

Maintenance manual WPE-I xxH 400 Premium

Version D0000089110-b 09/09/2019

This manual list all required steps and measures for the maintenance of this heat pumps series.



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1. General information

Work on an open appliance and repair work or maintenance should only be carried out by a person trained by STIEBEL ELTRON. Current safety instructions contained in the operating and installation instructions for the appliance must be observed.

2. Relevant appliances

Equipment code	Part number	Versions
WPE-I 33H 400 Premium	201412	A
WPE-I 44H 400 Premium	201413	B
WPE-I 59H 400 Premium	201414	C
WPE-I 87H 400 Premium	201415	D

Table 1 Relevant appliance versions

3. Function description

3.1 Function description for versions A to D

The WPE-I xx H Premium heat pump is an inverter ground source heat pump with output-dependent control for indoor installation. It is designed for mono mode use for heating and DHW. With the help of additional hydraulic components, the existing source system can be used for passive and active cooling, or even for simultaneous heating and cooling. Suitable for apartment buildings and commercial applications. For a high heating output, up to **6 heat pumps** can be cascaded. Optimised for a small installation area thanks to vertical design. The integral inverter makes the heat pump flexible and versatile, enabling it to be installed in various building types. The inverter continually adapts the heating output of the heat pump to the amount of energy currently required. There are two highly efficient circulation pumps on both the brine and heating sides. During normal heat pump operation, the hot gas technology enables the hot gas to be utilised directly to simultaneously heat the DHW via an additional heat exchanger. The integral heat pump controller with colour touchscreen enables fully automated, weather-compensated control of the heating system and, when combined with the optional ISG, the ability to control the system via a home network or a mobile terminal device. External control of the heating system by a building management system is possible as an option. To minimise the transfer of structure-borne sound to the building, the refrigerant circuit is mounted on an anti-vibration base plate and its hydraulic connections are flexible. The refrigerant circuit is hermetically sealed, tested at the factory for leaks and filled with safety refrigerant R410A. The inbuilt inverter ensures optimum year-round operation of the heat pump and therefore maximum efficiency. The standard-fitted hot gas technology allows high DHW temperatures to be achieved very efficiently and economically.

The internal pressure hoses enable a direct hydraulic connection to the heating and brine circuits.

4. Product illustration



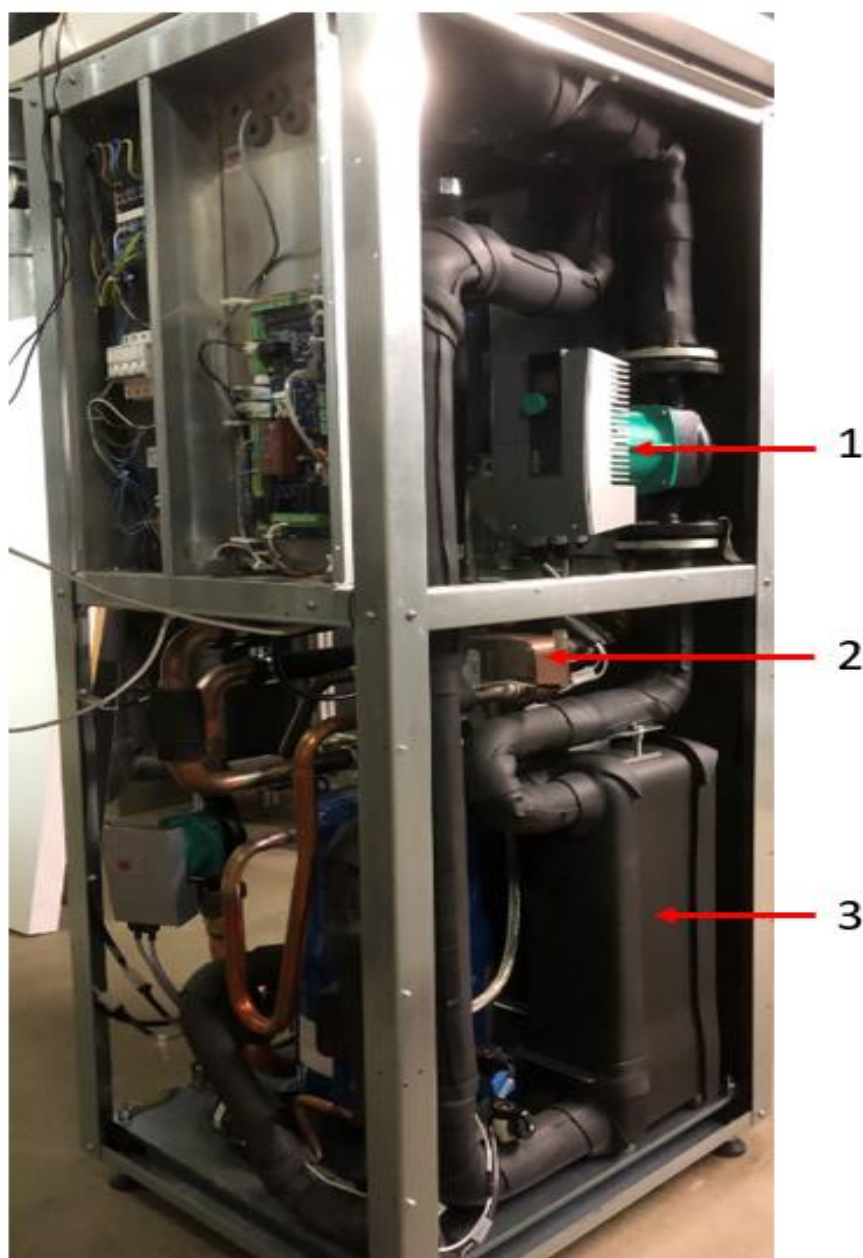
Figure 1 Heat pump versions A and B



Figure 2 Heat pump versions C and D

4.1 Appliance layout

4.1.1 Layout of versions A and B



- 1 Brine pump
- 2 Heat exchanger, hot gas
- 3 Evaporator

Figure 3 Heat pump versions A and B, right-hand side

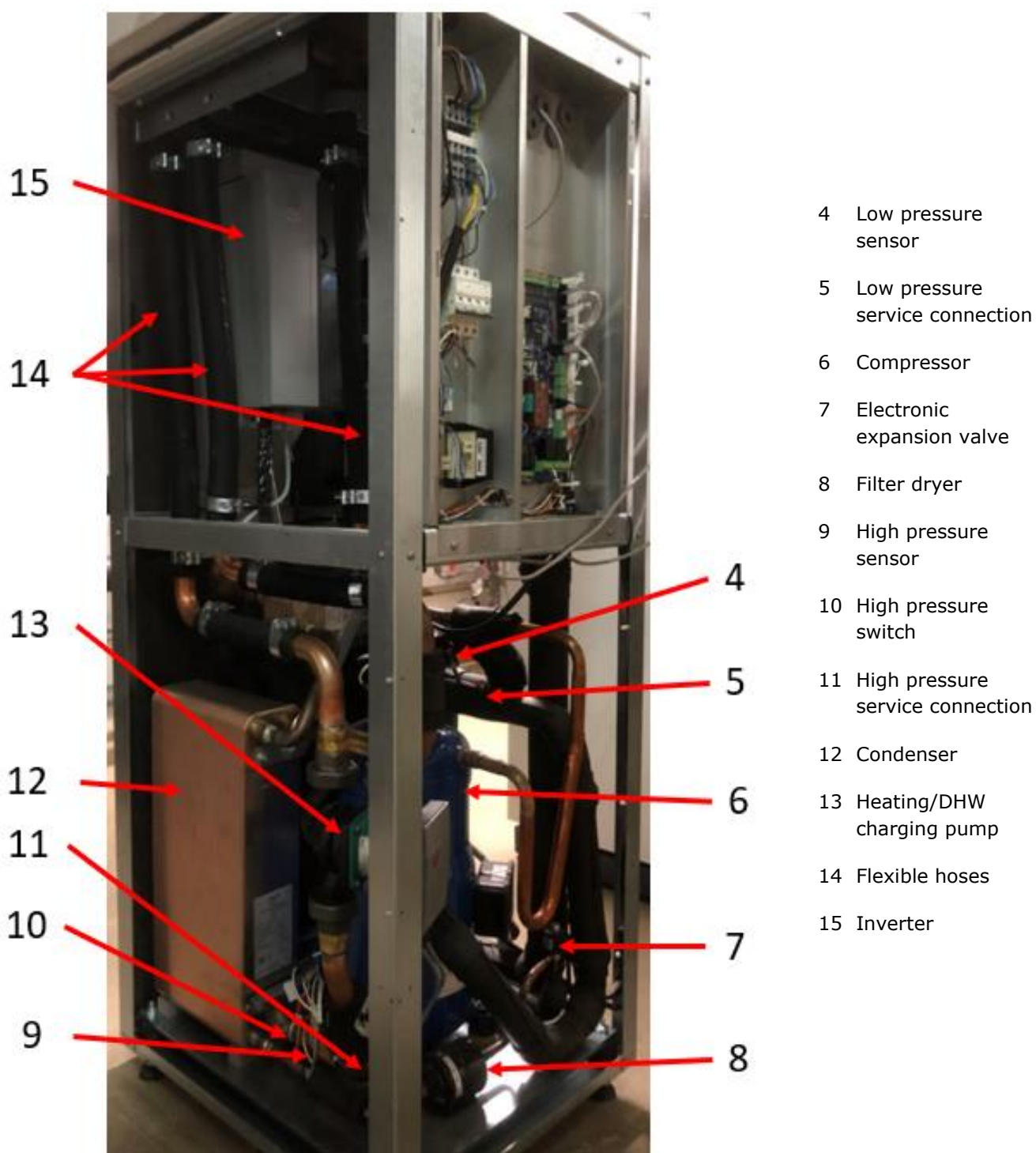


Figure 4 Heat pump versions A and B, left-hand side

4.1.2 Layout of versions C and D

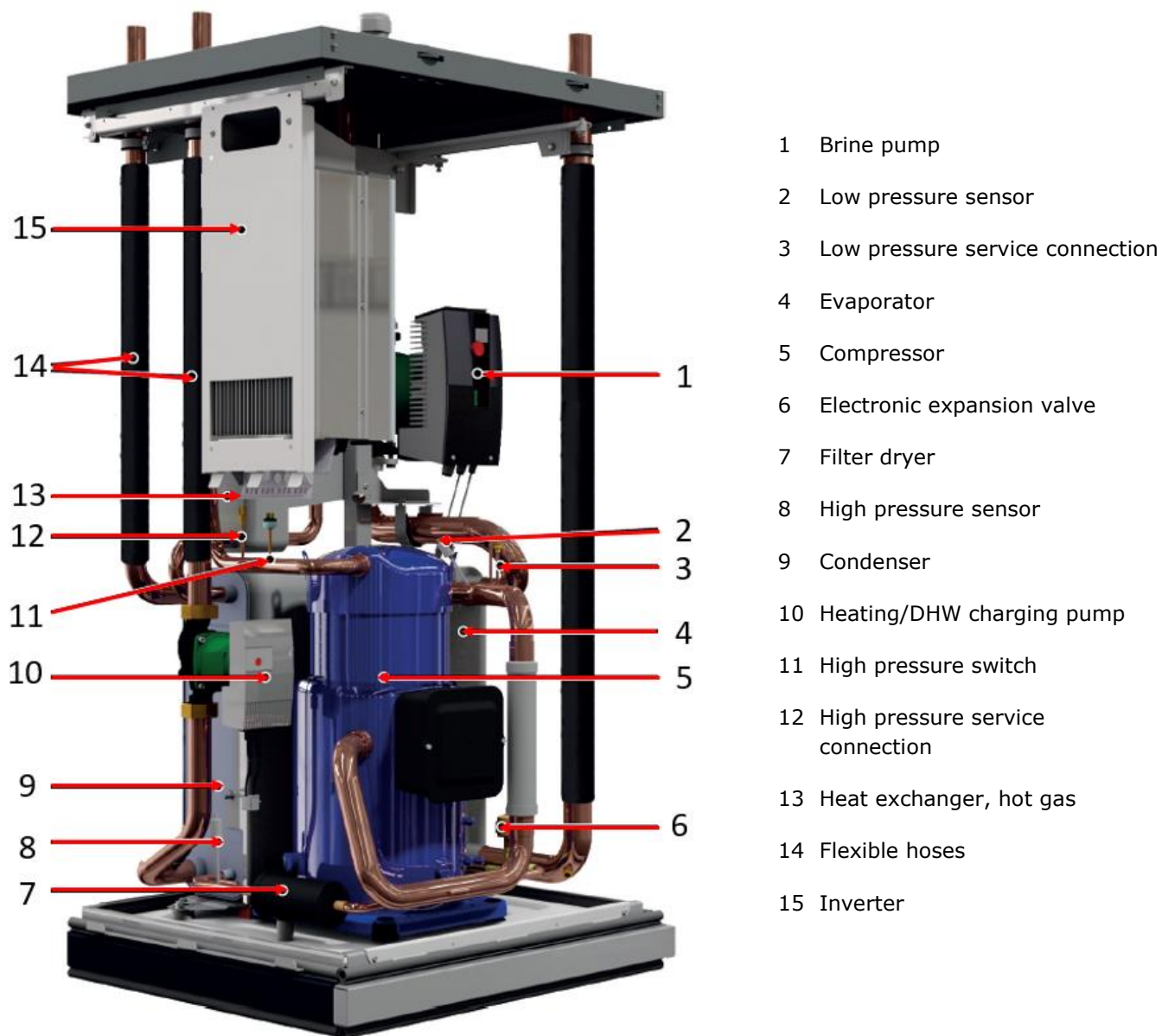


Figure 5 Heat pump versions C and D

5. Maintenance report

Maintenance checklist, heat pump WPE-I xxH 400 Premium

ORD number

Date of service

Location

Name			
Additional specification			
Street			
Country, postcode, town			

Appliance details

Appliance ID number		Appliance type		Works no.
Date of purchase		Manuf. no.		

Maintenance, general

Visual inspection of appliance components	☐	actioned		
Controller settings checked	☐	actioned		
Check refrigerant circuit for leaks (to EC No 517/2014)	☐	actioned		
All water carrying connections and components checked for leaks (visual inspection)	☐	actioned		
Circulation pump(s) checked for correct function	☐	actioned		
Heating expansion vessel checked (if cap valve installed), pre-charge pressure p0 =	MPa	☐	actioned	
Heating system pressure checked	pa =	MPa	☐	actioned
Function test completed			☐	actioned

Ground source heat pump

Plausibility of temperature values checked	☐	OK	☐	Not OK	
Brine expansion vessel checked (if cap valve installed), pre-charge pressure p0 =	MPa	☐	actioned		
Brine system pressure checked	pa =	MPa	☐	actioned	
Brine frost protection limit measured	°C	☐	actioned		
Brine pressure switch/flow sensor installed		☐	installed	☐	not inst.
Brine pressure switch, activated if installed		☐	activated		
Brine pressure switch only activated when compressor is running		☐	activated		
Brine outlet monitoring activated	Brine outlet min. =	°C	☐	activated/temperature recorded	
Brine temperature spread limit alarm		K	☐	temperature recorded	
Brine inlet monitoring activated	Brine inlet min. =	°C	☐	activated/temperature recorded	

Recording temperature values

DHW start temperature					°C
DHW stop temperature					°C
Brine/water inlet temperature		°C	Heating flow temperature		°C
Brine/water outlet temperature		°C	Heating return temperature		°C

High pressure switch test – MANDATORY TEST

High pressure switch test carried out	Shutdown value of the high-pressure switch		bar	☐	actioned
---------------------------------------	--	--	-----	--------------------------	----------

Testing acc. to VDE 0701 / 0702

Earth conductor resistance	R _{PE}		Ohm	Differential current, emergency/booster heater	I _{diff.}		mA
Controller differential current	I _{diff.}		mA	Contact current I _B	I _{diff.}		mA
Compressor differential current	I _{diff.}		mA	Values OK	☐ Yes ☐ No		

Notes

Identified faults that must be remedied in a separate contract

Date

Town

Service engineer no.

Customer signature

Service engineer signature

6. Maintenance

6.1 Maintenance process

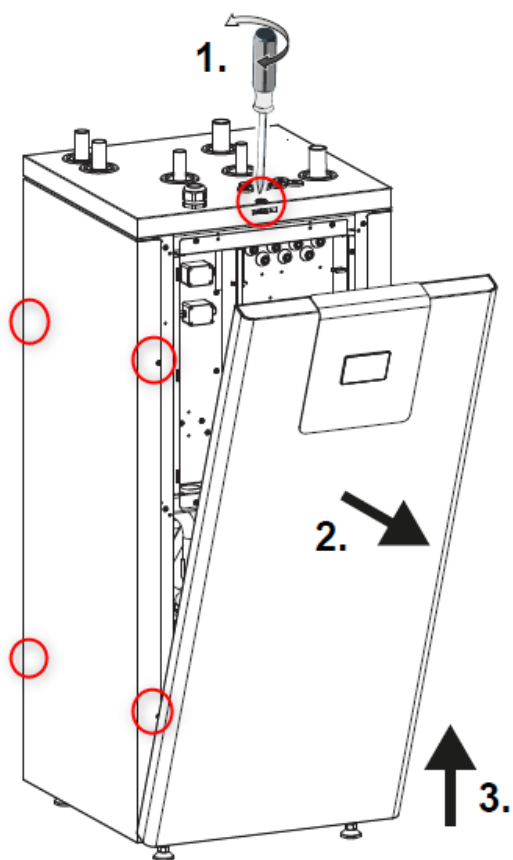
The individual maintenance points from the maintenance report regarding the heat pump are described below. The maintenance process can be customised during the process.

6.1.1 Maintenance, general

Visual inspection of appliance components

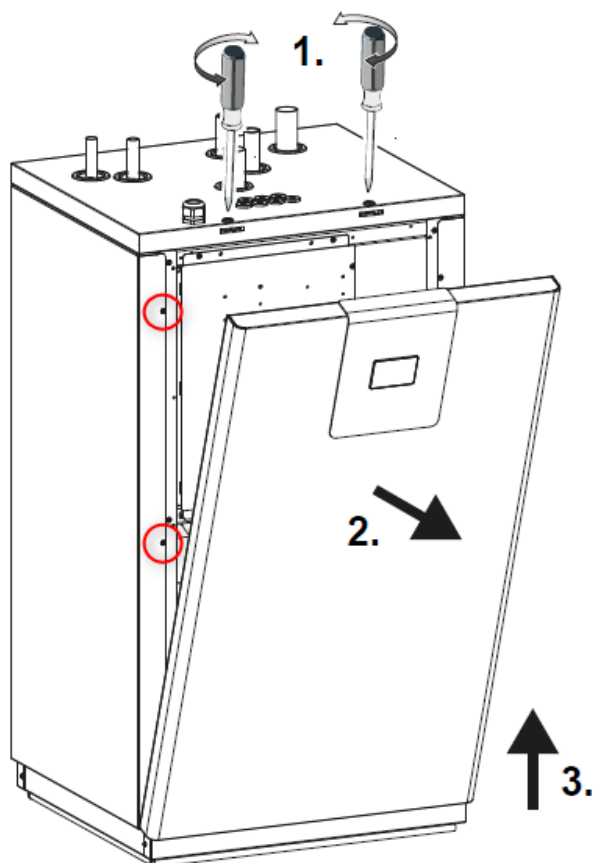
☐ actioned

Completely disconnect the appliance from the power supply and check the zero volt state. Then remove the casing sections.



1. Open the top closure using a screwdriver
2. Pull the casing forward
3. Lift the casing out of the bottom guide
4. Remove the screws for the side panels
(2 screws at the front and 2 screws at the back) and remove the side panels

Figure 6 Heat pump types A and B – casing



1. Open the top closures using a screwdriver
2. Pull the casing forward
3. Lift the casing out of the bottom guide
4. Remove the front screws for the side panels. Then lift the casing out of the back guide and remove the side panels

Figure 7 Heat pump types C and D – casing

Initial checks of all assemblies can be carried out. In the event of severe damage that prevents a correct completion of the service, the appliance must first be repaired.

Once the maintenance work has been completed, reassemble in reverse order.

Controller settings checked

☐ actioned

In the controller settings, check the standard settings. With this heat pump type, the controller is located at the front of the casing.

The standard settings are the time, day/night room temperature, day/night DHW temperatures, the heating curves of the individual heating circuits and the operating mode.

Changes to individual settings should be documented in the notes. If a customer has change requests, these must be documented as a customer request in the notes.

The figures below show how to access the individual menu items in the controller. Settings relate to the individual system and are not specified here.

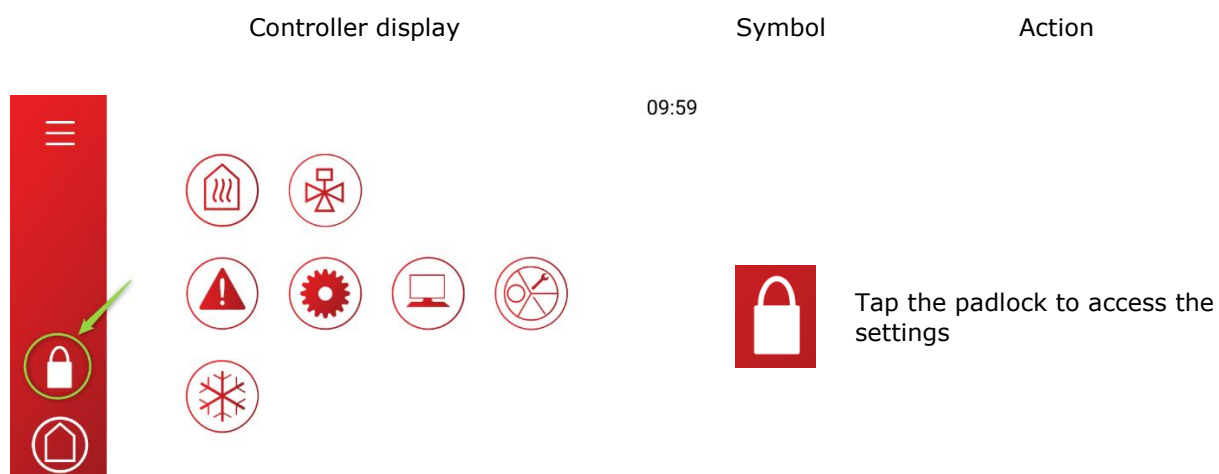


Figure 8 Access code 1 setting

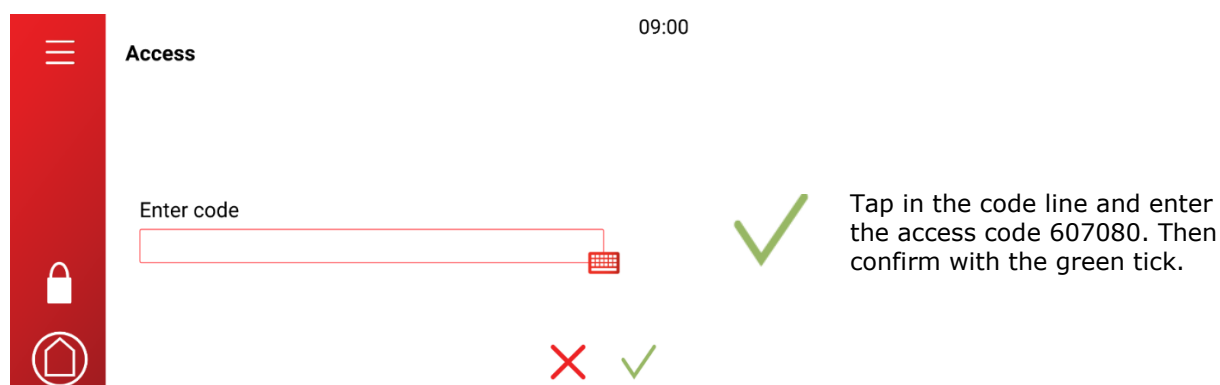


Figure 9 Access code 2 setting

Controller display	Symbol	Action
		To go to the main menu, press the button with the white lines at the top left of the controller.
		To switch the heat pump "On" or "Off", go to the "Operating mode" submenu.

Figure 10 Operating mode settings

		To switch off the heat pump, tap on the circle shown.
		To switch it back on, tap on the circle with the line.
		When the circle is green, the heat pump is back in standard mode.

Figure 11 Switch-off-1 settings

		When switching off, the action must be confirmed with the green tick.
		The grey double circle turns red to confirm switch-off.

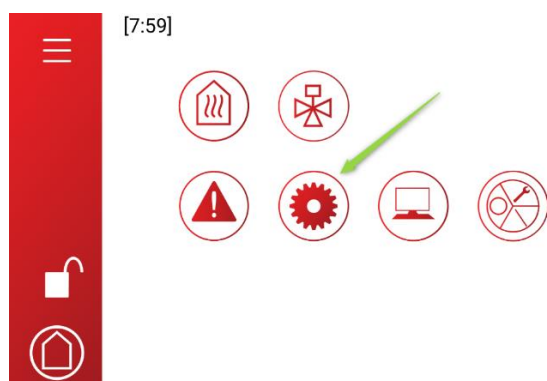
Figure 12 Switch-off-2 settings

Maintenance manual WPE-I xxH 400 Premium

Controller display

Symbol

Action



10:07



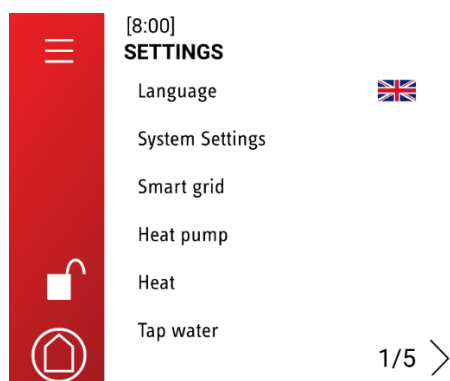
When the access code is entered, an open padlock is displayed and is active for 8 hours.

Return to the main menu.



Use the red gearwheel to select individual menu settings.

Figure 13 Main menu setting



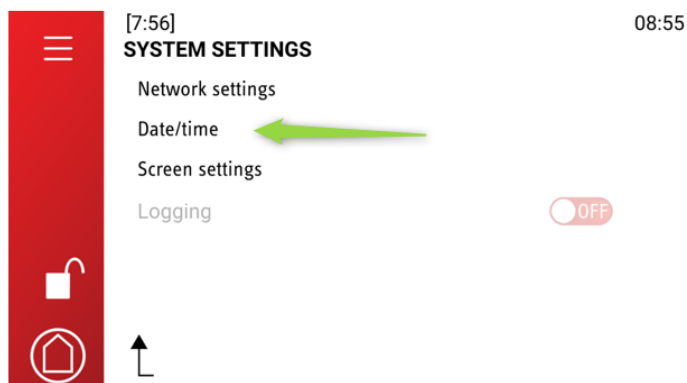
09:03

Select "System setting".

1/5 >

If necessary, correct the date and time.

Figure 14 Main menu page 1/5



08:55

Select the "Date/time" menu item.

Figure 15 Date/time 1 settings

Controller display	Symbol	Action
		Change the menu item (the year in this example) using the arrow buttons.
		The green tick in the bottom menu bar saves the new value. Once a setting has been made, return to the main menu.

Figure 16 Date/time-2 settings

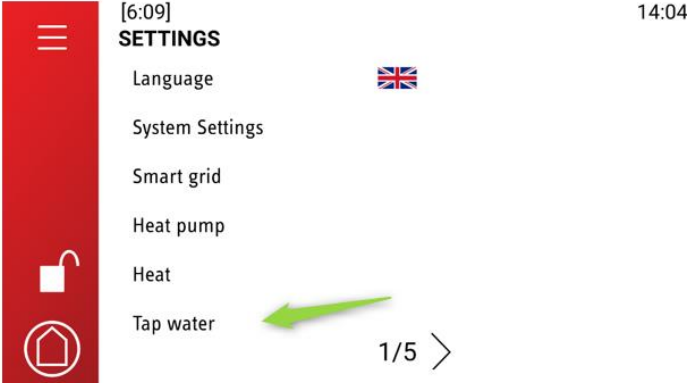
		If DHW heating has been activated, select "Tap water" [= domestic hot water].
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Figure 17 DHW-1 settings

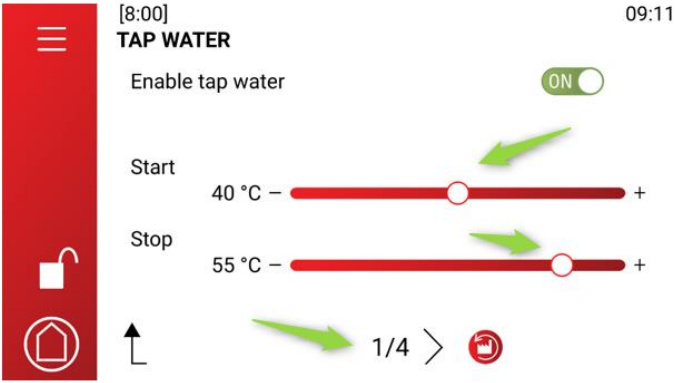
		DHW temperatures can be changed in the submenu on page 1/4.
		Once a setting has been made, return to the main menu. DHW start and stop temperatures can be transferred to the measured values table.

Figure 18 DHW-2 settings

Controller display

Symbol

Action



Figure 19 Room temperature 1 settings

Press the home button to go to the room temperature setting.



The figure here shows the standard heat pump display. For example, a room temperature of 22 °C is selected here.

When a change is made, this leads to a parallel offset of the heating curve.



Figure 20 Room temperature 2 setting

To change the room temperature (22 °C here), tap on the temperature circle and drag it up or down.



When the required temperature value is reached, let go of the temperature circle and the new temperature value is set.

Use the arrow to return to the menu.

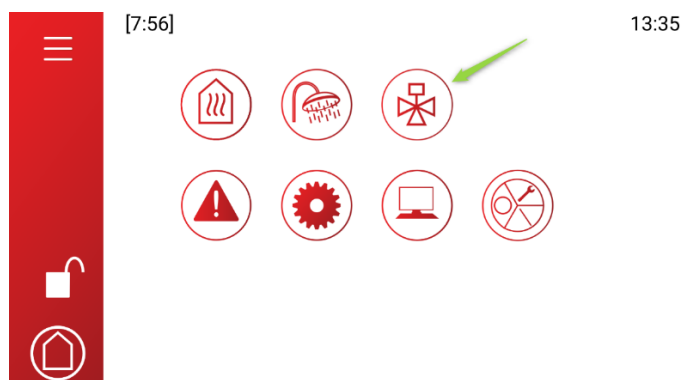


Figure 21 Main menu-1 setting



Select the main menu

In the main menu, tap on the mixer symbol.

Controller display

Symbol

Action

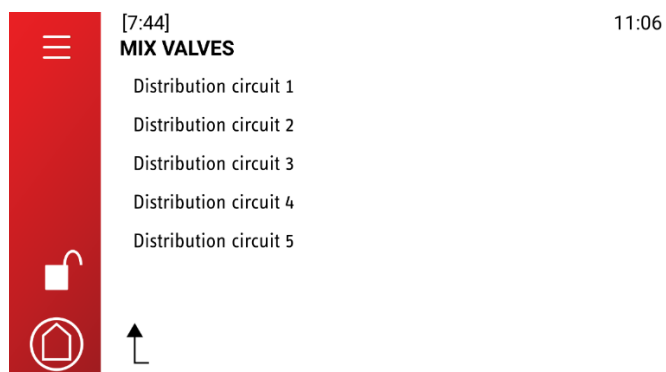


Figure 22 Mixing valves 1 settings

Select the "Distributing circuit"
[=heating circuit] to be changed.

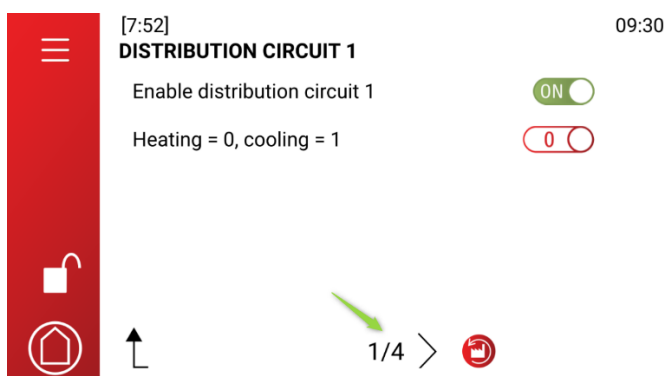


Figure 23 Mixing valves 2 setting

Here, distribution circuit 1
[=heating circuit 1] is selected
as an example.

< 3/4 >

From this page, go to page 3/4.

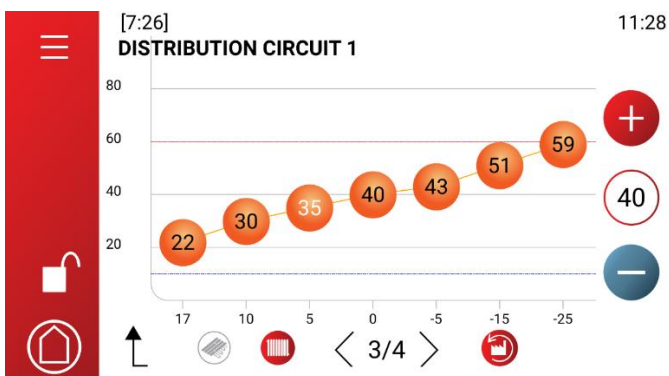


Figure 24 Mixing valves 3 settings

40

In this menu, it is possible to
customise the heating curve.

+

Change the temperature value
on the right (40 °C) with "+" or
"-".

-

This causes a parallel offset of
the entire heating curve.

Controller display

Symbol

Action

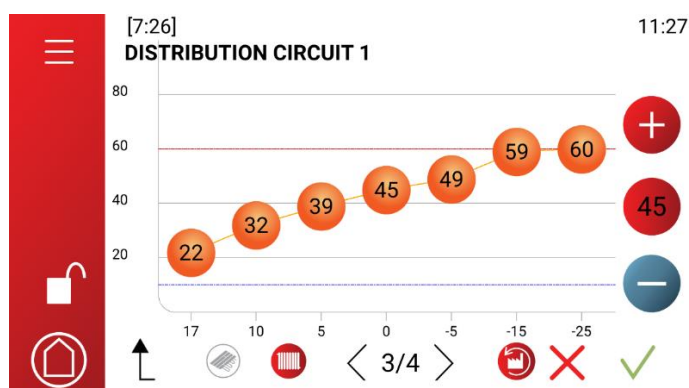


Figure 25 Mixing valves 4 settings



To completely change the heating curve, click on the number (40). The number turns red.



Use the plus and minus buttons to change the value.



Confirm the new value with the green tick.



Click on the number to remove the red background.



This last action completes the change.

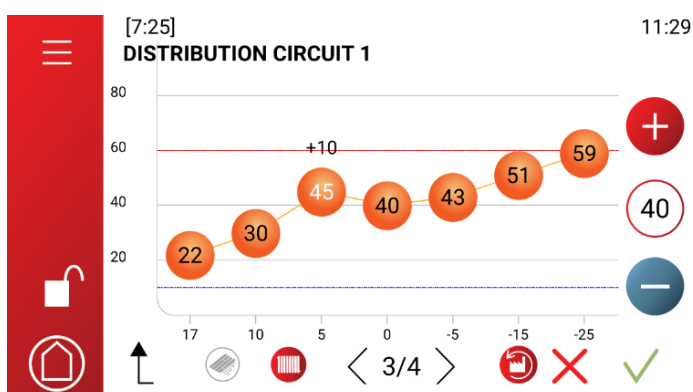


Figure 26 Mixing valves 5 settings



It is possible to change an individual temperature point in the heating curve.

For this, see figure 25.

Select the temperature value to be changed in the heating curve and adjust to a value of your choice.



Confirm the new value with the green tick and use the arrow to return to the main menu.



Use the home button to select the standard setting.

These settings bring us to the end of this point. More information can be found in the technical documents for the appliance.

Check refrigerant circuit for leaks (to EC No 517/2014)

☐ actioned

This maintenance point involves checking all refrigerant carrying components for leaks. Checking must be carried out in accordance with EN standard EC No 517 / 2014. After a successful check, this should be ticked off on the maintenance report.

For appliance versions C and D, an annual leak test should be carried out on the refrigerant circuit. This check is not part of the scope of maintenance, but is instead a separate service, which is documented in the system manual after it has been carried out.

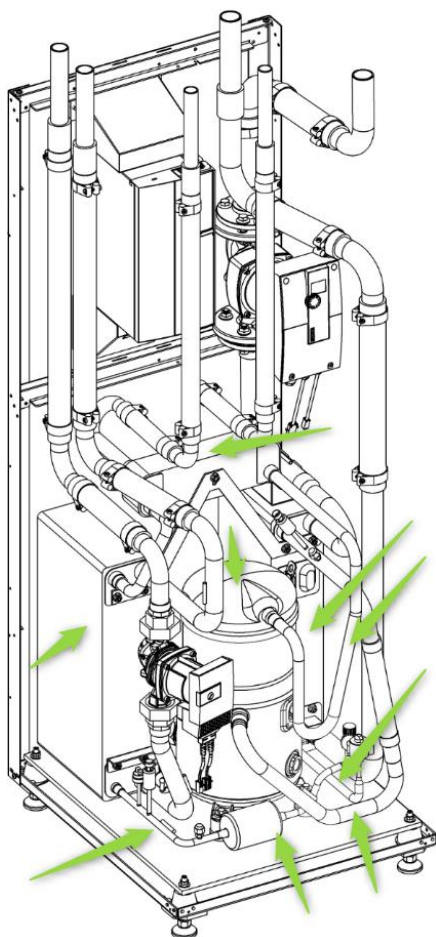


Figure 27 Refrigerant circuit versions A and B

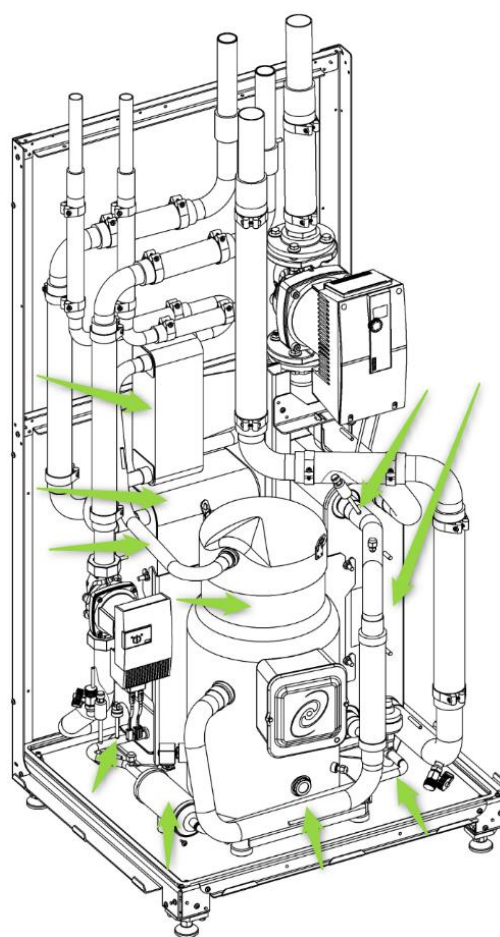


Figure 28 Refrigerant circuit versions C and D

The pipe assemblies indicated with the green arrows are refrigerant carrying components that are checked for leaks as part of this maintenance point.

All water carrying connections and components checked for leaks (visual inspection)

☐ actioned

This maintenance point involves checking all water carrying components in the heat pump. System-specific components and assemblies are not part of the check. Any apparent leaks in components outside the heat pump should also be recorded under the maintenance point "Identified faults".

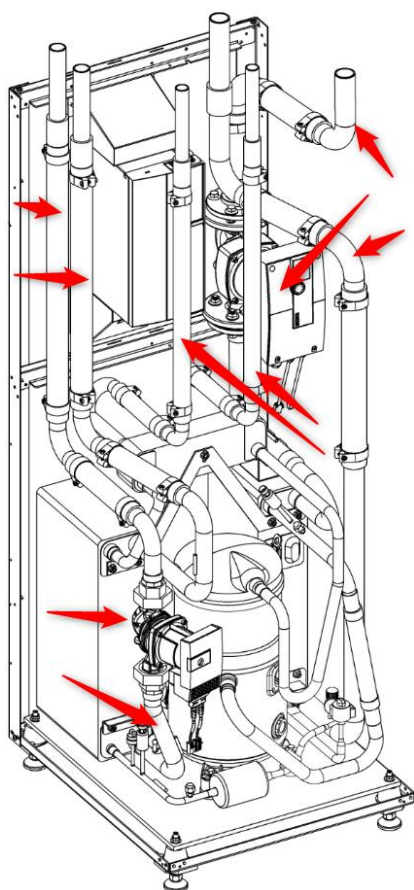


Figure 29 Water carrying assembly versions A and B

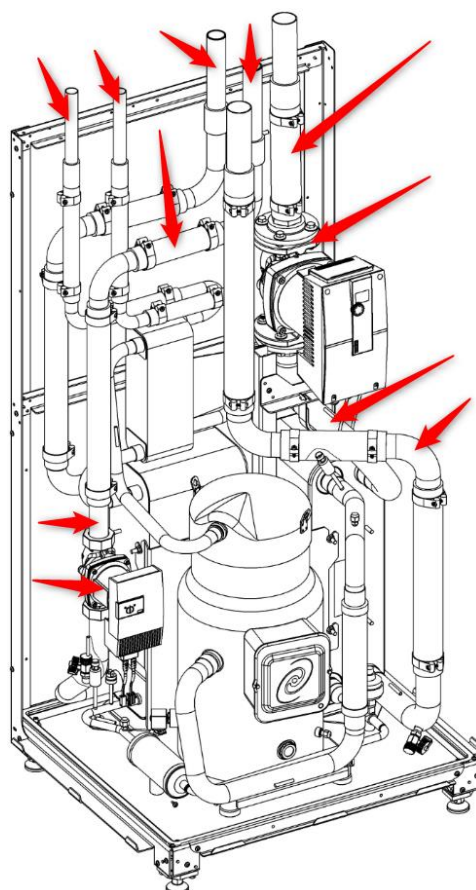


Figure 30 Water carrying assembly versions C and D

All assemblies marked in red are water carrying components that must be included in the visual inspection.

Circulation pump(s) checked for correct function

☐ actioned

This maintenance point includes checking the circulation pumps for noise, leaks, correct setting and correct wiring.

The heat pump has two integral pumps. Access to these pumps is possible when the casing sections have been removed. However, the external pumps controlled by the controller should also be included in the checks.

The individual pump is controlled via the manual test. Here, it is possible to separately control each pump connected to the controller. The process is explained in the following figures.

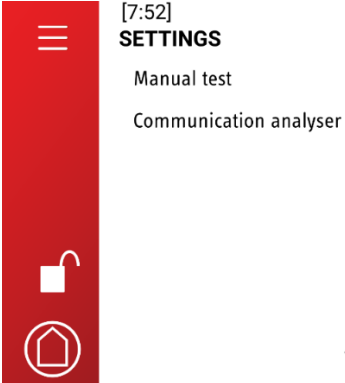
Controller display	Symbol	Action
	10:03	As explained in figures 8 and 9, enter the access code to go to the menu. Then open the main menu as described in figure 13. Open page 5/5 and select the manual test

Figure 31 Manual test 1 settings

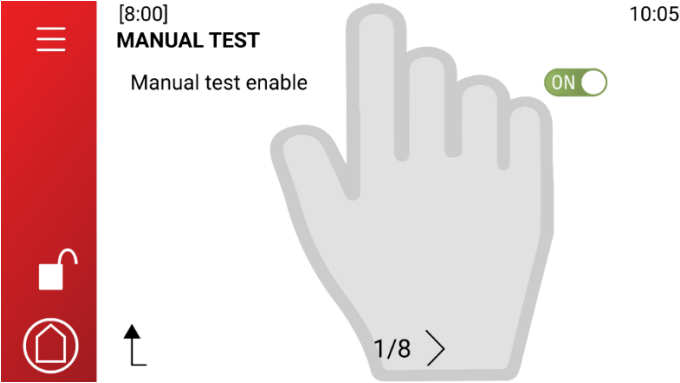
	10:05	In the menu, switch the slide toggle from Off to On. This activates the test, and, on the next submenu pages, the pumps can be individually controlled via the slide toggles. Once checks have been carried out via a manual test, remember to deactivate this again. The grey hand then disappears from the display.
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Figure 32 Manual test 2 settings

Maintenance manual WPE-I xxH 400 Premium

Heating expansion vessel checked (if cap valve installed):

☐ actioned

Pre-charge pressure p0 = MPa

In this maintenance point, the pre-charge pressure of the expansion vessel on the heating side is checked. However, the check is only carried out if a cap valve is installed in the correct installation position upstream of the expansion vessel.

Heating system pressure-tested:

pa = MPa

☐ actioned

Check and document the heating system pressure. If the system pressure is too low, top up the heating water.

For Stiebel Eltron heat pumps, the quality of the fill and top-up water is specified as follows: the water hardness must not exceed 3 °dH. If stricter limits are required by national regulations or standards, they must be observed.

Function test completed

☐ actioned

With the function test, a final inspection is carried out. Many function tests are already part of individual maintenance points and do not require any new maintenance work. This maintenance point can be carried out at the end of the maintenance work. The system returns to standard operating mode.

6.1.2 Recording temperature values

DHW start temperature					°C
DHW stop temperature					°C
Brine/water inlet temperature		°C	Heating flow temperature		°C
Brine/water outlet temperature		°C	Heating return temperature		°C

Temperature measurements have already been carried out during maintenance work. The temperature values are entered in this table. The measured values should be recorded after a compressor runtime of 10 minutes. Wherever possible, carry out the measurement directly at the heat pump. With this heat pump type, the heating curve can only be displayed as a seven-point curve and is therefore not further documented.

6.1.3 Maintenance work especially for ground source heat pumps

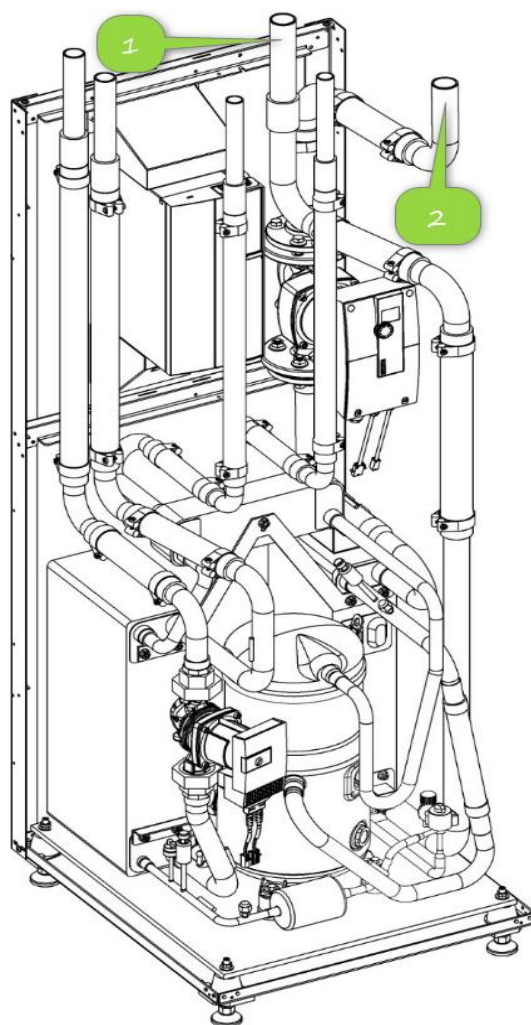
The following maintenance points must be completed.

Plausibility of temperature values checked

☐ OK

☐ Not OK

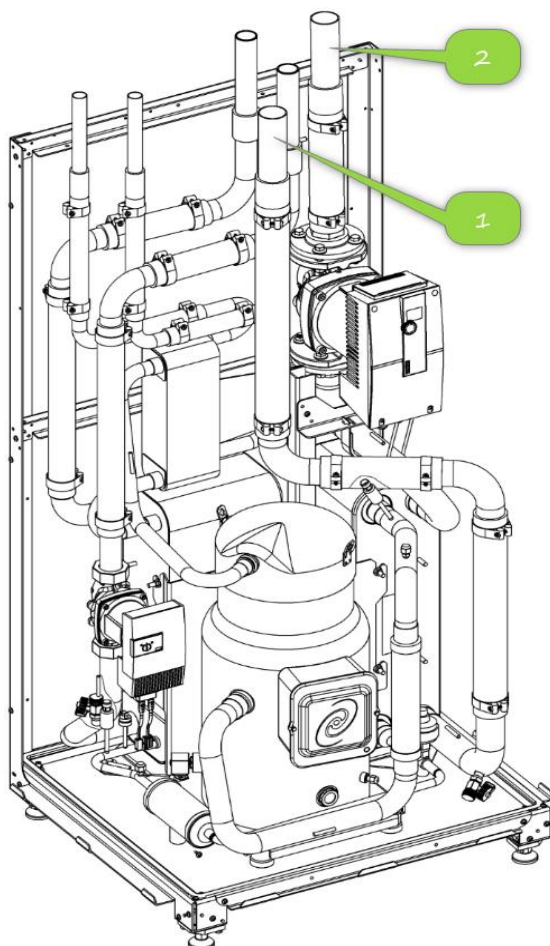
This check is based on temperature values in the brine system. The brine inlet and outlet temperatures are measured. These temperatures are compared with the values displayed on the controller. As the heat pump operates on a modulating basis, the differential values cannot be specified.



1 Heat source flow

2 Heat source return

Figure 33 Heat source versions A and B



1 Heat source flow

2 Heat source return

Figure 34 Heat source versions C and D

Controller display	Symbol	Action
		Call up the main menu.
		Tap on the monitor icon to open the process data menu.

Figure 35 Process values 1

Controller display

Symbol

Action

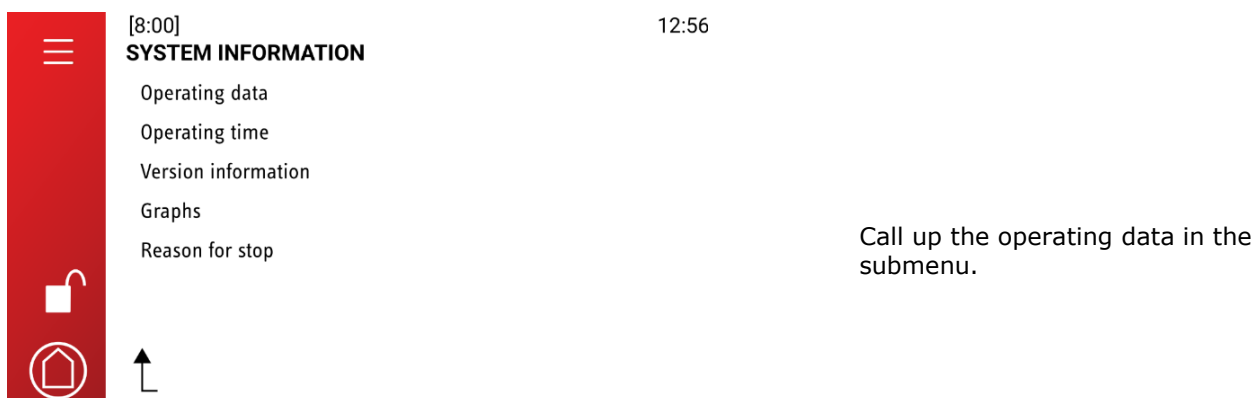


Figure 36 Operating data 1 settings

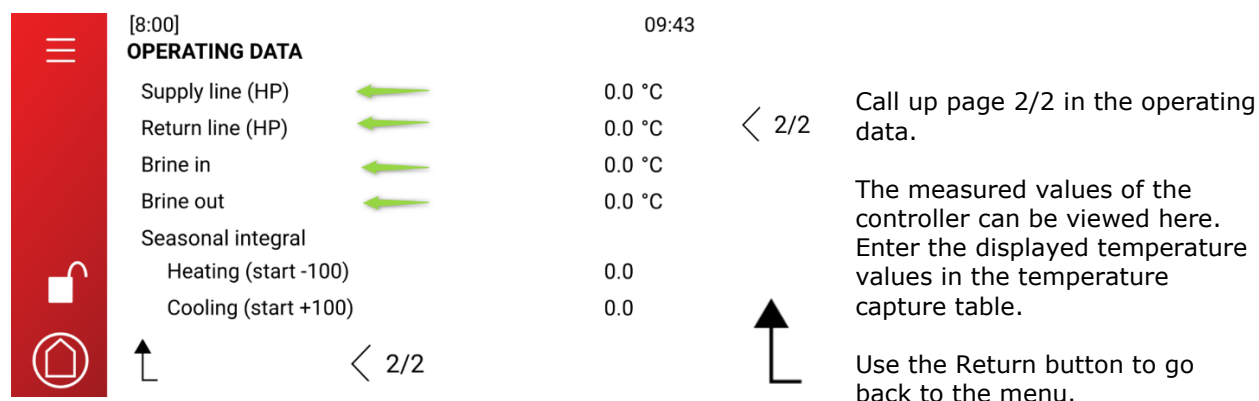


Figure 37 Operating data 2 settings

Maintenance manual WPE-I xxH 400 Premium

Brine expansion vessel checked (if cap valve installed):
Pre-charge pressure $p_0 =$ MPa

☐ actioned

This maintenance point involves testing the pre-charge pressure in the brine expansion vessel. However, the test is only carried out if a cap valve is installed in the correct position upstream of the brine expansion vessel. Please note that the brine expansion vessel in the brine circuit works as a liquid seal.

Brine system pressure-tested: $p_a =$ MPa

☐ actioned

This maintenance point involves testing and documenting the brine system pressure. The brine pressure should generally be 1.5 bar. If the system pressure is too low, the required flow rate may also not be reached on the source side. In this case, not enough heat is obtained from the source to reach the calculated heating output of the heat pump.

When topping up the brine, always use the same brine medium. Different brines should not be mixed due to the chemical quality of the individual media (risk of flocculation).

The table below gives the mixing ratio with water. The brine should be mixed before being poured into the system. Never top up with just water.

	Ethylene glycol	Water
Geothermal probe	25 %	75 %
Geothermal collector	33 %	67 %

Table 2 Mixing ratio – brine

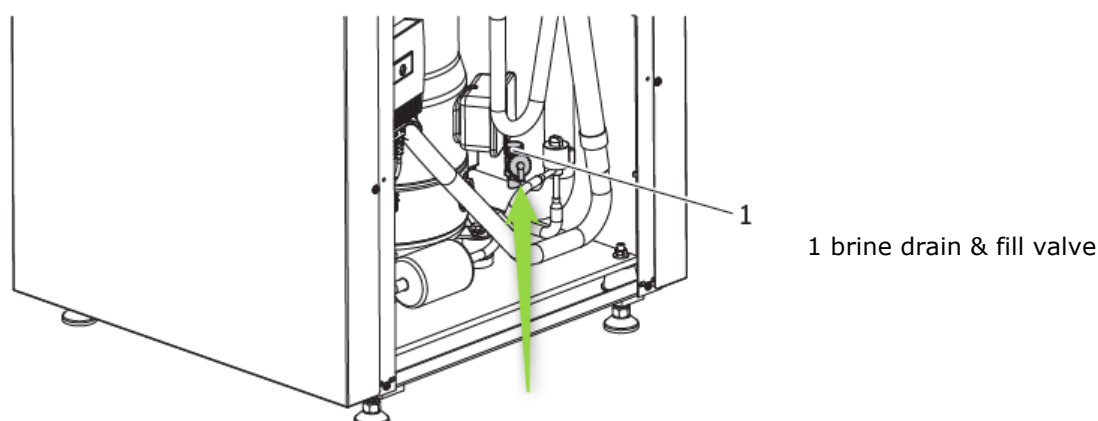


Figure 38 Brine drain valve versions A and B

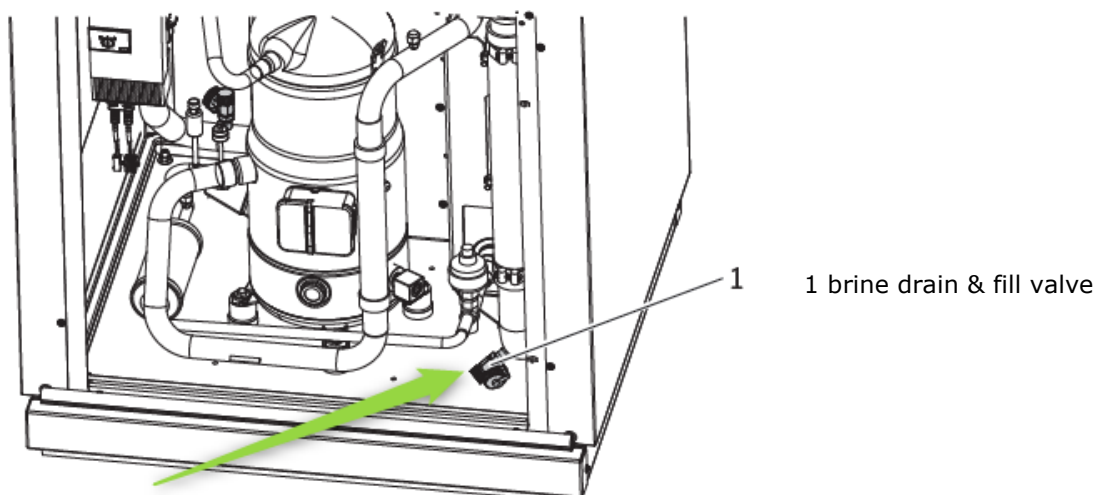


Figure 39 Brine drain valve versions C and D

Brine frost protection threshold checked	°C	☐ actioned
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The brine must not fall below a brine frost protection level of -12 °C. Ideally, the frost protection temperature should be -18 °C. The measurement can, for example, be carried out with a hydrometer or a comparable tester for the brine used. Take the brine sample directly from the system.

Brine pressure switch/flow sensor installed	☐ installed	☐ not inst.
---	------------------------------------	------------------------------------

This maintenance point also involves documenting whether a brine pressure switch is connected to the controller.

Brine pressure switch, activated if installed	☐ Activated
---	------------------------------------

If a brine pressure switch is installed, it should also be activated. This point includes checking and confirming activation. Activation is checked on the controller.

Maintenance manual WPE-I xxH 400 Premium

Controller display

Symbol

Action

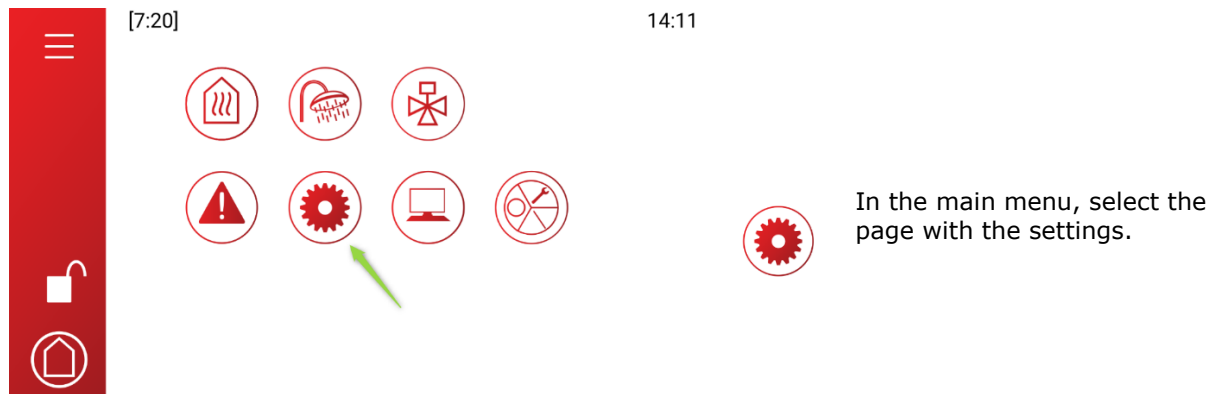


Figure 40 Main menu-2 settings

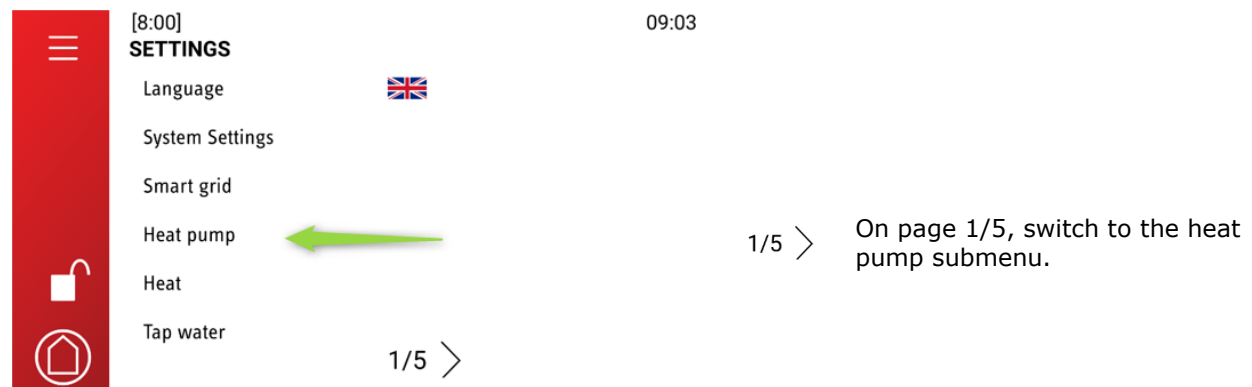


Figure 41 Heat pump-1 settings



Figure 42 Heat pump-2 settings

Brine pressure switch only activated when compressor is running

☐ activated

Controller display	Symbol	Action
		Activation only needs to be confirmed here as a checkpoint.

Figure 43 Heat pump-3 settings

Brine outlet monitoring activated

Brine outlet min. =

°C

☐ activated/temperature recorded

This maintenance point involves checking brine outlet monitoring and recording the min. brine outlet temperature value.

Controller display	Symbol	Action
		Check the position of the slide toggle
		Brine outlet monitoring
		Brine alarm
		The min. brine outlet temperature is recorded in the report.
		The limit is -9 °C

Figure 44 Heat pump-4 settings

Brine temperature spread limit alarm

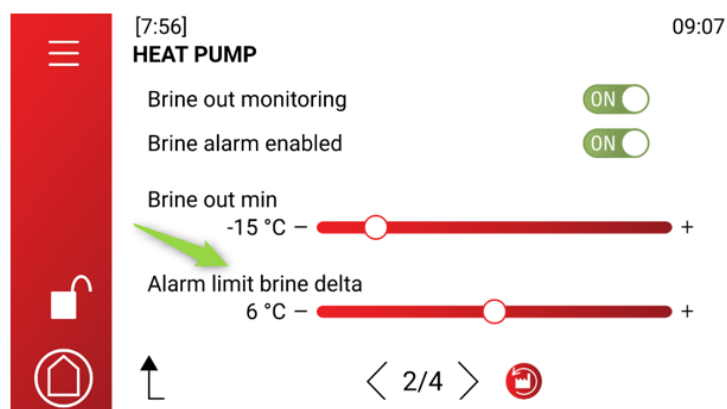
°C

☐ Temperature value recorded

Controller display

Symbol

Action



Check the setting of the brine temperature spread limit alarm in K

Transfer the value to the report

Figure 45 Heat pump-5 settings

Brine inlet temperature monitoring

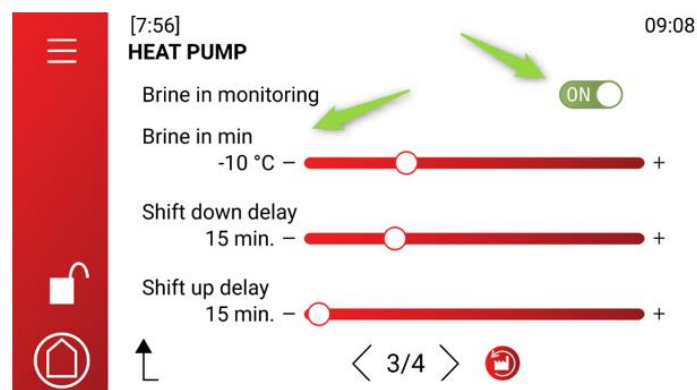
°C

☐ activated/temperature recorded

Controller display

Symbol

Action



Check the setting of brine inlet monitoring.

Document the setting in the report.

Transfer the setting value to the report.

Figure 46 Heat pump-6 settings

6.1.4 High pressure switch test – MANDATORY TEST

High pressure switch test carried out	Shutdown value of the high-pressure switch		bar	☐ actioned
---------------------------------------	--	--	-----	-----------------------------------

With the heat pump types described here, the high-pressure switch should be tested annually. The shutdown point shown on the display should be in the range of 40 bar to 45 bar. For testing, the heat pump must be in operation.

After this mandatory test, document the shutdown point in the maintenance report.

To accelerate shutdown, it is advisable to reduce the flow rate. Use the available options to reduce the flow rate. After testing, restore to the original condition.

Controller display	Symbol	Action
		Open the menu page in the main menu and tap on the padlock.
		On the next page, enter the known engineer code and confirm the entry with the tick.
		An open padlock is then displayed.

Figure 47 High pressure test-1 settings

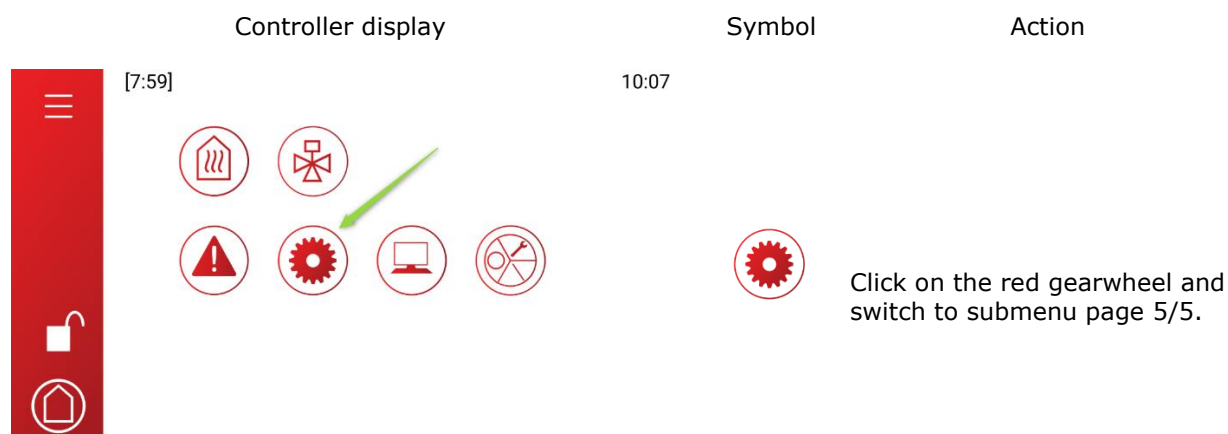


Figure 48 High pressure test-2 settings

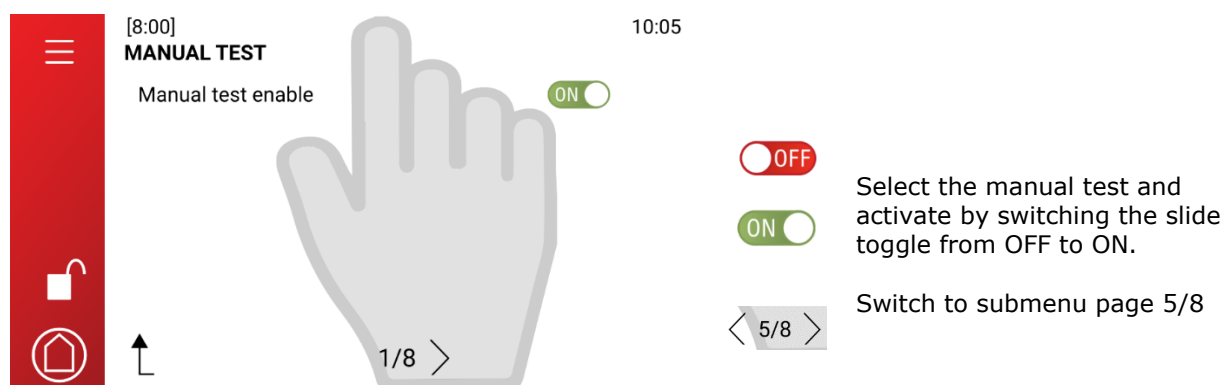


Figure 49 High pressure test 3 settings

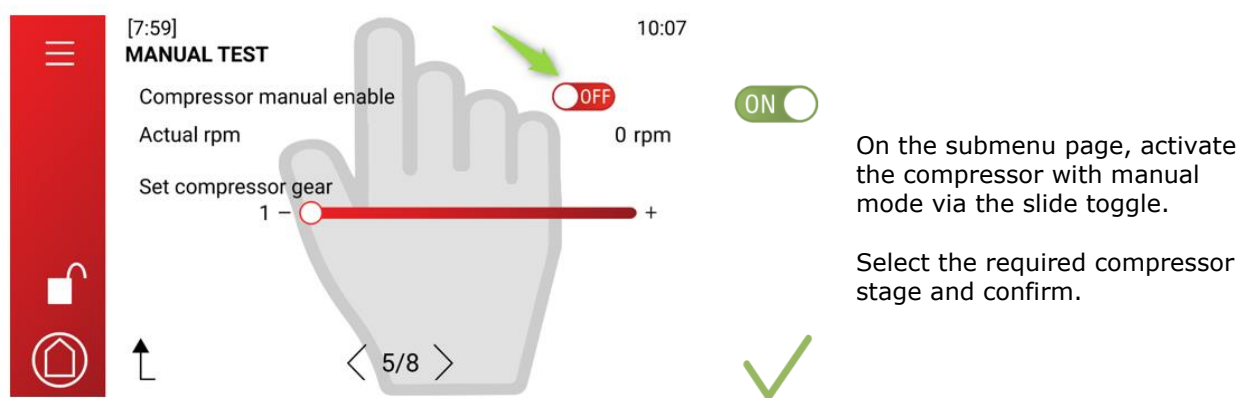


Figure 50 High pressure test-4 setting

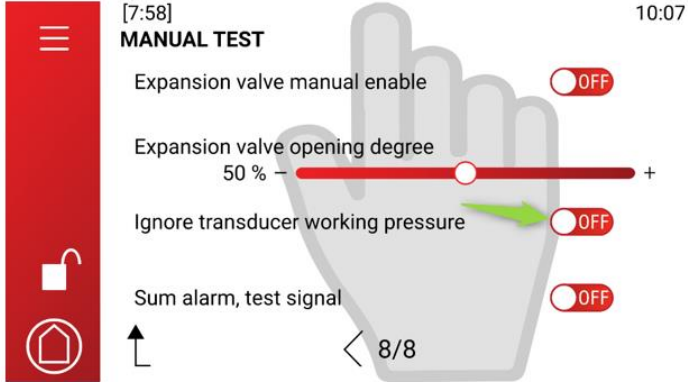
Controller display	Symbol	Action
		Call up submenu page 8/8.
		Switch the slide toggle "Ignore measured operating pressure" to ON.
		Return to the menu using the button at the top left.

Figure 51 High pressure test-5 settings

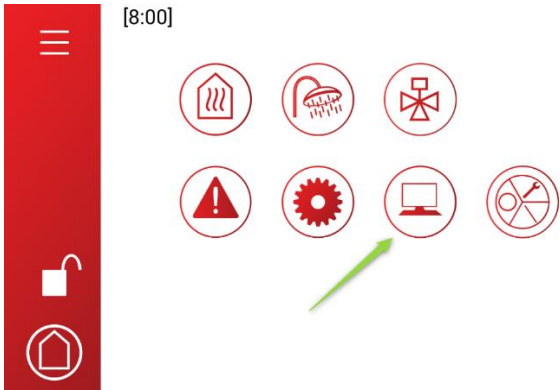
		Select the process data menu item with the monitor button.
---	---	---

Figure 52 High pressure test-6 settings

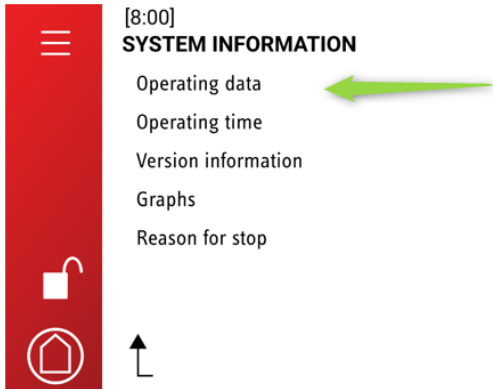
1 		On the next page, select the operating data.
		In the submenu, select page 4/5.

Figure 53 High pressure test-7 settings

Controller display

Symbol

Action

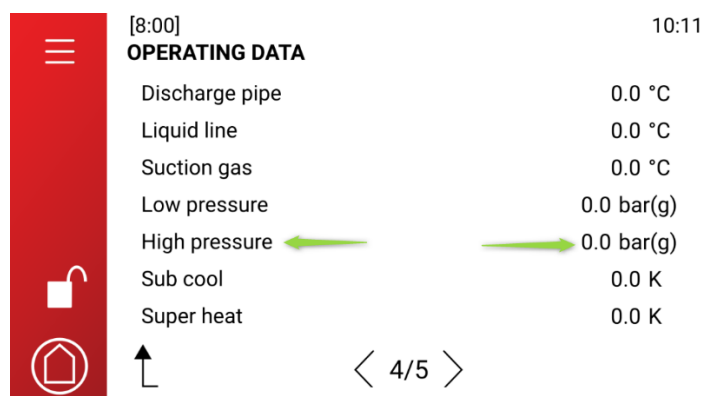


Figure 54 High pressure test-8 settings

In the submenu, check the high pressure.

In the case of a hard shutdown, document the pressure value in the report.

After shutdown by the high-pressure switch, testing is complete.

Exit the process data page and return to the manual test settings.

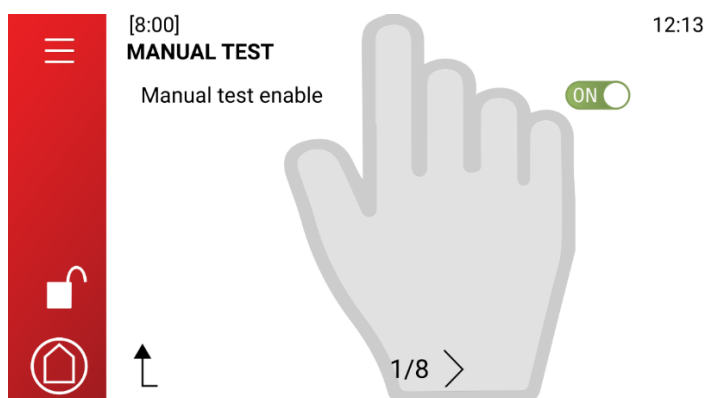


Figure 55 High pressure test-9 setting

In the manual test, reset the previously made settings and deactivate the test.

The hand should then no longer be visible.

This completes the test.

6.1.5 Testing acc. to VDE-0701 / 0702

Testing acc. to VDE 0701 / 0702

Earth conductor resistance	R_{PE}		Ohm	Differential current, emergency/booster heater	$I_{diff.}$		mA
Controller differential current	$I_{diff.}$		mA	Contact current	I_B	$I_{diff.}$	mA
Compressor differential current	$I_{diff.}$		mA	Values OK		☐ Yes	☐ No

The subsequent VDE test completes the maintenance process. Enter your readings in the report. The heat pumps described here have an L1, L2, L3, N and PE connection. There is no separate connection for the control voltage. The VDE test can therefore be carried out at the main connection. The connection for any possible reheating is not included in the heat pump and is therefore also not part of the VDE heat pump test.



Figure 56 Main electrical connection, heat pump versions A and B

6.1.6 Notes field in the maintenance report

The notes field is intended for documenting information about the maintenance procedure.

6.1.7 Identified faults that must be remedied in a separate contract

All faults that were identified during maintenance and that need to be processed separately can be documented in this field.

7. Final notes

Further information about the appliances can be found in the technical information. This also describes functions and provides operating information.
Technical modifications may result in deviations from the settings and connections specified in this manual. The enclosed technical documents shall apply.

8. Change history

Version	Change