge of the screen (see figure below).



Plant tree

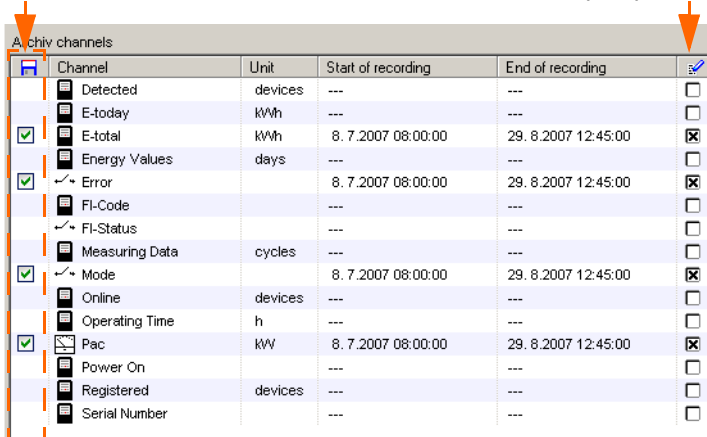
"Channel recording" tab

2. In the plant tree (see figure above), click on the device for which you wish to mark channels to be saved.

A list of the device's archive channels is displayed.

Channel query:
Select the channels
to save at the PC

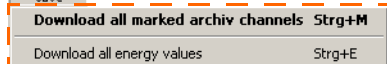
Channel recording:
Select the channels to
save at the Sunny Boy Control



Channel	Unit	Start of recording	End of recording	
Detected	devices	---	---	☐
E-today	kWh	---	---	☐
E-total	kWh	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒
Energy Values	days	---	---	☐
Error		8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒
FI-Code		---	---	☐
FI-Status		---	---	☐
Measuring Data	cycles	---	---	☐
Mode		8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒
Online	devices	---	---	☐
Operating Time	h	---	---	☐
Pac	kW	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒
Power On		---	---	☐
Registered	devices	---	---	☐
Serial Number		---	---	☐

Example (excerpt from the "Archiv channels" list)

- Click in the channel downloading column (beneath the icon shown in the figure to the right) in the check box beside the respective channel and add or remove a check mark. If a check mark is added, the channel is marked to be saved. 
- Repeat this procedure for each device.
- Finally, click on the "Save" icon (see figure to the right). The submenu opens.
- If you wish to save all marked channels, click on "Download all marked archiv channels".



If you wish to save all energy channels, click on "Download all energy values".

The data transfer begins (see example below). This process can take several minutes, depending on the data volume.



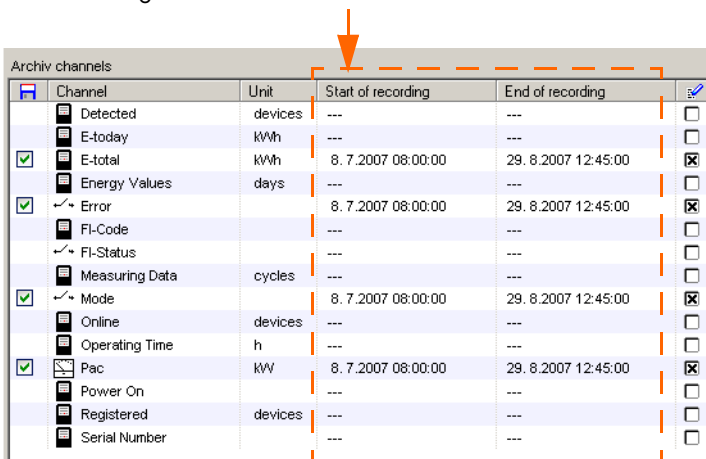
11.5.1 Updating Time Ranges

Sunny Data Control displays the time ranges of newly recorded values from the communication device which have not yet been read out (see figure below).

In Sunny Data Control, the time ranges update only when the program is started up. If you have kept Sunny Data Control open for a longer period of time, and wish to read out newly recorded data, you must first update the time ranges.

1. Select "Options / Storage Time Refresh".
The time ranges update.
2. Read out the data.

Start and end of the recording of new values in the Sunny Boy Control since the last time Sunny Data Control was started up.
This time range is read out.



Archiv channels					
	Channel	Unit	Start of recording	End of recording	
	Detected	devices	---	---	☐
	E-today	kWh	---	---	☐
☒	E-total	kWh	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒
	Energy Values	days	---	---	☐
☒	Error		8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒
	FI-Code		---	---	☐
	FI-Status		---	---	☐
	Measuring Data	cycles	---	---	☐
☒	Mode		8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒
	Online	devices	---	---	☐
	Operating Time	h	---	---	☐
☒	Pac	kW	8. 7.2007 08:00:00	29. 8.2007 12:45:00	☒
	Power On		---	---	☐
	Registered	devices	---	---	☐
	Serial Number		---	---	☐

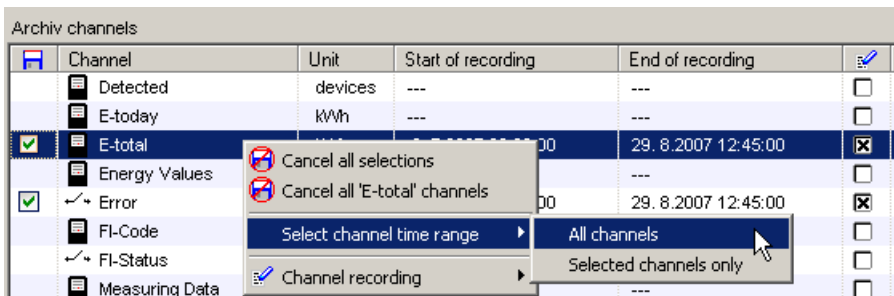
Example (excerpt from the "Archiv channels" list)

You can also set the time ranges which you wish to read out, as described in the next section, 11.5.2 "Setting Time Ranges" (Page 120).

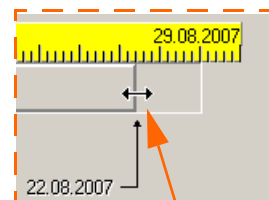
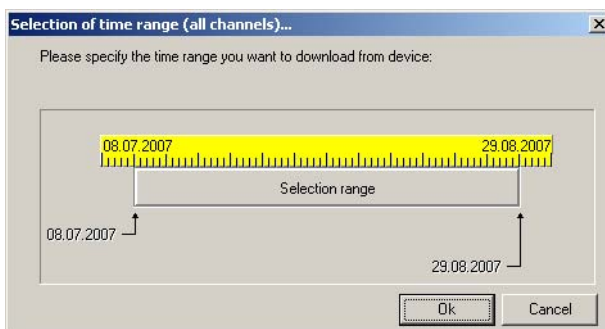
11.5.2 Setting Time Ranges

With Sunny Data Control, you can set the readout time ranges of all channels, or of individual channels.

1. If you wish to set the time range for individual channels, hold down the "Ctrl" key and mark the desired channels.
2. Click on the "Archiv channels" page (see figure below) with the right mouse button, and select "Select channel time range".
3. Select "All channels" or "Selected channels only".



The window for setting the time range opens.



New date

4. Set the desired time range (beginning and end) by clicking with the cursor on the beginning or end of the selection area, and moving the selection area. The date of the new time range is displayed immediately.
5. Click on <Ok> to save the settings.

11.5.3 Resetting Time Ranges

This function is necessary if you also wish to read out data from the Sunny Boy Control which have already been queried. Sunny Data Control keeps a record of the time ranges which have already been read out from the Sunny Boy Control, and normally only queries new data. You can reset the Sunny Data Control time ranges as follows:

- 1. Select "Extras / Reset time ranges".
A confirmation prompt opens:



- 2. Confirm the prompt with <Yes> in order to reset the time ranges.

11.5.4 Channel Recording Icons

Icon	Meaning
	meter channels
	analog channels
	status channels
	digital channels

11.5.5 Structure of the Excel Files



The structure of the Excel files is explained on the basis of files which have been read out from a Sunny Boy Control. Files read out from a Sunny Beam have a similar structure.

The data are saved as Excel files on your PC in the respective plant's directory. The directory has the name of the plant which you have created in Sunny Data Control.

By default, the plants' data are in the directory:

C:\Program Files\SMA\Sunny Data Control\Plants

If you selected a different directory on your PC during installation of Sunny Data Control, open the directory in which Sunny Data Control is saved, and open the directory "Plants".



Example

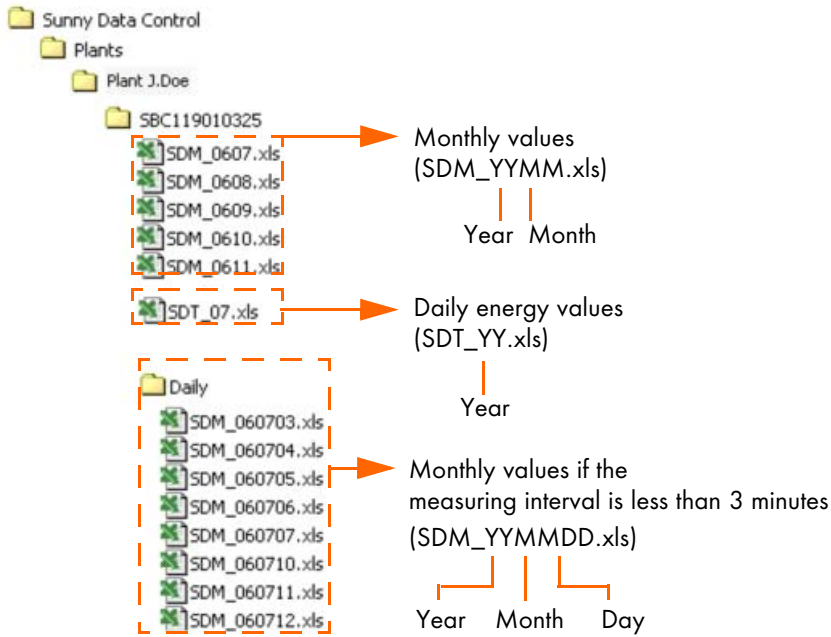
In the saved data, a distinction is made between measurement data and daily energy data. These data are read out from the Sunny Boy Control separately, and are saved in separate files.

- Daily files are saved together in a consolidated yearly file.
- All other measured values are saved together in consolidated monthly files.

For each Sunny Boy Control, there is a subdirectory with a name which comprises the text "SBC" and the device's serial number (e.g. SBC119010325).

This is where the files with the saved measurement data are situated. The measurement data from the individual channels are sorted according to day, and are saved on a monthly basis in the corresponding devices' subdirectories in separate Excel files.

Thus, the number of files is determined by the measurement period. For instance, if measurement data were recorded over an entire year with the Sunny Boy Control, there would be twelve files with monthly values on your hard drive after saving.



Example of an Excel File

Microsoft Excel - SDM_0611 [Read-Only]

File Edit View Insert Format Tools Data Window Help

M651 = 0.216000010259449

	A	B	C
1	645	71940	399617
2	1.1	E-Total	Fac
3		kWh	Hz
4		WR7K-017 SN:2000144881	WR7K-017 SN:2000144881
5			
6		WR7K-017	WR7K-017
7		2000144881	2000144881
8	21/11/2006 10:23:00	1514.362	49.97
9	21/11/2006 10:24:00	1514.372	49.98
10	21/11/2006 10:27:00	1514.404	49.99
11	21/11/2006 10:30:00	1514.437	49.96
12	21/11/2006 10:33:00	1514.471	49.96
13	21/11/2006 10:36:00	1514.526	49.98
14	21/11/2006 10:39:00	1514.589	49.99
15	21/11/2006 10:42:00	1514.636	49.98
16	21/11/2006 10:45:00	1514.662	50.00

Ready

WR7K-017 SN 2000144881 SBC+IoMq

NUM

Channel access key

Channel name

Channel unit

Device name

(device type / serial number)

Device ID

Device type

Serial number

Date and time of measurement

Selection of pages via tab bar

Measured values

11.6 Configuring the Automatic Readout

With the Sunny Beam, the function "Automatic Readout" only makes sense if the Sunny Beam is permanently connected to the PC with a USB cable.



With the automatic readout, data are automatically queried from the Sunny Boy Control at intervals of a length which you define, and are saved in Sunny Data Control. Only the devices currently included in the device overview ("Online" tab) are taken into account.

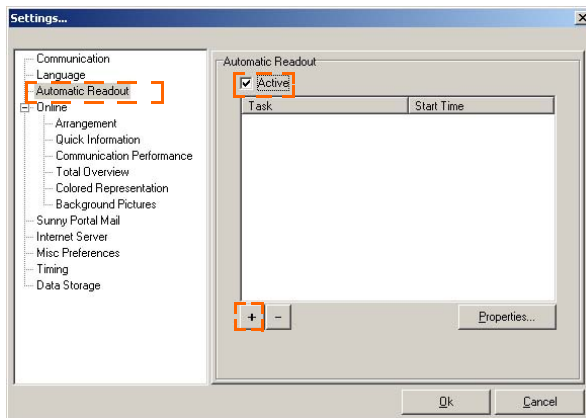
The automatic readout can only be performed if the PC is switched on, and if Sunny Data Control has been launched.

During the automatic readout, the spot value querying does not update until the readout is complete. In the bar at the lower edge of the screen, you can see whether data are currently being read out (see figure).

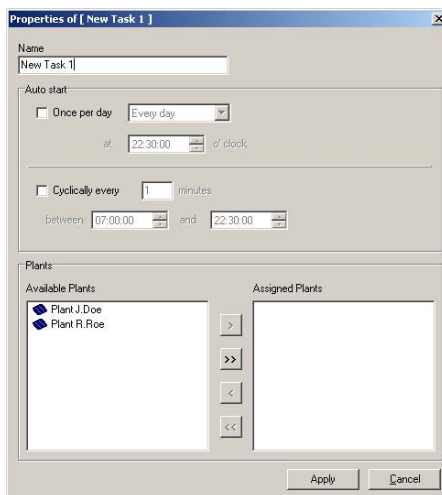


11.6.1 Setting a Task

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.



2. Select "Automatic Readout".
3. Add a check mark beside "Active" by clicking in the check box.
4. Click on <+> (see figure above).
The window shown to the right opens.



5. In the "Name" field (see figure below), type in the desired name for the automatic readout task (e.g. which plants the task involves).
6. In the "Auto start" area (see figure below), you can specify when the automatic query is to start.

Two possibilities are available.

Once per day:

Here, you can specify on which day of the week (or daily) and at what time of day the automatic readout is to start.

Cyclically:

Here, you can specify the times between which the automatic readout is to start, and at what intervals (after how many minutes).

Properties of [New Task 1]

Name
Doe & Roe

Auto start

☒ Once per day Every day
at 22:30:00 o'clock

☐ Cyclically every 1 minutes
between 07:00:00 and 22:30:00

Plants

Available Plants

- Plant J.Doe
- Plant R.Roe

Assigned Plants

> >> < <<

Apply Cancel

Example

7. In the "Plants" area (see figure below), select the plants to which these automatic query settings shall apply.
(Click on the names of the plants in the "Available Plants" field, and add them to the "Assigned Plants" field with the arrow button ">").

Properties of [New Task 1]

Name
Doe & Roe

Auto start

☐ Once per day Every day
at 22:30:00 o'clock

☐ Cyclically every 1 minutes
between 07:00:00 and 22:30:00

Plants

Available Plants

Assigned Plants

Plant J.Doe
Plant R.Roe

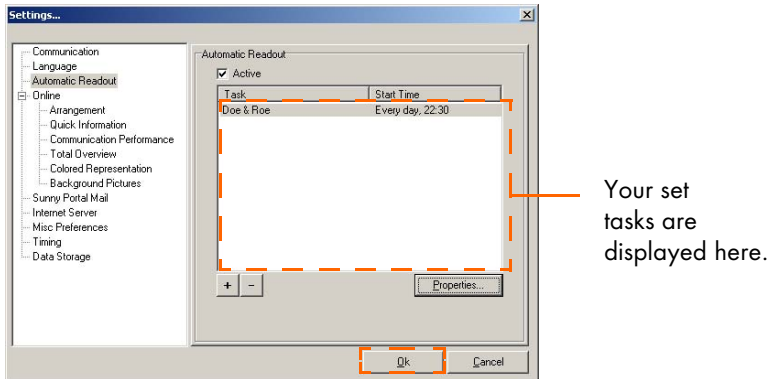
> >> < <<

Apply Cancel

Example

8. Click on <Apply>.

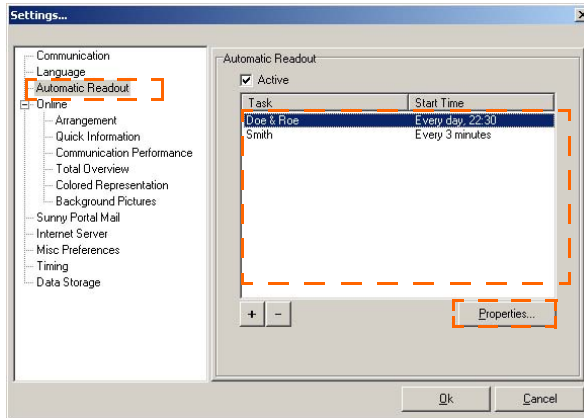
The "Settings" window opens again. The task which you have set is displayed in the "Task" field (see example below).



9. Click on <Ok> to save the settings.

11.6.2 Editing a Task

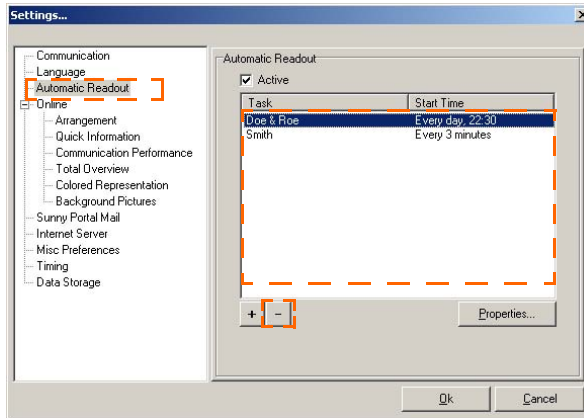
1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.



2. Select "Automatic Readout".
3. Click on the task which you wish to edit.
4. Click on <Settings>. The window for setting the task opens.
5. Adjust the settings as desired.
6. Then click on <Apply>. The "Settings" window opens again.
7. Click on <Ok> to save your settings.

11.6.3 Deleting a Task

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.

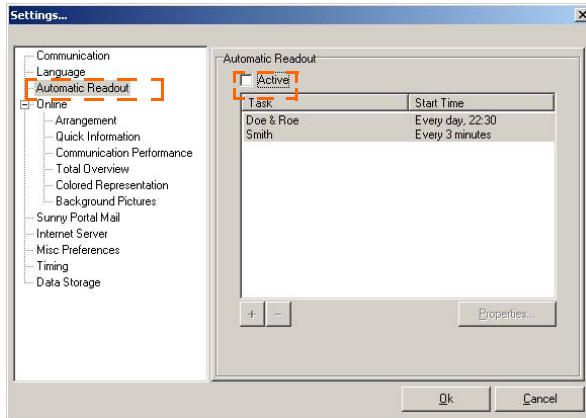


Example

2. Select "Automatic Readout".
3. Click on the task which you wish to delete.
4. Click on < - > to delete the task immediately.
5. Click on <Ok> to save the settings.

11.6.4 Deactivating the Automatic Readout

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.

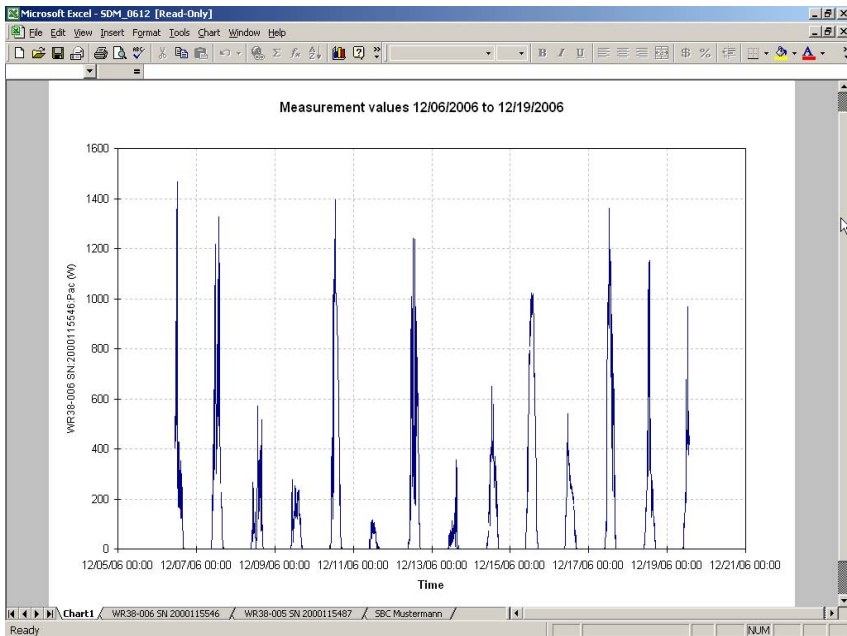


Example

2. Select "Automatic Readout".
3. Remove the check mark beside "Active" (see figure above).
4. Click on <Ok> to save the settings.

11.7 Creating a Chart in Excel

Your recorded measured values in Excel format can easily be analyzed graphically with Excel. The data are also automatically visualized in a chart.



Example chart

To this end, there are two options, which are described in the next sections.

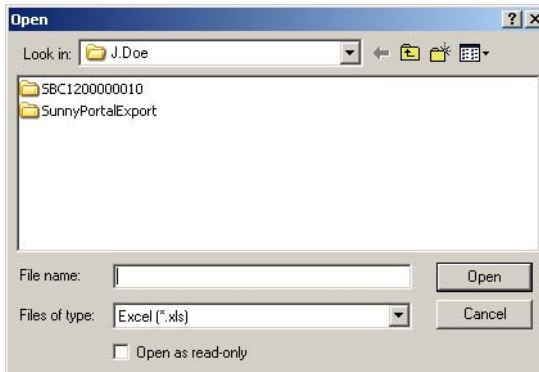
- **Automatic analysis:**
The analysis is started via Sunny Data Control. Excel opens automatically with the data analysis macro.
- **Manual analysis:**
Manual analysis is only required if you wish to start the analysis on a PC on which Sunny Data Control is not installed. The analysis is then started directly from Excel, and the macro is executed manually.

11.7.1 Automatic Analysis

The automatic analysis is started in Sunny Data Control. Excel opens automatically with the macro which has been specially written for the analysis.

1. Click on the "Show" icon (see figure to the right).
2. Select "Excel files", or the CSV type which you have created for saving CSV files (see section 11.3 "Saving Data in CSV Format" (Page 105)).

The window shown below opens.

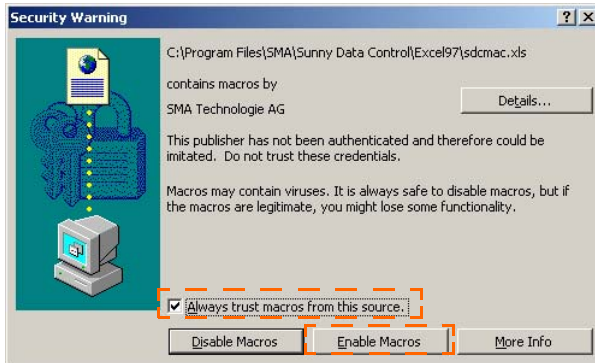


Example (Excel files)

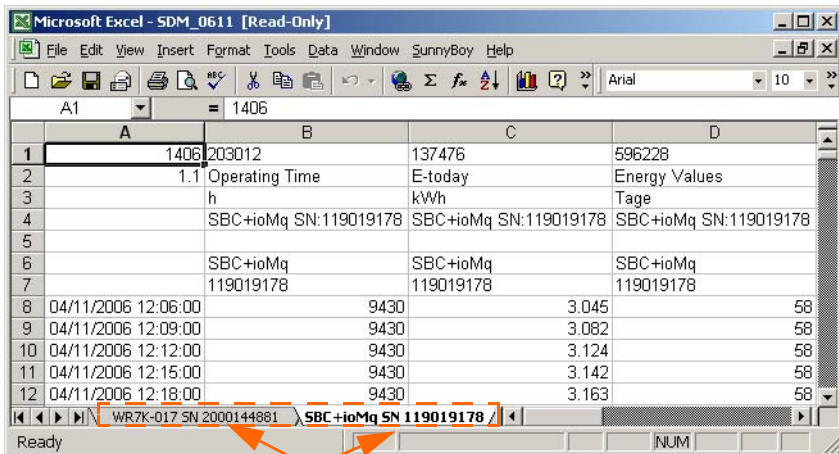
3. Select the desired plant. By default, the current plant is always displayed (here: sample plant "Smith").
4. Open the directory of the desired device, and open the Excel file which contains the data you wish to analyze.

Excel launches automatically, and a confirmation prompt opens (see figure below).

The data analysis macro is situated in the file "Excel97\sdcmac.xls" in the Sunny Data Control directory on your PC. Only if you activate the macro, can data analysis be performed.



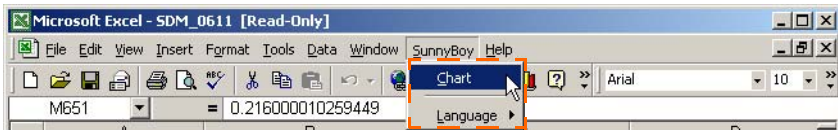
5. Add a check mark to the left of "Always trust macros from this source". This check mark causes the data analysis macro to be activated automatically every time Excel is opened via Sunny Data Control.
6. Click on <Enable Macros>.
7. If necessary, open the desired worksheet by clicking on the tab (see figure).



Tabs

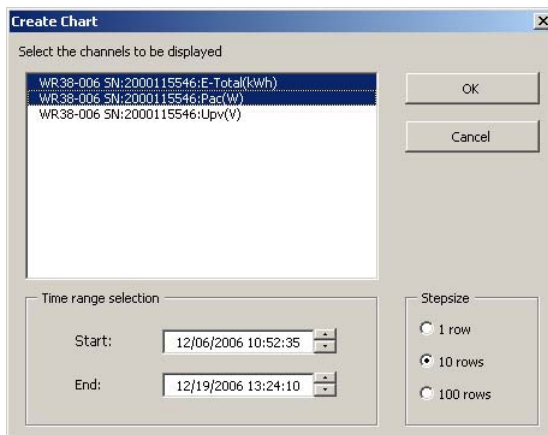
Creating the Chart

8. In Excel, select "Sunny Boy / Chart" (see figure below).



The window "Create chart" opens.

9. From the list, select the channels which are to be displayed in the chart, by clicking on the channel names. Several channels can be selected. The selected channels are highlighted in color.



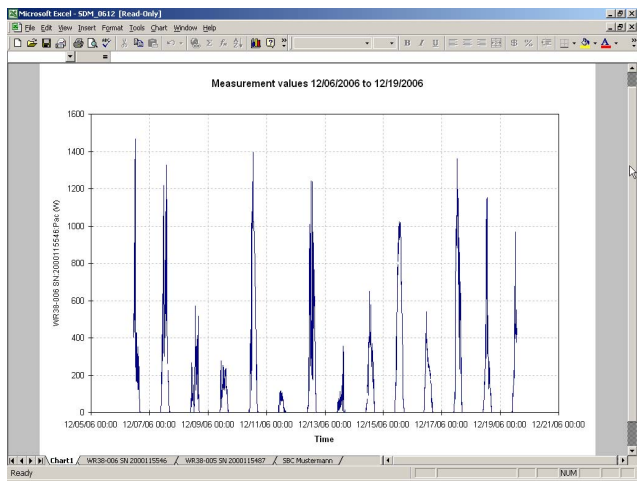
Example

10. Make the desired settings for display of the chart.

Start and End: the start and end (dates and times) of the interval, from which data are to be displayed. Take care to choose a display interval which is not too large, as Excel can display a maximum of 4,000 data sets in one chart.

Increment: indicates the increment in rows, from which the measured values are to be taken. For example, with "10 rows", only every tenth row of the measured values is included.

11. Click on <Ok>. The chart is displayed.



Example chart

11.7.2 Manual Analysis

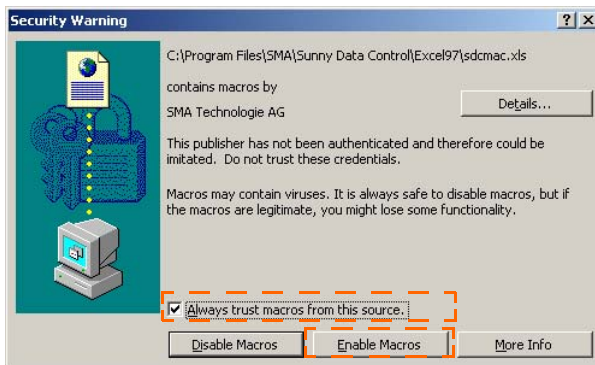
Manual analysis is only required if you wish to start the analysis on a PC on which Sunny Data Control is not installed. How to start the analysis directly from Excel and manually execute the analysis macro is described below.

1. Launch the program "Excel".
2. Open the file "Excel97\sdcmac.xls".

By default, the file is situated in the directory "Programs\SMA\Sunny Data Control\Excel97".

The data analysis macro is situated within this file. To guard against unintentional alterations, this file is write-protected. If you wish to alter the macro, you must first remove the write-protection (password: SMA).

Excel launches automatically, and a confirmation prompt opens (see figure below).



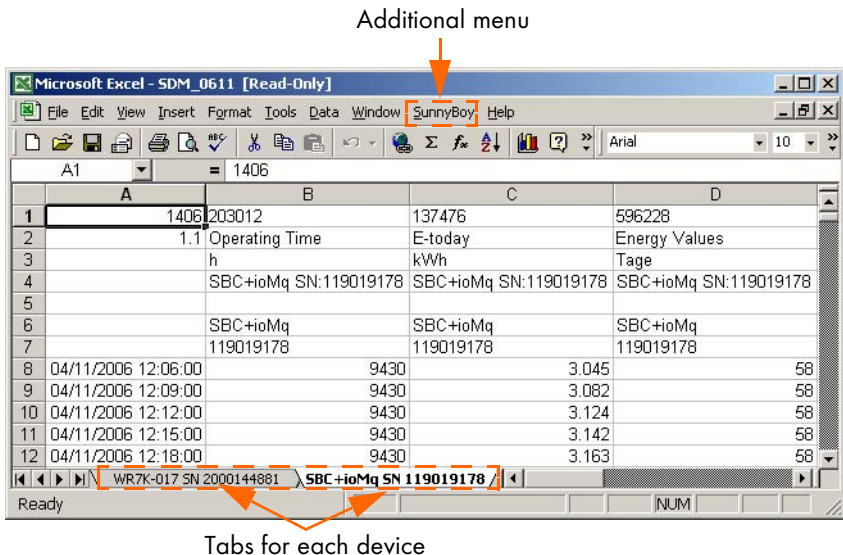
3. Add a check mark to the left of "Always trust macros from this source". This check mark causes the data analysis macro to be activated automatically every time Excel is opened via Sunny Data Control.
4. Click on <Enable Macros>.

Once the file has opened, the additional menu "Sunny Boy" is displayed in the table view (see figure below).

- Open the file which contains the data that you wish to analyze.

By default, data from your plants saved in Excel format reside in the directory "Programs\SMA\Sunny Data Control\Plants", and there in subdirectories for your respective plants.

By default, data from your plants saved in CSV format reside in the directory C:\Documents and Settings\Name of User\Application Data\SMA\Sunny Data Control\Plants\Plant name\Name of directory".

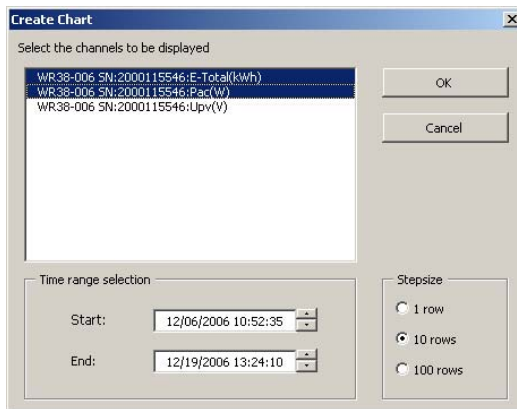


- Select the tab which pertains to the device with the data you wish to analyze.

Creating the Chart

7. In Excel, select "Sunny Boy / Chart".

The window "Create chart" opens.



Example

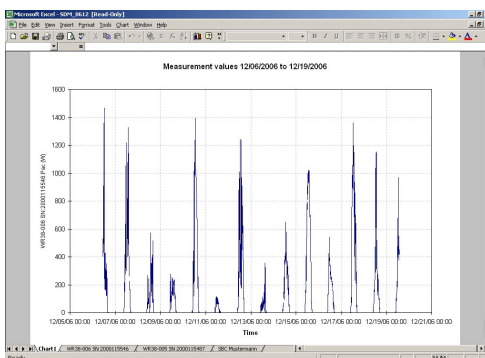
8. From the list, select the channels which are to be displayed in the chart, by clicking on the channel names. Several channels can be selected. The selected channels are highlighted in color.

9. Make the desired settings for display of the chart.

Start and End: the start and end (dates and times) of the interval, from which data are to be displayed. Take care to choose a display interval which is not too large, as Excel can display a maximum of 4,000 data sets in one chart.

Increment: indicates the increment in rows, from which the measured values are to be taken. For example, with "10 rows", only every tenth row of the measured values is included.

10. Click on <Ok>. The chart is displayed.



Example chart

12 Transferring Data to the Internet

12.1 System Requirements

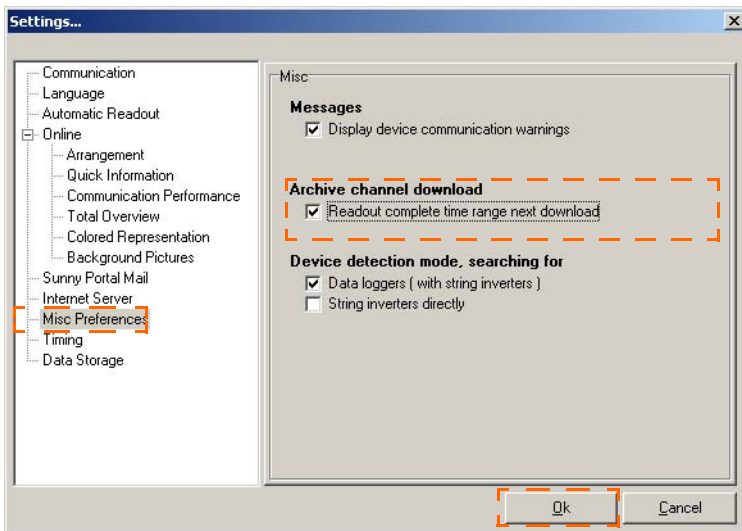
Utilization of the Internet functionality requires that the following be in place:

- Any pre-installed web server with an MS Windows operating system (Windows 2000 or Windows XP recommended).
- A JAVA-1.1-capable Internet browser (e.g. Firefox version 1.0 or above, or MS Internet Explorer version 4.x) on the part of the Internet visitor, for presentation and display of Java applets.
- TCP/IP protocol installed on the same computer on which Sunny Data Control is installed.

12.2 Reading Out the Complete Time Range

This function is necessary if you have already read out data from your communication device with Sunny Data Control, and have not yet sent them to the portal. With this function, the next time querying is performed, you can query the complete time range from your communication device, and send it to Sunny Portal.

1. Select "Settings / Misc".
2. Add a check mark beside "Readout complete time range next download".
3. Click on <Ok> to save the settings.



12.3 Configuring Sunny Portal Mail

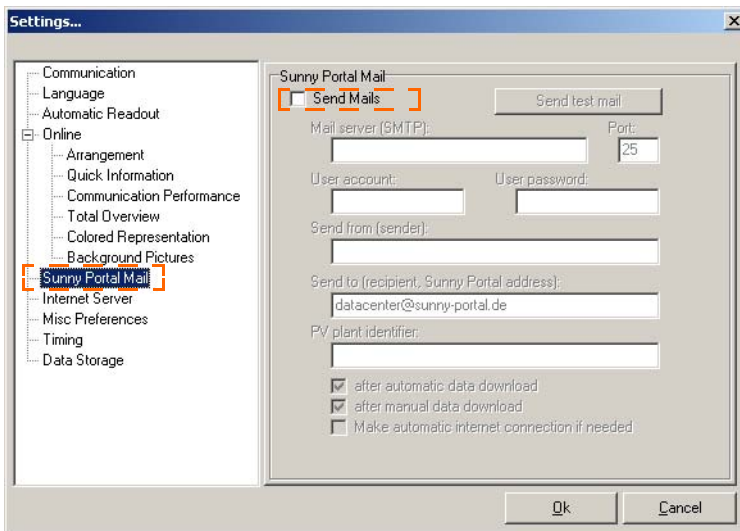


If you have already queried and saved data from your communication device with Sunny Data Control, you must read out the entire time range so that all data are transferred to Sunny Portal. See section 12.2 "Reading Out the Complete Time Range" (Page 141).

For online visualization of plants, SMA offers you the possibility of registering free of charge at the www.SunnyPortal.com site, in order to realize online display of plant data there. The data are sent by e-mail to Sunny Portal via Sunny Data Control.

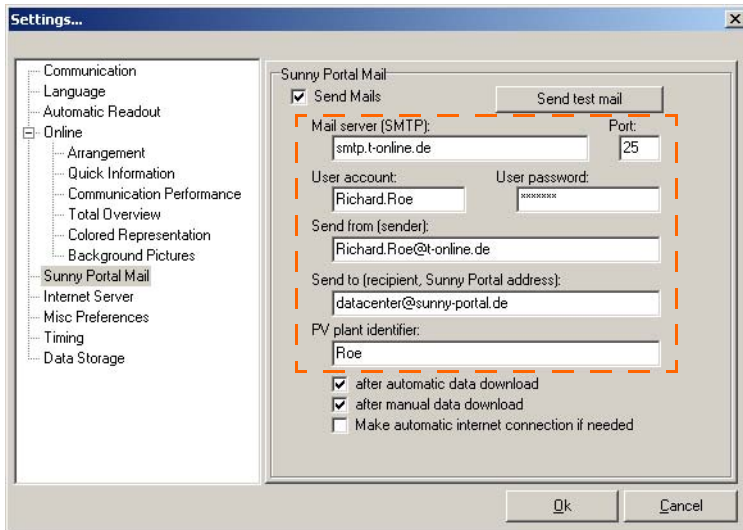
Sunny Portal software gathers the data sent by Sunny Data Control and stores it at the portal. You can then use these data for analysis, visualization and system monitoring at Sunny Portal.

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.



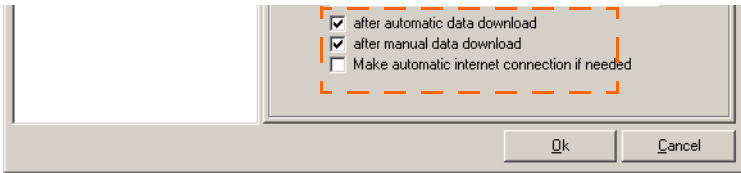
Example

2. Select "Sunny Portal Mail".
3. Add a check mark beside "Send Mails".



Example

4. In the field "Mail server (SMTP)", type in the IP address of your e-mail provider, e.g. "smtp.t-online.de" for T-Online, or that of your company's mail server.
5. In the field "Port", specify the port which corresponds to the IP address (SMTP=25).
6. In the field "User account", type in the name under which you are registered at the mail server.
7. In the field "User password", type in the password of your e-mail account.
8. In the field "Send from", type in your e-mail address.
9. The Sunny Portal e-mail address is always "datacenter@sunny-portal.de".
10. In the field "PV plant identifier", type in any name for your plant (e.g. SampleSystem). If the plant identifier you choose is already used in Sunny Portal, you will receive an error message by e-mail. You will then need to use a different name as your PV plant identifier.



11. You can specify when the Sunny Portal e-mail is to be sent:
 - After automatic data download
For this option, automatic readout must be configured. See section 11.6 "Configuring the Automatic Readout" (Page 125).
 - After manual data download
The Sunny Portal e-mail is sent whenever you read out the Sunny Boy Control's data store. See section 11.5 "Reading Out Data Saved on the Sunny Boy Control" (Page 117). When you click on the menu item "Extras / Send Sunny Mail".
Select the desired action by adding a check mark to the appropriate check box.
12. If the Internet connection is to be established automatically, add a check mark beside "Make automatic internet connection if needed".

Sending a Test E-Mail

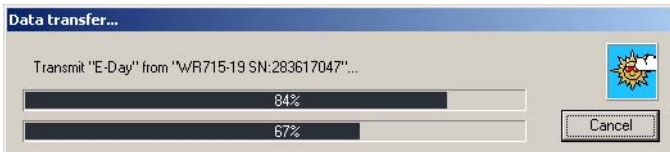
13. You can test your settings by clicking on <Send test mail>. If your settings are correct, you receive a test e-mail from Sunny Portal at the e-mail address which you have specified.

In the event that you have not yet registered at Sunny Portal under the specified e-mail address, an e-mail is automatically issued by Sunny Portal, advising you of the need to register at Sunny Portal to enable your plant data to be set up.

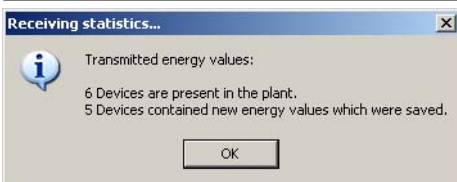
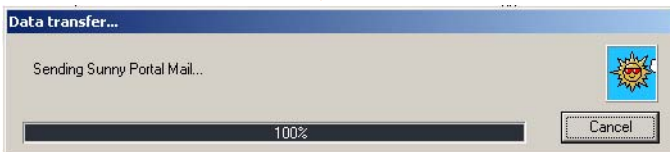
If you have already registered at Sunny Portal under the specified e-mail address, the e-mail indicates that you can send your plant data to Sunny Portal.
14. Click on <Ok> to save your settings.

12.4 Sending Sunny Portal Mail

The data are set to Sunny Portal either after an automatic data query, or after a manual data query, depending on whether you have selected "automatic" or "manual" data querying via the menu item "Settings / Sunny Portal Mail". See section 12.3 "Configuring Sunny Portal Mail" (Page 142).



After data transfer, the e-mail is sent to Sunny Portal.



12.4.1 After Automatic Data Query

If you have selected "after automatic data download", the data are automatically transferred from the Sunny Boy Control to Sunny Data Control after the set interval (see section 11.6 "Configuring the Automatic Readout" (Page 125)), and subsequently sent to Sunny Portal.

12.4.2 After Manual Data Query

If you have selected "after manual data download", the data are sent to Sunny Portal as soon as you save the data from the Sunny Boy Control. See section 11.5 "Reading Out Data Saved on the Sunny Boy Control" (Page 117).

Alternatively, the data is sent when you click on the menu item "Extras / Send Sunny Mail".

12.5.1 Writing the Online Data File

The online data file comprises two text files:

- .txt file = text file in "ini" format
- .xml file = text file in XML format

The files are saved on your PC in the directory "SMA\Sunny Data Control\Online". The files bear the name of the device overview which you activated most recently, and have the file suffixes ".txt" and ".xml" (e.g. "North Plant.txt").

You can read how to rename and manage device overviews, for example, in section 10.9 "Overview Management" (Page 92).

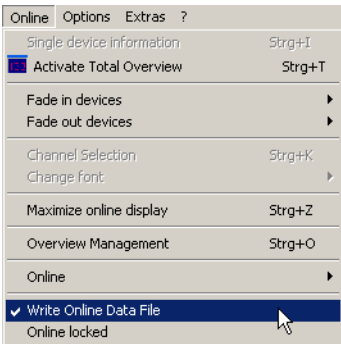
Please note that the files are only generated if there are device fields in the device overview.



1. Open the "Online" menu (see figure to the right).

If a check mark is shown beside "Write Online Data File", the online data file will be written. If no check mark is shown, no online data file will be written.

2. Activate or deactivate the writing of the online data file by adding or removing the check mark beside the menu item "Write Online Data File".



12.5.2 Structure of the Online Data Files

The structure of the online data files is explained below.

Online Data File in Text Format (".txt")

In the online data file, certain characters have a special meaning:

- ";" (semicolon) serves as a separator between the individual values
- "#" (hash) marks the start of a comment (for the entire row)

The file begins with a comment. This is followed by the date and time of the file's last update. These are separated from each other by a semicolon:

#This file is created automatically!

<date>;<time>

Each additional row represents exactly one device, with all of its properties, in the spot values display. In turn, the respective values are separated from each other by semicolons.

For improved legibility, the entries are shown below arranged in rows, one beneath the other.

<device position X:Y>;

<channel name for capacity>;<present capacity as a percentage>;<number of colors in palette>;

<channel 1 name>;<channel 1 value>;<channel 1 unit>;

<channel 2 name>;<channel 2 value>;<channel 2 unit>;

...

<channel n name>;<channel n value>;<channel n unit>



Row 1: #This file is created automatically! Rev. 1.00

Row 2: 18/06/2006;15:30:32

Row 3: 0:0;Pac;95.1;90;E-total;50529;kWh;

Row 4:

1:1;Pac;94.6;90;Upv_Ist;771;V;Upv_Soll;771;V;lac_Ist;771;mA;Uac;771;V;Fac;7.71;Hz;Pac;771;W;Riso;771;kOhm;lpv;771;mA;E_Total;842;kWh;h_Total;14035;h;

The example file was updated on 06/18/2006 at 15:30:32. The plant comprises a total of 2 devices:

Device 1:

Position (0:0), channel "Pac" as capacity utilization channel, 95.1 % present capacity utilization, color palette used contains 90 colors. This is followed by the device's displayed channel "E-Total", with the value 50529 and unit "kWh".

Device 2:

Position (1:1), channel "Pac" as capacity utilization channel, 94.6 % present capacity utilization, 90 colors displayed. This is followed by all displayed channels: channel "Upv-Ist" with value 771 and unit "V". The last channel is "h-Total" with the value 14035 and the unit "h".

Online Data File in XML Format (".XML")

The same measured values are saved in this file, as in the plain text file described above. The only difference is the format used. Here, the data are saved in XML format.

XML (Extensible Markup Language) is a data definition language, standardized by the consortium W3C. This enables, among other things, simple exchange of data over the Internet. For this reason, the online displays' measured values are also saved in this format. You can acquire more detailed information regarding XML online at "www.w3c.org".

The file begins with the normal XML header, followed by a brief comment:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<!--
**** Sunny Data Control Online Display Data File ****
...
-->
```

Directly afterwards, the "root element" of the document "<OnlineData>" begins:

```
<OnlineData>
<Date>10/02/2002</Date>
<Time>15:01:31</Time>
...
</OnlineData>
```

Within the root element are the elements "<date>" and "<time>", which indicate the date and time when the file was created.

This is followed by the "<devices>" element, in which all devices in Sunny Data Control's online display are now saved. Each device is described by a "<device>" element entry:

```
<devices>
  <device>
    ...
  </device>
  <device>
    ...
  </device>
  ...
</devices>
```

Within such a "<device>" element, information regarding the device (Sunny Boy or Sunny Boy Control) is recorded:

```
<Device>
  <Name>SBC+9tgr SN:114413059</Name>
  <SerNr>114413059</SerNr>
  <PositionX>0</PositionX>
  <PositionY>0</PositionY>
  <PerformChanName>Pac</PerformChanName>
  <Perform>72</Perform>
  <ColorCount>90</ColorCount>
  <Channels>
    . . .
  </Channels>
</Device>
```

From this, the following settings are to be derived:

Device name = "SBC+9tgr SN:114413059"

Serial number = "114413059"

Device position in the online display (x,y) = 0/0 ("top left")

Capacity utilization channel: "Pac"

Present capacity utilization: 72 percent

Number of colors in palette: 90 colors

In the element "<Channels>", all of the device's channels which are also included in the online display are now listed. Each channel is recorded in a "<Channel>" entry:

```
<Channels>
<Channel>
<Name>Pac</Name>
<Value>1234.000</Value>
<Unit>kW</Unit>
</Channel>
. . .
</Channels>
```

From this, in turn, the following information can be derived:

Channel name = "Pac"

Channel value = "1234.000"

Channel unit = "kW"

The number of occurrences of the "<Channel>" element within the "<Channels>" element is equal to the number of channels included in the online display for this device.

Below is a cohesive section of an example file:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
<!--
**** Sunny Data Control Online Display Data File ****
-->
<OnlineData>
<Date>10/14/2002</Date>
<Time>17:03:27</Time>
<Devices>
<Device>
<Name>SBC+9tgf SN:114413059</Name>
<SerNr>114413059</SerNr>
<PositionX>0</PositionX>
<PositionY>0</PositionY>
<PerformChanName>Pac</PerformChanName>
<Perform>72</Perform>
<ColorCount>90</ColorCount>
<Channels>
<Channel>
<Name>Pac</Name>
<Value>1234.000</Value>
<Unit>kW</Unit>
</Channel>
<Channel>
<Name>E-Total</Name>
<Value>2345</Value>
<Unit>kWh</Unit>
</Channel>
</Channels>
</Device>
...
</Devices>
</OnlineData>
```


12.6 Internet Server (SDC Agent)

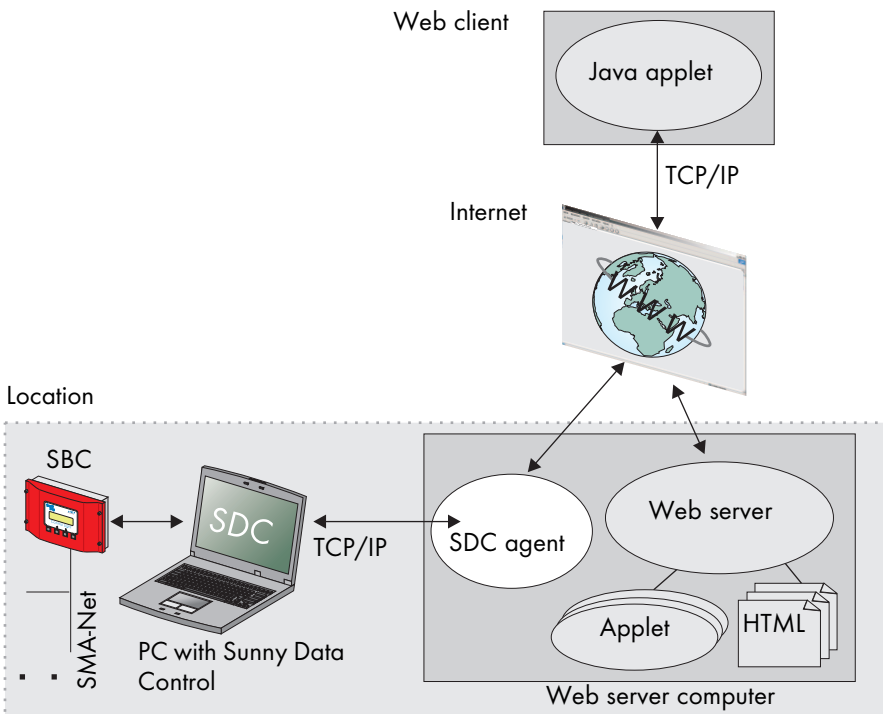
12.6.1 Overview

Sunny Data Control's Internet server function enables you to display any of a PV plant's measured values directly online in an interactive HTML page. In this context, the application operates as a server. For the display of measured values in an HTML page, Java applets are used in a client / server environment.



Setting up a web page with your plant's present operating data requires some knowledge of HTML, IP addresses, and Java applets. If you do not feel absolutely confident in this field, consult a specialist.

Fundamental Communication Structure



When the HTML page is accessed, the Java applet is downloaded from the web server and launched in the browser. It independently establishes a connection to the server.

The tool "SDC agent" serves as a communication intermediary between the Java applets and Sunny Data Control. For this purpose, it is installed on the HTML web server's computer. The communication between the applets and the agent, as well as between Sunny Data Control and the agent, occurs via a dedicated TCP connection.

Two different modes of connection from the PV plant to Sunny Data Control serve as the information source for the applets' display of measured values.

Direct Connection

The Sunny Boy Control is permanently in contact with Sunny Data Control via a direct RS232 / RS485 connection. The measured values are queried directly from the connected PV plant, and transferred to the Internet.

This mode enables the entire range of all different display types to be shown on the applets. This mode is preferable, as it offers the most possibilities.

Offline Connection

With this mode, there is no permanent connection between the Sunny Boy Control and Sunny Data Control (e.g. only a temporary modem connection). The only data source is the content of the online data file (see section 12.5.1 "Writing the Online Data File" (Page 147)).

This only enables the applets to show the device field display. No other display types are possible.

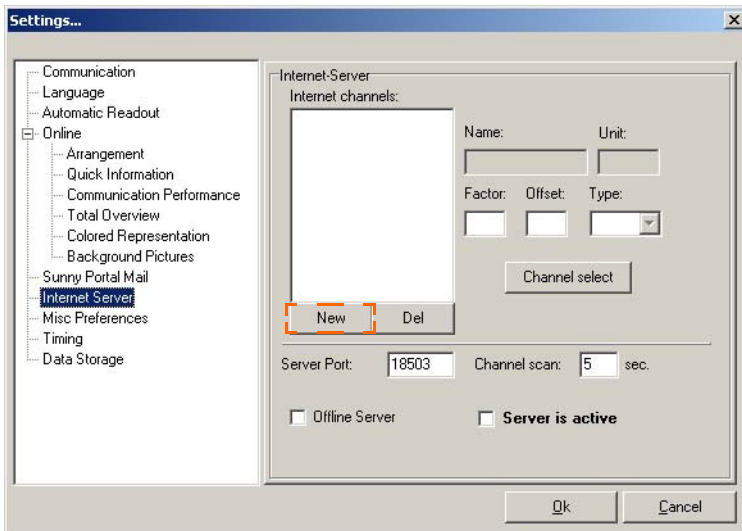
12.6.2 Configuring and Activating the Internet Server



If you wish to alter or delete an Internet channel which has already been configured, you must first remove the check mark beside "Server is active", so that the server is deactivated.

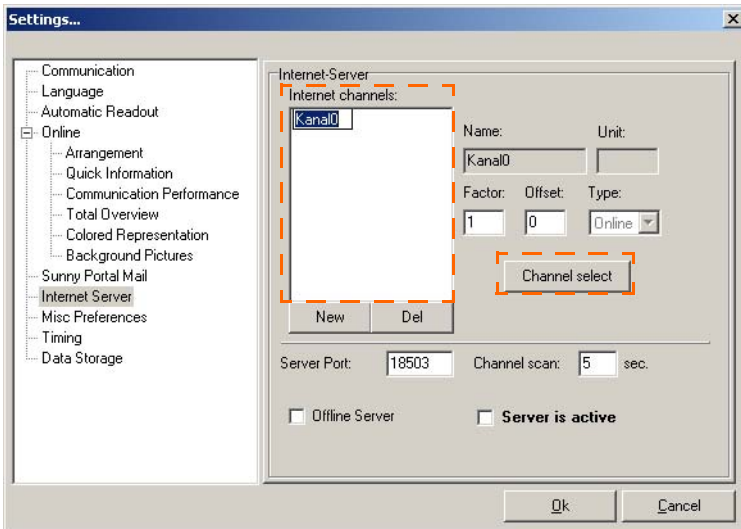
Creating a New Internet Channel

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.



2. Select "Internet Server".
3. Click on <New> to create a name for the new Internet channel.

The name "Channel0" is added to the "Internet channels" list (see figure below).



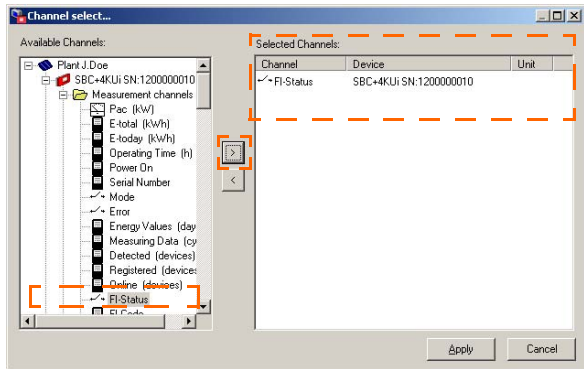
4. Click once on the name "Channel0". A frame appears around the name, and it can now be written over.
5. Type in the desired name for the new Internet channel (e.g. "Status").

Selecting Device Channels

6. Click on <Channel selection> (see figure above).
The "Channel selection" window for the current plant opens.

7. In the "Available Channels" list, click on the desired channel, and add it to the "Selected Channels" list by clicking on the arrow button (see example to the right).

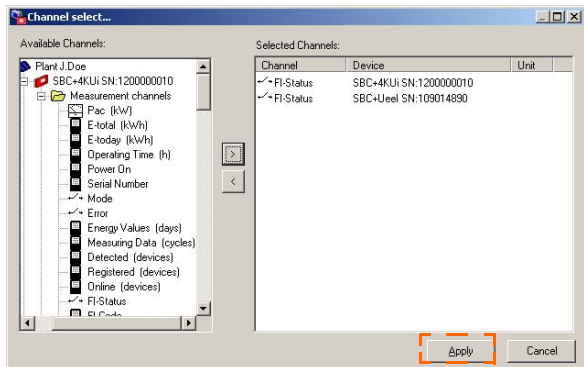
In this manner, you can select several channels with the same unit of measurement.



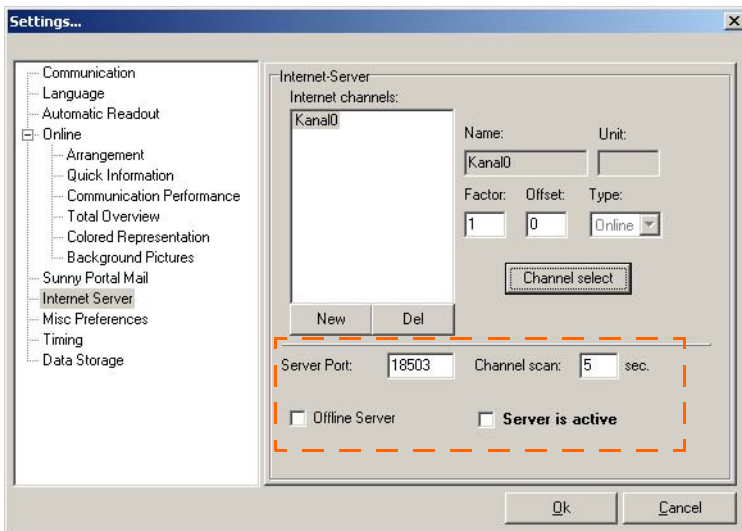
Multiple selection is only possible if the individual channels have the same unit of measurement (e.g. two "watts" channels [W]). The Internet channel is then made from the sum of these channels.

Existing connections to the Java applets are then automatically disconnected from the server for technical reasons.

8. Then click on <Apply>.



The "Settings" window is displayed once more.



Example

Configuring the Server Port and Channel Scan

Only alter the server port and channel scan settings if you fully understand the consequences of the changes. Incorrect settings can result in the SDC agent no longer functioning.



If your Ethernet network is managed by a network administrator, contact this administrator so that the appropriate port on the router can be enabled.

The server port setting specifies the TCP port at which the server awaits queries from the SDC agent. By default, this is set to port 18503.

The channel scan setting is the time waited (in seconds) between sending two channel updates.

9. If necessary, make the appropriate adjustments to the server port and channel scan settings.
10. Enable the port on your router. To this end, refer to your router's user manual, or contact your network administrator.

Offline Server

The setting "Offline Server" makes it possible to choose between direct connection and offline connection of the PV plant.

See section 12.6.1 "Overview" (Page 154).

11. Add or remove the check mark beside "Offline Server", according to whether or not your Sunny Boy Control is directly connected to Sunny Data Control.

Server is Active

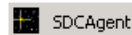
12. If you wish to activate the server, add a check mark beside "Server is active". If no check mark is present, the server is deactivated.
You can only make changes and adjust settings for the respective Internet channel if the check mark beside "Server is active" is first removed.
13. Click on <Ok> to save the settings.

12.7 SDC Agent

The SDC agent serves as a communication intermediary between the Java applets and Sunny Data Control on the web server. The SDC agent can manage a maximum of three server connections; thus, three PV plants can be communicated with simultaneously via one web server.

Prerequisites for Use

- The "SDC agent" must be installed
(see Windows Start menu under "Programs/
Sunny Data Control/SDCAgent").
- JavaScript must be activated in your browser (e.g. Internet Explorer).



Configuring the SDC Agent

Configuration can occur via any web browser.

We recommend that you include the SDC agent in the Windows autostart group, so that it is automatically launched every time the computer starts up. However, it can also be manually called up from the Windows Start menu (Programs/Sunny Data Control/SDCAgent/SDCAgent.exe).

1. Start the SDC agent.

The agent does not have its own graphical interface. With the Windows version, only a small window opens (see figure to the right), which after a brief moment automatically resides in the background. Do not close the window.



2. Open your web browser and type in the following URL:
http://<IP address>:18501;
for <IP address> please type the IP address or the DNS name of the computer on which you have installed the SDC agent.

The main page for configuration of the SDC agent opens.

Server

	Server-Name (Alias)	IP-Adresse (or DNS-Name)	Port	activated
Server 1:	Server1	127.0.0.1	18503	☐
Server 2:	Server2	127.0.0.1	18503	☐
Server 3:	Server3	127.0.0.1	18503	☐

Client

SDCAgent-Port:	18500
Max. Internet Clients:	50
Current connected:	0 Client(s)

Logging

Access:	☐
Errors:	☐

Commit changes...

The agent's most important settings are to be found in the "Server" table (see figure above). Each server connection to Sunny Data Control occupies one row in the table.

Server Name (Alias)

- In the field "Server Name (Alias)", type in the desired name for the server. The Java applets identify and communicate with each server on the basis of this name. Server names are case-sensitive.

IP Address (or DNS Name)

- In the field "IP Address (or DNS Name)", type in the IP address of the computer on which the server software (Sunny Data Control) is installed. Alternatively, you can type in a DNS name.

Port

- In the "Port" field, only make changes if you have changed the default port. The number must match the port number setting in Sunny Data Control. See section 12.6.2 "Configuring and Activating the Internet Server" (Page 156). The default port setting is 18503.
- Add a check mark in the "Activated" field in each respective row in order to allow the connections to Sunny Data Control.

Server

	Server-Name (Alias)	IP-Adresse (or DNS-Name)	Port	activated
Server 1:	ServerRoe	10.12.13.118	18503	☒
Server 2:	Server2	127.0.0.1	18503	☐
Server 3:	Server3	127.0.0.1	18503	☐

Client

SDCAgent-Port:	18500
Max. Internet Clients:	50
Current connected:	0 Client(s)

Logging

Access:	☐
Errors:	☐

Commit changes...

Example

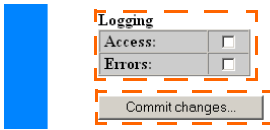
SDC Agent Port

- This is where the client-side settings are made. The SDC agent port represents the TCP port via which the Java applets can reach the SDC agent. The default port setting is 18500.

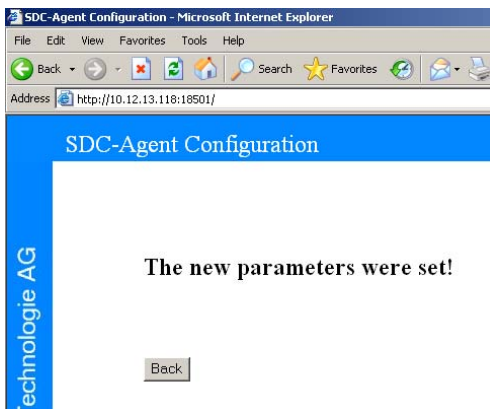
Max. Internet Clients

- The number of Java applets which the SDC agent can reach is stipulated here. The value should be adapted to the available processor speed. The default setting is 50 clients.

Logging



9. You can stipulate whether requests and errors are to be logged. For this purpose, place a check mark in the respective field.
10. Click on <Apply changes> to save the settings.
11. A message is briefly displayed, indicating that the new parameters have been set (see figure below).
The main page for configuration of the SDC agent is then displayed again automatically. You can now close the browser. The settings have been applied.



12.8 The Java Applet

The Java applet is responsible for the actual graphic presentation of the PV plant on the web pages. Applets run on the web clients in the Internet, i.e. on the Internet surfers' computers.

An HTML page can contain one or more applets, as desired. However, the number per page should be kept as low as possible, as each applet establishes its own TCP connection to the web server, or to the SDC agent.

There are several different display types for the PV plants' measured values. In order to keep the number of required TCP connections as low as possible, one applet can show several display types simultaneously.

The configuration of applets occurs by means of applet parameters which are transferred to the applet in the HTML code of the respective page.

Integration

Integration of the applet into the HTML document occurs by means of the APPLET tag. At the desired location in the HTML page, the applet is introduced by the code word "<APPLET>", and closed with "</APPLET>".

```
<APPLET
ARCHIVE = "SunnyViewer.jar"
CODEBASE = "."
CODE = "de.sma.SunnyViewer.SunnyApplet.class"
WIDTH = 900
HEIGHT = 400>
<PARAM name="1stParameterName" value="1stParameterValue">
. . .
</APPLET>
```

The parameter "ARCHIVE" describes the file (Java archive) which contains the applet. Here, please type "SunnyViewer.jar". "CODEBASE" stipulates the directory in which the Java archive resides. A "." (period) indicates that the archive is situated in the same directory as the HTML page.

The amount of space which the applet occupies on the page is specified by "WIDTH" and "HEIGHT" (given in pixels). The actual applet for execution is specified by the "CODE" parameter, and should always be "de.sma.SunnyViewer.SunnyApplet.class" (case-sensitive!).

In the sequence between "<APPLET>" and "</APPLET>", a series of PARAM tags are passed to the applet as parameters. These parameters serve for actual configuration of the applet. The commands have the following syntax:

```
<PARAM name="ParameterName" value="ParameterValue">
...
```

The quotation marks are only necessary if the parameter value contains empty spaces. Four different parameter types are used:

- Bool: the value is either "0" (deactivated) or "1" (activated).
- Integer: a whole number.
- String: a series of characters (possibly in quotation marks).
- Color: a color value in the format "#RRGGBB". This represents a 24-bit value. "RR" is the proportion of red, "GG" the green, and "BB" the proportion of blue. The color values are given in hexadecimal notation. This allows any hues within the displayable color spectrum to be defined.

#ff0000 (red)

#00ff00 (green)

#0000ff (blue)

#0a0a5c (dark blue)

#ffffff (white)



The actual parameters are subdivided into the following categories:

- General applet parameters (settings common to all components)
- Parameters specific to the individual component types

12.8.1 General Applet Parameters

The general applet parameters define the fundamental operating principles of the applet, and the settings which apply to all components.

BGColor

This parameter defines the background color of the area in the applet which is not covered by any display components. The parameter type is "color". The default value is white.

<PARAM name=BGColor value=#00003c>

This example sets the applet's background color to a dark blue.



ChannelX, ChannelX.Name, ChannelX.Unit, ChannelX.Stext (String)

With these parameters, all Internet channels which are to be displayed in the applet within a component are defined. The "X" indicates the number of the channel, and must be replaced accordingly. The sequence begins with "1" and ends at a maximum of "10".

The ChannelX parameter describes the name of the Internet channel as defined in Sunny Data Control (see section 12.6.2 "Configuring and Activating the Internet Server" (Page 156)). As the channel name is thus named in the display within the applet, you have the possibility of adapting the output text in the applet to another language, with the parameter ChannelX.Name. The same applies to the channel unit, which is defined by the parameter ChannelX.Unit. Unit and Name are optional.

With the parameter ChannelX.Stext, you can assign a text to a channel's numerical value. The texts are specified within the parameter, separated by commas. The first text corresponds to the value "0". This parameter should only be used for status channels.

SBC status channel: Stop, Wait, Operate, Disturbance, Fault, Detection

SWR status channel: Offset, Stop, Grid-Check., Wait, Uconst, Iconst, Mpp-Search, Mpp, Disturb., Error



```
<PARAM name=Channel1 value=Operating time>
<PARAM name=Channel1.Unit value=Hours>
<PARAM name=Channel2 value=Power>
<PARAM name=Channel2.Name value=Performance>
<PARAM name=Channel3 value=State>
<PARAM name=Channel3.Stext value=
"Stop,Wait,Operate,Disturbance,Fault,Detection">
```

This example defines three channels: the first channel is "Operating time", the channel unit of which is displayed in the applet as "Hours". Channel 2, "Power", appears in the applet as "Performance". Channel 3, "State", assigns its values to texts as follows: 0 = "Stop", 1 = "Wait", 2 = "Operate", etc.

DisplayErrMsg (Bool)

If the applet cannot establish a connection to the server, an automatic error message is generated. With this parameter, the messages can be suppressed. By default, the parameter has the value "1", which means that the messages are displayed.

If set to "0", all such error messages are suppressed.

```
<PARAM name=DisplayErrMsg value=0>
```



Language (String)

This setting can be used to set the language used by the applet. However, at present this setting only affects the "device field display". Here, the output of channel names and channel values is then given in the respective language.

The values "de" for German, and "en" for English can be selected. At present, Spanish texts are not supported here.

```
<PARAM name=Language value="en">
```

Sets the language of the applet ("device field components") to English.



LayoutHSpace, LayoutVSpace (Integer)

By default, a gap of 4 pixels is maintained between the components included in the applet. This can be separately adjusted horizontally and vertically with the parameters "LayoutHSpace" and "LayoutVSpace" respectively.

```
<PARAM name=LayoutHSpace value=0>
```

```
<PARAM name=LayoutVSpace value=0>
```

These settings switch the horizontal and vertical space between the components to 0 pixels (off).



ServerAlias (String)

This setting specifies the name of the (Sunny Data Control) server, measured values from which are to be displayed on the applet. The name is allocated in the SDC agent, and unambiguously identifies the desired server. This value is not optional, and must always be specified!

```
<PARAM name=ServerAlias value=ServerKassel>
```



ServerPort (Integer)

This parameter specifies the TCP port which aids the applet in establishing a TCP connection to the SDC agent (on the web server). The value must correspond to the SDC agent's settings. See section 12.7 "SDC Agent" (Page 162).

The default value is port 18500 if the parameter is not declared.



<PARAM name=ServerPort value=12345>

This setting sets the communication port to 12345.



If you use a firewall, it is imperative to enable the specified TCP port between the Java applet and the agent on the web server!

12.8.2 Component-specific Parameters

In order to support different display types within an applet, each display type is accommodated in a separate Java component. The number of components, and thus the number of displays per applet, is limited to a maximum of four.

The Java applet has three different display types:

- Chart display

With this display type, the values of an Internet channel are applied point by point to a coordinate system, which is defined by an X axis and a Y axis. A maximum of four channels can be shown simultaneously in this display. According to preference, display as a line chart or as an area chart can be selected. The line chart display connects the individual measured values' points to form a line. The area mode also fills in the area beneath the line.

- Device field display

As closely as possible, this display resembles the online display as already shown locally in Sunny Data Control (see section 2 Spot Values).

- Numerical display

Here, the measured values are displayed as numerical values. Each row in this display represents exactly one measuring channel. The number of channels is only limited by the applet's height.

ComponentX, NameX (String)

Each component to be displayed is introduced with:

```
<PARAM name=ComponentX value=ChartType>
```

```
<PARAM name=NameX value=ChartName>
```

among the parameters. The parameter ComponentX specifies the component type (see above). Each display type has an unambiguous character string which identifies the type. In this case, "X" stands for the sequential component number. A maximum of four are possible, beginning with 1.

At present, the following values are possible for ComponentX:

- "de.sma.SunnyViewer.ViewerDiagram" (for chart display)
- "de.sma.SunnyViewer.ViewerDigital" (for numerical display)
- "de.sma.SunnyViewer.ViewerGrid" (for device field display)

With the parameter "NameX", an unambiguous name is assigned to the component. In subsequent procedures, the component is identified by this name. This is similar to the definition of a variable in a programming language.



```
<PARAM name=Component1 value=de.sma.SunnyViewer.ViewerDiagram>  
<PARAM name=Name1 value=chart1>
```

This example specifies that the first display component is a chart component, and that this can subsequently be referred to as "chart1".

There is a set of parameters supported by all components. Each parameter is preceded by the name of the component to which it applies, separated by a period.

BGColor (Color)

This parameter defines the background color of this component.



```
<PARAM name=chart1.BGColor value=#ffffff>
```

This example sets the background color of the component "chart1" to white.

BGPicture (String)

The parameter BGPicture defines the component's optional background image. The possible image formats are "JPEG" and "GIF". If this parameter is declared, it causes the BGColor parameter to become ineffective.



```
<PARAM name=chart1.BGPicture value=BackGround1.jpg>
```

This example causes the component "chart1" to display the image "BackGround1.jpg" in the background. The image size is automatically adapted to the size of the component.

Draw3DFrame (Bool)

By default, every component is surrounded by a 3D frame. With this parameter, the frame can be deactivated. With a value of "0", the frame is no longer displayed around the component.



```
<PARAM name=chart1.Draw3DFrame value=0>
```

This example deactivates the 3D frame of the component "chart1".

FontName (String)

The font to be used in the component is set with the aid of this parameter. The possible font names depend on the Internet browsers used (Java machines). Some of the possible font names are:

"Helvetica", "TimesRoman", "Courier", "Dialog"

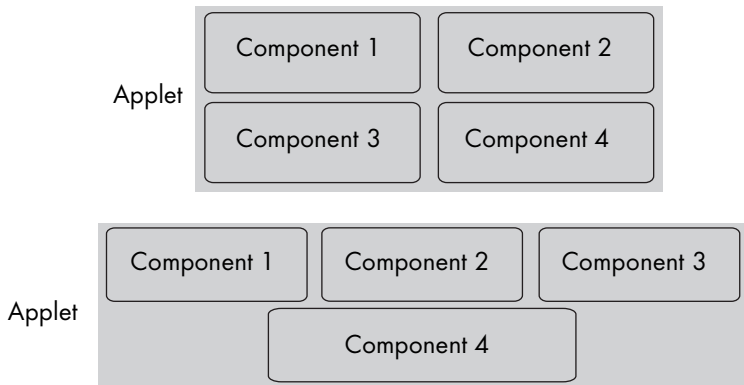
Please note that the font names are case-sensitive.

FontSize (Integer)

This parameter defines the size of the font used. The default setting is "12".

Width, Height (Integer)

Each component in the applet has its own height (Y) and width (X). The components are arranged in rows from left to right, on the basis of these two dimensions. If there is no longer sufficient space on the right in the applet, the component is positioned in the next row:



Width describes the horizontal dimensions and height describes the vertical dimensions of a component in the applet. The value is given in pixels.

```
<PARAM name=chart1.Width value=100>
```

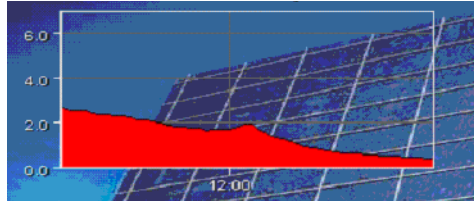
```
<PARAM name=chart1.Height value=50>
```



This example defines the size of the component "chart1" as 100 x 50 pixels.

12.8.3 Chart Display

With the aid of this component, channel values are displayed as a chart. Here, the values of the channel are applied to a Cartesian coordinate system as points, and interconnected by a line. As an option, the area beneath the line can be filled in.



Any text can be displayed as the title, centered within the display. This is also optional. The display's legend serves to label the individual channel curves. This indicates the name, the unit in brackets, and the color of each respective channel.

The labeling of the X and Y axes is generated automatically. The maximum value for the Y axis is based on the largest value of one of the displayed channels, and is always displayed with one decimal place. The X axis represents time.

In order to show "chart display" components, the type "de.sma.SunnyViewer.ViewerDiagram" must be entered in parameter "Component1".



```
<PARAM name=Component1 value=de.sma.SunnyViewer.ViewerDiagram>
```

The other parameters of this component type are listed below.

AxisColor (Color)

Defines the color of the actual X and Y axes. By default, this optional parameter is set to black.



```
<PARAM name=chart1.AxisColor value=#ffffff>
```

Sets the color of the axes to white.

AxisLabelColor (Color)

This parameter defines the color of both axes' labels. The default setting is #ffffff (white). This parameter is optional.

```
<PARAM name=chart1.AxisLabelColor value=#000000>
```

Sets the color of the axes' labels to black.



Channels (String)

This parameter specifies which channels are to be displayed in this component. The channel names are listed, and separated by commas. Each name must be identical to that specified by the general parameter ChannelX.

```
<PARAM name=chart1.Channels value="Betriebszeit,Leistung">
```

This example specifies that in the component "chart1", the channels "Betriebszeit" and "Leistung" are to be displayed.



ChartColorX (Color)

This parameter defines the color of channel X. For "X", a channel number is entered, which corresponds to the channels' sequential order as defined by the "Channels" parameter. The possible numbers for "X" are 1 to 4. If this parameter is not declared, the following allocations occur:

1st channel => red

2nd channel => black

3rd channel => blue

4th channel => green

```
<PARAM name=chart1.ChartColor1 value=#00ff00>
```

```
<PARAM name=chart1.ChartColor2 value=#0000ff>
```

```
<PARAM name=chart1.ChartColor3 value=#000000>
```

```
<PARAM name=chart1.ChartColor4 value=#ff0000>
```



This example sets the colors of the individual channels as follows:

1st channel => green

2nd channel => blue

3rd channel => black

4th channel => red

ChartStyle (String)

This parameter defines the component's style. It is possible to specify whether the area beneath the line is to be filled in ("Fill"), or whether just the line itself ("Line") is to be displayed in the chart. This parameter is case-sensitive, and optional. If this parameter is not declared, just the line is displayed in the charts.



```
<PARAM name=chart1.ChartStyle value="Fill">
```

LegendBGColor (Color)

This parameter is used to set the background color of the entire legend. If this parameter is not declared, the legend is displayed as transparent.

LegendTextColor (Color)

This parameter defines the text color used to display the channel text and units in the legend. This parameter is optional. The default setting is #ffffff (white).

LegendVis (Bool)

This parameter specifies whether the chart's legend is to be displayed. The default setting for this optional parameter is "1" (is displayed). If set to "0", the legend will no longer be displayed.

The following example deactivates the legend in component "chart1":



```
<PARAM name=chart1.LegendVis value=0>
```

MaxValue (Integer)

With this parameter, an initial value can be set as the largest value to be displayed on the Y axis. If this parameter is not declared, the value is calculated according to the following formula:

$$\text{MaxValue} = [\text{largest previous value of a channel}] / 2 * 3$$

If a channel's maximum value is exceeded during display, the scale of the Y axis is dynamically adapted to the maximum value.



```
<PARAM name=chart1.MaxValue value=3000>
```

This example sets the scale of the maximum value on the Y axis to 3000 (e.g. for output in W).

Title (String)

This parameter defines the text which is to be displayed as a title above the chart. If this parameter is not declared, no title is displayed.

```
<PARAM name=chart1.Title value="My Plant">
```



TitleColor (Color)

The parameter TitleColor defines the color in which the title is displayed. This parameter is of type "color". The default value is white (ffffff).

ValLineColor (Color)

This setting defines the color of the axis partitioning in the chart. The partitioning is drawn horizontally over the chart for each of the chart's scales (Y axis). By default, this optional parameter is set to the color #595959 (gray).

```
<PARAM name=chart1.ValLineColor value=#000000>
```

This example sets the color of the axis partitioning in chart "chart1" to black.



12.8.4 Device Field Display

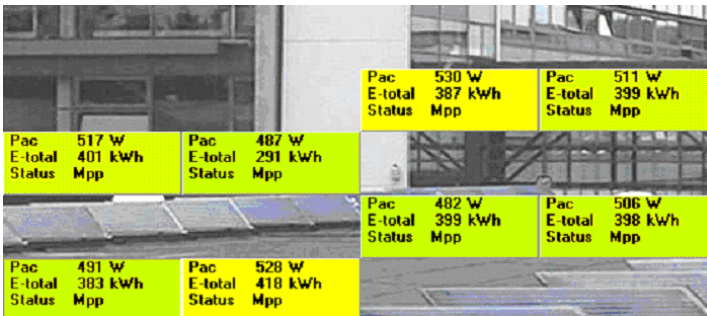
The component "ViewerGrid" implements Sunny Data Control's online display in the Java applet. With this component, individual devices are displayed in color in a chessboard-like field. In each of these fields, the device's measuring channels are also displayed.

The corresponding component type is **"de.sma.SunnyViewer.ViewerGrid"**.



<PARAM name=Component2 value=de.sma.SunnyViewer.ViewerGrid>

<PARAM name=Name2 value=chart2>



The arrangement of the individual device fields, the channel text settings, and the color settings, are linked to Sunny Data Control's online display.

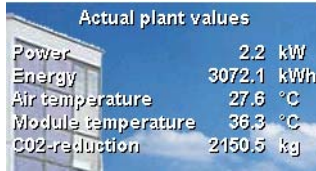
The applet also provides an enlargement function, which increases (left mouse button) or decreases (right mouse button) the size of a device field. With this function, it is possible to achieve a better view of the channel texts in each device field, as depending on the available space, it might not be possible to display them in full.

The general applet parameter "Language" specifies the language of the measuring channels displayed in the component.

Apart from the general applet parameters (see section 12.8.1 "General Applet Parameters" (Page 167)), this component does not support any other properties.

12.8.5 Numerical Display

With the "ViewerDigital" component, it is possible to display a channel's present value numerically.



Power	2.2 kW
Energy	3072.1 kWh
Air temperature	27.6 °C
Module temperature	36.3 °C
CO2-reduction	2150.5 kg

Each row represents a channel. The channel name is shown in the first column. Column 2 displays the most recent value from the channel as a numerical value, or as a channel text, depending on the channel shown. Column 3 displays the channel's unit. If status channels are used, a text can be allocated to each of a channel's values. The text is then displayed instead of the numerical value.

In principle, the number of displayable channels is unlimited. This number depends only on the graphical dimensions of the components, and on the font used.

The following example incorporates such a component:

```
<PARAM name=Component3 value=de.sma.SunnyViewer.ViewerDigital>
<PARAM name=Name3 value=chart3>
```



As well as the general parameters described previously, this component has additional parameters, which are described below.

BGColor (Color)

This parameter defines the background color of this component. If a background image is defined (parameter BGPicture), this parameter is ignored.

```
<PARAM name=chart3.BGColor value=#ffffff>
```

This example sets the background color of the component "chart3" to white.



Channels (String)

This parameter specifies which channels are to be displayed in this component. The channel names are listed, and separated by commas. Each name must be identical to that specified by the general parameter "ChannelX" (see section 6.5.2).



```
<PARAM name=chart1.Channels value= "Betriebszeit,Leistung,Status">
```

ChanTextColor (Color)

This parameter defines the text color with which the individual channel texts are shown in the component. The default value is "#ffffff" (white).

Title (String)

This parameter defines the text which is to be displayed as a title above the chart. If this parameter is not declared, no title is displayed.



```
<PARAM name=chart3.Title value= "Present Values">
```

TitleColor (Color)

The color of the title is defined with this optional parameter. The default setting is "#ffffff" (white).

ValueColor (Color)

This parameter defines the text color with which the channel's values are displayed. The default setting is "#ffff00" (yellow).

12.8.6 Overview of Parameters

General Applet Parameters			
Parameter	Description	Type	Default value
BGColor	background color of the area which is not concealed by a component	Color	#ffffff (white)
ChannelX	channel X, which is to be displayed in a component; X is in the range "1" to "10"	String	see above
ChannelX.Name	replaces the visible channel name of the Xth channel with a defined text	String	see above
ChannelX.SText	defines a channel's status texts	String	see above
ChannelX.Unit	replaces the channel unit with another text	String	see above
Language	the language used by the applet; at present, this parameter only affects the "device field display"	String	"de"
LayoutHSpace, LayoutVSpace	horizontal and vertical space between the individual components, given in pixels	Integer	4
ServerAlias	server (computer with Sunny Data Control) to which a connection is to be established, from which plant information is to be displayed	String	see above
ServerPort	TCP port of the SDC agent on the web server	Integer	18500

Additional Parameters of Display Components			
Parameter	Description	Type	Default value
BGColor	background color of the component, if NO image is displayed	Color	#ffffff (white)
BGPicture	file name of the component's background image	String	
ComponentX	class of the Xth component to be displayed: "de.sma.SunnyViewer.ViewerDiagram" or "de.sma.SunnyViewer.ViewerDigital" or "de.sma.SunnyViewer.ViewerGrid"	String	see above
DisplayErrMsg	display of any error messages upon establishment of a connection	bool	"1" (true)
Draw3Dframe	whether or not a 3D frame is to be drawn around components	Bool	"1" (true)
FontName	name of the font to be used in the components	String	"Dialog"
FontSize	font size in pixels	Integer	12
nameX	specifies the name of the Xth component	String	see above
Width, Height	dimensions of the individual components in the applet, in pixels	integer	500, 300

Additional Parameters of Chart Components			
Parameter	Description	Type	Default value
AxisColor	color of the actual axes	Color	#000000 (black)
AxisLabelColor	color of the axes' labels	Color	#ffffff (white)
Channels	text listing the names of all channels to be displayed in this component	String	
ChartColorX	color of the component's Xth channel (X is between "1" and "4")	Color	see above
LegendBGColor	background color of the legend	Color	
LegendTextColor	color of the legend's text	Color	#ffffff (white)
LegendVis	stipulates whether the legend is to be displayed	bool	"1" (true)
Title	title of the component	String	
TitleColor	color of the title	Color	#ffffff (white)

Additional Parameters of Numerical Components			
Parameter	Description	Type	Default value
Channels	text listing the names of all channels to be displayed in this component	String	see above
ChanTextColor	text color of the channel names and channel units	String	#ffffff (white)
ValueColor	text color of the channel values	Color	#ffff00 (yellow)

12.8.7 Example of an HTML Page

```
<html>
<head>
<title>PV Solar Power Plant at SMA...</title>
</head>
<body>
<b>PV Solar Power Plant on Building 1 at SMA</b>
<br>
<p><applet
CODE = "de.sma.SunnyViewer.SunnyApplet.class"
ARCHIVE = "SunnyViewer.jar"
CODEBASE = "."
WIDTH = 720
HEIGHT = 520
ALIGN = center>
<!-- General Parameters -->
<PARAM name=ServerPort value=18500>
<PARAM name=ServerAlias value=MyServerAlias>
<PARAM name=DisplayErrMsg value=0>
<PARAM name=Channel1 value=Energy>
<PARAM name=Channel2 value=Power>
<PARAM name=Channel3 value=Status>
<PARAM name=Channel3.SText
value="Stop,Wait,Operate,Disturbance,Fault,Detection">
<PARAM name=BGColor value=#FFFFFF>
<PARAM name=LayoutHSpace value=0>
<PARAM name=LayoutVSpace value=0>
<!-- Parameters of the 1st Component -->
<PARAM name=Component1 value=de.sma.SunnyViewer.ViewerDiagram>
<PARAM name=Name1 value=chart1>
<PARAM name=chart1.Title value="Output Values">
<PARAM name=chart1.FontName value="Arial">
<PARAM name=chart1.FontSize value=12>
<PARAM name=chart1.Channels value=Power>
<PARAM name=chart1.LegendVis value=1>
```



```
<PARAM name=chart1.BGColor value=#393939>
<PARAM name=chart1.AxisLabelColor value=#ffffff>
<PARAM name=chart1.AxisColor value=#ffffff>
<PARAM name=chart1.ChartColor1 value=#ff0000>
<PARAM name=chart1.ChartColor2 value=#0000ff>
<PARAM name=chart1.Width value=350>
<PARAM name=chart1.Height value=200>
<PARAM name=chart1.ChartStyle value=Fill>
<!-- Parameters of the 2nd Component -->
<PARAM name=Component2 value=de.sma.SunnyViewer.ViewerDigital>
<PARAM name=Name2 value=num2>
<PARAM name=num2.Title value="Current Plant Values">
<PARAM name=num2.TitleColor value=#ffffff>
<PARAM name=num2.FontName value=Arial>
<PARAM name=num2.FontSize value=20>
<PARAM name=num2.Channels value=Power,Energy,State>
<PARAM name=num2.BGColor value=#0080ff>
<PARAM name=num2.ValueColor value=#ffff00>
<PARAM name=num2.ChanTextColor value=#ffffff>
<PARAM name=num2.Width value=350>
<PARAM name=num2.Height value=200>
<!-- Parameters of the 3rd Component -->
<PARAM name=Component3 value=de.sma.SunnyViewer.ViewerGrid>
<PARAM name=Name3 value=chart3>
<PARAM name=chart3.FontName value="Dialog">
<PARAM name=chart3.FontSize value=11>
<PARAM name=chart3.BGPicture value="BackGround1.jpg">
<PARAM name=chart3.BGColor value=#c0c0c0>
<PARAM name=chart3.Width value=700>
<PARAM name=chart3.Height value=300>
</applet>
<p><br>
</body>
</html>
```

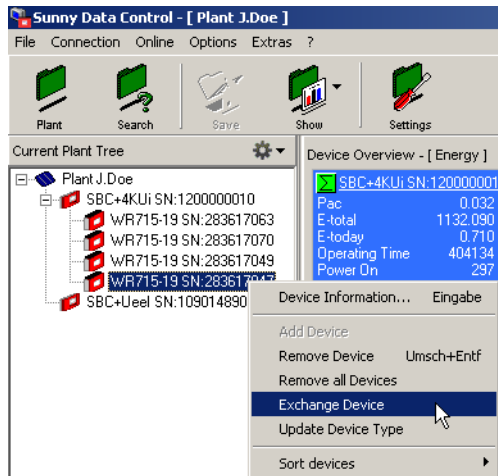

13 Additional Functions

13.1 Replacing a Device

If you have to replace an inverter, you can inform Sunny Data Control of the device replacement, without having to detect the Sunny Boy Control again.

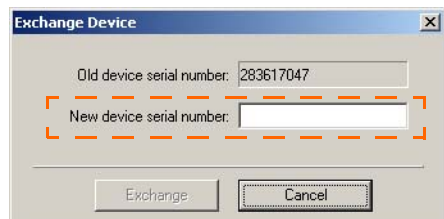
If you wish to replace an existing device in your plant with another, proceed as described in the following:

1. In the plant tree, click with the right mouse button on the device which you wish to replace (see example to the right).
2. Select "Exchange Device".

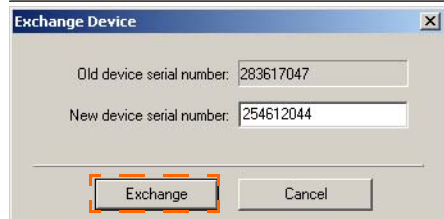


The "Exchange Device" window opens.

3. In the "New device serial number" field, type in the new serial number.



4. Click on <Exchange>.



A confirmation prompt appears, asking whether you really want to delete the device from the Sunny Boy Control and from Sunny Data Control.



5. Click on <Yes> to delete the device. Click on <No> to cancel the procedure.

If you confirm the prompt with <Yes>, Sunny Data Control replaces the old device in the Sunny Boy Control with the new device, whereupon Sunny Data Control attempts to establish a connection to the new device, and to query the device type.

6. Wait until Sunny Data Control has successfully queried the device type. This may take some time.

If the device type query cancels with an error message, you may have to repeat the device type update later (see section 13.1.1 "Updating the Device Type" (Page 189)).

The device is assigned the temporary type name "???" + serial number". It is possible that during device replacement, the added device was temporarily unreachable, and the device type could thus not be ascertained.



Communication with a device which has a temporary type name is not possible!

Common Causes of Error

- Incorrect serial number typed in (see name plate)
- Device is not active

13.1.1 Updating the Device Type

With this function, you can ascertain the device type of unsuccessfully detected devices at any subsequent point in time.

1. In the plant tree, click with the right mouse button on the device with the temporary type name "???" + serial number".
2. Select "Update Device Type".
Sunny Data Control attempts to establish a connection to the device, in order to ascertain the device type.
3. Wait until Sunny Data Control has successfully queried the device type. This may take some time.

13.2 Device Information

The device information provides the following data for each respective device:

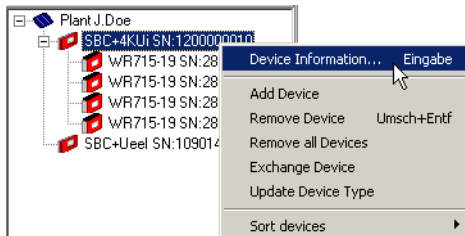
- Device name
- Device type
- Serial number
- Device ID
- Network address
- Managed devices (how many devices are connected to the device)
- Protocol used
- Channel list status
- Field position in the device overview
- Communication status

You can also adjust the following settings via the device information:

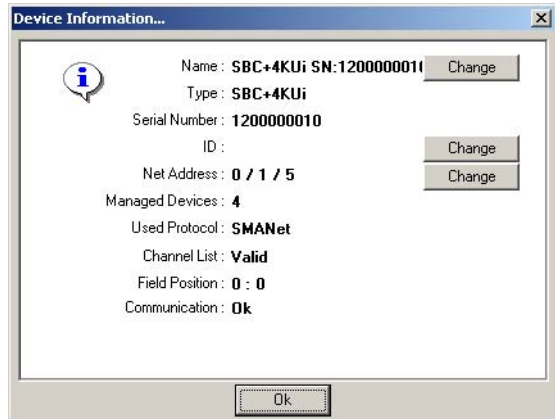
- Device name
- Device ID
- Network address

Accessing Device Information

1. In the plant tree, click with the right mouse button on the device for which you would like to change the name or device ID.
2. Select "Device Information...".



The "Device Information..." window opens.



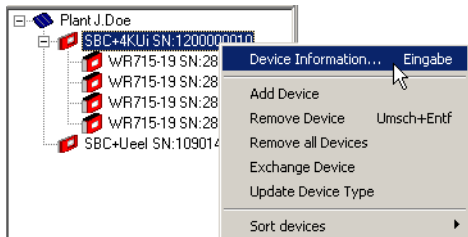
13.2.1 Setting the Device Name and Device ID

You can assign every device (Sunny Boy and Sunny Boy Control) its own device name and a two-digit device ID. By default, the device name used comprises the serial number and the device type (e.g. WR38-006 SN:2000115546).

The device names and device IDs are included in the transferred measurement files (Excel files). If you change the device name or device ID, from that time onwards, they will also change in all newly transferred measurement files for this plant.

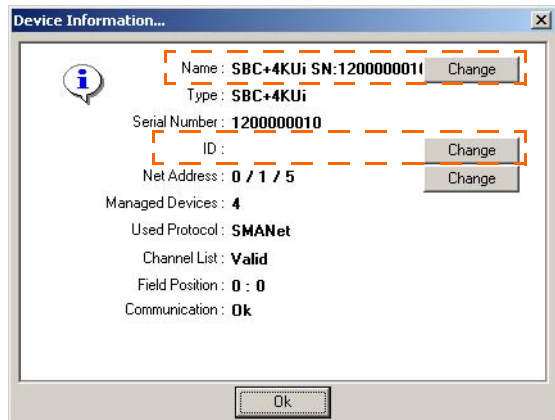
Changes to the device name and device ID are not automatically applied in Sunny Portal. Adjust the device name in Sunny Portal to match the changes in Sunny Data Control if desired. Refer to the Sunny Portal user manual, which can be downloaded from Sunny Portal, to learn how to change the device name in Sunny Portal.

1. In the plant tree, click with the right mouse button on the device for which you would like to change the name or device ID.
2. Select "Device Information..."



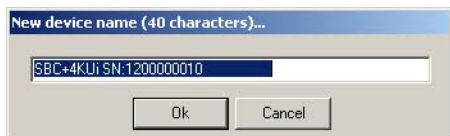
The "Device Information..." window opens.

3. Click on <Change> beside the name or device ID, in order to change the settings.

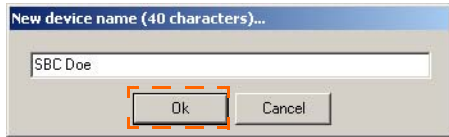


The window for changing the respective setting opens.

4. Change the setting as desired.



5. Afterwards, click on <Ok> to save the settings.



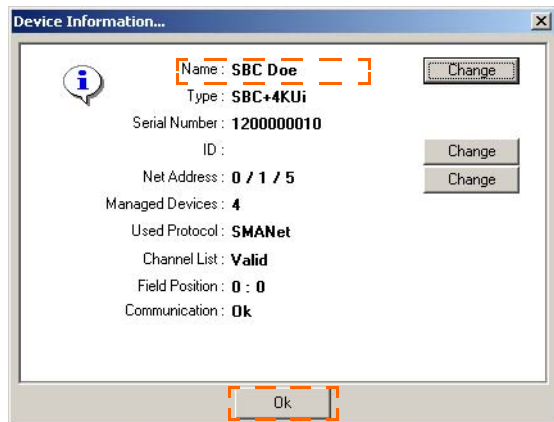
Example

Sunny Data Control updates the Excel lists with the measurement data.

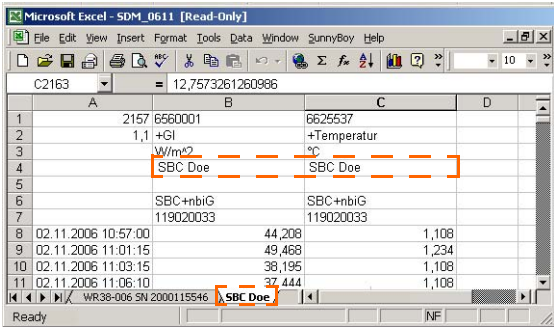
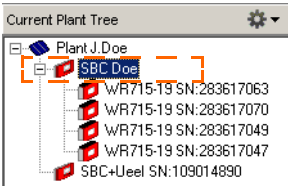


Afterwards, the window "Device Information..." is displayed with the new settings.

6. Click on <Ok>.

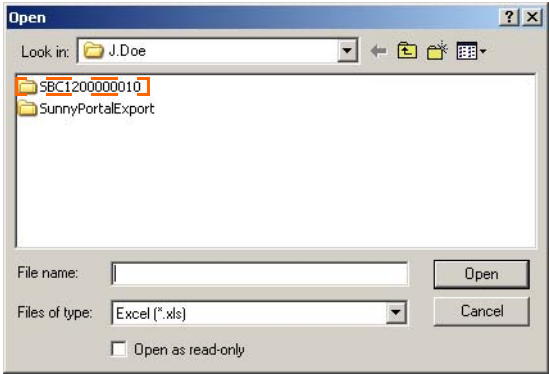


The changes have been applied in the plant tree, and in the Excel files (see example below).



Example with changed device name

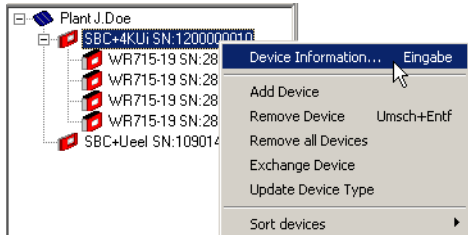
The name of the directory with the Excel files is not changed if you change the name of a Sunny Boy Control. The directory retains the identifier "SBC + serial number" (e.g. SBC119020033).



Example

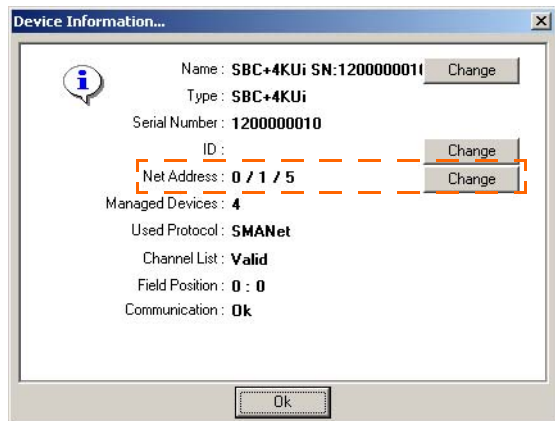
13.2.2 Changing a Device's Network Address

1. In the plant tree, click with the right mouse button on the device for which you would like to change the name or device ID.
2. Select "Device Information...".



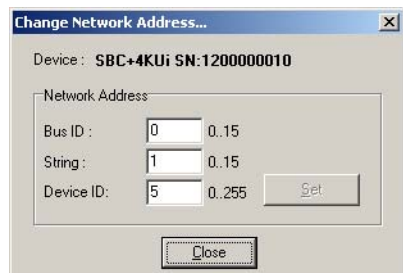
The "Device Information..." window opens.

3. Click on <Change> beside the network address, in order to change the settings.



The "Change Network Address..." window opens.

4. Change the settings as desired, and afterwards click on <Set>.
5. Click on <Close> to apply the settings.
6. The "Device Information..." window is displayed again. Click on <Ok> to save the settings.



13.3 Removing Devices

You can remove individual devices, or all devices in the plant tree.

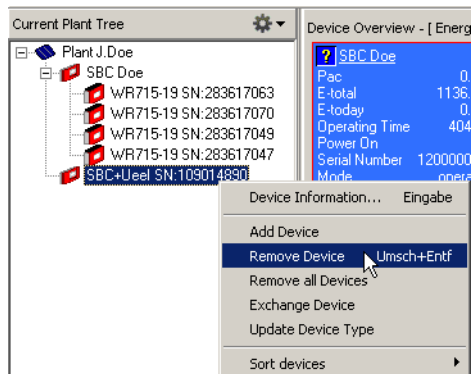


If you remove an inverter from the plant tree in Sunny Data Control, this inverter is also deleted in the Sunny Boy Control!

1. In the plant tree, click with the right mouse button on the device which you wish to remove.
2. Select "Remove Device" or "Remove all Devices", depending on what you wish to delete.

A confirmation prompt is displayed, asking whether the deletion is to be performed.

3. If you wish to delete the device (or all devices), click on <Yes>. If you do not wish to delete, click on <No>.



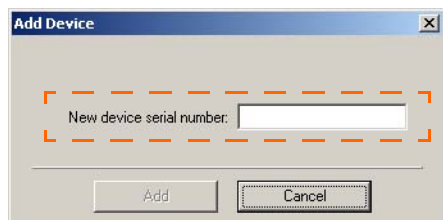
13.4 Adding a Device

You can add further sub-devices to a communication device by means of the device serial numbers.

1. Click on a communication device in the plant tree with the right mouse button.
2. Select "Add Device".

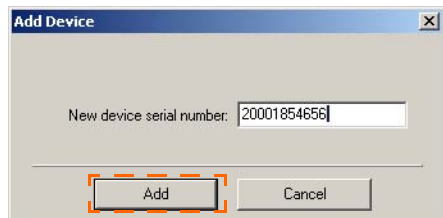
The "Add Device" window opens.

3. In the "New device serial number" field, type in the serial number.



4. Click on <Add>.
- Device detection starts for this serial number. The device is being searched for.

Wait for the detection to end.

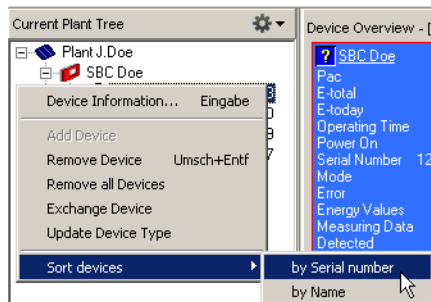


Example

13.5 Sorting Devices

You can either sort the devices in the plant tree according to name, or according to serial number.

1. Click with the right mouse button in the plant tree, and select "Sort devices".
2. Select either "by Serial number" or "by Name", depending on how you wish to sort.

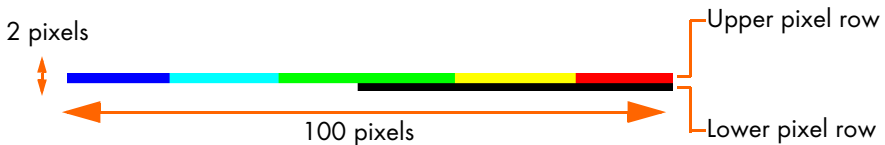


13.6 Creating a Color Palette for Device Fields

Upon delivery of Sunny Data Control, several palette files are included. You can create your own preferred color gradients by means of simple editing of these files, using commercially available graphics programs.

The files have the following structure:

- Size: 100 x 2 pixels
- Format: BMP (Windows bitmap)
- Subdivided into upper and lower pixel rows.
 - Upper pixel row: the upper pixel row is the color gradient for capacity utilization between 0 and 100 percent (first pixel = 0 percent and last pixel = 100 percent).
 - Lower pixel row: the lower pixel row represents the text color with which the information is to be displayed in the device field, according to the background color (upper pixel row).



To create a palette file, proceed as follows:

1. Launch a commercially available graphics program.
2. Select the appropriate menu item to create a new graphics file.
3. Specify the dimensions as 100 x 2 pixels.
4. Edit the color gradients according to your preference (see figure above).
5. Save the file in BMP format - Windows bitmap (e.g. MyPalette.bmp).
6. Rename the file (e.g. MyPalette.pbm).
7. Copy this file into Sunny Data Control's "Images" directory.

13.7 Changing the Fonts of Device Fields

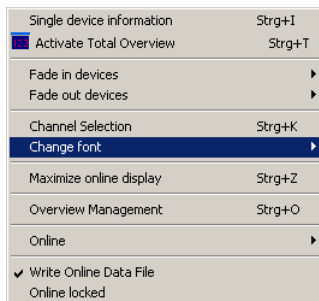
You can change the fonts of device fields. You can also assign each device field its own font, or change the font of a particular device type.

1. In the device overview, use the right mouse button to click on the field of the device for which you wish to change the font. The device overview menu opens.

SBC Doe	
Pac	0.000 kW
E-total	1136.441 kWh
E-today	0.000 kWh
Operating Time	404198 h
Power On	297
Serial Number	1200000010
Mode	operating
Error	---
Energy Values	284 days
Measuring Data	3025 cycles
Detected	4 devices

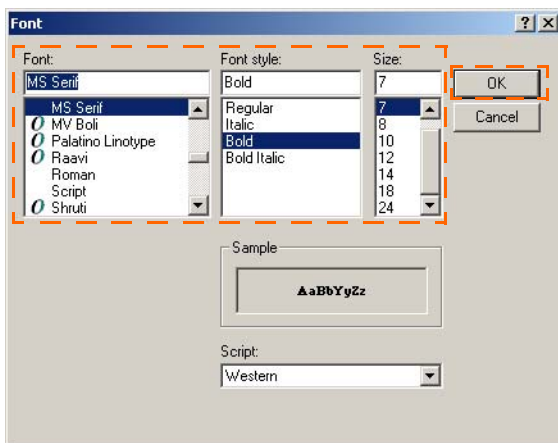
2. Select "Change font" (see figure to the right).

You can also call up this window as follows: select the device for which you wish to set the channels by clicking on the device's field with the left mouse button in the device overview. Select the menu item "Online / Change font".



3. Select whether you wish to change the font of this device, all devices, or all devices of this type. The window for adjusting the font opens.

4. Set the font, the font style, and the font size as desired.



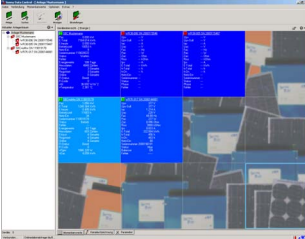
Default setting

5. Click on <Ok> to save the settings. The font has now been changed (see example to the right).

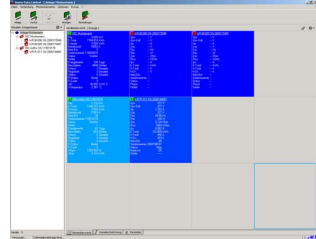
SBC Doe	
Pac	0.000 kW
E-total	1136.441 kWh
E-today	0.000 kWh
Operating Time	404198 h
Power On	297
Serial Number	1200000010
Mode	operating
Error	---
Energy Values	284 days
Measuring Data	3025 cycles
Detected	4 devices

13.8 Background Images

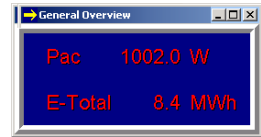
You can set background images for the device overview (online display) and for the total overview. It is also possible to have different background images which alternate automatically.



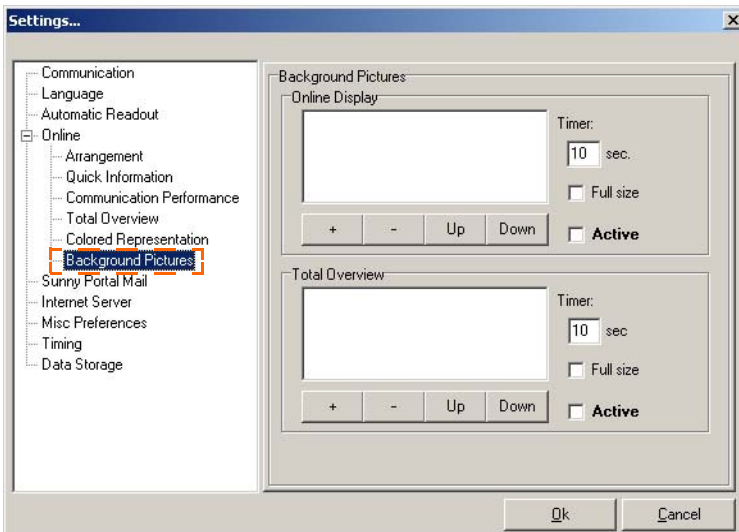
Device overview
(online display)
with and without
background
image



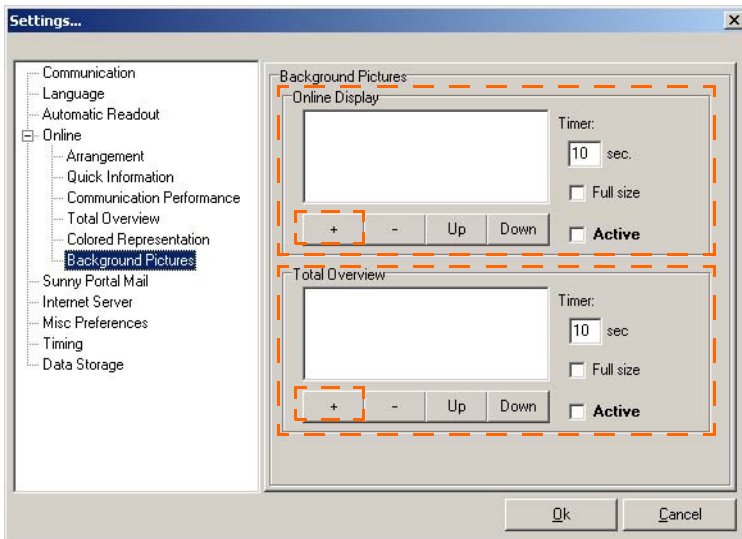
Total overview
with and without
background
image



1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.

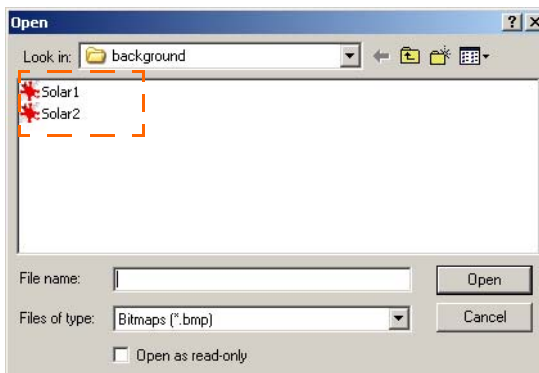


2. Select "Background Pictures".



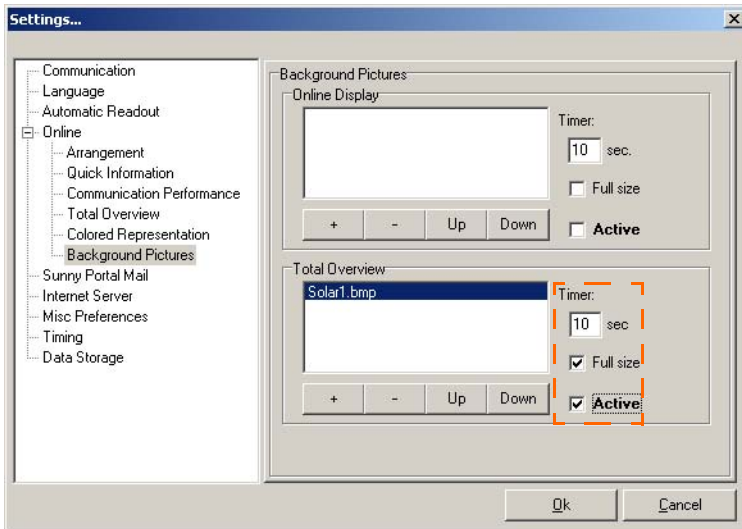
3. In the "Online Display" area, or in the "Total Overview" area, click on <+> in order to add a background image for the online display (device overview), or for the total overview.

The window for selecting a background image opens. By default, the background images are situated in the directory "Programs\SMA\Sunny Data Control\Images\background". You can also save your own background images there, and subsequently select them (file type "bitmap" only).



4. Select a background image, and click on <Open>. The "Settings" window is displayed once more.

The file name is shown in the "Online Display" field, or in the "Total Overview" field, depending on which area you are configuring (see example below).



Alternation Between Different Background Images

5. If you wish to set several background images to be displayed one after the other with an interval of a defined length, you must select at least two background images. To this end, click on <+> again, and select another background image.
6. In the "Timer" field, set the time in seconds after which the next background image is to be displayed.
7. To change the sequence in which the background images are to be displayed, click on the background image which you wish to move, and click on <Up> or <Down>.

Full Size

8. If the image is to be displayed in full size (over the entire area), add a check mark beside "Full size" by clicking on the check box.

Activating / Deactivating Background Image Display

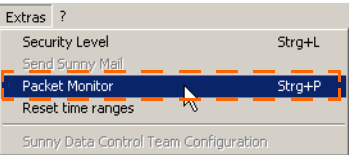
9. You can activate and deactivate the display of background images. Add or remove a check mark in the respective area's "Active" check box, in order to activate or deactivate the background display.
10. Click on <Ok> to save the settings.

You can activate the total overview via "Online / Activate Total Overview".

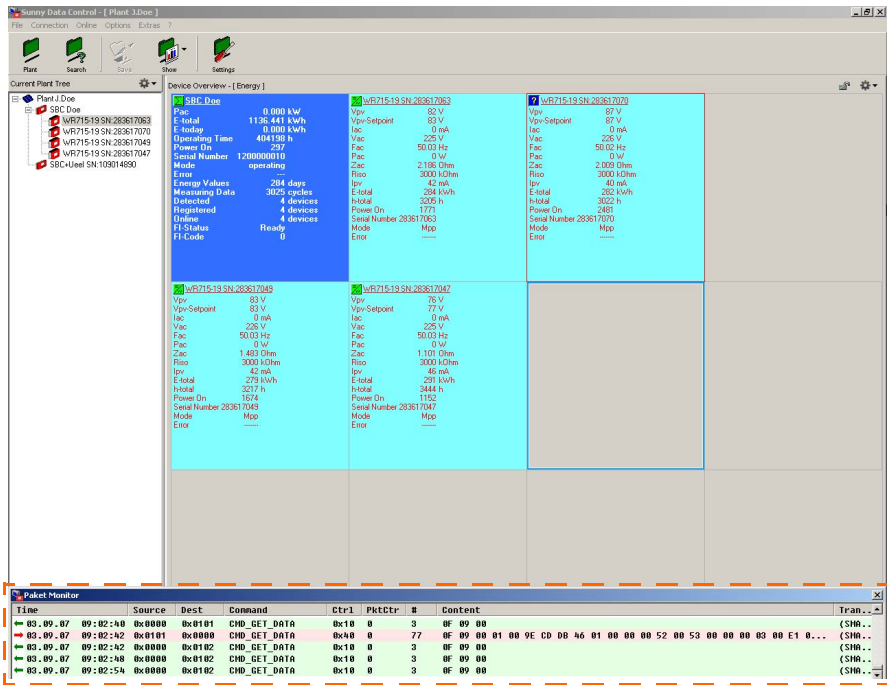
13.9 Packet Monitor

You can enable display of the data packets in the packet monitor.

1. Select "Extras / Packet Monitor" (see figure to the right).

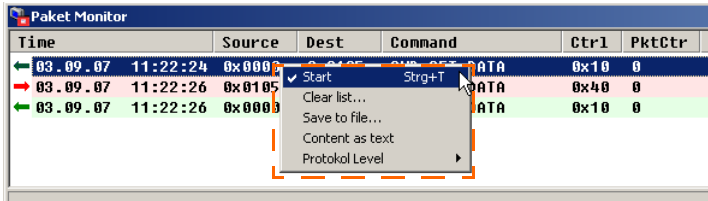


The "Packet Monitor" window opens as a separate window at the lower edge of the screen, then resides in the background once you click on the Sunny Data Control interface.



Packet monitor window

2. If you click in the packet monitor window with the right mouse button, a menu opens (see figure below).



Here, you can make the following settings for the packet monitor:

- Start:

Here, you can start or stop the packet monitor. Add or remove the check mark beside "Start". If the check mark is present, the packet monitor queries the packets.

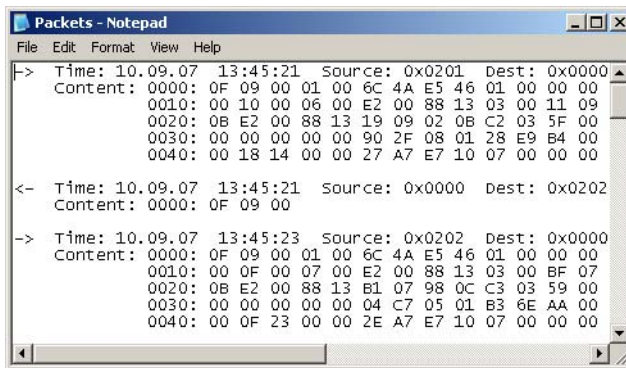
- Clear list...

If you click on "Clear list...", the list of already-displayed data packets is deleted.

- Save to file...

You can specify whether the data packets are to be saved in a text file. Add a check mark beside "Save to file...".

A window opens for selection of the directory in which the text file is to be saved. The saved file is called "Packets.txt".



Example of a "Packets.txt" file

- Content as text

If you add a check mark beside "Content as text", the content in the packet monitor's "Content" column is shown as text, instead of numbers.

- Protokoll Level

Here, you can select the protocol level (Level2 or Raw (Level1)).

13.10 Changing the Security Level (Installer Password)

Sunny Data Control has two security levels: "user" and "installer". Every time the program is launched, the security level "user" is automatically restored.

You can set the security level to "installer" with the installer password, as described below. Within the security level "installer", you are able to change more parameters, and can lock and unlock the device overview (online display). See section 13.11 "Locking the Device Overview (Online Display)" (Page 206).

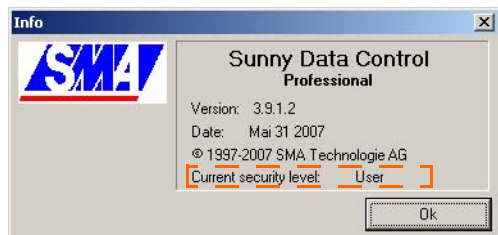
The installer password is provided with your Sunny Boy Control on a separate sheet.



Displaying the Present Security Level

You can call up Sunny Data Control's present security level via the menu item "? / Info...".

The "Info" window opens (see figure to the right).



Setting the Security Level to "Installer"

1. Select "Extras / Security Level".

The window for changing the security level opens.

2. Type in the installer or user password (provided with your Sunny Boy Control) and click on <Ok>.



A message is displayed, indicating that the respective security level has been set (see example to the right).

3. Click on <Ok>.



If you wish to leave the security level "installer", close Sunny Data Control and relaunch the program.

13.11 Locking the Device Overview (Online Display)

You can lock the device overview in order to protect the display from unauthorized access. This bars the following actions in the device overview:

- Moving, adding, or deleting device fields
- Changing the devices' channel settings for the device overview



Device overview



Unlocked



Locked

1. Select "Online / Online locked", or click on the padlock (see figure above).
2. Confirm the prompt by clicking on <Ok>.



The window for changing the security level opens.

3. Type in the installer or user password (provided with your Sunny Boy Control) and click on <Ok>.



A message is displayed, indicating that the respective security level has been set (see example to the right).

4. Click on <Ok>.



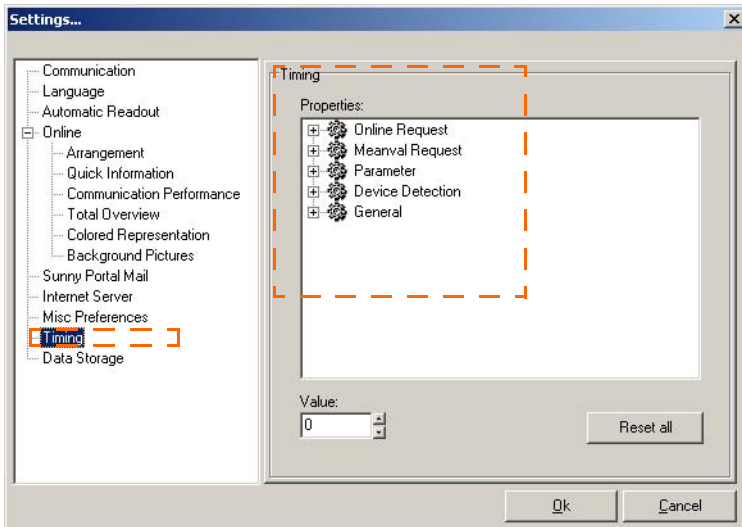
If you wish to leave the security level "installer", close Sunny Data Control and relaunch the program.

13.12 Timeouts

Normally, you will not need to adjust the timeout settings which apply to the communication with devices. Only change the settings if you fully understand the consequences.

It may be necessary to adjust channel querying for a Sunny Central Control.

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right). The "Settings" window opens.



2. Select "Timing".
3. Adjust the settings as desired.

Restoring Factory Settings

To restore the factory timeout settings, click on <Reset all>.

14 Troubleshooting

All electrical connections may only be performed by qualified electricians.



Follow all safety instructions contained in the inverter documentation!



14.1 Errors Upon Use of Sunny Data Control

No.	Error description	Cause
1	On the "Channel recording" page, the start and end of the recording are not visible.	Spot value querying is not active. Activate spot value querying, as described in section 10.10 "Activating / Deactivating Spot Value Querying" (Page 101).
2	Sunny Data Control indicates "Access denied." Sunny Data Control indicates "The specified file could not be found."	Another software program is using the interface (e.g. terminal). The PC interface is not available.
3	Device detection fails.	Under "Settings / Misc", the device detection mode is set incorrectly (see section 8.4.1 "Narrowing the Scope of Device Detection" (Page 59)). The PC interface's baud rate does not match that of the Sunny Boy Control. The wrong transfer medium was selected. Sunny Boy Control is not ready for reception. With the transfer medium RS485, it may be the case that in the extended properties of the serial port used for the Sunny Boy Control, FIFO has not been deactivated.
4	Communication cancels while in operation.	Data cable between PC and SBC interrupted.

No.	Error description	Cause
5	"Cannot open file."	A data file (SDX_XXXX.xls) is already open in another application (e.g. Excel) upon data transfer. Close the respective application, and start the transfer anew.
6	"The new device type is unknown because the device is unreachable."	At present, communication with the device is not possible. Possibly, the wrong serial number was entered, or the device is not switched on.

14.2 Java Applet Error Messages

No.	Error description	Cause
1	"Solar server is down! Please try again later! (x)"	1: The Internet function in Sunny Data Control is not activated, or either the application or the SDC agent has not been started. The numeric character which follows the error message indicates the exact cause of the error: 2: The specified server alias name in the applet parameter ServerAlias is unknown to the SDC agent. 4: The Internet function in Sunny Data Control is deactivated.
2	"Connection to solar server lost! Please try again later!"	Either the SDC agent or Sunny Data Control was stopped while a connection to the applet was in place.
3	"Too many users or solar server is down! Please try again later!"	The maximum number of connections between the Java applet and the SDC agent has been exceeded.
4	"Unable to connect! Probably there are firewall problems!"	The Java applet could not establish a connection to the SDC agent. This is possibly due to a firewall on the client side.

14.3 Directory Structure

Programs\SMA\Sunny Data Control

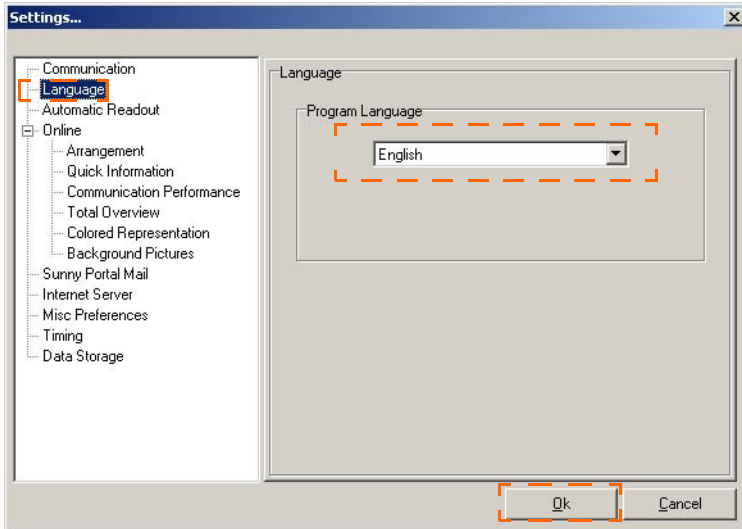
SDCData.exe	main program
DEVICES	configuration directory
EXCEL97	directory with Excel macro (MS Office 97)
SDCMAC.xls	macro file for data analysis
FIRMWARE	firmware directory
FL_SBC.EXE	Sunny Boy Control's Flash program
SBCkxxxx.rom	SBC kernel (x: version number)
HELP	online help
SDC_DT.hlp	German help file for Sunny Data Control
SDC_ENG.hlp	English help file for Sunny Data Control
SUNBC.HLP	German help file for the Sunny Boy Control device
SUNBC_ENG.hlp	English help file for the Sunny Boy Control device
JAVA	
SunnyViewer.jar	the Java applet (Java archive)
index.html	example of an HTML page with applet
PLANTS	directory for plants
<Plant name>	directory for measurement data
SDT_99.xls	file with daily energy values from 1999
SDM_9901.xls	file with measurement data from January 1999
Daily	subdirectory containing Excel files with a recording interval of less than 3 minutes
SDCAGENT	
SDCAgent.exe	communication program
HTML	directory of the agent interface

14.4 Setting the Sunny Data Control Language

You can set the language of Sunny Data Control according to your preference.

1. Select "Options / Settings", or click on the "Settings" icon (see figure to the right).

The "Settings" window opens.

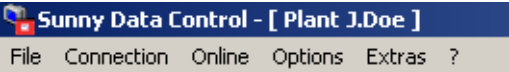


2. Select "Language".
3. In the drop-down list "Program Language", select the desired language.
4. Click on <Ok> to save the settings.



You can select various languages, depending on the installed language package.

15 Overview of Menu Functions



Main menu	Menu items
File	Exit
Connection	Connect Disconnect
Online	Single device information Activate Total Overview Fade in devices Fade out devices Channel Selection Change font Maximize online display Overview Management Online Write Online Data File Online locked
Options	Choose Plant Settings Device Detection Storage Time Refresh Plant Check

Main menu	Menu items
Extras	Security Level
	Send Sunny Mail
	Packet Monitor
	Reset time ranges
	Sunny Data Control Team Configuration
?	Manual
	Info...

16 Contact

If you have any questions or queries, please contact us. A team of qualified engineers and technicians is at your disposal.

Help us to help you by having the following information ready when you call us:

- Type of inverters and serial numbers
- Serial number and firmware version of the communication device
- Sunny Data Control firmware



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