

Customer operating instructions

SolvisMax/SolvisBen SC-3

For the following systems:

- Gas, Oil
- Gas Hybrid / Oil Hybrid
- Solo
- WP



1 Information About These Instructions

These instructions include the necessary information about how to operate and adapt your system according to your individual needs.

Please keep these instructions with the system so they can be referred to when necessary.

As we are interested in improving our technical documentation, we appreciate feedback of any kind.

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Please consult with your installer regarding questions about operation.

Using these instructions

These instructions apply to the SolvisMax and SolvisBen solar heating systems. The instructions describe the operation of the SolvisControl 3 system controller with the control version MA3.20.16.

Unless stated otherwise, the respective factory settings for the SolvisMax system are shown in the menus reproduced here. The menu entries quoted in the text are highlighted in bold and set in quotation marks.

Symbols used



DANGER

Immediate danger, with serious health consequences and even death.



WARNING

Danger, with potentially serious health consequences.



CAUTION

Possible risk of moderate or light injury.



CAUTION

Risk of damage to unit or system.



Useful information, notes and work tips.



Change of document, referring to another document.



Energy-saving tip with suggestions on how to save energy. This reduces costs and helps protect the environment.

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2 Notes

2.1 Safety Notes



CAUTION

Observe instructions

Solvis is not liable for any damage resulting from non-observance of these instructions.

- Read the instructions carefully before operating the system.
- Observe the safety notes.



DANGER

What to do if there is a risk of fire

- Immediately actuate the heating emergency switch.
- Shut off the fuel supply.
- Have a suitable fire extinguisher ready.



CAUTION

Observe ambient conditions

Malfunction or failure of system possible.

- Avoid ambient temperatures outside of the permitted range of 5°C to +50°C.
- Avoid dew condensation and an annual mean relative humidity higher than 75% (briefly 95%).



CAUTION

Check for damage

Damage to the controller, to cables or to connected pumps or valves may cause severe damage to the system.

- Do not operate the system/unit if there is visible damage to any of its components.



CAUTION

Avoid contaminants

- Water, oil, grease, solvent, dust, foreign bodies, aggressive vapours and other contaminants must be kept away from the system and the units.
- Cover the system and the units when performing construction or other work in the area to protect them from dirt and contaminants.
- Do not remove the protective foil on the unit until immediately before startup.



CAUTION

Do not make any unauthorised modifications

Otherwise, there is no guarantee that the system will function correctly.

- You must not make any changes to the components of the unit.
- Only use original spare parts.

2.2 Use

Intended use

The system is only intended for heating purposes and heating drinking water with optional solar panel support as described in this document.

Any other or extended use of the device is deemed unintended use. In such cases, safety and protective functions of the system could be impaired. SOLVIS is not deemed liable for damage resulting from such use.

Exclusion of liability

Solvis accepts no responsibility for damage to the unit or resulting damages if:

- installation and start-up have not been carried out by a specialist company recognised by Solvis,
- the system is not being used as intended or is being operated incorrectly,
- maintenance was not performed, or
- maintenance, modifications or repairs have been performed on the heating system by someone who is not a specialist.

Guarantee and warranty


We offer a **warranty** in accordance with our general terms and conditions. On various components, we also offer guarantees lasting several years.

Glossary

Certain terms are used in these instructions that have the following meaning if not otherwise indicated:

- **Standard value:** Values stored in the controller at the factory. They depend on the respective system configurations. The menus in these instructions usually display the standard values for the SolvisMax Gas; the values of other systems are referred to separately.
- **Internal heat generator:** Gas or oil burner in the SolvisBen or SolvisMax heat exchanger insert.
- **External heat generator:** Heating pump, solid fuel boiler, gas or oil burner or district heating connection to a building control station for district heating.
- **Solid fuel boiler:** Boilers that are fired with solid fuels, such as wood. They can also be used as an additional heat source.

3 Product Description

 For detailed system diagrams, see → document (ALS-MAX-7 or ALS-BEN).

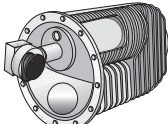
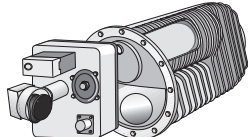

3.1 Differences between the system versions

3.1.1 Systems without a heating pump

Variants of the solar heating systems

Designation	heat generator	Combination storage tank with... *
SolvisMax/SolvisBen Gas solar heating system	a	Integrated gas condensing system and optional solar station
SolvisMax / SolvisBen Oil solar heating system	b	Integrated oil condensing system and optional solar station
SolvisMax / SolvisBen Solo solar heating system	c	external boiler or district heating connection and optional solar station

* All systems without an integrated heat generator can be retrofitted (exception: SolvisBen WP). It is also possible to change the type of heat generator.

Heat generator insert	Solar heating system	
	SolvisBen	SolvisMax
a with gas condensing system		
b with oil condensing system		
c without (flange cover*)		

* Included with SolvisBen/SolvisMax Solo; special flange cover for connecting external heat generators and district heating available.



Fig. 1: SolvisBen solar heating system



Fig. 2: SolvisMax solar heating system

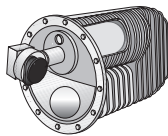
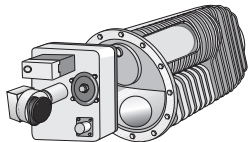
3.1.2 Systems with a heating pump

The proven SolvisMax or SolvisBen solar heating systems are used as buffer storage tanks for the air-water heat pumps.

The solar central heating systems with heat pump are available in the SolvisBen/SolvisMax WP and SolvisBen/SolvisMax Hybrid versions. "Hybrid" means that a further heat generator is installed in addition to the heat pump.

The solar heating systems with heat pump already contain a stainless steel soldered hot water station with a hot water output of 30 l/min. This means that the hot water station can continuously supply 30 liters of heated drinking water per minute, which can be drawn off at the tapping points (e.g. tap, bath and shower). The duration of the extraction and the temperature of the extracted water depend on the size of your buffer cylinder and the water temperatures set in the buffer cylinder and in the hot water station (see → ch. Water, p. 23 and ch. Circulation, p. 25). A heating circuit station can be optionally integrated into the SolvisBen systems.

3 Product Description

Heat generator insert	SolvisBen/SolvisMax Hybrid solar heating system
a With gas condensing system	
b With oil condensing system	

Variants of the solar heating systems

Designation	Heat generator	Combination storage tank with...
SolvisBen heating pump	None	External air-water heating pumps SolvisLea, SolvisLea 8.3 Premium, SolvisLea Eco*, SolvisMia* or SolvisPia*
SolvisMax heating pump	None	
SolvisBen Hybrid Gas	a	Integrated gas condensing boiler and external air-water heating pumps SolvisLea, SolvisLea 8.3 Premium, SolvisLea Eco, SolvisMia or SolvisPia
SolvisMax Hybrid Gas	a	
SolvisBen Hybrid Oil	b	Integrated oil condensing boiler and external air-water heating pumps SolvisLea, SolvisLea 8.3 Premium, SolvisLea Eco, SolvisMia or SolvisPia
SolvisMax Hybrid Oil	b	

* Electrical heating element integrated in SolvisBen / SolvisMax

3.2 Air/water heating pump

SolvisBen / SolvisMax with heating pump only

The SolvisLea, SolvisLea Eco, SolvisLea 8.3 Premium, SolvisMia and SolvisPia are air-water heating pumps which operate as heating pumps which are connected to a buffer tank. SolvisLea and SolvisLea 8.3 Premium are equipped with an electrical emergency / additional heating (DHC) which is activated as an emergency heating system in monovalence operation, when necessary. In the case of other heating pumps, the heating cartridges are integrated in the tank, where necessary.

During bivalent operation, the second heat generator is activated if the unit alone cannot cover the heat requirement. This can occur either monoenergetically using an additional electrical heater or using a bivalent alternative with an additional burner (hybrid heater).

Other properties:

- Suitable for underfloor heating and radiator heating
- Preferred for low temperature heating
- Extracts heat from the outside air even at an outdoor temperature of -20°C

3.2.1 Functional description

Heat is extracted from the outside air via the heat exchanger (evaporator) on the air side. The refrigerant evaporates and is compressed by a compressor. This requires electrical energy.

The refrigerant is now at a higher temperature level and transfers the heat from the air to the heating system via an additional heat exchanger (condenser). The refrigerant expands and the process starts again.

The air humidity condenses as frost on the evaporator fins at air temperatures below approx. $+7^{\circ}\text{C}$. This frost is automatically defrosted as necessary. The water produced during this process is drained off.

During the defrosting phase, the fan switches off and the heating pump circuit is reversed. The heat required for defrosting is taken from the buffer. The heating pump automatically switches back to heating mode at the end of the defrosting phase.

3.2.2 Versions

The heating pumps are available in variants with different outputs:

- SolvisLea, 11 kW and 14 kW performance classes (A2/W35)
- SolvisLea 8.3 Premium, 8 kW performance class (A2/W35)
- SolvisLea Eco, 8 kW performance class (A2/W35)
- SolvisMia, 10 kW and 14 kW performance classes (A2/W35)
- SolvisPia, 12 kW performance class (A2/W35).

SolvisLea



Fig. 3: SolvisLea 8.3 Premium, 11 and 14

SolvisLea Eco



Fig. 4: SolvisLea 8 Eco

SolvisMia



Fig. 5: SolvisMia 8, 10 and 14

SolvisPia



Fig. 6: SolvisPia 12

3.3 SolvisControl

The SolvisControl 3 system controller maximises energy use in the overall system by intelligently adjusting to weather conditions. The storage tank is charged or discharged to meet requirements, the heat generator is controlled, the solar circuit and heating circuits are adjusted and the hot water is heated to the required temperature. The installer has installed and configured the heating system. For setting options that can be carried out by the system operator, see → *ch. "Expert Operation", p. 20.*



Fig. 7: SolvisControl 3 system controller

Operation

The unit is operated using a touch-sensitive display (resistive touch screen) with menus in which you can select items and change parameters.

For the operating principle and an explanation of the operating elements, see → *Chap. "Operating the SolvisControl", p. 11.*

Memory card

A removable memory card (microSD card) contains help texts, language and logging files, a backup of the settings and the operating software.

System analysis

The system data must be stored in intervals of minutes and seconds (data logging). It can be evaluated using special software or a spreadsheet program.

Remote operation

The SolvisControl 3 can be operated by the user via the SolvisPortal to operate, monitor and evaluate it. It does not matter where the user is located, all they need is an end device with a browser that is connected to the Internet. The SolvisControl 3 must be connected (via LAN or WLAN) to a router that is also connected to the Internet. The Internet address for access is then:



<https://www.SolvisPortal.de>

Access rights to the control system can be granted to and withdrawn from the installation company. The user retains full control over the process.

To establish a connection between the SolvisControl 3 system controller and the SolvisPortal, see → *ch. "SolvisPortal", p. 36.*

Remote function

You can use the remote function to control the SC-3 remotely (from your sofa, for instance) in your local network via LAN or WLAN. To do so, you require only an end device with a browser that is also connected to the local network. Internet does not have to be enabled to do so and there is no connection to the cloud.

The remote function also enables the user to obtain full access to the familiar user interface of the SolvisControl 3 from an end device that is connected to the Internet, regardless of the possibilities of the SolvisPortal. To do this, the end device must be connected to the Internet and be able to access the local network via a VPN connection.

To activate the remote function and start the SolvisRemote web app, see → *ch. "SolvisRemote web app", p. 18.*

3.4 Room controller

Room controller (BE-SC-2/3)

The room controller is connected to the SolvisControl system controller and shows information such as the temperature and operating modes. It can be used for both mixed and unmixed heating circuits.

In the event of a system malfunction, “Er” (for error) is shown in the room controller display. This applies only to room controller version 24 or later.

The version of the room controller is displayed when the upper part is removed from the wall socket and plugged in again.

i When a room controller is connected, the “Simple operation” operating mode is not available.

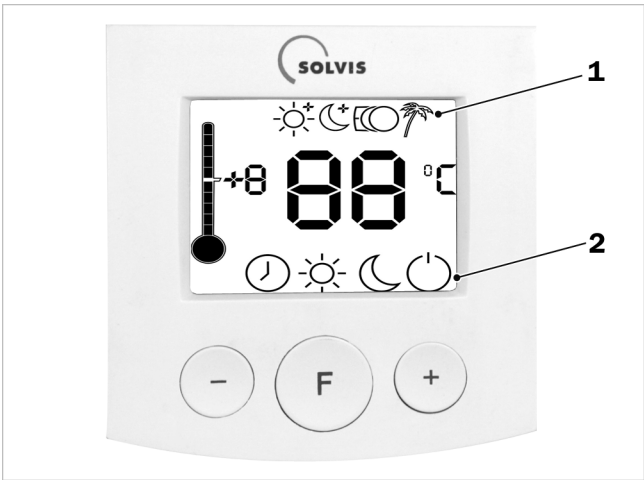


Fig. 8: Room controller BE-SC-2

- 1 These operating modes are displayed on the room control unit and can only be activated on the central controller.
- 2 These operating modes can be selected on the room control unit using the "F" button. To change the operating mode, press the "F" button repeatedly until the desired operating mode is selected.

Display of the operating modes

Display	Operating mode
	Time/automatic mode
	Day mode
	Time-based day mode (Party mode)*
	Lowering mode
	Time-based lowering mode (absence function)*
	Standby mode
	ECO mode*
	Leave mode/function*

* Symbol displayed above the room temperature.

Operation

- “+” and “-” buttons: Temperature correction (± 5 levels) to individually adjust the room temperature.
- “F” button: For setting the different operating modes and calibrating the temperature display.

3.5 Pool sensor (optional)

Pool sensor

Consists of room sensor BE-SC-2-O-SEN plus contact sensor SEN-A-105-PT (PTC Pt1000, please order separately, for connection to the room sensor)

The heating circuit uses the pool sensor to switch off the swimming pool/pool to be heated once the target temperature has been reached.

4 Operating the SolvisControl

4.1 Operating elements

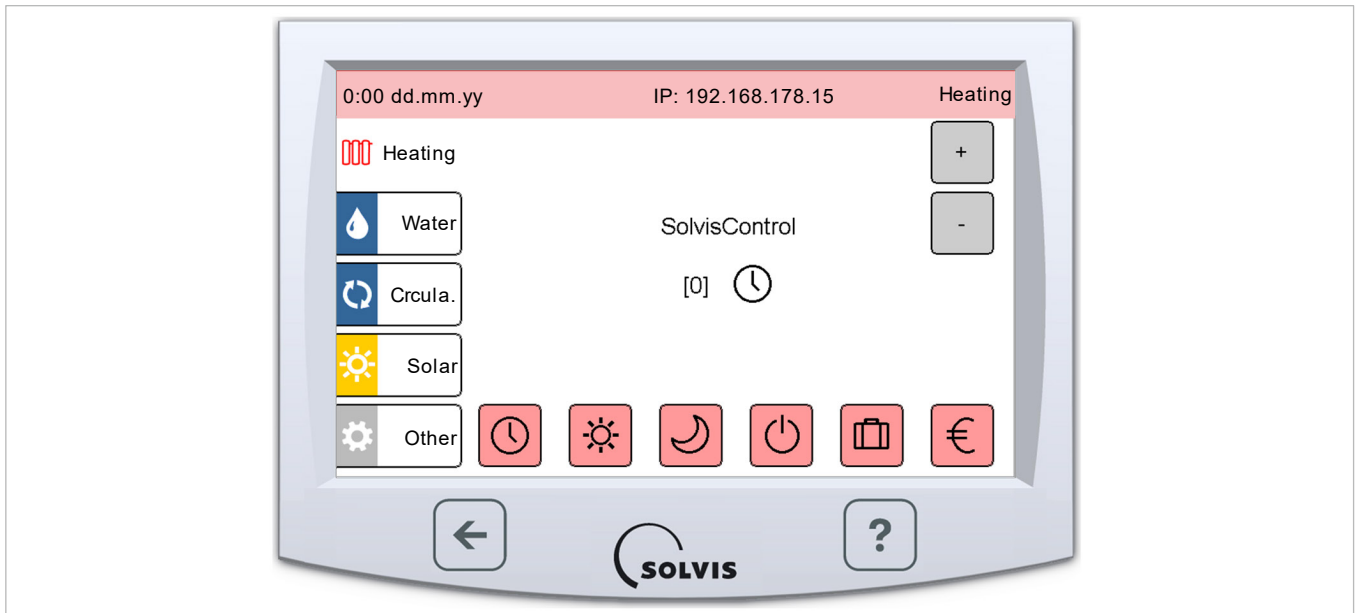


Fig. 9: SolvisControl menu display "Heating" (single heating circuit)

Touch screen

To prevent the surface from becoming damaged, do not let the touch screen come into contact with sharp objects. You only need to press the surface lightly (with clean, dry fingers).

Descriptions of the display

Symbol	Meaning
	WLAN activated, displays the signal strength, here 100%
	WLAN activated, no reception
	WLAN deactivated see → Chap. "Connection with WLAN", P. 15.
	LAN cable connected see → Chap. "Connection with LAN cable", P. 15.
	Establishing a connection to SolvisPortal see → Chap. "SolvisPortal", P. 36.
	IP address in the local network see → Chap. "Remote function", P. 40.

Button	Main menu for...
	Changing the room temperature and heating times See → chapter "Heating", page 20.
	Changing the hot water temperature and standby times See → chapter "Water", page 23.
	Setting the hot water circulation See → chapter "Circulation", page 25.
	Displaying important measured values from the solar system See → chapter "Solar (measured value display)", page 26.
	Changing other settings See → chapter "Other", page 26.

Buttons with a white background are selected

Button	Function
	Time/automatic mode. Press briefly: switch the heating circuit to automatic mode. Press for approx. 3 seconds: change heating times.
	Switch the heating circuit to day mode. Press for approx. 3 seconds: Party mode.
	Switch the heating circuit to lowering mode. Press for approx. 3 seconds: Away mode.
	Switch the heating circuit to standby mode.
	Activate the leave function.
	Activate the ECO function. Press for approx. 3 seconds: settings.

For an explanation of the operating modes, see → ch. "Expert Operation", p. 20.

Button	Function
	Toggle switch to change values, tap on "+" or "-" briefly.
	Help button, displays help text for displayed screen.
	Back button, to cancel entry or return to the previous menu.
	Open any active messages.
	Open the "Reset heat generator" menu, see → Chap. "Resetting the heat generator", P. 12.

4.2 Operating principle

The controller has a touch-sensitive display that you can operate with your fingers.

If no entries are made, the screen saver is activated after approx. 5 minutes and the display is switched off after a further 5 minutes (power-saving function).

If the display is dark, a brief tap on the display is sufficient to switch it on. The display then shows the "Heating" main menu (see → fig. 9, page 11).



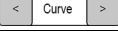



Tap the button once briefly to open submenus, adjust values, access functions or select options. If the button has a dark background, its option or function is activated.

Some option buttons have an additional second function: If they are pressed for more than 3 seconds, an additional menu opens.

You can press the help button on the bottom right corner of the device at any time to view descriptions of the settings that are currently available.

You can use the back button on the bottom left corner of the device to return to the previous menu.

Description of important operating elements

Button	Function
	Function (here: "Time") is activated; press briefly to deactivate.
	Function (here: "Time") is deactivated; press briefly to activate.
	Option button. Press "<" or ">" to change the option.
	Numeric value button. Press "+" or "-" briefly to change values.
	Rocker switch with "OK" button. Press "+" or "-" briefly to change values, and confirm the numeric value by pressing "OK".
	Navigation buttons: You can open additional menu items (pages) here.

4.3 Changing numeric values

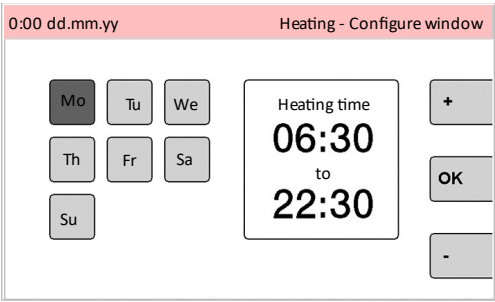
Configure window

Set the switch-on and switch-off times of a time window (see following figure) as follows:

1. Press a numerical value (e.g. e.g. the hourly value "06").

The selected value is displayed in red and the desired value can be set.

2. To set, select "+" or "-"
3. Repeat steps 1 to 2 for the 2nd value (e. g. "30" minutes).
4. Repeat steps 1 to 3 for the switch-off time.
5. Then press "OK".



4.4 Operating modes

SolvisControl features three different operating modes.

- "Expert" operation, see → "Expert Operation" section, page 20.

This operating mode is activated as standard and optimized for the system operator.

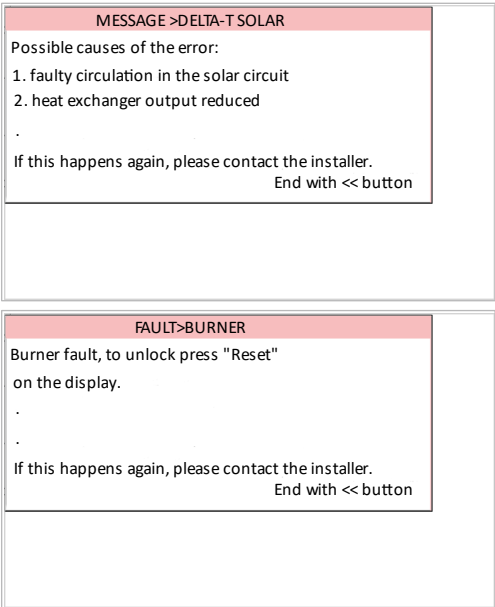
- "Installer" or "Factory service"

Additional operating modes for the installer and customer service. These operating modes are reserved for the corresponding user groups.

4.5 Messages

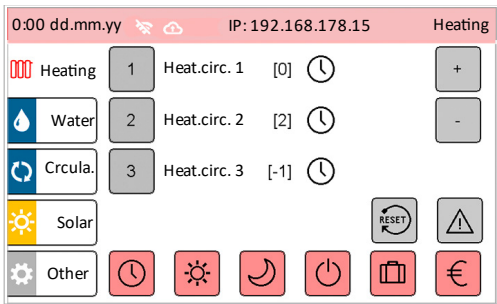
SolvisControl constantly monitors the entire system. If faults occur, these are displayed as messages in plain text. When the SolvisPortal is set up, you can also be notified by e-mail.

There are two different categories of messages: In addition to system status messages ("MESSAGE"), there are also fault messages ("FAULT"), which must be unlocked separately. For more information on the messages, see → "Troubleshooting", page 42.



4.6 Resetting the heat generator

If an error occurs, a warning triangle appears at the bottom right of the start screen. In the event of an error in the heat generator, a RESET button also appears directly beside the warning triangle.

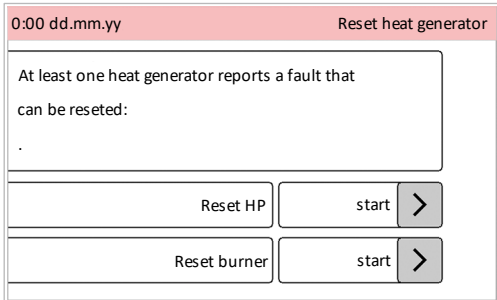


Resetting the heat generator

The heat generator that caused the error can be selected for resetting.

1. Select the arrow beside “start”.

The error is reset and the heat generator is restarted.



5 Starting Up the System

5.1 Notes



CAUTION

Check for damage

Damage to the controller, to cables or to connected pumps or valves may cause severe damage to the system.

- Do not operate the system/unit if there is visible damage to any of its components.

Frost protection

Standby button: To prevent the heating system from freezing while you are away for a longer period of time, the heating system can be switched into standby operating mode (see → “Operating mode: standby”, page 21).

You have to press the “Time/automatic mode” button to switch the system back on.

If you want to continue heating at a specific temperature while you are away for a longer period of time (such as on holiday), select the leave function (see → “Operating mode: leave”, page 22).

SolvisBen/SolvisMax oil and oil hybrid only

Fuel deliveries

The boiler must be switched off (main switch off) during oil deliveries. After the tank has been filled, the SolvisMax/SolvisBen Oil must remain shut off for at least 2 hours (up to 4 hours is better). It is not possible to run the solar system and water heating during this time.



CAUTION

Use approved heating oil only.

Otherwise, the warranty becomes invalid and the boiler may be damaged.

- Operate the boiler with low-sulphur EL heating oil only (max. 50 ppm sulphur).
- Preferably, we recommend using premium quality low-sulphur heating oil in compliance with DIN 51603-1.
- Furthermore, all oil heating boilers for (low-sulphur) heating oils with a biofuel proportion of up to 10 % as per DIN SPEC 51603-6 are approved.

5.2 Switching on the system

Your heating contractor installed your system and started it up. If you want to start up the system after an extended period of downtime, follow the most important steps for restarting the system that are given below.

Fuel supply / power supply

If present, switch the system on at the emergency stop switch. For systems with a heat pump, also switch on the power supply (fuse) for the compressor and electric heating element. For SolvisBen/SolvisMax gas/oil or SolvisBen/SolvisMax gas/oil hybrid, open the gas or oil tap.

Switching on the system

- Check if there is a power supply and, if necessary, gas/oil supply.
- Press the main switch.

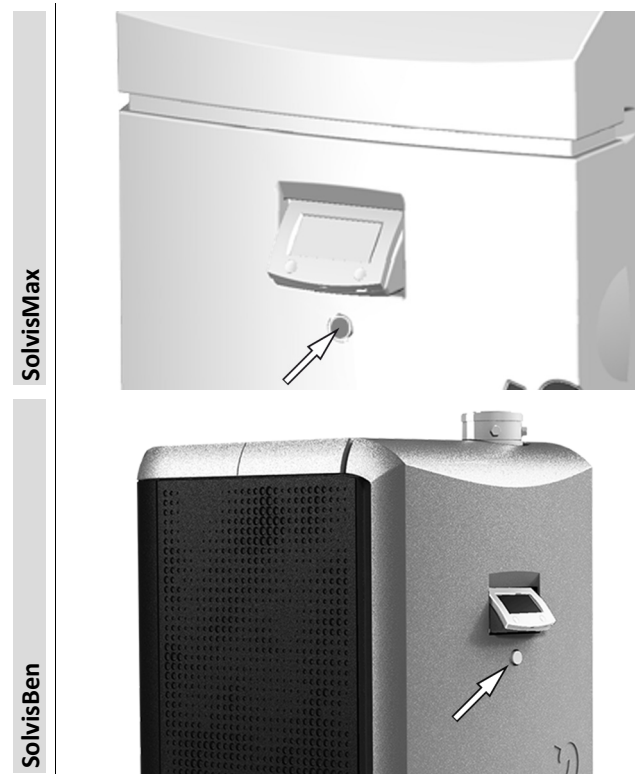
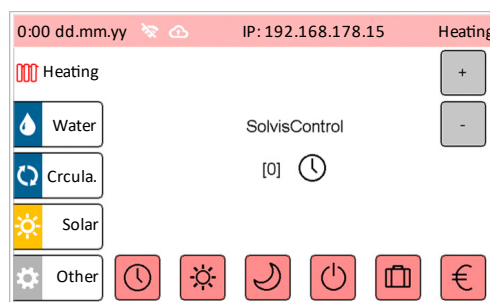


Fig. 10: Switching on the system

Checking the time and date

- Check the time and date, both of which are displayed in the status bar in the top left corner.
- Set the time and date if necessary, see → “Time / date” section, page 36.



Heating requirement

If the buffer cylinder is not sufficiently heated, e.g. because the heat generator was switched off, the heat generator first heats the water in the cylinder to the set target temperatures.

If the hot water time window is active or the minimum hot water buffer temperature (factory setting: 30 °C + 2 K dTStart) is not reached, hot water preparation is started. The heating circuit pumps do not normally run, as the hot water priority is usually active. The circulation pump may also be active depending on the mode (pulse/time).

5.3 Home network connection

The SolvisControl 3 can be connected to the Internet for remote operation. This is only possible if the controller is connected to an Internet-enabled router.

In addition to the innovative SolvisPortal (see → *Section “SolvisPortal”, page 36*), the controller can also be accessed via remote function without a cloud connection (see → *Section “Remote function”, page 40*).

The different procedures for connecting to a router are explained below.

5.3.1 Connection with LAN cable

Connecting the LAN cable

A network cable can be used if the local router is located near the system. Cable lengths of up to 20 m can be used.

1. Plug the network cable into the left port (1) on the back of the SolvisControl 3.

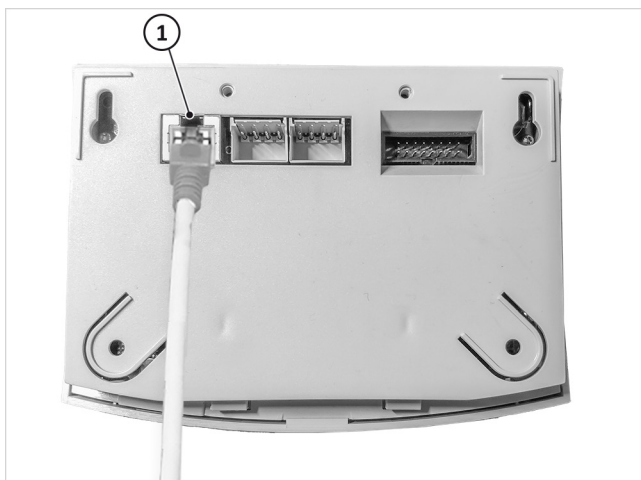


Fig. 11: Plug in the LAN cable

2. Plug the network cable on the router into the “LAN” port.



Fig. 12: Connect the LAN cable to the router

5.3.2 Connection with power line adapter

Connecting the power line adapter

If the local router is too far away from the system, a power line adapter can be used for the connection.

1. Connect the power line adapter to the SolvisControl 3: Plug the network cable into the left port on the back of the SolvisControl 3.

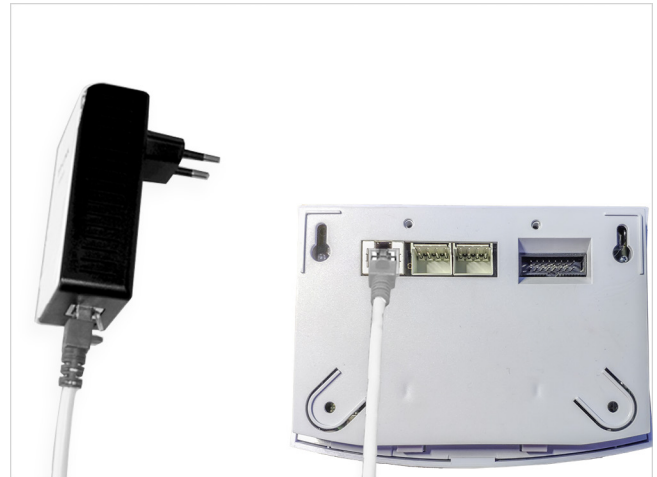


Fig. 13: Connect the power line adapter to the SolvisControl 3

In order to establish a data connection between two power line adapters, both electrical socket circuits must share a common distributor (usually in the fuse box). If the router and the SolvisRemote are in two different electrical circuits (e.g. main building and adjacent building), no data connection can be made via the mains.

2. Connect the power line adapter to the router by plugging the network cable into the “LAN” port on the router.



Fig. 14: Connecting a power line adapter to the router

5.3.3 Connection with WLAN

Notes

Prerequisites:

- If you want to connect the SolvisControl 3 (which is referred to below as the SC-3) with the WLAN, a **network cable must not be connected** to the RJ45 socket on the control panel.
- The WLAN reception at the installation site must be sufficiently strong; if necessary, install a WLAN repeater.

5 Starting Up the System

- To set up the wireless network, version MA3.0.75 (or higher) must be installed.
- Have the name and password for the WLAN ready (see sticker on the router housing or in the Internet contract documents).

Two options for connecting the SC-3 to the WLAN are described below:

- Wizard-guided setup of the WLAN connection by logging into the SolvisPortal
- Manual setup of the WLAN connection

Set up WLAN connection with wizard

Establishing a WiFi connection

To establish a WiFi connection, you must first enable the WiFi hotspot as follows:

1. In the **"OTHERS"** menu --> choose **"Network"**.
2. Click **"Start"** next to **"WiFi connection"**.

i If the WiFi connection is not displayed, please check the software version of the SC-3 (MA3.19.47 or higher).

3. Select **"Yes"** to answer the prompt.

The SC-3 reboots generates its own WiFi, which is displayed in a message window.

4. Scan the QR code in the window with a QR code scanner and open the web page.

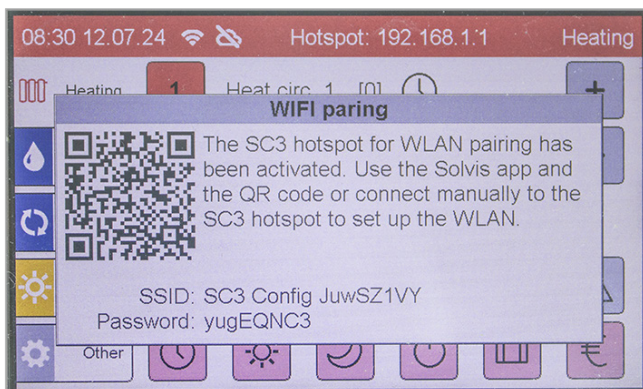


Fig. 15: Window with WiFi ID

i If a QR code is not displayed in the window, please check the software version of the SC-3 (MA3.19.47 or higher).

5. You can use the links for Android or iPhone to install and open the "SolvisPortal" app.
6. Log into the SolvisPortal. Create an account if necessary.
7. Select the **"Set-up WiFi"** option in the **"Help & Info"** menu.
8. Start the assistants by selecting **"LET'S GO"** and following the instructions.

Once the QR code has been scanned again, the APP automatically registers with the WiFi hotspot.

9. Select the network name (SSID) of the home network in the window that opens and log in with your password.

The work to set-up the WiFi is now complete. The SC-3 disconnects from the hotspot and connects to your wireless router.

The IP address of the SC-3 appears in the first line (in this case: 192.168.178.15).

If no IP address or 0.0.0.0 is displayed, you may not have entered the password correctly (other reasons for failing to establish a connection can be found in → *chapter "WLAN connection error", page 42*). You have to repeat the process after tapping **"Network settings – reset"**.

The set-up of the WLAN connection is now complete. The SC-3 can now be reached in the local network and can be operated remotely via a web app that you can access using a browser.

For remote access from the Internet and other visualization options, the SC-3 can be connected to the Solvis Portal (see → *chapter "SolvisPortal", p. 36*).

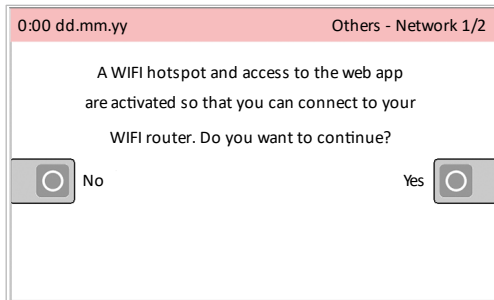
Set up WLAN connection manually

Establishing a WiFi connection

1. In the **"OTHERS"** menu --> choose **"Network"**.
2. Tap on **"Start"** next to **"WiFi pairing"**.

i If the WiFi pairing is not displayed, please check the software version of the SC-3 (> MA3.01.01).

3. Select **"Yes"** to answer the prompt.



The SC-3 generates its own WLAN, which is displayed in a message window.

4. Make a note of the password and the WLAN ID.

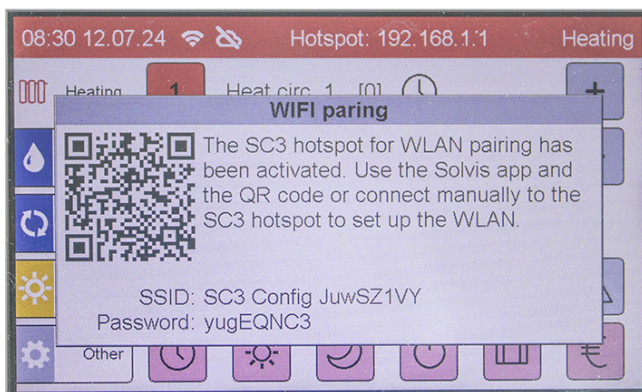


Fig. 16: Window with WLAN ID

In order to transfer the router's WiFi password to the SC-3, a connection to the SC-3's WiFi hotspot must be established. A WiFi-capable device with the option of entering text, e.g. a smartphone, tablet or notebook, is required. Please switch off all data connections (except WiFi), such as mobile radio communications.

5. Open the WLAN settings on the unit.
6. Select the hotspot that begins with **"SC3 Config"** and enter the password recorded in Step 4.

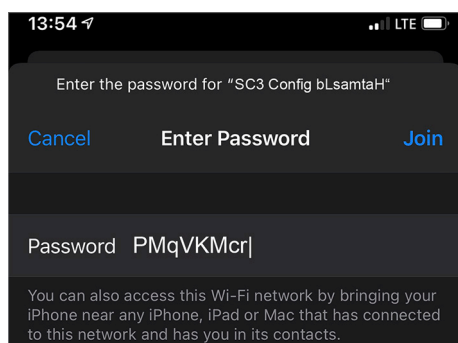


Fig. 17: Logging in to the hotspot

i If a message appears stating that it is not possible to connect to the Internet via the SC-3 hotspot, select the option **"Use other network"**.

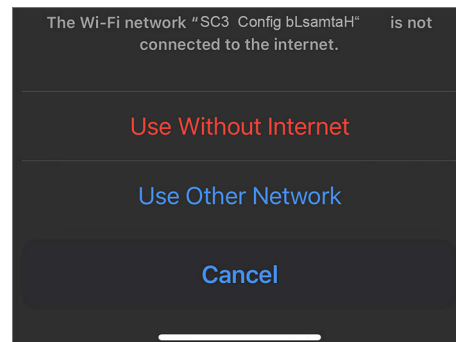


Fig. 18: Maintaining a WLAN connection

7. If necessary, click on the hotspot again once you are connected to bring up the configuration page.
8. If the configuration page does not open, please open a browser (preferably Chrome, Firefox or Safari) and enter the IP address of the hotspot in the address line: 192.168.1.1

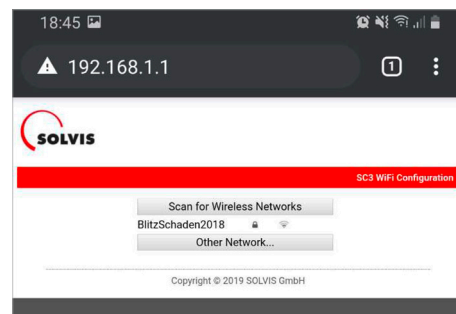


Fig. 19: Configuration page

A list of the networks in the area is displayed.

9. Select the name (SSID) of the home network and log in with the password.

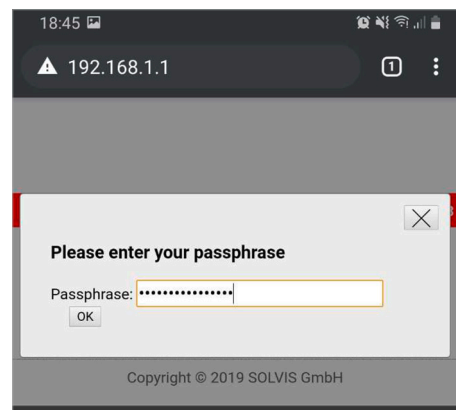


Fig. 20: Logging into the home network

The WLAN set-up is now complete. The SC-3 disconnects from the hotspot and connects to your wireless router.

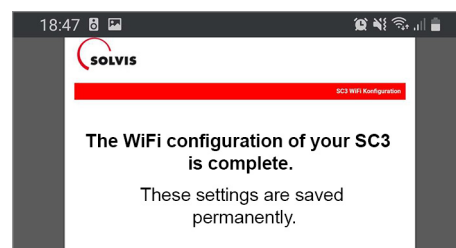
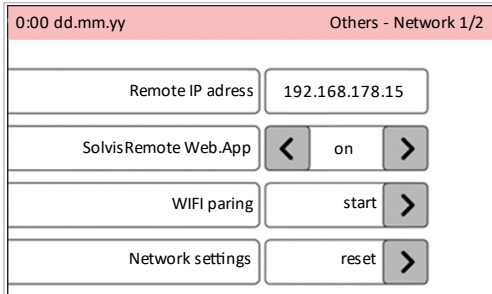


Fig. 21: Configuration completed

5 Starting Up the System

The IP address of the SC-3 appears in the first line (in this case: 192.168.178.15).

If no IP address is displayed or 0.0.0.0 appears, it is possible that the password entered was incorrect, in which case you must tap on **"Network settings reset"** and repeat the process.



The set-up of the WLAN connection is now complete. The SC-3 can now be reached in the local network and can be operated remotely via a web app that you can access using a browser.

For remote access from the Internet and other visualization options, the SC-3 can be connected to the Solvis Portal (see → *chapter "SolvisPortal", p. 36*).

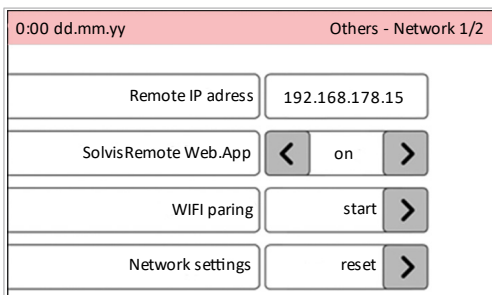
5.4 SolvisRemote web app

The Solvis systems with the SC-3 system controller can be completely remotely controlled using the included remote web app with no cloud connection. The steps required are explained below.

5.4.1 Activation

Activating remote control

1. Select **"OTHERS"** menu item in the installer or expert menu.
2. If necessary, select **"Continue"** and **"Network"**.
If it is possible to connect to the router, the IP address will be displayed after **"IP address"** (in this case: 192.168.178.15). If it is not possible to connect, see → *section "Home network connection" on page 15*.
3. Choose **"ON"** after **"SolvisRemote web app"** to activate remote control.



Note the following information.

- The controller can also be accessed via the Internet using the remote function. A video for configuring this function is available on YouTube.
- The controller can be accessed only if the supplied SD card is installed in the controller.

Name	Date modified	Type
boot	11/12/2020 09:07	File folder
SC3_MA7	11/12/2020 09:08	File folder

Fig. 22: content of the supplied SD card

5.4.2 Launching the web app

Once the home network connection has been established and the SolvisRemote web app has been activated on the SC-3, the SolvisRemote web app can be called up in any browser by entering the IP address. The IP address is displayed in the status bar at the top of the main menu Installer or Heating (specialist user). It can also be read under **"OTHERS"** => **"Network", "IP address"**.

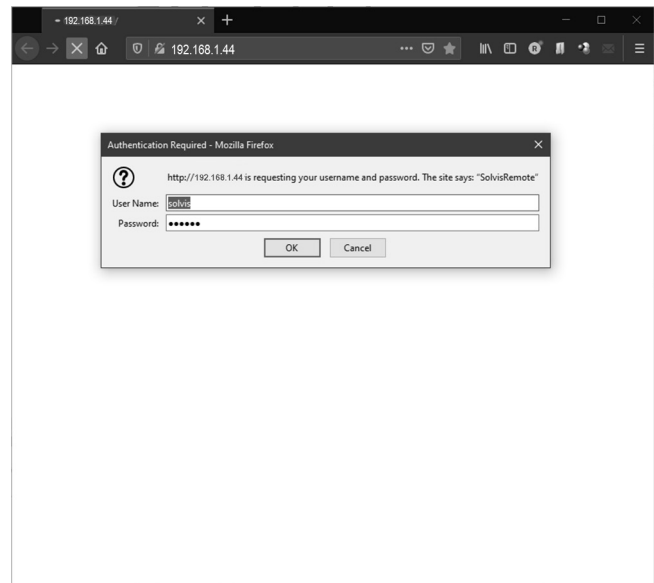


Fig. 23: Logging in with Firefox (example)

User name = **"Solvis"** and password = **"RCSC3!"**. After logging in, please change your password.

Changing the password



Change the user name and password immediately during start-up. Make a note of both and keep the information in a safe place.

4. Use the **"Settings"** option in the web app to change the password.

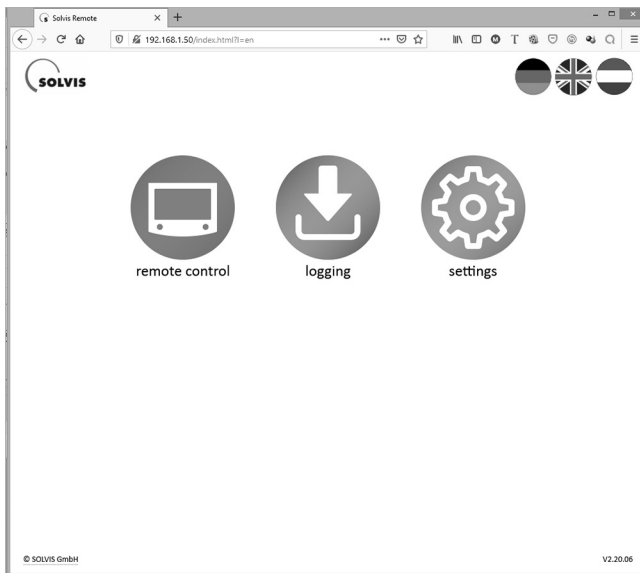


Fig. 24: Start screen for SC-3 web app

6 Expert Operation

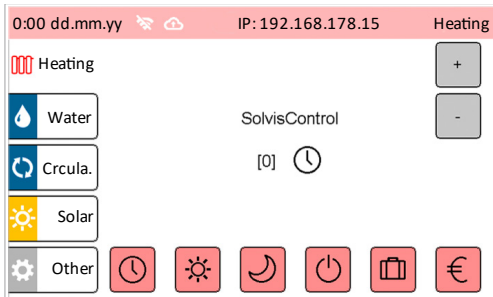
Five main menus with expanded functions and setting options are available in expert operation. You can use these to optimally adapt the heating system to your requirements.

The individual main menus can be opened by pressing the corresponding item on the left side. The following sections explain the setting options.

6.1 Heating

E To maximise energy savings, the heating circuits switch off during the summer when the outdoor temperature exceeds a configurable outdoor temperature value. In this case, it is possible that the target room temperatures will not be achieved, especially in autumn and spring. For this reason, you should carefully adjust the switch-off temperatures to the individual building conditions (see → “Setting the summer/winter switch” in “Heating circuits”, page 30).

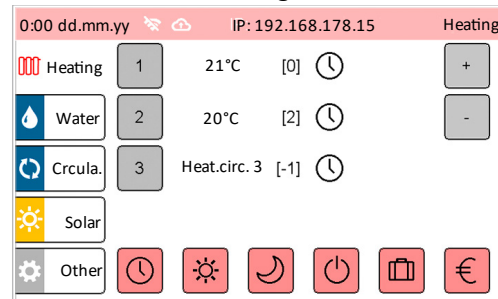
Systems with one heating circuit



The elements of the heating menu:

- The current time and date are displayed on the left corner of the top status bar. (For information about setting the date, see → chapter “Time / date”, page 36). The WLAN status, connection status to the SolvisPortal and current IP address in the local network are displayed next to that.
- The buttons for the five different main menus are located on the left.
- The temperature steps by which the room temperature is currently raised (unsigned) or lowered (“-”) are displayed in square brackets below “SolvisControl” (center of the display).
- If a room controller is connected (order separately if necessary; see → chapter “Room controller”, p. 9) the current room temperature is displayed instead of “SolvisControl”.
- A symbol indicating the respective operating mode is shown below “SolvisControl” (center of the display). The symbolic representation corresponds to that of the lower button bar for operating mode selection.
- On the right-hand side there are plus and minus buttons for changing the room temperature, which can be raised or lowered by five temperature steps.
- At the bottom of the display, there is a row of buttons for selecting the various operating modes (see the next chapter for descriptions).

Systems with several heating circuits



The elements of the heating menu:

- You cannot select an operating mode or change the temperature until you select the button with the number of the heating circuit that you want to change.
- In addition to the buttons with the number, either the room temperature (an optional room controller is connected) or “Heat.circ.” is displayed, followed by the number of the heating circuit in question.

6.1.1 Changing the room temperature

Press “+” or “-” to raise or lower the room temperature. If you have more than one heating circuit, you first have to select the heating circuit that you want to change.

i The step-by-step adjustment in ± 5 increments has a direct effect on the flow temperature. Depending on the heating system and the existing building insulation, you can change the room temperature by approx. $\pm 2^\circ\text{C}$.

If you have used this change option and the room is still too warm or too cold, you can reset the target room temperature for the relevant heating circuit (see → “Changing the target room and low-mode temperatures” in “Heating circuits”, page 30).

6.1.2 Operating mode: time/automatic

Press the clock symbol to activate time/automatic mode. The currently active operating mode is indicated by a symbol.

Overview of symbols (operating modes)

Symbol	Operating mode	Activate with
	Automatic mode , room temperature based on the time program	
	Day mode , comfort temperature permanently activated	
	Lowering mode , shut-off temperature permanently activated	
	Eco mode , optimal energy saving option	
	Standby , heating circuit deactivated, antifreeze activated	
	Leave at home , permanent heating (based on the time program) is activated	
	Leave away , temperature permanently lowered	

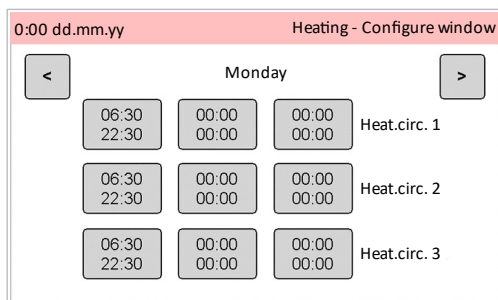
6.1.3 Changing heating times

Open the time window

1. Press the "Time/automatic mode" button for approx. 3 seconds.

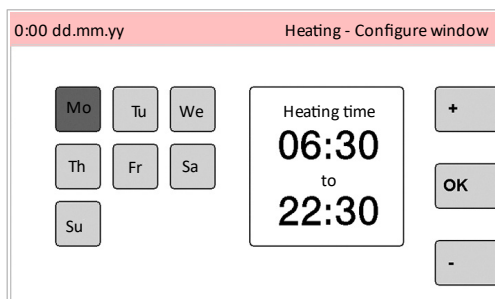
The time windows for all heating circuits are displayed.

2. Select the navigation button: This scrolls through the days of the week. Three different time windows are available for each heating circuit and each day of the week.
3. Select a time window for the relevant heating circuit.



Setting the times

1. Select the button with the day(s) of the week: select the day of the week to which the time window is to apply. You can also select several at the same time. Activated days of the week have a button with a dark background.
2. Change the preset start and end time (see → *chapter "Changing numeric values", page 12*).



6.1.4 Operating mode: day mode

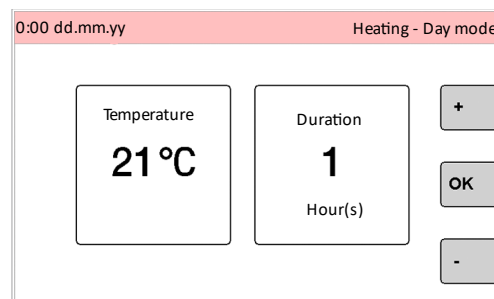
Set continuous day mode

1. For several heating circuits: Select the desired heating circuit.
2. Briefly press the "Day mode" button: activates continuous day mode.
3. Press the "Day mode" button for approx. 3 seconds.

A window appears, in which you can set the room temperature and duration of day mode (e.g. during a party).

4. Set the values according to your needs.

The symbol for day mode, followed by the duration of day mode, is displayed in the "Heating" main window next to the heating circuit number.



If a duration is set for the operating modes day or setback mode, the heating circuit returns to timed/automatic mode after the set period has elapsed.

6.1.5 Operating mode: lowering mode

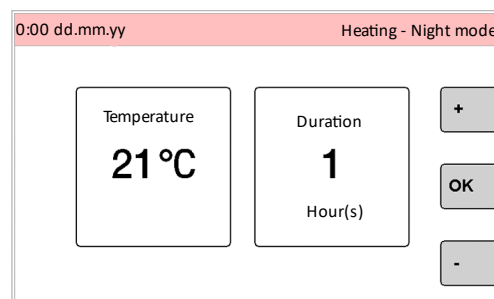
Set the duration for lowering mode

1. For several heating circuits: Select the desired heating circuit.
2. Briefly press the "Lowering mode" button: activates continuous lowering mode.
3. Press the "Lowering mode" button for approx. 3 seconds.

A window appears, in which you can set the room temperature and duration of lowering mode (e.g. during a period of absence).

4. Set the values according to your needs.

The symbol for lowering mode, followed by the duration of lowering mode, is displayed in the "Heating" main window next to the heating circuit number.



If a duration is set for the operating modes day or setback mode, the heating circuit returns to timed/automatic mode after the set period has elapsed.

6.1.6 Operating mode: standby

Switching to standby

1. For several heating circuits: Select the desired heating circuit.
2. Press the "Standby" button.

The heating circuit is switched off, the heating circuit pump is deactivated, hot water preparation, circulation and the solar thermal system continue to run.

The frost protection function has priority at all times to prevent damage to the system.

For outdoor temperatures below 3 °C (with connected room control unit at a room temperature below 5 °C), the heating circuit is supplied with the "Min. flow

temperature" (frost protection, see → section "Frost protection", p. 14).

Deactivating standby mode

1. For several heating circuits: Select the desired heating circuit.
2. Activate one of the operating modes (e.g. "Automatic") to switch the heating circuit back on.

6.1.7 Operating mode: leave

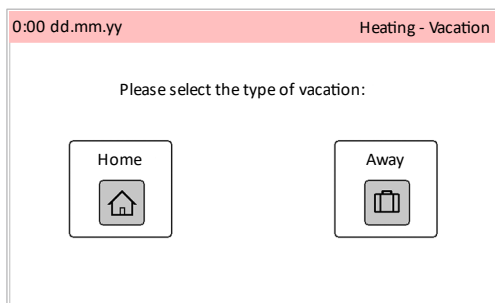
Select type of leave

You can determine how heating should take place while you are on leave. You always select between a leave at "Home" and a leave "Away". Proceed as follows:

1. Select the heating circuit if you have more than one heating circuit.
2. Briefly press the "Leave" button.

A window appears, in which you can select the type of leave.

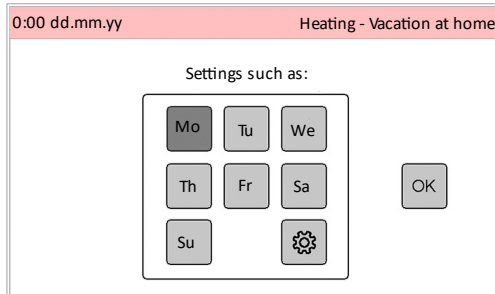
3. Select whether you are spending your leave "Home" or "Away".



Setting a vacation at home

After clicking on the "Home" button, a window opens in which to select the weekdays.

1. Select the weekday whose time window will be use as a basis for the "vacation at home" (in this example, Monday was selected).
2. Tap on the "OK" briefly: This setting is now valid for the following seven days.

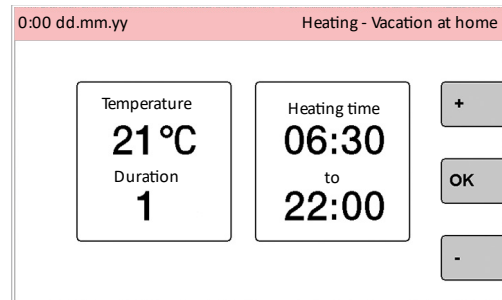


3. Alternatively: Tap on the "Configuration" button briefly.

A window appears in which the required room temperature, the period in days and a heating period can be entered.

4. Enter the values required and tap on "OK".

After the set date or duration in days has expired, the controller switches the heating circuit to automatic mode.

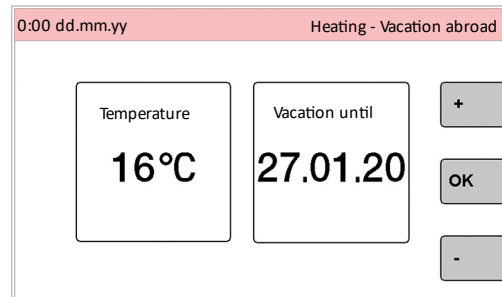


The "leave at home" operating mode only affects the heating circuits. It does not affect the hot water and circulation circuits.

Set the "Away" button

After you press the "Away" button, a window appears, in which you can enter the room temperature and the date of return.

1. Enter the value required and briefly press "OK".



The end date is always the day before your return. After the set date or duration in days has expired, the controller switches the heating circuit to automatic mode.

Example:

You will be away through 23 December, and you want to turn down the heating during this time to save energy. You want to return to a heated apartment on 24 December.

Solution: Enter an end date of 23/12. The controller will then switch to time/automatic mode when the date changes to 24/12.

You have 3 days of special leave, and you want to spend this leave time at home. The heating should continue running during the day. On the 4th day, you have to return to work. The normal time window should then apply.

Solution: Select "Home" and enter "3 days" as the duration.



The leave "away" operating mode assumes that no one is at home and therefore the heating circuit can be switched to lowering mode.

If all heating circuits are in this operating mode, the auxiliary hot water heating and circulation are also deactivated. A corresponding message is also displayed in the respective menu items.

Deactivating leave mode

If you want to terminate the leave function before the specified time has elapsed, proceed as follows:

1. Select the heating circuit if you have more than one heating circuit.
2. Activate one of the operating modes (e.g. "Automatic") to switch the heating circuit back on.

6.1.8 ECO function

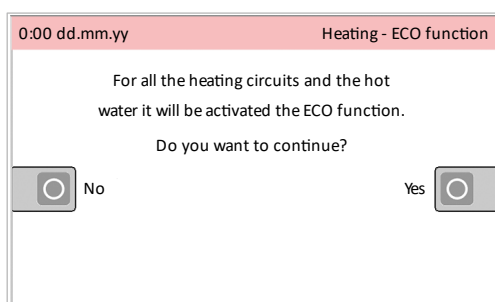
Briefly pressing the "ECO" button activates the ECO function. The aim of the ECO function is to keep the additional heating with a conventional heat generator as low as possible, i.e. the required temperature for additional heating is reduced in a defined time window.

The ECO function ensures that the heat requirement is primarily covered by solar radiation (solar thermal energy); early reheating is avoided. As a result, the room temperature may drop temporarily in cloudy weather.

In order to save additional energy, the hot water circulation is limited to pulse function while the ECO function is active. Time mode is switched off then.

Activate the ECO function

1. Briefly press the "ECO" button.
2. Answer the query with "Yes".



Deactivate the ECO function

1. To deactivate the ECO function, select an operating mode, e.g. "Automatic".

Set the ECO function

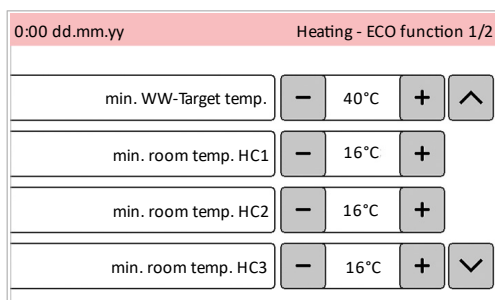
1. Press the "ECO" button for approx. 3 seconds.

The "ECO function 1 / 2" setting window is displayed.

2. Select the minimum acceptable hot water temperature with "Min. HW target temp."

3. For each heating circuit, enter a value for "Min. room temp.". This is the lowest room temperature that you find acceptable.

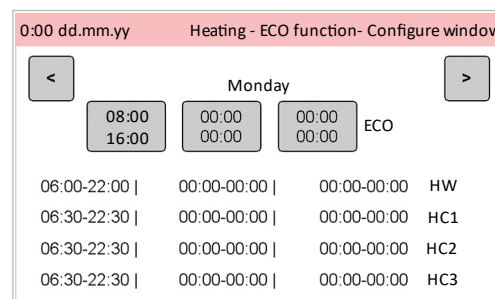
This will not change the time/automatic mode target values for heating and hot water. Instead, it changes the requirement temperatures for the auxiliary heating. If the storage tank is heated by sun exposure (charged), the system can still achieve the time/automatic mode target values. The heat generator ensures that at least the reduced temperatures can be maintained.



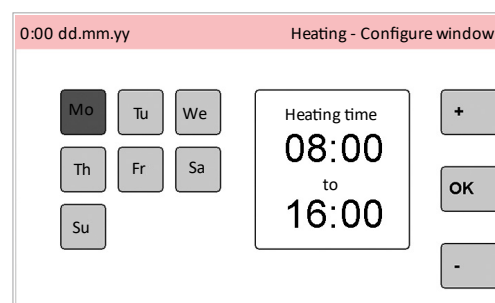
4. Press the navigation button to set the time window.

A window in which you can open the "Configure time window" function appears.

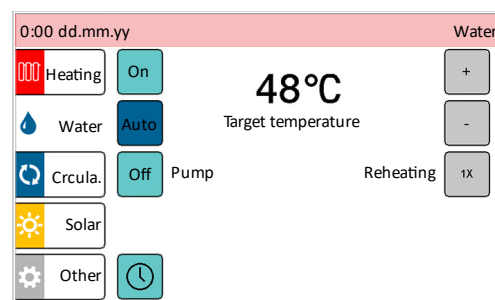
5. Open the "Configure time window" function.
6. Use the navigation buttons to select the day of the week. Three different time windows can be set for each day of the week.
7. To enter an individual time period, select a time window from the "ECO" line.



8. Select the button with the day(s) of the week: select the day of the week to which the time window is to apply. You can also select several days at the same time. Activated days of the week have a button with a dark background.
9. Change the preset start and end time (see → chapter "Changing numeric values", page 12.)



6.2 Water



The "Water" main menu shows all of the important functions and parameters for drinking water heating. The hot water control function is explained in further detail in → "Functional Description of SolvisControl" on page 38.

6.2.1 Setting the hot water temperature

Setting the hot water temperature

1. Press "+" (on the rocker switch) to raise the temperature or press "-" to lower it.
2. If the water temperature is not reached, see → "Malfunctions with heating and hot water", page 53.

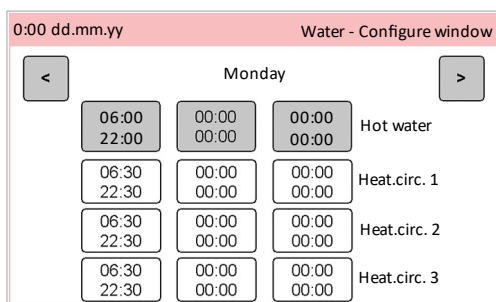
i If several persons shower or bathe in short succession, causing the storage tank to use auxiliary heating, the controller switches to "Hot water priority", i. e., the radiators might remain cold until the storage tank has been heated up again.

6.2.2 Hot water standby times

E During the hot water standby times, the upper part of the storage tank is kept warm so that the hot water can be drawn off at the desired temperature level. Times of the day when there is usually no requirement for showers or baths (e.g. night hours) can be excluded from auxiliary heating in order to save energy. During these times, there is also sufficient residual heat for water heating in the storage tank.

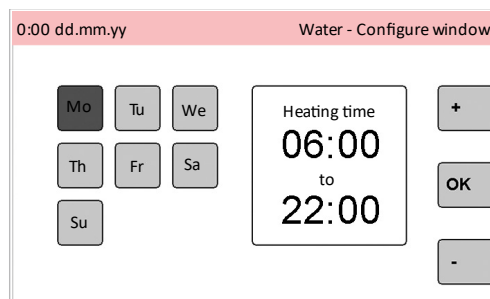
Set the hot water standby times

1. Press the "Automatic mode" (clock symbol in the "Water" menu) for approx. 3 seconds.
2. Use the navigation buttons to select the day of the week. Three different time windows are available for each day of the week. The heating times of the heating circuits are shown at the bottom of the display for information purposes.
3. To enter an individual time period, select a time window from the "Hot water" line.



4. Select the button with the day(s) of the week: select the day of the week to which the time window is to apply. You can also select several days at the same time. Activated days of the week are shown with a dark background.
5. Set the start and end time as described in → chapter "Changing numeric values", page 12.

i In the case of heating pumps, the hot water standby time should be at least 30 consecutive minutes in order to ensure the water is fully heated.



6.2.3 Comfort reheating time window 3

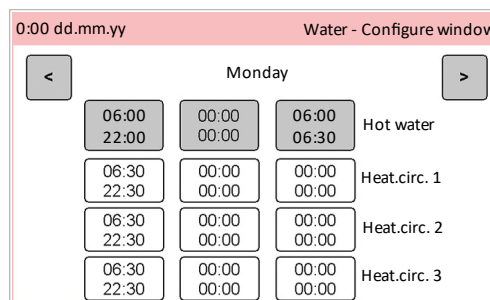
To heat the hot water, heat from the upper part of the storage area is used, which is then reheated by the heat generator. The procedure is determined by sensor position S1.

If the heat generator only has a relatively low output and a very large amount of hot water is required at peak times (e.g. because several people are showering one after the other or a very large bathtub needs to be filled), the storage tank can also be automatically heated up to a medium temperature (sensor position S4) using the 3rd time window of the hot water standby times (right column, see → Section "Comfort reheating time window 3", page 24).

Configuring the comfort reheating time window

In order to use this 3rd time window for comfort reheating, it must be activated in the Installer menu (see → Section "Water" in the SolvisMax / SolvisBen operating instructions for installers, BAL-SBSX-3-I).

1. Carry out steps 1 to 5 according to → Section "Comfort reheating time window 3", page 24.
2. Set the 3rd time window so that the storage tank is heated to the required temperature before the start of the expected peak load. The 3rd time window can overlap with one of the other time windows.



E Limit the time window for comfort reheating as much as possible because it increases the energy requirement. However, comfort reheating in combination with heating pumps is usually more suitable for specific times than the S1 comfort position on the SolvisBen.

Example

SolvisBen 10 kW (S1-Eco): On weekdays, the normal hot water standby of the SolvisBen with S1-Eco position (standard storage tank range for DHW heating) is completely sufficient to supply the showers. On Saturdays from 14:00, however, hot water should be available for a large bathtub. The 3rd time slot for comfort auxiliary heating is only set to 13:00-14:00 on Saturdays. On the other days, it remains deactivated at 00:00-00:00.

6.2.4 Auxiliary hot water heating button


Heating up the hot water buffer

If hot water (for showering or bathing) is required outside of the hot water standby times, proceed as follows:

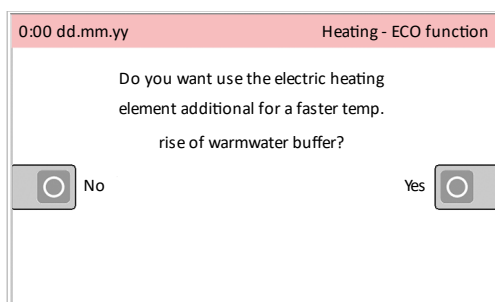
1. Choose the “1x” button next to “Aux. heating”.
2. **SolvisBen/SolvisMax WP only:** Select whether the electrical heating element must be used to accelerate heating.

The controller switches to hot water priority mode and heats the storage tank to the standby temperature. The radiators may cool down as long as the heating process continues.

SolvisBen/SolvisMax WP only: If the electric heating element has been selected for accelerated heating, it is switched off once the target temperature has been reached.

 The heating phase lasts for approximately 10 to 40 minutes.

SolvisMax/SolvisBen WP only



E Heating without an additionally activated electric heating element is significantly more energy-efficient, as the electric heating element only provides heat with a maximum efficiency of 100%.


6.2.5 Hot water pump

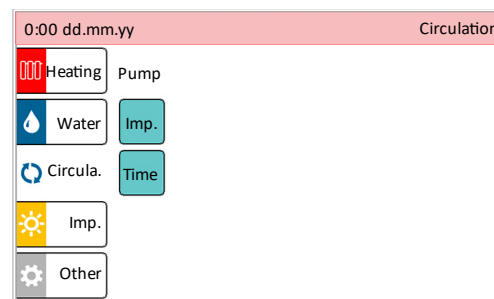
Checking the hot water pump

To check the hot water pump, you can use the “Pump” rocker switch in the “Water” main menu to switch the hot water pump.

1. Press “On” on the “Pump” rocker switch.
2. Listen to hear whether the hot water pump starts up.
3. Select the “Auto” button. Automatic mode must always be activated.

6.3 Circulation

 Circulation can be activated only if sensor S11 has been installed. If this is not the case, the missing sensor is highlighted when the function is selected.



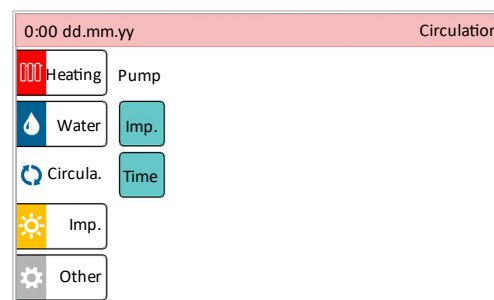
In the “Circul.” main menu, the hot water circulation can be activated or de-activated. In this example, the circulation is de-activated (both buttons are light). The circulation control function is explained in detail in the → section “Functional Description of SolvisControl”, p. 38.

6.3.1 Time control

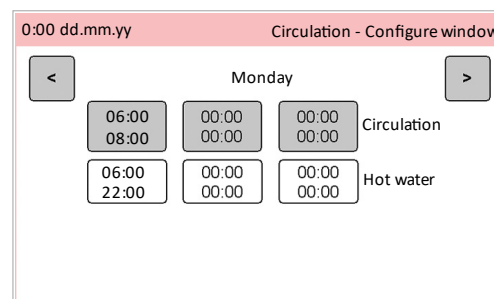
Setting the hot water circulation

The circulation pump runs only within the circulation times, and then only when the temperature at the circulation sensor falls below a limit value. To activate the time control, proceed as follows:

1. Choose the “Time” button. The button must be activated (shown with a dark background).
2. Press the “automatic mode” button for approx. 3 seconds.



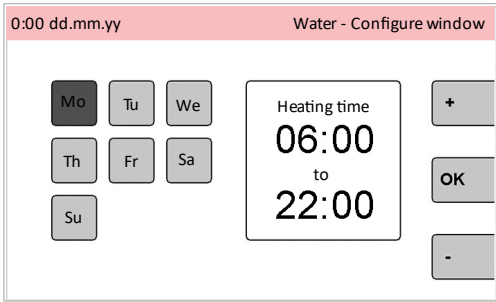
3. Use the navigation buttons to select the day of the week. Three time slots are available for each day of the week. The hot water standby times are shown at the bottom of the display for information purposes.
4. To enter an individual time period, select a time window from the "Circulation" line.



5. Select the button with the day(s) of the week: select the day of the week to which the time window is to apply. You can also select several days at the same time. Activated days of the week have a button with a dark background.
6. Set the start and end time as described in → chapter “Changing numeric values”, page 12.



Set the circulation time window so that the hot water time window is always active at the same time, otherwise the circulation can run continuously.

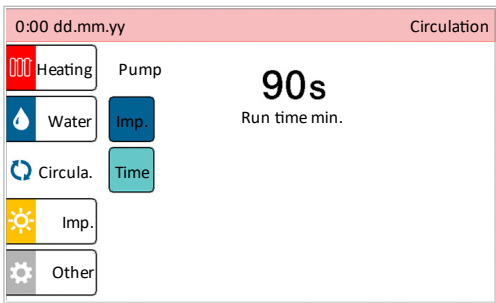


6.3.2 Pulse control

Setting the hot water circulation

In “Imp.” mode, the circulation pump runs only if the hot water is turned on at the tap for a short time (impulse) and if the temperature on the circulation sensor falls below a limit value. To activate the impulse control, proceed as follows:

1. Choose the “Imp.” button. The button must be activated (shown with a dark background).
2. If necessary, adapt the value for the “Minimum run time”: To raise the minimum run time of the circulation pump, press “+”. To lower it, press “-”.

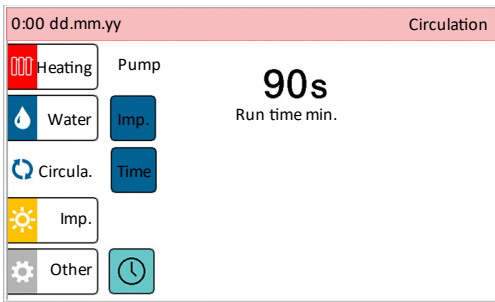


6.3.3 Time and pulse control

Set the hot water circulation

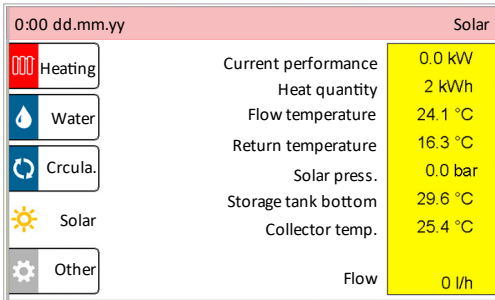
The two operating modes that were previously described can be activated at the same time. Outside of the time window, the circulation pump is controlled as described in the → section “Pulse control”. To activate the pulse and time function at the same time, proceed as follows:

1. Select the “Pulse” button. The button must be activated (dark background).
2. Select the “Time” button. The button must be activated (dark background).
3. Adjust the value for “Min. run time” as required: To raise the minimum run time of the circulation pump, press “+”; to lower it, press “-”.
4. Set the circulation times as required, see → section “Time control”, p. 25.



6.4 Solar (measured value display)

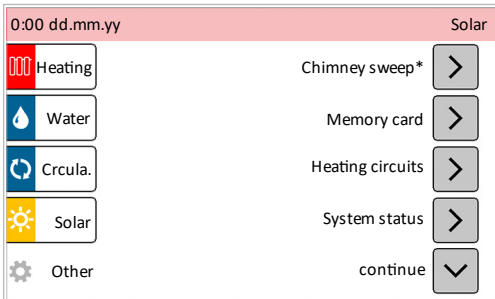
The current measurement data for the solar circuit can be accessed (if available) in the “Solar” main menu. The solar control function is displayed in more detail in the → chapter “Functional Description of SolvisControl”, p. 38.



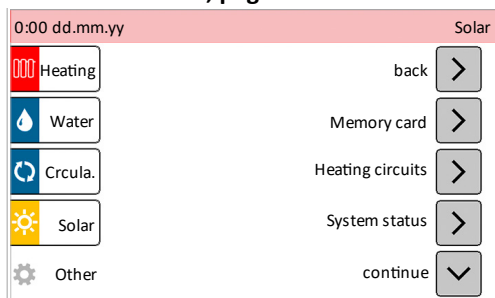
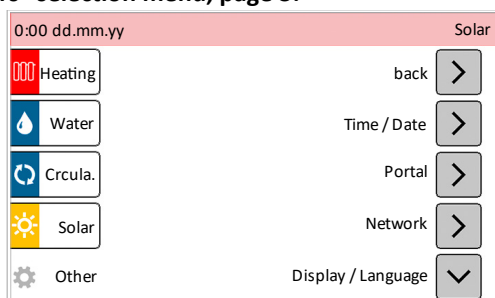
- “Current performance”: Heat output that is currently being produced by the collectors in kW.
 - “Heat quantity”: Total heat quantity produced by the collectors in kWh.
 - “Flow temperature”: Current solar flow temperature.
 - “Return temperature”: Current solar return temperature.
 - “Storage tank bottom”: Current temperature at the bottom of the storage tank.
 - “Collector temperature”: Current collector temperature.
 - “Flow”: Current volume flow in the solar circuit in l/h.
- All temperatures in °C

6.5 Other

Additional setting options are available in the “Other” main menu. These are described below.



* In systems with heating pumps: “Extended functions”

“Others” selection menu, page 2:**“Others” selection menu, page 3:****6.5.1 Chimney sweep**

Calling the “Others” selection menu, page 1.

The chimney sweep function allows for the burner to be run at maximum output for a set time. The chimney sweep can now carry out all required measurements.

This operating mode ends after the specified time has elapsed, or it can be ended ahead of time by pressing the “Stop” button (visible when the function is active).

Starting the burner

1. Select the “Other” main menu.
2. Select “Chimney sweep”.
3. Select “Start”.

The burner starts, the display changes to “Stop” and the remaining run time is displayed.

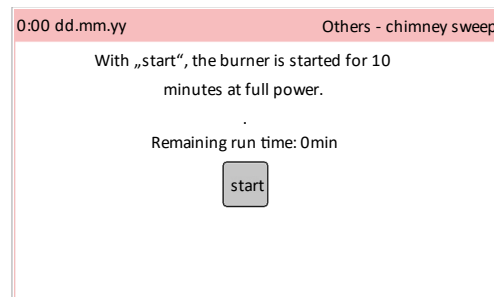
4. Select “Stop” to switch off the burner earlier.

SolvisBen/SolvisMax Gas Hybrid / Oil Hybrid only**Starting the burner**

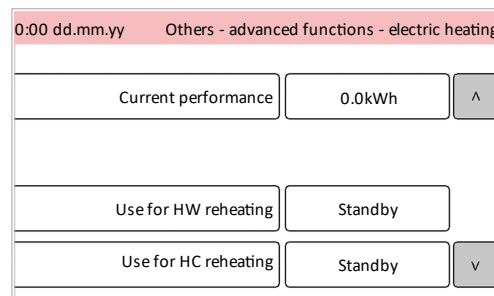
1. Select the “Other” main menu.
2. Select “Advanced functions”.
3. Select “Chimney sweep”.
4. Select “Start”.

The burner starts, the display changes to “Stop” and the remaining run time is displayed.

5. Select “Stop” to switch off the burner earlier.

**6.5.2 Electrical heating element****SolvisMax/SolvisBen WP only****Reading the electrical heating element**

1. Select the “Other” main menu.
2. Select “Advanced functions”.
3. Select “Electrical heating element”.
4. Read the values.



- **“Current performance”**: Display of the output performance of the electrical heating element currently used in kilowatt (2-stage or 3-stage, according to type).
- **“Use for HW reheating”**: This window displays whether the drinking water reheating function is in “Standby”, “On”, “Hand/On”, “Hand/Off” or “Emergency” operating mode. When in normal operation, the controller decides for itself, at this point, whether reheating is necessary to ensure fast drinking water heating. In the case of Solvis heating pumps from 10 kW, this is only necessary at very low outdoor temperatures and high warm water temperatures.
- **“Use for HC reheating”**: Displays the heating circuit reheating is in “Standby”, “On”, “Hand/On”, “Hand/Off” or “Emergency” operating mode. If the set temperature of the heating circuit is not reached within a period of approx. 10 minutes, the electrical heating element is used, even in heating operation, for heating until the required flow temperature is reached. When the system is set-up properly, this only occurs in the case of very low outdoor temperatures or when heating up extremely cold rooms.

E In contrast to the Hybrid systems, bivalent operation is not controlled based on a fixed outdoor temperature, but is based on the current conditions and requirements that result from the heating operation. This ensures that the heating elements are used in the most energy-saving way possible.

6.5.3 Replacement operation

SolvisBen / SolvisMax with heating pump only

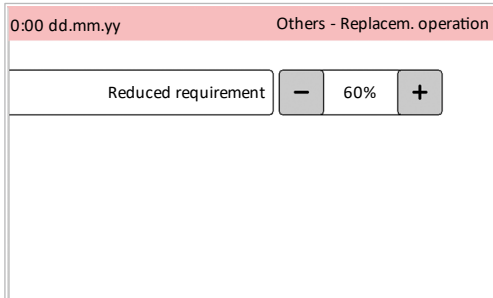
If the respective primary heat generator breaks down, if there is a blockage or communication to the heat generator is interrupted for example, the backup heat generator is activated.

If the heating pump breaks down:

- the burner is activated in the case of hybrid systems (heating pump plus burner)
- the electric heating cartridge is activated in the case of monoenergetic systems (without a burner), e.g. heating pump with electric heating cartridge

When running in replacement operation (previously “redundancy operation”), the relevant set temperature is lowered (factory setting: 60 %), so that the user notices the failure. This means, the temperature is lowered but not to a level where there would be a risk of frost damage in winter.

Lowering the temperature serves to make the user aware of a problem and prevent use of the heating element, where possible, because a one hundred percent use of the heating element leads to higher electricity costs.



- The temperature can be lowered in steps of 10 %.

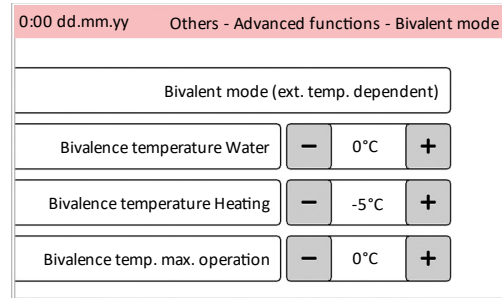
6.5.4 Bivalent operation

SolvisBen/SolvisMax Gas Hybrid / Oil Hybrid only

Setting the bivalence temperature

If the outdoor temperature is lower than the set bivalence temperature, the gas or oil burner is activated and the heating pump is switched off (alternative bivalence operation). An antifreeze function protects the heating pump from freezing by activating the load pump briefly.

1. Select “OTHERS”.
2. Select “Advanced functions”.
3. Select “Bivalence mode”.
4. Values for “Bivalence temperature Water” and “Bivalence temperature Heating” may only be changed following consultation with the installation technician.



6.5.5 Silent mode

SolvisBen / SolvisMax with heating pump only

See ➔ “Functional Description of SolvisControl” section, page 38 for a more information.

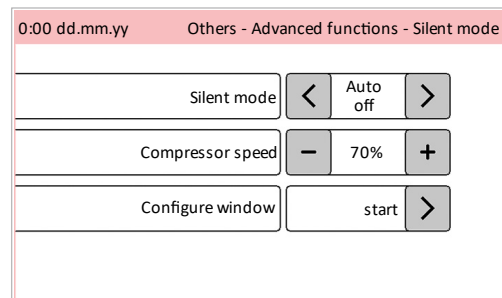
Activating Silent mode

Proceed as follows for quieter operation of the heating pump providing a lower performance:

1. Select the “OTHERS” menu option.
2. Select “Advanced functions”.
3. Select “Silent mode”.

Silent mode is active from 10 p.m. to 6 a.m. in the factory setting (mode: Auto). It can be permanently deactivated/activated (manual off/manual on).

- To change the mode, press the arrows next to “Silent mode” [Auto, Manual On, Manual Off]
- “Compressor speed” is used to set the reduction of the compressor speed (ex works “70%”). The set compressor speed applies to all silent mode modes.
- Tap on the arrow beside “Start” in the “Configure window” to set up to three time windows for Silent Mode (ex works 22 - 6 o'clock). Set time windows only apply to Auto mode.



If the time window for silent mode overlaps with the time window for water heating, comfort may be reduced when there is a significant reduction in output.

6.5.6 Smart Grid

SolvisBen / SolvisMax with heating pump only

See ➔ "Functional Description of SolvisControl" section, page 38 for a more information.

Setting the maximum auxiliary heating temperature/increase

Set the target temperature for maximum operation as follows:

1. Select the "OTHERS" menu option.
 2. Select "Advanced functions".
 3. Select "Smart Grid".
 4. Only change values for "Target temp. maximum operation", "Raise flow temp. increased mode" and "Limit temperature max. operation" following consultation with the installation technician.
- The current operating mode according to Smart Grid ("normal mode", "blocking time", "increased mode", "maximum mode") is displayed in the "Status" field.
 - If "Yes" is displayed for "Hydraulic set Smart Grid", the hydraulic set Smart Grid is installed. Then one of the storage tank sensors "S3", "S4" or "S9" is also displayed with "Smart Grid switch-off sensor". The selection of the sensor determines up to which sensor the cylinder is heated, i.e. whether the cylinder load is lower or higher.

0:00 dd.mm.yy Miscellaneous - Extended functions - SmartGrid 1/2

Status	normal mode	⬆
Smart Grid hydraulic set	No	
Smart Grid switch-off sensor	S4	
Target temp. maximum operation	- 55 °C +	⬇

0:00 dd.mm.yy Other - Extended functions - SmartGrid 2/2

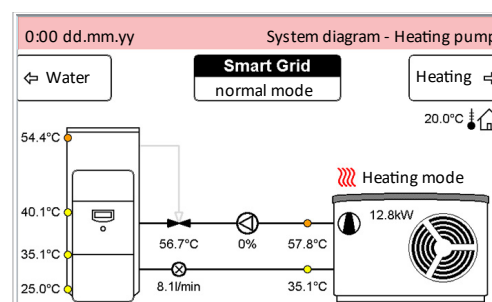
Max. operating limit temperature	- -8 °C +	⬆
Increase VL setpoint verst. op.	- 3K +	
Burner release in blocking time	< Off >	

- "Burner release in blocking time" (SolvisMax/Ben Oil Hybrid and Gas Hybrid only): "On" (factory setting) or "Off". During a block time, the system automatically switches to the burner as the heat generator if necessary.

System diagram - Heating pump



When you press the help button, the view of the sensor value (e.g. 63.8 °C) is swapped with the sensor name (e.g. S1). This makes it easy to match the view and name.



Page 4: Heating pump

- Storage tank with S1, S3, S4 and S9 sensors
- Heating pump flow and return temperature
- Display of the load pump control as a percentage
- Current level of the electrical heating element
- Current thermal power of the compressor
- System pressure (depending on the volume flow meter installed)
- Volume flow in l/min
- Display of the status of the heating pump (symbol and text above the heating pump). The operating states displayed are: "Defrosting", "Frost protection", "Ready", "Hot water", "Heating mode", "Cooling mode", "Idling time", "Error" and "LP delay"
- S10 outdoor temperature sensor.

6.5.7 SmartEnergy/PV

Only SolvisBen/SolvisMax with SolvisTim/SolvisTom

Use of the surplus electricity from a photovoltaic system to heat up the tank instead of feeding it in the electricity network. The SolvisTim or SolvisTom PV2Heat module is required in this case.

0:00 dd.mm.yy Others - SmartEnergy/PV

available surplus power	---
used surplus power	---
Activation threshold	- 800W +

- "Activation threshold": The PV2Heat module is activated from this surplus power level.

6.5.8 Memory card (Load basic settings)



Calling the “Others” selection menu, page 1.

Removing the memory card

You must deactivate the memory card with the command **“Memory card – eject”** before you remove it.

Purpose of the memory card

The memory card (microSD card) is required to record measured values (data logging) in intervals of seconds and minutes, to back up basic settings and to update the firmware.

The SolvisControl continuously saves all the input and output states (for sensors, pumps, heat requirements, etc.) once per minute. In addition, fresh water heating data is recorded every second, starting and ending automatically when water is withdrawn.

Analysis software is available for displaying and analysing this data on your PC. If you are interested, please consult the company responsible for installation.

The Solvis Customer Service Department can also analyse this data. The installation company must e-mail the data to Solvis. This service is subject to additional charges.

Loading basic settings

The basic settings that are stored to the controller settings can be restored as follows:

1. Switch to the **“Other”** menu.
2. Select **“Memory card”**.
3. Select **“Load basic settings”**.
4. Select **“Yes”** to load the settings.

6.5.9 Heating circuits



Calling the “Others” selection menu, page 1.

- **“Heat. circ. 1”, “Heat. circ. 2”, “Heat. circ. 3”**: The setting parameters for the heating circuits are summarised in the **“Others > Heating circuits”** menu. The settings are explained using heating circuit 1 as an example. They must be individually adjusted for each heating circuit that is present.
- Select **“Solar overage”** to assign the solar overage function to the heating circuits (see → *chapter “Solar excess function”, page 40.*

Query the status

1. Go to the **“Other”** menu.
2. Select **“Heating circuits”**.
3. Read the status values.

- **“Heat. circuit status”**: Current status of the heating circuit (e. g. **“Day”** for day mode, **“Lower”** for lowering mode or **“HW prior.”** for hot water priority heating).
- **“Hot water priority”**: **“On”** means that the heating circuit pumps are switched off when the hot water buffer receives auxiliary heating.
- **“Operating mode HC”**: This displays the current operating mode of the heating circuit (e. g. **“Auto”** for time/automatic mode).

Flow temperature

In the factory settings, the flow temperature is calculated automatically using a heating curve (**“Curve”**) (see the → *figure “Heating curves with various target room temperatures”*).

The heating curve is calculated based on the applicable outdoor temperature.

You can use the **“Fix”** setting to preset two fixed flow temperatures:

- One for day mode (during heating times)
- One for lowering mode (outside of heating times)

Setting the fixed flow temperature

1. Use the down arrow navigation button to move to the next page.

0:00 dd.mm.yy Others - Heating circuits - Heat.circ. 1 2/5

Op. mode flow temp. < Curve > ^

Slope - 0.80 +

▼

- “Op. mode flow temp.”: With “Curve” or “Fix”, the flow temperature is either adjusted automatically or is independent of the outdoor temperature.
- 2. Switch “Op. mode flow temp.” from “Curve” to “Fix”.
- 3. Input field “Fixed flow for daytime” (briefly press “-” or “+”): setting the flow temperature in day mode.
- 4. Input field “Fixed flow for low-mode” (briefly press “-” or “+”): setting the flow temperature in lowering mode.

0:00 dd.mm.yy Others - Heating circuits - Heat.circ. 1 2/5

Op. mode flow temp. < Fix > ^

Fixed flow for daytime - 50°C +

Fixed flow for low-mode - 35°C +

▼

Adjusting the heating curve

The SolvisControl heating curves are displayed in the → *Figure “Heating curves for various target room temperatures”*.

Example:

The target room temperature is set to 20 °C, and the slope is set to 1.0. For an outdoor temperature of 10 °C, the flow temperature is controlled to 32 °C and for an outdoor temperature of -10 °C it is controlled to 48 °C.

The heating curve can be set exactly using the rules in the table. To save energy, corrections should only be made in small steps.

i All corrections require a certain amount of time to take effect. For this reason, wait at least one day before making any further adjustments.

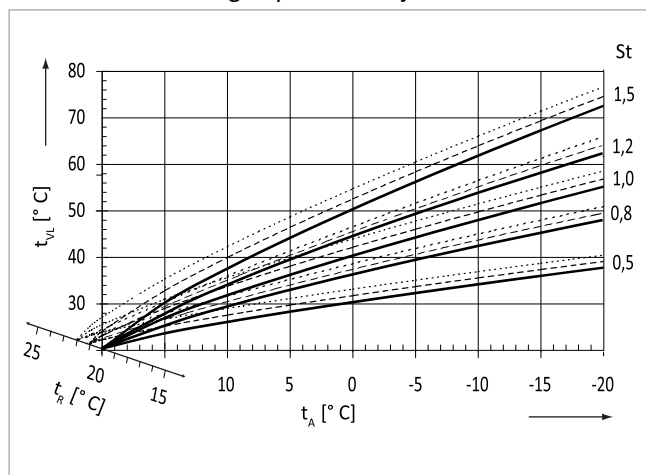


Fig. 25: Heating curves for various target room temperatures

St	Slope of the heating curve
t _A	Outdoor temperature [°C]
t _R	Target room temperature [°C]
t _{VL}	Flow target temperature [°C]
Heating curve	For target room temperature
_____	20 °C
-----	21 °C
.....	22 °C

Recommended values for the slope

Heating (Building)	Slope
Radiator (old construction)	1.2
Radiator (new construction)	1.0
Underfloor heating (old construction)	0.8
Underfloor heating (new construction)	0.5

Depending on the special properties of the building, a corresponding heating curve setting is required. Rough guidelines for the slope of the heat curve are shown in the table to the left.

i The heating curve can be set exactly using the rules in the table in → *“Adjusting the heating curve” in “Malfunctions with heating and hot water” on page 53.*

Change the room target and low-mode temperatures

1. Use the down arrow navigation button to access the next menu.
2. Adjust the values, if necessary.

0:00 dd.mm.yy Others - Heating circuits - Heat.circ. 1 1/5

Day temp. time window 1 - 20°C + ^

Day temp. time window 2 - 20°C +

Day temp. time window 3 - 20°C +

Low-mode temperature - 16°C + ▼

- “Day temp. time wind. 1 - 3”: Entry of the target room temperatures 1 - 3 that should apply to day mode (within heating time window 1 - 3).
- “Low-mode temp”: Enter the temperature to which the rooms are to be heated outside of the time windows.

E Adjust the preset values according to your requirements. In uninsulated buildings, reducing the room temperature by 1 °C can reduce the energy used by roughly 5 %.

In renovated buildings or in combinations with heating pump systems or underfloor heating, there should be little to no difference between the low-mode temperature and the day temperature to avoid high loads during reheating.

For information on changing the heating times, see → *chapter “Changing heating times” on page 21.*

Set the hold time and room influence

1. Use the down arrow navigation button to move to the next page.
2. Adjust the values, if necessary.

0:00 dd.mm.yy Others - Heating circuits - Heat.circ. 1 4/5	
Temp. flow ACTUAL	22°C ⬆
Temp. flow TARGET	55°C
Room influence	- 10% +
Hold time	- 0min. + ⬇

- **"T. Flow ACTUAL"**: current flow temperature of the heating circuit if a flow sensor is present.
 - **"T. Flow TARGET"**: flow target temperature determined by the controller.
"+": If a "+" is displayed, the flow temperature has been increased to reduce the cycling of the heat pump.
 - **"Room influence"**: If an (optional) room controller is connected, you can set the extent to which the room temperature has an effect on the calculation of the flow target temperature. We recommend a setting of 10 %.
- i** If a room controller is being used and if the room influence factor is less than 0, the heating valves in the room in which the room controller is installed must be fully opened.
- **"Hold time"**: depending on the outdoor temperature, the heating circuit is switched to day mode earlier by the time set for the hold time. The goal is to start heating up the rooms earlier when the outdoor temperatures are lower.

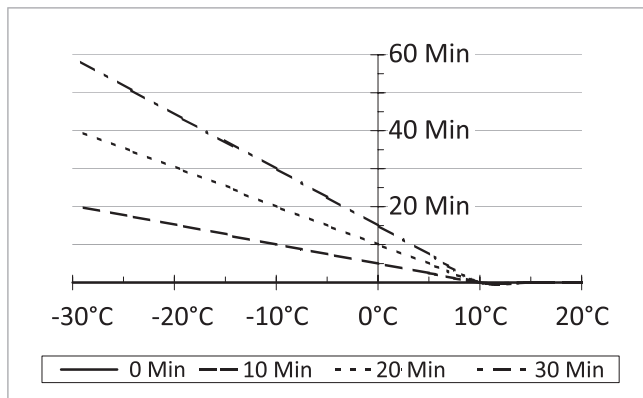


Fig. 26: Hold time

Example:

The hold time is linearly dependent on the outdoor temperature. In the illustration, the time period for early heating is shown in relation to the outdoor temperature for hold times of 0, 10, 20 and 30 minutes.

- At +10 °C, the hold time is always 0 minutes.
- At -10 °C, the hold time corresponds to the value set in "Hold time".

Configuring summer/winter switching

1. Use the down arrow navigation button to move to the next page.
2. Adjust the values, if necessary.

0:00 dd.mm.yy Others - Heating circuits - Heat.circ. 1 5/5	
Current outside temperature (OT)	12°C ⬆
Average outside temperature	14°C
HC start (day): OT smaller	- 19°C +
HC start (lowering): OT smaller	- 10°C + ⬇

- **"Current outside temperature (OT)"**: current outdoor temperature
- **"Average outside temperature"**: mean value over 30 minutes (used by the controller)
- **"HC start (day): OT smaller"**: Switch-on temperature of the heating circuit in day mode
- **"HC start (lowering): OT smaller"**: Switch-on temperature of the heating circuit in set-back mode.

The heating circuit is switched off if, depending on the operating mode (day/lowering mode), the average value of the outdoor temperature exceeds the **"HC start (day): OT smaller"** value or **"HC start (setback): OT smaller"** value by 2 K (hysteresis).

Example:

These values are used to switch to **day mode** if the average outdoor temperature rises above 19 °C + 2 K = 21 °C. The heating circuit switches on again if the outdoor temperature falls below 19 °C.

In **lowering mode**, the circuit switches off if the medium outdoor temperature rises above 10 °C + 2 K = 12 °C. The heating circuit switches on again if the outdoor temperature falls below 10 °C.

E The lower you select your switch-off temperatures, the more energy you will save. The factory-set temperatures of 19°C and 10°C are intended for use in newer buildings with good thermal insulation and may need to be adjusted to the existing heat insulation.



CAUTION

Note the set value for "MIN. outdoor temp.".

An improper setting may result in damage to the heating system.

- Do not set the **"MIN. outdoor temp."** below + 3 °C, otherwise there is no frost protection in lowering mode.

6.5.10 System diagram



Calling the "Others" selection menu, page 1.

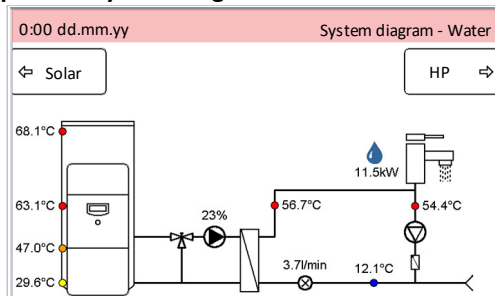
When you press the help button, the view of the sensor value (e.g. 63.8 °C) is swapped with the sensor name (e.g. S1). This makes it easy to match the view and name.

Requesting the system status

1. Switch to the **"OTHERS"** menu.
2. Select **"System diagram"**.

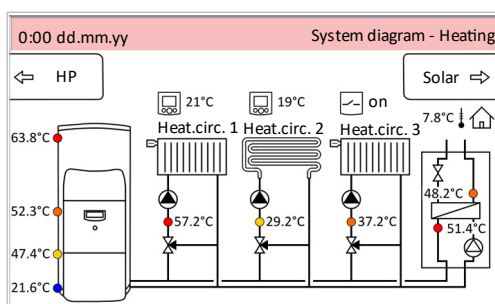
- Read the status values in the first menu (hot water).
- For the other system diagrams, select the “Solar” or “Heating” buttons at the top.

Description of system diagrams



Page 1: Hot water

- Storage tank with S1, S4, S9 (if required) and S3 sensors
- Hot water station with S2 and S18 sensors and PWM “HW” pump
- Cold water sensor S15 (if not connected, 10 °C is continuously displayed)
- Circulation (if activated: pulse, time, and pulse and time) with S11 sensor and A1 pump.

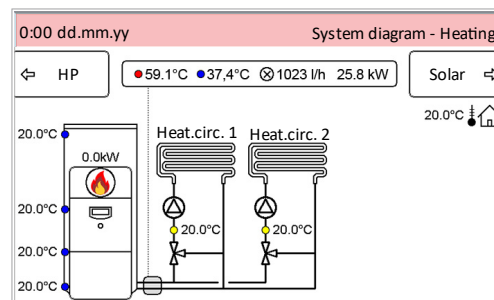


Page 2: Heating circuits and heat generators

- Storage tank with S1, S4, S9 (if required) and S3 sensors
- Integrated burner on output A12 (gas, oil) and A13 (oil, burner 2) or external boiler, if necessary with load pump “LP” or A13 and boiler sensor S14
- If available, solid fuel boiler with load pump A7 and boiler sensor S16 or: district heating exchanger with load pump (A13 or O-3) and flow sensor S14 and return sensor S16
- Heating circuit 1 with pump A3, if necessary mixer A8/9 and sensor S12
- If necessary heating circuit 2 with pump A4, if necessary mixer A10/11 and sensor S13
- If necessary, heating circuit 3 with pump A5, if necessary mixer A6/7 and sensor S16 (mixer and sensor are omitted for initialisation with district heating exchanger)
- Any available room controllers are displayed
- S10 outdoor temperature sensor.

If the recording of heat quantities is activated in the Modbus menu, the expert user’s graphical system diagram

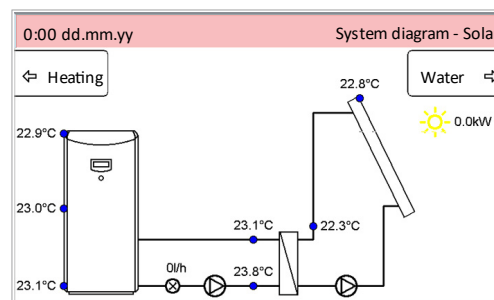
displays an additional element between the navigation buttons in the “Heating” view. This display includes:



- The flow temperature of the heating circuit(s) (red measuring point, degrees Celsius)
- The return temperature of the heating circuit(s) (blue measuring point, degrees Celsius)
- Flow of the heating circuit(s) (VFE icon, litres per hour)
- Current performance of the heating circuit(s) (kilowatts)

If there is no data connection with the Modbus board, all the values are displayed with (0.0). A message appears if there is an interruption period of approx. 15 seconds (timeout).

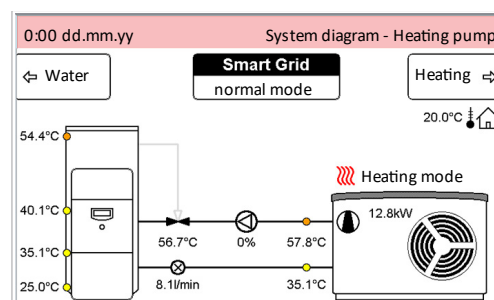
The two temperature sensors on the Modbus board are displayed with “-35°C” if a short circuit occurs and “+250°C” if a cable breaks.



Page 3: Solar system

- Storage tank with S1, S4, S9 (if required) and S3 sensors
- 2-circuit system with SP1 and SP2 pumps and S5, S6, S7, S8, and S17 temperature sensors
- If present, east-west roof with A6 and A7 valves and S16 sensor
- Solar volume flow S17 in l/h
- Current solar power in kW.

SolvisBen / SolvisMax with heating pump only



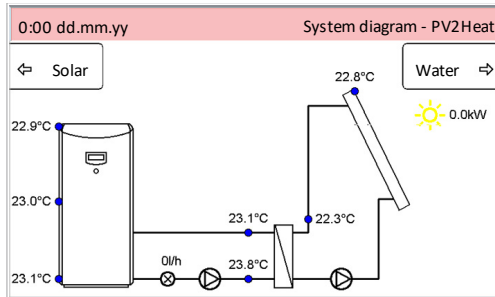
Page 4: Heating pump

- Storage tank with S1, S3, S4 and S9 sensors
- Heating pump flow and return temperature
- Display of the load pump control as a percentage
- Current level of the electrical heating element

6 Expert Operation

- Current thermal power of the compressor
- System pressure (depending on the volume flow meter installed)
- Volume flow in l/min
- Display of the status of the heating pump (symbol and text above the heating pump). The operating states displayed are: **“Defrosting”**, **“Frost protection”**, **“Ready”**, **“Hot water”**, **“Heating mode”**, **“Cooling mode”**, **“Idling time”**, **“Error”** and **“LP delay”**
- S10 outdoor temperature sensor.

SolvisMax/Ben with SolvisTim (PV2Heat) only



Page 5: SolvisTim (PV2Heat)

- Storage tank with S1, S4, S9 (if required) and S3 sensors
- Heating pump flow and return temperature
- Display of the electrical heating element performance level (0, 3 or 6 kW)
- Current measured energy surplus
- S10 outdoor temperature sensor.

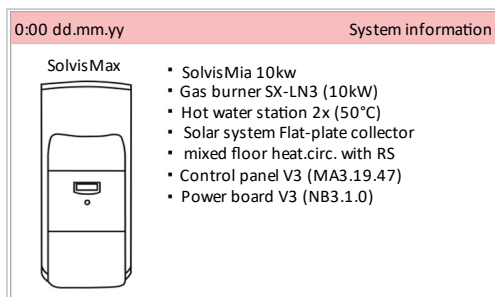
6.5.11 System information



Calling the “Others” selection menu, page 2.

Requesting system information

1. Switch to the **“Other”** menu.
2. Use the navigation button to go to the next page.
3. Select **“System information”**.
4. Read the system information*.



* Depending on the system, either **“SolvisMax 7”** or **“SolvisBen”**

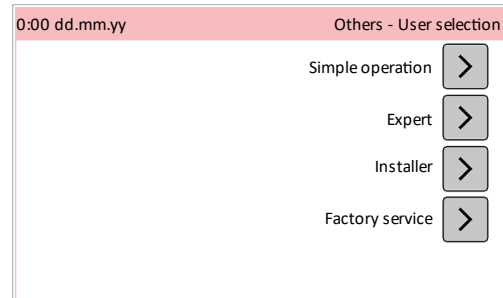
6.5.12 Change user



Calling the “Others” selection menu, page 2.

Switching operating mode

1. Switch to the **“OTHERS”** menu.
2. Use the **“Next”** to open the next page.
3. Select **“Change user”**.
4. Select the operating mode required.



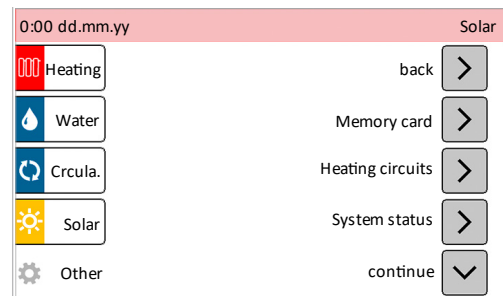
6.5.13 Counter function



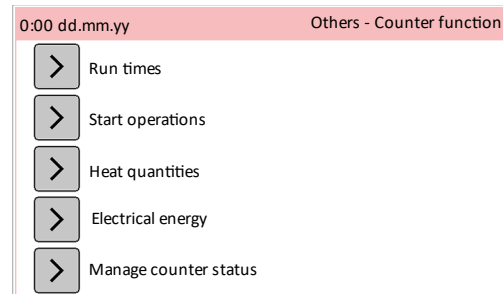
Calling the “Others” selection menu, page 2.

Querying heat quantities

1. Go to the **“Other”** menu.
2. Select **“Next”**.
3. Select **“Counter function”**.



4. Select **“Heat quantities”**.



Explanation of the “Run times” menu

0:00 dd.mm.yy Others - Counter function - Run times	
Solar pump 1 2	221h 421h
SolvisMia 10kW (ZA)	1563h
Gas burner	18h
PV2Heat	not installed

The run times of the connected devices are displayed in hours. If a solar system is connected, the run time of solar pump 1 (primary circuit or collector circuit) is displayed with the run time of solar pump 2 next to it (secondary circuit or storage tank circuit).

For the oil burner, the run time of the first level is shown with the run time of the second level next to it. For the gas burner and heat generator 2, only one run time is displayed because it does not have burner levels.

For PV2Heat, the run times of SolvisTim and/or SolvisTom are displayed.

Explanation of the “Start operations” menu

0:00 dd.mm.yy Others - Counter function - Start operations	
SolvisMia 10kW (ZA)	1360
Gas burner	236
PV2Heat	not installed


The start operations for the connected burners and additional heat generators and/or the PV2Heat (SolvisTim) are displayed here.

Explanation of the “Heat quantities” menu

0:00 dd.mm.yy Others - Counter function - Heat quantities				
		today	yesterday	total
Generator	Solar system	2 kWh	4 kWh	456 kWh
	Oil burner	10 kWh	15 kWh	1345 kWh
	Heat generator 2	2 kWh	5 kWh	310 kWh
	PV2Heat	not installed		
Consumer	Heating circuits	54 kWh	59 kWh	14332 kWh
	Hot water	5 kWh	9 kWh	1256 kWh

The heat quantities are displayed in a table with visual separation of the generators (red) and consumers (blue). Counters for the current and previous days have been introduced in addition to the total of the respective heat quantities. They make it easier to see the heat quantities produced and used. They also let you quickly see the effect of changes to parameters or to the heating system.

Note: It is not possible to divide the "Heating circuits" line into several heating circuits to record the consumption of several residential parties, for example, by installing several heat metering sets. The central controller can be connected to exactly one heat metering set.


 Oil burners, SolvisLino devices and other external heat generators cannot be recorded.

Description of the “Electrical energy” menu

The “Electrical energy” submenu displays the following values:

- Electrical input power of the heating pump
- Seasonal performance factor of the heating pump, including the observation period
- Electrical input power of the heating cartridge (only heating pump systems without oil/gas hybrid)
- Electrical input power of the SolvisTim (PV2HEAT)

0:00 dd.mm.yy Others - Counter function - Electrical energy	
Heating pump	1678 kWh
Annual perfm. factor (100 days)	4.5
Electric heating	not installed
PV2Heat	not installed

 The calculated energy quantities are not suitable for billing purposes!

The specified power consumption may differ from the actual power consumption.

You can find more information about the electrical energy, the system limits and the calculation of the seasonal performance factor in the help text.

6.5.14 Resetting the counters

You can reset the counter readings in a specific area (for example, when retrofitting a heating pump, PV2Heat station or HC heat quantity counter (HC-HQC)).

The counter readings for the HC-HQC board are stored directly in the device. When starting up the device, you may have to reset the counter readings. After you replace components, it may be helpful to reset their corresponding counters.

Resetting the heat quantity to zero

1. Go to the “Others” menu.
2. Select “Counter function”.
3. Choose “Manage counter status”.

0:00 dd.mm.yy Others - Counter function	
>	Run times
>	Start operations
>	Heat quantities
>	Electrical energy
>	Manage counter status

You can load saved counter readings from the memory card (e.g. after replacing the central controller) or reset specific areas to zero.

0:00 dd.mm.yy Others - Counter funct. - Manage counter stat.1/2			
Stored counter readings	load	>	^
Heat generator	reset	>	
Hot water	reset	>	
Solar system	reset	>	v

- Use the navigation button to go to the next menu.

You can also reset all the counter readings at once, for example, to begin a new count for all the areas after making changes to the system.

- To reset the relevant counter reading to zero, choose “reset” next to “Heat quantity HC”.
- Select “Yes” to answer the confirmation prompt.

Available options in the “Manage counter status” menu:

- “**Stored counter readings – load**”: this can be used to import counter readings stored on the memory card to the controller (for example, after replacing the central controller).
- “**Heat generator – reset**”: resets all the operating counters for the connected heat generators to zero (for example, run times, operating hours, generated heat quantities (including daily counters)).
- “**Hot water – reset**”: resets the extracted heat quantity to zero (including the daily counters).
- “**Solar system – reset**”: resets all operating counters (run times) on the solar system and the generated heat quantity (including the daily counters) to zero.
- “**PV2Heat – reset**”: resets the generated heat quantity (including the daily counters) and the recorded electrical energy to zero.
- “**Heat quantity HC – reset**”: resets the extracted heat quantity to zero (including the daily counters).
- “**All counter readings – reset**”: resets all the counter function counters to zero (delivered state).

6.5.15 Time / date



Calling the “Others” selection menu, page 3.

The time can be synchronised automatically if the Solvis-Control is connected to the internet. To do so, when an internet connection is established, set the menu item “**Time from the Internet**” to “**On**” and then set the time zone (default setting “+1:00” for Paris/Berlin). The automatic summer and winter time change is activated by default (“**On**”) and can be deactivated with “**Off**”.

Set date and time manually

- Switch to the “Other” menu.
- Select “Next”.
- Select “Time and date” and “Set”.
- Set the date and time as described in the → *chapter “Changing numeric values”, p. 12.*

6.5.16 SolvisPortal



Calling the “Others” selection menu, page 3.

To use the portal function, a connection to the router/repeater must be established and the local network must be connected to the internet.

Activating/deactivating the SolvisPortal

- Switch to the “Others” menu.
- Use the down arrow navigation button to move to the next page.
- Select “Portal”.
- If a connection is established, you can choose “**Off**” next to “**SolvisPortal data transfer**” to deactivate it.

Settings

Before you can control the SolvisControl via the SolvisPortal, you must set up a user account at “<http://solvisportal.de>”.



You must then generate a pairing code by choosing “**SC3 to portal – connect**”. This pairing code is required to connect the SolvisControl to the user account.

You can choose “**Link to SolvisPortal – delete**” to remove the connection. To connect again, you must choose “**SC3 to portal – connect**” and generate a new pairing code to enter in the user account.

If a connection to the SolvisPortal is established, a cloud symbol is displayed at the top of the screen in the main heating menu. You can use “**SolvisPortal data transfer**” to activate (“**On**”) and deactivate (“**Off**”) the SolvisPortal at any time. The link to the user account is retained.



For detailed instructions for the SolvisPortal, see the → *SolvisPortal operating instructions (BAL-SPT-SC-3)*.

6.5.17 Network



Calling the “Others” selection menu, page 3.

“**IP address**”: If the controller is connected to your home network, the IP address that can be used for remote access is displayed here. For remote access, simply enter the IP address in the address bar of your web browser (e.g. Chrome, Firefox, Edge, etc.).

“**SolvisRemote web app**”: You can enable and disable the remote control of the controller here. The unit with the browser and the controller must share the same network or connect to the network via DynDNS or VPN, see → *Section “Remote function”, page 40*.

“**WLAN coupling initiating**”: This section explains how the controller can be connected wirelessly to the home network. Activate the WLAN hotspot with the “**Start**” option before logging in using your mobile device. You can then access a browser on the mobile device and select the WLAN for the home network. After entering the correct WLAN password for the home network, the hotspot switches off and the IP address of the controller appears. If no IP address appears, the password was probably entered incorrectly. In this case, the network settings must be reset and the process repeated (see → *Section “Connection with WLAN”, page 15*).

“**Network settings – reset**”: All the network parameters are reset to the factory settings and the controller is automatically restarted.

“**MAC address LAN**”: The specific physical address of the network interface for the controller LAN.

“**MAC address WLAN**”: The specific physical address of the network interface for the controller WLAN.

“**WLAN SSID**”: The “Service Set Identifier”, the official name, which is assigned to a wireless network from your router.

“**WiFi signal strength**”: Indicates the quality of the connection between the (WiFi) router and the device used. The lower the value behind the minus sign, the better the reception. Values from -85 dB indicate a very critical signal strength and thus high attenuation between the transmitter and receiver.

6.5.18 Display/Language



Calling the “Others” selection menu, page 3.

You can use “**Display background lighting**” to set the brightness of the background lighting (setting range 1 to 25).

You can use “**Switch off display after**” to choose how long the background lighting remains on.

The signal tone that sounds when buttons are selected can also be activated (“**On**”) or deactivated (“**Off**”) here.

Setting menu languages

1. Switch to the “**Other**” menu.
2. Use the navigation button to go to the next page.
3. Select “**Language**”.
4. Select your required language. If required, choose “**next**” to switch to additional languages.


7 Functional Description of SolvisControl

7.1 Basic functions

7.1.1 Hot water

Hot water production is carried out with hygienic perfection, in accordance with the **continuous flow principle** using an external heat exchanger. This ensures drinking water quality. The hot water tap temperature is controlled using a volume flow sensor. When you open the hot water tap, the control switches on the hot water pump and regulates its speed for a constant hot water temperature. The tap delivery is mapped in the hot water station.

7.1.2 Circulation

 Circulation can be activated only if sensor S11 has been installed. If this is not the case, the missing sensor is highlighted when the function is selected.

The hot water circulation switches on when the temperature at the circulation sensor is 5 °C (factory setting) lower than the set temperature ("Circulation temp. SET"). It switches off again when the set temperature is reached. After switching off, the pump is blocked for 10 minutes (factory setting). In addition to this temperature control, it is possible to limit the times during which the circulation pump should run or to use the **pulse** function. To do this, the water tap must be briefly opened and then closed again. Both options can now be activated at the same time. The circulation station provides the circulation load.

7.1.3 Heating

The SolvisControl system controller supplies the house with heat, which can be distributed according to requirements through controllable heating circuits that are isolated from each other. The flow target temperature that is needed for the respective room temperature is calculated automatically (using heating curves) based on the outdoor temperature.

To save energy, you can use three different time windows for each heating circuit, which can be configured to lower the room temperature at night or during a period of absence. During a longer period of absence, you can use the **leave function** to lower the temperature continuously and increase it when you return. You can use the **party function** when you need heating for a specific occasion during lowering mode. In standby mode, an **antifreeze function** prevents damage that could be caused when pipes that are filled with heating water freeze.

To heat up the system more quickly after lowering mode, you can use a **hold time** to have the heating mode begin earlier. If it takes too long to heat the rooms when the temperatures are colder, you can further increase the flow temperature in relation to the outdoor temperature; please consult the installer for more information. You can use the **ECO function** to utilize solar heat more effectively in autumn or spring.

7.1.4 Defrosting


SolvisBen / SolvisMax with heating pump only

When heat is extracted from the air, water condenses from the air. At outside temperatures below 7 °C, the condensate can freeze on the heat exchanger and thus impair heat transfer.

The defrosting function removes ice from the heat exchanger and guarantees smooth, efficient operation. The heating pump process is reversed for this purpose: Some heat is extracted from the storage tank water and fed to the air heat exchanger. As soon as it is defrosted, the function is switched off and the heating pump is ready for use again.

A heating requirement can only continue following successful defrosting. During defrosting, the electrical heating elements are deactivated since it is not possible to charge the storage tank during this operating mode.

The defrosting process is symbolised by a snowflake in the main menu and in the system diagram.

 During defrosting, steam may appear outside of the heating pump.

7.1.5 Smart Grid

SolvisBen / SolvisMax with heating pump only

The term "smart grid" refers to the communicative networking and control of electricity generators, storage systems, electrical consumers and grid equipment in energy transmission and -distribution grids for the electricity supply.

This enables optimization and monitoring of the interconnected components. The aim is to secure the energy supply on the basis of efficient and reliable system operation. [Source: Wikipedia.org]

Both the system diagram and the status in the "**Smart Grid**" menu show the current operating mode of the heat pump: "**normal mode**", "**blocking time**", "**increased mode**", "**maximum mode**".

In "**normal**" mode, the storage tank is charged according to the requirements.

The heating pump remains switched off during the "**blocking time**" the heat pump remains switched off. If the EVU signal is lost, the heat pump remains switched off for a further 10 minutes. The blocking time may also be used for throttling in accordance with §14a EnWG. Throttling the heat pump to a discrete output is not yet possible in the current release (MA3.20.x).

In the case of "**increased mode**", the storage tank is heated to S4 (upper heating buffer), the set hot water temperature, if hot water production is already in operation. When there is a heating circuit requirement, the temperature level of the heating circuits is increased by the value set under "**Expert**" → "**Others**" → "**Advanced functions**" → "**Smart Grid**" → "**Raise flow temp. increased mode**" if the heating pump is in operation. I.e. Part of the heat is stored in the building and another part in the buffer tank.

When “**maximum mode**” is selected, heating is performed up to S4 (upper heating buffer) regardless of whether there is a request. There is no hot water priority. The heating circuits are still operated with their normal temperature.

The “**Bivalence temp. max. operation**” defines the outdoor temperature at which the heating pump is used when the signal is received (maximum mode). In some cases, the heating pump is not able to cover the full heating requirements at low temperatures. In such a case, the setting value must be increased.

Smart grid refers only to electrical heat generators. The gas or oil burner in the hybrid system is not affected by the smart grid.

Surplus solar power can continue to be used.

i When optimising self-consumption, the smart grid causes the power consumption to increase and the COP to fall. Using the smart grid may result in low seasonal performance factors. Nevertheless, the smart grid can still help to improve the overall energy balance.

7.1.6 Silent mode

SolvisBen / SolvisMax with heating pump only

“**Silent mode**” can be switched on/off and serves to reduce noise, e.g. at night.

The auxiliary heating performance is reduced in the set time window. The factory setting for Silent mode is Monday to Sunday from 22:00 to 6:00.

In unfavourable cases, the reduction of the auxiliary heating performance can result in additional electricity or fuel consumption (for the Hybrid system) if there is an increased heat requirement.

7.1.7 Solar control

The solar pumps are controlled based on their switch-on and switch-off differences in relation to the respective temperature sensors. The solar pump in the primary circuit is controlled using the collector sensor (S8) and the solar pump in the secondary circuit is controlled using the solar flow sensor (S7).

Control of the solar pump: the flow within the solar system is controlled using the speed-controlled solar pumps, so that the temperatures in the storage tank can be stratified as needed. This, together with the stratified charger, brings the tank to the standby temperature more quickly. Compared with conventional systems, the burner needs to provide less auxiliary heat.

7.1.8 Solar safety functions

Temperature sensors monitor the collector(s) and storage tank. This allows for a multiple safety function, i. e., the solar pump switches off in the primary circuit if:

- The temperature of the collectors falls below $\geq 125\text{ °C}$.
- The temperatures at the storage tank reference (S3) rise above $\geq 90\text{ °C}$ or the temperatures at the top storage tank (S1) rise above $\geq 90\text{ °C}$.

7.2 Special functions

In addition to the basic functions, there are also special functions that the installer sets during the initialisation of the controller:

- East-west roof
- Solid fuel boiler
- 3rd mixed heating circuit.

7.2.1 East/west roof

The best possibility of using the sun is when the roof surface is oriented toward the south and the sun can shine on the collectors continuously (no shadowing). However, on many houses, the roof surfaces face east and west. In such cases, the sun can be utilised continuously if collectors are installed on both roof surfaces.

Both collector fields are each connected to the solar circuit with a solar valve. The installer must initialise the controller using the special “**East-west roof**” function during start-up.

With the aid of the solar valve, the controller switches the relevant side on and off hydraulically on a fully automatic basis according to the position of the sun. No particular settings need to be made.

To prevent premature shutdown, do not switch the valves off immediately but only after a factory set delay of 1 minute.

7.2.2 Solid fuel boiler

The special function “**Solid fuel boiler**” allows for control of boilers that are manually fired with solid fuels, e.g. a fireplace that is fired with a back boiler pocket. By contrast, automatically fired solid fuel boilers (e.g. pellet boilers) can be connected as “**third-party boilers**”.

The SolvisControl takes over the temperature-controlled regulation of the load pump of the solid fuel boiler to be fired manually. To do this, a boiler sensor must be connected to the SolvisControl.

7.2.3 3rd mixed heating circuit

You can use this function to introduce a third mixed heating circuit. The installer connects the mixing valve to output A6/A7 and the flow sensor to input S16. During the system start-up, “**3rd mixed heating circuit**” must then be entered as a special function.

7.3 Remote operation of the SolvisControl

The SolvisControl system controller lets you monitor and remotely operate the system. You can use a network cable (specification: Cat-5e minimum) to connect the controller to a free port in the home router or repeater. Alternatively, you can establish a wireless connection using the WLAN function. The individual network functions are described below:

7.3.1 Remote function

The remote function lets you monitor and remotely control the heating system in the local network, with full access to the standard operator interface of the controller. To use this function, the installer establishes a connection to the router and activates the remote function.

On the upper edge of the screen in the main Heating menu, an IP address is displayed that must be entered in your browser (Mozilla Firefox, Microsoft Internet Explorer, Chrome, etc.) in order to access the SolvisControl (user name: "Solvis", password: "RCSC3!").

To connect to the SC-3 from outside the local network, we recommend using the SolvisPortal, which is quick and easy to set up. The SolvisPortal also provides encryption and works with internet connections with mobile routers or IPv6.

7.3.2 SolvisPortal

Another uncomplicated and secure option for remote operation and monitoring (logging) from any location with an internet connection is our SolvisPortal cloud connection. To use this feature, you must first set up a user account at "https://solvisportal.de" and use a pairing code to establish a connection (see → chapter "SolvisPortal", page 36).

7.4 Solar excess function

With the solar excess function, you can remove excess heat in order to avoid downtime of the collectors and protect the solar system. The excess heat can be used for solar heating of cellar rooms, baths or swimming pools.

7.4.1 Solar cellar or bath heating

During summer, the heating circuit is switched off if outdoor temperatures exceed 21 °C (factory setting, see → "Setting summer/winter switching" section, "Heating circuits" chapter, p. 30). If the solar excess function is activated, excess solar heat can be used independently of this. If it instead becomes cooler and the boiler is in winter mode, the burner provides auxiliary heat if there is not enough solar heat to keep the cellar room or bath sufficiently warm.

The relevant heating circuit can be equipped with a room controller (see → "Room controller" chapter, p. 9.). The heating circuit is switched on if the temperatures at the solar flow (S5) and at the heating buffer top (S4) are higher than the activation temperature. For mixed heating circuits, the "HC mixer target temp." is used for heating. The solar heating can be switched off if the room temperature has reached "Day temp. time wind. 1" (see → "Changing the room target and low-mode temperatures" section, "Heating circuits" chapter, p. 30) (only if the room controller is installed) or if the activation temperature on heating buffer top (S4) or solar flow (S5) drops below 5 K.



CAUTION

For unmixed heating circuits, flow temperatures of up to 90 °C can be reached.

7.4.2 Solar swimming pool heating

To heat a swimming pool with the solar excess function, a pool sensor (see → section "Pool sensor (optional)", p. 10) is required. The contact sensor is installed in the swimming pool circuit return in order to ensure that there is a switch-off when the target temperature ("Day temp. time wind.1") is reached.

7.4.3 Activation

Activating the solar overage function

1. In expert user mode, go to "Other".
2. Select "Heating circuits".
3. Select "Solar overage".
4. Switch the heating circuit for which the Solar overage function is to be activated to "On".
5. Check the activation temperature: "Activation temperature" > target hot water temperature + 18 K.

0:00 dd.mm.yy		Others - Heating - Solar overage 1/2	
Activation temperature	- 70°C +	^	
Heating pump 1	< off >		
Heating pump 2	< off >		
Heating pump 3	< off >	v	

Example:

If the target hot water temperature is 50 °C, for example, then the activation temperature must be set to 50 °C + 18 K = 68 °C at minimum.



The requirement temperature for hot water and the heating circuits must never rise above the set activation temperature. If they do, the conventional heat source would continue to provide auxiliary heat if the activation temperature were momentarily reached due to short-term sun exposure.

0:00 dd.mm.yy		Others - Heating - Solar overage 2/2	
Target temp. mixer	- 30°C +	^	
Switch-off sensor	< S4 >		
Switch-off hysteresis	- -5K +	v	

- "Target temp. mixer": for mixed heating circuits, this temperature applies as the target value if the heating circuit is activated by the excess function.
- "Switch-off sensor": Reference sensor, via which the surplus function is deactivated. The effect of "S4" is that the storage tank cools down; with "S5", the storage tank remains charged.
- "Switch-off hysteresis": the system is switched off if the "Activation temperature" and "Switch-off hysteresis" values are fallen below on the switch-off sensor. This

value may only be changed following consultation with the customer support department.

E The factory setting for the activation temperature is 70 °C and should only be changed in exceptional cases. While a lower activation temperature may allow for greater use of excess heat, a setting that is too low can lead to increased energy consumption due to conventional auxiliary heating.

E Make sure that the hot water requirement temperature can never rise above the set activation temperature. Otherwise, the gas or oil burner will keep on providing auxiliary heat if the activation temperature was momentarily reached due to short-term radiation.

7.4.4 Settings

Setting the target room and low-mode temperatures

1. Go to the **"Other"** menu.
2. Select **"Heating circuits"**.
3. Select the heating circuit that is to be operated with the solar excess function.
4. Open the **"HEATING>HEATING CIRCUIT 3/5"** menu using the down arrow navigation button.
5. For swimming pool heating without burner: **"Day temp. time wind. 1"** = 29 °C and **"Low-mode temperature"** = 5 °C.
6. When heating a bath or cellar in a situation in which the burner should also provide auxiliary heat, set the temperatures according to the individual requirements (i. e. normal heating mode is used outside of solar excess times).

0:00 dd.mm.yy		Others - Heating circuits - Heat.circ. 1 1/5	
Day temp. time window 1	− 29°C +	^	
Day temp. time window 2	− 20°C +		
Day temp. time window 3	− 20°C +		
Low-mode temperature	− 5°C +	v	

Setting the time windows

- **Swimming pool heating without burner:** The heating times must be deactivated so that the heating circuit is always in lowering mode. To do so, set the time windows in the heating circuit with the solar overage function to Mon – Sun from 0:00 to 0:00, see → *chapter "Changing heating times", page 21*.
- **Bath/cellar heating with burner:** Set according to the individual requirements, i.e. normal heating mode is used outside of solar overage times.

Decommission the swimming pool

If the swimming pool is decommissioned, make sure that the heat circuit pump is also de-activated (pull out plug), otherwise the heating circuit will begin to operate at temperatures below 5 °C.

8 Troubleshooting

Resetting the display

If the unit cannot be operated, switch it off and then switch it back on after approx. 10 s. If the controller still cannot be operated, you can reset the display:

1. Switch off the system and remove the memory card.
2. Press and hold the “Back” and “Help” buttons at the same time.

3. Switch on the system while pressing and holding down the buttons and continue to hold them until the calibration display appears.
4. Follow the English instructions on the screen.

8.1 WLAN connection error

Error attempting to establish WLAN connection

Display	Cause	Remedy
IP address: none or 0.0.0.0	Password entered incorrectly	Enter the correct password for (your own) local network; to do so, tap “ Network – reset ” and then repeat the connection process (see → chapter “Set up WLAN connection with wizard” on page 16)
	DHCP server deactivated	In the router of (your) local network, activate the DHCP server; for more information, see the manufacturer operating instructions. Then tap “ Network – reset ” and repeat the connection process (see → chapter “Set up WLAN connection with wizard” on page 16)
	MAC filter activated	In the router of (your) local network, go to the WLAN security settings and activate “Permit all new devices” (or similar); for more information, see the manufacturer operating instructions. Then tap “ Network – reset ” and repeat the connection process (see → chapter “Set up WLAN connection with wizard” on page 16)
SSID: not displayed in the list	Incorrect active frequency band	In the router of (your) local network, go to the WLAN wireless network settings and activate the 2.4 GHz frequency band; for more information, see the manufacturer operating instructions. Then tap “ Network – reset ” and repeat the connection process (see → chapter “Set up WLAN connection with wizard” on page 16)

8.2 General errors (systems with heating pumps)

Fault	Cause	Remedy
Water is leaking from the unit.	SolvisLea/SolvisMia/SolvisPia: The condensate drain could be blocked. SolvisLea Eco: The water outlet from the unit is normal, there is no defrosting tray and no pipe to drain off the condensate.	SolvisLea/SolvisMia/SolvisPia only: Call the installer to have the condensation drain cleaned.
Constant, heavy ice formation on the evaporator and the fan	The defrosting process is not carried out correctly	Call the installer to check the correct function of the heating pump components or to adjust the installation conditions.

If the cause cannot be eliminated, contact the installer. For better and faster help, provide the number on the nameplate (SolvisLea: 00000-0000-000000, SolvisMia: 00A000000A). The nameplate is located on the side of the heating pump.

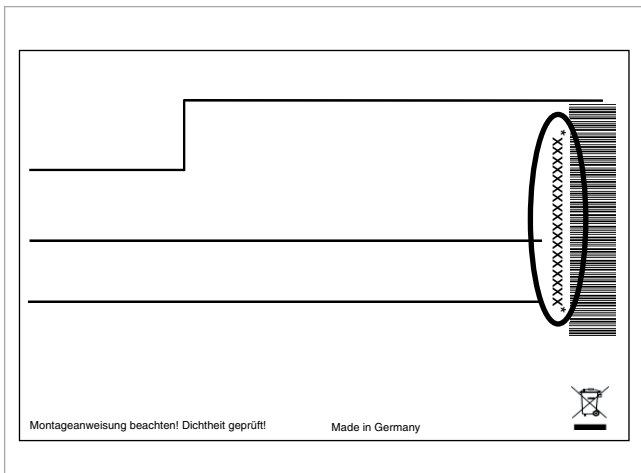


Fig. 27: Number on the nameplate

8.3 Status and warning messages

The operating status is not ideal. Countermeasures will be automatically implemented. Additional measures are not normally required. The status or warning message will disappear once the target status is restored. If it appears several times within a fixed period of time, you must act and unlock the message. Messages that are not re-set are displayed as a flashing warning triangle on a circle with a grey background.

Sensor check

Depending on the initialisation, the sensors required for operation are monitored. If a sensor fails or if there is a short circuit, a message is displayed. Appropriate measures for the sensor that has failed are also implemented in addition to the message.

If there are any active messages, a corresponding icon (a warning triangle in a circle) flashes in the expert main screen ("Heating" menu) instead of the time/date. Active messages can be displayed again by pressing it.

8.3.1 General

Messages for all systems with SC-3

Message	Meaning	Effects/measures
"Storage over-temp."	The "HW buffer temp. (S1)" sensor at the top of the storage tank shows a temperature higher than 95 °C.	The solar pump and heat generator are switched off. They can start up again when the storage tank temperature is below 92 °C.
"Delta-T solar"	Solar circuit function check: The collector sensor is 60 K warmer than the "storage tank reference" for longer than 30 min. while the solar pump is running. This means that the solar heat exchanger is removing very little heat. If this messages occurs several times in a row, the solar circuit may be defective.	The message is issued and an audible signal sounds. The message is reset if the temperature difference drops to below 60 K.
"Solar buffer full"	The maximum temperatures at the storage tank at the top (S1, factory setting 90 °C) or the bottom (S3, 90 °C) have been exceeded.	The solar pump is switched off. It can start up again when the storage tank temperature drops below 87 °C (at S1) or 87 °C (at S3).
"Volume flow too low during defrost."	The volume flow rate during defrosting is less than 7 l/min or the flow temperature is less than 7 °C	Set the charging pump characteristic curve correctly. Heat up the buffer cylinder sufficiently (min. 15 °C).

8 Troubleshooting

8.3.2 Additional messages

SolvisLea and SolvisLea Eco status and warning messages

Message	Meaning	Effects/measures
Antifreeze	Heating pump flow temperature < 5° C or outdoor temperature < 7° C (if there is no HP communication)	The load pump is activated and ensures that the heating pump does not freeze / check the operational readiness of the heating pump
Bus timeout	Bus timeout between the heating pump and SC-3	The heating pump can no longer be read out and controlled. / Check the power supply to the heating pump
10002 Compressor guard jams	Compressor guard jams	Contact installer
10003 Low pressure	The monitor for minimum low pressure was triggered	Refrigerant escaped; expansion valve does not open; fan does not run / Check evaporator for dirt/snow and remove if necessary, otherwise contact the installer
10004 High pressure	The monitor for high pressure has been tripped	Volume flow set too low or temperature too high. Check load pump volume flow, room temperature, heating curve and hot water temperature and reduce if necessary.
10015 Frost protection monitor: defrosting	The frost protection monitor was triggered in defrosting mode	Volume flow is too low during defrosting or storage tank temperature is too low; contact the installer
10027 No power	High pressure does not rise significantly above low pressure after compressor start-up and waiting period	Heating pump connection fuse was tripped / Activate the fuse. / Contact the installer
10028 Refrigerant overheating	Overheating of the refrigerant at the evaporator outlet or compressor inlet below the permitted limit value for too long	Expansion valve not working properly; contact the installer
10029 Refrigerant shortage	Unexpectedly high deviation between the degree of opening of the expansion valve and the pilot control characteristic	Refrigerant leakage; expansion valve not working properly; contact the installer
30009 to 30044 Sensor defective	Sensor value outside the permitted value range	Sensor defective; contact the installer
30055 Communication error: Gateway	Communication between the heating pump and SC-3 could not be established	Once this malfunction message has been sent to the SC-3, the connection has been re-established. If it occurs again, contact the installer

SolvisMia status and warning messages

Message	Meaning	Effects/measures
Antifreeze	Heating pump return temperature < 5°C or outdoor temperature < 7°C (if there is no HP communication)	The load pump is activated and ensures that the heating pump does not freeze / check the operational readiness of the heating pump
Communication interrupted	Bus timeout between the heating pump and SC-3	The heating pump can no longer be read out and controlled. / Check the power supply to the heating pump
SEC not/incorrectly initialised or compressor unit configuration error	The heating pump type is not recognised. The heating pump control (SEC) is probably not/incorrectly initialised.	After you reset the SEC or replace the SEC board with a replacement part with the factory settings, the type may be set to "0" and is then not recognised by the SC-3. To manually set the heating pump type, go to the factory service and select "Heat generator" there. If the type is "unknown", you can define it again using the "Set heating pump type" option.
Low pressure sensor: minimum low pressure fallen below	The monitor for minimum low pressure was triggered	Refrigerant escaped; expansion valve does not open; fan does not run / check evaporator for dirt or snow and remove if necessary
High pressure sensor: maximum high pressure exceeded	The monitor for high pressure has been tripped	Check whether the load pump is switched on (A2) and the PWM output (O-4) is set to "Auto". Check the temperature setpoints and adjust them if necessary.
Hot gas temperature exceeded	The hot gas temperature has exceeded the limit value, the difference between source and sink temperature is too high or the power requirement for the current outside temperature is too high.	Lower the temperature requirement of the heating circuits or the hot water; if necessary, increase the bivalence temperature
Overheating too low [compressor inlet]	Overheating of the refrigerant at the evaporator outlet or compressor inlet below the permitted limit value for too long	Expansion valve not working properly; check
Refrigerant loss	Expansion valve opening angle at 95% for more than 10 minutes	Refrigerant leakage; expansion valve not working properly; check
Sensor error	Temperature sensor or pressure sensor faulty	Sensor defective; check and replace if necessary
Inverter error: Phase loss at the input	Phase loss	Check the fuse, check the voltage on the connection to the building, via the utility supply company if necessary, and check the wiring to the inverter in the heating pump

Status and warning messages, SolvisPia

Message	Meaning	Effects/measures
AL099 Pressure switch has been triggered	Volume flow set too low or temperature too high.	Reset the message; if the error occurs 3 times in 3600s, inform the installation technician
AL107 Overheating too low	Overheating of the refrigerant at the evaporator outlet or compressor inlet below the permitted limit value for too long	Reset the message; if the error occurs 3 times in 3600s, inform the installation technician (expansion valve is not working properly)
AL159 Defrosting/Freeze protection	The frost protection monitor was triggered in defrosting mode	Reset the message; If the error occurs 3 times in 3600s, inform the installation technician (volume flow during defrosting or storage tank temperature too low)
AL166 Pressure switch has been triggered	Volume flow set too low or temperature too high.	Reset the message; if the error occurs 3 times in 3600s, inform the installation technician

8.4 Malfunction messages

The system is not working. To restart it, you have to clear a fault and reset the malfunction message.

SolvisMax/SolvisBen messages

Message	Meaning	Effects	Remedy
"Burner malfunction"	The heat generator was switched off via the automatic firing system.	The message is issued and a signal tone sounds. Only applies to LN-3 gas burners as of November 2015: error codes from the automatic firing system are also issued (see → chapter "Gas burner error codes" on page 46)	Gas/Gas Hybrid and Oil/Oil Hybrid**: unlock the message Otherwise: unlock on the automatic firing systems, e. g. in SÖ-NT; see → the "Unlocking a burner malfunction (not for gas and oil)" on page 48.
"STL1"/"STL2"***	The safety temperature limiter has been triggered.	The heat generator is switched off.	Notify the installer.
"Sensor check"	SolvisBen Solo and SolvisMax only: Connection to sensor S9 interrupted.	Sensor S9 faulty: No temperature display from S9 or Condensate discharge disrupted, reduced burner operation.	If present, check the condensate discharge and consult with the installer if necessary.
"Condensate"	Only SolvisBen Gas/Oil, optionally also SolvisMax Gas/Oil: Condensate pump warning contact triggered	Condensate discharge disrupted, reduced burner operation.	Check the condensate discharge and consult with the installer if necessary.

* Not displayed for on-site boilers.

** For SÖ-BW-2 burners, the Oil Hybrid must be unlocked at the automatic firing system

*** Only for SolvisMax Oil/SolvisBen Oil or, in Switzerland, also for SolvisMax Gas/SolvisBen Gas.

8.4.1 Resetting the mSTB

Unlocking the mSTB

If the electrical heating element fails, the mechanical safety temperature limiter (mSTB) for the electrical

heating element may have been triggered. To unlock the mSTB, proceed as follows:

1. Remove the small, black, rubber cap on the head end of the heating element.
2. Use a thin pen or screw driver to press the button inside it.
3. Refit the rubber cap.

8.4.2 Gas burner error codes

Applies only to SX-LN-3 gas burners with a year of construction of 11/2015 onwards: the automatic firing system's error codes are displayed in SolvisControl on the **SX-LN-3 burner error codes**

second page of the malfunction message. For this purpose, select the navigation button.

Code	Meaning	Code	Meaning
001	Overheating flow	129	Overheating flow, lock-out
004	No flame formation	132	No flame formation, lock-out
005	Flame goes out	133	Flame goes out, lock-out
012	Defective sensor	139	Flame simulation
024	Fan speed not achieved	152	Fan speed not achieved
032	Incorrect mains voltage	154	Implausible fan speed
038	Updating error	158	Invalid parameter
050	Activate burner chip card	159	Invalid parameter
051	Activating burner chip card	162	Cannot read chip card
089	Device error	163	Chip card missing
090	Bus timeout	164	Cannot read chip card
095	Programming mode	165	Incompatible chip card
096	Reset exceeded	167	Cannot activate chip card
099	Internal error	198	Defective relay
227	Internal error	255	No SC-3 – automatic firing system connection

8.4.3 Error codes for the oil burner BW-3

Brief reason	Error	Description	Cause	Action by mechanic
Overheating flow	F1	Safety shutdown temperature exceeded. Automatic firing system blocked, automatic acknowledgement after cooling	Boiler temperature above 105° C eSTB defective or positioned incorrectly	Check reason Fully insert eSTB and check whether it works
	F129	Safety shutdown temperature exceeded. Automatic firing system locked.		
No flame	F4	Burner starts up but no flame is formed during safety period. Another attempt to start burner	Various	See the "Table of malfunctions by symptom"
	F132	Burner starts up but no flame is formed. Automatic firing system locked		
Flame loss	F5	Flame goes out during stabilisation phase or operation. Another attempt to start burner	Various	See the "Table of malfunctions by symptom"
	F133	Flame goes out during stabilisation phase or operation. Automatic firing system locked		
No sensor	F12, F170	eSTB defective, automatic firing system locked		Check/replace eSTB
Fan speed not achieved	F24	Fan speed was not reached in program step 7 or 8.	Faulty blower or automatic firing system	Check/replace cable, plug, blower, automatic firing system
	F152	Fan speed not reached in program steps 3, 4, 9, 10, 11, 12. Automatic firing system locked		
Inadmissible mains voltage	F32	230V voltage supply lies outside the permissible range. Automatic firing system blocked	Mains voltage is not 230 V or automatic firing system is faulty	If it is not possible to acknowledge the error or if it occurs with the normal mains voltage, replace the automatic firing system.
Failure re-update	F38	Error during update. Automatic firing system blocked	Automatic firing system blocked	Power off the burner and then restart it
Product failure	F89	Internal error	Automatic firing system defective	Replace automatic firing system
Bus timeout	F90	Communication between the automatic firing system and SolvisControl disrupted or interrupted. Automatic firing system blocked	Extinguishes automatically if communication is present. Check status LED on the automatic firing system. Illuminated green: Voltage supply and communication present. Flashing green: Voltage supply present but no communication. Not illuminated: no voltage at the automatic firing system.	
	F255	Communication between the automatic firing system and SolvisControl disrupted or interrupted.	Check BUS communication cable and initialisation	
Programming mode	F95	Programming mode active	Wait	
Reset exceeded	F96	Remote unlock error: more than 5 remote unlocks in 15 min. Remote unlock is deactivated.	Power off the automatic firing system and unlock the malfunction if necessary	
Flame simulation	F139	Stray light/flame detected when there is no flame. A flame signal was registered before the burner was started. Automatic firing system locked	Various	See the "Table of malfunctions by symptom"
Oil preheater timeout	F143	Oil preheater timeout	Faulty oil preheater or automatic firing system	Check/replace cable, oil preheater, automatic firing system
Defective relay	F148	Defective relay	Defective relay	Replace automatic firing system
Implausible fan speed	F154	Fan speed not reached in downtime	Faulty blower or automatic firing system	Check/replace cable, plug, blower, automatic firing system
Parameter CRC error	F158, F59	Invalid EEPROM parameter for CM4 settings.	Automatic firing system defective	Replace chip card or automatic firing system
Reset exceeded	F96	Too many modifications in the 0 to 1 Chipcom K1 mode bit 7 address (remote reset) within a certain period (15 min). Remote unlock deactivated.	Automatic firing system blocked	Power off the automatic firing system, unlock the error message in message logging by pressing "start" next to "Unlock burner malfunction" in the menu "Installer" → "Messages" → "Heat generator" and replace the automatic firing system
Internal error	F99, F216, F227	Internal electronic error, automatic firing system locked	Automatic firing system defective	
CRC failure BBC	F162, F164	The internal data of the EEPROM or the chip card is not correct. Automatic firing system locked	Cannot read chip card	Replace chip card, reset automatic firing system
Burner chip card missing	F163	The activated burner chip card is no longer inserted in the automatic firing system. Automatic firing system locked	Chip card missing	Insert chip card, reset automatic firing system
Burner chip card incompatible	F165	Firmware for burner chip card and automatic firing system are not compatible. Automatic firing system locked	Incorrect chip card	Replace chip card, reset automatic firing system
BCC system failure	F167	Error while activating the burner chip card	Automatic firing system locked	Power off the burner and reinsert the BCC. Perform a reset after the restart

8.4.4 Unlocking a burner malfunction (not for gas and oil)

If a burner malfunction occurs with the **SolvisLino** or with **on-site heat generators**, you must reset the automatic firing system on the burner before you can unlock the message.



The way to reset the burner control system in the case of the **SolvisLino** or **heat generators provided by the customers** is described in the respective **→ *heat generator operating instructions***. Please contact the relevant manufacturer.

8.4.5 Additional SolvisLea messages

SolvisLea and SolvisLea Eco messages

Message	Meaning	Effects/measures
50002 Actuator defective: Contactor stuck	SolvisLea 11 kW and 14 kW only. Multiple occurrences of message number X- 0002 have caused the heating pump to lock	Contact installer
50003 Monitor: Low pressure	Multiple occurrences of message number X-0003 have caused the heating pump to lock	Rectify the cause and reset the system
50004 Monitor: High pressure	Multiple occurrences of message number X- 0004 have caused the heating pump to lock	Rectify the cause and reset the system
50006 Monitor: Medium pressure	Multiple occurrences of message number X-0006 have caused the heating pump to lock	Contact installer
50013 Monitor: min. low pressure	Multiple occurrences of message number X- 0013 have caused the heating pump to lock	Contact installer
50015 Frost protection monitor: defrosting	Multiple occurrences of message number X- 0015 have caused the heating pump to lock	Contact installer
50026 Sensor defective: Low pressure sensor	Sensor value of the low pressure sensor is outside the permitted value range	Contact installer
50027 No power	Multiple occurrences of message number X-0027 have caused the heating pump to lock	Contact installer
50028 Refrigerant over-heating	Multiple occurrences of message number X- 0028 have caused the heating pump to lock	Contact installer
50029 Refrigerant shortage	Multiple occurrences of message number X- 0029 have caused the heating pump to lock	Contact installer
50034 Min. volume flow	Multiple occurrences of message number X- 0034 have caused the heating pump to lock	Contact installer
50047 Monitor: LP defrosting	Multiple occurrences of message number X- 0047 have caused the heating pump to lock	Contact installer
50048 Monitor: LP cooling	Multiple occurrences of message number X- 0048 have caused the heating pump to lock	Contact installer

8.4.6 Additional SolvisMia messages

Malfunctions on the heating pump aggregate

System/malfunction message	Possible cause	Note/remedy
No communication	Modbus connection is interrupted, the heating pump fuse is deactivated or there is a phase loss (L1)	Check the Modbus connection, check the heating pump fuse and check the sliding switch position on the SEC
High pressure sensor: maximum high pressure exceeded	Load pump volume flow is too low	Contact installer
Sensor error: e.g. temperature sensor	Connection between SEC and sensor is defective	Check the line for the relevant sensor; replace the sensor if necessary
Inverter error: Phase loss at the input	Phase loss	Check the fuse, check the voltage on the connection to the building, via the utility supply company if necessary, and check the wiring to the inverter in the heating pump
Compressor unit configuration error	Incorrect compressor unit or no compressor unit specified in the SEC	Contact installer
No reaction from heating pump after switching on, but values visible in system status	Blocking time of the energy supplier active	Check under "Others" => "System diagram" and wait until the blocking time has elapsed if necessary.
Loud hissing at the expansion valve	Lack of refrigerant in cold circuit	Please contact Solvis customer service.
	No supercooling of the refrigerant	
	Defective expansion valve	
Iced pressure compensation or iced expansion valve	Lack of refrigerant in cold circuit	Check the grid and/or evaporator fins and clean if necessary.
	Air supply impaired	
Frequent and long defrosting	Wind cools the evaporator too much during the defrosting phase	Protect the intake side of the heating pump from strong wind via a protective wall when installed in the open.

8.4.7 Additional messages, SolvisPia

Malfunctions on the heating pump aggregate

System/malfunction message	Possible cause	Note/remedy
AL007 Outdoor temperature sensor defective (B3)		Contact installer
AL019 Frost protection in heating mode	The system stands still for longer in cold temperatures	Contact installer
AL028 Evaporator exhaust air sensor defective (B6)		Contact installer
AL035 Volume flow too low	Volume flow below 3.0 l/min	Contact installer
AL036 Alsonic volume flow sensor offline		Contact installer
AL037 Gas bubbles in the charging circuit		Contact installer
AL040 Evaporator outlet sensor defective (B4)		Contact installer
AL041 Defective plate heat exchanger inlet sensor (B5)		Contact installer
AL042 System pressure in charging circuit too high - propane leak - no emergency operation!		Contact installer
AL092 Defrosting not completed successfully		Contact installer
AL093 High pressure sensor defective		Contact installer
AL094 Low pressure sensor defective		Contact installer
AL095 Hot gas sensor defective (B1)		Contact installer
AL096 Suction gas sensor defective (B2)		Contact installer
AL098 SOA Compression ratio too low		Check the set room temperature or heating curve
AL099 SOA High pressure	<ul style="list-style-type: none"> • Missing heat emission • Heat sink too hot • Expansion valves are not working correctly 	Contact installer

8 Troubleshooting

Malfunctions on the heating pump aggregate (continued)

System/malfunction message	Possible cause	Note/remedy
AL102 SOA Compression ratio too low	Ratio between outdoor temperature and flow temperature requirement too low (e.g. in the transition period)	Contact installer
AL104 SOA High pressure does not rise significantly above low pressure	Defrost was triggered too late	Contact installer
AL105 SOA low pressure	<ul style="list-style-type: none"> Refrigerant leaked out Expansion valve does not open Fan does not rotate Outdoor temperature too low 	Contact installer
AL106 SOA hot gas	<ul style="list-style-type: none"> Expansion valve not working properly Refrigerant leakage 	Contact installer
AL107 Superheat too low	Expansion valve not working properly	Contact installer
AL108 Evaporating temperature too low (LOP)	Expansion valve not working properly	Contact installer
AL111 Suction gas temperature too low		Contact installer
AL122 Inverter: no communication	<ul style="list-style-type: none"> Power supply to the inverter interrupted Data connection to the inverter interrupted 	<ul style="list-style-type: none"> Check the power supply Check blocking time circuit
AL123 Inverter overcurrent	Current limit value exceeded (18 A)	Contact installer
AL125 DC bus overvoltage	Voltage in the intermediate circuit above the permitted limit	Contact installer
AL126 DC bus undervoltage	Voltage in the DC bus below the permitted limit	Contact installer
AL151 High pressure switch has tripped	<ul style="list-style-type: none"> Lack of heat dissipation Heat sink too hot Expansion valves not working correctly Pressure switch defective 	Contact installer
AL159 Defrost freeze protection	Expansion or changeover valve not working properly	Contact installer
AL172 High pressure switch has tripped	<ul style="list-style-type: none"> Missing heat dissipation Heat sink too hot Expansion valves not working correctly 	Contact installer
AL173 Low pressure switch has triggered	<ul style="list-style-type: none"> Refrigerant has leaked Expansion valve does not open Fan does not rotate 	Contact installer
AL400 Fan: no communication	<ul style="list-style-type: none"> Power supply to the fan interrupted Data connection to the fan interrupted 	Contact installer
AL402 Fan: Motor blocked		Contact installer

8.5 Malfunctions with heating and hot water

If the hot water and/or flow temperature are too cold, always check first whether the time and date are set correctly in the controller. Then check the time programs, as the heating circuit, drinking water heating or circulation may be not be within the time window.

Fault table

Problem	Cause	Remedy
The room temperature is too cold.	The controller is switched off or is in "Standby" or night mode.	Switch on the main switch on the control console. Switch on the heating emergency switch. Check the main fuse for the heating system.
	"BURNER FAULT" malfunction message	SolvisBen Gas: unlock the message. SolvisBen Oil / external heat generator: unlock the malfunction on the burner.
	The radiator is not warm enough.	The burner may currently be in hot water priority, i.e. the hot water buffer has priority and is being charged due to a high demand for hot water; see → "Querying the status", "Heating circuits" section, p.30. Open the radiator valve further.**
	The room temperature cannot be set using the radiator valve.	Increase the target room temperature in the time program of the heating circuit*; see → "Changing the target room and low-mode temperatures", "Heating circuits" section, p. 30. Change the slope, if necessary* (see the table on the next page).
The room temperature is too warm.	The radiator is too warm.	Close the radiator valve further.**
	All rooms are overheated or the reference room is too warm.**	Reduce the target room temperature in the time program of the heating circuit*; see → "Changing the target room and low-mode temperatures", "Heating circuits" section, p. 30. Change the slope, if necessary* (see the table on the next page). Notify the installer if you cannot resolve the problem.
The reference room is always too warm or too cold.**	The heating curve is set incorrectly.	You need to set another heating curve (see the table on the next page).
Hot water temperature is too low although the storage tank is warm.	T.WW.NOM is set too low.	Set T.WW.NOM; see → section "Setting the hot water temperature", p.23.
	Air in the storage tank.	Bleed the storage tank (notify installer).

* Each time that the system controller is reset, wait one or two days before making more changes. As a result of physical conditions, changes to the parameters in the control system can often cause fluctuations of the control value (room temperature), which, depending on the existing conditions, can reach a constant value relatively quickly.

** To improve the energy efficiency of your heating system, always ensure that the system is hydraulically balanced: first of all, open all the heating valves fully. The heating valves in the reference room with the temperature sensor (room controller) must always remain fully opened. If all rooms are equally too warm or too cold, change the heating curve on the system controller accordingly. If, on the other hand, the reference room has the proper temperature and the other rooms are too warm, close the heating valves in those rooms further. If it is still too cold in one of the rooms despite having fully opened the heating valves, we recommend that you move the room controller into this room (new reference room).

8 Troubleshooting

Adjusting the heating curve

The SolvisControl heating curves are displayed in the → Figure "Heating curves for various target room temperatures".

Example:

The target room temperature is set to 20 °C, and the slope is set to 1.0. For an outdoor temperature of 10 °C, the flow temperature is controlled to 32 °C and for an outdoor temperature of -10 °C it is controlled to 48 °C.

The heating curve can be set exactly using the rules in the table. To save energy, corrections should only be made in small steps.



All corrections require a certain amount of time to take effect. For this reason, wait at least one day before making any further adjustments.

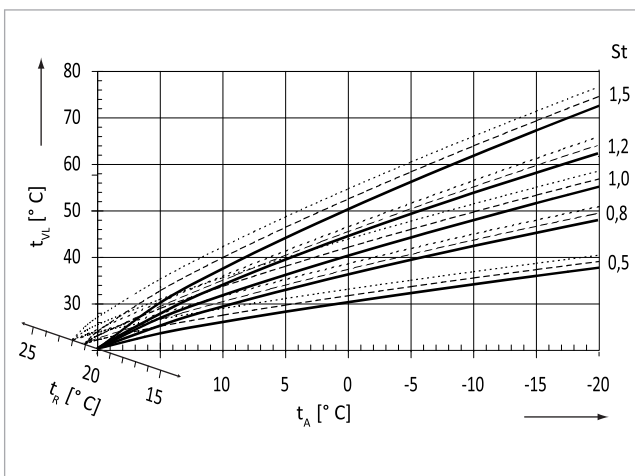


Fig. 28: Heating curves for various target room temperatures

St	Slope of the heating curve
t _A	Outdoor temperature [°C]
t _R	Target room temperature [°C]
t _{VL}	Flow target temperature [°C]
Heating curve	For target room temperature
—	20 °C
- - - - -	21 °C
.....	22 °C

Correcting the heating curve

Problem	Solution
All rooms are overheated regardless of the outdoor temperature.*	Reduce the target room temperature (see → "Changing the target room and low-mode temperatures" in "Heating circuits" on page 30).
The room temperature is too low regardless of the outdoor temperature.*	Increase the target room temperature.
The room temperature is too low in winter, but adequate in autumn and spring.	Increase the "slope" (see → "What is a heating curve?" in "Heating circuits" on page 30)
The room temperature is adequate in winter, but too low in autumn and spring.	Increase the target room temperature in the heating times program and reduce the "slope".**
The room temperature is adequate in winter, but too high in autumn and spring.	Reduce the target room temperature in the heating times program and increase the "slope".**
The room temperature is too high in winter, but adequate in autumn and spring.	Reduce the "slope".

* First of all, open all the heating valves fully. Then make adjustments to the room temperature by setting the heat curve. Only if one or more rooms have an adequate temperature and the other rooms are too warm do you have to close the heating valves there further. If it is too cold in a room, open the heating valves there before you change the heating curve.

** Set the target room temperature so that the temperature difference is compensated. Finally, change the slope by 0.05 per 2 °C temperature difference in the opposite direction. **Example:** The room temperature is approx. 4 °C too low in autumn and spring, but adequate in winter. You must increase the target room temperature in the heating time programs by this amount and reduce the slope by 0.1.

Notes on setting the heating curve

Recommended WP settings	Designation	Setting value Factory setting	Recommended setting value Heat pump monoenergetic	Recommended setting value Heat pump hybrid	Value set?
	Heating curve radiator	1.2	1.0	1.0	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Heating curve FBH	0.8	0.5	0.5	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Bivalence temperature hot water	0 °C	-	*	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Bivalence temperature Heating	-8 °C	-	**	<input type="checkbox"/> Yes <input type="checkbox"/> No
	Heating times (RT)	06:00 - 22:00	06:00 - 08:00 (21 °C), 08:00 - 16:00 (20 °C), 16:00 - 22:00 (21 °C)	06:00 - 08:00 (21 °C), 08:00 - 16:00 (20 °C), 16:00 - 22:00 (21 °C)	<input type="checkbox"/> Yes <input type="checkbox"/> No

* according to technical application limits, as well as ecological or economic criteria / ** according to design, e.g. Solvis design tool

9 Maintenance and Care

9.1 Maintenance interval

Maintenance and cleaning work must be performed once a year in accordance with German Energy Conservation Regulations (EnEV) and to maintain warranty claims.



Work to be performed by qualified technicians

- Only trained specialist companies may install or maintain the system.
- Only qualified electricians may work on electrical equipment.



The required maintenance work is described in the → *installation instructions of the respective Solvis system.*

9.2 General care



CAUTION

Avoid contaminants

- Water, oil, grease, solvent, dust, foreign bodies, aggressive vapours and other contaminants must be kept away from the system and the units.
- Cover the system and the units when performing construction or other work in the area to protect them from dirt and contaminants.



CAUTION

Handle the system surfaces carefully.

Cleaners can damage the surface.

- Do not use caustic or solvent-based cleaners to clean the outer cover.
- Remove dirt with a soft, damp cloth.

You should clean the operator interface now and then with a damp cloth (do not use any cleaning agents).

9.3 Switching the heat generator on and off

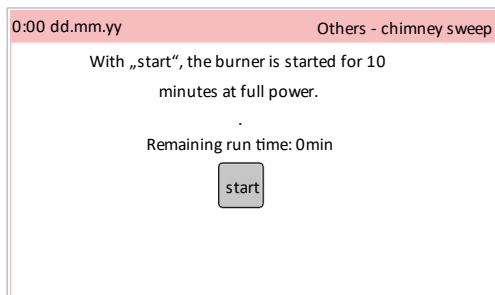
SolvisBen/SolvisMax Gas/Oil only

Starting the burner

1. Select the “Other” main menu.
2. Select “Chimney sweep”.
3. Select “Start”.

The burner starts, the display changes to “Stop” and the remaining run time is displayed.

4. Select “Stop” to switch off the burner earlier.



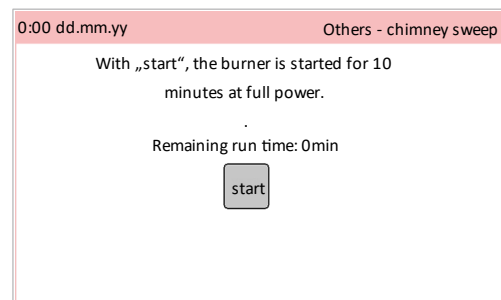
SolvisBen/SolvisMax Gas Hybrid / Oil Hybrid only

Starting the burner

1. Select the “Other” main menu.
2. Select “Advanced functions”.
3. Select “Chimney sweep”.
4. Select “Start”.

The burner starts, the display changes to “Stop” and the remaining run time is displayed.

5. Select “Stop” to switch off the burner earlier.



Exhaust gas measurements can only be completed with a cold storage tank and simultaneous heat requirement; if necessary, request a chimney sweep in good time during the heating period. When solar thermal collectors are available, there is an increasing risk that the storage tank could heat up strongly during the summer months.

SolvisBen / SolvisMax with heating pump only

Only the installer can manually switch the heating pump system on and off. If there is a heating requirement, the heating pump starts automatically. Please press the main switch if the heating pump should be switched off.

If hot water is required outside the hot water production times, the heating pump can be started up using the auxiliary heating function. See → *section “Auxiliary hot water heating button”, page 25.*

10 Decommissioning

Dismantle and dispose of the system

Consult the specialised dealer responsible or us regarding proper decommissioning, disassembly and disposal of the system. All Solvis components sent back to our factory at no cost to us will be disposed of according to regulations at no cost to you.

Disposal of materials

Collect and properly dispose of solar fluid or brine fluid (Tyfocor) that results from draining the solar system. You can send it to hazardous waste depots or to us, if you arrange for the Tyfocor to be delivered to our factory at no cost to us.

Follow the product's technical information and disposal instructions or consult your responsible specialised dealer or us.

Information about ElektroG

As per the regulations of the Electrical and Electronic Equipment Act (ElektroG), we are obliged to take back electrical and electronic equipment supplied by us and to reuse or dispose of it. We must also provide the following information:



Electrical and electronic equipment must not be disposed of with household waste! This is indicated by a waste bin symbol that is crossed out on a black bar. If the device can no longer be used, every end user is obliged to dispose of old devices separately from domestic waste, e.g. at a collection point in his or her local municipality/district. This ensures that the old equipment is recycled professionally and that negative effects on the environment are avoided.

In order to fulfil our disposal and reuse obligations, we belong to a comprehensive disposal system. Our registration number with the National Register for Waste Electric Equipment ("Stiftung Elektro-Altgeräte-Register") is: WEEE reg. no.: DE 63776771.

11 Appendix

Time programs overview

Time program for heating

Settings	Time window	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
		from	until	from	until	from	until	from	until	from	until	from	until	from	until
Factory Heating circuit 1–3	1	06:30	22:30	06:30	22:30	06:30	22:30	06:30	22:30	06:30	22:30	07:30	23:45	07:30	23:45
	2 + 3	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
User, heating circuit 1	1														
	2														
	3														
User, heating circuit 2	1														
	2														
	3														
User, heating circuit 3	1														
	2														
	3														

Hot water time program

Settings	Time window	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
		from	until	from	until	from	until	from	until	from	until	from	until	from	until
Factory	1	06:00	22:00	06:00	22:00	06:00	22:00	06:00	22:00	06:00	22:00	07:00	22:00	07:00	22:00
	2 + 3	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
User	1														
	2														
	3														

Circulation time program

Settings	Time window	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
		from	until	from	until	from	until	from	until	from	until	from	until	from	until
Factory	1	06:00	08:00	06:00	08:00	06:00	08:00	06:00	08:00	06:00	08:00	06:00	08:00	06:00	08:00
	2	12:00	13:00	12:00	13:00	12:00	13:00	12:00	13:00	12:00	13:00	12:00	13:00	12:00	13:00
	3	17:00	20:00	17:00	20:00	17:00	20:00	17:00	20:00	17:00	20:00	17:00	20:00	17:00	20:00
User	1														
	2														
	3														

Time program for ECO function

Settings	Time window	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
		from	until	from	until	from	until	from	until	from	until	from	until	from	until
Factory	1	08:00	16:00	08:00	16:00	08:00	16:00	08:00	16:00	08:00	16:00	08:00	16:00	08:00	16:00
	2 + 3	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
User	1														
	2														
	3														

Time program for Silent mode

Settings	Time window	Monday		Tuesday		Wednesday		Thursday		Friday		Saturday		Sunday	
		from	until	from	until	from	until	from	until	from	until	from	until	from	until
Factory	1	22:00	06:00	22:00	06:00	22:00	06:00	22:00	06:00	22:00	06:00	22:00	06:00	22:00	06:00
	2 + 3	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
User	1														
	2														
	3														

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SOLVIS GmbH
Grottrian-Steinweg-Straße 12
D-38112 Braunschweig
Phone: +49 (0) 531 28904-0
E-mail: info@solvis.de
Internet: www.solvis.com

