–weishaupt–

manual

Installation and operating instructions

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1 Safety instructions

Your information pack

- You are holding the **operating instructions** of the solar controller.
  Please read these operating instructions carefully. They will help you to fully utilise all functions of the solar controller and to operate your solar installation to its optimum.

- These instructions should be kept with the solar controller.

Explanation of notes and symbols

This symbol is used to mark instructions, which, if not followed, could result in death or serious injury.

This symbol is used to mark instructions, which, if not followed, could result in damage to, or the destruction of the equipment and environmental damage.

Permissible application

The controller is an electronic unit intended for use with hydraulic switching in accordance with manufacturer specifications.
Any other application is not permitted.

Dangers when using the equipment

Weishaupt products are manufactured in accordance with the relevant existing standards and guidelines and the recognised safety laws. However, improper use of the equipment could endanger life of the user or a third party, or result in damage to the plant.

To avoid unnecessary danger, the Weishaupt solar controller (WRSol) should only be used

- for its intended purpose

- in a technically safe, fault free condition

- in compliance with all the information in the installation and operating instructions

Faults, which could affect the safe operation, should be rectified immediately.

Personnel training

Only competent personnel may work on the appliance. Competent personnel according to this operating manual are persons who are familiar with the installation, mounting, setting and commissioning of the product and have the necessary qualifications such as:-

- Training, instruction or authorisation to switch electrical circuits and electrical devices on and off, to earth them and to mark them in accordance with the safety standards.

Informal safety measures

- Observe all information given in the operating instructions.
- Also observe the instructions given in the installation and operating instructions of the collectors.
- In addition to the installation and operating instructions, local codes of practice should also be adhered to. Special attention should be paid to the relevant installation and safety guidelines given.
- All safety and danger notices should be kept in a legible condition.
- Ask the installer to instruct you in the use of the solar controller.

Electrical safety

- Before starting work - isolate plant and protect against reactivation, check voltage is isolated, the unit is earthed, and protected from adjacent equipment that might still be under voltage!
- Work on the electrical supply should be carried out by a qualified electrician.
- Electrical components should be checked during servicing. Loose connections and heat damaged cables should be dealt with immediately.
- Should it be necessary to carry out work on live parts, country specific safety regulations must be observed. A second person should be present to switch off the mains supply in an emergency.

Alterations to the construction of the equipment

- No alterations to the equipment are to be made without the approval of the manufacturer.
  All conversions require written confirmation from Max Weishaupt GmbH.
- Any parts not in perfect working order should be replaced immediately.
- No additional components may be fitted, which have not been tested for use with the equipment.
- Use only -weishaupt- replacement and connection parts.

Settings

- Only settings as stipulated in these operating instructions are permissible. Incorrect settings can damage the solar system.

Guarantee and liability

Weishaupt will not accept liability or meet any guarantee claims for personal injury or damage to property arising as a result of one or more of the causes below:

- Failure to use the equipment as intended.
- Improper assembly, commissioning, operating or servicing of the equipment.
- Failure to follow the information in the installation and operating instructions.
- Alterations made to the construction of the equipment.
- Fitting additional components not tested or approved for use with the equipment.
- Alterations made to the equipment.
- Improperly executed repairs.
- Acts of God.
- Damage caused by continued use despite the occurrence of a fault.
- Use of non-original -weishaupt- spare parts.

2 About the Weishaupt solar controller WRSol 2.0

The Weishaupt solar controller (WRSol) allows easy control of your solar system.

Some characteristics of the WRSol:

- Easy interrogation of **information** about the solar system.
- **Temperature setpoint defaults** for DHW, frost protection, calorifier, valve activation, legionella and circulation.
- Easy **reset** to previously set values or to factory settings.
- Recording possible with WRSol recording software.
- Speed controlled solar and/or solid fuel boiler pump.

The WRSol can be used as differential controller for:
- Solar DHW storage tank
- Solar calorifier storage tank
- Return temperature maintenance
- Swimming pool
- Solid fuel
- Storage tank cascade
- Collector cascade
- Charge reversal of two storage tanks
- Single layer function WES 900-C

Easy operation

Three levels are available to you:

- The **standard display,** in which up to three selected values can be displayed.
- The **selection menu level**, for the selection of one of seven menus from where the sub-menu level can be accessed.
- The **sub-menu level,** where settings for additional solar, return temperature increase, swimming pool and solid fuel functions can be set.

2.1 What does the solar controller do

If programmed correctly, the controller, in conjunction with the relevant hydraulic switching, will ensure that the solar energy available is used correctly and that the need for additional heat exchangers is largely avoided.

General operation of the system is possible once the available hydraulic variation (system type) has been entered. The parameters, control and safety function relevant for the system type selected are preset automatically. This allow immediate operation.

With the potential free contact (MFA output terminals 5 and 6) a fault can be reset, and a burner interlock (exchanger interlock) or a request (exxchanger release) can be initiated.

Note: On system variation 20 the potential free contact (MFA output) acts only as fault output.
Setting on `Multi funct. output` :
9 or 10.

2.2 What you have to observe

Do not switch off the controller
Switching off the controller can damage the solar system, if the system is filled with water. (Frost protection no longer guaranteed).
The controller should only be shut down for the duration of service and repair work.

Note: These operating instructions are valid **only** for solar controller type WRSol 2.0 (see name plate).

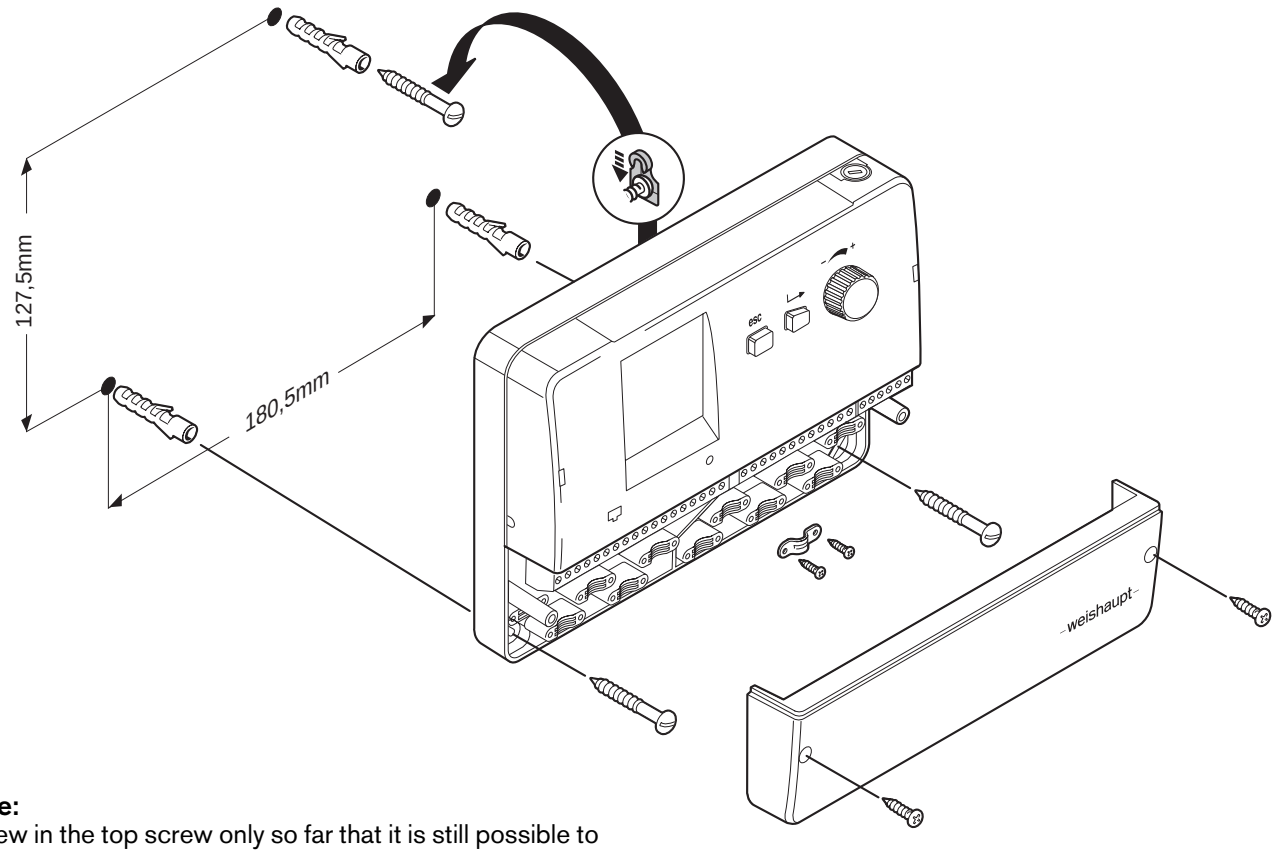
3 Installation and connection

3.1 Scope of delivery

Included in delivery are:
- Controller WRSol 2.0
- Mounting parts for wall mounting
- Traction relief clamps incl. screws
- Collector sensors STF 225 (4 m, blue cable, -w- No. 660 229)
- 3 immersion sensors STF 222.2 (2.5 m, grey cable, -w- No. 660 228)
- Operating instructions WRSol 2.0

Note: The sensors supplied are designed as immersion sensors.
If site conditions require contact sensors, these can be ordered under order No. 660 302.
Contact sensors cannot be used as a collector sensor.

3.2 Wall mounted installation



Note:
Screw in the top screw only so far that it is still possible to hook in the controller.

3.3 Commissioning

The WRSol 2.0 is constructed in such a way, that the function of the controller and the type of setting parameters can be set by selecting the relevant hydraulic variation.
Only the selection menus and setting parameters required for the hydraulic variation selected will then be displayed.

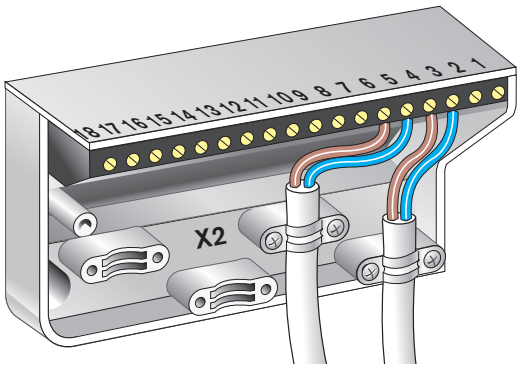
All other parameters are blanked out.

Procedure:

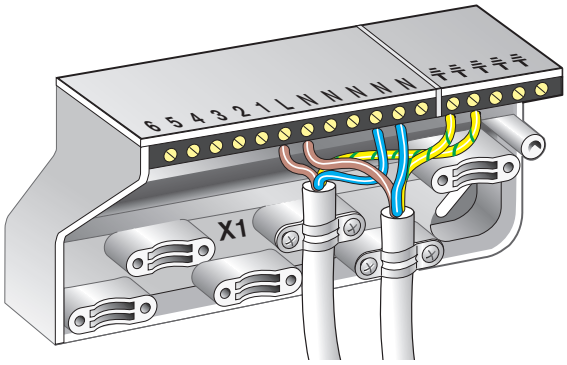
1. Select hydraulic variation required.
   ⇨ Ch. 4
2. Carry out electrical connection in accordance with the hydraulic variation selected.
   ⇨ Ch. 3.4; Ch. 4
3. Program the controller, if necessary, start with language selection.
   ⇨ Ch. 6.10
4. Set the hydraulic variation selected under item one in the controller.
   ⇨ Ch. 6.3
5. Activate overheat protection (recommendation).
   ⇨ Ch. 6.8
6. Activate other options as required where possible.
   ⇨ Ch. 6.8
7. Set time and timer programs
   ⇨ Ch. 6.3 … Ch. 6.6
8. Select all temperatures and values and check their plausibility.
   ⇨ Ch. 6.2
9. Test and check all outputs in type of operation Manual (the pump start of the solar pumps is not possible above collector temperatures of 130°C, not even in manual operation).
   ⇨ Ch. 6.7
10. Reset controller to type of operation Auto.
    ⇨ Ch. 6.1
11. Complete commissioning log in appendix.
12. Show customer the operation and functions of the controller.

3.4 Electrical connection

Terminal rail left (sensor)



Terminal rail right (outputs / voltage supply)



Connection

⇨ Remove terminal rail cover.
⇨ Connect
- sensor lines,
- MFA output,
- pump or change-over valve,
- voltage supply

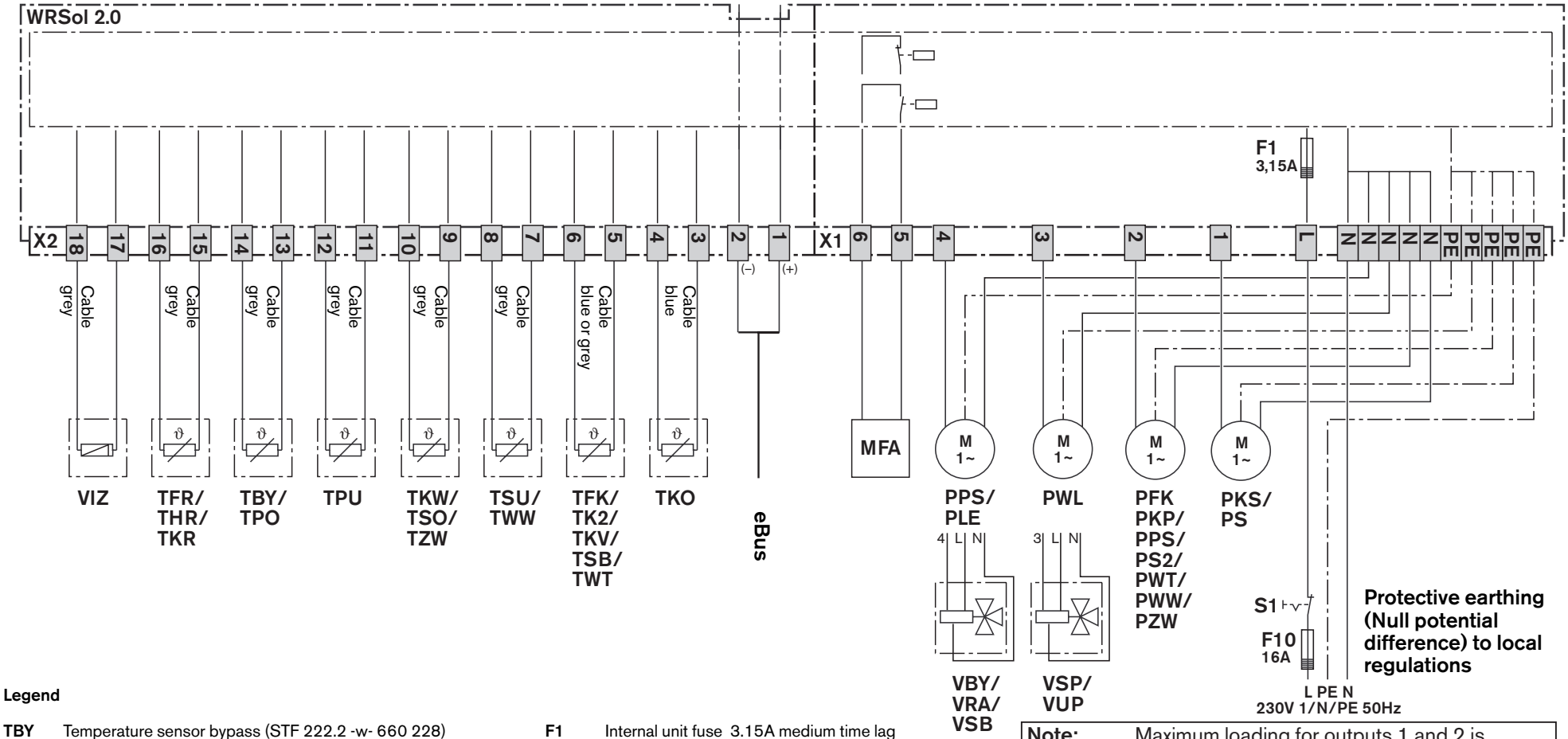
according to the hydraulic variation installed (Ch. 4).

⇨ Secure all connected cables with the traction reliefs supplied.
⇨ Apply voltage, if fault message appears check sensor connection, if necessary adjust hydraulic variation.
⇨ Refit terminal rail cover once the relevant cable cut-outs have been opened, use screws (traction relief) supplied.

Improper installation or repair attempts can cause life-threatening conditions through electric shock. The installation must only be carried out by an electrician with the relevant qualifications.
The unit and accessories must not be opened. Repairs must only be carried out by the manufacturer.

Voltage surge protection

The sensors connected do not require voltage surge protection.
The flow and return of the solar system must be earthed.



Legend

TBY	Temperature sensor bypass (STF 222.2 -w- 660 228)
TFK	Temperature sensor soild fuel boiler (STF 225 -w- 660 229)
THR	Temperature sensor heat circ. return (STF 222.2 -w- 660 228)
TK2	Temperature sensor collector 2 (STF 225 -w- 660 229)
TKO	Temperature sensor collector (STF 225 -w- 660 229)
TKR	Temperature sensor collector return (STF 222.2 -w- 660 228)
TKV	Temperature sensor collector supply (STF 222.2 -w- 660 228)
TKW	Temperature sensor cold water (STF 222.2 -w- 660 228)
TPO	Temperature sensor calorifier top (STF 222.2 -w- 660 228)
TPU	Temperature sensor calorifier bottom (STF 222.2 -w- 660 228)
TSB	Temperature sensor swimming pool (STF 222.2 -w- 660 228)
TSO	Temperature sensor tank top (STF 222.2 -w- 660 228)
TSU	Temperature sensor tank bottom (STF 222.2 -w- 660 228)
TWT	Temperature sensor heat exchanger (STF 222.2 -w- 660 228)
TWW	Temperature sensor DHW (STF 222.2 -w- 660 228)
TZW	Temperature sensor circulation (STF 222.2 -w- 660 228)
VIZ	Volume impulse meter

F1	Internal unit fuse 3.15A medium time lag
F10	Pre-fusing max. 16A
S1	**Emergency** switch
MFA	Multi-function output (potential free)
PFK	Pump solid fuel boiler
PKP	Pump collector - calorifier
PKS	Pump collector - storage tank
PLE	Pump Legionella
PPS	Pump Calorifier
PS2	Pump Solar 2
PS	Pump Solar
PZW	Pump DHW circulation
PWL	Pump DHW loading
PWT	Pump Heat exchanger
PWW	Pump DHW
VBY	Bypass valve
VRA	Return temperature increase valve
VSB	Swimming pool valve
VSP	Storage tank - calorifer valve
VUP	Change-over calorifier valve

Note: Maximum loading for outputs 1 and 2 is 1 amp. Circuits with a higher current consumption must be driven by an auxiliary relay.

If an auxiliary relay or valve for return temperature increase is fitted to outputs 1 and 2, parameter `PS Speed Minimum` must be set to 100%. Additionally, an RFI suppressor (-w- 701 890) must be connected parallel to terminal 1/N and/or 2/N.

The internal unit fuse (F1) protects only the outputs. The controller cannot be de-energised via F1.

Inputs and outputs of the individual hydraulic variations

Hydraulic variation	Sensor terminal										Outputs				
	1/2	3/4	5/6	7/8	9/10	11/12	13/14	15/16	17/18		1/N	2/N	3/N	4/N	5/6
1	eBus	TKO	TKV	TSU	TZW	–	–	TKR	VIZ		PS	PZW	PWL	PLE	MFA
2	eBus	TKO	TKV	TSU	TZW	–	TBY	TKR	VIZ		PS	PZW	PWL	VBY	MFA
3	eBus	TKO	TWT	TSU	–	–	–	TKR	VIZ		PS	PWT	PWL	–	MFA
4	eBus	TKO	TKV	TSU	TZW	TPU	–	TKR	VIZ		PS	PZW	VSP	PLE	MFA
5	eBus	TKO	TKV	TSU	TSO	TPU	TPO	TKR	VIZ		PS	PZW	VSP	PPS	MFA
6	eBus	TKO	TKV	TSU	TZW	TPU	TBY	TKR	VIZ		PS	PZW	VSP	VBY	MFA
7	eBus	TKO	TKV	–	TSO	TPU	TPO	TKR	VIZ		PS	PZW	–	PPS	MFA
8	eBus	TKO	TWT	TSU	–	TPU	–	TKR	VIZ		PS	PWT	VSP	-	MFA
9	eBus	TKO	TKV	TSU	TZW	TPU	TPO	THR	–		PS	PZW	VSP	VRA	MFA
10	eBus	TKO	TKV	TSU	TSO	TPU	TPO	THR	–		PS	PPS	VSP	VRA	MFA
11	eBus	TKO	TWT	TSU		TPU	TPO	THR	–		PS	PWT	VSP	VRA	MFA
12	eBus	TKO	TKV	–	–	TPU	–	TKR	VIZ		PS	–	–	–	MFA
13	eBus	TKO	TKV	–	–	TPU	TBY	TKR	VIZ		PS	–	–	VBY	MFA
14	eBus	TKO	TKV	TWW	TKW	TPU	TPO	TKR	VIZ		PS	PWW	–	–	MFA
15	eBus	TKO	TKV	–	–	TPU	TPO	THR	–		PS	–	–	VRA	MFA
16	eBus	TKO	TKV	TWW	TKW	TPU	TPO	THR	–		PS	PWW	–	VRA	MFA
17	eBus	TKO	TKV	TSU	TZW	TPU	–	TKR	VIZ		PS	PZW	PWL	–	MFA
18	eBus	TKO	TKV	TSU	TZW	TPU	TBY	TKR	VIZ		PS	PZW	PWL	VBY	MFA
19	eBus	TKO	TKV	TSU	TZW	TPU	TPO	THR	–		PS	PZW	PWL	VRA	MFA
20	eBus	TKO	TSB	–	–	–	–	TKR	VIZ		PS	–	–	–	MFA
21	eBus	TKO	TSB	TSU	TZW	–	–	TKR	VIZ		PS	PZW	PWL	VSB	MFA
22	eBus	TKO	TK2	TSU	–	–	–	–	–		PS	PS2	PWL	PLE	MFA
23	eBus	TKO	TK2	TSU	–	–	TBY	–	–		PS	PS2	PWL	VBY	MFA
24	eBus	TKO	TK2	TSU	–	TPU	–	–	–		PS	PS2	VSP	PLE	MFA
25	eBus	TKO	TK2	TSU	TSO	TPU	TPO	–	–		PS	PS2	VSP	PPS	MFA
26	eBus	TKO	TK2	TSU	–	TPU	TBY	–	–		PS	PS2	VSP	VBY	MFA
27	eBus	TKO	TK2	TSU	–	TPU	TPO	THR	–		PS	PS2	VSP	VRA	MFA
29	eBus	TKO	TK2	–	–	TPU	–	–	–		PS	PS2	–	–	MFA
30	eBus	TKO	TK2	–	–	TPU	TBY	–	–		PS	PS2	–	VBY	MFA
31	eBus	TKO	TK2	–	–	TPU	TPO	THR	–		PS	PS2	–	VRA	MFA
32	eBus	TKO	TK2	TSU	–	TPU	–	–	–		PS	PS2	PWL	–	MFA
33	eBus	TKO	TK2	TSU	–	TPU	TBY	–	–		PS	PS2	PWL	VBY	MFA
34	eBus	TKO	TK2	TSU	–	TPU	TPO	THR	–		PS	PS2	PWL	VRA	MFA
35	eBus	TKO	TFK	TSU	–	TPU	–	TKR	VIZ		PS	PFK	VSP	PLE	MFA
36	eBus	TKO	TFK	TSU	TSO	TPU	TPO	TKR	VIZ		PS	PFK	VSP	PPS	MFA
37	eBus	TKO	TFK	TSU	–	TPU	TBY	TKR	VIZ		PS	PFK	VSP	VBY	MFA
38	eBus	TKO	TFK	TSU	–	TPU	TPO	THR	–		PS	PFK	VSP	VRA	MFA
40	eBus	TKO	TFK	–	–	TPU	TPO	TKR	VIZ		PS	PFK	VUP	–	MFA
41	eBus	TKO	TFK	–	–	TPU	TBY	TKR	VIZ		PS	PFK	–	VBY	MFA
42	eBus	TKO	TFK	–	–	TPU	TPO	THR	–		PS	PFK	–	VRA	MFA
43	eBus	TKO	TFK	TSU	–	TPU	–	TKR	VIZ		PS	PFK	PWL	–	MFA
44	eBus	TKO	TFK	TSU	–	TPU	TBY	TKR	VIZ		PS	PFK	PWL	VBY	MFA
45	eBus	TKO	TFK	TSU	–	TPU	TPO	THR	–		PS	PFK	PWL	VRA	MFA
48	eBus	–	TFK	–	–	TPU	TPO	–	–		–	PFK	VUP	–	MFA
49	eBus	–	TFK	–	–	TPU	TPO	THR	–		–	PFK	–	VRA	MFA
50	eBus	TKO	TK2	TSU	TSO	TPU	TPO	–	–		PS	PS2	PWL	PPS	MFA
51	eBus	TKO	–	TSU	TSO	TPU	TPO	–	–		PKS	PKP	PWL	PPS	MFA
52	eBus	TKO	TSB	TSU	TZW	TPU	–	TKR	VIZ		PS	PZW	VSP	VSB	MFA
53	eBus	TKO	TKV	TSU	TSO	–	TPO	TKR	VIZ		PS	PZW	PWL	PPS/PLE	MFA
54	eBus	TKO	TKV	TSU	TSO	–	–	TKR	VIZ		PS	PZW	PWL	–	MFA
55	eBus	TKO	TKV	TSU	TSO	–	TBY	TKR	VIZ		PS	PZW	PWL	VBY	MFA
56	eBus	TKO	TKV	TSU	TSO	–	TPO	THR	–		PS	PZW	PWL	VRA	MFA
57	eBus	TKO	TFK	TSU	TSO	TPU	–	TKR	VIZ		PS	PFK	PWL	–	MFA
58	eBus	TKO	TFK	TSU	TSO	TPU	TBY	TKR	VIZ		PS	PFK	PWL	VBY	MFA
59	eBus	TKO	TFK	TSU	TSO	TPU	TPO	THR	–		PS	PFK	PWL	VRA	MFA

4 Hydraulic variations

	Collector	Collector with bypass	Collector cascade	Collector cascade with bypass	Collector + solid fuel boiler	Collector with bypass + solid fuel	Solid fuel boiler
Water heater with two heat exchangers	1①②④ 19④⑦	2①④	22②	23			
Storage tank with one heat exchanger	3①⑤ 12① 14①⑤ 15⑦ 16⑤⑦	13①	29 31⑦	30	40①⑦ 42⑦	41①	
Water heater with two heat exchangers in cascade and calorifier with one heat exchanger	4①②④ 5①④⑥ 9④⑦ 10⑥⑦ 50③⑥ 51⑥ 52①④	6①④	24② 25⑥ 27⑦	26	35①② 36①⑥ 38⑦	37①	
Swimming pool with system separation	20①④ 21①④⑧						
Calorifier							48 49⑦
Calorifier with tank for DHW	17①④	18①④	32 34⑦	33	43① 45⑦	44①	
DHW tank sequence switching	53①②⑥ 7①④⑥						
DHW tank with one heat exchanger and calorifier with one heat exchanger	8 11⑤⑦						
Energy storage WES	54①④ 56④⑦	55①④			57① 59⑦	58①	

① Energy yield calculation via volume impulse meter (VIZ)
② Legionella function
③ Two collectors with own flow and return
④ Circulation pump
⑤ Plate heat exchanger DHW circuit
⑥ Retrieval function
⑦ Heating support
⑧ and water heater with two heat exchangers

The following hydraulic variations are simplified schematic drawings, therefore not all components (gravity break, flow meter etc.) are included in the drawing.
If non -weishaupt- components are used, the flow direction must be determined to meet site specific requirements.

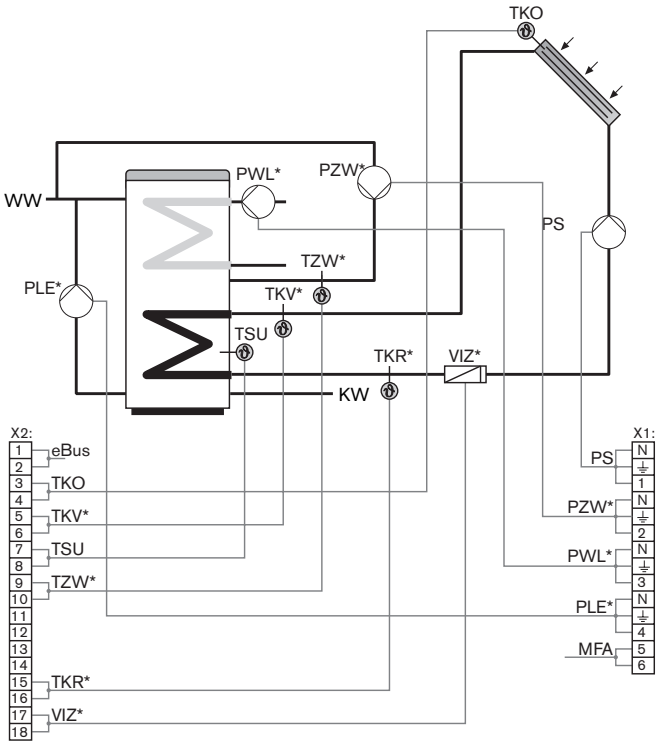
Variation 1: Dual statification tank for DHW

- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Legionella function (optional; ⇨ Ch. 7.12)
- Circulation function with sensor (optional; ⇨ Ch. 7.14)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU). If a collector flow sensor (TKV) is fitted this can be included in the control.
As soon as the temperature differential is greater than the value set (`Storage Diff. On`), the solar pump is switched on and the tank is topped up until the switch off condition (`Storage Diff. Off`) or the maximum temperature of the storage tank has been reached.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 3, 4, 7, 8, 9, 10



* optional

Variation 2: Dual stratification tank for DHW with collector bypass

- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulation function with sensor (optional; ⇨ Ch. 7.14)
- Collector bypass function

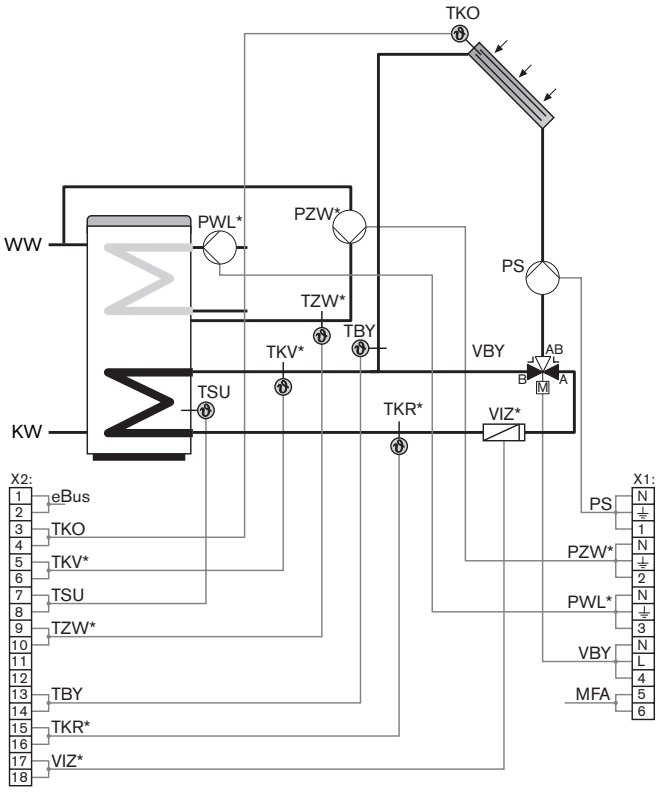
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU). If a collector flow sensor (TKV) is fitted this can be included in the control.

As soon as the temperature differential is greater than the value set (`Storage Diff. On`), the solar pump is switched on and the tank is topped up until the switch off condition (`Storage Diff. Off`) or the maximum temperature of the storage tank has been reached.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

The three way valve (VBY) is switched over depending on the collector temperature (TKO) and the reference sensor (TBY).

Possible settings MFA output:
0, 1, 2, 3, 4, 7, 8, 9, 10



* optional

Variation 3: DHW tank for warm water with plate heat exchanger

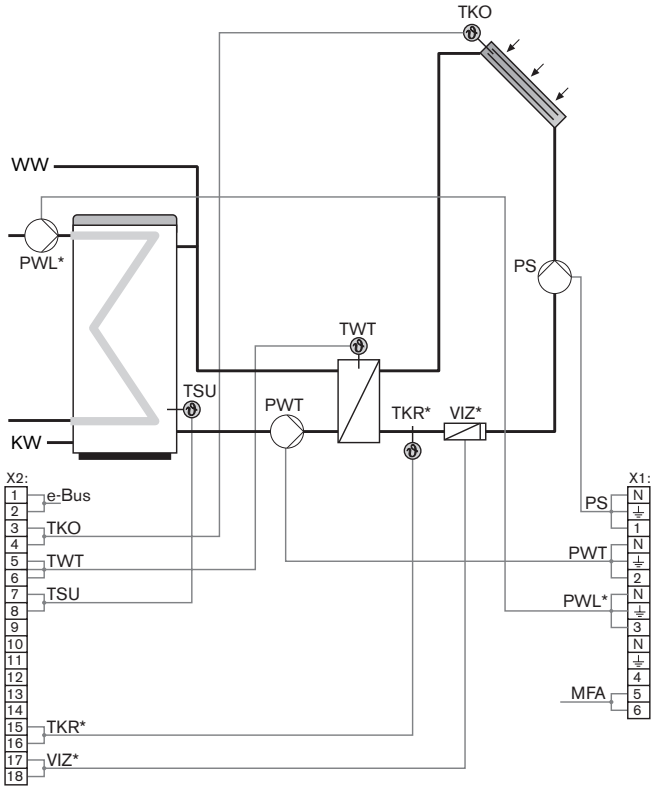
- Energy yield calculation (optional; ⇨ Ch. 7.9)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU).

If the collector temperature (TKO) increases by the `Storage Diff. On` above the `Storage Temp. Setpoint` solar loading is started. The pump (PWT) runs at minimum speed [30%], until the tank sepoint temperature has been reached at the sensor (TWT).
If the temperature differential (TKO to TSU) is less than `Storage Diff. Off` the pump switches off.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 7, 8, 9, 10



* optional

Variation 4: Storage tank cascade for DHW

- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Legionella function (optional; ⇨ Ch. 7.12)
- Circulation function with sensor (optional; ⇨ Ch. 7.14)
- Three way valve

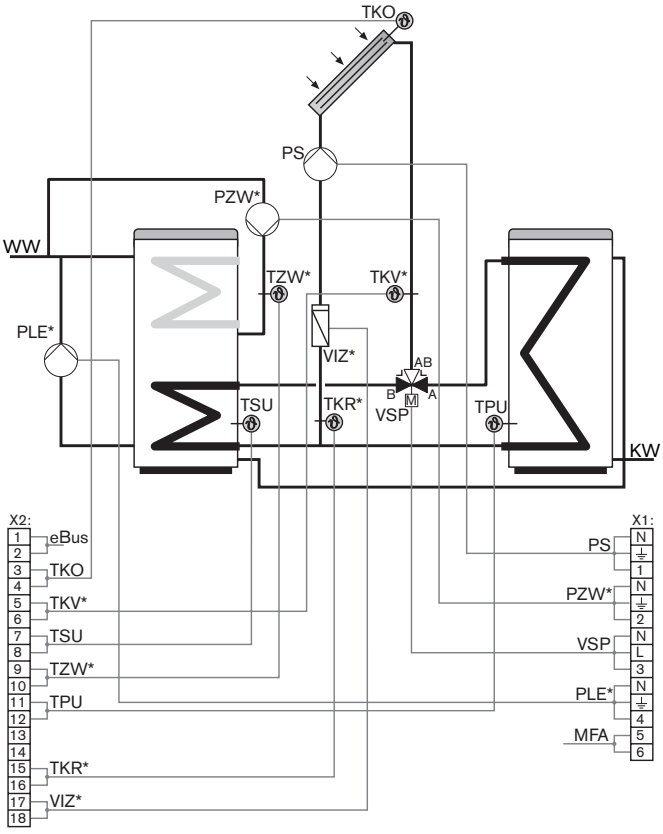
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU). If a collector return sensor (TKR) is fitted this can be included in the control.

As soon as the temperature differential is greater than the value set (`... Diff. On`), the solar pump is switched on and the tank is loaded.
Once the (`... Temp. Setpoint`) is reached, the three way valve changes over and and loads the DHW storage tank (calorifier) provided, in accordance with the priority setting (⇨ Ch. 7.11).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

By adding cold water the warm water from the DHW tank is transferred into the dual stratification tank.

Possible settings MFA output:
0 – 10



* optional

Variation 5: Storage tank cascade for DHW and retrieval function

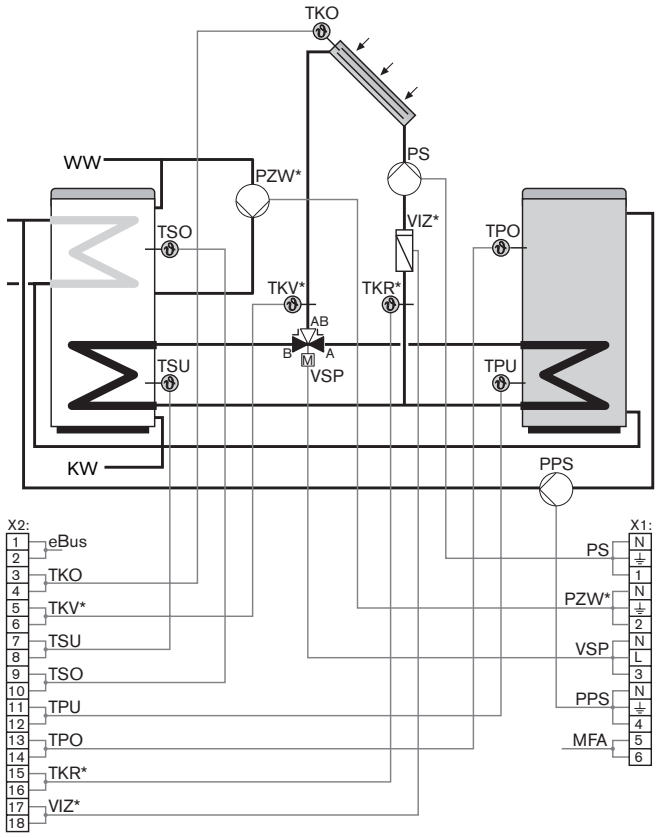
- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulation function (optional; ⇨ Ch. 7.14)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU). If a collector flow sensor (TKV) is fitted this can be included in the control.
As soon as the temperature differential is greater than the value set (`... Diff. On`), the solar pump is switched on and the tank is loaded.
Once the (`... Temp. Setpoint`)is reached, the three way valve changes over and and loads the calorifier (DHW storage tank) provided, in accordance with the priority setting (⇨ Ch. 7.11).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Using the charge reversal pump calorifier - storage tank (PPS) the energy stored in the calorifier is utilised depending on the `Storage Actual value top` (TSO) and the `Calorifier Actual value top` (TPO).

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 6: Storage tank cascade for DHW with collector bypass

- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulation function with sensor (optional; ⇨ Ch. 7.14)
- Three way valve (collector bypass)

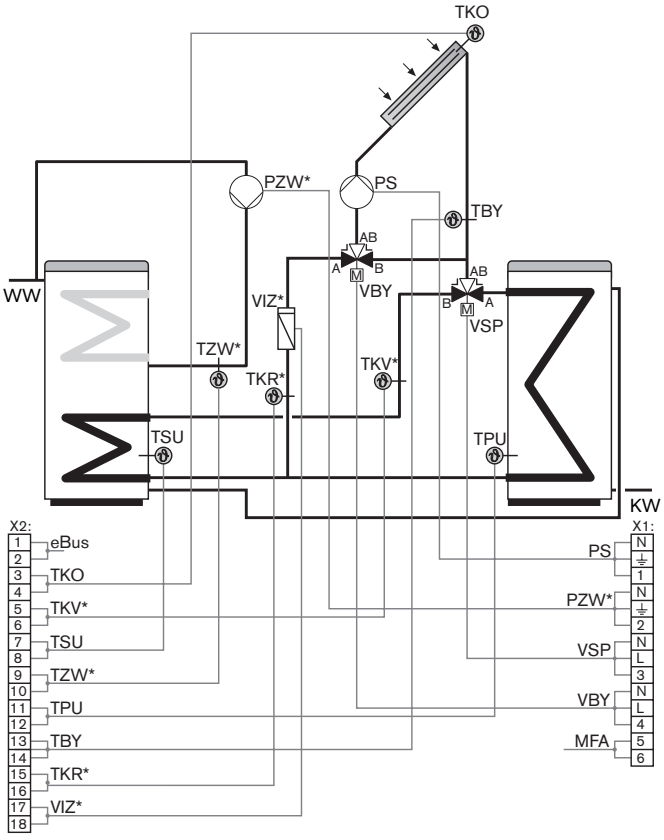
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU). If a collector flow sensor (TKV) is fitted this can be included into the control.
As soon as the temperature differential is greater than the value set (`... Diff. On`), the solar pump is switched on and the tank is loaded.

The three way valve (VBY) is switched over depending on the collector temperature (TKO) and the reference sensor (TBY). Once the (`... Temp. Setpoint`) is reached, the three way valve switches over and loads the DHW storage tank provided, in accordance with the priority setting (Ch. 7.11).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

By adding cold water the warm water from the DHW tank is transferred into the dual stratification tank.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 7: Storage tank sequence switching for DHW and retrieval function

- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulation function (optional; ⇨ Ch. 7.14)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU). If a collector flow sensor (TKV) is fitted this can be included into the control.

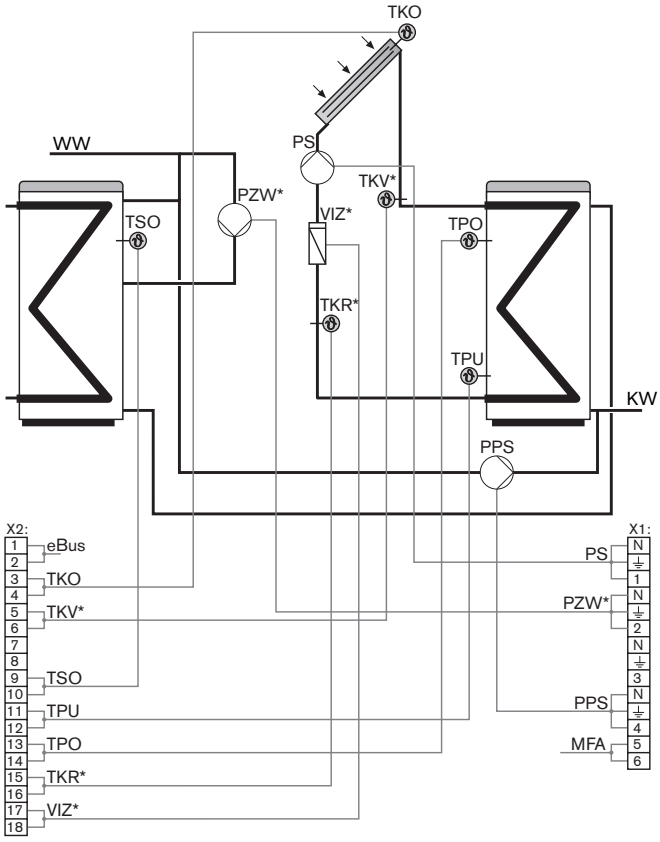
As soon as the temperature differential is greater than the value set (`Calorifier Diff. On`), the solar pump is switched on and the tank is topped up, until the switch off condition (`Calorifier Temp. Off`) or the maximum temperature of the storage tank has been reached.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

By adding cold water the warm water from the DHW tank is transferred into the dual stratification tank.

Using the charge reversal pump calorifier-tank (PPS) the energy stored is transferred depending on the calorifier temperature (TPO) and the storage tank temperature (TSO).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



* optional

Variation 8: Storage tank cascade for DHW via plate heat exchanger and calorifier

- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Three way valve

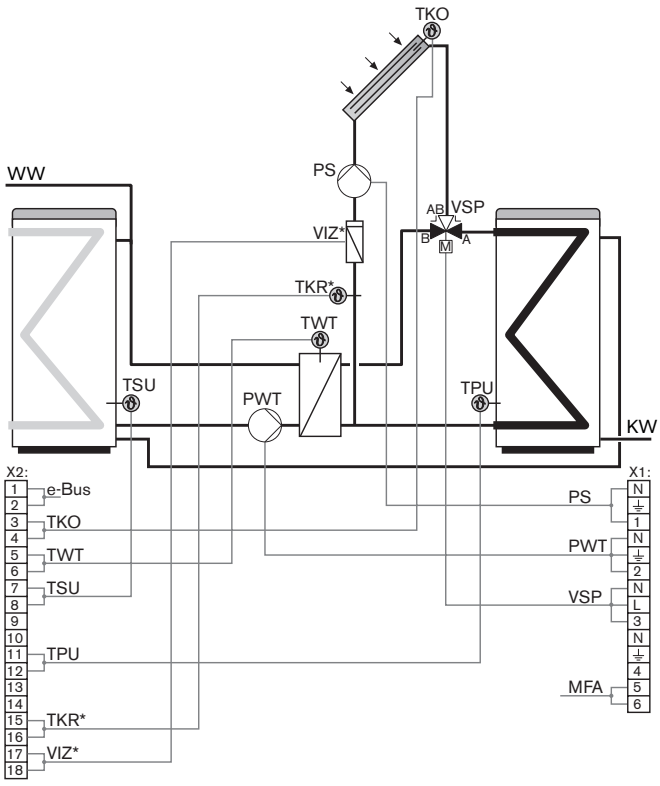
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU).

As soon as the temperature differential is greater than the value set (`... Diff. On`), the solar pump is switched on and the tank is loaded.
Once the (`... Temp. Setpoint`) is reached, the three way valve changes over and and loads the DHW storage tank provided, in accordance with the priority setting (⇨ Ch. 7.11).
If loading is on sensor TSU, pump PWT runs at lowest speed (30%), until the storage tank setpoint temperature has been reached at sensor TWT.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

By adding cold water the warm water from the DHW tank is transferred into the dual stratification tank.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variaton 9: Storage tank cascade for DHW and heating support via three way valve

- Heating return temperature increase
- Three way valve
- Circulation function wth sensor (optional; ⇨ Ch. 7.14)

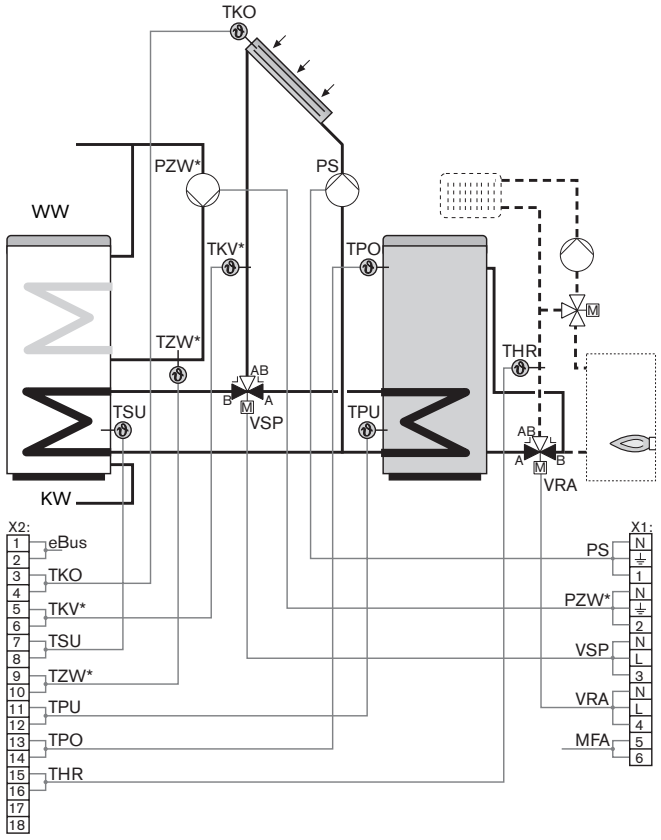
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU). If a collector flow sensor (TKV) is fitted this can be included into the control.

As soon as the temperature differental is greater than the value set (`... Diff. On`), the solar pump is switched on and the tank is loaded. Once the (`... Temp. Setpoint`) is reached, the three way valve changes over and loads the calorifier provided, in accordance with the priority setting (⇨ Ch. 7.11).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

With the three way valve used for return temperature increase (VRA) the energy available from the calorifier can be used depending on the calorifier temperature (TPO) and the heating return sensor (THR).

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 10: Storage tank cascade for DHW, heating support via three way valve and retrieval function

- Heating return temperature increase
- Three way valve

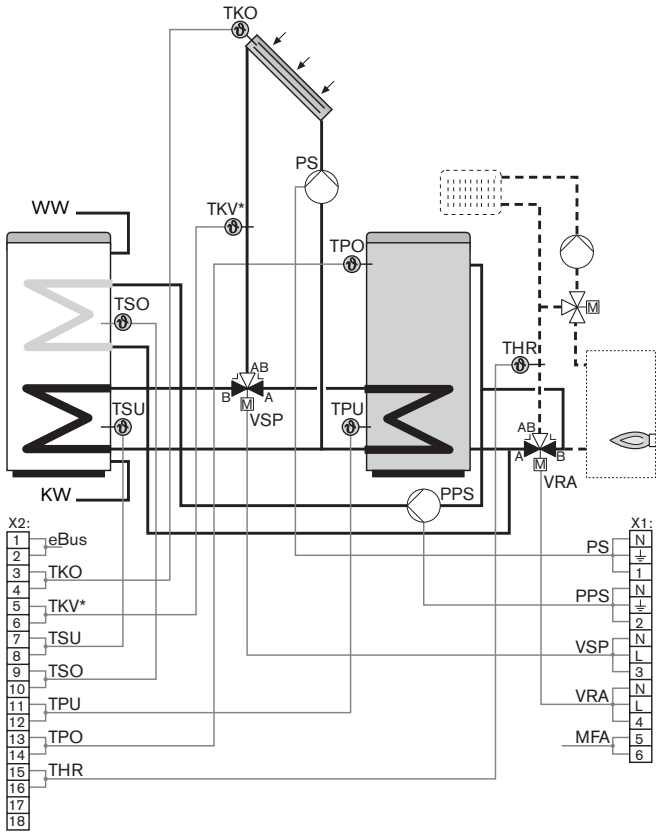
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU). If a collector supply sensor (TKV) is fitted this can be included into the control.

As soon as the temperature differental is greater than the value set (`... Diff. On`), the solar pump is switched on and the tank is loaded. Once the (`... Temp. Setpoint`) is reached, the three way valve changes over and loads the calorifier provided, in accordance with the priority setting (⇨ Ch. 7.11).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

With the three way valve used for return temperature increase (VRA) the energy available from the calorifier can be used depending on the calorifier temperature (TPO) and the heating return sensor (THR). Using thecharge reversal pump calorifier-tank (PPS) the energy stored is transferred depending on the calorifier temperature (TPO) and the storage tank temperature (TSO).

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variante 11: Storage tank cascade for DHW via plate heat exchanger and heating support

- Three way valve
- Heating return temperature increase

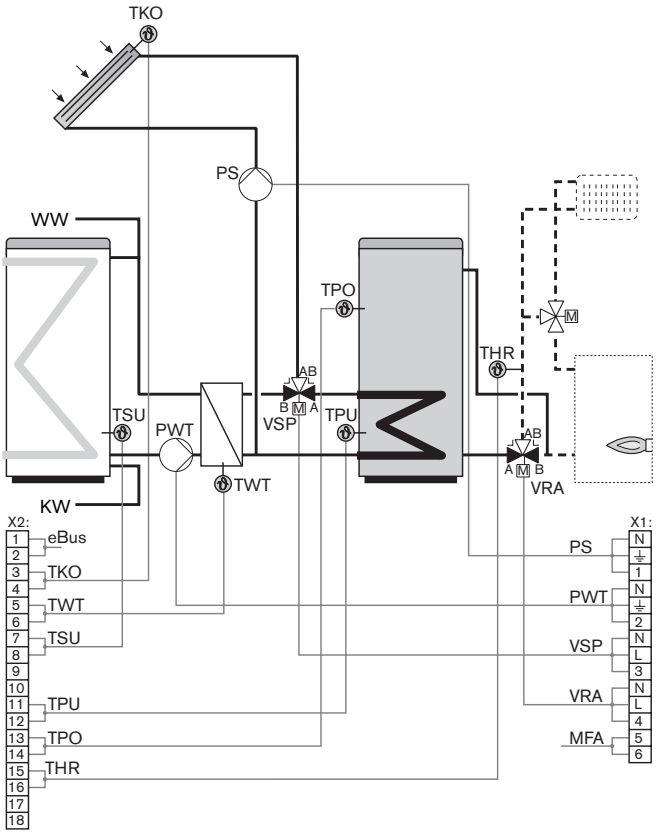
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU).

If the collector temperature (TKO) increases by the `(... Diff. On)` above the `(... Temp. Setpoint)` solar loading is started. The pump (PWT) runs at minimum speed, until the tank setpoint temperature has been reached at the sensor (TWT).
If the temperature differential (TKO to TSU) is less than `(... Diff. Off)` the pump switches off.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

With the three way valve used for return temperature increase (VRA) the energy available from the calorifier can be used depending on the calorifier temperature (TPO) and the heatng return sensor (THR).

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



Variation 12: DHW calorifier

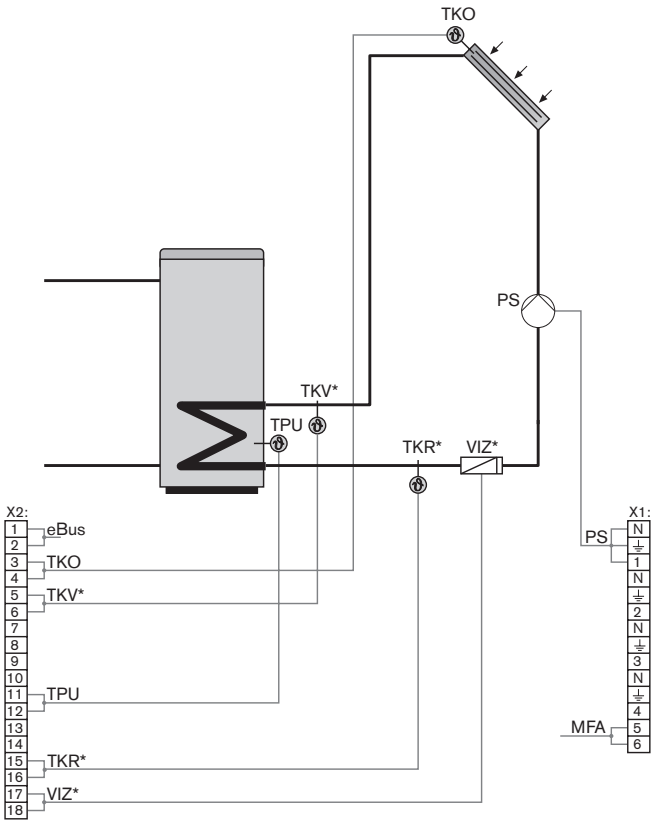
- Energy yield calculation (optional; ⇨ Ch. 7.9)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU). If a collector return sensor is fitted this can be included in the control.

As soon as the temperature differential is greater than the value set (`Calorifier Diff. On`), the solar pump is switched on and the tank is topped up until the switch off condition (`Calorifier Diff. Off`) or the maximum temperature of the calorifier has been reached.

The external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



* optional

Variation 13: DHW calorifier with collector bypass

- Energy yield calculation (optional; ⇨ Ch. 7.9)

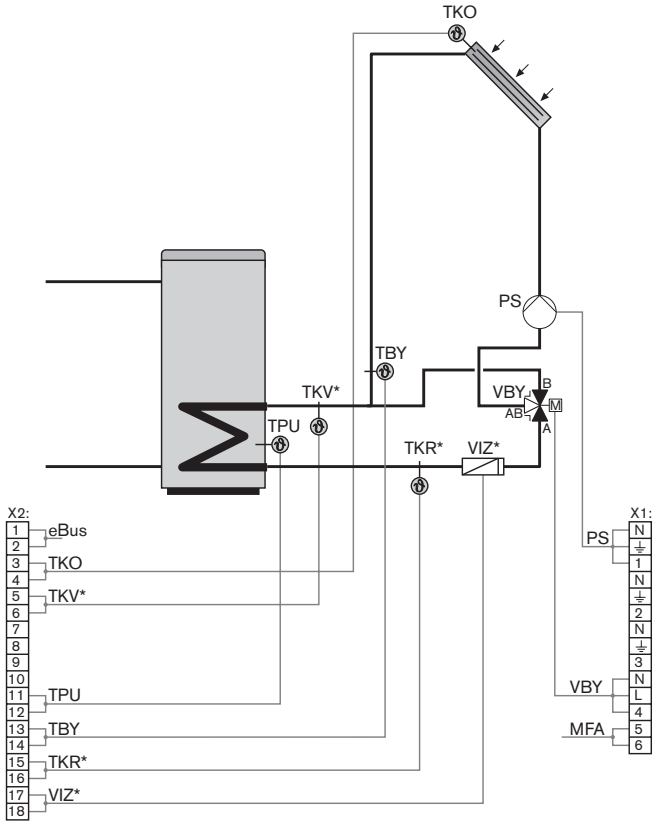
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU). If a collector return sensor (TKV) is fitted this can be included in the control.

As soon as the temperature differential is greater than the value set (`Calorifier Diff. On`), the solar pump is switched on and the tank is topped up until the switch off condition (`Calorifier Diff. Off`) or the maximum temperature of the calorifier has been reached.

The three way valve (VBY) is changed over depending on the collector temperature (TKO) and the reference sensor (TBY).

The external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



* optional

Variation 14: Calorifier for DHW via plate heat exchanger

- Energy yield calculation (optional; ⇨ Ch. 7.9)

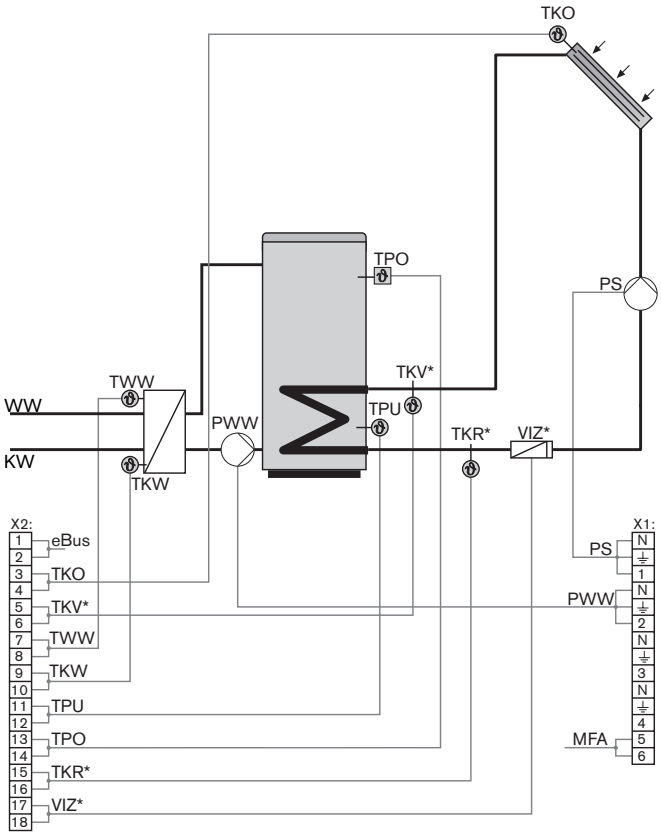
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU). If a collector flow sensor (TKV) is fitted this can be included in the control.

As soon as the temperature differential is greater than the value set (`Calorifier Diff. On`), the solar pump is switched on and the tank is topped up until the switch off condition (`Calorifier Diff. Off`) or the maximum temperature of the calorifier has been reached.

The plate heat exchanger pump (PWW) is switched on when the cold water temperture (TKW) falls below 30°C or the sensor short circuits..
The pump is switched over when the DHW temperature at the (TWW) is greater than the tank setpoint temperature, TKW exceeds 30°C or the short circuit at the sensor input has been rectified.

The external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



Variation 15: Calorifier for heating circuit support

- Heating return temperature increase

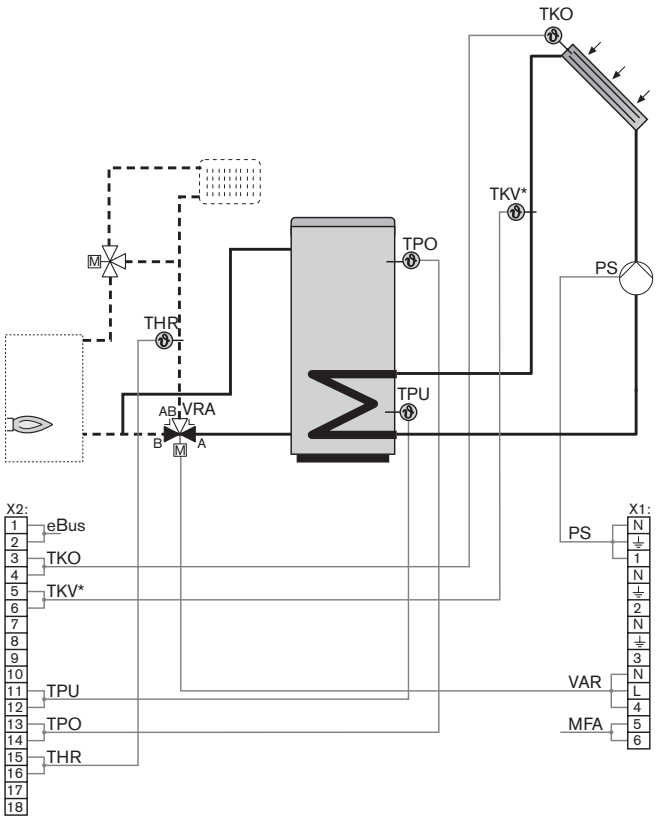
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU). If a collector return sensor (TKV) is fitted this can be included in the control.

As soon as the temperature differential is greater than the value set (`Calorifier Diff. On`), the solar pump is switched on and the tank is topped up until the switch off condition (`Calorifier Diff. Off`) or the maximum temperature of the calorifier has been reached.

Using the three way valve for the return temperature increase (VRA) the existing energy from the calorifier can be used depending on the calorifier temperature (TPO) and the heating return sensor (THR).

The external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



* optional

Variation 16: Calorifier for DHW via plate heat exchanger and heating circuit support

- Heating return temperature increase
- DHW withdrawal via plate heat exchanger

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU). If a collector return sensor (TKV) is fitted this can be included in the control.

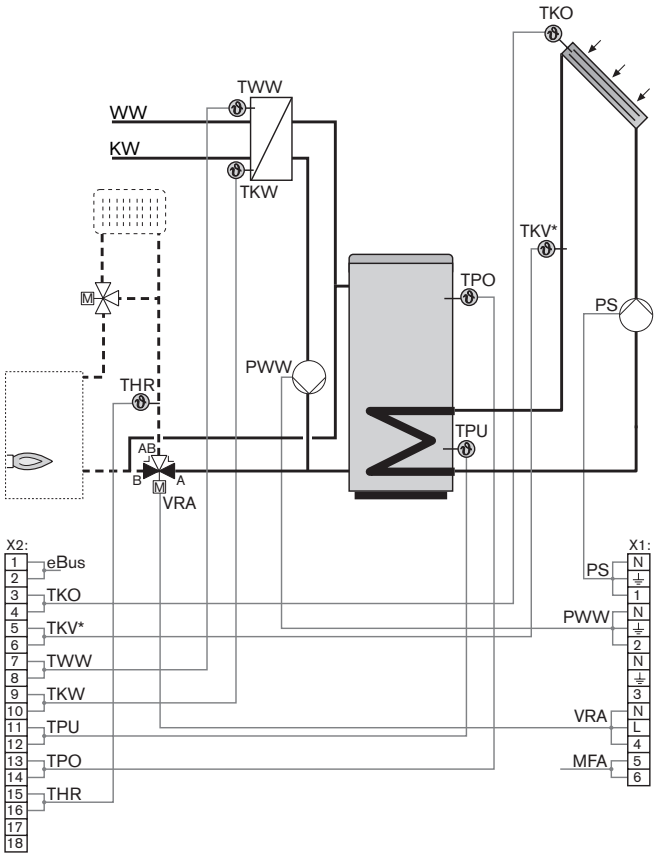
As soon as the temperature differential is greater than the value set (`Calorifier Diff. On`), the solar pump is switched on and the tank is topped up until the switch off condition (`Calorifier Diff. Off`) or the maximum temperature of the calorifier has been reached.

Using the three way valve for the return temperature increase (VRA) the existing energy from the calorifier can be used depending on the calorifier temperature (TPO) and the heating return sensor (THR).

The plate heat exchanger pump (PWW) is switched on when the cold water temperture (TKW) falls below 30°C or the sensor short circuits.
The pump is switched off when the DHW temperature at the (TWW) is greater than the tank setpoint temperature, TKW exceeds 30°C or the short circuit at the sensor input has been rectified.

The external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



* optional

Variation 17: Calorifer wth internal tank for DHW

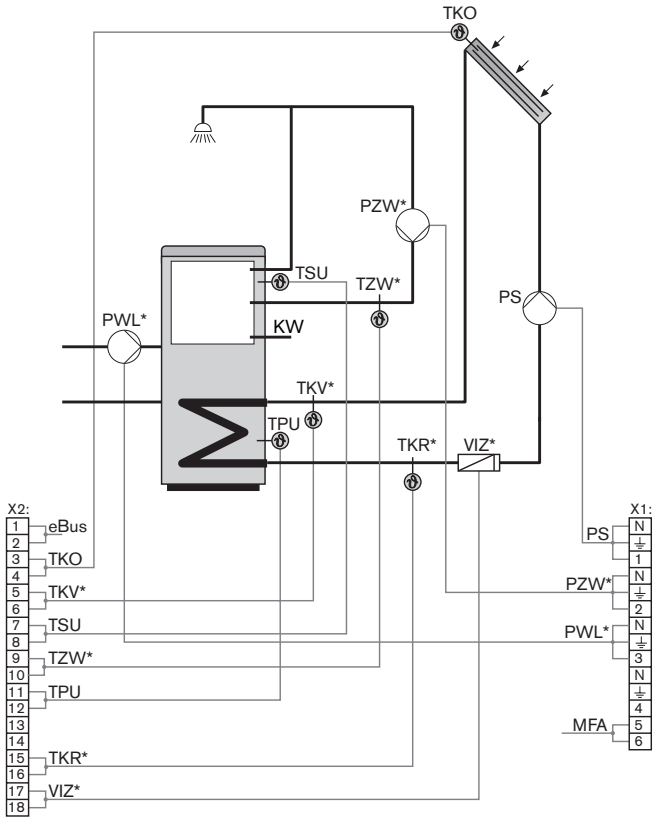
- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulaton functon wth sensor (optional; ⇨ Ch. 7.14)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU or TSU). If a collector flow sensor (TKV) is fitted this can be included in the control.

As soon as the temperature differential at the reference sensor is greater than the value set (`... Diff. On`), the solar pump is switched on and the tank is topped up until the switch off condition (`... Diff. Off`) or the maximum calorifer temperature has been reached. TSU or TPU are selected as reference sensor.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possble settngs MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 18: Calorifier with internal tank for DHW with collector bypass

- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulation function wth sensor (optional; ⇨ Ch. 7.14)

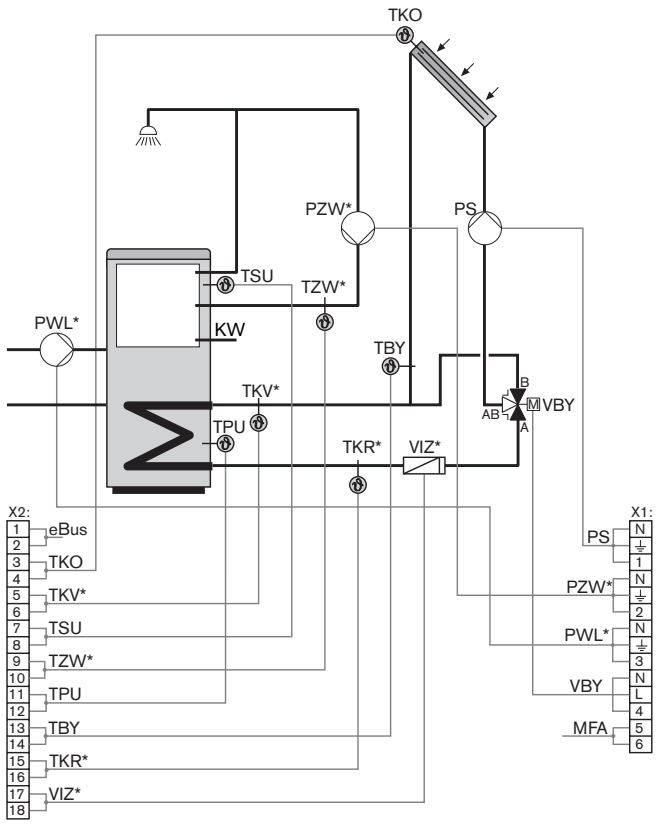
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU or TSU). If a collector flow sensor (TKV) is fitted this can be included in the control.

As soon as the temperature differential at the reference sensor is greater than the value set (`... Diff. On`), the solar pump is switched on and the tank is topped up until the switch off condition (`... Diff. Off`) or the maximum calorifer temperature has been reached. TSU or TPU are selected as reference sensor.

The three way valve (VBY) is switched over depending on the collector temperature (TKO) and the reference sensor (TBY).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possble settngs MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 19: Dual stratification storage tank for DHW and heating circuit support

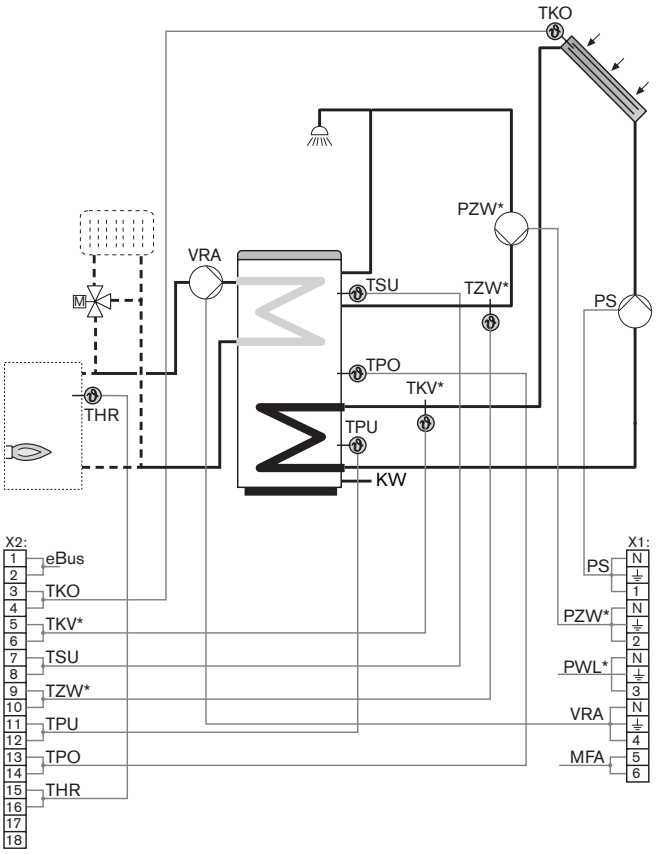
- Heating return temperature increase

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU or TSU). If a collector flow sensor (TKV) is fitted this can be included into the control.

As soon as the temperature differential at the reference sensor is greater than the value set (`... Diff. On`), the solar pump is switched on and the tank is topped up until the switch off condition (`... Diff. Off`) or the maximum calorifer temperature has been reached. TSU or TPU are selected as reference sensor.
Using the VRA output for return temperature increase the energy available from the calorifier can be used depending on the calorifier temperature (TPO), the storage tank setpoint temperature (TSU) and the heating return sensor (THR). The return temperature increase is only released if the storage tank setpoint value (TSU) is exceeded.
If the temperature at the sensor TSU falls by 5K below the storage tank setpoint value, return temperature increase is blocked.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possble settngs MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 20: Swimming pool

- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Fault transmission

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSB).

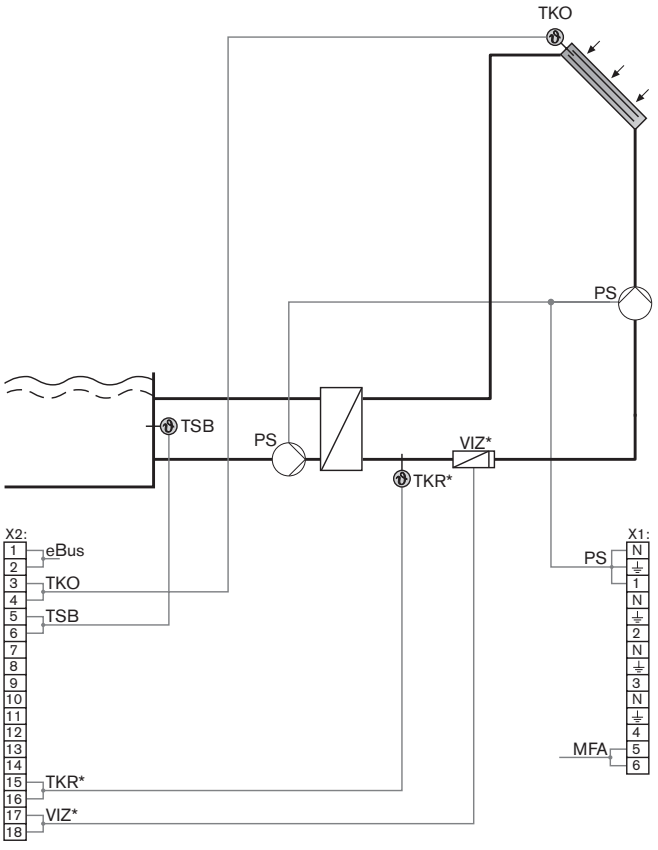
As soon as the temperature differential is greater than the value set (`Swim pool Diff. On`), the solar pump is switched on the swimming pool is topped up via the heat exchanger until the switch off condition (`Swim pool Temp. Off`) or the setpoint temperature has been reached.

If a fault occurs this can be passed on via the potential free `Multi-funct. Output` (MFA).

ATTENTION

When connecting both pumps to connection (`PS`) please ensure that both pumps together do not consume more than 1 A current, otherwise an auxiliary relay should be installed and the minimum rating of the solar pump should be set to 100% (`PS Speed Minimum`).

Possble settngs MFA output:
0, 9, 10



* optional

Variation 21: Swimming pool and dual stratification storage tank for DHW

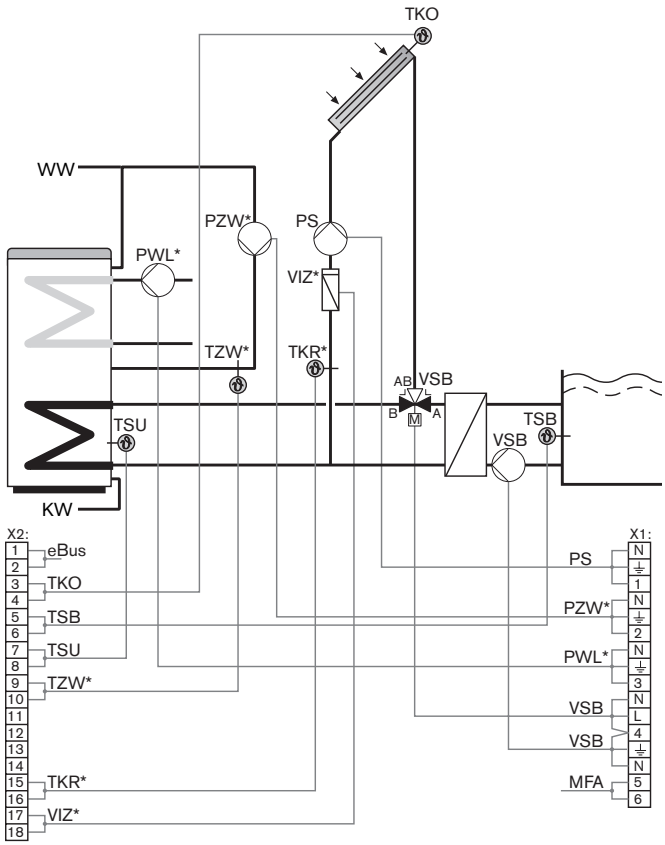
- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulation function with sensor (optional; ⇨ ch. 7.14)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TSB).

As soon as the temperature differential at the reference sensor is greater than the value set (`... Diff. On`), the solar pump is switched on and the demand with the lowest temperature level is loaded.
Once the (`... Temp. Setpoint value`) has been achieved the three way valve switches over and loads according to the priority setting.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possble settngs MFA output:
0, 1, 2, 7, 8, 9, 10



* optional

Variation 22: Dual stratification storage tank for DHW with collector cascade

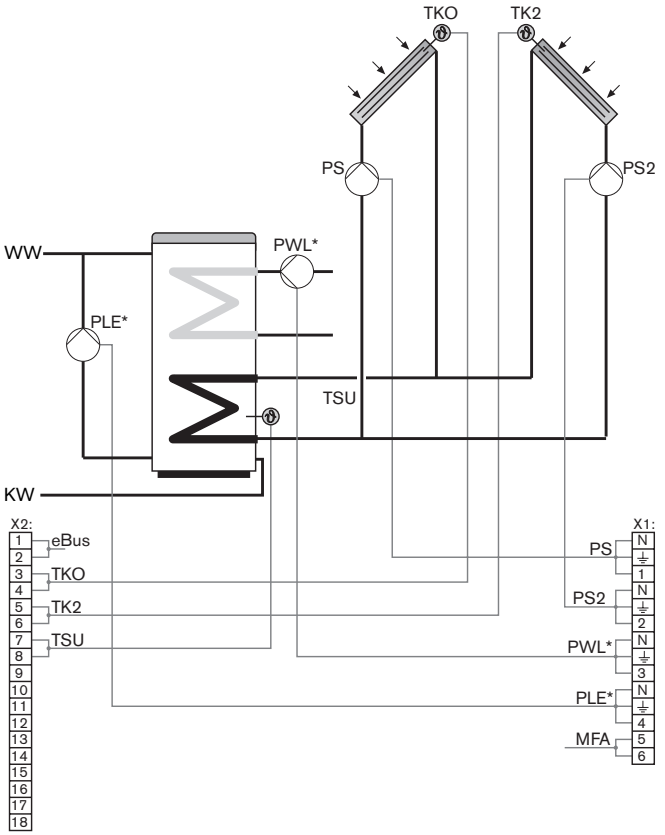
- Legionella function (optional; ⇨ Ch. 7.12)

The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TSU).

As soon as the temperature differential is greater than the increase set (`Tank Diff. On`), the relevant solar pump (PS or PS2) is activated.
Once the increase (`Tank Diff. Off`) or the maximum storage tank temperature has been reached the solar pump is switched off.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possble settngs MFA output:
0, 1, 2, 3, 4, 7, 8, 9, 10



* optional

Variation 23: Dual stratification storage tank with collector cascade/bypass

The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TSU).

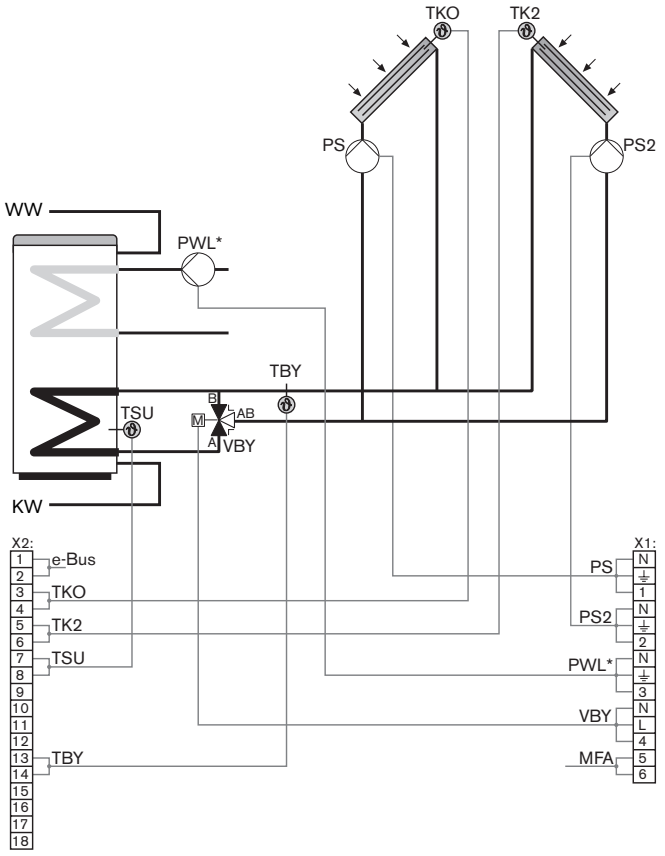
As soon as the temperature differential is greater than the increase (`Tank Diff. On`), the relevant solar pump (PS or PS2) is activated.

The three way valve (VBY) is switched over depending on the collector temperature (TKO or TK2) and the reference sensor (TBY).

Once the increase (`Tank Diff. Off`) or the maximum storage tank temperature has been reached the solar pump is switched off.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possble settings MFA output:
0, 1, 2, 7, 8, 9, 10



Variation 24: Storage tank cascade for DHW with collector cascade

- Legionella function (optional; ⇨ Ch. 7.12)
- Exchanger interlock
- Three way valve

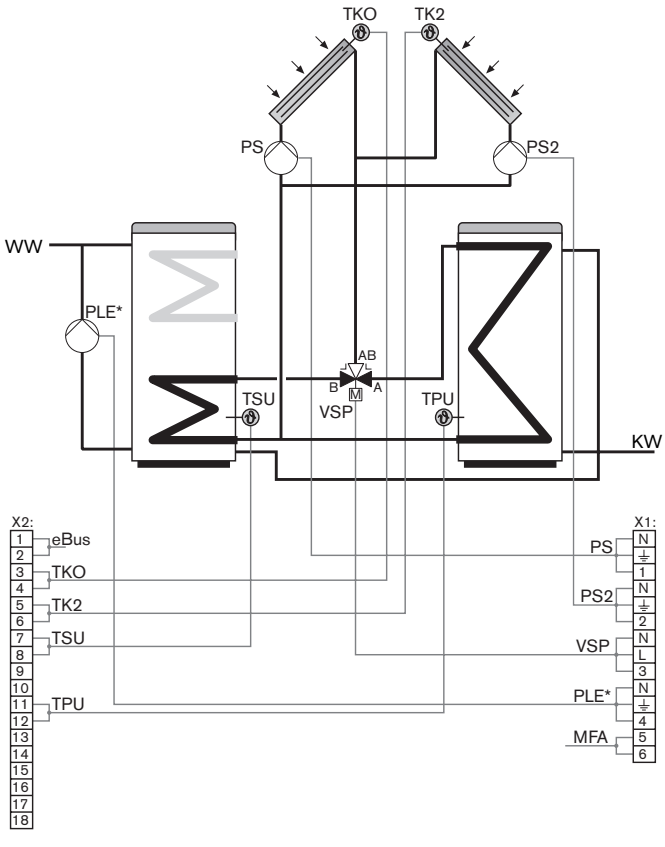
The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TPU, TSU).

As soon as the temperature differential is greater than the increase (`... Diff. On`), the relevant solar pump (PS or PS2) is activated. Once the (`... Temp. Setpoint`) has been reached the three way valve switches over and loads the DHW storage tank (calorifier)provided, according to the priority setting (⇨ Ch. 7.11).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

By adding cold water, the warm water from the DHW tank is transported to the dual stratification storage tank.

Possble settngs MFA output:
0 … 10



* optional

Variation 25: Storage tank cascade for DHW with collector cascade and retrieval function

- Retrieval function
- Three way valve

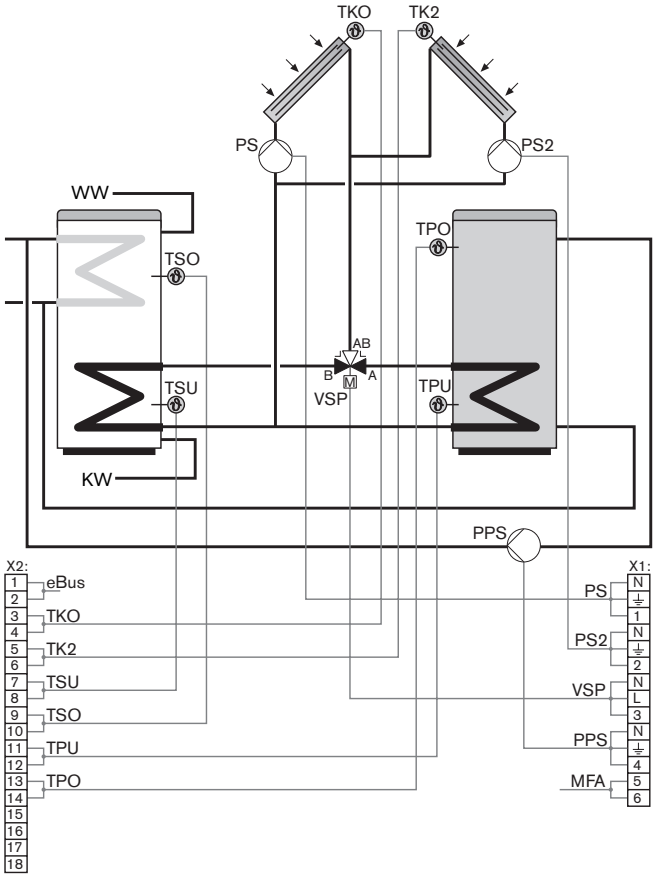
The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TPU or TSU).

As soon as the temperature differential is greater than the increase (`... Diff. On`), the relevant solar pump (PS or PS2) is activated.
Once the (`... Temp. Setpoint`) has been reached the three way valve swithces over and loads the calorifier provided, according to the priority setting (⇨ Ch. 7.11).

With the charge reversal pump calorifier-tank (PPS) the energy stored in the calorifier is utilised depending on the `Tank Actual value Top` (TSO) and the `Calorifier Actual value Top` (TPO).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output: 0, 1, 2, 5, 6, 7, 8, 9, 10



Variation 26: Storage tank cascade for DHW with collector cascade/bypass

- Three way valve

The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TPU or TSU).

As soon as the temperature differential is greater than the increase (`... Diff. On`), the relevant solar pump (PS or PS2) is activated.

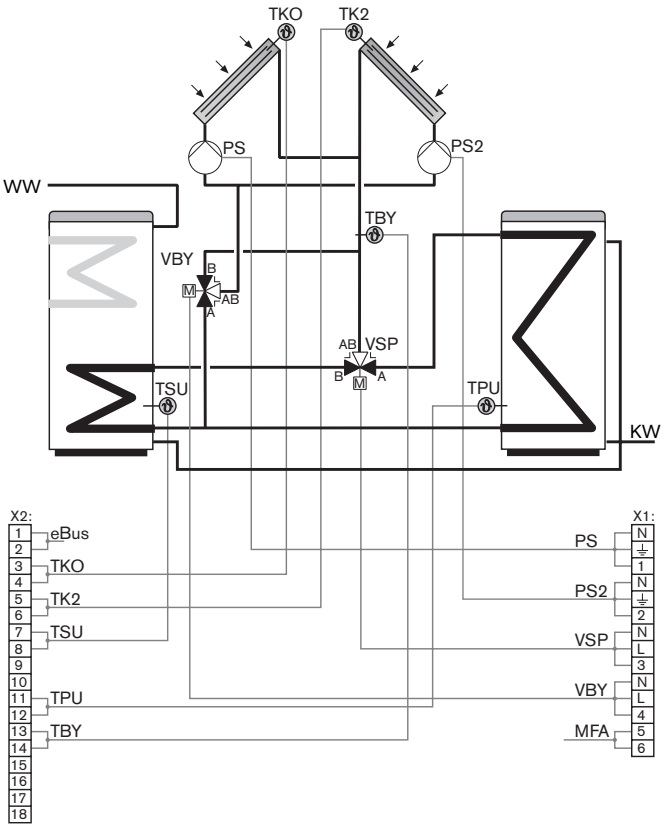
The three way valve (VBY) is switched over depending on the collector temperature (TKO or TK2) and the reference sensor (TBY).

Once the (`... Temp. Setpoint value`) has been reached the three way valve switches over and loads the DHW storage tank (calorifier) according to the priority setting (Ch. 7.11).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

By adding cold water, the warm water from the DHW tank is transported to the dual stratification storage tank.

Possble settngs MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



Variation 27: Storage tank cascade for DHW and heating circuit support

- Three way valve
- Heating return temperature increase

The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TPU or TSU).

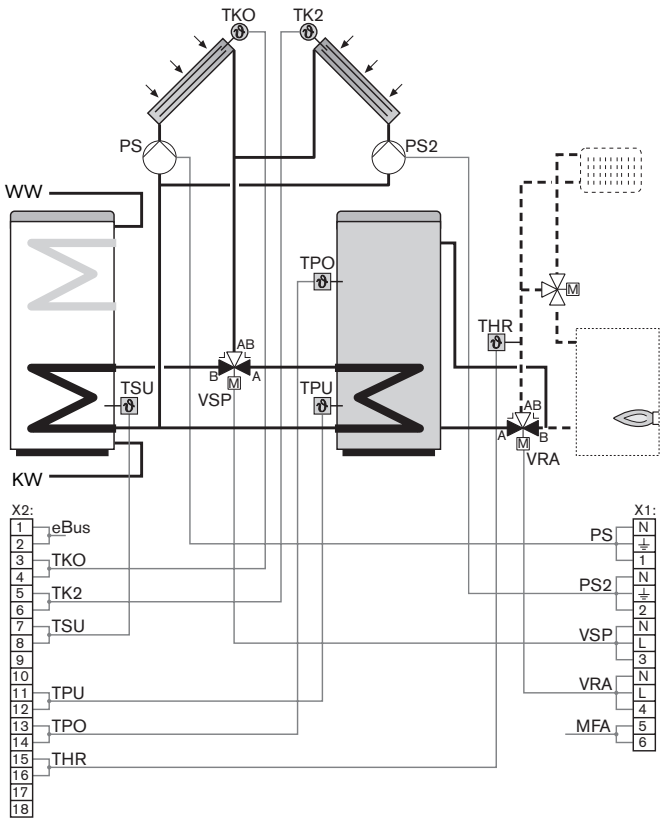
As soon as the temperature differential is greater than the increase (`... Diff. On`) set, the relevant solar pump (PS or PS2) is activated.
Once the `... Temp. Setpoint` has been reached the three way valve switches over and loads the calorifier provided according to the priority setting (⇨ Ch. 7.11).

The three way valve (VBY) is switched over depending on the collector temperature (TKO or TK2) and the reference sensor (TBY).

Using the three way valve for return temperature increase (VRA) the available energy from the calorifier can be utilised depending on the calorifier temperature (TPO) and the heating return sensor (THR).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



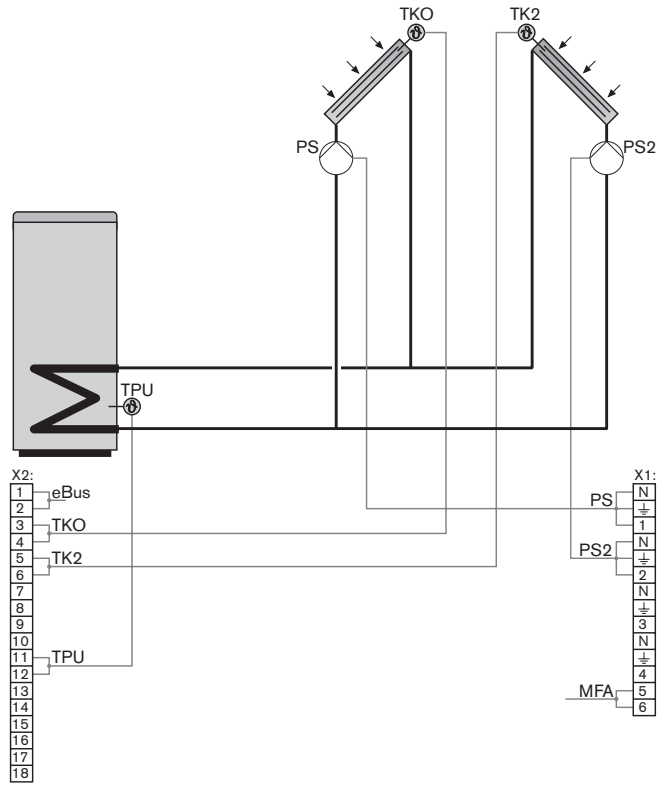
Variation 29: Calorifier with collector cascade

The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TPU).

As soon as the temperature differential is greater than the increase (`Calorifier Diff. On`) set, the relevant solar pump (PS or PS2) is activated.
Once the increase (`Calorifier Diff. Off`) or the maximum calorifier temperature has been reached, the pump is switched off.

The external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



Variation 30: Calorifier with collector cascade/bypass

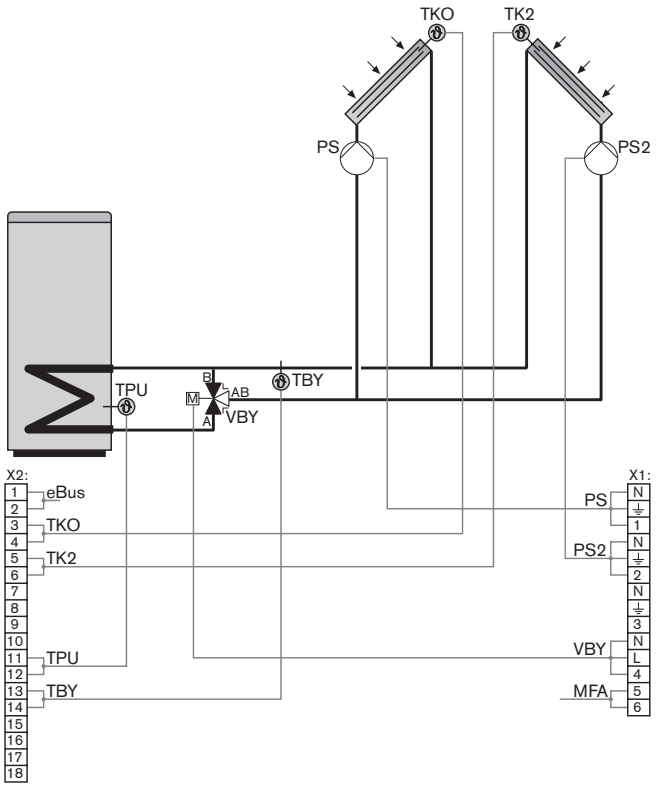
The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TPU).

As soon as the temperature differential is greater than the increase (`Calorifier Diff. On`) set, the relevant solar pump (PS or PS2) is activated.
Once the increase (`Calorifier Diff. Off`) or the maximum calorifier temperature has been reached, the pump is switched off.

The three way valve (VBY) is switched over depending on the collector temperature (TKO or TK2) and the reference sensor (TBY).

The external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



Variation 31: Calorifier for heating circuit support with collector cascade

- Heating return temperature increase

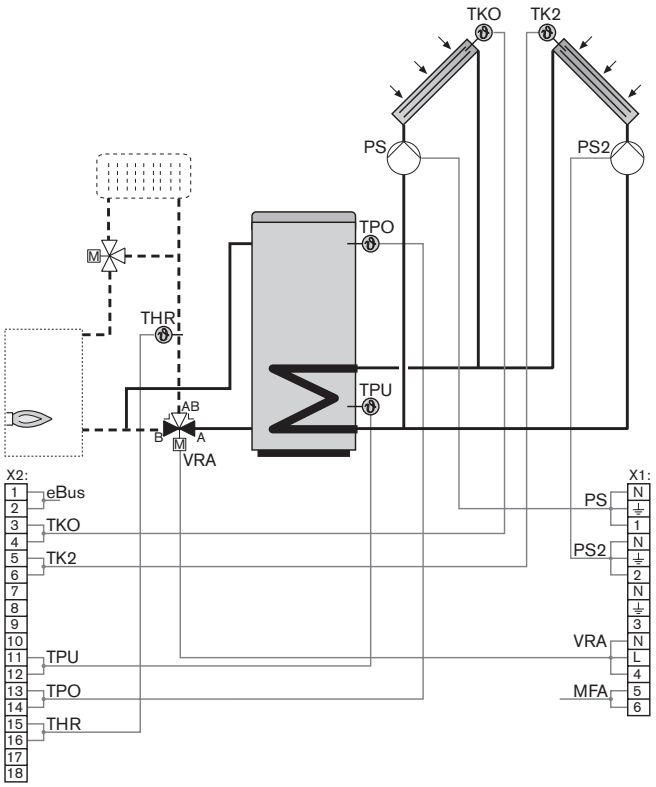
The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TPU).

As soon as the temperature differential is greater than the increase (`Calorifier Diff. On`) set, the relevant solar pump (PS or PS2) is activated.
Once the increase (`Calorifier Diff. Off`) or the maximum calorifier temperature has been reached, the pump is switched off.

Using the three way valve for return temperature increase (VRA) the available energy from the calorifier can be utilised depending on the calorifier temperature (TPO) and the heating return sensor (THR).

The external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



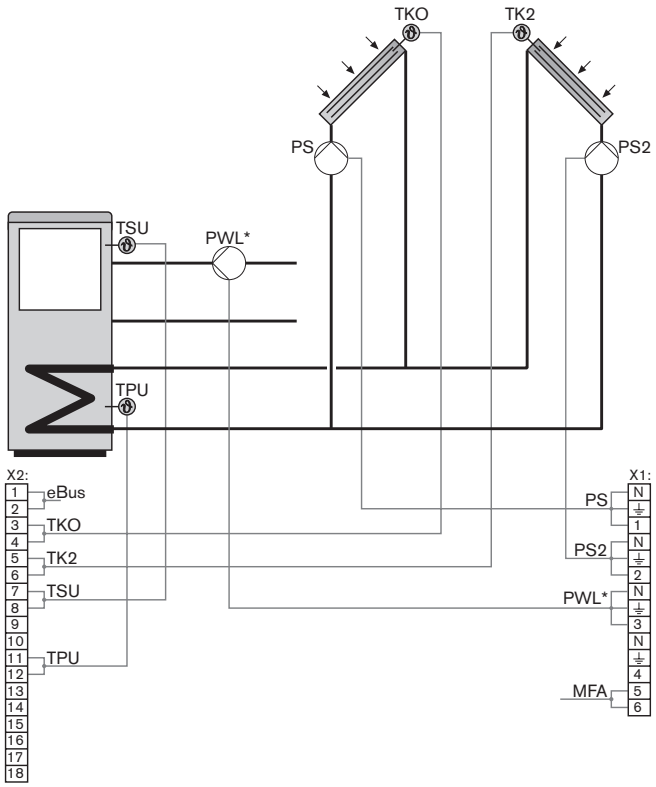
Variation 32: Calorifier with internal tank for DHW and collector cascade

The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TPU or TSU).

As soon as the temperature differential is greater than the increase (`... Diff. On`) set, the relevant solar pump (PS or PS2) is activated.
Once the increase (`... Diff. Off`) or the maximum calorifier temperature has been reached the solar pump is switched off. TSU or TPU is selected as reference sensor.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 33: Calorifier with internal tank for DHW and collector cascade/bypass

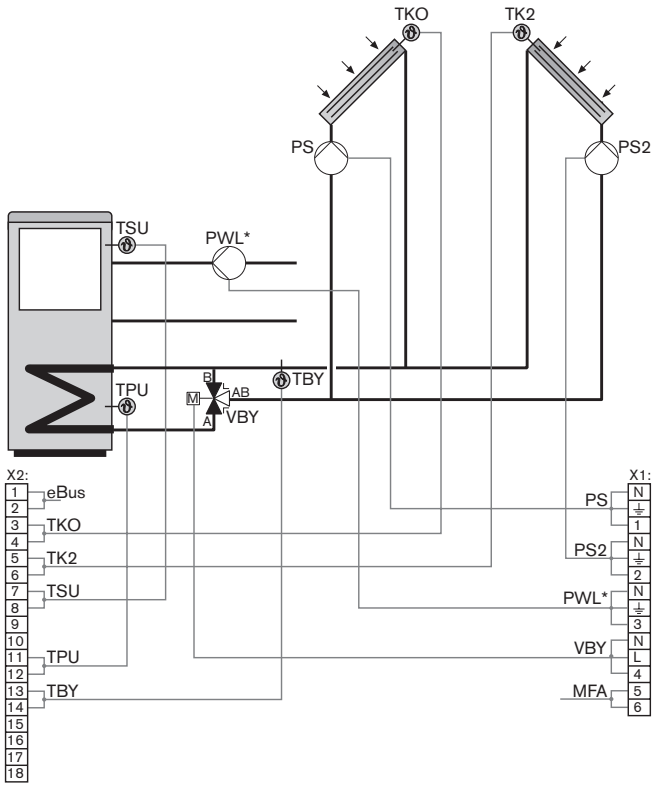
The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TPU or TSU).

As soon as the temperature differential is greater than the increase (`... Diff. On`) set, the relevant solar pump (PS or PS2) is activated.
Once the increase (`... Diff. Off`) or the maximum calorifier temperature has been reached the solar pump is switched off. TSU or TPU is selected as reference sensor.

The three way valve (VBY) is switched over depending on the collector temperature (TKO or TK2) and the reference sensor (TBY).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 34: Calorifier with internal tank for DHW with collector cascade and heating circuit support

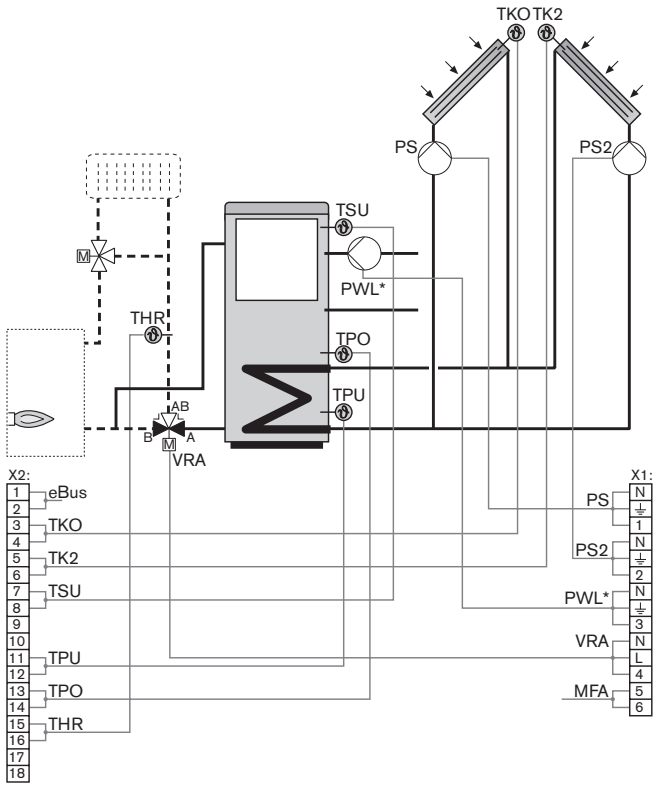
The WRSol 2.0 determines the temperature differential between the collector sensors (TKO or TK2) and the reference sensor (TPU or TSU).

As soon as the temperature differential is greater than the increase (`... Diff. On`) set, the relevant solar pump (PS or PS2) is activated.
Once the increase (`... Diff. Off`) or the maximum calorifier temperature has been reached the solar pump is switched off. TSU or TPU is selected as reference sensor.

Using the three way valve for return temperature increase (VRA) the available energy from the calorifier can be utilised depending on the calorifier temperature (TPO) and the heating return sensor (THR).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 35: Storage tank cascade for DHW and heating with collector and solid fuel boiler

- Three way valve
- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Legionella function (optional; ⇨ Ch. 7.12)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU).

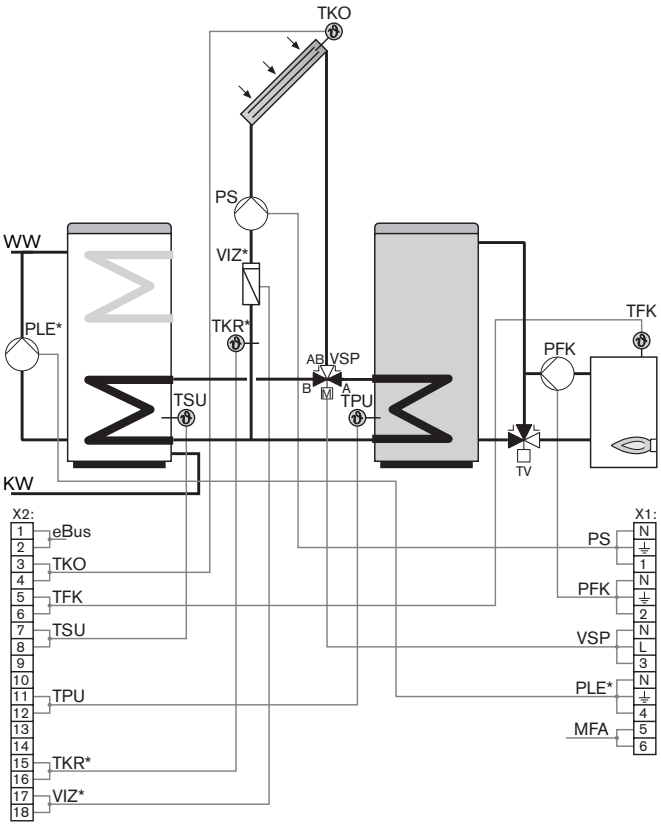
As soon as the temperature differential is greater than the value (`... Diff. On`) set, the solar pump is switched on and the storage tank is loaded.
Once the (`... Temp. Setpoint value`) has been reached the three way valve switches over and loads the calorifier provided according to the priority setting (⇨ Ch. 7.11).

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0 … 10



* optional

Variation 36: Storage tank cascade for DHW with collector and solid fuel boiler via retrieval function

- Three way valve
- Energy yield calculation (optional; ⇨ Ch. 7.9)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU). As soon as the temperature differential is greater than the value (`... Diff. On`) set, the solar pump is switched on and the storage tank is loaded. Once the `... Temp. Setpoint value` has been reached the three way valve switches over and loads the calorifier provided according to the priority setting (⇨ Ch. 7.11).

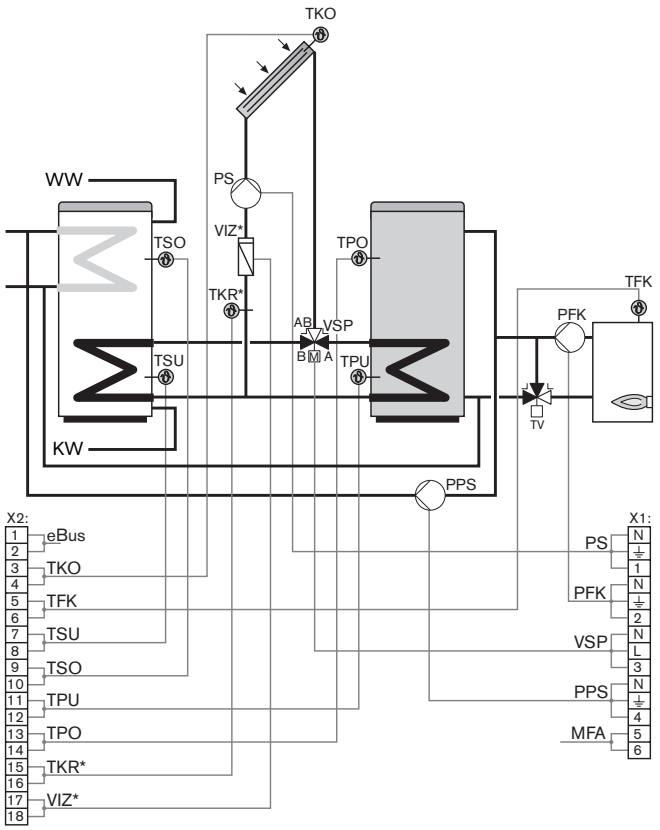
With the calorifier - tank pump (PPS) the energy stored in the calorifier is transferred, depending on the storage tank temperature top (TSO) and the calorifier temperature top (TPO).

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 37: Storage tank cascade for DHW and heating with collector/bypass and solid fuel boiler

- Three way valve
- Energy yield calculation (optional; ⇨ Ch. 7.9)

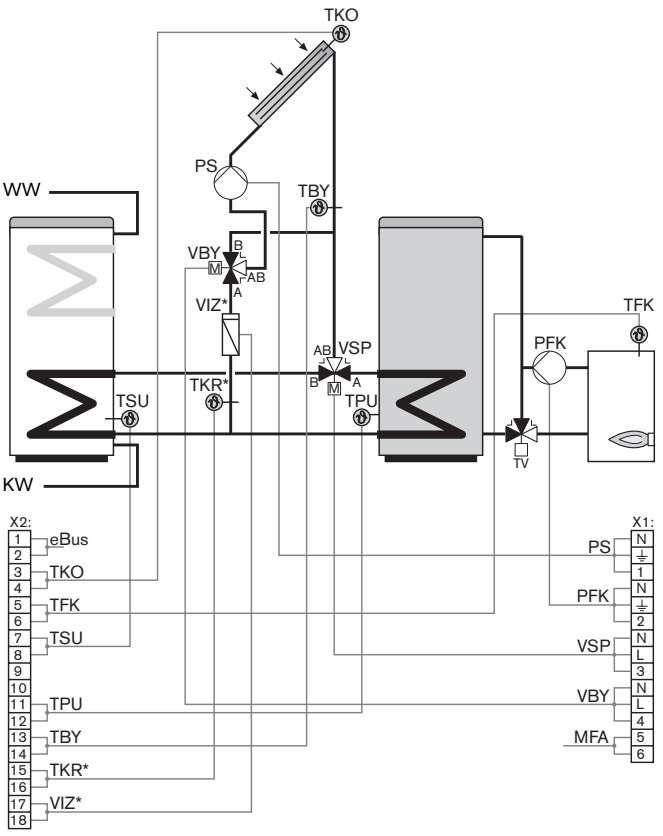
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU).
As soon as the temperature differential is greater than the value (`... Diff. On`) set, the solar pump is switched on and the storage tank is loaded. The three way valve (VBY) is switched over depending on the collector temperature (TKO) and the reference sensor (TBY).
Once the (`... Temp. Setpoint value`) has been reached the three way valve switches over and loads the calorifier provided according to the priority setting (⇨ Ch. 7.11).

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 38: Storage tank cascade for DHW and heating support with collector and solid fuel boiler

- Three way valve
- Heating return temperature increase

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU). As soon as the temperature differential is greater than the value (`... Diff. On`) set, the solar pump is switched on and the storage tank is loaded. Once the (`... Temp. Setpoint value`) has been reached the three way valve switches over and loads the calorifier provided, according to the priority setting (⇨ Ch. 7.11).

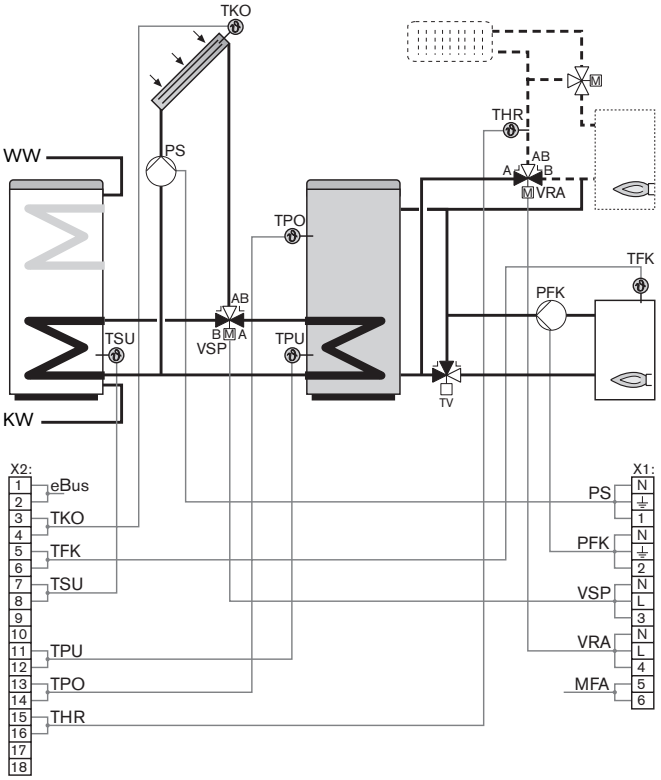
Using the three way valve for return temperature increase (VRA) the available energy from the calorifier can be utilised depending on the calorifier temperature (TPO) and the heating return sensor (THR).

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



Variation 40: Calorifier for heating with collector and solid fuel boiler

- Energy yield calculation (optional; ⇨ Ch. 7.9)

The WRSol 2.0 determines the temperature differential between the calorifier sensor (TKO) and the reference sensor (TPU).

As soon as the temperature differential is greater than the value set (`Calorifier Diff. On`), the solar pump is switched on and the storage tank is topped up until the switch off condition (`Calorifier Temp. Off`) or the maximum calorifier temperature has been reached.

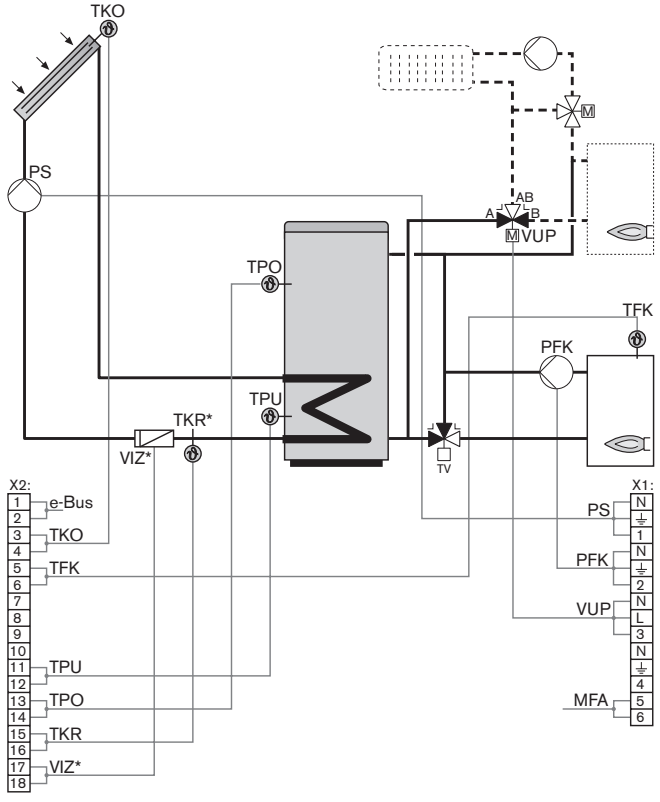
Release of solid fuel boiler pump (PFK) see Ch. 7.6.

Switch over three way valve (VUP) see Ch. 7.20

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

The external heat exchanger can be blocked via the potential free `Multi-funct. output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



* optional

Variation 41: Calorifier for heating with collector/bypass and solid fuel boiler

- Energy yield calculation (optional; ⇨ Ch. 7.9)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU).

As soon as the temperature differential is greater than the value set (`Calorifier Diff. On`), the solar pump is switched on.

The three way valve (VBY) is switched over depending on the collector temperature (TKO) and the reference sensor (TBY).

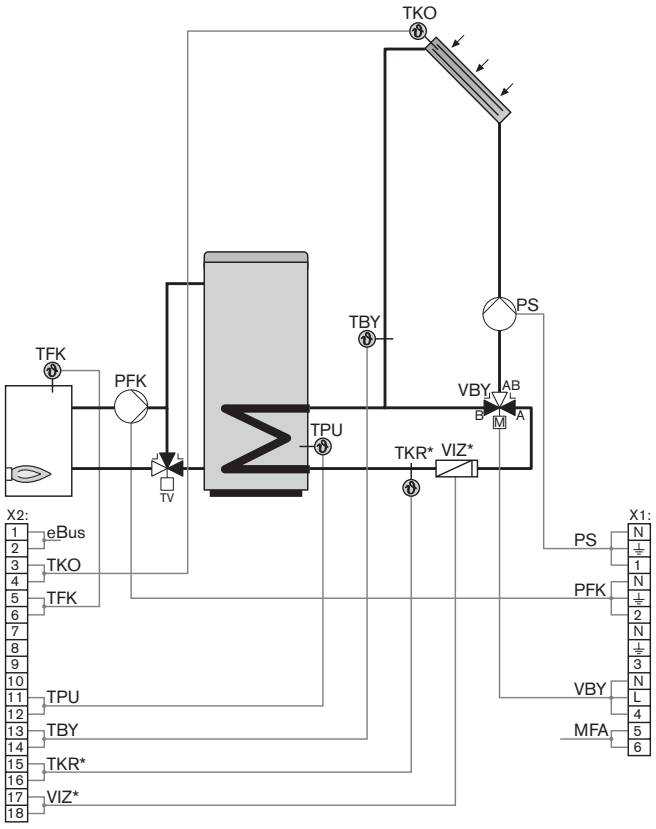
The storage tank is topped up until the switch off condition (`Calorifier Temp. Off`) or the maximum calorifier temperature has been reached.

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

The external heat exchanger can be blocked via the potential free `Multi-funct. output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



* optional

Variation 42: Calorifier for heating support with collector and solid fuel boiler

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU).

As soon as the temperature differential is greater than the value set (`Calorifier Diff. On`), the solar pump is switched on and the storage tank is topped up until the switch off condition (`Calorifier Temp. Off`) or the maximum calorifier temperature has been reached.

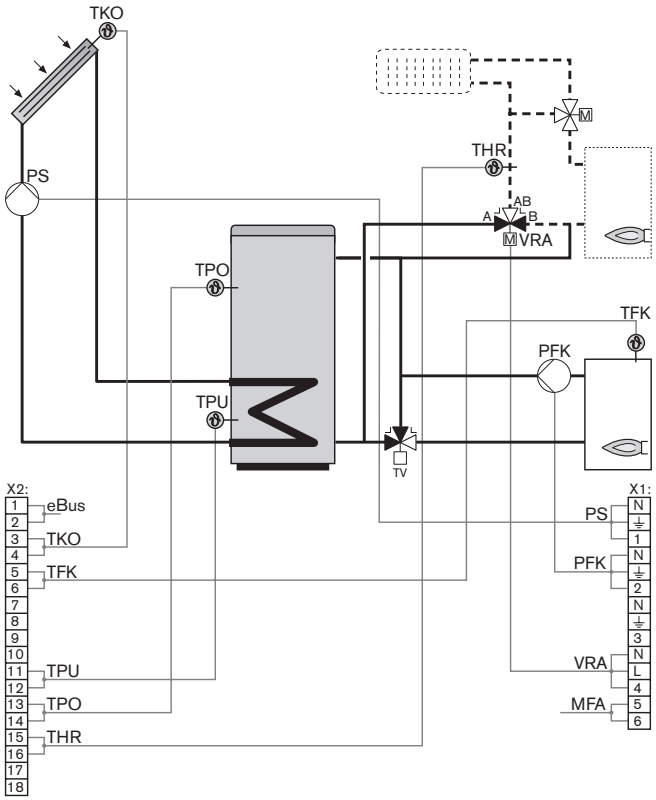
Using the three way valve for return temperature increase (VRA) the available energy from the calorifier can be utilised depending on the calorifier temperature (TPO) and the heating return sensor (THR).

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

The external heat exchanger can be blocked via the potential free `Multi-funct. output` (MFA).

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



Variation 43: Calorifier with internal tank for DHW with collector and solid fuel boiler

- Energy yield calculation (optional; ⇨ Ch. 7.9)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU).

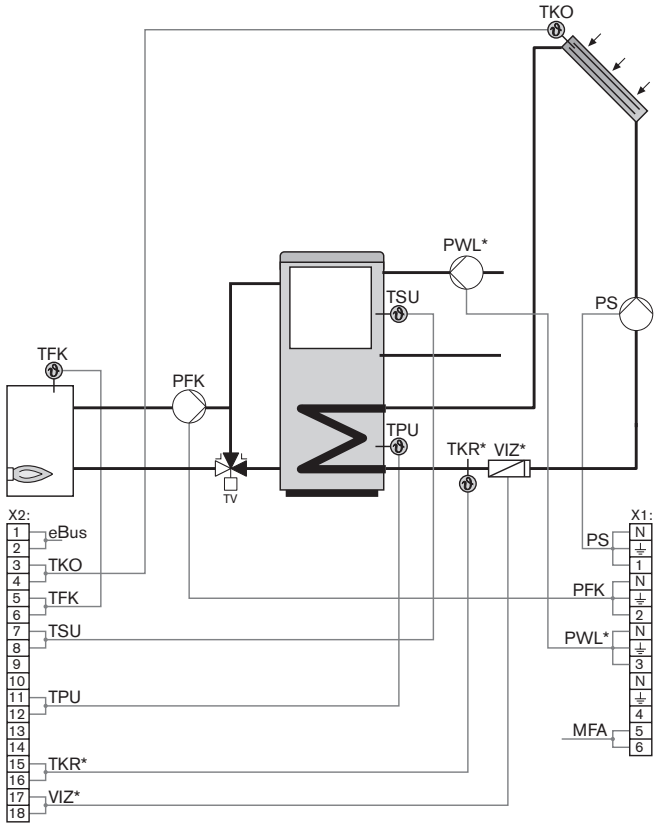
As soon as the temperature differential on the reference sensor is greater than the value set (`... Diff. On`), the solar pump is switched on and the storage tank is topped up until the switch off condition (`... Diff. Off`) or the maximum calorifier temperature has been reached. TSU or TPU is selected as reference sensor.

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 44: Calorifier with internal tank for DHW with collector/bypass and solid fuel boiler

- Energy yield calculation (optional; ⇨ Ch. 7.9)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU).
As soon as the temperature differential on the reference sensor is greater than the value set (`... Diff. On`), the solar pump is switched on. TSU or TPU is selected as reference sensor.

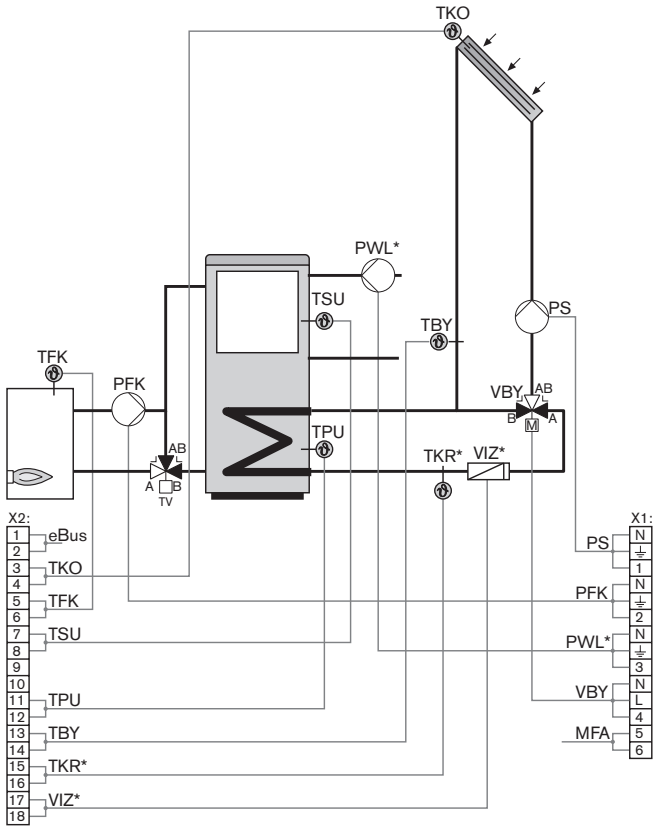
The three way valve (VBY) is switched over depending on the collector temperature (TKO) and the reference sensor (TBY).
The storage tank is topped up until the switch off condition (`... Diff. Off`) or the maximum calorifier temperature has been reached.

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 45: Calorifier with internal tank DHW and heating circuit support with collector and solid fuel boiler

- Heating return temperature increase

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TPU or TSU).

As soon as the temperature differential on the reference sensor is greater than the value set (`... Diff. On`), the solar pump is switched on and the storage tank is topped up until the switch off condition (`... Diff. Off`) or the maximum calorifier temperature has been reached. TSU or TPU is selected as reference sensor.

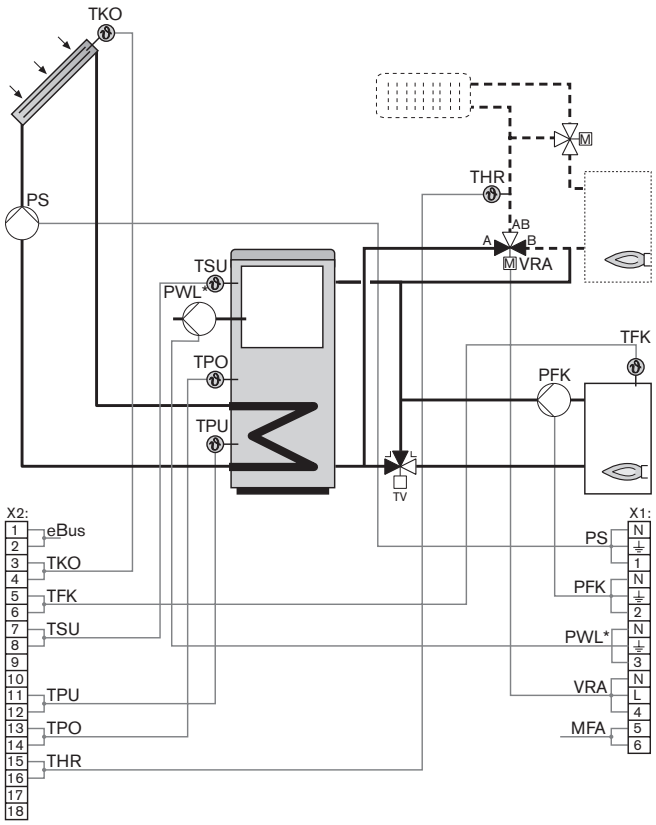
Using the three way valve for return temperature increase (VRA) the available energy from the calorifier can be utilised depending on the calorifier temperature (TPO) and the heating return sensor (THR).

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



Variation 48: Calorifier for heating with solid fuel boiler

The WRSol 2.0 compares the solid fuel boiler temperature (TFK) with the calorifier temperature (TPU).

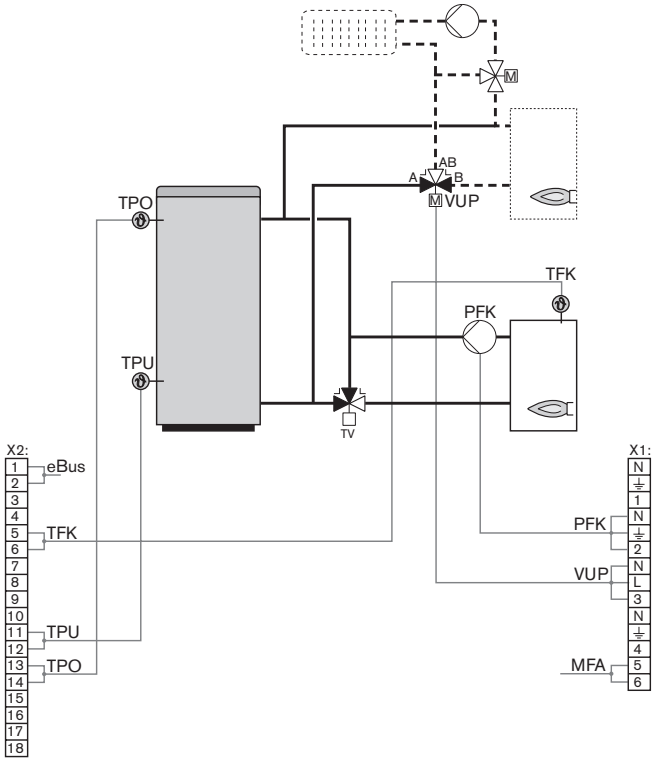
If the average temperature differential is greater than the value set (`Solid fuel Diff. On`) the pump is switched on, if the predetermined minimum temperature (`Solid fuel Temp. Minimum`) is reached at the same time.
The speed of the temperature increase can also lead to the pump starting (⇨ Ch. 7.6).

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Switch over function three way valve (VUP) see Ch. 7.20.

Depending on the average speed of the solid fuel boiler pump and the reduced calorifier temperature (see parameter `Diff. Calorifier Min`), an external heat exchanger can be blocked via the potential free multi-function output (MFA). Blocking also occurs, if the `Calorifier Temp. Setpoint` is exceeded and is unblocked if the temperature falls by 5K.

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



Variation 49: Calorifier for heating support with solid fuel boiler

- Heating return temperature increase

The WRSol 2.0 compares the solid fuel boiler temperature (TFK) with the calorifier temperature (TPU).

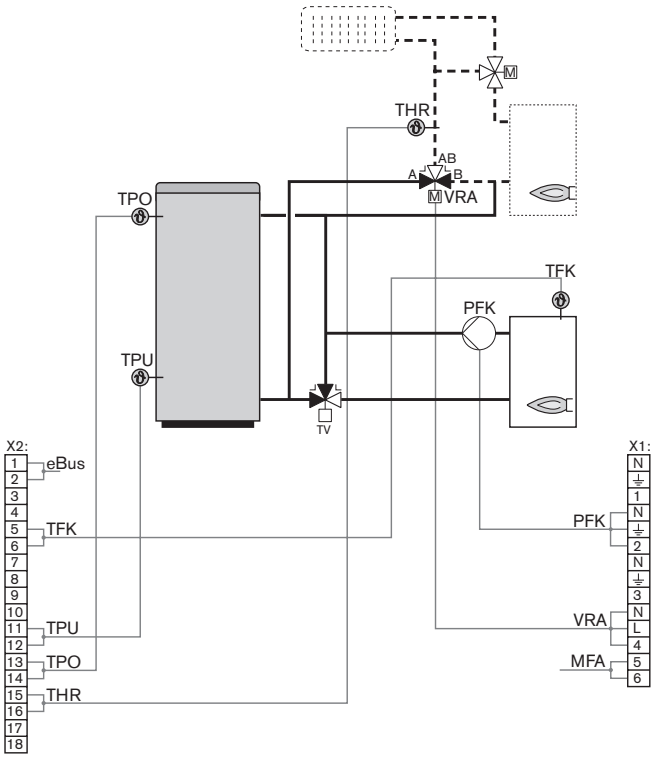
If the average temperature differential is greater than the value set (`Solid fuel Diff. On`) the pump is switched on, if the predetermined minimum temperature (`Solid fuel Temp. Minimum`) is reached at the same time.
The speed of the temperature increase can also lead to the pump starting (⇨ Ch. 7.6).

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Using the three way valve for return temperature increase (VRA) the available energy from the calorifier can be utilised depending on the calorifier temperature (TPO) and the heating return sensor (THR).

Depending on the average speed of the solid fuel boiler pump and the reduced calorifier temperature (see parameter `Diff. Calorifier Min`), an external heat exchanger can be blocked via the potential free multi-function output (MFA). Blocking also occurs, if the `Calorifier Temp. Setpoint` is exceeded and is unblocked if the temperature falls by 5K.

Possible settings MFA output:
0, 5, 6, 7, 8, 9, 10



Variation 50: Dual storage tank switching for DHW with separate collectors and retrieval function

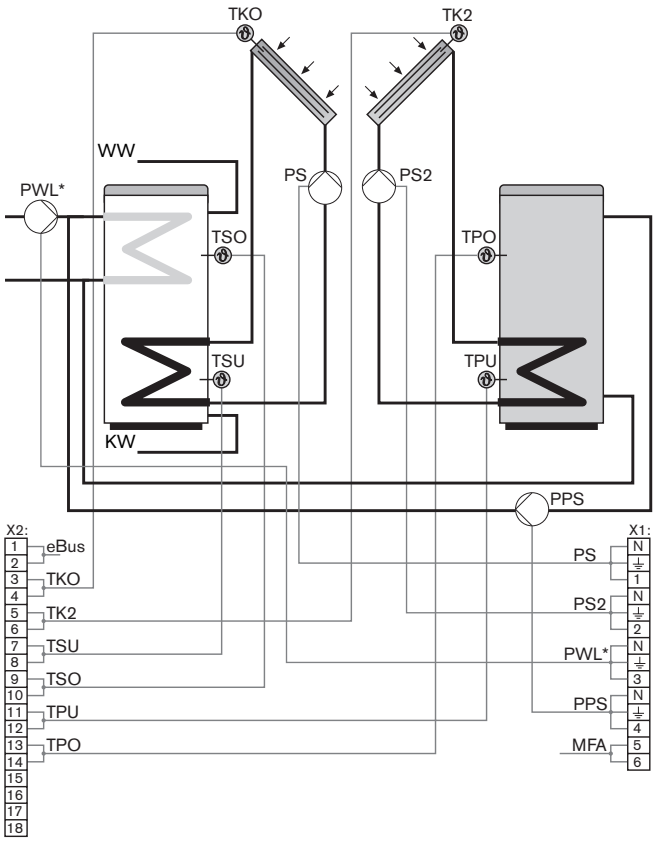
- Retrieval function

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU) for the dual stratification storage tank. The temperature differential between the second collector sensor (TK2) and the reference sensor (TPU) is also determined for the calorifier.
Depending on the temperature differential determined the pumps (PS / PS2) are started.

With pump reloading calorifier-tank (PPS) the energy stored in the calorifier is transferred depending on the storage tank temperature top (TSO) and the calorifier temperature top (TPO).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

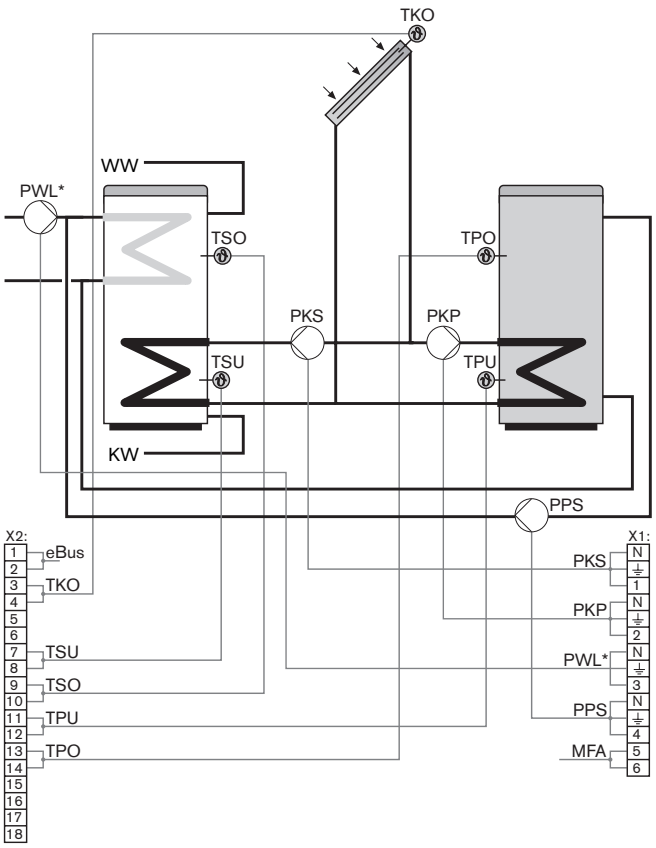
Variation 51: Storage tank cascade for DHW with two collector load pumps and retrieval function

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU und TPU). If the temperature differential exceeds the value set (`... Diff. On`) the relevant solar pump is activated and the storage tank is loaded. Once the dual stratification storage tank reaches its `... Temp. Setpoint value` the pump is deactivated and the calorifier pump is activated in accordance with the switching differential or the priority setting (Ch. 7.11).

With the charge reversal pump calorifier-tank (PPS) the energy stored in the calorifier is used depending on the storage tank temperature top (TSO) and the calorifier temperature top (TPO).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



* optional

Variation 52: Storage tank cascade for DHW / heating and/or swimming pool

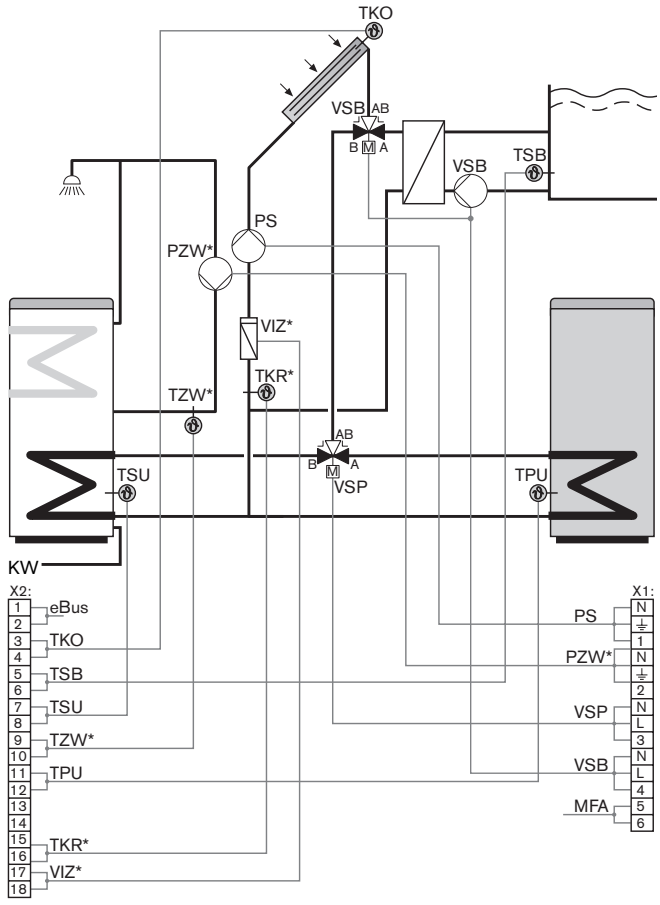
- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulation function with sensor (optional; ⇨ Ch. 7.14)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU, TPU, TSB).

As soon as the temperature differential on the reference sensor is greater than the value set (`... Diff. On`), the solar pump is switched on and the storage tank is loaded. Once the (`... Temp. Setpoint value`) has been reached the three way valve (VBP) switches over and loads the calorifier provided according to the priority setting (Ch. 7.11).
Once the calorifier has been loaded the swimming pool is loaded via the three way valve (VSB) and the heat exchanger.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 5, 6, 7, 8, 9, 10



Variation 53: Storage tank sequence connection for DHW, retrieval function and legionella function

- Legionella function (optional; ⇨ Ch. 7.12)
- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulation function (optional; ⇨ Ch. 7.14)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSU). If a collector flow sensor (TKV) is fitted this is included in the control.

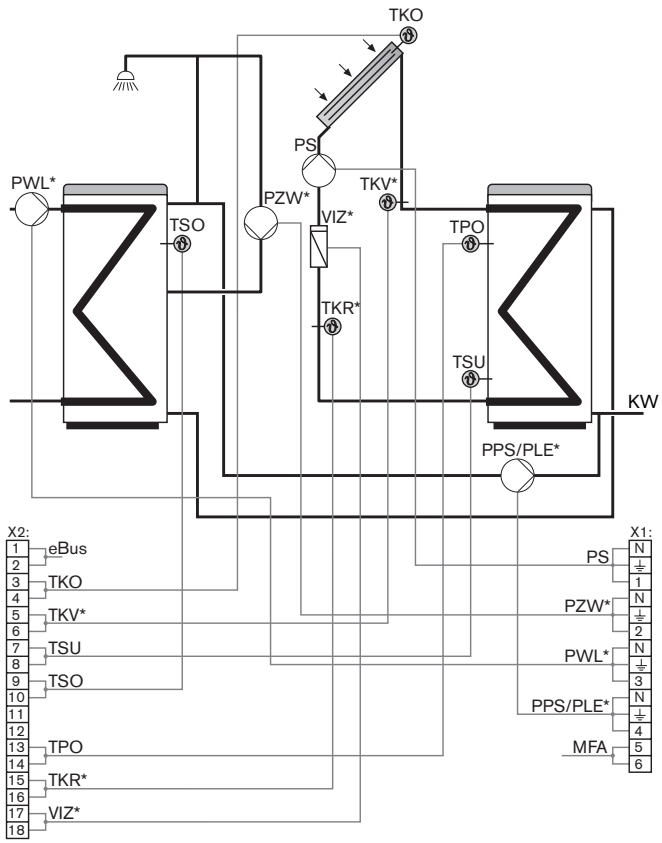
As soon as the temperature differential is greater than the value set (`Tank Diff. On`), the solar pump is switched on and the storage tank is topped up until the switch off condition (`Tank Diff. Off`) or the maximum storage tank temperature has been reached.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

By adding cold water the warm water from the DHW tank is tranported into the dual stratification tank.

Using the charge reversal pump-calorifier-tank (PPS) the energy stored in the calorifier is transferred depending on the calorifier temperature (TPO) and the storage tank temperature (TSO).

Possible settings MFA output:
0, 1, 2, 3, 4, 7, 8, 9, 10



* optional

Variation 54: Energy storage tank WES

- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulation function (optional; ⇨ Ch. 7.14)

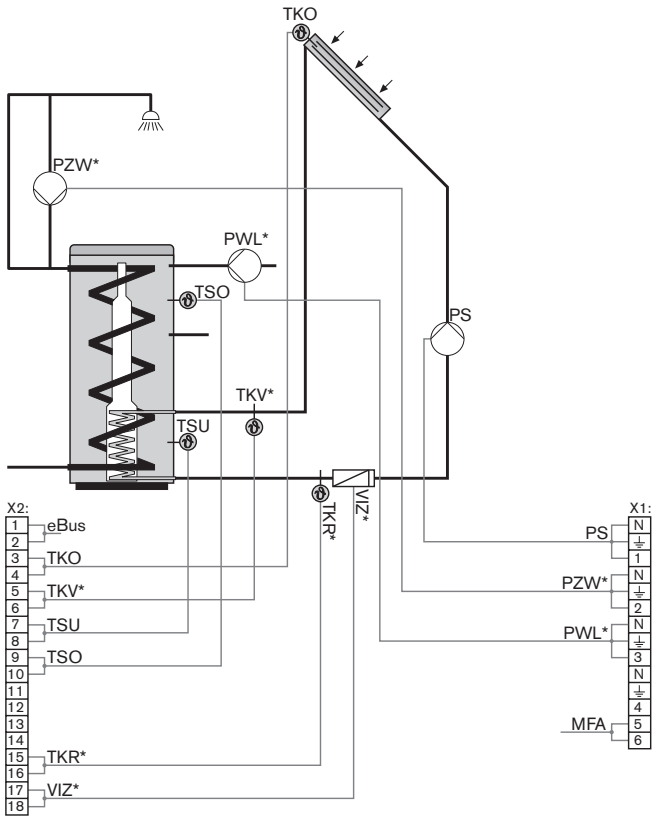
The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSO or TSU). If a collector flow sensor (TKV) is fitted this is included in the control.

As soon as the temperature differential is greater than the value set (`Tank Diff. On`), the solar pump is switched on and the storage tank is topped up until the switch off condition (`Tank Diff. Off`) or the maximum storage tank temperature has been reached.

WES function see Ch. 7.21

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 7, 8, 9, 10



* optional

Variation 55: Energy storage tank WES with collector bypass

- Energy yield calculation (optional; ⇨ Ch. 7.9)
- Circulation function (optional; ⇨ Ch. 7.14)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSO or TSU). If a collector flow sensor (TKV) is fitted this is included in the control.

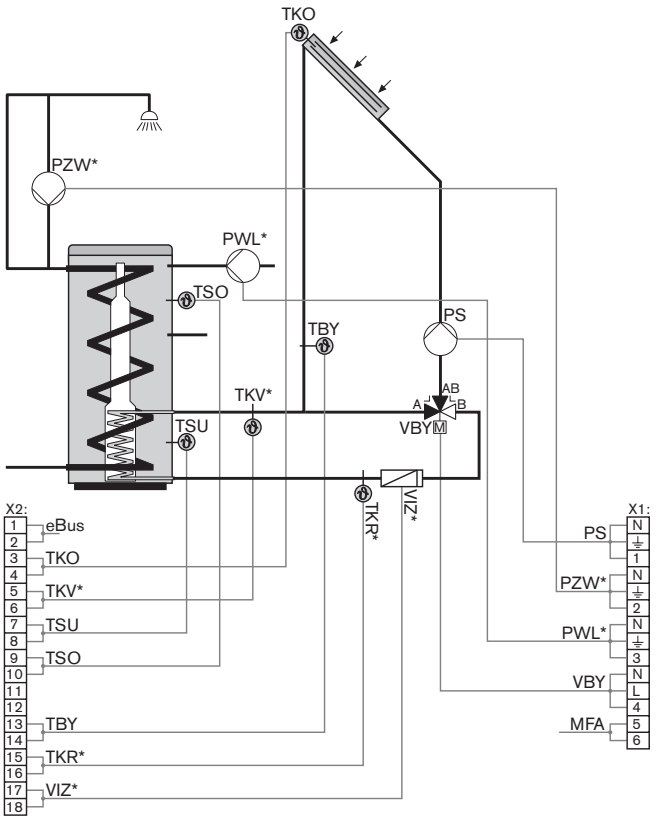
As soon as the temperature differential is greater than the value set (`Tank Diff. On`), the solar pump is switched on and the storage tank is topped up until the switch off condition (`Tank Diff. Off`) or the maximum storage tank temperature has been reached.

WES function see Ch. 7.21

The three way valve (VBY) is switched over depending on the collector temperature (TKO) and the reference sensor (TBY).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 7, 8, 9, 10



* optional

BVariation 56: Energy storage tank WES and heating support

- Heating return temperature increase
- Circulation function (optional; ⇨ Ch. 7.14)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSO or TSU). If a collector flow sensor (TKV) is fitted this is included in the control.

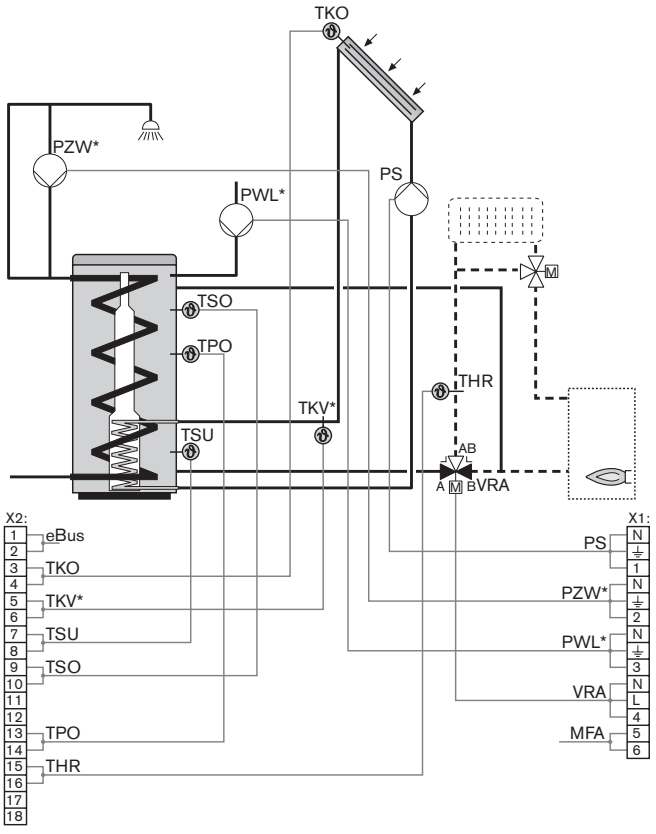
As soon as the temperature differential is greater than the value set (`Tank Diff. On`), the solar pump is switched on and the storage tank is topped up until the switch off condition (`Tank Diff. Off`) or the maximum storage tank temperature has been reached.

WES function see Ch. 7.21

Using the three way valve for return temperature increase (VRA) the available energy from the calorifier can be utilised depending on the calorifier temperature (TPO) and the heating return sensor (THR).

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 7, 8, 9, 10



* optional

Variation 57: Energy storage tank WES with collector and solid fuel boiler

- Energy yield calculation (optional; ⇨ Ch. 7.9)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSO or TSU).

As soon as the temperature differential is greater than the value set (`Tank Diff. On`), the solar pump is switched on and the storage tank is topped up until the switch off condition (`Tank Diff. Off`) or the maximum storage tank temperature has been reached.

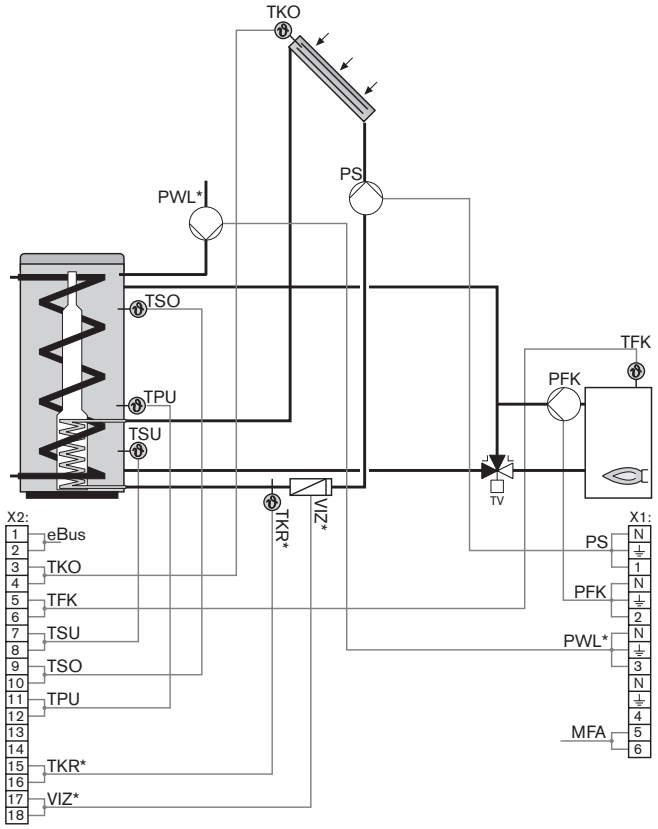
WES function see Ch. 7.21

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 7, 8, 9, 10



* optional

Variation 58: Energy storage tank WES with collector/bypass and solid fuel boiler

- Energy yield calculation (optional; ⇨ Ch. 7.9)

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSO or TSU).

As soon as the temperature differential is greater than the value set (`Tank Diff. On`), the solar pump is switched on.
The three way valve (VBY) is switched over depending on the collector temperature (TKO) and the reference sensor (TBY). The storage tank is topped up until the switch off condition (`Calorifier Temp. Off`) or the maximum calorofier temperature has been reached.

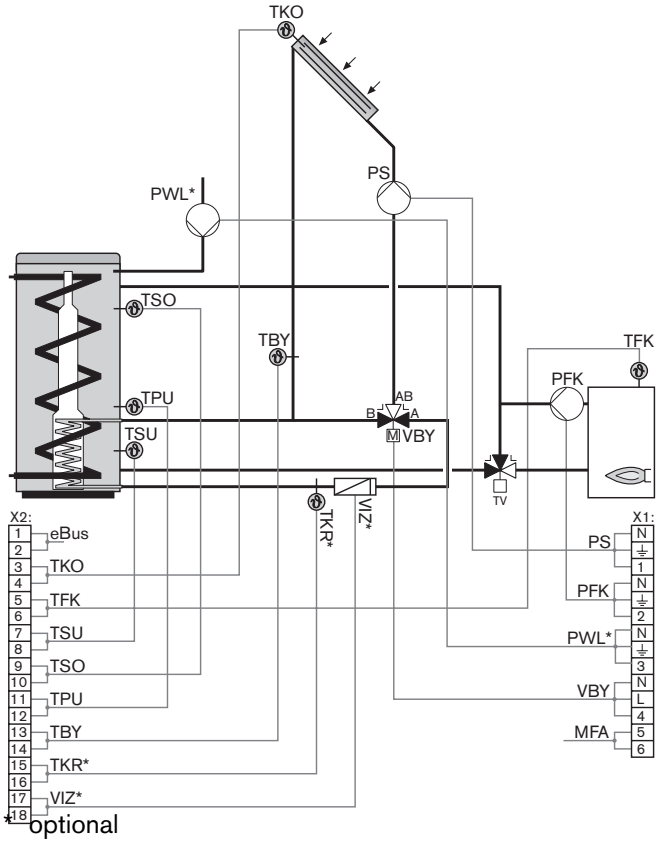
WES function see Ch. 7.21

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 7, 8, 9, 10



* optional

Variation 59: Energy storage tank WES with heating support, collector and solid fuel boiler

- Heating return temperature increase

The WRSol 2.0 determines the temperature differential between the collector sensor (TKO) and the reference sensor (TSO or TSU).
As soon as the temperature differential is greater than the value set (`Tank Diff. On`), the solar pump is switched on and the storage tank is topped up until the switch off condition (`Tank Diff. Off`) or the maximum storage tank temperature has been reached.

WES function see Ch. 7.21

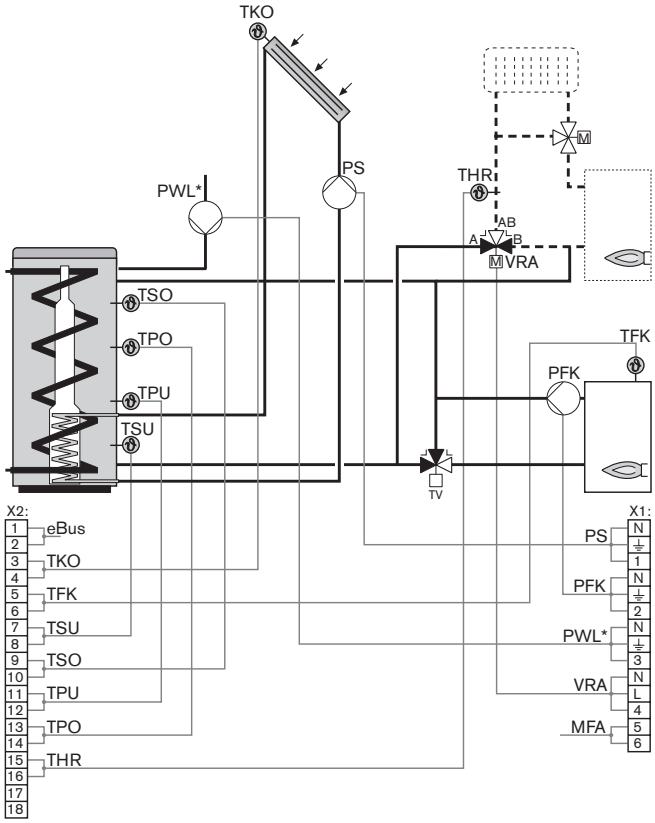
Using the three way valve for return temperature increase (VRA) the available energy from the calorifier can be utilised depending on the calorifier temperature (TPO) and the heating return sensor (THR).

Release of solid fuel boiler pump (PFK) see Ch. 7.6.

The thermal mixer valve (TV) enables fast heat up of the solid fuel boiler.

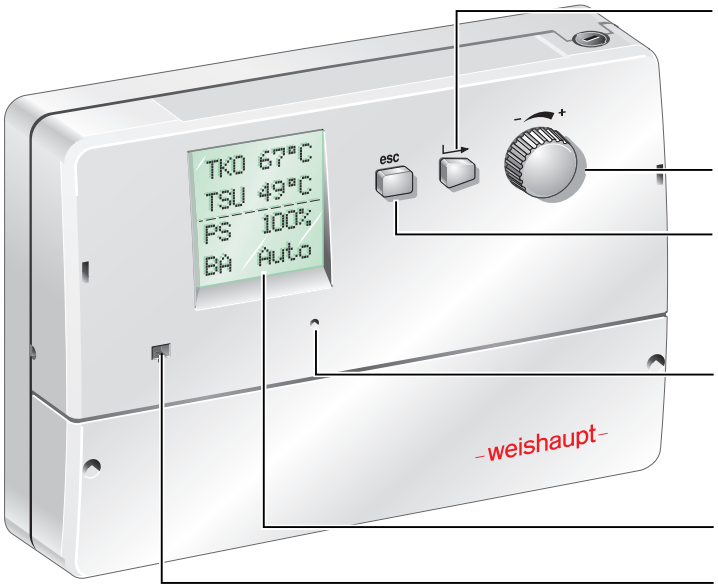
Depending on the average pump speed and the minimum storage tank temperature, the external heat exchanger can be blocked via the potential free `Multi-funct. Output` (MFA).
In addition an 18 hour block can be activated.
The DHW function (Ch. 7.13) can also influence the MFA output.

Possible settings MFA output:
0, 1, 2, 7, 8, 9, 10



* optional

5.1 Display and operating elements



Enter button
Pressing this button confirms entries and changes.

Dial knob

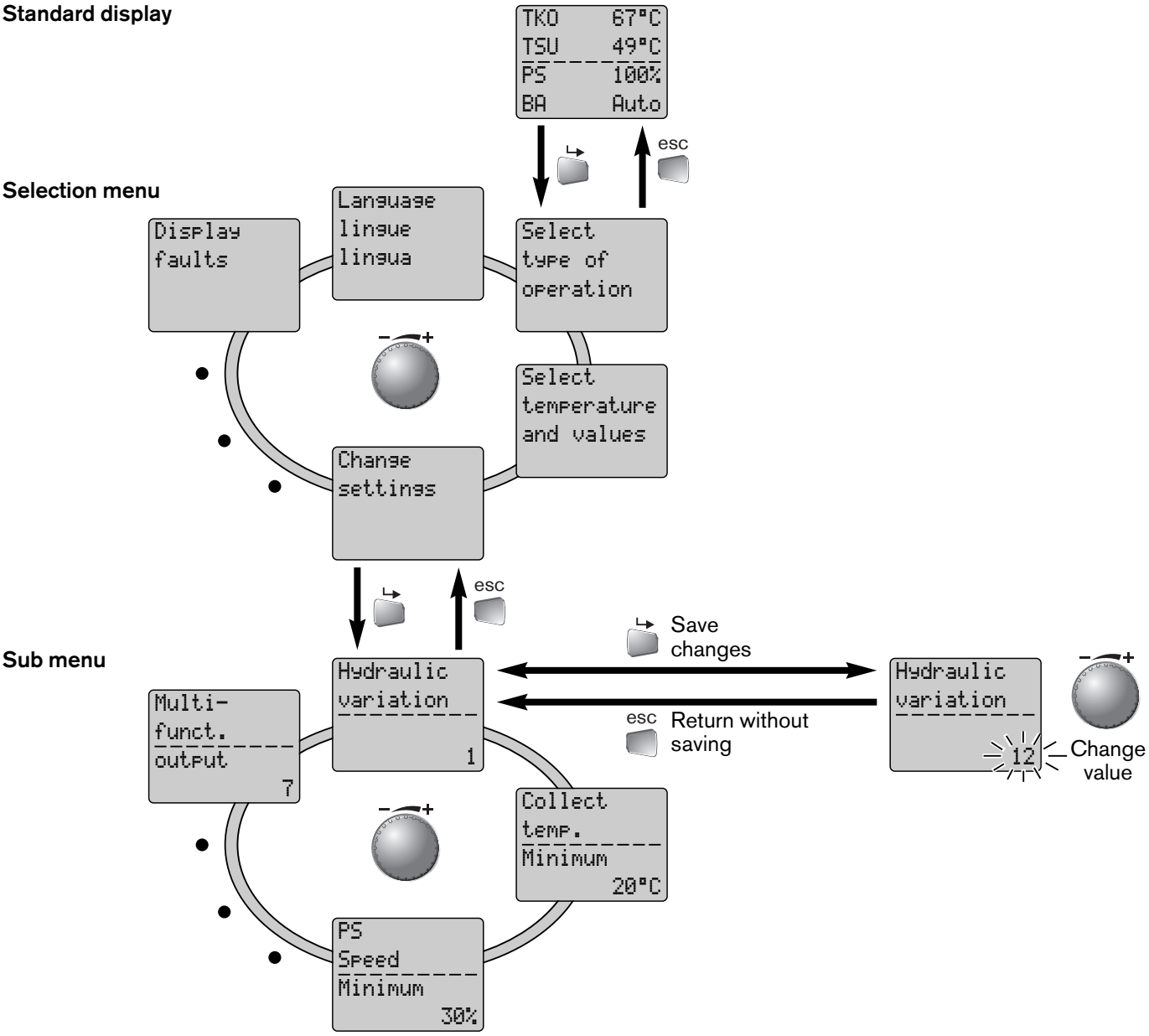
Escape button
Return to the main display. This key is used to exit settings. Any unsaved entries will be lost. Return by one level at a time.

Reset
By pressing the Reset button, the processor is re-started with the previously set values.
It is **not** possible to start the factory presettings.

LCD Display

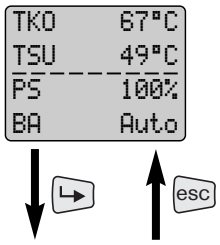
eBus plug socket

5.2 Navigation / Menu structure (change hydraulic variation)



5.3 Where do I find what…

Standard display

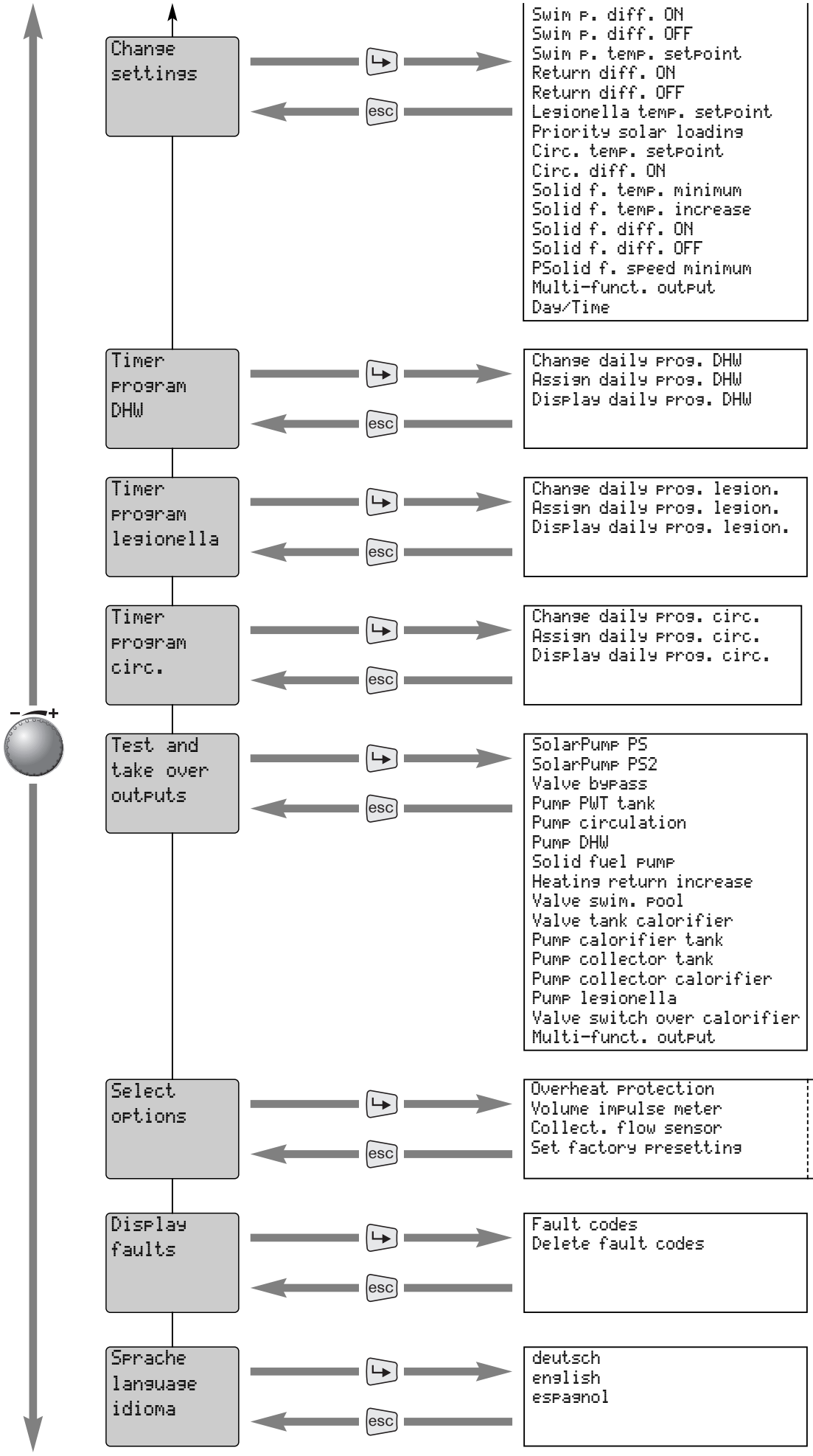


By pressing the ↵ key in the standard menu the following selection menus can be accessed.

By pressing the esc key you can return to the base menu.

Selection menu / **Sub menu**

- Select type of operation
  - Auto
  - Manual
  - Off
- Select temp. and values
  - Collect. temp. act. value
  - Collect2 temp. act. value
  - Collect. supply. act. value
  - Collect. return act. value
  - Collect. bypass act. value
  - Tank PWT act. value
  - Tank top act. value
  - Tank bottom act. value
  - Calorifier top act. value
  - Calorifier bottom act. value
  - Circ. temp. act. value
  - CW temp. act. value
  - WW temp. act. value
  - Solid f. temp. act. value
  - Heat. circ. return act. value
  - Swim p. temp. act. value
  - Collect. temp. maximum
  - Current rating collector
  - Part yield collector
  - Delete part yield
  - Total yield collector
  - Average rating PS
  - Operating hours PS
  - Rating current collect2
  - Part yield2 collect
  - Part yield2 delete
  - Toatl yield collect2
  - Average load PS2
  - Operating hours PS2
  - Volume flow
  - Version
- Change settings
  - Hydraulic variation
  - Collect. temp. minimum
  - PS Speed minimum
  - Collect2 temp. minimum
  - PS2 Speed minimum
  - Throughput
  - Volume flow
  - Volume flow2
  - Heat capacity
  - Frost protection
  - Tank diff. ON
  - Tank diff. OFF
  - Tank temp. minimum
  - Tank temp. setpoint
  - Tank temp. maximum
  - Calorifier diff. ON
  - Calorifier diff. OFF
  - Diff. calorifier minimum
  - Calorifer temp. setpoint
  - Calorifier temp. maximum



Note
These parameters have to be reselected when changing variations.

5.4 Display

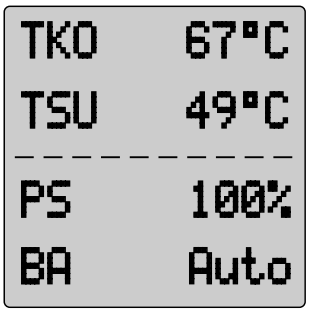
Standard display
The standard display is recognised by its 4 lines with a dotted line in the centre of the display.

In the first three lines of the display, three temperatures, values or switch conditions of the outputs are displayed. The fourth line contains the operation selection switch. If the operation selection switch is set to manual, an arrow flashes to the right and left of `BA Manual`, to indicate an incorrect operating condition.

If another display has been set, the controller automatically returns to the standard display after a *time out* of eight minutes.

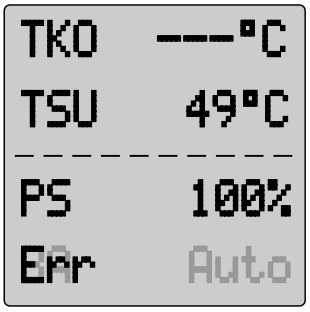
Operator defined standard display
The standard display can be set with certain values from the selection groups `Select temp. + values` and `Test or take over outputs`.
New values are entered on line three of the display and the display is pushed up by one line. The value in the first line is therefore lost.

Standard display



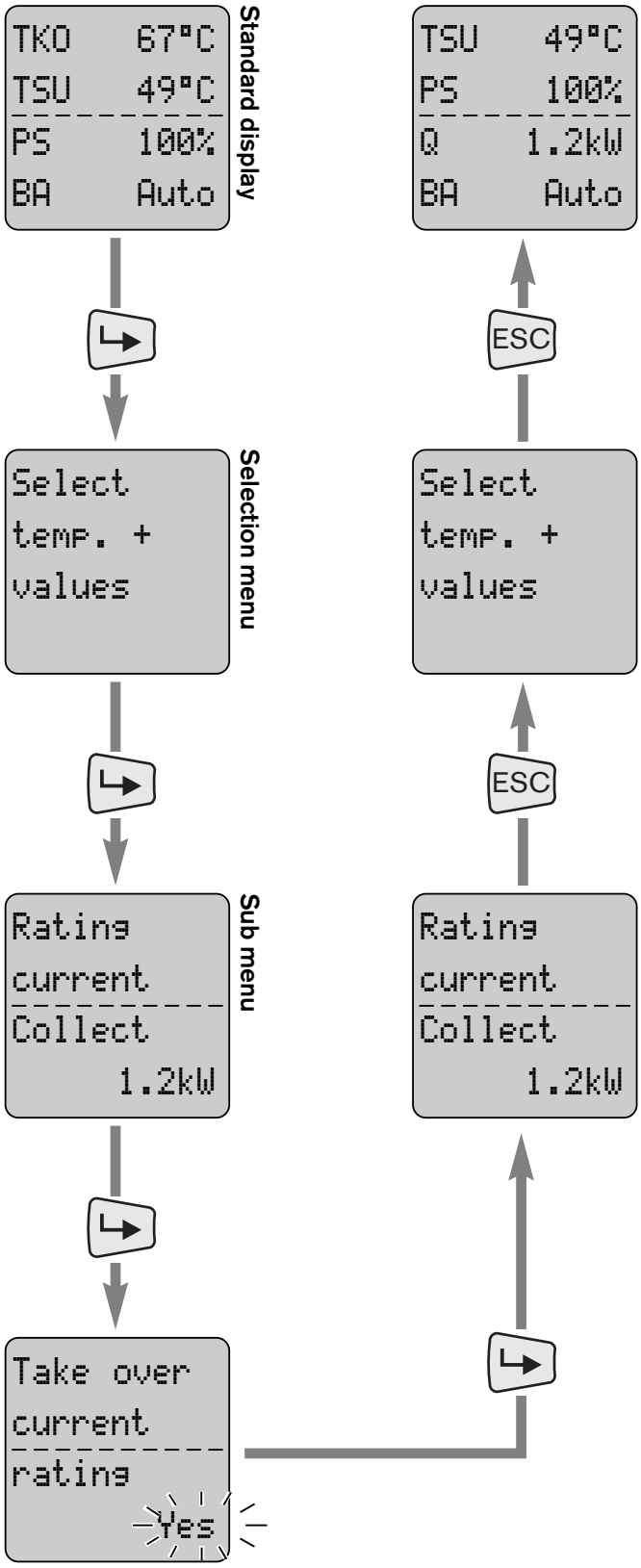
If an error message is present, line `BA Auto` flashes alternating with `Err` .

Error message



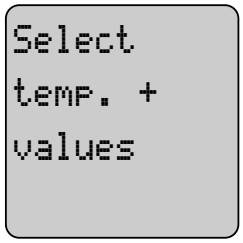
Note: The error codes can be viewed in Ch. 6.9.

Changing the standard display



Selection menu
A selection menu only has text and no dotted line. The sub menu is reached by pressing the ↳ , pressing esc means exit, any changes not saved are lost.

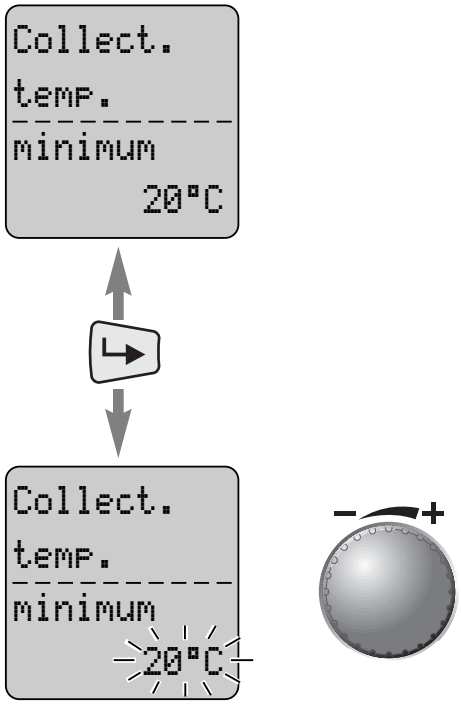
Selection menu



Sub menu
A sub menu has a dotted line in the centre of the display.

By pressing the ↳ the selected parameter for taking over into the standard display can be selected, or made adjustable. The adjustable value flashes.
The change has to be confirmed by pressing the ↳ key to save the new value. If the esc key is pressed the previous value is re-entered.

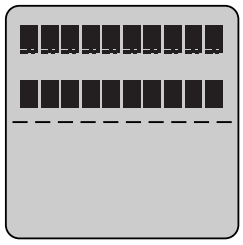
Sub menu



Display does not show standard display
If the display shows the display to the right when voltage is applied, the display is not started correctly. Pressing the reset key re-initialises the display and the standard display is shown.

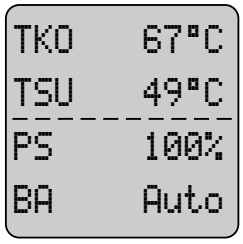
If the standard display does not appear after repeated initialisation the controller should be replaced.

Display not initialised



Resetting the display
The display and all parameter are reset to the factory settings by activating the factory presettings in menu Select options.

Standard display

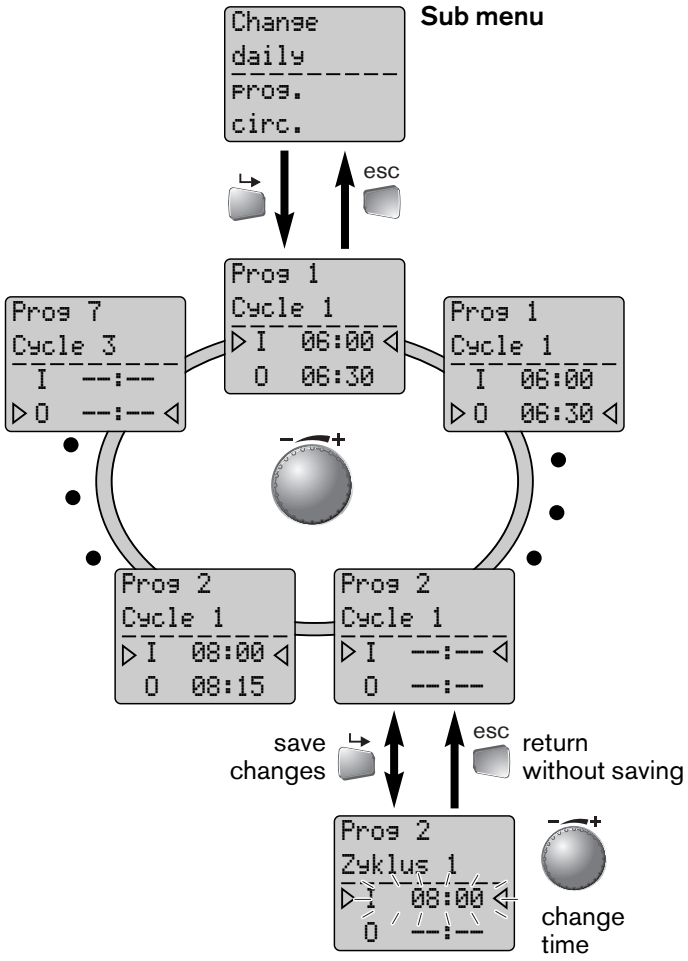


5.5 Change, assign and interrogate timer programs

Using the timer programes, the system can be matched to daily requirements. Standard daily programs have already been factory preset and asigned to the week days. The system can be reset to these factory presettings at any time (see Ch. 6.8).
Daily programs can be interrogated, changed or extended and asigned using the sub menu (see Ch. 5.2).
A maximum of 7 daily programs, each with up to 3 cycles can be programmed. A separate daily program can therefore be assigned to each weekday.

Progamming switch cycles
Call up timer program to be interrogated in selection menu and select function `Change daily prog.` in the sub menu.

Alter or add cycles

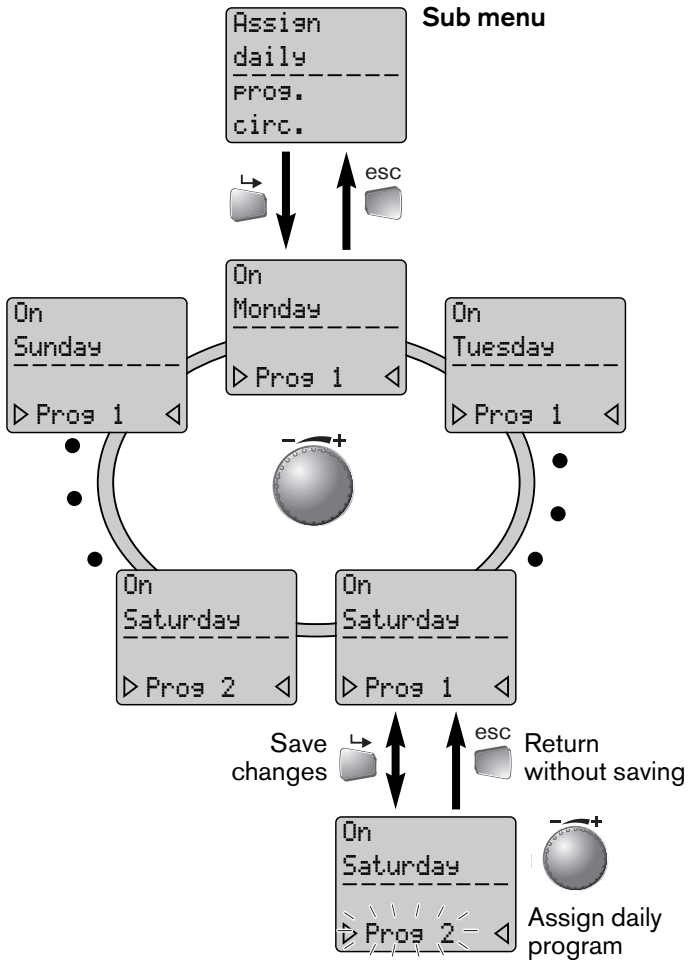


Deleting cycle
Select switch on time, turn dial knob until the display shows `--:--` and confirm with Enter. The switch off time is automatically reset, the cycle is deleted.

Assigning daily programs
Call up timer program to be interrogated in the selection menu and select function Assign daily prog. in the sub menu.
The relevant week days have to be assigned so that the daily program can be carried out .

Note Only one daily program can be assigned to a weekday.

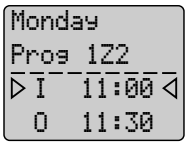
Asign daily program

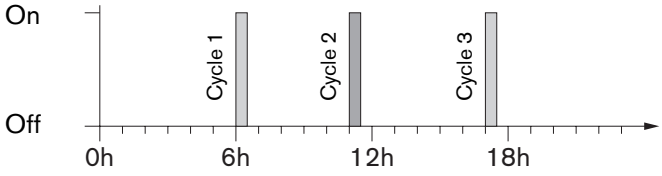


Interrogating switch times
Call up the timer program to be interrogated in the selection menu and select function Display daily prog. in the sub menu.

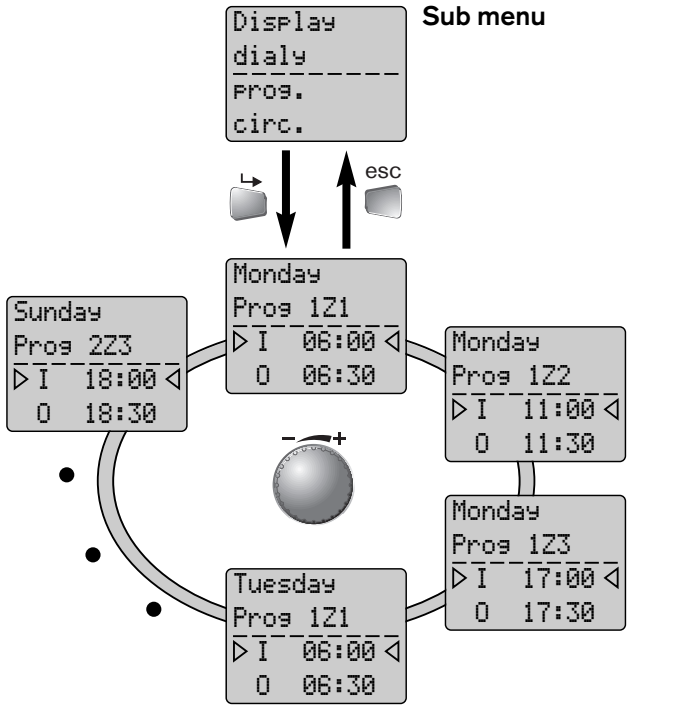
Example:

Monday = week day
Prog 1 = daily program assigned
Z2 = cycle 2
I = cycle switch on time 11:00 o'clock
0 = cycle switch off time 11:30 o'clock



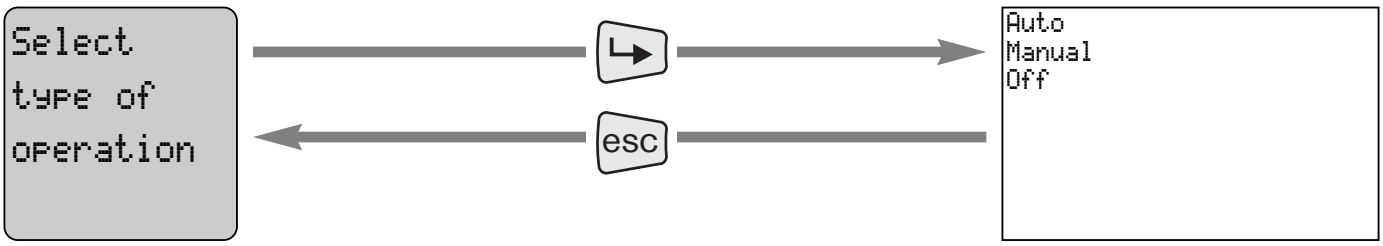


Interrogate cycles of daily programs assign



6 Parameters

6.1 Select type of operation



Use:
The function of the solar controller can be stipulated using selection menu point Select type of operation.

Auto
Automatic operation to the criteria set. From an energy point of view the best type of operation.

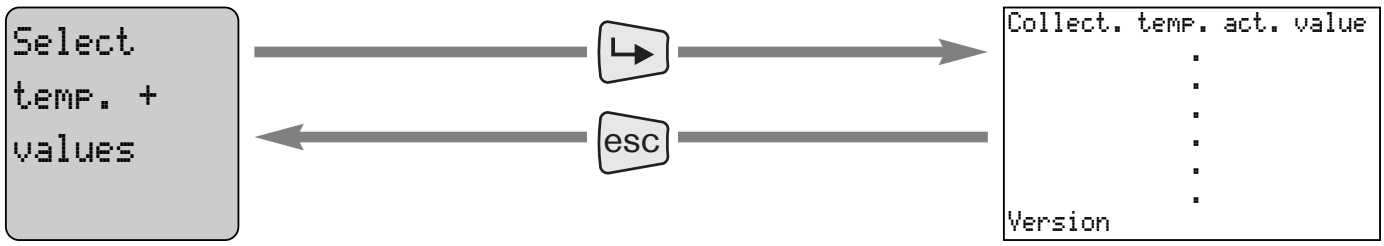
Manual
Use for hydraulic commissioning and adjustment of the solar system.
Output 1 is driven with 100%.
In manual operation, all outputs can be switched on and off, or the speed control can be matched in 10 % steps using Test or take over outputs.

Off
The system is now switched off in accordance with the software. The controller continues to carry voltage. Interrupt the voltage supply to the controller prior to carrying out service or repair work.

ATTENTION

No frost protection
In types of operation Manual and Off the frost protection function is not longer active.

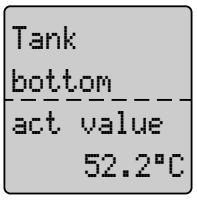
6.2 Select temperatures and values



Use:
In this selection menu, temperatures and values can be selected and taken over for the standard display (see Ch. 5.4).

Note: The values, which will be displayed or hidden in the menu, depend on the Hydraulic variation currently set under Change settings.

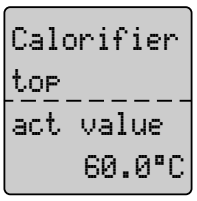
Collect. temp. act value 77.4°C	Current temperature at collector Variation: 1…45, 50…59	Sensor : TKO
Collect2 temp. act value 77.4°C	Current temperature on the second collector field Variation: 22…34, 50	Sensor : TK2
Collect. supply act value 66.6°C	Current flow temperature. The flow sensor must be activated in options with YES. Variation: 1…7, 12…14, 17, 18, 53, 56	Sensor : TKV
Collect. return act value 40.0°C	Current return temperature. The volume impulse meter must be activated in options with YES. Variation: 1…8, 12…14, 17, 20, 21, 35, 36, 40…44, 52…55, 57, 58	Sensor : TKR
Collect. bypass act value 35.4°C	Current bypass temperature Variation: 2, 6, 13, 18, 26, 30, 33, 37, 41, 44, 55, 58	Sensor : TBY
Tank TWT Istwert 50.0°C	Current temperature in plate heat exchanger in conjunction with calorifer loading. Variation: 3, 8, 11	Sensor : TWT
Tank top act value 60.0°C	Current DHW temperature in solar storage tank top. Variation: 5, 7, 10, 25, 36, 50 ,51, 53…59	Sensor : TSO



Current DHW temperature in solar storage tank bottom.

Variation: 1…11, 17…19, 21…27, 34…38, 43…45, 50…59

Sensor : TSU



Current DHW temperature in calorifier top.

Variation: 5, 7, 9…11, 14…16, 19, 25, 27, 31, 34, 36, 38, 40, 42, 45, 48…51, 53

Sensor : TPO

Current DHW temperature in calorifier bottom.

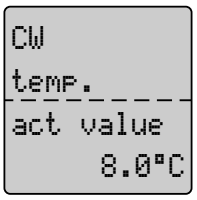
Variation: 4…19, 24…45, 48…52

Sensor : TPU

Current DHW temperature in the circulation line.

Variation: 1, 2, 4, 6, 9, 17, 18, 19, 21

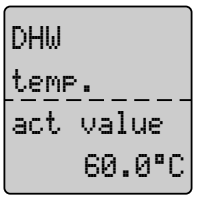
Sensor : TZW



Current cold water temperature in conjunction with a plate heat exchanger for hot water.

Variation: 14, 16

Sensor : TKW



Current DHW temperature in conjunction with a plate heat exchanger for DHW.

Variation: 14, 16

Sensor : TWW

Current solid fuel boiler temperature.

Variation: 35…45, 48, 49, 57…59

Sensor : TFK

Current return temperature of the heating circuit for return temperature increase.

Variation: 9…11, 15, 16, 19, 27, 31, 34, 45, 49, 56, 59

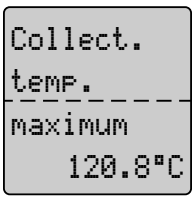
Sensor : THR

Select temperatures and values continued

Current water temperature in the swimming pool.

Variation: 20, 21, 52

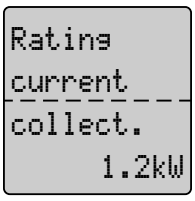
Sensor : TSB



Value indicator which shows the highest daily collector temperature

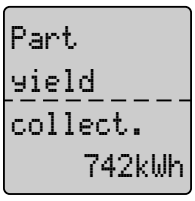
Variation: 1…45, 50…59

Reset : Automatic and following every reset



Current rating of collector in kW.

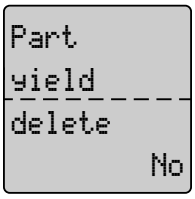
Variation: 1…45, 50…59



Summation of collector yield in kWh since last reset.

Variation: 1…45, 50…59

Reset : by `Part yield delete`



Reset summarised part yield.

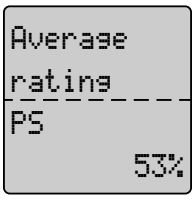
Variation: 1…45, 50…59

Press ↵ key to delete and select `Yes` with dial knob, then re-confirm with ↵ key.

Summation of collector yield in MWh since controller commissioning.

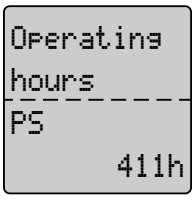
Variation: 1…45, 50…59

Note: This value cannot be reset.



Average pump speed during the operating phase, is used as one of the guide sizes for the control of the MFA outputs.

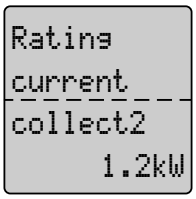
Variation: 1…45, 50…59



Operating hours of solar pump since initial commissioning.

Variation: 1…45, 50…59

Note: This value cannot be reset



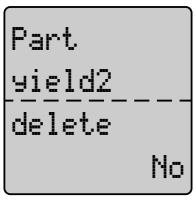
Current rating of second collector field in kW.

Variation: 22…34, 50

Summation of collector yield in kWh of collector field 2, starting from last reset.

Variation: 22…34, 50

Reset : by `Part yield2 delete`



Reset summarised part yield of second collector field.

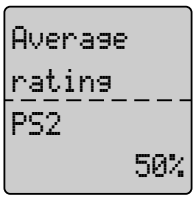
Variation: 22…34, 50

Press ↦ key to delete and select `Yes` with dial knob, than re-confirm with ↦ key.

Summation of collector yield in MWh from collector field 2, since controller commissioning.

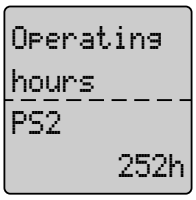
Variation: 22…34, 50

Note: This value cannot be reset.



Average pump speed of second pump during operating phase, is used as one of the guide sizes for the control of the MFA output.

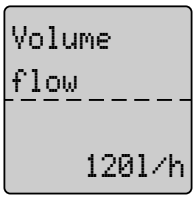
Variation: 22…34, 50



Operating hours of second solar pump since initial commissioning.

Variation: 22…34, 50

Note: This value cannot be reset



Current display of volume flow, which is transmitted by the impulse meter (VIZ). The volume impulse meter must be activated in options with `Yes`.

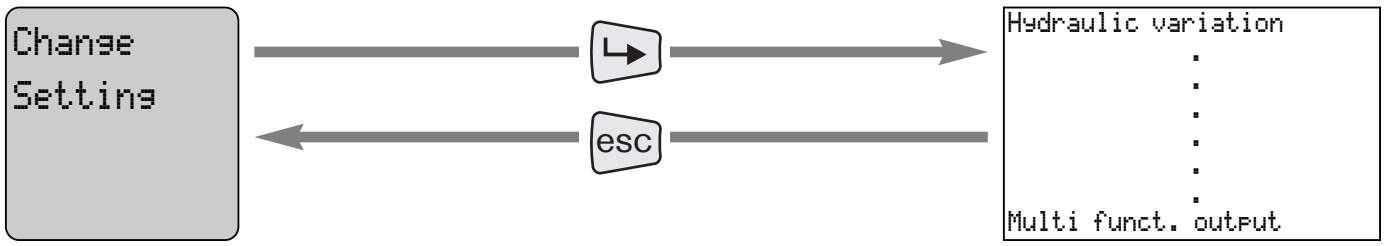
Variation: 1…7, 12…14, 17, 18, 20, 21, 35…37, 40, 41, 43, 44, 52…55, 57, 58

Note: A return sensor must be installed when using a volume impulse meter, otherwise error code 9 will be given.

Display of Software Version.

Variation: 1 ...59

6.3 Change setting



Use:
This selection menu is used to carry out site specific settings (preferably by a heating engineer).

Note: Only the settings stored for the hydraulic variation selected are displayed in the menu. Settings without function in the selected variation are not shown.

Hydraulic variation
1

Selection of the system procedure required. Depending on variation the relevant displays are generated.

Hydraulic variations see Ch. 4

Variation: 1…59

Presetting: 1

Note: If the variation is changed, all setting parameters must be checked and adjusted if necessary. The parameters in selection menu Options must be adjusted to site specific requirements.

Collect. temp. minimum
20.0°C

Minimum collector temperature which must be achieved before the solar pump is switched on.

Variation: 1…45, 50…59

Setting range 0°C…70°C

Presetting: 20°C

PS speed minimum
40%

Lowest limit value of modulation range of solar pump.

Variation: 1…45, 50…59

Setting range 10%…100%

Presetting: 40%

(A minimum of 30% should be maintained, otherwise the gravity breaks of the hydraulic assembly will close

---

Collect2 temp. minimum
20.0°C

Minimum collector temperature of the second collector field which must be achieved before the solar pump (PS2) is switched on.

Variation: 22…34, 50

Setting range: 0°C…70°C

Presetting: 20°C

PS2 speed minimum
40%

Lowest limit value of modulation range of second solar pump.

Variation: 22…34, 50

Setting range: 10%…100%

Presetting: 40%

(A minimum of 30% should be maintained, otherwise the gravity breaks of the hydraulic assembly will close).

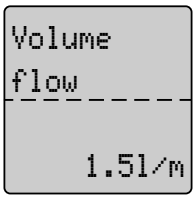
Through put
0.25l/I

Setting for amount of fluid throughput per impulse of the volume impulse meter. The volume impulse meter must be actoivated in options with Yes (Ch 6.8).

Variation: 1…7, 12…14, 17, 18, 20, 21, 35…37, 40, 41, 43, 44, 52…55, 57, 58

Setting range: 0.01…10.0 l/Impuls

Presetting: 0.25 l/Impuls

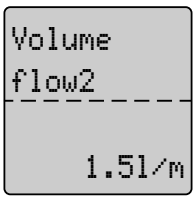


Value set or read at throughput limiter, at 100% pump rating.

Variation: 22…45, 50…59

Setting range: 0.1…500.0 l/m (litres/minute)

Presetting: 1.5 l/m

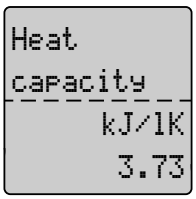


Value set or read at throughput limiter, at 100% pump ratingof second solar pump.

Variation: 22…34, 50

Setting range: 0.1…500.0 l/m (litres/minute)

Presetting: 1.5 l/m



The factor depends on the type and the mixing ratio of heat exchanger fluid.
This factor is used for the energy yield calculation.

50…59

Setting range: 0.01…10.0 kJ/lK

Presetting: 3.73 kJ/lK (at 60°C)

The solar pump switches on, when the collector sensor value reaches the set value.
The pump switches off, when the value set is exceeded by 3K (hysteresis).

Hysteresis: 3K (fixed cannot be altered)

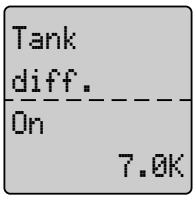
Variation: 1…45, 50…59

Setting range: –50°C…–41°C ; frost prot. deactivated
–40°C…+20°C ; frost prot. activated

Presetting: –50°C

Attention: With variation 20, frost protection should not be set below 5°C or frost protection should be deactivated if using a suitable collector fluid to protect the heat exchanger.

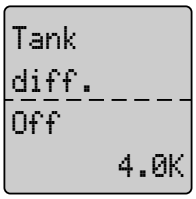
Note: With sensor short circuit, the pump is driven at `PS Speed Minimum`, if the frost protection temperature > –40°C has been set.



Temperature differential between collector sensor (TKO) and tank sensor (TSU) as switch on criteria of solar pump.
Variation: 1…6, 8…11, 17…19, 21…27, 32…38, 43…45, 50…59

Setting range: 0K…40K

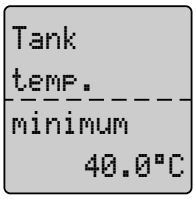
Presetting: 7.0K



Temperature differential between collector sensor (TKO) and tank sensor (TSU) as switch off criteria of solar pump.
Variation: 1…6, 8…11, 17…19, 21…27, 32…38, 43…45, 50…59

Setting range: 0 K…40 K

Presetting: 4.0 K



Switch level for external heat exchanger via the protential free MFA contact.

Variation: 1…6, 8…11, 17…19, 21…27, 32…38, 43…45, 50…59

Setting range: 0°C…70°C

Presetting: 40°C

Note: `Diff. OFF` is a size that can be used to include the ratings losses.

Change setting continued

Tank temp. setpoint 55.0°C	Switch level for external heat exchanger (18 hrs.), only possible with one DHW storage tank. In conjunction with sensors TSU, TSB and TPU this setpoint value is the criteria for the continued switching of the loading.	Variation: 1…6, 8…11, 17…19, 21…27, 32…38, 43…45, 50…59 Setting range: 0°C…70°C Presetting: 55°C
Tank temp. maximum 90.0°C	Achievable max. tank temperature. Once this temperature is reached, the solar pump is switched off, if the overheat protection has been set to "NO". Variation: 1…6, 8…11, 17…19, 21…27, 32…38, 43…45, 50…59	Setting range: 20°C…90°C Presetting: 90°C Depending on the limescale content of the domestic hot water it might be necessary to reduce the temperature to avoid exessive scaling of the water heater.
Calorifier diff. On 7.0K	Temperature differential between collector sensor (TKO) and calorifier sensor (TPU) as switch on criteria of the solar pump. Variation: 4…19, 24…52, 56…59	Setting range: 0 K…40 K Presetting: 7.0 K
Calorifier diff. Off 4.0K	Temperature differential between collector sensor (TKO) and calorifier sensor (TPU) as switch off criteria of the solar pump. Variation: 4…19, 24…52, 56…59	Setting range: 0 K…40 K Presetting: 4.0 K
Diff. calorifier minimum 15.0K	If the average pump speed reaches 50%, the Calorifier temp. Set-point is reduced by this amount. Example: 60°C – 15K = 45°C Once the actual calorifier temperature reaches this reduced value (45°C), the MFA contact is activated.	Variation: 4…19, 24…52, 56…59 Setting range: 0 K…40 K Presetting: 15 K
Calorifier temp. Setpoint 70.0°C	If the average pump speed reaches 50%, the setpoint value is reduced by the Diff. Calorifier Minimum and the MFA contact is activated. In conjunction with sensors TSU, TSB and TPU this setpoint value is the criteria for continued switched of the loading .	Variation: 4…19, 24…52, 56…59 Setting range: 0°C…90°C Presetting: 70°C
Calorifier temp. maximum 90.0°C	Achievable max. calorifer temperature. Once this temperature is reached, the solar pump is switched off, if the overheat protection has been set to "NO". Variation: 4…19, 24…52, 56…59	Setting range: 20°C…90°C Presetting: 90°C
Swim. pool diff. On 7.0K	Temperature differential between collector sensor (TKO) and swim. pool sensor(TSU) as switch on criteria of the solar pump. Variation: 20, 21, 52	Setting range: 0 K…40 K Presetting: 7.0 K

Note: Diff. OFF is a size that can be used to include the ratings losses.

Change setting continued

Swim. pool diff. Off 4.0K	Temperature differential between collector sensor (TKO) and swim. pool sensor (TPU) as switch off criteria of the solar pump. Variation: 20, 21, 52	Setting range: Presetting:	0K…40K 4.0K
Swim pool temp. Setpoint 30°C	Swim. pool temperature setpoint leads to the shutdown of swim. pool loading. In conjunction with the sensors TSU, TSB and TPU this setpoint is the criteria for the continued switching of the loading.	Variation: Setting range: Presetting:	20, 21, 52 0°C…90°C 30°C
Return diff. On 5.0K	Temperature differential between return sensor (THR) and calorifier sensor “top” (TPO), at which the three way valve (VRA) is activated. Variation: 9…11, 15, 16, 27, 31, 34, 42, 45,49, 56, 59	Setting range: Presetting:	0 K…40 K 5.0 K
Return-diff. Off 2.0K	Temperature differential between return sensor (THR) and calorifier sensor “top” (TPO), at which the three way valve (VRA) is deactivated. Variante: 9…11, 15, 16, 27, 31, 34, 42, 45,49, 56, 59	Setting range: Presetting:	0 K…40 K 2.0 K
Legionella temp. setpoint 0.0°C	Temperature default which must be achieved within 2 hours to circulate the tank. Variation: 1, 2, 4…7, 9, 17…19, 21, 52…56	Setting range: Presetting: Setpoint = 0°C: function deactivated. Setpoint > 0°C: function carried out to legionella time program	0…70°C 0°C
Priority solar loading 0	Selection, which citeria is used to load the storage tank cascade. Variation: 4…6, 8…11, 17…19, 21, 24…27, 32…38, 43…45, 51, 52	Setting range: Presetting:	0…3 0
Circ.. temp. setpoint 30°C	DHW circulation is released depending on the time switch program or the circulation return temperature Circu. temp. setpoint. Variation: 1, 2, 4, 6, 9, 17,…19, 21	Sensor: TZW Setting range: Presetting:	 0…70°C 30°C
Circ. diff. On 5.0K	DHW circulation is release depending on the time switch program or the circulation return temperature (Circ. temp. setpoint) and the switch differential (Circ. diff. On) Variation: 1, 2, 4, 6, 9, 17,…19, 21	Setting range: Presetting:	0…40 K 5.0 K

Note: Diff. OFF is a size that can be used to include the ratings losses.

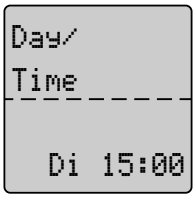
Change setting continued

Solid f. temp. minimum 50.0°C	Minimum solid fuel temperature, at which the solid fuel pump is released with the min. speed set. Variation: 35…49, 57…59	Setting range: 20°C…90°C Presetting: 50°C
Solid f. temp. increase 0.0K/m	If the solid fuel temperature increases by the value set within 3 minutes prior to reaching the Solid f. temp. minimum, the solid fuel pump starts with the minimum speed. Variation: 35…49, 57…59	Setting range: 0…40K/min Presetting: 0 K/min Note: Without thermal return temperature increase this value should be kept at 0 K/min, otherwise there is a danger of condensate formation.
Solid f. diff. On 15.0K	Temperature differential between solid fuel boiler sensor (TFK) and calorifier sensor (TPU) as switch on criteria or speed increase of the load pump. Variation: 35…45, 48, 49, 57…59	Setting range: 0 K…40 K Presetting: 15 K
Solid f. diff. Off 5.0K	Temperature differential between solid fuel boiler sensor (TFK) and calorifier sensor (TPU) as switch off criteria of the load pump. Variation: 35…45, 48, 49, 57…59	Setting range: 0 K…40 K Presetting: 5 K
PSolid f. speed minimum 30%	Lower limit value of modulation range of load pump. Variation: 35…45, 48, 49, 57…59	Setting range: 10%…100% Presetting: 30%
Multi funct. output 8	The function of the potential free multi- function relay output on terminal 5/6 can be defined as follows. The table describes the required function, when the output is activated, that means when the relay contact is closed.	Setting range: 1…8 heat exchanger release / interlock Setting range: 9…10 lockout signalling Presetting: 8

Setting value	Heat exchanger interlock / release tank loading	Special temperature level heat exchanger for leginonella function	Heat exchanger interlock / release calorifier loading	Signalling lockout
0				
1	interlock			
2	release			
3		interlock		
4		release		
5			interlock	
6			release	
7	interlock		interlock	
8	release		release	
9				no lockout
10				lockout

Note: A setting, which is not supported by the current hydraulic variation activates the output, that means the contact is closed.

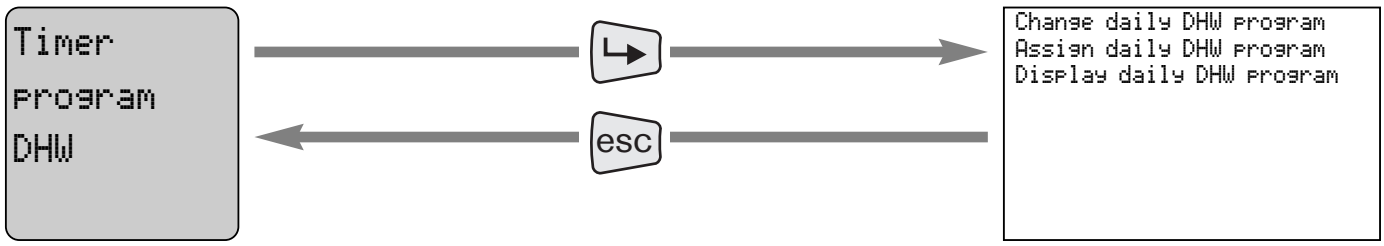
Change setting continued



Setting of weekday and time.
The DHW, legionella and circulation program is activated by the time.
The time also activates the pump standby protection and the reset of the maximum collector temperature.

Variation: 1…59

6.4 Timer program DHW



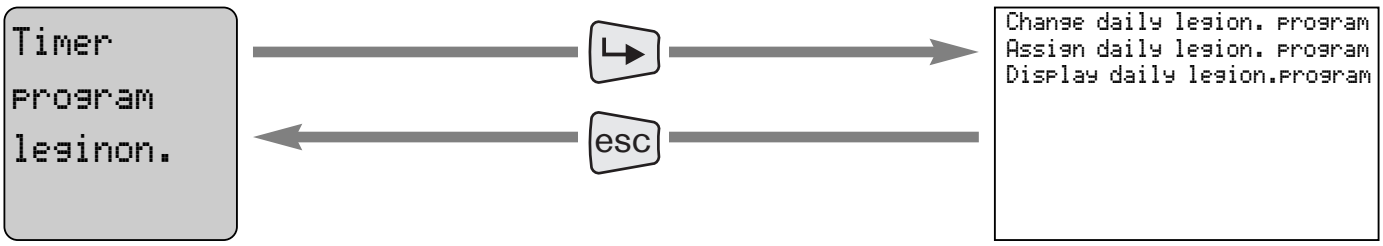
Use:
Release of DHW top up depending on the time program set (se Ch. 5.5)

Change daily DHW program	Changing, adding or deleting switch times. A maximum 7 daily programs with up to 3 cycles each can be programmed.	Variation: 1…11, 17…19, 21…27, 32…38, 43…45, 50…59
Assign daily DHW program	Assign daily programs to the weekdays on which they are to be carried out.	Variation: 1…11, 17…19, 21…27, 32…38, 43…45, 50…59 **Note:** Only one daily program with a maximum of 3 cycles can be assigned to each weekday.
Display daily DHW program	Interrogation of daily programs assigned to the weekdays including the relevant switch cycles.	Variation: 1…11, 17…19, 21…27, 32…38, 43…45, 50…59

Factory presetting timer program DHW

Weekday							Daily program	Cycle			
Mon	Tues	Wed	Thurs	Fri	Sat	Sun			Z1	Z2	Z3
✗	✗	✗	✗	✗	✗	✗	1	I = On	06:00	:	:
								0 = Off	22:00	:	:

6.5 Timer program for legionella function



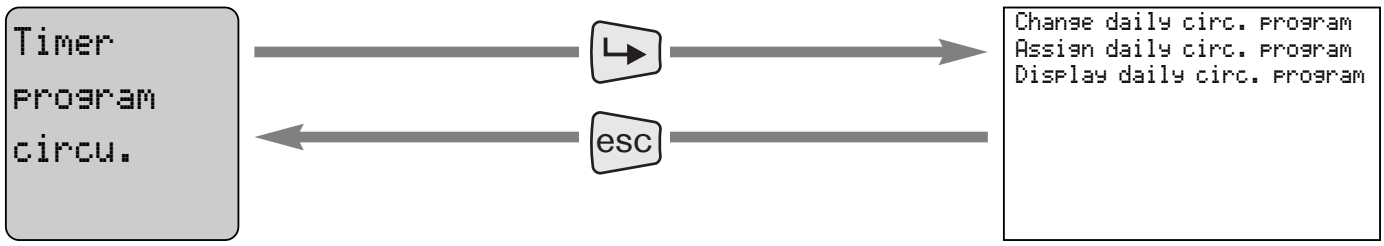
Use:
Release of legionella pump depending on the time program set (se Ch. 5.5)

Change daily legionella program	Changing, adding or deleting switch times. A maximum 7 daily programs with up to 3 cycles each can be programmed.	Variation: 1, 4, 22, 24, 53
Assign daily legionella program	Assign daily programs to the weekdays on which they are to be carried out.	Variation: 1, 4, 22, 24, 53 **Note:** Only one daily program with a maximum of 3 cycles can be assigned to each weekday.
Display daily legionella program	Interrogation of daily programs assigned to the weekdays including the relevant switch cycles.	Variation: 1, 4, 22, 24, 53

Factory presetting timer program legionella function

Wochentag							Daily program	Cycle			
Mon	Tues	Wed	Thurs	Fri	Sat	Sun			Z1	Z2	Z3
				✗			1	I = On	17:00	:	:
								0 = Off	22:00	:	:

6.6 Timer program for circulation pump activation



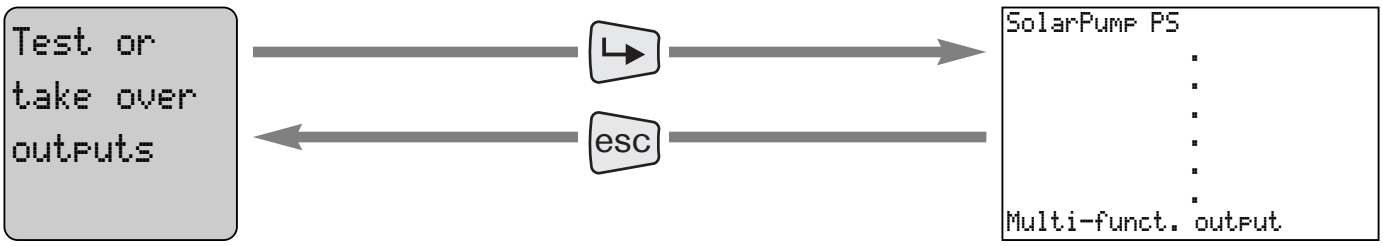
Use:
Release of circulation pump depending on the time program set (se Ch. 5.5)

Change daily circ. program	Changing, adding or deleting switch times. A maximum 7 daily programs with up to 3 cycles each can be programmed.	Variation: 1, 2, 4…7, 9, 17…19, 21, 52…56
Assign daily circ. program	Assign daily programs to the weekdays on which they are to be carried out.	Variation: 1, 2, 4…7, 9, 17…19, 21, 52…56 **Note:** Only one daily program with a maximum of 3 cycles can be assigned to each weekday.
Display daily circ. program	Interrogation of daily programs assigned to the weekdays including the relevant switch cycles.	Variation: 1, 2, 4…7, 9, 17…19, 21, 52…56

Factory presetting timer program circulation pump

Weekday							Daily program	Cycle			
Mon	Tues	Wed	Thurs	Fri	Sat	Sun			Z1	Z2	Z3
✗	✗	✗	✗	✗	✗	✗	1	I = On	06:00	11:00	17:00
								0 = Off	06:30	11:30	17:30

6.7 Test outputs



Use
Here, you can check the current switch condition of the outputs.

Switch the outputs on and off to check their function. If necessary, the degree of modulation can be altered in steps of 10%. To do this the controller must be set to Manual operation (see CH. 6.1).

Note: As long as the display is flashing, the value has not been taken over and will revert to the previous setting when exiting by pressing the esc key. Press ↵ key to save, take over and execute the value.
The outputs remain in the selected switch conditions even once the sub menu has been exited and alter only when changed again or if a different type of operation is selected (see Ch. 6.1).

Solar pump
PS
100%

Current speed of solar pump depending on collector temperature.
Output: 1/N

In Manual operation the pump is driven at 100% speed.

Variation: 1…46, 50…59

Solar pump
PS2
100%

Current speed of solar pump 2 depending on collector temperature.
Output: 2/N

In Manual operation the pump is driven at 100% speed.

Variation: 22…34, 56

Valve Bypass
On

Switch condition of output 4/N.
Off: 0 Volt
On: 230 Volt

In Manual operation the the valve is activated.

Variation: 2, 6, 13, 18, 26, 30, 33, 37, 41, 44, 55, 58

Pump PWT tank
100%

Current speed of feeder pump to the plate heat exchanger.

In Manual operation the pump is driven at 100% speed.

Variation: 3, 8, 11

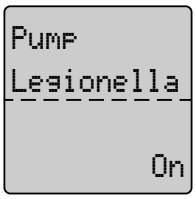
Pump circ.
On

Switch condition of output 2/N.

In Manual operation the valve is activated.

Variation: 1, 2, 4, 6, 9, 17, 18, 19, 21

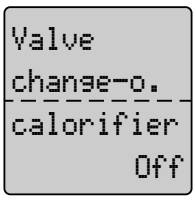
Pump DHW 100%	Current speed of feeder pump to plate heat exchanger. In Manual operation the pump is driven at 100% speed.	Variation: 14, 16
Solid f. pump 100%	Current speed of solid fuel boiler circuit pump depending on solid fuel temperature or calorifier temperature. Output: 1/N In Manual operation the pump is driven at 100% speed.	Variation: 35…45, 48, 49, 57…59
Heating return increase Off	Switch condition of output 4/N: Off: 0 Volt On: 230 Volt In Manual operation, the valve is not activated.	Variation: 9…11, 15, 16, 19 , 27, 31, 34, 45, 49, 56, 59
Valve swim. pool Off	Switch condition of output 4/N: Off: 0 Volt On: 230 Volt In Manual operation, the valve is not activated.	Variation: 21, 52
Valve tank calorifier Off	Switch condition of output 3/N: Off: 0 Volt On: 230 Volt In Manual operation, the valve is not activated.	Variation: 4…6, 8…11, 17…19, 21, 24,…27, 32…38, 43…45, 51, 52
Pump calorifier tank Off	Switch condition of output 4/N: Off: 0 Volt On: 230 Volt In Manual operation, the valve is not activated.	Variation: 5, 7, 25, 36, 50, 51, 53
Pump collect. tank Off	Switch condition of output 1/N: Off: 0 Volt On: 230 Volt In Manual operation, the valve is not activated.	Variation: 51
Pump collect. calorifier Off	Switch condition of output 2/N: Off: 0 Volt On: 230 Volt In Manual operation, the valve is not activated.	Variation: 51



Switch condition of output 4/N.
Off: 0 Volt
On: 230 Volt

In Manual operation the pump is activated with 230 Volt.

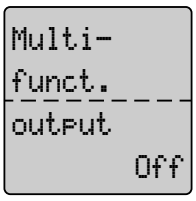
Variation: 1, 2, 4…7, 9, 17…19, 21, 52…56



Switch condition of output 3/N:
Off: 0 Volt
On: 230 Volt

In Manual operation, the valve is not activated.

Variation: 40, 48

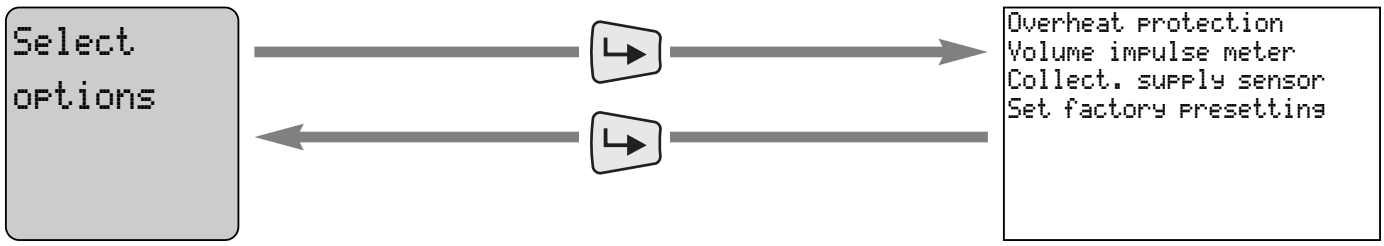


Switch condition of output 5/6.
Off: contact open
On: contact close

In Manual operation the output is set to 'Off'.

Variante: 1…59

6.8 Select options



Use:
Independent of the hydraulic variation used, additional us-function and be activated or blocked (only by heating engineer).
If functions have been activated, the values can be checked in the selection menu `Select temp. a. values` and if additional settings are required these can be adjusted in `Change settings`.

Note: If the hydraulic variation is changed, the parameters have to be re-selected.

`Over heat protection No`

Protective function of the heat transfer fluid.
(see Ch. 7.1.

Variation: 1…45, 50…59

Presetting: No

Recommendation: Yes

`Volume impulse meter No`

Activation of input to recognise the collector return sensor and the volume impulse meter (Ch. 7.8).

Variation: 1…7, 12…14, 17, 18, 20, 21, 35…37, 40, 41, 43, 44, 52…55, 57, 58

Presetting: No

Note: A return sensor must be fitted when activating the volume impulse meter, otherwise fault code 9 will be signalled.

`Collect. supply sensor No`

The activation of input for recognition if a collector flow sensor is connected and if it is used as control (Ch. 7.4 / 7.9).

Variation: 1…7, 12…14, 17, 18, 53, 56

Presetting: No

`Set factory presetting No`

Resets the controller to the factory presettings.

Yes: Reset to factory presettings (after pressing the Enter key the display returns to `No` after approx. 5 to 10 seconds and the function has been executed)

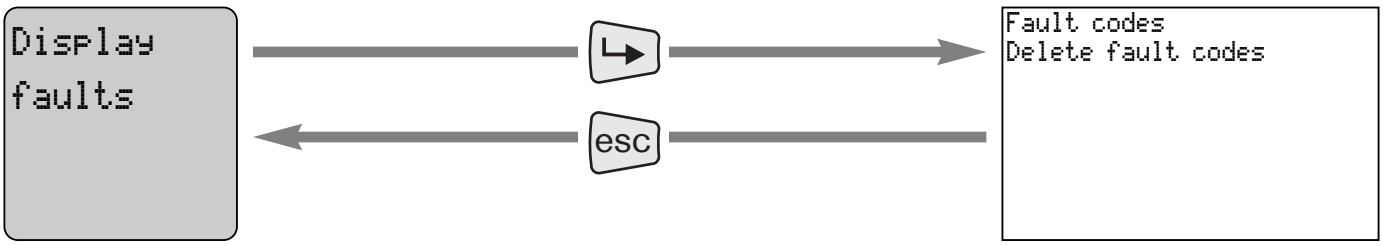
No: No reset to factory presettings

Variation: 1…59

Presetting: No

Note: All parameters are set to the values of variation 1 and the display is returned to its factory settings.

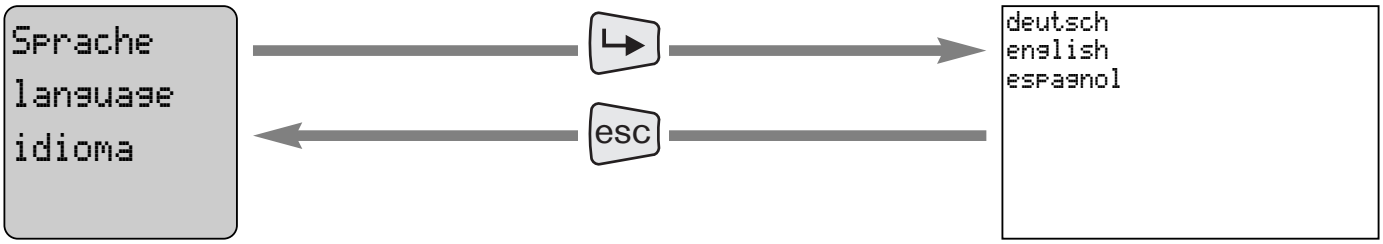
6.9 Display faults



Use:
Here, a fault which has occurred can be called up as a number code.
The faults listed in Chapter 8 reset automatically once the cause has been rectified.
One exception is fault 1, this remains saved within the controller and can only be reset using `Delete fault codes`.

Variation: 1…59

6.10 Language selection



Use:
Here, one of three languages can be selected.

Variation: 1…59

7.1 Overheat protection (heat ttransfer fluid)

Setting: Yes (recommended)

- If the storage tank or the calorifier temperature reaches the maximum value set and the collector temperature continues to rise, the speed control attempts to hold the collector temperature at 110°C.
- If the collector temperature rises to above 120°C the solar pump switches off and remains switched off until the collector temperature falls to below 110°C.
- The solar pump always switches off at a storage tank /calorifier temperature of 95°C.
- If the 92°C mark is not achieved, the pump is released again if the collector temperature is still below the 120°C limit.

Setting: No

- Once the maximum temperature of the storage tank or calorifier has been reached, the solar pump is switched off.
- If the collector temperature increases to above 120°C the solar pump switches off and remains switched off until the collector temperature fall to below 110°C.

Variation: 1…45, 50…59

7.2 Energy management via the MFA output

The multi-function output (potential free contact, terminal 5/6) must be selected site specific.

With storage tank operation (DHW), reference sensor TSU

- With good solar yield (average rating PS above 50%) and storage tank temperature greater than Tank temp. minimum burner interlock is activated. If the requirements are no longer met, the interlock is deactivated.
- With very good solar yield (average rating PS above 80%) the burner interlock is activated for 18 hours once the Tank temp. setpoint has been achieved.

  If the storage tank temperature fall below its minimum temperature (Tank temp. minimum) by 3K the interlock is deactivated and the 18 hours are reset.

With calorifer operation, reference sensor TPO

- With good solar yield (average rating PS above 50%) the Calorifier temp. setpoint is reduced by Diff. calorifier minimum.
  If the actual temperature of the calorifier reaches this reduced value the interlock is activated.
  If the actual calorifier temperature falls below the reduced value or if the Average rating PS falls to below 50% the interlock is deactivated.

Setting value	Heat exchanger Interlock / release Tank loading	Special temp. level Heat exchanger for legionella function	Heat exchanger Inrterlock / Release Calorifier loading	Re-transmission Lockout
0				
1	interlock			
2	release			
3		interlock		
4		release		
5			interlock	
6			release	
7	interlock		interlock	
8	release		release	
9				no lockout
10				lockout

7.3 Pump standby protection

To avoid seizing of the actuators fitted, outputs X1:1 and X1:2 are activated every day at 12 o'clock for approx. 35 seconds. The change-over valves are activated for 15 secs. "Open" and 20 secs. "Closed".

Variation: 1…59

7.4 Reference value of pump speed control in conjunction with collectors

The controller is equipped with speed control which is used to drive the pump via direct drve shaft.

This operation depends on the following factors:

- A prefixed increase is added to the temperature at the reference sensor (TSU, TPU or TSB).

  If a collector supply sensor (TKV) is fitted this is used instead of the collector sensor (TKO).

The speed control now aims to control the collector temperature (TKO) or the supply temperature (TKV) to this value.

Reference value for speed control:

- Sensor TSO 15K Increase
- Sensor TSU 10K Increase
- Sensor TPU 10K Increase
- Sensor TSB 10K Increase
- Offset TKV - 4K (no effect with swimming pool TSB)

Example: (with tank)

The target collector temperature is calculated from:

	Increase:	10K	fixed
+	Actual tank temperature:	40°C	(TSU)
=	Collector setpoint temperature:	50°C	(TKO)

- If the actual collector temperature (TKO) falls towards the target collector temperature the speed control is modulated within the given limits.

  The switch on and switch off conditions for the pump can be adjusted (see Ch. 6.3).
  If the collector temperature exceeds the storage tank temperature by + 7K (Tank diff.On) the pump is switched on, if the collector temperature does not achieve the value of the "Storage tank temperature + 4K" (Tank diff. Off) the pump is switched off.

Note: Due to the direct drive shaft a pulsating volume flow is created in the modulation range, which can be noticeable through noise and/or vibration of flexible lines.

Variation: 1…59

Example: (with tank and collector supply sensor)
The target collector flow temperature (TKV) is calculated from:

	Increase:	10K	fixed
–	Offset:	4K	fixed
+	Actual tank temperature:	40°C	(TSU)
=	Collector supply setpoint temp:	46°C	(TKV)

- If the actual collector flow temperature (TKV) falls towards the target collector flow temperature the speed control is modulated within the given limits.

Note: By using a collector flow sensor the ratings losses are taken into consideration as much as possible.

7.5 Pump control in conjunction with a solid fuel boiler

The controller is equipped with speecd control, which drives the pump by direct drive shaft.

Switch on conditions

1.) The solid fuel boiler must have reached its minimum temperature.

SolidF temp. actual value ≥ SolidF temp. minimum

2.) If the boiler temperature reaches the calorifier temperature (TPU) plus the SolidF diff. On, the pump runs at the lowest speed.
Prerequisite: Condition 1 has been met

Note:
If function SolidF temp. Increase is activated (value > 0), the pump already runs at a temperature increase of 3K/min. at the smallest rating, even if the boiler minimum temperature has not yet been achieved and the SolidF diff. Off has not been maintained.
The function SolidF temp. Increase should only be activated in conjunction with a thermal return flow increase.

SolidF temp. actual value = Tank bottom actual value + SolidF diff. On
⇨ Pump runs at lowest speed

3.) When the boiler temperature reaches the calorifier temperature plus half the value of the SolidF diff. On plus SolidF diff. Off, speed control is released.
Prerequisite: Condition 1 has been met

Note:
If the actual boiler temperature falls towards the target boiler temperature the speed control is modulated within the given limit. Below this limit the pump runs at the lowest rating.
Due to the direct drive shaft a pulsating volume flow is created in the modulation range, which can be noticeable through noise and/or vibration of flexible lines.

$$\text{SolidF temp. act. value} \geq \text{Tank bottom act. value} + \frac{\text{SolidF diff. ON} + \text{SolidF diff. Off}}{2}$$

⇨ Pump is driven speed controlled

Switch off conditions

1.) The Solid temp. minimum falls by the switch differential of 3K.

SolidF temp. act. value ≤ SolidF temp. minimum – Switch differential (3 K)

or

2.) If the actual boiler temperature falls below the actual calorifer temperature (TPU) plus the SolidF diff. Off the pump switches off.

SolidF temp. act. value < Tank bottom act. value + SolidF diff. Off
⇨ Pump off

Variation: 35…45, 48, 49, 57…59

7.6 Solid fuel boiler functions

The solar controller has three different solid fuel boiler functions.

1. **Solid fuel boiler minimum temperature**
   To release solid fuel boiler operation, this temperature must be exceeded. The limit value SolidF. temp. minimum is allocated with a switch hysteresis of -5K.

   Example:
   SolidF.temp. minimum = 30°C
   Released at 30°C; disabled at 25°C

2. **Solid fuel boiler function without thermal return flow increase via controller**
   The release of the boiler circuit pump PFK occurs when the temperature differential between the solid fuel boiler sensor (TFK) and the calorifier sensor (TPU) is greater than the SolidF. diff. On set. The boiler circuit pump PFK is switched off, when the temperature differential between the solid fuel boiler sensor (TFK) and the calorifier sensor (TPU) is less than the SoldF. diff. Off set. The speed control attempts to maintain a minimum load temperature. The setpoint is made up to the formula on the right.

   Formula:
   Minimum load temperature =
   TPU + $^1/_2$ x (Diff. On + Diff. Off)

3. **Solid fuel boiler function with thermal return flow increase via controller**
   The boiler circuit pump PFK be be released due to the temperature increase rate at the solid fuel boiler sensor (TFK).
   If the temperature increase is greater than the SolidF temp. increase set, the boiler circuit pump (PFK) is switched on irrespective of the SolidF. temp. minimum and the temperature differential between TPU and TFK.
   An average value is formed from the current boiler temperature. If the temperature increase of SoidF. temp. increase is greater than the average temperature the boiler circuit pump PFK is switched on.
   If there is no temperature difference the pump switches off. The pump also switches off, if the temperature differential between TFK and TPU is less than the SolidF diff. Off.

   The speed control attempts to maintain a minimum load temperature. The setpoint is made up to the following formula.

   Formula:
   Minimum load temperature =
   TPU + $^1/_2$ x (Diff. On + Diff. Off)

7.7 Manual operation

- In selection menu, Select type of operation set the selection to Manual.
- All outputs are activated to the factory presetting (see Ch. 6.4).
- In sub-menu Test or take over outputs the outputs can be switched on or off and the speed control can be altered in 10% steps.

Note: In manual operation the volume flow of the system at 100% pump rating can be set. The volume flow to be set can be found in the installation and operating instructions of the collector.

Variante: 1…59

7.8 Calculation of energy yield

This solar controller contains a function for calculating the energy yield on the basis of the temperature differential between the collector temperature (TKO) and the reference sensor (TSU, TPU, TSB) via the throughput quantity (volume flow).

After setting the volume flow, at a pump rating of 100%, via the throughput limiter the scale value should be read off and entered into parameter volume flow in selection group Change settings.
If a different heat transfer fluid is used the heat capacity at 20°C (Heat capacity) should be adjusted.

Note: The calculation of energy yield to a limited degree complies with the funding guidelines.

Heat capacity at 50°C:

-weishaupt- Solar thermal fluid Tyfocor L (45% Propylene Glycol)	3.73 kJ/lK
Water	4.19 kJ/lK

Variation: 1…45, 50…59

7.9 Determination of energy yield

To carry out this function, a volume meter with impulse output (VIZ) and a collector return sensor (TKR) must be connected to the controller and the Volume impuls meter has to be activated in Select option.

If a collector flow sensor (TKV) has also been fitted and activated under Select options, this replaces the collector sensor (TKO) when determining the energy yield and and thus leads to an even higher accuracy in determining the energy yield.
The collector flow sensor (TKV) takes the pipeline losses from collector to transfer station into account.

The energy yield determination of the solar rating is carried out on the basis of the volume flow (VIZ) and the temperature differential between the collector temperature (TKO) or collector flow temperature (TKV) and the collector return temperature (TKR).
The yield is calculated from these values measured and the Heat capacity of the thermal fluid entered.

Note: Due to its deviation of less than 10% the determination of energy yield complies with the funding guidelines.

Heat capacity at 60°C:

-weishaupt- Solar thermal fluid Tyfocor L (45% Propylenglykol)	3.73 kJ/lK
Water	4.19 kJ/lK

Variation: 1…8, 12…14, 17, 18, 20, 35…37, 40, 41,43, 44, 52…55, 57, 58

7.10 Collector bypass function with 3 way valve (VBY)

A bypass valve (VBY) switches between the collector circuit and the user circuit to stop the solar pump pulsating if long pipelines or large diameter pipe lead to the collector and the solar pump can no longer be modulated by the controller (consumption >1 A).

The activation of the bypass valve depends on the temperature at the bypass sensor and the storage tank and/or calorifier temperature.

Variation: 2, 6, 13, 18, 26, 30, 33, 37, 41, 44, 55, 58

User circuit ON:
The 3 way valve releases the user circuit if, with the solar pump activated, the bypass temperature (TBY) exceeds the measured storage tank and/or calorifier temperature plus the `Tank/Calorifier Diff. Off` by 2K.

Collector circuit ON:
The valve switches back to the collector circuit, if the bypass temperature (TBY) is lower than the measured storage tank/calorifier temperature plus the `Tank/Calorifier Diff. Off` or the solar pump is disabled.

7.11 Priority solar loading

Loading to yield
This load strategy is used if only limited solar yield is available, that means when the average pump speed is below 80%. The advantage is the optimised energy usage with low collector yield, with increasing storage tank temperatures, and the resulting reduction in yield.

Function:
Firstly the tank/calorifier with the lowest temperature level is loaded, until there is no temperature difference between the users. Then the DHW tank temperature is increased by 5K, following this the users are loaded alternately until the temperature differential is 5K. If one user is loaded to its setpoint temperature or has reached an average pump speed of 80%, the DHW tank is loaded to its setpoint. When even the last user has reached its setpoint temperature, first the DHW tank and then the calorifier are loaded to the respective `... Temp. Maximum` set.

Loading to temperature
When loading to temperature, the users are loaded to their respective setpoint temperature in the sequence set (`Priority solar loading`).

Function:
Firstly the user with the highest, predetermined priority is loaded to its setpoint value, only then are all other users loaded to their setpoint value in the sequence set.
Once all users have reached the setpoint value set and if sufficient collector rating remains the users are loaded in sequence to the respective `... Temp. Maximum` set.
If one user is not avilable or has reached its maximum (e.g. swimming pool only to its setpoint temperature), the next user automatically receives this value.

Setting value: `0` (automatic loading to yield)
The controller can determine whether the tanks are loaded to yield or temperature by the solar rating.
Sequence:
Tank (TSU) → swimming pool (TSB) → calorifier (TPU)

Once the setpoint temperatures have been reached the loading continues to the maximum temperatures set.
Sequence:
Tank (TSU) → Calorifier (TPU)

Setting value: `1` (Loading to temperature)
Sequence:
Tank (TSU) → swimming pool (TSB) → calorifier (TPU)

Once the setpoint temperatures have been reached the loading continues to the maximum temperatures set.
Sequence:
Tank (TSU) → Calorifier (TPU)

Setting value: `2` (Loading to temperature)
Sequence:
Calorifier (TPU) → tank (TSU) → swimming pool (TSB)

Once the setpoint temperatures have been reached the loading continues to the maximum temperatures set.
Sequence:
Calorifier (TPU) → tank (TSU)

Setting value: `3` (Loading to temperature)
Sequence:
Swimming pool (TSB) → tank (TSU) → calorifier (TPU)

Once the setpoint temperatures have been reached the loading continues to the maximum temperatures set.
Sequence:
Tank (TSU) → calorifier (TPU)

Note: If a sensor in the sequence is not available the next sensor is used

Variation: 4…6, 8…11, 17…19, 21, 24…27, 35…38, 51, 52

7.12 Legionella function

If the disinfection has been released in accordance with the Timer program Legionel and the legionella setpoint value at sensor TSU on this day has not been reached, the legionella pump PLE is switched on and the burner interlock is switched off. The Multi-funct. output must be set to 1, 2, 3 or 4. To achieve the legionella setpoint value, the heat exchanger must make the temperature required available. Once the legionella setpoint value has been reached at sensor TSU and TSO or if the disinfection in accordance with the timer program is no longer released, the legionella pump is switched off and the burner interlock is switched on. This function can be matched to the DHW demand with the timer program.

The legionella setpoint is factory preset to 0°C, that means the function is deactivated.

The legionella pump Pump Legionel (PLE) is released via output 4/N.
If setting 3 or 4 is selected at the MFA output, the heat exchanger can be driven to a special level using this output thus achieving the legionella function.

Variation: 1, 2, 4…7, 9, 17…19, 21, 52…56

7.13 DHW function

If DHW loading has been released in accordance with the Timer program DHW and the tank setpoint value at sensor TSO or TSU falls by 5K, the burner interlock is switched off.
Once the tank setpoint value at sensor TSO or TSU has been reached or the DHW loading in accordance with the timer program is no longer released, the burner interlock is switched on.
Burner interlock is activated via the MFA contact. The Multi-funct. output must be set to either 1, 2, 7 or 8.

Variation: 1…11, 17…19, 21…27, 32…38, 43…45, 50…59

If a load pump (PWL) is conencted to output 3/N, independent DHW top-up can be realised depending on the timer program and the Tank Temp. Setpoint. The switch differrential is fixed at 5K.

Prerequisite for DHW top-up:
The heat transfer fluid temperature for DHW top-up must be a minimum of 10K above the Tank Temp. Setpoint.

Variation: 1, 2, 3, 7, 32…34, 43…45, 50, 51, 53…59

7.14 DHW circulation

Function with sensor
If the function has been released in accordance with the Timer program circu. and the Circu. Temp. Setpoint value at sensor TZW falls by the switch differential Circ. Diff. On, the circulation pump PZW is switched on.
Once the circulation setpoint value is reached at sensor TZW or if the function in accordance with the timer program is no longer released, the pump is switched off.

Variation: 1, 2, 4, 6, 9, 17…19, 21, 52

Function without sensor
If it is not possible to connected a sensor TZW, circulation is only carried out to the timer program.

Variation: 5, 7, 53…56

Example:
Circ. Temp. Setpoint : 30°C
Circ. Diff. On : 5 K

Pump On:
Circ. Temp. act. value (TZW) ≤ 25°C (30°C – 5 K)

Pump Off:
Circ. Temp. act. value (TZW) ≥ 30°C

Note: The pump run time should be as short as possible.

7.15 Load function DHW tank via plate heat exchanger

If the collector temperture (TKO) increases by the Tank Diff. On via the tank setpoint temperature, solar loading is initiated. The PWT pump runs at the lowest speed (30%), until the tank setpoint temperature is reached at the sensor TWT. The controller now tries to maintain the tank setpoint temperature at TWT.

Once the tank setpoint temperature(TSU) has been reached, loading continues until Tank Temp. Maximum has been achieved.
If the temperture differential between TKO and TSU is less than Tank Diff. On the pump switches off.

Variation: 3, 8, 11

7.16 DHW via plate heat exchanger

The primary pump PWW is switched on if the cold water temperature at the plate heat exchanger TKW falls below 30°C or the sensor input has short circuited and the DHW temperature at the plate heat exchanger TWW is lower than the tank setpoint temperature set. The pump is switched off if the DHW temperature at the plate heat exchanger TWW is higher than the tank setpoint temperature set or the cold water temperature at the plate heat exchanger TKW increases to above 30°C, or the short circuit at the sensor input is rectified.

The speed control of the PWW pump is used to try to control the DHW setpoint value (Tank setpoint temperature) at sensor TWW.
If the calorifier temperature at sensor top (TPO) is lower than the DHW setpoint temperature +10K, the setpoint for the speed control is formed based on the temperature TPO. The setpoint value then is TPO –10K.

Variation: 14, 16

7.17 Retrieval function

This function is used to retrieve energy from the calorifier and load it in the DHW tank.
If the temperature at tank sensor top (TSO) is lower than the tank setpoint value an the calorifier temperature top (TPO) is higher than TSO by 5K, the PPS pump is switched on.

The retrieval is stopped, if the Tank Temp. Setpoint at sensor TSO is exceeded, or if the temperature at sensor TPO is less than 3K above TSO.

Variation: 5, 7, 10, 25, 36, 50, 51

7.18 Heating return temperature increase

If the calorifier temperature top (TPO) is higher than the heating return temperature increase (THR) by Return Diff. On, the output heating return temperature increase switches on.
If the temperature differential between TPO and THR is lower than Return Diff. Off, the output heating return temperature increase switches off.

Variation: 9…11, 15, 16, 19, 27, 31, 34, 45, 49, 56, 59

7.19 Collector cascade

The collector cascade is treated the same way as two independent differential controls.
Basically, collector cascade should always be treated like two individual differential controls on the same user (tank, calorifier, swimming pool).

Variation: 22…34, 50

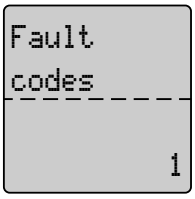
7.20 Switch over function calorifier, oil and gas boiler

If the Calorifier top act. value at sensor TPO is higher than the Calorifier Temp. Setpoint, the switch over value (Valve switch over calorifier) VUP at output 3/N is activated.
If the TPO temperature falls below the calorifier setpoint value by 5K, the output is switched off.

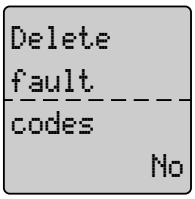
7.21 WES function

Depending on the average pump speed during loading to the sensor TSU, the solar controller calculates if a reduction of the pump speed leads to a sufficient increase at sensor TKO or TKV, to enable loading to sensor TSO.
If the required increase is not achieved during loading to sensor TSO, the controller switches over to loading to TSU again.

8.1 Fault messages (fault display)



The faults recognised by the controller are displayed with a fault code and can be assigned or rectified here.

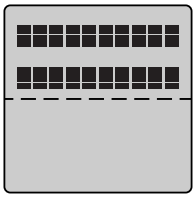


The fault code display is reset by confirming with Yes.

Code	Description	Cause	Rectification
1	ΔT between TKO and TSU or TPU longer than 15min. >80K	Pump defective	Repair, or if necessary replace pump
		Air in system	Vent system
		Sensor defective	Replace sensor
Note:	After 15 minutes the solar pump is switched off. If the temperature differential is not maintained, the solar pump switches on again. The fault message remains saved and can be reset via Delete fault codes.		
2	ΔT between TK2 and TSU or TPU longer than 15min. >80K	Pump defective	Repair, or if necessary replace pump
		Air in system	Vent system
		Sensor defective	Replace sensor
Note:	After 15 minutes the solar pump is switched off. If the temperature differential is not maintained, the solar pump switches on again. The fault message remains saved and can be reset via Delete fault codes.		
4	Collector sensor TKO has short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	The solar pump switches off, if the frost protection function is not active. Otherwise the pump runs at minimum speed. Once the cause of the fault has been rectified, the fault message is automatically reset.		
5	Collector sensor TK2 has short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	The solar pump switches off, if the frost protection function is not active. Otherwise the pump runs at minimum speed. Once the cause of the fault has been rectified, the fault message is automatically reset.		
6	Tank sensor bottom TSU has short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	The solar pump switches off. Once the cause of the fault has been rectified, the fault message is automatically reset.		
7	Calorifier sensor bottom TPU has short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	The solar pump switches off. Once the cause of the fault has been rectified, the fault message is automatically reset.		

Code	Description	Cause	Rectification
8	Collector flow sensor TKV has short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	Pump control switches to collector sensor TKO. Once the cause of the fault has been rectified, the fault message is automatically reset.		
9	Collector return sensor TKR has short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	The yield determination no longer functions correctly. Once the cause of the fault has been rectified, the fault message is automatically reset.		
10	Swim pool sensor bottomTSB hat short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	The solar pump switches off. Once the cause of the fault has been rectified, the fault message is automatically reset.		
11	Solid fuel boiler sensor bottom TFK has short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	The solid fuel pump is driven at maximum speed (100%). Once the cause of the fault has been rectified, the fault message is automatically reset.		
13	The calorifier sensor top TPO has short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	The three way valve is de-energised and returns to its start position. Once the cause of the fault has been rectified, the fault message is automatically reset.		
14	The tank sensor top TSO has short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	Output 4 (PPS) is de-energised or the WES function only loads to TSU sensor. Once the cause of the fault has been rectified, the fault message is automatically reset.		
15	The heating circuit return sensor THR has short or open circuit	Sensor or cable short or open circuit	Check installation, if necessary replace sensor
Note:	The three way valve is de-energised and returns to its start position. Once the cause of the fault has been rectified, the fault message is automatically reset.		

8.2 Displays



Undefined condition
Once reset the controller restarts.
If the controller does not restart after a reset it should be replaced.

⇨ see Ch. 5.4

8.3 Cause and rectification of lockouts

Observation	Cause	Rectification
Solar pump does not switch off	The current consumption of the load is insufficient	Select different relay (higher current consumption) Use RFI suppressor.
	Frost protection temperature set too high	Check and if necessary adjust parameter

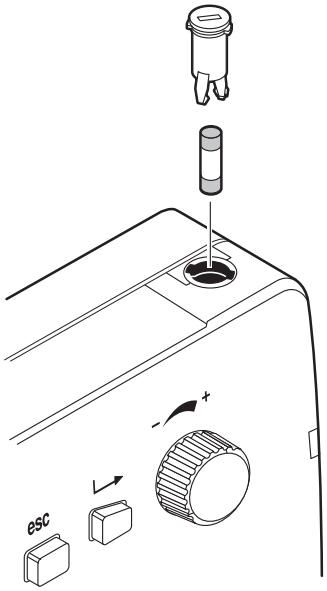
9.1 Electrical data

Mains voltage 230 V ± 10%
Mains frequency 50-60 Hz
Consumption 7 VA
Voltage meas. circuit 12 V, insulated 4 KV
Breaking capacity outputs:
Electronic outputs ~230 V, 1 A, 50 Hz
Mechanical outputs ~230 V, 6 (2) A, 50 Hz
External unit fuse 16 A
Internal unit fuse 3.15 A slow
Type of protection IP40 to EN 60529
Protection Class II to EN 607300 if installed correctly

Cables
Sensor cable length, cross section max. 100m, 0.75 mm^2

eBus 2 core Bus
Bus cable length, cross section max. 100m, 0.75 mm^2

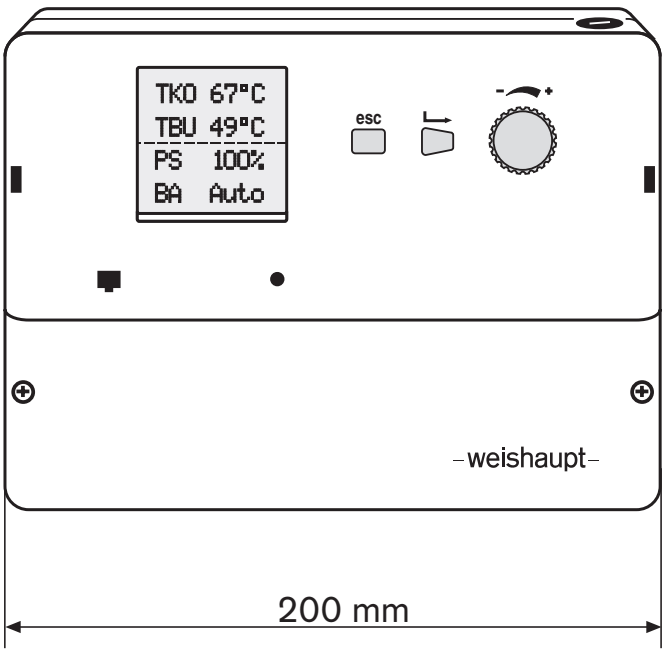
Micro fuse 3.15 A slow

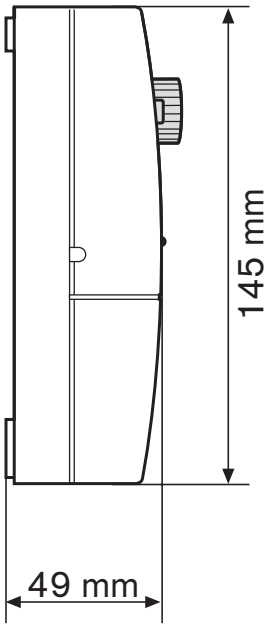


9.2 Permissible ambient conditions

Temperature	Humidity	Requirements to EMC	Low voltage
During operation 0°C…50°C Transport/storage -20°C…+60°C	at 25°C no dew point	Guideline 89/336/EEC EN 50081-1 EN 50082-1	Guideline 73/23/EEC EN 60335

9.3 Dimensions





9.4 Temperature sensor data

Sensor element NTC 5000 Ω at 25°C

Sensor	Measuring range	Measurement accuracy	Ambient temperature	Cable material	Cable length	Order number
Immersion sensor STF 225	-10…240°C	0…70°C ± 0.5K	-50…250°C	Silicone (blue)	4m	660 229
Immersion sensor STF 222.2	-10…130°C	0…50°C ± 0.5K 0…70°C ± 0.8K	-50…90°C	PVC (grey)	2.5m	660 228
Surface contact sensor ZVF 210 (Accessory)	-10…130°C	0…50°C ± 0.5K 0…70°C ± 0.8K	-50…90°C	PVC (grey)	2.5m	660 302

9.4.1 Sensor characteristics

Sensor characteristic curve
(Resistance values without self-heating)
The Weishaupt controller system offers the possibility of displaying the correct connection of all sensors and the respectively measured temperature. To check the sensors and simulation of relevant sensor temperatures, value pairs for all units used (sensor temperature/resistance value) are listed in the following table.

NTC sensor (blue cable)	ϑ °C	R Ω	ϑ °C	R Ω	ϑ °C	R Ω
Collector sensor: TKO, TK2	-40	112k	60	1.45k	160	115
	-35	84.1k	65	1.24k	165	105
Solid fuel sensor: TFK	-30	63.6k	70	1.06k	170	95
	-25	48.6k	75	914	175	86
	-20	37.4k	80	789	180	79
as immersion sensor	-15	29.1k	85	684	185	72
order No.: 660 229	-10	22.8k	90	595	190	66
	-5	18.0k	95	520	195	60
	0	14.3k	100	455	200	55
	5	11.4k	105	400	205	51
	10	9.21k	110	353	210	47
	15	7.47k	115	312	215	43
	20	6.10k	120	276	220	40
	25	5.00k	125	246	225	37
	30	4.13k	130	219	230	34
	35	3.42k	135	196	235	31
	40	2.86k	140	175	240	29
	45	2.40k	145	157	245	27
	50	2.02k	150	142		
	55	1.71k	155	128		

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

A Appendix

Content
- Checklist
- Commissioning log
- Timer program table

Checklist

❏ Carry out wiring of controller to the variation selected.

❏ Supply connection made to wiring schematic (only with Emergency/Off switch and pre-fusing).

❏ Are the sensors connected displayed.

❏ Check plausibility of temperatures and values.

❏ Is the pump driven (pos. in manual operation).

Commissioning log of adjustable parameters 'Change settings' (please complete)

Parameter	Setting range	Presetting	Set to
Hydraulic variation	1…59	1	[_____]
Collect. temp. minimum	0°C…70°C	20°C	[_____]
PS Speed minimum	10%…100%	40%	[_____]
Collect2 temp. minimum	0°C…70°C	20°C	[_____]
PS2 Speed minimum	10%…100%	40%	[_____]
Throughput meter	0.01…10.0 l/Impuls	0.25 l/Impuls	[_____]
Volume flow	0.1 l/m…500.0 l/m	1.5 l/m	[_____]
Volume flow 2	0.1 l/m…500.0 l/m	1.5 l/m	[_____]
Heat capacity	0.01 kJ/lK…10.0 kj/lK	3.73 kJ/lK	[_____]
Frost protection	-50°C…+20°C	-50°C	[_____]
Tank Diff. ON	0 K…40 K	7K	[_____]
Tank Diff. OFF	0 K…40 K	4 K	[_____]
Tank Temp. Minimum	0°C…70°C	40°C	[_____]
Tank Temp. Setpoint	0°C…70°C	55°C	[_____]
Tank Temp. Maximum	20°C…90°C	90°C	[_____]
Calorifier Diff. ON	0 K…40 K	7 K	[_____]
Calorifier Diff. OFF	0 K…40 K	4 K	[_____]
Diff. Calorifier Minimum	0K…40K	15K	[_____]
Calorifier Temp. Setpoint	0°C…70°C	70°C	[_____]
Calorifier Temp. Maximum	20°C…90°C	90°C	[_____]
Swim. pool Diff. ON	0 K… 40 K	7 K	[_____]
Swim. pool Diff. OFF	0 K…40 K	4 K	[_____]
Swim. pool Temp. Setpoint	0°C…40°C	30°C	[_____]
Return Diff. ON	0 K…40 K	5 K	[_____]
Return Diff. Off	0 K…40 K	2 K	[_____]
Legionella Temp. Setpoint	0°C…70°C	0°C	[_____]
Priority Solar loading	0…3	0	[_____]
Circ. Temp. Setpoint	0°C…70°C	30°C	[_____]
Circ Diff. ON	0 K…40 K	5 K	[_____]
Solid f. Diff. ON	0 K…40 K	15 K	[_____]
Solid f. Diff. OFF	0 K…40 K	5 K	[_____]
Solid f. Temp. Minimum	20°C…90°C	50°C	[_____]
Solid f. Temp. Increase	0 K/min…40 K/min	0 K/min	[_____]
Psolid f. Speed Minimum	10%…100%	30%	[_____]
Multi-funct. output	0…10	8	[_____]
Time	Mon. 00:00…Sun. 23:59		[_____]

Commissioning log of adjustable parameters 'Options' (please complete)

Parameter	Setting range	Presetting	Set to
Overheat protection	Yes / No	No	[_____]
Volume impulse meter	Yes / No	No	[_____]
Collector supply sensor	Yes / No	No	[_____]

Table timer program

DHW

Weekday							Daily program	Cycle			
Mon	Tues	Wed	Thurs	Fri	Sat	Sun			Z1	Z2	Z3
							1	I = On	:	:	:
								0 = Off	:	:	:
							2	I = On	:	:	:
								0 = Off	:	:	:
							3	I = On	:	:	:
								0 = Off	:	:	:
							4	I = On	:	:	:
								0 = Off	:	:	:
							5	I = On	:	:	:
								0 = Off	:	:	:
							6	I = On	:	:	:
								0 = Off	:	:	:
							7	I = On	:	:	:
								0 = Off	:	:	:

Circulation

Weekday							Daily program	Cycle			
Mon	Tues	Wed	Thurs	Fri	Sat	Sun			Z1	Z2	Z3
							1	I = On	:	:	:
								0 = Off	:	:	:
							2	I = On	:	:	:
								0 = Off	:	:	:
							3	I = On	:	:	:
								0 = Off	:	:	:
							4	I = On	:	:	:
								0 = Off	:	:	:
							5	I = On	:	:	:
								0 = Off	:	:	:
							6	I = On	:	:	:
								0 = Off	:	:	:
							7	I = On	:	:	:
								0 = Off	:	:	:

Legionella function

Weekday							Daily program	Cycle			
Mon	Tues	Wed	Thurs	Fri	Sat	Sun			Z1	Z2	Z3
							1	I = On	:	:	:
								0 = Off	:	:	:
							2	I = On	:	:	:
								0 = Off	:	:	:
							3	I = On	:	:	:
								0 = Off	:	:	:
							4	I = On	:	:	:
								0 = Off	:	:	:
							5	I = On	:	:	:
								0 = Off	:	:	:
							6	I = On	:	:	:
								0 = Off	:	:	:
							7	I = On	:	:	:
								0 = Off	:	:	:

Weishaupt products and services

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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 10900 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 12000 kW
	**WK industrial burners**	Modular powerhouses: Adaptable, robust, powerful. Oil, gas and dual fuel burners for industrial plant.	Up to 17500 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. Fuel: Gas.	Up to 240 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.	
	**Service**	Customer service completes the Weishaupt range. Weishaupt customer service is available 24/7. We're there when you need us. Everywhere.	