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Sunmaster-Monitor

User Manual

Version „002“
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Sunmaster-Monitor: NR002

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Preface

This user manual explains all the functions provided by Sunmaster-Monitor. It is meant to offer you a quick and easy introduction to the application.

Sunmaster-Monitor has been developed for the visualization of your measured values. It does not offer you an automatic fault analysis or alarm messages.

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Errors and omissions are excepted. Both documentation and program are subject to change without prior notice.

1 Purpose of User Manual

This user manual applies to interested Sunmaster-Monitor end customers. It is aimed at guiding the user from the installation to the visualization of the measuring data. It gives explanations on all the user interface functions and all the menu items and exemplifies step-by-step how to use them.

2 Components and Accessories

Software:

On the installation CD you will find the Sunmaster-Monitor program for installation as well as the following additional information:

- User manual on how to operate the data logger
- Hardware connection diagrams and installation guidelines.
- Brochures

Hardware:

The following components are required for starting up the hardware:

Local version:

- Data logger with Ethernet interface
- Cross cable for direct communication with a PC
- Patch cable for integration into your intranet

or Modem type:

- Data logger with integrated modem
- Telephone cable from the data logger to your telephone socket
- Modem for the PC used to run the Sunmaster-Monitor

3 Software Installation

3.1 System Requirements

General:

Processor with at least 1 GHz

RAM 256 MB

Hard disk with at least 50 MB of free memory

Microsoft® Windows® 98 / ME / 2000 / XP

Local version:

Network interface card with Ethernet port (100 Mbit)

Modem type:

Depending on the data logger: analog or ISDN Modem

Note: Please keep in mind that the longer you use the program the more memory space will be required on the hard disk, as the program files the data recorded by the data logger in a data base.

3.2 Installation

The first steps

Put the installation CD into your computer's CD drive.

Under Windows, the installation manager will start automatically. If this is not the case, please open the file manager and click the drive letter of the CD drive. Doubleclick **Sunmaster-MonitorSetup.exe**.

You need administration rights in order to install the program.

The installation will be started now automatically.

The Sunmaster-Monitor installation program will appear. Follow the instructions on the screen and click **Continue**.

After all files have been copied to the hard disk a program group will be created. The installation is completed now. Some operating systems restart the computer after the installation. Later you can open the program anytime via the Windows start menu.

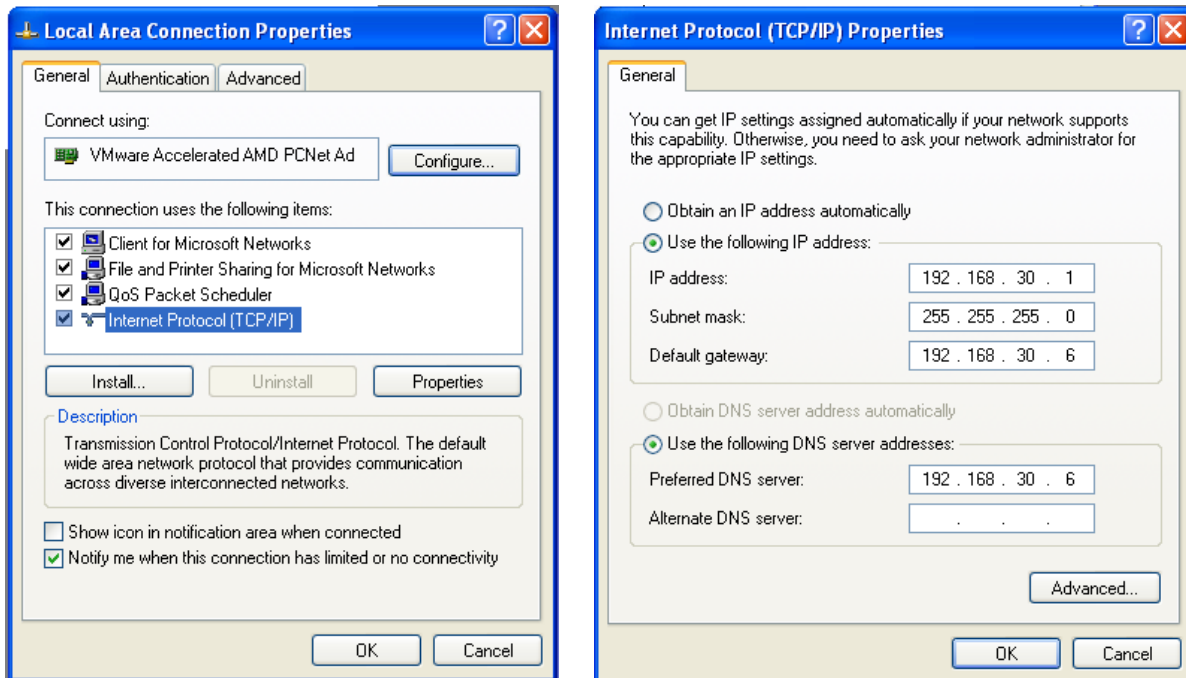
Network Connection Set-Up:

For direct connection between the data logger and your PC please use a network interface card. Normally this network interface card is already integrated in new systems.

To set up your network interface card, please go to: **System Settings > Network connections**.

Click on **Network Connections**; a new window will appear displaying your network connections. Select **Local Area Connection** by double-clicking on the icon.

The following dialogue will open:



Please select **Internet Protocol (TCP/IP)** and click on the **Properties** button. The settings of your network interface card will be displayed here. Please configure your network according to the example shown above.

Please note: The IP address of your network interface card and the IP address of your data logger must not be identical. Example:

IP address of the network interface card: 192.168.30.1

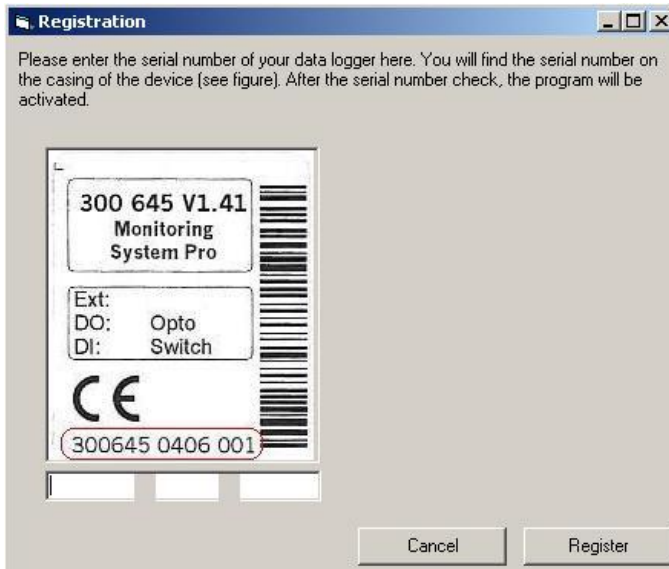
IP address of the data logger: 192.168.30.40

Setting up an RDT connection

In this manual, the connection via RDT is only mentioned as an option. Please find detailed information on how to establish an RDT connection in the installation guidelines for the data logger.

3.3 Application Registration

If you start the program for the first time, the **Registration** dialogue will be shown. The serial number of the data logger has to be entered for the registration. You will find the serial number on the casing of the device.



Please make sure the number is in the correct format. The serial number is divided into three blocks that are separated by blanks. Please enter the three blocks into the corresponding input fields.

Example: 300645 0406 001

Click the **Register** button afterwards. If the registration was successful, click **Continue**. The dialogue **Set up new system** will be opened.

4 Configuration

4.1 Set up a New System

After you have successfully registered the program you will be asked to enter the system parameters. Here, you enter a designation for the PV system as well as the installed power and the area. These parameters will be used for future calculations.

Click the **Save** button.
Afterwards the view of the new system will be presented.

Please note:

The parameters “Designation”, “Power” and “Area” can later be modified via the **Edit > System Parameters** menu.

4.2 Connection Settings

Open the dialogue **Establish Direct Connection** via the **File > Connection Settings** menu.

Select the type of your connection in the list next to **Connection via**.

Direct communication: „Network“

Modem communication: “Name of RDT connection”

Please note:

If the communication is effected via modem, the RDT connection must have been established and tested independently of the Sunmaster-Monitor program in advance.

In the **Target Directory**, the recalled measuring data will be stored. In this way, the data will be available as backup and raw data.

You can change the target directory via the button next to the path name.

If you do not need the measured value files any further, the program can delete them after they have been imported. For this option, set the checkmark next to **Delete measured value files after import**. You only need the files if you wish to archive this raw data. The program does not require the files after they have been imported.

The **IP address** and the IP address of the data logger must be the same. Unless you have altered them, the default settings for the IP address are as follows:

Direct communication: 192.168.30.40
or
Modem communication: 192.168.200.1

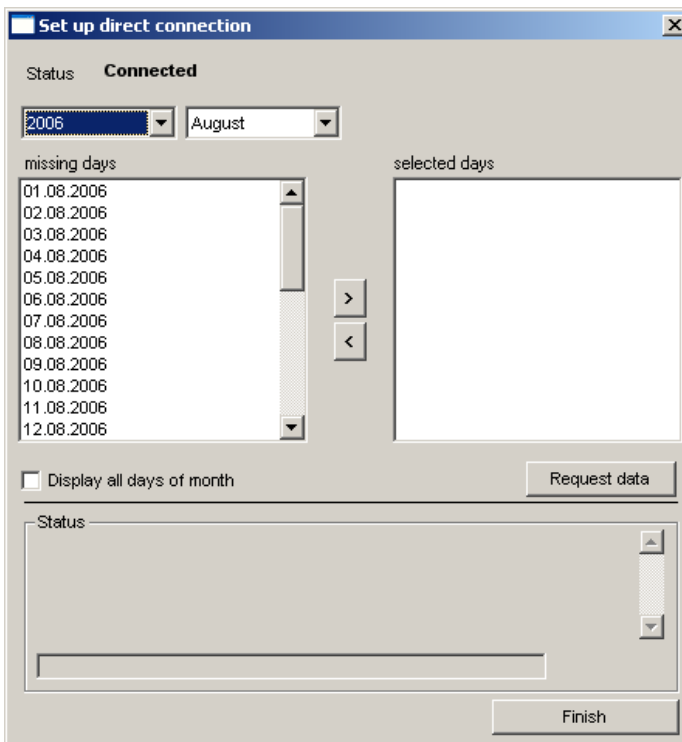
For the direct connection it is required to enter the **User name** and the **Password**, too. The default values are as follows:

User name: admin
Password: admin

Click **Save** in order to accept the entry and close the dialogue.

4.3 Recall Data

After you have completed all the settings you can import the measured values by clicking **File > Recall data**. The following dialogue will be shown:



Next to **Status** you can check whether the connection to the data logger has been established. If you use a network connection, the status should always read "Connected". If you use an RDT connection, this is only the case after the connection has successfully been established.

Select the year and the month first. After that, select the days you wish to import from the **Missing days** list. If you hold down the Shift key you can select several days at a time. Click > then in order to transfer the selected days to the **Days to be recalled** window. Use < to undo this process.

In the **Missing days** window the days which have not been recalled yet are displayed. If you put a checkmark in front of **Show all the days of a month**, the days that have already been recalled are shown, too. In addition you will be shown how many measuring points are available or whether there is no data at all.

Click **Request data** to set up the connection. You can watch the transmission and the data import in the status window. The following status messages are shown:

Status	Description
Setting up connection.	The connection to the device is being prepared (RDT).
Connection "X"	The connection (RDT) is being set up.
Connection "X" has been set up.	The net connection has been established. (RDT)
Setting up FTP connection.	The FTP connection is being set up according to the connection options.
The files for the date "X" are being copied to the directory "X".	The measured value files are being copied and stored in the target directory.
Disconnecting FTP connection.	The copying has been completed now.
Importing data	The connection to the data logger has been closed, the copied files are being imported.
Importing directory "X"	The content of the stated directory is being imported.
Process finished	The import has been completed The window can be closed.

While the connection is being set up or while data is being copied, certain errors can occur. Some of the errors are listed in the following table:

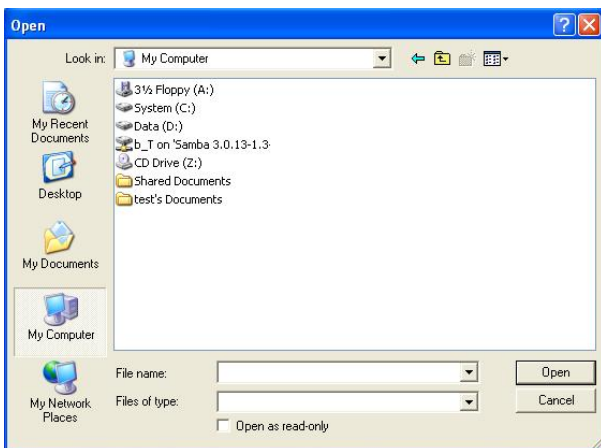
Error message	Reason
The computer is currently in offline mode and cannot be set online. The transmission cannot be initiated.	If you use the Internet Explorer to view web pages, it might be possible that your PC is in the so-called "off-line mode". The computer tries to load the requested web pages from the local memory. This functionality can lead to failures while the connection to the data logger is being set up.
The latest request is still being processed.	An internal error has occurred during the FTP transfer. Close the connection and try again.
The connection to the remote host cannot be established.	Maybe the connection settings are not correct. This concerns the IP address as well as the user information.
The user name has been refused by the data logger.	Please check the settings under Connection Settings . The entered user

	name has not been accepted.
The password has been refused.	Please check the settings under Connection Settings . The entered password has not been accepted.
The data logger cannot be accessed via the indicated IP address (xxx.xxx.xxx.xxx).	Please check the settings under Connection Settings . The data logger cannot be accessed via the indicated IP address (xxx.xxx.xxx.xxx).

4.4 Import of Measured Values

In addition to being able to recall the measured data from the data logger memory you can also import data from the hard drive of your Computer or via the portable memory card of the data logger. This function is useful if you cannot establish a connection between data logger and computer.

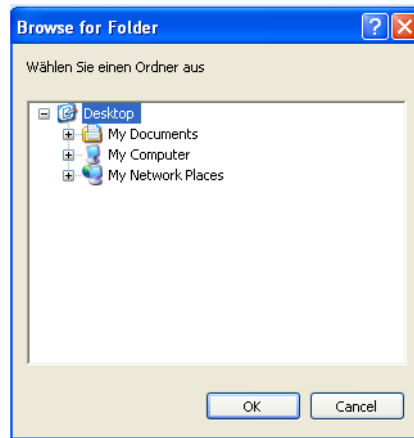
If you want to import single files, click **File > Import > File(s)**. Afterwards, select the desired files in the **Open** dialogue and click **Open** in order to start the import of the measured data.



Transfer of measured data via memory card

If you use this function, please consider the following points:

- The data logger is to be separated from the net before the memory card is taken out. If you take out the memory card during operation it can be destroyed!
- The card is on the right hand side of the data logger.
- It is recommended to use a small screwdriver to take the card out.
- Put the card into your card reader.
- Choose the menu item **File > Import > Directory** to open the **Browse for Folder** dialog.



- Select the drive letter of your card reader and afterwards the “Data” directory.
- Click **OK** in order to start the import of the measured data.

4.5 Defining the Feed-in Meter

The energy yield of your PV system can be determined in different ways. Click the menu option **Edit > Feed-in Meter** to open the dialogue **Define the feed-in meter**. Here you can define how the total energy yield of your PV system is to be determined. The following options are available:

- **Measured Values:** The feed-in meter is made up of different measured values. Select the corresponding value(s) in the selection window.
- **Inverters:** The feed-in meter is built using the inverters' measured values.
- **Not available:** There is no measured value to be used for the feed-in meter.

Define the feed-in meter

The stated information does not indicate which values should be used for the feed-in meter. Please fill in the following form indicating which measured value(s) should be used to built the feed-in meter. If you state several measured values, they will be added up. You can open this input form at any time under Edit ->Feed-in Meter.

Selection

Measured Values:

Please select the measured value(s) that built together the feed-in meter.

I12 (I12)
I2 (I2)
I3 (I3)
I4 (I4)
I5 (I5)
I6 (I6)

Inverter

The feed-in meter is built using the inverters' measured values. The sum of all measured energy values is added up and is available under 'Feed-in Meter'. Manual configuration is not required.

Not available

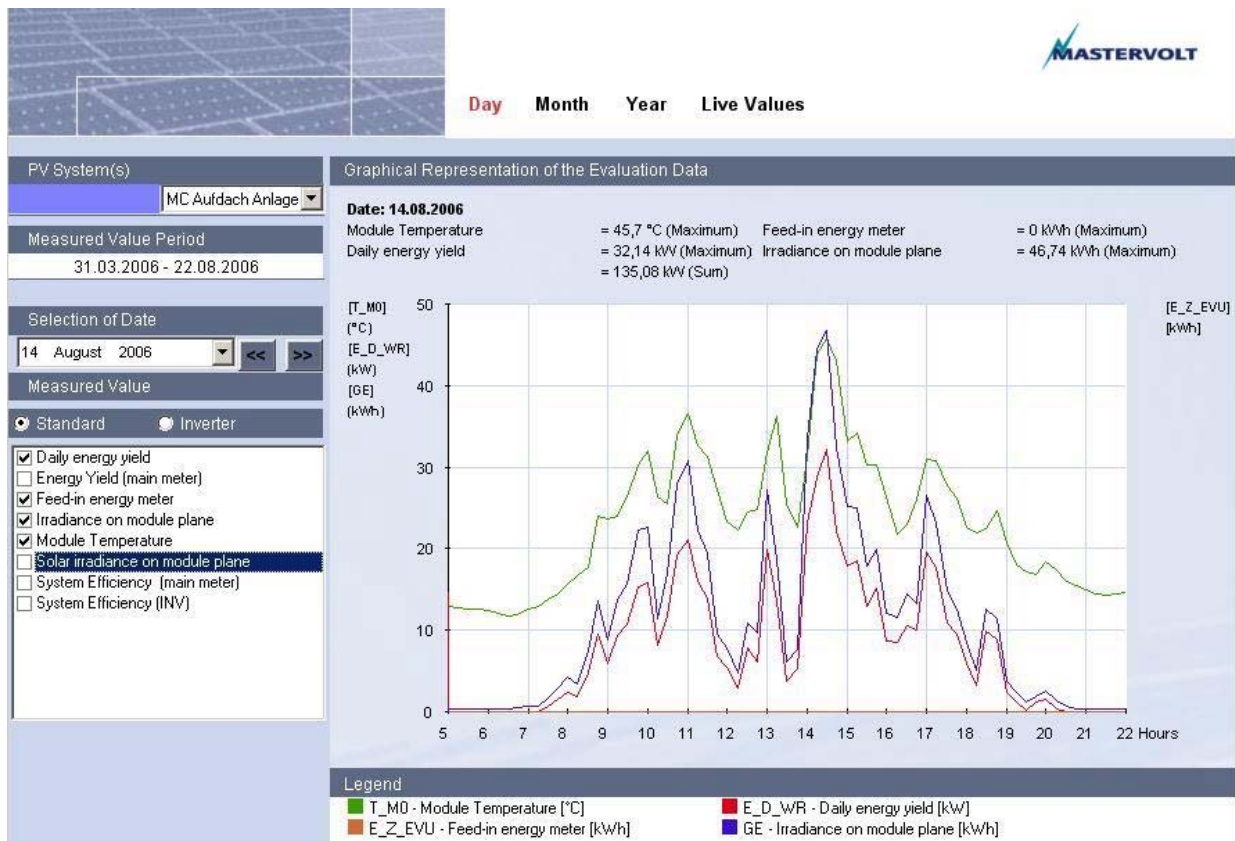
The measured values do not provide any information about the feed-in meter. If this information is available at a later date, you may open the input form and change this at any time under Edit->Feed-in Meter.

Cancel Save

5 Display of Measured Values

5.1 Day Graph

The menu option **Day** provides the following view:



In the left part of the window, choose your PV system under **PV System(s)** first. Under **Measured Value Period** you are shown the period for which the database contains measured data. Under **Selection of Date** use the calendar function or the arrow buttons **<<**, **>>** to select the desired date. After the data have been imported the current day will automatically be displayed.

You can choose between the options **Standard** and **Inverter**.

Standard

The measured values which are available by default will be displayed here. If you put a checkmark in the box for the desired **Measured Value**, the data will be displayed in the diagram.

Inverter

Put a checkmark for the desired **Measured Value** and the **Address** of the inverter in order to display the data. Under **Colour Distinction** you can define whether the measured values or the inverters are to be distinguished by different colours.

For the inverters only daily values are available, so the menu options **Month** and **Year** will be deactivated if you choose **Inverter**.

In the legend below the diagram the measured values are assigned the corresponding colours.

Display single measured values:

If you move the cursor slowly over the graph, the measured values will be displayed next to the cursor together with their numerical value and unit.

5.2 Month Graph

The menu option **Month** provides the following view:



First select the desired month in the left part of the window under **Selection of Date**, afterwards select the type of value that you want to be displayed under **Measured Value**.

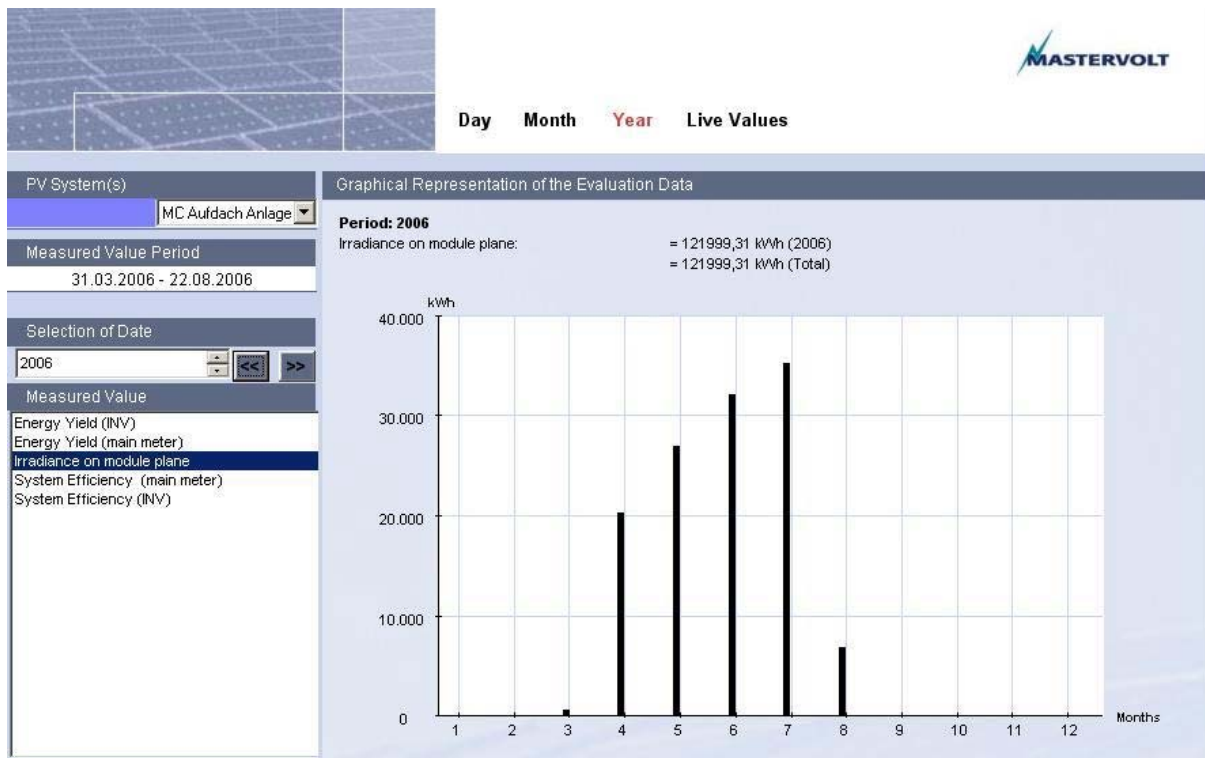
Display single measured values:

If you move the cursor over the bars slowly, the measured values will be displayed next to the cursor together with their numerical value and unit.

In addition, the total sum of the chosen month and the entire year is displayed above the graph.

5.3 Year Graph

The menu option **Year** provides the following view:



First select the desired year in the left part of the window under **Selection of Date**, afterwards select the type of value that you want to be displayed under **Measured Value**.

Display single measured values:

If you move the cursor over the bars slowly, the measured values will be displayed next to the cursor together with their numerical value and unit.

The sum of the chosen year and the total sum since data acquisition was started are displayed above the graph as a numerical value.

5.4 Live Values

If you click the **Live Values** menu item you can choose between the view options **Survey** and **Detail**.

Survey

Survey of data logger's live values

Current Data of PV System
MC Aufdach Anlage

Current irradiance - W/m²

Current Power **7.721 kW**

Total energy since system start-up **14720 kWh**

Time **16:19:07**

In this view, current data such as irradiance, power and total energy yield are displayed. Irradiance data is only displayed if an irradiance sensor is available and if the sensor is connected to the first analog input of the data logger.

Detail

Live values of inverters

Address	U_DC [V]	I_DC [A]	P_DC [W]	U_AC [V]	I_AC [A]	P_AC [W]	T [°C]	E_D [Wh]	S
1	473	2,05	970	231	3,74	871	32	19392	4
2	461	2,14	987	233	3,71	871	31	18613	4
3	471	2,08	980	232	3,76	880	32	19881	4
4	479	2,16	1034	231	3,94	900	34	19652	4
5	466	2,07	964	231	3,74	857	35	19105	4
6	459	2,14	983	232	3,85	883	37	19622	4
7	467	2,03	947	230	3,76	857	34	19441	4
8	472	2,01	949	231	3,75	859	34	19121	4

In this view, a table containing inverter data will be displayed. This function is only available if inverters have been connected to the data logger and if the data logger is equipped with the latest software.

If the connection to the data logger is effected via the local network, the connection is already established: the progress bar will let you know when the display is being refreshed. If you use a modem connection, the connection to the data logger has to be established first.

Since the Detail view requires information on the number and the addresses of the connected inverters, it is necessary to import measured data before using this function.

5.5 Printing and Saving a Diagram

Click the **Graph > Print** menu item to print the displayed diagram.

If you click the **Graph > Save** menu item you can save the diagram as an image file and make it available for integration into other programs.

Please note:

The Print and Save functions are not available for the Live Values.

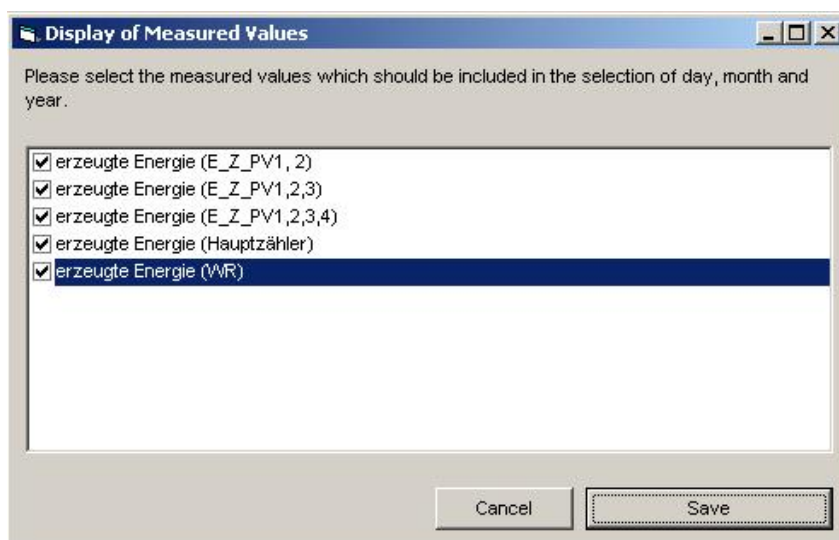
6 Additional Functions

6.1 Displaying Calculated Values

The “Sunmaster-Monitor” program automatically calculates a number of further values from the available measured values.

If, for example, the energy yield is not acquired directly via an energy meter, but the energy of the individual inverters is transferred, the total sum can be calculated.

Click the **Edit > Measured Value Display** menu item in order to open the following dialogue:

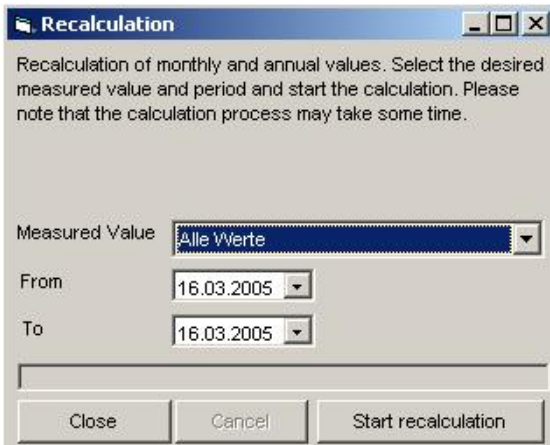


Here you can select which calculated values are to be displayed in the diagrams by putting a checkmark in front of the corresponding entry.

If you want to do without a certain calculated value, remove the checkmark from the corresponding entry. These settings can be changed at any time.

6.2 Recalculation of Measured Values

Under the menu item **Edit > Recalculation** values can be recalculated for a certain period.



This is only required if power or area have been adjusted belatedly and if measured values are displayed which are based on it, such as irradiance energy or efficiency. Choose the period for which the values are to be recalculated first. Click the button **Start recalculation** afterwards. If the calculation is done, click **Close**.

6.3 Setting up a New System

Select the menu item **File > New System** in order to set up a new system.

Proceed just like you did when setting up the first system. If you set up another system you need to enter a registration number as well. Use the serial number of your data logger as your registration key – just like when you set up the first system.

The selection of the two different systems is done via the selection list **PV System(s)**.

6.4 Deleting a System

Under **File > Delete System** you can completely remove a system from the program. The currently selected system will be deleted, all the data stored in the data base of the corresponding system will be removed.

An additional dialogue will prevent you from deleting the system unintentionally.

6.5 Changing the Language

Under the menu item **Language** you can choose between the languages German and English.

6.6 Program Update

If you click the **? > Program update** menu item you can check whether a later version of the program is available. In this case you can download the new version via a link. This requires Internet access.

6.7 Version Information

The menu item ? > **Information** provides you with information on the version of the program you are using.

7 Troubleshooting

Registration not successful

If you should experience problems when registering, the following reasons might be considered:

- The registration key is invalid (typing error).
- The same key has already been used for another system.

Data import not successful

If the data import was not successful you might consider the following reasons:

- The file format is invalid.
- An error has occurred during the transfer.
- The connected inverter is not supported.

Connection between designation of measured value, abbreviation and representation

The abbreviation of a measured value is used in tables, lists and diagrams in order to make the masks clearer and more concise. The designation of a measured value describes the function that the measured value has within the system, e.g. feed-in meter.