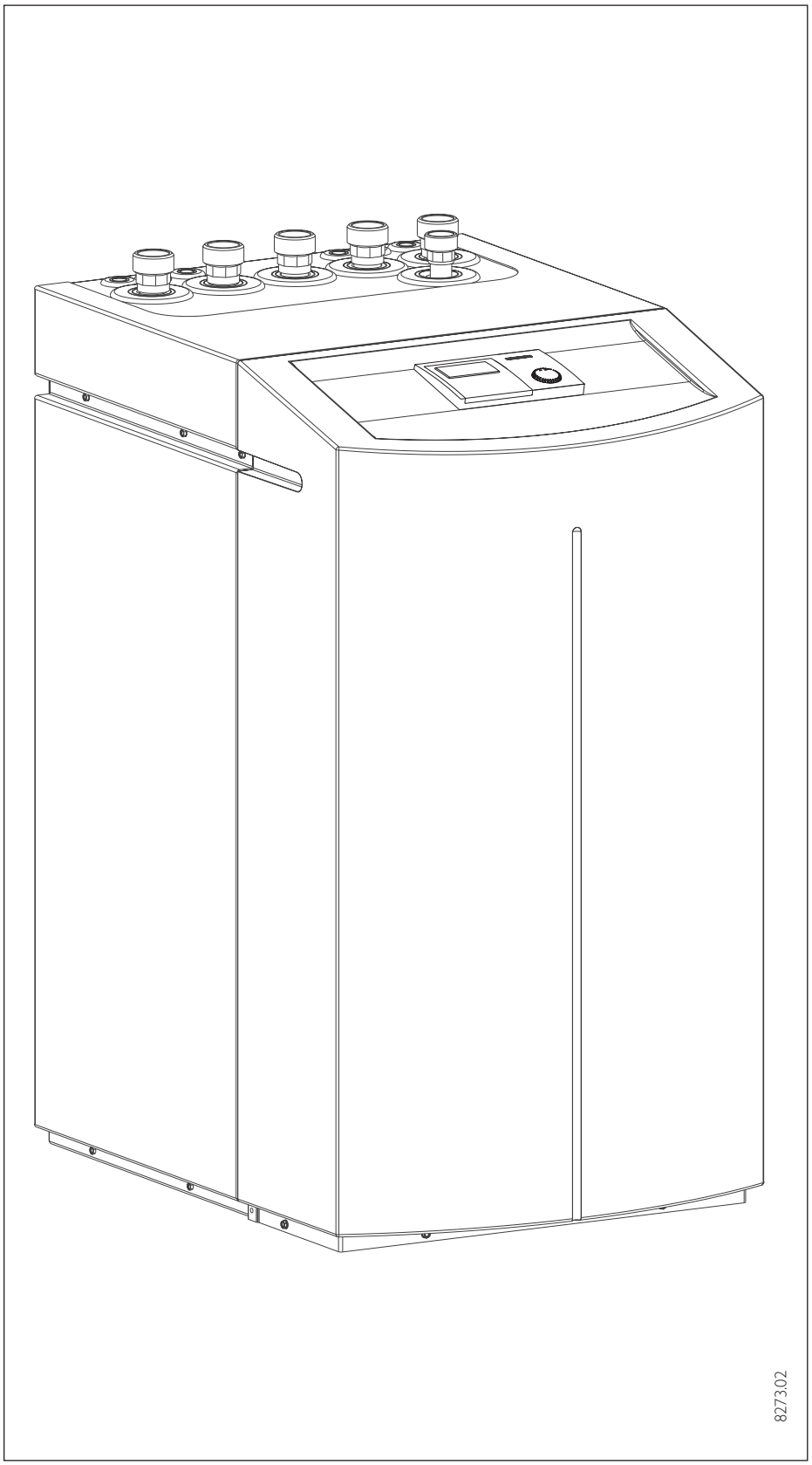
STIEBEL ELTRON

WPF 5 (S), WPF 7 (S), WPF 10, WPF 13

Water/water heat pump

Brine/water heat pump

Operating and installation instructions



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Index

The installation (water and electrical) and commissioning, as well as the maintenance of this equipment, must only be carried out by an authorised qualified contractor, in accordance with these instructions.

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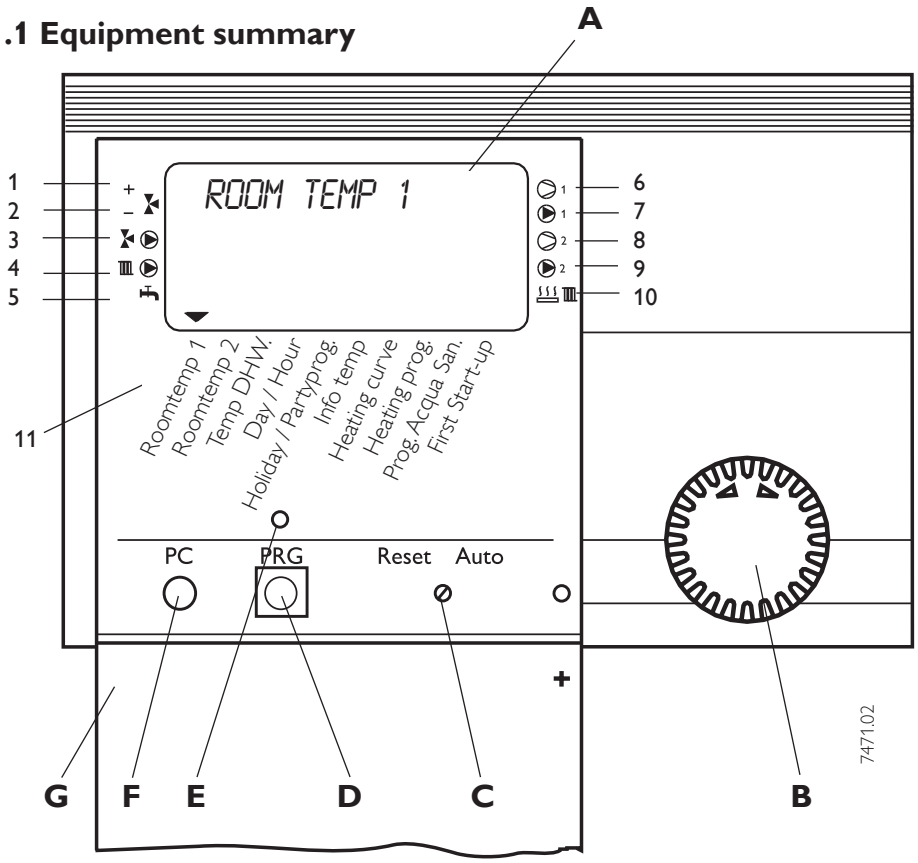
1. Operating instructions for users and contractors

1.1 Equipment summary



A Display
B Rotary selector
C Rotary selector Reset / Auto
D Programming key
E Programming indicator
F Optical interface RS 232
G Control flap (open)

System status display
1 Mixer opens
2 Mixer closes
3 Circulation pump heating circuit 2 "mixer circuit"
4 Circulation pump heating circuit 1 "radiator circuit"
5 DHW loading
6 Compressor 1
7 Buffer cylinder loading pump 1
8 Compressor 2
9 Buffer cylinder loading pump 2
10 Heat source 2 (central heating)
11 Equipment menu

1.2 Equipment description

WPF is a heating system which is designed for operation as brine/water or water/water heat pump. The heat pump extracts energy from the heat source medium i.e. brine or water at a low temperature level. This extracted energy is then transferred to the heating water at a higher level, enriched with the energy transferred by the compressor. Subject to the heat source temperature, the heating water can be heated up to a flow temperature of 60 °C.

Inside the WPF, a heating circuit pump and a three-way valve have been integrated for diverting the flow either to the heating circuit or the DHW circuit. DHW is heated by pumping the heating water, which has been heated by the heat pump, through a heat exchanger into the DHW cylinder, where it transfers its energy to the DHW.

The WPF is regulated by an integral, weather-compensated return temperature controller. This controller also regulates the DHW heating to the required temperature. If, during the DHW heating process, temperatures are required which are higher than the maximum heat pump flow temperature, then the DHW heating is automatically completed by an integral electrical supplementary heater (internal second HS).

Summary of available functions

- RS 232 interface for adjustment and monitoring via PC
- The three-wire databus enables rapid installation and system extension using the MSM mixer module
- Control of a second heat generator for DHW and central heating
- 9 temperature inputs as set/actual value display
- Demand-depended control of seven different circulation pumps
- Input of the system and heat pump frost protection limits
- At least 10 h backup power for the clock
- Automatic kick-start pump control
- Reset option
- Stored error list with precise fault code indication, together with date and time display
- Rapid and accurate fault diagnostics using system analysis including temperature scan for heat pump and peripheral equipment without additional equipment.
- Factory settings for time switch programs for all heating and DHW circuits
- Integral solar differential controller or heat meter

1.3 Operating and installation instructions

Subject to the relevant system, observe the operating and installation instructions of the components of which the system comprises.

⚠ Keep these operating and installation instructions safely and pass them on to any new user, should the equipment change hands, and let your contractor check their content in conjunction with required maintenance and repair work.

1.4 Maintenance and care

⚠ Maintenance work, e.g. checking the electrical safety, must only be carried out by qualified personnel. Protect the equipment from dust and dirt ingress during building work.

A damp cloth is sufficient for cleaning all plastic parts. Never use scouring or solvent-based cleaning agents.

1.5 Important information

⚠ Heat pumps must only be installed and maintained by qualified contractors.

Heat pump types

The description of individual functions varies between the different heat pump types. Therefore different types of heat pump are determined, which are identified as **HP type 1, 2 or 3.**

HP type 1: (Not this Heat Pump)
Heat pump with flammable refrigerant and without internal secondary heater.
Rotary selector position **1, 2, 3, 9, A or B**.
(WPWE .. KW and WPL .. KW)

HP type 2:
Heat pumps with safety refrigerant and internal second HS (Heat Source).
Rotary selector position **1**.
(WPF 5 (S), 7 (S), 10, 13)

HP type 3:
Heat pumps with safety refrigerant and external second HS (Heat Source).
Rotary selector position **9**.
(WPF 5 (S), 7 (S), 10, 13)

⚠ Never ...

- process media which are not expressly approved
- heat liquids other than heating water
- install the equipment
  a) outside
  b) in rooms at risk from frost
  c) in wet areas, e.g. bathrooms
  d) in rooms at risk from heavy dust contamination
  e) in areas, where there is a risk of explosions
- operate the equipment
  a) outside the stated temperature limits
  b) without minimum circulation volume at the heat source and heat reduction side

1.6 Operation

The operation is split over three control levels. **Control levels 1 and 2** are accessible to users and contractors alike. **Control level 3** is only designed for qualified contractors:

Control level 1 (control flap closed)
This enables the adjustment of operating modes, such as standby mode, programmed operation, constant day or setback mode, etc. (see section 1.8.1).

Control level 2 (control flap open)
This enables system parameters, such as room temperature, DHW temperature, heating programs, etc. to be adjusted (see section 1.8.2).

Control level 3 (for contractors only)
This level is protected by a code and should only be used by contractors. At this level, heat pump and system-specific details are determined (see section 2.10).

Vital facts in brief

Adjustments

All adjustments follow the same pattern:

Opening the control flap toggles the manager into programming mode. An indicator symbol ▼ is shown at the bottom of the display at system parameter ROOM TEMP 1.
Turning the rotary selector ○ allows you to move the indicator to the system parameter you want to change.
Press PRG to change the system parameter.
Whenever the red indicator PRG above illuminates, you can modify the current value by turning the rotary selector ○. Press PRG again; the illuminator then goes out and the new set value has been saved. You can modify further values for this menu item by pressing PRG, if the red indicator has not been extinguished above PRG.

The programming step can only be terminated when the red indicator has gone out.

Terminating the programming process
You can terminate the programming process after entering and saving the require menu point changes by closing the control flap. However, if you want to make further changes, turn the rotary selector ○ until the display shows BACK, then press PRG
This will return you to the previous level.
Closing the control flap with illuminated indicator above PRG returns the manager into its original position. The modified value will not have been saved.

⚠ During commissioning, a system check will be implemented, e.g. all sensors that are currently connected, are displayed upon request. Sensors not connected before the system went 'live' are not registered by the manager and are therefore not displayed. The indicator symbol skips the system parameter.

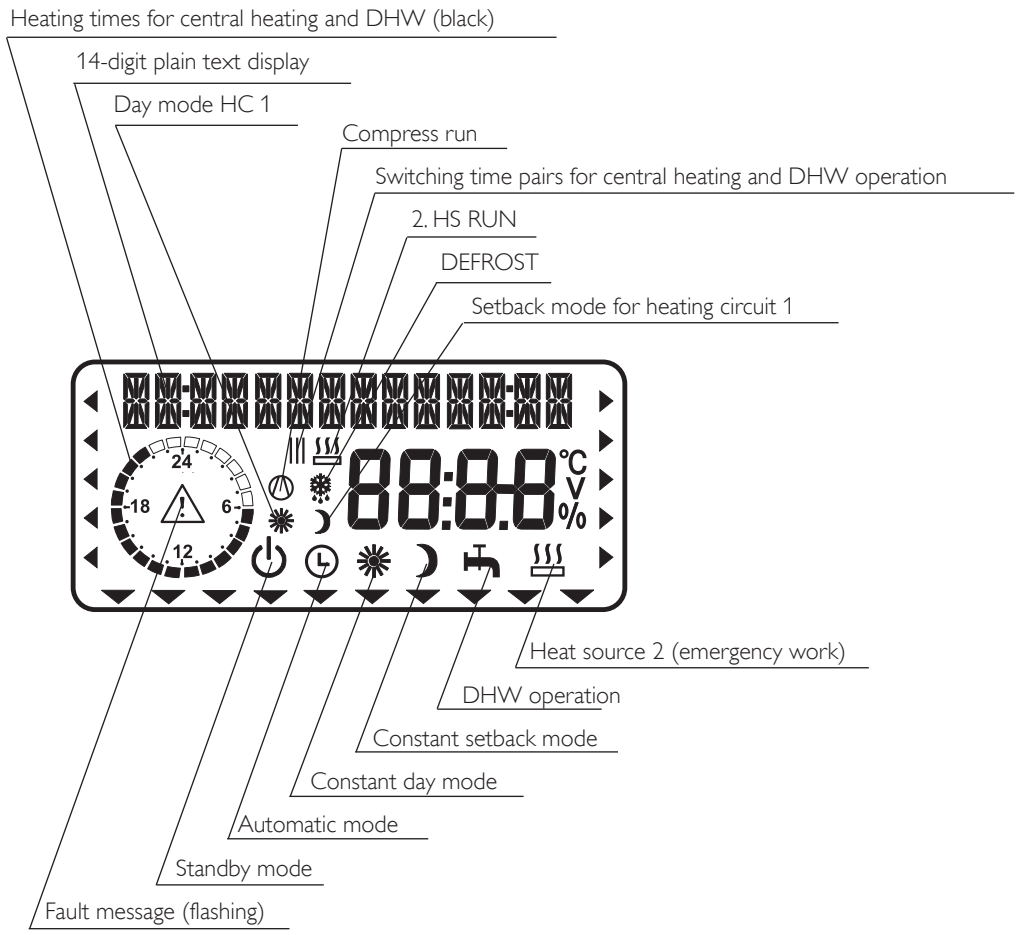
Example: The system parameters DHW TEMP and DHW PROG will be skipped if, during commissioning, the DHW cylinder sensor was not connected. Values for these parameters can therefore not be programmed.

1.7 What to do if . . . ?

. . . there is no hot water or the heating system stays cold:
Check the fuse/circuit breaker in your fuse box. If it has blown/tripped, replace/reset the fuse/MCB. Notify your local contractor if the fuse/MCB blows/trips again.

⚠ Notify your local contractor in case of all other faults.

Display (showing all elements)



1.8 Adjustments

1.8.1 Operating modes (control level 1)

The operating modes are changed by pressing ○ with the control flap closed.

Standby mode
Frost protection is activated for central heating and DHW operation. The display indicates frost protection when the flap is closed.
The set DHW temperature is permanently set to 10 °C; the set central heating flow temperature is calculated in relation to a set room temperature of 5 °C, see point 3.
Application: During holidays.

Automatic mode
Heating subject to time switch program (applies to HC 1 and HC 2), changeover between day temperature and setback temperature. DHW in accordance with a time switch program; changeover between day temperature and setback temperature, see point 4.
With this operating mode, an additional symbol (sun or moon) indicates, whether heating circuit 1 is currently in day or in setback mode.
The remote control is only active in this mode.
Application: If you need heating and DHW.

Constant day mode
The heating circuits HC1 and HC2 are constantly held at the day temperature. DHW according to time switch program.
Application: In low energy houses without setback operation.

Constant setback mode
The heating circuit is constantly held at the setback temperature (applicable to HC 1 and HC 2). DHW according to time switch program.
Application: During weekends away.

DHW mode
DHW in accordance with a time switch program; changeover between day temperature and setback temperature. Frost protection is activate for central heating operation.
Application: The heating period ends; only DHW should be generated (summer mode).

Heat source 2 (HS 2)
This setting activates the emergency operation. With **HP type 2**, HS 2 provides central heating and DHW heating during this operating mode, irrespective of the dual-mode changeover point.
For **HP type 3**, HS 2 for heating or DHW must be set to ON at control level 3; only then can this operating mode be selected. With this operating mode, HS 2 takes over the heating or DHW function, independent of the dual-mode changeover point.

Fault message (flashing)
Indicates faults in the heat pump system. Notify your local contractor.

1.8.2 Overview of system parameters (control level 2)
Select the required menu point with the rotary selector.
For adjustments to menu items, turn to page 6.

ROOMTEMP HC1

With the menu item **ROOM TEMP 1** you can select the **SET ROOM TEMP** for day and setback mode for heating circuit 1.
The actual room temperature can also be scanned, as soon as the FE 7 remote control has been connected and allocated to heating circuit 1.

ROOMTEMP HC 2

With the menu item **ROOM TEMP 2** you can select the **SET ROOM TEMP** for day and setback mode for heating circuit 2. **ROOM TEMP 2** will only be displayed, if the mixer flow sensor for heating circuit 2 has been connected.
The actual room temperature can also be scanned, as soon as the FE 7 remote control has been connected and allocated to heating circuit 2.

DHW TEMP

You can allocate a set day or night temperature to the DHW cylinder temperature using the menu item **DHW TEMP**

TIME / DATE

You can adjust the time and summer time with the **TIME/DATE** menu item.
At the factory, summer time is set up to begin on the 25 March and to end on the 25 October.

HOLIDAY/PARTY

The **HOLIDAY PROG** menu item puts the heat pump system into setback mode. Frost protection is activated for the DHW cylinder.

The **PARTY PROG** menu item allows you to extend the day mode by a few hours.

TEMPERATURES

The menu item **INFO TEMP** enables you to scan the heat pump or heat pump system sensor temperatures, comparing set with actual values, the heating curve gap, etc.

HEATING CURVES

The **HTG CURVE** menu item enables you to adjust one heating curve each for heating circuit 1 and 2. The room temperature will only remain constant, irrespective of the outside temperature, if the correct heating curve has been selected for the relevant type of building. Selecting the correct heating curve is therefore vitally important.

HEATING PROGS

The **HTG PROG** menu item enables you to adjust associated heating programs for heating circuit 1 and 2 respectively.

DHW PROG

The **DHW PROG** menu item enables you to adjust the times for the day and setback temperatures for **DHW HTG**.

FIRST START UP

As part of the **commissioning process**, determine not only the adjustments at control level 2 but also the system-specific parameters. These parameters are adjusted at control level 3, access to which is protected by code.
Check all parameters in sequence.
Enter all selected values into the column (system value) provided on the commissioning report.

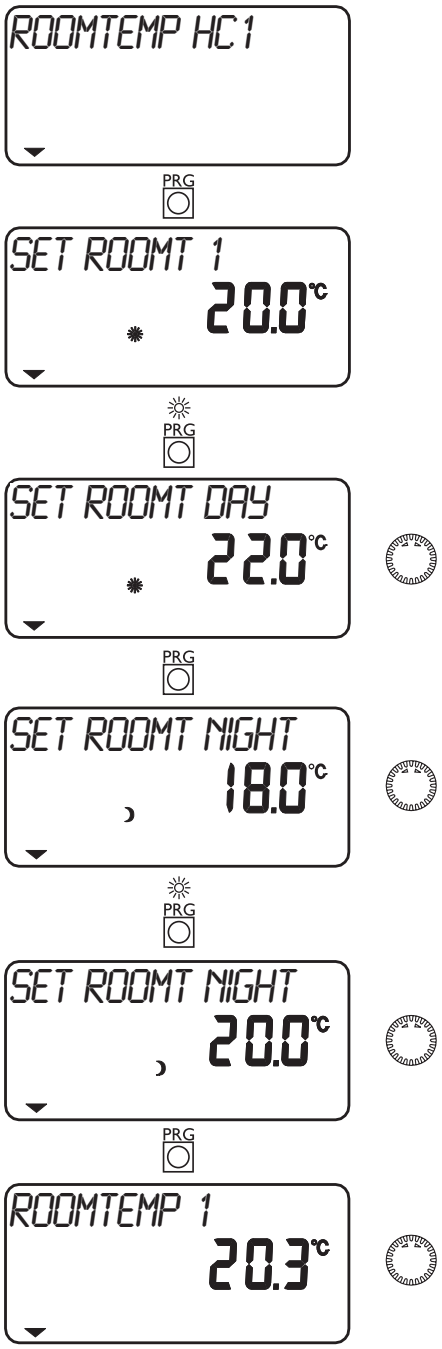
Adjustments at control level 2 for users and contractors

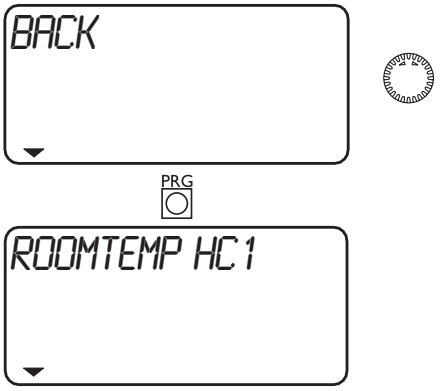
Room temperature HC 1

With the menu item **ROOM TEMP 1** you can select the set room temperature for day and setback mode for heating circuit 1. Changing these parameters results in a parallel offset of the heating curve.

The actual room temperature can also be scanned, as soon as the FE 7 remote control has been connected and allocated to heating circuit 1.

Open the control flap.



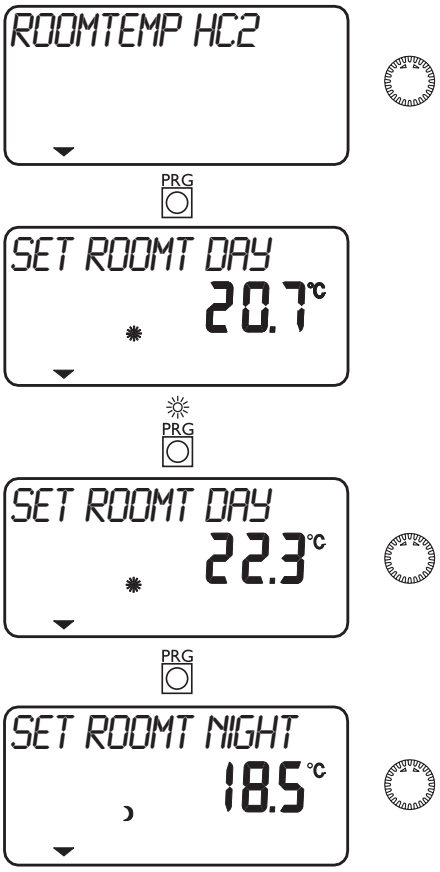


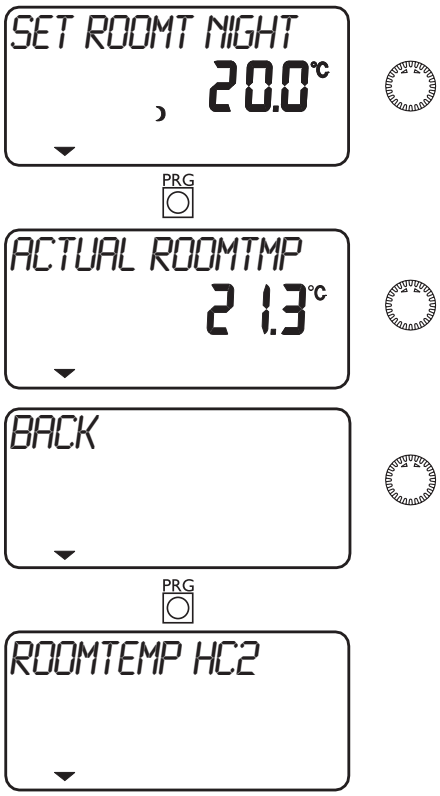
Room temperature HC 2

With the menu item **ROOM TEMP 2** you can select the set room temperature for day and setback mode for heating circuit 2. You can change the room temperature, if you feel rooms are either too hot or too cold. ROOM TEMP 2 will only be displayed, if the mixer flow sensor is connected.

The actual room temperature can also be scanned, as soon as the FE 7 remote control has been connected and allocated to heating circuit 2.

Open the control flap.





DHW temperature

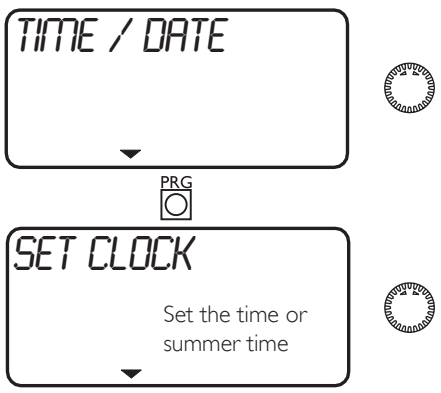
You can allocate a set day or night temperature to the DHW cylinder temperature using the **DHW TEMP** menu item.

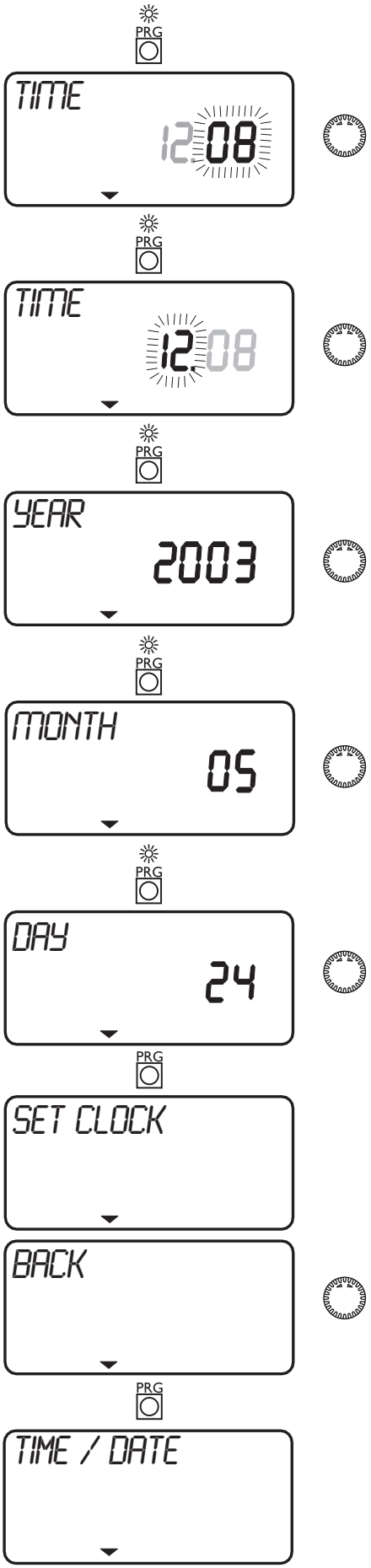
Open the control flap.

Time and date

You can adjust the time and summer time with the **TIME/DATE** menu item.
At the factory, summer time is set to begin on the 25 March and to end on the 25 October.

Open the control flap.



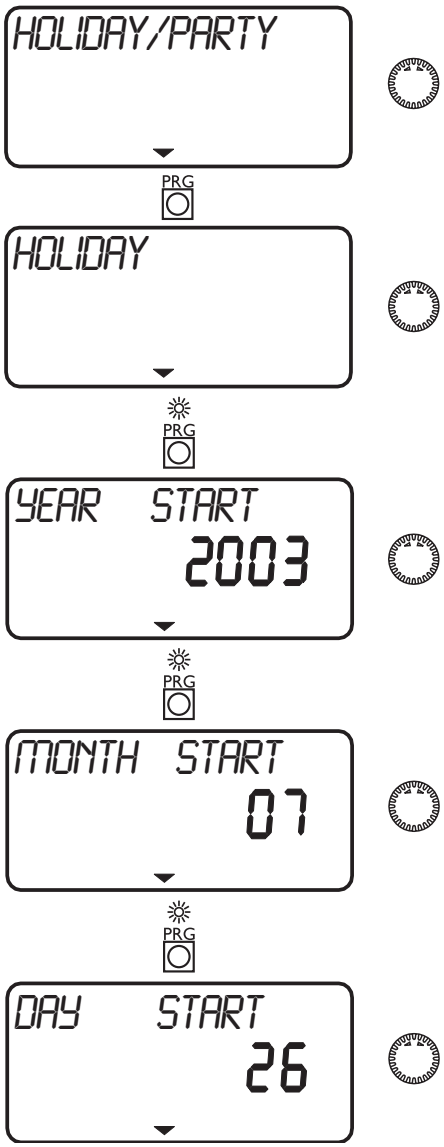


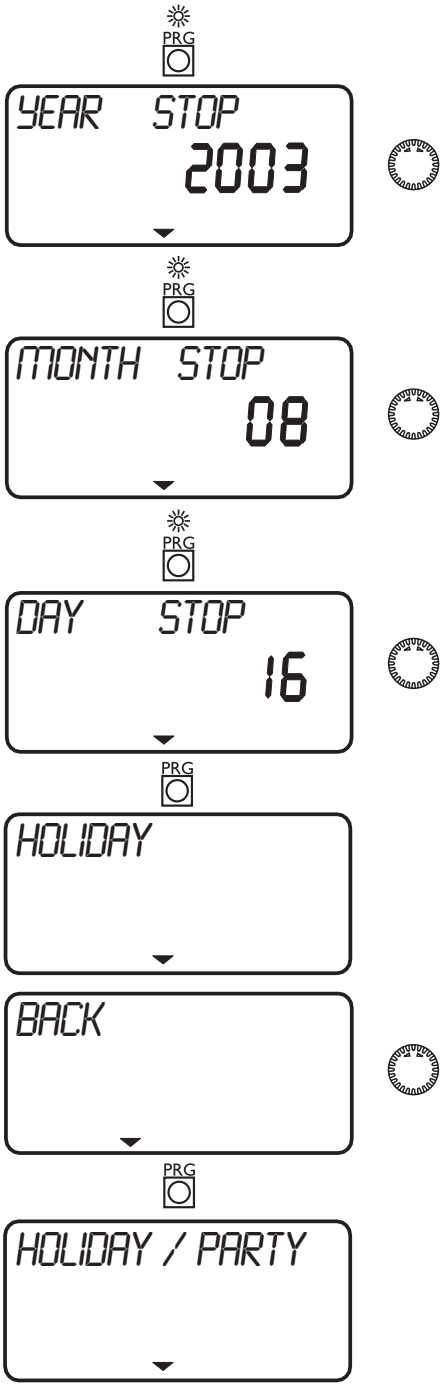
Holiday and party program

In **holiday mode**, the heat pump system operates in setback mode, and frost protection for DHW heating is active. Holiday mode is displayed with the flap closed. For the start of the holidays, the year, month and day are entered; for its end also enter the year, month and day. The start and end time is always 24:00 h of the date entered. After the holiday period has expired, the heat pump system operates again in accordance with the previous heating and DHW program.

In **party mode** you can extend day mode for central heating by a few hours. This is displayed with the flap closed.
For example, if the heating program normally switches to setback mode at 22:00 h, and you set the party mode to two hours, then setback mode would only begin at 24:00 h.

Open the control flap.



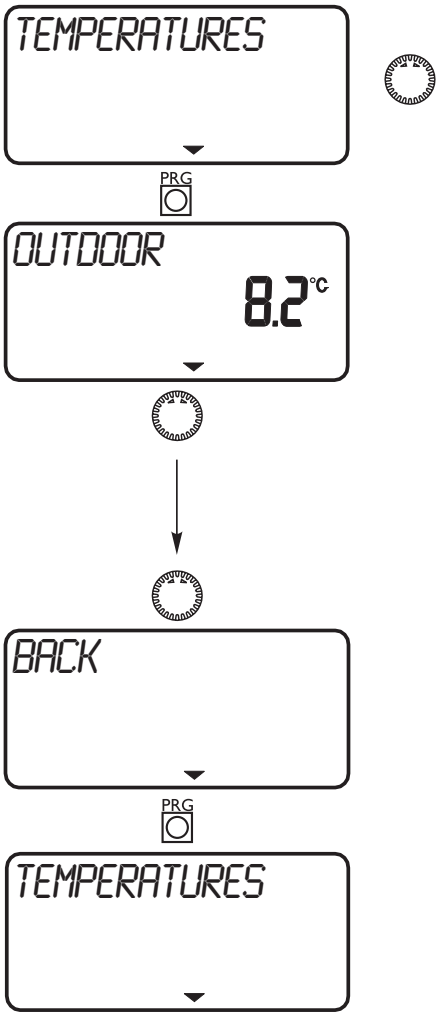


Info temperatures

The menu item **INFO TEMP** enables you to scan the heat pump or heat pump system sensor temperatures, comparing set with actual values, the heating curve gap, etc. In all, the following 22 parameters can be scanned:

- Outside temperature
- Actual room temperature (HC 1/HC 2) (will only be displayed if the FE 7 remote control is connected)
- Set room temperature (HC 1/HC 2) (will only be displayed if the FE 7 remote control is connected)
- Actual DHW temperature
- Set DHW temperature
- Actual HP return temperature (HC 1)
- Set HP return temperature (HC 1) The fixed temp. will be displayed for fixed temperature control
- Actual mixer flow temperature (HC 2)
- Actual mixer flow temperature (HC 2)
- Fixed HP return temperature
- Set buffer temperature Highest set value of heating circuits H1, H2, H3 if MSM is installed. Fixed temperature will be displayed for fixed temperature control)
- Actual HP flow temperature
- Set DHW flow temperature
- Set heating flow temperature
- Actual source flow temperature
- Set source flow temperature
- CHG PT HTG
- CHG PT DHW
- Heating limit temperature
- Limit temperature DHW
- System frost protection temperature
- Frost protection temperature IWS 1 to IWS 6

Open the control flap.



Note: Actual or set temperatures will not be displayed, if the corresponding sensor is not connected.

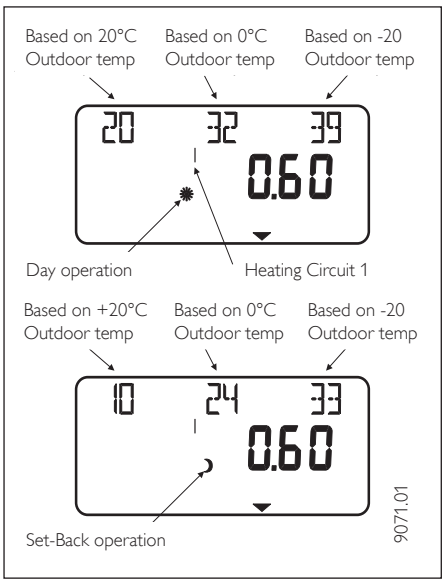
Heating curves

The **HTG CURVE** menu item enables you to adjust one heating curve each for heating circuit 1 and 2. Selecting the correct heating curve is therefore vitally important.

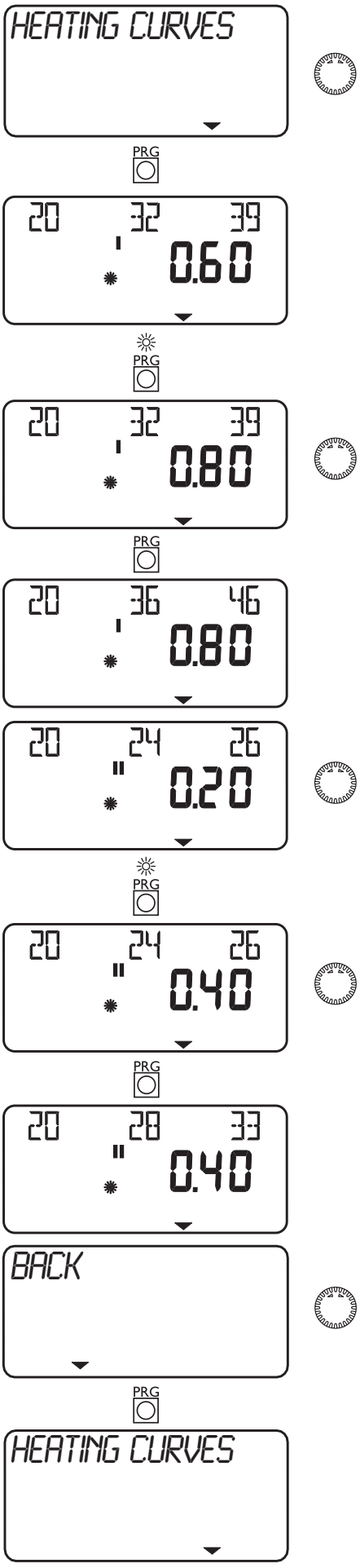
Note: Your contractor will have set up a building and system-specific optimum heating curve for every heating circuit. It relates to the HP return temperature for heating circuit 1 and to the mixer flow temperature for heating circuit 2.

When adjusting the heating curve on WPM, the calculated set return or flow temperature, which is subject to the outside temperature and the set room temperature, will be shown at the top of the display.

As soon as a temperature has been pre-selected via the fixed temperature parameter at control level 3, heating circuit 1 will be hidden, and the display will show **FIXED TEMP** with the relevant temperature.

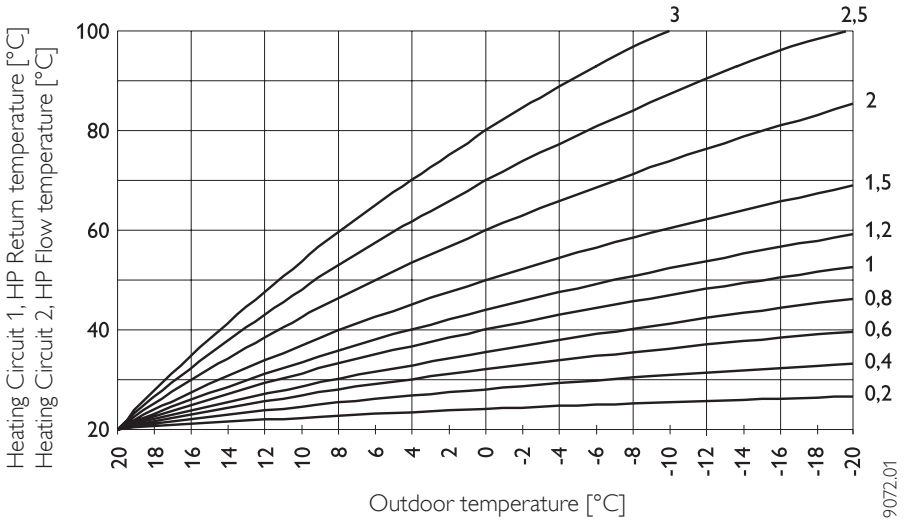


Open the control flap.



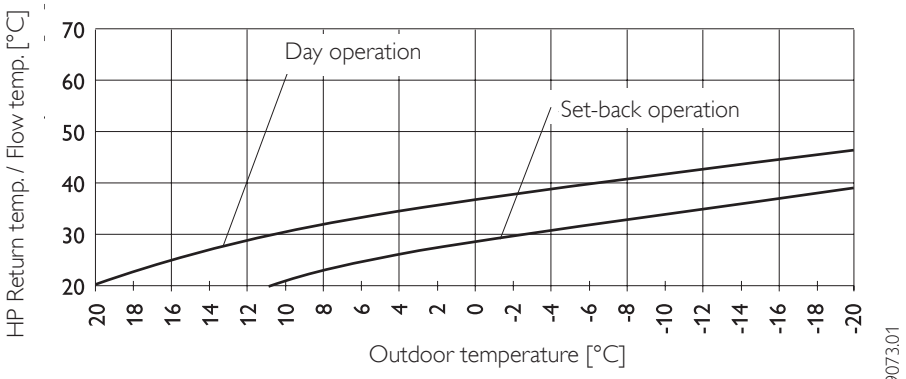
Heating curve diagram

One heating curve respectively can be adjusted for heating circuit 1 and heating circuit 2. At the factory, heating curve 0.6 is set up for heating circuit 1 and heating curve 0.2 for heating circuit 2.
These heating curves relate to a set room temperature of 20 °C.



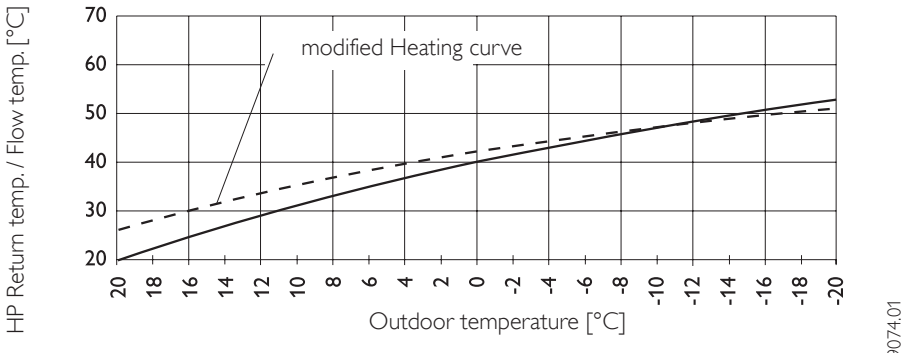
Adjustment of programmed changeover between day/setback mode

The figure shows a standard heating curve with a slope of 0.8, relative to a set room temperature for day mode of 20 °C. The lower curve represents the setback curve. For this, the set room temperature for setback mode of 15 °C is used, in other words the heating curve is subjected to a parallel offset.



Matching a heating curve to actual conditions

Example:
During spring and autumn, the return or flow temperature of a heating system is too low at an outside temperature between 5 and 15 °C, but is OK at outside temperatures of ≤ 0 °C. This problem can be remedied with parallel offset and a simultaneous reduction of the heating curve.
Prior to this adjustment, heating curve 1.0 was adjusted, relative to a Set room temperature of 20 °C. The dotted line indicates the modified heating curve at 0.83 and a modified set room temperature at 23.2 °C.



Heating programs

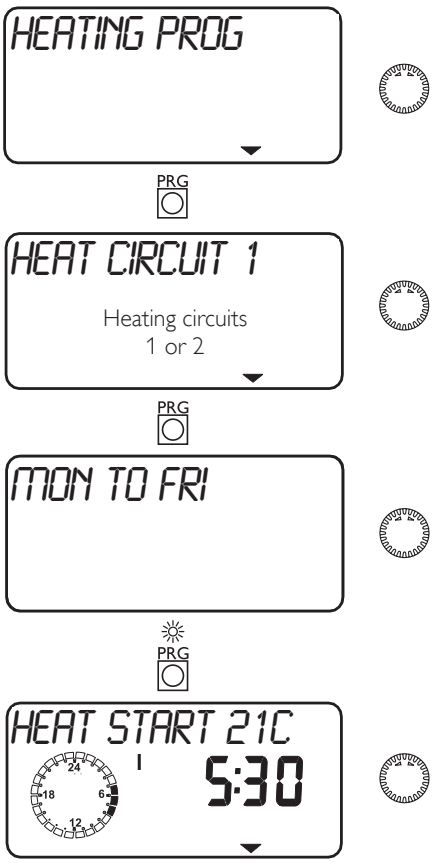
The **HTG PROG** menu item enables you to adjust associated heating programs for heating circuit 1 and 2 respectively.

You can adjust your heating system as follows:
– for each individual day of the week **(Monday, ..., Sunday)**
– Monday to Friday **(Mo - Fr)**
– Saturday and Sunday **(Sa - Su)**
– the whole week **(Mo - Su)**

You can adjust three switching time pairs **(I, II, III)** for each of these options.
This determines, when and how often the heat pump system should heat in day mode. At all other times, the heat pump operates in setback mode. You will already have selected the corresponding set values for day and set-back mode under menu item **ROOM TEMP 1/2.**

Example: For heating circuit 1, your heating system should operate daily from Monday to Friday at two different times, i.e. from 05:30 h until 08:30 h as well as from 14:00 h until 22:00 h. For the weekend, your heating system should provide heat from 08:30 h until 21:00 h.

Open the control flap.



DHW programs

The **DHW PROG** menu item enables you to adjust the times for the day and night temperatures for DHW heating.

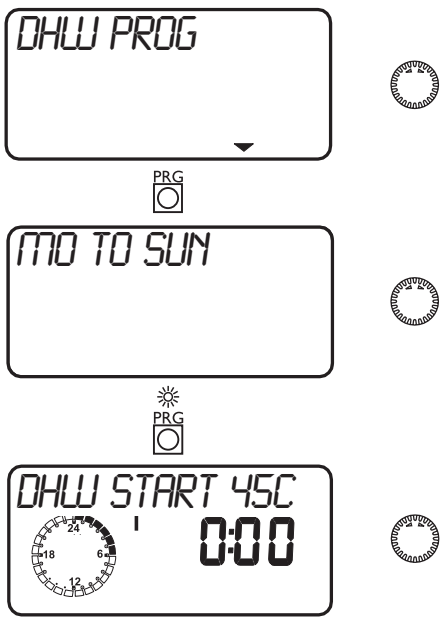
You can adjust your DHW heating as follows:
– for each individual day of the week **(Monday, ..., Sunday)**
– Monday to Friday **(Mo - Fr)**
– Saturday and Sunday **(Sa - Su)**
– the whole week **(Mo - Su)**

You can adjust three switching time pairs **(I, II, III)** for each of these options.

Exception:
You will need two switching time pairs, if you want to heat DHW from 22:00 h until 06:00 h the following day. This determines, when and how often the heat pump system should heat/load DHW in day mode. You will already have selected the corresponding set values for day and setback mode under the DHW TEMP system parameter.

Example:
You want to heat up DHW daily at two different times, i.e. from 22:00 h until 06:00 h the following day, and then again from 08:00 h until 09:00 h.
The day begins at 00:00 h; therefore begin programming for this example at 00:00 h. The first switching times pair runs from 00:00 until 06:00 h. The second switching times pair runs from 08:00 until 09:00 h. The third switching times pair runs from 22:00 until 24:00 h.

Open the control flap.



Standard settings

At the factory, the heat pump manager is programmed with the following standard settings:

Switching times[1] for heating circuit 1 and heating circuit 2 H1 / H2 (day mode)	
Monday - Friday	6:00 - 22:00
Saturday - Sunday	7:00 - 23:00
ROOM TEMP 1 / 2 [2]	
Room temperature in day mode	20 °C
Room temperature in setback mode	20 °C
DHW program switching times	
Monday - Sunday [3]	22:00 - 6:00 and 8:00 - 10:00
DHW temperature	
DHW DAY T	47 °C
DHW SETBACK T	10 °C
Heating curve slope	
Heating curve 1	0.6
Heating curve 2	0.2

1) Only for switching times pair 1; switching time pairs 2 and 3 are pre-programmed.
2) Stiebel Eltron recommends systems without night setback; our systems are set up accordingly.
3) 22:00 - 6:00 (night heat-up to take advantage of favourable HP tarifs)
8:00 - 10:00 (heat-up after DHW is drawn off in the morning)

Heating and DHW programs

You may enter your only individual programs into the following tables.

	Heating circuit 1		
	Switching times pair I	Switching times pair II	Switching times pair III
Mo			
Tu			
We			
Th			
Fr			
Sa			
Su			
Mo - Fr			
Sa - Su			
Mo - Su			

	Heating circuit 2		
	Switching times pair I	Switching times pair II	Switching times pair III
Mo			
Tu			
We			
Th			
Fr			
Sa			
Su			
Mo - Fr			
Sa - Su			
Mo - Su			

	DHW Program		
	Switching times pair I	Switching times pair II	Switching times pair III
Mo			
Tu			
We			
Th			
Fr			
Sa			
Su			
Mo - Fr			
Sa - Su			
Mo - Su			

1.9 FE 7 remote control

The FE 7 remote control enables you to change the set room temperature for heating circuit 1 or heating circuit 2 by ± 5 °C, as well as the operating mode.

The remote control offers the following:

- one rotary selector for modifying the set room temperature
- one rotary switch with the following positions:

Programming mode

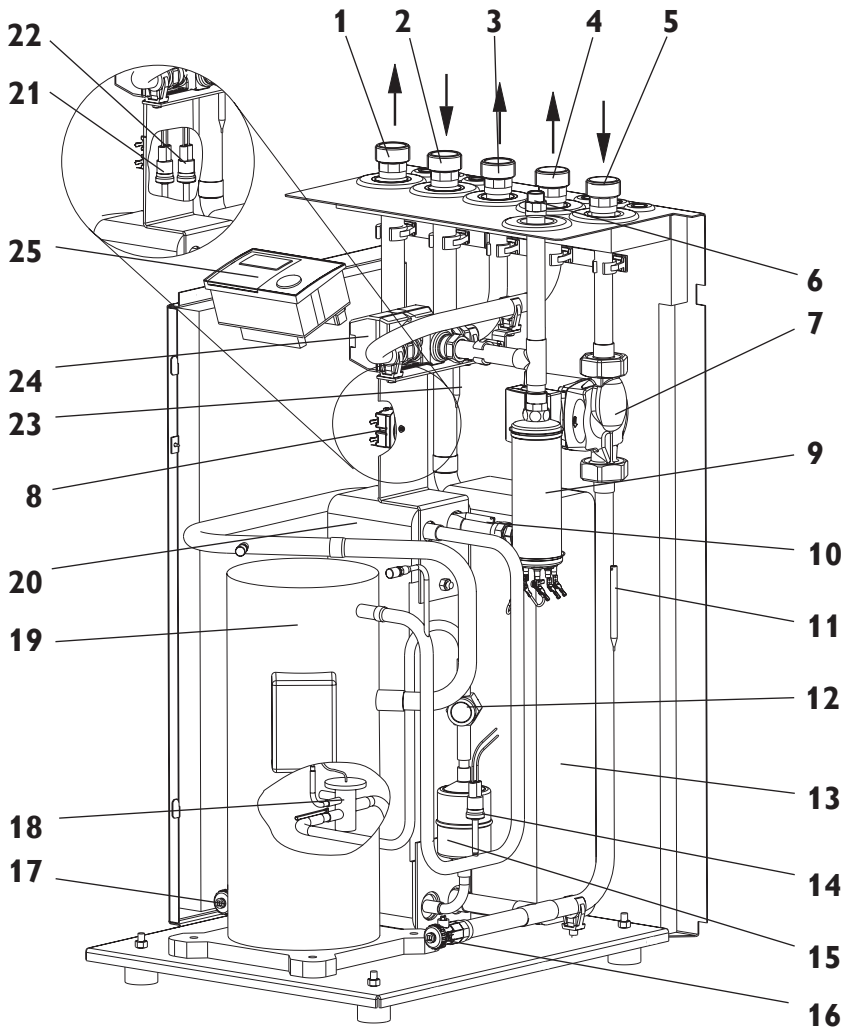
Constant setback mode

Constant day mode

The remote control is only active in the WPM programmed mode.

2. Installation instructions for contractors

2.1 Equipment layout



1 Brine outlet
2 Brine inlet
3 Flow DHW cylinder
4 Heating flow
5 Heating return
6 Safety assembly connection (included in the pack)
7 Heating circuit pump / buffer cylinder loading pump
8 High limit safety cut-out - electrical supplementary heater (reset button at the back)
9 Electrical supplementary heater (internal HS 2)
10 Temperature sensor (flow)
11 Temperature sensor (return)
12 Sight glass
13 Evaporator
14 High pressure limiter
15 Filter dryer
16 Fill & drain valve (heating)
17 Fill & drain valve (brine)
18 Expansion valve
19 Compressor
20 Condenser
21 Low pressure limiter
22 Frost protection
23 Temperature sensor (brine inlet)
24 Diverter valve
25 WPM heat pump manager

Fig. 3

2.2 Accessory (part of the standard delivery)

Quantity	Description	Part no
1	Outside temperature sensor AFS 2	16 53 39

2.3 Special accessories

Description	Part no.
Pressure hose G 1¼" x 1 m (DN32)	07 44 14
Pressure hose G 1¼" x 2 m (DN32)	18 20 19
Pressure hose G 1¼" x 5 m (DN32)	18 20 20
Pressure hose G 1¼" x 1 m (DN32) for trimming to size	18 56 47
Hose fittings for pressure hose (DN 32)	07 06 92
Vibration damper G 1¼" x 0.65 m (DN32) vacuum resistant for well installations	15 42 72
WPKI-H (for cylinder SBP 100)	07 43 14
WPKI-V (for cylinder SBP 100)	07 43 47
WPKI 3 (for cylinder SBP 200 and 700)	07 37 38
Cylinder SBP 100	07 42 50
Cylinder SBP 200 E	18 54 58
Cylinder SBP 700 E	18 54 59
Cylinder SBP 700 E SOL	18 54 60
DHW cylinder SBP 300 E SOL	07 40 45
DHW cylinder SBP 400 E SOL	07 40 46
WPSB 307 (brine assembly)	07 42 01
WPSB 310 (brine assembly)	07 42 02
WPSB 407 (brine assembly)	07 42 03
WPSV 25-4 (brine distributor)	18 22 52
WPSV 32-4 (brine distributor)	18 22 53
WPSV 25-6 (brine distributor)	18 22 54
WPSV 32-6 (brine distributor)	18 22 55
Concentrated process medium	16 16 96
Ready-mixed process medium	18 54 72
Remote control for heating system FE 7	18 55 79
Contact sensor AVF 6	16 53 41
Immersion sensor TF 6	16 53 42

2.4 Specification

Heat pump		Type	WPF 5 (S)	WPF 7 (S)	WPF 10	WPF 13
Part no.			07 42 94 (074425)	07 42 95 (074426)	07 42 96	07 42 97
Design and function						
Design (Compact / split / open version)			Compact			
Function			Mono-mode Alternative dual-mode Parallel dual-mode			
Dimensions, weights, connection dimensions						
Dimensions		H/W/D	960 × 510 × 680	960 × 510 × 680	960 × 510 × 680	960 × 510 × 680
Weight		kg	120	130	140	150
Refrigerant		type	R 410A	R 410A	R 410A	R 410A
Filling weight		kg	1.5	2.0	2.5	2.3
Permissible operating pressure		MPa	4.3	4.3	4.3	4.3
Pipe connector – heating side		Inch	G 1¼" male	G 1¼" male	G 1¼" male	G 1¼" male
Pipe connector on the heat source side		Inch	G 1¼" male	G 1¼" male	G 1¼" male	G 1¼" male
Evaporator material			1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Condenser material			1.4401/Cu	1.4401/Cu	1.4401/Cu	1.4401/Cu
Compressor		Qty.	1	1	1	1
Performance Heat pump (EN 255)						
Heat output	at W10/W35 [1]	kW	7.2	10.0	12.5	17,1
	at B0/W35 [2]	kW	5.8	7.8	9.9	13,4
Refrigeration capacity	at W10/W35 [1]	kW	6.0	8.3	10.3	13,9
	at B0/W35 [2]	kW	4.5	6.1	7.8	10,4
Power consumption	at W10/W35 [1]	kW	1.33	1.8	2.27	3,03
	at B0/W35 [2]	kW	1.34	1.78	2.2	3,05
Performance factor	at W10/W35 [1]		5.4	5.6	5.5	5,6
	at B0/W35 [2]		4.3	4.4	4.5	4,4
Power consumption of the internal electrical supplementary heater (DHC)		kW	8.8 (6,2)	8.8 (6,2)	8.8	8.8
Process medium			**Brine/water values in [ ]**			
Process medium hot side/cold side			Brine made from water with 33 Vol. % ethylene glycol			
Volume flow min.	hot side	m^3/h	0,6 / [0,5]	0,8 / [0,7]	1,1 / [0,9]	1,4 / [1,2]
	cold side	m^3/h	1.5 / [1.4]	2.1 / [1.9]	2.6 / [2.2]	3,4 / [3,1]
Permissible operating pressure (hot and cold side)		MPa	0.3	0.3	0.3	0.3
Available ext. pressure difference hot side [3]		hPa	280	280	280	280
Internal pressure differential cold side [3]		hPa	90 / (100)	100 / (110)	110 / (120)	200 / (230)
Operating temperature limits						
WQA min. / WQA max. [4]		°C	7 / 20 (–5 / 20) [for short periods (max. 30 min), max. source temp. to 40 °C permiss].			
WNA min./WNA max. [4]		°C	15 / 60 (15 / 60)			
Electrical specification						
Fuse Mains compressor		A	16 gl (20 gl)	16 gl (20 gl)	16 gl	16 gl
Mains electrical suppl. heater (internal HS 2)		A	16 gl (35 gl)	16 gl (35 gl)	16 gl	16 gl
Control circuit		A	16 gl (16 gl)	16 gl (16 gl)	16 gl	16 gl
Voltage/frequency - compressor (Triple phase)			3/PE~400/50	3/PE~400/50	3/PE~400/50	3/PE~400/50
Voltage/frequency - compressor (Single phase)			1/N/PE~230/50	1/N/PE~230/50		
Voltage/freq. elec. suppl. heater (internal HS 2) (Triple phase)			3/N/PE~400/50	3/N/PE~400/50	3/N/PE~400/50	3/N/PE~400/50
Voltage/freq. elec. suppl. heater (internal HS 2) (Single phase)			1/N/PE~230/50	1/N/PE~230/50		
Voltage / frequency – control circuit			1/N/PE~230/50	1/N/PE~230/50	1/N/PE~230/50	1/N/PE~230/50
Start-up current		A	<30 (<58)	<30 (<88)	<30	<30
Power consumption compressor + heat source pump [5] min / max		kW	2.0 / 2.9	2.3 / 3.7	2,9 / 4,5	3,5 / 5,9
Power consumption heat source pump max.		kW	0,7	0.7	0.7	0.7
Corrosion protection casing			Zinc-plated / partially painted			
Protection EN 60529 (DIN VDE 0470)			IP 20	IP 20	IP 20	IP 20
Compliant with safety regulations			DIN EN 60335, DIN 8975, EMC Directive 89/336/EEC, Low Voltage Directive 73/23/EEC			
Sound power level [6]		dB(A)	46	47	51	53

1) W10/W35 = Well water inlet temperature 10 °C, heating flow 35 °C
2) B0/W35 = Brine water inlet temperature 0 °C, heating flow 35 °C
3) At W10/W35 or B0/W35
4) WQA = Heat source system (cold side)
   WNA = Heat utilisation system (hot side)
5) At min.: B5/W35
   At max.: B20/W60
6) At W10/W50 to DIN EN 255

2.4.1 Specification - control unit (WPM)

Supply voltage	230 V ~ ± 10 %, 50 Hz
Power consumption	Max. 8 VA
EN 60529	Protection IP 1XB
EN 60730	Class II
	Function type 1B
	Software - class A
Control panel integration to DIN 43700	Cut-out 138 x 92
Clock backup, day	> 10 hours
Permiss. ambient temperature during operation	0 to 50 °C
Permiss. ambient temperature during storage	- 30 to 60 °C
Sensor resistances	Test resistance at 2000 Ω
Communication system	RS232 (optical), CAN

Max. relay output capacities	
Buffer loading pump	2 (1.3) A
Heating circuit pump	2 (1.3) A
Mixer circuit pump	2 (1.3) A
DHW loading pump	2 (1.3) A
DHW circulation pump	2 (1.3) A
Source pump	2 (1.3) A
Contact HS 2	2 (1.3) A
Mixer	2 (1.3) A
Max. total relay output capacity	10 (10) A

2.5 Operation and control

The WPM heat pump manager integrated into WPF controls the entire heating system. All necessary adjustments prior and during operation are made on this device.

Only qualified contractors must make adjustments listed in the commissioning report of the heat pump manager.

⚠ Generally, the system must not be shut down during summer, as the WPM is provided with an automatic summer/winter changeover facility. Set the WPM to standby when the system is taken out of use. This retains the safety functions designed to protect the system (e.g. frost protection).

Drain the water side of the system, if the heat pump installation room is subject to a risk from frost.
The water inside the condenser and that in the evaporator can be drained (if the heat pump is used as water/water heat pump) via the fill & drain valves, which are accessible after removing the front cover.

2.6 Maintenance and cleaning

2.6.1 Maintenance

The heat pump operates under automatic control and requires no specific maintenance. If heat meters are installed, frequently clean their strainers, which block easily.

2.6.2 Cleaning

2.6.2.1 Evaporator

In case well water sediment settles inside the evaporator, where it can form a sludge, clean the evaporator by flushing it via its connectors (heat source inlet and outlet).

2.6.2.2 Condenser

When the heat pump operation is impaired (HP limiter trips) through deposits of corrosion byproducts (rust sludge) inside the condenser, only dissolving them by means of solvents used by our customer service will remove this problem.

Performance curve WPF 5 (S)

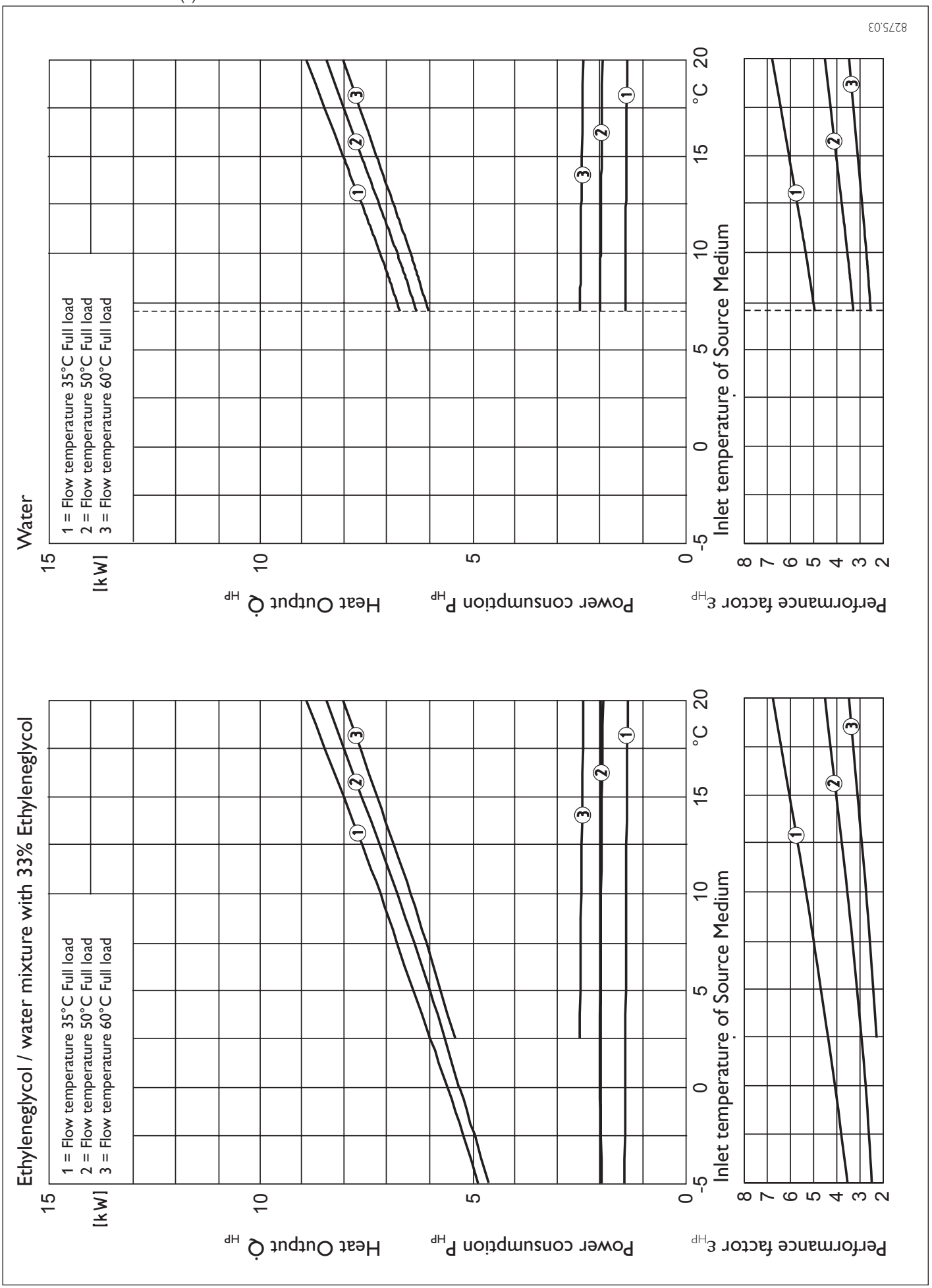


Fig. 4

Performance curve WPF 7

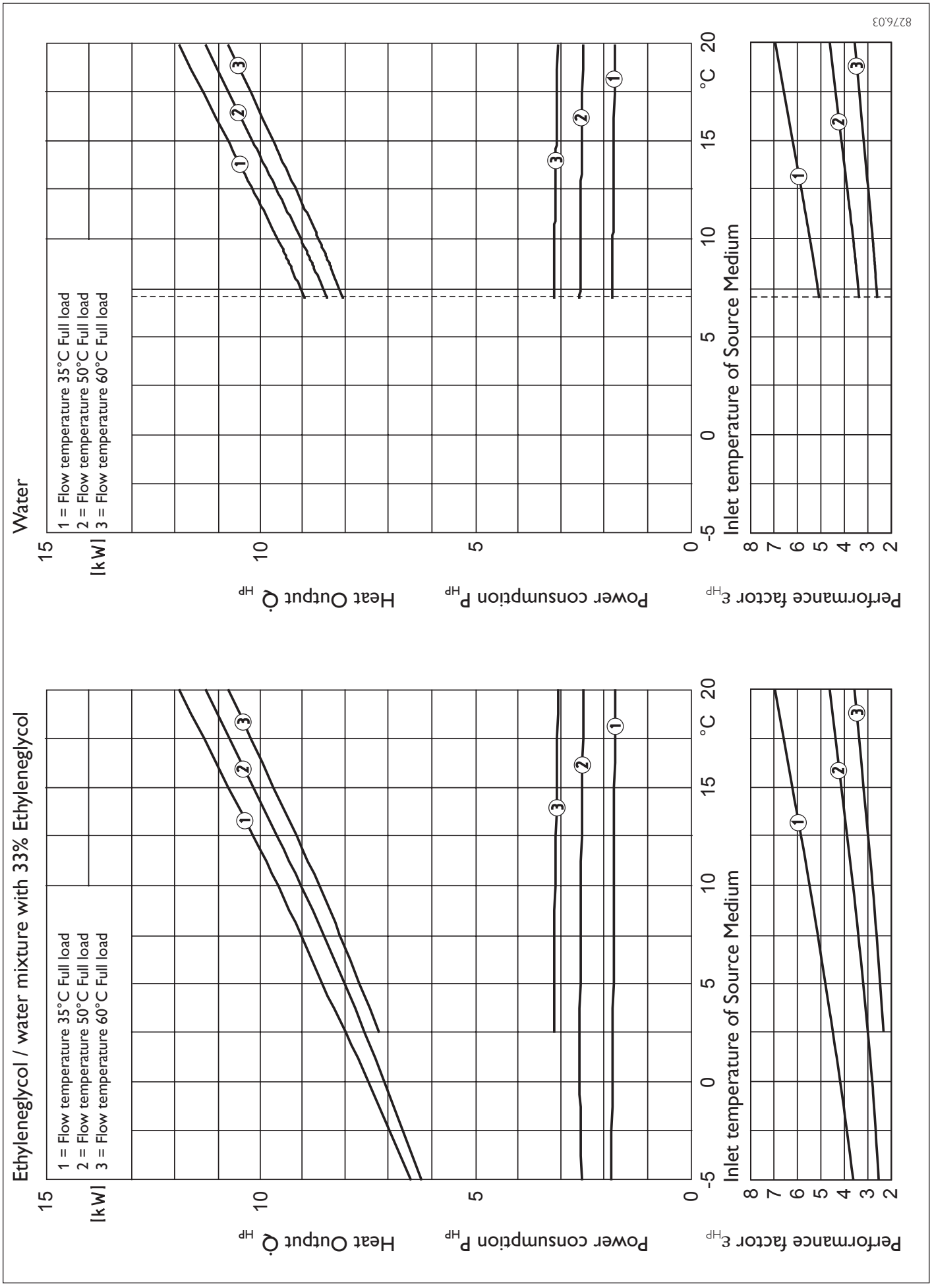


Fig. 5a

Performance curve WPF 10

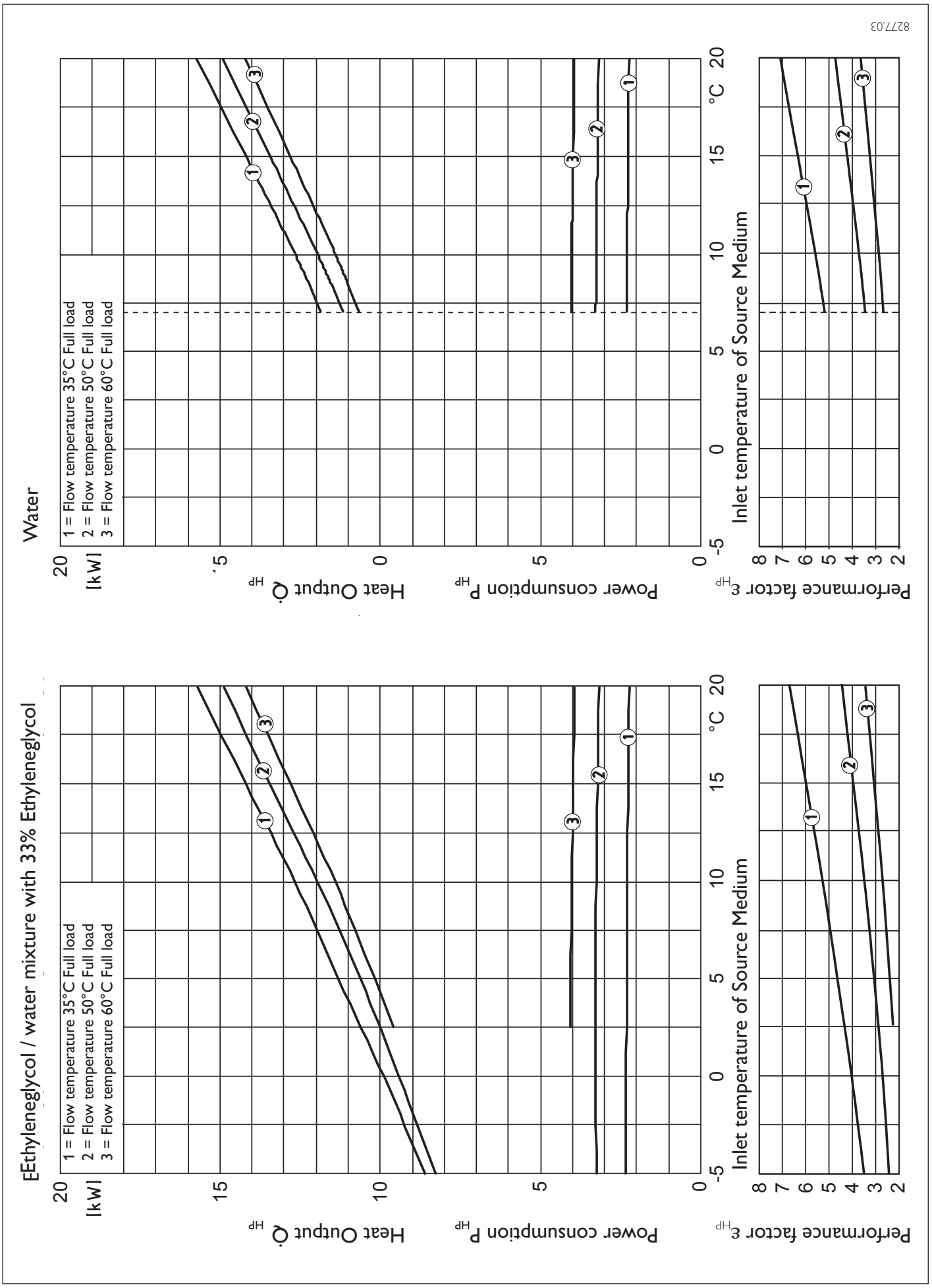


Fig. 5b

Performance curve WPF 13

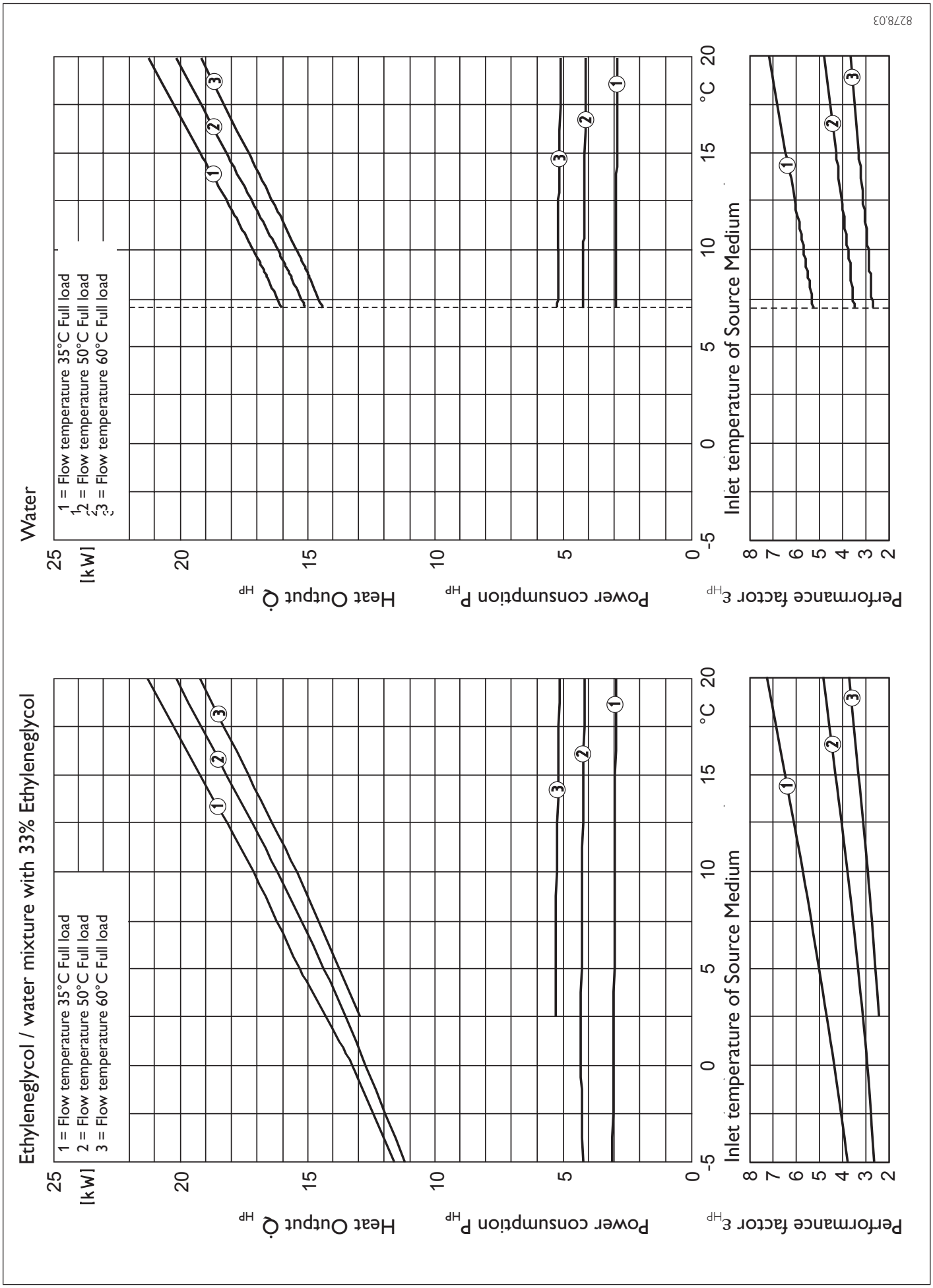


Fig. 6

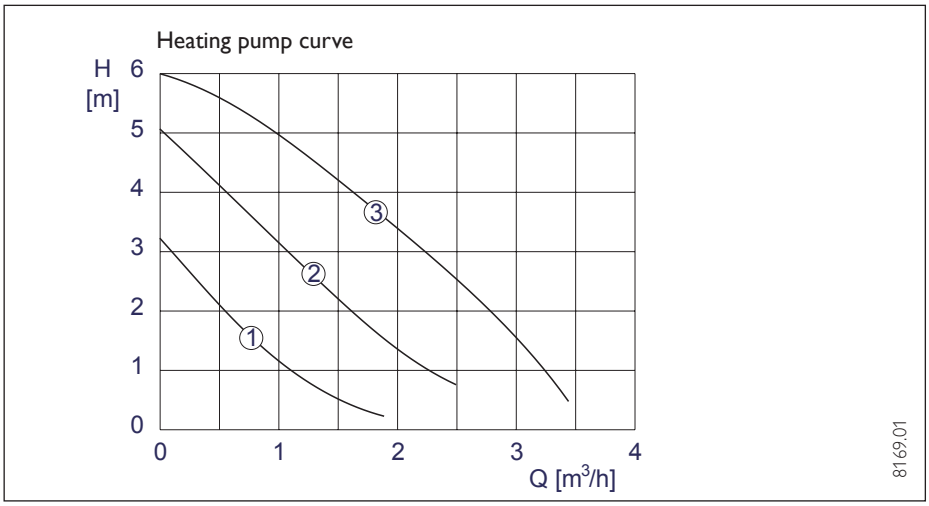


Fig. 7

2.7 Equipment description

2.7.1 Function

The heat source medium (water or brine) enters the heat pump evaporator. There, heat is extracted from the medium, so it exits the heat pump at a lower temperature.

The energy made useful through the heat pump is transfered to the heating water inside the condenser.

Then, the heating water transfers its energy to the heating circuit or is utilised for heating the DHW. In that case, the heating water is diverted by a three-way valve to a heat exchanger (indirect coil) inside the DHW.

The electrical supplementary heater (internal HS 2) starts, when temperatures are required to heat the DHW, which exceed the maximum flow temperature of the heat pump. In addition it can cover any residual heat demand, if the heating system demand exceeds the heat pump output.

2.8 Regulations and requirements

On the water side:
DIN 4751 Bl. 1 and 2: Safety equipment for hot water heating systems

DIN 1988: Technical rules for DHW installations

TRD 721: Safety equipment to prevent excess pressure - safety valves.

On the electrical side:
DIN VDE 0100: Regulations for the installation of HV systems with rated voltages up to 1000 V.

VDE 0701: Regulations regarding the repair, modification and testing of used electrical equipment.

DIN-EN 60335 part 2-40

TAB: Technical connection conditions for connections to the LV mains.

On the refrigerant side:
EN 378: Safety and environmental requirements.

Pressure Equipment Directive

General:
Collation of technical requirements for boiler rooms, e.g. Boiler Room Directives or national/local Building Regulations, commercial and fire as well as emission control regulations and requirements.

TA-Lärm: Technical instructions to protect against noise emissions.

2.9 Installation

2.9.1 Transport

To protect the equipment against damage, it must be transported vertically inside its dedicated packaging. Storage and transport at temperatures below -20 °C and in excess of +50 °C are not permissible.

2.9.2 Installation

1. Remove the equipment from its pallet and position it where required.
2. Remove the eight screws from the equipment plinth (Fig. 10), and set down the casing onto the floor.

⚠ The casing must stand on the floor free from the refrigeration unit. That means, the eight plinth screws must not be refitted.

Checking the condition at the installation location
The room where the WPF should be installed must meet the following conditions:

- No risk from frost.
- Stable floor (WPF weight approx. 150 kg).
- Horizontal, level and solid floor, as the equipment feet on the heat pump are non-adjustable.
- For quiet operation on floating screeds, remove the screed and the anti-vibration insulation around the installation location of the heat pump (Fig. 12).
- The room must not be subject to contamination from dust, gases or vapours.
- The floor area of the installation room must be at least 3 m², and provide a volume of 6 m³ (minimum).
- When installing the WPF in a boiler room together with other heating equipment ensure, that the operation of other heating equipment will not be impaired.

2.9.3 Installation of the heat source equipment for WPF with water as heat source

2.9.3.1 Required water quality

Amongst common difficulties in the operation of water/water heat pumps are:

1. Erosion of evaporator and water supply pipes.
2. Evaporator corrosion.
3. Sludge contamination or blockages in evaporator and supply lines.
4. Sedimentation of the return well.

To prevent such problems, the quality of the well water used as heat source must meet the following standards:

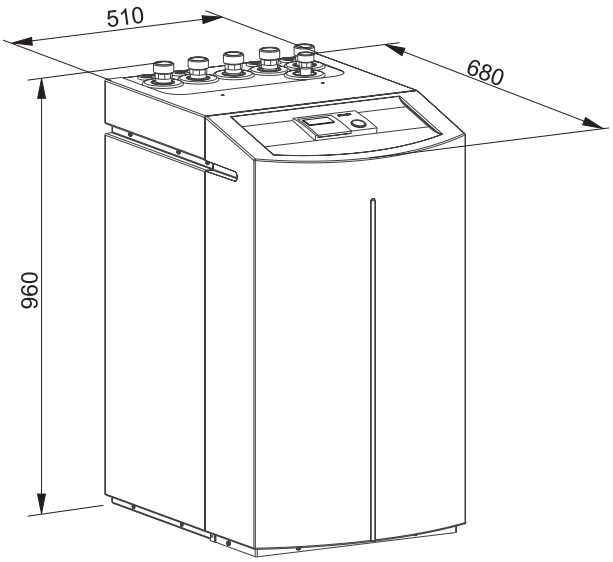
1. The water must not contain any matter which might settle.
2. Maintain the following limits regarding water particles to prevent corrosion of the evaporator.

Sulphate	< 100 mg/l
Free chlorine (Cl2)	< 0.5 mg/l
Chloride	< 300 mg/l
Nitrate	< 100 mg/l
pH value	6,5 - 9
Electr. conductivity	50 - 1000 µS/cm
Iron and manganese	< 1 mg/l *
Oxygen	< 2 mg/l *

* These water particle limits must be maintained to prevent the evaporator and its supply lines becoming contaminated with sludge and the sedimentation of the return well.

3. The use of surface water or saline water is not permitted.

⚠ Operation of a Stiebel Eltron water/water heat pump is not permitted with water, the condition of which exceeds any of the above limits.



Dimensions in mm

Fig. 8

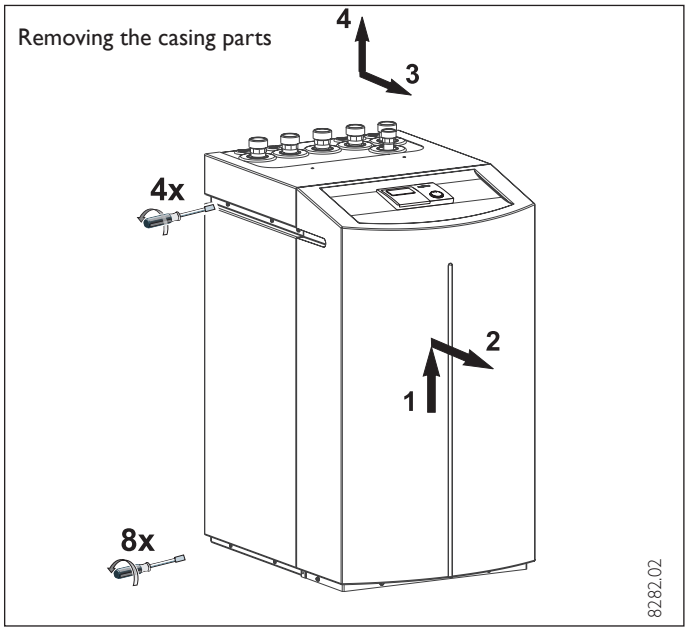


Fig. 10

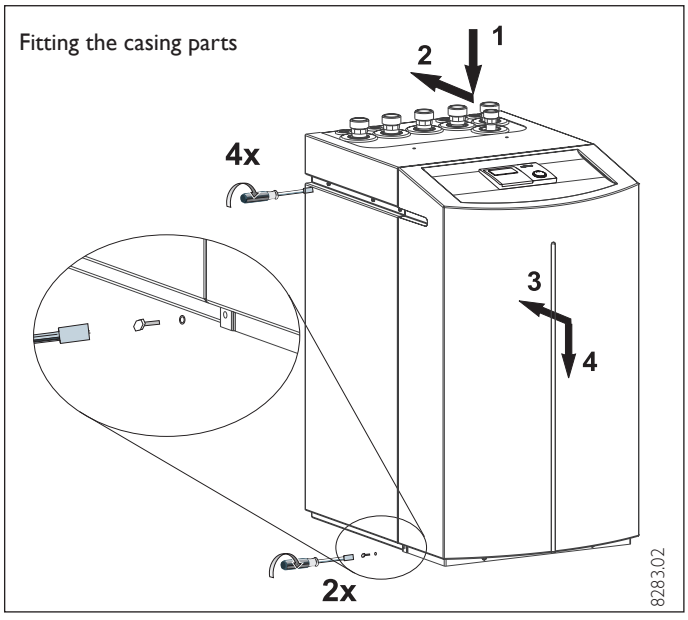
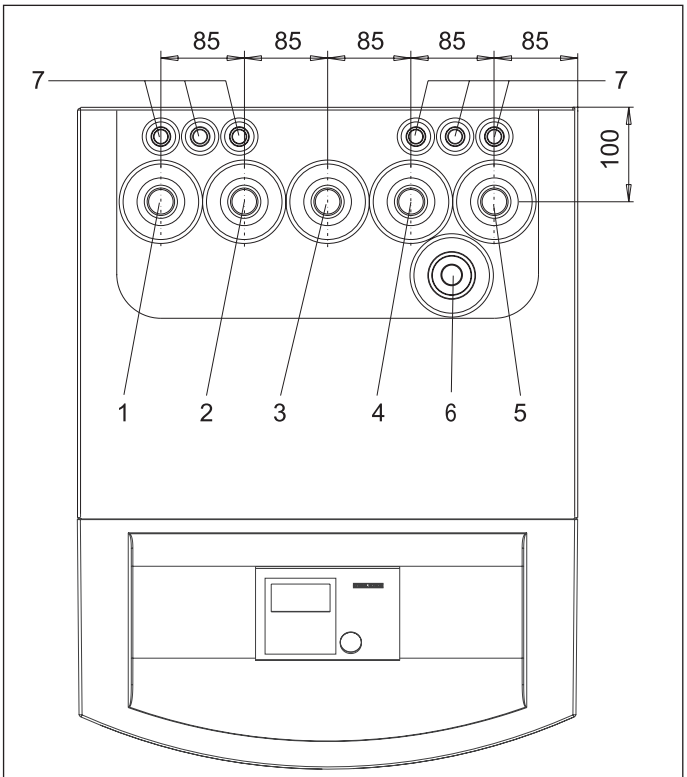


Fig. 11



1 Brine outlet
2 Brine inlet
3 DHW flow
4 Central heating flow
5 Central heating return
6 Safety assembly connection (included in the pack)
7 Electrical cable terminal

8281.02

Fig. 9

1 Impact sound insulation
2 Floating screed

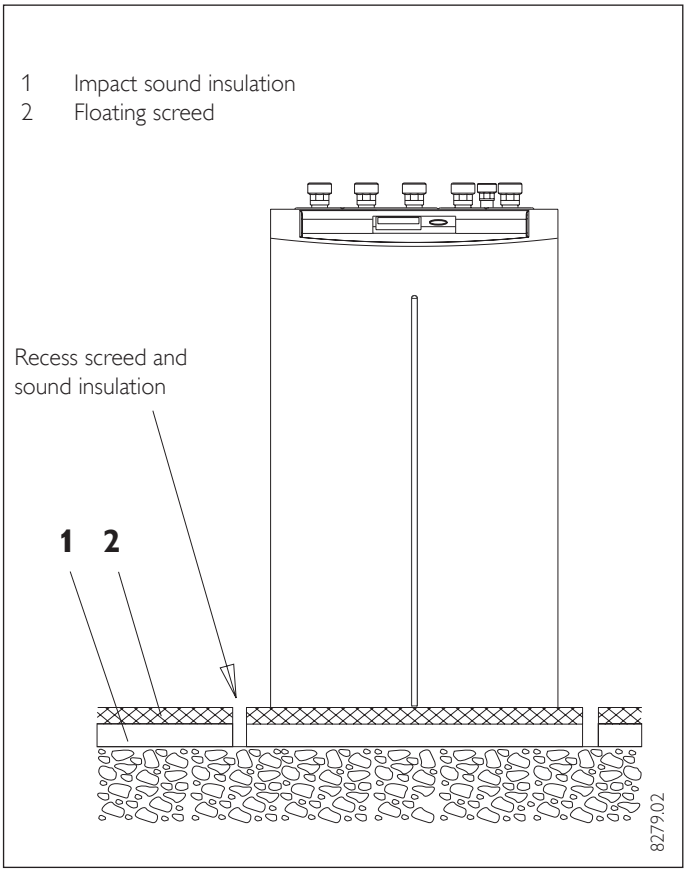


Fig. 12

2.9.3.2 Circulation pump
Size the circulation pump of the heat pump system in accordance with the system-specific conditions, i.e. rated volume flow and pressure drop (see specification).

2.9.3.3 Water temperature
The WPF heat pump can be used with water inlet temperatures down to + 7 °C. If such temperatures can be expected, for example after snow has melted, water with lower temperatures than 4 °C must not constantly be supplied to return wells (DIN 8900 part 2).

2.9.3.4 Filter
Install appropriate settlement basins, if higher levels of solid particles (sand, fine sludge, etc.) are transported with the well water. Otherwise the evaporator might get blocked. The evaporator can be flushed after removing the connection fittings (see section 2.9.2.1).

2.9.3.5 Connection
To prevent the transmission of noise as far as possible, connect the heat source circuit with
– flexible pressure hoses in case of wells with a depth up to 8 m
– vacuum-resistant anti-vibration joints in case of wells with a depth greater than 8 m (part no. see 2.3).

2.9.3.6 Volume flow control
(to be implemented during heat pump commissioning)
Measure the flow and return temperatures of the heat source. For this, determine the temperature difference by measuring the temperature below the thermal insulation on both flow and return pipes of the heat pump. The diagram (Fig. 13) shows the temperature spread at the rated volume flow.

⚠ When using the WPF as water/water heat pump, parameter 12 at the WPM (see commissioning report) is set to "WATER". At temperatures below 7 °C, the heat pump will be shut down by the frost stat.
You can check the source inlet temperature on the WPM display under system parameter INFO TEMP.

2.9.4 Installation of heat source system for WPF with brine as heat source
Design the heat source system for the brine water heat pump in accordance with Stiebel Eltron technical guides.
Permitted brine:
– Ethylene glycol
– Propylene glycol
– Concentrated process medium
  Part no: 161696
– Ready-mixed process medium
  Part no: 185472

When using ready-mixed process medium (part no. 185472), never seal the heat source system with hemp.

2.9.4.1 Circulation pump and required volume flow
Use a circulation pump with compound-filled windings to supply the brine, to prevent an earth short circuit through condensation in the electrical part of the pump (cold water version). Size the circulation pump in accordance with the system-specific conditions, i.e. observe the rated volume flow and pressure drop (see specification, page 14).

Sufficient volume flow must be safeguarded at every possible brine temperature, i.e.
– rated volume flow at a brine temperature of 0 °C with a tolerance of +10 %.

2.9.4.2 Connection and filling with brine
Prior to connecting the heat pump, check the heat source circuit for possible leaks, and flush thoroughly.
After filling the system with brine, and prior to commissioning, open the fill & drain valve (item 17, Fig. 3, page 13), until brine runs out of it. No water must remain in the pipe run to the fill & drain valve.
Calculate the volume of the heat source circuit. You can obtain the brine volume inside the heat pump from the following table.

Heat pump	Brine volume
WPF 5	5.84 l
WPF 7	6.45 l
WPF 10	7.06 l
WPF 13	7.06 l

The overall volume equals that of the required brine, which should be mixed from 33 % (vol.) pure ethylene glycol and 67 % (vol.) water.

Mixing ratio:
1 unit pure ethylene glycol with
2 units water (max. chloride contents in the water = 300 ppm), then fill mixture into the system.
Checking the brine concentration:
Determine the density of the ethylene glycol water mixture (e.g. with a hydrometer). Using the actual density and temperature, you can check the current concentration in the diagram (Fig. 13).

⚠ The details quoted refer to ethylene gylcol. When using propylene glycol and the Stiebel Etron process medium as ready-mixed solution (part no 185472), these details will be slightly different (see specification).

To prevent the transmission of noise, connect the heat source circuits to the heat pump with flexible pressure hoses
(part no. see section 2.2).

2.9.4.3 Volume flow control (to be implemented during heat pump commissioning)
Measure the flow and return temperatures of the heat source. For this, determine the temperature difference by measuring the temperature under the thermal insulation on both flow and return pipes of the heat pump. The diagram (Fig. 14) shows the temperature spread at the rated volume flow.

⚠ When using the WPF as brine/water heat pump, set parameter 11 at the WPM (see commissioning report) to "ETHYLENE GLYCOL" or "POTASS CARB" (if Stiebel Eltron process medium, part no: 185472 is used). Otherwise, the frost stat will shut down the heat pump below temperatures of 7 °C.

You can check the source inlet temperature on the WPM display under system parameter INFO TEMP.

2.9.5 Installation of the heat utilisation system
2.9.5.1 Heating circuit
The heat utilisation system must be installed in line with current technical guidelines. For safety equipment on the heating system, consult DIN 4751 page 2 or local regulations.

Prior to connecting the heat pump, check the heating system for leaks, flush it thoroughly, fill and carefully vent it.

Check the correct connection of heating flow and return (Fig. 9). The reduction of structure-borne vibrations on the water side requires the installation of flexible pressure hoses (for part no. see section 2.3).
Implement thermal insulation in accordance with local regulations.

2.9.5.2 Buffer cylinder
A buffer cylinder is recommended to ensure trouble-free heat pump operation. The buffer cylinder provides hydraulic separation of the volume flow in the heat pump circuit and the heating circuit.
The volume flow in the heat pump circuit remains constant if, for example, the volume flow in the heating circuit is reduced by thermostatic valves. **If a buffer cylinder is utilised, the link between terminal X4/5 (pump) and X4/8(HCP) remove during WPF commissioning.**

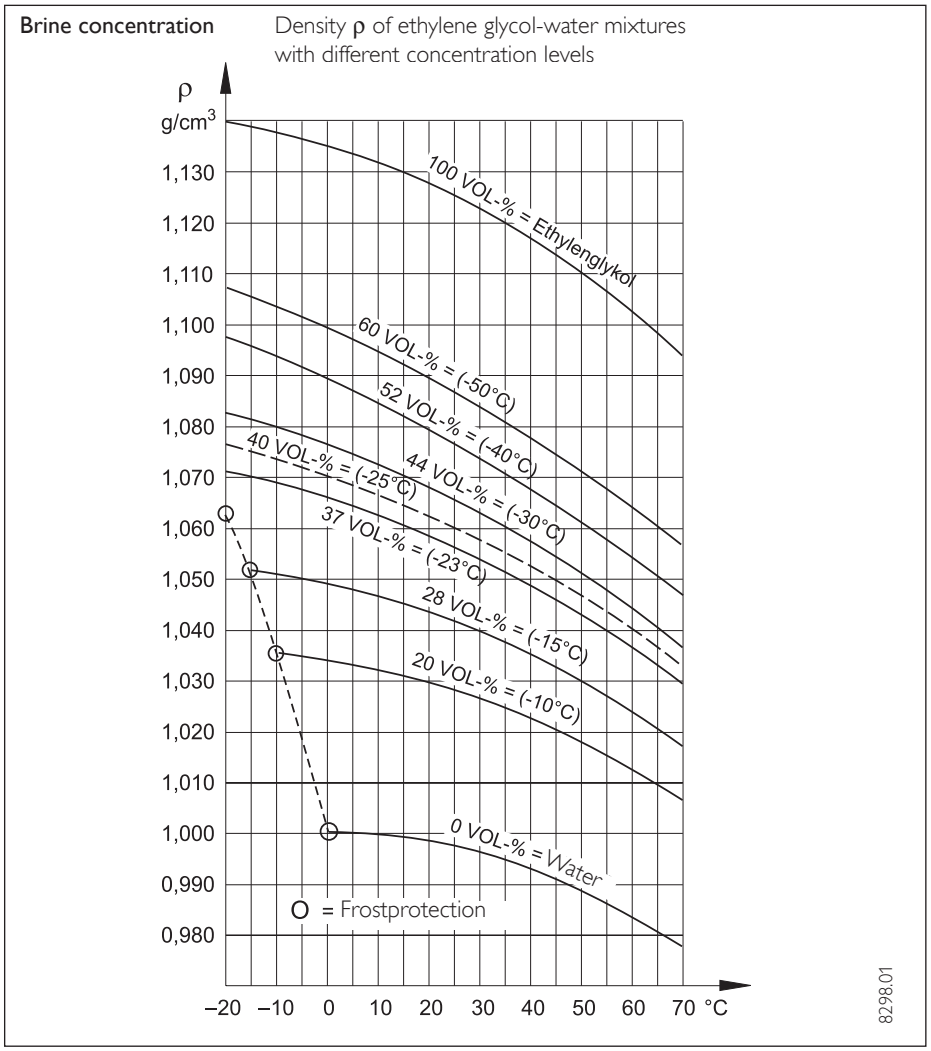


Fig. 13

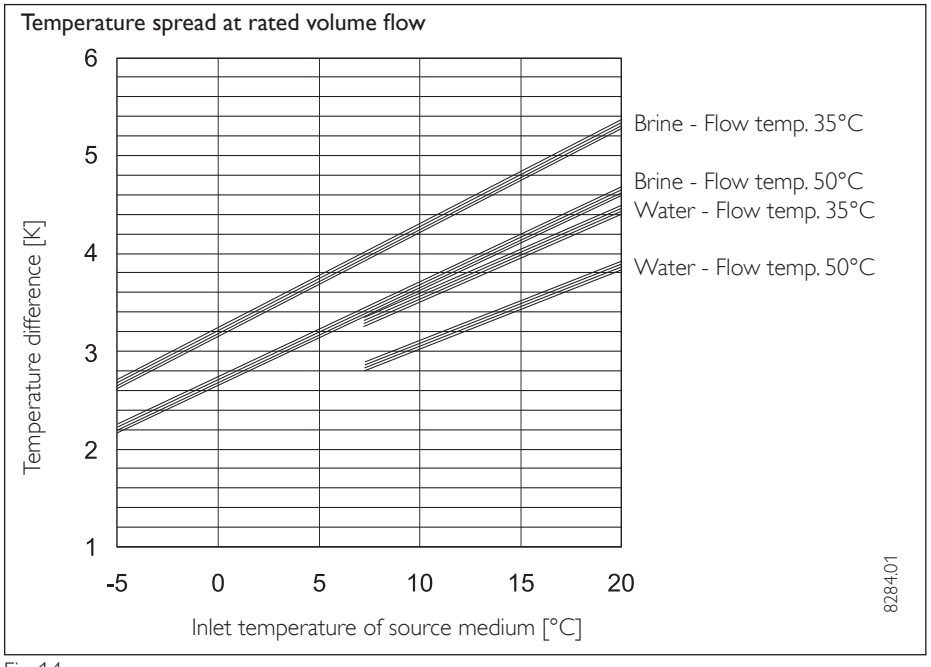


Fig. 14

Remove the return sensor connected to terminals X2/2(B2) and X2/3(B2) from the sleeve in the heat pump return and insert it into the buffer cylinder sensor well.

2.9.5.3 Circulation pump (cylinder loading pump)

The cylinder loading pump is integrated into the WPF. Consider the available external head of 2.8 m when sizing the anti-vibration elements and the pipework between the heat pump and the buffer cylinder.

When utilising the WPF for DHW heating, ensure that the connection between the heat pump and the DHW cylinder are sized so that the total pressure drop outside the heat pump is less than the available external head of 2.8 m.

2.9.5.4 Circulation pump (central heating pump)

If no cylinder (buffer cylinder) is used, consider the maximum external pressure of 280 hPa when sizing the heating circuit. Ensure the rated volume flow of the heat pump under all operating conditions of the heating system by installing an overflow valve.

2.9.5.5 Second external heat source

A dual-mode heating operation can be achieved by different means:

1. The WPF is integrated into the return of the second heat source (e.g. oil fired boiler); the pump integrated into the WPF is used as central heating pump. At the WPM, set parameter 21 to **HS 2 BGC**.

Electrical control:

In the delivered condition, the pump has a link between X4/5(pump) and X4/8(HCP).
Connect the enable signal for the second heat source to X4/9 (HS 2).

– Apply no voltage for the second internal heat source. [X3/4(N), X3/5(L1), X3/6 (L2), X3/7(L3)].

2. The WPF is operated with a separate buffer cylinder. The second external heat source is integrated into the heating circuit. At the WPM, set parameter 21 to HS 2 BOILER.

Electrical control:

– Remove the link between X4/5(pump) and X4/8(HCP).
– Connect the enable signal for the second external heat source to X4/9 (HS 2).
– Apply no voltage for the second internal heat source. [X3/4(N), X3/5(L1), X3/6 (L2), X3/7(L3)].

⚠ **Set the rotary selector on the IWS to single compressor mode without second internal HS 8 (switch position 9). Install the temperature sensor for the second heat source [terminal X2/8 (T HS 2)]. Observe the settings on the WPM under parameter 21 (ON T HS 2 HTG).**

High heating water temperature:
In dual-mode heating systems, the return water from the second heat source can flow through the heat pump, immediately after it has been switched off, with a max. temperature of 60 °C.
The temperature may be 70 °C no earlier than ten minutes after shutdown.

2.9.5.6 Heat meter
Observe the additional pressure drop when installing heat meters on the heating side. The sives inside the heat meters are easily blocked by the dirt particles in the heating circuit, further increasing the pressure drop.

2.9.5.7 Oxygen diffusion
Corrosion can affect steel components, when non-impermeable plastic underfloor heating system pipes are used with steel radiators, steel pipes or DHW cylinders.

The product of corrosion, i.e. rusty sludge, can settle inside the heat pump evaporator and can result in output loss through a reduction of cross-section or in a heat pump shutdown triggered by the high pressure limiter.

Therefore, never use heat pumps type WPF in conjunction with underfloor heating systems with non-impermeable pipes.

2.9.5.8 DHW heating
For DHW heating, a DHW cylinder with internal indirect coils is recommended (see special accessories on page 13).

A three-way diverter valve is integrated into the WPF between the DHW heating circuit and the central heating circuit. Connect the upper coil connection of the DHW cylinder to the DHW flow of the WPF (see Fig. 9).

Connect the lower coil connection of the DHW cylinder to the WPF return. For this, insert a tee immediately behind the anti-vibration joint connected directly to the WPF. With this tee, join the central heating and the DHW heating circuits.

2.9.5.9 Power supply
Notify your local power supply company of the electrical connection.
Only qualified electricians must carry out the installation in accordance with these instructions.

⚠ Before any work, isolate the equipment from the power supply at the control panel

Observe VDE 0100 and the regulations of your local power supply company.

The WPF must be able to be separated from the mains power supply by an additional isolator, which disconnects all poles with at least 3 mm contact separation. For this purpose, use contactors, mains isolators, fuses, etc. on site.

Terminals are located inside the WPF control panel (Fig. 15). The terminals become accessible by removing the front cover (Fig. 10) and opening the front panel. To open the front panel, remove the fixing screws on the side at the top of the control panel. When removing the front cover ensure, that the cables, which connect the heat pump manager with the control panel, are not torn off.
Remove the lid to enable the equipment to be connected (Fig. 10).
Assemble these components in reverse order. For this, observe the following:
– After closing the front panel, tightly secure this to the control panel using the fixing screws and serrated washers.
– When fitting the front cover secure it, as shown in Fig. 11, to the side panels (screws and serrated washers included in the pack supplied).
– Route all connecting cables and sensor leads through the apertures in the back panel (item 7, Fig. 9).

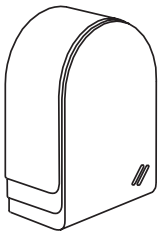
⚠ The compressor must only turn in one direction. Should the compressor fail to start, interchange two phases to alter the direction of rotation. You can check the direction of rotation by means of a red diode the phase monitoring relay (Fig. 15). The rotational direction is correct if the red diode lights up.

After connecting all electrical cables, refit and seal the cover over the mains terminal strip (X3) (Fig. 15).

Terminal rating of the electrical supplementary heater
Mark the box in front to the relevant terminal rating on the label below the type plate.

2.9.5.10 Sensor installation
The temperature sensors have a decisive influence on the function of your heating system. Therefore ensure the correct seating and adequate insulation of sensors.

Outside temperature sensor AFS 2
(included in the pack supplied)

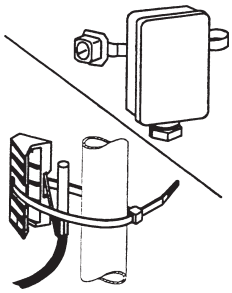


Install the outside temperature sensor on a north or north-eastern wall.
Minimum distances:
2.5 m above the ground
1 m away from windows and doors.

The outside temperature sensor should be freely exposed to the elements, but should not be installed above windows, doors or air ducts and should not be subject to direct sunlight. Connect the outside temperature sensor to terminal X2/9(T (A)) and the earth terminal block X26 of the WPF.

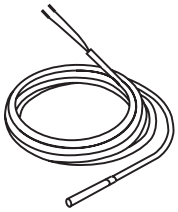
Installation:
Pull off the lid.
Secure the lower part with the screw supplied. Insert and connect the sensor lead.
Re-position the lid and let it audiby click into place.

Contact sensor AVF 6
(part no.: 165341)



This sensor is required when using a second heat source or a mixer circuit. Installation information:
Thoroughly clean the pipe.
Apply heat conduction paste.
Secure the sensor with a strap.

PTC immersion sensor TF 6A
(part no: 165342)

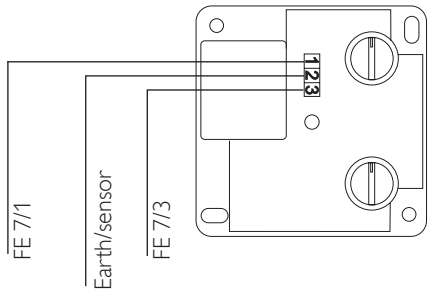


The immersion sensor is required when the WPF is used for DHW heating.
Insert it into the appropriate sensor well at the DHW cylinder.
Diameter: 6 mm
Length: 1 m

PTC sensor resistance values
The sensors installed in the WPF (return, flow and source sensors), the outside temperature sensor AFS 2, the contact sensor AVF 6 and the PTC immersion sensor TF 6A all have identical resistance values.

Temperature in °C	Resistance in Ω
– 20	1367
– 10	1495
0	1630
10	1772
20	1922
25	2000
30	2080
40	2245
50	2417
60	2597
70	2785
80	2980
90	3182
100	3392

Remote control unit FE 7
(part no.: 185579)
Connection array:



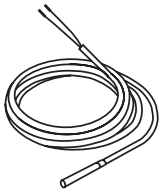
The FE 7 remote control enables you to change the set room temperature for heating circuit 1 or heating circuit 2 by ± 5 °C as well as the operating mode.
Connect it to terminals X2/11 (REM CON.1), X2/12 (REM CON.3) and the earth terminal block X26 of the WPF.

The remote control offers the following:
- one rotary selector for modifying the set room temperature
- one rotary selector with the following positions

Programming mode
Constant setback mode
Constant day mode

The remote control is only active in programmed mode.

PT1000 immersion sensor
part no:165818



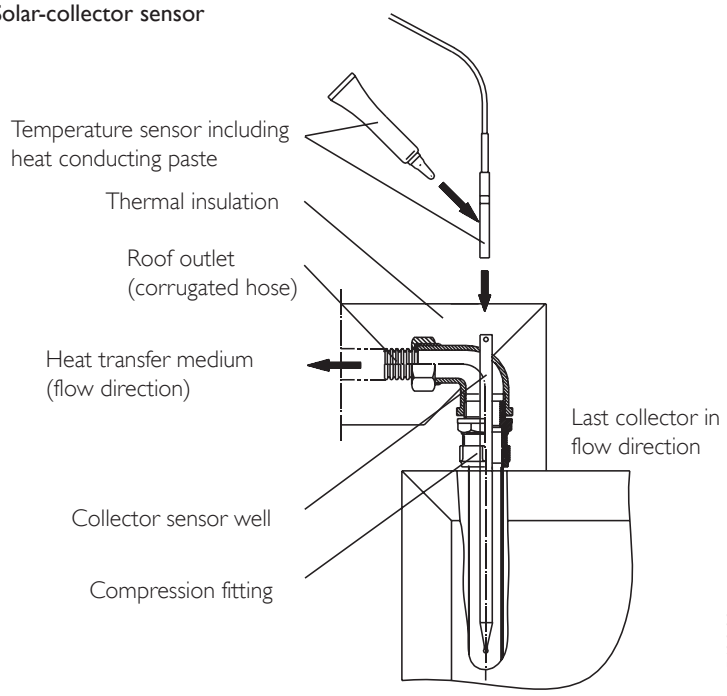
Collector sensor
Diameter: 6 mm
Length: 1.5 m
The immersion sensor with the longer silicone lead is the collector sensor (PT 1000).
.

The correct connection of the collector sensor (silicone lead) is crucial for the correct function of a solar heating system. The sensor on collectors from Stiebel Eltron is installed on the last collector, viewed in the flow direction of the heat transfer medium. For this, install and seal-in the collector sensor well on the collector. Coat the collector sensor with heat conducting paste and insert into the sensor well tube until it bottoms out.
Provide thermal insulation for the collector sensor well and the roof outlet, which must be closed without gap and must be UV resistant.

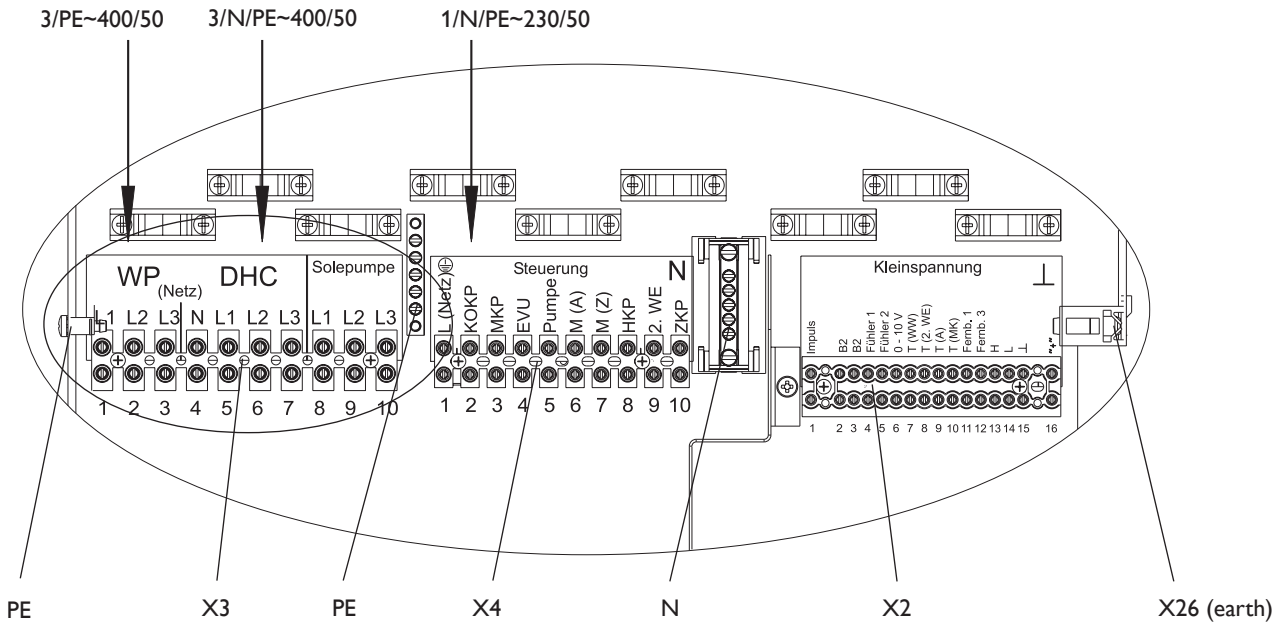
Resistance coefficient PT 1000 collector sensor

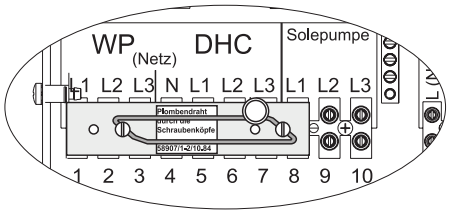
Temperature in °C	Resistance in Ω
– 30	843
– 20	922
– 10	961
0	1000
10	1039
20	1078
30	1117
40	1155
50	1194
60	1232
70	1271
80	1309
90	1347
100	1385
110	1423
120	1461

Installation of Solar-collector sensor

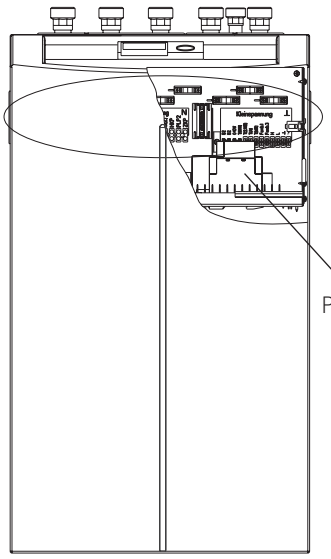


Wiring diagram (Triplephase)





Provide separate fuses for the three power circuits HP, supplementary heater and control.



X4 Terminal - control

Mains supply: L, N, PE

Outputs:

KOKP	Collector circuit pump and N, PE
MKP	Mixer circuit pump and N, PE **for HC2**
Pumpe	Heating circuit 2 and N, PE **for HC1**
M(A)	Mixer OPEN
M(Z)	Mixer CLOSE
HKP	Heating circuit pump and N, PE **for HC1**
2.WE	Heat source 2 and N, PE
ZKP	DHW circulation pump and N, PE

Control inputs:

EVU	Power Supply Company signal

X2 Terminal LV

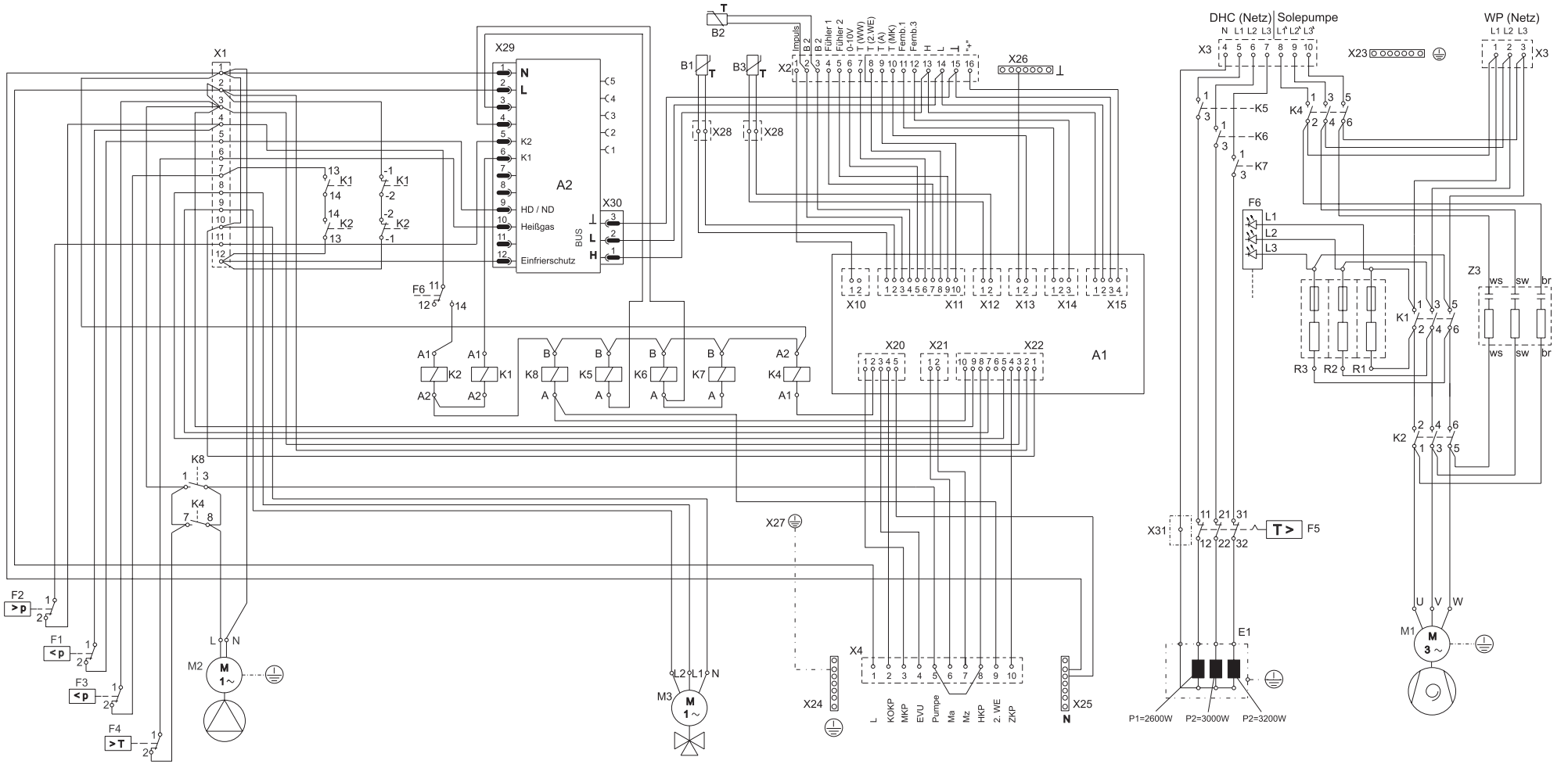
Impulse	Pulse input heat meter measurement
B2	Temperature sensor HP return
B2	Temperature sensor HP return
Fühler 1	Temp. sensor HP return (heat usage) Temp. sensor DHW cylinder bottom (for solar connection)
Fühler 2	Temp. sensor HP flow (heat usage) Temp. sensor collector (for solar connection)
0 - 10 V	Analog output and earth
T(WW)	DHW temperature sensor and earth
T(2.WE)	Heat source 2 sensor and earth
T(A)	Outside temperature sensor and earth
T(MK)	Mixer circuit temperature sensor and earth
Fernb. 1	Remote control 1
Fernb. 3	Remote control 3
H	BUS high
L	Bus low
⊥	BUS ground ⊥
" + "	BUS " + " (not connected)

X3 Mains supply

HP	Heat pump (compressor)	L1, L2, L3, PE
	Brine pump	L1´, L2´, L3´, PE
DHC	Supplementary heater	L1, L2, L3, N, PE

Terminal rating	Terminal allocation				
2.6 kW	L1			N	PE
3.0 kW		L2		N	PE
3.2 kW			L3	N	PE
5.6 kW	L1	L2		N	PE
5.8 kW	L1		L3	N	PE
6.2 kW		L2	L3	N	PE
8.8 kW	L1	L2	L3	N	PE

Fig. 15

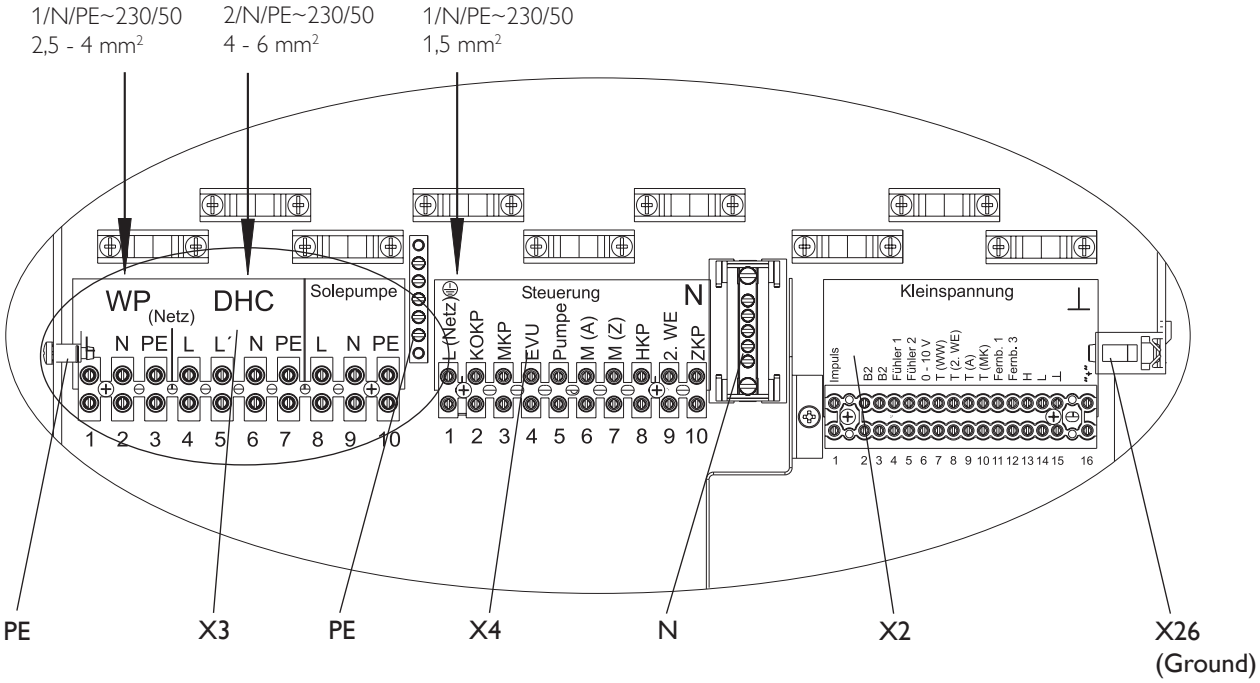


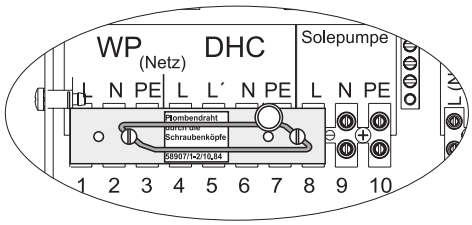
A1	WPM heat pump manager	K1	Contactor – resistor link	R3	Start-up resistance
A2	Integral heat pump control unit IWS	K2	Contactor – compressor start	X1	Terminals
B1	Temperature sensor HP flow	K4	Contactor - brine pump	X2	Terminal LV
B2	Temperature sensor HP return	K5	Relay - supplementary heater	X3	Mains supply
B3	Temperature sensor heat source	K6	Relay - supplementary heater	X4	Terminals - control
E1	Electrical supplementary heater (DHC)	K7	Relay - supplementary heater	X10	Socket plug DCF WPM
F1	Low pressure limiter	K8	Relay motor-pump	X11	Socket plug temperature sensor WPM
F2	High pressure limiter	M1	Motor - compressor	X12	Socket plug WQ temperature sensor WPM
F3	Frost stat	M2	Motor-pump	X13	Socket plug mixer circuit temp. WPM
F4	Hot gas temperature limiter	M3	Diverter valve motorised	X14	Socket plug remote control WPM
F5	High limit safety cut-out for DHC	R1	Start-up resistance	X15	Socket plug BUS WPM
F6	Phase monitoring relay	R2	Start-up resistance	X20	Socket plug pumps and ESC WPM

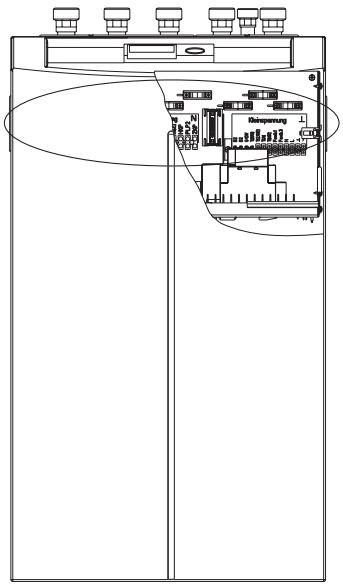
X21	Socket plug mixer control WPM
X22	Socket plug external pump WPM
X23	Earth block – mains supply
X24	Earth block control
X25	N block control
X26	Earth block LV
X27	Earth plug-in block
X28	Socket terminal strip 2-pole
X29	Socket plug IWS 12-pole
X30	Socket plug IWS 3-pole
X31	Terminal supplementary heater
Z3	Supressor

STIEBEL ELTRON

Wiring diagram (Singlephase)







X3 Mains supply

HP	Heat pump (compressor)	L, N, PE
	Brine pump	L, N, PE
DHC	Supplementary heater	L, N, PE

Terminal rating	Terminal allocation			
3,0 kW	L		N	PE
3,2 kW		L'	N	PE
6,2 kW	L	L'	N	PE

X4 Terminal - control

Mains supply: L, N, PE

Outputs:

KOKP	Collector circuit pump and N, PE
MKP	Mixer circuit pump and N, PE **for HC2**
Pumpe	Heating circuit 2 and N, PE **for HC1**
M(A)	Mixer OPEN
M(Z)	Mixer CLOSE
HKP	Heating circuit pump and N, PE **for HC1**
2.WE	Heat source 2 and N, PE
ZKP	DHW circulation pump and N, PE

Control inputs:

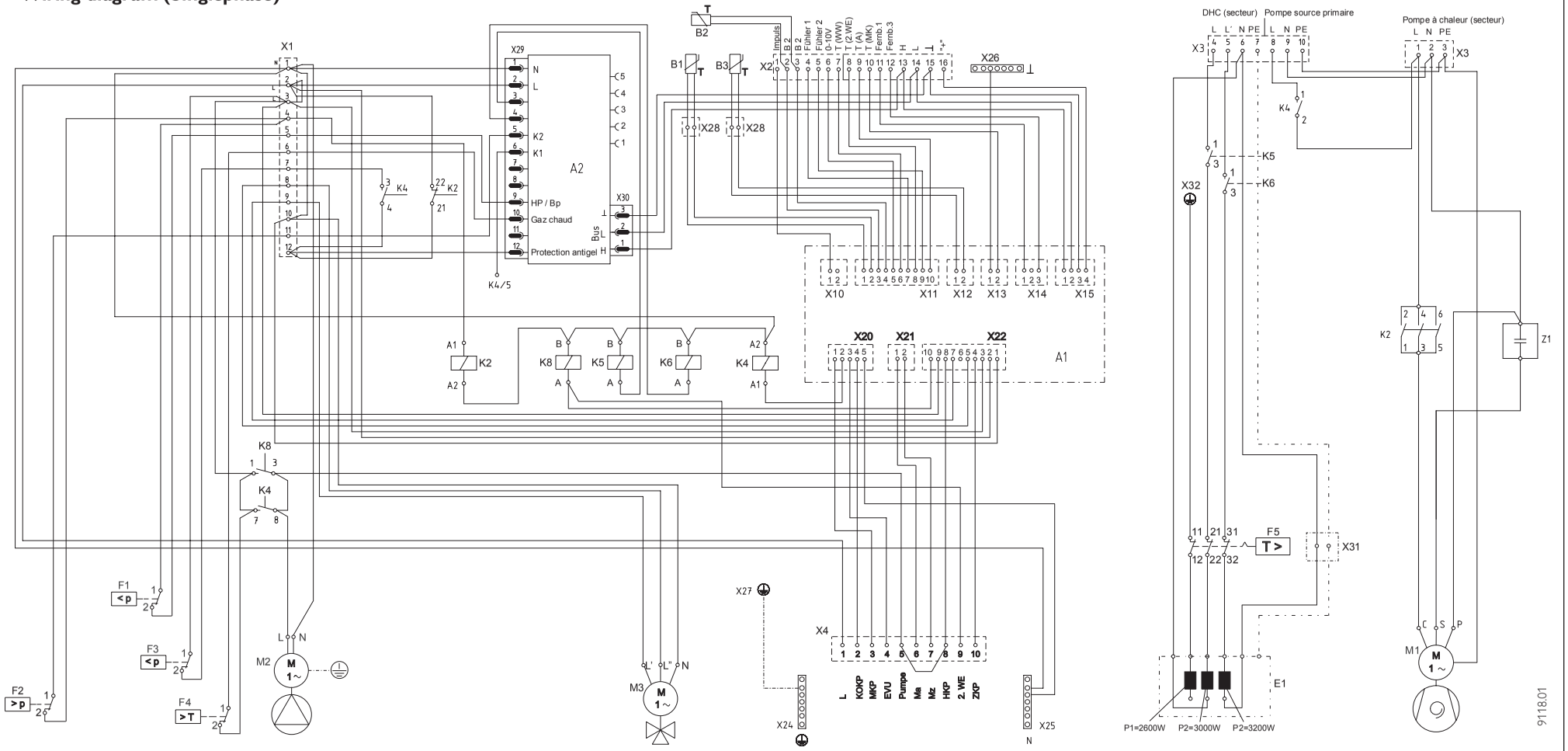
EVU	Power Supply Company Signal

X2 Terminal LV

Impulse	Pulse input heat meter measurement
B2	Temperature sensor HP return
B2	Temperature sensor HP return
Fühler 1	Temp. sensor HP return (heat usage)
	Temp. sensor DHW cylinder bottom (for solar connection)
Fühler 2	Temp. sensor HP flow (heat usage)
	Temp. sensor collector (for solar connection)
0 - 10 V	Analog output and earth
T(WW)	DHW temperature sensor and earth
T(2.WE)	Heat source 2 sensor and earth
T(A)	Outside temperature sensor and earth
T(MK)	Mixer circuit temperature sensor and earth
Fernb. 1	Remote control 1
Fernb. 3	Remote control 3
H	BUS high
L	Bus low
⊥	BUS ground ⊥
" + "	BUS " + " (not connected)

Fig. 16

Wiring diagram (Singlephase)

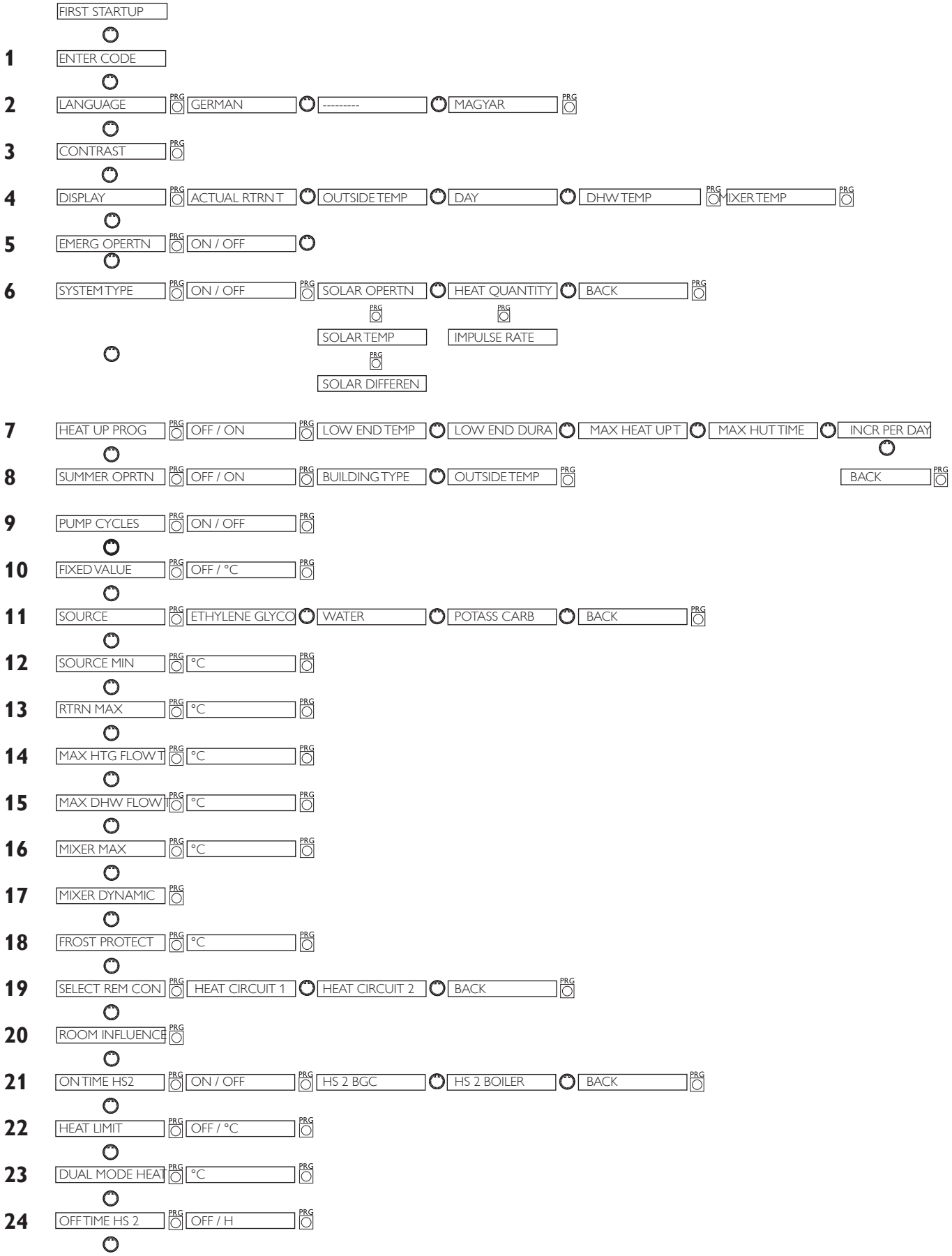


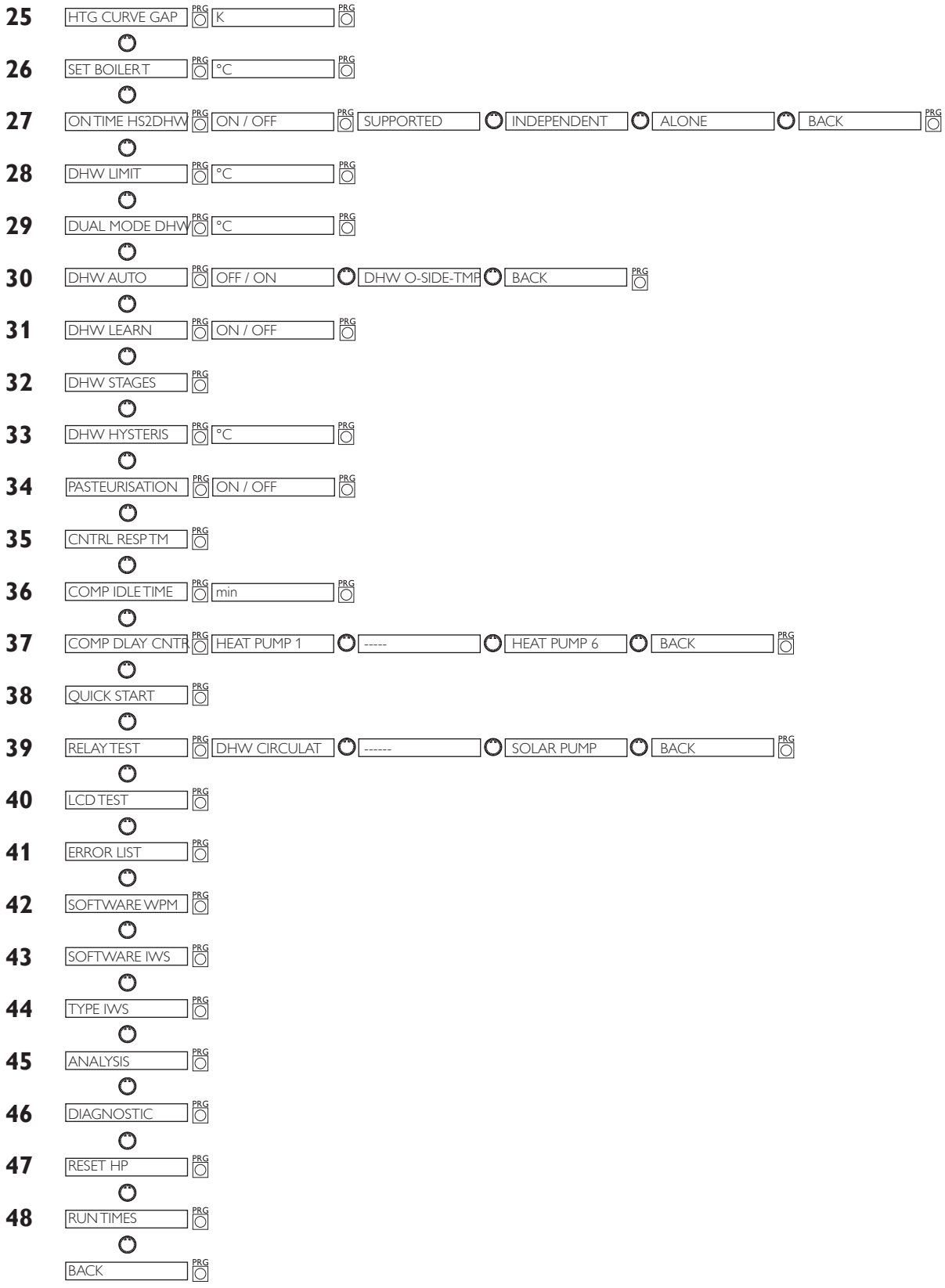
A1 WPM heat pump manager
A2 Integral heat pump control unit IWS
B1 Temperature sensor HP flow
B2 Temperature sensor HP return
B3 Temperature sensor heat source
E1 Electrical supplementary heater (DHC)
F1 Low pressure limiter
F2 High pressure limiter
F3 Frost stat
F4 Hot gas temperature limiter
F5 High limit safety cut-out for DHC
K1 Contactor – resistor link
K2 Contactor – compressor start
K4 Contactor - brine pump
K5 Relay - supplementary heater
K6 Relay - supplementary heater
K7 Relay - supplementary heater
K8 Relay motor-pump
M1 Motor - compressor
M2 Motor-pump
M3 Diverter valve motorised
R1 Start-up resistance
R2 Start-up resistance
R3 Start-up resistance
X1 Terminals
X2 Terminal LV
X3 Mains supply
X4 Terminals - control
X10 Socket plug DCF WPM
X11 Socket plug temperature sensor WPM
X12 Socket plug WQ temperature sensor WPM
X13 Socket plug mixer circuit temp. WPM
X14 Socket plug remote control WPM
X15 Socket plug BUS WPM
X20 Socket plug pumps and ESC WPM
X21 Socket plug mixer control WPM
X22 Socket plug external pump WPM
X23 Earth block – mains supply
X24 Earth block control
X25 N block control
X26 Earth block LV
X27 Earth plug-in block
X28 Socket terminal strip 2-pole
X29 Socket plug IWS 12-pole
X30 Socket plug IWS 3-pole
X31 Terminal supplementary heater
Z3 Supressor

STIEBEL ELTRON

2.10 Commissioning

No. Parameter (as shown in the Display)




25
HTG CURVE GAP
PRG
K
PRG
26
SET BOILER T
PRG
°C
PRG
27
ON TIME HS2DHW
PRG
ON / OFF
PRG
SUPPORTED
INDEPENDENT
ALONE
BACK
PRG
28
DHW LIMIT
PRG
°C
PRG
29
DUAL MODE DHW
PRG
°C
PRG
30
DHW AUTO
PRG
OFF / ON
DHW O-SIDE-TMP
BACK
PRG
31
DHW LEARN
PRG
ON / OFF
PRG
32
DHW STAGES
PRG
33
DHW HYSTERIS
PRG
°C
PRG
34
PASTEURISATION
PRG
ON / OFF
PRG
35
CNTRL RESP TM
PRG
36
COMP IDLE TIME
PRG
min
PRG
37
COMP DLAY CNTR
PRG
HEAT PUMP 1

HEAT PUMP 6
BACK
PRG
38
QUICK START
PRG
39
RELAY TEST
PRG
DHW CIRCULAT

SOLAR PUMP
BACK
PRG
40
LCD TEST
PRG
41
ERROR LIST
PRG
42
SOFTWARE WPM
PRG
43
SOFTWARE IWS
PRG
44
TYPE IWS
PRG
45
ANALYSIS
PRG
46
DIAGNOSTIC
PRG
47
RESET HP
PRG
48
RUN TIMES
PRG
BACK
PRG

2.11 Commissioning

Only approved contractors may commission this equipment and instruct the owner in its use.

Commission this WPF in accordance with these operating and installation instructions. Our customer service can be asked to assist in the commissioning, which is chargeable.

Check the following prior to commissioning:

- Heating system
  Was the heating system filled up to the correct pressure, and was the quick acting air vent valve opened?
- Temperature sensor
  Were the outside temperature sensor and the return temperature sensor (in conjunction with a buffer cylinder) correctly located and connected?
- Mains power supply
  Was the mains power supply properly connected?
  The rotational direction at the HP connection (mains) is correct, if the red diode on the phase montoring relay lights up, when voltage (mains) is applied to the supply terminals.
  The heat pump will not start, if the red diode on the phase monitoring relay does not light up.

Then heat up the system to its maximum operating temperature and vent again.

⚠ **Observe the maximum system temperature in underfloor heating systems.**

2.12 Commissioning details

Not only the adjustments at control level 2 but also the system-specific parameters must be determined as part of commissioning the heat pump system. These parameters are adjusted at control level 3, the access to which is protected by code.
Check all parameters in sequence. Enter all set values into the column (SYSTEM VALUE) provided in the commissioning report under section 2.14, page 39.

Note: Not all adjustments take immediate effect. Some adjustments only become effective in certain situations or after a delay.

1 CODE 1 0 0 0

Enter the correct four-digit code to change parameters on control level 3. The factory-set code is 1 0 0 0.
After pressing the PRG key (indicator illuminates), the first digit can be selected by turning the rotary selector. Pressing the PRG key again confirms the figure, then the second digit of the code begins to flash. Turning the rotary selector enables the second digit to be entered. When all four digits have been entered correctly, four lines appear in the display. This enables access to control level 3, and the display shows CODE OK. Closing and re-opening the flap requires that the code is entered again. Checking settings does not require the code to be entered.

2 LANGUAGE

Press the PRG key and select the language with the rotary selector. Then confirm your selection by pressing PRG again.

3 CONTRAST

4 DISPLAY

At this point select, what you want the display to show when the control flap is closed. You can select between outside temperature, return temperature, day and time, DHW temperature or mixer temperature.

5 EMERGENCY OP:

Characteristics in case of **Fatal error** conditions in conjunction with the emergency operation:
The EMERGENCY OP parameter can be set **ON** or **OFF**.
Emergency operation set ON:
As soon as faults occur for **HP type 2** and the heat pump stops, the program selector automatically changes over to emergency operation.

For **HP type 1 and HP type 3**, heating source 2 for central heating or DHW heating must be set to **ON**; only then can it automatically change over to emergency operation in case of fatal errors. However, as soon as several heat pumps have been connected, all of these must be in fatal error mode, before the program selector automatically changes to emergency operation.

Emergency operation set to OFF:
As soon as faults occur for **HP type 2** and the heat pump stops, heat source 2 covers only the frost protection for central heating. Users can then themselves select emergency operation.

6 SYSTEM TYPE

Heat meter or solar differential controller
This parameter can only be selected if both sensors listed in this field are connected.
In addition, a heat meter with reed contacts must be connected in case of system type "Heat meter"; alternatively a solar pump must be connected in case of system type "Solar heating operation".
Parameter PULSE RATE can be adjusted, as soon as system type Heat usage has been set to ON. The standard setting for PULSE RATE is 10, and the unit is litres/pulse.
The heat usage results from calculating the volume flow and the temperature difference (sensor 1 on the return and sensor 2 on the flow).
The various heat usage values, for example total heat usage in kWh, heat usage in kWh that day, current heat usage in W or the volume flow in m3/h, can be scanned under INFO TEMP.

You can set two parameters, such as MAX CYL TEMP and SOLAR DIFFEREN as soon as system type SOLAR OPERATION has been set to ON. With this constellation, sensor 1 is the DHW sensor bottom and sensor 2 the collector sensor (PT 1000).
The temperature difference established by these two sensors is recorded and compared with the set temperature difference (parameter SOLAR DIFFEREN). The solar heating pump is started, if the recorded difference exceeds the set differential. The solar hearing pump is stopped again, when the actual value falls below the set value minus a hysteresis of 1.5 K.
In addition, the controller provides an adjustable maximum cylinder limit (parameter MAX SOLAR TEMP). The solar heating pump will also be stopped, if this temperature is reached at the bottom cylinder sensor.

7 HEAT UP PROG

Heat-up program for underfloor heating systems

This heat-up program comprises a total of six parameters. These six parameters can be adjusted in sequence as soon as the heat-up program is activated. This program is started with the HEAT-UP PROG parameter and set to ON. The system then heats to the selected low end temperature (parameter LOW END TEMP). This temperature is then held for the set period (parameter LOW END DURAT). After expiry of this period, the system heats to the maximum low end temperature (MAX HEAT-UP T) using increase per day/K (INCR PER DAY) and holds this maximum temperature for the selected period (MAX TEMP DURAT). After expiry of this period, the system reduces the temperature back to the low end temperature in the same stages as per heat-up.
This concludes the heat-up program.

As soon as two heating circuits are operational, both will be operated in accordance with this heat-up program (operation with buffer cylinder and mixer circuit).
The direct heating circuit 1 (buffer circuit with return sensor) adopts the heat-up program set values. The actual temperature inside the buffer cylinder is higher at the heating flow as the regulation takes place via the return sensor. The mixer (heating circuit 2) regulates the temperature back down to the selected set values in the heat-up program (low end temperature and maximum temperature).

Please note that only the mixer circuit pump is running when operating with two heating circuits.

When only the direct heating circuit 1 is operational, the return sensor is again used for control. As the actual temperature inside the buffer cylinder is higher at the heating flow, this constellation sees 5 K being deducted from the heat-up program set values (low end and maximum temperatures).
The summer logic is disabled when the heat-up program runs..

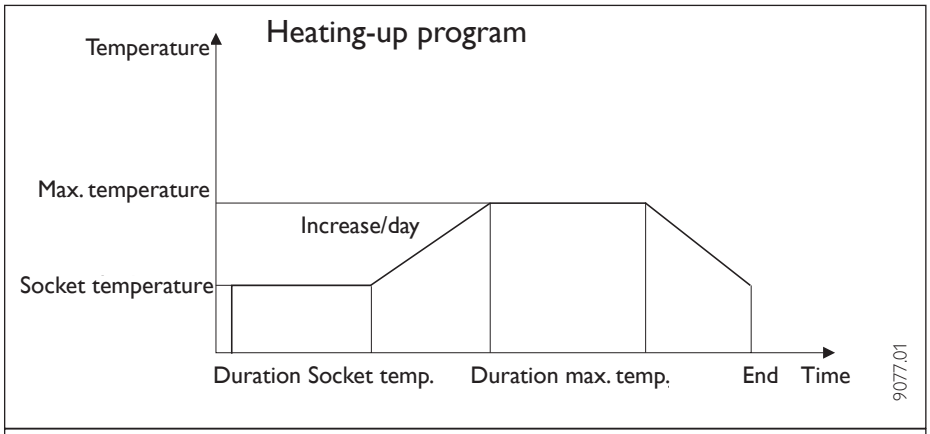
8 SUMMER OPR

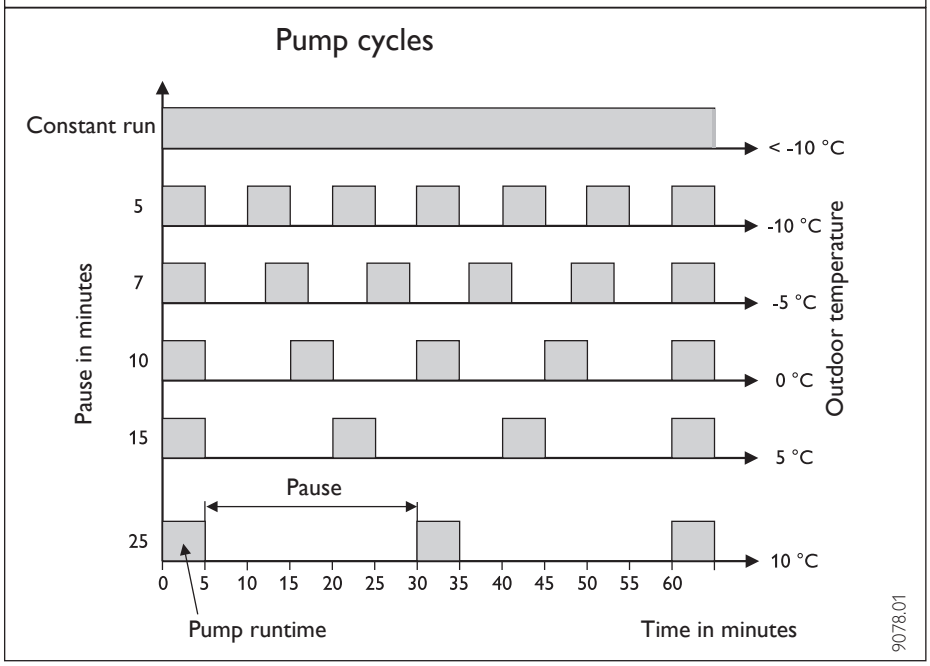
The SUMMER OPR parameter allows you to select the time when summer operation should be active. Summer operation can be switched ON or OFF. In total, this function offers two adjustable parameters.
Under the BUILD TYPE parameter you can select, whether the current outside temperature should be compared with the selected outside temperature (setting 0) or whether, subject to building type (setting 1, 2 or 3), an adjusted outside temperature should be determined. In both cases, if the current or the adjusted outside temperature is ≥ than the selected outside temperature, both heating circuits (if installed) enter summer mode; reverse hysteresis –1 K.
The display indicates summer operation when the flap is closed.
Summer mode is inactive for heating circuit 1 when regulating to a fixed temperature.
OUTSIDE TEMP parameter:
Outside temperature adjustable from 10 °C to 30 °C
BUILD TYPE parameter:
Adjustment 0: The outside temperature will not be adjusted. The average and the building-specific outside temperature are identical to the current outside temperature; direct comparison between the selected and current outside temperature.

Adjustment 1: Mild adjustment (averaging over a 24 h period) of the outside temperature, e.g. timber construction with rapid heat transfer.

Adjustment 2: Mean adjustment (averaging over a 48 h period) of the outside temperature, e.g. solid construction with thermal insulation and average heat transfer.

Adjustment 3: Severe adjustment (averaging over a 72 h period) of the outside temperature, e.g. house with slow heat transfer.





9 PUMP CYCLES

Heating circuit pump control

The PUMP CYCLES parameter only applies to the direct heating circuit 1, i.e. for heating circuit pump 1.
This parameter can be set ON or OFF. With this parameter set to OFF, the heating circuit pump will not cycle, i.e. it runs constantly and is only switched OFF in summer mode.
The heating circuit pump start will be controlled in accordance with a fixed temperature curve of the outside temperature, as soon as this parameter is set to ON.
The heating circuit pump start pulse is always 5 minutes.
The heating circuit pump for HC 1 also always starts with each heat pump start. The pump runs on for 5 minutes after the heat pump has been switched OFF. Now the start-up duration is brought to bear, e.g. at an outside temperature of 5 °C, the pump starts three times per hour for 5 minutes respectively. The return sensor is masked as soon as the heating circuit pump is switched OFF. Each time the heating circuit pump is started again, the return sensor is masked for three minutes.

Pump kick

To prevent the pump from seizing up, for example during summer, 24 hours after the pump was last switched OFF, it will be started for 10 s. This applies to all pumps.

Heating circuit pump control with connected FE 7 remote control
In conjunction with the FE 7 remote control, the respective heating circuit pump is switched OFF in accordance with the switching condition

$$\vartheta_{ACTUAL\ room} > \vartheta_{SET\ room} + 1K$$

and the mixer CLOSES. This only applies if the room sensor influence is set to K > 0. Reverse control is subject to the following condition:

$$\vartheta_{ACTUAL\ room} > \vartheta_{SET\ room}$$

Summer operation as described in parameter 8 also becomes effective for the respective heating circuit when operating with a FE 7 remote control.

10 FIXED VALUE

Fixed value temperature
The heat pump return is regulated to a set fixed temperature. The switching time program will then be ignored. The various program switch positions will then only affect the mixer circuit (if installed). Frost protection is activated and the compressors are switched OFF in the program selector positions "Standby" and "DHW", if a fixed temperature has been selected.
Summer logic remains inactive with fixed temperature control. This means, that the heating circuit pump is not switched OFF for the direct heating circuit.
With the flap closed, the display shows the fixed temperature program, in other words always heating times.

11 SOURCE

Frost protection for brine/water and water/water heat pumps
The three adjustable options determine, which heat transfer medium is used as brine in the heat pump system.
Water as brine means, that the heat pump frost protection is active. This means that the heat pump is switched OFF as soon as the frost stat has responded. The idle time is then set and OTHER FAULTS is displayed with a flashing warning triangle. The fault is also entered into the error list.
Ethylene glycol as brine (including polypropylene glycol) means that the heat pump frost protection is inactive. Responses by the frost stat no longer have any influence.
Potassium carbonate as brine (Stiebel Eltron process medium, part no. 185472) means, that the heat pump frost protection is inactive. This only ensures that the source pump is started at an outside temperature of –10 °C, even if the heat pump is idle. It is switched OFF again at an outside temperature of – 8 °C.

12 MIN SRCE TEMP

Minimum source temperature
Setting range –10 °C to +10 °C and OFF position.

⚠ **Never operate the WPF with source temperatures below – 5 °C!**

In the OFF position there is no scanning via the source temperature sensor. When the actual temperature falls below the minimum source temperature, all compressors are shut down, and the idle times are set. The compressors are enabled again after the idle times have expired and the fixed hysteresis of 2 K has been exceeded.
This fault, i.e. MIN.SRCE.TEMP., will be shown in the display with a flashing warning triangle, and will be entered into the error list.
The source pump will always be started 30 seconds earlier than the compressor, which starts when there is a heat demand coming from the central heating or DHW side.

⚠ **The source pump runs on for 60 minutes after the heat pump has been switched OFF.**

13 RTRN MAX

Maximum return temperature
Setting range 20 °C to 55 °C.
All heat pumps are switched OFF immediately, when the temperature at the return sensor reaches this value during heating operation. This safety function prevents the high pressure limiter responding. Reaching this value will not trigger a fault message.
The return temperature is not scanned during DHW operation.

14 MAX HTG FL T

Maximum heat pump flow temperature for central heating
Setting range 20 °C to 65 °C.
This setting limits the heat pump flow temperature and all secondary heat sources during heating operation. This limiter shutdown applies to all heat pump types.

15 MAX DHW FL T

Maximum HP flow temperature for DHW
Setting range 20 °C to 65 °C.
This setting limits the heat pump flow temperature during DHW loading/heating. This limiter shutdown applies to all heat pump types.
See also parameter 33 DHW LEARN.

16 MIXER MAX

Maximum mixer flow temperature
Setting range 20 °C to 90 °C.
This setting limits the flow temperature of the mixer circuit. For example, if a higher set flow temperature is calculated from the mixer circuit data, the max. set mixer flow temperature is used by the controller, which regulates to this value.

17 MIX DYNAMIC

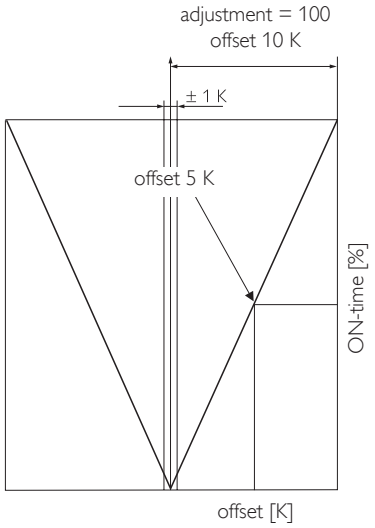
Mixer run time
Setting range 60 to 240.
This setting enables a matching of the mixer characteristics. Setting 60 to 240 means 6 K to 24 K control deviation.
The system scans every 10 s, and the minimum ON duration for the mixer is 0.5 s.
The mixer does not respond inside the dead zone of ±1 K from the set value.
Example: for a setting of 100 = 10 K (see Fig. below). The control deviation (set mixer temperature – actual mixer temperature) is 5 K. The mixer opens for 5 s, then pauses for 5 s and starts again from the beginning.

The control deviation (set mixer temperature – actual mixer temperature) is 7.5 K. The mixer opens for 7.5 s, then pauses for 2.5 s and starts again.

In other words, the smaller the control deviation, the shorter the mixer ON time and the longer its pauses. A reduction of the MIXER RESP TM value with static control deviation increases the ON duration and reduces pauses.

Example for setting 100 and a current control deviation of 5 K

5 K of 10 K = 50 % = ON duration



18 FROST PROTECT

Frost protection
To prevent the heating system freezing up, the heat pumps are started at the set frost protection temperature; the reverse hysteresis is 1 K.

19 SELECT REM CON

The FE 7 remote control can be selected for both heating circuits
Using the SELECT REM CON parameter you can predetermine for which heating circuit the remote control should be active. Under the parameter ROOM T 1 OR 2 on control level 2 you can scan the actual room temperature, subject to the remote control pre-selection.

20 ROOM INFLUENCE

FE 7 remote control
Standard setting 5 adjustable from ---- via 0 to 20 dashes (----) on the display:
With the FE 7 remote control connected, the room temperature sensor only serves to record and display the actual room temperature; it has no influence on the actual control. With the setting 0 TO 20 you can adjust the set room temperature for the heating circuit on the FE 7 remote control by ±5 K. This set value adjustment applies for the then current heating time, not for the setback time.
Similarly, setting 0 TO 20 serves to control the room temperature-dependent night setback. This means, the heating circuit pump is switched OFF at the point of changeover from the heating into the setback phase. It remains OFF, until the actual room temperature falls below the set room temperature. Afterwards the system regulates in weather-compensated mode.

Set the room sensor influence to a value of ≥ 2, if you want the room temperature to be taken into account. The room sensor influence has the same effect as the outside temperature sensor has on the return temperature. Only this effect is 2 to 20 times greater by the set factor.

Room temperature-dependent return temperature with outside temperature influence
With this type of control, a control cascade is formed from weather-compensated and room temperature-dependent return temperature control. In other words, the weather-compensated return temperature control pre-selects the return temperature, which is corrected by the overlaid return temperature control in accordance with the following formula:

$$\Delta\vartheta_R = (\vartheta_{Rset} - \vartheta_{Ractual}) * S * K$$

Because a substantial proportion of regulation is already taken care of by the weather-compensated control, the room sensor influence K can be set lower than with room temperature control (K = 20). The figure below indicates the control method with the set factor K = 10 (room influence) and a heating curve S = 1.2.

Room temperature control with weather-compensation
This type of control offers two substantial advantages:
Incorrectly set heating curves are corrected by room sensor influence K, whilst the smaller factor K provides more stable control.

However, observe the following for all control units with room sensor influence:
– The room sensor must record the room temperature precisely.
– Open doors and windows severely influence the control result.
– All radiator valves in the lead room must always be fully open.
– The temperature inside the lead room is decisive for the entire heating circuit.

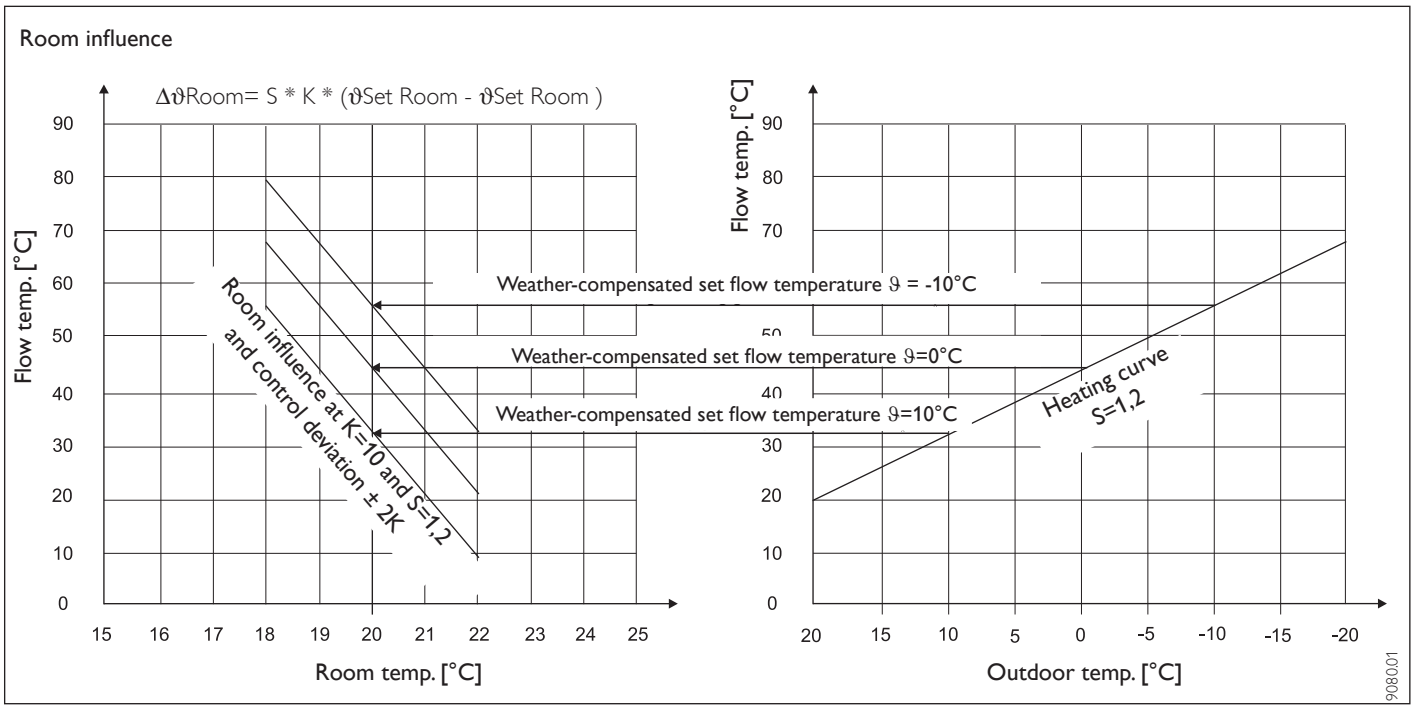
Set the room sensor influence > 2, if you want the room temperature to be taken into account.

21 ON T HS 2 HTG

Heating operation with ON T HS2

You can only select this setting with **HP type 1 (Not this HP!) and HP type 3**, if the sensor **HS 2** has been connected.
With **HP type 2** parameter **HS 2** is not available.
The HS 2 in heating operation will only be controlled via the return sensor. This means that the HS 2 (supplementary stage) is started, subject to load, below the dual-mode temperature (parameter 24 DUAL-MODE HTG).
Stage 1 = 2.6 kW
Stage 2 = 6.2 kW
Stage 3 = 8.8 kW

Setting HS 2 BGC:
HS 2 is directly connected to the heating circuit. This can take the form of direct interconnection into the buffer cylinder with an electric immersion heater or an interconnection in the heating flow with a modulating boiler. The HS 2 sensor must be connected to the heating flow of HS 2. HS 2 starts, subject to load, below the dual-mode temperature (parameter 23 DUAL-MODE HTG) as final state in the cascade. HS 2 controls the temperature to the calculated the return temperature + heating curve gap (parameter 25 HTG CURVE GAP). HS 2 will only shut down if this temperature has been reached. This means that it may be running on its own, even if this heat



pump is already switched OFF, and the set temperature for HS 2 has not been reached.

Start-up conditions for HS 2 are:
– The actual temperature is below the dual-mode temperature
– The heat pump operates with all stages
– The actual HS 2 temperature is < set return temperature

Setting HS 2 BOILER:
You cannot control heating circuit 2 (mixer circuit) with this setting. The mixer is used for HS 2. Connect the HS 2 sensor to the boiler and the mixer sensor to the heating flow. HS 2 starts, subject to load, below the dual-mode temperature (parameter 23 DUAL-MODE HTG) as final state in the cascade.
The mixer is closed during the heat pump operation.
After HS 2 has started, the mixer regulates to the set mixer temperature, provided: the temperature of HS 2 > the calculated set mixer temperature, and the actual mixer temperature < 1 K than the set mixer temperature.
HS 2 shuts down when it reaches the max. set boiler temperature (parameter 26 SET BOILER TEMP). It can operate on its own, if the heat pump is already OFF and the set temperature for HS 2 has not yet been reached.

Start-up conditions for HS 2 are:
– The actual temperature is below the dual-mode temperature
– The heat pump operates with all stages
– The actual temperature must be –5 K below the set boiler temperature.

22 HEAT LIMIT

Operational heat pump limit
The heat pump is switched OFF if the outside temperature falls below the selected lower limit for heating (parameter 22 HTG LIMIT). Heat source 2 provides central heating on its own.

23 DUAL MODE HTG

The dual-mode temperature of the heat pump for heating operation
Below this outside temperature, HS 2 will be started to provide heating subject to load (see also parameter 21 ON T HS 2).

24 OFF T HS 2

You can only adjust this parameter, if parameter 22 (ON T HS 2) has been set to ON.
Since the heat pump cannot meet a heating demand during times, when the electricity supplier shuts down his supply, it is advisable to define the characteristics of HS 2 for such times. If set to OFF, HS 2 will always take over the heating function during power off periods (even above the dual-mode temperature).

Enter the corresponding time in hours if HS 2 should be disabled for heating during the ESC off period.

25 HTG CURVE GAP

Heating curve gap
You can only adjust this parameter, if parameter 22 (ON T HS 2) has been set to ON.

26 SET BOILER T

See parameter 21 ON T HS 2;
setting HS 2 BGC and setting HS 2 BOILER.

27 ON T HS2 DHW

DHW operation with HS 2 enabled
You can only select this setting with **HP type 2**.

Parameter HS 2 DHW is not available for **HP type 2.** HS 2 in DHW mode will be controlled via the DHW sensor. This means that the internal HS 2 (supplementary heater) is started below the dual-mode temperature (parameter 29, DUAL-MODE DHW).

To control the second heat source in case of DHW demand, the output DHW circulation pump is switched subject to setting SUPPORTED being selected. For this, HS 2 supports the heat pump during DHW loading below the dual-mode point (parameter 29 DUAL-MODE DHW).

With setting INDEPENDENT, only HS 2 will provide DHW, i.e. independent of the dual-mode point. In case of DHW demand, the outputs DHW circulation pump + DHW loading pump are switched to control HS 2.

Set parameter 32 DHW stages to 0, as soon as this setting has been selected, as the heat pump no longer provides DHW.

With setting ALONE, only HS 2 will provide DHW heating below the dual-mode point.
To control HS 2 in case of DHW demand, this setting switches the output of the DHW circulation pump.

28 DHW LIMIT

Operational heat pump limit
The heat pump is switched OFF if the outside temperature falls below the selected lower DHW limit (parameter DHW LIMIT).
Heat source 2 provides DHW on its own.

29 DUAL MODE DHW

Dual-mode heat pump temperature for DHW operation
Below this outside temperature, HS 2 will be started to provide DHW subject to load (see also parameter 27 ON T HS 2 DHW).

30 DHW AUTO

Automatic DHW operation independent of outside temperature

The menu point DHW AUTO can be switched ON or OFF.
For multi-stage WPL, DHW heating takes place subject to load and outside temperature.
Automatic operation applies to multi-stage air/water heat pumps.
In addition an adjustable outside temperature can be selected.
Setting range: –15 °C to + 30 °C, standard setting 5 °C
Above ≥ 5.1°C, only one heat pump stage produces DHW.
At ≤ 5.0 °C, stage 1 starts; 10 s later stage 2 is added and so forth.

⚠ All DHW stages must be enabled as soon as DHW AUTO is utilised

31 DHW LEARN

DHW learning function
DHW heating with HP type 1 realises automatic matching of the DHW temperature to demand (self-learning effect).
As soon a the heat pump is switched OFF via the maximum DHW flow temperature (parameter 15 MAX DHW FL T) or via the hot gas limiter during DHW heating, the supplementary heater element (internal HS 2) is started as reheating stage.
If, during this operation, a DHW flow temperature of 80 °C is reached, the supplementary heater element is switched OFF, and DHW heating is terminated. In addition, the set DHW temperature is overwritten with the actual DHW temperature.

For HP type 2, the heat pump is switched OFF during DHW heating and when the maximum DHW flow temperature has been reached, and DHW heating is terminated.
In addition, the set DHW temperature is overwritten with the actual DHW temperature.

32 DHW STAGES

Heat pump stages for DHW

Here, you can pre-select the number of heat pump stages for DHW loading. Stages can no longer be set to 0 when a DHW sensor is connected.

33 DHW HYSTERIS

This determines the switching hysteresis for DHW operation.

– Starting DHW loading at DHW set value minus hysteresis.

34 PASTEURISATION

You can only select this setting with **HP type 2**.
With activated pasteurisation, the DHW cylinder will be heated to 60 °C every 20th loading or once a week on Saturday at 01:00 h.

35 CNTRL RESP TM

Setting range 0 to 30
The selected control response time is a measure of the switching gap between the individual compressor stages.
The selected control response time is a measure of the switching gap between individual compressors and the internal HS 2. Normally, the selected response time should operate sufficiently fast and without oscillation.
Heating systems which respond quickly require a lower value, whilst very slow reacting systems require you to set a higher

36 COMP IDLE TIME

After a heat pump has been switched OFF, an idle time is set as protection for the compressor. The default idle time of 20 minutes should normally not be reduced. Where a reduction is required because of adjustments or repair work, reset the idle time again to 20 minutes after completing the necessary work.

37 COMP DLAY CNTR

Residual idle time
Pressing PRG enables you to scan the idle times of the individual compressors.

38 QUICK START

During commissioning, you can test the heat pump function by triggering a quick start for all heat pumps. When this parameter is started, OFF appears at the bottom of the display. Pressing PRG initiates a quick start. The respective pumps are started after the heat pump start. The value 60 is visibly counted down to 0 in the display; then the display shows ON.
After that, compressor 1 and the associated buffer loading pump are switched ON. All compressors are then started in 10 s intervals. You terminate this function by pressing PRG or by closing the control flap. OFF is displayed again.

39 RELAY TEST

Pressing PRG and continuing to turn the rotary selector allows you to individually call up the WPM relay outputs. The individual outputs are displayed as plain text.

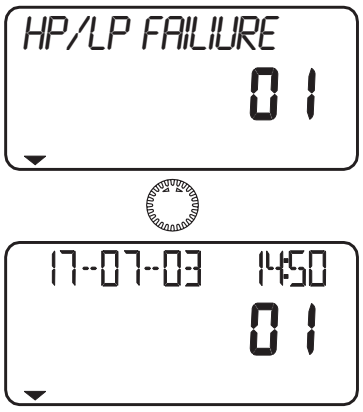
40 LCD TEST

Pressing PRG once initiates a LCD test. All display elements are displayed in sequence.

41 ERROR LIST

Pressing PRG displays fault code 1. The fault is described in plain text at the top of the display, the bottom shows the fault number. Continuing to turn the rotary selector still displays fault 1. As additional information, the display shows the day, month and year together with the relevant time, when the fault occurred. At the bottom of the display, arrows indicate the HP number. Arrow 1 means HP 1, arrow 2 means HP 2 etc.
In total, 20 faults can be displayed. You can reset the error list via a hardware reset.

Example:
The high pressure or low pressure limiter has responded on the 17.07.03 at 14:50 h representing the latest fault in heat pump 1.



42 SOFTWARE WPM

Display of the software version in WPM.

43 SOFTWARE IWS

Pressing PRG displays the software version of the individual heat pumps.

44 TYPE IWS

Pressing PRG enables you to call up the factory settings of the heat pumps (rotary switch position on the IWS), which will be shown in the display.

Rotary switch position IWS:
1 Single compressor with internal HS 2 (supplementary heater).
9 Single compressor with external HS 2.

45 ANALYSIS

Function for checking the system state during initialisation or during operation. At the top of the display, figures from 1 to 6 indicate the number of connected heat pumps.
An MSM is connected, if the display shows 7.
The bottom of the display shows the enabled stages. However, this does not mean that these are operating. For this, the idle times of the individual heat pumps must first reach 0.
The two-digit display shows the internal controller calculation. A stage will be switched every time the counter has counted down to zero. This calculation depends on the control response time and the control deviation, see parameter 35.

46 DIAGNOSTIC

Pressing PRG displays the connected BUS users in sequence.

47 RESET HP

You can reset the heat pump in case of faults. That fault is reset by pressing PRG and setting the system to ON, followed by repeatly pressing PRG. The compressor starts again after the idle time has expired. The fault remains in the error list.

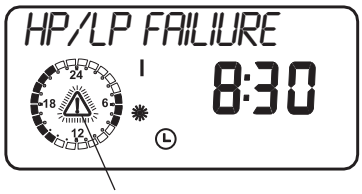
48 RUN TIMES

Pressing PRG displays, in sequence, the run times of the individual compressors, secondary heat sources and the solar heating pump in hours. Run times can only be reset via a hardware reset.

2.13 Troubleshooting

Faults/errors in the system or in the heat pump are indicated on the display. All parameters required for extensive system analysis can be checked under system parameters COMMISSIONING and INFO TEMP.
For troubleshooting, analyse all available WPM parameters before opening the heat pump (to gain access to the IWS).

2.13.1 Fault display:
Heat pump-specific or hardware fault



Fault message (flashing)

All faults (except hot gas) causes the heat pump to shut down, the red LED on the IWS flashes for approx. 10 minutes, the idle time is set and the corresponding fault is written to the error list.
The heat pump starts again after the IWS fault time and the idle times have expired. The heat pump will only re-start after expiry of the idle time, even if a heat pump reset has been implemented or if the red LED on the IWS no longer flashes.
Fault inputs on the IWS have no effect. In standard operation this means, that 230 V is always present at the fault inputs.
The hot gas fault is purely a limiter shutdown, i.e. there will be no fault shutdown, the red LED on the IWS will not flash, and no fault will be written to the error list. Only the idle time will be set.
One special feature of faults is OTHER FAULTS. This scans the input during operation and when the heat pump has stopped.
After the heat pump has been switched OFF (controlled shutdown), and after the expiry of 10 s, the 230 V signal must be present. If that is not the case, the red LED on the IWS will flash, and OTHER FAULTS will be displayed.

⚠ Such faults are written to the error list, and the system will be switched OFF. The display message will extinguish 10 min after the fault has been removed. The system will be shut down permanently, if 5 heat pump-specific or hardware faults occur inside of five hours. Under these circumstances, you can only restart the heat pump after the fault has been removed and the IWS has been reset.

Additional parameters available for system analysis:

Parameter 38 QUICK START:
Check the heat pump compressor by implementing a quick start.

Parameter 39 RELAY TEST:
Test all relays in WPM

Parameter 44 TYPE IWS:
Software check of the position of the rotary selector (IWS)

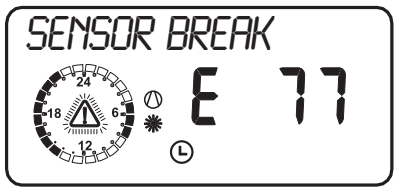
Parameter 45 ANALYSIS:
System analysis for checking all existing BUS users and the compressor stages, which are switched ON.

Parameter 47 RESET HP:
Heat pump reset to clear all saved faults.

Parameter 45 ERROR LIST Checking all faults according to the fault list

Fault	Cause	Remedy
SOURCE MIN	The defined minimum source temperature was not reached.	Check the minimum source temperature and change, if required. Check the source volume flow. Check source design.
OTHER FAULT	„Other fault" for IWS was triggered.	Check the source parameter. Check the volume flow parameter. Check the source design. Check contactors K1 and K2.
HP/LP FAULT	The high or low pressure limiter of the heat pump has responded.	High pressure limiter: Check the RTRN MAX (max. return temperature) parameter. Check the volume flow and temperature on the heating side. Check the connection of the flow and return sensors. Low pressure limiter (WPF-M): Check the volume flow and temperature on the source side. Check the refrigerant level (sight glass). Low pressure limiter (WPL): Is the evaporator iced up? • Initiate a manual defrost • Check the defrosting function Has refrigerant escaped? • Check the level (sight glass). • Notify customer service
FROST PROTECT	The frost protection sensor of the IWS is faulty. Problems during defrosting.	Check the terminals of the frost protection sensor. Replace sensor. Defrosting (parameter 38).
RELAY DRIVER	The IWS fan monitor has a relay driver fault.	You can reset the system via parameter 51 HP RESET. Notify customer service if this fault occurs several times.
RELAY VOLTAGE	The IWS fan monitor has a relay voltage fault.	You can reset the system via parameter 51 HP RESET. Notify customer service if this fault occurs several times.
ROTARY SWITCH	The rotary switch of the IWS is faulty or has been incorrectly adjusted.	You can reset the system via parameter 51 HP RESET. Notify customer service if this fault occurs several times.
GRAVITY SWITCH	The gravity switches of the IWS are not closed. IWS hardware fault	Close the gravity switches.
HARDWARE FAULT	IWS hardware fault	You can reset the system via parameter 51 HP RESET. Notify customer service if this fault occurs several times.

2.13.2 Fault display: Sensor fault



Such faults are written to the error list, and the system will be switched OFF. The display message will extinguish 10 min after the fault has been removed. The system will be shut down permanently, if 5 heat pump-specific or hardware faults occur inside of five hours. Under these circumstances, you can only restart the heat pump after the fault has been removed and the IWS has been reset.

Observe the list under system parameter INFO TEMP. (see page 8).

Sensor	Fault code
Outside temperature	E 75
Actual room temp. (H2)	E 80
Actual DHW temp.	E 76
Actual HP return temp. (H1)	E 73
Actual mixer flow temp. (H2)	E 70
Actual HP flow temp.	E 72
Actual boiler temp. HS 2	E 77
Actual source flow temp.	E 71
Flow or return sensor (for heat metering)	E 128
DHW or collector sensor (for solar heating operation)	E 129

2.13.3 The heat pump does not run

The heat pump is in standby mode [⏻]
Remedy: Change to programming mode

Power supply blocked; standby symbol flashing [⏻]
Remedy: Wait; the heat pump restarts automatically at the end of the lockout period.

There is no heat demand
Remedy: System parameter INFO TEMP
Check temperature, compare actual with set temperature

BUS cable incorrectly connected
Remedy: Check that high, low and ground of the BUS cable from the heat pump to the WPM are not interchanged. How many BUS users were found by the WPM? Check via parameter 46 DIAGNOSTIC

Possibly incorrect fuse rating
Remedy: Check in line with the specification in the heat pump installation instructions.

Five heat pump-specific faults or hardware faults have occurred in the heat pump system within five hours. The system is permanently shut down.
Remedy: Reset the HP (parameter 47)

2.13.4 Checking the settings at the IWS

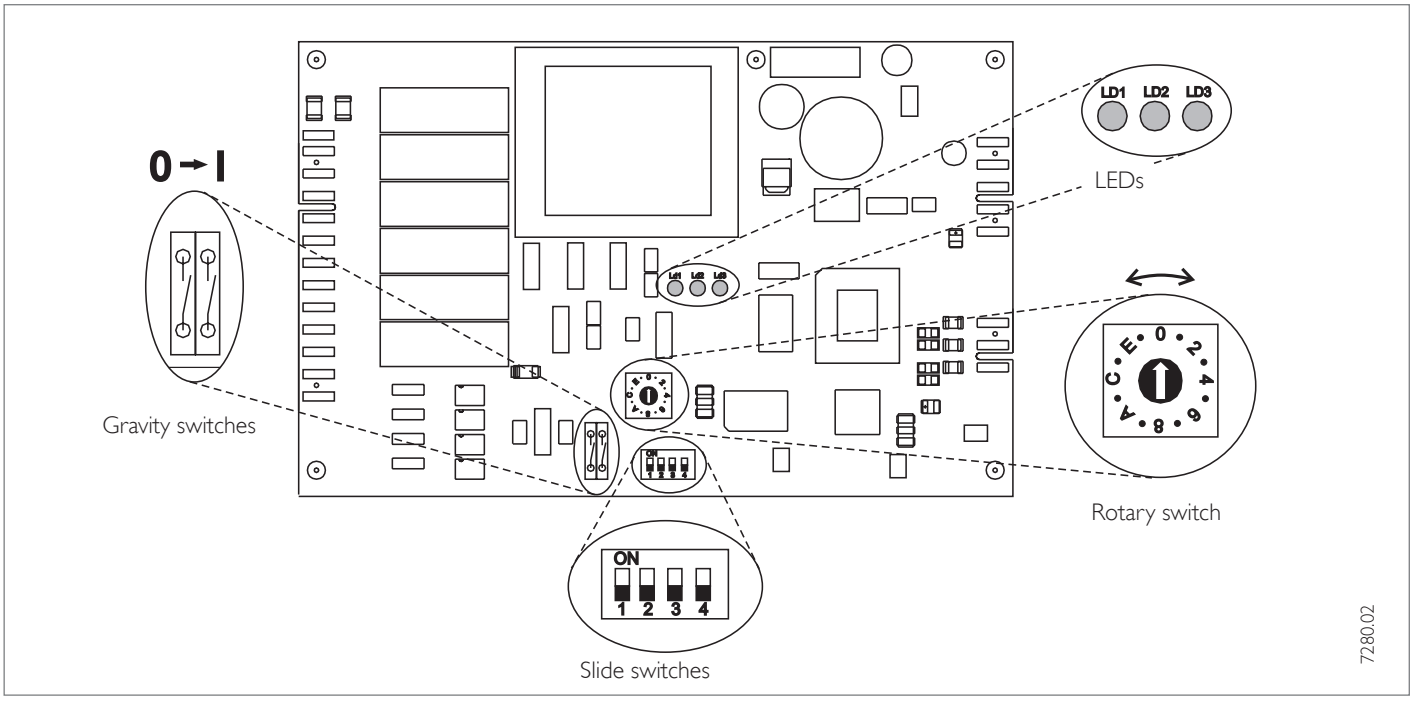


Fig. 16

The control panel with the "Internal heat pump control" (IWS) is accessible after removing the front cover. The following lists the IWS adjustments required for the WPF:

Rotary selector
You can chose various compressor systems with the rotary selector. For the WPF, this was set in the factory to **1**, subject to the heat pump type.

1 Single compressor with internal HS 2 (supplementary heater)

If the WPF is to be operated in dual-mode together with a second heat source other than the supplementary heater, then set the rotary selector to

9 Single compressor with external HS 2.

Please check the rotary selector for correct setting.

Gravity switches

⚠ Both Gravity switches must be closed on the WPF.

Slide switches
The slide switches S1 and S2 have no effect for the WPF.

Slide switch S3 position
Switch ON: SERVICE
Corresponding compressors (defaulted by setting the rotary selector) are started in one second intervals.

Slide switch S4 position
Switch ON: STAND ALONE operation
This operating mode is not available for the WPF (it is also inappropriate, as the control unit is an integral part of this heat pump). Therefore ensure, that this switch is always set to OFF.

LEDs
Red LED: Flashing or static:
The LED flashes if a heat pump fault occurs once.
The system will be shut down:
The red LED becomes static, if more than five heat pump faults occur within five hours. The system will be shut down permanently.
In both cases, the fault will be entered into the ERROR LIST (parameter 41) of the WPM.
Operation can start 10 minutes after the fault has been removed; the LED goes out.
To delete faults at the IWS, select parameter 47 RESET HP, then press PRG to reset the IWS. The internal counter will then be returned to zero.
Heat pump faults indicated by the LED: High pressure fault / low pressure fault, other faults and hardware faults at the IWS (see parameter 41 ERROR LIST).

Green LED centre:
Flashes during initialisation, and becomes static after the BUS address has been allocated successfully. Only then is the communication with WPM possible. This is only relevant for the WPF, if the control unit is replaced, otherwise the unit is initialised at the factory.

Green LED right:
Illuminates constantly, when stand alone operation has been selected.

2.14 Commissioning report

⚠ The controller should be in standby mode during commissioning. This prevents an uncontrolled heat pump start. Please remember to reset the system into its last operating mode.

No.	PARAMETER	SETTING RANGE	STANDARD	SYSTEM VALUE
1	ENTER CODE	0000 to 9999	1000	
2	LANGUAGE		GERMAN	
3	CONTRAST	– 10 TO + 10	0	
4	DISPLAY		ACTUAL RETURN	
5	EMERGENCY OPR	ON / OFF	OFF	
6	SYSTEM TYPE	ON / OFF	OFF	
7	HEAT-UP PROG	ON / OFF	OFF	
8	SUMMER OPR	ON / OFF	ON	
9	PUMP CYCLES	ON / OFF	OFF	
10	FIXED TEMP	OFF / °C	OFF	
11	SOURCE		ETHELENGLYC	
12	MIN SRCE TEMP	– 10 °C TO 10 °C	– 5 °C	
13	MAX RET TEMP	20 °C TO 55 °C	50 °C	
14	MAX HTG FL TEMP	20 °C TO 65 °C	60 °C	
15	MAX DHW FL TEMP	20 °C TO 65 °C	60 °C	
16	MAX MIXER TEMP	20 °C TO 90 °C	50 °C	
17	MIXER RESP TM	30 - 240	100	
18	FROST PROTECT	– 10 °C TO 10 °C	4 °C	
19	SELECT REM CON		HEAT CIRC 1	
20	ROOM INFLUENCE	0 TO 20	5	
21	ON T HS 2	ON / OFF	OFF	
22	HEAT LIMIT	OFF TO 30 °C	OFF	
23	DUAL-MODE HTG	– 20 °C TO 30 °C	0 °C	
24	OFF T HS 2	OFF TO 10 h	OFF	
25	HTG CURVE GAP	1 K TO 10 K	3 K	
26	SET BOILER TEMP	60 °C TO 100 °C	70 °C	
27	ON T HS 2 DHW	ON / OFF	OFF	
28	DHW LIMIT	OFF TO 30 °C	OFF	
29	DUAL-MODE T DHW	– 20 °C TO 30 °C	0 °C	
30	DHW AUTO	ON / OFF	OFF	
31	DHW LEARN	ON / OFF	ON	
32	DHW STAGES	1 – 6	1	
33	DHW HYSTERESIS	1 °C TO 10 °C	3 °C	
34	PASTEURISATION	ON / OFF	OFF	
35	CNTRL RESP TM	1 – 30	20	
36	COMP IDLE T	2 TO 20 MIN	20 MIN	
37	RES IDLE TIME			
38	QUICK START			
39	RELAY TEST			
40	LCD TEST			
41	ERROR LIST			
42	SOFTWARE HP			
43	SOFTWARE IWS			
44	IWS TYPE			
45	ANALYSIS			
46	DIAGNOSTIC			
47	RESET HP (IWS)			
48	RUN TIMES			

Note

Note

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