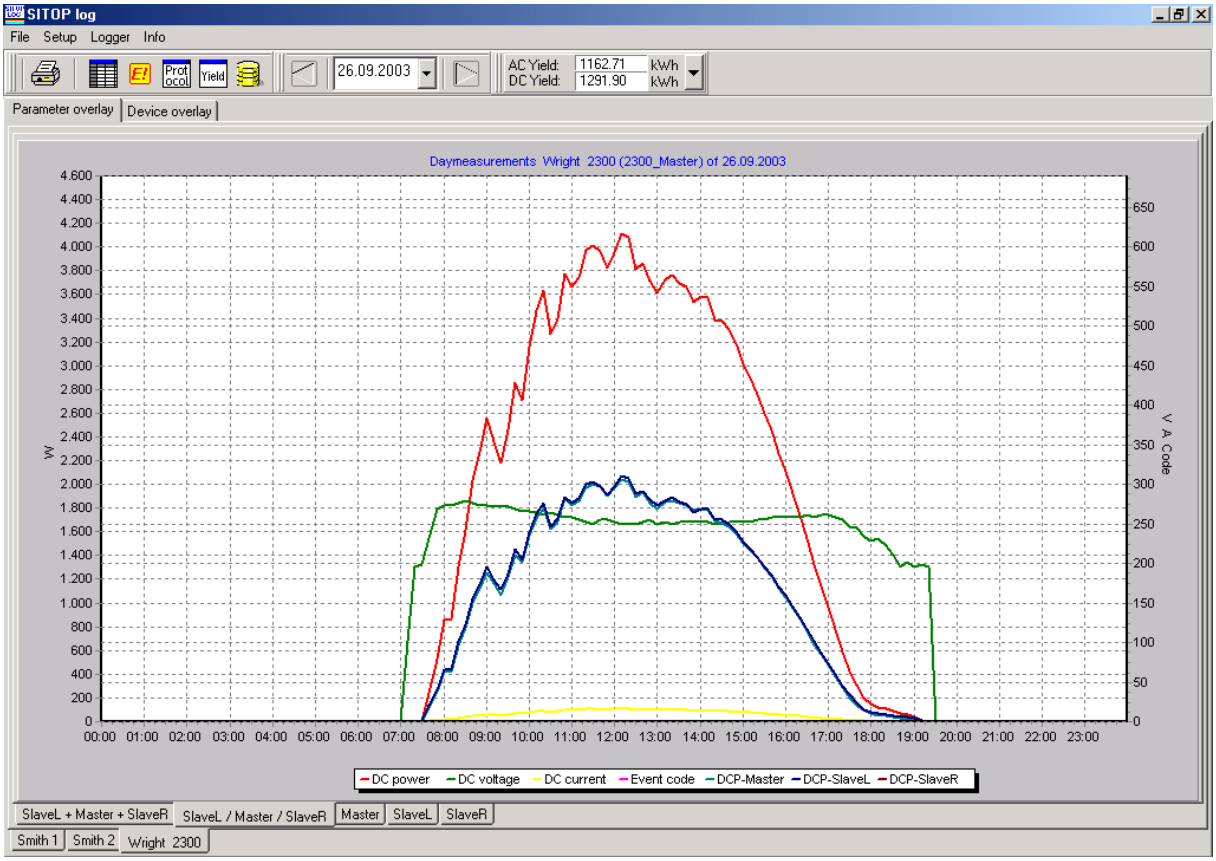
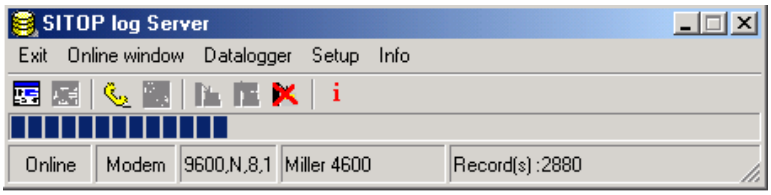
Solar Inverter





SITOP log

SIEMENS

User's Guide

Version 3.0

Although we have checked the contents of this publication for correspondence to the hardware and software described, differences cannot be excluded and complete correspondence cannot be guaranteed. The information in this publication is checked at regular intervals and any necessary corrections included in subsequent releases. Your suggestions are welcome.

TABLE OF CONTENTS

1 History

Version 1.0: First approved version

Version 2.0:
- Transformer-free inverters can be read and evaluated.

Version 2.1:
- Yield lists are now organized by devices. A history of AC and DC yields is kept for each device.
- Inverter data can be read out in blocks.
- Event lists always show the last events.
- Offset factors are now available for the optional sensors for sun radiation and module temperature.
- Adjustable range for current and the power based on the system configuration (not for SITOP solar T).
- Reading is possible at night.
- SITOP solar inverter wakeup was revised.
- Expanded presentation of the measured values for SITOP solar inverter
- The position of the screens is stored when the program is exited.

Version 2.2 :
- Automatic reading of online data with daily storage of the data on the hard drive

Version 3.0:
- Output of a download log from the server (button: )
- Correction of problems for hardware address changes and for yields
- Correction of the problem when devices are deleted from the device configuration. Directories were not renamed correctly when directories already existed.
- Output of the measured values as EXCEL spreadsheets
- Communication via modem was revised.
- Online data logger integrated in the SITOP log server program. All devices can be logged in simultaneously on one interface.
- No data reading in online logger mode at night
- The new inverter types SITOP solar 2300 and SITOP solar 4600 IP65 were entered and the corresponding configuration files were added.
- Sensor data were adjusted in the device configuration.
- Icon on Desktop for easier starting of SITOP solar log
- Settings for the S0 interface available
- Internal bug fixes

2 General

This user's guide explains the functions of the *SITOPlog.exe* and *SITOPServer.exe* programs. These programs are used to read and graphically evaluates the data stored on SITOP solar inverters.

There are two ways to evaluate inverter data.

1. Evaluation of historical data
2. Analysis of current data

Historical data show the behavior of the inverters over an extended period of time. This period can be days, weeks, months or even years. To also be able to examine the historical data on computers which do not have direct access to the inverters, the directory for the storage of the data can be set as desired.

Current data are of interest particularly during commissioning and when trouble-shooting problems on the inverters. The current data also offer information which is not available in the historical data. The hours of operation are only available as current data, for instance.

2.1 Server Program (SITOPServer.exe)

The server program is used for communication with the inverters. Communication takes place either locally via the serial interface of the computer being used or via a modem for distant inverters.
In addition to reading the data stored on the inverters, current online data can be indicated with the server program. The current data of the inverters are indicated in the online displays of the server program. Several online displays can be open at one time to permit comparison of various different inverters.

After the data stored on the inverters have been read, they are stored on the hard drive in files so that these data can also be viewed by other PCs. The computers must be linked via a network and must be able to be accessed with the letter of a drive.

Other features

- Log file for each device with all data on the downloads
- When inverters are removed from the device list, the data are saved in the directory Devxx_save (xx = device number) and are not deleted.

2.2 Presentation Program (SITOPlog.exe)

The presentation program is used to present the historical inverter data. It offers both graphic evaluation and the output of spreadsheets. The graphic user environment of the program is designed so that all important information and settings can be accessed directly via file cards. The output formats are selected in a pop-up menu which is opened with the right-hand mouse button.

Other features

- Graphics can be zoomed (with left mouse button pressed, highlight an area from top left to bottom right).
- Any parameters can be superimposed for a device.
- Any devices can be superimposed for a parameter.
- Error codes output as yearly list in plain text
- Log file for each device with all data for downloads
- When inverters are removed from the device list, the data are stored in the directory Devxx_save (xx = device number) and not deleted.

3 System Prerequisites

The following prerequisites are required for optimum installation and smooth operation of the software.

- Microsoft Windows 98/ME/2000/XP or NT4.0 operating system
- IBM-compatible PC
- At least 4 MB of free storage space on the hard drive for the program
- 32-MB RAM main memory, preferably more
- An RS 232 serial standard interface
- A modem (optional)
- A mouse

4 Installation of the Software

The user should be familiar with the basics of the operating system Windows 98/ME/2000/XP or NT4.0. When performing the installation as an **update** of earlier versions, be absolutely sure to make a backup copy of the *SX_main.ini* file before beginning installation. This file is located in the directory which you specified during installation. This is usually C:\SITOLOG.
Remark for Windows NT users: No administrator rights are required since no system DLLs are changed.

4.1 New Installation

The software to be installed is located in the installation file *SITOP30.exe*.
There are two ways to perform the installation.

1. Via **Start -> Execute -> < drive\path>*SITOP30.exe***
2. Use Windows Explorer and go to the directory with the installation program and open the program *SITOP30.exe*.

In both cases, program installation is started. After this, follow the instructions on your monitor screen.

4.2 First Start after New Installation

Before each program start, a check is made to determine whether inverters have already been configured. If no devices have been configured yet, the menu "Device configuration" is called.

4.2.1 Device Configuration

The following steps must be performed to configure a device.

1. Select the <Add device> function.
2. Select the file name of your device type and confirm with <OK>.
   ⇒ All important device data are now loaded.
3. Enter device addresses. The standard setting there is 01.
4. If the inverter is addressed via modem, enter the telephone number of the modem.
5. Change the data path if you want to use another path than the preset one.
6. With inverters of the transformer-free series SITOP solar, you can select the configuration under "Options".
7. If sensors are installed for solar radiation and module temperature, an offset factor can be set under "Configuration".

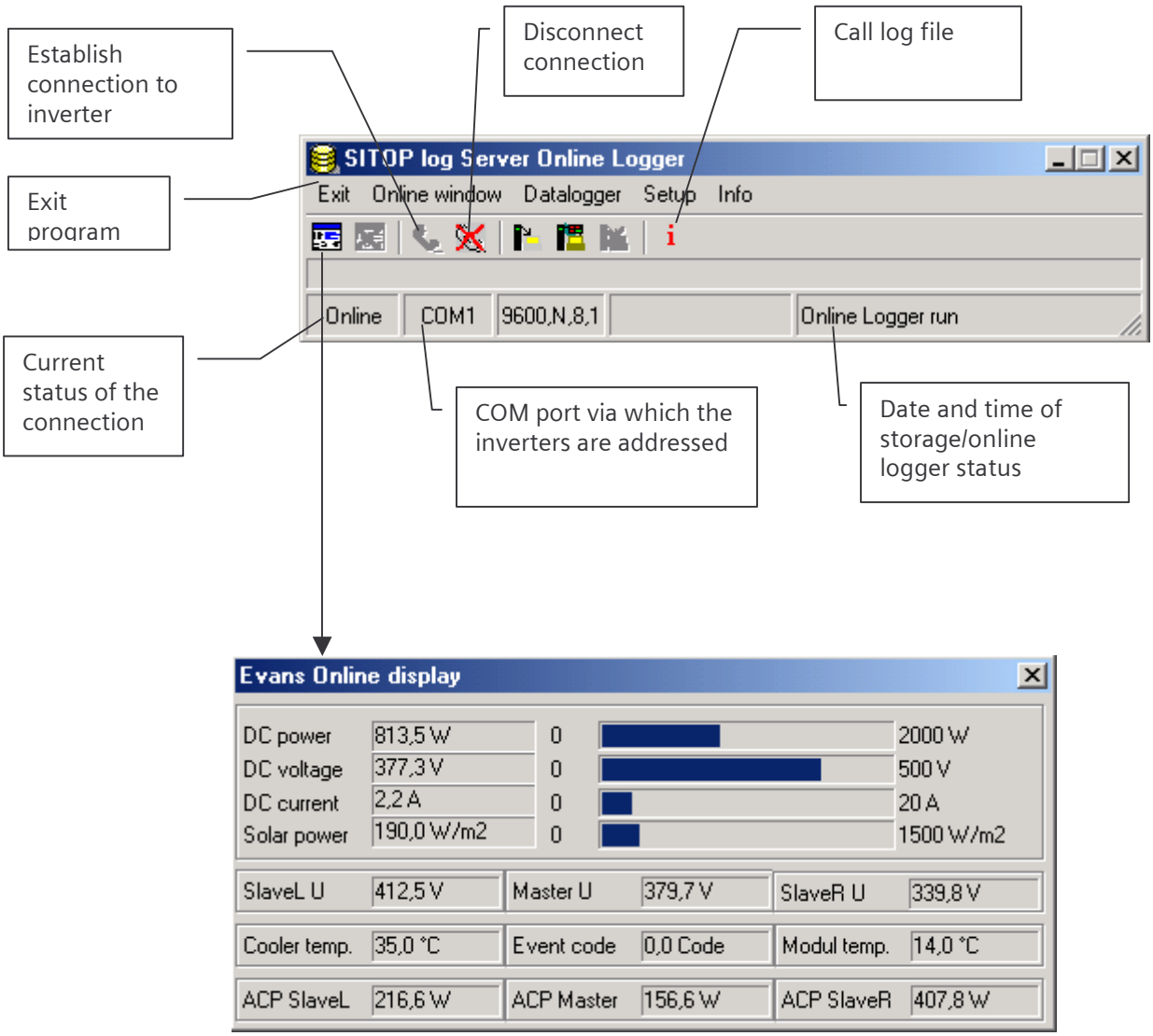
4.2.2 Set Interfaces of the Server

After the first start of the server program, the serial interface for local operation and, if necessary, the modem port to the inverter must be set. The setting is made in the **Setup** menu of the SITOP log server.

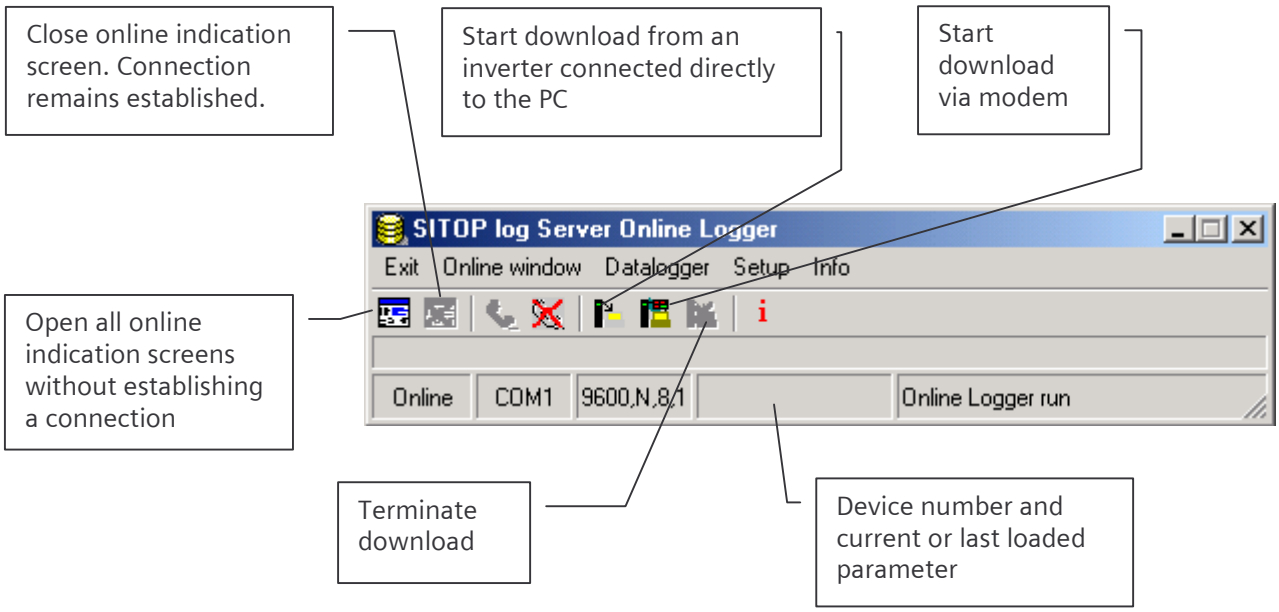
5 Start Monitor Screens of the Program

5.1 SITOP log Server - Main Screen

The server reads the data stored on the inverter and indicates online data (current measured data).



Example of an online display

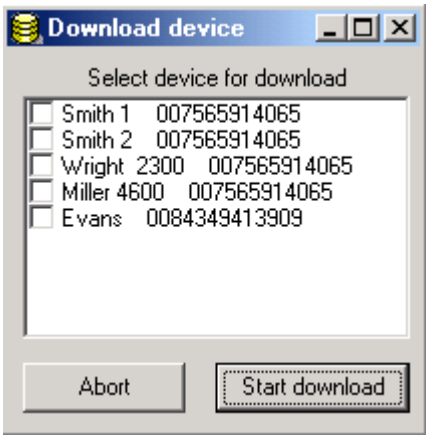


5.1.1 Read Data

The server establishes the connection to the inverters and disconnects the connection automatically after the download when the online indication is off.

The download is started via the menu item "Datalogger" or the  button.

A selection screen appears in which the inverter to be read must be selected. The unavailable inverters are shaded gray.



5.1.2 Log of All Downloads

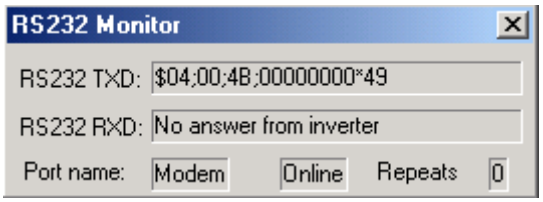
The status of the last read accesses can be viewed in a log file with the i button.

5.1.2.1 Waking Up an Inverter at Night

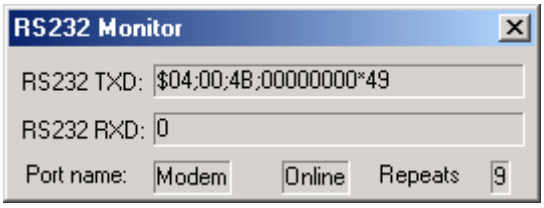
When the download is started at night, the inverters (SITOP solar and SITOP solar T) are awaken if necessary.

The wakeup procedure is performed as shown below.

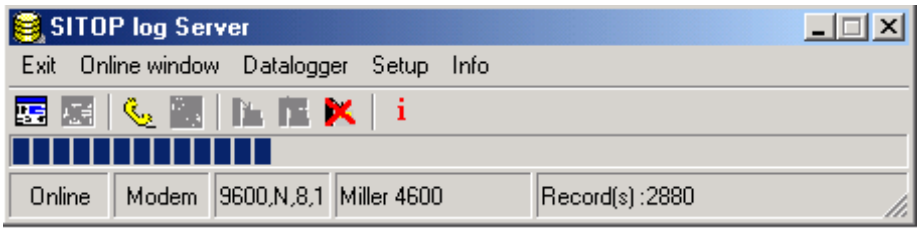
- Establish connection to the inverter via the serial interface or the modem.
- Attempt to read data from the inverter. The number of attempts can be set in the device configuration.
- If no answer is received, zeroes are sent to the inverter for 10 seconds.
  The remaining seconds are indicated as attempts on the RS 232 monitor and as wakeup timer value in the status line of the main screen of the server.



- For the next 45 seconds a check is now made every 5 seconds to determine whether a response can be obtained from the inverter.



- Normal read procedure
  Progress of the read access is shown in the progress display.



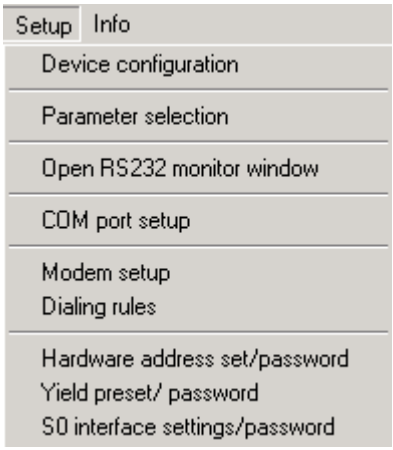
5.1.3 Online Data

All connected inverters can be indicated at the same time. Each inverter has its own screen. This makes is possible to compare the online data.
Restriction: Only locally connected devices or devices connected via modem with the same telephone number can be indicated at the same time.

The online indication is started via menu item **Online window -> connect** or the button  .

5.1.4 Server Settings

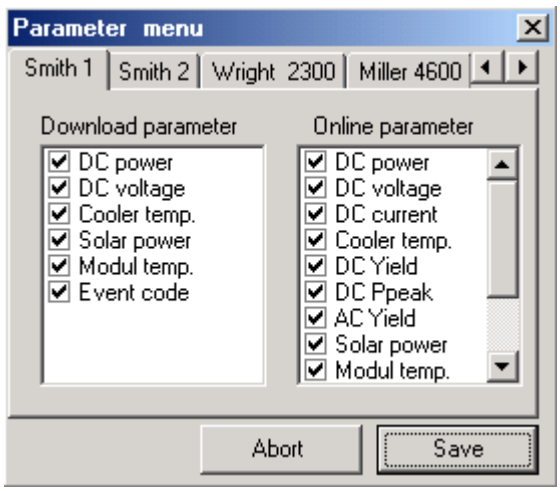
The "Setup" menu item permits you to perform various actions.



The subitem "Device configuration" will be described in more detail under 5.2.4. This is the same screen as for the indication program.
Remark: Changes made here will not take effect in the indication program until the indication program is started again.

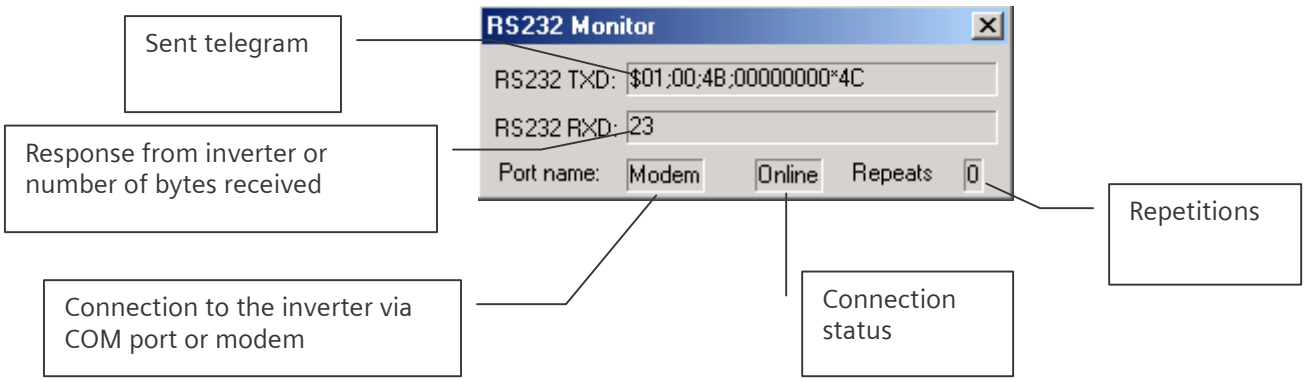
5.1.4.1 Parameter Selection

The "Parameter selection" subitem permits you to specify the parameters which are to be read during a download. This means that users are able to read only those data which they need. This reduces the time required to read a SITOP solar T. In addition, the parameters of the online indication are selected here.



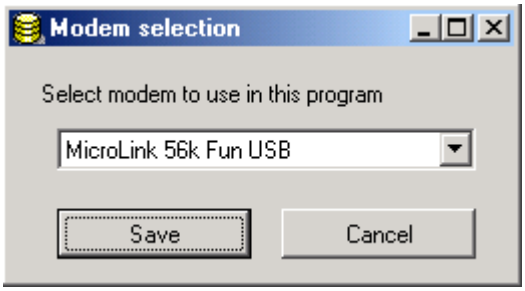
5.1.4.2 RS 232 Monitor

The RS 232 monitor is used to check communication between PC and inverter. The sent and received telegrams are indicated. In addition, the lower part of the monitor screen shows the connection, the online status and the number of attempts to obtain a response from the inverter.



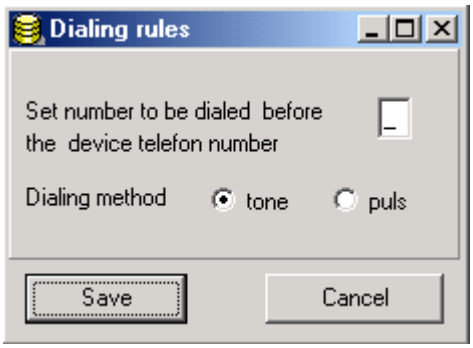
5.1.4.3 Modem Setup

The modem is set up here. This modem is used to establish the connection to a remote inverter.



5.1.4.4 Dialing Rules

If the program is installed on a Notebook, it may be necessary to use an ID to obtain an outside line from different locations. The required ID for an outside line can be entered here so that you do not always have to keep changing the telephone numbers in the device configuration.



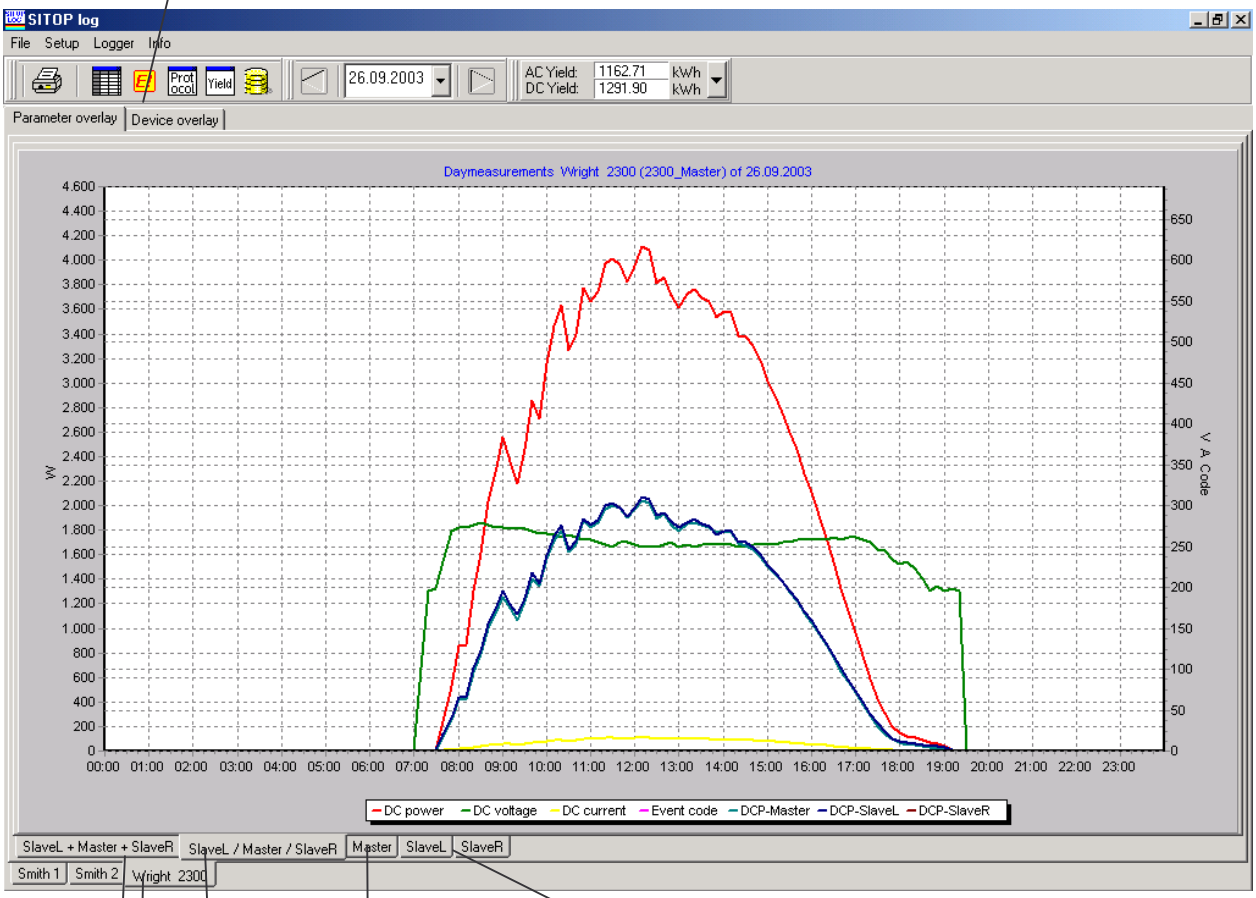
5.1.4.5 Set Hardware Address/Set Yields

The function of this menu is described in detail in chapter 11 *(Password-Protected Menus)*.

5.2 SITOP log Indication Module

The indication module is used for graphic and spreadsheet-type indication of the historical inverter data.
Six different evaluation graphics are available for analysis of the inverter data. In addition, there are two ways to superimpose the parameters. The selection of the graphic type, the parameters and the devices is performed via menu item "Setup → Grafic parameter" or via a pop-up menu. The pop-up menu is opened by pressing the right mouse button in the graphic indication.

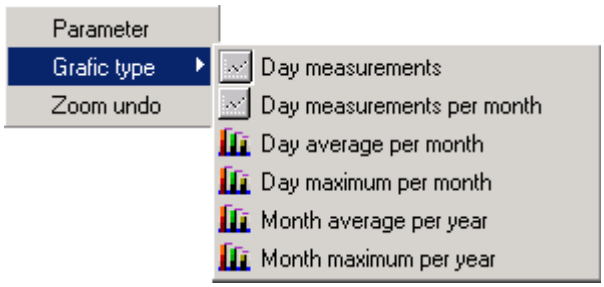
5.2.1 SITOP log Main Screen



Division into master and slave data is only performed for SITOP solar inverters. These title bars are not indicated on SITOP solar T devices.

5.2.2 Pop-Up Menu

The type of graphic is selected via a pop-up menu which appears when you press the right mouse button over the indication area.



5.2.3 Function Buttons of the Indication Module

Prints the graphic on the system printer. The printer menu is started before the printout.

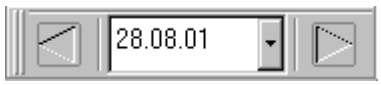
Outputs graphic data as a list

Outputs error messages as a yearly list

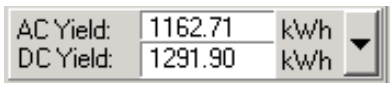
Outputs log of the downloads

Yields of the individual inverters, organized by DC and AC yield

Starts SITOP log Server



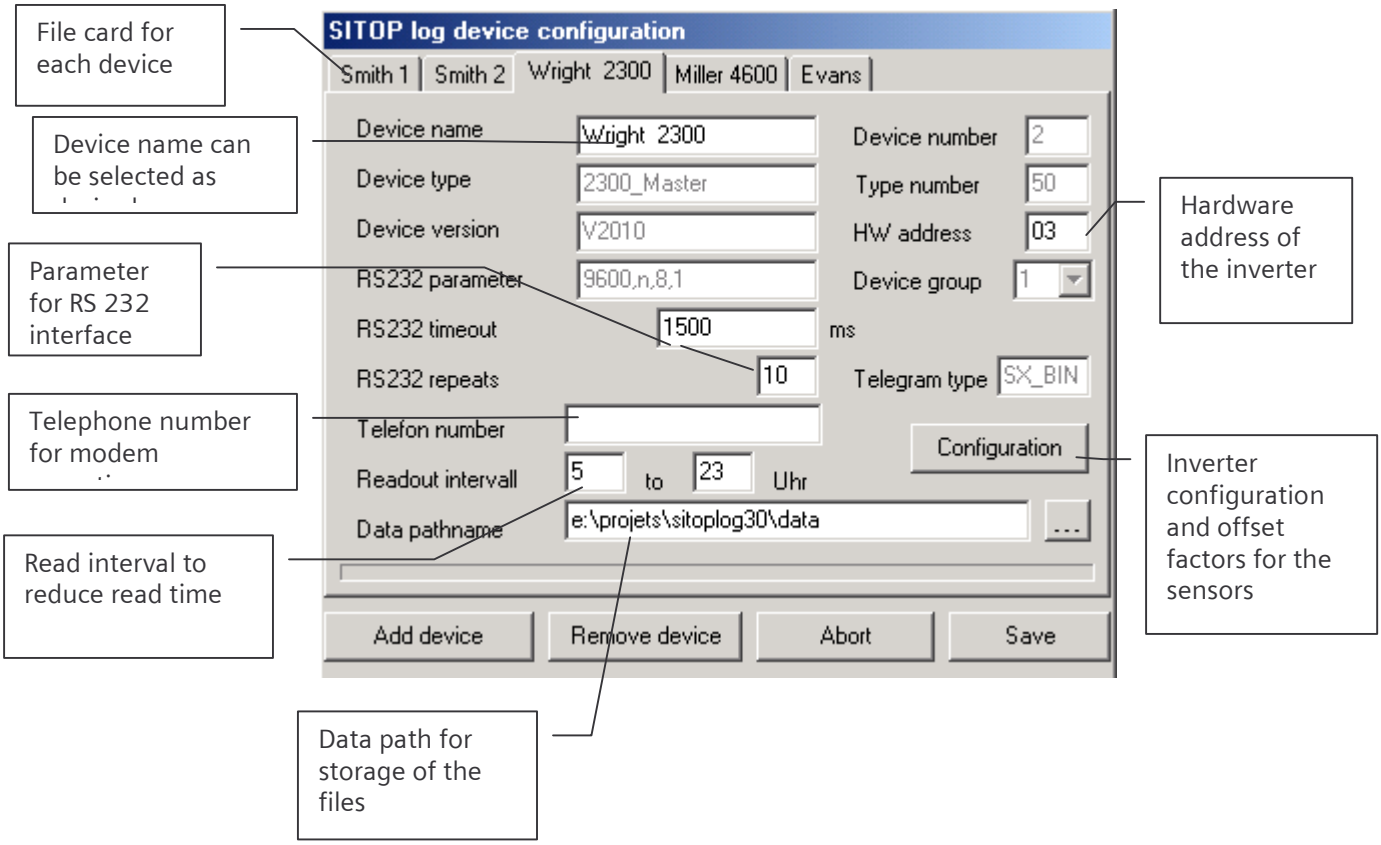
Set date of the evaluation. The large arrow buttons can be used to page up/down through day, month or year depending on the type of graphic.
The button next to the date can be used to directly open a calendar.



Total yield of all devices with device selection. The devices which are to be included in the total can be selected from a list which is opened by the button.
The display is updated once per second.

5.2.4 Device Settings Menu

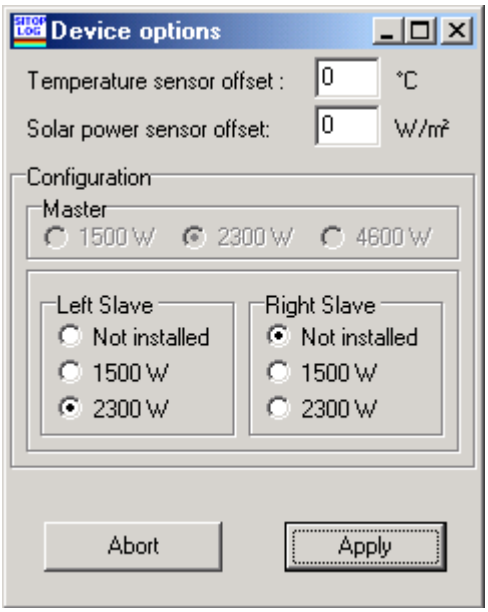
The server program (SITOP log Server) and the indication program (SITOP log) both use the same menu for the settings of the connected inverters.



Since the entries for device type, device version, RS 232 parameters, device number, and telegram type cannot be changed with this screen, they are shown in gray.

Remark: **After you remove a device, always perform a save operation or data may be lost.**

5.2.4.1 Options in the Device Configuration Menu



The option screen permits the entry of offset factors for the optionally installed sensors. The offset factor is added to the measured values. If the measured value is too large, enter a negative value.

With transformer-free SITOP solar inverters, the configuration must be set here. The configuration adjusts the scaling for the current and the power display.

Since there are various types of inverters which can be combined, the software can be adjusted to the installation here. The master to be used was already decided when the configuration file was selected. A change cannot be made here.

6 File Names and Formats of the Device Data

All data are stored in the directory \Dev00 (\Dev01 ...). This device directory is set up in the directory which is specified in the device configuration under data path. The program stores the data by month in this directory. A separate monthly file is set up for each type of measured values.

6.1 File Name of the Logger Measured Values for SITOP solar T

The names of the measured value files consist of the letters "LOG_" and a 4-digit number for the month and the year. The file extension is derived from the measured value size.

File Prefix	Month/Year ID	Measured Value Number	Measured Value Designation
LOG_	MMYY	000	DC power
		001	DC voltage
		002	Heat dissipater temperature
		003	Radiation
		004	Module temperature
		005	Error code

Example: LOG_1002.000 is a file from **October 2002** containing **power data**.

6.2 File Name of the Logger Measured Values for SITOP solar

The name of the measured value files consists of the letters "LOG_" and a 4-digit number for the month and the year. The file extension is derived from the measured value size and the ID for the master or one of the slaves. All files are always set up.

File Prefix	Month/Year ID	Measured Value Number	Measured Value Designation
LOG_	MMYY	000	DC power, **sum of master + slaves**
		001	DC voltage, **master**
		002	DC current, **sum of master + slaves**
		003	Radiation
		004	Module temperature, **master**
		005	Error code combination, **master + slaves**
		100	DC power, **master**
		101	DC voltage, **master**
		102	DC current, **master**
		103	Radiation
		104	Module temperature, **master**
		105	Error code, **master**
		200	DC power, **left slave**
		201	DC voltage, **left slave**
		202	DC current, **left slave**
		203	Radiation
		204	Module temperature, **left slave**
		205	Error code, **left slave**
		300	DC power, **right slave**
		301	DC voltage, **right slave**
		302	DC current, **right slave**
		303	Radiation
		304	Module temperature, **right slave**
		305	Error code, **right slave**

Example: LOG_0702.300 is a file from **July 2002** with power data for the right-hand slave.

6.3 File Name of the Online Measured Values and Yields

The name of the online measured value file consists of the letters "LOG_akt" and a two-digit number for the device number. The files are always stored in the current data directory of the device. The data are used for the calculation of the total yields.
In addition, the yields are stored in this file which were stored on the inverter at the time of the download so that the yields can be monitored. The data stored here are indicated in the **Yield** list.

6.4 File Formats

Although a measured value file is available in a non-ASCII format, it can be converted into a text file via the menu "**File->Store data in CSV format.**" The data can then be imported to **Microsoft EXCEL** or another spreadsheet calculation program.

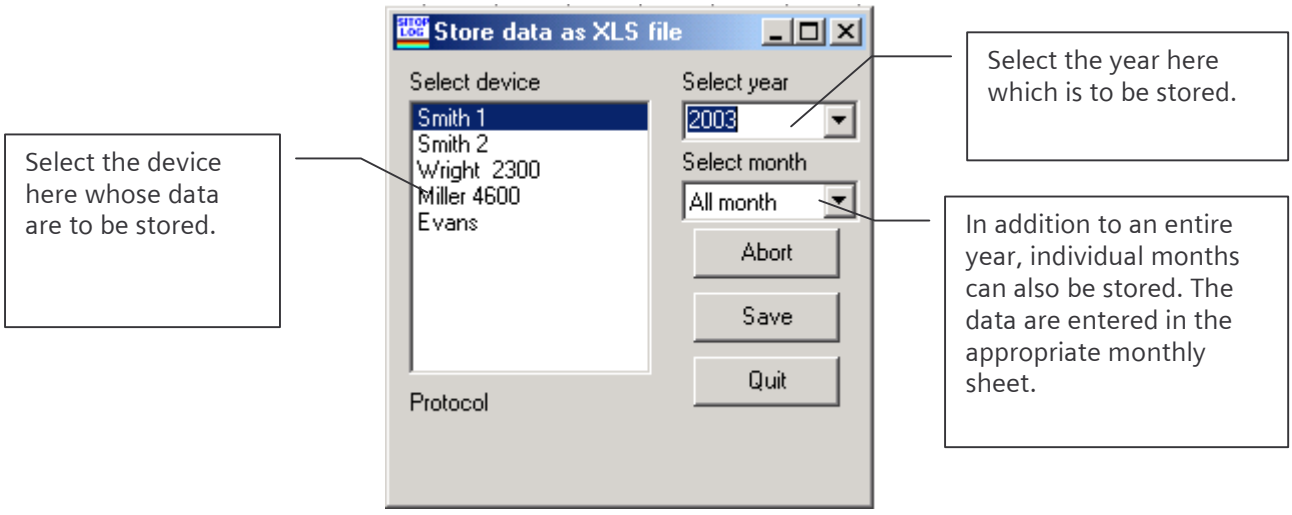
In addition to the CSV format, output directly in an EXCEL file will be offered starting with version 3.0 ("**Datei->store data in XLS format**"). The data are then written as one year in a working folder with 12 sheets for the 12 months. This procedure takes approximately 10 minutes. The export to a CSV file is faster.

6.4.1 Measured Value Format

DATE	as double in Windows TdateTime format	
MEAS. VALUE	char[8]	Eight ASCII characters (can be read)

6.4.2 XLS File Format

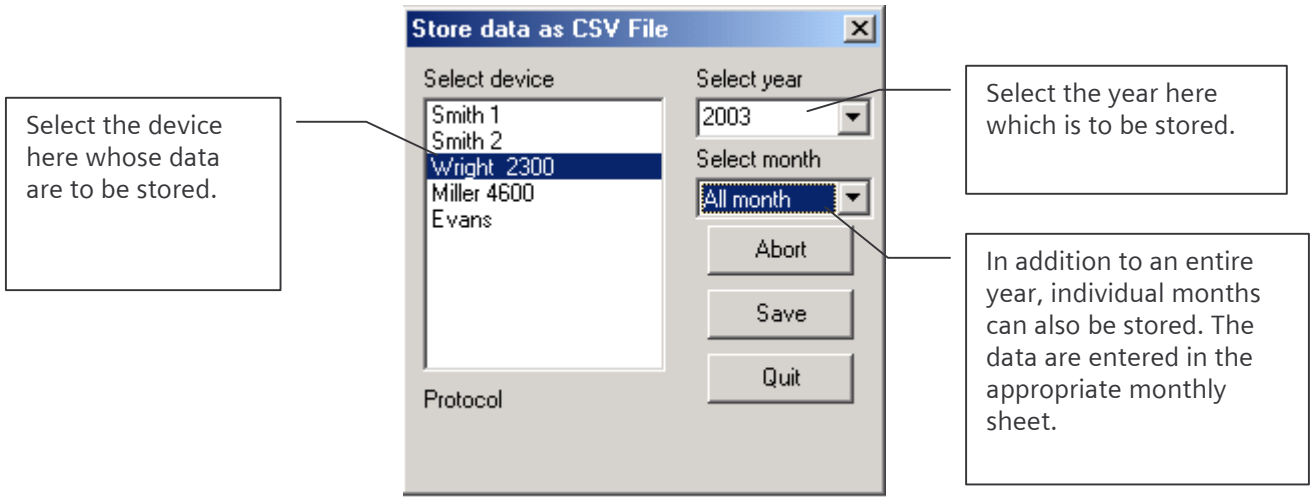
The files are stored in EXCEL format.



The sequence of the data corresponds to that in the already available CSV format which will be described in the next chapter.

6.4.3 CSV File Format

Starting with version 2.4, the data are always written together in one CSV file.
When the inverter type is SITOP solar 1500 or 2300, the data of all individual devices (master and related slaves) are always stored.



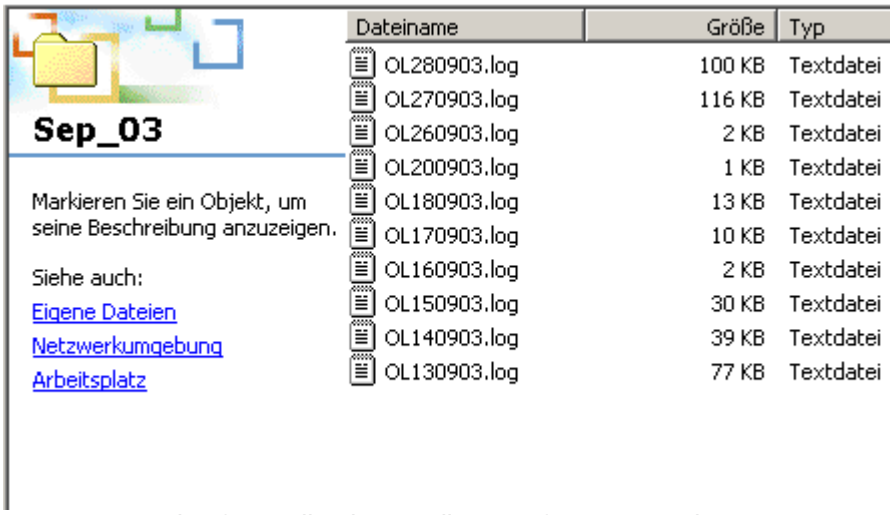
SITOP solar T: DATE TIME; MW0; MW1;MW2;MW3;MW4;MW5

SITOP solar : DATE TIME; MW0; MW1;MW2;MW3;MW4;MW5; MW0_Master; MW1_Master; MW2_Master;MW3_Master;MW4_Master;MW5_Master; MW0_SlaveL; MW1_SlaveL; MW2_SlaveL; MW3_SlaveL; MW4_SlaveL; MW5_SlaveL; MW0_SlaveR; MW1_SlaveR; MW2_SlaveR; MW3_SlaveR; MW4_SlaveR; MW5_SlaveR;

MW corresponds to the parameters described in chapter 6.1 or 6.2.

6.4.4 Online Logger File Format

The online logger data are stored by day in a subdirectory of the data directory. The name of the subdirectory consists of the first three letters of the month and the last two positions of the year, separated by an underline.



Example of an online logger directory from September 2003

This directory contains a file with the online logger data for each day.

The following data are stored, separated by commas:
Date HH:MM, Master.PDC, SlaveL.PDC, SlaveR.PDC, Master.U, SlaveL.U, SlaveR.U, Master.I, SlaveL.I, SlaveR.I, Master.Temp, Einstrahlung, ErrorCode, ModulTemp, Master.PAC, SlaveL.PAC, SlaveR.PAC

6.4.5 Current Measured Data File

The format of the current measured data is an INI file format. It consists of a section and a parameter name.

Example:

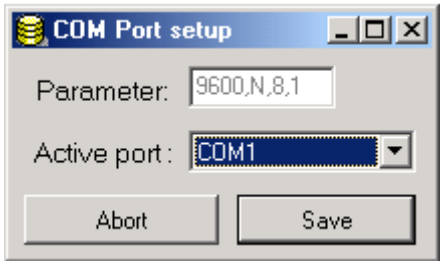
[CurData] ◄——	Section
LastCurLog=25.02.02 03:01:14	Date, time of last storage
DC Yield=2550	Same entries
AC Yield =1900	
....	

7 Serial Connections

Proceed as shown below to connect the inverter(s) to the serial interface.

- A DSUB9 male socket is located on the inverter. Connect this with a 1:1 cable to a free interface on your PC.
- Configure the serial interface.

The parameters contained in the device data are used to configure the serial interface of your PC. The serial interface to be used is selected in the selection screen which can be accessed via the menu **<Setup -> COM port setup>**.



8 Modem Operation

You will need a so-called null modem cable to connect the inverter with the modem. This cable is also sometimes called a "twisted data cable" since the connections are crossed inside. Be sure to use a 9-pin sub D cable with plug and socket. The data cable included with the modem cannot be used for the connection.

The cable and the required adapter can be ordered, for example, from Conrad Electronic GmbH under the order number 97 99 70 or 74 16 20. Bürklin also offers a large selection of cables and adapter plugs.

USB modems cannot be used on the inverter.

The following popular modems were tested for smooth operation.

Acer Modem 56 Surf
CREATIVE Modem Blaster V.92

8.1 Operation with SITOP solar Inverters

Proceed as shown below to install the inverter. First, establish the connection to the inverter with the null modem cable. It makes no difference whether you connect the cable on the inverter to the left or right RS 232 interface. Now turn on the modem. Then turn off your inverter with the switch on the front of the device and, after a brief pause, back on.

The inverter then makes the necessary settings on the modem by sending a parameterization string. Afterwards, connect the modem to your telephone network as described in the user's guide of the modem. You can now read the data of your inverter as described in chapter 4.

8.2 Operation with SITOP solar T Inverters

With SITOP solar T inverters, the modem must first be connected with the modem cable of the modem to the COM1 interface of a PC and turned on. The telephone cable of the modem does not have to be connected yet.

Our homepage (www.siemens.de/sitop/solar) contains a ZIP file (Modemkonfig.zip) with two files which must be both copied to the hyperterminal directory. With Windows 98, this directory is located under the path:

C:\Programe\Accessories\HyperTerminal

After the hyperterminal appears, the "New connection" screen is closed. The "Modem.ht" file must then be opened. Then send the file "Modem.txt" under the menu item "Transfer → Send Text File."

You can now view the configuration procedure on the monitor screen. The modem should respond with OK after each AT command. At the end, the configuration stored on the modem is indicated. The modem is now configured.

Connect the null modem cable to the inverter and modem. Then connect the modem to your telephone network. You can now read the data of your inverter as described in chapter 4.

9 Restrictions

The maximum number of inverters in this version is 20.

10 Installed Files

The installation program Sitop30E.exe installs the following files.

Server:

SITOPServer.exe	Program file
SITOPServer.deu	Language DLL for German
SITOPServer.enu	Language DLL for English

Indication program:

SITOPlog.exe	Program file
SITOPlog.deu	Language DLL for German
SITOPlog.enu	Language DLL for English

Configuration files:
Various XXXX.cfg files are available. XXXX stands for the particular type designation of the inverter.

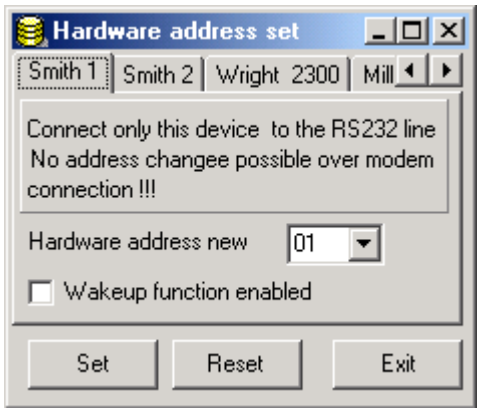
If the language DLLs are not available, the program uses the English language.

11 Password-Protected Menus

The menu of the SITOP log server program contains two password-protected menu items under "Setup." In both cases, the password is **service**.

11.1 Set Hardware Address/Password

With **SITOP solar** and **SITOP solar T**, menu item <Hardware address set ...> can be used to set the address on the inverter. If a device is selected for which no address can be changed, this is indicated.



The address on the inverter is used for clear differentiation between the devices in a system group. An inverter addressed via the serial interface responds only to this address.

11.1.1 Change the Address

The address currently set on the device must be entered in the device configuration before the address can be changed.

The user dialog always indicates all devices which are stored in the configuration. This means that devices are also shown whose addresses can only be changed by replacing the EPROM. The <Set> button is not activated for devices which cannot be changed via software.

When it is possible to change the address, the user can select an address from the list of possible addresses and transfer this to the inverter with the <Set> button. If the procedure was successful, the selection box shows the new address. If an error occurred, the address indicator is reset to 01.

The new device address is also entered in the device configuration after successful change.

11.1.2 Reset the Hardware Address from 01

Starting with version 03, the hardware address can be reset. The old address must not be known for this. The address is reset with a hard RESET to 01.

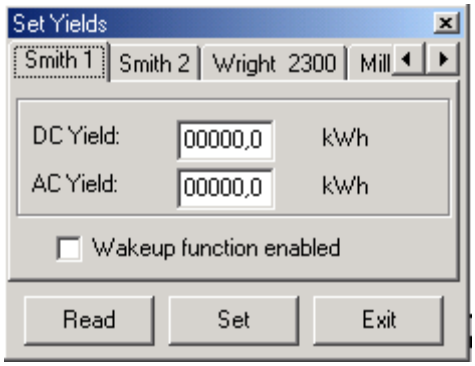
11.1.3 Important Information

The hardware address can only be changed with a local connection via the serial interface. The device must be connected directly to the PC.
If the RESET is used on a group of devices, **ALL inverters** are reset to address 01 and can then no longer be addressed via a bus structure since all devices respond simultaneously to the same request!

The address can only be changed on an individual device.

11.2 Set Yields/Password

This menu item can be used to set the yields. The counter states of the inverters can be adjusted with this to external counter states.

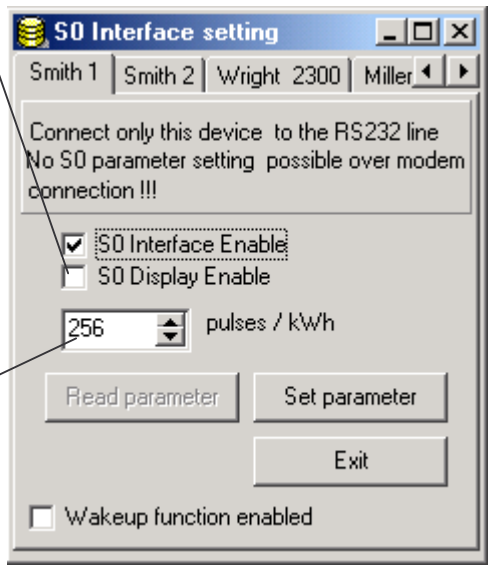


11.3 Parameterize S0 Interface/Password

This menu item can be used to adjust appropriately equipped inverters to an S0 interface.

The indication of the real measured AC yields on the display of the inverter can be activated here.

The pulses can be set between 256 and 10,000 pulses/kWh depending on the type of counter.



Siemens AG
Division
Electronics Plant, Vienna
PO Box 83, A-1211 Vienna

Siemens Aktiengesellschaft