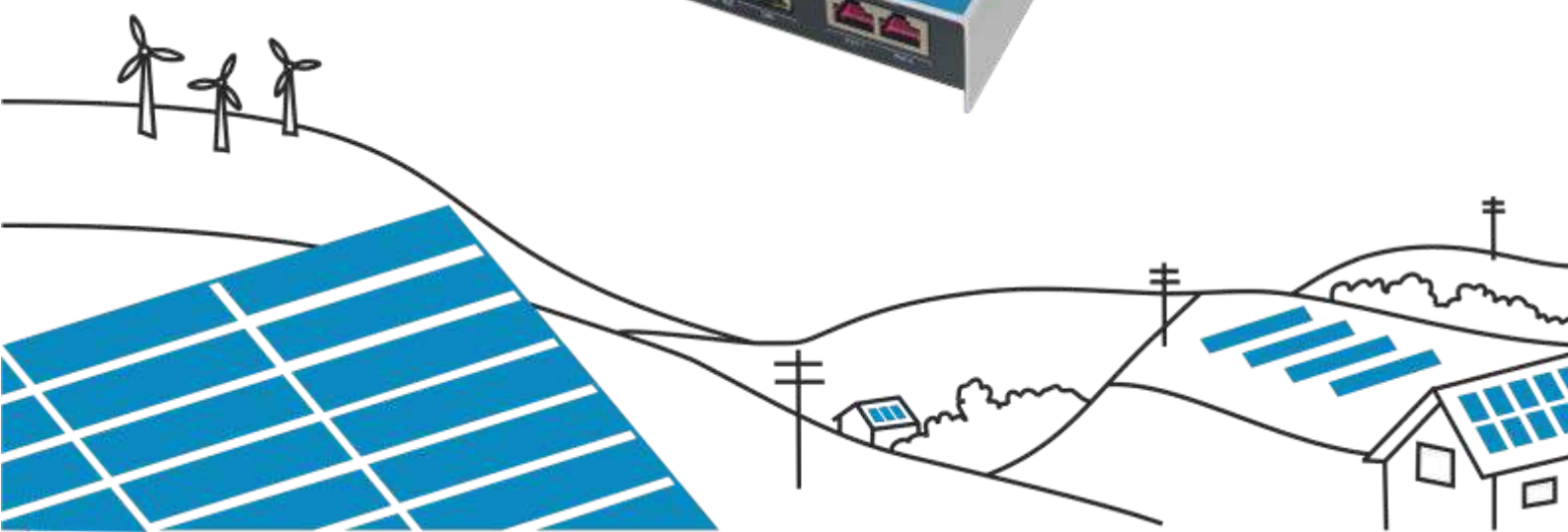
Papendorf Software Engineering GmbH

User Manual

SOL.Connect Center III



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Please keep this manual in a safe place for future reference!

Contents

1 Preface

In this manual you will find detailed product information and instructions how to use the **SOL.Connect Center**.

In the following text the SOL.Connect Center is called **data logger** for the purpose of better readability.

The SOL.Connect Center is available in a standard version as well in connection with optionally available SOL.Connect products for enhanced features. The configurations of these products are only visible on the web surface after connecting them. Therefore these are marked herein as **optional**.

This document incorporates the latest version at the time of printing. It is subject to changes which refer to new functionalities and enhancements.

The names of actual products and companies mentioned herein may be the trademarks of their respective owner. Techniques and assemblies described herein are partly patented.

1.1 Symbols

Throughout the manual important information is being highlighted with various symbols:

Note

This symbol points to circumstances that need special attention and, if not followed, may lead to damage of components or even hazards to people. Information marked as „Note" must be observed on all accounts.

Information

The symbol "Information" points to additional information and hints for the user regarding enhancement of the operating procedures.

2 Security Warnings

It is assumed that the reader is aware of the common rules and provisions regarding electrical installations and connection to the public power grid. Especially the common safety regulations for working on electric installations must be observed closely.

Please pay attention to the following safety instructions to avoid bodily injuries and hazards of the connected devices:

Touching electrical parts could result in death or serious injury - even after the equipment has been completely disconnected from the mains! **Only install this device while completely disconnected**!

Devices must only be operated in a dry, protected environment. With optional accessories an IP65 installation is possible.

Do not try to enter into the inside of the device by using a metallic, pointed or sharp tool.

Avoid exposed cables and connections.

Electric supply must have a fuse and protecting earthing.

The main plug must be accessible at all times.

Maintenance work may only be carried out by qualified personnel.

Touching electrical parts could result in death or serious injury - even after the equipment has been completely disconnected from the mains! Only install this device while completely disconnected!

Devices can only be operated in a dry, protected environment. With optional accessories an IP65 installation is possible.

Do not try to enter into the inside of the device by using a metallic, pointed or sharp tool.

3 Product Description

The data logger is a freely programmable system to collect, reprocess, validate, and submit plant information and it's design is based on longterm experiences.

It is specifically designed for the process monitoring of regenerative energy plants. The system incorporates the following features:

- Retrieval of data, detailed storage and permanent monitoring of data from inverters
- Recording of up to 50 inverters (depending on the respective model) in 10-minute intervals
- Monitoring of large-scale plants of up to 500 inverters from various brands (installing a master control system)
- Tracking of yield / performance / errors (monitoring)
- Individual administration of inverters arranged in groups
- Alarm triggering functions at certain events via e-mail and fault signalling (configurable)
- Internal reporting and charting for display and automatic distribution via e-mail, HTTP (internet)
- Display of the on-going plant status (momentary values of the plant under surveillance)
- Download of measurement data out of the internal data memory for further processing
- Dynamic language selection for the users

A significant advantage of this data logger system is that the intelligence is within the device and therefore within the plant itself. This creates the basis for an independent monitoring onsite.

The following illustration shows and overview about the systems components:

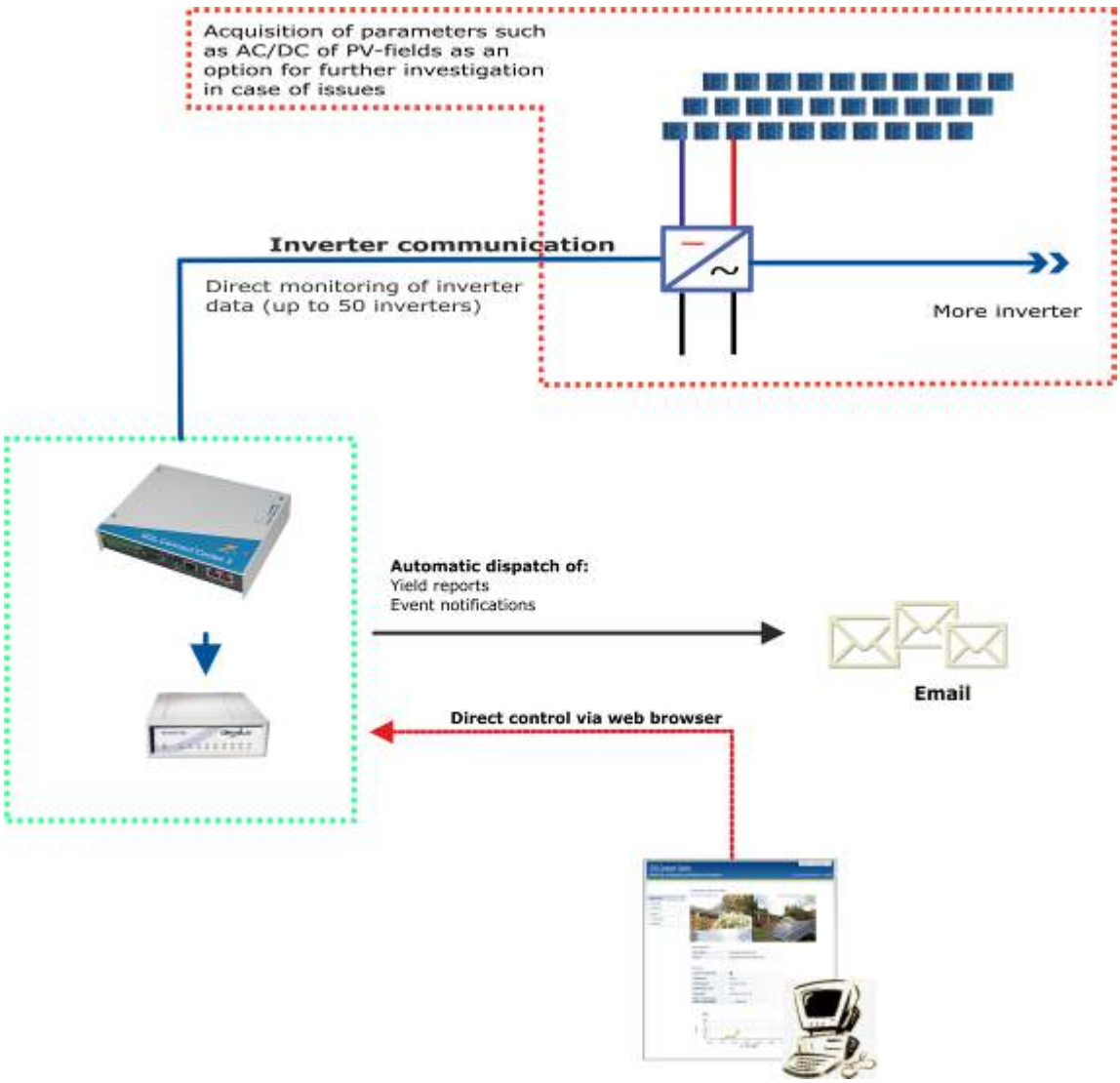

Illustration 3-1 System Overview Standard Version

3.1 System Prerequisites

For the use with SOL.Connect Center the following web browsers are recommended:

Internet Explorer®	From version 8
Firefox®	From version 3

3.2 Intended Use

The SOL.Connect Center is to be used exclusively for data analysis of inverter data. Information about supported types of inverters is available from the manufacturer.

Drilling holes into the case or any other mechanical modifications lead to damages and will render the warranty invalid!

3.3 Scope of Delivery

The scope of delivery contains:

- SOL.Connect Center
- Terminator plug for inverter bus RS485
- 1 GB Compact Flash® memory card (already installed within the device)
- Plug-in power supply: cable length: 1m

  Input: 100 - 240VAC

  Output: 12V, 2A, 75 x 43 x 34 mm
  (Preinstalled on terminal strip)
- „Cross link cable“ Ethernet PC-connection cable (2m)

- Inverter breakout cable (approx. 5m)
- Installation kit: adapter, cap rail clamp, screw set (3 screws and plastic screw anchors) for mounting of the device
- User manual, connection diagram inverter to SOL.Connect Center

3.4 Accessories

3.4.1 SOL.Connect MultiScan

AD-converter module to connect transducer, sensors, counter, and transmitter.

The SOL.Connect MultiScan (sensor module) captures data from the following sensors:

- Irradiation sensor: 0-150mV, mono-, poly-crystalline or amorphous, with or without measuring of temperature
- Module temperature sensor and ambient temperature sensor: PT1000
- Impulse transmitter: digital input, passive 12 -V … 24 V
- Transducer for performance recording: 0-20 mA output proportional to the performance

Information

The sensor module must only be installed in connection with the respective sensors from sensor kits. The use of other sensors might put the functionality of the system at risk.

3.4.1.1 Sensor Kits

A sensor kit contains an irradiation sensor, module temperature sensor and ambient temperature sensor.

Variant Sensor Kit „Light“

- SI-SENSOR®*: Mono-crystalline silicon; linearity of the electronic circuit: ± 0,3 % v. M. for 50 to 1300 W/m²; deviation at 25°C: ±1,5°C; non-linearity: ±0,5°C; deviation at minimal and maximal temperature: ±2,0 C
- SOL.Connect Sensor T: PT 1000, measurement range from -35°C to +105°C; sensor element: tolerance class B; exactness: ± 0,5 %*
- Ambient temperature sensor: PT 1000; platinum resistor; exactness: ± 0,5 %*1

Variant Sensor Kit „Pro“

- ISET Sensor*: Mono-, poly-crystalline, amorphous, calibrated by Fraunhofer IWES; with integrated temperature measuring; measurement range: 0 to 1300 W/m²; exactness: ± 4 %* crystalline; ±5 % amorphous*
- SOL.Connect Sensor T: PT 1000, measurement range from -35°C to +105°C; sensor element: tolerance class B; exactness: ± 0,5 %*1

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* Excerpt from manufacturer's information

*1 with a max. cable length of 3m

- Ambient temperature sensor: PT 1000; platinum resistor; exactness: ± 0,5 %*

3.4.2 SOL.Connect Power Manager

For power limitation in accordance with EEG amendment 2012: Operators of photovoltaic installations with a nominal capacity of more than 100 kWp must install a remotely controllable power limitation until mid of 2012 – this refers also to existing plants!

For PV Anlagen between 30kWp and 100kWp, which have been set into operation after 01.01.2009, retrofitting is mandatory until the end of 2013.

3.4.3 SOL.Connect Portal

Internet Portal with public and private access areas

- Presenting the plants
- Graphic analysis
- Publication and comparison of plant characteristics
- Backup of log and configuration data
- Service interface for technical firm, supplier, manufacturer

Information on accessories is available at Papendorf Software Engineering GmbH, www.papendorf-se.de or by phone.

3.4.4 Casing

- Protection class IP65 with respective additional casing for outdoor use

3.4.5 Modem

- Analogue: DEVELO Microlink 56k i
- ISDN: DEVELO Microlink ISDN i
- GSM: Siemens MC35i Terminal

3.4.6 Network Cable

- Commercially available RJ45 TP10/100 network cable

4 Technical Description

4.1 Connections (Front Side)

On the front side the data logger has the following connections available:

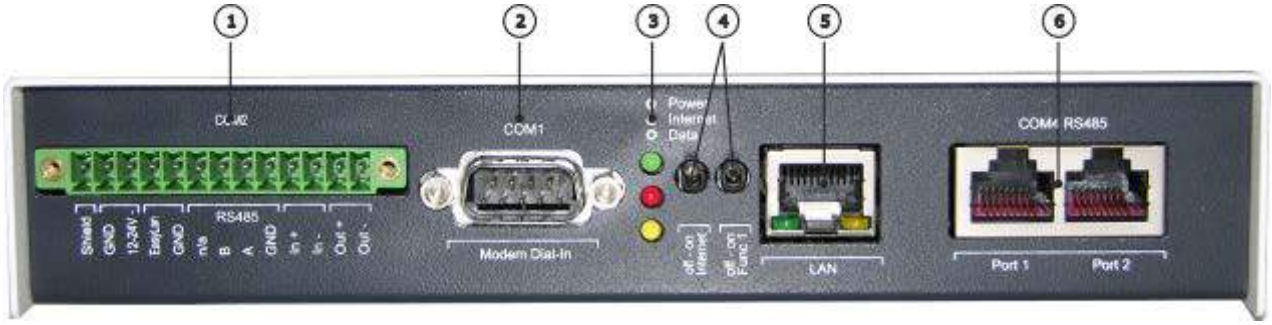


Illustration 4-1 SOL.Connect Center Front Side

1 Terminal strip for power supply, field bus EasyLan, data interface RS232 or RS485, 1x relay output for fault alarm contact and 1x isolated input

2 Serial interface to connect a modem

3 3 LEDs for operating mode display (red, yellow, green)

4 Dial-out switch for control of internet dial-up as well as a function switch (Func 1)

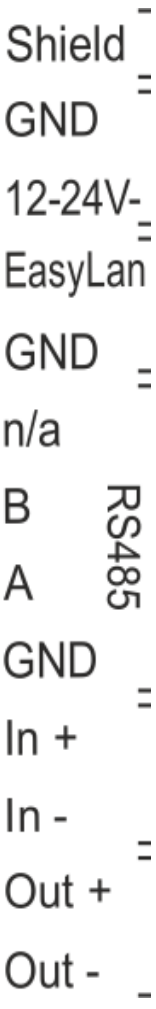
5 Ethernet interface for LAN

6 Data interface RS485 RJ45 twin socket for inverter connection

Information

The function select switch may be connected to the relays output, see chapter 7.7.1.6.

4.1.1 Wiring of Terminal Strip



PIN	Function	Description
Shield	Shielding	Shielding of cable
GND	Power supply	
12-24V		
EasyLan	EasyLan-Bus	Field bus, to connect sensor modules
GND		
-	(COM2) RS485 inter-face	Optional interface
B		
A		
GND		
IN+	Isolated input	To connect a fault sensor (e.g. fuse)
IN-		
Out+	Relay output	Output of a message (contact voltage max. 48 VDC, e.g. to reactivate a fuse)
Out1-		

4.2 Connections (Back Side)

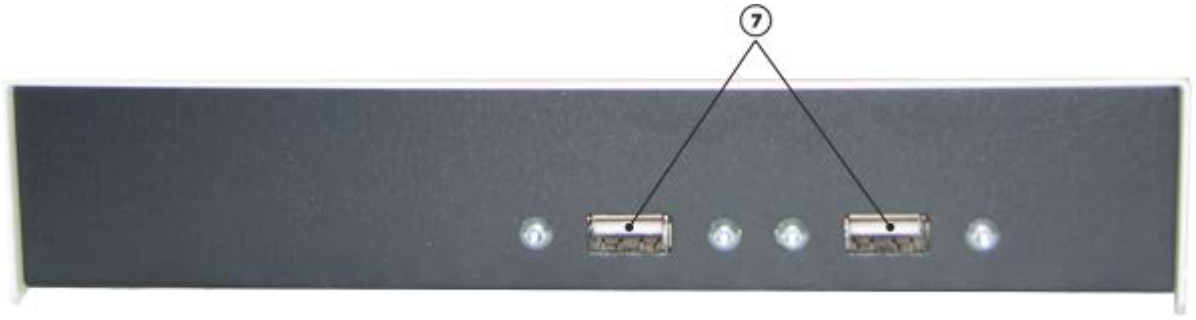


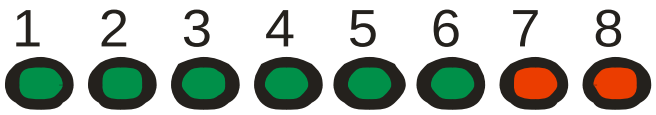
Illustration 4-2 SOL.Connect Center Back Side

7 USB interface

4.3 Signals and Operating Display at the Device

4.3.1 LED Bar on the top side

When turning on the data logger all status LEDs light up briefly in order to perform a functional check of the LED-bar.



LED		Description
6	Indicator lamp flashes.	System is working.
1 to 6	On-going performance total (min. 1 to max. 6)	The calculation of the total performance shown by the LED-Bar is based on the max. feed-in value of the inverters (=100% divided by the number of LEDs).

LED		Description
		Information During the start-up phase the established performance is very low, therefore during this phase raised values may occur. To prevent this maximum feed-in performance may be determined for each single inverter.
7	Inverter malfunction	This LED flashes as soon as at least one of the programmed and active inverters is no longer available via the RS485 bus.
8	General system malfunction	General malfunctions of the system

Note

The “Dial-out” switch prevents / allows that the data logger may independently connect via the modem, (dial-out LED flashes). By connecting additional costs may occur.

4.3.2 LED on the plus assembly

Yellow turned on: Serial/Modem communication is active

Red turned on: Modem is able to independently build-up connections (internet dial-up)

Green turned on: power status, power supply is active

4.3.3 Acoustic Signals

The data logger only confirms the switch-on procedure with an acoustic signal. A further signal can be heard when starting the software. Further acoustic signals are only performed in cases of errors, similar to a PC.

4.4 The Compact Flash® Memory Card

In order to store data a Compact Flash® memory card is installed into the data logger. The data logger is only functional with an installed Compact Flash® memory card.

Note

The Compact Flash® memory card installed must only be exchanged by the manufacturer. Otherwise all warranty claims shall expire prematurely.

4.5 Software Updates

The software of the SOL.Connect Center is subject to constant enhancements; especially due to the constant advancements of the connected system components, most recent findings in the area of data evaluation, new demands from users and changes of PC operating systems.

Enhancements and correction of the software can be uploaded either automatically or via an alternate update server.

4.6 Warranty / Liability

All SOL.Connect components have a 2 year warranty. However excluded are data media, data, damages caused by overvoltage or other improper handling, damaging or external influences.

Drilling holes into the case or any other mechanical modifications lead to damages and will render the warranty invalid!

4.7 Large-scale Display / Display

The data logger supports the display of measurement data (performance, daily yield and total yield) at a large-scale display (RS485) operating with a HVG-based communication protocol. Because the HVG-protocol is limited to the display of a plant performance of < 100 kW, also an especially adapted HVG-based protocol may be selected.

5 Operation

5.1 Network

There are 2 possibilities to connect the data logger with a computer:

- A connection via the **LAN-interface** (chapter 5.1.1)

Or

- Via remote access using a **modem** (Analogue/ISDN/GSM) (chapter 3.4.3)

5.1.1 LAN Interface

The data logger tries to automatically obtain an IP address from a DHCP server. If this is not successful within the first 2 minutes, an automatic TCP/IP addressing is being performed without DHCP server (Auto-IP).

The access to the data logger is possible via:

- **NetBIOS name:** enter the serial number of the data logger into browser's address field.

or

- **Bonjour:** the software „Bonjour" is freely available over the internet (it's already integrated on Apple PCs with Mac OS). Please note to select the correct version for your PC operating system!

Information

Should the installation as described above fail an IP address must be assigned to the data logger. This can be done via the network settings of your computer.

Information

It may take a few minutes until the SOL.Connect Center appears in the Windows Explorer (via UPNP).

5.1.1.1 Network Router

When using a network router some ports must be opened and released for certain services:

Service	Description	Port	Direction of release
NTP	Timely synchronisation with external servers	123	Outbound
FTP	Data transfer e.g. into the SC Web Portal	20,21	Outbound
HTTP	Websites	80	Inbound
SMTP	e-mail transmission via an external Server	25, 587, 465 (provider specific)	Outbound
SNMP	Monitoring interfaces for	161, 162	Both directions

Service	Description	Port	Direction of release
OPC	external software	8080	Inbound
SSH	Maintenance communication	22	Inbound
Control Station Mode	Linkage with SOL.Connect Control Center – master control station network	9009	Both directions
Modbus IP	Communication protocol for communication with e.g. special measuring appliances	502	Both directions
MySQL	Direct data transfer into external data bases	3306	Outbound

5.1.2 Connection via Modem

In this case the operation of the data loggers is being performed by using eh modem interface.

While using the modem (serial interface, see 4.1) a connection between the PC and the data logger is being set up by phone:

- Start → control panel → network connections → create new connection

- create connection with internet

Illustration 5-1 Connect with the Internet

Illustration 5-2 Setting up Connection Manually

- Set up connection manually
- Set up connection with modem
- Select modem

Selecting a modem is not available when only one modem has been installed.

- Enter „Name”
- Enter „Phone number”
- Next → Username and password are not necessary!
- Finish connection
- The connection can now be selected

Illustration 5-3 Dial-up Connection

When using an ISDN-Modem together with a „normal modem” the driver for “modem emulation” must be installed on the side of the data logger.

Using an AVM Fritz® card (also for USB versions) this option must be installed afterwards from the AVM software CD (see „AVM ISDN analogue modem V32 BIS”).

Enter **http://192.168.2.1** into the address field of a browser. The start screen of the data logger is being loaded.

Information

Because the system collects a big volume of data we recommend using a broadband connection together with a flat rate.

5.1.3 Connecting further SOL.Connect Devices

Details on how to connect and operate the optionally available SOL.Connect devices are indicated in the quick guides included in the respective scope of supply!

5.1.4 Connecting a large-scale display

5.1.4.1 Connecting a serial display (direct connection)

A serial display is connected directly to the data logger, following these steps:

- Connect the large-scale display with pin A and A at the data logger's terminator strip (A = data+; B = data-).

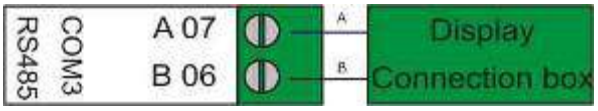


Illustration 5-4 Connecting Display

- Configure the display (see chapter 7.7.2.4)

The display receives data which are being displayed.

5.1.4.2 Connecting a remote display)

Via a serial Ethernet converter (RS485) a large-scale display which is available via the internet can also receive data (UDP-communication). Some network settings of the serial Ethernet converter within the data logger are necessary (see chapter 7.7.2.4).

Data logger → network (internet) → serial ethernet converter → display

Information

Further information is provided in the display's manual.

5.1.5 Connect a Signalling Contact

You can connect an alarm contact, e.g. a signal light to the data logger.

Illustration 5-5 Connect Alarm Contact

Connect one contact with the relay output of the data logger (see connections, chapter 4.1).

5.1.6 Connection of Power Supply

The power supply plug is by default already connected to the terminal strip.

Illustration 5-6 Connection Power Supply

Please plug the terminal strip into the respective plug (see also chapter 4.1) and then the power supply plug into the wall socket.

Attention!

Touching the electrical parts might result in death or serious injury.

The electrical connection must only be performed after installation of the hardware and all other cables has been finished!

5.1.7 Turning on the Device

After connecting up the power supply the SOL.Connect Center is taken into operation with approximately **60 seconds**.

When turning on the data logger all status LEDs light up briefly in order to perform a functional check of the LED-bar. Then the device is ready for use.

5.2 PV-plant

The initial operation of the monitoring components must be done onsite using a notebook to establish a direct connection with the SOL.Connect Center.

Step 1: Programming an inverter

Activate the automatic network search at *configuration → solar plant → inverter → search*.

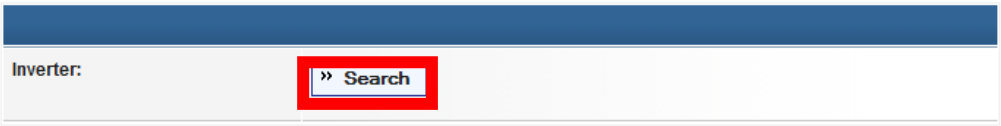


Illustration 5-7 First Steps – Searching Inverters

All detected inverters are displayed in an overview screen.

Note

Terminate the inverter bus additionally with the terminator included. A missing termination leads to inverters not being recognized by the system.

Various types of inverters are being terminated in different ways. Therefore please check your inverter's manual.

For information about the lights signalling the network search see chapter 12.2.

Step 2: Programming and configuring sensors (only when a sensor module is connected)

Activate the automatic network search at *Configuration* → *Solar Plant* → *Sensors* → *Search*.

Illustration 5-8 First Steps – Searching Sensors

All detected SOL.Connect MultiScan (sensor modules) and sensors are displayed in an overview screen.

Please configure the sensor module according to your needs.

For information about the lights signalling the network search see chapter 12.2.

Step 3: Check measurement values for completeness

See *Plant status* → *Inverter and* → *Sensors* to check the measurement values.

6 Assembly

The data logger is designed for indoor use and use within switching cabinets. It can be mounted in both a horizontal and vertical position (the connections facing downwards) onto a cap rail system or with the included adapter (see illustration 6-1) directly to a wall.

Note

Like all electric devices also the data logger must be protected from humidity and especially from condensate formation.

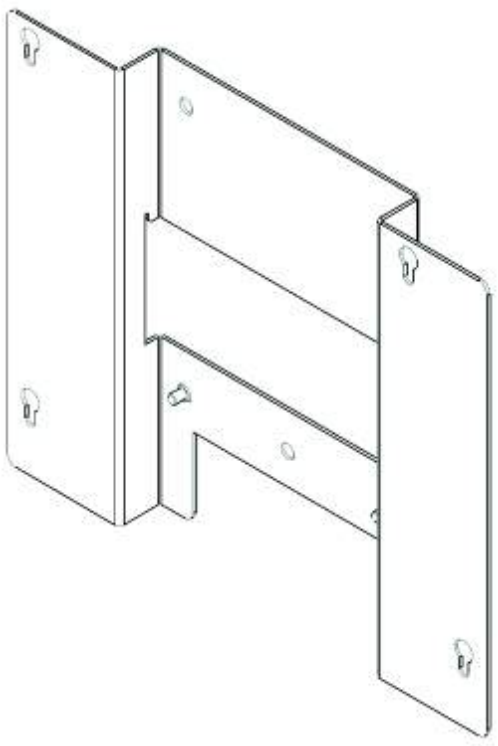


Illustration 6-1 Mounting Adapter

The data logger is attached to the adapter by locking in place the backside screws of the data logger into the respective holes of the adapter. On choos-

ing a position for the data logger make sure that the connections of the cables are easily accessible at any time and that the cables are accessible from the bottom of the device. Provide suitable pull relieves!

Note

In order to prevent the device from falling down, the adapter should be mounted firmly to a wall using screw anchors.

Mounting the device in outdoor areas is only possible within adequate switch cabinets (protection class IP65).

Note

Cables must only be connected and disconnected from the device with the power switched off.

7 Working with the SOL.Connect Center

7.1 User Rights, Access Rights

The data logger has two levels of access. These differ in the rights owned by the user.

Areas	Guest	Administrator
Welcome screen	✓	✓
Plant status	✓	✓
Reports	✓	✓
Configuration		✓
Download		✓

7.1 Registration

Enter the data logger's IP-address into the address field of an internet browser. After a moment the main screen appears.

In order to configure the data logger an administrator's password is necessary.

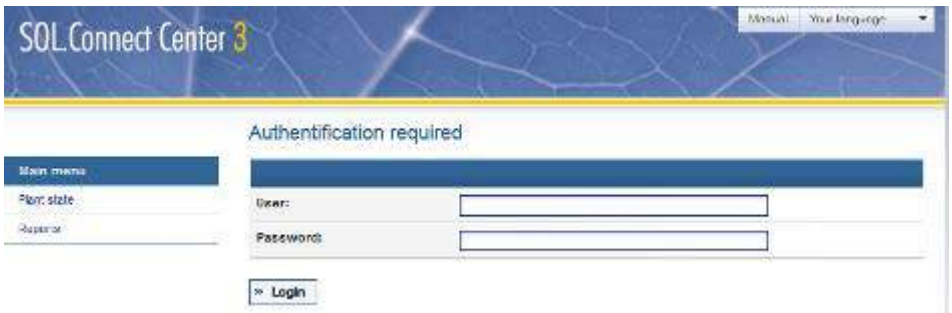


Illustration 7-1 User Authentication

By factory default the administrator's password has been set to „admin/ **admin“**.

Note

In order to prevent an unintended access from third parties change the password immediately after the first log-in (see chapter 7.6.4.2).

7.2 Overview / Tables and Diagram Functions

7.2.1 Working with the Submenu

Settings and changes are being performed in the submenus of the selected functions.

To change settings click on *Edit*. While clicking on *Cancel* takes you back to the menu without saving your changes. *Save* stores the changed settings.

System and configuration changes are being recorded as an event in the monitoring area (see 7.5).

Note

For several functions the Java Script support must be activated. For details please check your browser's manual.

On some tabs you see icons (symbols) which allow activating or deactivating settings directly in the overview screen. Setting / clearing the tick within the settings is automatically taken over by the system. All functions for setting

the event groups will remain active even if the monitoring function has been deactivated.

Monitoring can also be activated and deactivated directly in the overview screen:

Symbol	Meaning
	Activate monitoring
	Deactivate monitoring
	Change settings

7.2.2 Table of Events

Recorded events are listed automatically by the system and are visible via *Monitoring → Group of events* (e.g. system events).

Click on the desired event group. The protocol records the events as follows:

Illustration 7-2 Monitoring Protocol

All events are displayed in chronological, descending order starting with the most recent one.

7.2.3 Diagram analysis

The measurement data of your PV plant are graphically displayed at *Analysis* → *Group of analysis*.

Select the respective group. Depending on the type of diagram you can browse through days, months and inverter groups.

Information

The maximum of the performance axis corresponds to the plant's maximum output (see chapter 7.7.3.1).

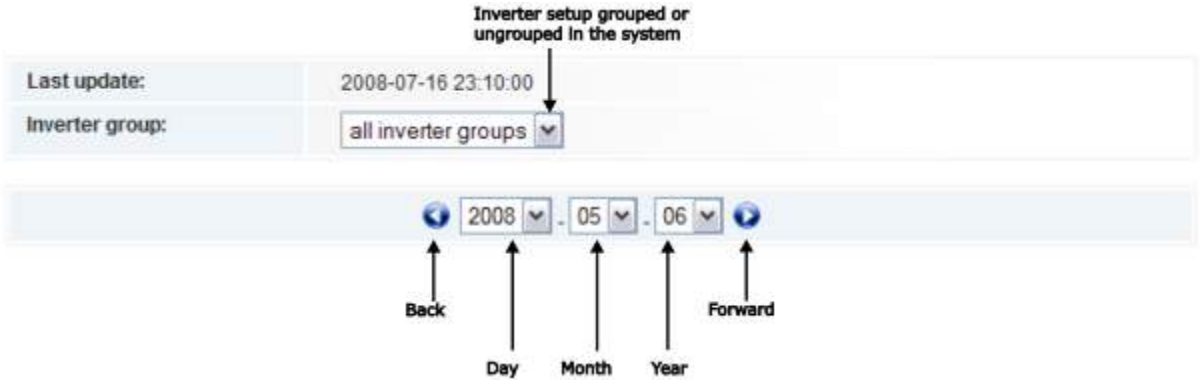


Illustration 7-3 Navigation Analysis

By default the inverter groups are displayed at first. Selecting a group shows the respective inverters.

Events are recorded in the protocol as follows:

Illustration 7-4 Event Protocol in Analysis

Beneath the diagram all events are displayed in chronological order.

7.3 The Welcome Screen

The welcome screen displays an overview of the current status of your photo-voltaic plant. Furthermore it shows the main menu.

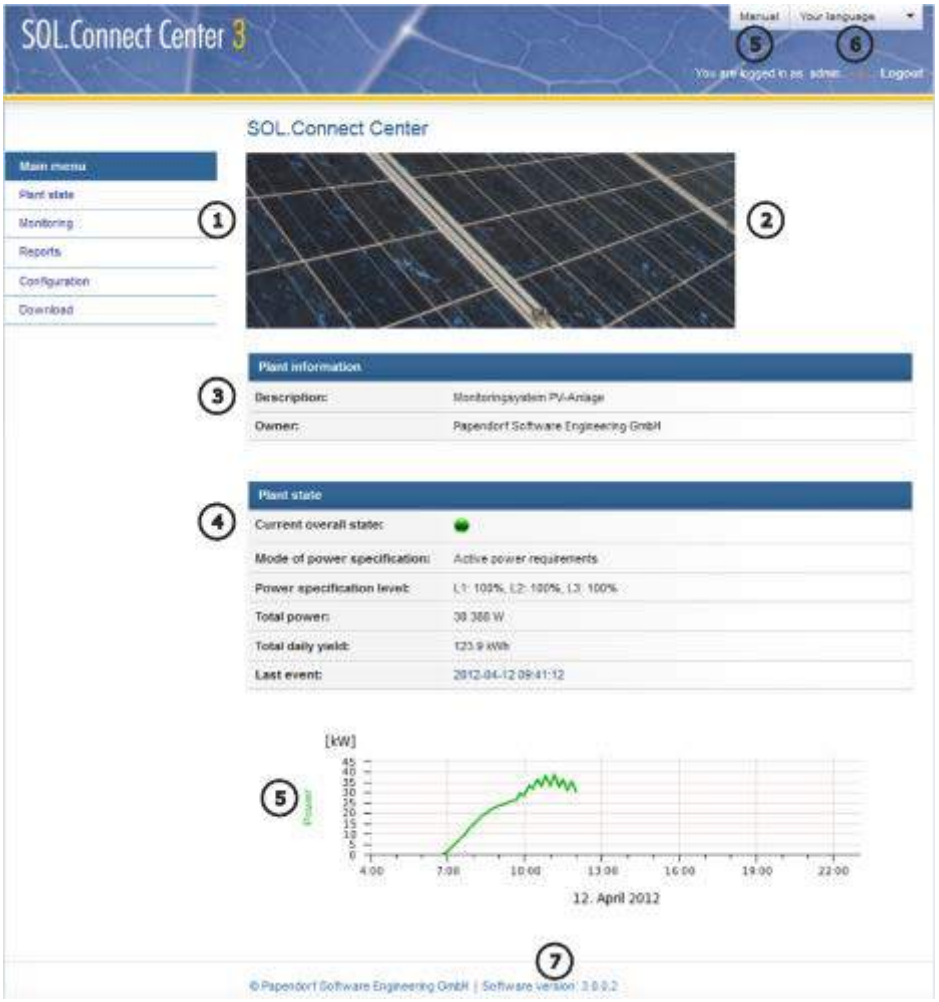


Illustration 7-5 Welcome Screen

1 Menu navigation

2 Picture of the plant

3 Plant information

4 Plant status (Status lights, overall performance, total daily yield, latest event)

5 Manual

6 Language selection

7 Software version

A potential alarm is being displayed on the main screen and can be confirmed by accepting it. Please check chapter 7.5.1 for further details.

If any inputs like e.g. switches are monitored the status displayed is „switched on“.

Note

Performance Ratio is only possible in connection with the SOL.Connect MultiScan and an irradiance sensor.

7.4 Plant Status

The data logger collects energetic information, errors and status messages sent from the inverter. The plant status is a dynamic dialogue, which displays the measurement values in an overview in tabular form.

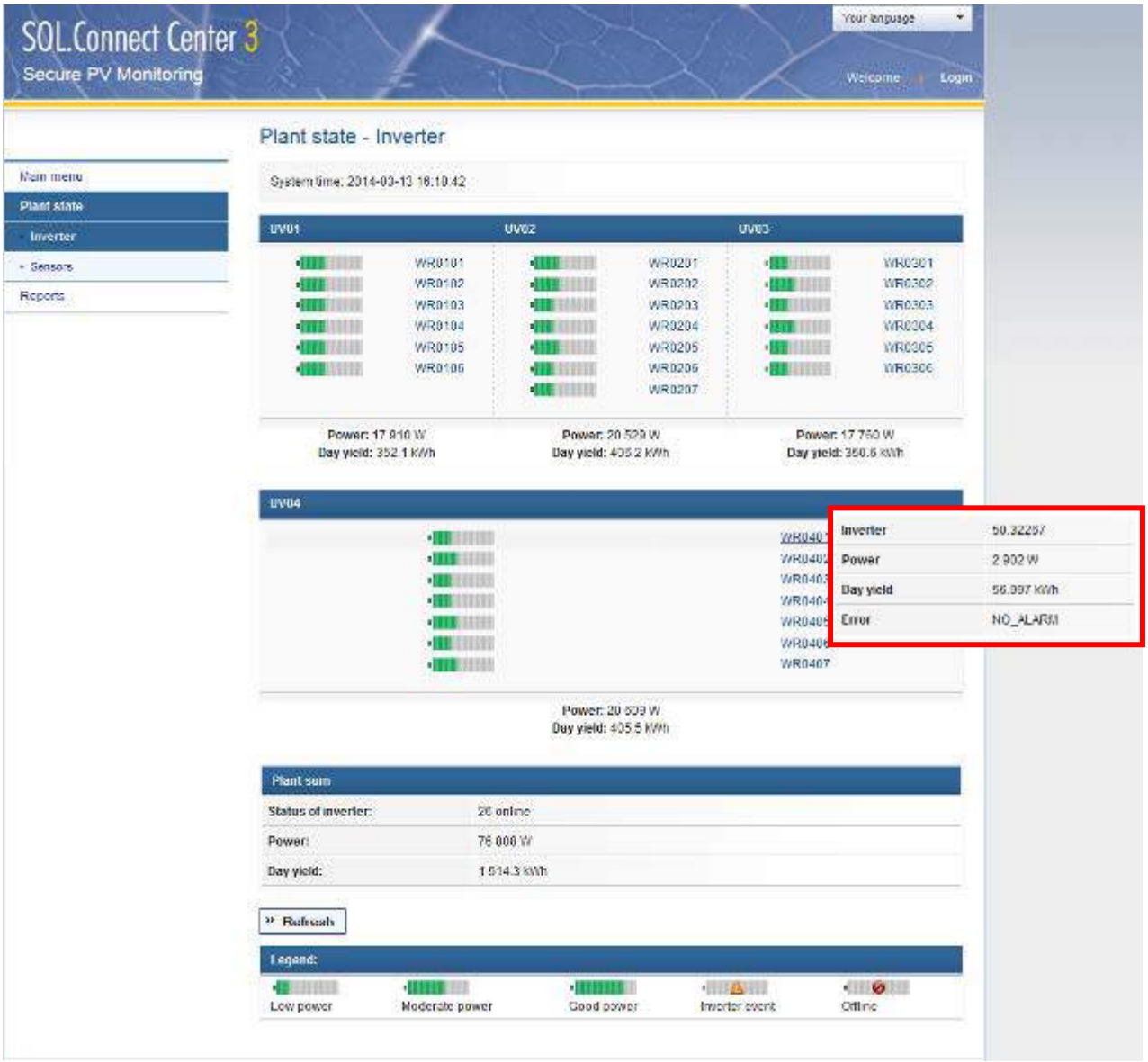


Illustration 7-6 Plant Status - Inverter

This table contains basic information about the **active** inverters (settings), like denominations, output power, daily yield and moment of last data retrieval.

Note

This information depend on the type of inverter connected.

In addition the most important inverter data are displayed as a „Tooltip“ (see Illustration 7-6). Hover the pointer over any status bar or inverter name. A pop up window opens (see Illustration 7-6).

Measurement values may be *updated* manually or automatically in 5 seconds intervals.

Note

For additional information about the inverter data please consult the inverter’s manual.

Status details about the sensors connected to the sensor module are displayed after clicking *Sensors* in the navigation bar:

Illustration 7-27 Plant Status – Sensor Details

7.5 Monitoring

Monitoring contains an overview of all events available within the system. These events are classified in several groups. The events are listed in detail, can be examined and individually configured for distribution by e-mail.

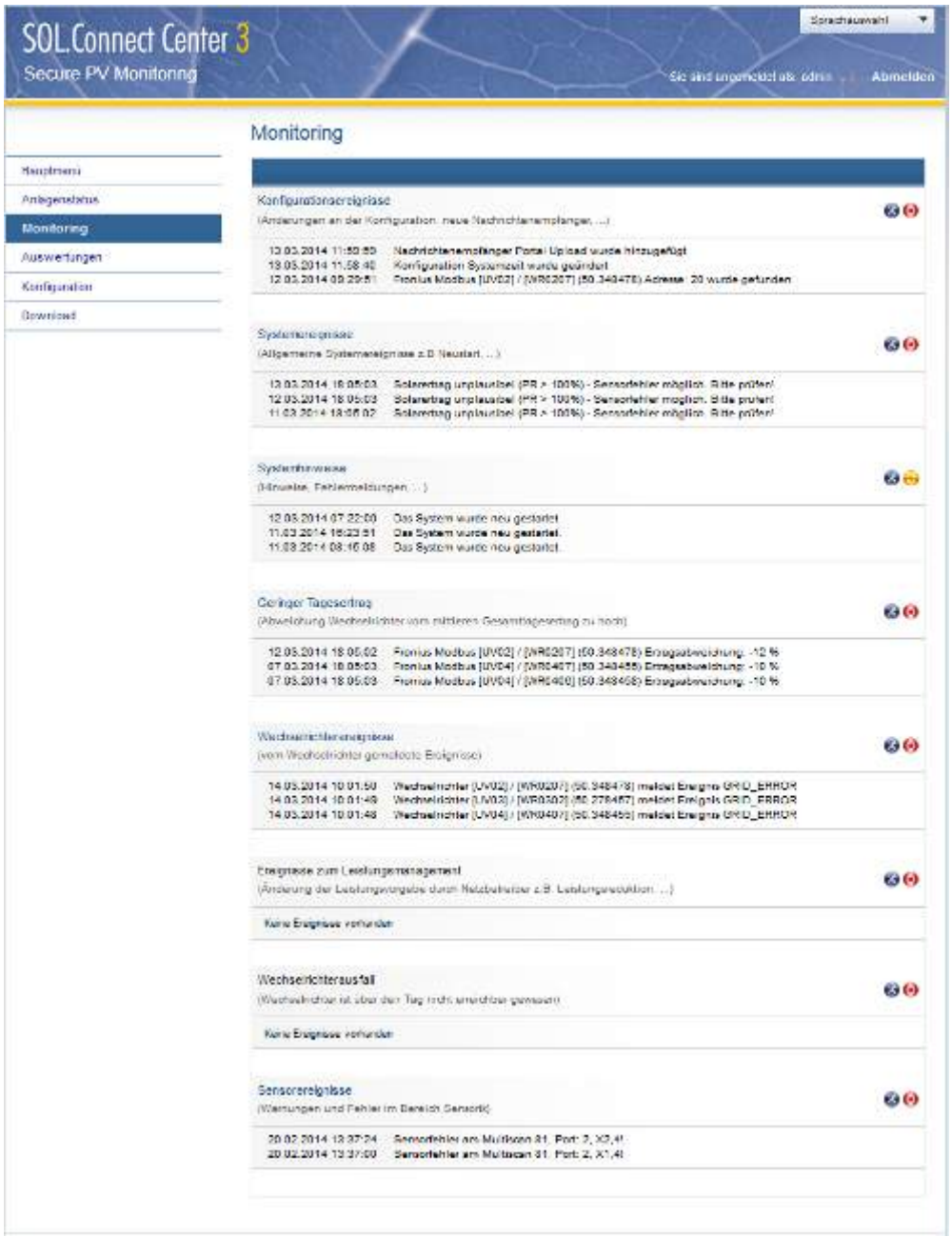


Illustration 7-7 Overview Monitoring

Configuration events:	Information about configuration changes, creation and modification of message recipients.
System details:	Important of special notes or error messages (e.g. problems sending emails)
System information:	Important or special information and error messages (e.g. problem with the e-mail distribution)
Inverter events:	Events signalled from the inverter, like e.g. excess voltage, excess temperature and supply interruption
No daily yield:	Inverter's deviation from the medium daily yield is to high
Inverter breakdown:	Inverter has not been available during the day.
Events regarding performance management:	Changes in the allowed power by the grid operator, e.g. performance reduction

The check for the plant monitoring (inverter breakdown, yield comparison and deviation) is performed **daily at 6 p.m**.

To open an event group click on the top line and all events recorded up to then are automatically being displayed by the system.

7.5.1 Triggering an alarm by an alarm contact

Once an alarm has been initiated a message is displayed on the welcome screen. You can confirm this alarm manually or have it automatically confirmed by the system in a time predefined in the settings (see chapter 7.7.2.3)

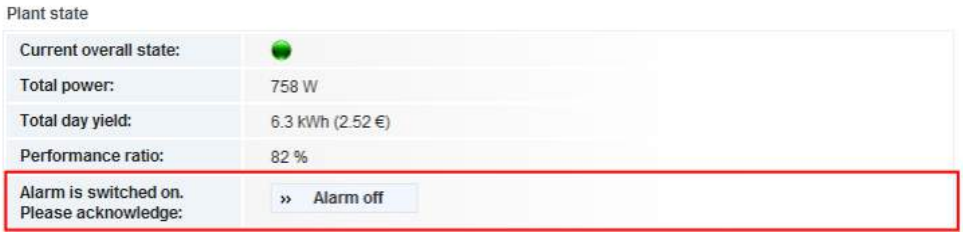


Illustration 7-8 Active Alarm

Information

The relay's response time is up to 5 minutes. Therefore slight delays might happen until the alarm contact is triggered.

The confirmation of an alarm is recorded in the list of configuration events.

7.6 Analysis

The **Energetic Reports** allow for various graphic data analysis periods which display performance and yield in relation to possible **malfunctions**.

Illustration 7-9 Overview Analysis

Daily plant yield: Performance of all inverters during one day (line diagram)

Daily yield of inverters: Overview about the inverter's daily during one day (bar diagram)

Monthly plant yield: Yield of all inverters during one month (bar diagram)

Yearly plant yield: Plant and inverter yield during one year (bar diagram)

Nominal monthly yield:	Yield of all inverters during one month in relation to 1 kWp (bar diagram)
Performance ratio of the entire plant:	The plant's target-performance comparison in comparison with reference sensors (bar diagram)

Information

Performance Ratio is only available in connection with a SOL.Connect MultiScan and one irradiance sensor.

7.7 Configuration (on administrator level)

This is your entry point to perform in further submenus changes of the system and the PV plant's components.

Select *Configuration* and an overview screen opens with the momentarily system configuration and information about the data logger as well as the available and the engaged capacity of the internal memory (Compact Flash® card) and the main memory.

Illustration 7-10 Overview System Information

Information about hardware and memory are being updated automatically by the data logger and cannot be modified.

7.7.1 Core System

7.7.1.1 Network

The topic *Network* allows all necessary settings for of the data logger's network.

Host name, domain name, IP address, broadcast address, subnet mask, standard gateway and DNS server are already set as factory default.

You can choose between *own settings* (default) or *DCHP*. For DHCP please contact your LAN administrator as this means to change as well the IP address.

Note

Network configuration can only be changed by a network administrator, as this may lead to severe connection problems with the data logger.

Information

DHCP: "Dynamic Host Configuration Protocol" – dynamic creation of an IP address.

The data logger transmits the host name to the DHCP server in order to be easily detected within the network.

Illustration 7-11 Configuration Network

The following settings are available:

Setting	Description
Operation mode	Operation mode of the data logger. Settings can only be performed by service personnel.
Hostname	e.g. Samplehost
Domain name	Name of the domain. Information available from your network administrator.
IP Address	Only active when no DHCP server is set. Default address: 192.168.1.190

Setting	Description
Broadcast address	IP address to reach all computers within a network.
Subnet mask	Default entry 255.255.255.0
Standard Gateway	IP address of the internet gateway. Information is available from your network administrator.
DNS Server	Information is available from your network administrator.

Network default settings for internet access via modem dial-up (see chapter 7.6.1.2):

- IP address: 192.168.1.190
- Subnet mask: 255.255.255.0
- Standard Gateway: <blank>
- DNS server: 193.101.111.10

7.7.1.2 Modem

In case you wish to use a modem for dial-up the necessary information about the modem must be set (modem type, PIN, dial-up number, login name and password).

Illustration 7-12 Configuration Modem

The following settings are available:

Setting	Description
Modem type	Type of the used modem
Baud rate	Max. velocity of the connected modem
Additional modem	Configuration command for the set-up of special op-

Setting	Description
configuration	eration modes
PIN (for GSM)	GSM PIN Code. Available from your provider *This is an essential information with the use of a GSM modem as otherwise no connection can be established!*

Setting	Description
Multiple subscriber number	The multiple subscriber number (MSN) is an ISDN phone number for a multi terminal access
Specified number of rings	Number of rings until the modem is automatically accepting the call

Setting	Description
Access number	The provider's number for the internet dial-up, e.g. 0192658 Don't forget the line access code of the extension!
Dial in command	Configuration command, e.g. for internet dial-up via GPRS
Login name	User name for the internet dial-up, e.g. MSN
Password	Password for the internet dial-up

With some GSM modems the flow control is by default deactivated after switching it on. Therefore the registration of an additional command is essentially necessary to activate the hardware flow control!

These are the following commands:

- Siemens® MC/TC35: AT\Q3
- INSYS® ISDN 4.0: AT&R1&S1

Default modem settings for internet dial-up via MSN:

- Dial-up number: 0193670
- Login name: msn@easysurfer-eco.de
- Password: msn
- Additional modem command: ATX3

Note

When using a GSM modem near an international border the international roaming must be blocked in order to avoid international connection fees. Please contact your provider.

Prerequisite for the internet dial-up is the dial-out switch being turned on (see chapter 4). The momentary setting of this switch is visible in the overview of the modem configuration.

Note

To avoid unexpected costs the dial-out switch should be deactivated if not in use.
No notifications are being sent out while the internet dial-up is deactivated!

Once the modem connection has been configured you can test it. Please select *Test modem internet dial-up*.

7.7.1.3 Customize the Welcome Screen

You can customize the welcome screen as desired. Besides a picture of the plant you can add plant information such as name, description and operator individually.

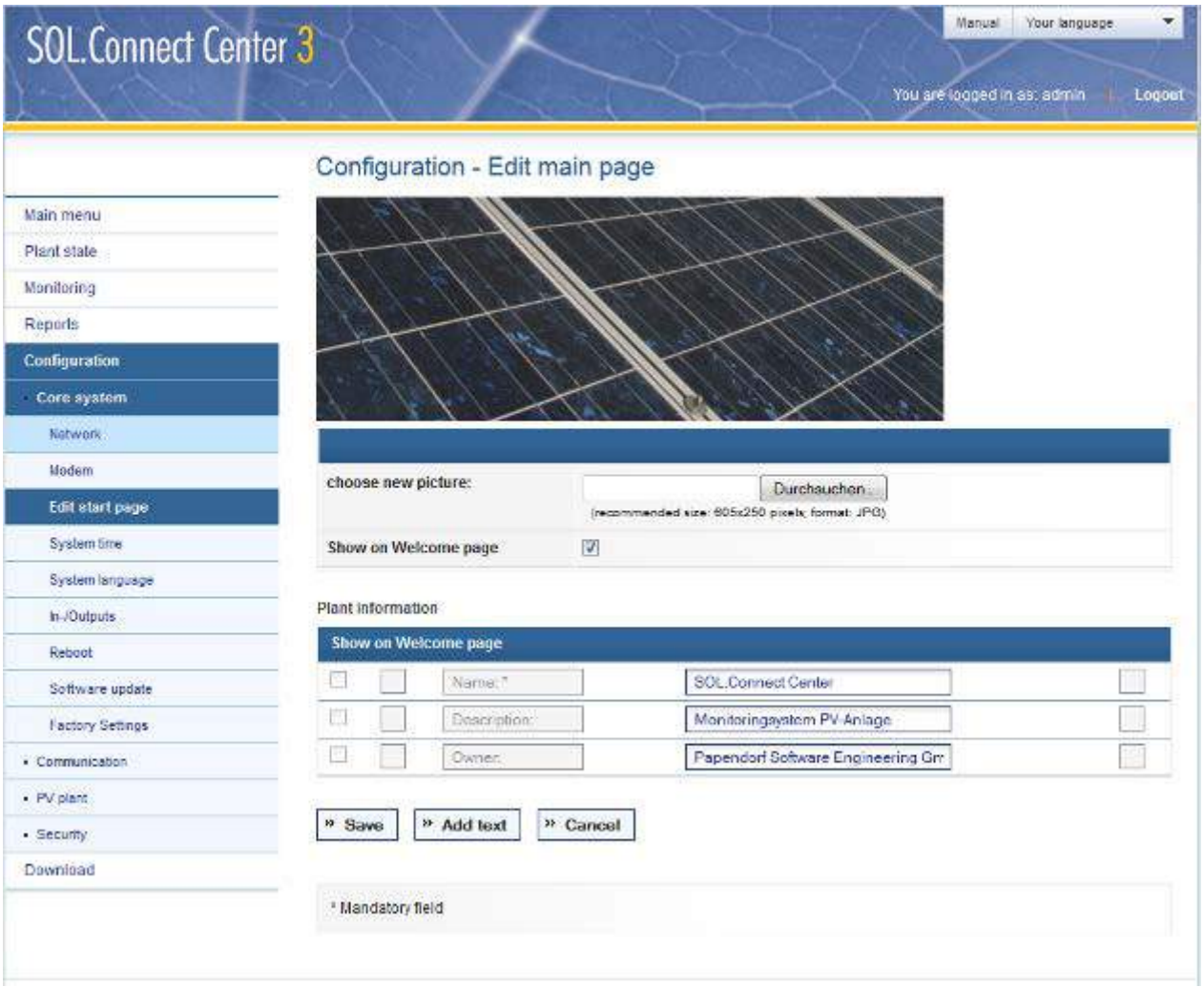


Illustration 7-13 Customize the Welcome Screen

To chance the plant's picture select *Browse* to find a picture. However in case the selected graphic does not correspond to the prerequisites the existing graphic will remain active.

To activate the picture, set the tick in *Display welcome screen.*

Recommended size: 605x250 pixel

Format: .jpg

Apart from the fixed plant information name*, description*, and operator* you can determine additional information. Click on *Insert text* → *Identification** (max. 200 characters) and enter e text (max. 30 characters) into the field.

Information

Text formatting is possible by using HTML tags.

* Mandatory field

7.7.1.4 System Time

The *system time* shows the data logger's current time. You can change this manually or have it synchronized automatically by an NTP time server.

An NTP time server is not activated by default. It is recommended to activate it after taking it into operation. Addresses are available in the internet.

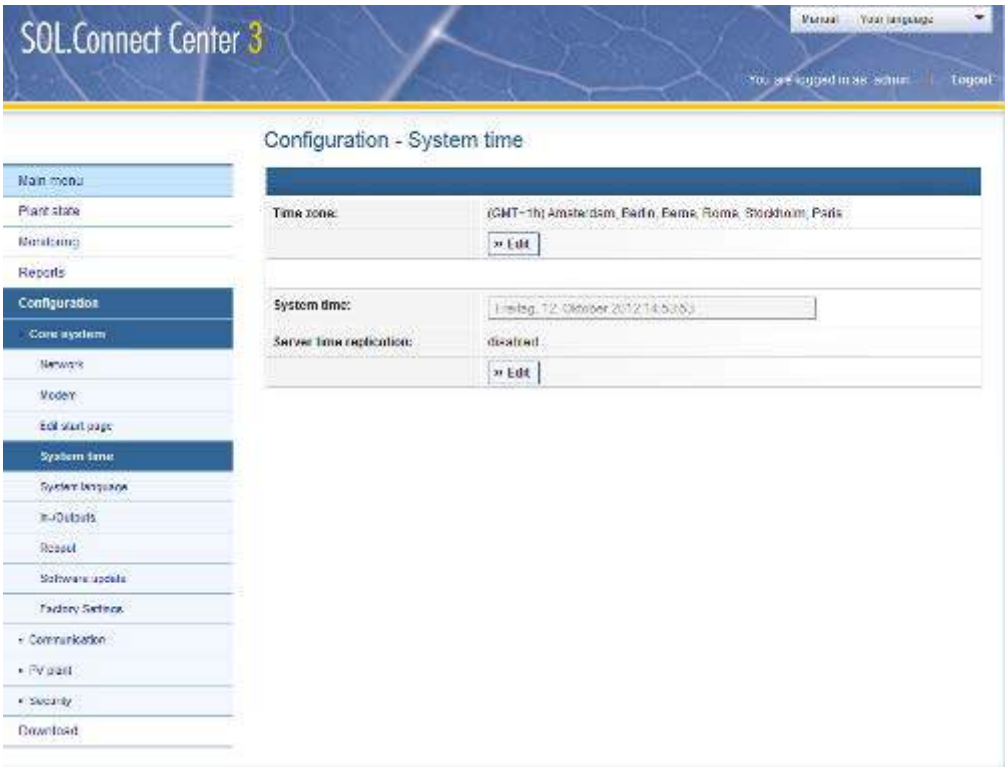


Illustration 7-1 Configuration – System Time

Time zone

To set the time zone select Time zone → *edit.*

Illustration 7-14 Configuration – Time Zone

Select *Region/Country* and automatically appears the respective time zone. Confirm your time zone. The adjustment from summer to winter time will take place automatically.

In case you don't want to perform the time adjustment between summer and winter time select „World (standard time)" and the respective time.

Note

Changing the time zone requires a restart of the system! This will take approximately 5 minutes and disconnects all network and modem connections.

Manual time settings

To set the time manually select *System time → edit*.

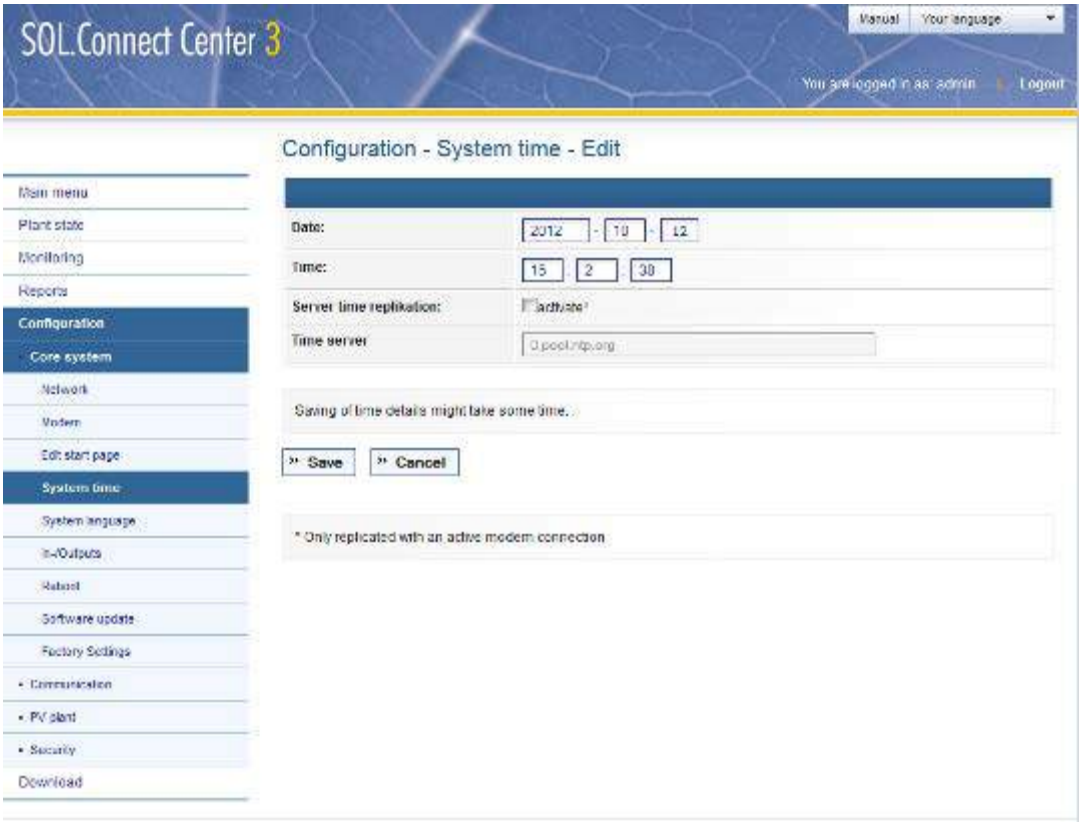


Illustration 7-15 Configuration – Manual Setting of System Time

Enter *Date* and time and save the entry.

Select *Region/Country* and automatically appear the respective time zones. Select your time zone. The adjustment from summer to winter time will take place automatically.

In case you don't want to perform the time adjustment between summer and winter time select „World (standard time)" and the respective time.

Note

Changing the time zone requires a restart of the system! This will take approximately 5 minutes and disconnects all network and modem connections.

Manual time settings

To set the time manually select *System time → edit*.

Information

NTP: "Network Time Protocol" standard to synchronize clocks within computer systems.

The system time is only synchronized on active internet connections.

Note

Be careful with system time changes: A time deviation of **more than 10 minutes** may cause problems with the data recorded before the change!

The synchronisation of time depends on the connection settings and the following conditions:

When?	Connection	Condition
Daily at midnight	Network connection	Correct setting of DNS and gateway, see chapter 7.6.1.1.

When?	Connection	Condition
After successfully established connection	Connection via modem	The connection must be generated by the data logger

7.7.1.5 System Language

The (default) system language of the data logger is German as set by factory default. However this can be changed individually for every system.

Illustration 7-16 Configuration System Language

Changing the system language will only come into effect once the current session has expired or a new session has been opened. If you wish to change the language immediately a browser restart is required.

7.7.1.6 In-Outputs

For PV plant monitoring additional inputs at the data logger may be configured and linked with the relay output.

Illustration 7-17 Configuration – In- and Outputs

Settings	Description
IN	Input
Func 1	Function switch for optional use
Out	Output

Note

An activated in- and output is prerequisite for a linkage.

Inputs

To configure the input select *IN/Func 1 --> edit.*

Illustration 7-18 Configuration Input

The following settings are possible:

Settings	Description
Name	IN / Func 1
Description	Individual denomination of the input.
Status	Activates / deactivates the input

Settings	Description
Output	Selecting the output

Note

Linking an input with an output deletes message recipients of the type alarm contact.

Output

To configure the output select *Out --> edit.*

Illustration 7-19 Configuration Output

The following settings are possible:

Settings	Description
Name	Out
Description	Individual denomination of the output.
Status	Activates / deactivates the output

7.7.1.7 Reboot

Rebooting the data logger might be necessary in very rare cases. However this should only be done at real emergencies. Rebooting terminates all system processes and restarts the system. During this period recording data by the data logger is disabled which might cause data gaps.

Illustration 7-20 Configuration - Restart

Note

The restart takes about 5 minutes and disrupts all network and modem connections.

7.7.1.8 Software Update

The data logger is capable to detect and upload automatically available updates. By default this feature is disabled.

Illustration 7-21 Configuration – Software Update

The following settings are available:

Settings	Description
Automatic software update	Activate / deactivate the software updates
Frequency	Interval of transmission

Alternatively a different update server can be used. Activate this by ticking the respective box. Another input mask opens up:

Settings	Description
Server	Server address
Login	Allocated user name
Password	Allocated password

7.7.1.9 Factory Settings

You can quickly and easily reset the data logger via the user interface.

Please note that this means a reset to the factory default settings. This also completely deletes all personal settings and the saved measurement data. Therefore reset the data logger only back to factory defaults when you are absolutely sure or when services ask you to do so. This procedure cannot be interrupted!

Illustration 7-22 Configuration – Factory Settings

7.7.2 Communication

7.7.2.1 E-Mail service

In order to use the message function an e-mail service has to be set-up. To do so the data logger needs the information from the SMTP server, login data, address of the sender and type of authentication.

Illustration 7-23 Configuration E-Mail Services

The following settings are available:

Settings	Description
SMTP server (out-going mail server)	(Simple Mail Transfer Protocol) This information be obtained from the internet provider (see below) or the LAN administrator.
Login	Corresponds to the user names of the internet provider.
Password	The password assigned by the internet provider. *By security reasons each character of the password is only displayed to you in asterisks (*).*
Sender	Corresponds to the e-mail address of the sending mailbox and serves to authenticate the SMTP server. An unknown sending address may prevent the e-mail from being sent.

Settings	Description
SMTP authentication	Authentication – SMTP – turned on; the e-mail account information allocated by the internet provider upon creating the account. The **only** supported type of authentication is **SMTP authentication**!

Additionally an individual transmission time for sending the notification e-mail can be defined:

Settings	Description
Dispatch time of daily e-mails	Time of the daily e-mail transmission. Manual input of a time is not possible.
Dispatch time of weekly e-mails	Time of the weekly e-mail transmission. Manual input of a time is not possible.

To send the e-mails a so called free e-mail provider (provides free of charge e-mail services) may be used.

Prerequisite for the transmission of e-mails is an *SMTP server* at the provider's side. A list of the most well-known free e-mail providers and online services is available on the internet.

Note

Not every e-mail provider places a free-of-charge SMTP server at disposal. This feature may be connected to commercial e-mail services, e.g. "Premium"/"Plus"/"Extra"/"Pro"!

7.7.2.2 Notification Recipients

Apart from the e-mail provider a notification recipient is also necessary to send messages. There are several types of messages:

Type of message	Description
Alarm contact	To connect sirens and lamps
E-mail	Electronic letter
FTP	Data upload onto an FTP server
SOL.Connect Web Portal	Data upload onto the SOL.Connect Portal
Condensed e-mail	In contrast to e-mails important information is only transmitted in the subject line of the message. This allows the forwarding of the message as an SMS to a mobile phone. *Example: Current day yield – plant name (20.03.2007) = 34.340 kWh*

Before the messaging options are being configured, the notification recipient must be set-up (see chapter 8.1).

Note

When using a modem, the e-mail transmission is only working with an active internet connection, dial-out switch (see chapter 4).

Alarm contact

If a device such as a signal lamp is connected to the alarm contact of the data logger, the message recipient must be configured respectively.

Illustration 7-24 Message Recipient – Alarm Contact

The following settings are available:

Settings	Description
Type	Alarm contact
Name	Individual identification name
Alarm period	Choose the duration of the alarm (from 1 minute up to 48 hours and permanent alarm)
Status	Activates / deactivates the alarm contact

The alarm contact automatically switches off after expiration of the preselected duration. You can also manually switch off the alarm confirmation.

E-mail / Short E-mail

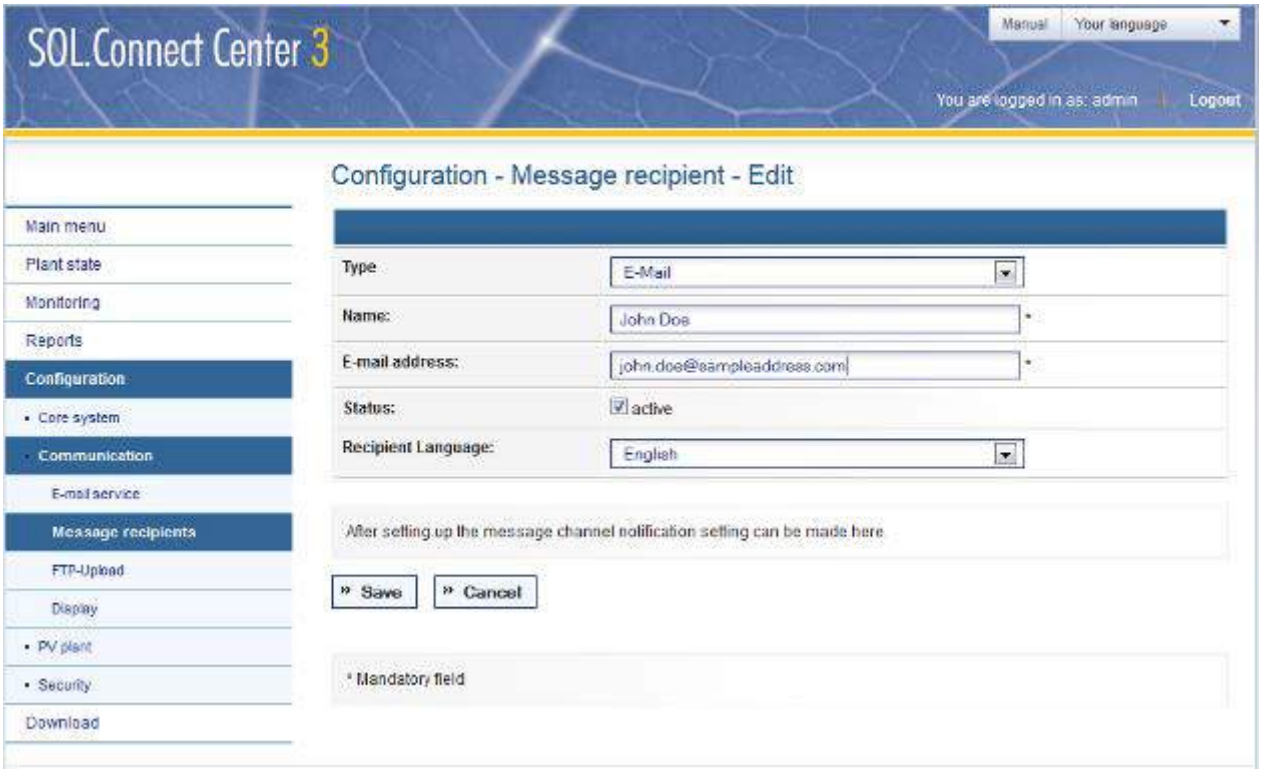


Illustration 7-25 Message Recipient - E-mail

The following settings are available:

Settings	Description
Type	E-mail
Name	Name of the recipient, e.g. John Doe
E-mail address	Internet address of the recipient, e.g. john.doe@sampleaddress.com.

Settings	Description
Status	Activates / deactivates e-mail. Recipients already set-up can be momentarily deactivated (e.g. during their vacation times).
Recipients language	Language of the e-mail.

FTP

Illustration 7-26 Message Recipient - FTP-Upload

The following settings are available:

Settings	Description
Type	FTP
Name	Individual identification, e.g. inverter data.

Settings	Description
Server	Destination address
Login	Login
Password	Password
Status	FTP activated /deactivated

7.7.2.3 FTP-Upload

The recorded measuring data are being uploaded onto an FTP server or the SOL.Connect Portal by FTP upload.

A swift internet access to the server performs the download of measuring data and the creation of respective performance and yield diagrams.

Illustration 7-27 FTP-Upload – Sensor Data

The following settings are available:

Settings	Description
Notification	Ticking / unchecking the select box activates / deactivates the data transfer.
Description	Individual shortcut of the group. Leaving this line blank sets the description back to the default text.
Interval	Frequency of the data transfer.
Recipient	SOL.Connect Web Portal or FTP recipient

To upload the measuring data create a message recipient FTP.

Below are listed the possible intervals in comparison to the FTP upload groups:

Group	Hourly	Daily
Sensor data	X	X
WXT details	X	X
Events	X	X

Define the transmission time at the item e-mail services.

7.7.2.4 Display (optional)

A display may be connected directly or remote to the data logger (remotely controlled display requires installation of a serial Ethernet converter).

The following data string is sent to the display using type HvG:

Value	Description
#	Starting signal
00241479	Total yield = 00241479 kWh
001234	Daily yield = 001234 kWh
001234	Performance (Pac) = 0012,34 kW
0000	Iac (is not displayed)
0000	Upv (is not displayed)
0000	Uac (is not displayed)
4567	Daily yield 2 = 4567 Wh (usually not used)
<CR><LF>	End signal (optional)
Result:	#0024147900123400123400000000000004567

Characters printed in "red" are added as enhanced HVG-protocol to support plant performances > 100 kW. However the display must be designed adequately which requires coordination with the display's manufacturer.

Information

The display must be operated in the same ‚HVG-mode' as predefined in the data logger.

The enhanced HVG-protocol in general may be used for plants up to 9999,99 kW performance if the display supports the enhanced HVG-protocol.

Information

Check the network configuration of the serial ethernet converter with an administrator if possible!

Information

Further information may be found in the display's and the serial ethernet converter's manual.

Depending on the connection of the large-scale display (see chapter 0) and the plant's nominal performance the input signal requires configuration.

Illustration 7-28 Configuration Display

The following settings are possible:

Settings	Description
Type of display	Schneider, HVG, HVG (plant performance > 100kW) or RI-CO
Connection	Serial interface (COM2 RS485) or remote display
Address*	IP-Address or name of serial Ethernet converter (only when using a remote display)

* only with use of a remote display

Settings	Description
	Note Enter IP-addresses without *http://* prefix.
Port*	Port-settings of the serial ethernet converter
Update	Update time of display data.

Note

Saving the display configuration automatically triggers a restart of the system.

7.7.3 PV plant

7.7.3.1 General Settings

At *Solar Plant* defines information about the entire plant and the monitoring options. These may be adjusted individually for each PV-plant.

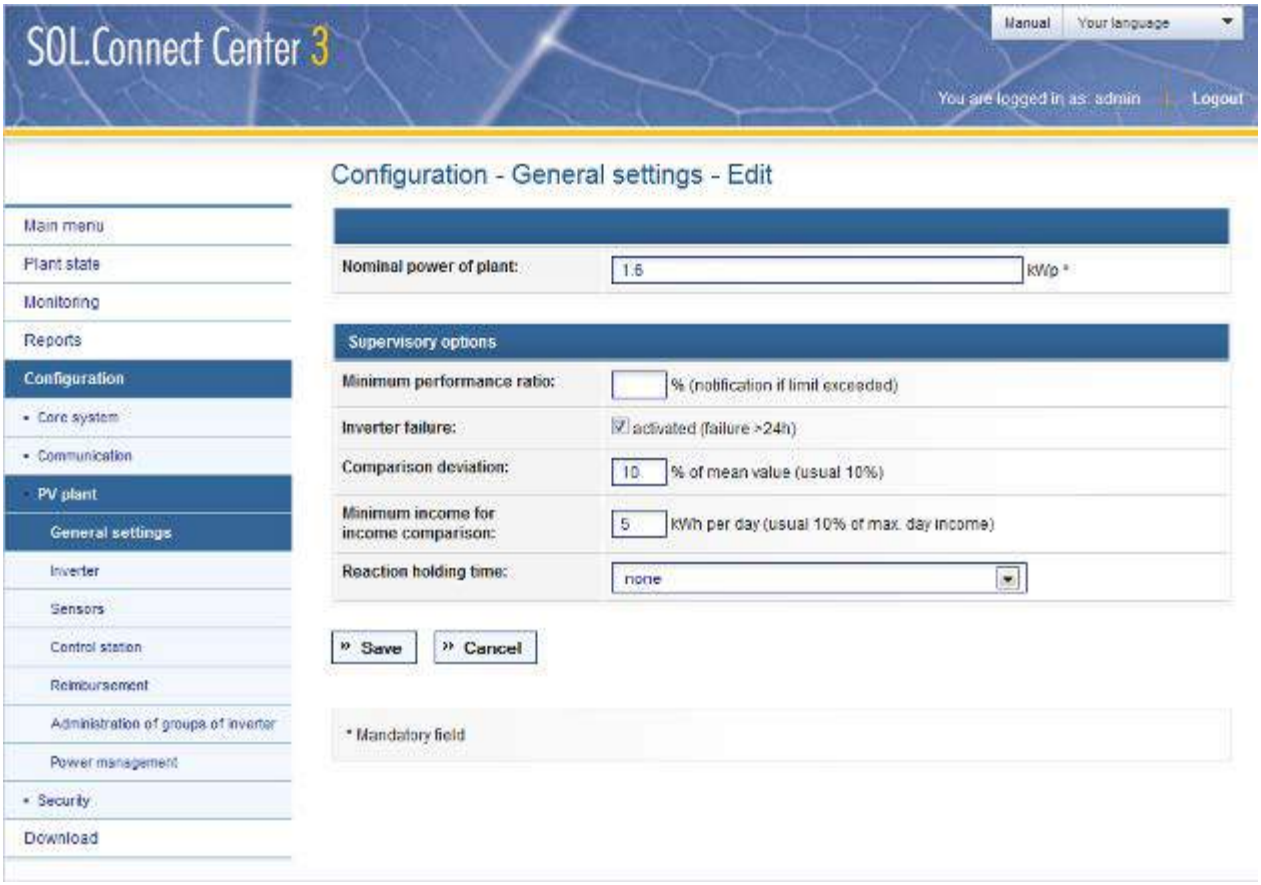


Illustration 7-29 Solar Plant

The *Monitoring Options* dare used to supervise the inverters and trigger alarms:

Breakout WR (Inverter)

Activate breakout WR if you wish to trigger an alarm in case of inverter breakout. The alarm is then triggered once an inverter has not communicated with the data logger during the whole day.

Minimum-Performance-Ratio

An alarm is triggered when the performance of the plant and the defined minimum performance ratio (percentage ratio between target and actual performance) falls below.

Information

Performance Ratio is only possible in connection with the SOL.Connect MultiScan and an irradiance sensor.

Yield Deviation

The comparison of yield is only performed once two or more inverters are active.

Alarms are triggered as soon as an inverter has fed-in during the past day less energy in comparison to the other inverters. Reason for this could be soiling, partial malfunction of the solar cells or a problem within the inverter itself.

Determine at *Yield Deviation* the deviation in percentage from the average which serves as a basis for evaluating yield. The following settings are needed for the yield deviation:

- **Yield Deviation**: deviation in percentage of an inverter in relation to the expected share of yield.
- **Minimum Yield for Yield Comparison:** In order to avoid erroneous alarm triggering on days with very low irradiance a minimum yield may be defined. If the entire plant's yield is below the minimum yield not the comparison of energy and the alarm triggering will be blocked.
- **Nominal Power of Plant:** The maximum power must be defined in the field [kWp]. Entering „0" deactivates the yield monitoring.

The maximum power can be defined individually for each inverter.

Evaluation is done as follows:

The daily yield of each inverter is divided by the maximum performance of each solar module installed to this inverter.

The relative yield of each single inverter is determined as follows:

Relative Yield = Energy per day [kWh] / installed power [kWp]

This relative yield is then compared to the other inverters. In case the deviation in percentage is above the predefined minimum yield an alarm is being triggered.

Response Time Delay

Additionally a delay in the response time until an alarm is being triggered can be determined („Response Time Delay) (none = the alarm is triggered immediately after the event happened).

You can also receive alarm messages via e-mail. For that purpose an e-mail recipient must be set-up (7.7.2.3).

Information

Seasonal reasons may cause false alarms, e.g. snow fall or shadowing due to the setting sun, etc.

7.7.3.2 Inverter

At Inverter you'll find all inverters known to the system. These can be installed individually for your PV plant. Furthermore this triggers the search for new inverters.

This allows a comfortable *search* for all active, operative inverters (it's also called *scan*) and is a prerequisite to work with the data logger.

Illustration 7-30 Search for Inverters

A search can be performed at any time. Newly found inverters appear in the protocol from this moment on.

Once all inverters have been detected select a new inverter to start configuration.

Illustration 7-31 Configuration Inverter

The following settings are possible:

Settings	Description
Inverter serial number	An identifier allocated by the manufacturer
Inverter name	Individual denomination (unique designation) of inverters. No special characters or blanks! Denominations are considered as well within the analysis of daily yield.
Inverter group	To group inverters. One or more groups may be defined (e.g. group 1 and group 2).

Settings	Description
Inverter status	Activate / deactivate status Only active inverters will appear in the plant status, inactive inverters are hidden by default!
Monitoring	Activate / deactivate monitoring options
Maximum feed-in power (AC-power)	This shows the maximal performance reached so far. Newer and higher values override older entries.

Define the settings individually for each inverter.

Delete removes the inverter from the system!

Automatic Network Search

Daily at 10 a.m. and 2 p.m. the system initiates a network seach cycle. The data logger searches for all network participants. Not yet registered participants are added automatically and logged *in the configuration events protocol*.

Information

Active inverters which are already marked deleted are automatically added again with a network search cycle. To prevent this mark the *inverter status* as deactivated.

7.7.3.3 Administration of groups of inverters

A PV plant consisting of many inverters and subsystems often might have a confusing layout. The inverters can be grouped and administered easily with this function.

Illustration 7-32 Administering Inverter Groups

The following settings are possible:

Setting	Description
Group	Available groups
Name of group	Name of an inverter group

To add a **further / new inverter group**:

- Select *new*
- Enter a name for this group.
- Place a check mark at the respective inverter.
- Click ok → save

To add an inverter into an **existing inverter group**:

- Select a group
- Place a check mark at the respective inverter.
- Click ok → save

A group can only be defined in connection with one inverter.

Information

Delete does not remove the inverter from the system but only from a group and marks this inverter as *ungrouped*

7.7.3.4 Sensors (optional)

Additional sensors may be connected and recorded via the SOL.Connect MultiScan. All sensors known to the system are shown here and can be edited individually.

The comfortable search for sensor modules detects all operational, active sensor modules.

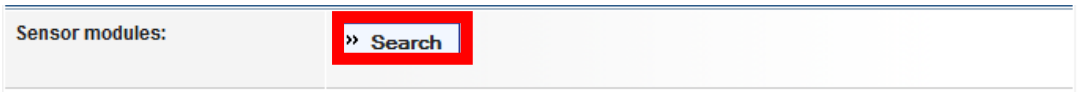


Illustration 7-33 Searching Sensor Modules

Delete removes a sensor module from the system.

7.7.3.5 Control Station (optional)

The configuration can only be viewed and edited at a data logger while in control station mode.

See attached quick guide for details about the active control station mode.

7.7.3.6 Earnings

To display the financial revenue analysis some settings are necessary at first.

Depending on the choice of feed-in tariff the data collected are customized.

Self-defined earning setting

Manually define your own model of feed-in tariff determining a period and the amount per kWh. This should allow calculating most international subsidy schemes. However prerequisite for this manual definition is a thorough knowledge of the respective subsidy model!

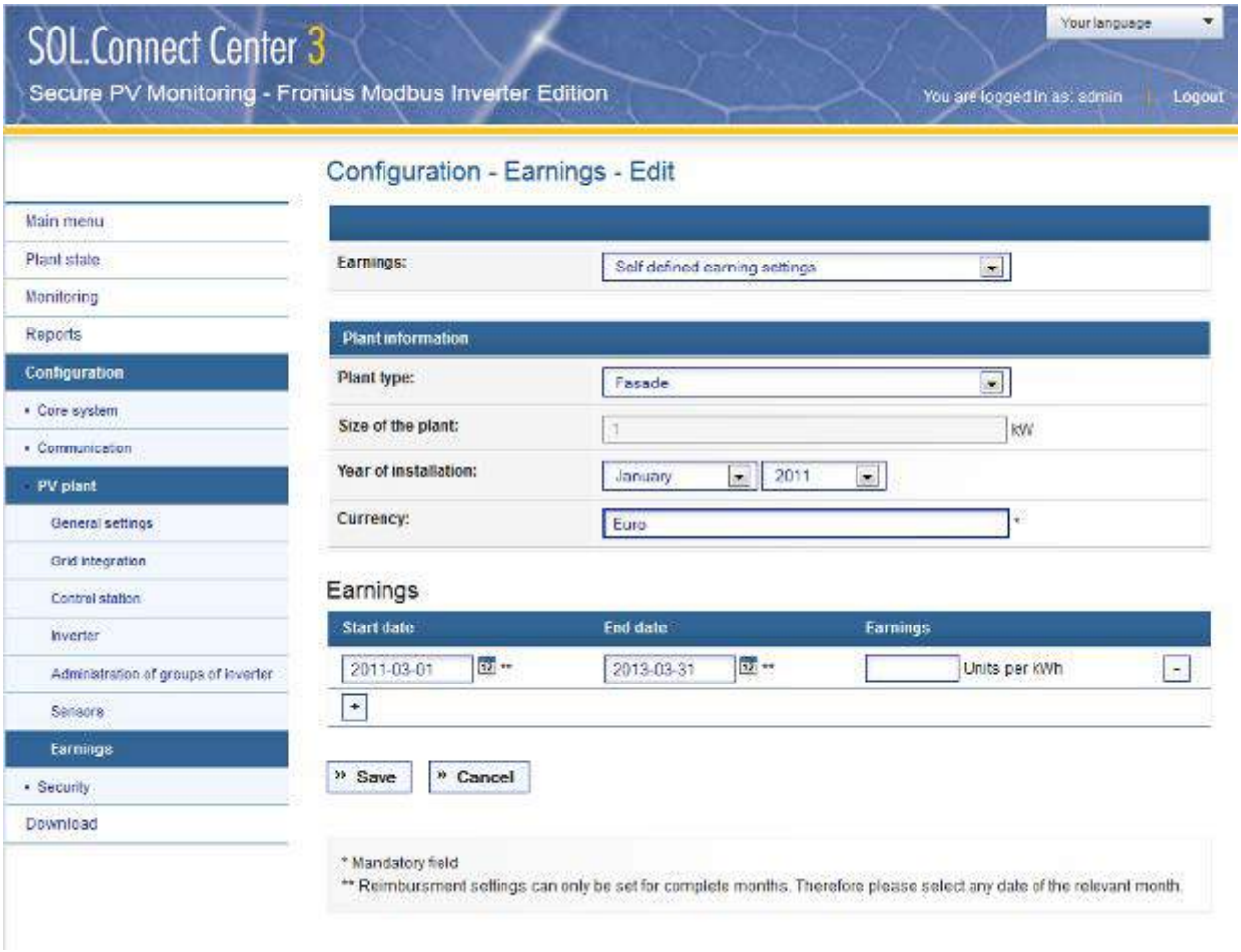


Illustration 7-34 Own Model of Feed-in Tariff

Plant Information

Plant information is only informative and has no influence on the subsidy:

Settings	Description
Plant type	Select your type of plant
Size of plant	The size oft he PV plant is calculated automatically from “Nominal power of plant” (Configuration → PV plant → General settings, see chapter 7.7.3.1)
Year of commission-ing	Year of commissioning of the PV plant
Currency	Select the desired currency

Subsidy

To add the subsidy period and amount add one line (). Define a start and end date and the rate of subsidy per kWh.

To delete a subsidy click minus ()

Information

The subsidy period always comprises entire months!

7.7.3.7 Power management (optional)

For the performance management of a SOL.Connect Power Manager the relay position of the ripple control recipient (RCR) must be configured.

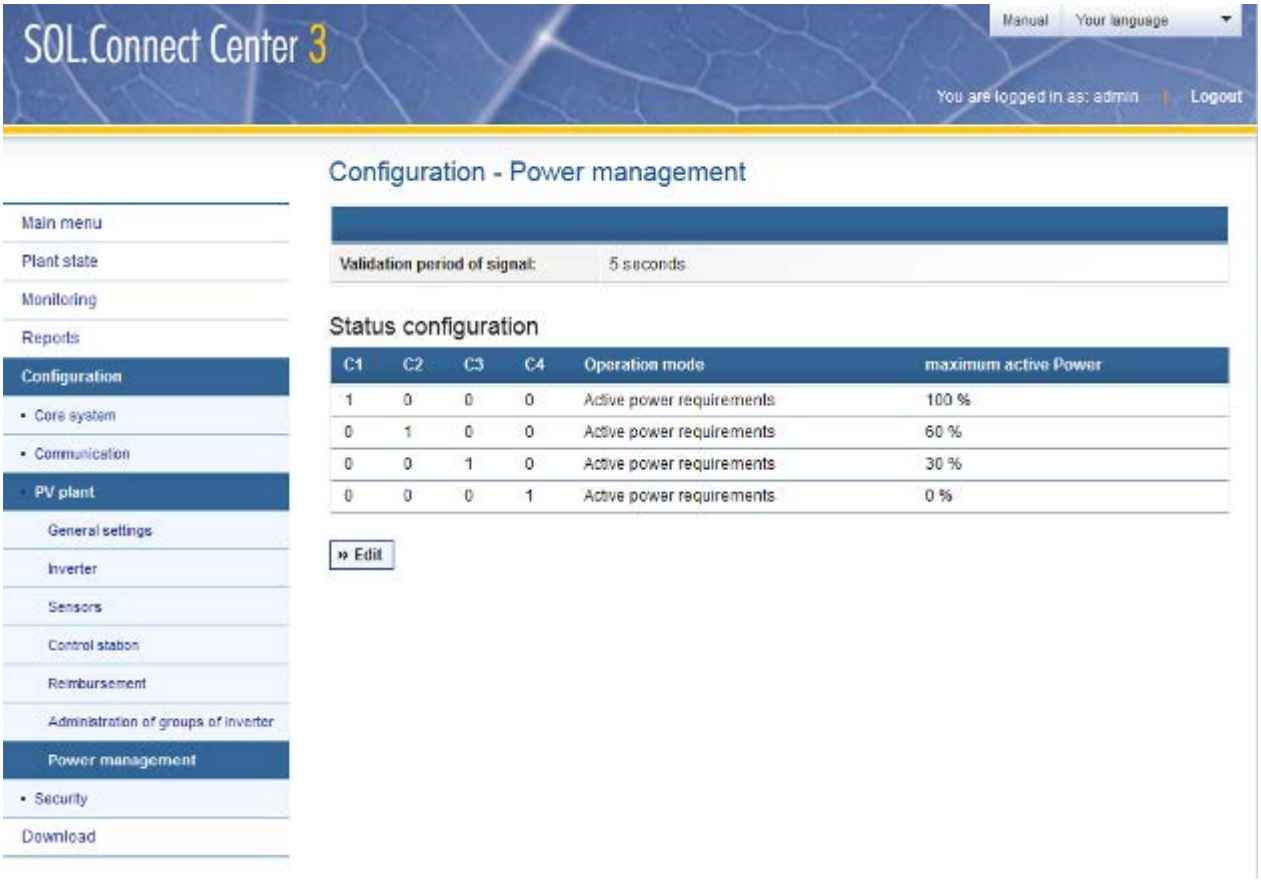


Illustration 7-35 Configuration Performance Management

The following settings are possible:

Settings	Description
Period of signal	Dauer der Signalprüfung des Rundsteuerempfängers. Mindestdauer der Signalvorgabe des Rundsteuerempfängers (K1 .. K4) bis zur Akzeptierung durch den Datenlogger
K 1 ... K4	Channel 1 to 4 of the RCR
Active	To (de-)activate
Operation mode	Active power set points
Maximum power set point	0 – 100 % max. power set point

Note

A power set point of 0 % reduces the performance not entirely to 0 W. A minimal power remains which the inverter feeds in.

7.7.4 Security

7.7.4.1 Public Access

The status and the welcome screen can be shown in public or for demonstration purposes. In public means that this is not protected by a password.

Illustration 7-36 Public Access

For an active public access a password is only required to access the configuration and monitoring area.

7.7.4.2 Passwords

The password administration enables the user and administrator to change passwords.

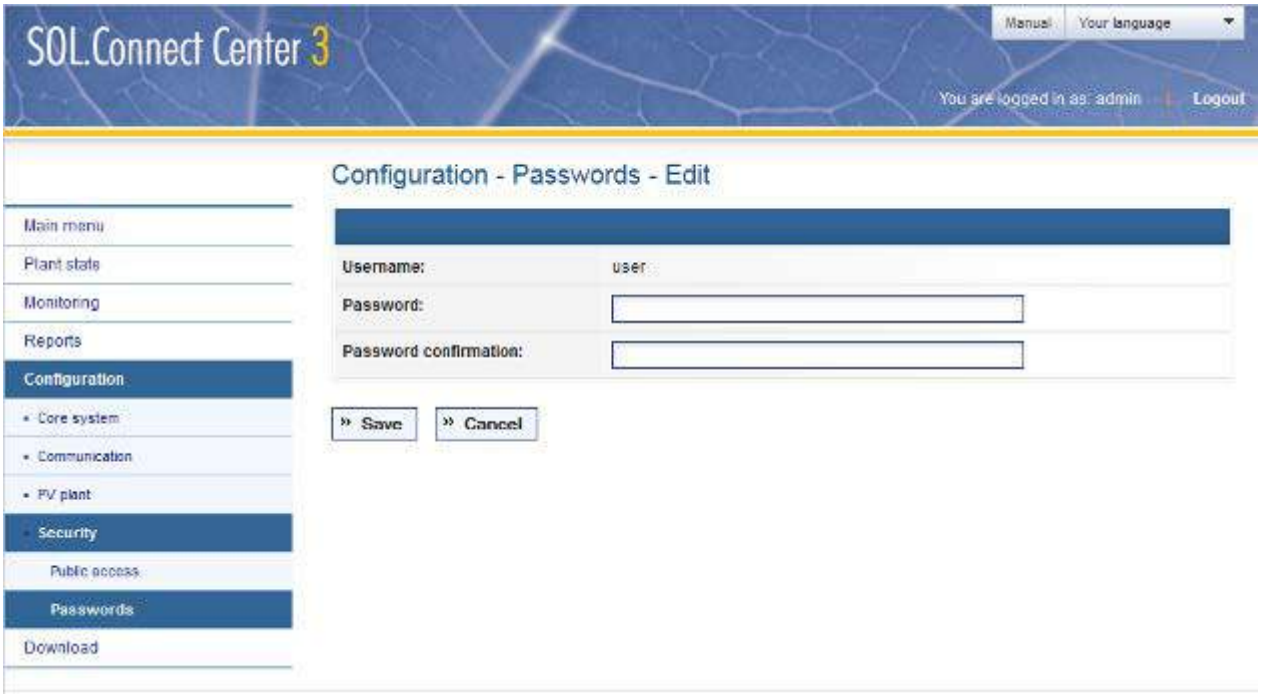


Illustration 7-37 Passwords

A password must consist of at least 6 characters (maximum 16 characters).

7.8 Download

7.8.1 Plant Data

The data download offers the possibility to display stored data, retrieve data and to save them locally.

Illustration 7-38 Overview Download

Plant Summary

Contains the data regarding the performance total, output power and time stamp as well as

	irradiance power and irradiance energy as of today.
Inverter Details	Contains detailed information about each single inverter. The desired data can be selected individually.
Sensor Data	Contains detailed information with time stamp of the sensors connected. The desired data can be selected individually. This is only available in connection with a SOL.Connect MultiScan.
Plant Events	Contains all events occurred, e.g. information, warnings and malfunctions.

All information available from the data logger is displayed on the download page in the following order:

- Data (fixed values for events)
- Time period
- Size of protocol (in KB, or MB)

The list of data columns is shown on the download page depending on the type of protocol.

Illustration 7-39 Download Form

Set the following criteria to prepare a download:

- Desired time period in days. All data records available within this time frame are displayed.
- Select the data columns. This is not available for the plant summary as this protocol provides fixed data for download.
- File format .txt (text file)
- Additional selection of a compressed transmission which allows a quicker download of data for large data quantities or in case of a modem connection. Up-to-date browsers (e.g. Internet Explorer) decompress files automatically!

The time stamp cannot get deactivated.

Click Download. Depending on the data volume this may last several seconds. As soon as the download is finished the options to open the file or to store it locally show up in a separate window. There the consolidated data can be

stored locally or by click on open displayed directly with the allocated program.

Documentation

Download the respective user manual in PDF format.

Information

The download of files might be blocked by a pop-up blocker within the Internet Explorer®, Firefox® and / or a firewall. Consult the options and user manuals of the respective software manufacturer!

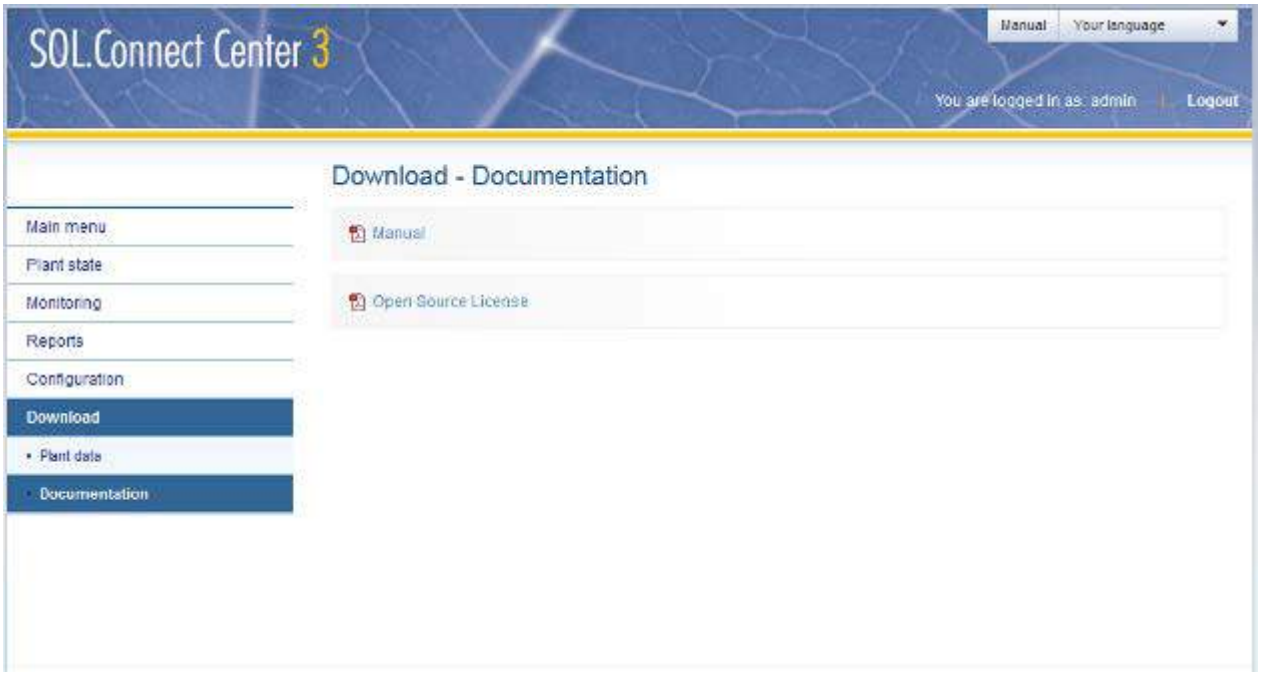


Illustration 7-40 Documentation Download

8 Set-up Messaging

You can configure and send individually customized notifications.

To send messages the following steps must be followed:

- Set-up e-mail service.
- Set-up message recipient.
- Allocate messages to a recipient.
- Determine recipients in monitoring groups and / or analysis groups.

E-mails which could not be sent due, e.g. caused by an erroneous e-mail address will be recorded in the system messages. It is advised to sort these out immediately!

In case several people shall be informed at the same time it is recommended to use just one single message recipient as distributing address (e.g. support@sampleaddress.com).

Information

Should you - despite correct configuration - not receive e-mails please check your spam filter.

In addition please check regularly the sending e-mail account because in most cases of problems a message is being returned.

Information

On exclusive use of a modem sending e-mails is only possible with an active internet connection (dial-out switch), see also chapter 4

8.1 Allocate Messaging to a Recipient

Under point Configuration → Communication → Message recipient you can configure the message recipient and allocate messages.

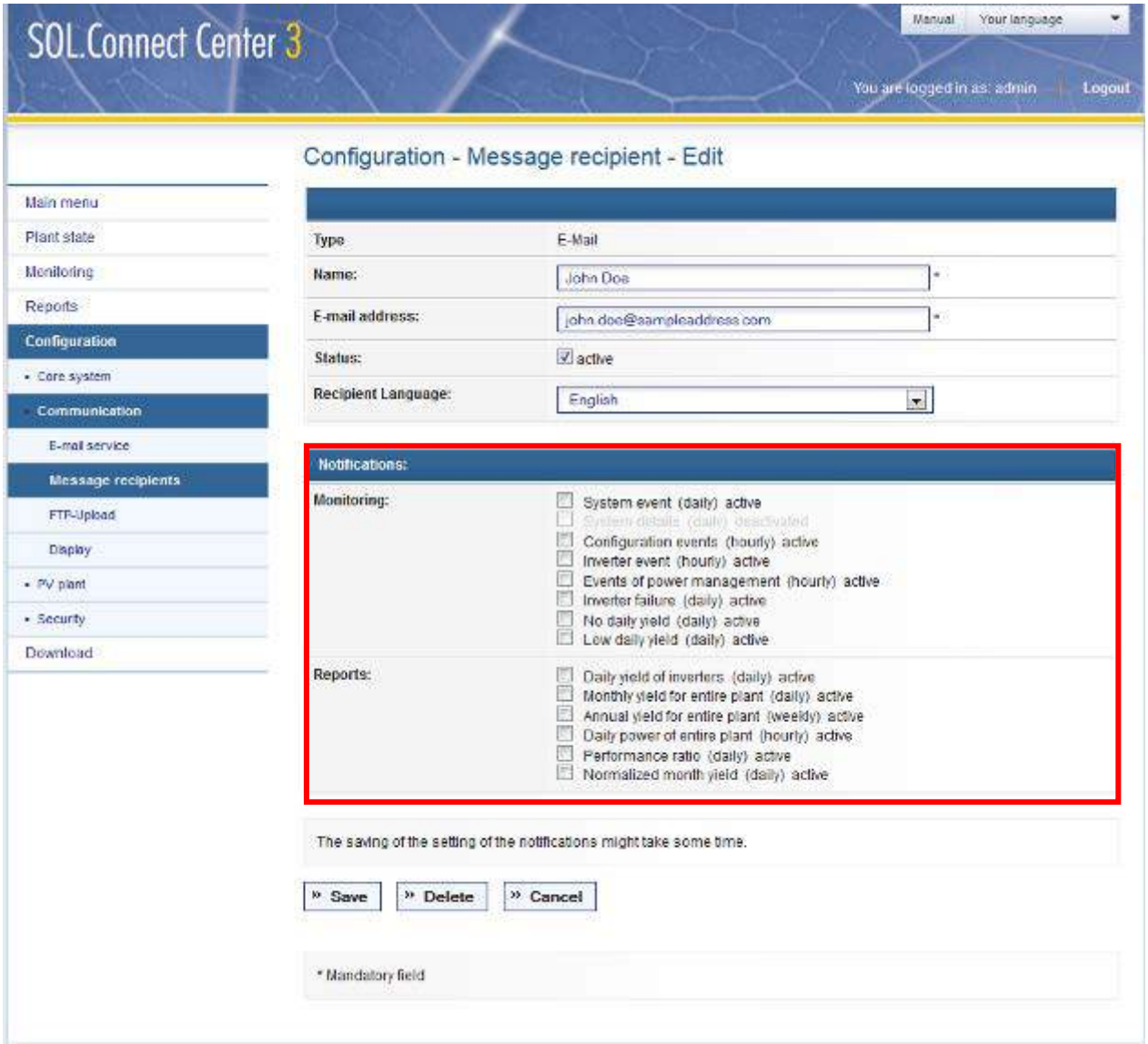


Illustration 7-41 Messaging for News Recipients

A new recipient requires set-up first in order to be allocated to receiving news.

Note

An exception is the news recipient of type FTP. After saving the settings this can no longer be modified. A new recipient must be set-up in this case.

8.2 Monitoring

Under point Monitoring → Monitoring group → Change Settings you can configure the messaging settings and allocate recipients.

Illustration 7-42 Change Monitoring Settings

The following settings are available:

Settings	Description
Messaging	Activates / Deactivates the messaging
Description	Short description of the monitoring group. The name of the monitoring group cannot be changed.
Interval	Frequency of messages
Recipient	Recipient of the messages (see also chapter 7.7.2.2)

Note

Messages can only be sent when the messaging function is active, and an interval and a recipient has been defined.

These are the possible intervals in comparison to the event groups:

Event group	immediately	Immediately with hourly reminder	Hourly	Daily	Weekly
System events	X		X	X	
System details				X	X
Configuration events			X	X	X

Immediately: *Immediately* (in some cases after a certain response time), after this no reminder will happen.

Immediately, with hourly reminder: *Immediately*, with hourly reminder in case the event is still pending.

Hourly: It is checked *every hour on the hour* if events of the event group happened within the past hour. These are consolidated with possible pending events and sent out together.

Daily: It is checked *once a day* if events of the event group happened during the previous day. These are consolidated with possible pending events and sent out together.

Weekly: It is checked *weekly* if events of the event group happened during the past 7 days. These are consolidated with possible pending events and sent out together.

8.3 Reports

Configure the communication settings and allocate recipients at Analysis → Analysis group → Settings.

Illustration 7-43 E-Mail Distribution of Analysis

The following settings are possible:

Settings	Description
Messaging	Activates/deactivates messaging
Description	Quick description of the analysis group.

Settings	Description
	Information The name of the analysis group must not be modified.
Interval	Frequency of messaging
Display events	Activates/deactivates the display of events (except the annual diagram).
Recipient	The recipient allocated (see as well chapter 7.7.2.3)

See below for the possible intervals in comparison to the event groups:

Analysis group	hourly	Daily	weekly
Daily performance	X	X	
Daily yield	X	X	
Monthly yield*		X	X
Standardized monthly yield		X	X
Annual yield			X

Hourly: *Always on the hour* an updated analysis with events occurred

* Entspricht der Versandzeitpunkt nicht gleich dem Monat oder Jahresende, dann wird zusätzlich eine E-Mail gesendet.

is distributed.

Daily: *Always once a day* an updated analysis with events occurred is distributed.

Weekly: *Always weekly* an updated analysis with events occurred is distributed.

9 XML-Upload by the SOL.Connect Center

Depending on the user configuration the **SOL.Connect Center** cyclically (typically on an hourly basis) transmits the recorded measurement data to an FTP server in a predefined hierarchy and nomenclature. The file format is XML:

SOL.Connect Center serial number

↳ Type data source (MultiScan, SMA etc.)

↳ Time stamp.xml.gz

Example:

CI8000P1400

↳ MultiScan

↳ 20090618140613.xml.gz

The XML file contains arrays from all measurements that have been collected since the last upload. The data are compressed in gzip.

9.1 Structure of the XML File

Below is an explanation of the XML structure. This represents a data table composed of one column header and the subsequent data lines.

Section <description>

The attributes of the single data columns are defined in the area <description>.

Attribute	Description
col_ref	Column header = Name of the reference of a data base (see chapter 9.1.1.1).
dict_ref	Further description, reserved for future extensions; entries are identical to col_ref.
data_type	Definition of the data type (see chapter 9.1.2).
unit	Applied SI-unit (e.g.: °C, V, W/m²).
data_size	Data size in Byte (e.g.: 2, 4, 32, 2048), which implies for example for numerical data the maximal number of digits.
data_precision	Definition of the values after the decimal point (granularity). This typically corresponds to the accuracy of the measurement (e.g.: 1, 0.01, 0.001).

9.1.1.1 Description of the Column Header (col_ref)

The declaration of col_ref defines the column header in the table of a database and thus the names of the respective measurement data.

The following measurement data are available for a SOL.Connect Center:

col_ref	Example
timestamp	Time stamp at the beginning of the measurement. Consists of date and time at the moment of the beginning of the minute-by-minute measurement cycle.

col_ref	Example
inverter_id	Internal reference number of the measurement place for administrative purposes: Together timestamp and inverter_id create a common unique code for a data record.
serialnumber	Serial number
…	Depends on the manufacturer of the connected inverter. Measurement data correspond to plant status (for a description see the manual of the inverter's manufacturer)

9.1.1.2 Data Type (data_type)

The data type defines the set-up of the information. This is important for the structure of the data base.

data_type	Description
T	Time stamp: time stamp, contains date and time of the measurement.
C	Controller: Serial number of the ISET-*mpp meter* measuring card
S	String: Text , it's length is defined by data_size
I	Integer: signed integer
J	Natural number
R	Real: signed decimal number

9.1.2 Section <row>

Each data line corresponds to one section <row> within the XML file Je which contains the data elements per column as <item>.

9.2 Example of an XML File

The XML file is separated into header, declaration, and data.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE sccdata [
    <!ENTITY auml "&#228;">
    <!ENTITY ouml "&#246;">
    <!ENTITY uuml "&#252;">
    <!ENTITY Auml "&#196;">
    <!ENTITY Ouml "&#214;">
    <!ENTITY Uuml "&#220;">
    <!ENTITY szlig "&#223;">
    <!ENTITY quot "&#34;">
    <!ENTITY gt "&#62;">
    <!ENTITY % lt "&#60;">
    <!ENTITY % amp "&#38;">
    <!ENTITY deg "&#176;">
    <!ENTITY sup2 "&#178;">
    <!ELEMENT sccdata (info,description?,row*)>
    <!ELEMENT info (item*)>
    <!ELEMENT description (column*)>
    <!ELEMENT column (#PCDATA)>
        <!ATTLIST column
            col_ref CDATA #REQUIRED
            dict_ref CDATA #IMPLIED
            data_type CDATA #IMPLIED
            unit CDATA #IMPLIED
            data_size CDATA #IMPLIED
            data_precision CDATA #IMPLIED
        >
```

Illustration 9-1 Header of XML-file

```
<?xml version="1.0" encoding="UTF-8" ?>
<!DOCTYPE sccdata (View Source for full doctype...)>
- <sccdata>
  - <info>
      <item key="xmlversion" value="12" />
      <item key="hwversion" value="2.3" />
      <item key="swversion" value="3.0.0.4" />
      <item key="softwaretype" value="psescc_mpp" />
      <item key="serial" value="179544P1311" />
      <item key="guid" value="92b67ed3-626f-4da0-9e7c-18444a47f75c" />
      <item key="name" value="SOL.Connect meter mpp" />
      <item key="opmode" value="0" />
      <item key="interval" value="60" />
      <item key="timezone" value="+0200 CEST" />
      <item key="type" value="details" />
      <item key="mainclass" value="MPP" />
      <item key="class" value="MPP" />
      <item key="language" value="de" />
      <item key="startdate" value="2012-07-04 11:57:00" />
      <item key="enddate" value="2012-07-04 12:02:00" />
      <item key="now" value="2012-07-04 12:05:09" />
      <item key="resetcounter" value="1" />
      <item key="vertexinterval" value="10" />
      <item key="characteristicinterval" value="60" />
    </info>
  - <description>
      <column col_ref="timestamp" dict_ref="timestamp" data_type="T" unit="" data_size="4" data_precision="1" />
      <column col_ref="inverter_id" dict_ref="inverter_id" data_type="J" unit="" data_size="4" data_precision="1" />
      <column col_ref="serialnumber" dict_ref="serialnumber" data_type="C" unit="" data_size="32" data_precision="1" />
      <column col_ref="iv_characteristic" dict_ref="iv_characteristic" data_type="S" unit="" data_size="2048"
        data_precision="1" />
      <column col_ref="voc_1" dict_ref="voc_1" data_type="R" unit="V" data_size="2" data_precision="0.01" />
      <column col_ref="voc_2" dict_ref="voc_2" data_type="R" unit="V" data_size="2" data_precision="0.01" />
      <column col_ref="voc_3" dict_ref="voc_3" data_type="R" unit="V" data_size="2" data_precision="0.01" />
      <column col_ref="voc_4" dict_ref="voc_4" data_type="R" unit="V" data_size="2" data_precision="0.01" />
      <column col_ref="voc_5" dict_ref="voc_5" data_type="R" unit="V" data_size="2" data_precision="0.01" />
      <column col_ref="voc_6" dict_ref="voc_6" data_type="R" unit="V" data_size="2" data_precision="0.01" />
      <column col_ref="isc_1" dict_ref="isc_1" data_type="R" unit="A" data_size="2" data_precision="0.001" />
      <column col_ref="isc_2" dict_ref="isc_2" data_type="R" unit="A" data_size="2" data_precision="0.001" />
      <column col_ref="isc_3" dict_ref="isc_3" data_type="R" unit="A" data_size="2" data_precision="0.001" />
      <column col_ref="isc_4" dict_ref="isc_4" data_type="R" unit="A" data_size="2" data_precision="0.001" />
      <column col_ref="isc_5" dict_ref="isc_5" data_type="R" unit="A" data_size="2" data_precision="0.001" />
      <column col_ref="isc_6" dict_ref="isc_6" data_type="R" unit="A" data_size="2" data_precision="0.001" />
      <column col_ref="vmpp_1" dict_ref="vmpp_1" data_type="R" unit="V" data_size="2" data_precision="0.01" />
      <column col_ref="vmpp_2" dict_ref="vmpp_2" data_type="R" unit="V" data_size="2" data_precision="0.01" />
      <column col_ref="vmpp_3" dict_ref="vmpp_3" data_type="R" unit="V" data_size="2" data_precision="0.01" />
      <column col_ref="vmpp_4" dict_ref="vmpp_4" data_type="R" unit="V" data_size="2" data_precision="0.01" />
      <column col_ref="vmpp_5" dict_ref="vmpp_5" data_type="R" unit="V" data_size="2" data_precision="0.01" />
```

Illustration 9-2 Declaration of the XML file

10 Disposal

Disposal of waste by users in private households within the European Union:

. This symbol attached to a product or packaging indicates that this product must not be disposed together with the normal domestic waste. Instead it is your responsibility to dispose of such waste by handing it over to a designated collection point for recycling of electric or electronic devices. Separate collection and recycling helps to conserve natural resources and to ensure that the product is disposed in accordance with the protection of health and ecosystems.

For further information where such waste may be delivered for recycling please consult your municipal administration, your local waste disposal company or the retailer where you purchased this product.

11 Technical Data

Processor:	800Mhz Vortex-86DX
Central memory:	256MB RAM
Internal memory:	2GB SSD
Operating system:	Linux
COM Ports:	1x RS485 or RS232 via plug connector 1x RS485 via RJ45 dual socket
Interfaces:	LAN (Ethernet 10/100 MBit full-duplex) Modem- or GSM-connection SUB-D9 EasyLan
USB:	2x (on the backside)
Signals:	Internal loudspeaker LED for event display on the top side (6x green, 2x red) 3 LED on the plug connector
Data storage:	1 GB Compact Flash® memory card (expandable up to 4 GB)
Casing:	Two-piece, metal casing without fan for top hat rail mounting (IP20)
Weight:	800 g net (without accessories and external power supply)
Ambient humidity:	Indoor areas / within switching cabinets
Operating temperature:	Minimal -10 to 50°C

Dimensions:	175 mm x 155 m x 45 mm (B x H x T) including backside top hat rail adapter and plug connector
Alarm contact:	Isolated output max 48VDC
Power supply:	External power plug: 100 -240 VAC, 50 – 60 Hz, 12 ... 24 VDC, 0,5 A (power 6 W)
Power consumption:	3W

12 Description of Symbols

Move the computer mouse over the single symbols and the descriptions of the symbols via so called „Tooltips” show up.

12.1 General

Symbol	Description
	New line
	Delete line
	Edit settings
	Scroll forward
	Scroll backwards
	Deactivate

12.2 Network Search

Colour	Description
Red	No inverter / sensor module detected.
Yellow	Active network search running.
Green	Network search successfully terminated

12.3 Status Display

Symbol	Description
	**Green:** plant is running regularly
	**Yellow:** One inverter presents an error (no communication, no feed-in).
	**Red:** At least 30% of all inverters present errors (no communication, no feed-in)

12.4 Messaging

Symbol	Description
	Alarm activated
	Alarm deactivated
	Edit settings

12.5 Solar Feed-in Tariff

Symbol	Description
	Add tariff
	Delete tariff

12.6 Plant Status

Symbol	Description
	Insufficient performance
	Moderate performance

Symbol	Description
	Good performance
	Notification from inverter available
	Inverter offline

13 Description of Conformity

Papendorf
Software Engineering

RoHS-Declaration of Conformity

The manufacturer Papendorf Software Engineering GmbH
Robert-Bosch-Str. 10
D-71116 Gärtringen

certifies that all used products of product line

SOL.Connect Center 3

correspond to the requirements of the RoHS guideline 2002/96/EG (27.01.2003) from the

01.08.2008

and contains none of the restricted substances in concentrations higher than the upper limit. The RoHS guideline stipulates the enforcement for Restriction of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations.

Gärtringen, April 2012

Peter Papendorf, Managing Director

Papendorf
Software Engineering

RoHS-Konformitätserklärung

Der Hersteller Papendorf Software Engineering GmbH
Robert-Bosch-Str. 10
D-71116 Gärtringen

erklärt hiermit, dass alle verwendeten Bauteile der Baureihe

SOL.Connect Center 3

die Anforderungen der RoHS Richtlinie 2002/96/EG (27.01.2003) ab dem

01.08.2008

entsprechen und keine der verbotenen Substanzen in einer Konzentration oberhalb der Grenzwerte enthält. Die RoHS Richtlinien legt Bedingungen zur Beschränkungen bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten fest.

Gärtringen, im April 2012

Peter Papendorf, Geschäftsführer

14 Illustration Index