ABB solar inverters

Product manual
SREA-50 remote monitoring adapter

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List of related manuals

PVS300 manuals and guides	Code (English)
PVS300 string inverters product manual	*3AUA0000096321*
PVS300 string inverters user's guide	*3AUA0000100680*

Option manuals and guides	
PVS-APK-F control unit wall mounting kit for PVS300 string inverters installation guide	*3AUA0000108440*
PVS-APK-M control unit table stand and wireless communication kit for PVS300 string inverters installation guide	*3AUA0000100644*
SREA-50 remote monitoring adapter product manual	*3AUA0000098875*
SREA-50 remote monitoring adapter quick installation and start-up guide	*3AUA0000098876*

All manuals are available in PDF format on the Internet. See section *Further information* on the inside of the back cover.

Product manual

SREA-50 remote monitoring adapter

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1

Safety

What this chapter contains

The chapter presents the warning symbols used in this manual and the safety instructions which you must follow when installing the adapter into an inverter. If ignored, physical injury or death may follow, or damage may occur to the equipment. Read this chapter before you start the installation.

Use of warnings

Warnings caution you about conditions which can result in serious injury or death and/or damage to the equipment and advise on how to avoid the danger. The following warning symbols are used in this manual:

Electricity warning warns of hazards from electricity which can cause physical injury and/or damage to the equipment.

General warning warns about conditions, other than those caused by electricity, which can result in physical injury and/or damage to the equipment.

Safety in installation

These warnings are intended for all who install the adapter into an inverter.

WARNING! Ignoring the following instructions can cause physical injury or death, or damage to the equipment.

- Only qualified electricians are allowed to install and maintain the inverter!
- Disconnect the inverter into which the adapter will be installed from all possible power sources (see the inverter product manual for further details). After disconnecting, always wait for 5 minutes to let the intermediate circuit capacitors discharge before you proceed.
- Do not work on the control cables when power is applied to the external control circuits of the inverter. Externally supplied control circuits may carry dangerous voltage.

2

Introduction to the manual

What this chapter contains

This chapter describes the contents of the manual. It also contains a flowchart of steps for checking the delivery, installing and starting up the adapter. The flowchart refers to chapters/sections in this manual.

Applicability

This manual applies to the SREA-50 remote monitoring adapter, application version 3.32.8 and later.

Compatibility

The SREA-50 remote monitoring adapter is compatible with PVS300 string inverters.

Target audience

This manual is intended for people who install, start up and use the remote monitoring adapter with a string inverter.

Read the manual before working on the equipment. You are expected to know the fundamentals of electricity, wiring, electrical components, electrical schematic symbols, the inverter, the use of the inverter control unit, Internet browsers, and the basic network protocols.

User groups

Operating user uses the adapter for local and remote monitoring.

Administrative user performs the adapter start up and modifies the adapter configuration and setup for the operating user. The administrative user has Admin and/or Super Admin access rights for the adapter web user interface.

If the contents of a chapter are targeted at a specific user group, this is stated at the beginning of the chapter.

Before you start

Make sure that the inverter is installed and ready to operate before you start the installation of the adapter.

In addition to conventional installation tools, have the manuals of the inverter available during the installation as they contain important information not included in this manual.

Contents of the manual

The manual consists of the following chapters:

- *Safety* presents the safety instructions which you must follow when installing the adapter.
- *Introduction to the manual* describes the contents of the manual.
- *Operation basics and hardware description* briefly describes the key features, connectivity and construction of the adapter.
- *Mechanical installation* contains instructions on checking the delivery and mounting the adapter.
- *Electrical installation* presents the connectors of the adapter and gives wiring instructions.
- *Start-up* presents the tasks which need to be accomplished before the adapter is ready for use for the operating user and gives instructions on changing the network settings.
- *Operation* describes the adapter web user interface for the operating user.
- *Administration* describes the adapter web user interface for the administrative user and contains examples of setting up the adapter for typical applications.
- *Fault tracing* describes the diagnostic LEDs of the adapter and gives troubleshooting instructions.
- *Technical data* contains the technical data of the adapter.
- *Dimension drawings* presents the dimensions of the adapter.
- *Appendix A: Internal Modbus registers* contains a list of the registers of the adapter that can be accessed by Modbus/TCP clients.

Quick installation and start-up flowchart

Task	See chapter:
Check the adapter delivery. Only intact units may be installed and started up.	*Checking the delivery*, page *23*
↓	
Mount the adapter.	*Mounting*, page *24*
↓	
Connect the power supply. Connect the digital inputs (if any). Connect the Ethernet network. Connect the GSM/GPRS modem (if any). Connect the inverter(s).	*Electrical installation*, page *25*
↓	
Configure the inverter Modbus interface. Power up the adapter. Connect to the adapter over Ethernet. Run the start-up wizard.	*Start-up*, page *31*
↓	
Adjust the adapter configuration and set up the adapter for the desired applications.	*Administration, page 65*
↓	
Operate the adapter.	*Operation*, page *45*

Terms and abbreviations

Term/abbreviation	Explanation
Actual value	A piece of state information of the inverter. Usually read-only.
Alarm	A notification sent by the adapter to the user when an event (eg, a warning or fault) occurs
Binding	A method to relay actual signals and parameters from an inverter to another Modbus follower device (for example, a weather station or Modbus display unit) or vice versa
Crossover Ethernet cable	A special RJ45-ended cable that can be used to connect exactly two Ethernet devices together without using a hub or a switch. Useful in many simple installations and when configuring a device without interfering with other network equipment.
Device	In this manual, the term device is used to refer to a device that is connected to the adapter, ie, the inverter.
DHCP	Dynamic Host Configuration Protocol. Used in networks to configure the IP address and other network settings of a connecting device automatically. Most big company networks and Internet connections offer DHCP service, so the user does not have to configure the network settings manually.

Term/abbreviation	Explanation
DynDNS	DynDNS® is free Dynamic Domain Name Service from Dyn Inc. It allows the adapter to have a fixed host name, such as srea50.example.com, even if the actual network address is regularly changing. This is often beneficial when using a consumer-level Internet connection, for example, a typical GPRS connection. For more information, see www.dyndns.com.
EFB	Embedded fieldbus. The adapter is connected to inverter(s) through an RS-485 embedded fieldbus interface.
Event	Occasions registered by an inverter (eg, warning or fault) or by the adapter (eg, LOGGER STARTED), shown to the user in the adapter web user interface. See also *Fault*, *Warning* and *Alarm*.
Fault	A serious error condition that prevents the inverter from running. The adapter can show the reasons of the last inverter faults and send alarm messages when a fault condition occurs.
GPRS	General Packet Radio Service. A a packet-oriented data service used in GSM networks to provide mobile Internet access, for example.
Inverter	A cabinet-built entity containing all inverter modules together with their control electronics, and I/O and auxiliary components. The inverter module converts DC voltage to AC voltage. Its operation is controlled by switching the IGBTs.
IP Address	Unique addresses that identify the devices in a network. Used in Ethernet networks and on the Internet.
Modbus	A standard, widely used fieldbus protocol that is used by the adapter to connect to inverter(s). The Modbus implementations of ABB inverters work on top of RS-232, RS-485 or TCP/IP. Modbus transactions are half-duplex, featuring a single master controlling one or more followers. The Modbus specification defines three distinct transmission modes: human-readable Modbus ASCII, binary-mode Modbus RTU and Ethernet-enabled Modbus/TCP.
Modem	A device that connects the adapter over a telephone network. A GSM/GPRS modem can be used to connect the adapter to a mobile telephone network, while an analog modem can be used for communicating on a traditional, analog telephone network.
Node address	Unique addresses that identify the device in a network. Used in Modbus networks to identify the inverters.
Parameter	A user-adjustable operation instruction to the inverter, or signal measured or calculated by the inverter.
Remote monitoring adapter	An optional accessory compatible with the PVS300 inverter. Shortened to ‘adapter’ in this manual. The adapter offers, eg, automatic and manual data loggers, an integrated web user interface, connectivity to Ethernet and mobile networks.
RS-485	RS-485, also known as EIA-485, is a high-distance, half-duplex, multi-drop serial standard that is used when connecting inverter(s) to the adapter over a twisted-pair cable. The RS-485 standard specifies only the electrical characteristics of the bus system. The communication protocol and communication speed depend on the used application. For example, the electrical characteristics of the Modbus protocol are based on the RS-485 standard.
SMTP	Simple Mail Transfer Protocol. The standard protocol for carrying e-mail messages.

Term/abbreviation	Explanation
SNMP	Simple Network Management Protocol. Widely used to manage and monitor network-attached devices. The adapter can send SNMP messages when an event condition occurs.
Solar array	A group of parallel-connected solar strings
Solar cell	A device that converts light directly into electricity by the photovoltaic effect
Solar generator	The total of all solar strings of a solar power supply system, which are electrically interconnected
Solar module	A packaged interconnected assembly of solar cells that can be installed as a single unit and connected to other panels to form a solar string
Solar string	A circuit of series-connected solar modules
SPD	Voltage surge protection device
Straight Ethernet cable	A standard RJ45-ended cable that can be used to connect an Ethernet device to a switch or hub. In addition, the cable can be used to connect exactly two Ethernet devices together without using a hub or a switch, provided that one of the devices supports automatic MDI/MDI-X configuration. SREA-50 supports MDI/MDI-X.
String inverter	A low power solar inverter type which typically has one or a few string inputs. Converts direct current and voltage from a solar string to alternating current and voltage to the power line.
TCP/IP	Transmission Control Protocol/Internet Protocol. It is the most widely used protocol in Internet and Ethernet environments, as many common protocols work on top of TCP/IP. For example, HTTP, SMTP and FTP protocols rely on TCP/IP communication.
Template	An inverter model information file that contains information on parameters, alarms and fault codes of an inverter model. To be able to use a certain inverter model with the adapter, the template file of the model has to reside in the memory of the adapter.
Warning	Minor error condition similar to faults, only less severe. See also *Fault*.

3

Operation basics and hardware description

What this chapter contains

This chapter briefly describes the key features, connectivity and construction of the adapter.

Product overview

The SREA-50 remote monitoring adapter is a multi-purpose solution for local and remote monitoring of 1…10 ABB string inverters through the Ethernet, modem and Internet. It has an integrated multilingual web user interface, which provides access to inverter parameters, actual values, inverter status, events and data. The adapter collects operating statistics into logs and can inform the user of inverter events, for example, by SMS alarms. It can also act as a Modbus/TCP gateway.

The adapter is intended for residential use as well as for commercial buildings and installations.

Key features of the adapter

Graphical user interface

- Accessible from standard PCs through a web browser (Internet Explorer and Mozilla Firefox)
- Accessible to several users at the same time
- Data accessible 24/7, even if inverters are in the sleep mode
- Supported languages: English, French, Spanish, German, Italian
- Dedicated terminology for solar inverters

Start-up

- A six-step wizard for plug-and-play start-up
- Automatic scanning of all connected inverters during the start-up

Automatic production logger

- A built-in historical data logger for inverter operational data, including plant-level summaries
- Data visualized as graphs on various time spans
- Data permanently stored to the adapter's memory

Manual data logger

- A built-in manually configurable data logger for inverter parameters and actual values
- Data visualized as graphs or log files, which can be downloaded to PC, sent as E-mail attachments or uploaded to an FTP server
- Data stored as a local replica to the adapter's memory

Maintenance functions

- Access to inverter parameters and actual values
- Customizable alarm conditions, messages and recipients
- Alarm messages of events by SMS, e-mail or SNMP (traps)

Modbus/TCP gateway

- All inverter parameters and actual values are accessible by Modbus/TCP clients.

Connectivity

The adapter connects to the inverters through a serial Modbus RS-485 connection. A maximum of 10 ABB string inverters (max. 32 Modbus devices) can be connected to a single adapter. The embedded communication port of the inverter is dedicated and reserved for the adapter.

With inverters as followers, the adapter acts as a Modbus master on the RS-485 bus. In addition, the adapter can act as a Modbus/TCP gateway that connects to the inverters by Modbus RTU and offers access to the inverter data by Modbus/TCP. For gateway connection examples, see section *Modbus/TCP gateway* on page *97*.

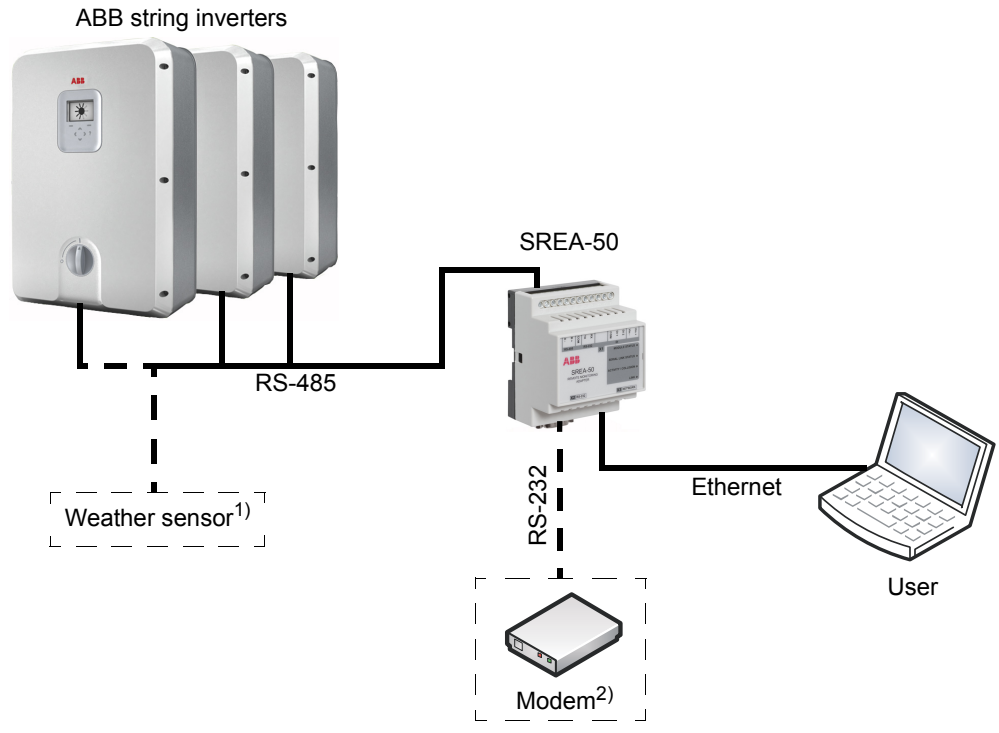
The user accesses the adapter over a local network (Ethernet) or over the Internet (GSM/GPRS/analog modem). The GSM/GPRS modem can be used to:

- send SMS alarms
- connect to Internet for sending e-mails including log files or alarm information
- connect to Internet for sending log files by FTP
- connect to Internet to provide access to the adapter web user interface.

The modem connection can be configured to be redundant, meaning that the connection is established when the Ethernet connection gets cut off or vice versa.

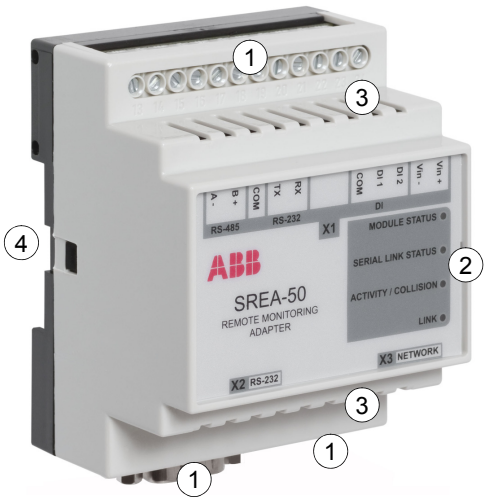
External devices, such as weather sensors, can be integrated to the system to provide the inverters with additional solar radiation measurements.

Connection example



1) Eg, Si-RS485-TC-T. Support upcoming. Not available from ABB.
2) Eg, OnCell G2110 GPS/GPRS Modem kit, available from ABB as an option (3AXD50000000372).

Layout drawing



No.	Description
1	Connectors. See page *26*.
2	Diagnostic LEDs. See page *102*.
3	Air outlets
4	DIN rail mounting slot

4

Mechanical installation

What this chapter contains

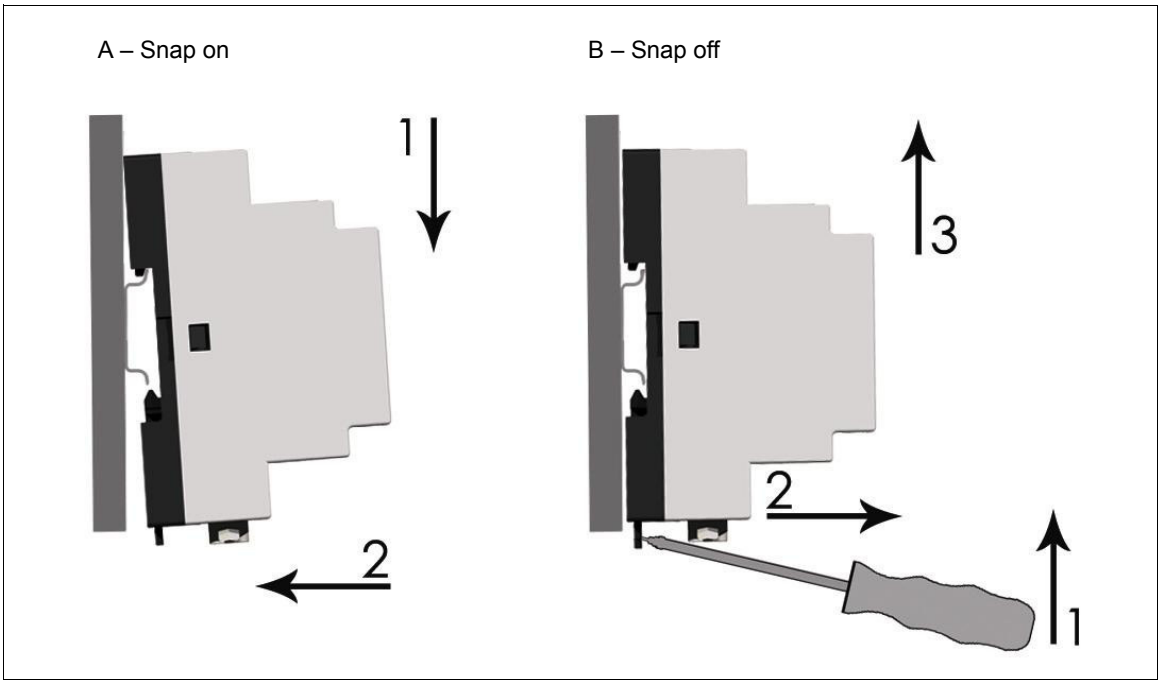
This chapter contains instructions on checking the delivery and mounting the adapter.

Checking the delivery

Check that the option package contains the following items:

- remote monitoring adapter, type SREA-50
- activation code label (the default **admin** password for the adapter web user interface)
- A straight Ethernet cable for connecting the PC to the adapter for start-up
- A 120 ohm terminating resistor for RS-485 networks
- Quick installation and start-up guide
- CD-ROM with this manual, ABB IP Configuration Tool and supplemental data.

Mounting



1. Choose the location for the adapter. Note the following:
   - The cabling instructions in chapter *Electrical installation* must be followed.
   - The ambient conditions must be taken into account; see chapter *Technical data*. The degree of protection of the adapter is IP20.
   - The air outlets of the adapter must be kept open so that the cooling air can flow through the adapter.
2. Switch off all dangerous voltages in the enclosure that the adapter is to be mounted in.
3. Fasten the rail.
4. Push the adapter onto the rail as shown in figure A above. The adapter can be released by pulling the locking spring with a screwdriver (see figure B above).

Side by side mounting

It is possible to mount adapters side by side. However, the air outlets of the adapters must be kept open so that the cooling air can flow through the adapters.

5

Electrical installation

What this chapter contains

This chapter presents the connectors of the adapter and gives instructions on:

- connecting the power supply, I/O and Ethernet
- connecting the adapter to a GSM/GPRS modem
- connecting the adapter to the inverter(s).

WARNING! Before installation, switch off the inverter power supply. Wait for five minutes to ensure that the capacitor bank of the inverter is discharged. Switch off all dangerous voltages connected from external control circuits to the inputs and outputs of the inverter.

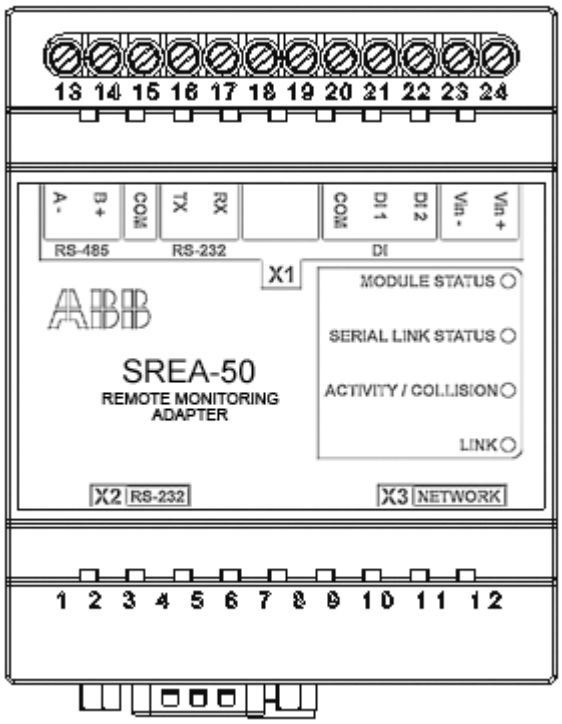
General cabling instructions

- Arrange the network cables as far away from the motor cables as possible.
- Avoid parallel runs.
- Use bushings at cable entries.

Connectors

The adapter has three connectors:

- screw terminal block X1
- modem connector X2
- Ethernet connector X3.



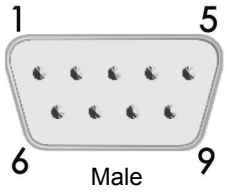
X1

Terminal block X1 has the following terminals:

	Name	Description	Used for...
RS-485	A-	Negative RS-485 channel	Solar inverter connection
	B+	Positive RS-485 channel	
	COM	RS-232/RS-485 ground	
RS-232	TX	RS-232 transmit (RS-232 connector)	Not in use with solar inverters
	RX	RS-232 receive (RS-232 connector)	
DI	COM	Digital input, common ground	Triggering alarm messages
	DI1	Digital input 1	
	DI2	Digital input 2	
	Vin-	Power supply, negative	9–28 V AC/ V DC power **Note:** The power requirement of the adapter is 2 W.
	Vin+	Power supply, positive	

X2

X2 is a 9-pole D-sub connector for an RS-232 connection to an external GSM/GPRS modem. The pin-out of the X2 connector is shown below.



1	CD (Carrier Detect)
2	Rx (Receive)
3	Tx (Transmit)
4	DTR (Data Terminal Ready)
5	GND
6	DSR (Data Set Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	RI (Ring Indicator)

X3

X3 is a standard 10/100 Mbps RJ-45 Ethernet connector.

Connecting the power supply

Connect 9-28 V DC to the Vin+ and Vin- terminals.

The power requirement of the adapter is 2 W.

Note: Do not power up the adapter until advised to do so in section *Powering up SREA-50* on page *32*.

Connecting the digital inputs

The digital inputs of the adapter can be used to transmit on/off status information. The statuses of the digital inputs are stored into internal Modbus registers 1 and 2, which can be viewed through the Internal Registers page (see section *Internal Registers* on page *59*). The registers can also be selected to trigger alarm messages (see section *Event* on page *75*).

Connect the switch between the digital input and the COM terminal. With the switch closed, the status of the input is 0.

The digital inputs are opto-isolated. The logical levels are:

- 0…2 V = "0"
- 10…24 V = "1".

Connecting the Ethernet network

Connect the Ethernet cable delivered with the adapter directly between a PC and the adapter for start-up.

Note: After the start-up, you can start using the cable permanently between the adapter and an Ethernet switch or hub.

Connecting a GSM/GPRS modem

If you want to connect to the adapter through a modem, connect the modem to the X2 RS-232 port by using a typical straight, male-female DB9 modem cable.

For more information on connecting the modem, refer to the manual of the modem.

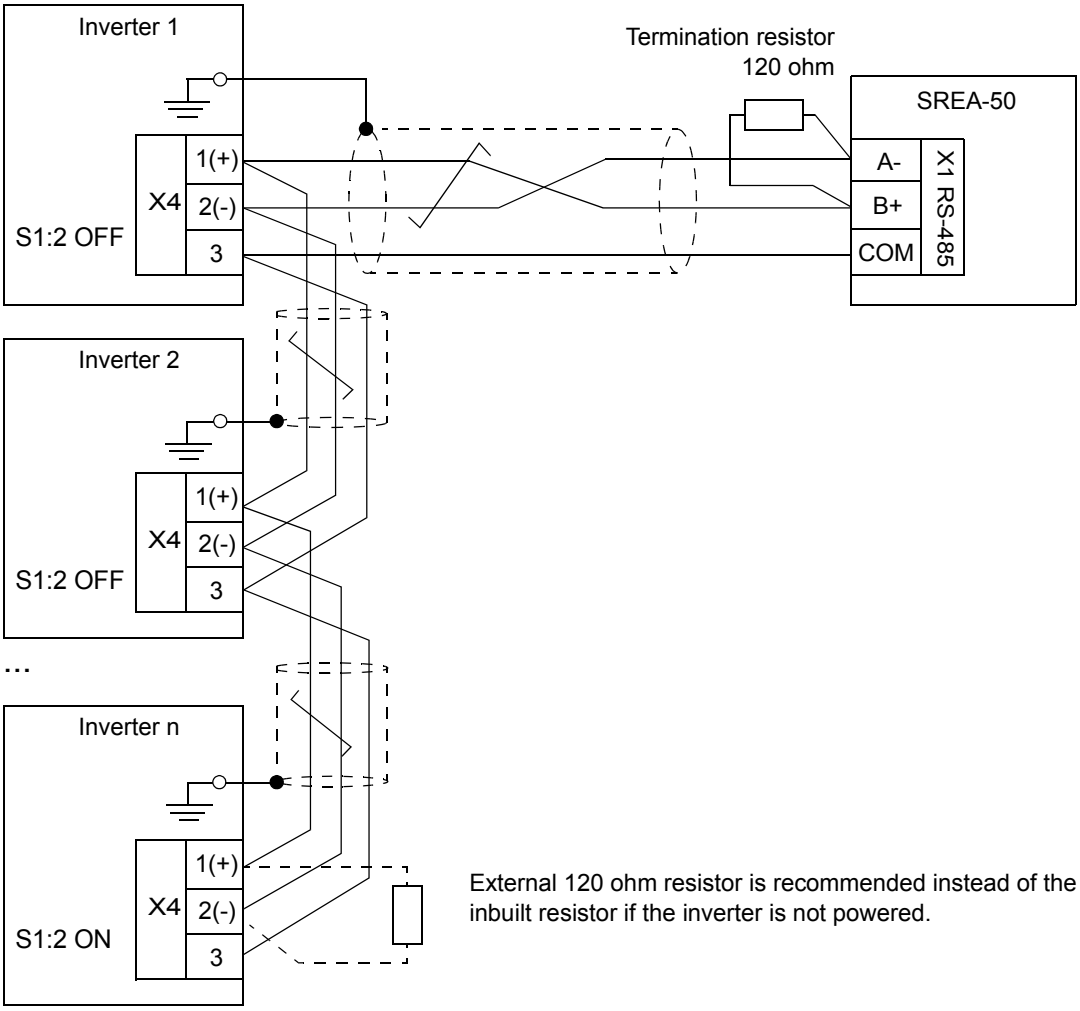
For more information on setting up the modem, see section *Modem* on page *85*.

Connecting the inverter(s)

Recommended cable type

It is recommended to use shielded twisted pair cable (STP), impedance 100...150 ohm (eg, Lapp Kabel UNITRONIC LiHCH (TP) or equivalent) with 120 ohm termination resistors. Bus termination is required to prevent signal reflections from the bus cable ends.

Modbus connection diagram



External 120 ohm resistor is recommended instead of the inbuilt resistor if the inverter is not powered.

Connection procedure

1. Connect the adapter to the inverter.
   - Connect the A- terminal of the adapter to the negative signal connector (X4:2) of the inverter.
   - Similarly, connect the B+ terminal to the positive signal connector (X4:1).
   - For signal ground, connect the COM terminal to X4:3.
   - Ground the cable shield(s) at one end only, for example, to the PE busbar near the X4 connector of the inverter.
2. Wire any additional inverters so that the bus forms a daisy chain topology as shown in the diagram above. Between the units on the bus, ground the cable shield(s) at one end only.
3. Terminate the bus at each end.
   - Whenever the adapter is at one end of the bus, connect one of the 120 ohm resistors included between its A- and B+ terminals.
   - Whenever an inverter is located at the end of the bus, activate its internal termination by setting switch S1:2 to ON.

   Note: The termination circuit built in the inverter is active and requires that the inverter is powered. If the inverter is not powered at all times, use an external 120 ohm resistor (connected between X4:1 and X4:2) instead and make sure that internal termination is disabled (S1:2 is set to OFF).

6

Start-up

What this chapter contains

This chapter presents the tasks which need to be accomplished before the adapter is ready for use for the operating user. In addition, it contains instructions on changing the network settings of the adapter and the PC.

Note: The user account must have Super Admin access rights to be able to perform the start-up.

Configuring the inverter Modbus interface

Set the following parameters in each inverter:

Parameter	Setting	Description
58.01 Protocol enable	**1** = Modbus RTU	Enables the embedded fieldbus interface.
58.03 Node address	1…32	Defines the node address of the inverter. A maximum of 10 ABB string inverters can be connected to a single adapter. **Note:** This value must be unique for each inverter within a range of 1…32. For example: • Inverter 1: 58.03 = 1 • Inverter 2: 58.03 = 2, and so on. Two devices with the same address are not allowed.
58.04 Baud rate	**3** = 19.2 kbps	Sets the baud rate.
58.05 Parity	**2** = 8 EVEN 1 (default)	Sets the parity.
58.10 Refresh settings	**1** = Refresh	Validates the communication settings.

If needed, you can modify the Modbus interface settings via the adapter web user interface. For more information, see section *Modbus* on page *83*.

SREA-50 start-up

Before you proceed, make sure that:

- all inverters are connected to the RS-485 network (see page *28*)
- the inverter Modbus interface has been configured (see page *32*)
- the inverters are powered
- the Ethernet network is connected (see page *27*)
- the modem (if any) is connected (see page *28*).

Powering up SREA-50

Power up the adapter and wait one minute for it to initialize.

Connecting to SREA-50 over Ethernet

The default Ethernet configuration of the adapter is:

IP address: 10.200.1.1
Subnet mask: 255.255.255.0

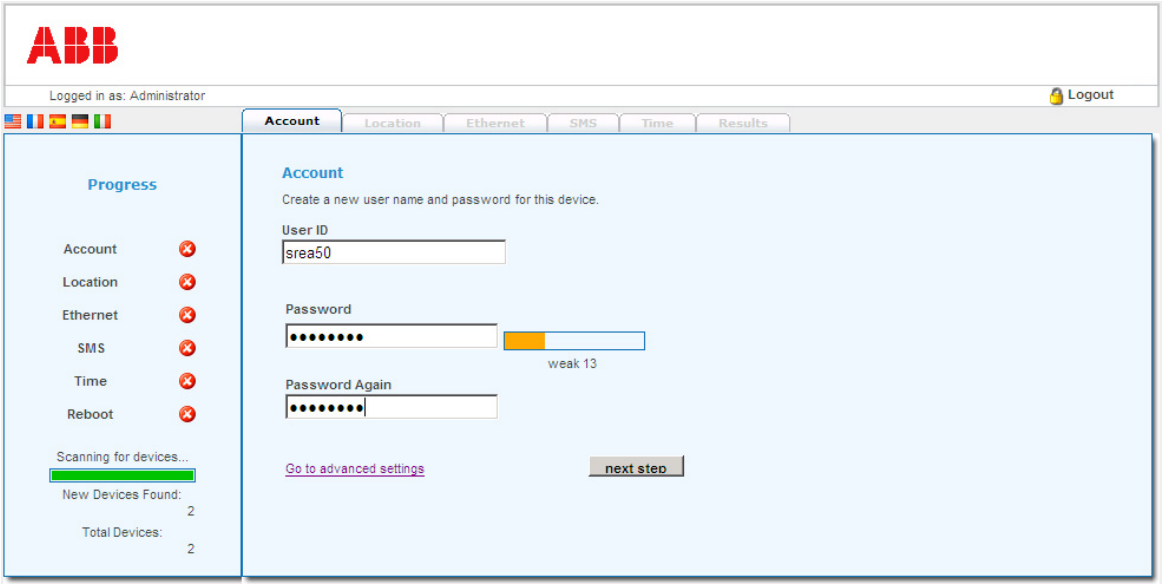
1. Configure your PC to the same subnet (for example, IP address 10.200.1.2 and subnet mask 255.255.255.0).
   For detailed instructions, see section *Changing network settings* on page *38*.
2. Use, for example, Internet Explorer or Mozilla Firefox and go to http://10.200.1.1.

Configuring SREA-50

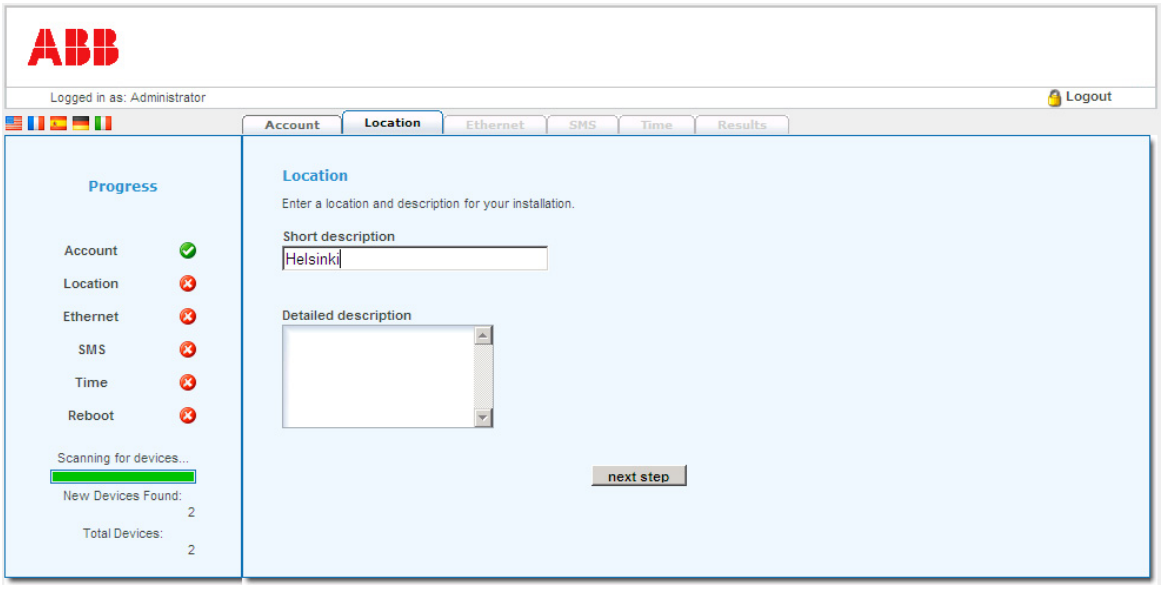
A start-up wizard will take you through the configuration steps. It will simultaneously scan for the inverters on the RS-485 bus.

1. Type in the activation code (printed on a label included in the adapter delivery).

2. Create an account for the administrator and click **next step**.

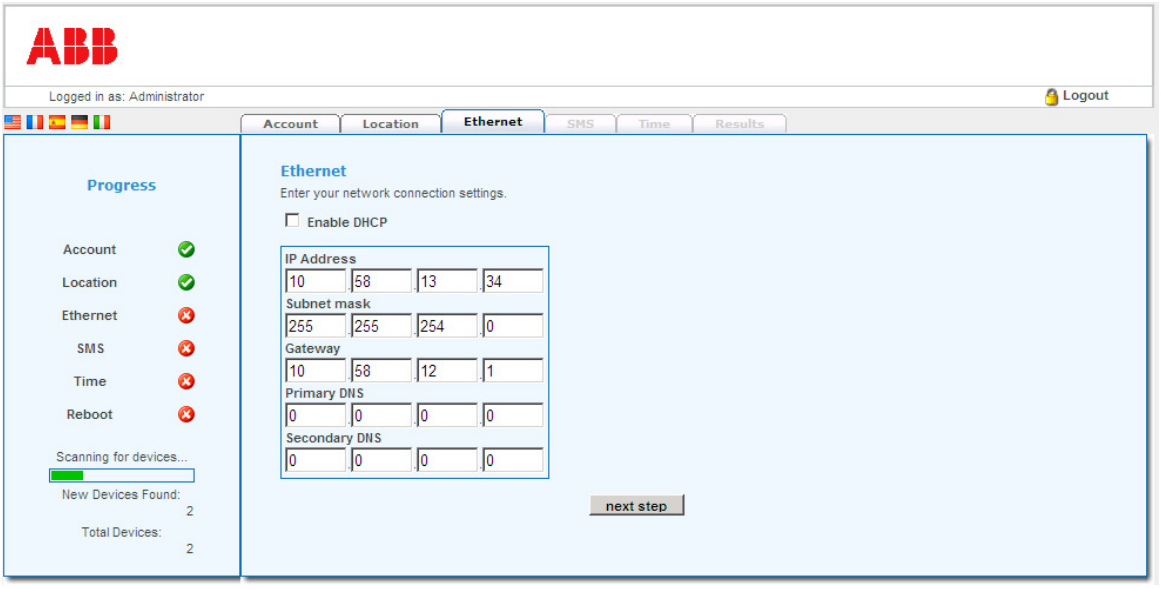


3. Type in the location of your site.



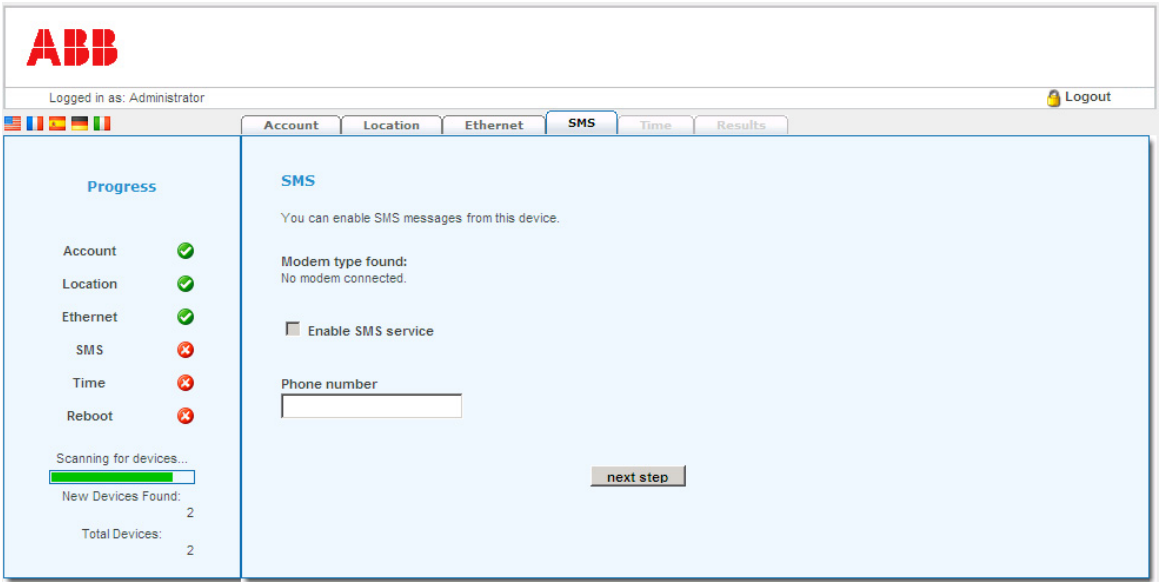
4. Set the Ethernet parameters.

   Note: DHCP is enabled by default. If you want to assign a fixed IP address, check the router settings. See section *Changing network settings* on page *38*.



5. **Modem/SMS settings**:

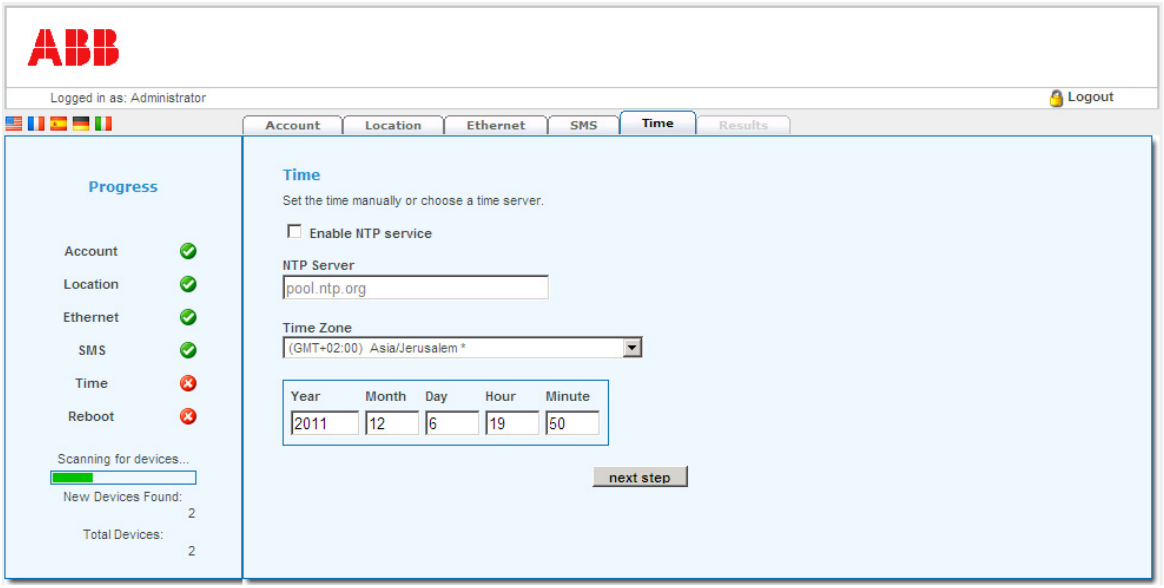
   If a modem has been installed, it is detected automatically.



6. **Time settings**:

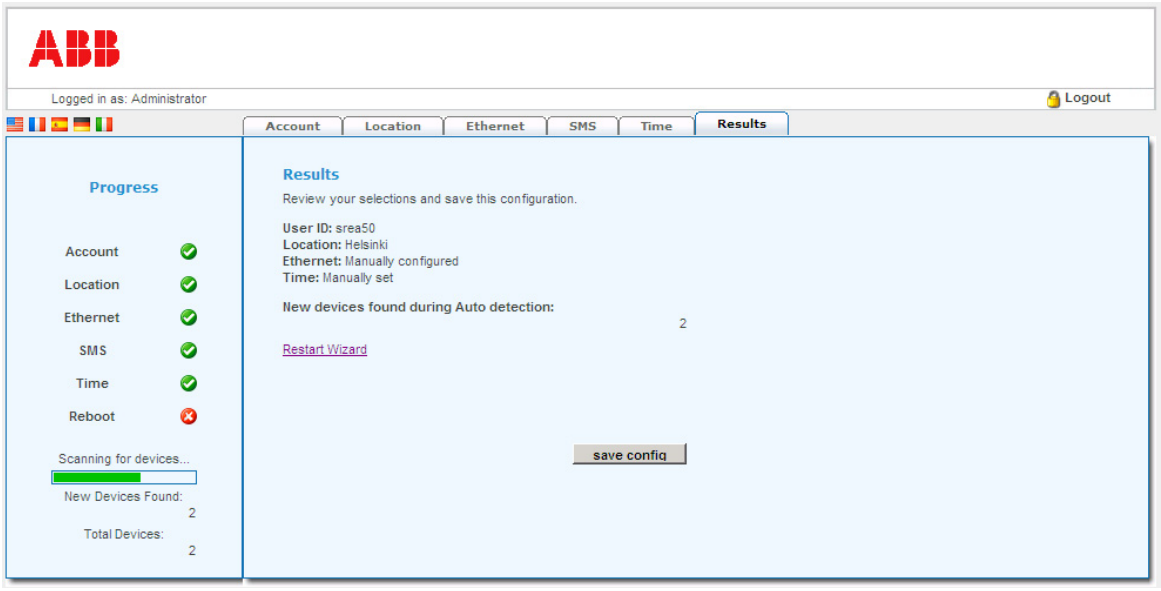
   Set the current date and time manually or enable automatic time synchronization from an NTP server.

   Note: It is important to make sure that the clock settings of the adapter and the clock on the user's PC are correct. If they are not, the automatic production log data may not be displayed on the Historical Graphs page.

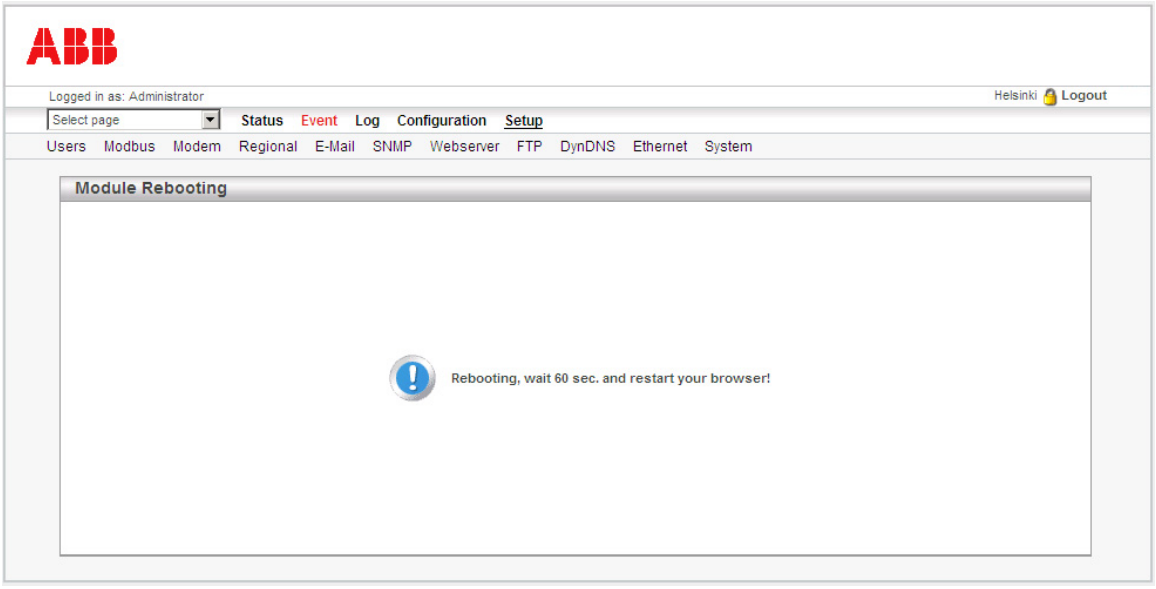


7. Review your selections.

- If the selections are adequate, approved them by clicking **save config**. The adapter is then restarted.
- If you want to modify the selections, click **Restart wizard** to start from the beginning.



Note: The number of the inverters found on the RS-485 bus is now indicated on the left-hand pane as well as under **Results**.



8. After restarting the adapter:
   - connect the adapter to the local Ethernet
   - with a web browser, connect to the default IP address or the address defined in step 4
   - and then log in with the administrator user name and password created in step 2.

The adapter is now ready for use. To modify the adapter configuration and setup, see sections *Configuration pages* on page *65* and *Setup pages* on page *81*. For examples of setting up the adapter for typical applications, see section *Application examples* on page *94*.

Changing network settings

The default IP address of the adapter is 10.200.1.1. There are two ways to change the network settings:

- You can use a straight Ethernet cable to connect to the device and change the settings by using the adapter web user interface.
- You can use ABB IP Configuration Tool to change the settings.

  The ABB IP Configuration Tool is a PC-based configuration utility to set the TCP/IP network settings of the adapter. This utility has the ability to scan the Ethernet network for connected adapters and let the user set IP address, net mask, gateway, DNS and host name for each unit.

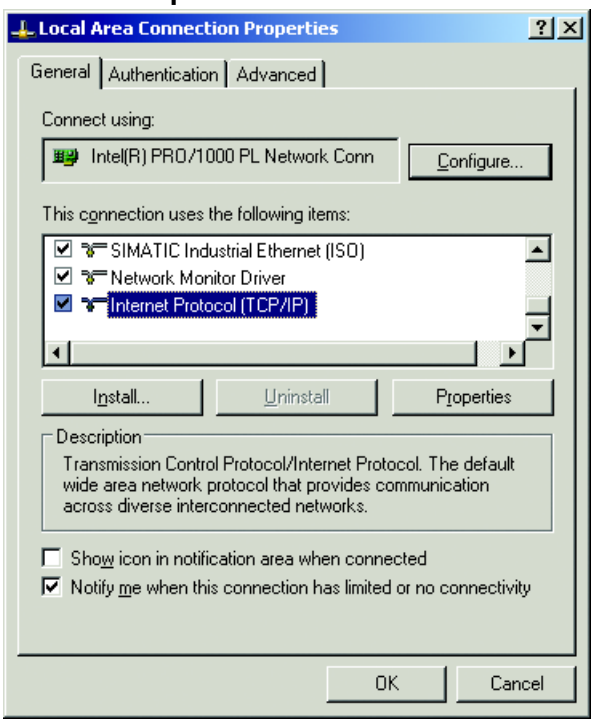
Note: Ask your network administrator for the correct network settings and an IP address for the adapter.

Changing the network settings by using a web browser

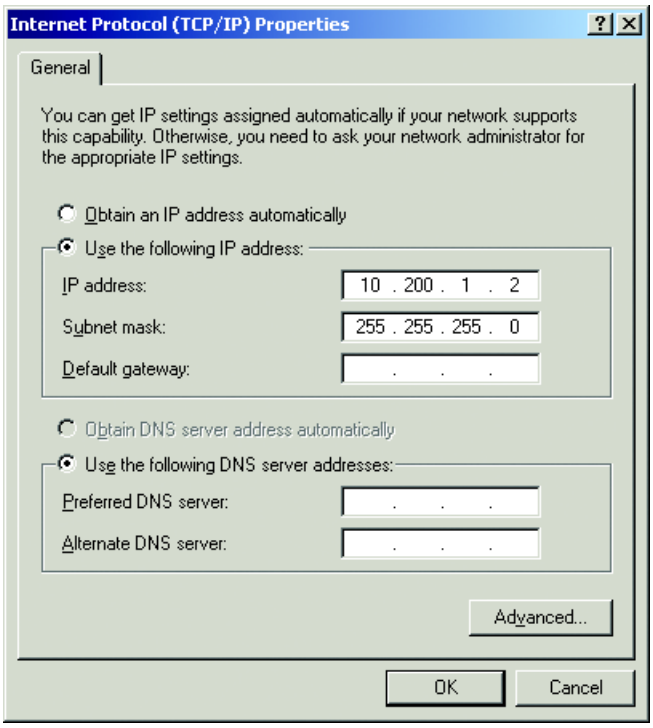
You can access the web pages of the adapter for configuration if you connect your PC directly to the unit and change the network settings of the PC to correspond to the settings of the adapter.

1. Connect the PC directly to the adapter by using an Ethernet cable.
2. Change the IP address of the PC to the same subnet as the adapter, for example, 10.200.1.2.

   In Microsoft Windows XP, for example, access Network Connections and open the Properties page for your local network adapter. Select **Internet Protocol (TCP/IP)** and click **Properties**.

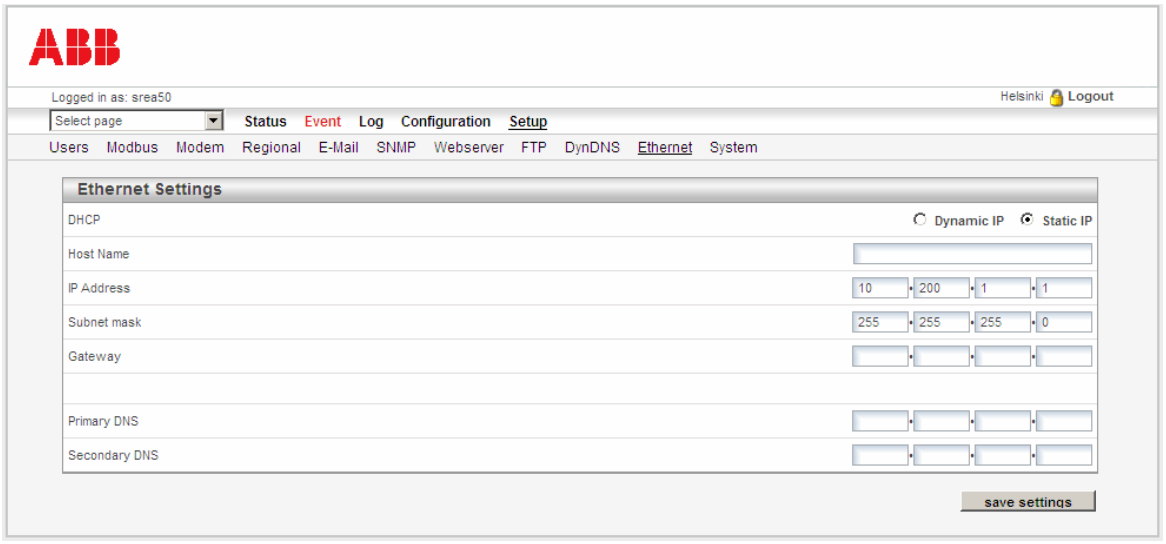


Write down your current network settings. Change the IP address to 10.200.1.2 and the Subnet mask to 255.255.255.0.



3. Open your web browser and enter address http://10.200.1.1.
   Note: Make sure that your browser is not configured to use a proxy server for this address.
4. Log in with the administrator user name and password.

5. Select **Setup** – **Ethernet** on the menu and enter the new network settings. Save the settings when you are finished and reboot the adapter. See section *Ethernet* on page *92* for more information.



6. Restore the network settings of the PC. This is done exactly the same way as in step 2, except that this time the settings that you wrote down previously are used.

Changing network settings by using the ABB IP Configuration Tool

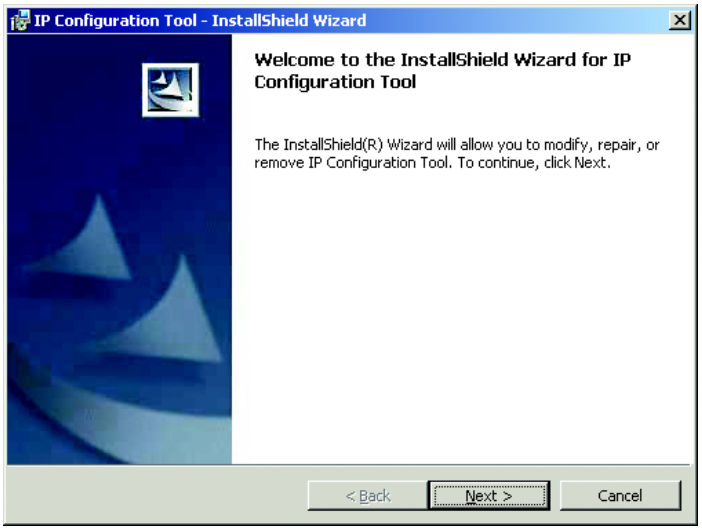
System requirements

- Pentium 133 MHz or higher
- 50 MB of free space on the hard drive
- Win 2000/XP/Vista/Win 7 or newer
- Network Interface Card (Ethernet)

Installing the tool

1. Double-click the ‘IP Configuration Tool Setup.exe’ file on the CD-ROM.

2. The installer starts. Follow the instructions given in the installation wizard to finish the installation.

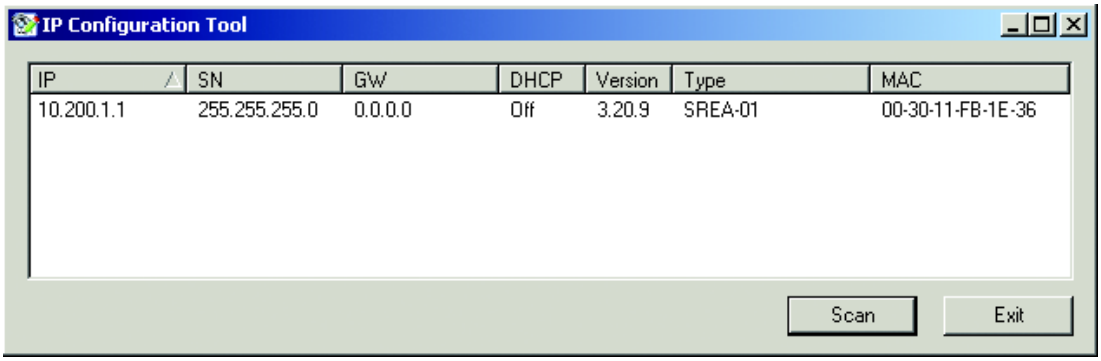


Scanning for connected devices

Before you start, ensure that you have connected the adapter units you want to install on the same Ethernet network as the PC is connected to. Use standard Ethernet cables. See chapter *Electrical installation* for more details.

To start scanning, select **ABB Drives** – **IP Configuration Tool** – **IP Configuration Tool** on the **Start** menu of Windows.

When the tool is started, it will scan the Ethernet network for adapter devices. All detected devices will be presented in a list in the main window. If you want to force a new scan for the devices, click the **Scan** button.



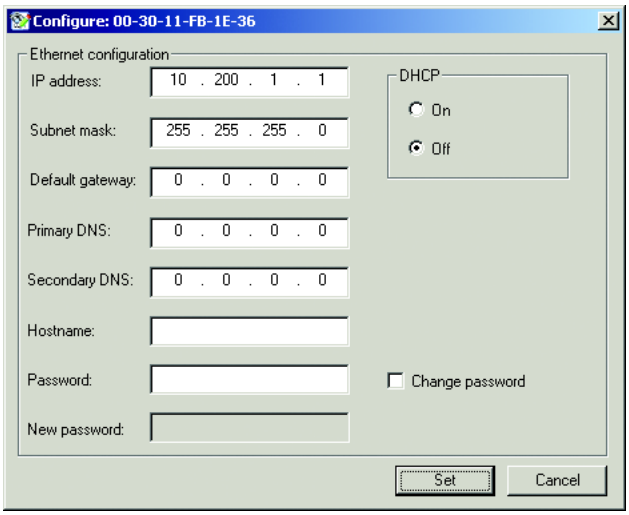
IP	The IP address of the adapter
SN	The subnet mask
GW	The default gateway
DHCP	Dynamically assigned IP address On/Off
Version	Firmware version of the adapter
Type	Product type (SREA-50)
MAC	The Ethernet MAC address (unique for each adapter, printed on the side label)

Note: Some software firewall applications block the network packets sent or received by the IP Configuration Tool. If this happens, you may need to disable your software firewall temporarily. Be sure not to connect to an insecure network while operating without a firewall application.

Changing IP settings

1. In the list of detected devices, double-click the device you want to configure.
2. In the dialog box that opens, enter the desired IP configuration.

   To obtain the necessary information about IP address, subnet mask etc., contact your network administrator.



IP Address	The IP address of the adapter
Netmask	The subnet mask
Gateway	The default gateway
Primary DNS	The primary Domain Name Server (optional)
Secondary DNS	The secondary Domain Name Server (optional)
Host Name	A host name for your device (optional)

   Note: Do not set DHCP to “On” if you do not have a DHCP server available on the network.

3. In the **Password** field, type the administrator password of the adapter.

   You can also change the password by typing the old password in the **Password** field, selecting the **Change password** check box and typing the new password in the **New password** field.

4. Click **Set** to reboot the adapter. After that the new settings will be enabled.

Testing the new settings

You can test the new settings by opening a web browser and entering the IP you assigned to the device. If you selected DHCP and want to know what IP your device has been assigned, you can do a new scan with the ABB IP Configuration Tool to view the new network configuration.

7

Operation

What this chapter contains

This chapter describes the web user interface of the remote monitoring adapter. The target audience of this chapter is the operating user.

Browser requirements

The web pages are optimized for Internet Explorer 8 and 9, and Mozilla Firefox 3.6 and 6. Other browsers may work as well, but the web pages might appear different. The browser must be JavaScript-enabled to use the pages and Java-enabled to use pages with JAVA content (such as the Log page). If it is not, visit www.java.com to download a Java plug-in for your browser.

Logging in

After the adapter has been started up as instructed in chapter *Start-up*, log in as follows:

1. Open a web browser and type the IP address of the adapter in the address field.
   For example, if you are using the default IP address 10.200.1.1., type http://10.200.1.1., and then press **Enter**.

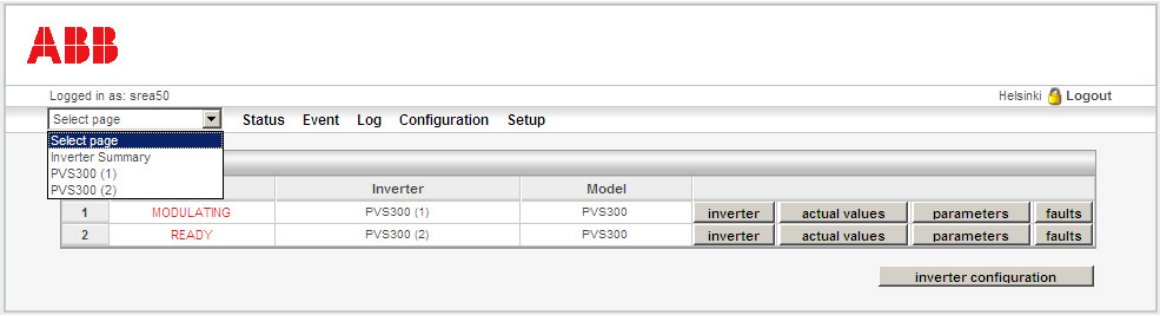
2. Log in with a user name and a password.
   The default user name is **admin**, and the password is the activation code (printed on a label included in the adapter delivery).

After pressing the **login** button, the user interface is loaded. The Historical Graphs page (the automatic production log) is loaded by default. The administrative user can also create a custom page to be used as the start-up page.

Note: JavaScript must be enabled to use the web pages. If error “JavaScript must be enabled” appears on the login page, change the settings of your browser.

Menu overview

To navigate on the web pages, use the menu items available: **Select page**, **Status**, **Event**, **Log**, **Configuration** and **Setup**.



In the **Select page** list, you can select:

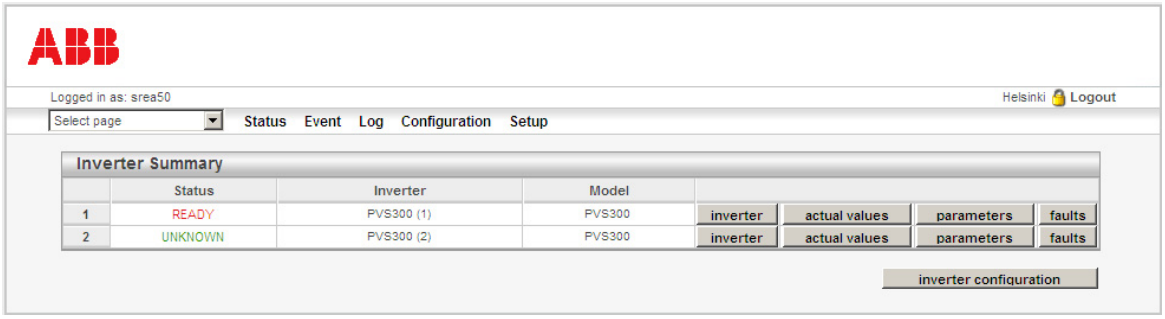
- the Inverter Summary page with information on all inverters
- the Inverter Information pages with information on each individual inverter
- custom pages created by the administrative user.

Some sections of the main menu have multiple subpages. For example, when you access the information page of an inverter, a submenu with links to the Inverter Information page, Actual Values page, Parameters page and Faults page appears below the main menu.

After you are finished using the web pages, click **Logout** on the top-right corner.

Inverter Summary page

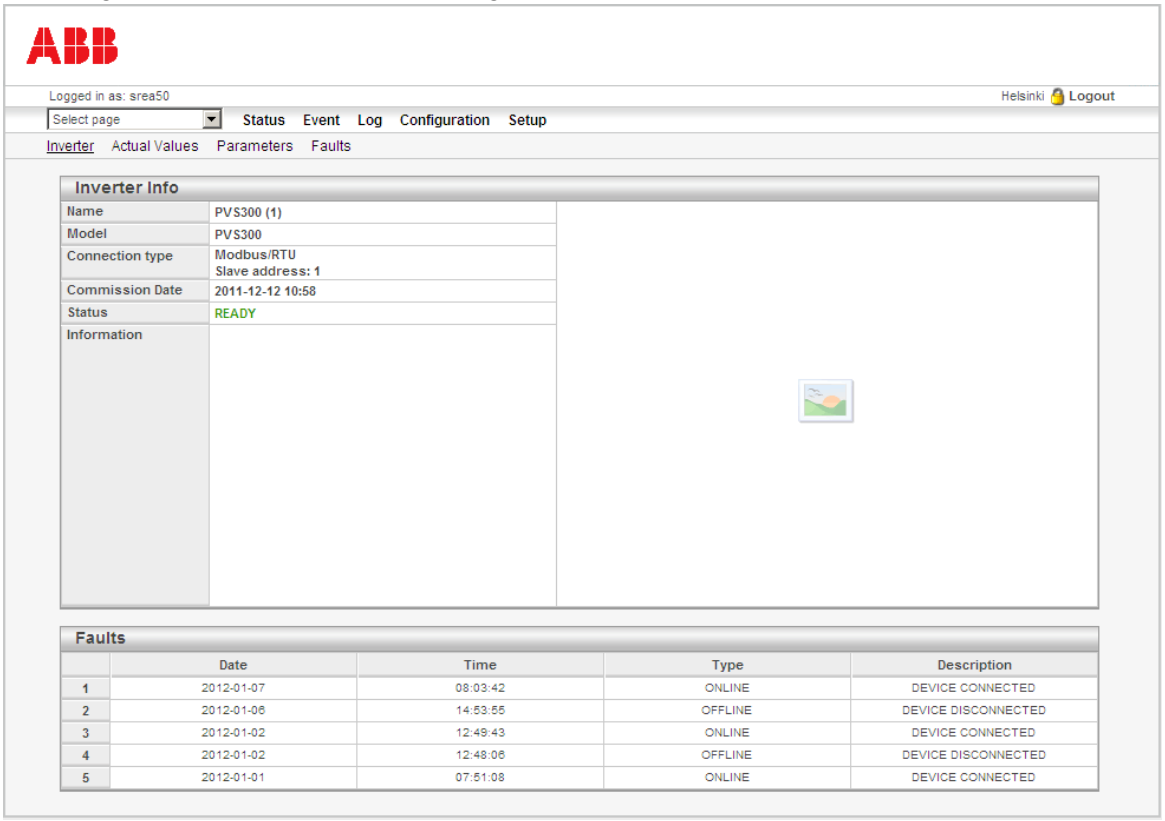
This page shows the status and model codes of the inverters that are configured and enabled.



The page also has buttons for accessing the subpages of each inverter. The **inverter configuration** button is a shortcut to **Configuration** – **Devices**, where the administrative user can add or remove inverters and alter the information of each inverter.

Inverter Information page

This page shows information on a single inverter.



The page displays the inverter name and model, how the inverter is connected to the adapter, the date when the inverter fed for the first time, and the status of the inverter. In addition, the page may display additional information and a picture of the inverter. The Faults section shows the five latest events of the inverter.

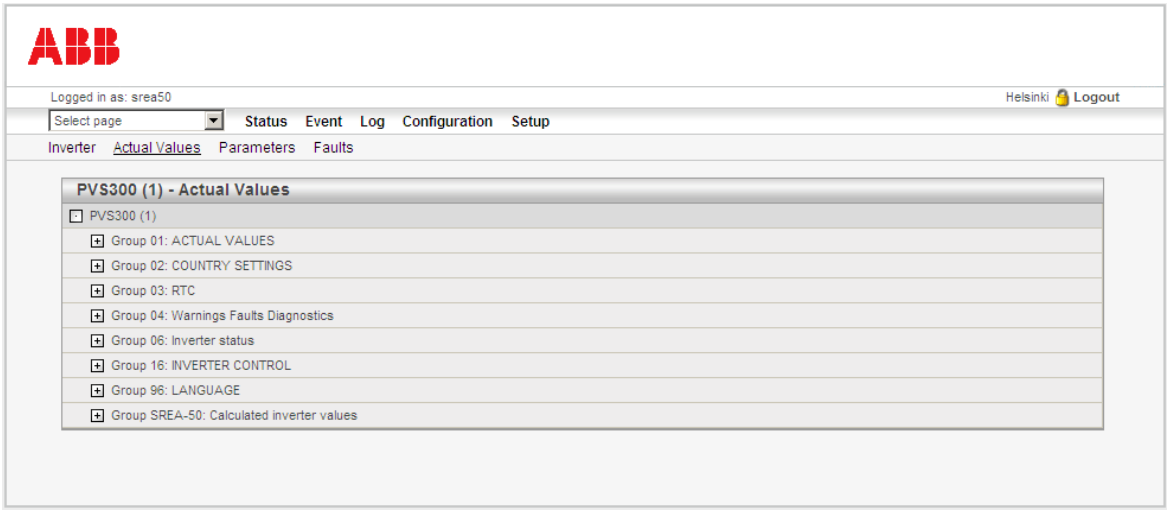
The page only shows information. The texts and values can be altered by the administrative user; see section *Devices* on page *67*.

You can access the other pages of the inverter – Actual Values, Parameters and Faults – on the submenu below the main menu.

Actual Values

You can access the Actual Values page of an inverter in two ways:

- by clicking the **actual values** button on the Inverter Summary page
- by clicking **Actual Values** on the submenu when viewing some other page of the inverter.



This page shows both the actual values and parameters of the inverter, as well as the inverter values calculated by the adapter. The data are refreshed automatically.

Note: If you are using a low-bandwidth link, such as a GPRS modem, you can disable the automatic refreshing of the values by activating an alternative web server port with bandwidth-saving features. For more information, see section *Webserver* on page *90*.

Expanding or collapsing a group

To expand or collapse a group, click the plus or minus sign button or the name of the group.

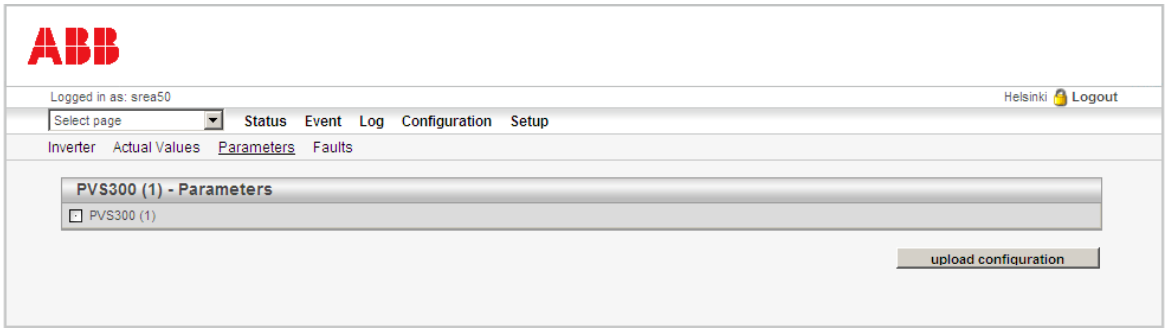
Resetting values

Some actual values can be written to or reset by setting the value to zero. These values have an input field and a set button.

Parameters

You can access the Parameters page of an inverter in two ways:

- by clicking the **parameters** button on the Inverter Summary page
- by clicking **Parameters** on the submenu when viewing some other page of the inverter.



The Parameters page does not currently show any parameters. The parameters of the inverter are shown on the Actual Values page (see page *48*).

Uploading configuration

To read the complete parameter configuration from the inverter to the PC, click **upload configuration**.

The parameters are saved in a tab-delimited plain text file. Example of a parameter file:

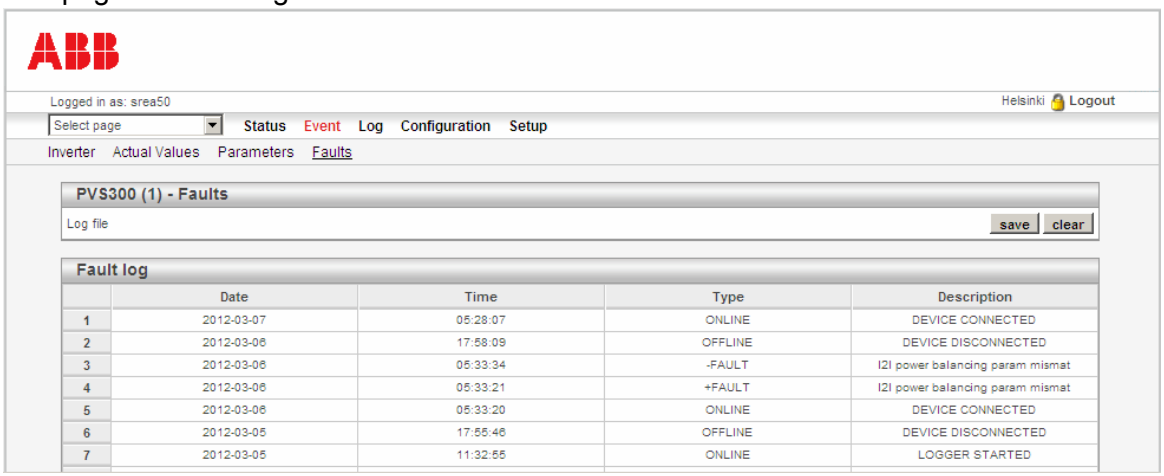
```
[SREA-50 Report File]
2012-03-07 09:05:23

PVS300 (1)

PVS300


Group 01: ACTUAL VALUES

NAME     VALUE
01.06: OUTPUT CURRENT [A]                15.5
01.09: DC-VOLTAGE [V]                    627.7
01.11: OUTPUT VOLTAGE [V]                239.6
01.12: OUTPUT POWER [kW]                 3.722
01.14: INVERTER ENERGY COUNTER [kWh]     179
01.16: ENERGY COUNTER, RESETABLE [kWh]   179.02

Group 02: COUNTRY SETTINGS

NAME     VALUE
02.01: Country code      6

Group 03: RTC

NAME     VALUE
03.01: DATE              11755
03.02: TIME              16423
03.03: INPUT DATE        0
03.04: INPUT TIME        0

...
```

Faults

You can access the fault (event) log of the inverter in two ways:

- by clicking the **Faults** button on the Inverter Summary page
- by clicking **Faults** on the submenu when viewing some other page of the inverter.

The page shows a log of the 50 last events of the inverter.



	Date	Time	Type	Description
1	2012-03-07	05:28:07	ONLINE	DEVICE CONNECTED
2	2012-03-06	17:58:09	OFFLINE	DEVICE DISCONNECTED
3	2012-03-06	05:33:34	-FAULT	I2I power balancing param mismat
4	2012-03-06	05:33:21	+FAULT	I2I power balancing param mismat
5	2012-03-06	05:33:20	ONLINE	DEVICE CONNECTED
6	2012-03-05	17:55:46	OFFLINE	DEVICE DISCONNECTED
7	2012-03-05	11:32:55	ONLINE	LOGGER STARTED

The logger can log two types of inverter events:

- inverter faults
- inverter warnings.

Faults are identified by event type “FAULT” and warnings by event type “WARNING”. The logger logs both positive and negative edges of events. When an event occurs, the type is preceded by a plus sign; when an event is reset, the type is preceded by a minus sign.

Note: The log is collected and stored by the adapter. Therefore, the log only shows events that have occurred when the adapter is connected to the inverter and powered on.

Because the event logger can only detect events when the adapter is connected to the inverter, there are also special ONLINE and OFFLINE events:

- A LOGGER STARTED event is generated every time the adapter is powered on or a new inverter is configured to the adapter.
- A DEVICE DISCONNECTED event is generated whenever the inverter stops responding to the adapter and a DEVICE CONNECTED event whenever it starts responding again.

Saving the log file to the PC

To save the log file to the PC, click **save**.

The events are stored in plain text format. Example of a log file:

```
PVS300 (1)

PVS300


DATE    TIME    TYPE    DESCRIPTION
2012-03-06      05:33:34        -FAULT  I2I power balancing param mism
2012-03-06      05:33:21        +FAULT  I2I power balancing param mism
2012-03-06      05:33:20        ONLINE  DEVICE CONNECTED
2012-03-05      17:55:46        OFFLINE DEVICE DISCONNECTED
2012-03-05      11:32:55        ONLINE  LOGGER STARTED
2012-03-05      11:31:52        OFFLINE DEVICE DISCONNECTED
2012-03-05      05:36:05        ONLINE  DEVICE CONNECTED
2012-03-04      17:52:46        OFFLINE DEVICE DISCONNECTED
2012-03-04      05:42:18        ONLINE  DEVICE CONNECTED
2012-03-04      05:40:38        OFFLINE DEVICE DISCONNECTED
2012-03-04      05:40:24        ONLINE  DEVICE CONNECTED
2012-03-04      05:38:45        OFFLINE DEVICE DISCONNECTED

...
```

Clearing the log

To clear the log, click **clear**.

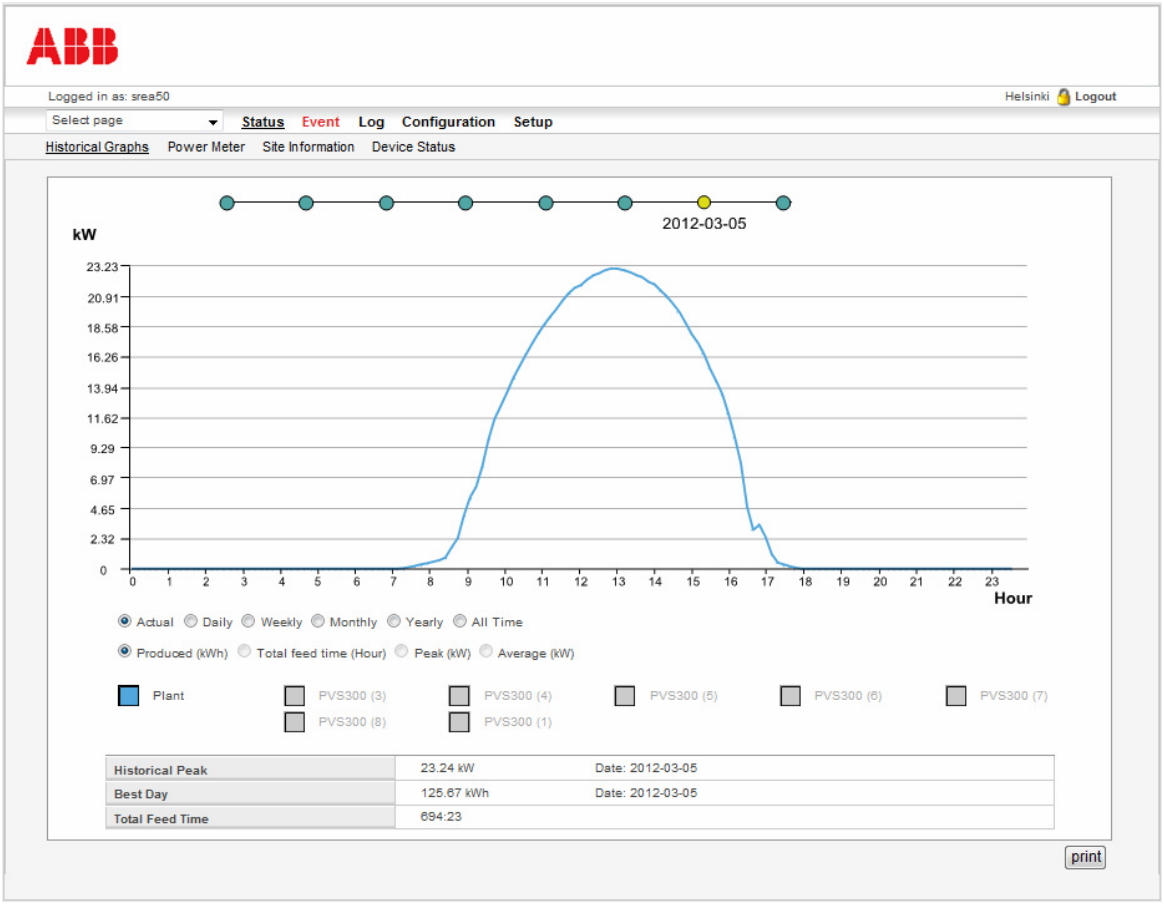
Status

On the **Status** menu, you can

- examine the inverter operational data collected into the automatic production log
- view the inverter power meters and site information
- monitor the Modbus interface status.

Historical Graphs

The Historical Graphs page visualizes the automatic production log data on various time spans, showing individual inverters, several or all inverters inverter by inverter, or the plant as a whole. The logger calculates the data for each time span by reading actual signal 01.12 OUTPUT POWER [kW] at 10-second intervals.



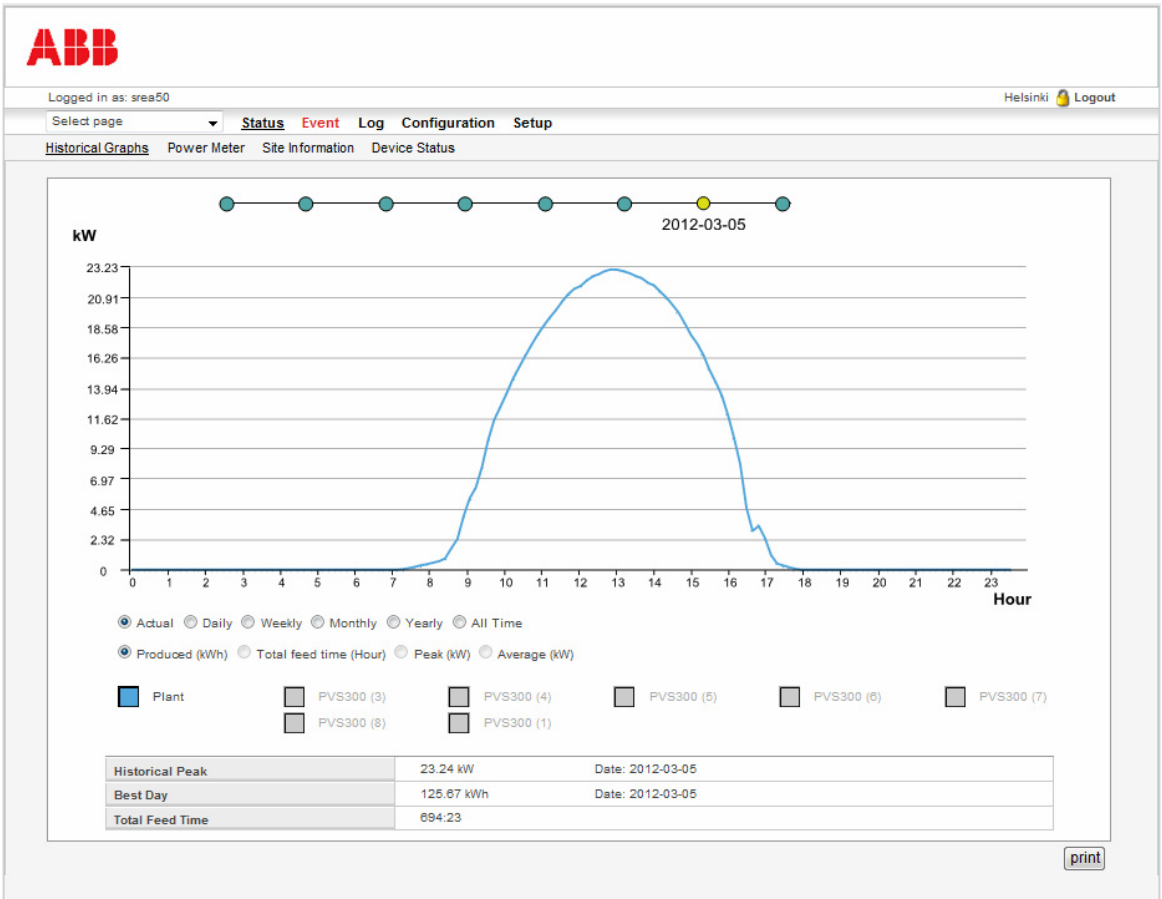
For individual inverters and the whole plant, the record values (eg, Historical Peak) of each time span are listed at the bottom of the page. Note that the record values are not available if you select to show several or all inverters by clicking them inverter by inverter.

The following time spans/graph types are available:

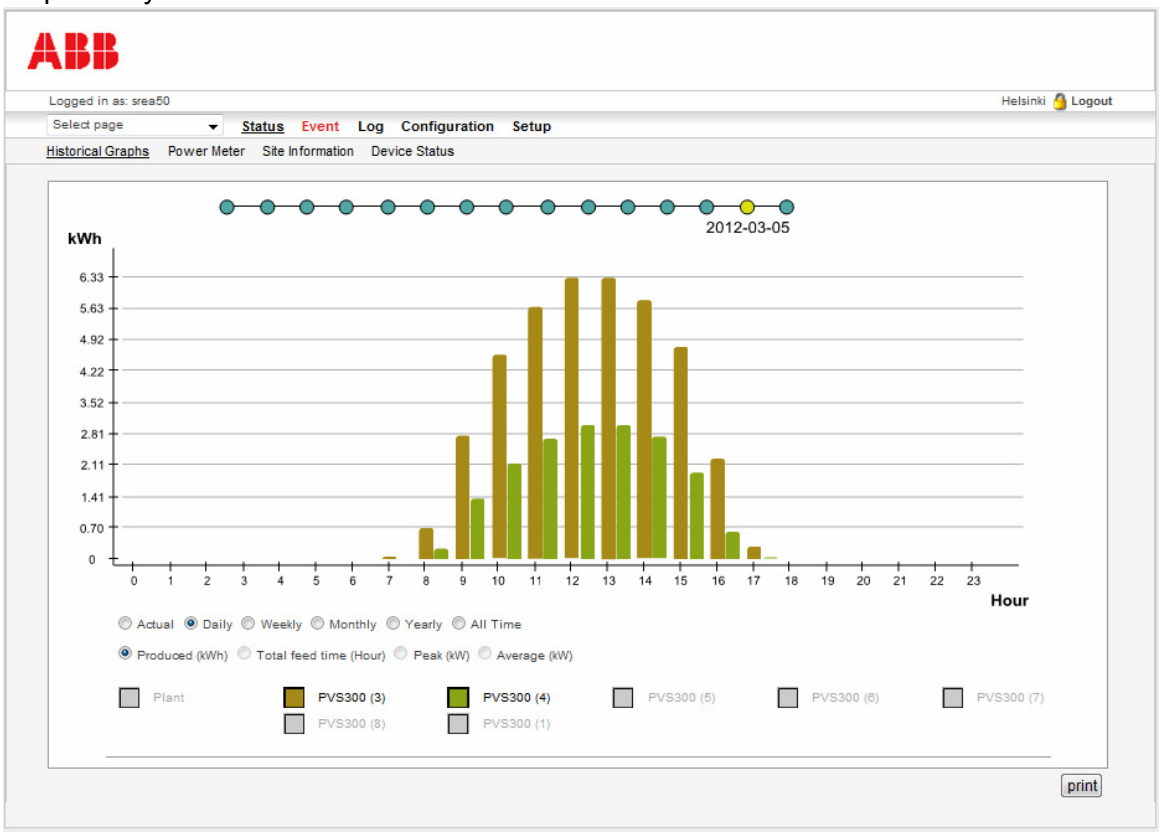
Time span/graph	Description
Actual	Actual power (kW) up to the last 8 days. This graph shows the sampled data averaged over 10 minutes. Thus, there are 60 peaks used to calculate every point in the graph. So, realistically, the Historical Peak is always higher than the data point logged in this graph for the same time period.
Daily	Daily energy production (kWh) up to the last 15 days. The data is logged once per hour.
Monthly	Monthly energy production (kWh), feed time (h), average power (kW) and peak power (kW) of each day up to the last 400 days. The data is logged once per day at 23:55.
Weekly	Weekly (Monday – Sunday) energy production, feed time (h) and peak power (kW) of each day up to the last 53 weeks. The data is logged once per day at 23:55.
Yearly	Yearly energy production (kWh) and peak power (kW) of each month up to the last 5 years
All Time	All-time production (kWh) of each year up to the last 25 years

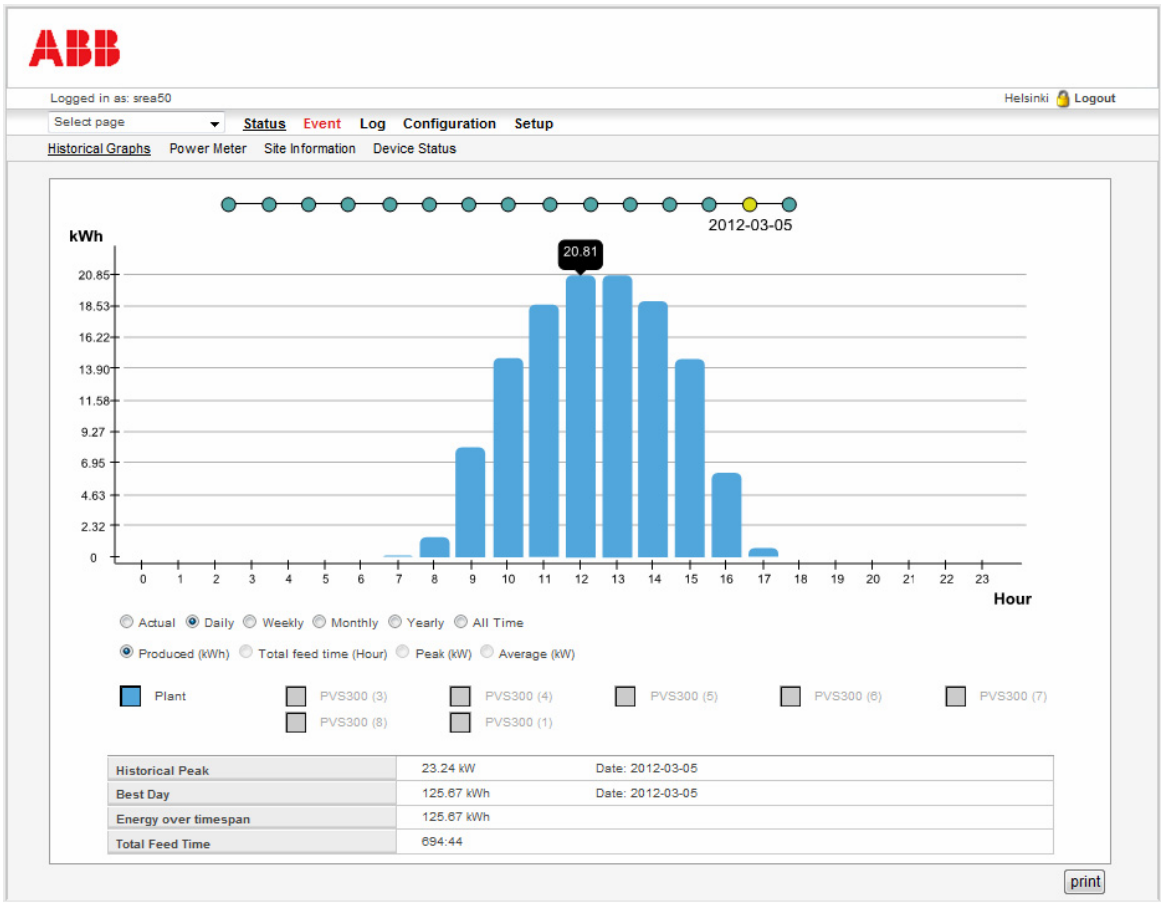
Note: The automatic production log data is displayed relative to the browser's local time. This means that if the clock on the adapter or on the user's PC is incorrect, the data may not be displayed.

The following are examples of the **Actual** graph for several inverters and the whole plant, respectively.



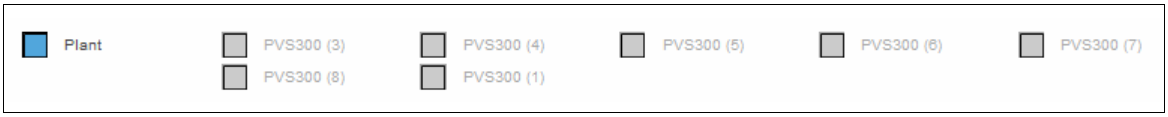
The following are examples of the **Daily** graph for several inverters and the whole plant, respectively.



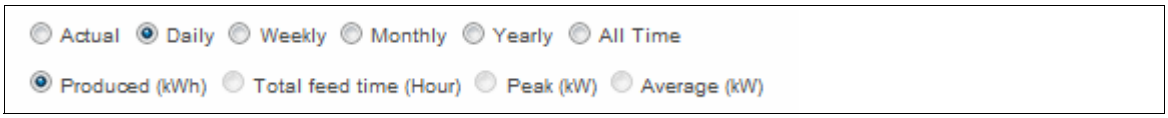


Selecting the graph type

You can select to show individual inverters, several or all inverters inverter by inverter, or the whole plant. To show a device, click the square in front of the device name. To make the device disappear from the view, click the square again.

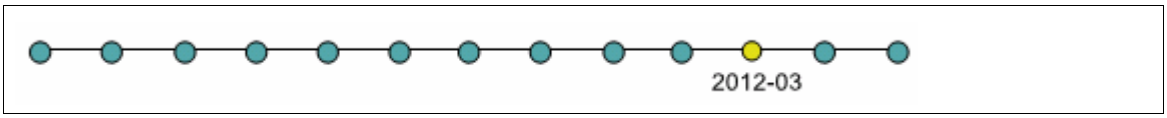


Use the option buttons to select the desired time span. If the selected time span has no data to show, the scaling on the y axis is 0…1000 kWh, 0…1000 kW or 0…1000 h.



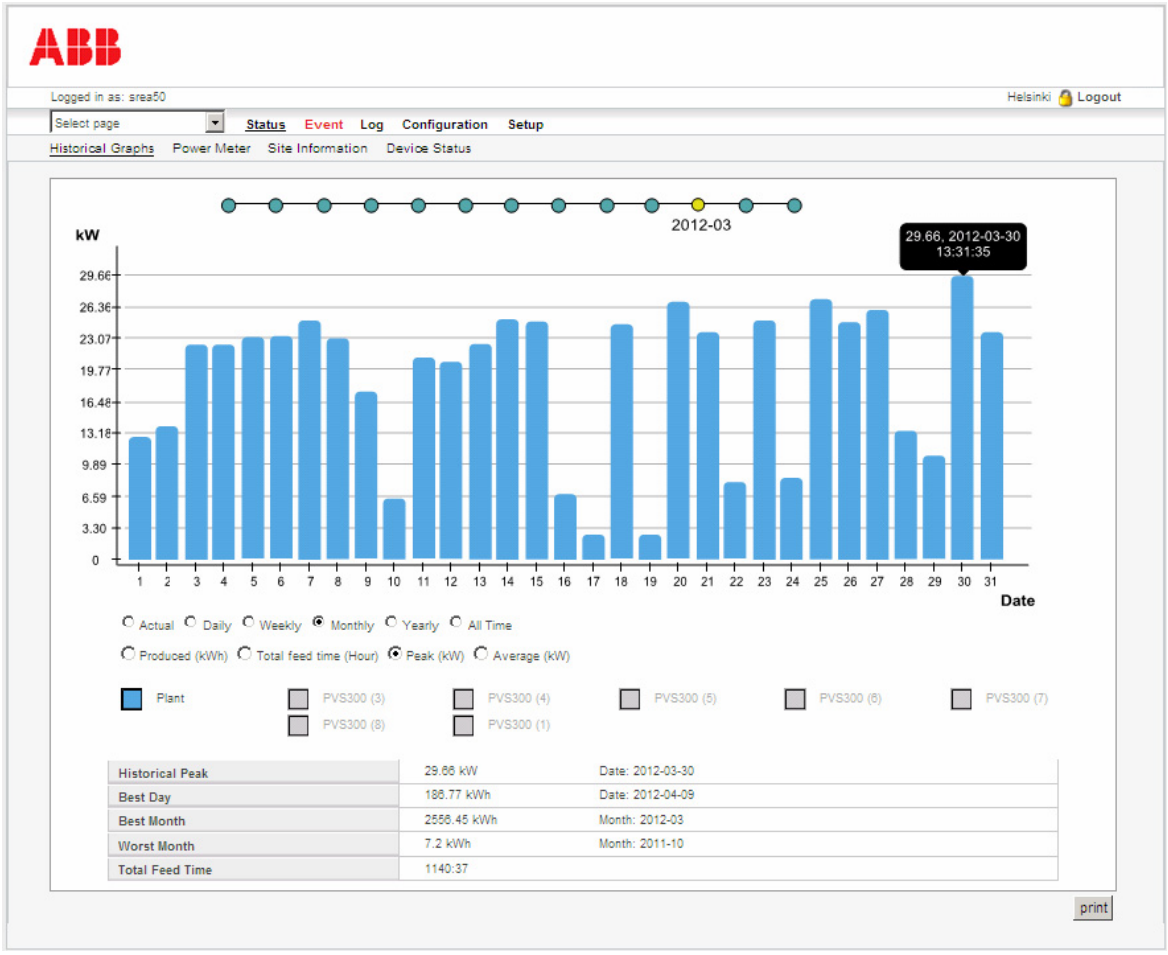
Moving along the selected time span

To move backwards and forwards within the time span covered by a graph, move the cursor over the timespan selector above the graph.



Viewing histogram values

To view the exact value of a bar in a histogram, hold the cursor over the bar. For Peak (kW), the exact point of time when the peak power was registered is also shown.



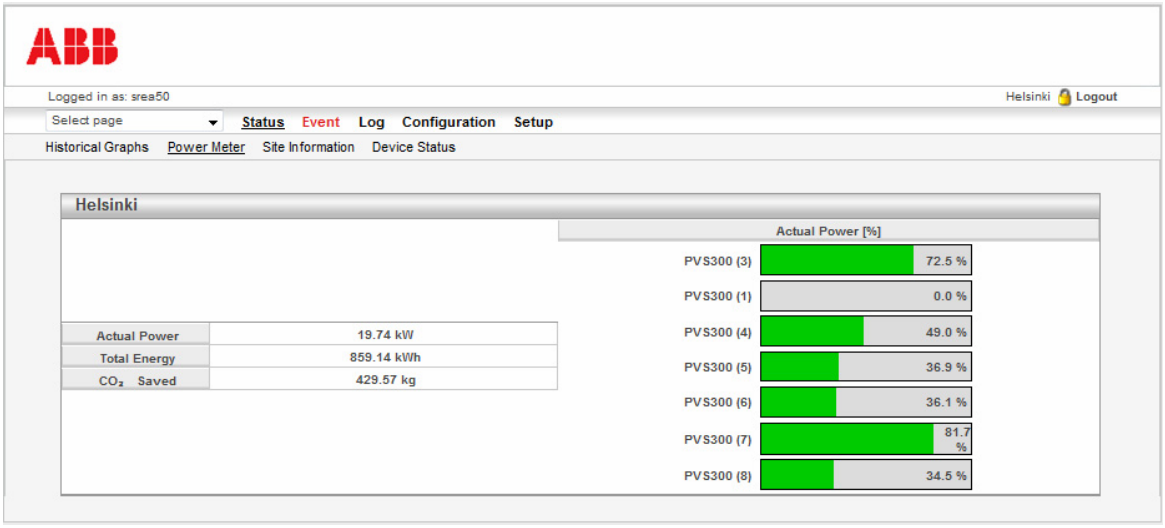
Printing a graph

To print a graph, click **print** on the bottom-right corner.

Power Meter

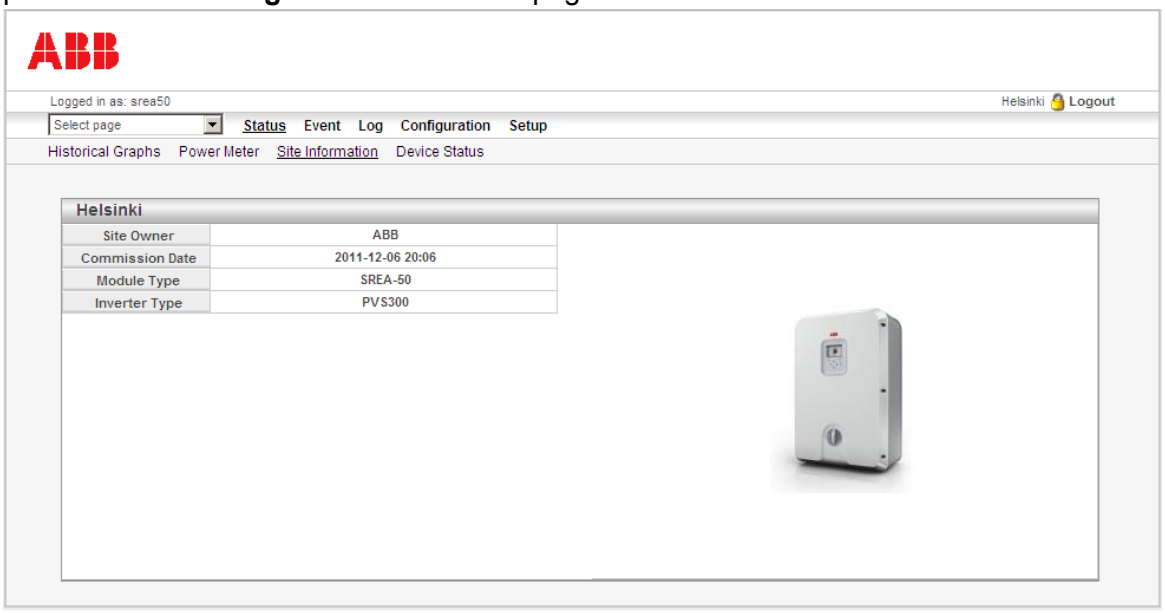
The Power Meter page shows the following information:

- Actual Power: Actual power (kW) produced by each inverter in percentage of the inverter nominal power
- Total Energy: Total energy (kWh) produced by the site
- CO_2 Saved: Total energy converted into CO^2 emissions (kg/kWh).



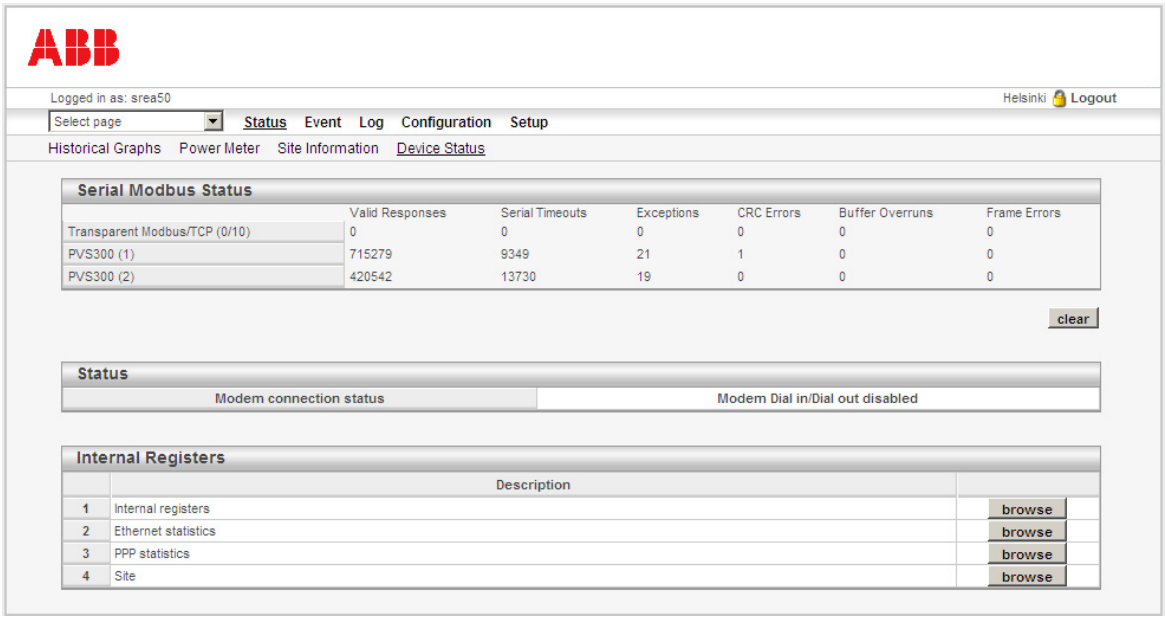
Site Information

The Site Information page shows the site owner, the plant commissioning date set upon the completion of the start-up wizard, and the adapter and inverter types. In addition, the page may display a picture of the inverter if the administrative user has specified the picture on the **Configuration** – **Devices** page.



Device Status

The Device Status page shows status information on the Modbus interface used for the inverter connection. The page is split into multiple rows and columns.



Serial Modbus Status

The **Transparent Modbus/TCP** row displays counters for the Modbus traffic from Modbus/TCP to Modbus RTU. This functionality is also known as the Modbus/TCP gateway. Information on the connected devices is indicated with device-specific counters. You can clear all counters by clicking the **clear** button.

The table below describes the counters:

Counter	Description
Valid Responses	Counts valid responses from the inverter.
Serial Timeouts	Counts the number of time-outs from the inverters connected.
Exceptions	Counts all exception responses from the inverters connected.
CRC Errors	Counts the number of checksum errors on the incoming Modbus/RTU responses.
Buffer Overruns	Counts buffer overruns. If an incoming Modbus RTU response is larger than 300 bytes, it will cause the input buffer to overflow.
Frame Errors	Counts frame errors. If an incoming Modbus RTU response has an incorrect length or some other fault in the frame, it will cause a frame error.

Status

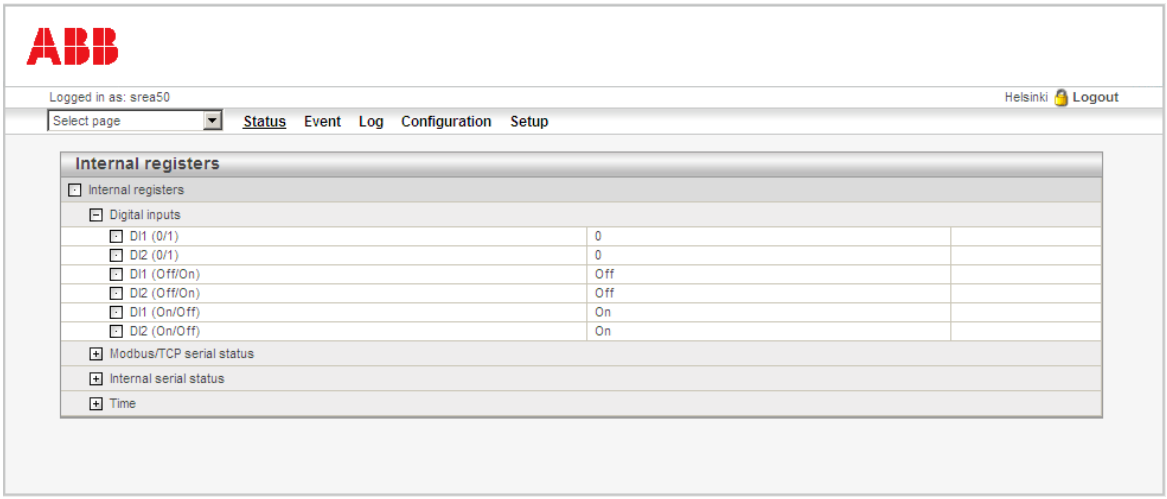
On the **Modem connection status** row, you can view the modem status. The table below lists the possible states:

State	Description
Connecting to Internet	Calling Internet Service Provider and negotiating for a connection.
Waiting for incoming connection	The unit is waiting for an incoming call.
Waiting for Event/Alarm	The unit is in the stand-by mode, and when an alarm or event appears, it will connect to the Internet.
Connection established	A connection to the Internet is established and data will be sent.
Incoming connection is in progress	There is an incoming call and the correct baud rate, user name and password are being verified.
Modem Dial in/Dial out disabled	It is not possible to connect using the modem.

Internal Registers

Below Internal Registers, you can monitor the following statistics by clicking the respective **browse** button:

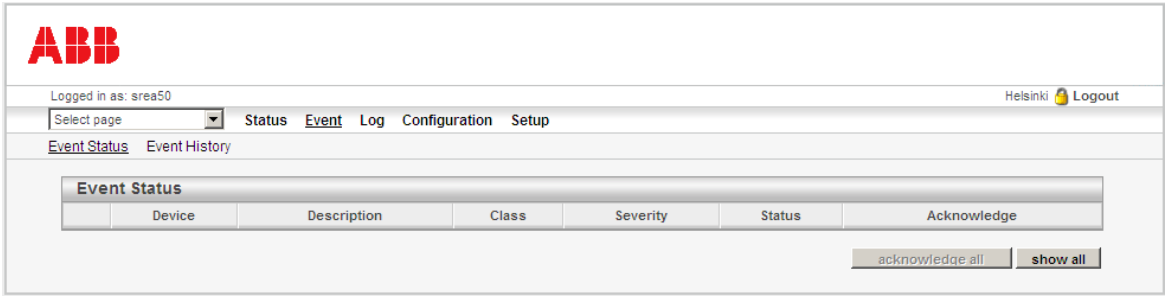
- Internal registers, such as the digital inputs status and Modbus/TCP serial status
- Ethernet statistics
- PPP statistics
- Site statistics.



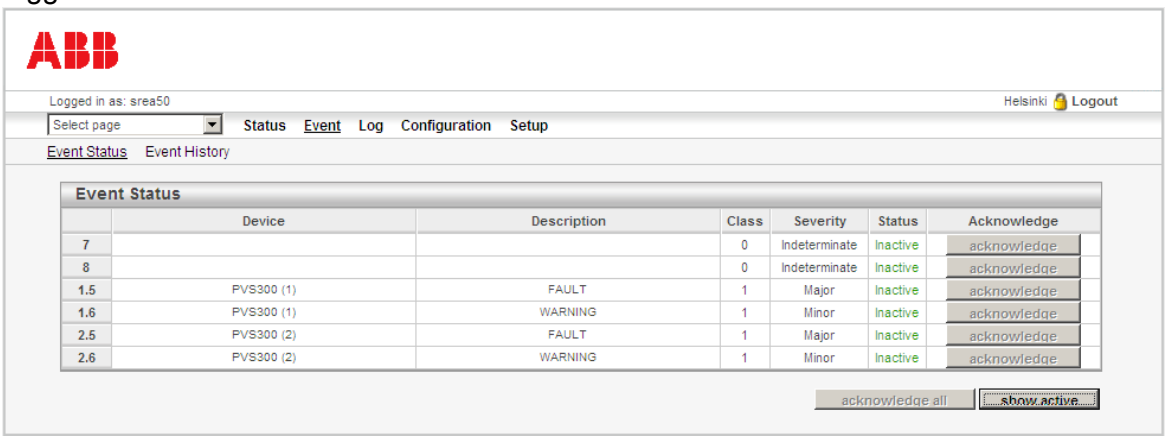
To expand or collapse a group, click the plus or minus sign button or the name of the group.

Event

When there are events present in the system, the **Event** menu item appears red. To view a list of the events and their states, click **Event**.



The Event Status page shows all active and unacknowledged events. You can also select to view the status of all configured events. Use the **show all** and **show active** buttons to toggle between the two modes.

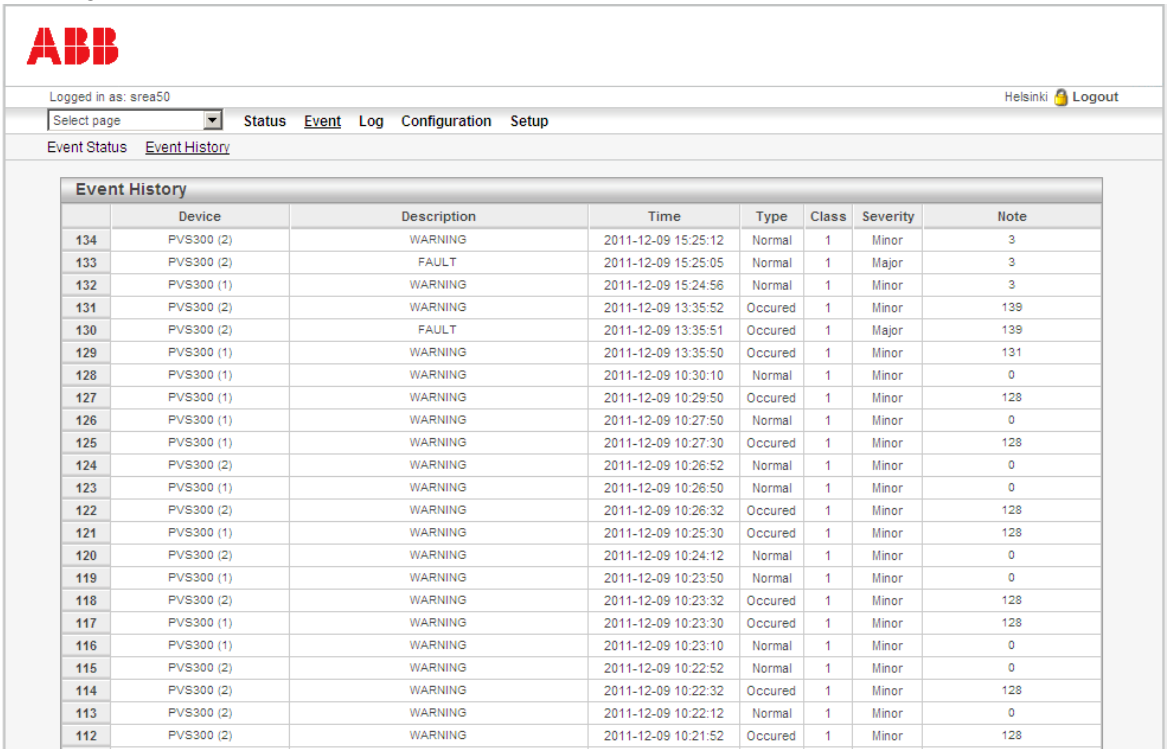


Acknowledging events

If event acknowledgements have been enabled on the **Configuration** – **Event** page, you need to acknowledge active events by clicking the **Acknowledge** button next to each event. Before an event is acknowledged, new e-mails or SMS messages regarding that event are not sent, even if the event goes temporarily off and then on again. To acknowledge all active events, click **acknowledge all**.

Viewing event history

To view a list of the previously occurred events of all inverters on the site, click **Event History**.



Event History

	Device	Description	Time	Type	Class	Severity	Note
134	PVS300 (2)	WARNING	2011-12-09 15:25:12	Normal	1	Minor	3
133	PVS300 (2)	FAULT	2011-12-09 15:25:05	Normal	1	Major	3
132	PVS300 (1)	WARNING	2011-12-09 15:24:56	Normal	1	Minor	3
131	PVS300 (2)	WARNING	2011-12-09 13:35:52	Occured	1	Minor	139
130	PVS300 (2)	FAULT	2011-12-09 13:35:51	Occured	1	Major	139
129	PVS300 (1)	WARNING	2011-12-09 13:35:50	Occured	1	Minor	131
128	PVS300 (1)	WARNING	2011-12-09 10:30:10	Normal	1	Minor	0
127	PVS300 (1)	WARNING	2011-12-09 10:29:50	Occured	1	Minor	128
126	PVS300 (1)	WARNING	2011-12-09 10:27:50	Normal	1	Minor	0
125	PVS300 (1)	WARNING	2011-12-09 10:27:30	Occured	1	Minor	128
124	PVS300 (2)	WARNING	2011-12-09 10:26:52	Normal	1	Minor	0
123	PVS300 (1)	WARNING	2011-12-09 10:26:50	Normal	1	Minor	0
122	PVS300 (2)	WARNING	2011-12-09 10:26:32	Occured	1	Minor	128
121	PVS300 (1)	WARNING	2011-12-09 10:25:30	Occured	1	Minor	128
120	PVS300 (2)	WARNING	2011-12-09 10:24:12	Normal	1	Minor	0
119	PVS300 (1)	WARNING	2011-12-09 10:23:50	Normal	1	Minor	0
118	PVS300 (2)	WARNING	2011-12-09 10:23:32	Occured	1	Minor	128
117	PVS300 (1)	WARNING	2011-12-09 10:23:30	Occured	1	Minor	128
116	PVS300 (1)	WARNING	2011-12-09 10:23:10	Normal	1	Minor	0
115	PVS300 (2)	WARNING	2011-12-09 10:22:52	Normal	1	Minor	0
114	PVS300 (2)	WARNING	2011-12-09 10:22:32	Occured	1	Minor	128
113	PVS300 (2)	WARNING	2011-12-09 10:22:12	Normal	1	Minor	0
112	PVS300 (2)	WARNING	2011-12-09 10:21:52	Occured	1	Minor	128

If the **Type** field contains classification ‘Occurred’, it means that the event has not been acknowledged yet. The **Time** field shows the point of time when the event took place. Classification ‘Normal’ means that the event has been acknowledged. In this case, the **Time** field shows the point of time when the event was acknowledged.

The **Note** field gives additional information on the event in question. The content depends on the event type. It can be the (trigger) value read for the event/parameter in question or the register that is acknowledged. The field also shows the phone number or e-mail address to which the alarm message concerning the event is sent. If the sending fails, the field contains an error message (**network unreachable** or **SMTP server return code**).

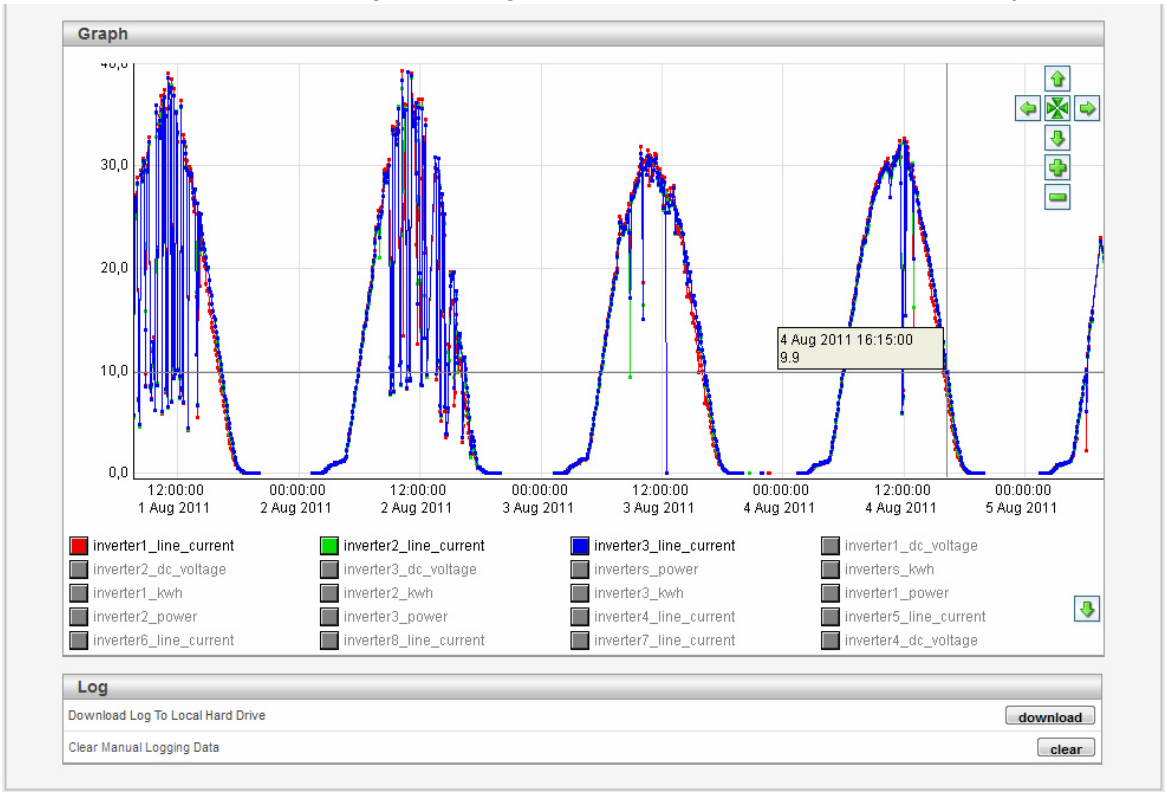
For more detailed information on the classes, severities and other properties of events, see section *Event* on page *75*.

Log

On the **Log** menu, you can view and download log files from the adapter, provided that the manual data logger has been configured on the **Configuration** – **Log** page. The log file contains the values of the selected actual values and parameters of the inverters.

Note:

- This data logger is separate from the automatic production logger, which cannot be configured by the user.
- To be able to view the log file as a graph, ensure that JAVA is installed on your PC.



Showing log points

To show a log point, click the square in front of the parameter name. To make the log point disappear from the view, click the square again.

Navigating a log graph

To navigate a graph, use the navigation buttons on the top right corner.

	Scroll graph up		Back to starting view
	Scroll graph left		Zoom in
	Scroll graph right		Zoom out
	Scroll graph down		

You can also zoom the graph as follows: Left-click, keep the mouse button down, and release it at the diagonal corner of the box.

You can also scroll the graph as follows: Right-click, keep the mouse button down, and then move the mouse.

Downloading a log file

To download a log file to your PC, click **download**. In the dialog box that opens, you can choose to open the file, for example, in Microsoft Excel.

Note: Make sure that the field and decimal separator characters of the CSV file are correct on the **Setup** – **Regional** page. Incorrect settings may cause the log file to be imported incorrectly to Microsoft Excel.

Removing data from a log file

To remove all data from a log file, click **clear**.

Configuration and Setup

The operating user does not normally need to modify the Configuration and Setup pages. They are used by the administrative user. The difference between these pages is that the Setup pages are used to configure the adapter platform, while the Configuration pages are used to define which inverters are connected and how they should be monitored and logged.

These pages are described in more detail in chapter *Administration*.

8

Administration

What this chapter contains

This chapter describes the adapter web user interface for the administrative user and contains examples of setting up the adapter for typical applications. The target audience of this chapter is the administrative user (Admin and/or Super Admin access rights).

Configuration pages

Note: The user account must have Admin access rights to be able to access the Configuration pages.

Use the Configuration pages to describe which inverters are connected and how they should be monitored and logged by the remote monitoring adapter. On these pages, you define:

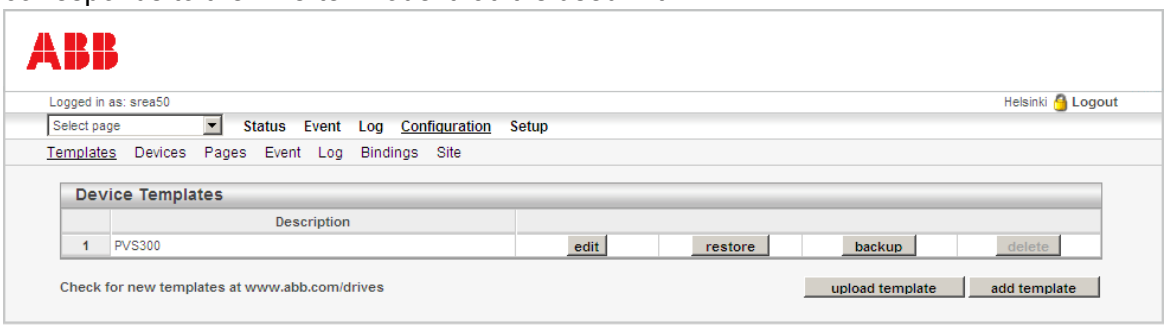
- templates, which are available inverter model information files
- devices, which are the connected inverters
- pages, which are customized views of inverter parameters and actual values
- events, which are occasions registered by an inverter (eg, warning or fault) or the adapter (eg, LOGGER STARTED)
- manual data logger, which stores data from inverters into a file
- bindings, which are data relays between the inverters and other Modbus follower devices
- site information.

You can access the pages by clicking **Configuration** on the main menu and then the feature to be configured on the submenu.

Templates

Use the Templates page to access device templates, that is, inverter model information files that contain properties for the parameters and features available in an inverter of a certain type and mode. To name just a few, these properties include parameter names, data scaling, presentation information, fault codes and warnings.

The page shows a list of the available template files. The name of the template corresponds to the inverter model that it is used with.



To support a certain inverter, the adapter must contain the correct template file. You can delete unnecessary templates from the adapter to save memory, and likewise, upload additional template files to add support for more inverter models. Not all ABB inverters are supported by the adapter by default.

Uploading additional templates

If you have received an additional template file for your inverter from ABB, you can upload it to the adapter from your PC as follows:

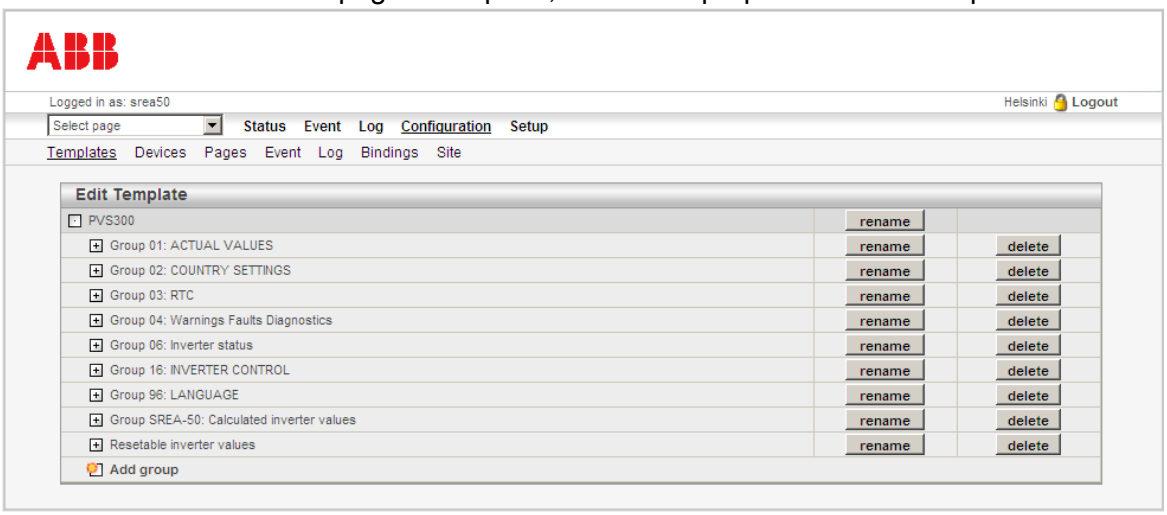
1. On the Templates page, click **upload template**.
2. In the dialog box that opens, click **Browse...**, select your template file, and then click **upload template**.

The new template is added to the Device Templates list.

Creating additional templates

If you want to create a template file for a device other than an inverter (for example, a weather station or some other Modbus device), you can do it as follows:

1. On the Templates page, click **add template**.
2. In the dialog box that opens, type a name for the template, and then click **ok**.
3. Click **edit**. On the subpage that opens, define the properties of the template.



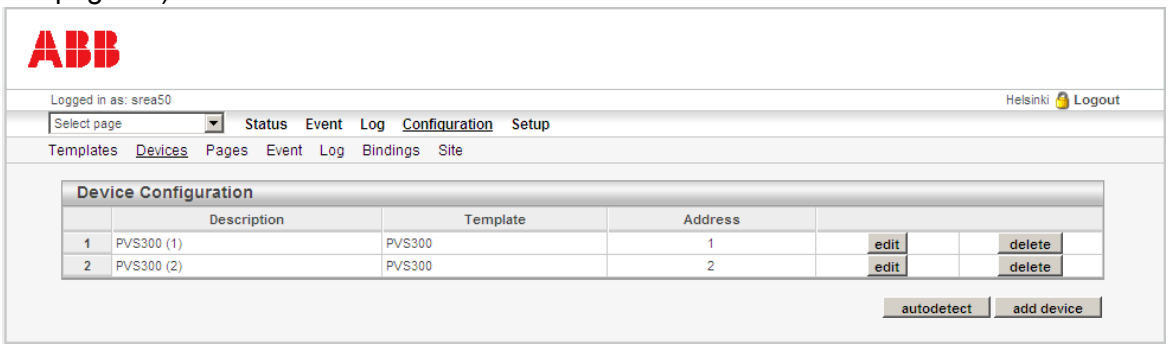
Saving and restoring templates

To save a template file to the PC and restore it back to the adapter, use the **backup** and **restore** buttons on the Templates page.

Devices

Use the Devices page to define the inverters that are connected to the adapter. You can access the page in two ways:

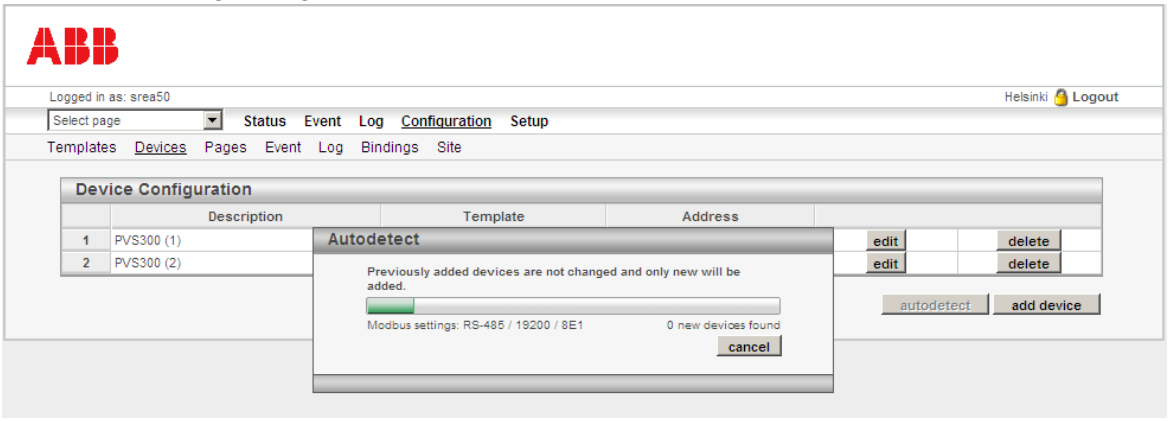
- by clicking **Configuration** – **Devices**
- by clicking the **inverter configuration** button on the Inverter Summary page (see page *47*).



The Device Configuration list shows the names of the inverters, as well as their templates and Modbus addresses. If the inverters are connected to the adapter, powered on and configured properly, the easiest way to add new inverters to the list is to click the **autodetect** button. The other option is to add each inverter manually by clicking **add device**.

Adding inverters by using autodetection

1. On the Devices page, click **autodetect**.
   The following dialog box opens.



2. Check that the Modbus settings (port, baud rate and parity) shown in the dialog box correspond to your setup. You can stop the process by clicking **cancel**, if needed.

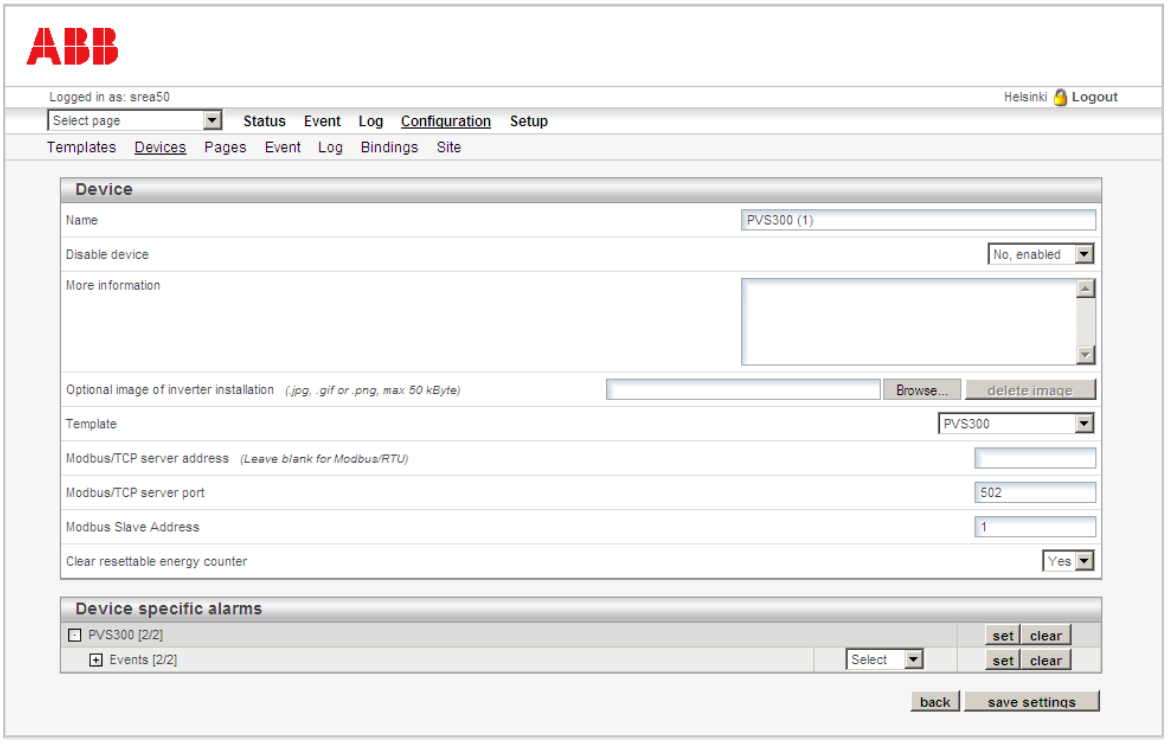
After the scanning is finished, the inverters found are added to the Device Configuration list. By default, the inverters are named by the template file and their Modbus addresses.

Notes:

- Autodetection leaves the previously configured inverters intact. For example, if there is an inverter with address 5 on the list, but the actual inverter has been removed from the network, this procedure does not remove the inverter from the list.
- Autodetection does not find inverters which are in the sleep mode because it does not distinguish the sleep mode from a disconnected device.
- Autodetection sets the commissioning date as the date when the inverter fed for the first time. The plant commissioning date is set upon the completion of the start-up wizard.
- Autodetection only finds and identifies inverters with Modbus addresses 1...32. If you need to add inverters having addresses other than 1…32, you have to select the templates for such inverters manually. See section *Editing inverter information* on page *69*.
- Autodetection is automatically run when the adapter is booted. The adapter finds inverters with Modbus addresses 1…32 and installs them automatically.

Editing inverter information

1. On the Devices page, click **edit**.
   The following subpage opens.



2. Fill in the desired fields, and then click **save settings**.

The table below describes how to fill in the fields on the page.

Field	Instruction
Name	The name of the inverter. By default, the inverters are named by their templates and Modbus addresses.
Disable device	Use this drop-down list to disable an inverter if the inverter is away for service or maintenance, or if it is switched off for any other reason and cannot reply to Modbus requests. Disabling the inverter will speed up communications for the other connected inverters. When disabled, the inverter is not monitored by the adapter or listed on the Inverter Summary page, and no alarming is active regarding the inverter. The inverter remains on the devices list with the indication that it is disabled. **Note:** Disabling an inverter does not affect the historical graphs.
More information	Use this field to add additional information on the inverter to the Inverter Information page.
Optional image of inverter installation	Use this field to upload a picture to the Inverter Information page. To upload a picture: 1. Click **Browse...**. 2. Select the image. 3. Click **save settings**. To remove the image, click **delete image**.
Template	Use this drop-down list to select the inverter type and mode. Usually the mode is detected by the autodetection procedure.

Field	Instruction
Modbus/TCP server address	If the inverter is connected to the adapter via Ethernet, enter its IP address into this field. If you are using serial Modbus to connect to the inverter, leave the field blank.
Modbus/TCP server port	If the inverter is connected to the adapter via Ethernet, enter its Modbus port into this field. Usually the port is 502.
Modbus Slave Address	Type the node address of the inverter into this field (parameter 58.03 in PVS300).
Clear resettable energy counter	Use this selection to define how the cumulative energy data produced by an inverter is handled when a “used” inverter (one which has already produced energy) is installed into the system. • Selection **Yes** zeroes the energy counter register of the inverter and keeps the current (bigger) energy counter value for the inverter. This way the system will not show production spikes upon the first reading. • Selection **No** does not zero the energy counter register. If the energy counter value of the new inverter is smaller than the current energy value, the value of the new inverter is used. If the energy counter value of the new inverter exceeds the current energy value, the value of the new inverter is ignored. Changing this selection for an existing inverter has no effect because this function is active only when a new inverter is detected by the adapter.
Device specific alarms	Device-specific alarms are default alarms that are sent if the inverter is disconnected from the adapter or if its status is FAULT or WARNING. To define an alarm as device specific: 1. Expand the desired alarm by clicking the plus sign. 2. Select the respective check box. The alarm will be monitored and reported. To ignore an alarm, clear the respective check box. To check or clear all alarms, use the **set** and **clear** buttons. For information on alarm classes, see section *Event* on page *75*.

Replacing an inverter

If you need to replace an inverter with another one (for example, in the event of inverter malfunction), you have several choices:

Option 1:

1. Delete the old inverter by clicking **delete** on the Devices page.

   Note: Deleting an inverter means that the history of the inverter is lost, but the plant level history is maintained.

2. Add a new inverter by clicking **add device**. Use the same Modbus Slave Address as for the old inverter.

Option 2:

1. On the Devices page, click **edit** and disable the old inverter in the **Disable device** drop-down list.

   Note: Disabling an inverter means that its history is maintained.

2. Add a new inverter by clicking **add device**. Use the same Modbus Slave Address as for the old inverter.

Option 3:

1. On the Devices page, click **edit** and disable the old inverter in the **Disable device** drop-down list.

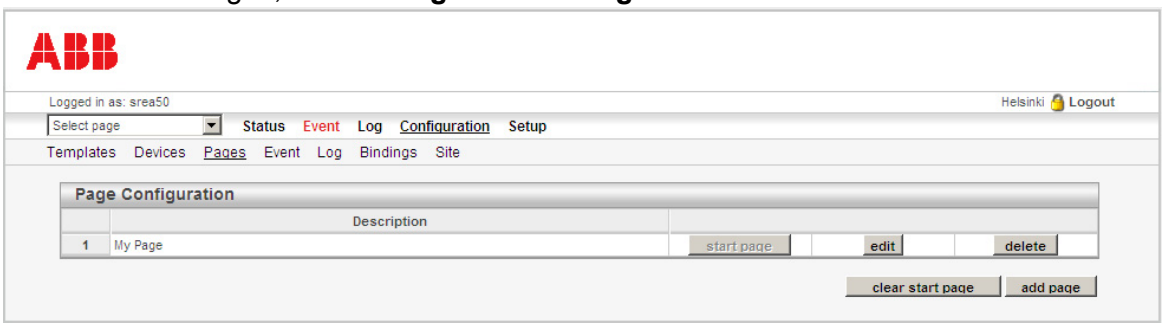
   Note: Disabling an inverter means that its history is maintained.

2. Add a new inverter by clicking **add device**. Give the new inverter a new Modbus Slave Address.

Pages

Pages are custom views of inverter parameters and actual values. Each custom view can show 20 freely selectable values, and there can be several custom pages. A custom page can also be selected as the start-up page of the adapter web user interface.

To access the Pages, click **Configuration** – **Pages**.



Selecting the start-up page

Below Page Configuration,

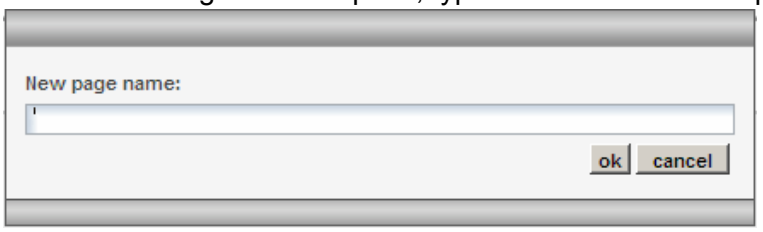
- click **start page** to select the custom page as the page that is shown when you log into the adapter web user interface

OR

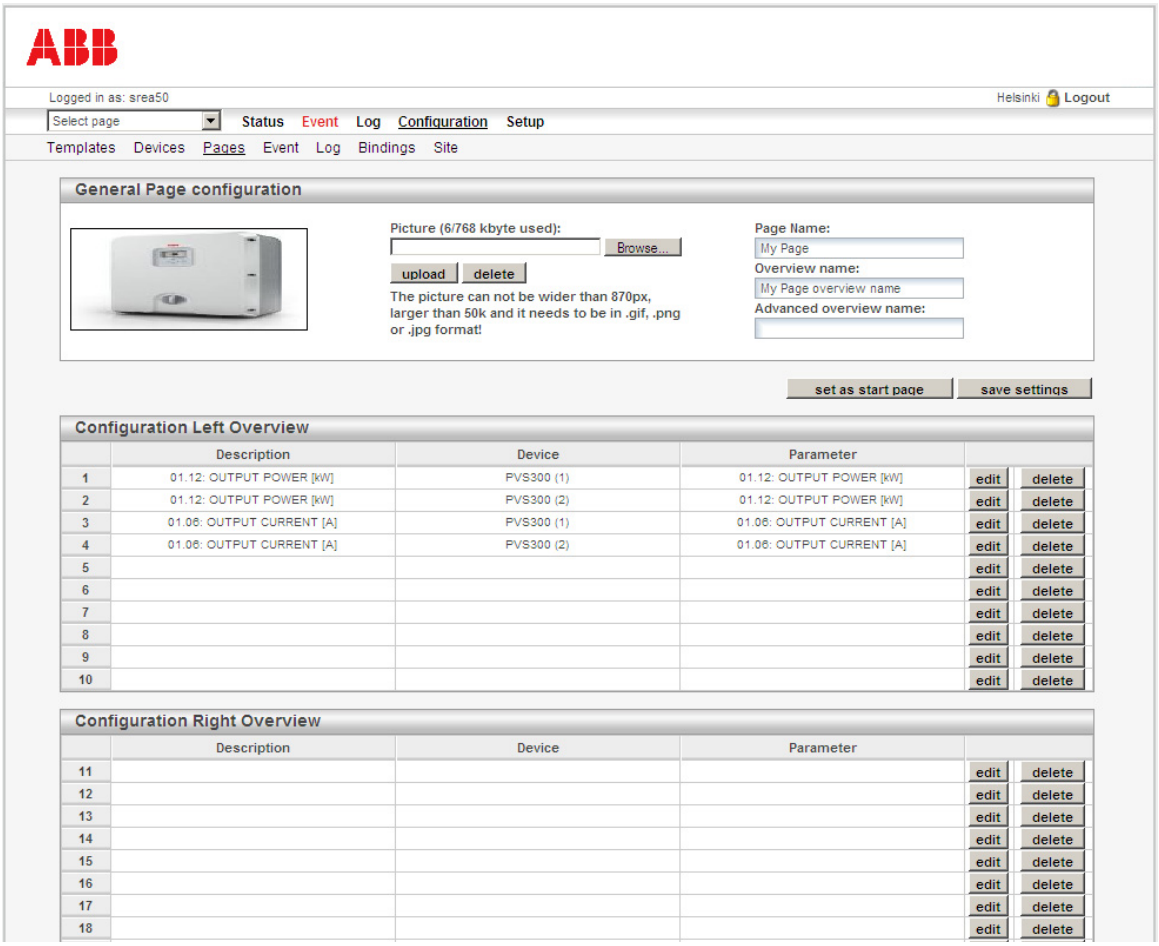
- click **clear start page** to use the Inverter Summary or Inverter Information page as the default start-up page.

Creating a new custom page

1. Below Page Configuration, click **add page**.
2. In the dialog box that opens, type a name for the new page, and then click **ok**.



The following subpage opens.



3. Specify the desired properties for your custom page, and then click **save settings**.
   For instructions on specifying the properties, see the following sections:
   - *Adding or deleting a picture* on page *72*
   - *Renaming a custom page* on page *73*
   - *Renaming custom subpages* on page *73*
   - *Adding parameters to a custom page* on page *74*.

Adding or deleting a picture

To add a picture to the custom page, browse to the picture file, and then click **upload** to send the picture to the device.

To remove a picture from the device, click **delete**.

Note:

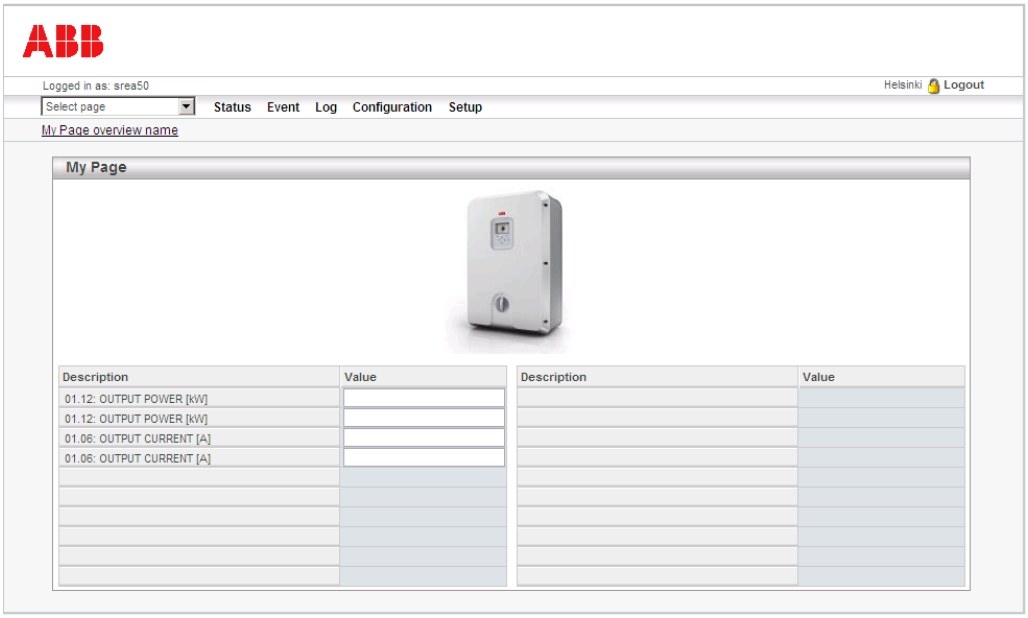
- The picture must not be more than 870 pixels wide, and it must be in .gif, .jpg or .png format.
- The maximum space available for pictures is 800 kB. Above the picture field, you can see how much space there is left.

Renaming a custom page

Fill in the **Page Name** field on the top-right corner to give the page a more descriptive name. Click **set as start page** if you want to make this page the default start-up page.

Renaming custom subpages

Every created custom page has two subpages, each of which can show 20 different values.

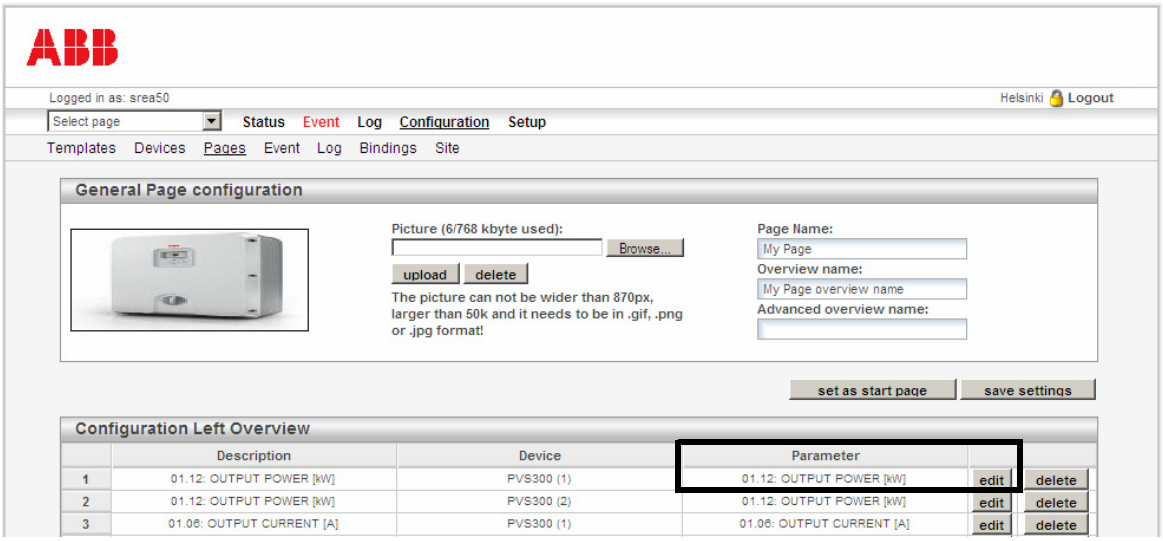


Usually the subpages are named as ‘Overview’ and ‘Advanced overview’, but you can also rename them by typing the new names in the **Overview page** and **Advanced overview page** fields on the top-right corner on the General Page configuration.

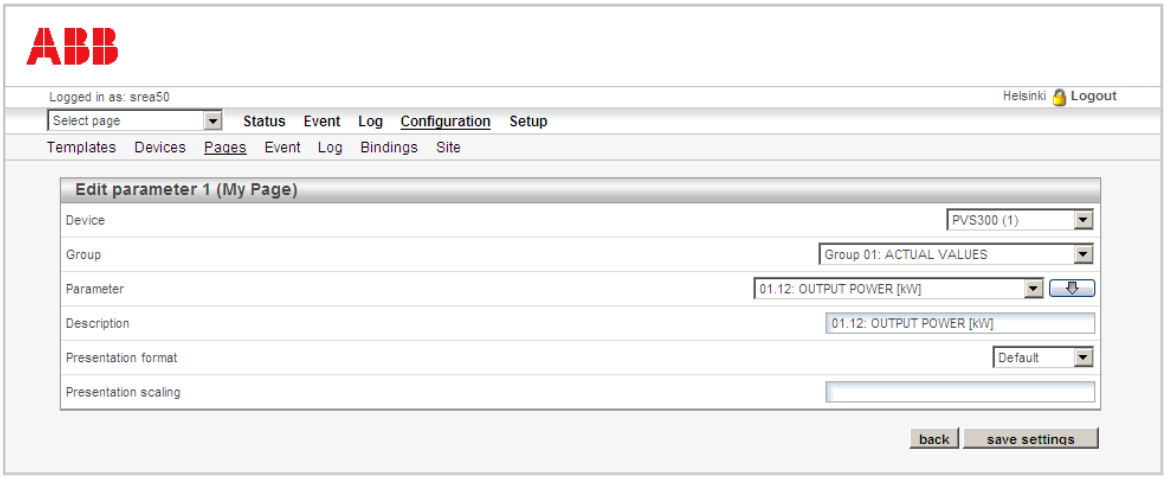
Note: The submenu does not appear on the page, unless you have selected to show some parameters on the Advanced overview page as well.

Adding parameters to a custom page

1. Under Configuration Left Overview or Right Overview, click the **edit** button of the parameter you want to work with.



The following subpage opens.



2. Select Device, Group and Parameter, and type a description for the parameter.

   You can use the down arrow button to copy the parameter name to the **Description** field.

3. Select the presentation format for the parameter value.
   - **Default**: Value is presented as it is configured in the device template.
   - **Hexadecimal**: Value is presented in hexadecimal form.
   - **Binary**: Value is presented in binary form.

4. If needed, define presentation scaling for the parameter value.

   The value will be divided by the scale value before presented on the web page. It will be multiplied with the scale value before the value is written to the inverter.

5. Click **save settings.**

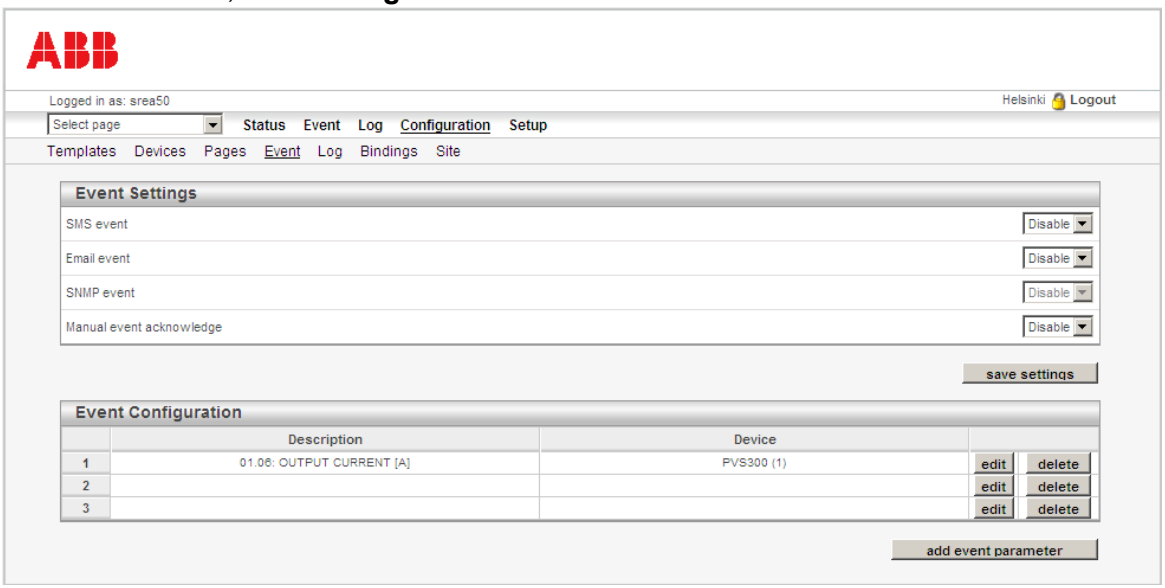
6. In the **Select page** list, click the page you have been working with, and check that the parameter appears on the page.

Event

The adapter can send alarm messages concerning events by e-mail, SMS or SNMP (traps). In addition, the adapter can send files containing event status information by FTP.

Note: Sending SMS alarms requires an external GSM modem.

To access events, click **Configuration** – **Event**.



Defining the alarm sending mode

To define whether to send alarms by SMS, e-mail or SNMP, click **Disable** or **Enable** in the corresponding drop-down lists, and then click **save settings**. If you have configured an FTP server under **Setup** – **FTP**, you can also select to send event status by FTP.

Enabling manual event acknowledgements

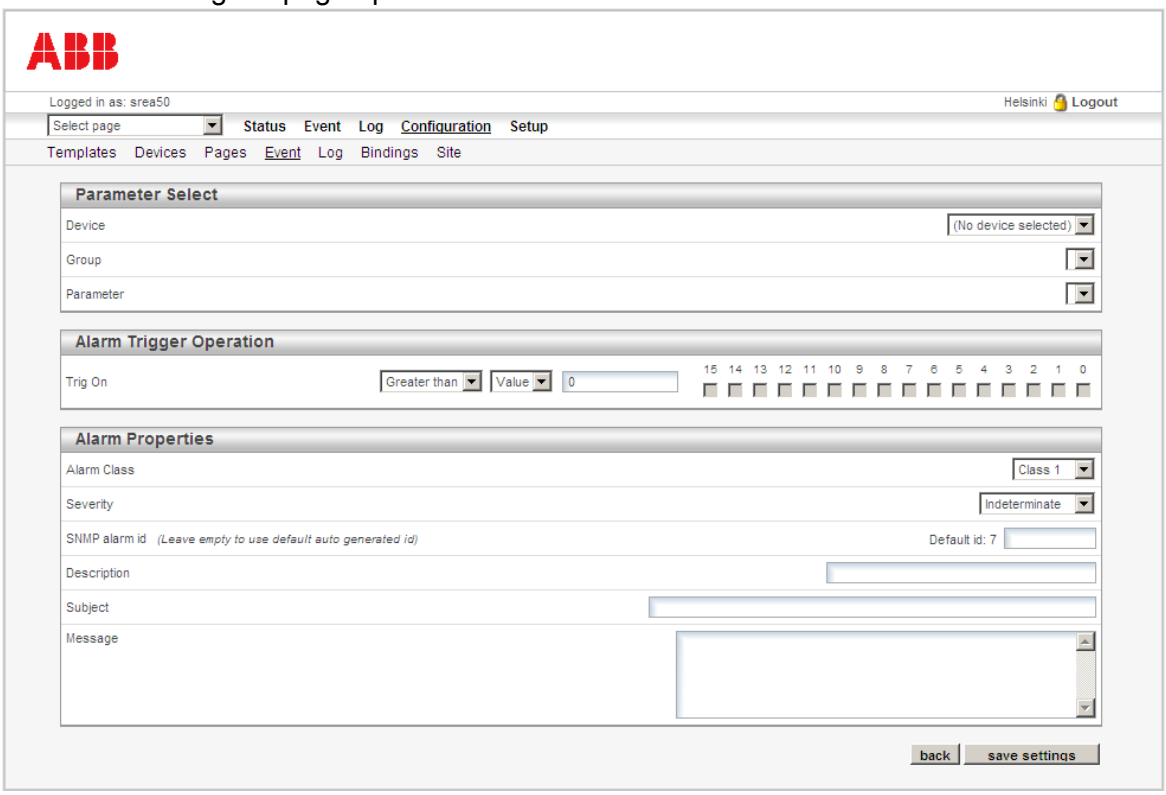
To enable manual events acknowledgements, click **Enable** in the corresponding drop-down list, and then click **save settings**.

Use this function to prevent sending multiple messages in case of a repetitive event. When the function is enabled, the user has to log in and acknowledge the event on the **Event** – **Event Status** page before being able to receive further alarm messages regarding that event. The function is disabled by default, meaning that the user will receive a message every time when the event becomes active.

Adding or editing event parameters

A maximum of 64 event parameters can be added. To add or edit parameters:

1. On the Event page, click **add event parameter** or **edit** on the Event Configuration list. The following subpage opens.



2. Fill in the desired fields, and then click **save settings**.

The table below describes how to fill in the fields on the page.

Field	Instruction
Device	Select the inverter that is being monitored. Alternatively, you can use the internal registers to trigger the alarm. This is useful if you want to trigger the alarm by the digital inputs of the adapter.
Group / Parameter	Select the parameter of the inverter or adapter to monitor.
Trig On	Select the trig condition for the event parameter. It is possible to trigger on a Value (Greater than, Less than, Equal to, Not Equal, Change) or on a bit field (Any, Neither, or All of the bits in the check boxes 0-15). The option ‘No response’ is used to send an alarm if there is no response from the inverter.
Alarm class	Select a class (1-10) for the alarm. The alarm class has to be set separately for each user that the alarm message will be sent to. See section *Users* on page *81*. **Example:** If user “bob” has classes 1 and 2 selected, and user “charlie” only has class 1 selected on his user setup page, all alarms that belong to class 1 are sent to both users. Alarms belonging to class 2 are, however, sent only to “bob”.
Severity	Select the severity of the alarm. It is shown on the Event Status page when the alarm is active and used when sending SNMP traps. The possible values are Warning, Minor, Major, Critical and Indeterminate. **Note:** An alarm can also have the severity ‘Cleared’. This severity class cannot be set, but it will be sent via SNMP when the alarm is in the normal state.
Description	Type the text displayed in the alarm views and sent via SNMP.

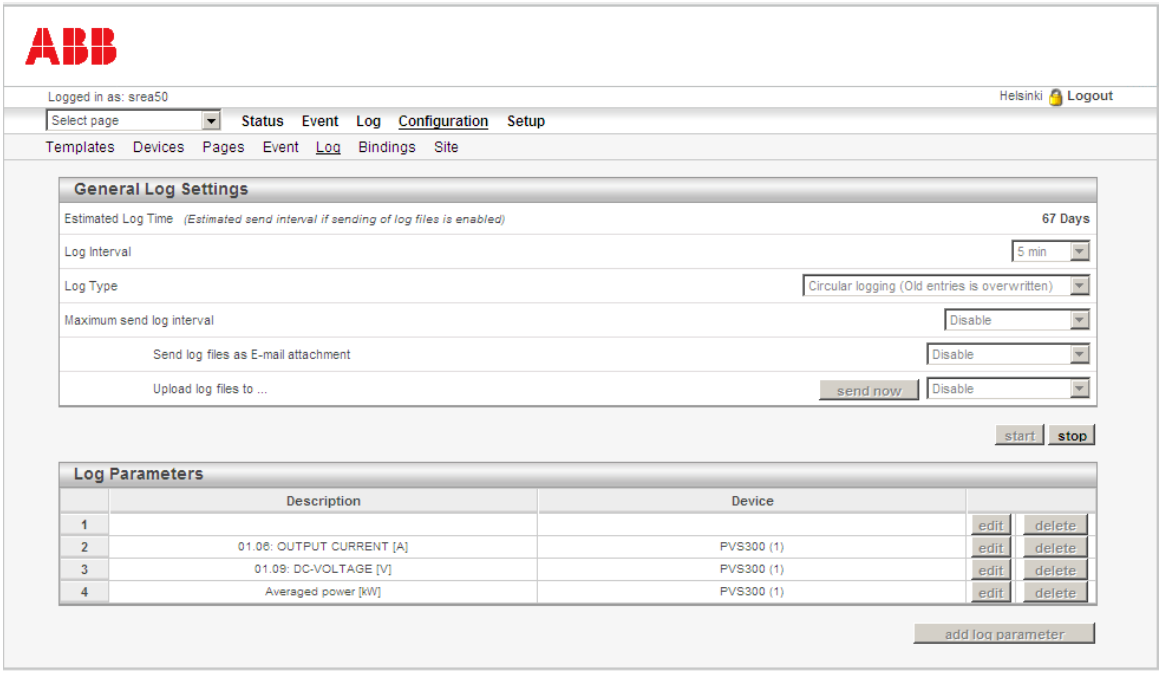
Field	Instruction
Subject	Type the text to be shown as Subject in the e-mail/SMS message.
Message	Type the body of the alarm message.

Log

The adapter can be configured to log the values of certain actual values and parameters of the inverter. All data is stored in a CSV file, which the user can upload to the PC for further analysis in, for example, Microsoft Excel. A maximum of 64 log parameters can be configured.

Note: This data logger is separate from the automatic production log, which cannot be configured by the user.

To access the log, click **Configuration** – **Log**.



The table below describes how to fill in the fields on the page.

Field	Instruction
Estimated Log Time	Gives an estimate on how long it takes to fill the log file. Cannot be modified by the user.
Log Interval	Select the sample interval. Possible values: 10 sec., 30 sec., 1 min., 2 min., 5 min., 10 min., 30 min. and 60 min.
Log Type	Select whether to stop logging when the log file is full, or to overwrite old values (circular logging).
Maximum send log interval	Enable this option if you want to send the log files periodically by e-mail or FTP. You can choose to send the file every 1 minutes, 5 minutes, 10 minutes, 30 minutes, 60 minutes, 12 hours, 24 hours (will be sent around midnight) and 7 days (Sunday at midnight), or when the memory of the adapter is full.
Send log files as E-mail attachment	Enable this option if you want to send the log files periodically by e-mail with the log interval set above. Make sure that each user that should get the logs by e-mail has this function activated. See section *Users* on page *81*.

Field	Instruction
Upload log files to...	Enable this option to upload the log file to an FTP server periodically with the log interval set above. Make sure that the there is an FTP server set up. See section *FTP* on page *91*.

Note:

- The log file that is stored in the adapter will contain historical data for a maximum of two periods as defined in the **Maximum send log interval** field. That is, if you set this to 24 hours, the log file in the adapter memory will keep a maximum of two days historical.
- Check the **Setup** – **Regional** settings to make sure that you have the correct settings for the list separator and decimal symbol. Wrong settings may cause the log file to be imported incorrectly to Microsoft Excel.

Starting the logger

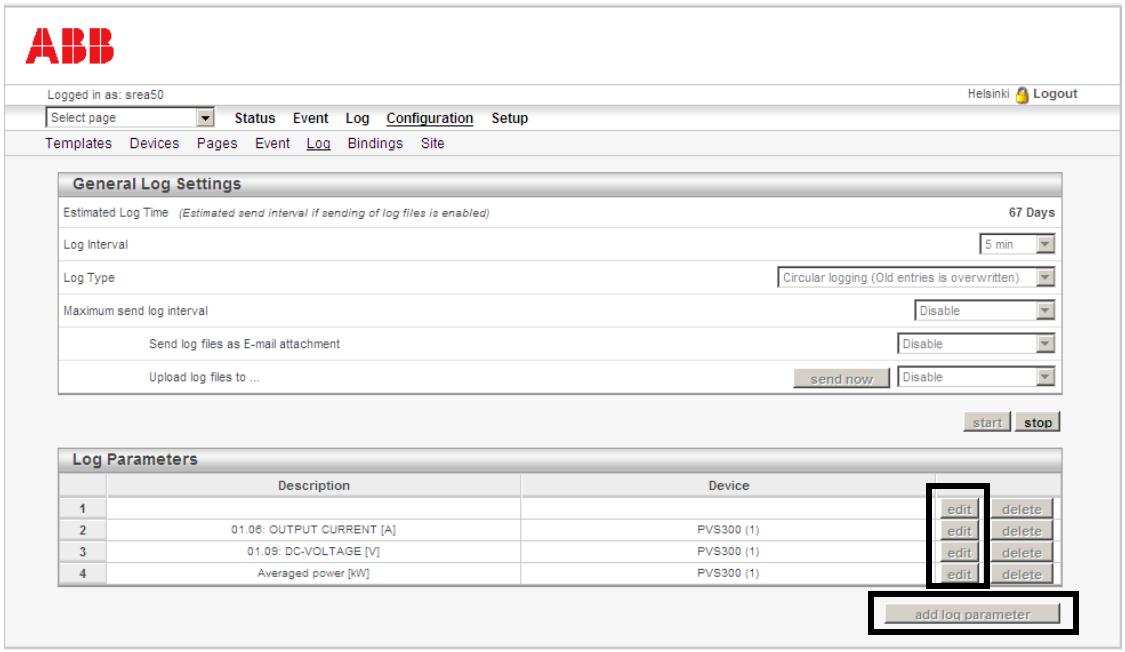
To start logging, click the **start** button on the Log page.

To restart the logging, click **stop**, and then **start**. The log file will then be cleared.

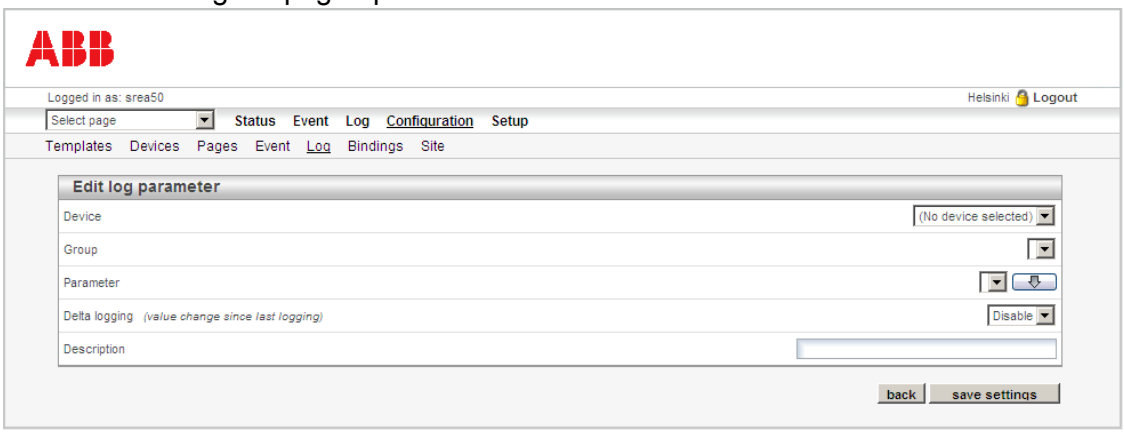
To send the latest logged data, click **send now** before restarting the logging.

Adding or editing a log point

1. On the Log page, click **add log parameter** or **edit**.



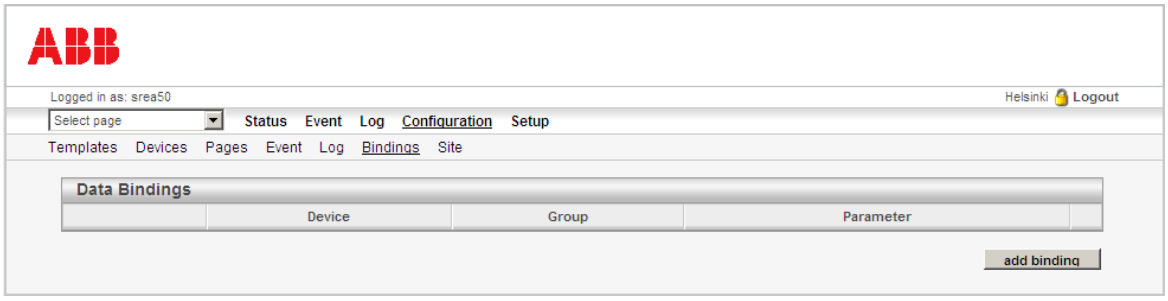
The following subpage opens.



2. Select the Device, Group and Parameter you want to log.
3. Select whether you want to enable Delta logging, which logs only changed values, meaning that two consecutive samples are never the same.
4. In the **Description** field, type a description for the log entry.
   You can use the down arrow button to copy the parameter name into this field.
5. Click **save settings**.

Bindings

Use the Bindings page to relay actual signals and parameters from an inverter to another Modbus follower device (for example, a weather station) or vice versa. You can also set the inverter output power to be controlled via an external control signal coming, for example, from a Modbus I/O device. In practice, this means that no PLC is needed between the devices.

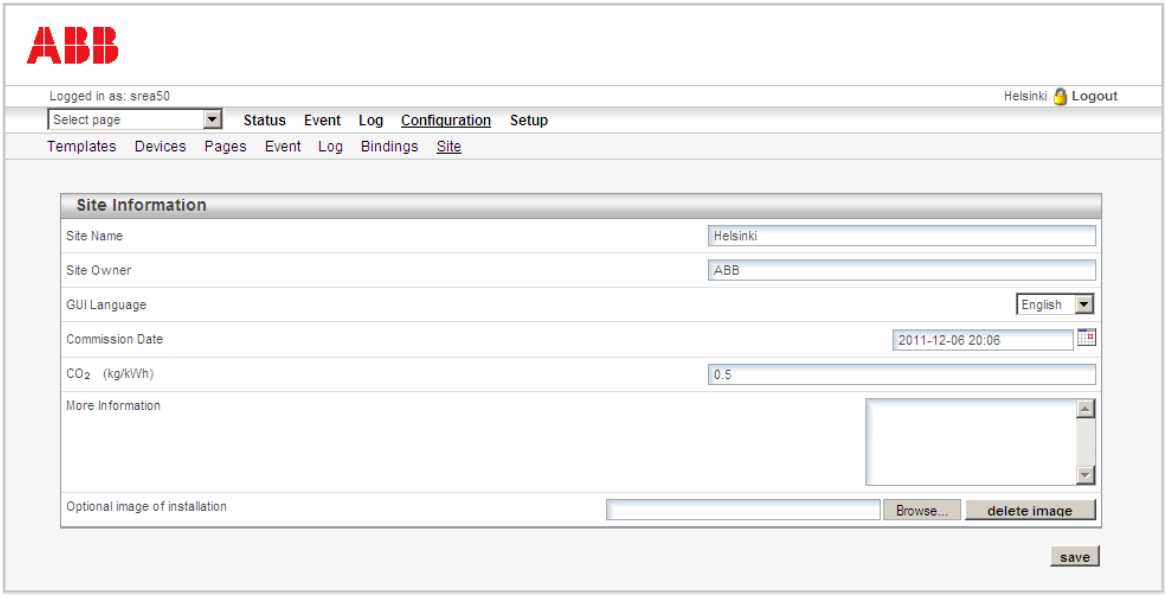


Adding a binding

1. On the Bindings page, click **add binding**.
2. On the page that opens, choose the source and destination parameters and the interval for copying the data.
3. Click **save settings**.

Site

Use the Site Information page to define the adapter site's properties.



The table below describes how to fill in the fields on the page.

Field	Instruction
Site Name	The location of the adapter (for example, address or building ID). This information is shown on all page headers next to the **Logout** link and on the Login page. It is also included in the default alarm messages.
Site Owner	The site owner
GUI Language	The language of the adapter web user interface (for all users). The adapter reads the language from the last detected inverter on the Modbus link and sets the GUI language as the same. If no inverters are found, the GUI language is set as English. **Note:** On the **Setup** – **Users** page, it is also possible to define the language case-by-case for each user. This setting overrides the GUI language setting.
Commission Date	The plant commissioning date is set upon the completion of the start-up wizard. The commissioning date can be reset/changed by the user.
CO_2	Conversion factor for converting energy into CO^2 emissions (kg/kWh). This information is shown on the **Status** – **Power Meter** page.
More Information	Notes about the installation
Optional image of installation	The picture shown on the **Status** – **Site Information** page.

Setup pages

Note: The user account must have Super Admin access rights to be able to access the Setup pages.

Use the Setup pages to configure the adapter platform, that is:

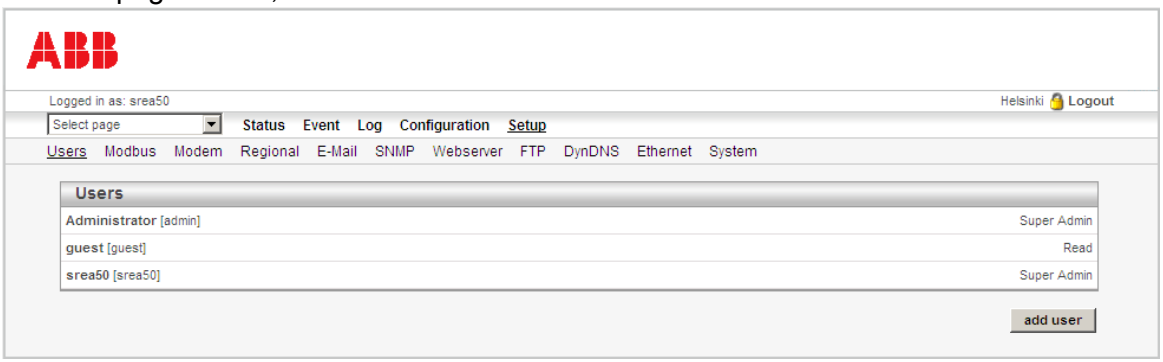
- the user accounts and user contact information for sending e-mails and SMS messages
- the Modbus settings that are used when communicating with inverters
- the settings of an optional GSM/GPRS/analog modem
- time, date and regional settings
- e-mail sending options
- SNMP alarm options
- web server and page display options
- FTP upload options
- Ethernet network options, such as the IP address.

In addition, on the Setup pages you can back up the settings of the adapter and upgrade the firmware.

You can access the pages by clicking **Setup** on the main menu and then the feature to be configured on the submenu.

Users

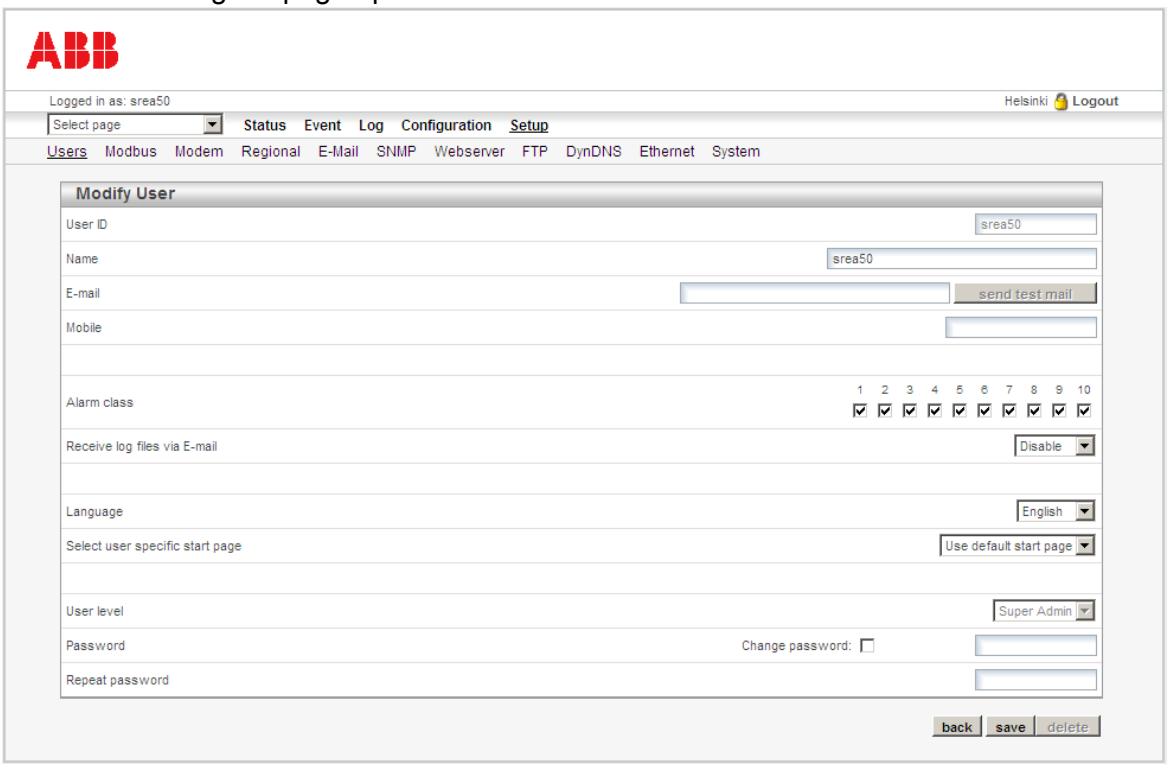
Use this page to add, edit and remove users.



Note: The default user name is **admin** with Super Admin access rights, and the default password is the activation code (printed on a label included in the adapter delivery). You can change the password, in which case the activation code is no longer valid. Always keep the activation code or valid password safe. If you lose it and no other user has been given Super Admin access rights, you will no longer be able to access the **Setup** menu.

Adding or modifying users

1. To add a user, click **add user**.
   To modify or remove a user, click the user name you want to modify or remove.
   The following subpage opens.



2. Fill in the desired fields, and then click **save**, or if you want to remove the user, click **delete**.

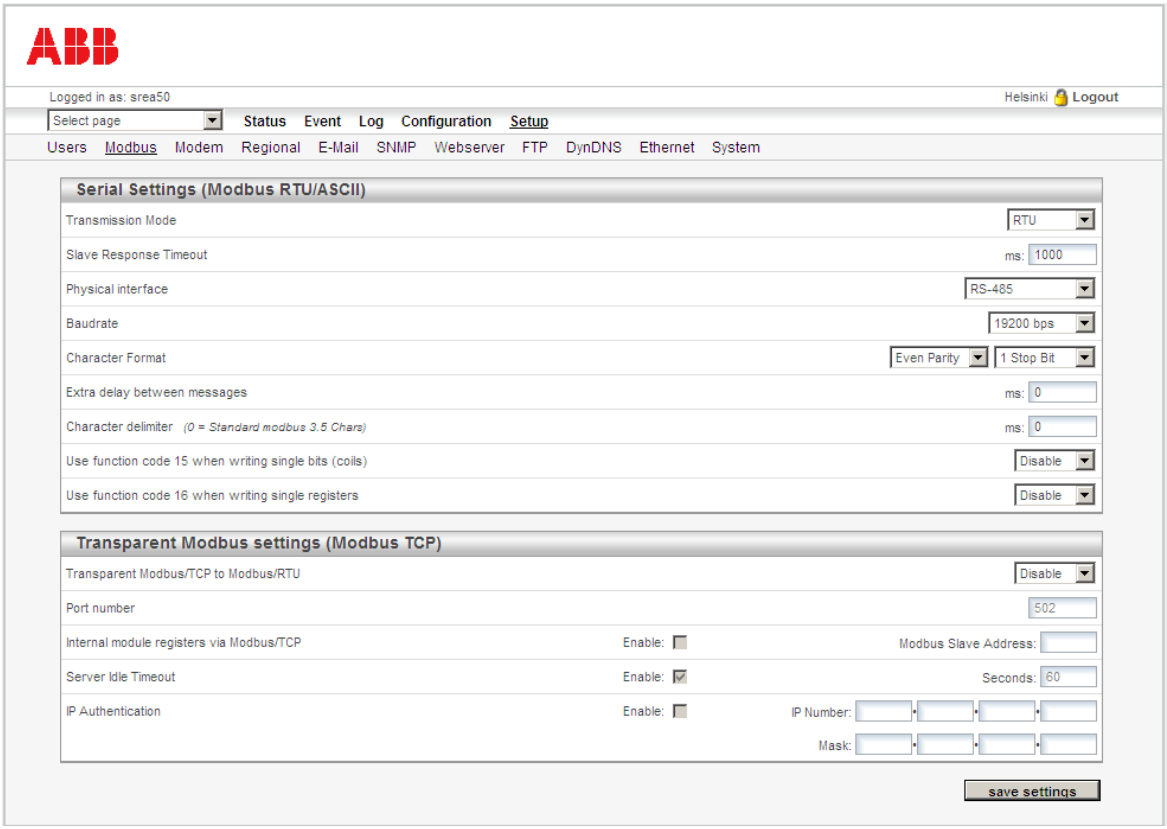
The table below describes how to fill in the fields on the page.

Field	Instruction
User ID	The user ID used on the login screen
Name	The name of the user
E-mail	The e-mail address the alarms will be sent to (if the user is configured as an alarm recipient and e-mail alarms are enabled).
Mobile	The mobile number SMS alarms will be sent to (if the user is configured as an alarm recipient and SMS alarms are enabled).
Alarm Class	To configure a user as an alarm recipient, enable one or more of the alarm classes (1-10) for the user. This is necessary, so that the user will get an alarm mail or SMS for an alarm point with the corresponding alarm class set. Make sure that the alarm has the correct alarm class set; see section *Event* on page *75*. **Note:** The user will only receive alarms that match the alarm class selection.
Receive log files via E-mail	This option defines whether the user will receive logs via e-mail or not. See section *Log* on page *77* for more details.
Language	The language to be used for this specific user. This setting overrides the GUI language set on the **Configuration** - **Site** page.
Select user specific start page	Each user can have a specific start-up page for smooth navigation. Select the user-specific start page from the drop-down list. The default value is the default start-up page of the adapter.

Field	Instruction
User level	Defines what the user can do on the web pages: • Read - Can view pages but not configure the adapter or modify parameters • Write - Can view pages, modify parameters, acknowledge alarms • Admin - Read, Write and access the **Configuration** menu • Super Admin - Read, Write, Admin and access the **Setup** menu
Password / Repeat password	To change the password of a user, select the **Change password** check box and type the new password in both password fields.

Modbus

Use the Modbus page to define the Modbus interface settings.



Serial Settings (Modbus RTU/ASCII)

To define the serial settings, fill in the following fields.

Field	Instruction
Transmission mode	Modbus RTU or Modbus ASCII. Modbus RTU is used in all typical inverter installations.
Slave Response Timeout	The time that the adapter will wait for a response from the inverter before a Serial timeout will occur (default 1000 ms)
Physical interface	Options: • **RS-485**: Select this if you have multiple inverters connected by RS-485 interface of X1. • **RS-232**: This interface is not in use with solar inverters. • **RS-232 (D-Sub)**: Select this if you are using the RS-232 interface of the connector X2.
Baudrate	The baud rate for the adapter. **Note:** Select the same baud rate that the inverter is using.
Character Format	The number of stop bits and parity (Odd, Even, or none).
Extra delay between messages	The time to wait between Modbus messages. Usually an extra delay is not needed, but some slow RS-232/RS-485 converters may cause collisions that result in communication problems. In that case, you can try 20 ms or even longer extra delays.
Character delimiter	The number of milliseconds between the characters in the Modbus frame. Set to zero to use standard Modbus (3.5 characters).
Force function code 15 when writing single bits (coils)	If this option is enabled, all writes to Modbus coil addresses will be done with function code 15. This is useful only if the inverters do not support function code 05, so this option is not needed in typical inverter installations.
Use function code 16 when writing single registers	If this option is enabled, all writes to Modbus register addresses will be done with function code 16. This is useful only if the inverters do not support function code 06, so this option is not needed in typical inverter installations.

Transparent Modbus settings (Modbus TCP)

To define the transparent Modbus settings, fill in the following fields.

Field	Instruction
Transparent Modbus/TCP to Modbus/RTU	Enables the Modbus gateway feature.
Port number	The port to use for Modbus/TCP communication. The default value is 502.
Internal module registers via Modbus/TCP	The address to the gateway internal registers (if enabled). For more details, see section *Internal module registers* on page *85*.
Server Idle Timeout	The idle timeout in seconds for the Modbus/TCP connection (if enabled). If the adapter does not receive any Modbus/TCP queries within this time, the connection will be closed. The default value is 60 seconds.
IP Authentication	The IP addresses that are allowed to connect to the adapter (if enabled). Connections from other IP addresses will be blocked. **Example:** You want the adapter to be accessible only from a single IP address 192.168.25.99. Type this IP number to the **IP Number** field and use **Mask** 255.255.255.255.

Note: When assigning Modbus device addresses to the inverters, it is very important to ensure that two devices do not have the same address. In such a case, abnormal behavior of the whole bus can occur, and the Master may not be able to communicate with all inverters present on the bus.

Internal module registers

If you enable the **Internal module registers via Modbus/TCP** on the Modbus page, queries sent to that address will not be forwarded to the serial Modbus RTU network. Instead, the adapter will respond to these queries by itself.

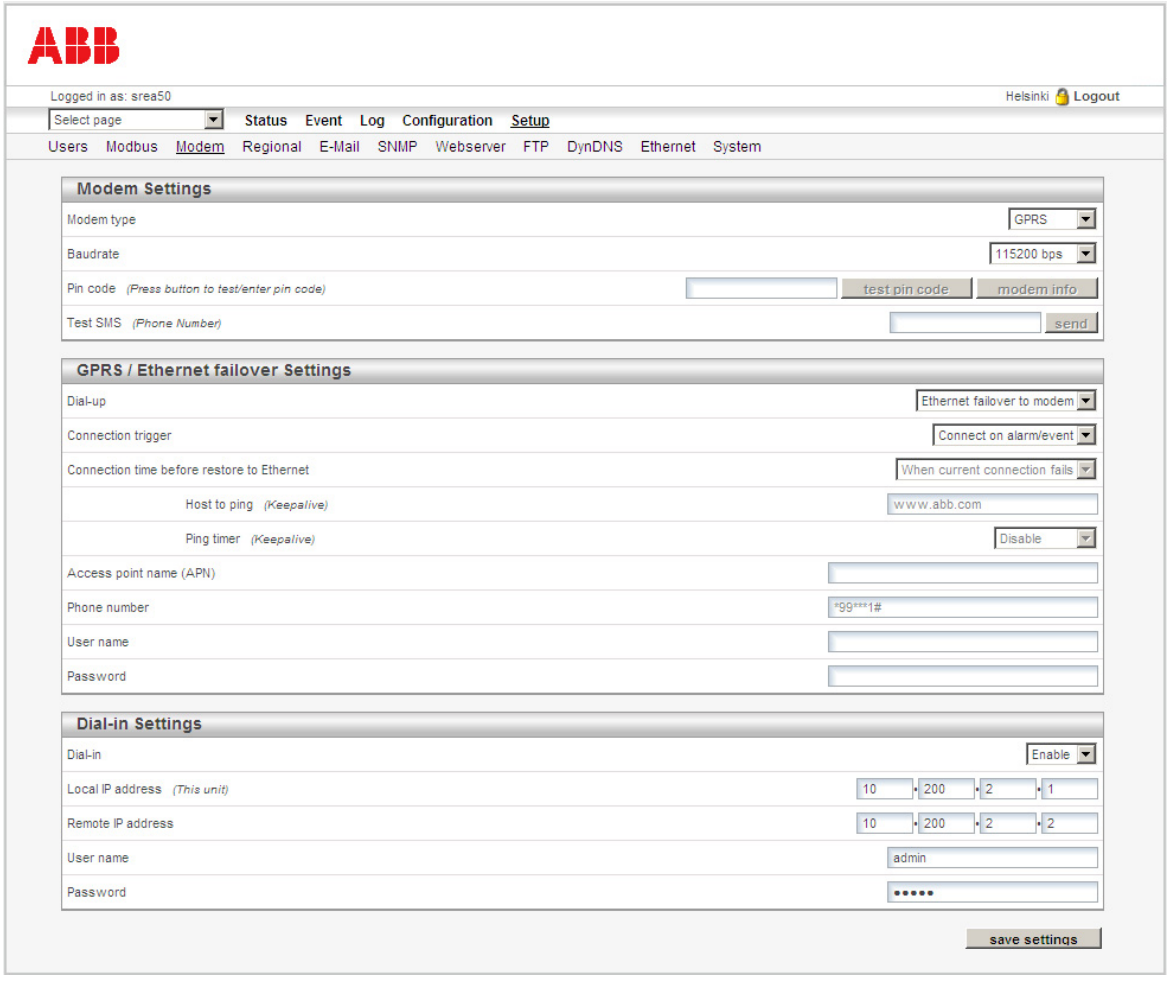
For a list of the internal registers, see *Appendix A: Internal Modbus registers*. Valid Modbus commands for the internal registers are:

Command	Name
3	Read Holding Registers
6	Preset Single Register
16	Preset Multiple Registers

Note: The internal registers are also available as an “internal device”, that is, the registers can be used on custom pages and as alarms/log entries.

Modem

Use the Modem page to set up an external modem (optional). The modem can be either a GSM/GPRS modem or an analog modem (PSTN).



Modem Settings

To define the general modem settings, fill in the following fields.

Field	Instruction
Modem type	The type of the modem attached: Analog, GSM or GPRS.
Baudrate	The desired baud rate that the adapter should connect to the modem with
Pin code	The PIN code for the GSM modem. **Note:** The **modem info** button will open a screen with some details about the modem (eg, signal strength).
Test SMS	The phone number of the recipient for a test SMS message. To send the test message, click **send**.

GPRS / Ethernet failover Settings

To allow the adapter to connect to the Internet using a modem, fill in the following fields.

Field	Instruction
Dial-up	Enables or disables the dial-up. With the **Ethernet failover to modem** option, the adapter communicates to the Internet over wired Ethernet and changes to modem communication if Ethernet communication to the Internet is lost. After the Ethernet communication has been restored, the modem communication will be terminated.
Connection trigger	Specifies whether the adapter should be always connected to the Internet using the modem, or only connect when there is an alarm or event. **Note:** SMS alarms are not supported when the selection is **Always Connected**.
Connection time before restore Ethernet	This is the setting until the permanent modem connection has been established if Ethernet communication fails is terminated after re-establishing the Ethernet communication. Options: With the **When current connection fails** option, the adapter keeps the modem communication as the primary connection method after loosing Ethernet communication. The other options are 5 minutes, 30 minutes, 2 hours and 8 hours.
Host to ping	The address to the host that the adapter will ping when sending keep-alive messages for the GPRS connection.
Ping timer	The interval for the keep-alive messages. Set the value as high as possible to avoid unnecessary GPRS traffic.
Access Point Name (APN)	The gateway for all GPRS traffic. Contact your GSM/GPRS operator for more information.
Phone number	The phone number to dial (for example, to an Internet Service Provider, ISP)
User name	The user name your ISP has assigned to you
Password	The password to log in the ISP network

Dial-in Settings

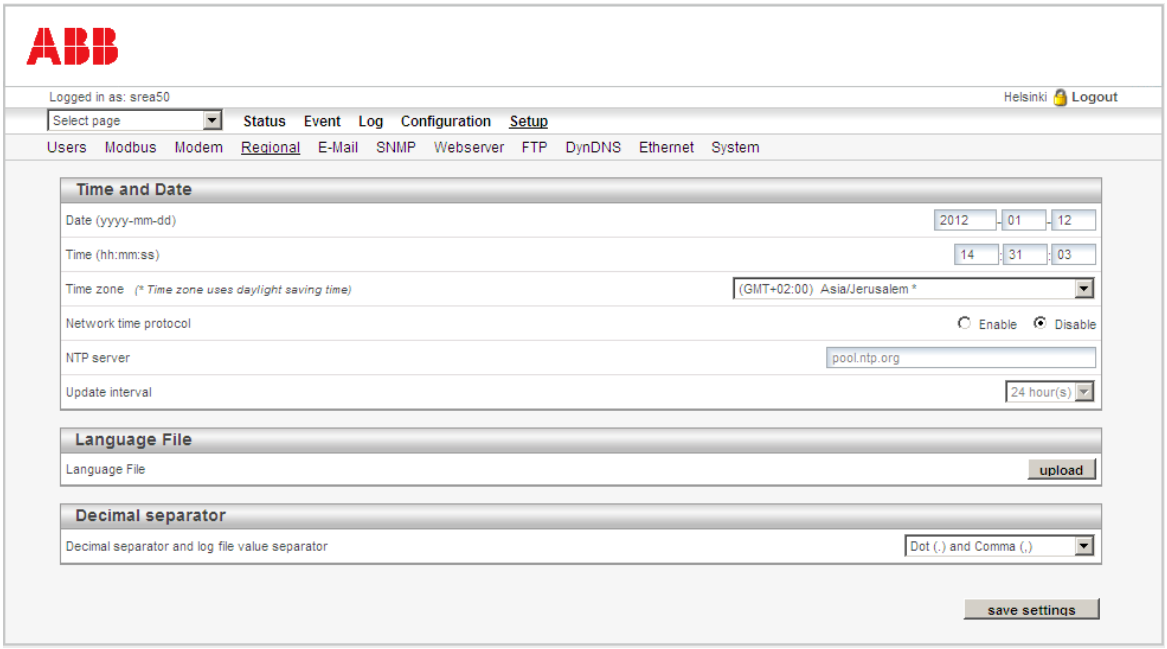
To allow users to access the adapter web user interface over a modem link, fill in the following fields.

Field	Instruction
Dial-in	Enables or disables the dial-in functionality.
Local IP address	The IP number of the adapter which the remote client will see when creating the PPP connection
Remote IP address	The IP number that will be assigned to the remote client when creating the PPP connection
User name	The login name that the remote client will use when creating the PPP connection
Password	The password that the remote client will use when creating the PPP connection

Regional

Use the Regional page to define the clock settings of the adapter and the representation of the log file list separator and decimal symbol.

Note: It is important to make sure that the clock settings of the adapter and the clock on the user's PC are correct. If they are not, the automatic production log data may not be displayed on the Historical Graphs page.



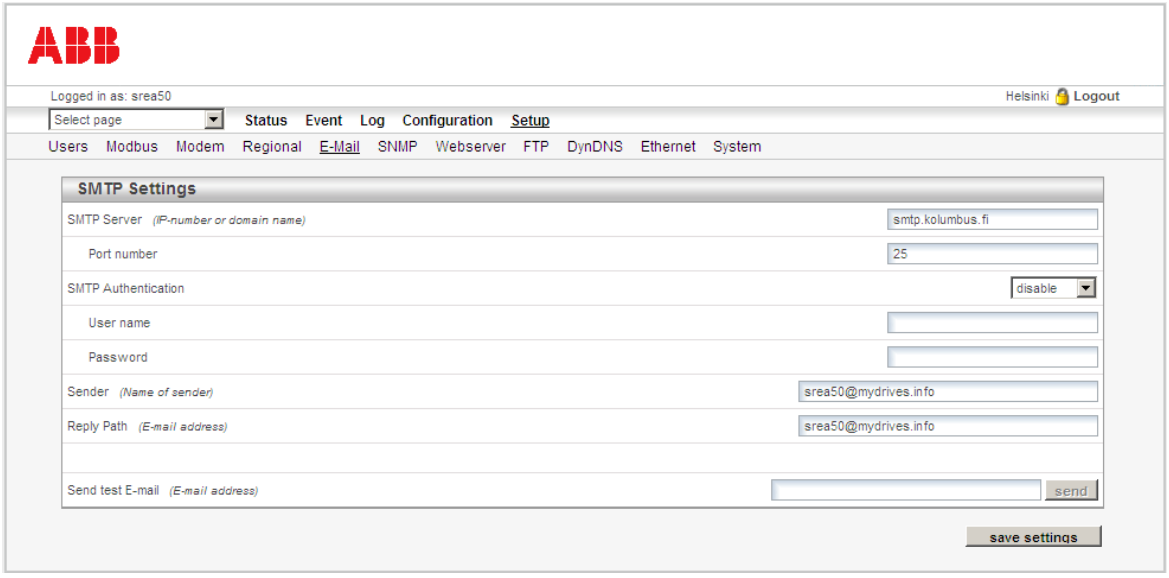
The table below describes how to fill in the fields on the page.

Field	Instruction
Date / Time / Time zone	The real-time clock settings of the adapter. The clock will also continue to work during a power loss (max. one week).
Network time protocol	Enables NTP (Network Time Protocol) for synchronizing the clock.
NTP server	NTP server
Update interval	Interval to how often NTP will synchronize the time
Language File	Click **Upload** to upload a new language for the graphical user interface.
Decimal separator and log file value separator	List separator: Can be either comma (,) or semi-colon (;). Decimal symbol: Can be either dot (.) or comma (,). **Note:** Ensure that your selections match the configuration on the PC where the log files will be analyzed.

E-Mail

Use the E-Mail page to define the SMTP settings.

Note: To be able to send e-mails, you have to specify a host name on the **Setup** – **Ethernet** page. See section *Ethernet* on page *92*.



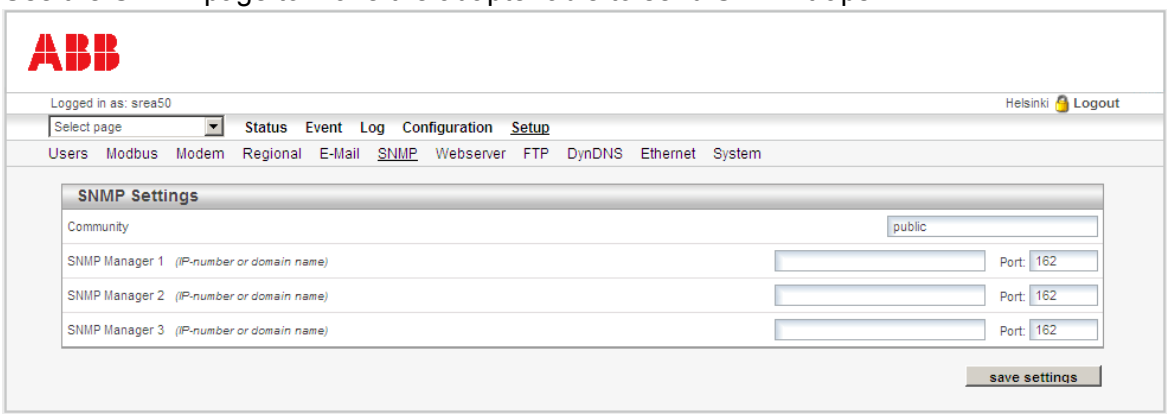
The table below describes how to fill in the fields on the page.

Field	Instruction
SMTP server	The IP number or domain name of the SMTP server that the adapter should use when sending e-mails. If the domain name is used, make sure that you have entered a DNS under **Setup** – **DynDNS**.
Port number	The TCP/IP port used by the SMTP server. The default is 25, but sometimes the server needs to be adjusted to another port because of firewall limitations.
SMTP Authentication	If the SMTP server requires authentication, you need to enable SMTP Authentication. The following methods are available: • disable – No user name based authentication is used. Usually this means that you have to use the Internet connection provided by your SMTP server provider. • plain – a simple non-encrypted method supported by most SMTP servers. • login – a simple non-encrypted method supported by most SMTP servers. • cram-md5 – a more secure login method where the user name and password is encrypted. (This method is not supported by all SMTP servers.) Also, type in the user name and password for sending e-mails.
Sender	The "From" field in the alarm mail. Example: SREA-50.
Reply path	The e-mail address to send a mail to when someone wants to reply to an alarm mail.
Send test E-mail	The recipient of the test e-mail.

To verify the setup, click the **send** button. A test e-mail will be generated and sent to the recipient specified.

SNMP

Use the SNMP page to make the adapter able to send SNMP traps.



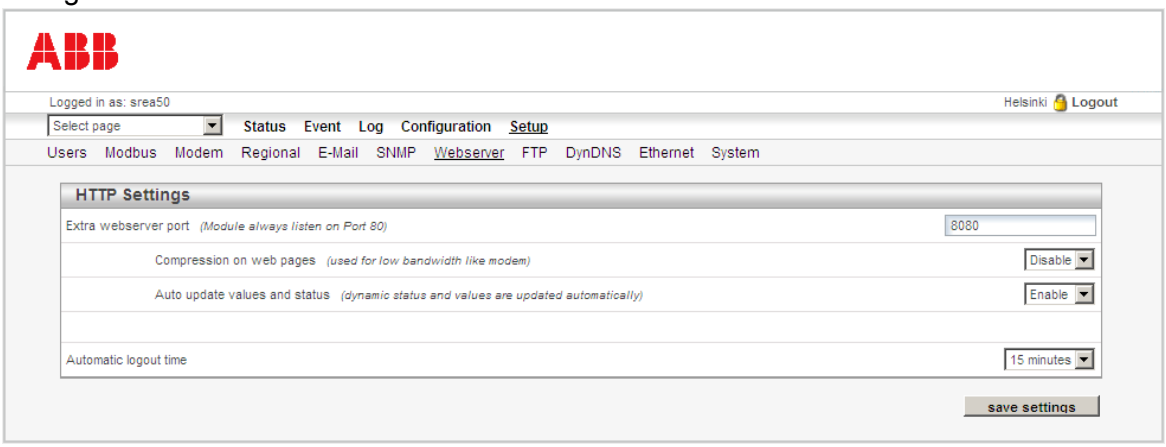
The table below describes how to fill in the fields on the page.

Field	Instruction
SNMP Manager 1…3	Type the address of the SNMP manager to which SNMP traps should be sent.
Port	Type the port number on the SNMP manager to which traps should be sent.

If SNMP is activated for events, all alarms will be sent by using SNMP. For more information, see section *Event* on page *75*.

Webserver

Use the Webserver page to define the settings needed to make the web server listen to another port in addition to the default port 80 (http). The alternate port can also be configured to function as a low-bandwidth server.



The table below describes how to fill in the fields on the page.

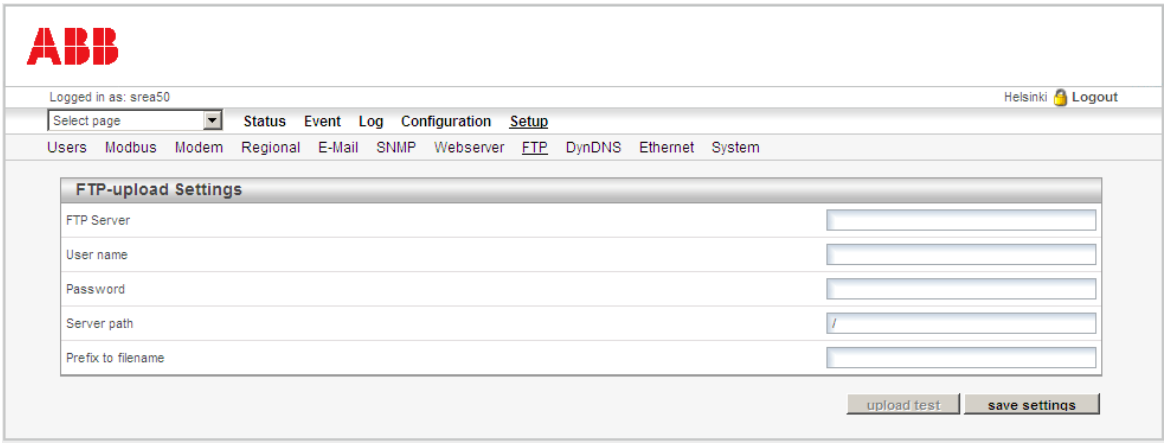
Field	Instruction
Extra webserver port	To connect to the Extra webserver port, the URL must have a colon ':' followed by the new port number, ie, http://10.10.10.30:8080, where: • 10.10.10.30 is the IP number or DNS address of the adapter • :8080 is the new port.
Compression on web pages	Only used for the Extra webserver port. Options: • **Enable**: The adapter will check if the connecting web browser supports compressed data transfers and then compress the web pages before sending them. This improves the data transfer for low bandwidth connections, such as modem connections. However, the workload of the adapter will increase, which is why this feature is not enabled by default. • **Disable**: The pages will be sent as normal web pages, which is always the case for the default web server port 80. • **Force**: The pages will be always sent compressed, regardless of the support of the web browser. In some cases, the information whether the web browser supports compressed data is altered in the network route, as with the Microsoft ISA server default setting for controlling port 80. This option ensures that compressed web pages are sent anyway. Most web browsers support compressed data.
Auto update values and status	Only used for the Extra webserver port. If you enable this option, the amount of data transferred over a connection is minimized with http compression. **Note:** The data will be read only one time. To refresh the values and status of the visible page, click the appearing refresh button on the upper left corner. If you use the web browser reload button instead, unnecessary data traffic will be generated.
Automatic logout time	The time interval before a user is logged out from the web server.

Note:

- In addition to the possible extra web server port, the server will always listen to the default port 80 as well.
- When a modem connection is used, **Compression on web pages** is always enabled and **Auto update values and status** disabled to improve response times. In this case, click the **refresh** button to update the values and status.

FTP

Use the FTP page to make the adapter upload manual data logger files and event status files to a remote FTP server.



The table below describes how to fill in the fields on the page.

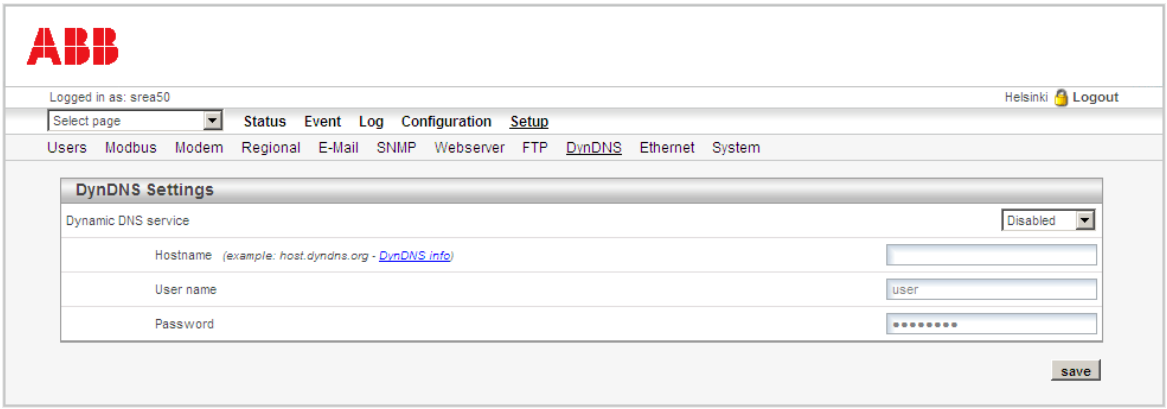
Field	Instruction
FTP Server	The IP address or DNS name of the FTP server
User name	The user name for the server
Password	Password for the server
Server path	Where on the server to upload the files. Use a single slash “/” for the root directory.
Prefix to filename	Uploaded files are named according to this scheme. If the prefix is, for example, “Unit_A_”, the uploaded log files will be named as Unit_A_2008-05-30_1559.csv.

To test the FTP configuration, click the **upload test** button. The adapter will send a test file to the server and report whether the configuration is working.

DynDNS

Use the DynDNS page to configure DynDNS, a free Dynamic Domain Name Service from Dyn Inc.

Note: Before modifying this page, create a DynDNS account at www.dyndns.com.

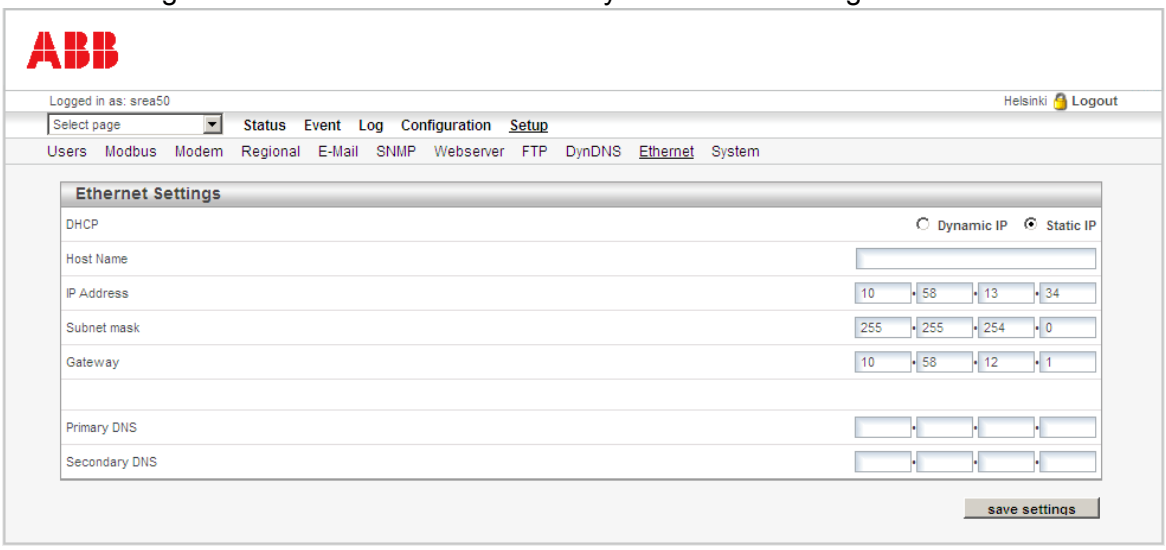


The table below describes how to fill in the fields on the page.

Field	Instruction
Dynamic DNS service	Enables the service. Select dyndns.org to enable the service.
Hostname	The host name of the adapter in the DynDNS service
User name	The user name of the DynDNS account which the adapter will use
Password	The password related to the previous user account

Ethernet

Use the Ethernet page to view and change the TCP/IP network settings of the adapter. These settings are the same as the ones set by the ABB IP Configuration tool.

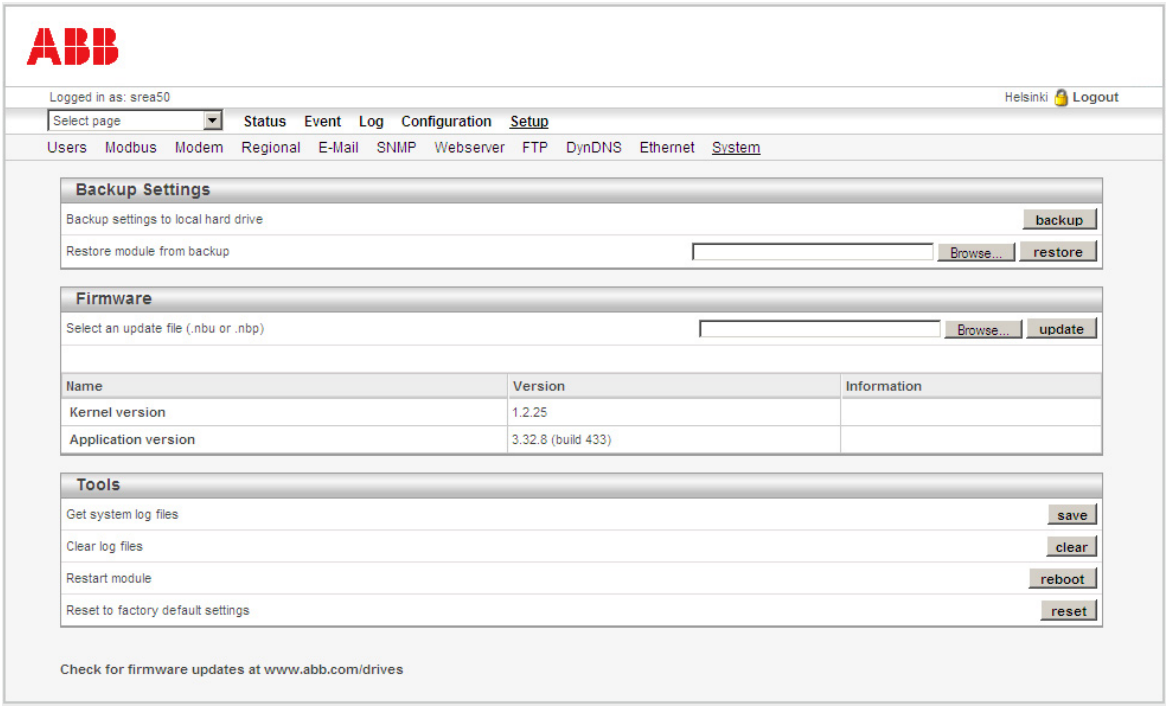


The table below describes how to fill in the fields on the page.

Field	Instruction
DHCP	Select **Dynamic IP** if you have a DHCP server on your network and you want the IP address to be assigned automatically by the server. Do not select the **Dynamic IP** option if you do not have a DHCP server available on the network.
Host Name	The host name of your device. **Note:** If you are using e-mail alarms, make sure that this field has a value.
IP Address	The IP address of the adapter
Netmask	The subnet mask
Gateway	The default gateway
Primary DNS	The primary Domain Name Server (optional)
Secondary DNS	The secondary Domain Name Server (optional)

System

Use the System page to back up and restore configurations and upgrade the firmware.



Backup Settings

- To get a backup file that can be stored locally, click the **backup** button. All configurations in the adapter except the Ethernet settings will be in this file.
- To upload a backup to the adapter, browse to the file, and then click **restore**. After the configuration has been restored, you will be asked to restart the adapter.

Firmware

To upload a new firmware image (.nbu file) or a patch file (.nbp), browse to the file, and then click **upload**.

The **Name** section displays the version of the kernel and the file system version.

Tools

- To get system log files, click **save**.
- To clear log files, click **clear**.

  Note: This function will clear both the manual data logger and automatic production logger. This may be necessary if the user has accidentally entered a wrong date when starting up the adapter.
- To restart the adapter, click **reboot**.
- To bring the adapter back to factory default configuration, click **reset**. This may be necessary if the user has accidentally entered a wrong date when starting up the adapter.

Application examples

This section explains how to set up the adapter for typical applications: manual data logger application, alarm monitoring application, GPRS access interface application and Modbus/TCP gateway application.

Note: The user account must have Super Admin access rights to be able to change the settings described below.

Manual data logger

Check the following settings if the adapter is to be used for manual data logging.

Note: This data logger is separate from the automatic production logger, which cannot be configured by the user. This logger is typically used to collect data to be sent to a database or portal.

Regional settings (Setup – Regional)

Use the regional settings to set the time of the internal real-time clock of the adapter. In logging applications, this is important because the data is time-stamped by the internal real-time clock. The most important regional settings are **Date**, **Time** and **Time zone**. For more information, see section *Regional* on page *87*.

FTP settings for sending log files (Setup – FTP)

If needed, use the FTP settings to define where the adapter should upload logs by FTP. For more information on the FTP settings, see section *FTP* on page *91*.

E-mail settings for sending log files (Setup – E-Mail)

If needed, use the e-mail settings to define which SMTP server the adapter should use when sending logs by e-mail. For more information on the e-mail settings, see section *E-Mail* on page *88*.

Modem settings for GPRS connectivity (Setup – Modem)

If the logs are to be sent by e-mail or FTP over GPRS, configure the modem on the **Setup – Modem** page. The most important settings are:

- **Modem type**: GPRS
- **Pin code**
- **Dial-up**: Select **Enable** to enable connecting to the Internet.
- **Connection trigger**: Select **connect on alarm/event** if you want the adapter to connect to the Internet only when it is sending logs, or **Always Connected** if you want to be able to access the web pages remotely over GPRS as well.
- **Access point name (APN)**, **User name**, and **Password**: Enter the information your Internet Service Provider has given to you.

For more information, see section *Modem* on page *85*.

Log file recipients (Setup – Users)

If the logs are sent by e-mail, define the recipients of the logs. Create a user account for each recipient, type an e-mail address and enable **Receive log files via E-mail**. For more information, see section *Users* on page *81*.

Log configuration (Configuration – Log)

Finally, configure the parameters that you want to log. For more information on the logging options, see section *Log* on page *77*.

Event monitoring

Check the following settings if the adapter is to be used for sending alarm messages of events.

Modem settings for sending SMS messages (Setup – Modem)

If you want to send alarm messages by SMS, configure the GSM modem. The most important settings are:

- **Connection trigger**: Select **Connect on alarm/event** to be able to send SMS alarms. SMS alarms are not supported when the selection is **Always Connected**.
- **Modem type**: Select **GSM** or **GPRS** to be able to send SMS messages.
- **Pin code**.

For more information, see section *Modem* on page *85*.

E-mail settings for sending e-mail messages (Setup – E-Mail)

If needed, use the e-mail settings to define which SMTP server the adapter should use when sending alarm messages by e-mail. For more information on the e-mail settings, see section *E-Mail* on page *88*.

SMS and e-mail recipients (Setup – Users)

If alarm messages are to be sent by SMS or e-mail, configure the message recipients. Create a user account for each recipient, enter an e-mail address or a mobile phone number and select the alarm classes that you want the user to receive messages from. For more information, see section *Event* on page *75*.

Device-specific default alarms (Configuration – Devices)

By default, there are two alarms defined for each inverter. These alarms are sent if the inverter is disconnected from the adapter or when the inverter is in the FAULT or WARNING state. To enable or disable these alarms or assign them to an alarm class different from 1, go to **Configuration** – **Devices** and select the inverter you want to configure. For more information, see section *Devices* on page *67*.

Custom alarm configuration (Configuration – Event – Event Configuration)

If needed, you can create custom alarms in addition to the default pre-defined alarms. For more information, see section *Event* on page *75*.

GPRS access interface

Check the following settings if the adapter is to be used for accessing the inverters remotely over a GPRS connection.

User accounts (Setup – Users)

It is recommended to create additional user accounts with fewer privileges for remote use. More user accounts can be created on the **Setup** – **Users** page. For more information, see section *Users* on page *81*.

GPRS settings (Setup – Modem)

If you want to be able to access the adapter web pages by GPRS, configure the modem. The most important settings are:

- **Modem type**: GPRS
- **Pin code**
- **Dial-up**: Select **Enable** to enable connecting to the Internet.
- **Connection trigger**: Select **Always Connected** to be able to access the adapter.
- **Access point name (APN)**, **User name**, and **Password**: Enter the information your Internet Service Provider has given to you.

For more information, see section *Modem* on page *85*.

Alternative web server port (Setup – Webserver)

You may need to configure an alternative web server port if the Internet Service Provider blocks incoming connections to port 80. In addition, you can specify the alternative port to use compression and not to refresh the values on the web pages automatically to save bandwidth. For more information, see section *Webserver* on page *90*.

Custom views with only the desired values (Configuration – Pages)

If you want to monitor just a few actual values or parameters, it may be a good idea to create a custom page with just these values. Loading such a minimalist page is much faster than loading the complete Actual Values page. For more information on creating custom pages, see section *Pages* on page *71*.

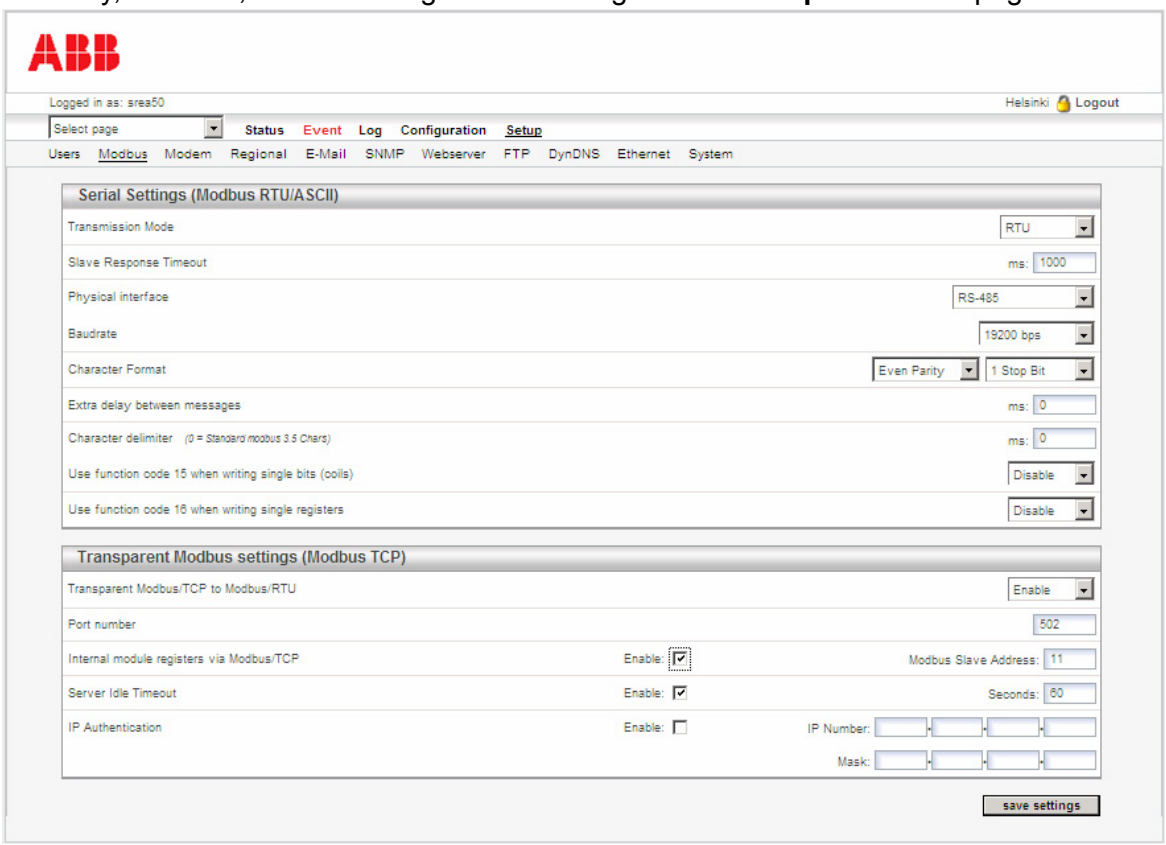
Modbus/TCP gateway

When the adapter acts as a Modbus/TCP gateway, it accepts connections from Ethernet-connected Modbus/TCP client devices (eg, SCADA, PLC) and relays the communication to the inverters over serial Modbus RTU. The adapter can relay, for example, parameters, actual values and status words.

Check the following settings if the adapter is to be used as a Modbus/TCP gateway.

Modbus settings (Setup – Modbus)

Basically, the adapter works as a Modbus/TCP gateway without any special configuration. You may, however, want to change some settings on the **Setup** – **Modbus** page.



- **Transparent Modbus/TCP to Modbus/RTU**: The default value is **Disable**. Change the value to **Enable**.
- **Port number**: The TCP port of the Modbus/TCP gateway. The Modbus/TCP software that connects to the adapter uses the IP address and port of the adapter to connect to the gateway.
- **Internal module registers via Modbus/TCP**: The Modbus address that can be used to access the internal registers of the adapter. For example, if you have inverters with addresses 1…10, you can set the **Internal module registers via Modbus/TCP** to 11 and use that address to access the internal registers. For more information, see *Appendix A: Internal Modbus registers*.
- **IP Authentication**: If you want to restrict the use of the Modbus/TCP gateway, you can do it by entering the desired network IP and subnet mask. For example, if the computers at addresses 192.168.100.* should be able to connect and others should be blocked, use IP number 192.168.100.1 and mask 255.255.255.0.

For more information on the settings, see section *Modbus* on page *83*.

Settings of the Modbus/TCP client application that connects to the adapter

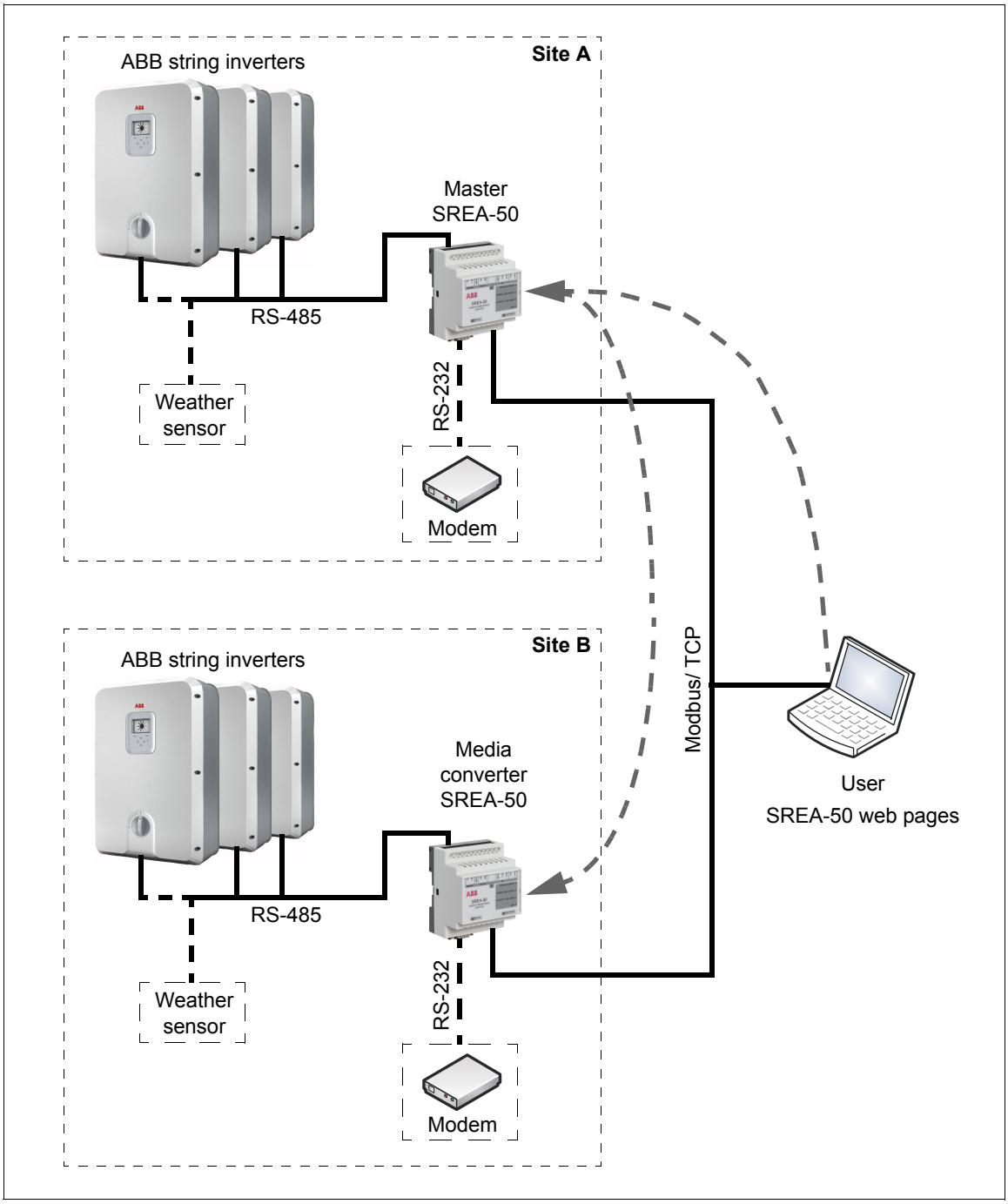
Typically, you have to configure these settings in your Modbus/TCP client application software:

- **IP Address**: The IP address of the adapter
- **IP Port**: The port defined on the **Setup** – **Modbus** page, for example, 502
- **Unit ID/Node Addresses**: The node address of the inverter in question. You can also use the address defined in the **Internal module register via Modbus TCP** field on the **Modbus** - **Setup** page to connect to the internal registers of the adapter.
- **IO Type**: The holding register
- **I/O Addresses**: The address of the parameter or value to be read. In such cases, parameter 12.02 is 1202 instead of 41202. See the manual of your Modbus/TCP client application for more information.

Example: SREA-50 as a Modbus/TCP gateway for another SREA-50

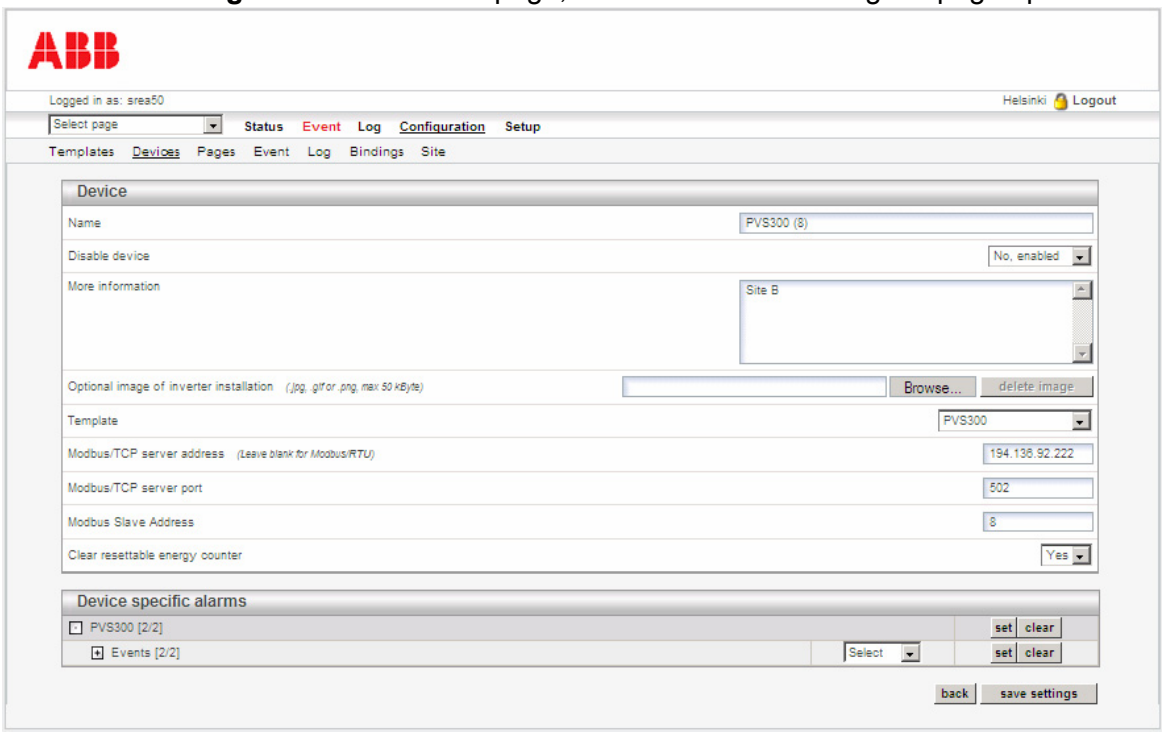
One way to utilize the gateway feature is shown in the figure below. In this example, the user monitors site B via the adapter on site A. The adapter on site A acts as a master Modbus/TCP gateway, while the adapter on site B acts as a media converter or Etherner adapter between Modbus/TCP and Modbus RTU.

This type of gateway application makes device connectivity in the Ethernet network possible and enables the user to monitor all devices in the network via one web page, regardless of the locations of the devices. A maximum of 10 ABB string inverters (max. 32 Modbus devices) can be connected and monitored.



To set up the master SREA-50 (site A):

1. Check the settings described in section *Modbus settings (Setup – Modbus)* on page *97*.
2. On the **Configuration** – **Devices** page, click **edit**. The following subpage opens.



3. Repeat the following settings for all the inverters connected to the media converter SREA-50 (site B):
   - **Modbus/TCP server address**: The IP address of the media converter SREA-50
   - **Modbus/TCP server port**: The port number, usually 502.
   - **Modbus Slave Address**: The node address of the inverter. The address needs to be unique and different from any of the addresses of the inverters on site A.

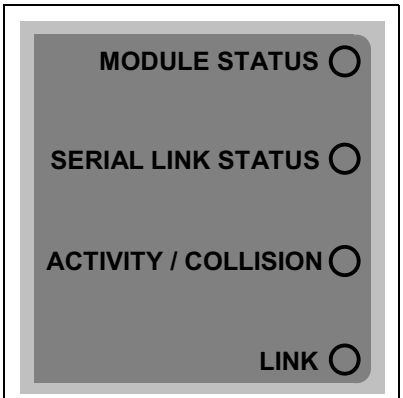
9

Fault tracing

What this chapter contains

This chapter describes the diagnostics LEDs of the adapter and gives troubleshooting instructions for finding out the root causes and corrections to the most common problems with the adapter.

Diagnostic LEDs



LED	Mode	Description
MODULE STATUS	OFF	No power
	Green	Adapter is running in the normal mode.
	Orange	During boot-up
SERIAL LINK STATUS	Flashing green	Serial packet receive
	Flashing red	Serial packet transmit
	Orange	During boot-up
ACTIVITY / COLLISION	Flashing green	Ethernet packet received
	Flashing red	Ethernet collision detected
LINK	OFF	No Ethernet link detected
	Green	Ethernet network detected, 10 Mbps
	Orange	Ethernet network detected, 100 Mbps

Troubleshooting

ABB IP Configuration Tool does not find any adapter units

- Some firewall applications block the ABB IP Configuration Tool. If you are experiencing problems with finding the adapter unit, try disabling your firewall.
- Make sure that the adapter is connected to the same network as the PC without any gateways.

Adapter cannot be connected to locally

- Check that the LINK LED of the adapter is lit. If necessary, check the Ethernet cabling.
- Make sure that the adapter unit is configured with the correct network settings. Make sure that your network adapter is configured to the same subnet as the adapter unit. Check that the adapter unit can be found by the ABB IP Configuration Tool.
- If you are using DHCP, make sure that the IP address of the adapter has not changed automatically.
- Make sure that your browser is not configured to use a proxy server for local network connections.

Adapter cannot be connected to from a remote location

- Make sure that your Internet service provider or network system does not block port 80 from outside. If necessary, configure the adapter to use an alternate web server port (see section *Webserver* on page *90*) and check that your firewall allows traffic to that port.
- If you are using DHCP, make sure that the IP address of the adapter has not changed automatically.

Logging in fails

- Make sure that CAPS LOCK is turned off.
- Make sure that JavaScript is enabled in your browser.
- Make sure that you are using Internet Explorer 8 or 9, or Mozilla Firefox 3.6 or 6.

Inverters are not found by the adapter or appear as disconnected

- Check that you have selected the correct physical interface, baud rate and parity on the **Setup** – **Modbus** page. Check that all inverters are configured to use the same baud rate and parity.
- Check the **Status** – **Device Status** page to see if communication works partially or not at all. Check cabling, terminating resistors and the correct wiring of the A/B channels.
- Check that all inverters have different node addresses.
- If you have an inverter connected at node address 247, it cannot be detected automatically because this address is reserved for special functionality. It is possible, however, to use an inverter at this node address by configuring it manually.

Inverters are found by the adapter, but their models are not identified automatically

- On the **Configuration** – **Templates** page, check that the correct template file for your inverter is installed. If it is not, you can upload it if it is available.
- Some inverters cannot be identified automatically. If you have such an inverter, you have to select the correct template manually.

When importing a log file to Microsoft Excel, the data is not separated in columns

- Check that you have selected the correct decimal and field separators on the **Setup** – **Regional** page. The selection should match the PC.
- Try the Text to Columns feature of Excel to fix the file. In Excel 2003, it is located on the **Data** menu.

Transparent Modbus/TCP does not work

- Check the settings on the **Setup** – **Modbus** page. Check that IP authentication does not block the client, that the port is correct and that the gateway register is not overlapping an actual inverter.

Adapter cannot send e-mails

- Check that you are using the correct SMTP server. If the adapter is not connected to a company network, be sure to use the SMTP server of the Internet Service Provider that is used to connect the adapter to the Internet.
- Check that your spam filter does not prevent you from receiving e-mails from the address of the adapter.

Only one alarm message is received from the adapter although an event occurs multiple times

- Check that event acknowledgements are disabled on the **Configuration** – **Event** page. If they are enabled, the event has to be acknowledged on the **Event** – **Event Status** page before an alarm message is sent the next time.

The Historical Graphs page does not display data

- Check that the clock settings of the adapter are correct on the **Setup** – **Regional** page.
- Check that the clock on your PC is correct.

10

Technical data

What this chapter contains

This chapter contains the technical data of the adapter.

Ethernet connection

10Base-T or 100Base-TX (IEEE 802.3)

RJ-45 connector

Serial interfaces

RS-232 with full modem control (RTS, CTS, DCD, DTR, DSR, RI)

300-115.200 bps, 9-pole D-sub connector

RS-485, 300-115.200 bps, screw connector

Digital inputs

Two opto-isolated digital inputs

Logical levels: 0…2 V = "0"; 10…24 V = "1".

Power supply

9…28 V AC/DC (2 W)

Ambient conditions

Allowed ambient temperature (operation and storage): -40…85 °C

Relative humidity level (RH, non-condensing): 5…95%

Cover material

Gray plastic, LEXAN 940, self-extinguishing acc. to UL94-V0

Mounting option

DIN rail (EN 50022)

CE certification

According to EN 61000-6-4:2001 and EN 61000-6-2:2005

Degree of protection

IP20

11

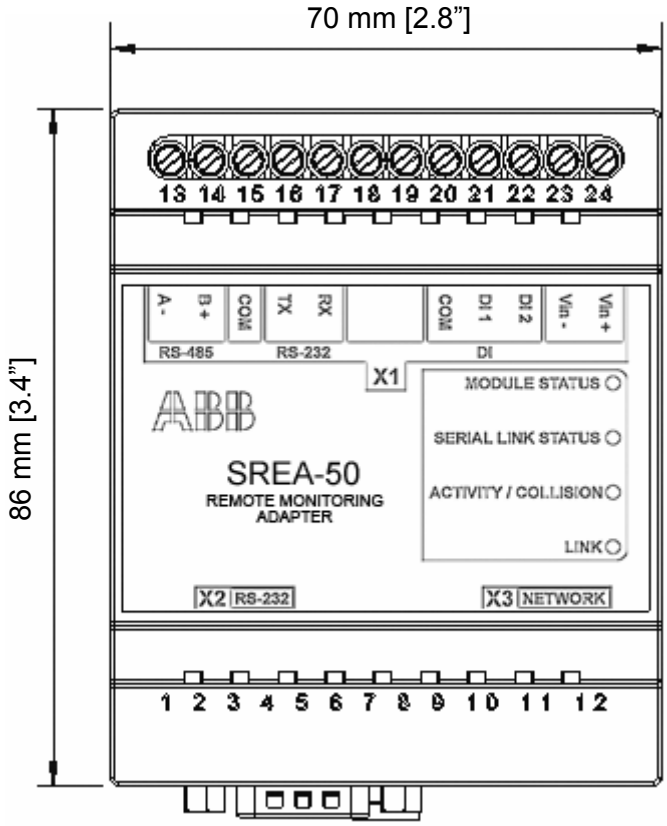
Dimension drawings

What this chapter contains

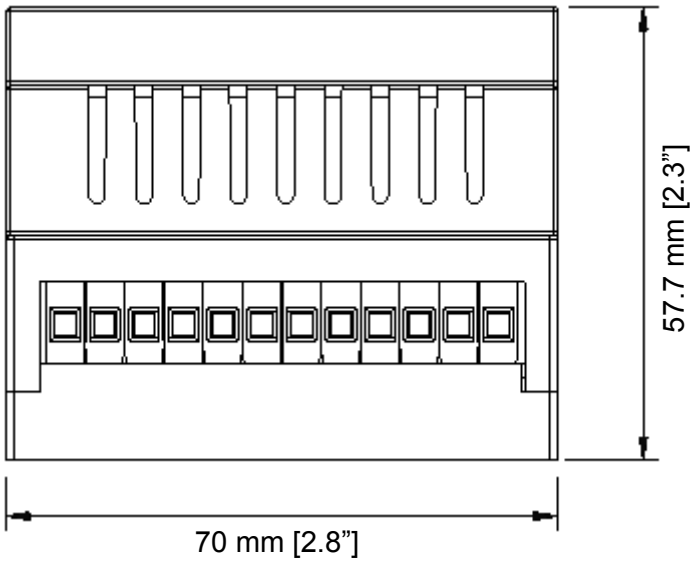
This chapter presents the dimensions of the adapter. The dimensions are given in millimeters and [inches].

Adapter dimensions

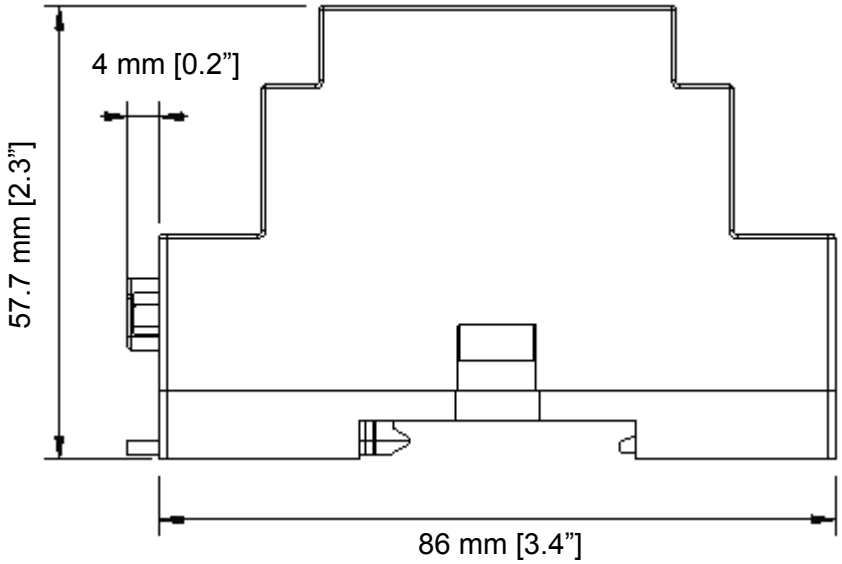
Front view:



Top view:



Side view:



12

Appendix A: Internal Modbus registers

What this chapter contains

This chapter contains a list of the registers of the adapter that can be accessed by Modbus/TCP clients.

Register table

Holding register	Name	Values	Options	Access	Comment
1	Digital input 1 status	0 or 1		Read only	
2	Digital input 2 status	0 or 1		Read only	
3	Number Active Connections MB/TCP	0…10		Read only	
4	Number Active Internal Connections	0…32		Read only	
Serial Status (Modbus/TCP)					
5	Valid responses	0…65535		Can be cleared	
6	Serial timeouts	0…65535		Can be cleared	
7	CRC errors	0…65535		Can be cleared	
8	Input Buffer overruns	0…65535		Can be cleared	
9	Frame errors	0…65535		Can be cleared	
10	Exception responses	0…65535		Can be cleared	
Serial Status (Buffered messages)					
11	Valid responses	0…65535		Can be cleared	
12	Serial timeouts	0…65535		Can be cleared	

Holding register	Name	Values	Options	Access	Comment
13	CRC errors	0…65535		Can be cleared	
14	Input Buffer overruns	0…65535		Can be cleared	
15	Frame errors	0…65535		Can be cleared	
16	Exception responses	0…65535		Can be cleared	
Serial Status (Internal requests and Web pages)					
17	Valid responses	0…65535		Can be cleared	
18	Serial timeouts	0…65535		Can be cleared	
19	CRC errors	0…65535		Can be cleared	
20	Input Buffer overruns	0…65535		Can be cleared	
21	Frame errors	0…65535		Can be cleared	
22	Exception responses	0…65535		Can be cleared	
Configuration Registers					
23	Modbus/TCP Port	0…65535		Read-write	Default port number is 502
24	Gateway Modbus address	(-1)…255		Read-write	
		-1	Disabled		Default
		0…255	Enabled		
25	Modbus/TCP idle timeout	0…65535 (seconds)		Read-write	Default 60 seconds
		0	Disabled		
		1…65525	Enabled		
26	Baudrate			Read-write	
		2400	2400 bps.		
		4800	4800 bps.		
		9600	9600 bps.		Default value
		19200	19200 bps.		
		38400	38400 bps.		
		57600	57600 bps.		
		115200	115200 bps.		
27	Parity	0…2		Read-write	
		0	No parity		Default
		1	Even parity		
		2	Odd parity		
28	Number of Stop bits	1…2		Read-write	Default 1 stop bit
29	Slave timeout time	25…65535 (milliseconds)		Read-write	Default 1000 ms.
30	Physical interface	0…2		Read-write	
		0	RS-485 (RJ12)		Default
		1	RS-232 (DSUB)		
		2	RS-232 (RJ12)		
Authentication					
31	Valid IP address 1	0…255		Read-write	First byte of IP address
		0	Disabled		IP address auth disabled
		1…255	Enabled		

Holding register	Name	Values	Options	Access	Comment
32	Valid IP address 2	0…255	Enabled	Read-write	Second byte of IP address
33	Valid IP address 3	0…255	Enabled	Read-write	Third byte of IP address
34	Valid IP address 4	0…255	Enabled	Read-write	Fourth byte of IP address
35	Mask for Valid IP address 1	0…255	Enabled	Read-write	First byte of mask
36	Mask for Valid IP address 2	0…255	Enabled	Read-write	Second byte of mask
37	Mask for Valid IP address 3	0…255	Enabled	Read-write	Third byte of mask
38	Mask for Valid IP address 4	0…255	Enabled	Read-write	Fourth byte of mask
Relay output					
39	Relay feedback	0…1		Read-only	
40	Relay output	0…1		Read-only	
Time					
41	Year				
42	Month				
43	Day of month				
44	Hour				
45	Minutes				
46	Seconds				
47	Seconds from Jan 1 1970 epoch (GMT)				

Note: You can read the Modbus addresses of the PVS300 parameters in the PVS300 template file. See section *Templates* on page *66*.

Further information

More information about ABB products for solar applications on the Internet: www.abb.com/solar.

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