–weishaupt–

manual

Installation and operating instructions

Solar controller WRSol 1.1

83278402 • 2/2012-05

Conformity certification

4800000002

Manufacturer: **Max Weishaupt GmbH**

Address: **Max-Weishaupt-Straße**
D-88475 Schwendi

Product: Solar controller

WRSol 1.1

The product described above conforms with

the regulations of directives:

LVD	2006 / 95 / EC
EMC	2004 / 108 / EC

This product is labelled as follows:

CE

Schwendi, 12.04.2012

i. V. / Research and Development

Dr. Schloen

Manager Research
and Development

ppa

Denkinger

Manager Production and
Quality Management

1 User information

These installation and operating instructions are a component of the device and must be kept at the place of use.

1.1 User guidance

1.1.1 Symbols

 **DANGER**	Direct hazard with high risk. Nonobservance leads to serious bodily injury or death.
 **WARNING**	Hazard with moderate risk. Nonobservance can lead to environmental damage, serious bodily injury or death.
 **CAUTION**	Hazard with low risk. Nonobservance can lead to property damage or minor to moderate bodily injuries.
	Important note.
▸▸	Prompts you to perform a direct action.
✓	Result after an action.
■	List
…	Value range

1.1.2 Target group

These installation and operating instructions are meant for the user and qualified, skilled personnel. They are to be observed by all persons who work on the device.

Work on the device may only be carried out by persons with the training or instruction required for it.

Persons with limited physical, sensory or mental capacities may only work on the device if they are supervised or have been instructed by an authorized person.

Children must not play on the device.

1.2 Warranty and liability

Warranty and liability claims are excluded for personal injury and property damage if they can be ascribed to one or more of the following causes:

- Unintended use of the device
- Nonobservance of the installation and operating instructions
- Operating the device when the safety or protective equipment isn't working
- Continued use despite the occurrence of a deficiency
- Improper installation, commissioning, operation or maintenance of the device
- Unauthorized modification of the device
- Installation of additional components which have not been tested together with the device
- Improperly carried out repairs
- Weishaupt original parts not used
- Deficiency in the supply lines
- Forces of nature

2 Safety information

Your information packet
- You are currently holding the operating instructions of the solar controller in your hand.

Please read these operating instructions through carefully. They will help you optimally utilize the controller functions and operate the solar installation.
- Always keep these operating instructions near the solar controller.

Intended use

The controller is an electronic device intended for use together with a hydraulic circuit in accordance with the manufacturer specifications.

Any other use is not permissible.

Hazards when working with the device

Weishaupt products are built according to the valid standards and directives and the recognized safety rules. Nevertheless, if used improperly, life-threatening danger to the user or third parties can arise or the device or other property could be impaired.

To avoid hazards, the Weishaupt solar controller (WRSol) may only be used
- as intended
- when it is in safe, operating condition.
- under the observance of all information in the operating instructions.

Malfunctions which can impair safety are to be remedied immediately.

Personnel training

Only qualified personnel may put the Weishaupt system into operation.

Qualified personnel include persons who are familiar with the setup, installation, adjustment, commissioning and maintenance of the product and have the qualifications required for their job, such as:

Training, instruction or authorization to activate/deactivate, ground and label circuits and electric devices in accordance with the standards of safety technology.

Informal safety measures
- Also observe the instructions in the installation and operating instructions of the collectors.
- In addition to the installation and operating instructions, the nationally valid rules and regulations for accident prevention are to be observed. In particular, the relevant construction and safety regulations (e.g. EN, DIN, VDE, etc.) are to be observed.
- All safety and hazard information on the device are to be kept in legible condition.
- Have the heating system professional give you extensive instruction in how to operate the solar controller.

Hazards due to electrical energy
- Before beginning work, disconnect, secure against switching on again, make sure there is no voltage, ground and short circuit, and protect from neighbouring live parts.
- Have work on the electrical power supply done by a professional electrician.
- Check the electrical equipment of the device during maintenance. Fix loose connections and replace defective cables immediately.
- If work on live parts is required, the accident prevention regulations UVV VBG4 or other national regulations are to be observed and tools used in acc. with EN 60900. Have a second instructed person there to switch off the voltage supply in case of an emergency.

2 Safety information

Constructional modifications to the device

- Do not make any modification, additions or conversions to the Weishaupt system without permission from the manufacturer. All conversion measures require written confirmation from Max Weishaupt GmbH.
- Immediately exchange any device parts which are not in perfect condition.
- No additional components may be installed which haven't been tested together with the device.
- Only use original Weishaupt spare and wear parts.

Settings

- You may only make the settings specified in these instructions. The solar installation can be damaged by faulty settings.

3 About the Weishaupt solar controller WRSol 1.1

The Weishaupt solar controller (WRSol) allows you to simply control your solar installation.

Some features of the WRSol:
- Full graphical display with a display of the animated hydraulic type
- Intuitive menu guidance with plain text display
- Simple query of solar installation information
- Temperature setpoint specifications for hot water and frost protection
- Simple resetting to previously set values or to the original status at delivery
- Recording option via the WRSol recording software or SD card
- Statistics function for the solar yield with weekly, monthly and yearly evaluation
- Speed-controlled solar or solid fuel boiler pump
- Output for power signals PMW or 0 - 10 V

The WRSol can be used as a differential controller for:
- Solar hot water tank
- Solar storage tank
- Return temperature controller
- Swimming pool
- Solid fuel

3.1 What can the solar controller do

Correctly programmed, the controller, acting together with a corresponding hydraulic circuit, makes sure that the incidental solar energy is correctly used and the operation of additional heat generators can be omitted as much as possible.

It is possible to generally operate the system after inputting the existing hydraulic type (system type). The parameters, controller and safety functions relevant to the selected type of system are automatically preset. This allows for immediate operation.

With the potential-free contact (MFA output terminals 5 and 6), a malfunction can be advanced, a burner block (generator block) or a request (generator enable) can be generated, or a high-temperature relief (cooling function) can be carried out.

3.2 What must be observed

CAUTION

Do not switch off the controller

Switching off the controller can damage the solar installation if the system is not filled. (Protective functions no longer guaranteed).

The controller should only be put out of operation for the duration of maintenance and repair work.

Note: These operating instructions are only valid for the solar controller type WRSol 1.1 (compare with the nameplate).

Conversion measures are only permitted with the written agreement from Max Weishaupt GmbH.
- Only install additional components which have been tested together with the device.
- Only use original Weishaupt parts.

4 Installation and connection

4.1 Scope of delivery

The following is included in the scope of delivery:
- WRSol 1.1 controller
- Fastening material for wall mounting
- Strain relief clamp, including screws
- Collector sensor STF 225, 1x (4 m, blue cable , -w- no. 660 262)
- Immersion sensor STF 222.2, 1x (2.5 m, gray cable, -w- no. 660 228)
- Operating instructions WRSol 1.1

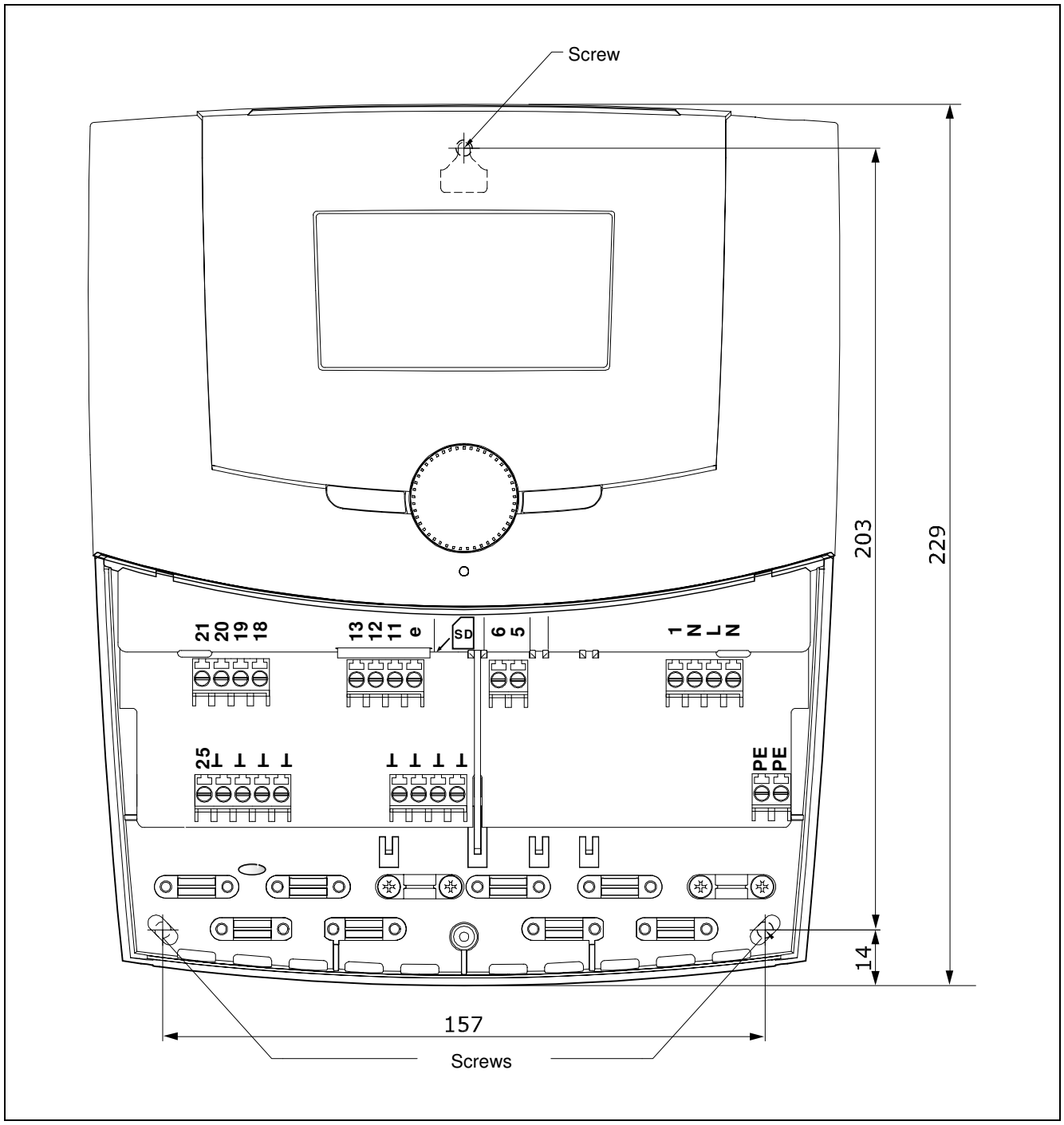
Note:
The sensors included in the scope of delivery are designed as immersion sensors. If contact sensors are required for system-related reasons, they can be ordered under order no. 660 302.

The collector sensor cannot be designed as a contact sensor.

4.2 Wall mounting

CAUTION

Note: Before fastening, break out the required cable entry glands.



Note: Only screw in the screw so far that the controller can still be hung in.

4.3 Start-up

The WRSol is set up so that the controller function and type of setting parameters can be defined via the selection of a corresponding hydraulic type.

Then, only those selection menus and setting parameters appear which are required for the selected hydraulic type.

All other parameters are hidden.

Procedure:

1. Select desired hydraulic type. Chap. 6
2. Make the electric connection according to the selected hydraulic type. Chap. 6
3. The commissioning menu appears when the device is started for the first time. Chap. 4.4

- ▸ Select language
- ▸ Set the time and date
- ▸ Set the hydraulic type selected in step 1 on the controller.
- ▸ Select the volume pulse counter and collector return flow sensor, as well as collector flow sensor, as needed.
- ▸ Select the solar pump

CAUTION

If "Output 1: Solar pump" is at "0: standard pump", NO electronic pump may be installed.

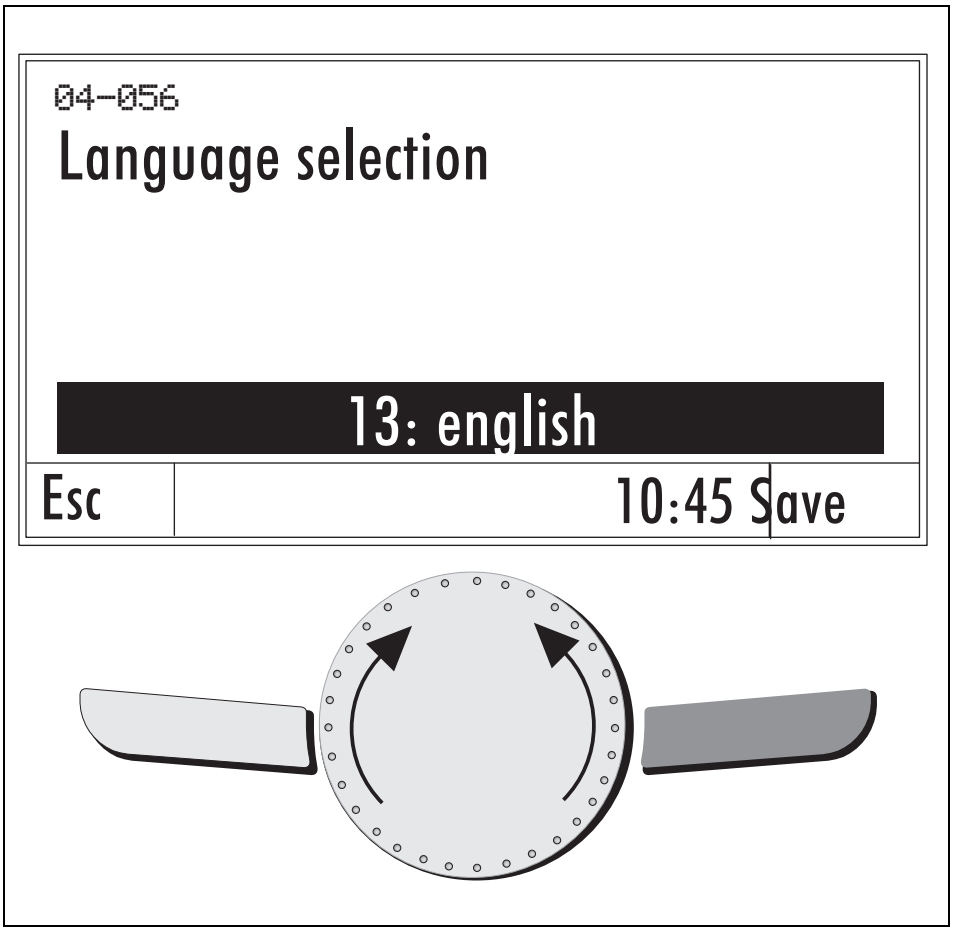
- ▪ The controller is restarted

4. Read out all temperatures and values and check for plausibility. Chap. 7.4
5. Check all outputs in test mode. Chap. 8.6
6. Adjust the maximum and, if necessary, minimum volume flow. Chap. 7.7

Note:
If no volume pulse counter is installed, the maximum volume flow corresponds to the read-off volume flow at 100% pump actuation.
If there is an active volume pulse counter, the flow is limited to the set minimum and maximum volume flow values.

7. Set controller back to auto mode. Chap. 7.6.1
8. Fill out the commissioning log in the appendix.

4.4 Commissioning assistant



The values can be changed using a rotary knob, and the change confirmed with the **Save** key, and the next value appears.

The following values are queried:

Language selection
Time
Date
Hydraulic type
VIZ/TKR option, volume pulse counter
TKV option
Output 1: Solar pump

After the commissioning assistant is finished, the device is restarted.

CAUTION

If "Output 1: Solar pump" is at "0: standard pump", NO electronic pump may be installed.

4.5 Electrical connections

CAUTION

Note: Before fastening, break out the required cable entry glands.

WARNING

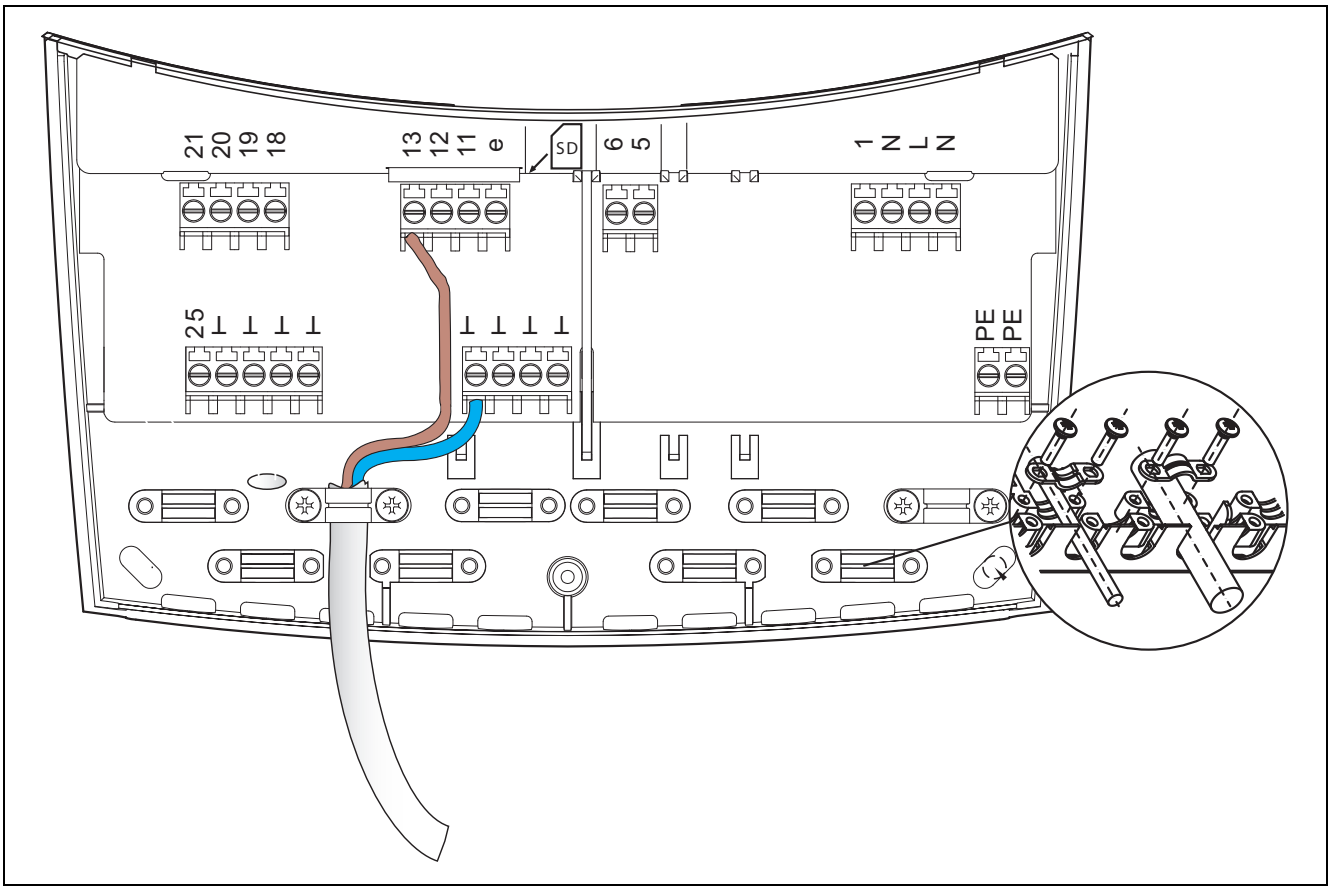
Improper installation or repair attempts can cause life-threatening electric shock. Installation may only be carried out by skilled personnel with sufficient qualifications. Opening the device and accessory parts is to be refrained from in general. Repairs may only be carried out by the manufacturer.

The supply and return lines of the solar installation must be grounded.

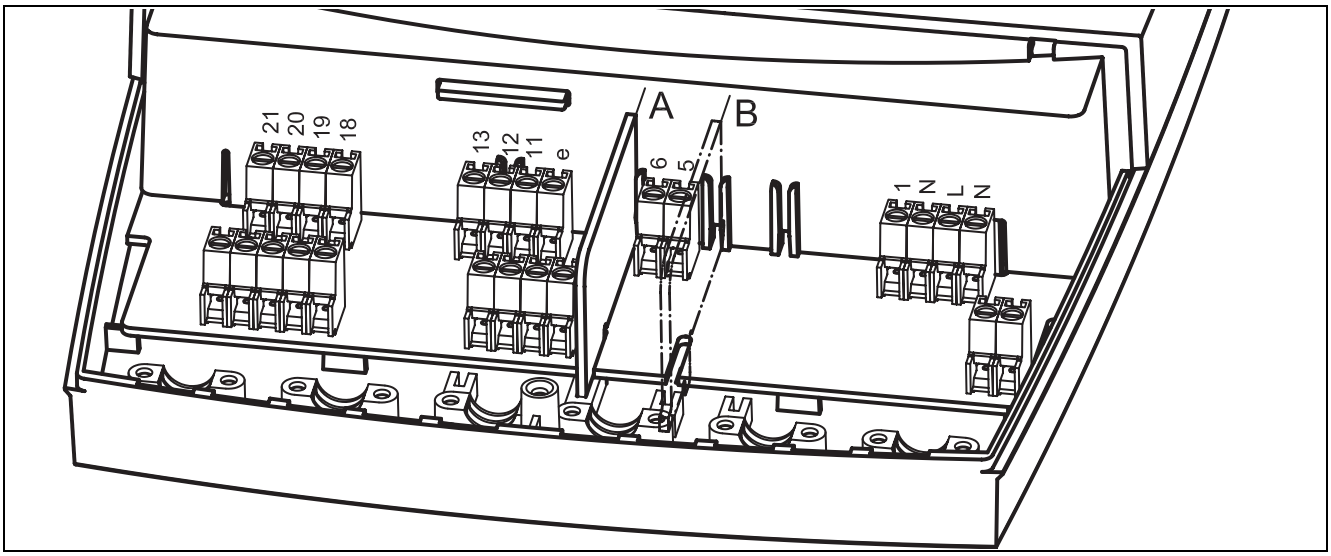
Overvoltage protection

The connected sensors do not have to be protected against overvoltage by any special protective equipment.

Terminal strip, left (sensor) Terminal strip, right (outputs/voltage supply)

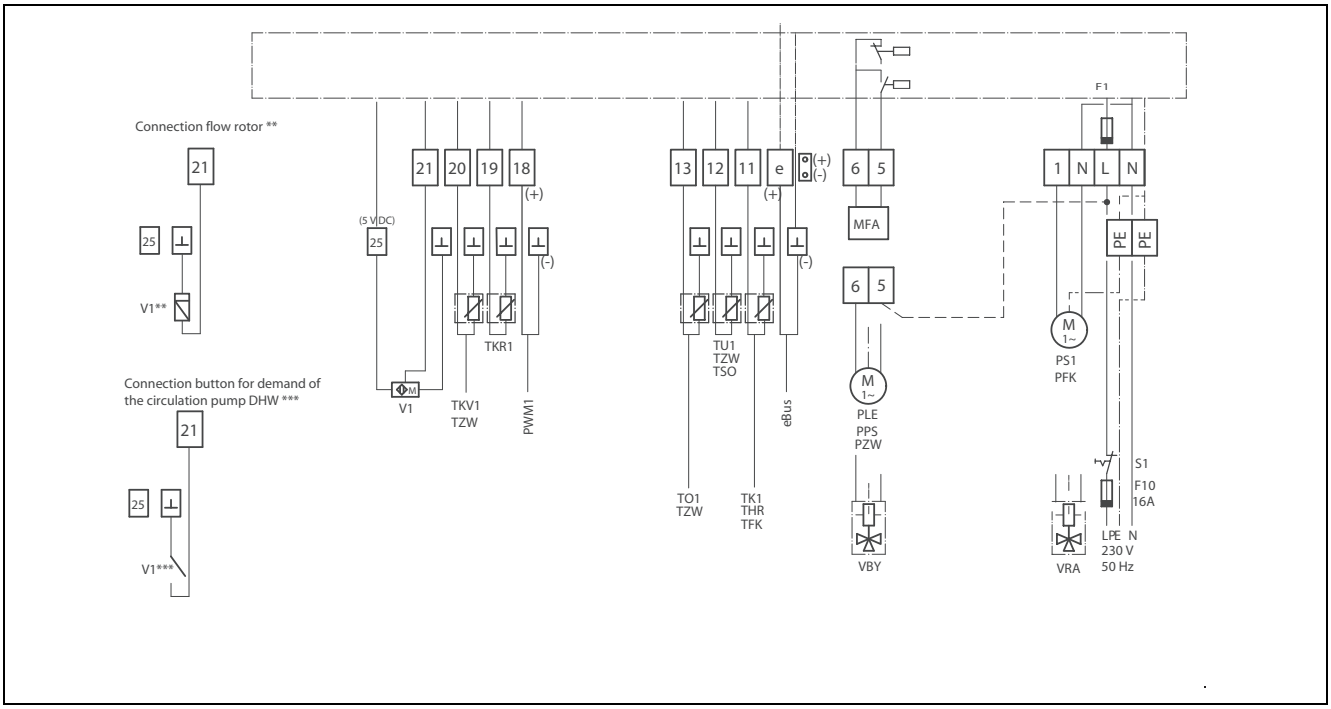


- Remove terminal compartment cover.
- Connect the sensor cables, MFA output, pump or diverter valve and power supply according to the selected hydraulic type (chap. 6).
- Secure the connected lines with the strain relief elements included in the scope of delivery.



- Correctly insert the dividing wall for the MFA output according to its use.
  (**A**) LEFT 230 V
  (**B**) RIGHT, small voltage
- Apply voltage.
- Remount the terminal compartment cover.

4.6 WRSol 1.1 circuit diagram



TFK	Temperature sensor, solid fuel boiler
THR	Temperature sensor, heating circuit return
TK1	Temperature sensor, collector 1
TKR1	Temperature sensor, collector field 1, return
TKV1	Temperature sensor, collector field 1, supply
TO1	Temperature sensor, tank 1, top
TSO	Temperature sensor, additional tank
TU1	Temperature sensor, tank 1, bottom
TZW	Temperature sensor, hot water circulation
V1	Flow rotor, volume pulse counter or button for pulse-controlled circulation pump
F1	Internal device fuse, 3.15 A (time-delay fuse)
F10	Preliminary fuse max. 16 A
S1	Emergency switch

MFA	Multifunctional output (potential-free)
PFK	Solid fuel boiler pump
PLE	Pump for thermal disinfection
PPS	Pump, reverse charging to additional tank
PS	Solar pump (1st solar circuit)
PZW	Pump, hot water circulation
VBY	Valve, collector circuit bypass
VRA	Valve, return temperature increase
PWM/ 0-10 V	Output for a power signal, e.g. PS

Note:

The output 1 (PS) may be loaded with max. 1 Ampere. Consumers with a higher current consumption must be actuated via an auxiliary relay. In addition, an RC quenching element must be connected with terminal 1/N in parallel (-w- 701 890).

If the adjuster **`Output 1`** is selected to be equal to "0: standard pump" and an auxiliary relay or a valve is connected, the parameter **`Minimum speed PS`** must be set to 100%.

4.6.1 Connection of a volume meter

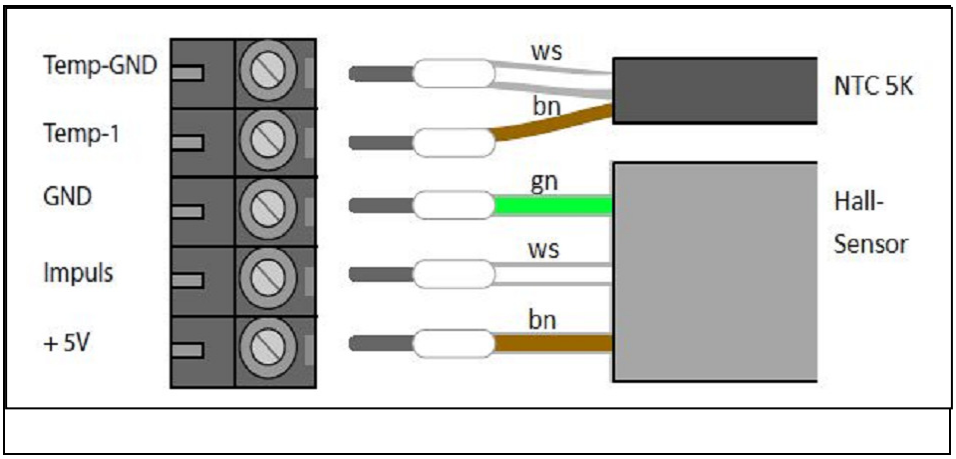
Flow rotor		V1 FlowRotor *	V1 Volume pulse counter **	V1 Button ***
GND	⊥	Green	White	COM
Signal	21	White	Brown	NO
5 V DC	25	Brown		

*) The existing plug of the WHPSol EA flow rotor must be removed and connected to the WRSol terminals according to the table given above.

**) Connection of a volume pulse counter, e.g. WVZSol or WVZSol 2.

***) Connection of a button or other N/O contact (provided on-site) for the pulse-controlled request for the pump circulation of hot water PZW.

The drawing shows the connections of the WHPSol EA flow rotor

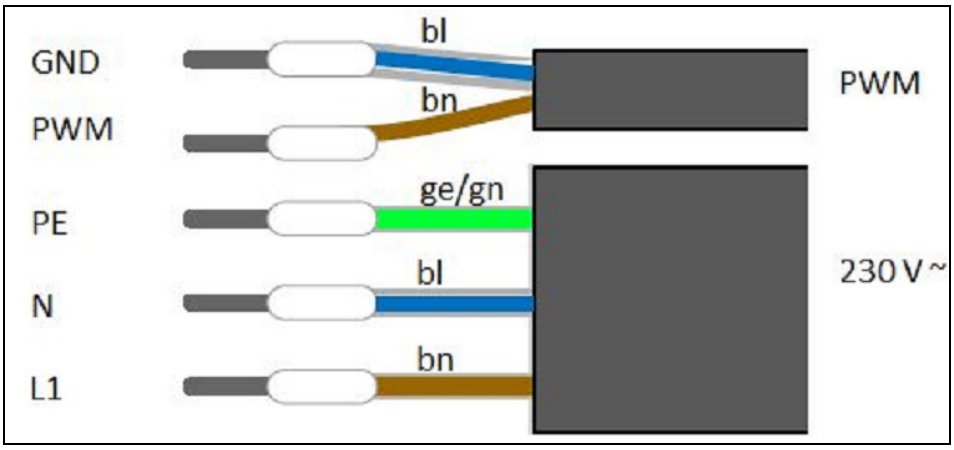


4.6.2 Connection of power signal for pump speed control

Speed signal		WHPSol 20-7/11 EA	Other pump PWM	Other pump 0 – 10 V
Output 1 PWM or 0 – 10 V	⊥	Blue	GND	-
	18	Brown	Signal	+

The cable ends of the WHPSol 20-7/11-EA must be connected to the terminals of the WRSol according to the table given above.

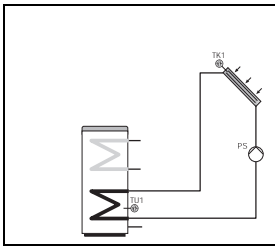
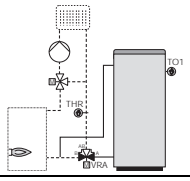
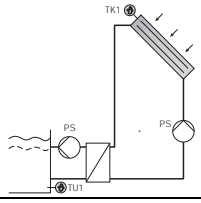
The drawing shows the wire ends of the WHPSol EA pump.

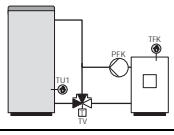
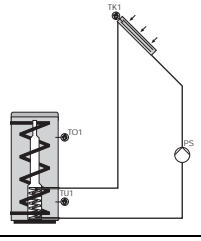


4.7 Input and output allocation of the individual hydraulic variants

HV	Sensor terminals								Outputs	
	21		20	19	18	13	12	11	e	5/6	1
	25	⊥	⊥	⊥	⊥	⊥	⊥	⊥	⊥		N/PE
1	V1		TKV1	TKR1	PWM	TO1 TZW	TU1	TK1	eBUS	MFA PZW PLE	PS
8	V1					TO1	TSO TZW	THR	eBUS	MFA PPS PZW	VRA
9	V1		TKV1	TKR1	PWM		TU1	TK1	eBUS	MFA VBY	PS
17	V1				PWM	TO1	TU1	TFK	eBUS	MFA PZW	PFK
23	V1		TKV1 TZW	TKR1	PWM	TO1	TU1	TK1	eBUS	MFA VBY PZW PLE	PS

5 Overview of hydraulic types

Variant 1	Variant 8	Variant 9
		
Output 5/6	Output 5/6	Output 5/6
MFA/ PZW/ PLE	MFA/ PPS/ PZW	MFA/ VBY

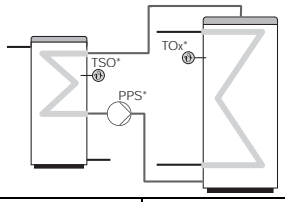
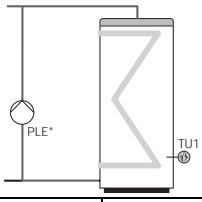
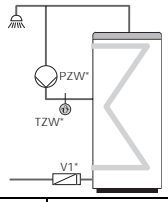
Variant 17	Variant 23
	
Output 5/6	Output 5/6
MFA/ PZW	MFA/ VBY/ PZW/ PLE

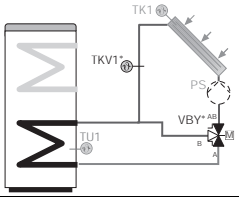
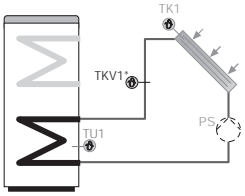
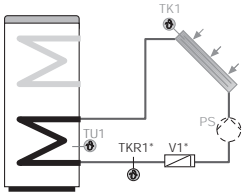
5.1 Options

In the hydraulic variants, there are 4 outputs, some of which are assigned fixed functions. For every free output, one of a selection of different functions can be chosen.

All options are shown here. For the individual hydraulic variants, only the respective options which come into question are shown.

As another option for controlling the solar circuit, there is the option of including the solar supply sensor TKV as well as the solar return sensor TKR in the control.

Option PPS		Option PLE		Option PZW	
					
Aktor	Sensor	Aktor	Sensor	Aktor	Sensor
PPS	TO1 und TSO	PLE	TU1	PZW	TZW und/ oder V1

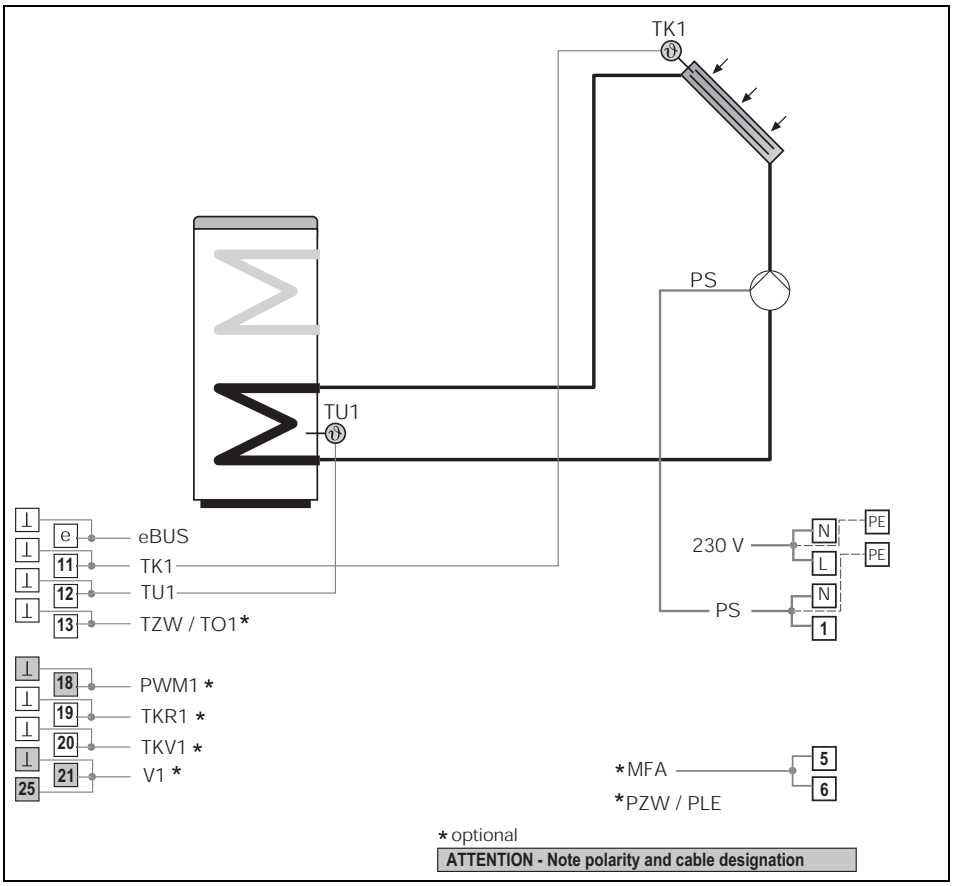
Option VBY		Option TKV	Option VIZ/ TKR
			
Aktor	Sensor	Sensor	Sensor
VBY	TKV	TKV	TKR und VIZ

6 Hydraulic variants

The following hydraulic variants are simplified schematic diagrams. Therefore, not all components (anti-siphon valve, flow meter, etc.) are drawn in.

6.1 Variant 1

Bivalent tank with collector and reheating influence



The WRSol determines the temperature difference between the collector sensor (TK) and the reference sensor (TU).

As soon as the temperature difference is greater than the set value, (**`switch-on difference TK - TU`**), the solar pump is activated, thereby charging the consumer, until the switch-off condition (**`switch-off difference TK - TU`**) or the maximum temperature of the consumer has been reached.

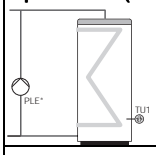
For the speed control of the solar pump PS, see chap. 8.4.

MFA options: Heat request (Kap. 8.2.1)
Malfunction message (Kap. 8.2.2)
High-temperature relief (Kap. 8.2.3)

Only one of the optons PLE, PZW or MFA-Options can be selected.

Selectable option

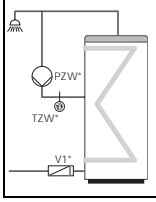
Option PLE (Kap. 8.12)



Output 5/6
PLE
Input 12
TU1

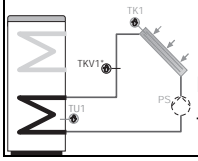
or

Option PZW (Kap. 8.13)



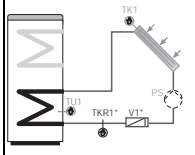
Output 5/6
PZW
Input 13
TZW*
Input 21
V1*

Option TKV (Kap. 8.4 ff.)



Input 20
TKV1

Option VIZ/ TKR (Kap. 8.10)

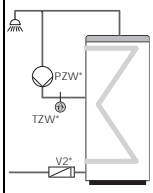


Input 21/25
V1
Input 19
TKR1

6.2 Variant 8

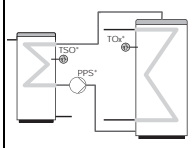
Selectable options

Option PZW (Kap. 8.13)



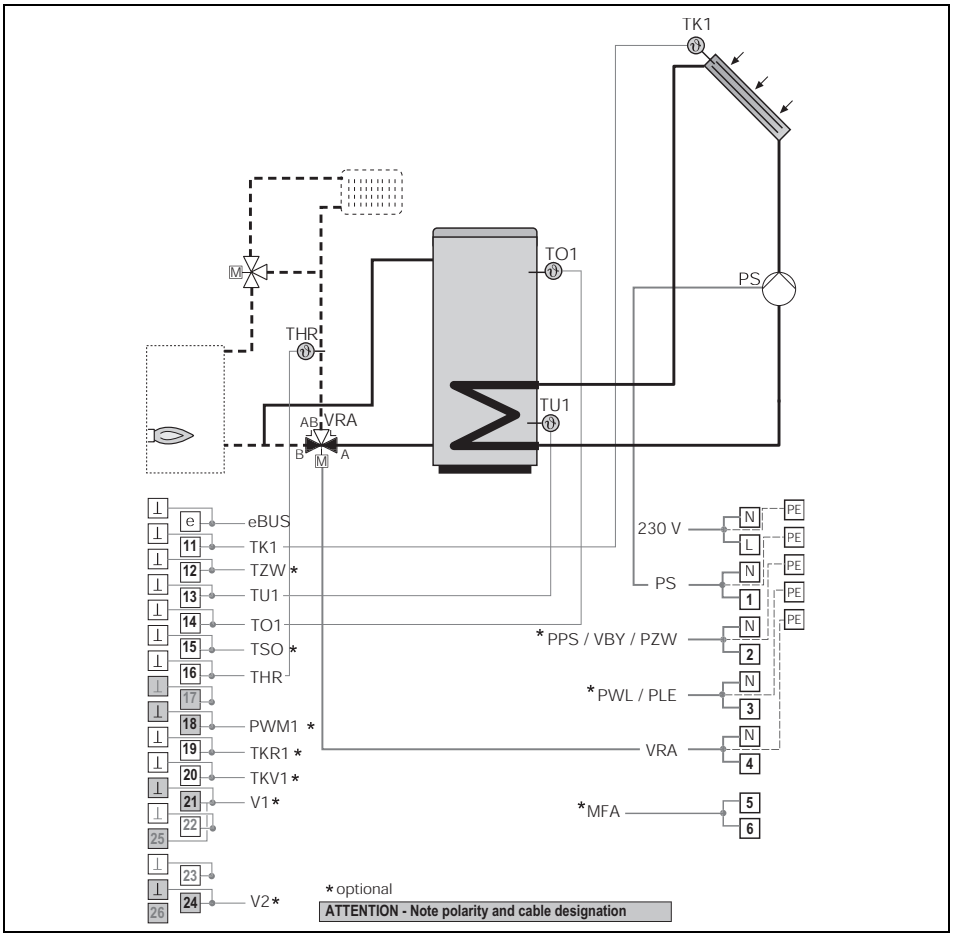
Output 5/6
PZW
Input 12
TZW*
Input 21
V1*

or
Option PPS (Kap. 8.9)



Output 5/6
PPS
Input 12
TSO
Input 13
TO1

Tank for heating system support



With the 3-way valve for the return temperature increase (VRA), the existing energy from the storage tank can be used depending on the temperature (TO1) and the heating system return sensor (THR). See chap. 8.16.

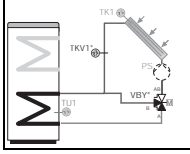
MFA options:
- Heat request (chap. 8.2.1)
- Malfunction message (chap. 8.2.2)
- High-temperature relief (chap. 8.2.3)

Only one of the options PZW, PPS or MFA-Options can be selected.

6.3 Variant 9

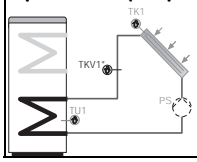
Selectable options

Option VBY (chap. 8.11)



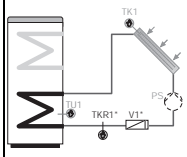
Output 3
VBY
Input 20
TKV1

Option TKV (chap. 8.4 ff.)



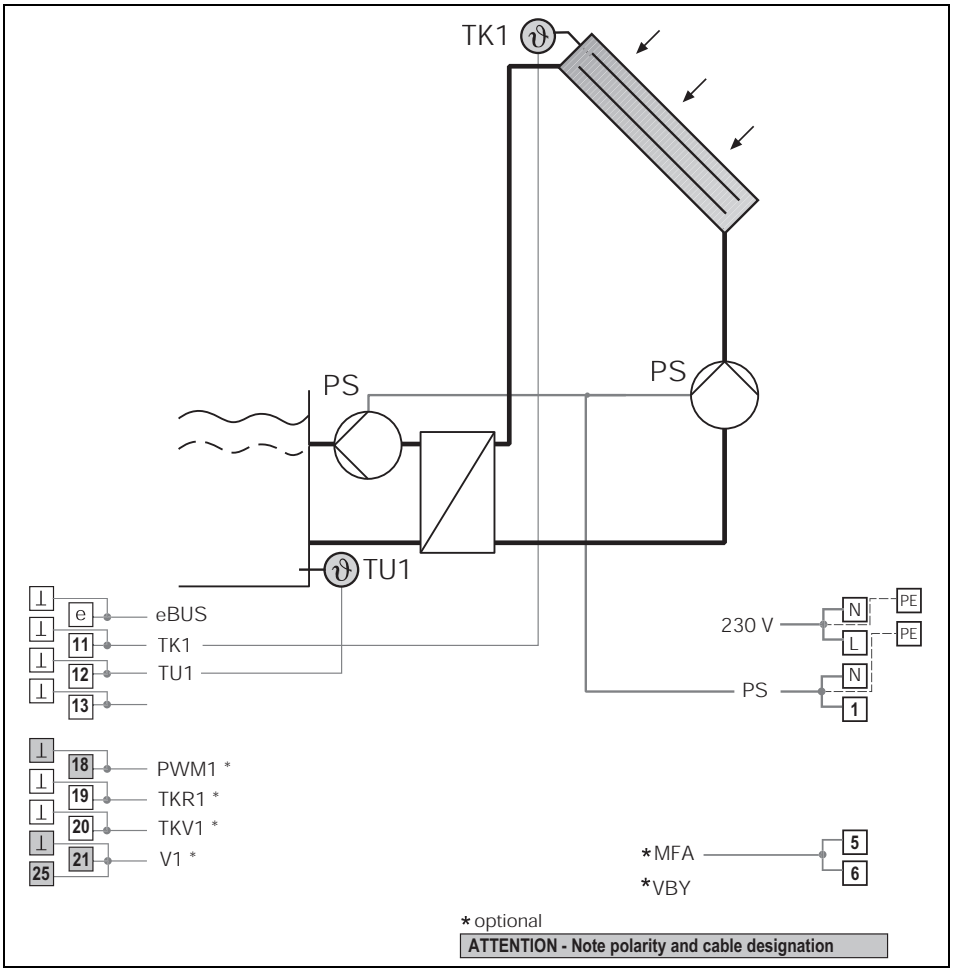
Input 20
TKV1

Option VIZ/ TKR (chap. 8.10)



Input 21/25
V1
Input 19
TKR1

Swimming pool



The WRSol determines the temperature difference between the collector sensor (TK) and the reference sensor (TU).
As soon as the temperature difference is greater than the set value **(Switch-on difference TK – TU)**, the solar pump is activated, thereby charging the consumer, until the **(Switch-off difference TK – TU)** or the maximum temperature of the consumer has been reached.

For the speed control of the solar pump PS, see chap. 8.4.

MFA options:
- Malfunction message (chap. 8.2.2)
- High-temperature relief (chap. 8.2.3)

CAUTION

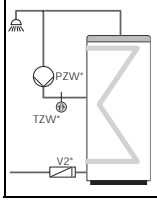
The set and maximum value for the swimming pool must be set.

Only one of the options VBY or MFA-Options can be selected.

6.4 Variant 17

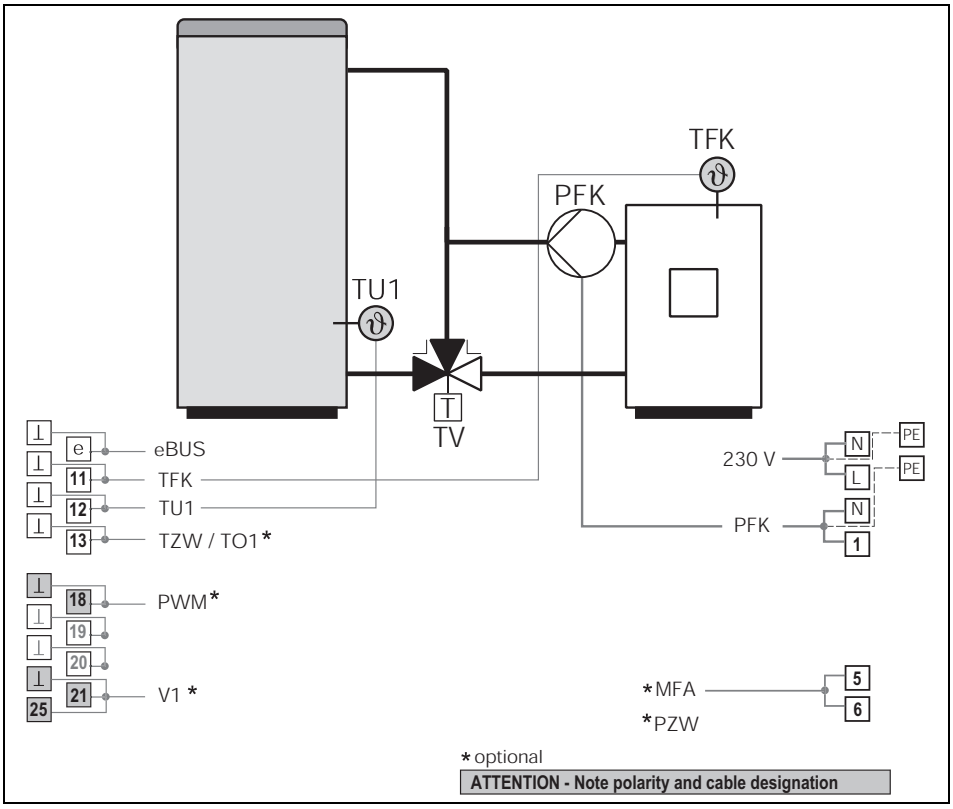
Selectable options

Option PZW (Kap. 8.13)



Output 5/6
PZW
Input 13
TZW*
Input 21
V1*

Storage tank for heating with collector and solid fuel boiler



Charging the storage tank with solid fuel boiler, temperature difference control between the sensor of the solid fuel boiler (TFK) and the reference sensor (TU1).
The thermal mixing valve (TV) allows the solid fuel boiler to heat up fast.

As soon as the temperature difference is greater than the set value (**`Switch-on difference TFK – TU`**) and the minimum temperature at the TFK is reached, the pump PFK is switched on, thereby charging the consumer until the (**`Switch-off difference TFK – TU`**) is reached. See chap. 8.5.

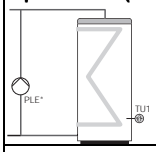
MFA options: Heat request (chap. 8.2.1)
Malfunction message (chap. 8.2.2)

Only one of the options PZW or MFA-Options can be selected.

6.5 Variant 23

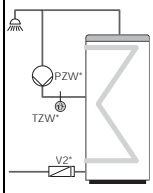
Selectable options

Option PLE (Kap. 8.12)



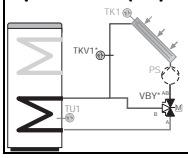
Output 5/6
PLE
Input 12
TU1

or
Option PZW (Kap. 8.13)



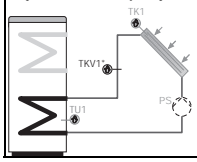
Output 5/6
PZW
Input 20
TZW*
Eingang 21
V1*

or
Option VBY (Kap. 8.11)



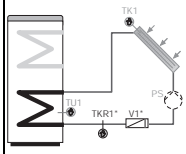
Output 5/6
VBY
Input 20
TKV1

Option TKV (Kap. 8.4 ff.)



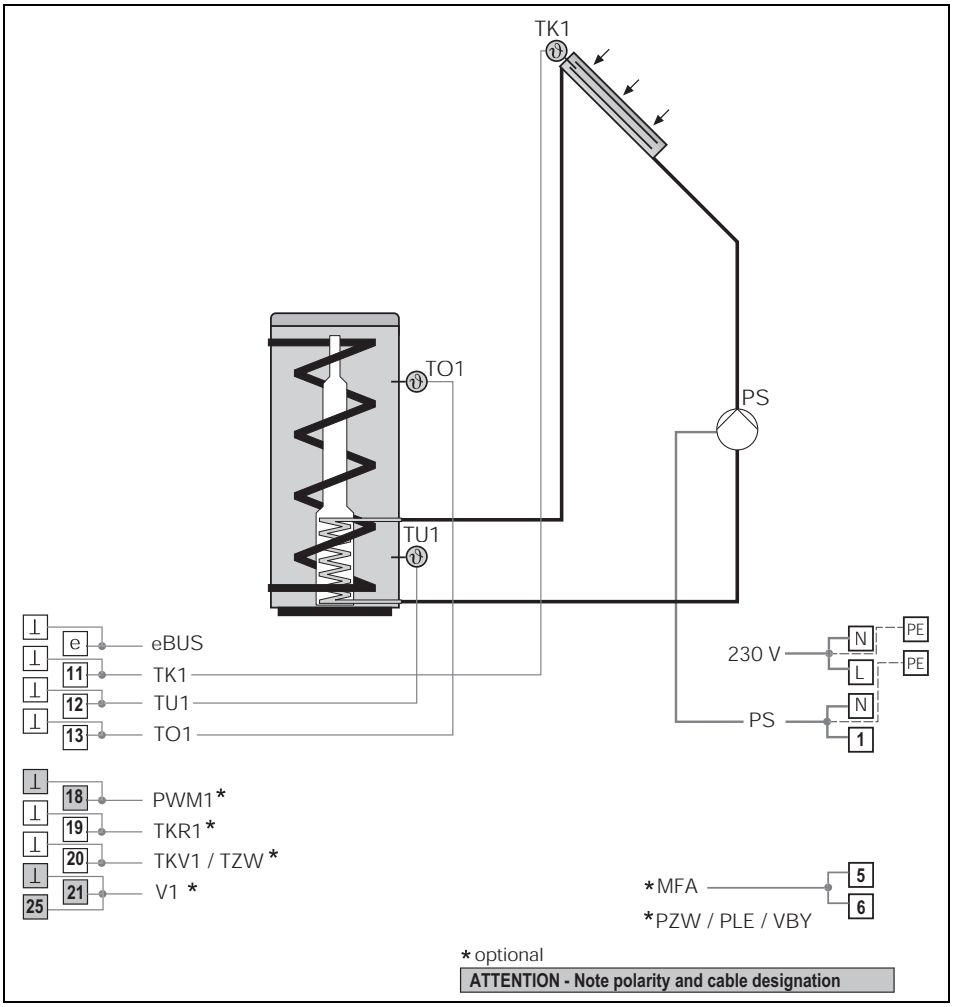
Input 20
TKV1

Option VIZ/ TKR (Kap.8.10)



Input 21/25
V1
Input 19
TKR1

Energy storage WES



The WRSol determines the temperature difference between the collector sensor (TK) and the reference sensor (TU).
As soon as the temperature difference is greater than the set value **(Switch-on difference TK – TU)**, the solar pump is activated, thereby charging the consumer, until the **(Switch-off difference TK – TU)** or the maximum temperature of the consumer has been reached. For the speed control of the solar pump PS, see chap. 8.4.

The WES function (chap. 8.17) is for optimizing the charging of the tank. Depending on the solar supply, the upper sensor is charged to quickly reach the usable temperature at the top.

MFA options: Heat request (chap. 8.2.1)
Malfunction message (chap. 8.2.2)
High-temperature relief (chap. 8.2.3)

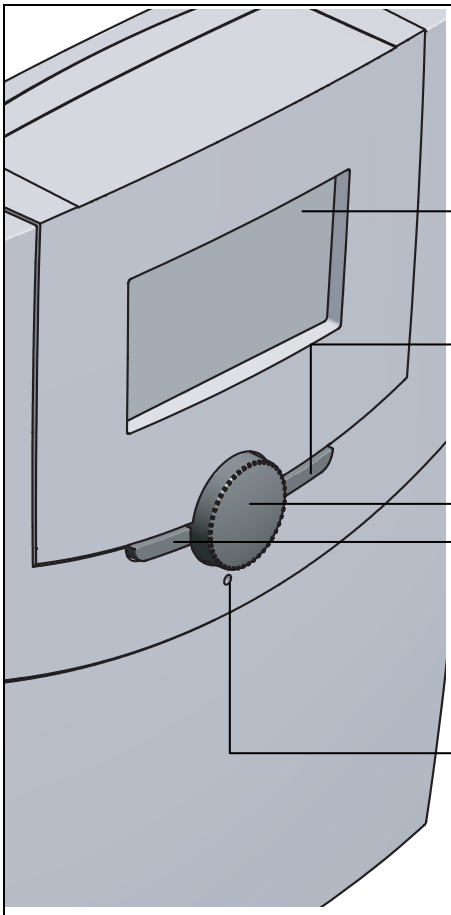
Only one of the options PLE, PZW, VBY or MFA-Options can be selected.

The option TKV and VBY can only be selected, if the input 20 is free, and not occupied with TZW sensor circulation DHW.

The option VIZ/ TKR can only be selected, if the input 21 is free, and not occupied with PZW pump circulation DHW.

7 Operation

7.1 Operating and display elements



LC display

Confirmation key

By pressing, a selection or change is confirmed.

Rotary knob

Escape key

Back to basic display With this key, you can cancel the settings. Unsaved changes will be lost. Jump back by 1 level.

RESET

By pressing the reset button, the processor with the previously set values are restarted. No factory settings can be started.

The factory settings can be restored under **`Configuration`** with **`Reset`**.

7.2 Display

Mode selection or info

PWL option, hot-water charging or PLE therm. disinfection

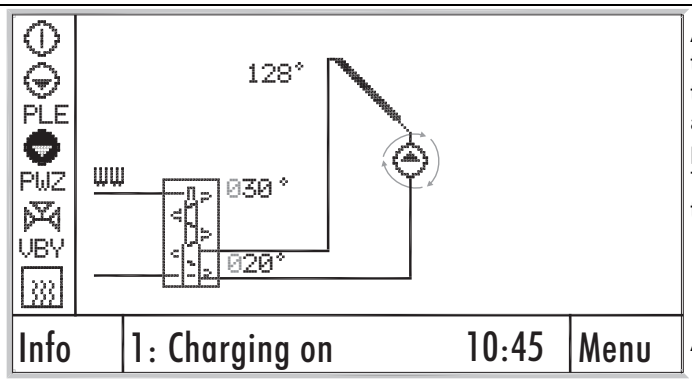
PPS re-/discharging or

PWZ circulation

Collector bypass option

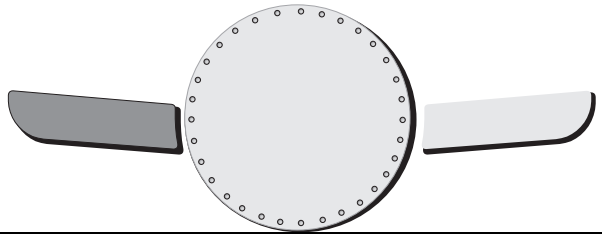
Multifunctional output MFA

Information menu

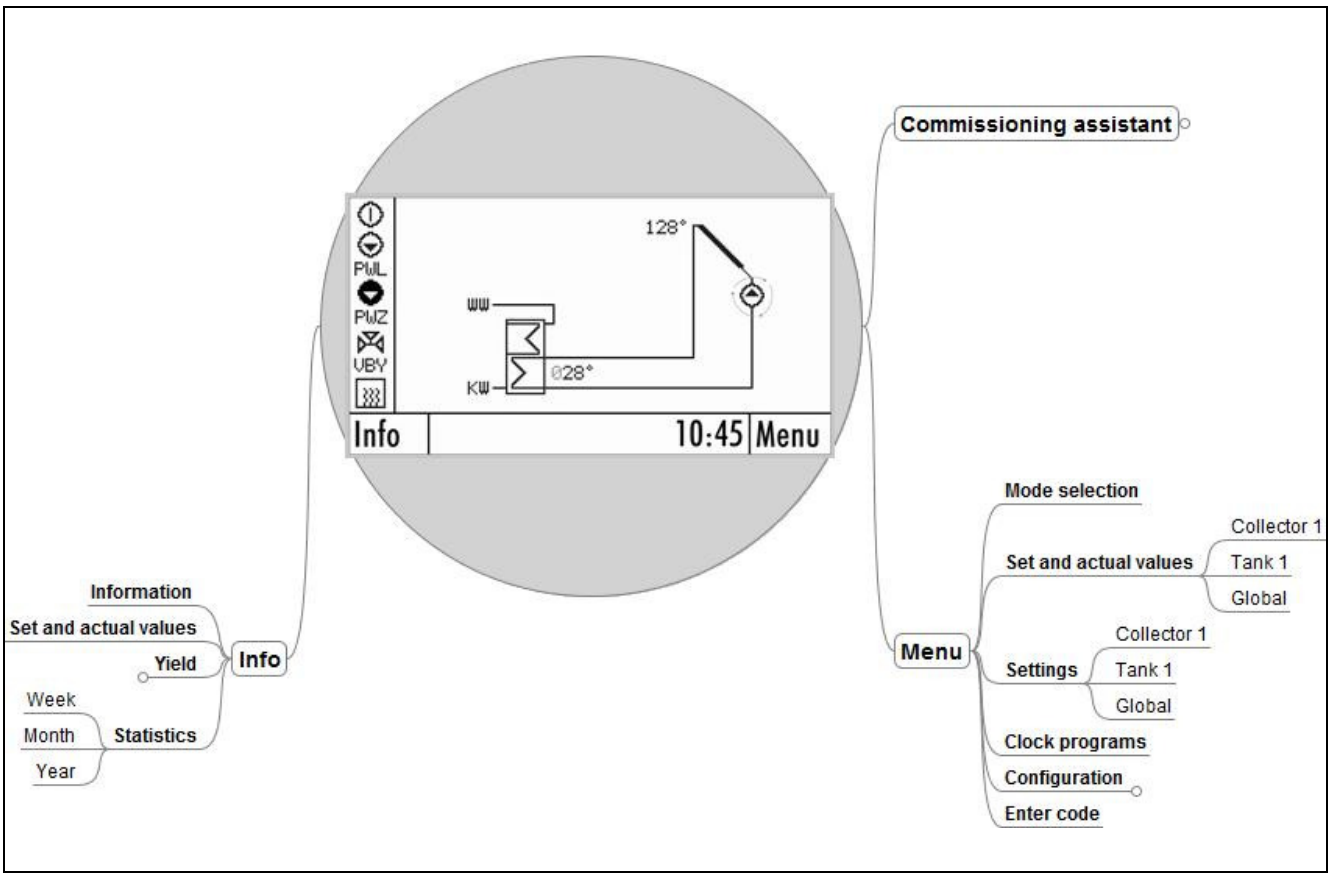


Active hydraulic types with the display of the current temperatures, the actuators are animated, and if the pump is working, it rotates. The switchover valves show the current direction of flow.

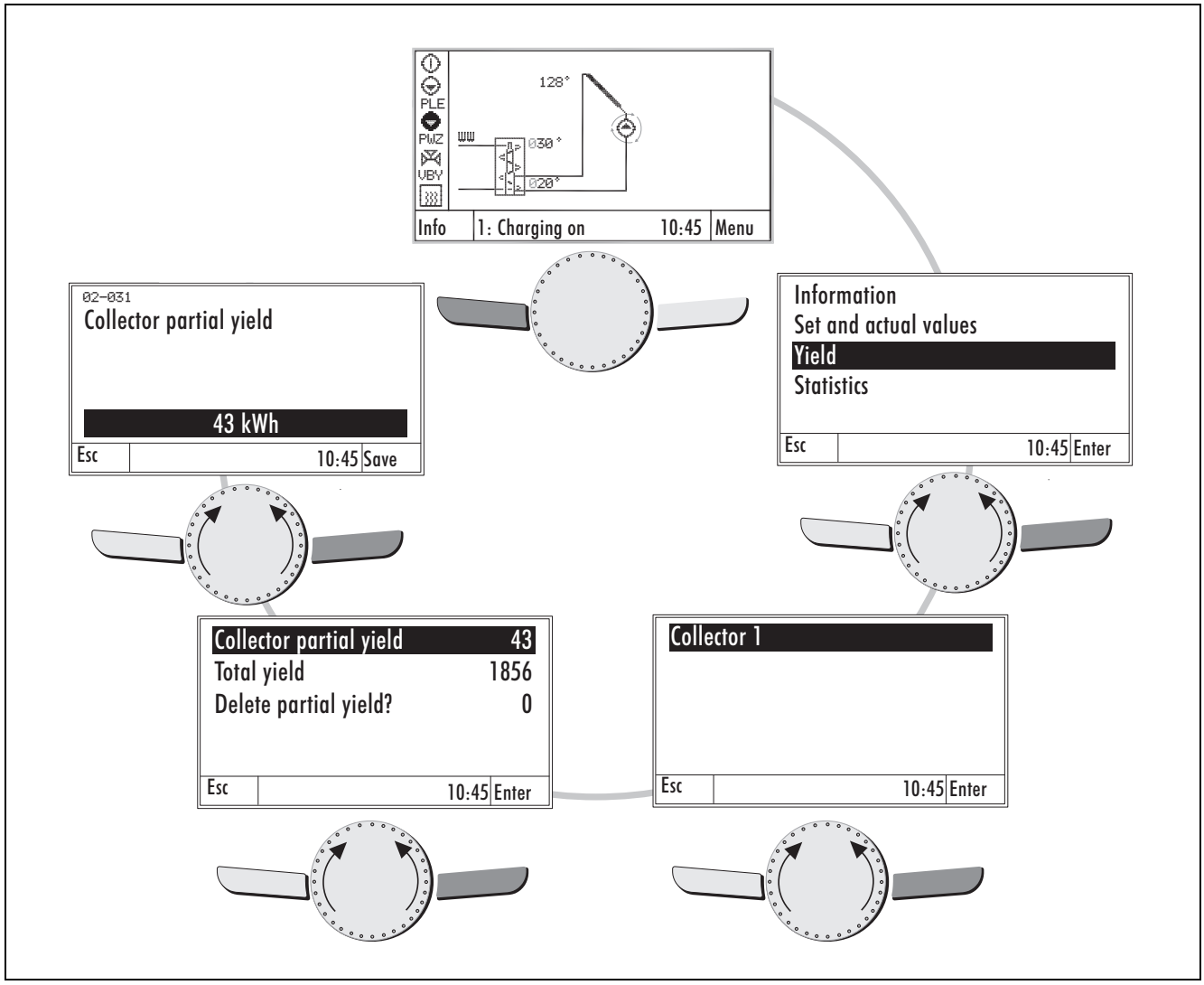
Adjuster / configuration



7.3 Navigation menu structure



7.4 Navigation menu info



7.4.1 Nominal/actual values

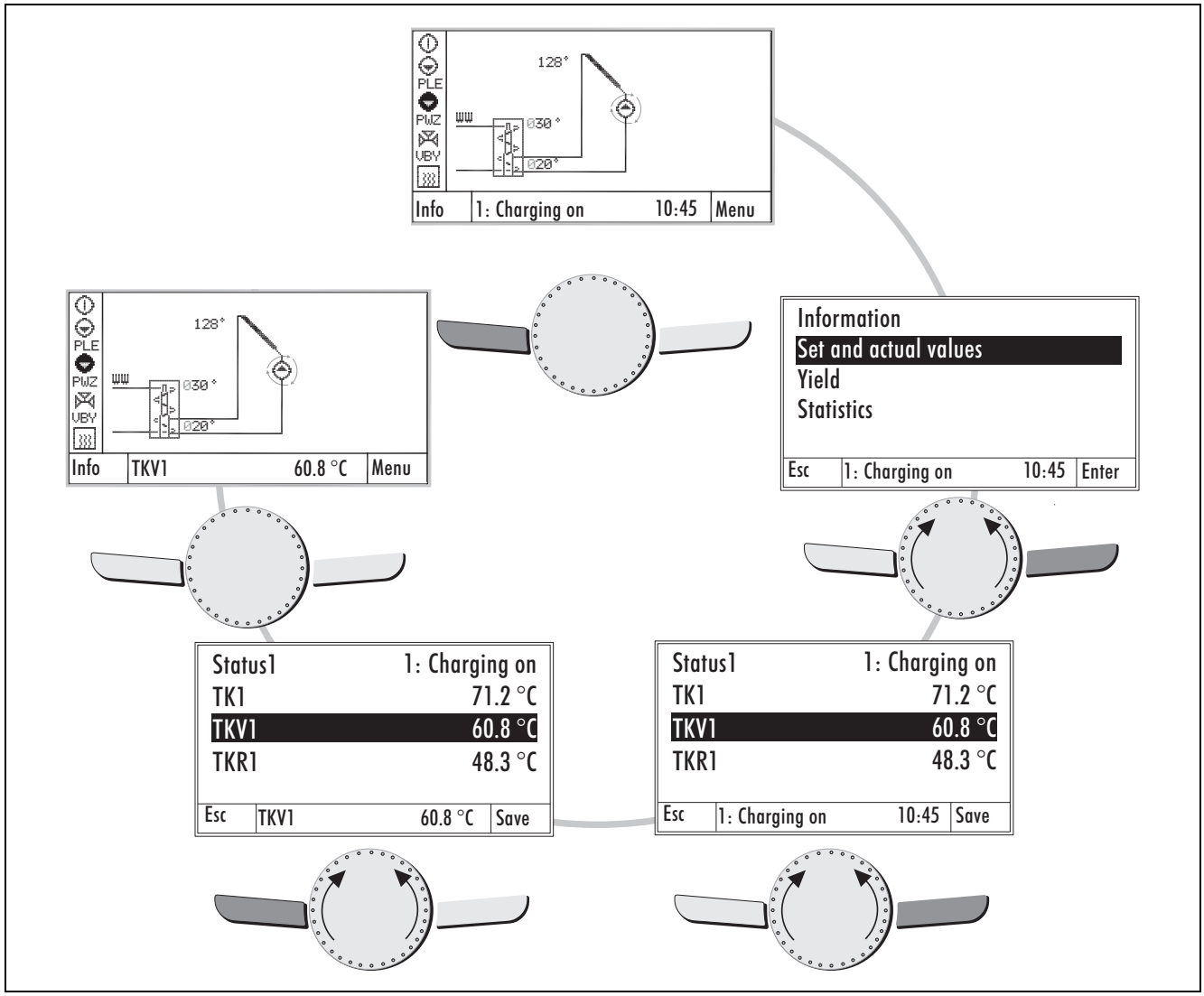
In this menu, all nominal/actual values are shown.

Value	Name
THR	Return temperature of a heating circuit
TSO	Upper hot water tank temperature, additional tank
TFK	Solid fuel boiler, supply temperature
TK	Solar collector temperature (outlet temperature)
TO	Upper tank temperature
TU	Lower tank temperature
TKV	Solar collector supply temperature (TKV)
TKR	Solar collector return temperature (TKR)
FLOW	Volume flow for the heat energy measurement in the solar circuit
TZW	Temperature in the hot water circulation line
TWT	Temperature of heat exchanger
NALAD	Current status of the MFA for heat request / boiler disable
PS	Current speed of the SP solar pump in %
PZW	Current status of the hot water circulation pump PZW
Pakt	Current calculated collector capacity
Status	Solar function status:
VBY	Current status of the collector bypass valve VBY
PPS	Current status of the re-/discharging pump PPS
VRA	Current status of the switchover valve, return temperature increase VRA
PFK	Current status of the charging pump PFK (charging the tank through the solid fuel boiler)
PLE	Current status of the pump PLE, in the thermal disinfection section
HTE	Current status of the output, high-temperature relief

Note:
The following values are only visible for code input.

Value	Name
SetTK	Calculated nominal collector temperature, reference for the speed control of the PS solar pump
SetTO	Calculated nominal temperature on the upper tank sensor, reference for wide range of functions, such as recharging, solar charging, etc.
SetTU	Calculated nominal temperature on the lower tank sensor, reference for wide range of functions, such as thermal disinfection, solar charging, etc.
SetTZW	Calculated nominal temperature on the hot water circulation line sensor TWZ.

Note:
The values from the nominal/actual values level can be accepted to the status line of the title page with "Save".

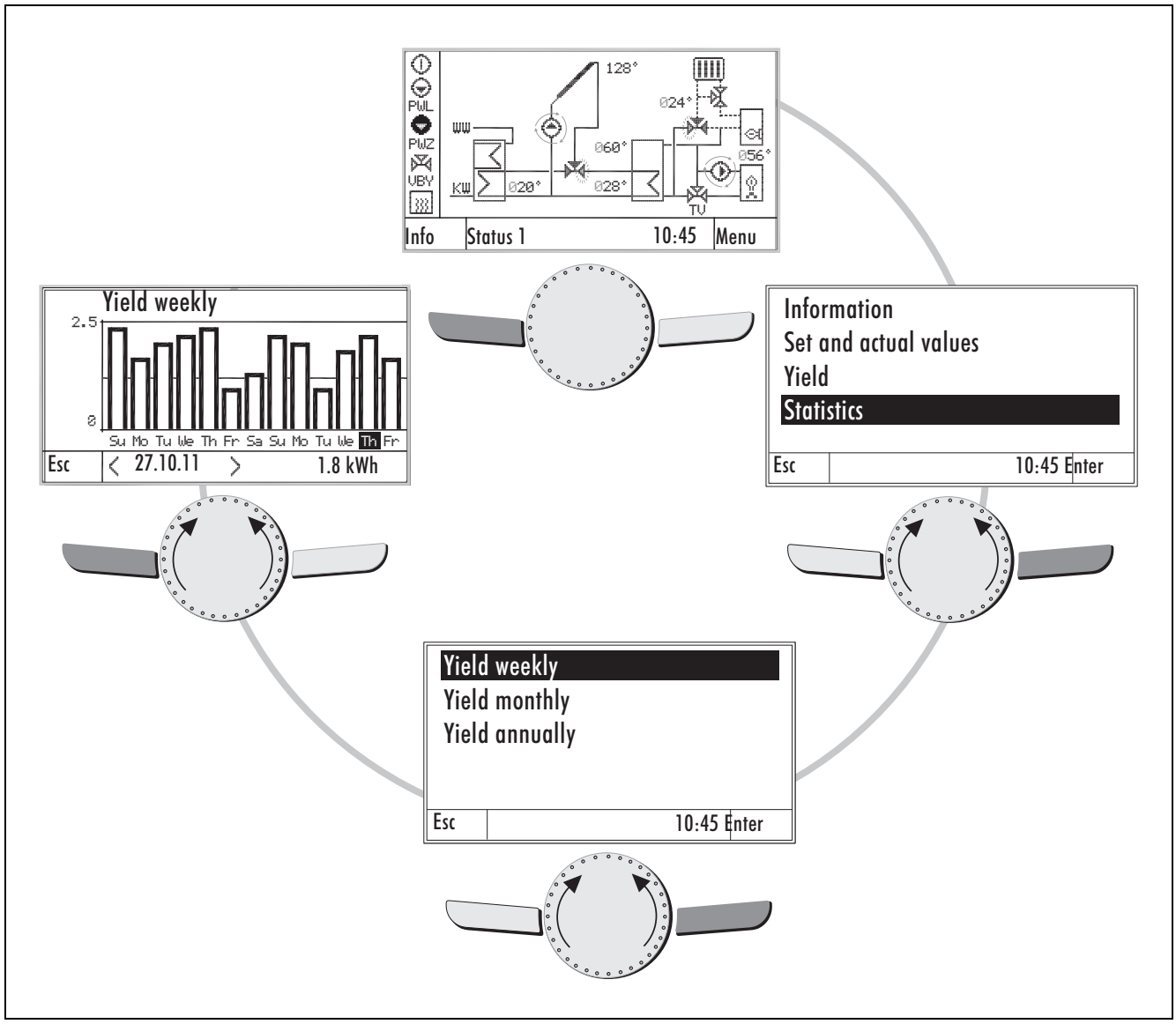


7.4.2 Yield

In this menu, all yields are shown.

Value	Name
Collector partial yield	Accumulated solar energy in kWh, can be reset
PS pump solar pump run time	Accumulated operating hours on the PS solar pump
Total collector yield	Accumulated solar energy in kWh
Delete partial yield?	Reset the partial yield 0 : No 3 : Yes

7.5 Navigation of Statistics menu

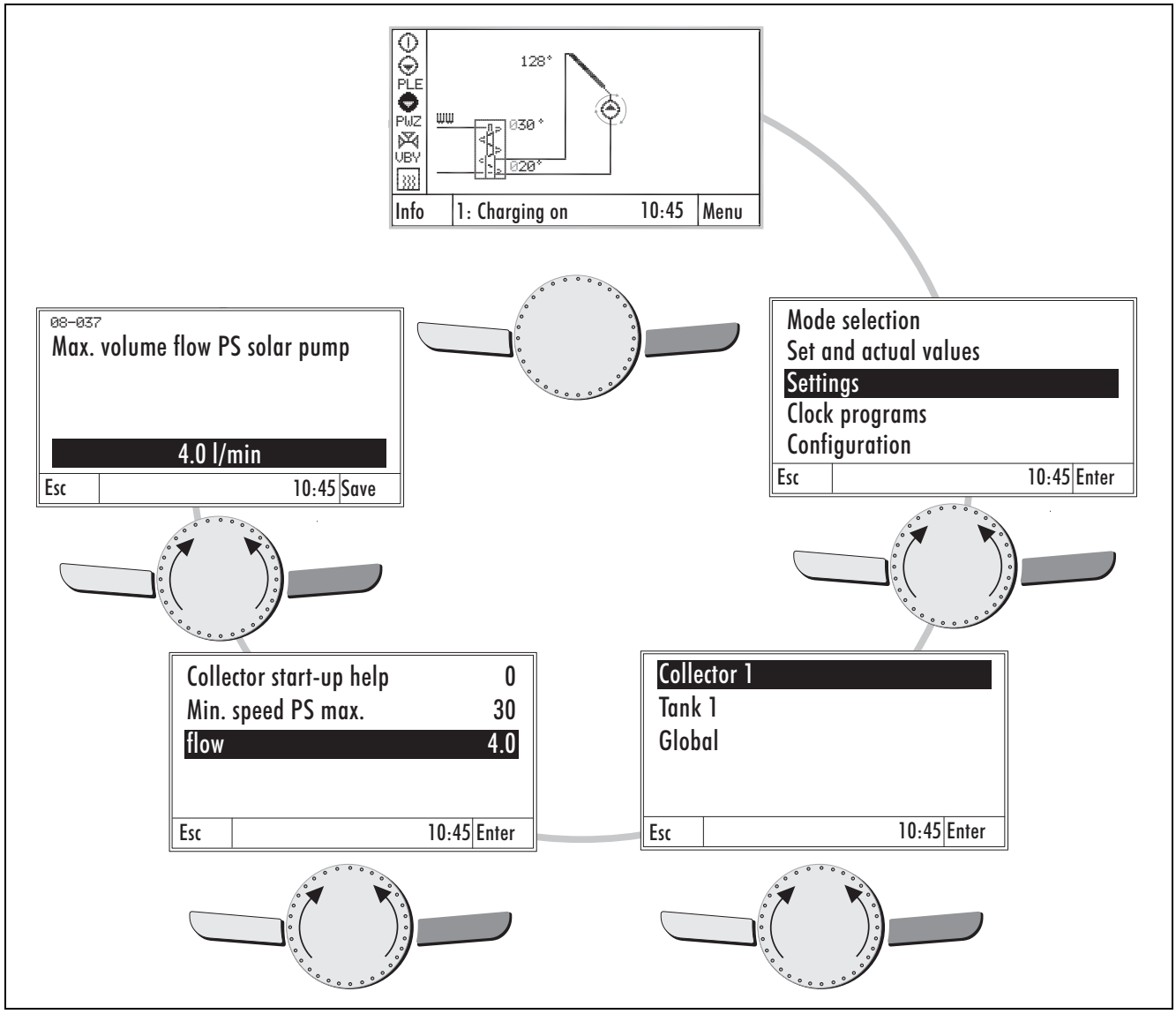


In the "Info" menu, the solar yields are shown graphically.

One can choose between the yields for the week, the last 13 days, the month, the last 13 months, and for the year and the last 13 years.

In the graphics, one can use the rotary knob to select a bar graph for display. At the bottom, then, the selection appears with the corresponding value.

7.6 Navigation / menu structure (change flow)



In the menu:

- The operating mode can be changed.
- The nominal/actual values can be read out.
- The adjusters can be adjusted.
- The time programs can be changed.
- The controller can be configured.

7.6.1 Mode selection

Mode selection

Value	ID	Setting range	Factory settings	Password
Mode selection	08-045	0 ... 3	1	-
	The following operating modes can be selected: 0 : Off System OFF, protective functions active (pump blocking protection, overheating protection, if (08-005) at "On", cooling off function if (08-074) active) 1 : Automatic The control functions are active according to the selected hydraulic type and parameterization 3 : Test The output functions can be manually set in the menu and checked. See chap. 8.6. Attention: No protective functions are active.			

7.6.2 Set/actual values

Collector 1

Value	ID	Name
TK collector temperature	00-014	Solar collector temperature (outlet temperature)
TKV collector flow temperature	00-060	Solar collector supply temperature (TKV)
TKR collector return flow temperature	00-061	Solar collector return temperature (TKR)
FLOW Collector flow	00-062	Volume flow for the heat energy measurement in the solar circuit
Current collector capacity	02-030	Current calculated collector capacity
PS solar pump speed	01-050	Current speed of the SP solar pump in %
Output VBY diverter valve Collector bypass	22-100	Current status of the collector bypass valve VBY

With password

Value	ID	Name
Current set collector temperature	01-014	Calculated nominal collector temperature, reference for the speed control of the PS solar pump
Average PS solar pump speed	02-035	Average speed of the PS solar pump

Tank 1

Value	ID	Name
THR heating circuit return flow temperature	00-003	Return temperature of a heating circuit
TSO DHW temperature	00-004	Upper hot water tank temperature, additional tank
TFK solid fuel boiler temperature	00-007	Solid fuel boiler, supply temperature
TO tank top temperature	00-015	Upper tank temperature
TU tank bottom temperature	00-016	Lower tank temperature
TZW circulation temperature	00-118	Temperature in the hot water circulation line
Output MFA recharging Heat request	01-049	Current status of the MFA output for heat request/boiler disable
Output PZW pump circulation, hot water	01-065	Current status of the hot water circulation pump PZW
PPS re-/discharging pump output, tank	22-102	Current status of the re-/discharging pump PPS
VRA return flow diverter valve output	22-107	Current status of the switchover valve, return temperature increase VRA
PFK solid fuel boiler pump speed	22-108	Current status of the charging pump PFK (charging the tank through the solid fuel boiler)
PLE thermal disinfection pump output	22-111	Current status of the tank circulation pump PLE, for thermal disinfection

With password

Value	ID	Name
Current set tank-top temperature	01-015	Calculated nominal temperature on the upper tank sensor, reference for wide range of functions, such as recharging, solar charging, etc.
Current set tank-bottom temperature	01-016	Calculated nominal temperature on the lower tank sensor, reference for wide range of functions, such as thermal disinfection, solar charging, etc.
Current set circulation temperature	01-118	Calculated nominal temperature on the hot water circulation line sensor TWZ.

General

Value	ID	Name
Solar control status	02-056	Solar function status: 0 : Charging Off 1 : Heating on 2 : Error 3 : Info
MFA high-temperature relief output	22-112	Current status of the output, high-temperature relief
SW version	04-092	Display of the installed software version

With password

Value	ID	Name
Commissioning date	04-089	Display of the commissioning date

7.7 Settings

In this menu, the settings for the collector, tank and general settings can be changed.

Note: Some adjusters are only visible after entering a code.

Collector 1

Value	ID	Setting range	Factory settings	Password
Collector protection function	08-005	0 ... 1	0	-
	With this setting, the protective function for collector overheating is set: 0 : Off ... (no collector protection) 1 : On ... (collector protection active) If collector protection is active and the temperature on the collector rises above the set collector maximum temperature (08-011), the solar charging is enabled regardless of the set tank maximum temperature (08-059). If the collector protection temperature (08-010) or the tank protection temperature (08-060) should be exceeded, the solar charging is disabled .			
Collector fluid heat capacity	08-009	0.01 ... 9.99 kJ/kg*K	3.70 kJ/kg*K	-
	Spec. heat capacity of the collector fluid at 50 °C, -weishaupt- solar heat transfer medium Tyfocor L (45% propylene glycol) or in acc. with data sheet			
Collector protective temperature	08-010	80 ... 180 °C	120°C	11
	If the temperature at the collector sensor rises above the set value, solar charging is disabled.			
Collector maximum temperature	08-011	80 ... 150 °C	90°C	11
	If the collector protection is active (08-005) and the temperature rises at the collector sensor above the set value, solar charging is enabled. **Note:** The temperature for switching on again after switching off for protection is at the set value minus 10 K.			
Collector minimum temperature	08-012	-15 ... 90 °C	20°C	-
	Minimum collector temperature, at which the solar installation is enabled/disabled (fixed hysteresis -5 K).			
Collector frost protection temperature	08-013	-50 ... 10 °C	-20°C	-
	Deactivated when the set value is -50°C. Frost protection mode active when the collector temperature falls below the set value. Frost protection mode is ended when the set value is fallen below by 2 K. Fixed hysteresis 2 K.			

Value	ID	Setting range	Factory settings	Pass word
Collector start-up help	08-015	0 ... 1	0	-
	Start-up aid is for optimizing the system. Due to a positive temperature change at the collector sensor, the solar pump is switched on for a limited runtime. See (08-017). After this time elapses, the pump switches off again. The temperature on the collector is measured. If the temperature difference to the tank is sufficient, the solar pump switches "On". If the switch-on criteria are not met, the solar pump is switched on again after a variable waiting time (min. 15 minutes, max. 100 minutes). The waiting time is defined based on the collector temperature and the temperature change during rinsing. 0 : Off 1 : On ... (collector start-up aid active)			
Start-up help pump runtime	08-017	0.5 ... 20.0 min	0.5 min	11
	Runtime of the pump with active collector start-up aid function.			
Min. speed, PS solar pump	08-035	5 ... 100%	40%	-
	Minimum control variable for the speed control of the PS solar pump. **Note:** Speed-controlled pumps are always started at 100% and run 5 s at this starting speed. This ensures that the pump starts up without problems.			
Max. volume flow, PS solar pump	08-037	10 ... 12000 l/h	240 l/h	-
	If the VIZ / TKR option is not activated, the volume flow of the solar circuit is set, which adjusted itself at a solar pump speed of 100%. This value is used for calculating the current and nominal collector capacity as well as the yield. **If the VIZ / TKR option is activated**, the maximum permissible volume flow of the solar circuit is set. The current volume flow is limited to this value via the pump speed control.			
Min. volume flow, PS solar pump	08-038	0 ... 12000 l/h	60 l/h	-
	If the VIZ / TKR option is activated, the minimum permissible volume flow of the solar circuit is set. The current volume flow is limited to this value via the pump speed control.			
Manual setting PS solar pump	08-085	0 ... 100%	100%	-
	Specification of the control variable/status in test mode.			
Min. standstill time, PS solar pump	08-093	0 ... 200 s	10 s	11
	Off-time for the output. After switching off, the output is blocked for starting up again by this time. Adjuster for high-efficiency or electronic pumps (relay protective function)			
Max. DT temperature difference collector-tank	08-091	10 ... 80 K	50 K	11
	If the temperature difference between the collector and tank temperature for active solar charging during the set time (08-092) is greater than the set value, an error message (Err 71) is generated.			

Value	ID	Setting range	Factory settings	Pass word
Collector–tank DT error message waiting period	08-092	0 ... 180 min	30 min	11
	If the temperature difference between the collector and tank temperature is too high during the set time with solar charging active, an error message is generated according to (E 8-091). 0: Error message suppressed!			
VIZ / TKR option Volume pulse counter / collector return flow sensor	08-107	0 ... 1	1	-
	Option - flow rate measurement 0: Off 1: On If the flow rate meter is active a pulse rate (17-001) must be defined. When the flow is measured, a collector return flow sensor (TKR) is activated at the same time.			
Pulse rate VIZ	17-001	1 ... 9999 pulses/l	180 pulses/l	-
	The pulse constant defines how many pulses per liter the sensor gives off.			
Offset FLOW, solar volume flow	28-020	-200 ... 200 l/h	15 l/h	11
	Offset flow sensor, collector This is added to the measurement to get the finished value.			
TKV option Collector flow sensor	08-108	0 ... 1	1	-
	Option - collector flow sensor 0: Off 1: On The option for the TKV collector flow sensor can be connected as an additional measuring point and then serves as a reference sensor for the speed control of the solar charge.			
VBY option Collector bypass	08-109	0 ... 1	0	-
	Option - collector bypass 0 : Off 1: On			
Manual setting VBY diverter valve Collector bypass	08-125	0 ... 1	0	-
	Specification of the control variable/status in test mode. 0 : Off 1: On			

Tank 1

Value	ID	Setting range	Factory settings	Pass-word
Switch-on difference TK – TU collector – tank bottom	08-001	0 ... 50 K	7 K	-
	With this adjuster, the switch-on difference between the solar reference temperature and the collector temperature is set.			
Switch-off difference TK – TU collector – tank bottom	08-002	0 ... 50 K	4 K	-
	With this adjuster, the switch-off difference between the solar reference temperature and the collector temperature is set.			
Tank control difference	08-064	5 ... 50 K	15 K	-
	The pump speed control attempts to hold the collector temperature higher than the temperature at the lower tank sensor (TU1) by the set control deviation.			
Tank temperature setpoint	08-062	10 ... 90 °C	55°C	-
	Reference parameter for different tank charging functions. If the value at the tank sensor is exceeded, the setpoint is met. Switchpoint for charging at set point. Setpoint, tank recharging. Basic target setpoint for calculating the optimized speed control setpoint rise when charging at the nominal value.			
Switch-on hysteresis to set tank temperature	08-063	1 ... 30 K	2 K	-
	If the temperature in the tank is less than the setpoint minus the set value, this results in a charging request.			
Maximum tank temperature	08-059	10 ... 95 °C	90°C	-
	If the temperature at the tank sensor is above the set value, solar charging is disabled for this tank. **Note:** When overheating protection is active (08-005), this limit is not observed. (08-060) applies.			
Protective tank temperature	08-060	10 ... 99 °C	95°C	11
	If the temperature at the tank sensor increases above the set value, solar charging is disabled, even for active overheating protection.			
Active collector protection / night cooling tank	08-074	0 ... 2	0	-
	This allows the tank to recool via the collector with a negative temperature difference if the maximum tank temperature (08-059) and/or the maximum collector temperature (08-011) is exceeded during the day. 0 : Off No consumer active 1 : At maximum tank temp. Cooling-off function is set, if tank temp. > max. tank temp. (08-059) 2 : Collect./max. tank temp. Cooling-off function is set, if tank temp. > max. tank temp. (08-059) and collector temp. > Collector protection temp. (08-010)			

Value	ID	Setting range	Factory settings	Password
Sensor selection, setpoint	08-007	0 ... 1	1	11
	Selection of the reference sensor for measuring or set temperature function 0 : Lower sensor ... (TUx lower sensor in the tank) 1 : Upper sensor ... (TOx upper sensor in the tank)			
Sensor selection, maximum value	08-008	0 ... 1	1	11
	Selection of the reference sensor for measuring or maximum temperature function 0 : Lower sensor ... (TUx lower sensor in the tank) 1 : Upper sensor ... (TOx upper sensor in the tank)			
Circulation function	05-006	0 ... 8	0	-
	Selection of the desired circulation function. The hot water circulation pump PZW can become active according to the following criteria. 0: Inactive 1: Clock program and temperature 3: Temperature controlled 4: Pulse controlled 5: according clock program 6: Temp.- and pulse-control. 7: Temp, pulse and clock pr. 8: Pulse and clock program			
Circulation circuit, release temperature	05-054	0 ... 90 °C	45°C	-
	If the set value at the TZW sensor is fallen short of, the hot water circulation pump is active. **Note:** For active thermal disinfection, this value is replaced by the **thermal disinfection temperature** (05-004).			
PZW pump runtime for pulse control	05-070	0 ... 30 min	3 min	-
	If the PZW hot water circulation pump is operated with pulse control, the runtime of the PZW pump is defined with this value.			
PZW pump off-time for pulse control	05-071	0 ... 240 min	0 min	-
	After the runtime of the PZW pump (05-070) has elapsed, its operation is disabled by the set value time.			
Manual setting PZW pump circulation circuit	05-122	0 ... 1	0	-
	Specification of the control variable/status in test mode. 0 : Off 1 : On			
MFA option – recharging, heat request	08-113	0 ... 1	0	-
	Option - heat request / boiler disable 0 : Off 1 : On			

Value	ID	Setting range	Factory settings	Password
Manual setting MFA recharging Heat request	08-124	0 ... 1	0	-
	Specification of the control variable/status in test mode. 0 : Off 1 : On			
Setpoint reduction for high solar yield	08-072	0 ... 20 K	15 K	11
	If a high solar or daily yield is detected according to adjuster (08-070) or (08-071), the normal nominal tank value (08-062) is reduced by the set value for recharging with a conventional heat generator.			
Thermal disinfection function	05-014	0, 10,	0	-
	Selection whether thermal disinfection is desired and what actuator is for recirculating the tank. In addition, a time program can be edited for thermal disinfection. The hot water is heated to the set **thermal disinfection temperature** according to the time program and held for 2 h. 0 : No function 10 : with PLE pump, for tank recirculation with PLE pump			
Thermal disinfection temperature	05-004	60 ... 80 °C	60°C	-
	Setting the desired temperature when the **thermal disinfection function** is active. After reaching the temperature at the lower tank sensor, this is held for 2 h.			
Manual setting PLE circulation pump, thermal disinfection	28-002	0 ... 1	0	-
	Specification of the control variable/status in test mode. 0 : Off 1: On			
PPS option Discharging	08-101	0 ... 1	0	-
	Option – transfer, discharging 0 : Off 1 : On			
Manual setting PPS re-/discharging pump	08-120	0 ... 1	0	-
	Specification of the control variable/status in test mode. 0 : Off 1 : On			
DHW temperature setpoint	05-051	10 ... 90 °C	55°C	-
	Set temperature of the additional tank, to which charging is done with the PPS transfer function.			
Switch-on difference re-/discharging PPS	08-098	5 ... 50 K	5 K	-
	If the temperature at the tank sensor is greater than the active set tank value plus 2 K, and if the temperature difference from the TSO sensor increases above the set value, the transfer PPS is enabled.			

Value	ID	Setting range	Factory settings	Password
Switch-off difference re-/discharging PPS	08-099	2 ... 20 K	3 K	-
	If the temperature at the tank sensor is less than the active nominal tank value, or if the temperature difference from the TSO sensor falls below the set value, the transfer PPS is disabled.			
Max. tank temperature for VRA return temperature increase	07-008	30 ... 105 °C	70°C	-
	Specification of the maximum tank temperature for the return temperature increase function. If the temperature at the tank top sensor, TOx, rises above the set value, the return temperature increase function is disabled.			
Switch-on difference VRA Return temperature increase	08-080	5 ... 50 K	10 K	-
	If the temperature at the tank sensor rises above the heating circuit return temperature plus the set value, the return temperature increase is enabled. If the max. tank temperature for the return temperature increase (07-008) is exceeded, the return temperature increase is disabled.			
Switch-off difference VRA Return temperature increase	08-081	2 ... 20 K	5 K	-
	If the temperature at the tank sensor falls below the heating circuit return temperature plus the set value, the return temperature increase is disabled.			
Manual setting VRA diverter valve Return temperature increase	08-121	0 ... 1	0	-
	Specification of the control variable/status in test mode. 0 : Off 1 : On			
Manual setting PFK pump, solid fuel boiler	08-083	0 ... 100%	30%	-
	Specification of the control variable/status in test mode.			
Switch-on difference, TFK – TU, solid fuel boiler – tank bottom	08-003	0 ... 50 K	10 K	-
	With this adjuster, the switch-on difference between the charging reference temperature and the solid fuel boiler temperature is set.			
Switch-off difference, TFK – TU, solid fuel boiler – tank bottom	08-004	0 ... 50 K	5 K	-
	With this adjuster, the switch-off difference between the charging reference temperature and the solid fuel boiler temperature is set.			
Min. standby time, PFK pump, solid fuel boiler	08-094	0 ... 200 s	10 s	11
	Off-time for the output. After switching off, the output is blocked for starting up again by this time. Adjuster for high-efficiency or electronic pumps (relay protective function)			
Minimum temperature, TFK solid fuel boiler	09-032	10 ... 90 °C	50 °C	-
	Minimum temperature at which charging from the solid fuel boiler to the storage tank is enabled/disabled (fixed hysteresis -5 K). Example: Enable at 50 °C Disable at 45 °C (= 50 °C - 5 K)			
Min. speed, PFK pump, solid fuel boiler	09-039	5 ... 100%	30%	-
	Minimum control variable for the speed control of the solid fuel boiler pump. **Note:** The pump is always started at 100% and runs for 5 s at this starting speed. This ensures that the pump starts up without problems.			

Value	ID	Setting range	Factory settings	Pass-word
Solar charging strategy	08-050	0 ... 4	0/ 3	-
	A strategy can be selected for solar charging: In the charging strategies, it is attempted to charge the tank to the desired set or maximum temperature in as few charging cycles as possible. Based on the solar supply, the controller attempts to hold an even setpoint rise, setpoint rise (E 8-064) or optimized setpoint rise on the collector sensor during the entire charge. The optimized setpoint rise is limited downward using adjuster (E 8-064). In strategies 3 + 4, this calculation is only used for a high solar yield. 0 : At yield The setpoint for speed control results from the temperature on the tank sensor plus the setpoint rise (08-064). For several consumers, charging is done in alternating tank operation. Here, the tank with the lower temperature is charged first. 1 : To set temperature The setpoint for speed control results from the temperature on the tank sensor + optimized setpoint rise. For several tanks, the charge is done according to tank priority (08-056) at the setpoint. The tank with priority 1 is first charged at the setpoint (08-062). 3 : Automatic yield / set The setpoint for speed control results according to the active strategy, yield-dependent strategy switchover between 0 and 1. Charging is done based on yield, in parallel in alternating tank operation, or according to priority of the tanks at the setpoint.			
Change-over solar charging (high yield)	08-051	30 ... 100%	50%	11
	If the comparison of the current solar capacity with the calculated nominal capacity results in a factor which lies above the set value, it switches from parallel mode (swinging) to the nominal or maximum charge. **Note:** Calculation of the nominal capacity from max. volume flow (08-037), spec. heat capacity (08-009) and tank control deviation (08-064).			

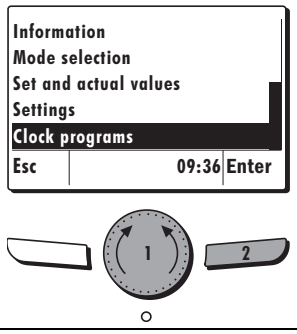
Value	ID	Setting range	Factory settings	Password
Switch-on threshold detection of high solar energy	08-070	0 ... 100%	50%	11
	If the comparison of the current solar capacity and the nominal capacity results in a factor above the set value, and if the reduced nominal tank temperature [(08-062) - (0-072)] exceeded, recharging is only allowed with a conventional heat exchanger at the reduced nominal temperature. If the factor is 10% below the set value, the normal nominal tank temperature (08-062) is reactivated, except if the long-term disable prevents this. See (08-071).			
Switch-on threshold recognition high daily energy	08-071	0 ... 100%	80%	11
	If the daily yield lies below the set value, and if the set tank temperature (08-062) is exceeded, recharging is only allowed for 18 h with a conventional heat generator at the reduced setpoint (long-term disable). If the reduced setpoint is fallen short of, recharging is done to the set tank temperature (08-062).			
Option MFA high-temperature relief	08-110	0 ... 1	0	-
	High-temperature relief option, for protecting the collectors from stagnation. With this function, overtemperature should be prevented on the collectors. By removing heat directly from the consumers or from the collector, the excess heat can be removed, ... if TO1 > max. tank temperature (E 8-059) = HTE active, if TO1 < max. tank temperature (E 8-059) = HTE disabled 0 : Off 1: On **Note:** The collector protection function (08-005) must be activated.			
Option MFA-error output	08-111	0 ... 1	0	-
	Option - collective malfunction message 0 : Off 1: On			
Manual setting MFA high-temperature relief	08-123	0 ... 1	0	-
	Specification of the control variable/status in test mode. 0 : Off 1: On			

7.8 Setting time programs

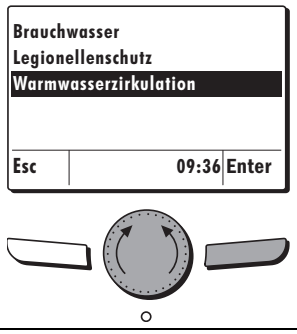
The time programs for domestic water/thermal disinfection/hot water circulation can be changed and saved.
The function must be enabled beforehand for the corresponding hydraulic type, so that the clock programming can be done.

Example: Hot water circulation (Circulation circuit)

1. Select the ***Time program*** with the adjusting knob and press ***Enter***.

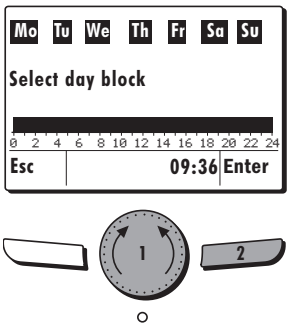


2. In the submenu, select ***Circulation circuit*** and press ***Enter***.

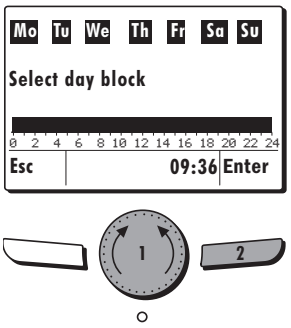


3. Select ***Select day block*** with the adjusting knob and press ***Enter***.

- Either blocks of days or individual days can be selected.
- Days programmed the same way are consolidated into blocks.

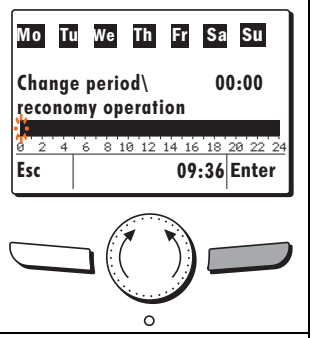


4. Select ***Set cursor position*** with the adjusting knob and press ***Enter***.



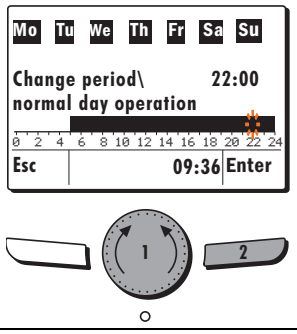
5. By repeatedly pressing ***Enter***, the following functions appear:

- Adapt period normal heating
- Adapt period economy heating
- Set cursor position

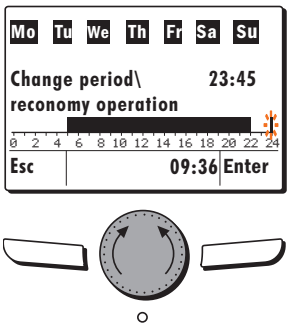


6. A period can be programmed with the adjusting knob, e.g. normal mode period.

- By pressing ***Enter***, the function is changed, as described under step 5.



7. A period can be programmed with the rotary knob, e.g. Heating mode economy.

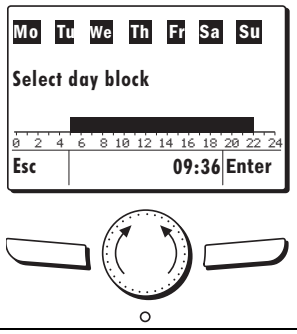


8. In order to save the changed program, the ***Esc key*** must be pressed until the display shown here appears.

- By pressing ***Save***, the time program can be definitely saved.

9. After pressing ***Save***, the controller jumps to the time program selection functions.

10. By pressing ***Enter***, the previously programmed time program can be checked.

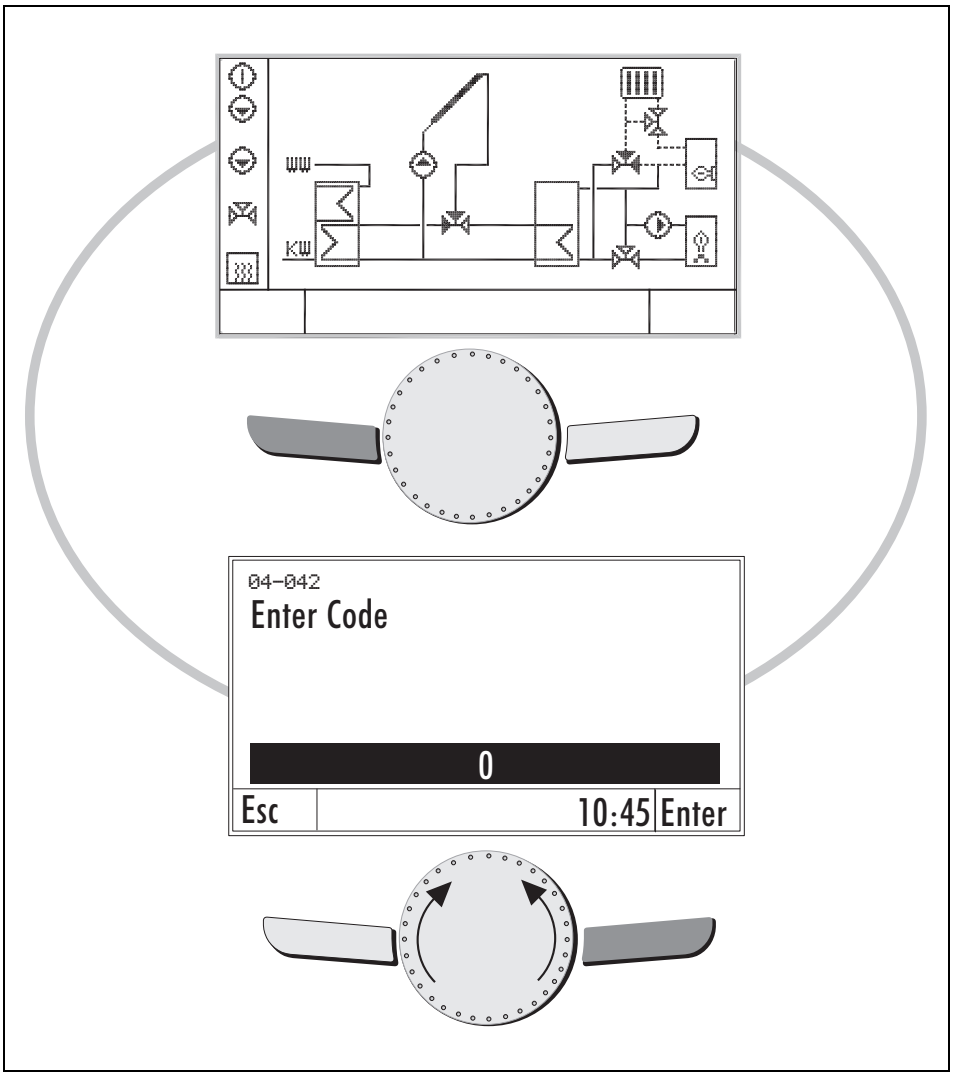


7.9 Configuration

Value	ID	Setting range	Factory settings	Pass-word
Hydraulic type	04-006	1 - 23	1	-
	Setting the desired hydraulic type After selecting and confirming with Save, the controller is restarted.			
Language selection	04-056	0 ... 15	0	-
	Selecting the desired language. 0: deutsch 1: français 2: nederlands 3: italiano 4: español 5: svenska 6: danske 7: polski 8: slovenski 9: hrvatski 10: slovenských 11: český 12: magyar 13: english 14: român 15: norsk			
Date	02-070	01.01.2011 - 31.12.2099	-	-
	Setting of the current date			
Time	02-072	00:00 - 23:59	-	-
	Setting of the current time			
Output 1: Solar pump	04-030	0 ... 4	1	-
	Selection of the signal type for the 1st signal output (terminal 18). The control variable of output 1 is then output in the selected signal. For a setting not equal to 0, the output only switches 100% (On) or 0% (Off). 0: Standard pump 1: PWM 2: Special PWM inverse 3: 0 - 10 V 4: Special 0 - 10 V inverse			
 **CAUTION**	**If "Output 1: Solar pump" is at "0: standard pump, NO electronic pump may be installed!**			

Value	ID	Setting range	Factory settings	Password
Normal position, MFA	08-000	0 ... 1	0	11
	Definition of the switching/effective direction of the multifunctional output, terminal 5/ 6. Here, it can be set whether the output for the heat request, high-temperature relief or collective malfunction message functions should work as N/C contacts or N/O contacts. 0 : N/O contact ... (electric specification of the resting status NO) 1 : N/C contact ... (electric specification of the resting status NC)			
Data recording	04-115	0 ... 1	0	-
	Adjuster for starting or stopping data recording on the SD card. 0 : Stop 1 : Start Starting from this time, all actual and status values are recorded. In addition, an error history is also logged and the changes to the adjusters.			
RESET	04-045	0, 29	0	-
	With this adjuster, the corresponding commands can be given, which trigger an action. 0 : No function 29 : Factory settings All values are reset to factory settings and the commissioning menu is restarted. All counters are zeroed, except for statistics.			

7.10 Navigation code input



To input the password, press the left key for longer than 5 s.

The window appears to input the password.

Enter password "11" and confirm with "Save".

It jumps back to the title screen, and the menu levels are reloaded.

8 Functions

8.1 Collector protection

In addition to the basic function of the controller, the system can be further protected from overheating via a passive and/or active protective function. In the basic function (setting 0), when the maximum tank temperature is exceeded, the solar pump is switched off. It also switches off if the collector protection temperature is exceeded. The pump is switched on again after the collector cools off 10 K below the maximum collector temperature.

1. **Collector protective function:**

   If the collector temperature rises above the maximum temperature, and if the tank temperature is above the maximum temperature, the solar pump is operated at 100%. The tank is now charged to the protective tank temperature independent of the maximum tank temperature setting. It still switches off if the collector protection temperature (120 °C) is exceeded.
   It switches on again at 10 K below the maximum collector temperature or when the tank temperature falls 5 K below the protective tank temperature without the collector protection temperature being exceeded.

2. **Active collector protection / night cooling tank**

   In addition to collector protection, cooling via the collectors can be activated.
   2.1 Enable cooling function as soon as the maximum tank temperature has been reached.
   2.2 Enable cooling function as soon as the collector protection temperature and maximum tank temperature have been reached.
   After the cooling function has been enabled, when the collector temperature falls below the tank temperature by 8 K, the solar pump is actuated and the tank discharged. The discharge ends as soon as the collector temperature only lies 4 K above the tank temperature or when the maximum tank temperature is fallen short of by 15 K.

WARNING

The collector protection active setting (08-005) must not occur in connection with a tank whose permissible maximum temperature lies under 95 °C. This setting is also not permitted when there is no scalding protection on the potable water line.

If no cooling function is desired, the setting 0 must be selected.

8.2 MFA output

The multifunctional output can be used for the following functions:
- Heat generator disable/enable
- Retransmission of malfunction message
- Removal of excess heat (high-temperature relief)

The MFA contact is a potential-free contact.
To actuate a heat generator or a circulation pump, the supply voltage of terminal L to terminal 5 must be bridged.

The following parameters are available for the three functions:

MFA option - high-temperature relief (08-110)
MFA option - error output (08-111)
MFA option - recharging, heat demand" (08-113)

The factory setting for these parameters is "0" (= off).
If one of these parameters is set to "1" (= on), the other parameters are hidden.

8.2.1 Heat generator disable, heat generator enable

Depending on the tank temperature and solar capacity, a controller-external heat generator can be disabled, or an existing enable for this heat generator can be interrupted.

Heat generator enable function: For the tank (tank 1 or 2), a nominal value can be set which is monitored at the upper tank sensor TOx (TO1 or TO2).

If the **`set tank temperature`** (08-062) is fallen below by the switch-on hysteresis (08-064), the heat generator is enabled and the MFA contact closes. In addition, however, the **`Domestic water`** time program has an effect on the heat generator enable, i.e. the heat generator is only requested if the nominal value is fallen short of within the **`Domestic water`** time program.

Switching criteria for heat generator disable, heat generator enable:
- If the current tank temperature is greater than the nominal tank temperature (08-062), the heat generator is disabled.
- If the current capacity of the solar installation is greater than 50% of the nominal capacity and the current tank temperature is greater than the nominal tank temperature (08-062) minus the **`nominal value reduction at high solar yield`** (08-072), the heat generator is disabled. If one of the two conditions is no longer met, the disable is cancelled.
- If the current capacity of the solar installation is greater than 80% of the nominal capacity, once the nominal tank temperature (08-062) is reached, the burner disable is activated for 18 hours. If the tank temperature falls below the **`set tank temperature`** minus the **`setpoint reduction at high solar yield`** (08-072), the disable is deactivated.

Sensors and actuators

`TO tank top temperature`	00-015	Upper tank temperature
`Set TO set tank top temperature`	01-015	Calculated set temperature on upper tank sensor
`MFA output, recharging, heat request`	01-049	Current status of the MFA output for heat request/boiler disable

Adjuster on tank level:				
Tank temperature setpoint	08-062	10 ... 90 °C	55 °C	-
Switch-on hysteresis to set tank temperature	08-063	1 ... 30 K	2 K	-
Setpoint reduction for high solar yield	08-072	0 ... 20 K	15 K	11
Manual setting of MFA recharging, heat request	08-124	0 ... 1	0	-
Adjuster on general level:				
Switch-on threshold detection of high solar energy	08-070	0 ... 100%	50%	11
Switch-on threshold recognition high daily energy	08-071	0 ... 100%	80%	11

Reversal of the effective direction

In the factory settings, the mode of operation of the MFA contact is as described above (for cold tank, MFA closed). If the effective direction should be reversed, the parameter **Effective direction MFA** (08-000) is to be set from "0" to "1".

Application case of the heat generator disable in connection with a heat generator with its own tank charging function: The hot water tank is recharged via a hot water sensor in the tank charging control system. If the set temperature in the tank is exceeded by the solar installation, the heat generator does not recharge. In this case, a boiler disable via the solar controller WRSol 1.1 is not mandatory.

However, with the boiler disable, the heat generator can be made to only recharge at a reduced setpoint for solar yield.

Example: The set temperature for the hot-water charging of the external heat generator is 55 °C. The boiler would recharge the tank at 50 °C (hysteresis - 5K). When the solar installation goes into operation and a larger amount of hot water is tapped at the same time (tank drops to 49 °C), the boiler recharges the tank.

If a boiler disable is installed via WRSol, this would prevent recharging as long as the tank does not drop below 40 °C (**nominal tank temperature** minus **nominal value reduction at high solar yield**).

8.2.2 Retransmission of malfunction message

If an occurring malfunction should be indicated with an acoustic or optical signal, or if the malfunction message should be transmitted to a building services management system, this can be done via the potential-free MFA switch contact.

The function is activated via the parameter **Option MFA-error output** (08-111).

If a malfunction occurs, which appears on the display of the solar controller, the controller-internal relay contact closes.

If the relay contact should open when a malfunction occurs, the parameter

Normal position, MFA (08-000) is to be set from "0" to "1".

8.2.3 High-temperature relief

With this function, the tank can already be cooled via an additional cooling circuit during the day. For this, an additional circulation pump is connected to the tank, for example, which is controlled via the MFA output.

The MFA output is actuated when the tank has reached the set maximum temperature (08-059). There is a shutdown when the maximum temperature is fallen short of by 5 K.

To prevent the solar pump from switching off as soon as the maximum tank temperature is reached, the **`collector protection`** (08-005) must be set to "1".

Sensors and actuators

`TO tank top temperature`	00-015	Upper tank temperature
`MFA high-temperature relief output`	22-112	Current status of the output, high-temperature relief

Adjuster on general level:

`Manual setting MFA high-temperature relief`	08-123	0 ... 1	0	-

8.3 Pump maintenance

To prevent the connected actuators from getting stuck, the outputs are activated every 24 hours for approx. 35 seconds.

8.4 Pump speed control in connection with collectors

The controller has speed control, with which the pump is controlled by means of a power signal (0 – 10 V or PWM) or by means of an oscillation packet.

The actuation depends on the following factors:

- The temperature at the reference sensor (TUx) is added to the setpoint rise, **`tank control difference`** (08-064).
  The speed control now tries to regulate the collector temperature (TKx) to this value.

Example:
The target collector temperature results from:

Set setpoint rise: 15 K + actual tank temperature: 40 °C (TU1) = nominal collector temperature: 55 °C (TKx)

If the actual collector temperature drops toward the target collector temperature, the speed is modulated within the specified limits.

Note:
If the collector flow sensor option TKV (08-108) is active, the temperature is included in the speed control of the solar pump PS and is also included in the switch-off condition of the solar charge.

The collector return temperature with the volume pulse counter option / TKR active, this is also included in the control of the solar charge and speed control. See chap. 8.10

Note:
The switch-on and switch-off conditions for the pump are adjustable (see chap. 7.7).
If the factory setting is maintained and the collector temperature exceeds the tank temperature by + 7 K (**switch-on difference TK – TU**), the pump is switched on.
If the collector temperature falls below the value of the tank temperature + 4 K (**switch-off difference TK – TU**), the pump is switched off.

Note:
For the setting **Output 1 = 0: standard pump**, this can result in a pulsating volume flow due to the speed control in modulation mode, which can be noticed due to the flow noises or due to oscillations in flexible lines.

8.5 Pump actuation in connection with a solid fuel boiler

The controller has speed control, with which the pump is controlled by means of a power signal (0 – 10 V or PWM) or by means of an oscillation packet.

Switch-on conditions

1.) The **minimum temperature TFK** must be reached.

and

2.) If the solid fuel boiler temperature reaches the lower tank temperature (TUx) plus the **switch-on difference TFK – TU** (08-003), the pump runs at the slowest speed.

TFK > **minimum temperature TFK** (09-032) and

TFK > TUx + **switch-on difference TFK – TU** (08-003)

► Pump runs at slowest speed

Via the speed control, it is attempted to reach the set tank temperature (08-062) and to maintain this.

If the current solid fuel boiler temperature drops toward the target set temperature, the speed is modulated within the specified limits. Below this set temperature, the pump runs at minimum capacity.

Note:
For the setting **Output 2 = 0: standard pump**, this can result in a pulsating volume flow due to the speed control in modulation mode, which can be noticed due to the flow noises or due to oscillations in flexible lines.

Switch-off conditions

1.) The **minimum temperature TFK** is fallen short of by the switching differential of 5 K.

or

2.) If the current solid fuel boiler temperature falls below the lower tank temperature (TUx) plus the **switch-off difference TFK – TU** (08-004), the pump switches off.

TFK < **minimum temperature TFK** (09-032) - 5 K or

TFK < TUx + **switch-off difference TFK – TU** (08-004)

► Pump off

8.6 Test function

- In the selection menu under mode selection, set the selection to **`Test`**.
- All outputs are actuated according to the factory settings.
- In the **`Settings`** submenu, the outputs can be activated/deactivated and the speed changed.

Note:

In the test function, the volume flow of the system can be set at 100% pump capacity. The volume flow to be set can be found in the installation and operating instructions of the collector.

Value	ID	Setting range	Factory settings	Password
	Collector 1			
`Manual setting PS solar pump`	08-085	0 ... 100%	100%	-
`Manual setting VBY bypass diverter valve`	08-125	0 ... 1	0	-
	Tank 1			
`Manual setting PFK pump, solid fuel boiler`	08-083	0 ... 100%	30%	-
`Manual setting PPS re-/discharging pump`	08-120	0 ... 1	0	-
`Manual setting VRA return flow diverter valve`	08-121	0 ... 1	0	-
`Manual setting of MFA recharging, heat request`	08-124	0 ... 1	0	-
	General			
`Manual setting MFA high-temperature relief`	08-123	0 ... 1	0	-

8.7 Energy yield calculation

In this solar controller, there is an energy yield calculation included as a function based on the temperature difference between the collector temperature (TKx) and the reference sensor (TUx) over the flow rate (volume flow).

After setting the volume flow, at a pump speed of 100% via the flow limiter, the scale value must be read off and input in the selection group settings -> Collector in the max. volume flow parameter.

Also, for another heat transfer medium, the heat transfer medium capacity at 50°C (heat capacity) must be adjusted.

If the option **TKV option, collector flow sensor** is active, this is used as a reference sensor instead of TKx for the yield calculation.

If the option **VIZ / TKR option, volume pulse counter / collector return flow sensor** is active, TKR is used as the reference sensor instead of TUx for the yield calculation. The measured volume flow is also included in the calculation.

Heat capacity at 50°C:

-weishaupt- Solar heat transfer medium Tyfocor L (45% propylene glycol): 3.70 kJ/lK

Water: 4.19 kJ/lK

8.8 Start-up help function

Due to a positive temperature change on the collector sensor TKx, the solar pump is switched on for the **Start-up help pump runtime** (08-017).

After this time elapses, the pump switches off again.
The temperature on the collector is measured. If the temperature difference to the tank is sufficient, the solar pump switches "On".
If the switch-on criteria are not met, after a variable waiting time from 15 to 100 minutes, the solar pump is switched on again for the **Start-up help pump runtime** (08-017).
The waiting time is defined based on the collector temperature and the temperature change.

8.9 Option PPS re-/discharging

Option PPS - Transfer to existing hot-water tank with TSO and definable set hot-water temperature
If the temperature at the tank top (TOx) is greater than the temperature at the additional tank sensor TSO, the additional tank can be charged.
Transfer PPS is enabled when the **DHW temperature setpoint** (05-051) at the additional tank sensor TSO is fallen short of and the temperature at the tank top sensor TOx is greater by the **Switch-on difference re-/discharging PPS** (08-098) and the **Tank temperature setpoint** (08-062) is reached.

TSO < **DHW temperature setpoint** (05-051) - hysteresis (08-063) and

TOx > **Tank temperature setpoint** (08-062) and

TOx > TSO + **Switch-on difference re-/discharging PPS** (08-098),

then PPS active

TSO > **DHW temperature setpoint** (05-051) or

TOx < **Tank temperature setpoint** (08-062) - hysteresis (08-063) or

TOx < TSO + **Switch-off difference re-/discharging PPS** (08-099),

then PPS disabled

Sensors and actuators

TSO DHW temperature	00-004	Upper hot water tank temperature, additional tank		
TO tank top temperature	00-015	Upper tank temperature		
PPS re-/discharging pump output, tank	22-102	Current status of the re-/discharging pump PPS		

Adjuster on tank level:

DHW temperature setpoint	05-051	10 ... 90 °C	55°C	-
Tank temperature setpoint	08-062	10 ... 90 °C	55°C	-
Switch-on hysteresis to set tank temperature	08-063	1 ... 30 K	2 K	-
Switch-on difference re-/discharging PPS	08-098	5 ... 50 K	5 K	-
Switch-off difference re-/discharging PPS	08-099	2 ... 20 K	3 K	-
Manual setting PPS re-/discharging pump	08-120	0 ... 1	0	-

8.10 Option volume pulse counter / collector return flow sensor

If the flow rate measurement is activated, a **VIZ pulse rate**(17-001) must be defined. With this option, a collector return flow sensor is also activated.

The flow rate is included in the capacity and yield calculation. The return temperature TKR is taken into consideration instead of the tank bottom temperature for the capacity and yield calculation.

For the speed control of the solar pump, instead of TU (lower tank temperature), the collector return flow sensor TKR is used.

If the flow meter is active, the volume flow is limited to the two limits **Min. volume flow, PS solar pump** (08-038) and **Max. volume flow, PS solar pump** (08-037) in the collector circuit.

Sensors and actuators

TKR collector return flow temperature	00-061	Solar collector return temperature (TKR)		
FLOW Collector flow	00-062	Volume flow for the heat energy measurement in the solar circuit		

Adjuster on collector level:

Pulse rate VIZ	17-001	1 ... 9999 pulses/l	180 pulses/l	-
Offset FLOW collector flow	28-020	-200 ... 200 l/h	15 l/h	11
Max. volume flow, PS solar pump	08-037	10 ... 12000 l/h	240 l/h	-
Min. volume flow, PS solar pump	08-038	0 ... 12000 l/h	60 l/h	-

8.11 Collector bypass VBY

Is used for optimization on large systems or for long line distances.

The valve generates a short circuit (bypass) in the collector circuit so that no cold medium gets into the consumer.
Only when the sensor (TKV) in the supply of the collector circuit reaches the temperature of the tank bottom sensor (TUx) plus the switch-off difference (08-002) plus 2 K is tank charging enabled.

TKV > TUx + switch-off difference (08-002) + 2 K, then VBY active

TKV < TxU + switch-off difference (08-002), then VBY disabled

Note:
If the collector flow sensor TKV is also used for controlling the speed of the solar pump PS and flows into the capacity calculation, the **`Option TKV collector flow sensor`** (08-108) must be activated.

Sensors and actuators

`TKV collector flow temperature`	00-060	Solar collector supply temperature (TKV)
`VBY collector bypass diverter valve output`	22-100	Current status of the collector bypass valve VBY

Adjuster on collector level:

`Manual setting VBY bypass diverter valve`	08-125	0 ... 1	0	-

8.12 Thermal disinfection

If disinfection is enabled with the **`Thermal disinfection`** time program and the **`Thermal disinfection temperature`** at the sensor TUx on this day has not yet been reached, the pump PLE is switched on and the burner disable deactivated.

If the **`Thermal disinfection temperature`** is reached at sensor TUx and is maintained for 2 h or if disinfection is no longer enabled according to the time program, the pump PLE is switched off and the burner disable activated.

Note:
If recharging is active, the setpoint for recharging is automatically raised to the **`Thermal disinfection temperature`**. With the help of the time program, this function can be adapted to the hot-water requirement.

The pump for circulating the tank can be defined in the adjuster **`Thermal disinfection`** (05-014).

10: ... with pump PLE
11: ... with pump PZW
12: ... with pump PPS

Note:
`Thermal disinfection` can only be selected if **`3: Hot-water tank`** is selected in the adjuster **`Tank type`** (08-055) of the respective tank.

Adjuster on tank level:

`Thermal disinfection temperature`	05-004	60 ... 80 °C	60°C	-

8.13 Hot-water circulation

For the circulation in the hot-water line, one can choose from various functions and their combinations. The circulation pump PZW can be enabled according to the **Hot-water circulation ("circulation circuit")** time program, temperature-controlled and/or pulse-controlled.

0 : No function
1 : Temperature-controlled and according to time program
3 : Temperature-controlled
4 : Pulse-controlled *
5 : According to time program
6 : Temperature- and pulse-controlled *
7 : Temperature-, pulse-controlled and according to time program *
8 : Pulse-controlled and according to time program *

If the **Circulation circuit enable temperature** (05-054) at the sensor TZW is fallen short of by the switching differential of 2 K. the circulation pump PZW is switched on.

A pulse is triggered by a tapping operation or button, which activates the PZW pump for the adjustable **Runtime PZW pump with pulse control** (05-070). For this, a button is clamped to the pulse input V2, for example.

*) Cannot be selected for 2 collector fields!

Sensors and actuators

TZW circulation temperature	00-118	Temperature in the hot water circulation line
Set TZW circulation temperature setpoint	01-118	Calculated nominal temperature on the hot water circulation line sensor TZW.
Output PZW pump circulation, hot water	01-065	Current status of the hot water circulation pump PZW

Adjuster on tank level:

Circulation circuit, release temperature	05-054	0 ... 90 °C	45°C	-
PZW pump runtime for pulse control	05-070	0 ... 30 min	3 min	-
PZW pump off-time for pulse control	05-071	0 ... 240 min	0 min	-
Manual setting PZW pump circulation circuit	05-122	0 ... 1	0	-

8.14 Solar charging strategy

0 : **For yield**
The setpoint for speed control results from the temperature on the tank sensor plus the setpoint rise (08-064).

1 : **To set temperature**
The setpoint for speed control results from the temperature on the tank sensor plus the optimized setpoint rise.

3 : **Automatic yield/nominal**
The setpoint for speed control results according to the active strategy, yield-dependent strategy switchover between 0 and 1.

8.15 Strategy switchover

8.15.1 Calculation of nominal capacity

The nominal capacity is calculated from the adjuster **Max. volume flow, PS solar pump** (08-037), the **Collector fluid heat capacity** (08-009) and the **Tank control difference** (08-064).

8.15.2 Charging for yield

0 : Parallel charging
3 : Charge yield / nominal

This charging strategy is used when there is a low solar yield, i.e. when the current capacity is less than the percentage of the set value of the nominal charge switchover (high yield) (08-051) of the nominal capacity.

The nominal capacity is calculated from the adjuster Max. volume flow, PS solar pump (08-037), the specific heat capacity cp (08-009) and the tank control deviation (08-064).

The advantage is the optimized energy utilization at low collector capacity.

8.15.3 Charging to temperature

1 : Nominal charge
3 : Charge yield / nominal

This charging strategy is used when there is a high solar yield, i.e. when the current capacity is greater than the percentage of the set value of the **Change-over solar charging (high energy levels)** (08-051) of the nominal capacity. Hereby, the consumers are charged according to the set order of the **Priority tank** (08-056), first to the respective **Tank temperature setpoint** (08-062) and then to the maximum temperature.

8.16 Heating return temperature increase (VRA)

If the upper tank temperature (TOx) is higher than the heating return temperature (THR) by the **Switch-on difference VRA return temperature increase** (08-080), the heating return temperature increase VRA output switches on.

If the temperature difference between TOx and THR is less than the **Switch-off difference VRA return temperature increase** (08-081), the heating return temperature increase VRA output switches off.

If the value **Max. tank temperature for VRA return temperature increase** (07-008) is exceeded at the tank top sensor (TOx), the return temperature increase function is blocked.

8.17 WES function

Depending on the average solar yield when charging to the sensor TU1, the solar controller calculates whether reducing the pump speed leads to a sufficient setpoint rise at the collector sensor TKO or collector flow sensor TKV, in order to make charging to the tank top sensor TO1 possible.

If the **Switch-off difference TK – TU** (08-002) is fallen short of during the charging operation to the sensor TO1, the controller switches back to charging to TU1.

Charging to TO1 is also done when the temperature at the sensor TKO or TKV has exceeded the temperature and sensor TO1 by the **Switch-on difference TK – TU** (08-001).

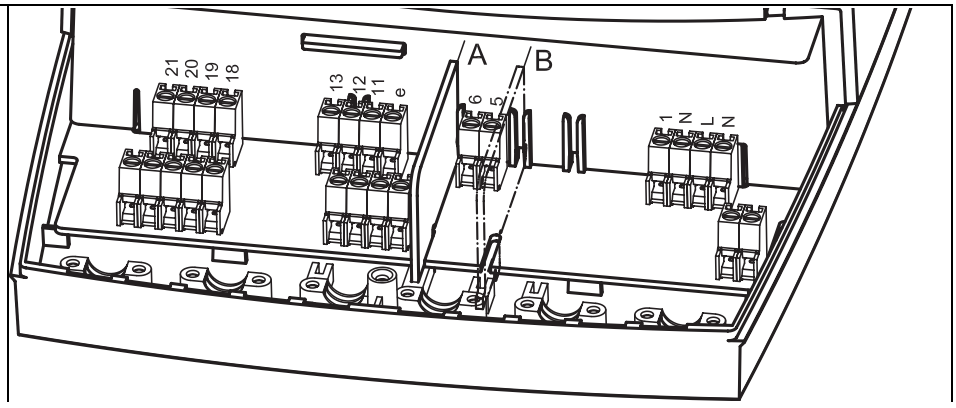
If the **Tank temperature setpoint** (08-062) is reached on the tank top sensor TO1, charging no longer takes place at the tank top sensor TO1.

8.18 Data recording

After inserting the SD card, the data recording can only be started by a professional with the adjuster **Data logging** (04-115). If no SD card is inserted, the adjuster cannot be changed.

WARNING

Before inserting the SD card, de-energize the device. SD card slot under the terminal compartment cover.
Before removing the SD card, the recording must be stopped. If the card is removed without stopping the recording, the card can be rendered useless.



The values are written to a conventional SD card, 2 - 4 GB, in CSV format. This format can be opened with the usual table calculation programs, such as Microsoft Excel.

Periodically, the operating parameters and, in the case of changes, adjusters and occurring errors are recorded.

8.18.1 Recording of operating parameters

Every 30 s, the values analogous to the "Nominal/actual values" menu under **Info** are recorded. Every day, a file VarYYMMDD.csv, e.g. Var120123.csv, is saved.

Example:

Time	00-004/0	01-004/0	00-016/2
10.06.11 13:39:17	49.5	50.0	16.7

A new file is generated at the beginning of every day.

8.18.2 Recording of parameter blocks

All adjustable, scalable parameters are recorded during adjustment.

Example:

Time	ID	Value
15.06.11 08:15:00	04	030/0 3
15.06.11 08:15:00	04	100/0 4
15.06.11 08:15:01	05	090/0 30.0

The same file is always used: ParYYMMDD.csv, e.g. Par110701.csv.

8.18.3 Recording of errors

All occurring errors and information is logged in a file ErrYYMMDD.csv, e.g. Err120131.csv

Example:

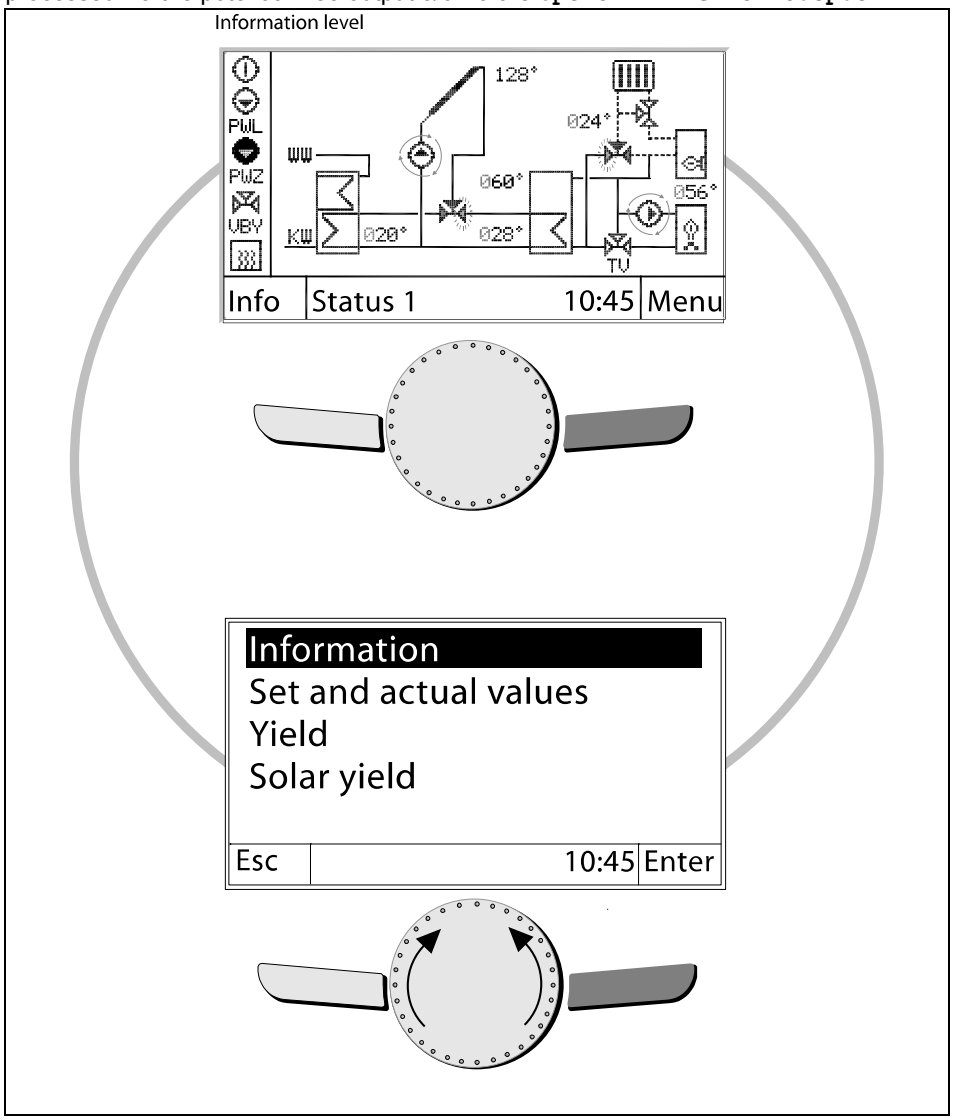
Time	Error code
10.06.11 20:15:00	105
15.06.11 08:15:00	163
30.09.11 12:43:01	301

The same file is always used.

9 What to do if ... ?

9.1 Malfunction messages (error display)

If a malfunction should occur or if there is an informational message from the plausibility check, this is indicated on the controller. In addition, this information can also be further processed via the potential-free output 5/6 via the **`Option MFA error output`**.



In the event of an error, the display flashes red and instead of the symbol of the current operating mode, a warning triangle is visible. As soon as there is an operation, the background color changes back to the standard white.

In the **`Info`** menu, the error can be read out and acknowledged under **`Information`**. More information about the error or information text can be found on the following pages.

If an error is pending due to a sensor defect, this is acknowledged automatically, as soon as the error has been rectified, as are the information messages from the plausibility check.

All other errors must be acknowledged. If an error is acknowledged by mistake, but is still present, the error message will appear again.

Errors are written to the SD card during active data recording.

Error text	Code	Description	Cause
Max. DT collector 1 - tank	71	Error charging from collector 1 to tank x, lower zone (temperature difference between collector and tank remains high) **Note:** (E 8-092) = 0, monitoring off	No heat transfer, air in charging circuit, no hydraulic compensation, output, pump defective
TZW circulation sensor	112	TZW hot-water circulation sensor outside of measuring range.	Sensor short-circuit / interruption
TFK solid fuel boiler sensor	114	TFK solid fuel boiler sensor outside of the measuring range.	Sensor short-circuit / interruption
TK1 collector sensor 1	119	TK collector 1 sensor outside of the measuring range.	Sensor short-circuit / interruption
THR heating circuit return sensor	123	THR heating circuit return sensor outside of the measuring range.	Sensor short-circuit / interruption
TU tank bottom sensor	146	TUX tank bottom sensor outside of the measuring range	Sensor short-circuit / interruption
TO tank top sensor	147	TOx tank top sensor outside of the measuring range	Sensor short-circuit / interruption
TKV collector flow sensor	157	TKV collector flow sensor outside of the measuring range.	Sensor short-circuit / interruption
TKR collector return flow sensor	158	THR collector return flow sensor outside of the measuring range.	Sensor short-circuit / interruption
FLOW collector flow sensor	159	FLOW volume flow sensor / direct sensor outside of the measuring range.	Sensor short-circuit / interruption
TSO additional DHW tank sensor	160	THR additional tank sensor outside of the measuring range.	Sensor short-circuit / interruption
TKV collector flow sensor	163	TKV bypass collector circuit sensor outside of the measuring range.	Sensor short-circuit / interruption

Information text	Code	Description	Cause
Set temperature > Maximum tank temperature	300	Normal set tank temperature > Maximum tank temperature	Incorrect basic setting SPEIC x (E 8-062) > (E 8-059)
Maximum temperature > Protective tank temperature	301	Maximum tank temperature > Protective tank temperature	Incorrect basic setting (E 8-059) > (E 8-060)
Temperature, thermal disinfection > Maximum tank temperature	302	Thermal disinfection temperature > Maximum tank temperature	Incorrect basic setting (E 5-004) > (E 8-059)
VRA: Switch-off difference >= Switch-on difference (hysteresis) (return temperature increase)	311	Switch-off setpoint rise for return temperature increase => Switch-on setpoint rise for return temperature increase	Incorrect basic setting (E 8-081) => (E 8-080)
Maximum collector temperature > Protective temperature, collector	312	Maximum collector temperature > than the protective collector temperature	Incorrect basic setting (E 8-011) > (E 8-010)
Switch-off difference TK - TU >= Switch-on difference TK - TU	313	Setpoint rise, collector/tank for charging OFF => Setpoint rise, collector/tank for charging ON	Incorrect basic setting (E 8-002) => (E 8-001)
Switch-off difference TFK - TU >= Switch-on difference TFK - TU	314	Setpoint rise, additional boiler/tank for charging OFF => Setpoint rise, additional boiler/tank for charging ON	Incorrect basic setting (E 8-004) => (E 8-003)
No tank active, all types Tank at 0	315	Attention: No tank / consumer active. All tanks are switched off (E 8-055) = 0	Incorrect basic setting (E 8-055) = 0

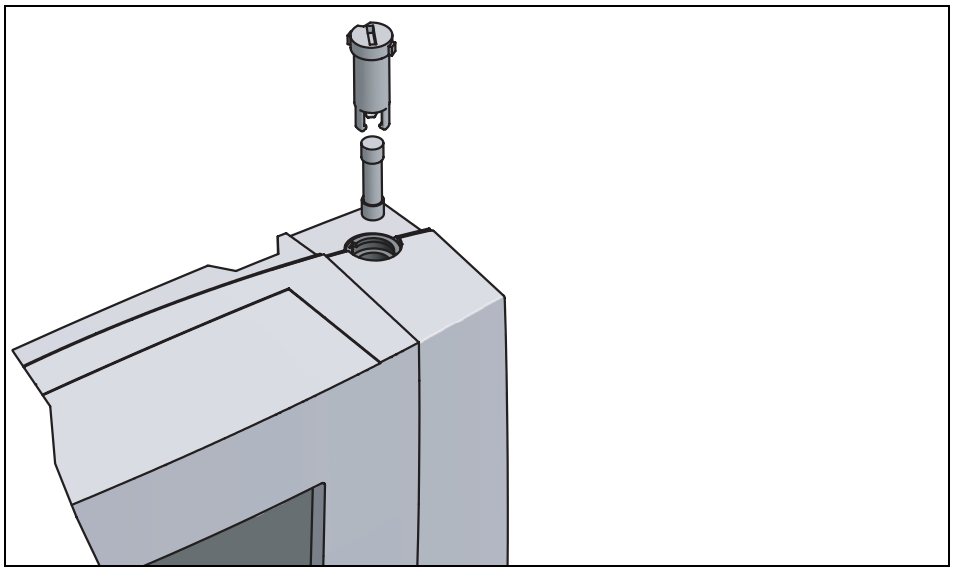
9.2 Cause and remedy of malfunctions

Observation	Cause	Remedy
Solar pump doesn't switch off	The current consumption of the consumer is too low	Select other relay (higher current consumption)
		Use RC element
	Frost protection temperature set too high	Check parameter and adjust, if necessary

10 Technical data

10.1 Electric data

Fine fuse 3.15 A slow-blow



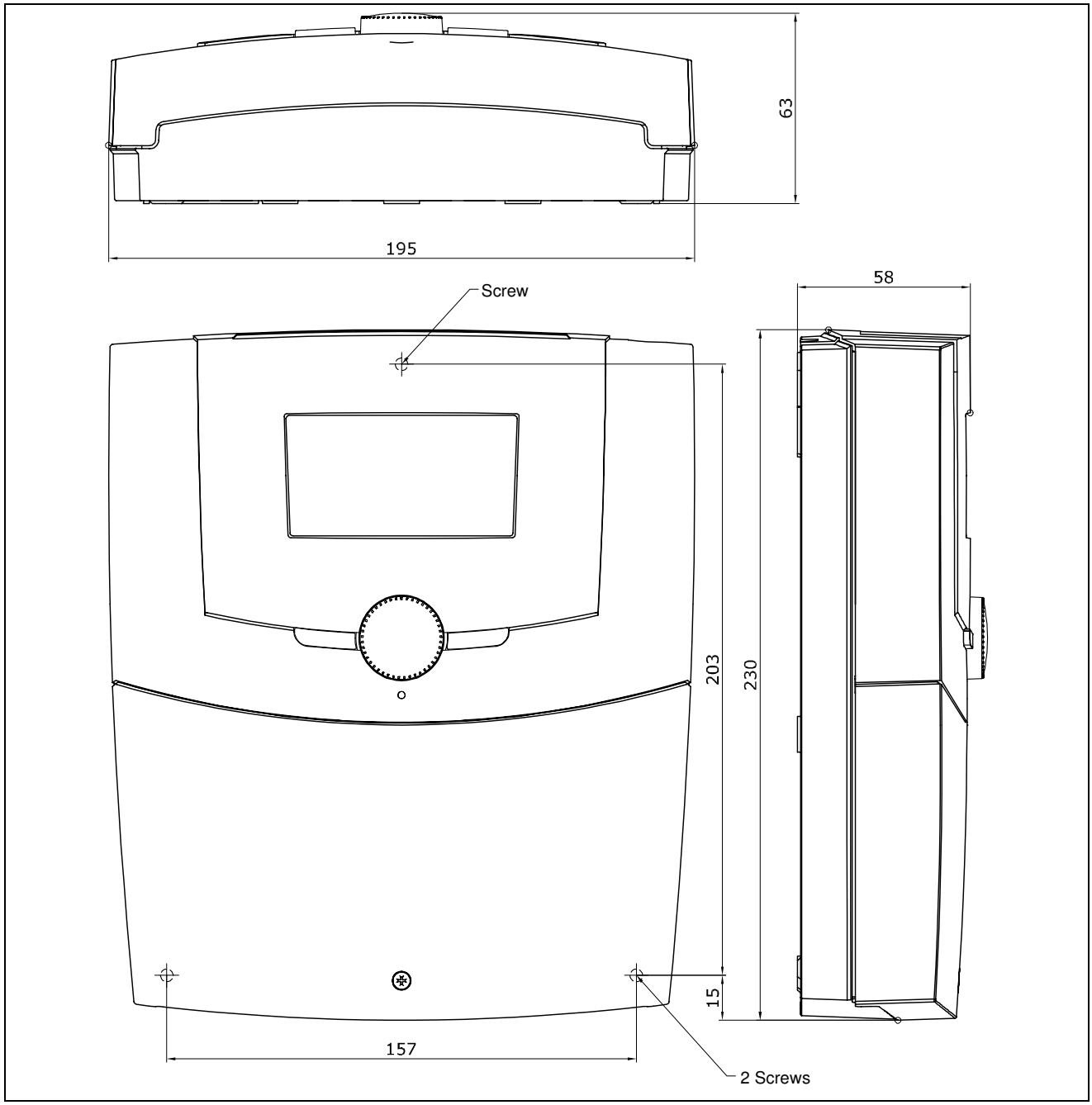
Mains voltage	230 V ± 10%
Mains frequency	50-60 Hz
Power consumption	4.5 VA
Measuring circuit voltage	5.0 V, protectively insulated 3.3 KV
Switching capacity, outputs:	
⇨ Electronic outputs	~230 V, 1 (1) A, 50 Hz
⇨ Minimum current	20 mA
⇨ Mechanical outputs	~230 V, 3.15 (2) A, 50 Hz

External device fuse	16 A
Internal device fuse	3.15 A slow-blow
Degree of protection	IP 40 – EN 60529
Protection class	II according to EN 60730 for installation according to regulations
Lines:	
Sensor line, length, cross-section	max. 100 m, 0.75 mm2
eBUS	2-wire bus
Bus line, length, cross-section	max. 100 m, 0.75 mm2

10.2 Permissible ambient conditions

Temperature	Humidity	Requirements regarding EMC	Low-voltage directives
During operation 0°C…50°C Transport/storage -20°C…+60°C	Max. 85% rel. humidity at 25°C No condensation	Directive 2004/108/EEC EN 50082-1 EN 50081-1	Directive 2006/95/EEC EN 60335

10.3 Dimensions



10.4 Temperature sensor data

Sensor element NTC 5000 Ω at 25 °C

Sensor	Measuring range	Measuring precision	Ambient Temperature	Cable material	Cable length	Order Number
Immersion sensor STF 225	-10…240 °C	0…70 °C ± 0.5 K	-50…250 °C	Silicone (blue)	4 m	660 262
Immersion sensor STF 222.2	-10…130 °C	0…50 °C ± 0.5 K 0…70 °C ± 0.8 K	-50…90 °C	PVC (gray)	2.5 m	660 228
Contact sensor ZVF 210 (accessory)	-10…130 °C	0…50 °C ± 0.5 K 0…70 °C ± 0.8 K	-50…90 °C	PVC (gray)	2.5 m	660 302

10.5 Sensor characteristic values

Sensor characteristic curves

(Resistance values without self-heating) The Weishaupt controller system allows the all sensors to be properly connected and the respectively measured temperature to be displayed. To check the sensor and simulation of the corresponding sensor temperatures, value pairs (sensor temperature / resistance value) are listed below for the used devices.

NTC sensor (blue cable)	t °C	R Ω		t °C	R Ω		t °C	R Ω
Collector sensor: TK1, TK2	-40	112 k		60	1.45 k		160	115
	-35	84.1 k		65	1.24 k		165	105
Solid fuel sensor: TFK	-30	63.6 k		70	1.06 k		170	95
	-25	48.6 k		75	914		175	86
	-20	37.4 k		80	789		180	79
as immersion sensor	-15	29.1 k		85	684		185	72
Order no.: 660 262	-10	22.8 k		90	595		190	66
	-5	18.0 k		95	520		195	60
	0	14.3 k		100	455		200	55
	5	11.4 k		105	400		205	51
	10	9.21 k		110	353		210	47
	15	7.47 k		115	312		215	43
	20	6.10 k		120	276		220	40
	25	5.00 k		125	246		225	37
	30	4.13 k		130	219		230	34
	35	3.42 k		135	196		235	31
	40	2.86 k		140	175		240	29
	45	2.40 k		145	157		245	27
	50	2.02 k		150	142			
	55	1.71 k		155	128			

10 Technical data

NTC sensor (gray cable)	T °C	R Ohm		T °C	R Ohm		T °C	R Ohm
Reference sensor: TOx, TUx, THR, TKV1, TKR1, TZW	-20	48.5 k		10	9.95 k		60	1.24 k
	-18	43.5 k		12	9.05 k		65	1.04 k
	-16	38.6 k		14	8.23 k		70	880
as immersion sensor	-14	34.5 k		16	7.50 k		75	740
Order no.: 660 228	-12	30.9 k		18	6.84 k		80	630
	-10	27.7 k		20	6.25 k		85	540
as contact sensor:	-8	24.8 k		22	5.71 k		90	390
Order no.: 660 302	-6	22.3 k		24	5.23 k		100	340
	-4	20.1 k		26	4.79 k		105	290
	-2	18.1 k		30	4.03 k		110	260
	0	16.3 k		35	3.27 k		120	200
	2	14.5 k		40	2.66 k		130	150
	4	13.3 k		45	2.18 k		140	120
	6	12.1 k		50	1.80 k			
	8	11.0 k		55	1.49 k			

11 Appendix

11.1 Checklist

- Controller wired according to the selected variant.
- Supply connected according to diagram
  (only with emergency switch and preliminary fuse).
- Are the connected sensors displayed?
- Check temperatures and values for plausibility.
- Is the pump actuated (possibly via manual mode)?

11.2 Commissioning log of adjustable parameters (please fill out)

Collector 1

Value	ID	Setting range	Factory settings	Pass word	Set
Collector protection function	08-005	0 ... 1	0	-	
Collector fluid heat capacity	08-009	0.01 ... 9.99 kJ/kg*K	3.70 kJ/kg*K	-	
Collector protective temperature	08-010	80 ... 180 °C	120°C	11	
Collector maximum temperature	08-011	80 ... 150 °C	90°C	11	
Collector minimum temperature	08-012	-15 ... 90 °C	20°C	-	
Collector frost protection temperature	08-013	-50 ... 10 °C	-20°C	-	
Collector start-up help	08-015	0 ... 1	0	-	
Start-up help pump runtime	08-017	0.5 ... 20.0 min	0.5 min	11	
Min. speed, PS solar pump	08-035	5 ... 100%	40%	-	
Max. volume flow, PS solar pump	08-037	10 ... 12000 l/h	240 l/h	-	
Min. volume flow, PS solar pump	08-038	0 ... 12000 l/h	60 l/h	-	
Min. standstill time, PS solar pump	08-093	0 ... 200 s	10 s	11	
Max. DT temperature difference collector-tank	08-091	10 ... 80 K	50 K	11	

Value	ID	Setting range	Factory settings	Pass word	Set
Collector–tank DT error message waiting period	08-092	0 ... 180 min	30 min	11	
VIZ / TKR option Volume pulse counter / collector return flow sensor	08-107	0 ... 1	1	-	
Pulse rate VIZ	17-001	1 ... 9999 pulses/l	180 pulses/l	-	
Offset FLOW, solar volume flow	28-020	-200 ... 200 l/h	15 l/h	11	
TKV option Collector flow sensor	08-108	0 ... 1	1	-	
VBY option Collector bypass	08-109	0 ... 1	0	-	

Tank 1

Value	ID	Setting range	Factory settings	Pass word	Set
Switch–on difference TK – TU collector – tank bottom	08-001	0 ... 50 K	7 K	-	
Switch–off difference TK – TU collector – tank bottom	08-002	0 ... 50 K	4 K	-	
Tank control difference	08-064	5 ... 50 K	15 K	-	
Tank temperature setpoint	08-062	10 ... 90 °C	55°C	-	
Switch–on hysteresis to set tank temperature	08-063	1 ... 30 K	2 K	-	
Maximum tank temperature	08-059	10 ... 95 °C	90°C	-	
Protective tank temperature	08-060	10 ... 99 °C	95°C	11	
Active collector protection / night cooling tank	08-074	0 ... 2	0	-	
Sensor selection, setpoint	08-007	0 ... 1	1	11	
Sensor selection, maximum value	08-008	0 ... 1	1	11	
Circulation function	05-006	0 ... 8	0	-	
Circulation circuit, release temperature	05-054	0 ... 90 °C	45°C	-	
PZW pump runtime for pulse control	05-070	0 ... 30 min	3 min	-	
PZW pump off–time for pulse control	05-071	0 ... 240 min	10 min	-	
MFA option – recharging, heat request	08-113	0 ... 1	0	-	
Setpoint reduction for high solar yield	08-072	0 ... 20 K	15 K	11	

Value	ID	Setting range	Factory settings	Pass word	Set
Thermal disinfection function	05-014	0, 10, 11, 12	0	-	
Thermal disinfection temperature	05-004	60 ... 80 °C	60°C	-	
PPS option Discharging	08-101	0 ... 1	0	-	
DHW temperature setpoint	05-051	10 ... 90 °C	55°C	-	
Switch-on difference re-/discharging PPS	08-098	5 ... 50 K	5 K	-	
Switch-off difference re-/discharging PPS	08-099	2 ... 20 K	3 K	-	
Max. tank temperature for VRA return temperature increase	07-008	30 ... 105 °C	70°C	-	
Switch-on difference VRA Return temperature increase	08-080	5 ... 50 K	10 K	-	
Switch-off difference VRA return temperature increase	08-081	2 ... 20 K	5 K	-	
Switch-on difference, TFK – TU, solid fuel boiler – tank bottom	08-003	0 ... 50 K	10 K	-	
Switch-off difference, TFK – TU, solid fuel boiler – tank bottom	08-004	0 ... 50 K	5 K	-	
Min. standby time, PFK pump, solid fuel boiler	08-094	0 ... 200 s	10 s	11	
Minimum temperature, TFK solid fuel boiler	09-032	10 ... 90 °C	50°C	-	
Min. speed, PFK pump, solid fuel boiler	09-039	5 ... 100%	30%	11	

General

Value	ID	Setting range	Factory settings	Pass-word	Set
Solar charging strategy	08-050	0 ... 4	0/ 3	-	
Change-over solar charging (high yield)	08-051	30 ... 100%	50%	11	
Switch-on threshold detection of high solar energy	08-070	0 ... 100%	50%	11	
Switch-on threshold recognition high daily energy	08-071	0 ... 100%	80%	11	
Option MFA high-temperature relief	08-110	0 ... 1	0	-	
Option MFA-error output	08-111	0 ... 1	0	-	

Configuration

Value	ID	Setting range	Factory setting	Password	Set
Date	02-070	01.01.2011 - 31.12.2099	-	-	
Time	02-072	00:00 - 23:59	-	-	
Hydraulic type	04-006	1 - 37	1	-	
Output 1: Solar pump	04-030	0 ... 4	1	-	
Commands	04-045	0, 29	0	-	
Language selection	04-056	0 ... 15	0	-	
Data recording	04-115	0 ... 1	0	-	
Normal position, MFA	08-000	0 ... 1	0	11	

11.3 Commissioning log of adjustable options

(please fill out)

Collector 1

Value	ID	Setting range	Factory setting	Password	Set
VIZ / TKR option Volume pulse counter / collector return flow sensor	08-107	0 ... 1	1		
TKV option Collector flow sensor	08-108	0 ... 1	1		
VBY option Collector bypass	08-109	0 ... 1	0		

Tank 1

Value	ID	Setting range	Factory setting	Password	Setting
Circulation function	05-006	0 ... 8	0	-	
Thermal disinfection function	05-014	0, 10, 11, 12	0	-	
PPS option Discharging	08-101	0 ... 1	0		
MFA option – recharging, heat request	08-113	0 ... 1	0		

General

Value	ID	Setting range	Factory setting	Password	Set
Option MFA high-temperature relief	08-110	0 ... 1	0	-	
Option MFA-error output	08-111	0 ... 1	0	-	

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–weishaupt–

Product		Description	Performance
	**W-Burners**	The compact series, proven millions of times over: Economical, reliable, fully automatic. Gas, oil and dual fuel burners for domestic and commercial applications. The purflam burner gives almost soot-free combustion of oil with greatly reduced NO_x emissions.	Up to 570 kW
	**Monarch and industrial burners**	The legendary industrial burner: Tried and tested, long lived, clear construction. Gas, oil and dual fuel burners for district heat provision.	Up to 11,700 kW
	**multiflam® burners**	Innovative Weishaupt technology for large burners: Minimal emission values particularly at ratings over one megawatt. Oil, gas and dual fuel burners with patented fuel distribution system.	Up to 17,000 kW
	**WK industrial burners**	Modular powerhouses: Adaptable, robust, powerful. Oil, gas and dual fuel burners for industrial plant.	Up to 22,000 kW
	**Thermo Unit**	The Thermo Unit heating systems from cast iron or steel: Modern, economic, reliable. For environmentally friendly heating. Fuel: Gas or oil as desired.	Up to 55 kW
	**Thermo Condens**	The innovative condensing boilers with the SCOT system: Efficient, low in emissions, versatile. Ideal for domestic heating. Floor standing gas condensing boiler with ratings of up to 1200 kW (cascade), for higher heat demands.	Up to 1,200 kW
	**Heat pumps**	The heat pump programme offers solutions for utilisation of heat from air, soil and ground water. The systems are suitable for refurbishment or new builds. It is possible to use several heat pumps in cascade operation.	Up to 130 kW
	**Solar systems**	Free energy from the sun: Perfectly coordinated components, innovative, proven. Pleasantly shaped flat roof collectors to support heating and of domestic water	
	**Water heater / energy reservoir**	The attractive domestic water heating range includes classic water heaters which are supplied through a heating system and energy reservoirs which can be fed through solar systems.	
	**Control technology / building management**	From control panels to complete building management systems – at Weishaupt you can find the entire spectrum of modern control technology. Future oriented, economical and flexible.	