

For the operator

Instructions for use



auroFLOW plus

Solar system

EXPen

Publisher/manufacturer

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1 Safety

1.1 Action-related warnings

Classification of action-related warnings

The action-related warnings are classified in accordance with the severity of the possible danger using the following warning signs and signal words:

Warning symbols and signal words



Danger!

Imminent danger to life or risk of severe personal injury



Danger!

Risk of death from electric shock



Warning.

Risk of minor personal injury



Caution.

Risk of material or environmental damage

1.2 General safety information

1.2.1 Installation by competent persons only

Only an approved competent person is permitted to carry out installation, inspection, maintenance and repair work on the product.

1.2.2 Danger due to incorrect handling

- ▶ Read through these instructions carefully.
- ▶ Observe the general safety information and warnings for all tasks that involve the Vaillant product.
- ▶ Perform all tasks only as described in this manual.

1.2.3 Risk of burns from components through which solar fluid flows and heating water pipes

In solar mode, components through which solar fluid flows, such as collectors and solar lines, as well as the heating water pipes, reach extremely high temperatures. Touching these components may result in serious personal injury.

- ▶ Only touch these components if you have first checked the temperature.

1.2.4 Danger due to changes in the product environment

There is a risk of injury or death to the operator or others, or of damage to the product and other property, in the event of changes to the product environment. Changes must not be made to the following:

- the product,
 - the product environment,
 - the solar fluid, heating water and power supply lines,
 - the discharge line and the collecting container for the solar fluid,
 - the drain line and expansion relief valve for the heating water,
 - the structural conditions that may affect the operational safety of the product.
- ▶ Never shut down the safety devices.
 - ▶ Do not tamper with any of the safety devices.

1.2.5 Structural damage due to escaping water

Escaping water can cause damage to the building.

- ▶ If there is a possibility of leaks in the pipework, close the service valves immediately.
- ▶ Have any leaks remedied by a heating specialist company.

1.3 CE label



The CE label shows that the products comply with the basic requirements of the applicable guidelines as stated on the identification plate.

1.4 Intended use

There is a risk of injury or death to the user or others, or of damage to the product and other property in the event of improper use or use for which it is not intended.

The product is designed for use in solar systems. The Vaillant solar system is used for solar heating support or hot water generation. The product must only be operated in the solar circuit with Vaillant ready-mixed solar fluid. The product has been specially

1 Safety

developed for the Vaillant solar collectors **auroTHERM** (VFK 135 VD and VFK 140 VD). The components in the solar circuit have been developed for use with Vaillant solar fluid.

Intended use includes the following:

- observing the included operating, installation and servicing instructions for the Vaillant product and any other system components
- compliance with all inspection and maintenance conditions listed in the instructions.

This product can be used by children over eight years old and also by persons with limited physical, sensory or mental capabilities or insufficient experience and/or knowledge if they are supervised or have been provided with instructions on how to safely use the product, and they understand the risks resulting from using the product. Children must not play with the product. Cleaning and user maintenance work must not be carried out by children unless they are supervised.

The use of the product in vehicles, such as mobile homes and caravans, is not classed as intended use. Units that are not classed as vehicles are those that are installed in a fixed and permanent location (known as "fixed installation").

Installing and using the product in locations where there is a risk of exposure to damp or splashed water constitutes improper use.

Any other use that is not specified in these instructions, or use beyond that specified in this document shall be considered improper use. Any direct commercial or industrial use is also deemed to be improper.

Caution.

Improper use of any kind is prohibited.

2 Notes on the documentation

2.1 Original instructions for use

These instructions are the original instructions for use within the context of the machine directive.

2.2 Observing other applicable documents

- ▶ You must observe all operating instructions enclosed with the system components.

2.3 Storing documents

- ▶ Keep this manual and all other applicable documents safe for future use.

2.4 Applicability of the instructions

These instructions apply for the following only:

Product types and article numbers

VPM 15 D basic module	0020133195
Expansion module	0020133196
VPM 15 D basic module, country-specific	0010013154
VPM 30 D basic module with expansion module, country-specific	0010013164

The 10-digit article number of the product is the seventh to sixteenth number of the serial number.

The article number can also be found on the identification plate, which is fitted in the factory on the underside of the product.

3 System

3.1 System characteristics

3.1.1 Basic principles of the system

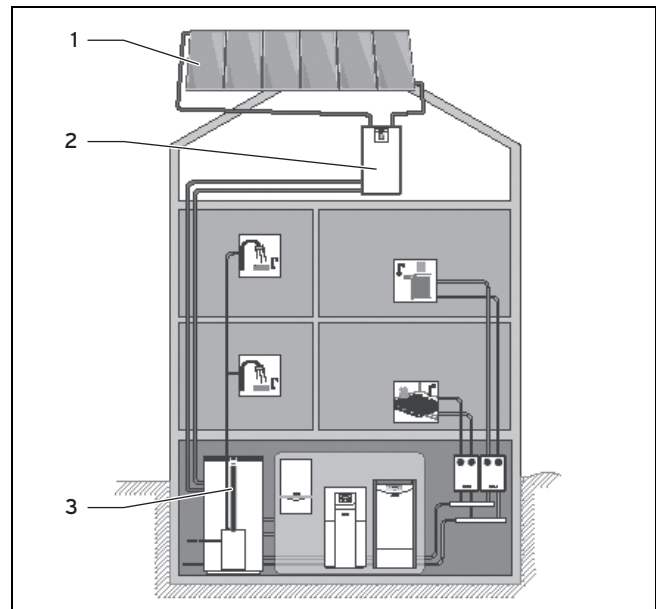
The **auroFLOW plus** solar system acts as a heat generator in a hot water heating installation with a cylinder. In order to cover the basic load and potential peak loads of the heat demand, various heat generators are used in solar-supported heating installations, e.g. heat pumps, block heating and generating plants and gas boilers. The hot water generation can be combined with the cylinder.

The **auroFLOW plus** solar system comprises:

- Collector field
- **auroFLOW plus** solar charging system
- Cylinder
- Solar lines
- Heating water pipes

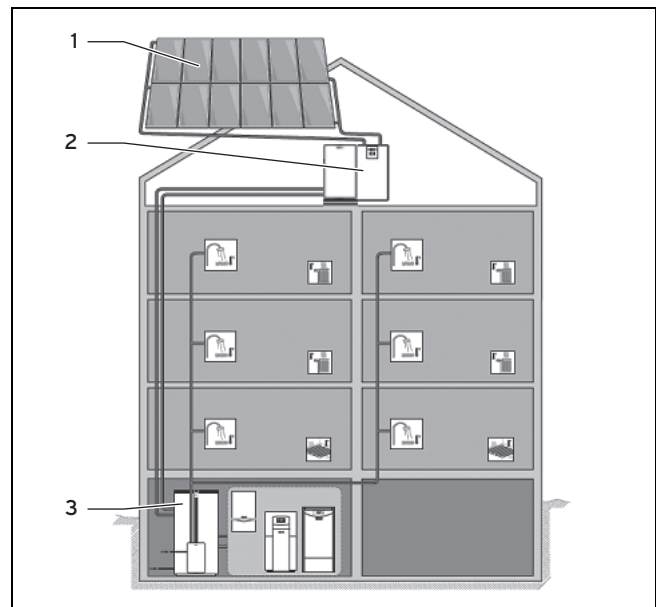
In addition, a system controller can be used to control all components of the heating installation, e.g. the **auroMATIC VRS 620**.

3.1.2 Design of coordinated system examples



- | | |
|--|-------------------------------------|
| 1 Collector field with maximum six collectors (VFK 135 VD or VFK 140 VD) | 2 auroFLOW plus basic module |
| | 3 Cylinder |

A typical example for the use of the basic module of the **auroFLOW plus** solar charging system is solar-supported heating in a single-occupancy house. Cylinder cascades and swimming pool heating are possible.



- | | |
|---|--|
| 1 Collector field with maximum 12 collectors (VFK 135 VD or VFK 140 VD) | 2 Basic module and expansion module auroFLOW plus |
| | 3 Cylinder |

A typical example for the use of the basic module and expansion module of the **auroFLOW plus** solar charging system is solar-supported production of hot water in multiple-occupancy houses. Cylinder cascades and swimming pool heating are possible.

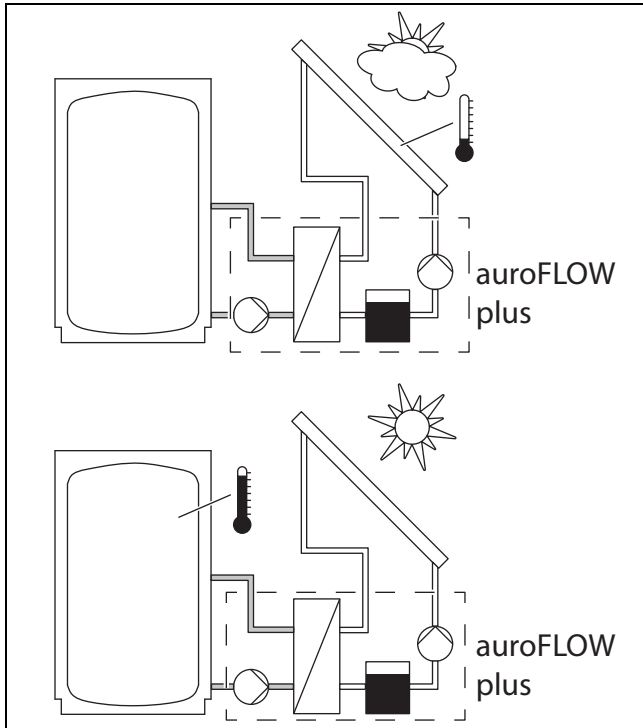
For even larger applications, up to four solar charging systems (basic module and expansion module) can be cas-

3 System

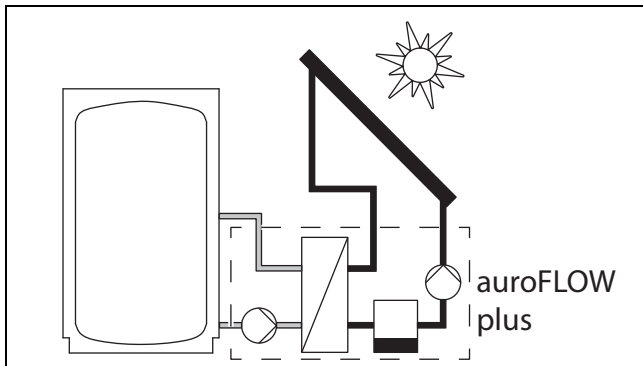
caded. The collector field can then be made up of up to 48 collectors.

3.1.3 Functionality

The way the **auroFLOW plus** solar system operates is different to many other solar systems. The **auroFLOW plus** solar system is not completely filled with solar fluid and it is not under pressure. For this reason, some of the otherwise standard components for solar systems, such as the expansion vessel, pressure gauge and air vent, are not fitted.



When the solar pump is idle, the solar fluid is collected in the storage tank. The collector field and all solar lines are installed with downward gradients, to ensure that the solar fluid flows back to the solar charger. The solar lines and the collector field are then filled with air. The solar fluid is a special ready-mixed water/glycol fluid that is added to the solar system during installation by the competent person.

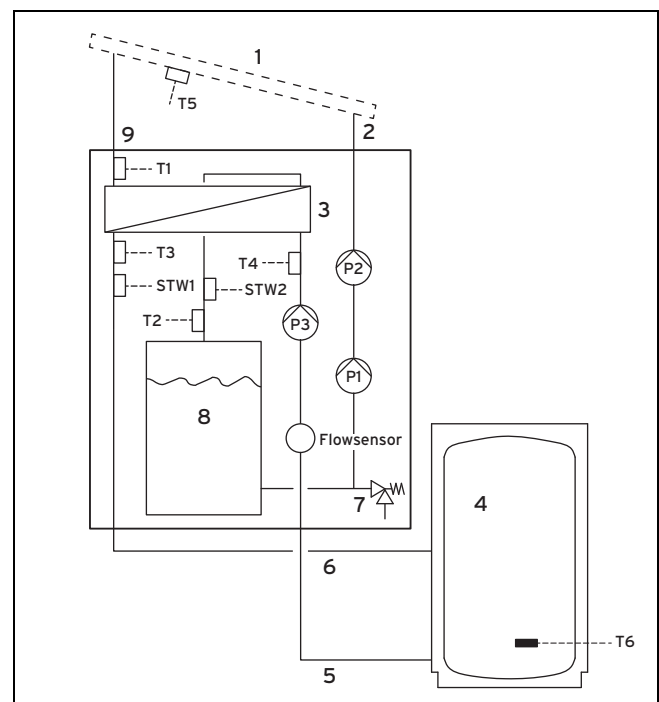


When the solar control activates the solar pump, the solar pump pumps the solar fluid from the storage tank through the solar return and into the collector field. The solar fluid is heated at this point, before flowing back to the solar charger via the solar flow pipe.

- When the solar pump is idle, there is air in the collectors and solar lines. Frost protection measures are therefore only required for the installation site of the solar charger.

- The collector field and solar lines, and especially the downward gradient of the lines, must be installed as specified to ensure that the solar system functions correctly.
- The fluid capacity of the collector field and the solar lines is precisely designed with the solar system in mind.
 - The minimum length and the maximum length of the solar lines must be observed
 - All solar lines have defined diameters in relation to the number of collectors
 - The use of corrugated hoses impairs the functionality of the solar system
 - The design and number of collectors must not be changed
- The physical properties of the solar fluid are also an important contributing factor to the fault-free operation of the system. Therefore, only original Vaillant solar fluid without additives may be added to the system.

3.1.4 Product function



The way the basic module of the solar charger operates is described below.

If the expansion module is also installed,

- the solar fluid volume is doubled by a separate storage tank connected in parallel
- the pump output is higher as a result of two solar pumps connected in series

The way the solar charging system operates remains the same, however.

When the solar pump is idle, only the storage tank (8) contains solar fluid. The collectors (1) and solar lines (2) and (9) are then filled with air.

The solar control in the solar charger activates the solar pump whenever

- the temperature difference between the collector temperature sensor (T5) and cylinder temperature sensor (T6) is at least 15 K (if a system controller is connected, the cyl-

inder temperature is transmitted to the solar control via the eBUS line)

- the cylinder temperature is lower than the set maximum cylinder temperature
- the anti-cycling time of ten minutes after the last cylinder charging has expired
- the safety temperature limit of 110 °C in the solar circuit is not exceeded (**STW2**)
- the safety temperature limit in the buffer circuit (**4**) is not exceeded (**STW1**)
- the temperature has fallen by at least 15 K following activation of a safety cut-out
- there are no faults (e.g. sensor faults, activated safety temperature monitor)
- activation of the solar pump is enabled (only if a system controller is connected)

The solar control in the solar charging system deactivates the solar pump whenever

- the maximum cylinder temperature is reached
- current solar radiation is < 250 W
- there is a fault, see fault messages (→ Page 10)

Every time the solar pump is switched on, a filling phase is started. The solar pump (**P1**) and/or (**P2**) is now working at maximum power and pumps the solar fluid via the solar return (**2**) into the collector field. The solar fluid then forces the air out of the solar return and the collector field into the solar flow pipe and the storage tank.

In the collector field, the solar fluid is heated up, some of which can then evaporate. The vapour mixes with the air that is still present.

The continued flow of the solar fluid is supported by the downward gradient of the solar flow pipe (**9**). The air and solar fluid mixture passes through the solar flow pipe to the heat exchanger (**3**) in the solar charger. The heat exchanger transfers the heat energy of the solar fluid to the heating water in the cylinder charging circuit. After a specified filling time, the solar control reduces the output of the solar pump. The filling phase is then completed.

While filling: If (**T1**) measures a temperature > 50 °C and > activation temperature (default setting: 15 K), the solar control activates the cylinder charging pump (**P3**) in the solar charging system.

After filling: If (**T1**) is at least 4 K higher than the cylinder temperature, the product changes to cylinder charging mode and switches the (**P3**) cylinder charging pump on.

The heating water circulates through this pump from the heat exchanger to the cylinder.

The temperature sensors (**T3**) and (**T4**) in the flow (**5**) and return (**6**) of the cylinder charging circuit as well as a (**Flow-sensor**) flow sensor enable the solar control to measure the solar yield.

The solar fluid flows back from the heat exchanger into the storage tank. The tank volume dimensions are such that the air bubbles from the solar fluid are separated out before the solar fluid is pumped further by the solar pump.

When the solar system heats up, the solar fluid and the air expand. The pressure of the air enclosed in the solar system increases slightly as a result. The enclosed air in the system therefore fulfils the role of an expansion vessel. The increased pressure is necessary and must not be discharged

in any way. For this reason, an air vent must not be fitted in the solar system.

If there is a fault, an expansion relief valve (**7**) protects the solar plant from prohibited overpressure.

3.2 Control functions of the system

With the help of the solar control that is integrated into the solar charging system, the solar charging system can charge a cylinder. Whether or not the cylinder is charged depends on the cylinder temperature and the current solar radiation.

If coordination with other heat generators of the heating installation is required, a system controller is needed.

3.2.1 Range of available functions for the integrated controller

The **auroFLOW plus** solar system is regulated by the integrated, microprocessor-controlled solar control.

3.2.1.1 Differential temperature control system

The solar control works according to the differential temperature control principle. When the temperature difference (temperature of collector - temperature of cylinder) is greater than the switch-on differential, the solar control switches on the solar pump. The internal sensors in the solar charger determine the power through the collector field. When power is no longer available from the collector field, the solar control switches off the solar pump.

3.2.1.2 Annual calendar

The solar control is fitted with an annual calendar that enables automatic adjustment between summer and winter time. During installation, the competent person enters the current date to activate the annual calendar.



Note

Note that, in the event of a power failure, the solar control is equipped with a reserve power supply of 30 minutes. The internal clock stops after 30 minutes. The calendar does not continue running once the voltage supply is restored. In this instance, the time must be reset. Check the current date.



Note

If a system controller is connected, it is not necessary to set the date, time or summer time.

3.2.2 Combination with system controller

The product can be combined with the **auroMATIC VRS 620/3** system controller or the controller for the **geoTHERM** heat pumps.

If you combine the product with the **auroMATIC VRS 620/3** system controller, we recommend that you install a **VPM ..1/2 W** drinking water station.

4 Operation

4 Operation

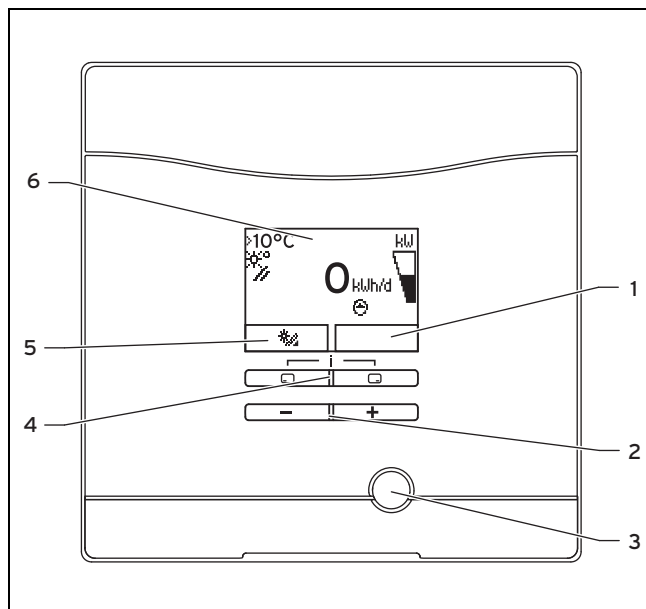
4.1 Digital Information and Analysis System (DIA)

The product is equipped with a digital information and analysis system (DIA system). The DIA system consists of a display that shows symbols and plain text, along with 5 operating buttons. The DIA system provides information on the operating condition of the product and helps you deal with problems.

The display lights up when one of the DIA system buttons is pressed. At first, pressing the button does not trigger any other function.

The light automatically switches off after one minute if no further buttons are pressed.

Operator control element for the DIA system (Digital Information and Analysis System)



- | | |
|--|--|
| 1 Display of the current assignment of the right-hand selection button | 4 Left- and right-hand selection buttons |
| 2 Minus and plus buttons | 5 Display of the current configuration of the left-hand selection button |
| 3 Fault clearance key | 6 Display |

4.1.1 Displayed symbols

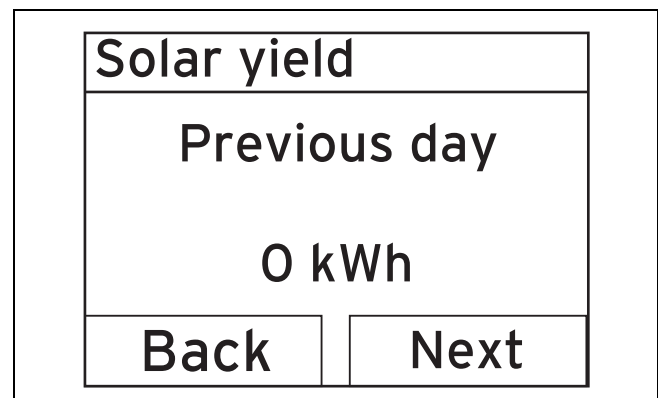
Symbol	Meaning	Explanation
	Display of the current solar output (bar display)	Power transmitted to the cylinder
	Collector temperature	Temperature at the collector temperature sensor (T5)

Symbol	Meaning	Explanation
	Solar pump(s) active	Flashes: Solar circuit is starting up (filling of the field) Permanently on: solar circuit running, cylinder charging pump active
 F.XX	Fault in the solar system	Appears instead of the basic display. A plain text display explains the displayed fault code.

4.2 Operating concept

The product is operated using the selection buttons and the plus/minus buttons.

Both selection buttons have a soft key function. This means that the function of the selection buttons changes.



If, for example, the left-hand selection button is pressed in the basic display, the current function of (solar yield) switches to **Back**.

Press :

- to switch directly from the basic display to the yield display
- to cancel the change to a set value
- to go one selection level higher in the menu.

Press :

- to go to the next yield display, for example
- to confirm a set value
- to go one selection level lower in the menu.

Press + simultaneously:

- to call up a menu with additional functions.

Press or :

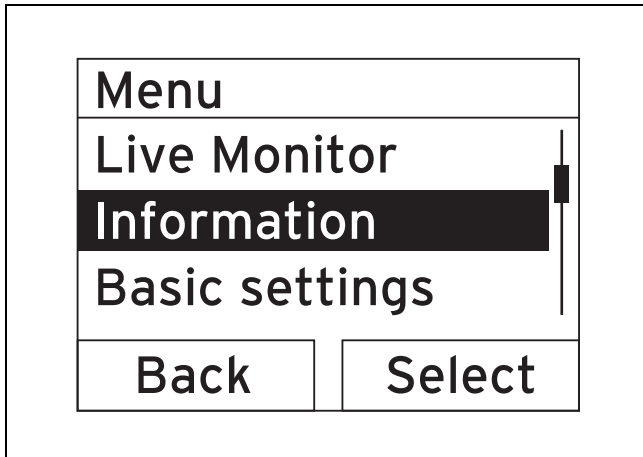
- to go back and forth between the individual points of the entry list in the menu
- You can increase or decrease a selected set value.

Configurable values are always displayed flashing.

You must always confirm any change to a value. Only then does the product save the new setting.


Note

You always have the option to cancel the change to a setting or the reading of a value by pressing the left-hand selection button.

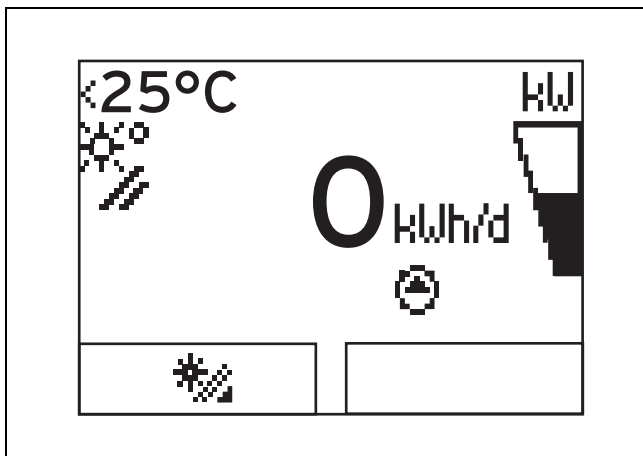


A highlighted object is indicated in the display inversely (light text on dark background).


Note

If you do not press any buttons for more than 15 minutes, the display returns to the basic display. Any unconfirmed changes are then cancelled by the product.

4.3 Basic display



In the normal operating condition, the basic display is shown. The basic display shows the current condition of the solar system. When the left-hand selection button is pressed, the display shows the solar yield. If the display is dimmed, the first button push switches on the display illumination. In this case, to trigger the button function, you must press the button again.

You can switch back to the basic display by:

- pressing to exit the selection levels
- not pressing any button for longer than 15 minutes.

The product does not save any unconfirmed changes in this case.

If there is a fault message, the basic display switches to a plain text display of the fault message.

4.4 Operating levels

The product has two operating levels.

4.4.1 Operating level

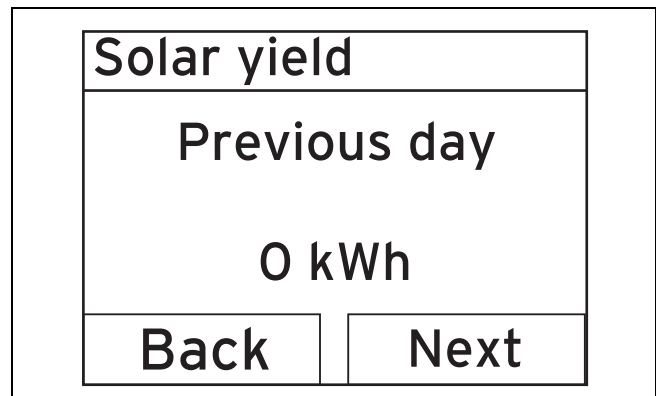
The standard operating level offers you the most frequently used setting options that do not require any special prior knowledge and displays the most important information.

You can access additional information using a menu.

4.4.2 Installer level

The installer level must only be operated by a competent person. The installer level is therefore protected with a code. The competent person uses this level to calibrate the parameters of the solar charger with the solar system.

4.5 Reading the solar yield



The solar yield can be displayed in the basic display in kilowatt hours as follows:

- ▶ Press .
- ◁ The display shows the solar yield from the previous day.
- ▶ Press .
- ◁ The display shows the solar yield from the current month.
- ▶ Press .
- ◁ The display shows the solar yield from the current year.
- ▶ Press .
- ◁ The display shows the total solar yield.

5 Troubleshooting

5.1 Reading fault messages

Fault messages have priority over all other displays. If a fault occurs in the solar system, the solar system switches itself off. The display of the solar charger displays a fault code in place of the basic display. A plain text display explains the displayed fault code.

If multiple faults occur at the same time, the display shows the corresponding fault codes for two seconds each in sequence.

- If the solar charging system displays a fault message, contact your approved competent person.



Note

Status messages about the condition of the solar system can be called up using the Live Monitor (→ Page 13) function.

5.1.1 Fault message

Fault messages appear on the display approx. 20 seconds after a fault has occurred. If a fault is present for at least three minutes, a fault message is recorded in the fault memory of the solar control.



Note

Only a competent person can eliminate the cause of the faults described below and delete the fault memory.

Fault code	Fault text
20	Shut-down of temperature limiter
1272	Electronics fault in cylinder charge pump
1273	Electronics fault in solar pump
1274	Electronics fault in solar pump 2
1275	Cylinder charge pump blocked
1276	Solar pump blocked
1277	Solar pump 2 blocked
1278	T5 collector sensor fault
1279	T6 cylinder temperature sensor fault
1281	T1 temperature sensor fault
1282	T2 temperature sensor fault
1283	T3 temperature sensor fault
1284	T4 temperature sensor fault
1355	Volume flow sensor cylinder circuit fault

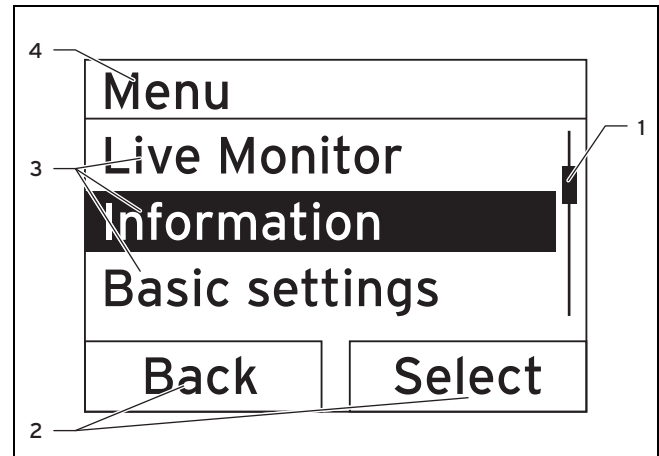
6 Auxiliary functions

The digital information and analysis system provides auxiliary functions via the menu.

6.1 Operation in the menu

Press and ("i") at the same time to access the menu.

6.1.1 Design of the menu



- 1 Scroll bar
(only appears if there are more list entries than can be shown at once on the display)
- 2 Current functions of the right and left selection buttons
(Soft key functions)
- 3 Selection level list entries
- 4 Name of the selection level

The Digital Information and Analysis System has a menu containing up to two selection levels (sub-menus).

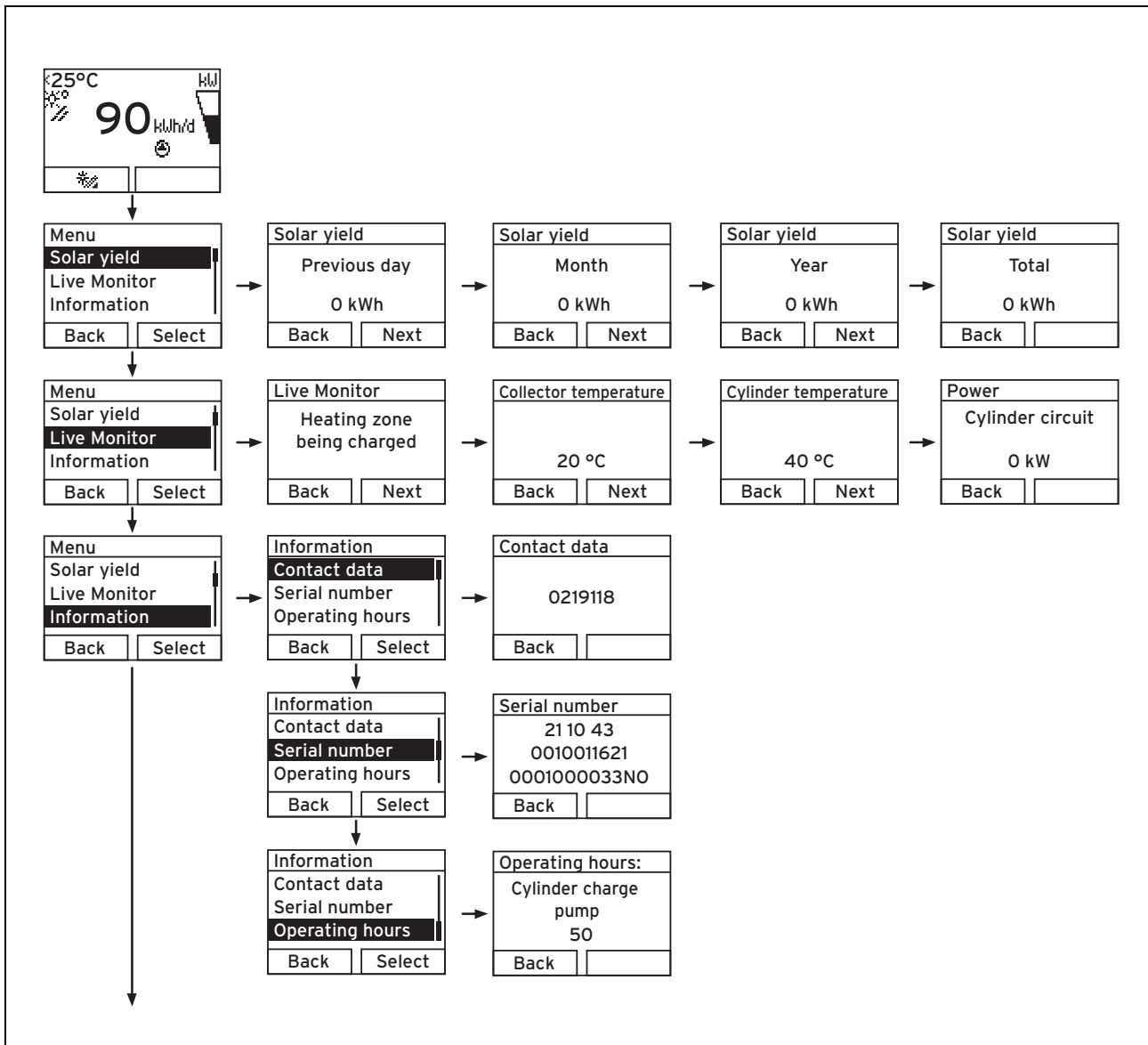
The selection levels are used to navigate to the setting level required to read or change settings.



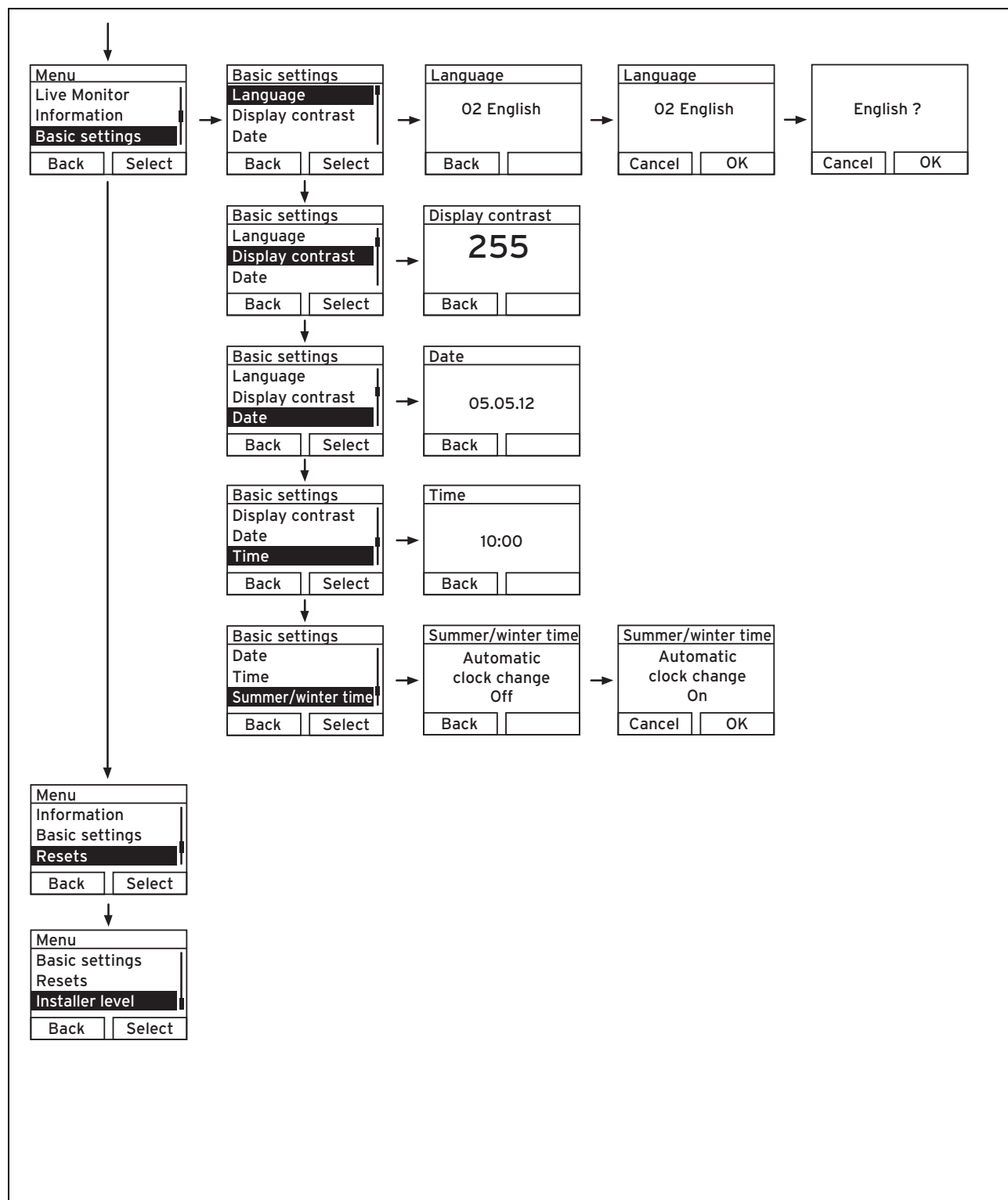
Note

Path details at the start of an instruction specify how this function can be accessed, e.g. **Menu → Information → Contact data**.

6.1.2 Overview of menu structure



6 Auxiliary functions



6.2 Live Monitor

Menu → Live Monitor

- This function allows you to display the current product status of the solar system. The display also shows the meaning in plain text.
- The display is automatically updated if the product status changes.

Status code	Meaning
400	Module in standby
401	Solar circuit being filled
403	Cylinder completely charged
405	Heating zone being charged
406	Process water zone being charged
407	Pool or second cylinder being charged
408	Frost protection active
410	Module shut down
411	Cylinder charging starting
413	Cylinder being charged

6.3 Displaying contact data

Menu → Information → Contact details

- If the competent person has entered their telephone number during the installation, you can read the data under **Contact data**.

6.4 Displaying the serial number and article number

Menu → Information → Serial number

- **Serial number** shows the serial number of the product, which the competent person may require you to tell him.
- The article number is found in the second line of the serial number (seventh to sixteenth digits).

6.5 Displaying operating hours

Menu → Information → Operating hours

- Under **Operating hours**, you can display the number of operating hours of the cylinder charging pump since start-up.

6.6 Setting the language

Menu → Basic setting → Language

- During installation, the competent person has set the desired language for you. If you want to set a different language, you can do this using the menu point mentioned above.

6.7 Setting the date/time and summer time



Note

The date, time and automatic summer/winter adjustment can only be set if there is no system controller connected.

Menu → Basic setting → Date

- You can use this menu point to set the date.

Menu → Basic setting → Time

- You can use this menu point to set the time.

Menu → Basic setting → Summer/winter time

- You can use this menu point to set the DIA system to switch automatically between summer time and winter time.

6.8 Set display contrast

Menu → Basic setting → Display contrast

- This function is used to adjust the display contrast to ensure that the display can be read easily.

7 Maintenance

7.1 Servicing the solar system



Danger!

Risk of injury and material damage due to incorrect maintenance and repairs.

Failure to carry out maintenance, or incorrectly completed maintenance, may adversely affect the operational reliability of the solar system.

- ▶ Never attempt to carry out maintenance work or repairs on the solar system yourself.
- ▶ Always employ a competent person.

Permanent operational readiness and safety, reliability and a long working life require inspections and maintenance work to be carried out annually on the solar system by an approved competent person.

Regular maintenance ensures maximum efficiency and economical operation of the solar system

We recommend making a maintenance agreement.

7.2 Caring for the product



Caution.

Risk of material damage caused by unsuitable cleaning agents.

Unsuitable cleaning agents can damage the casing, the fittings or the operator control elements.

- ▶ Do not use sprays, scouring agents, detergents, solvents or cleaning agents that contain chlorine.

8 Decommissioning

- Clean the casing with a damp cloth and a little solvent-free soap.

8 Decommissioning

8.1 Switching off the solar charging system

- Disconnect the product by de-energising it using a partition with a contact opening of at least 3 mm (e.g. fuses or power switches).

8.2 Decommissioning the solar system permanently

- Contact a competent person to decommission the solar system permanently.

8.3 Recycling and disposal

Disposing of the packaging

- The competent person who installed your product is responsible for the disposal of the packaging.

Disposing of the product and accessories

- Do not dispose of the product or the accessories with household waste.
- Ensure that the product and all accessories are disposed of properly.
- Observe all relevant regulations.

Disposing of solar fluid

The solar fluid must not be disposed of with normal household waste.

- Dispose of the solar fluid in compliance with local regulations through an appropriate disposal company.
- Dispose of packaging that cannot be cleaned in the same way as solar fluid.

Uncontaminated packaging can be reused.

9 Customer service and guarantee

9.1 Customer service

For contact details for our customer service department, you can write to the address that is provided on the back page, or you can visit vaillant.com.

9.2 Guarantee

For information on the manufacturer's guarantee, you can write to the contact address that is provided on the back page.

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