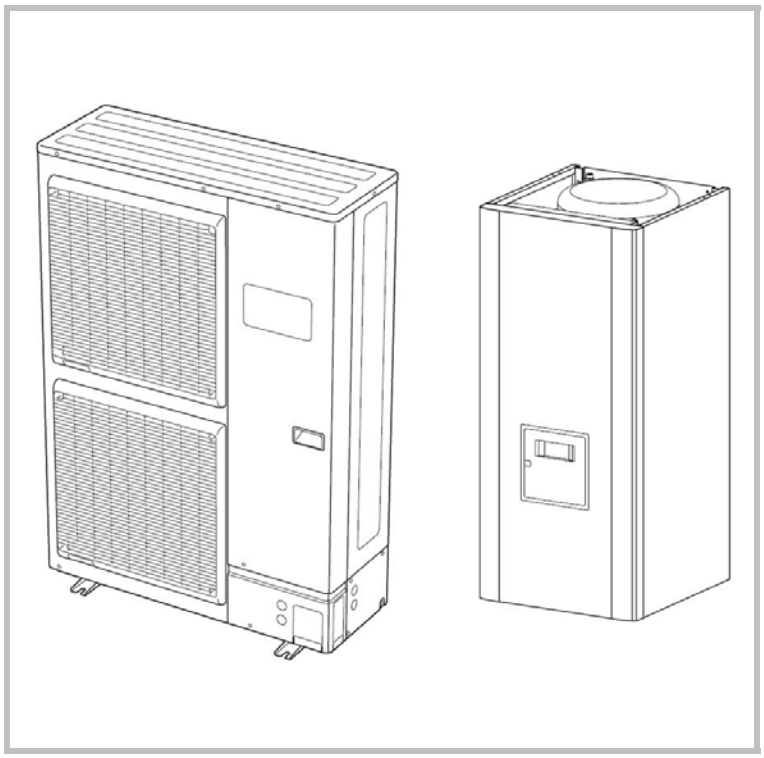
Waterstage 3 phase

Air/Water Heat Pump
Split System, Single Service 3 phase
112, 140 and 160



Document 1394-1 ~ 29/01/2010

FR NL DE **EN** IT

Maintenance Document

Intended for professional use

Fujitsu General (Euro) GmbH
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Contents

1 Technical Characteristics

1.1 Specifications

Heating system operating limits		WATERSTAGE 112	WATERSTAGE 140	WATERSTAGE 160
Exterior temp mini/maxi	°C		-20/+35	
Initial max heating water temperature				
- Floor heating system	°C		45	
- Low temperature radiator	°C		60	
Flow min heating water temperature	°C		8	

1.2 Performance Data

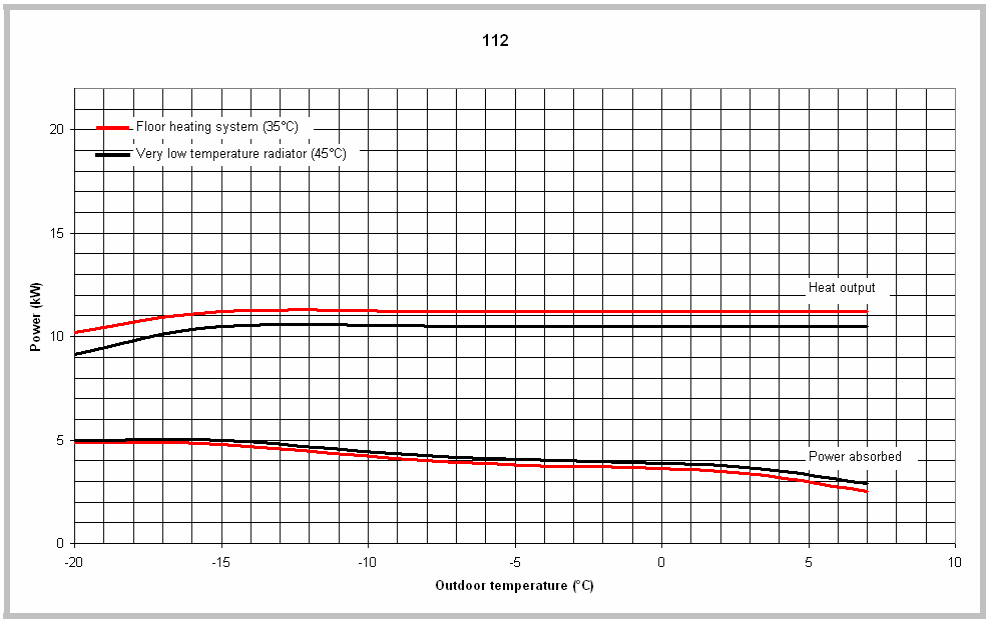
1.2.1 Rated Performance

HEAT PUMP		WATERSTAGE 112	WATERSTAGE 140	WATERSTAGE 160
+ 7°C/ + 35°C	P_{out} (kW)	11,2	14,00	16,00
-	P_{in} (kW)	2,51	3,22	3,72
HCF	COP	4,46	4,35	4,30
- 7°C/ + 35°C	P_{out} (kW)	11,2	14,00	15,00
-	P_{in} (kW)	3,92	5,15	5,55
HCF	COP	2,86	2,72	2,70
+ 7°C/ + 45°C	P_{out} (kW)	10,5	13,1	15,1
-	P_{in} (kW)	2,9	3,7	4,42
LT Radiators	COP	3,62	3,54	3,42
- 7°C/ + 45°C	P_{out} (kW)	10,5	13,1	14,5
-	P_{in} (kW)	4,16	5,39	6,38
LT Radiators	COP	2,52	2,43	2,27

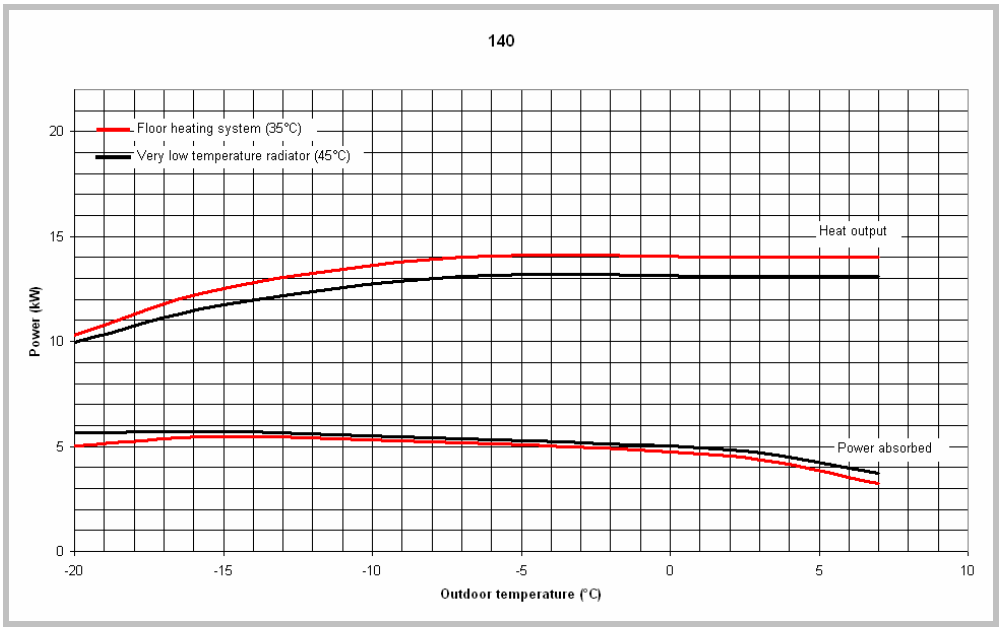
1.2.2 Maximum Stated Performance

HEAT PUMP		WATERSTAGE 112	WATERSTAGE 140	WATERSTAGE 160
+ 7°C/ + 35°C	P_{out} (kW)	20,26	21,91	23,39
-	P_{in} (kW)	5,06	5,75	6,5
HCF	COP	4,00	3,81	3,60
+ 7°C/ + 45°C	P_{out} (kW)	17,09	18,67	20,20
-	P_{in} (kW)	5,04	5,67	6,43
LT Radiators	COP	3,39	3,29	3,14

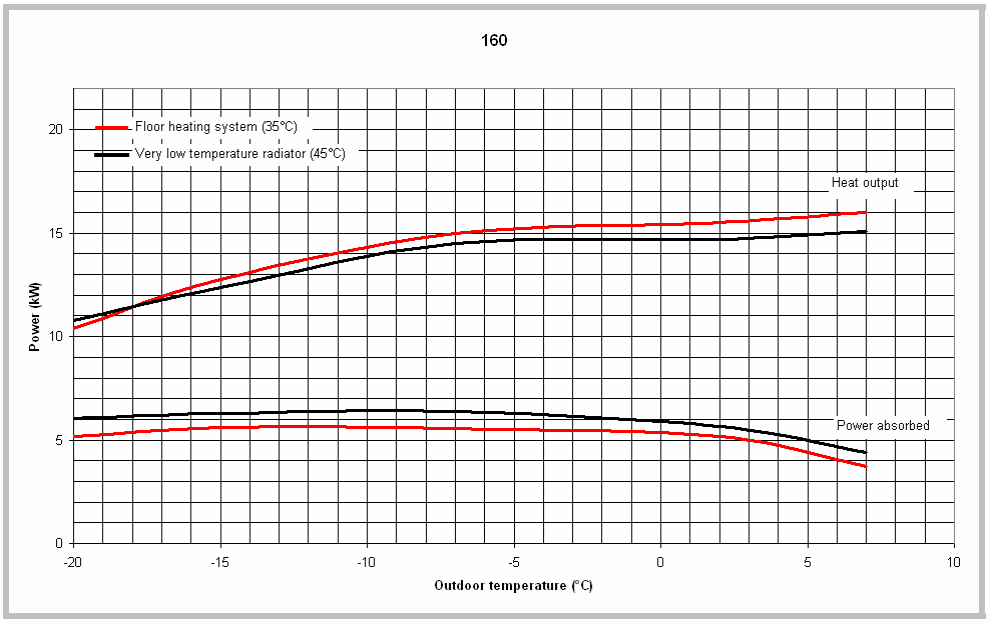
1.2.3 Performance Curves for Waterstage 112



1.2.4 Performance Curves for Waterstage 140



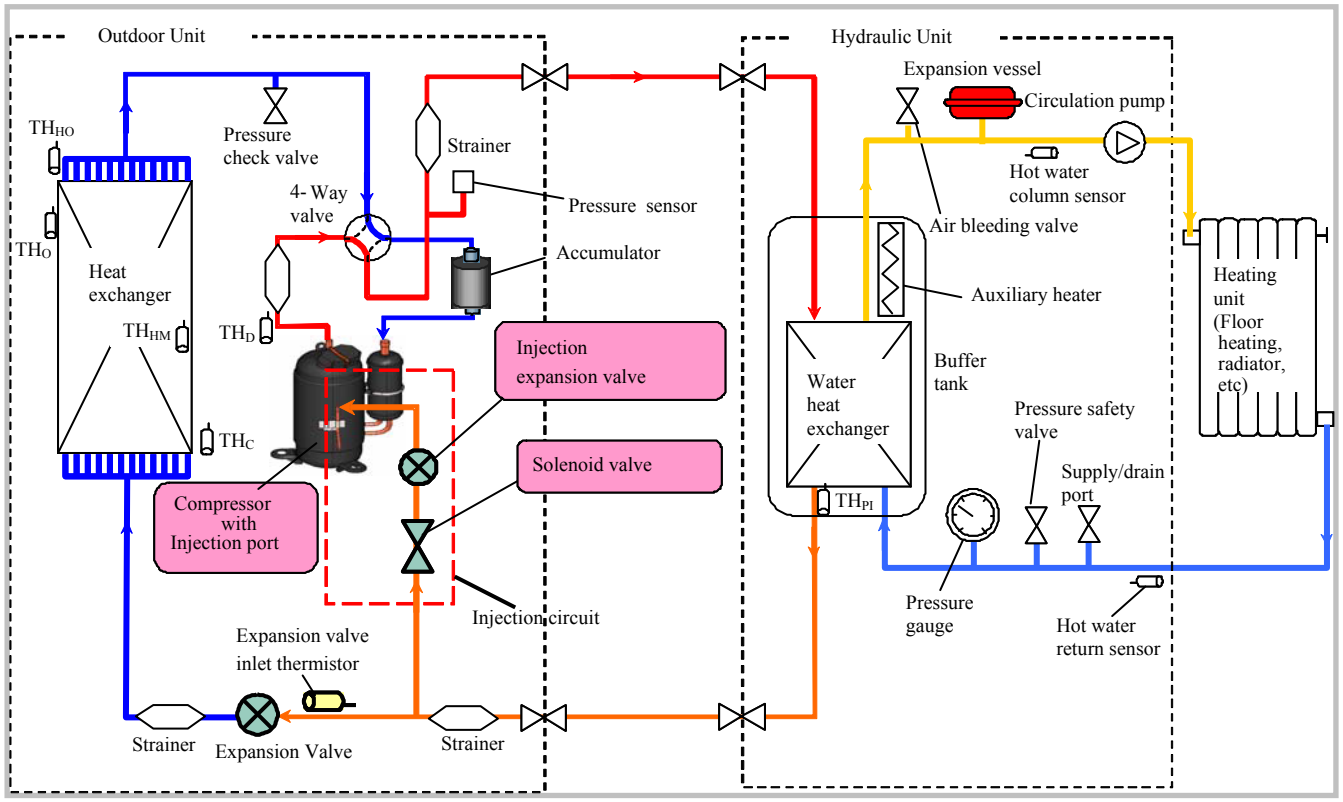
1.2.5 Performance Curves for Waterstage 160



1.3 Hydraulic Characteristics

HEAT PUMP	WATERSTAGE 112	WATERSTAGE 140	WATERSTAGE 160
Connection diameter		1" – 25.4 mm (male)	
Exchanger tank volume (L)		25	
Expansion vessel volume (L)		8	
Max pressure water circuit (Bar)		3	
Max flow rate (l/h)	2400	3000	3400
Min flow rate (l/h)	1200	1500	1700
Min Delta T (°C)		4	
Max Delta T (°C)		8	

1.4 Refrigeration Diagram



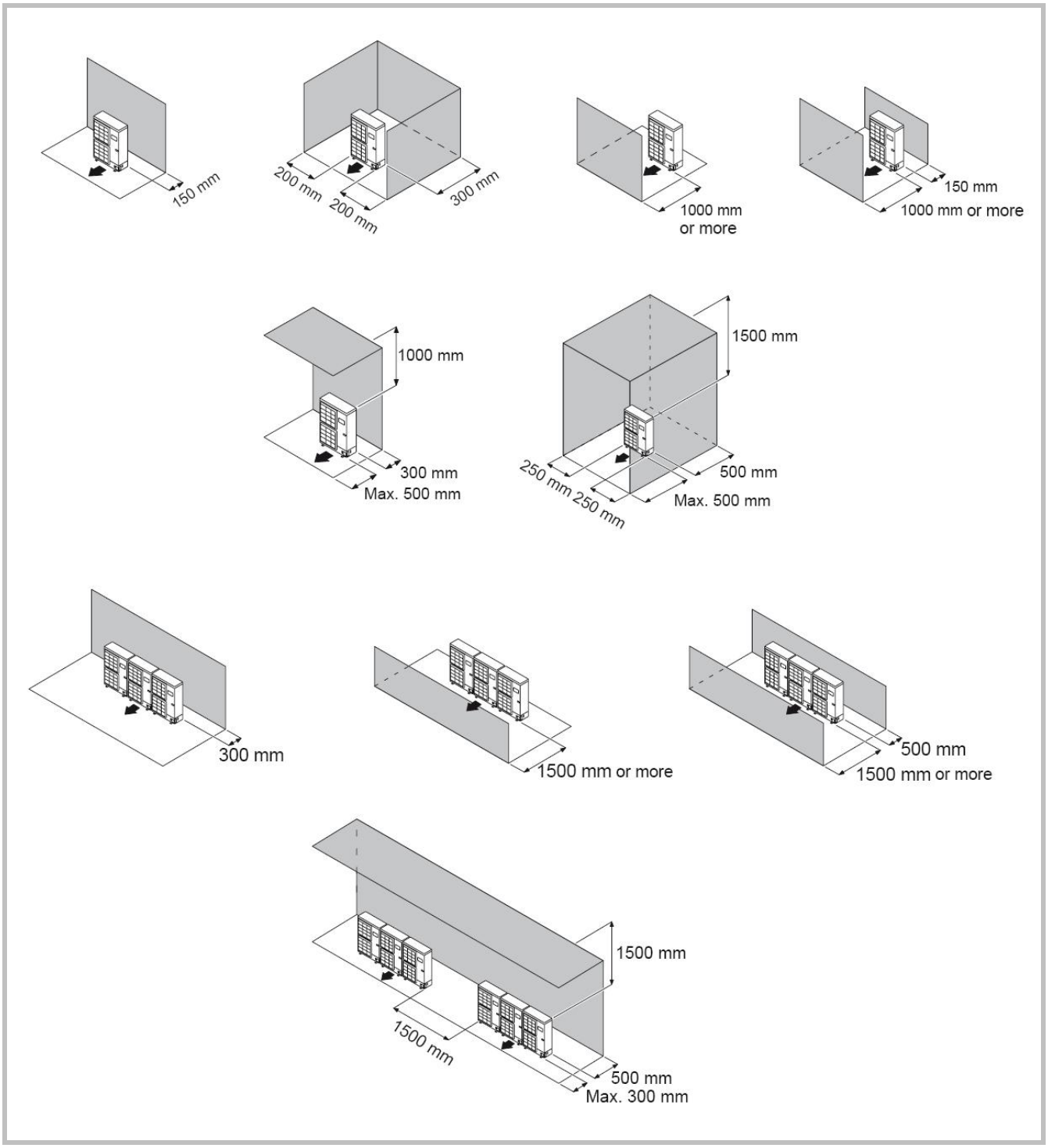
TH C: Compressor temperature sensor
TH D: Discharge temperature sensor
TH HM: Outdoor exchanger middle temperature sensor

TH HO: Outdoor exchanger outlet temperature sensor
TH O: Outdoor temperature sensor
TH PI: Exchanger temperature sensor

2 Installation Rules

2.1 Heat Pump

2.1.1 Outdoor Units



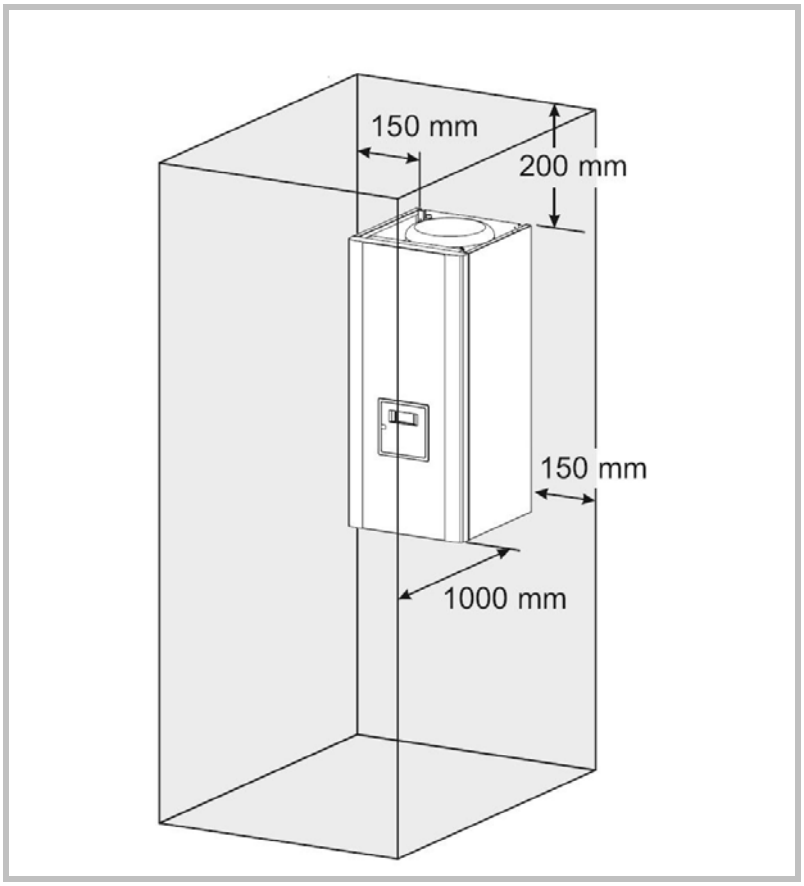
In snowy areas: raise the outdoor unit by a height equal to the maximum height of snow cover plus 20cm.

2.1.2 Hydraulic Unit

Minimum clearance dimensions must be provided around the appliance as shown on the drawing, to enable the machine to be serviced.

> Warning! <

Maintain a distance of at least 20 cm between the unit and the ceiling to allow replacement of heaters.



The Hydraulic Unit should be installed in such a way that the distance between the module and the outdoor unit is within the authorized range.

Beware of any flammable gas near the heat pump during its installation, especially when it requires brazing. In addition, the devices are not explosion-proof and therefore, they must not be installed in an explosive atmosphere.

2.2 Control Terminal

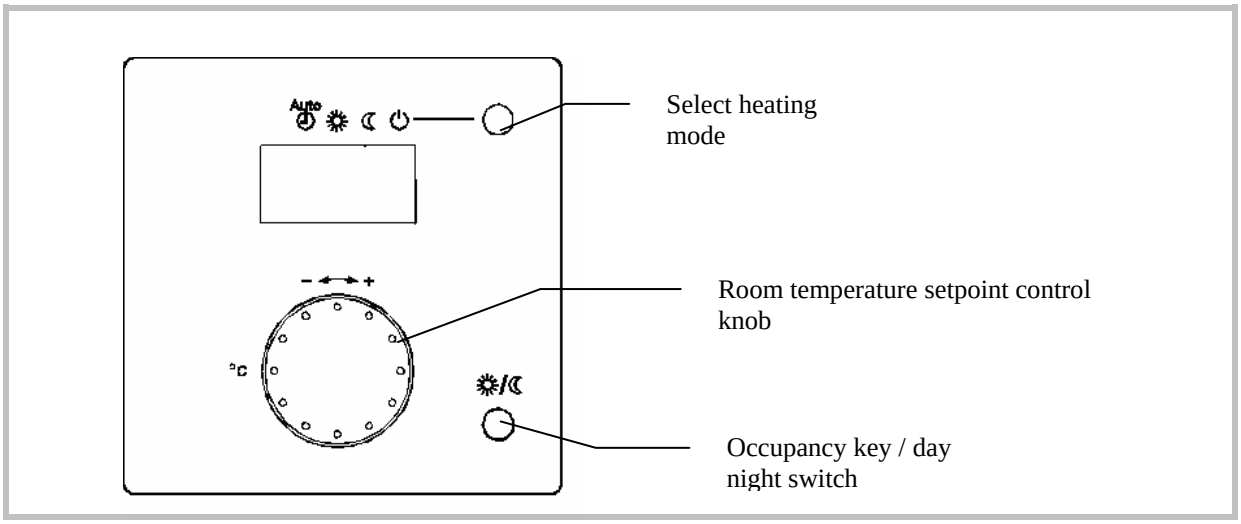
2.2.1 Room Unit

The room thermostat gives the user access to the following basic functions:

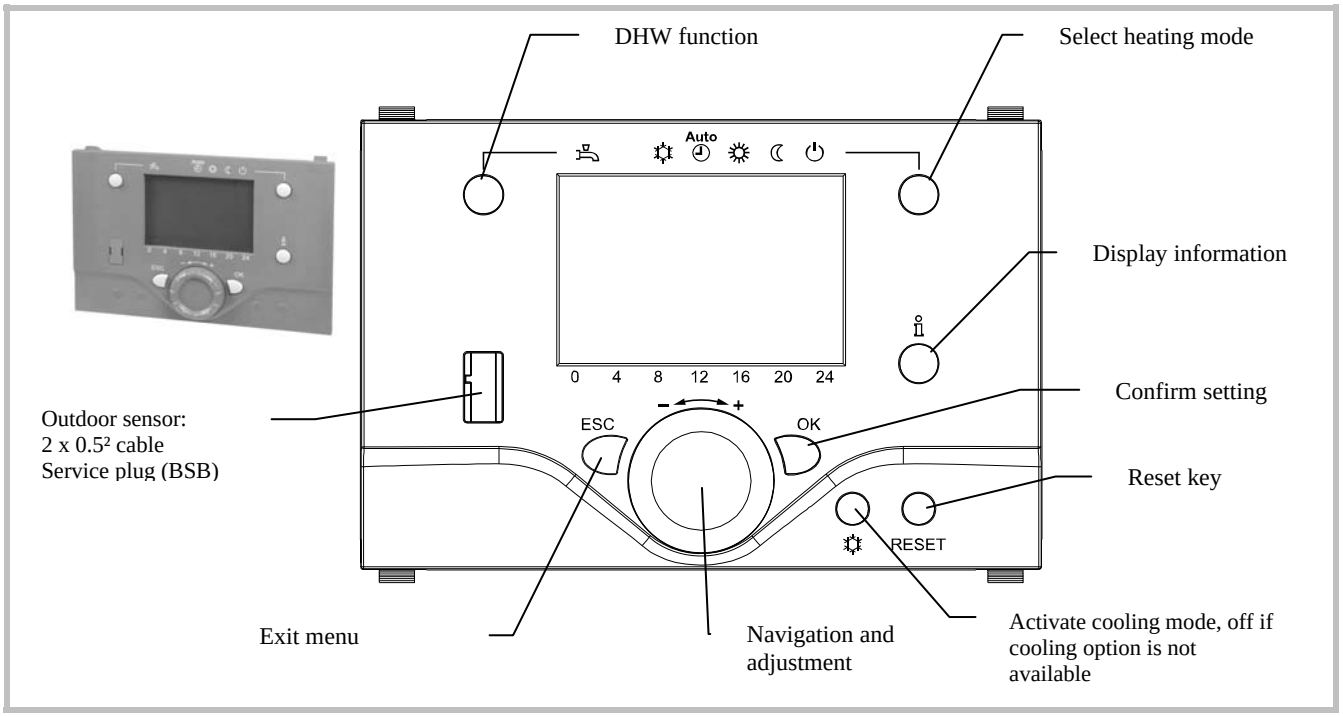
- Adjustment of the room temperature setting by simply turning the knob
- Selection of the heating mode
- Switching to comfort temperatures by simply actuating the occupancy switch.

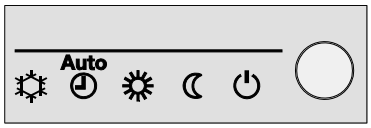
In addition, the room thermostat shows the user the following information:

- the current temperature
- the heating mode
- the presence of a fault, when displaying the symbol



2.2.2 User Interface





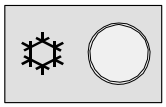
Select heating mode

Auto mode AUTO:
The temperature is controlled automatically:
- Heating mode according to time program
- Automatic summer/winter changeover

Continuous operating modes ☼ or ☾:
The temperature setpoint is maintained:
- ☼: Heating to the comfort setpoint
- ☾: Heating to the reduced setpoint

Heating with no time program, no summer/winter automatic changeover

Protection mode ⏻:
The installation is maintained at the frost protection temperature, on condition that the heat pump supply voltage is not interrupted.



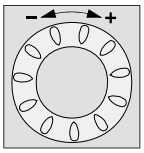
Activate cooling mode (off if option is not available):

Cooling mode ❄
The "Cooling" mode adjusts the room temperature according to the time program.
Cooling mode properties:
- Manual cooling mode
- Cooling mode according to time program
- Temperature setpoint according to "Comfort setpoint cooling"
- Protective functions active
- Summer/winter auto changeover active
- Summer compensation

DHW Function

This key stops or allows the production of DHW and activates the "boost" mode, which allows the nominal temperature to be reached at any time, regardless of the time program. Electric auxiliaries are activated if necessary be to reach the DHW temperature setpoint. In general they are not activated for daytime boosting at the reduced temperature setpoint, as long as the temperature remains below 43°C.
On: DHW is produced according to the time program
Off ---: no DHW is produced, the frost protection function is active

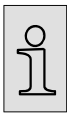
To start the boost function keep the key pressed for 3 seconds. DHW production comes "on" again when the nominal setpoint has been reached.



Adjust comfort setpoint temperature

The comfort setpoint is adjusted directly by turning the knob, the value must be confirmed with the OK key.

Adjustment of the reduced setpoint will be described in detail in the "control settings" section.



Display information

The information key displays various items of information.

Error message symbol.

This symbol appears whenever there is a fault in the installation. Press the info key for details.

Symbol for maintenance or special operating mode, press the info key for details.

Reset symbol.

Keep the key pressed less than 3s for a reset: this resets all error messages. This function must not be used in normal operating conditions.

2.3 Electrical Connections

2.3.1 Installation Precautions

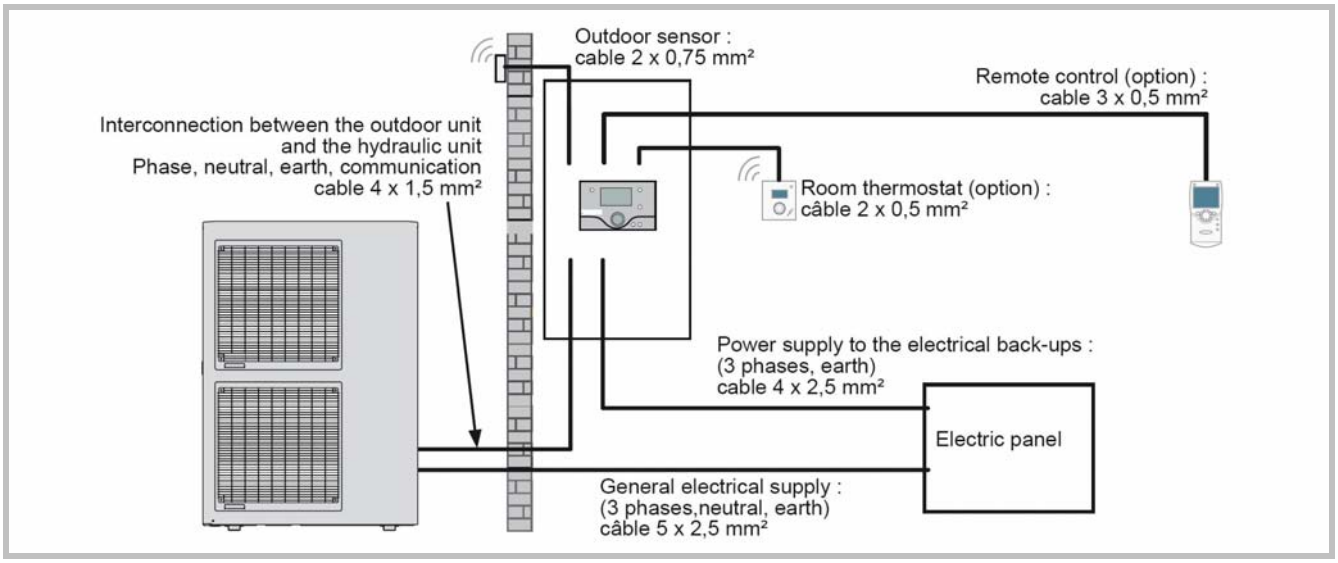
All machines in the ATW Split System Inverter range are designed to operate at 3x400V 50Hz. Power supplies must be compliant with NFC 15-100. The power supply contract must be able to cover not only the power of the unit but also the sum of powers of all the devices likely to operate at the same time.

Protections will be of the omnipolar, D curve circuit breaker type, with a contact opening distance of at least 3 mm. Lines will be made of HO7 RNF cable or similar. Provide a 300 mA maximum, differential protection line-end in compliance with the current standards. Under no circumstances (including during startup periods) may the voltage across the unit drop below 198V or rise above 264V. Do not use a power outlet as the power supply.

> Warning ! <

Cable cross-sections and protection ratings are given for information only. The installation technician should always check that these components are in line with the maximum current ratings and the standards applied on the installation premises

2.3.2 Electrical Connection Overview



Block diagram of electrical connections for a simple installation: one zone, no boiler backup or DHW

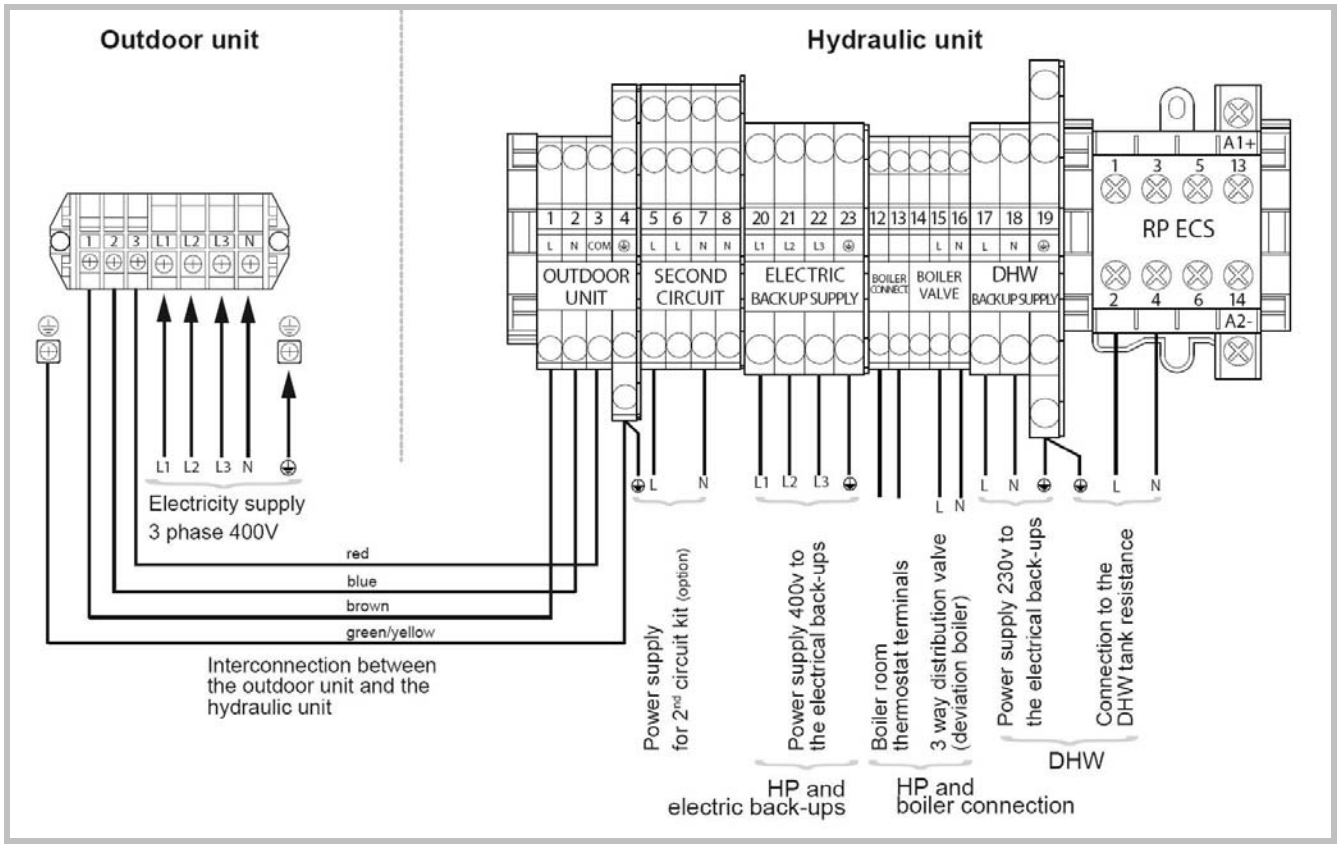
Two connections to the electrical panel:

- Heat pump general power supply on the outdoor unit
- Electric auxiliary power supply on the Hydraulic Unit

Interconnection between the Hydraulic Unit and the outdoor unit.

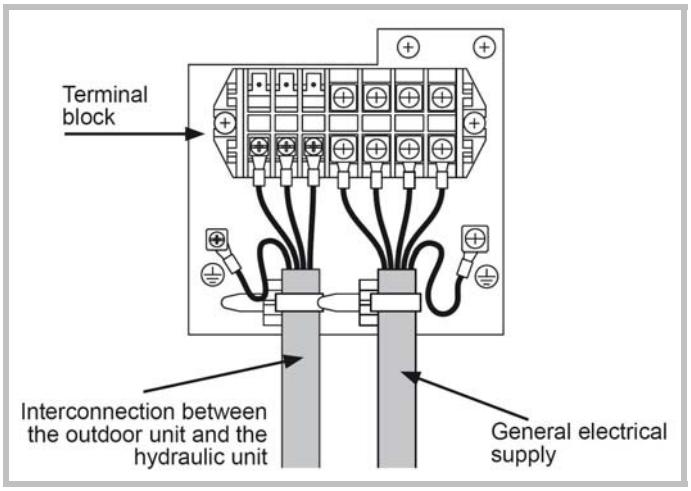
Connection of the outdoor sensor and the room thermostat.

Hydraulic Unit Connection

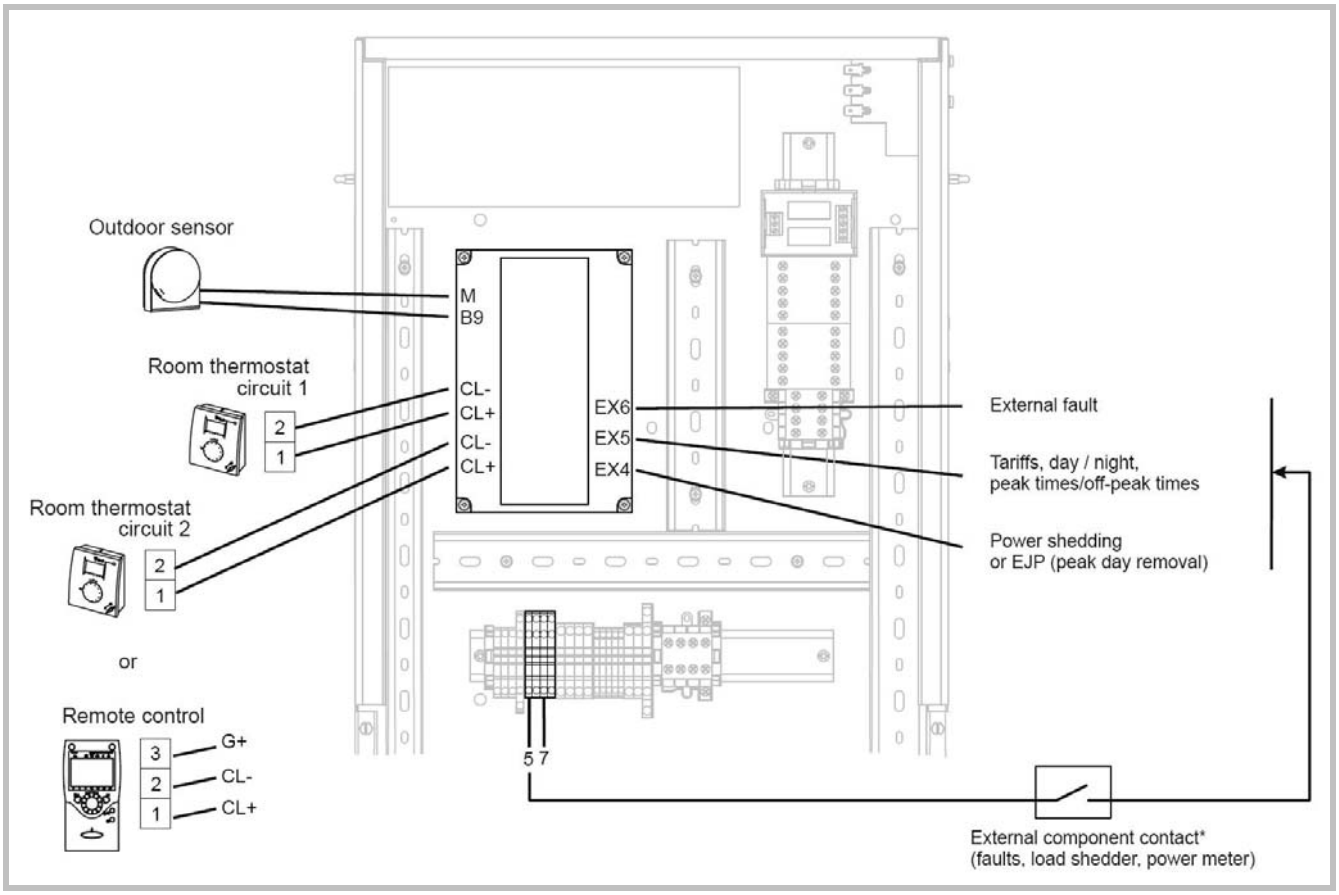


Outdoor Unit Connection

The wiring of all Waterstage outdoor units is as follows:



2.3.3 Hydraulic Unit Connection Diagram



* If the control device does not provide a potential-free contact, the contact must be relayed to create equivalent wiring. In all cases, please refer to the instruction manuals for the external components (load limiting device, power meters) to create the wiring.
** If several fault inputs are required, they are to be wired in series (they must be of the normally-open type).

3 Getting Started

3.1 Checks

3.1.1 Outdoor Unit

- Unit is secured to a stable surface
- Unit is raised in regions of regular snowfall
- Distances to potential obstacles or hazards are maintained
- A condensate drain line is connected

3.1.2 Hydraulic Unit

- Unit is secured to a stable surface
- There is enough space for maintenance around the unit
- There is free access to the unit
- There are no leaks

3.1.3 Hydraulic System

- Check the conformity of connections
- The use of flexible connections is recommended
- The system must be flushed
- Check the expansion vessel pre-charging (1 bar)
- Check the system's pressure and purge
- Check that the pump(s) is/are not locked

3.1.4 Electrical System

- Check the conformity of connections (per NFC 15100)
- Check that the lines are protected (two C curve circuit breakers for "heat pump" and "auxiliaries", lines must be separate)
- Differential protection is required (up to 300 mA).
- Check that connections are properly tightened (flexible wire tips)
- Check the main power supply voltage and make sure the polarity is correct
- Find out what type of contract has been subscribed with the power company (load shedding)

3.1.5 Refrigeration System

- Make sure connections are compliant (diameters, minimum and maximum lengths)
- Flare fittings must be properly made
- Use only HFC-specific tools and materials (POE oil, etc.)
- For welding, use silver welding (40% min.) under nitrogen flux
- Comply with the refrigerant handling legislation
- Conduct a nitrogen pressure leak test (~ 25 bar)
- Pump-down is required (preferably using a vacuometer)
- Open both valves on the outdoor unit (first the liquid valve then the gas valve)
- Supplement if necessary (according to the tables in the instructions)
- Check fittings for tightness
- Check that pipes are correctly insulated and fastened

3.2 Settings

Depending on their associated functions, the control settings are not accessed at the same level. There are 4 levels of access:

U: end-user level
I: commissioning level (installer start-up)
S: engineer level (specialist)
C: OEM level (manufacturer)

To get to the level of access desired:

- Press OK: you are now on the main menu
- Press the info key for 3s (pressing continuously)
- To select the desired level, turn the control knob
- Press OK to confirm: this takes you back to the main menu, with the rights associated to that level. If you exit the main menu by returning to the main page, the access level goes back to U (end-user level)

To adjust the various settings:

- From the main menu, after obtaining the desired level
- turn the control knob to scroll the menu
- When the desired menu appears, press OK to confirm
- Turn the control knob to adjust the setting
- Press OK to confirm the setting

If not setting has been made for 8 minutes, the screen automatically returns to the basic display.

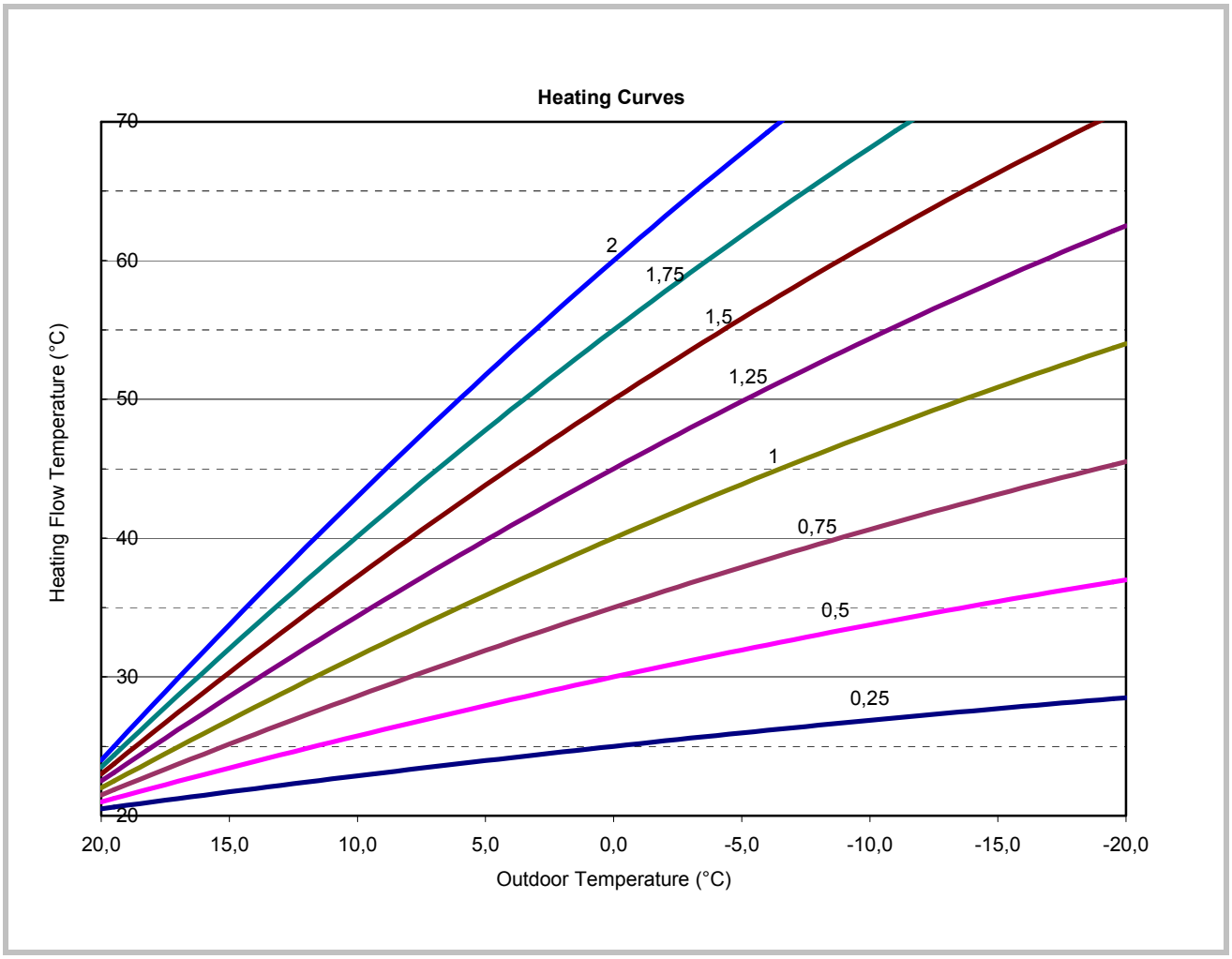
3.3 Operating Modes

Heat pumps are controlled according to the heating curve principle, i.e., the setpoint temperature of the heating circuit water is adjusted as a function of the outdoor temperature.

In heating mode, the choice of the heating curve best suited to the machine's operating conditions can be made automatically by the machine (auto-adapt) or adjusted manually by the installation technician (Settings 720, 721 and 726).

3.3.1 Manual Adjustment

During installation the heating curve must be defined according to the emitters and the home's insulation.



Graph 1: Heating Curves

The heating curves shown above refer to a 20°C room temperature setpoint.
The heating curve slope (setting 720) determines the impact of outdoor temperature variations on heating flow temperature variations. The steeper the slope, the higher will be the increase in the heating circuit water flow temperature which occurs when the outdoor temperature increases slightly.

The heating curve offset (setting 721) changes the flow temperature of all curves, without the slope being modified.

The corrective actions in case of discomfort are listed in the following table:

Feeling of discomfort		**Corrective action**	
By mild weather	**By cold weather**	**Heating curve slope**	**Offset**
Too cold	Too warm	Decrease	Increase
Too cold	OK	Decrease	Increase
Too cold	Too cold	OK	Increase
OK	Too warm	Decrease	OK
OK	OK	OK	OK
OK	Too cold	Increase	OK
Too warm	Too warm	OK	Decrease
Too warm	OK	Increase	Decrease
Too warm	Too cold	Increase	Decrease

3.3.2 Auto Adapt Adjustment

When this function has been activated (setting 726) the heating curve is automatically adjusted, and therefore, there is no need to change the slope or offset of the heating curve.
In order for the auto adapt feature to be operational:

- a room sensor must be connected
- the room influence parameter must be set between 1 and 99 (setting 750) (depending on the system, the room sensor may influence the heating curve adjustment to a greater or lesser extent)
- the room in which the room sensor is installed must not contain any thermostatic valves. If it does, these valves must be fully opened.

This function may cause some feeling of discomfort. This is because in order for the function to be valid, the system needs time to stabilize, which can take more or less time depending on the weather conditions. In general it takes at least a week, without the room temperature setpoint being changed, for the auto-adaptive control to be operational.

3.4 Control of Electric Backups

	H 3 Outdoor Unit Fault **(370)**	**EX 4** Load-shedding (EJP)			**EX 5** Off-peak/peak hours		**EX 6** External fault (**369**)	
		0 V	**230 V** "released"	**230 V** "locked"	**0 V**	**230 V**	**0 V**	**230 V**
EJP lock signal (I 2920)								
HEAT PUMP	OFF	ON	ON	OFF	ON	ON	ON	OFF
DHW auxiliary	ON (1)	ON	OFF	OFF	ON	OFF	ON	OFF
1st stage elec. auxiliary	ON (2)	ON	OFF	OFF	ON	ON	ON	OFF
2nd stage elec. auxiliary	ON (2)	ON	OFF	OFF	ON	ON	ON	OFF
Boiler backup	ON (2)	ON	ON	ON	ON	ON	ON	OFF

*(1) subject to authorization by **EX5***
*(2) provided the outdoor temperature is less than the setting on "**2884** or **3700**" (+2° from the beginning)*

3.5 Domestic Hot Water

The heat pump may be connected to a combined heating device (heat exhanger + electric auxiliaries) for domestic hot water.
DHW handling requires a DHW kit. This kit includes a 3-way selection valve and a temperature sensor.

Warning: the maximum DHW temperature reached with the heat pump does not exceed 60°C. Therefore, the tank must be equipped with an electric auxiliary, especially for legionella protection cycles.

3.5.1 Principle of Operation

DHW production starts when the temperature inside the tank is 7°C less than the setpoint temperature. The setpoint can be either a "reduced" or a "nominal" setpoint, depending on time program 4. During the programmed time periods it is the nominal setpoint which is active, and outside of these periods it is the reduced setpoint which is active. Thus, to avoid accidental DHW charge boosting outside of the nominal time periods, we recommend having a reduced setpoint as low as possible in order to avoid the starting of DHW production outside the programmed time period.

- $T_{reduced}$: the temperature outside the time period. This DHW temperature can be reached with the heat pump alone. This requires that the temperature does not exceed 35°C.
- $T_{nominal}$: the temperature within time period 4, which is approached first with the heat pump then with the electric auxiliaries or the boiler backup (if necessary). Both of these temperatures are adjustable (settings 1610 and 1612).

If the installation's power supply contract includes a Peak/Off-Peak rate subscription, the heaters will be controlled by the power rates and $T_{nominal}$ will be reached only during Off-Peak Hours. This requires that input E5 is wired as shown on Figure 1: Typical Wiring of External Devices.
If no special power supply contract has been subscribed to, or if the DHW input is not wired, $T_{nominal}$ will be reached according to time program 4 / DHW. The $T_{nominal}$ temperature can thus be reached at any time, including during the day.
During the day, DHW has priority over heating, however, DHW production is controlled by cycles which regulate the times allocated to heating and to DHW production in case of simultaneous demands.

A DHW boost function is available on the user interface front panel. This DHW boost enables the DHW to be heated up to $T_{nominal}$ at any time during the day. The boost function is automatically cancelled after a given time (which can be configured). The boost function can be used only if DHW programming has been performed. If the DHW is in nominal mode (nominal T) the boost function is obviously inoperative.
Legionella protection cycles can be programmed.

3.6 Test Mode

3.6.1 Sensor and Input Test Mode

LINE	SENSOR	INPUT	WATERSTAGE
7730	B9		Outdoor temperature
7820	BX1		DHW temperature
7823	BX4		Heat pump flow temperature
7824	BX5		Heat pump return temperature
7830	BX21 (1)		Circuit 1 flow T if 2 circuits (or sw pool)
7831	BX22 (1)		
7832	BX21 (2)		
7833	BX22 (2)		
7841		H1	defrost information
7846		H2	swimming pool operation (if optional)
7855		H3	outdoor unit fault (370)
7914		EX4	Auxiliary load-shedding (EJP)
7915		EX5	Peak/Off-peak rates
7916		EX6	External fault (369)

3.6.2 Output Test Mode

LINE	OUTPUT	WATERSTAGE
7700	QX23 (1)	Circuit 1 heating pump or swimming pool selection valve
	QX21 (1)	Open mixing valve 1
	QX22 (1)	Close mixing valve 1
	QX1	
	QX2	DHW heating circuiting pump (if connected)
	QX3	Circuit 2 heating pump
	QX4	DHW selection valve
	QX5	Boiler selection valve (or heater 1)
	QX6	Boiler (or heater 2)
	QX23 (2)	
	QX21 (2)	
	QX22 (2)	
	QX7	DHW electrical auxiliary
7710	UX	Output test UX %
7711	UX	Voltage signal UX
7721	DO 1	Heating (or cooling) mode
7722	DO 2	Outdoor unit operation

4 Faults

4.1 Fault List

4.1.1 Hydraulic Unit Fault

Faults which occur on the Hydraulic Unit are shown by the symbol 🔔. Press the info key for details on the cause of the fault. The following information is displayed:

- Description of the error
- Location of the error (sensor or contact)
- Reset. Depending on its type, the fault can be manually or automatically deleted:
  - Manual delete: the text displayed when pressing the info key shows "reset ?". Press OK once, the yes flashes; press again to confirm deletion of the fault.
  - Faults whose deletion is automatic are automatically reset.
- Heat pump op: shows whether or not the heat pump operates despite the fault.

No.: Designation of error	Location *(connection)*	Reset		HP op
		Manual	Auto	
10: Outdoor sensor	B9	No	No	Yes
33: Heat pump flow temp sensor error	B21	No	No	Yes
44: Heat pump return temp sensor error	B71	No	No	per diagram
50: DHW temp sensor	B3	No	No	Yes
60: Room sensor 1		No	No	Yes
65: Room sensor 2		No	No	Yes
105: Maintenance message		No	No	Yes
121: HC1 flow temp not reached		No	No	Yes
122: HC2 flow temp not reached		No	No	Yes
127: Legionella protection temp not reached		No	No	Yes
369: External fault (safety component)				No
370: Outdoor unit fault*		Yes	Yes	No

* A fault in the outdoor unit is indicated by LED located on the Hydraulic Unit interface board.

LED display LED 2 (green)	LED 1(red)	Fault description
1 Flash	1 Flash	Communication error between Hydraulic Unit and Outdoor unit.
4 Flashes	1 Flash	Heat pump capacity signal error (Open or short).
4 Flashes	2 Flashes	Hydraulic Unit heat-exchange thermistor Error.
6 Flashes	3 Flashes	Inverter error.
6 Flashes	4 Flashes	Active filter error. PFC error.
7 Flashes	1 Flash	Discharge thermistor error.
7 Flashes	2 Flashes	Compressor thermistor error.
7 Flashes	3 Flashes	Heat-exchange thermistor (outlet) error. Heat-exchange thermistor (intermediate) error.
7 Flashes	4 Flashes	Outdoor thermistor error.
7 Flashes	7 Flashes	Heat sink thermistor (inverter) error. Heat sink thermistor (P.F.C.) error.
7 Flashes	8 Flashes	Expansion valve thermistor error.
8 Flashes	4 Flashes	Current sensor error.
8 Flashes	6 Flashes	Pressure sensor error. Pressure switch error.
9 Flashes	4 Flashes	Current trip.
9 Flashes	5 Flashes	Detection of compressor position error. Compressor start up error.
9 Flashes	7 Flashes	Outdoor unit fan motor error.
10 Flashes	1 Flash	Discharge temperature protection.
10 Flashes	3 Flashes	Compressor temperature protection.
10 Flashes	5 Flashes	Low pressure abnormal.
Continuous flashing (1 sec ON / 1 sec OFF)		Pump down operation.

Faults external to the heat pump

Any safety device (e.g. thermostat pressure switch) wired to input Ex6 (E20) allows external problems to be reported and the heat pump to be immediately stopped. For example, a safety thermostat on the heating floor can be wired to input Ex6 (E20) to avoid excessively high temperatures in the floor.

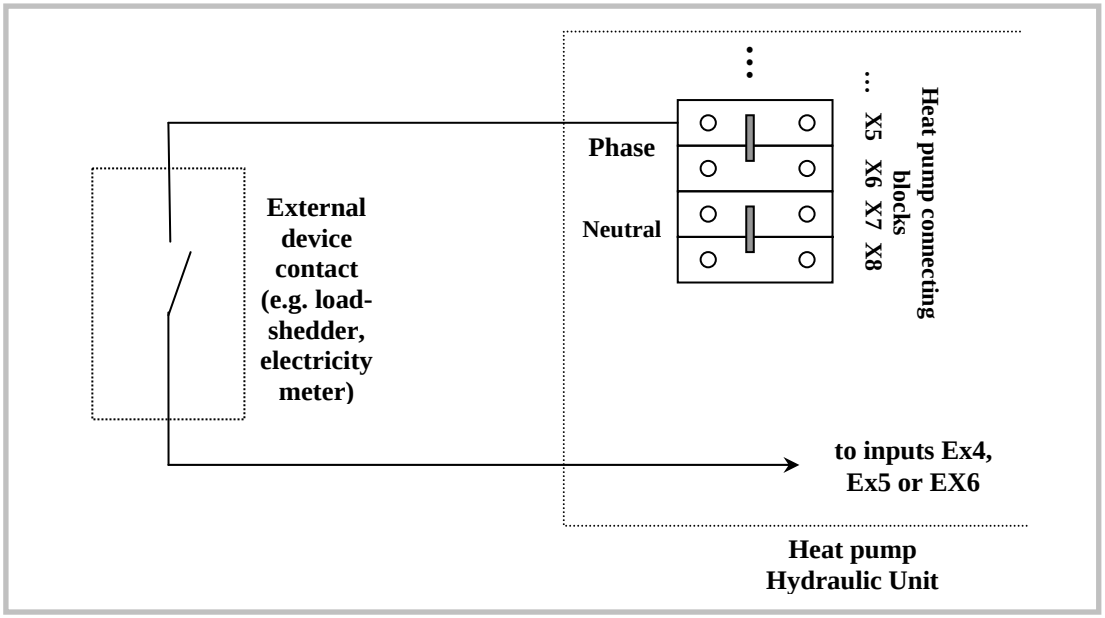


Figure 1: Typical Wiring of External Devices

If the control unit does not provide a potential-free contact, the contact will have to be relayed to obtain an equivalent wiring.

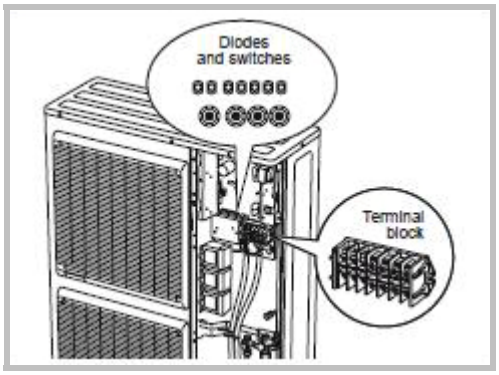
In any case, you should refer to the manuals for the external devices (e.g. load shedders, electricity meters) to perform the wiring.

4.1.2 Outdoor Unit Fault

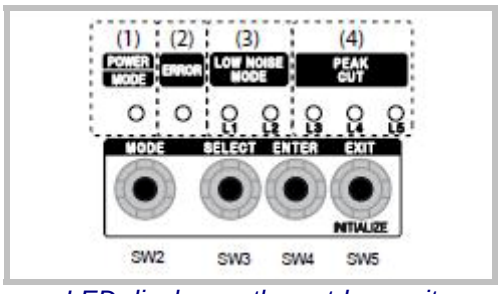
When the system is switched back on after a power outage, the Hydraulic Unit may display fault 370 for a few tens of seconds. This is not a serious problem. It simply means that the outdoor unit is running its tests. Once the tests have been completed, the fault should disappear.

If it doesn't, if a fault has occurred on the outdoor unit as indicated by the Hydraulic Unit, you must remove the front (right-hand) facing from the outdoor unit.
Faults are coded by LED flashes. Error messages are listed in the table below:

On the outdoor unit
When an error occurs:
- The diode "**ERROR**" (2) blinks
  Press once on the switch "**ENTER**" (SW4)
- The "**ERROR**" (2) diode blinks several times depending on the error's type



Location of switches and diodes on outdoor unit



LED display on the outdoor unit

LED display			Diagnosis	Clear
Hydraulic Unit		Outdoor unit		
Green	Red			
1 flash	1 flash	Off	Serial reverse transfer error.	1
		1 flash	Serial forward transfer error.	2
4 flashes	1 flash	22 flashes	Heat pump capacity signal error	4
4 flashes	2 flashes	22 flashes	Hydraulic Unit Heat ex. Sensor error	5
6 flashes	3 flashes	18 flashes	Inverter error.	20
6 flashes	4 flashes	19 flashes	P.F.C. error.	27
7 flashes	1 flash	2 flashes	Discharge thermistor error.	7
7 flashes	2 flashes	8 flashes	Compressor thermistor error.	11
7 flashes	3 flashes	5 flashes	Heat-exchange thermistor (intermediate) error.	12
		4 flashes	Heat-exchange thermistor (outlet) error.	8
7 flashes	4 flashes	7 flashes	Outdoor temperature thermistor error.	9
7 flashes	7 flashes	9 flashes	Heat sink thermistor (inverter) error.	10
		10 flashes	Heat sink thermistor (P.F.C.) error.	13
7 flashes	8 flashes	6 flashes	Expansion valve thermistor error.	14
8 flashes	6 flashes	3 flashes	Pressure sensor error.	24
9 flashes	4 flashes	13 flashes	Current trip (permanent stoppage).	15
9 flashes	5 flashes	14 flashes	Detection of compressor position error (permanent stoppage).	33
		15 flashes	Compressor start up error (permanent stoppage).	17
9 flashes	7 flashes	16 flashes	Outdoor unit fan 1 motor error.	18
		17 flashes	Outdoor unit fan 2 motor error.	
10 flashes	1 flash	11 flashes	Discharge temperature protection (permanent stoppage).	22
10 flashes	3 flashes	12 flashes	Compressor temperature protection (permanent stoppage).	25
10 flashes	5 flashes	20 flashes	Low pressure abnormal.	26

4.2 Outdoor Unit Clearing

This section describes the techniques which can be used to identify the failure.

4.2.1 Failures with Error Code

Clear 1: Serial reverse transfer error

Hydraulic Unit LED: Green 1 flash / Red 1 flash
Outdoor Unit LED: Off

Probable causes:

- Misconnection.
- External cause.
- Main PCB failure.

Check:

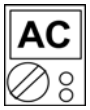
1-1. Stop the system and start it again (disconnection time 1min):
Is the error still displayed?

YES

2. Check the connections:
- Check the connection between the hydraulic unit and the outdoor unit.
- Check the connections between the outdoor unit main board and the active filter board.

OK

3. Check the power supply voltage:
- Check that an AC 198 – 264 V voltage exists between terminals 1 and 2, L1 and N, L2 and N, L3 and N on the outdoor unit terminal block.



OK

4. Check the serial signal:
- Check the voltage between terminals 2 and 3 of the outdoor terminal block. The voltage must fluctuate between AC 70 V and AC 130 V.
- If it doesn't, replace Main PCB.

NO

1-2. Check for external causes:
- Check the system's overall isolation.
- Check for any equipment generating electromagnetic waves which interfere with the communication between the hydraulic unit and the outdoor unit.

Clear 2: Serial forward transfer error

Hydraulic Unit LED: Green 1 flash / Red 1 flash
Outdoor Unit LED: 1 flash

Probable causes:

- Misconnection.
- External cause.
- Interface PCB failure.

Check:

1-1. Stop the system and start it again (disconnection time 1min):
Is the error still displayed?

YES

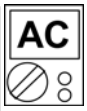
2. Check the connections:
- Check the connection between the hydraulic unit and the outdoor unit.
- Check the connections between the outdoor unit main board and the active filter board.

OK

3. Check the power supply voltage:
- Check that an AC 198 – 264 V voltage exists between terminals 1 and 2, L1 and N, L2 and N, L3 and N on the outdoor unit terminal block.

OK

4. Check the serial signal:
- Check the voltage between terminals 2 and 3 of the outdoor terminal block. The voltage must fluctuate between AC 70 V and AC 130 V.
- If it doesn't, replace Interface PCB.



NO

1-2. Check for external causes:
- Check the system's overall isolation.
- Check for any equipment generating electromagnetic waves which interfere with the communication between the hydraulic unit and the outdoor unit.

Clear 4: Heat pump capacity signal error

Hydraulic Unit LED: Green 4 flashes / Red 1 flash
Outdoor Unit LED: 22 flashes

Probable causes:

- Misconnection.
- Sensor failure.
- Interface PCB failure.

Check:

1. Check connection interface PCB and Heat pump regulator PCB:

- See if the connector has been disconnected.
- See if the connection is correct.
- Check for any damage on the sensor cable.

After solving the misconnection problem, switch the heat pump back on.

OK

2. Check resistance value:

3 pin of CN22 – M < 10Ω

OK

3. Replace interface PCB:

If check point 1 and 2 do not improve the symptom, replace Interface PCB.

Clear 5: Hydraulic Unit Heat exchanger thermistor error

Hydraulic Unit LED: Green 4 flashes / Red 2 flashes
Outdoor Unit LED: 22 flashes

Probable causes:
- Misconnection.
- Sensor failure.
- Interface PCB failure.

Check:

1. Check the sensor connection:
- See if the connector has been removed
- See if the connection is correct
- Check for any damage on the sensor cable.

After solving the misconnection problem, switch the heat pump back on.

OK

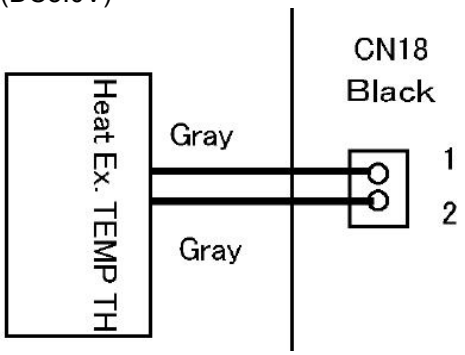
2. Remove the sensor and check its resistance value :
- Check the resistance value.

Temperature (°C)	0	5	10	15	20	25	30	35	40	45	50
Resistance (kΩ)	176	134	103	80,3	62,9	49,7	39,6	31,7	25,6	20,8	17,1

- If the thermistor is faulty, replace it.

OK

3. Check the electronic board voltage:
- Make sure circuit diagram of hydraulic unit and check terminal voltage at thermistor (DC5.0V)



- If there is no voltage, replace Interface PCB.

Clear 7: Discharge thermistor error

Hydraulic Unit LED: Green 7 flashes / Red 1 flash
Outdoor Unit LED: 2 flashes

Probable causes:

- Misconnection.
- Sensor failure.
- Main PCB failure.

Check:

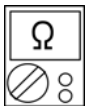
1. Check the sensor connection:

- See if the connector has been disconnected.
- See if the connection is correct.
- Check for any damage on the sensor cable.

After solving the misconnection problem, switch the heat pump back on.

OK

2. Remove the sensor and check its resistance value:



- Check the resistance value

Temperature (°C)	0	5	10	15	20	30	40	50
Resistance (kΩ)	168	130	101	79	63	40	26,3	17,8

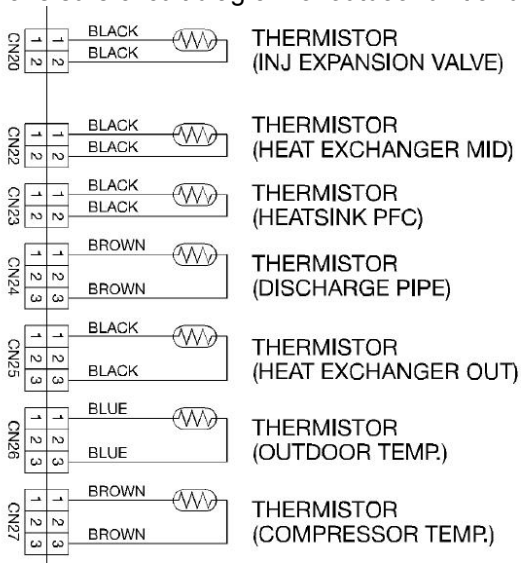
Temperature (°C)	60	70	80	90	100	120
Resistance (kΩ)	12,3	8,7	6,3	4,6	3,4	2

- If the thermistor is faulty, replace it.

OK

3. Check the electronic board voltage:

Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC5.0V)



- If there is no voltage, replace Main PCB.

Clear 8: Heat-exchange thermistor (outlet) error :

Hydraulic Unit LED: Green 7 flashes / Red 3 flashes
Outdoor Unit LED: 4 flashes

Probable causes:
- Misconnection.
- Sensor fault.
- Main PCB failure.

Check:

1. Check the sensor connection:
- See if the connector has been disconnected.
- See if the connection is correct.
- Check for any damage on the sensor cable.

After solving the misconnection problem, switch the heat pump back on.

OK

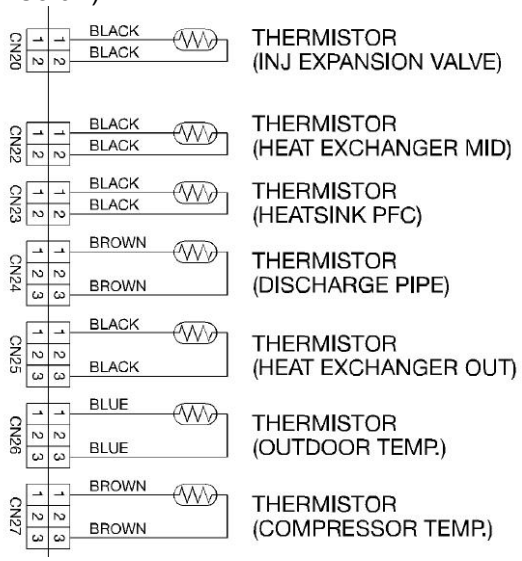
2. Remove the sensor and check its resistance value :
- Check the resistancer value

Temperature (°C)	-10	-5	0	10	15	20	25	30
Resistance (kΩ)	27,5	20,9	16,1	12,4	9,73	7,67	6,1	3,95

- If the thermistor is faulty, replace it.

OK

3. Check the electronic board voltage:
- Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC5.0V)



- If there is no voltage, replace Main PCB.

Clear 9: Outdoor temperature thermistor error

Hydraulic Unit LED: Green 7 flashes / Red 4 flashes
Outdoor Unit LED: 7 flashes

Probable causes:

- Misconnection.
- Sensor failure.
- Main PCB failure.

Check:

1. Check the sensor connection :

- See if the connector has been disconnected.
- See if the connection is correct.
- Check for any damage on the sensor cable.

After solving the misconnection problem, switch the heat pump back on.

OK

2. Remove the sensor and check its resistance value :

- Check the resistance value.

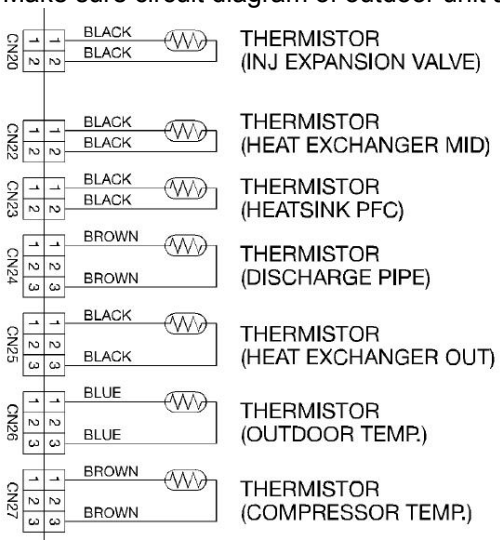
Temperature (°C)	-20	-10	-5	0	5	10	15	20	30	40	50	60	70
Resistance (kΩ)	115	62,3	46,6	35,2	26,9	20,7	16,1	12,6	7,97	5,18	3,45	2,36	1,65

- If the thermistor is faulty, replace it.

OK

3. Check the electronic board voltage:

- Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC5.0V)



- If there is no voltage, replace Main PCB.

Clear 10: Heat Sink Thermistor (inverter) error

Hydraulic Unit LED: Green 7 flashes / Red 7 flashes
Outdoor Unit LED: 9 flashes

Probable causes:

- Misconnection.
- Sensor failure.
- Inverter PCB failure.

Check:

1. Check the sensor connection :

- See if the connector has been disconnected.
- See if the connection is correct.
- Check for any damage on the sensor cable.

After solving the misconnection problem, switch the heat pump back on.

OK

2. Remove the sensor and check its resistance value :

- Check the resistance value.

Temperature (°C)	0	5	10	15	20	30	40	50
Resistance (kΩ)	15,8	12,2	9,5	7,5	5,9	3,78	2,50	1,69

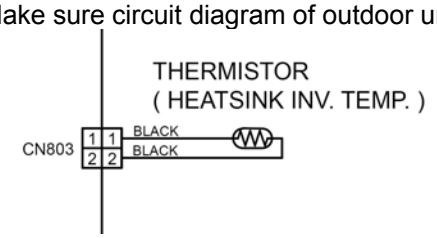
Temperature (°C)	60	70	80	90	100	120
Resistance (kΩ)	1,17	0,83	0,6	0,44	0,33	0,19

- If the thermistor is faulty, replace it.

OK

3. Check the electronic board voltage:

- Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC5.0V)



- If there is no voltage, replace Inverter PCB.

Clear 11: Compressor thermistor error

Hydraulic Unit LED: Green 7 flashes / Red 2 flashes
Outdoor Unit LED: 8 flashes

Probable causes:
- Misconnection.
- Sensor failure.
- Main PCB failure.

Check:

1. Check the sensor connection:
- See if the connector has been removed
- See if the connection is correct
- Check for any damage on the sensor cable.

After solving the misconnection problem, switch the heat pump back on.

OK

2. Remove the sensor and check its resistance value :
- Check the resistance value.

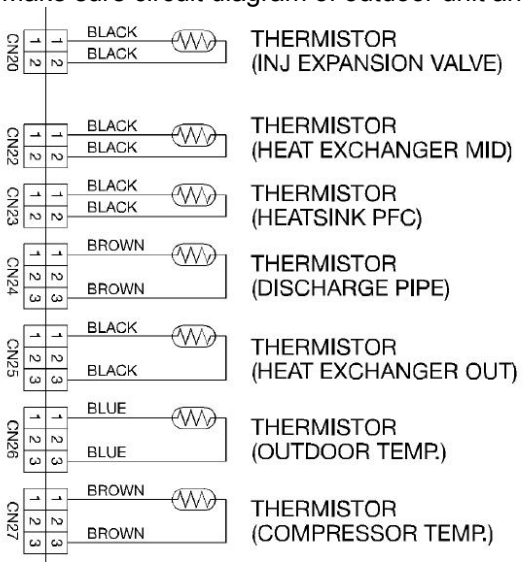
Temperature (°C)	0	5	10	15	20	30	40	50
Resistance (kΩ)	168	130	101	79	63	40	26,3	17,8

Temperature (°C)	60	70	80	90	100	120
Resistance (kΩ)	12,3	8,7	6,3	4,6	3,4	2

- If the thermistor is faulty, replace it.

OK

3. Check the electronic board voltage:
- Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC5.0V)



- If there is no voltage, replace Main PCB.

Clear 12: Heat-exchange thermistor (intermediate) error

Hydraulic Unit LED: Green 7 flashes / Red 3 flashes
Outdoor Unit LED: 5 flashes

Probable causes:
- Misconnection.
- Sensor failure.
- Main PCB failure.

Check:

1. Check the sensor connection:
- See if the connector has been disconnected.
- See if the connection is correct.
- Check for any damage on the sensor cable.

After solving the misconnection problem, switch the heat pump back on.

OK

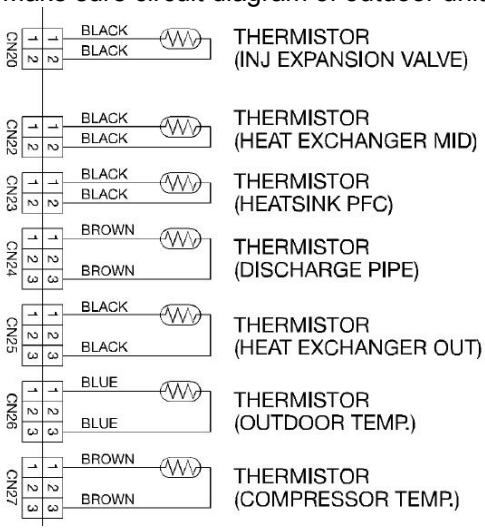
2. Remove the sensor and check its resistance value :
- Check the resistance value

Temperature (°C)	-10	-5	0	10	15	20	25	30
Resistance (kΩ)	27,5	20,9	16,1	12,4	9,73	7,67	6,10	3,95

- If the thermistor is faulty, replace it.

OK

3. Check the electronic board voltage:
- Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC5.0V)



- If there is no voltage, replace Main PCB.

Clear 13: Heat sink thermistor (P.F.C.) error

Hydraulic Unit LED: Green 7 flashes / Red 7 flashes
Outdoor Unit LED: 10 flashes

Probable causes:
- Misconnection.
- Sensor failure.
- Main PCB failure.

Check:

1. Check the sensor connection:
- See if the connector has been removed
- See if the connection is correct
- Check for any damage on the sensor cable.

After solving the misconnection problem, switch the heat pump back on.

OK

2. Remove the sensor and check its resistance value :
- Check the resistance value.

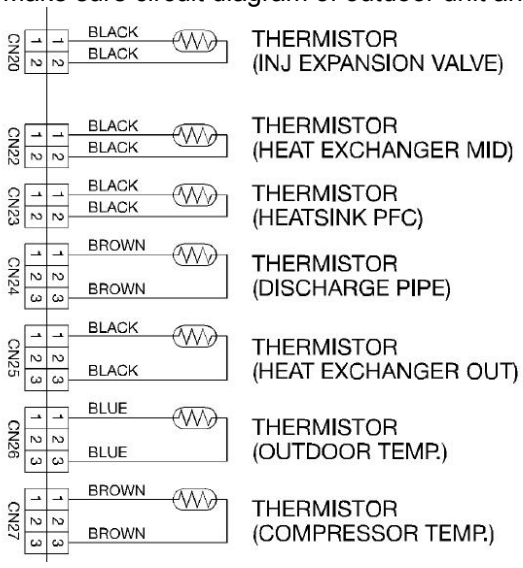
Temperature (°C)	0	5	10	15	20	30	40	50
Resistance (kΩ)	15,8	12,2	9,5	7,5	5,9	3,78	2,50	1,69

Temperature (°C)	60	70	80	90	100	110	120
Resistance (kΩ)	1,17	0,83	0,60	0,44	0,33	0,25	0,19

- If the thermistor is faulty, replace it.

OK

3. Check the electronic board voltage:
- Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC5.0V)



- If there is no voltage, replace Main PCB.

Clear 14: Expansion valve thermistor error

Hydraulic Unit LED: Green 7 flashes / Red 8 flashes
Outdoor Unit LED: 6 flashes

Probable causes:
- Misconnection.
- Sensor failure.
- Main PCB failure.

Check:

1. Check the sensor connection:
- See if the connector has been removed
- See if the connection is correct
- Check for any damage on the sensor cable.

After solving the misconnection problem, switch the heat pump back on.

OK

2. Remove the sensor and check its resistance value :
- Check the resistance value.

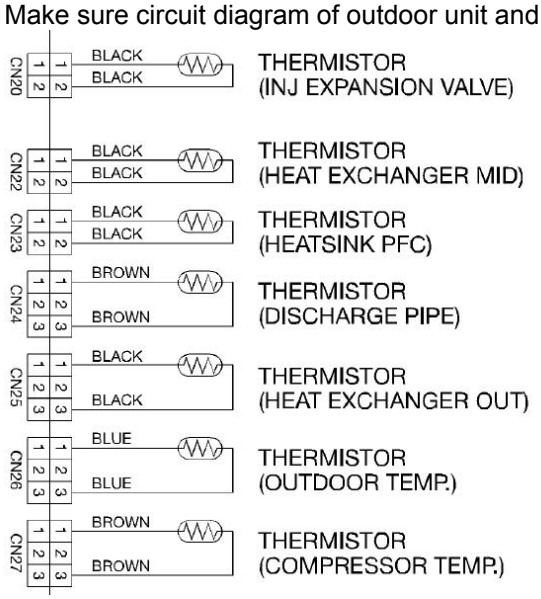
Temperature (°C)	0	5	10	15	20	30	40	50
Resistance (kΩ)	168	130	101	79	63	40	26,3	17,8

Temperature (°C)	60	70	80	90	100	120
Resistance (kΩ)	12,3	8,7	6,3	4,6	3,4	2

- If the thermistor is faulty, replace it.

OK

3. Check the electronic board voltage:
- Make sure circuit diagram of outdoor unit and check terminal voltage at thermistor (DC5.0V)



- If there is no voltage, replace Main PCB.

Clear 15: Current trip (permanent stoppage)

Hydraulic Unit LED: Green 9 flashes / Red 4 flashes
Outdoor Unit LED: 13 flashes

Probable causes:

- Connection failure.
- Outdoor Heat Exchanger clogged.
- Outdoor Fan operation failure.
- Compressor failure.
- Inverter PCB failure.

Check:

1. Check connections condition in control unit:
- Check if the terminal connection is loose.
- Check if connector is removed.
- Check if connector is erroneous connection.
- Check if cable is open.

Upon correcting the removed connector or mis-wiring, reset the power.

OK

2. Check Outdoor Heat Exchanger:
- Is there any obstructing the air flow route?
- Is there any clogging of outdoor unit Heat Exchanger?

If clogged, clear the clog.

OK

3. Check Outdoor Fan:
- Check Outdoor Fan Motor. (Refer to Clear 18)

If the Fan Motor is failure, replace it.

OK

4. Check Compressor:

Refer to “Service parts information 2 : Inverter compressor
If it is abnormal, replace compressor.

OK

5. Replace Inverter PCB:
If Check Point 1 ~ 4 do not improve the symptom, replace Inverter PCB.

Clear 17: Compressor startup error (permanent stoppage)

Hydraulic Unit LED: Green 9 flashes / Red 5 flashes
Outdoor Unit LED: 15 flashes

Probable causes:

- Misconnection of the various electrical components.
- Inverter PCB failure.
- Compressor failure.

Check:

1. Check connections condition in control unit:
- Check if the terminal connection is loose.
- Check if connector is removed.
- Check if connector is erroneous connection.
- Check if cable is open.

Upon correcting the removed connector or mis-wiring, reset the power.

OK

2. Check Compressor:

Refer to “Service parts information 2 : Inverter compressor
If it is abnormal, replace compressor.

OK

3. Replace the electronic board :
- If steps 1 and 2 do not solve the problem, replace Inverter PCB.

Clear 18: Fan motor error (permanent stoppage)

Hydraulic Unit LED: Green 9 flashes / Red 7 flashes
Outdoor Unit LED: 16 flashes (fan 1), 17 flashes (fan 2)

Probable causes:

- Fan motor failure.
- Motor protection.
- Main PCB failure.

Check:

1. Check fan rotation:
- Switch off the heat pump and rotate the fan manually.
- If the fan or bearings are faulty, replace them.

OK

2. Check the ambient temperature around the motor:
- Check excessively high temperature around the fan.

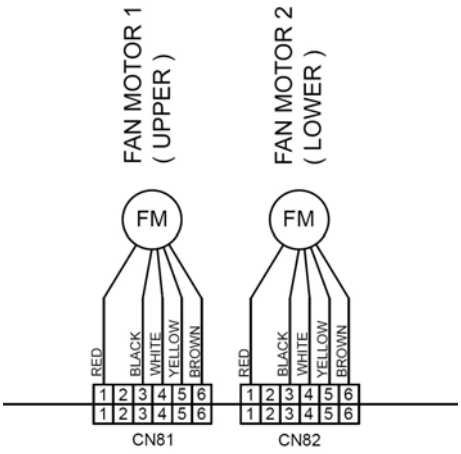
Wait until the temperature comes down again and switch the fan back on.

OK

3. Check the main board output voltage:
- On the outdoor unit, check the output voltage (DC) of the following connectors:

DC

Terminals	Voltage
1 (red)/ 3 (black)	250~400V
4 (white)/3 (black)	15 ±2V



If the voltage is incorrect, replace Main PCB.

Clear 20: Inverter error

Hydraulic Unit LED: Green 6 flashes / Red 3 flashes
Outdoor Unit LED: 18 flashes

Probable causes:

- Connection failure.
- Main PCB failure.
- Inverter PCB failure.

Check:

1. Check connections in control unit:
- Check if the terminal connection is loose.
- Check if connector is removed.
- Check if connector is erroneous connection.
- Check if cable is open.

Upon correcting the removed connector or mis-wiring, reset the power.

OK

2. Replace Main PCB and Inverter PCB:

If Check Point 1 do not improve the symptom, replace Main PCB and Inverter PCB.

Clear 22: Discharge temperature protection (permanent stoppage)

Hydraulic Unit LED: Green 10 flashes / Red 1 flashes
Outdoor Unit LED: 11 flashes

Probable causes:

- Valve is close.
- EEV failure.
- Gas leak, less.
- Discharge Thermistor failure.
- Outdoor Fan operation failure.
- Outdoor Heat Exchanger clogged.

Check:

Cooling mode

1. Check if gas valve is open:

If it is not open, open it and check the operation.

OK

2. Check EEV and Strainer:
Are EEV and Strainer open?

If EEV or Strainer is defective, replace it.

OK

Heating mode

1. Check if liquid valve is open:

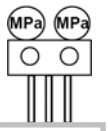
If it is not open, open it and check the operation.

OK

2. Check EEV and Strainer:
Are EEV and Strainer open?

If EEV or Strainer is defective, replace it.

OK



3. Check if gas leak or less gas:
Measure gas pressure, if there is a leak, correct it.

If recharging refrigerant, make sure to perform vacuuming and recharge the specified amount.

OK

4. Check Discharge Pipe Thermistor:
- Is it on the holder?
- Is there a cable pinched?

Check characteristics of thermistor (Refer to Clear 7), If defective, replace the thermistor

OK

5. Check Outdoor Heat Exchanger:
- Is there any obstructing the air flow route?
- Is there any clogging of outdoor unit Heat Exchanger?

If clogged, clear the clog.

OK

6. Check Outdoor Fan:
Check Outdoor Fan Motor. (Refer to Clear 18)

If the Fan Motor is failure, replace it.

Clear 24: Pressure sensor error

Hydraulic Unit LED: Green 8 flashes / Red 6 flashes
Outdoor Unit LED: 3 flashes

Probable causes:

- Connector connection failure.
- Pressure Sensor failure.
- Main PCB failure.

Check:

1. Check connection of the Pressure Sensor:
- Check if the terminal connection is loose.
- Check if connector is removed.
- Check if connector is erroneous connection.
- Check if cable is open.

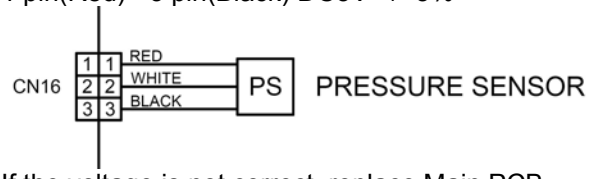
Upon correcting the removed connector or mis-wiring, reset the power.

OK

2. Check output voltage of Main PCB :
Check voltage of Main PCB (Measure at Main PCB side connector)

DC

1 pin(Red) - 3 pin(Black) DC5V +/- 5%



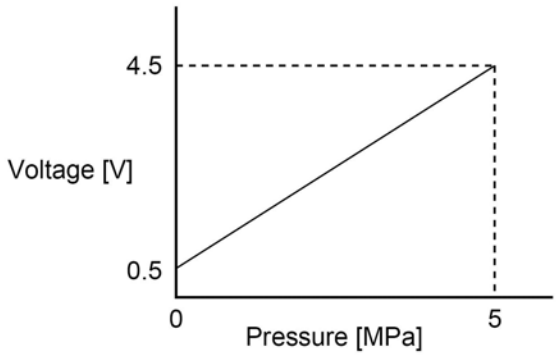
If the voltage is not correct, replace Main PCB.

OK

3. Check output voltage of Pressure Sensor
Check voltage of Main PCB (Measure at Main PCB side connector)

DC

2 pin(White) - 3 pIn(Black) Voltage is refer to the following graph.



If the voltage is not correct, replace Presure Sensor.

Clear 25: Compressor temperature protection (permanent stoppage)

Hydraulic Unit LED: Green 10 flashes / Red 3 flashes
Outdoor Unit LED: 12 flashes

Probable causes:

- Valve is close.
- EEV failure.
- Gas leak, less.
- Compressor Thermistor failure.
- Outdoor Fan operation failure.
- Outdoor Heat Exchanger clogged.

Check:

Cooling mode

1. Check if gas valve is open:

If it is not open, open it and check the operation.

OK

2. Check EEV and Strainer:
Are EEV and Strainer open?

If EEV or Strainer is defective, replace it.

OK

Heating mode

1. Check if liquid valve is open:

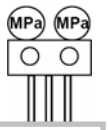
If it is not open, open it and check the operation.

OK

2. Check EEV and Strainer:
Are EEV and Strainer open?

If EEV or Strainer is defective, replace it.

OK



3. Check if gas leak or less gas:
Measure gas pressure, if there is a leak, correct it.

If recharging refrigerant, make sure to perform vacuuming and recharge the specified amount.

OK

4. Check compressor temperature Thermistor:
- Is it on the holder?
- Is there a cable pinched?

Check characteristics of thermistor (Refer to Clear 11), If defective, replace the thermistor

OK

5. Check Outdoor Heat Exchanger:
- Is there any obstructing the air flow route?
- Is there any clogging of outdoor unit Heat Exchanger?

If clogged, clear the clog.

OK

6. Check Outdoor Fan:
Check Outdoor Fan Motor. (Refer to Clear 18)

If the Fan Motor is failure, replace it.

OK

7. Replace Main PCB:
If Check Point 1 ~ 6 do not improve the symptom, replace Main PCB.

Clear 26: Low pressure abnormal

Hydraulic Unit LED: Green 10 flashes / Red 5 flashes
Outdoor Unit LED: 20 flashes

Probable causes:

- Connector connection failure.
- Pressure Sensor failure.
- Main PCB failure.
- Gas leak, less.

Check:

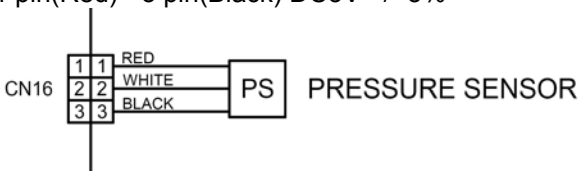
1. Check connection of the Pressure Sensor:
- Check if the terminal connection is loose.
- Check if connector is removed.
- Check if connector is erroneous connection.
- Check if cable is open.

Upon correcting the removed connector or mis-wiring, reset the power.

OK

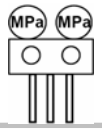
2. Check output voltage of Main PCB :
Check voltage of Main PCB (Measure at Main PCB side connector)

1 pin(Red) - 3 pin(Black) DC5V +/- 5%



If the voltage is not correct, replace Main PCB.

OK



3. Check if gas leak or less gas
Measure Gas pressure, if there is a leak, correct it.

If recharging refrigerant, make sure to perform vacuuming and recharge the specified amount.

OK

4. Replace Pressure Sensor

If Check Point 1 ~ 3 do not improve the symptom, replace Pressure Sensor.

Clear 27: P.F.C. error

Hydraulic Unit LED: Green 6 flashes / Red 4 flashes
Outdoor Unit LED: 19 flashes

Probable causes:

- Connector connection failure.
- Main PCB failure.
- PFC PCB failure.

Check:

1. Check connections of between Main PCB and PFC PCB:
- Check if the terminal connection is loose.
- Check if connector is removed.
- Check if connector is erroneous connection.
- Check if cable is open.

Upon correcting the removed connector or mis-wiring, reset the power.

OK

2. Check output voltage of Main PCB :
Check voltage of Main PCB (Measure at Main PCB side connector)

1 pin(brown) - 2 pin(Red) DC5V +/- 5%

If the voltage is not correct, replace Main PCB.

OK

3. Replace PFC PCB

If Check Point 1, 2 do not improve the symptom, replace PFC PCB.

Clear 33: Detection of compressor position error (permanent stoppage)

Hydraulic Unit LED: Green 9 flashes / Red 5 flashes
Outdoor Unit LED: 14 flashes

Probable causes:

- Misconnection.
- Inverter PCB failure.

Check:

1. Check connections condition in control unit:
- Check if the terminal connection is loose.
- Check if connector is removed.
- Check if connector is erroneous connection.
- Check if cable is open.

Upon correcting the removed connector or mis-wiring, reset the power.

OK

2. Replace the electronic board :
- If steps 1 do not solve the problem, replace Inverter PCB.

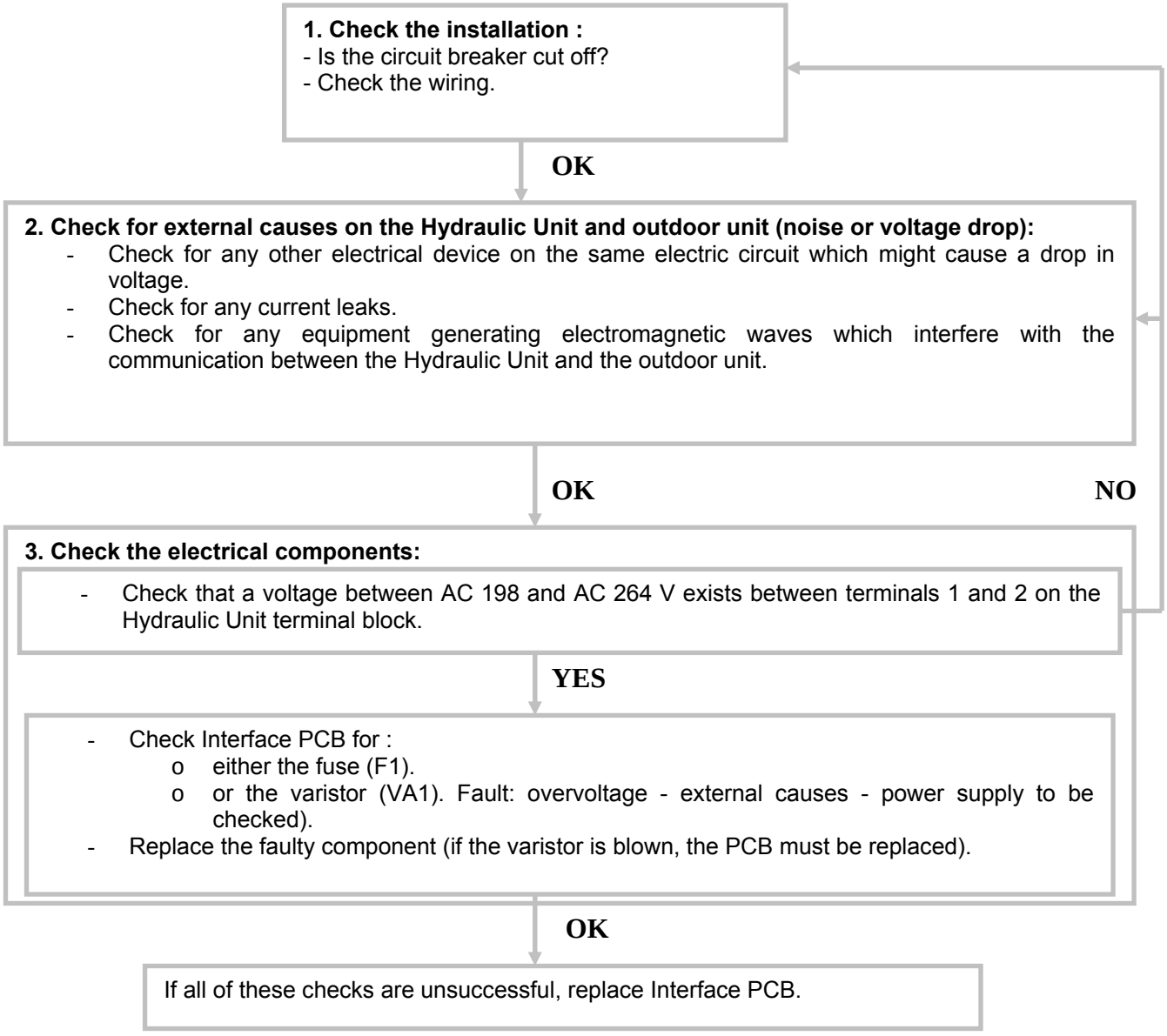
4.2.2 Failures With No Error Code

Clear 35: No voltage on Hydraulic Unit

Probable causes:

- Power supply fault.
- External causes.
- Faulty electrical components.

Check:

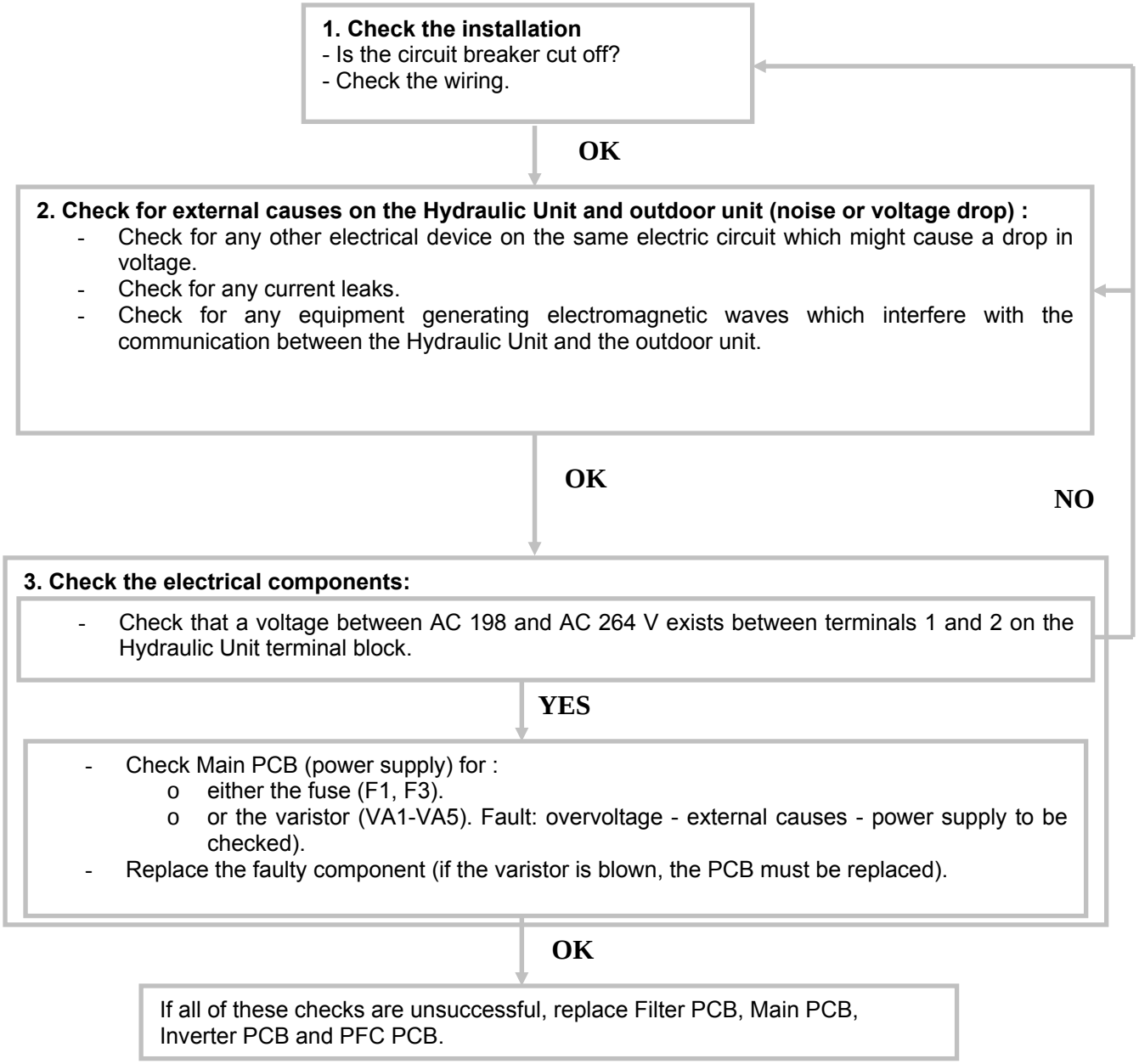


Clear 36: No voltage on outdoor unit

Probable causes:

- Power supply fault.
- External cause.
- Faulty electrical components.

Check:

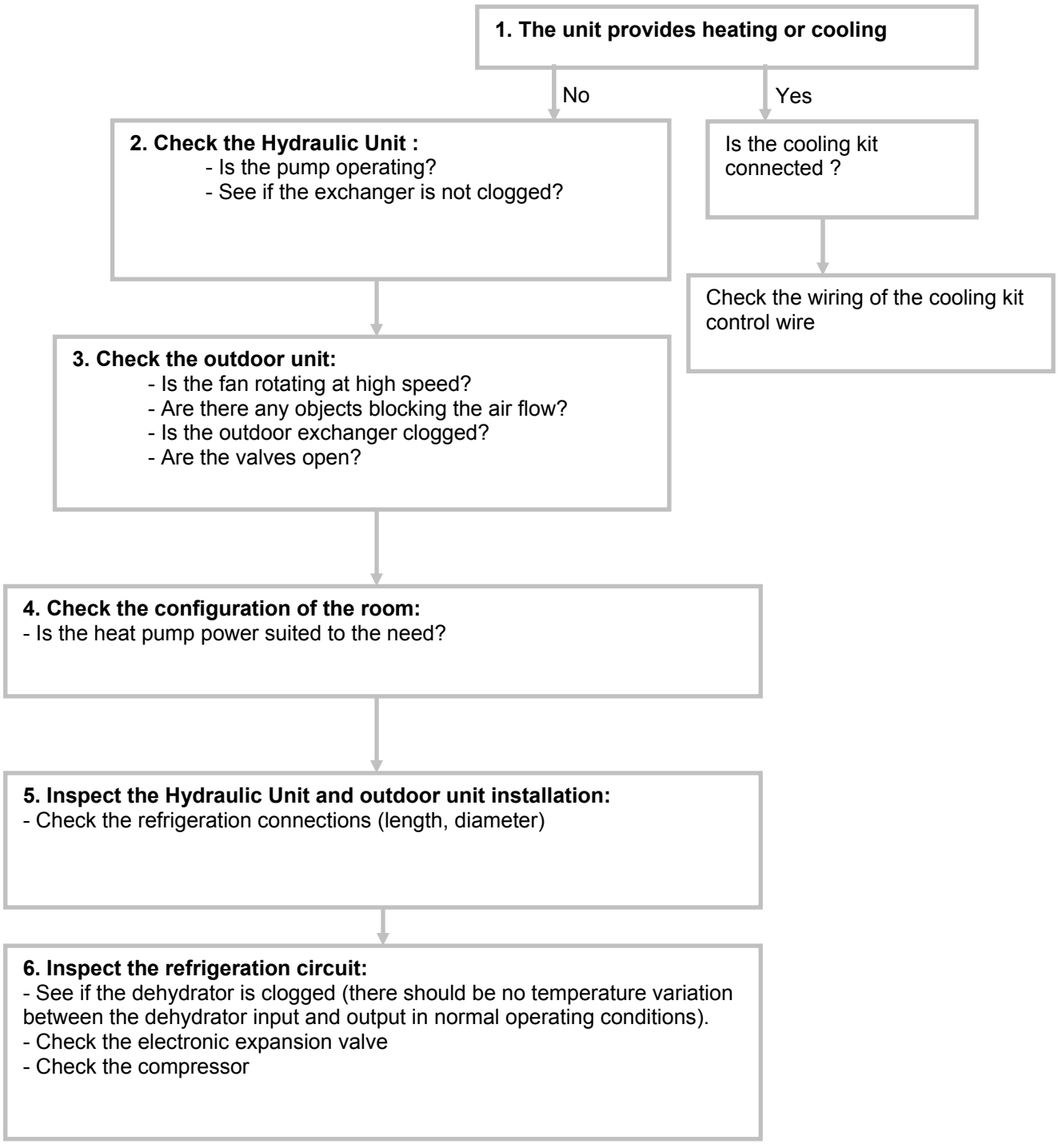


Clear 38: **No heat**

Probable causes:

- Hydraulic Unit error.
- Outdoor unit error.
- Influence from the outdoor environment.
- Misconnections of connectors and cables.
- Refrigeration system fault (not enough gas, clogging, dirty filters).

Check:

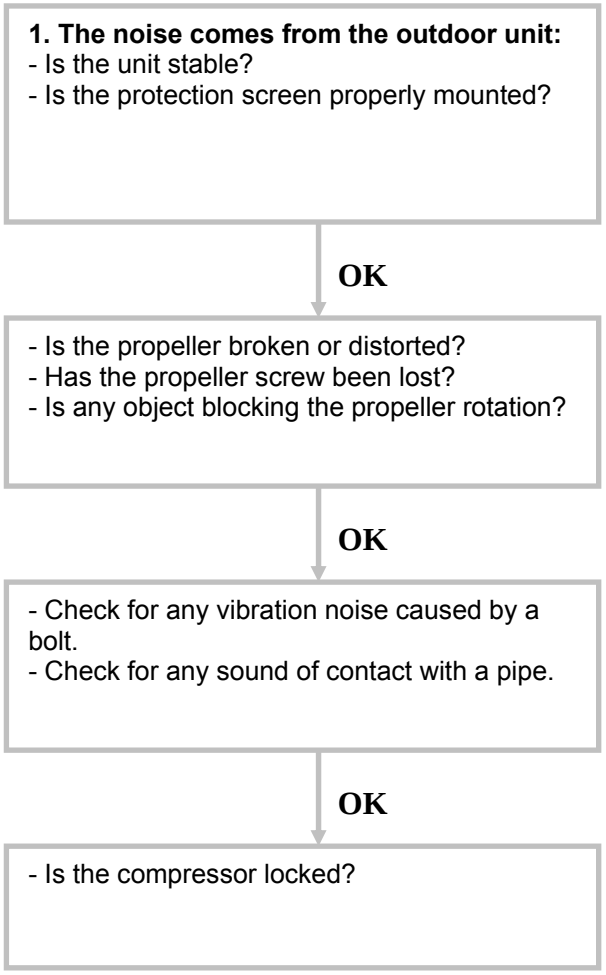


Clear 39: Abnormal noise

Probable causes:

- Abnormal installation (outdoor)
- Fan failure
- Compressor failure.

Checks:



4.3 Sensor Values

4.3.1 Outdoor Unit Temperature Sensors

Outdoor Heat Exchanger (outlet), Outdoor Heat Exchanger (middle)

Temperature (°C)	-10	-5	0	10	15	20	25	30
Resistance value (kΩ)	27,5	20,9	16,1	12,4	9,73	7,67	6,1	3,95

Outdoor Discharge Pipe / Compressor / Expansion valve inlet

Temperature (°C)	0	5	10	15	20	30	40	50	60
Resistance value (kΩ)	168	130	101	79	63	40	26,3	17,8	12,3

Temperature (°C)	70	80	90	100	120
Resistance value (kΩ)	8,7	6,3	4,6	3,4	2

Outdoor Temperature

Temperature (°C)	-20	-10	-5	0	5	10	15	20	30
Resistance value (kΩ)	115	62,3	46,6	35,2	26,9	20,7	16,1	12,6	7,97

Temperature (°C)	40	50	60	70
Resistance value (kΩ)	5,18	3,45	2,36	1,65

Heat sink (INV), Heat sink (PFC)

Temperature (°C)	0	5	10	15	20	30	40	50	60
Resistance value (kΩ)	15,8	12,2	9,5	7,5	5,9	3,78	2,50	1,69	1,17

Temperature (°C)	70	80	90	100	110	120
Resistance value (kΩ)	0,83	0,60	0,44	0,33	0,25	0,19

4.3.2 Hydraulic Unit Temperature Sensors

Heat Exchanger (Condensing sensor)

Temperature (°C)	0	5	10	15	20	25	30	35	40	45	50
Resistance value (kΩ)	176	134	103	80,3	62,9	49,7	39,6	31,7	25,6	20,8	17,1

Outdoor sensor

Temperature (°C)	-20	-15	-10	-5	0	5	10	15	20
Resistance value (kΩ)	7,60	5,85	4,60	3,60	2,85	2,30	1,85	1,50	1,20

Temperature (°C)	25	30	35	40	45
Resistance value (kΩ)	1	0,83	0,70	0,58	0,48

Heat pump flow and return sensor – DHW and heating zone 2 sensor – Swimming pool return sensor

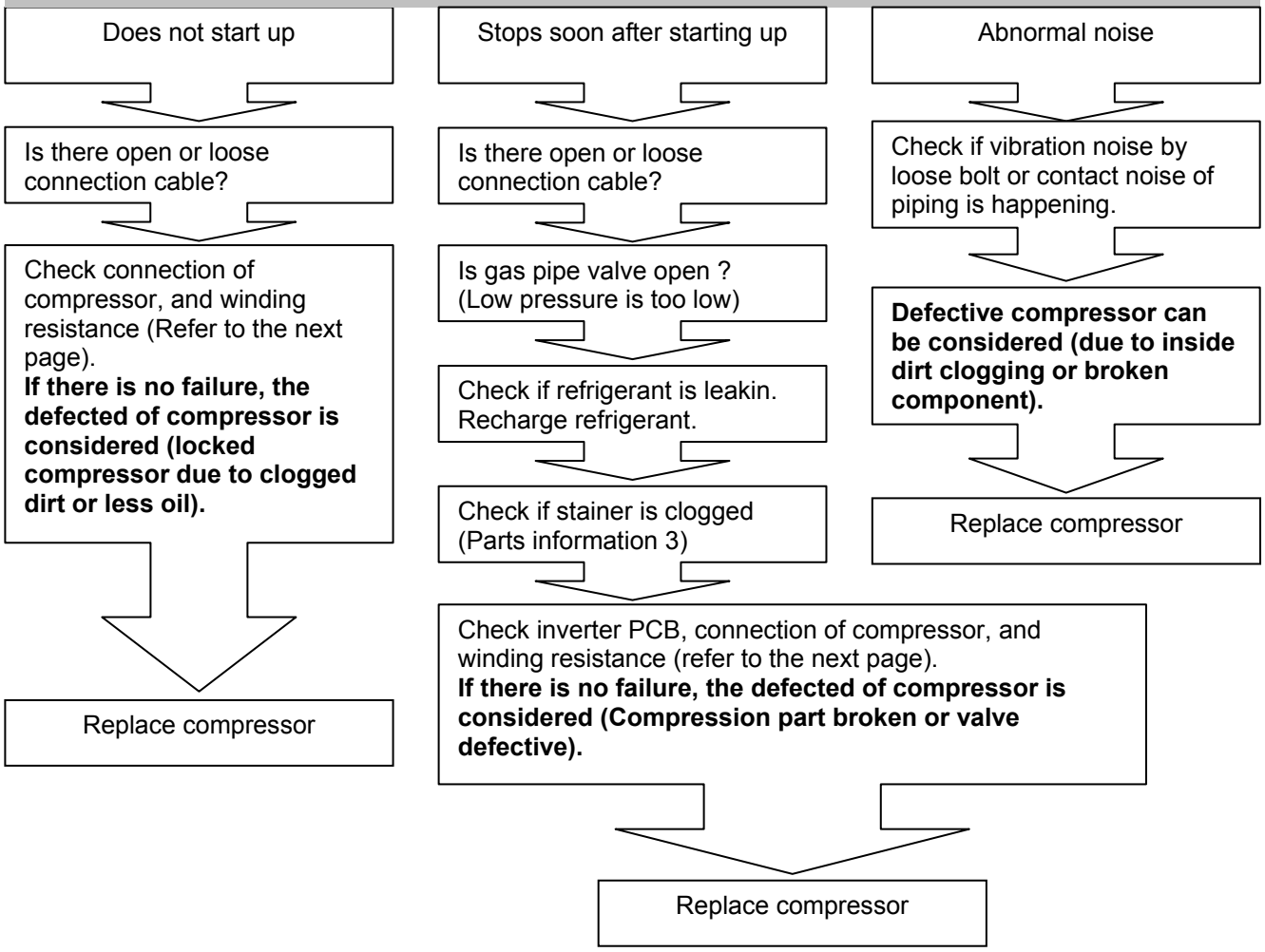
Temperature (°C)	-15	-10	-5	0	5	10	15	20	25
Resistance value (kΩ)	72,5	55	42	32,5	25	20	15,7	12,5	10

Temperature (°C)	30	35	40	45	50	55	60	65	70
Resistance value (kΩ)	8	6,5	5	4	3,5	3	2,5	2	1,7

4.4 Service parts information

4.4.1 Service parts information 1 : Compressor

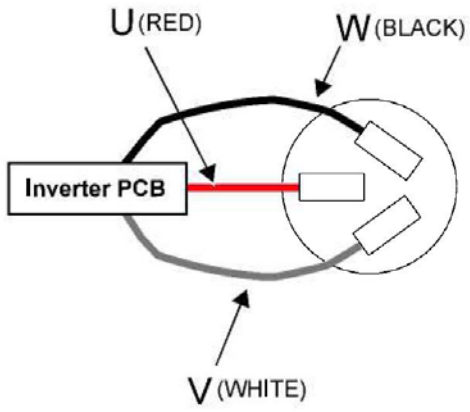
Diagnosis method of compressor (if outdoor unit LED displays error, refer to Failures and clears)



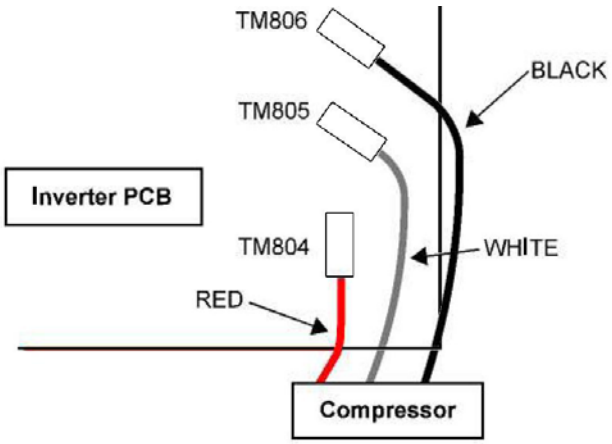
4.4.2 Service parts information 2 : Inverter compressor

Check point 1 : Check connection

Check terminal connection of compressor
(Loose or incorrect wiring)

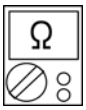


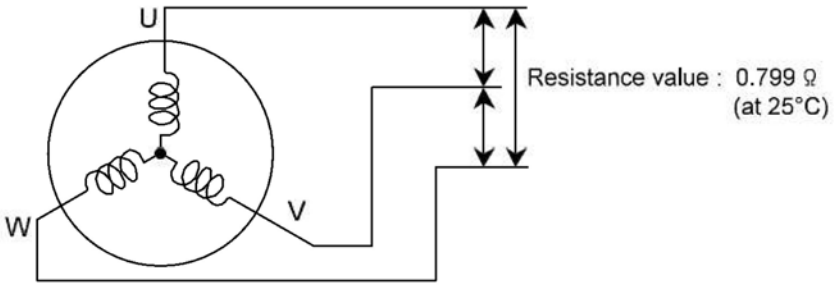
Check connection of inverter PCB
(Loose or incorrect wiring)



Check point 2 : check winding resistance

Check winding resistance on each terminal
If the resistance value is 0Ω or infinite, replace compressor.





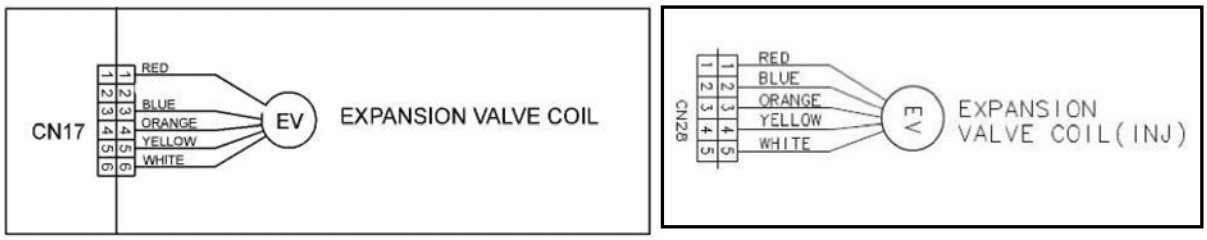
Check point 3 : replace inverter PCB

If check point 1 and 2 do not improve the symptom, replace Inverter PCB.

4.4.3 Service parts information 3 : Outdoor unit electronic expansion valve (EEV, EEV(INJ))

Check point 1 : Check connection

Check connection of connector
(Loose connector or open cable)



Check point 2 : Check coil of EEV

Remove connector, check each winding resistance of coil.

Read wire	Resistance value
White-Red	46Ω +/- 4Ω at 20°C
Yellow-Red	
Orange-Red	
Blue-Red	

If resistance value is abnormal, replace EEV.

Check point 3 : Check voltage from main PCB

Remove connector and check voltage (DC12V)
If it does not appear, replace Main PCB.

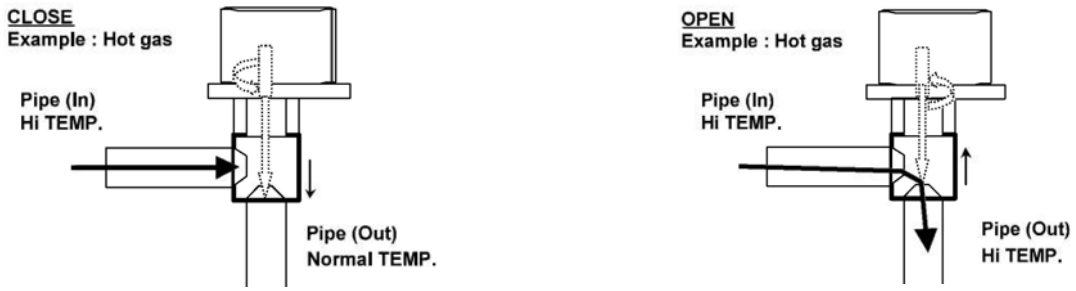
Check point 4 : Check noise at start up

Turn on power and check operation noise.
If an abnormal noise does not show, replace Main PCB.

Check point 5 : Check opening and closing operation of valve

When valve is closed, it has a temp. (Add period) difference between inlet and outlet.

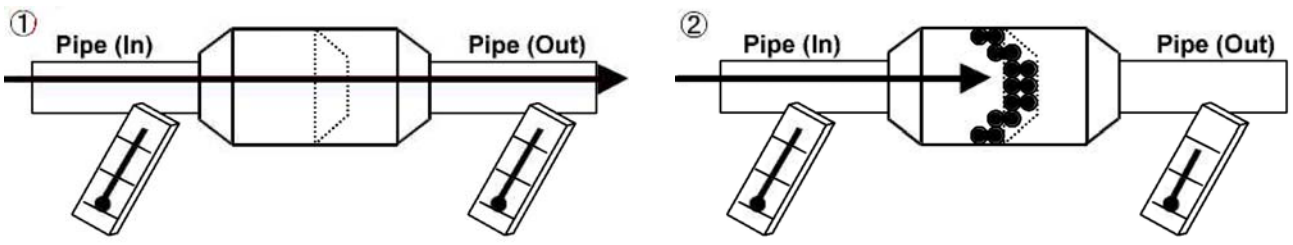
If it is open, it has no temp. (Add period) difference between inlet and outlet.



There is no refrigerant flow coming to EEV(INJ) while the liquid injection is inactive. Check whether the liquid injection is active before executing check point 5 for EEV(INJ).

Check point 6 : Check stainer

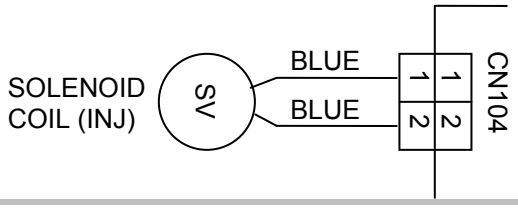
Stainer normally does not have temperature difference between inlet and outlet as shown in 1, but if there is a difference as shown in 2, there is a possibility of inside clogged. In this case, replace stainer.



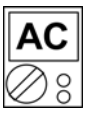
4.4.4 Service parts information 4 : Outdoor unit solenoid valve (SV)

Check point 1 : Check connections

Check connection of connector
(Loose connector or open cable)

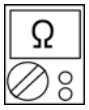


Check point 2 : Check solenoid coil



Remove connector and check if coil is open (normal resistance value of each coil : 1495+/-7%)
If resistance value is abnormal, replace solenoid coil.

Check point 3 : Check voltage from main PCB

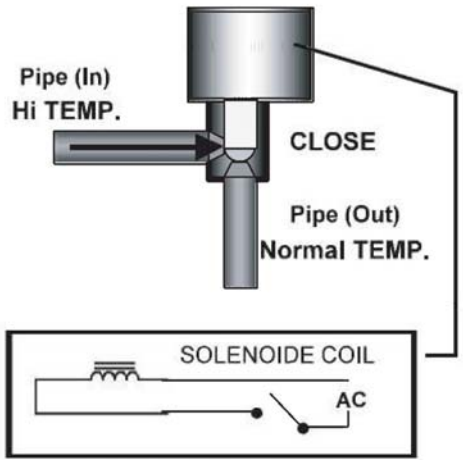


Remove connector and check the voltage (AC230V).
If the voltage does not appear, replace Main PCB.

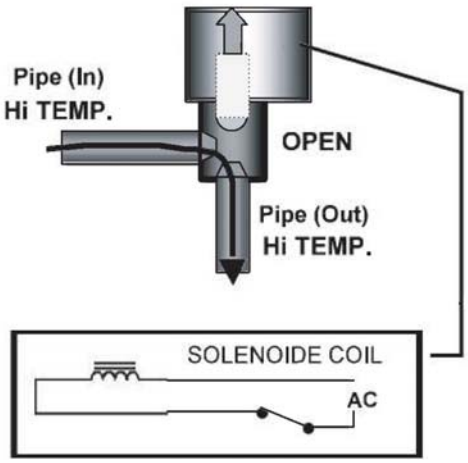
Check point 4 : check opening and closing operation valve

Depending on the injection activity, check if valve is operating normally.
(When valve opens, ther is no temperature difference between inlet and outlet)

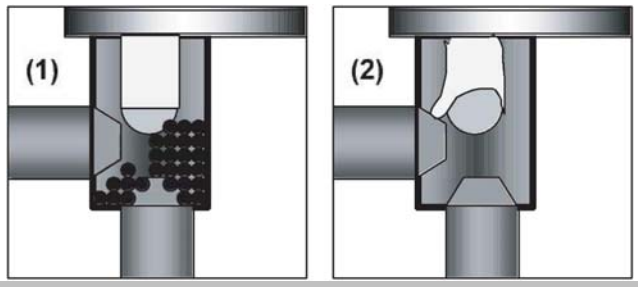
Injection is inactive
Pipe (In) TEMP. Hi,
Pipe (Out) TEMP.Normal



Injection is active
Pipe (In) TEMP. = Pipe (Out) TEMP.



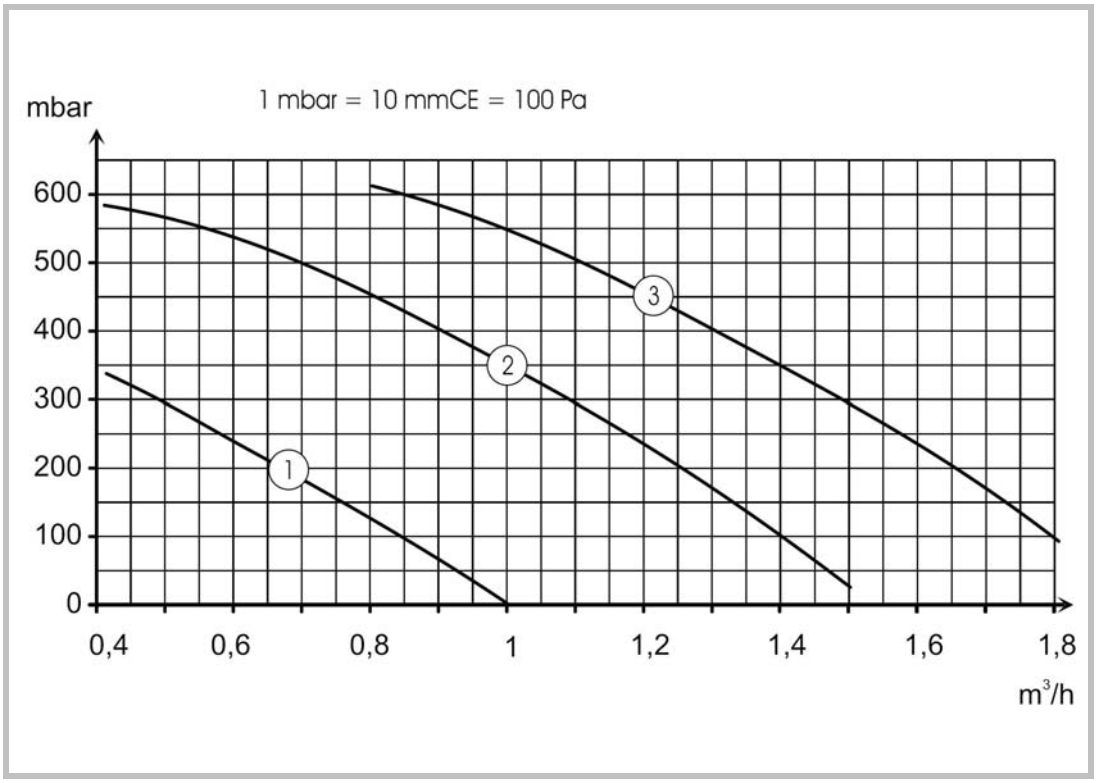
- If the valve closes by removing the connector of the valve which does not close, it is considered to be Main PCB failure. Replace Main PCB.
- If it does not closeby removing connector, there is a possibility of (1) clogging by dirt, or (2) deformation by the heat at the time of solenoid valve installation. In this case, replace solenoid valve.



4.5 Operating Limits

HEAT PUMP	WATERSTAGE 112	WATERSTAGE 140	WATERSTAGE 160
Min/max OT in heat mode (°C)***		-20/35	
Heating floor maximum water temperature (°C)		45	
LT radiator maximum water temperature (°C)		60	
Min/max OT in cooling mode(°C)		8/43	
Cooling floor minimum water temperature (°C)		18	
Fan coil minimum water temperature (°C)		8	
Water circuit max pressure (Bar)		3	
Maximum flow rate (l/h)	2400	3000	3400
Minimum flow rate (l/h)	1200	1500	1700
Refrigerant circ max pressure (kPa)		4,2	
Min delta T (°C)		4	
Max delta T (°C)		8	
Outdoor unit Noise level 1 (dBA)*	53	55	56
Outdoor unit Noise level 5 (dBA)**	39	41	42
Outdoor unit air flow rate (m^3/h)		3100 x 2	

** Acoustic pressure level reading at 1m, in open field, on a reflecting plane.*
*** Acoustic pressure level reading at 5m, in open field, on a reflecting plane t.*
**** When the outdoor temperature continuously exceeds 35°C, DHW heating is done by the water heater heating element.*



Available Hydraulic Pressures and Flow Rates

5 Failures

5.1 Hydraulic, Electric and Refrigeration Systems

5.1.1 Hydraulic System

If the installation is fitted with a heating floor, the most common failures are those listed below:

FAILURE CASES	CONSEQUENCES	SOLUTIONS		APPLIED BY
1- Clogged filter* or sludge in system	Flow pressure too high	clean filter or desludge		Installer
	ΔT too high (>7)	clean filter or desludge		Installer
2- Pump out of order	Zero flow pressure	change pump with warranty if pump is faulty		Service station
	current too high (rotor locked)	change pump with warranty if pump is faulty		Service station
	zero current (winding cut off)	change pump with warranty if pump is faulty		Service station
	pump stuck	release with a screwdriver		Installer
3-Leak	Low level in expansion vessel	On collector, isolate heating circuits to determine which heating circuit is perforated.	Pipe leak. Pipe under warranty if faulty	Service station
			Leak in heating circuit. Floor again.	Installer
4- Clogged heating circuit (crushed pipe)	Very high difference between floor flow/return temp	On collector, check heating circuit flow/return temps (infrared thermometer)	Clear with test pump	Service station
		If no clogged heating circuit, check for crushing with infrared camera	Call the installer's or floor coverer's responsibility into question	
5- Misbalance	Very high difference between floor flow/return temp	Rebalance		Installer
6- Floor undersized or charge losses too high	Very high difference between floor flow/return temp	On collector, check heating circuit flow/return temps (infrared thermometer)	Call the installer's responsibility into question	Installer or Service station

* Not required and not shown on the device.

5.1.2 Electrical System

Outdoor Unit Overvoltage

Check for possible causes in the list below (this list is not exhaustive):

- Problem with the compressor
- PFC board
- Inverter board
- Main board
- Faulty power relay

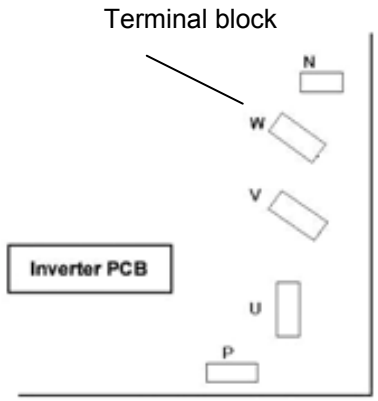
Steps to be followed before performing any work on the Inverter module:

- First switch off the system using the circuit breaker at the head of the line.
- Remove the unit cover and then remove the Inverter module cover.
- Measure the voltage at the condenser terminals. You should find a value of 5 Vdc or less.

Inspection of the Power Transistor Module (Inverter board)

Disconnect the compressor relay and the condenser connection. Measure the resistance value at the points shown on the illustration, and then compare the values observed with those in the table.

Multimeter		Resistor
-	+	1 MOhm or more
P	U	
	V	
	W	
U	N	
V		
W		



5.1.3 Refrigeration System

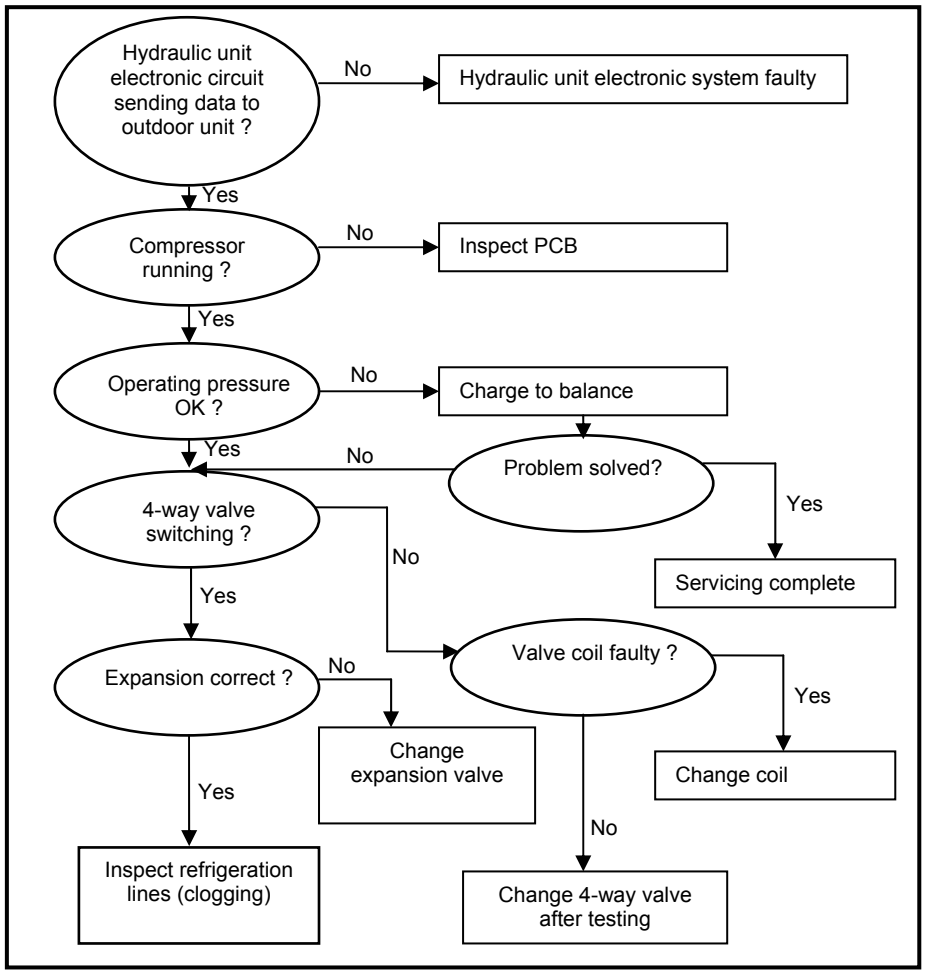
Unit produces no heat

The unit remains in continuous scanning mode.

Initial checks:

Check the settings

Are the data sent by the user interface received by the heat pump?



Outdoor unit does not defrost

- Is condensation drain properly discharged (outdoor unit directly on the ground)?
- Are the auxiliaries powered?
- In boiler backup mode, is the boiler authorized?

- In very cold areas, a fusing resistance value is recommended.
  - Is the installation regularly subject to micro-outages of power (frequent outages on the mains power system may also cause defrosting problems)?
  - Is there a peak day clearing (EJP) outage on the installation?

- Does the heat pump regularly switch to high pressure safety mode?

If this occurs at low temperatures (< 5 °C), we recommend checking that the water pump is operating properly.

- Is the charge correct (refer to the temperature/pressure curve)?
  - Insufficient charging will result in frequent icing.
  - Overcharging will result in frequently switching to HP safety mode.

(If you still have doubts as to the charge, perform the charging with an electronic scale).

- Outdoor unit defrosting is controlled by the exchanger sensor and the controller board.

If the defrost sensor is not iced up while the rest of the exchanger is, then:

⇒ *Move the sensor between the exchanger blades to a place where the exchanger is iced up.*

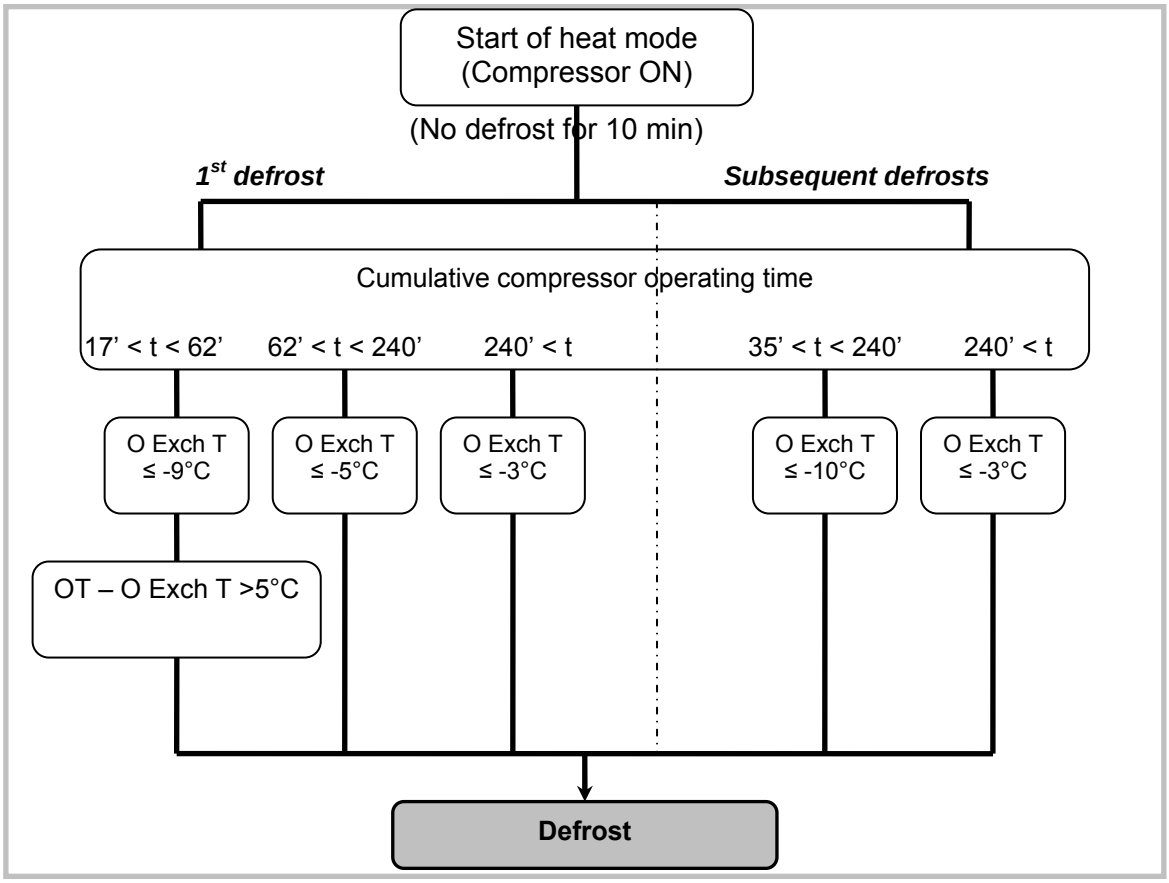
⇒ *If all these points have been checked, replace the outdoor controller board.*

Note:

Outdoor unit defrosting is controlled by the exchanger sensor and the controller board. If no frosting is observed and no anomaly is otherwise noted, the sensor and board must be inspected and the faulty part will have to be replaced.

Defrosting

a. Defrost beginning conditions



O Exch T : outdoor unit exchanger temperature
OT : outdoor temperature
t : Cumulative compressor operating time

b. Defrost ending conditions

With all models, defrosting stops if the exchanger temperature is above 10 °C or if the defrosting time is over 15 minutes).

Crankcase heater

When the outdoor exchanger temperature is below -5°C and the heating mode has been stopped for 30 minutes, the compressor windings are powered and maintain the compressor temperature.

When operation has started and the temperature becomes higher than -3°C, heating stops.

5.2 Compressor Operating Checks

Using a multimeter set to mega ohm, check that the resistance value across the windings is identical irrespective of the phase (between U and V, V and W, W and U). This value should be approx. 1 Ohm.

Check that resistance between each phase and the earth is infinite. The result should be clear (you should not see the displayed value increasing slowly up to a value greater than the multimeter maximum rating).

5.3 Refrigeration Circuit Leak Test

The new regulation requires annual leak testing of installations with a refrigerant charge higher than 2kg.

Leak testing is to be performed with an approved detector that has been appropriately calibrated.

5.4 Troubleshooting

The heat pump is not operating at all (no illuminated indicator):

- Are the power supply voltage and frequency normal?
- Is the connection to mains correct?
- Have all the connectors been properly inserted?
- Are the fuses on the outdoor unit still operating? *If not, change the bad fuse(s).*
- Is the connection between the outdoor unit and the Hydraulic Unit correct? Do you read 230V AC between terminals 1 and 2 of the Hydraulic Unit terminal block?
- Do you read 230V AC at the transformer primary on the Hydraulic Unit? If not, *change the board.*
- Is there any voltage on the transformer secondary on the Hydraulic Unit? *If not, check the thermal fuse. If the fuse is good, the error comes from the board.*

6 Control Settings

6.1 General

The settings described below are those which can be modified by the user.
We wish to remind you that changing the settings below may cause the heat pump to behave in an undesirable way. A testing period should be conducted before the permanent settings of the heat pump are confirmed. This may require a number of changes to be made by the installer.

There are 4 access levels:

U: end-user level
I: commissioning level (installer start-up)
S: engineer level (specialist)
C: OEM level (manufacturer) (not available)

6.2 Function Table

COMMAND LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE	FACTORY SETTING
		Time of day and date		
1	U	Hour/minutes	00:00…23:59	
2	U	Day/month	01.01…31.12	
3	U	Year	1900…2099	
5	S	Start of summertime	01.01…31.12	25.03
6	S	End of summertime	01.01…31.12	25.10
		Operator section		
20	U	Language		English
22	S	Info	Temporarily / Permanent	Temporarily
26	S	Operation lock	Off/on	Off
27	S	Programming lock	Off/on	Off
28	I	Direct adjustment	Auto/confirm	Confirm
40*	I	Used as	Room unit 1 Room unit 2 Room unit P User interface 1 User interface 2 User interface P Operating unit	Room unit 1
42*	I	Assignement device 1		
44	I	Operation HC2	Commonly with HC1	
46	I	Operation HCP	Commonly with HC1	
48*	I	Operator occupancy button	None Heating circuit 1 Heating circuit 2 Shared	None
54*	I	Readjustment room sensor		
70	S	Software version		
		Time prog heating circuit 1		
500	U	Preselection	Mon-Sun ¦ Mon-Fri ¦ Sat - Sun ¦ Mon ¦ Tue ¦ Wed ¦Thu ¦ Fri ¦ Sat ¦Sun	Mon-Sun
501	U	1st phase on	00:00…--:--	6:00
502	U	1st phase off	00:00…--:--	22:00
503	U	2nd phase on	00:00…--:--	--:--
504	U	2nd phase off	00:00…--:--	--:--
505	U	3rd phase on	00:00…--:--	--:--
506	U	3rd phase off	00:00…--:--	--:--
516	U	Default values	No/yes	No
		Time prog heating circuit 2		
520	U	Preselection	Mon-Sun ¦ Mon-Fri ¦ Sat - Sun ¦ Mon ¦ Tue ¦ Wed ¦Thu ¦ Fri ¦ Sat ¦Sun	Mon-Sun
521	U	1st phase on	00:00…--:--	6:00
522	U	1st phase off	00:00…--:--	22:00

COMMAND LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE	FACTORY SETTING
523	U	2nd phase on	00:00…--:--	--:--
524	U	2nd phase off	00:00…--:--	--:--
525	U	3rd phase on	00:00…--:--	--:--
526	U	3rd phase off	00:00…--:--	--:--
536	U	Default values	No/yes	No
		Time program 4 / DHW		
560	U	Preselection	Mon-Sun ¦ Mon-Fri ¦ Sat - Sun ¦ Mon ¦ Tue ¦ Wed ¦Thu ¦ Fri ¦ Sat ¦Sun	Mon-Sun
561	U	1st phase on	00:00…--:--	00:00
562	U	1st phase off	00:00…--:--	05:00
563	U	2nd phase on	00:00…--:--	--:--
564	U	2nd phase off	00:00…--:--	--:--
565	U	3rd phase on	00:00…--:--	--:--
566	U	3rd phase off	00:00…--:--	--:--
576	U	Default values	No/yes	No
		Time program 5 / Cooling circuit		
600	U	Preselection	Mon-Sun ¦ Mon-Fri ¦ Sat - Sun ¦ Mon ¦ Tue ¦ Wed ¦Thu ¦ Fri ¦ Sat ¦Sun	Mon-Sun
601	U	1st phase on	00:00…--:--	8:00
602	U	1st phase off	00:00…--:--	20:00
603	U	2nd phase on	00:00…--:--	--:--
604	U	2nd phase off	00:00…--:--	--:--
605	U	3rd phase on	00:00…--:--	--:--
606	U	3rd phase off	00:00…--:--	--:--
616	U	Default values	No/yes	No
		Holidays heating circuit 1		
641	U	Preselection	Period 1…8	Period 1
642	U	Start	01.01…31.12	
643	U	End	01.01…31.12	
648	U	Operating level	Frost protection ¦ Reduced	Frost protection
		Holidays heating circuit 2		
651	U	Preselection	Period 1…8	Period 1
652	U	Start	01.01…31.12	
653	U	End	01.01…31.12	
658	U	Operating level	Frost protection ¦ Reduced	Frost protection
		Heating circuit 1		
710	U	Comfort heating setpoint	Reduced temp to 35°C	20°C
712	U	Reduced setpoint		18°C
714	U	Frost protection setpoint	4°C to Reduced temp	8°C
716	S	Comfort setpoint max	20°C…35°C	28°C
720	I	Heating curve slope	0,1…4	0,5
721	I	Heating curve displacement	-4,5°C…4,5°C	0°C
726	I	Heating curve adaptation	Off, on	Off
730	I	Summer/winter heating limit	8°C…30°C	18°C
732	S	24-Hour heating limit	-10°C…10°C	-3°C
740	S	Flow temp setpoint min (for fan convectors)	8°C… 95°C	8°C
741	S	Flow temp setpoint max Floor heating system = 50 °C / Higher temperature radiator = 65 °C	8°C… 95°C	55°C
750	S	Room influence	1%...100%	20%
790	S	Optimum start control max	0…360min	120 min
791	S	Optimum stop control max	0…360min	120 min
800	S	Reduced setpoint increase start	-30°C…10°C	---
801	S	Reduced setpoint increase end	-30°C…10°C	-5°C
830	S	Mixing valve boost	0…50°C	0

COMMAND LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE	FACTORY SETTING
834	S	Actuator running time	30…873s	240s
850	I	Floor curing function	0…5	Off
851	I	Floor curing setpoint manually	0°C…95°C	25°C
856	I	Floor curing day current	0…32	
857	I	Floor curing days completed	0…32	
900	S	Optg mode changeover		Protection mode
		Cooling circuit 1		
901	U	Operating mode	Off … automatic	Off
902	U	Comfort cooling setpoint	17…40	24°C
907	U	Release	24h/day Heating circuit time pgm Time program 5	Time program 5
908	I	Flow temp setp at OT 25°C	6…35°C	20°C
909	I	Flow temp setp at OT 35°C	6…35°C	16°C
912	I	Cooling limit at OT	8…35°C	24°C
913	S	Lock time after end of heating	8…100h	24h
918	S	Summer comp start at OT	20…50°C	26°C
919	S	Summer comp end at OT	20…50°C	40°C
920	S	Summer comp setp increase	1…10°C	4°C
923	S	Flow temp setp min at OT 25°C	6…35°C	18°C
924	S	Flow temp setp min at OT 35°C	6…35°C	18°C
928	S	Room influence	1…100%	80%
932	S	Room temperature limitation	0,5…4°C	0,5°C
938	S	Mixing valve decrease	0…20°C	0°C
941	S	Actuator running time	30…873s	240s
945	S	Mixing valve in heating mode	Control Open	Control
946	S	Lock time dewpoint limiter	10…600min	60min
947	S	Flow temp setp incr hygro	1…20°C	10°C
948	S	Flow setp incr start at r.h.	0…100%	60%
950	S	Flow temp diff. dewpoint	0…5°C	2°C
963	S	With prim contr/system pump	No Yes	No
969	S	Optg mode changeover	None ; Off ; Automatic	Off
		Heating circuit 2		
1010	U	Comfort heating setpoint	Reduced temp to 35°C	20°C
1012	U	Reduced setpoint		18°C
1014	U	Frost protection setpoint	4°C to Reduced temp	8°C
1016	S	Comfort setpoint max	20…35°C	28°C
1020	I	Heating curve slope	0,1…4	0,5
1021	I	Heating curve displacement	-4,5°C…4,5°C	0°C
1026	S	Heating curve adaptation	Off, on	Off
1030	I	Summer/winter heating limit	8°C…30°C	18°C
1032	S	24-Hour heating limit	-10°C…10°C	-3°C
1040	S	Flow temp setpoint min (for fan convectors)	8°C… 95°C	8°C
1041	S	Flow temp setpoint max Floor heating system = 50 °C / Higher temperature radiator = 65 °C	8°C… 95°C	55°C
1050	S	Room influence	1%...100%	20%
1090	S	Optimum start control max	0…360min	120 min
1091	S	Optimum stop control max	0…360min	120 min
1100	S	Reduced setpoint increase start	-30…10°C	---
1101	S	Reduced setpoint increase end	-30…10°C	-5°C
1130	S	Mixing valve boost	0…50°C	0°C
1134	S	Actuator running time	30…873s	240s
1150	I	Floor curing function	0…5	0
1151	I	Floor curing setpoint manually	0°C…95°C	25°C

COMMAND LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE	FACTORY SETTING
1156	I	Floor curing day current	0…32	
1157	I	Floor curing days completed	0…32	
1200	S	Optg mode changeover		Protection mode
		Domestic hot water		
1610	U	Nominal setpoint	Thc…65°C	50°C
1612	U	Reduced setpoint	8°C….Thc	25°C
1620	I	Release	24h/day Heating circ time pgms Time program 4/DHW Off-peak rate 4: Time pgm 4/DHW or Off-peak rate	Time program 4/DHW
1640	I	Legionella function	Off Periodic Fixed day in week	Off
1641	I	Legionella funct periodically	1 to 7	7
1642	I	Legionella funct weekday	Mon,…Sun	Saturday
1644	I	Legionella funct time	00:00…23:50	--:--
1645	I	Legionella funct setpoint	55°C…95°C	65°C
1646	I	Legionella funct duration	10min…360min	30
1647	I	Legionella funct circ pump	On/off	On
1660	I	Circulation pump release	Time program 3/HCP DHW release Time program 4/DHW	DHW release
		Swimming pool		
2056	U	Setpoint source heating	8…80	22
		Heat pump		
2844	S	Switch-off temp max Floor heating system = 55 °C / Higher temperature radiator = 65 °C	8°C… 100°C	55°C
2882	S	Release integr electric flow	0… 500°Cmin	100°Cmin
2884	S	Release el flow at OT	-30°C…30°C	2°C
2910	S	Release above OT	---/-30°C…30°C	---
2920	S	With electrical utility dock	Lock/release	Released
		Supplementary source		
3700	S	Release below outside temp	-50…50°C	2°C
3705	S	Overrun time	0...120min	20
3720	S	Switching integral	0… 500°Cmin	100°Cmin
		DHW storage tank		
5020	S	Flow setpoint boost	0…30°C	5°C
5024	S	Switching differential	0…20°C	7°C
5030	S	Charging time limitation	10…600min	90 min
5060	S	El imm heater optg mode	Substitution Summer Always Cooling mode	Substitution
5061	S	Electric immersion heater release	24h/day DHW release Time program 4/DHW	DHW release
		Configuration		
5700	I	Preselection	1 to 12	1
5711	S	Cooling circuit 1	Off 4-pipe system 2-pipe system	Off
5870	S	Combi storage tank	No/yes	No
5987	S	Cont type input EX4	Normally-closed contact (NC) Normally-opened contact (NO)	NO
5989	S	Cont type input EX5	Normally-closed contact (NC) Normally-opened contact (NO)	NC

COMMAND LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE	FACTORY SETTING
6046	I	Function Input H2	HC+DHW op mode change HC op mode change HC1 op mode change HC2 op mode change Error/alarm msg Dewpoint monitoring Pool release	Dewpoint monitoring
6047	I	Contact type H2	Normally closed Normally open	Normally open
6048	S	Function value Contact H2	0…130°C	45°C
6100	S	Readjustm outside sensor	-3…3°C	0°C
6120	S	Frost protection for the plant	On/off	On
6205	S	Reset to default parameters	No/yes	No
6220	S	Software version	0…99	0
		Errors		
6711	U	Reset HP	No/yes	No
6740	S	Flow temp 1 alarm	10…240min	---
6741	S	Flow temp 2 alarm	10…240min	---
6745	S	DHW charging alarm	1…48h	---
6746	S	Flow temp cooling 1 alarm	10…240min	---
6800	S	History 1	Date/time/code	
6802	S	History 2	Date/time/code	
6804	S	History 3	Date/time/code	
6806	S	History 4	Date/time/code	
6808	S	History 5	Date/time/code	
6810	S	History 6	Date/time/code	
6812	S	History 7	Date/time/code	
6814	S	History 8	Date/time/code	
6816	S	History 9	Date/time/code	
6818	S	History 10	Date/time/code	
		Service / special operation		
7070	S	HP interval	1..240 months	---
7071	S	HP time since maint	0..240 months	0
7072	S	Max starts compr1/hrs run	0,1…12	---
7073	S	Cur starts compr1/hrs run	0…12	0
7076	S	Diff condens max/week	1…250	---
7077	S	Cur diff condens max/week	0…250	0
7078	S	Diff condens min/week	1…250	---
7079	S	Cur diff condens min/week	0…250	0
7090	S	DHW storage tank interval	1…240	---
7091	S	DHW stor tank since maint	0…240	0
7141	U	Emergency operation	On/off	Off
7142	S	Emergency operation function type	Manual/auto	Manual
7150	I	Simulation outside temp	-50…50°C	---
7181	I	Phone no. responsibility 1	0…255	
7183	I	Phone no. responsibility 2	0…255	
		Input / output test		
7700	I	Relay test	No test All OFF Relay output QX23 module 1 Relay output QX21 module 1 Relay output QX22 module 1 Relay output QX1 Relay output QX2 Relay output QX3 Relay output QX4 Relay output QX5 Relay output QX6 Relay output QX23 module 2 Relay output QX21 module 2 Relay output QX22 module 2 Relay output QX7	No test
7710	I	Output test UX	0…100%	---%

COMMAND LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE	FACTORY SETTING
7711	I	Voltage signal UX	0…10volt	0 volt
7720	I	Digital output test	No test All OFF Digital output DO1 Digital output DO2	No test
7721	I	Digital output DO1	Cooling mode Heating mode	Heating mode
7722	I	Digital output DO2	On/off	Off
7730	I	Outside temp B9	-50…50°C	0°C
7820	I	Sensor temp BX1	-28…350°C	0°C
7823	I	Sensor temp BX4	-28…350°C	0°C
7824	I	Sensor temp BX5	-28…350°C	0°C
7830	I	Sensor temp BX21 module 1	-28…350°C	0°C
7831	I	Sensor temp BX22 module 1	-28…350°C	0°C
7832	I	Sensor temp BX21 module 2	-28…350°C	0°C
7833	I	Sensor temp BX22 module 2	-28…350°C	0°C
7841	I	Contact state H1	Open/closed	Open
7846	I	Contact state H2	Open/closed	Open
7855	I	Contact state H3	Open/closed	Open
7914	I	Input Ex4	0/230V	0
7915	I	Input Ex5	0/230V	0
7916	I	Input Ex6	0/230V	0
		State of plant		
8000	I	State heating circuit 1		0
8001	I	State heating circuit 2		0
8003	I	State DHW		0
8004	I	State cooling circuit 1		0
8006	I	State heat pump		0
8011	I	State swimming pool		0
8022	I	State supplementary source		0
8050	I	History 1	Date/time/code	
8052	I	History 2	Date/time/code	
8054	I	History 3	Date/time/code	
8056	I	History 4	Date/time/code	
8058	I	History 5	Date/time/code	
8060	I	History 6	Date/time/code	
8062	I	History 7	Date/time/code	
8064	I	History 8	Date/time/code	
8066	I	History 9	Date/time/code	
8068	I	History 10	Date/time/code	
		Diagnostics heat source		
8402	I	El imm heater 1 flow	Off/on	Off
8403	I	El imm heater 2 flow	Off/on	Off
8406	I	Condenser pump	Off/on	Off
8410	U	Return temp HP	0…140°C	0°C
8411	U	Setpoint HP	0…140°C	0°C
8412	U	Flow temp HP	0…140°C	0°C
8413	U	Compressor modulation	0…100%	0%
8425	I	Temp diff condenser	-50…140°C	0°C
8454	S	Locking time HP	0…2730h	00:00:00
8455	S	Counter number of locks HP	0…65535	0
8456	S	Hours run el flow	0…2730h	00:00:00
8457	S	Start counter el flow	0…65535	0
		Diagnostics consumers		
8700	U	Outside temperature	-50…50°C	0°C
8701	U	Outside temp min	-50…50°C	50°C
8702	U	Outside temp max	-50…50°C	-50°C
8703	I	Outside temp attenuated	-50…50°C	0°C
8704	I	Outside temperature composite	-50…50°C	0°C

COMMAND LINE	ACCESS LEVEL	FUNCTION	SETTING RANGE	FACTORY SETTING
8730	I	heating circuit pump 1	Off/on	0
8731	I	Heating circ mix valve 1 open	Off/on	0
8732	I	Heat circ mix valve I close	Off/on	0
8740	U	Room temp 1	0…50°C	20°C
8741	U	Room setpoint 1	4…35°C	20°C
8743	U	Flow temp 1	0…140°C	50°C
8744	U	Flow temp setpoint 1	0…140°C	50°C
8756	U	Flow temperature cooling 1	0…140°C	0°C
8757	U	Flow temperature setpoint cooling 1	0…140°C	0°C
8760	I	Heating circuit pump 2	Off/on	0
8761	I	Heat circ mix valve 2 open	Off/on	0
8762	I	Heat circ mix valve 2 close	Off/on	0
8770	U	Room temp 2	0…50°C	20°C
8771	U	Room setpoint 2	4…35°C	20°C
8773	U	Flow temp 2	0…140°C	50°C
8774	U	Flow temp setpoint 2	0…140°C	50°C
8820	I	DHW pump	Off/on	0
8821	I	Electric immersion heater DHW	Off/on	0
8830	U	DHW temp 1	0…140°C	0°C
8831	U	DHW temp setpoint	5…80°C	50°C
8840	S	Hours run DHW pump	0…2730h	00:00:00
8841	S	Start counter DHW pump	0…2730h	0
8842	S	Hours run el DHW	0…2730h	00:00:00
8843	S	Start counter el DHW	0…65535	0
8900	U	Swimming pool temp	0…140°C	0°C
8901	U	Swimming pool setpoint	0…80°C	22°C
8950	I	Common flow temp	0…140°C	0°C
8951	I	Common flow temperature setpoint	0…140°C	0°C
8957	I	Common flow setp refrig	0…140°C	0°C
9031	I	Relay output QX1	Off/on	0
9032	I	Relay output QX2	Off/on	0
9033	I	Relay output QX3	Off/on	0
9034	I	Relay output QX4	Off/on	0
9035	I	Relay output QX5	Off/on	0
9036	I	Relay output QX6	Off/on	0
9037	I	Relay output QX7	Off/on	0
9050	I	Relay output QX21 module 1	Off/on	0
9051	I	Relay output QX22 module 1	Off/on	0
9052	I	Relay output QX23 module 1	Off/on	0
9053	I	Relay output QX21 module 2	Off/on	0
9054	I	Relay output QX22 module 2	Off/on	0
9055	I	Relay output QX23 module 2	Off/on	0

6.3 Adjustment Function Details

6.3.1 Date and Time Functions

The controller has an annual clock which contains the time, the day of the week and the date.

In order for the function to operate, the time and date must be set properly on the clock.

LINE NO.	PROGRAMMING LINE
1	Hour/minutes
2	Day/month
3	Year
5	Start of summertime
6	End of summertime

***NOTE**:* Summer time/winter time change
Dates have been set for changing to summer time or to winter time. The time changes automatically from 2am (winter time) to 3am (summer time) or from 3am (summer time) to 2am (winter time) on the first Sunday following the respective date.

6.3.2 User Interface Functions

LINE NO.	PROGRAMMING LINE
20	Language
22	Info
26	Operation lock
27	Programming lock
28	Direct adjustment

Info (22):

- **Temporary**:

After pressing the Info key, the information display returns to the basic "predefined" display after 8 minutes or when pressing the operating mode key.

- **Permanent**:

After pressing the Info key, the information display returns to the "new" standard display after a maximum of 8 minutes. The last selected information value is shown in the new basic display.

Operation lock (26):

If the operating lock is activated, the following control elements can no longer be adjusted:
Heating circuit mode, DHW mode, room temp comfort setpoint (knob), occupancy key.

Programming lock (27):

If the programming lock is activated, the setting values are displayed but may no longer be changed.

- **Temporary Suspension of Programming**

The programming lock can be temporarily deactivated at programming level. To do this, simultaneously press the OK and ESC keys for at least 3 seconds. The temporary suspension of the programming lock remains in effect until you exit the programming.

- **Permanent Suspension of Programming**

First perform a temporary suspension, then cancel "Programming lock" on line 27.

Direct adjustment (28):

- **Automatic Save**

Correction of the setpoint with the knob is adopted without a particular confirmation (timeout) or by pressing the OK key.

- **Confirm save**

Correction of the setpoint with the knob will be adopted only after pressing the OK key.

Used as (40):

LINE NO.	PROGRAMMING LINE
40*	Used as *(Room unit 1 / Room unit 2 / Room unit P / Operator unit1 ¦ Operator unit 2 ¦ Operator unit P ¦ Service unit)*

* applies only to room central units C75

This line allows adjusting the use of the user interface. According to use, other settings will be required under "Heating circuit assignment". If several user interfaces are used, operation of each device can be defined selectively.

o If several user interfaces are used, each device address may be used only once.

o The user interface mounted to the Hydraulic Units is set in the factory as operating device 1 (line 40) which has an effect on all heating circuits (line 42) and can be configured only on command lines 44, 46, 48.

Depending on how the device is used (line 40), the following adjustments can be made for assignment to the heating circuits with the following effects:

	Programming line				
40	42	44	46	48	54
Room unit 1	Heating circuit 1				X
	Heating circuits 1 and 2	X		X	X
	Heating circuits 1 and P		X	X	X
	All HCs				
Room unit 2					
Room unit P					
Operator unit 1	Heating circuit 1				
	Heating circuits 1 and 2	X		X	
	Heating circuits 1 and P		X	X	
	All HCs	X	X	X	
Operator unit 2					
Operator unit P					
Operating unit					

- **Room unit 1**

The user interface controls the heating circuits which are authorized on line 42 "Room unit 1 assignment" and which have been activated accordingly in the base unit.

- **Room unit 2**

The user interface only controls heating circuit 2.

- **User interface / operating unit**

The user interface controls the heating circuits that have been activated in the base unit.

Note: with this setting, no room temperature is saved or transmitted by the user interface.

Heating Circuit Assignment

LINE NO.	PROGRAMMING LINE
42*	Assignment device 1
44	Operation HC2
46	Operation HCP
48*	Operator occupancy button
54*	Readjustment room sensor
70	Software version

* applies only to room central units C75

Unit 1 assignment

As unit 1 (setting 40), action of the respective user interface can be assigned either to heating circuit 1 or to both heating circuits. The second option is necessary particularly when there are 2 heating circuits and only one room unit.

Operation HC2

Depending on the setting of line 40, the operating action (operating mode key or knob) can be defined either on room unit 1, on the user interface or on the operating unit for heating circuit 2.

- **Commonly with HC1**

The control for heating circuits 1 and 2 is shared.

- **Independently**

Action of the control is called on the display whenever use is made of the operating key or the knob.

Operation HCP

According to command line 40, the control action (operating mode key or knob) can be defined either on room unit 1, on the user interface, or on the operating unit for heating circuit P.

- **Commonly with HC1**

The control for heating circuits 1 and 2 is shared.

- **Independently**

Changes in the operating mode or adjustment of the nominal temperature setpoint must be made in the programming.

Readjustment room sensor

The room sensor indication can be corrected.

Software version

The indication shows the current version of the user interface.

6.3.3 Time Program Functions (heating circuit 1 & 2, DHW, cooling)

Several control programs are available for the heating circuits and the production of DHW. They are initiated in "Automatic" mode and control the change in temperature levels (and therefore the associated setpoints, reduced and comfort) via the adjusted changeover times.

Enter changeover times:
Changeover times can be adjusted in a combined way, i.e., identical times for several days or distinct times for certain days. Preselecting groups of days (e.g., Mon...Fri and Sat...Sun) having the same changeover times makes adjustment of the changeover program considerably shorter.

Changeover Points

Line no.				Programming line
HC1	HC2	4/DHW	5	
500	520	560	600	Preselection *(Mon-Sun / Mon-Fri / Sat – Sun / Mon...Sun)*
501	521	561	601	1st phase On
502	522	562	602	1st phase Off
503	523	563	603	2nd phase On
504	524	564	604	2nd phase Off
505	525	565	605	3rd phase On
506	526	566	606	3rd phase Off

Standard Program

Line no.	Programming line
516, 536, 576, 616	Default values *(No /Yes)*

All time programs can be reset to factory settings. Each time program has its own command line for this reset action.

In this case, individual settings will be lost!

Holidays:

Line no. HC1	HC2	Programming line
642	652	Start
643	653	End
648	658	Operating level

The holiday program enables changing the heating circuits over to a selected operating level according to the date (calendar).

Important !
The holiday program can be used only in the automatic mode.

6.3.4 Heating Circuit 1 & 2 Functions

Operating Mode

For heating circuits there are several functions available which can be individually adjusted for each heating circuit.

The programming lines for the 2nd heating circuit are displayed only if an extension module has been connected to the controller.

Operation of heating circuits 1 and 2 is directly controlled via the operating mode key.

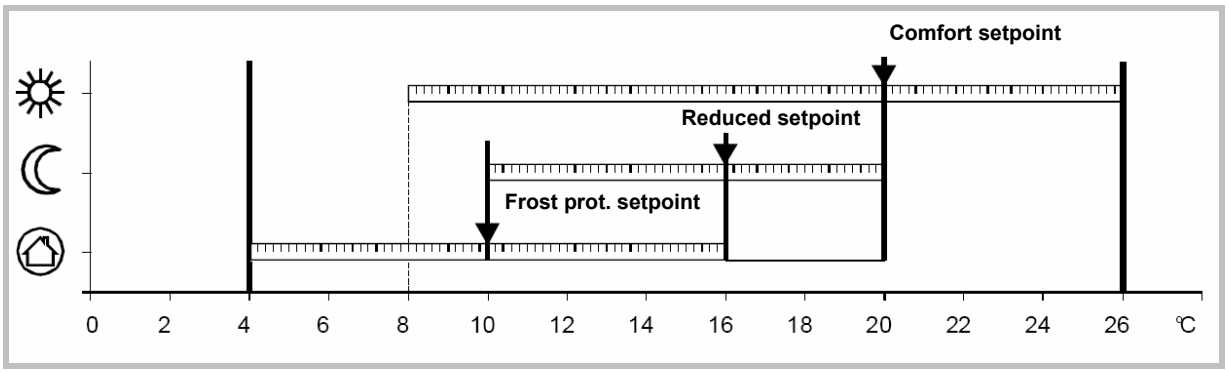
Setpoint Values

Line no. HC1	HC2	Programming line
710	1010	Comfort heating setpoint
712	1012	Reduced setpoint
714	1014	Frost protection setpoint
716	1016	Comfort setpoint max

Room Temperature:

Room temperature can be set according to different setpoint values. Depending on the selected mode, these setpoints are activated and provide different temperature levels in the rooms.

The ranges of configurable setpoints are defined by their interdependencies, as shown in the graph below.



Frost protection:

The protection mode automatically prevents an excessively sharp drop in room temperature.

In this case the control adopts the frost protection room setpoint.

Heating Curve

Line no. HC1	HC2	Programming line
720	1020	Heating curve slope
721	1021	Heating curve displacement
726	1026	Heating curve adaptation

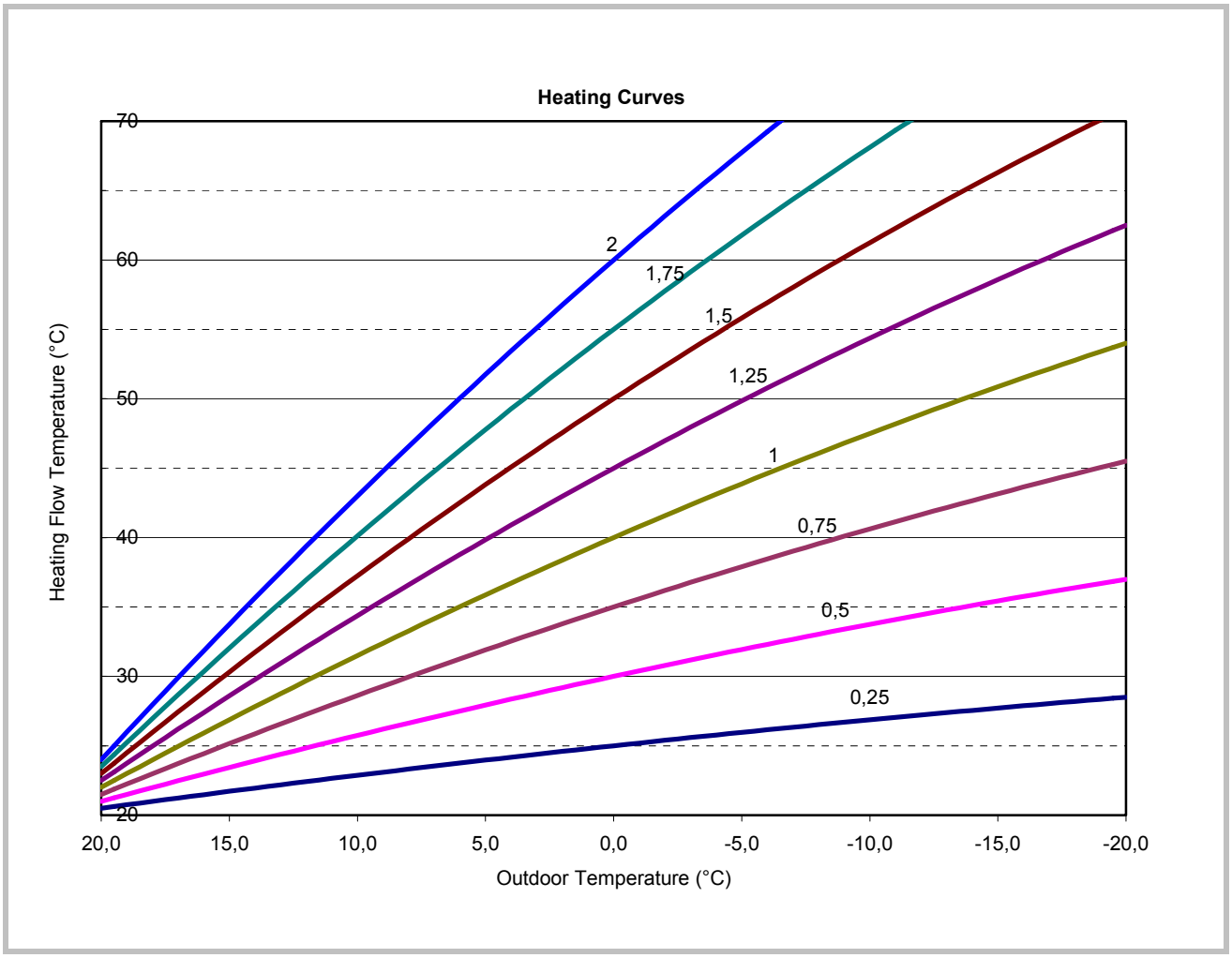
Heating curve slope:

Based on the heating characteristic, the controller computes the flow temperature setpoint which will be used for controlling the flow temperature in consideration of atmospheric conditions. Different settings can be used to adapt the heating characteristic so that the heating capacity, and therefore the room temperature, will match the individual needs.

The colder the outdoor temperature, the greater the extent to which the slope will modify the flow temperature. In other words, the slope should be corrected if the room temperature shows a difference when the outdoor temperature is low, but not when it is high.

o Increase the setting:
The flow temperature is increased mainly when the outdoor temperatures are low.
o Decrease the setting:
The flow temperature is lowered mainly when the outdoor temperatures are low.

Warning:
The heating curve is adjusted in relation to a room temperature setpoint of 20°C. If the room temperature setpoint is modified, the flow temperature setpoint is automatically recomputed. This will not modify the setting and amounts to automatically adapting the curve.



Heating curve displacement

The curve shift (offset) modifies the flow temperature in a general and even manner over the full range of outdoor temperature. In other words, the shift should be corrected when the room temperature is generally too high or too low.

Heating curve adaptation

Adaptation enables the controller to automatically adapt the heating curve to the present conditions. This correction may only be activated or deactivated.
In the latter case, there is no need to correct the slope and shift.

Information:
To ensure operation, the following requirements must be met:
- A room sensor must be connected.
- The "room influence" parameter must be set between 1 and 99.
- The reference room (where the room sensor is installed) must not contain adjusted thermostatic valves. If present in the room, these valves must be fully open.
- Operation of this function requires an adaptation period which can take more or less time (approx. 1 week) depending on weather conditions and on the stability of the room temperature setpoint.

Eco Functions

Line no. HC1	HC2	Programming line
730	1030	Summer/winter heating limit
732	1032	24-Hour heating limit

Summer/winter heating limit

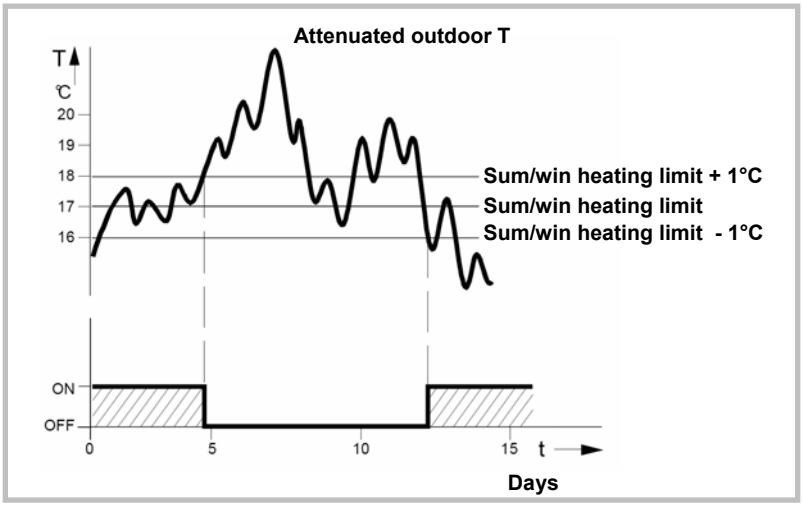
The summer/winter heating limit switches the heating on or off through the year according to the temperature ratio. Changeover is performed automatically when in automatic mode and thus avoids the user having to turn the heating on or off. Changing the input value makes the respective annual periods (summer/winter) shorter or longer.
- If the value is increased:

Changing to winter operating mode is advanced, changing to summer mode is delayed
- If the value is decreased:

Changing to winter mode is delayed; changing to summer mode is advanced.

Information:
This function does not work in "Continuous Comfort temperature" mode. (Sunlight)
The controller displays "ECO".
The outdoor temperature is attenuated to take the building's dynamics into account.

Example:



24-Hour heating limit

The 24-hour heating limit is used to switch the heating on and of in the course of the day, depending on the outside temperature.This function is used mainly during intermediate seasons (spring and fall) to react rapidly in case of fluctuating temperatures.

Thus, in the following example the changeover temperature will be 18°C, computed as follows:

Comfort heating setpoint (710)	22°C
24-Hour heating limit (732)	-3°C
Changeover temperature (710 – 732) Heating off	=19°C
Differential (Fixed)	-1°C
Changeover temperature Heating on	=18°C

Changing the input value makes the respective heating periods shorter or longer.

- If the value is increased: changeover to heating mode is advanced; changeover to ECO is delayed.
- If the value is decreased: changeover to heating mode is delayed; changeover to ECO is advanced.

Information:
This function will not work in "Continuous Comfort temperature" mode.
The display will show "ECO".
The outdoor temperature is attenuated to take the building's thermal dynamics into account.

Flow temperature setpoint

Line no. HC1	HC2	Programming line
740	1040	Flow temp setpoint min (for fan convectors)
741	1041	Flow temp setpoint max

This limitation allows to define a range for the orders to start. When instructed to start the heating circuit reaches the threshold, this record remains permanently at the maximum or minimum, even if the heat demand continues to increase or decrease.

Room Influence

Line no. HC1	HC2	Programming line
750	1050	Room influence

Control types:
When using a room temperature sensor there are 3 different types of control to choose from.

SETTING	CONTROL TYPE
- - - %	Simple control according to outdoor conditions *
1...99 %	Control according to outdoor conditions with room influence *
100 %	Control according to room temperature only

** Requires the connection of an outdoor sensor*

Simple control according to outdoor conditions

The flow temperature is computed via the heating curve according to the averaged outdoor temperature.
This type of control requires proper adjustment of the heating curve, as the control does not take the room temperature into account for this adjustment.

Control according to outdoor conditions with room influence

The difference between the room temperature and the setpoint value is measured and taken into account for temperature control. This enables taking into account possible heat inputs and ensures a more even room temperature.

The influence of the difference is defined as a percentage. The better the installation in the reference room (accurate room temperature, correct installation location, etc.) the higher will be the value that can be set.

Example:

Approx 60%: the reference room is appropriate
Approx 20 %: the reference room is inappropriate

Information:

Activation of the function requires taking into account the following requirements:

- A room sensor must be connected.
- The "room influence" parameter must be set between 1 and 99.
- The reference room (where the room sensor is installed) must not contain adjusted thermostatic valves. If present in the room, these valves must be fully open.

Control according to room temperature only

The flow temperature is adjusted according to the room temperature setpoint, the current room temperature and its evolution. A slight increase in room temperature, for example, causes an immediate drop in the flow temperature.

Information:

Activation of the function requires taking into account the following requirements:

- A room sensor must be connected.
- The "room influence" parameter must be set to 100%.

The reference room (where the room sensor is installed) must not contain adjusted thermostatic valves. If present in the room, these valves must be fully open.

Optimisation at switch-on and switch-off

Line no. HC1	HC2	Programming line
790	1090	Optimum start control max
791	1091	Optimum stop control max

Optimum start control max

The change in temperature levels is optimised in such a way as to reach the comfort setpoint during changeover times.

Optimum stop control max

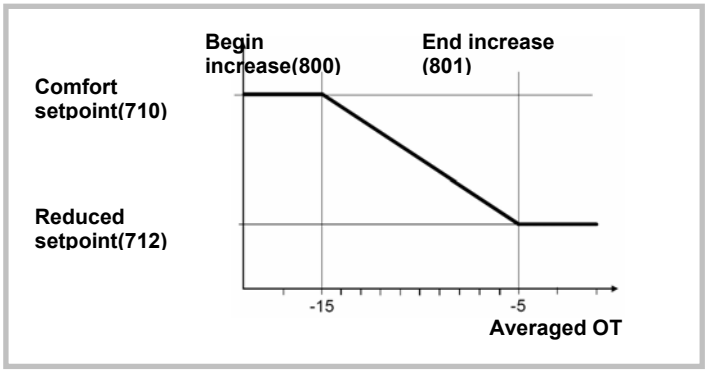
The change in temperature levels is optimised in such a way as to reach the comfort setpoint -1/4 °C during changeover times.

Reduced Setpoint Increase

Line no. HC1	HC2	Programming line
800	1100	Reduced setpoint increase start
801	1101	Reduced setpoint increase end

This function is used mainly in heating installations that do not have high supplies of power (e.g. low energy homes). In that case, when outdoor temperatures are low, adjusting the temperature would be too long.

Increasing the reduced setpoint prevents excessive cooling of the rooms in order to shorten the temperature adjustment period when changing over to the comfort setpoint.



Mixing Valve Control

Line no. HC1	HC2	Programming line
830	1130	Mixing valve boost
834	1134	Actuator running time

Mixing valve boost

The controller adds the increase set here to the current flow setpoint and uses the result as the temperature setpoint for the heat generator.

Actuator running time

For 3-position control the valve servomotor travel time can be adjusted. With a 2-position servomotor, the adjusted travel time is inoperative.

Controlled floor drying function

Line no. HC1	HC2	Programming line
850	1150	Floor curing function
851	1151	Floor curing setpoint manually
856	1156	Floor curing day current
857	1157	Floor curing days completed

This function is used in the controlled drying of floors. It adjusts the flow temperature to a temperature profile. Drying is performed by floor heating via the heating circuit with a mixing valve or with a pump.

"Controlled floor curing" function

- **Off:**

The function is deactivated.

- **Heating operational (Fh):**

The first part of the temperature profile is automatically completed.

- **Heating "ready for occupancy" (Bh)**

The second part of the temperature profile is handled automatically..

- **Heating "ready for occupancy" / Heating operational**

The full temperature profile (1st and 2nd part) is performed automatically.

- **Manual**

No temperature profile is performed, but the control is performed according to the "manual controlled drying setpoint". The function is automatically terminated after 25 days

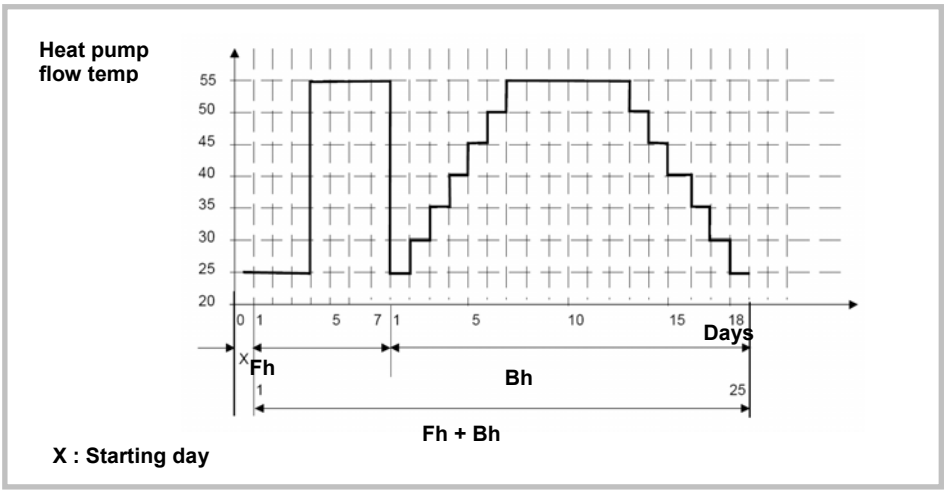
Important

o The standards and directions of the building contractor must be followed!

o This function will not work properly unless the installation has been adequately made (hydraulics, electricity, settings). Otherwise, the floors to be dried may be damaged!

o The function may be prematurely interrupted by setting it to Off.

o The maximum flow temperature limitation remains active.



"Manual controlled curing" setpoint

The flow temperature setpoint for the "Manual" controlled floor drying function can be adjusted separately for each heating circuit.

Current controlled curing setpoint

Displays the current flow temperature setpoint for the controlled floor drying function

Current day of controlled curing

Displays the current day of the controlled floor drying function

Important:
After a power outage, the installation resumes the controlled drying function as it was when the outage occurred.

Operating Mode Changeover

Line no. HC1	HC2	Programming line
900	1200	Optg mode changeover *(None / Frost protection mode / Reduced / Comfort / Automatic)*

In case of an external changeover via input H2 (on the extension module only) the operating mode to which the changeover will be performed must be previously defined.

Heating Circuit Frost Protection

The heating circuit frost protection is continuously activated (protection mode ⏻) and is not adjustable.

Heating circuit frost protection in heating mode

If the flow temperature is below 5°C, the controller initiates the production of heat and starts the heating pumps, regardless of the current heating mode.

If the flow temperature rises again above 7°C, the controller waits another 5 minutes, and then stops the production of heat and the heating pumps.

Heating circuit frost protection in cooling mode

See Cooling mode

6.3.5 Cooling Circuit 1 Functions

The cooling sequence is automatically started when the room temperature is higher than the comfort setpoint in cooling mode (line 902). The cooling function must be activated (command line 901 = Auto) and is triggered by the programming clock (Command line 907).
The cooling sequence is interrupted as soon as heating circuit 1 indicates a need for heat or in the presence of a heat demand signal from a DHW circuit or other heating circuit (only if cooling is active).

The controller measures the current room temperature and compares it with the room temperature setpoint to compute the flow temperature setpoint. If the temperature is not low enough the heat pump is started to provide cooling (reversed control of the mixing valve).

The following settings apply to the hydraulic circuit in zone 1 (HC1).
If there is a second zone, this zone can be cooled with the setting 963 which will connect the pump directly to zone 2. This will require setting the "Mixing valve sub-cooling" parameter (938) to a suitable value in order for both zones to be adequately cooled according to the available emitters.

WARNING:
Cooling mode is prohibited on all radiators, heating-only floors, or any emitters not intended for this purpose.

Operating Mode

Line no.	Programming line
901	Operating mode *(Off / Automatic)*

The cooling key on the user interface enables switching between operating modes.

- **Off:**

The cooling function is deactivated.

- **Automatic:**

The cooling function is automatically activated by the time program (command line 907), the holiday program, the occupancy key, or according to the need.

Comfort cooling setpoint

Line no.	Programming line
902	Comfort cooling setpoint

In cooling mode the room temperature control follows the comfort setpoint adjusted under this setting. The cooling comfort setpoint can be displayed with a knob on the room unit.

In summer the comfort setpoint is gradually increased in relation to the outdoor temperature (see lines 918-920).

Release:

Line no.	Programming line
907	Release *(24h/day / heating circuit time pgm / Time program 5)*

The "Release" setting determines the time program according to which cooling is released.

- **24h/day:**

Cooling is continuously activated (24h/day).

- **heating circuit time program:**

Cooling is activated according to the heating circuit time program.

- **Time program 5:**

Cooling is released according to time program 5.

Cooling Characteristic

Line no.	Programming line
908	Flow temp setp at OT 25°C
909	Flow temp setp at OT 35°C

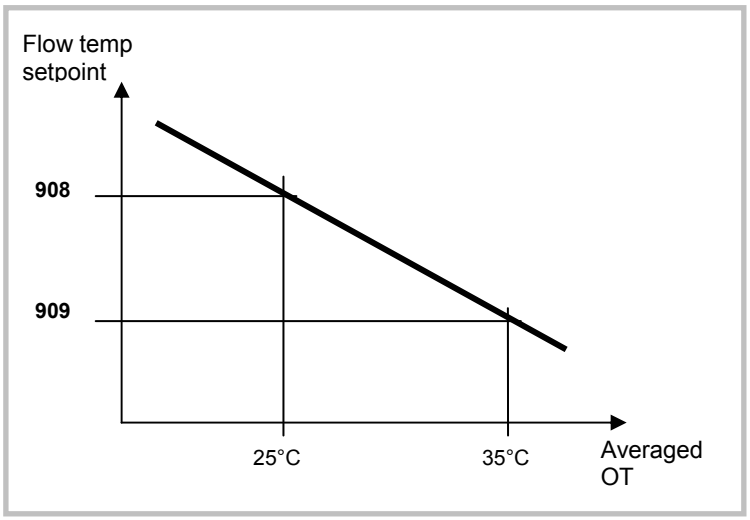
The controller computes the flow temperature required for a given averaged outdoor temperature based on the cooling characteristic. This is defined by two reference points (flow setpoint at 25°C and at 35°C).

Flow temp setp at OT 25°C

This is the cooling flow temperature required when the averaged outdoor temperature is 25°C, without summer compensation.

Flow temp setp at OT 35°C

This is the cooling flow temperature required when the averaged outdoor temperature is 35°C, without summer compensation.



The cooling characteristic is adjusted for a 25°C room temperature setpoint. If the room temperature setpoint is changed the curve will automatically adapt.

Eco

Line no.	Programming line
912	Cooling limit at OT
913	Lock time after end of heating

Cooling limit at OT

If the composite outdoor temperature is higher than the cooling limit, cooling is released. If the composite outdoor temperature falls at least 0.5°C below the cooling limit, cooling is locked.

Lock time after end of heating

To avoid a quick start of cooling after termination of heating, the cooling function is locked for a time period which can be adjusted with this setting. The lock time starts when there is no valid heating demand from heating circuit 1. Heating demands from heating circuits 2 or P are ignored.

Information:
Switching off and switching on again the mode selection key causes the lock time to be interrupted

Summer Compensation

Line no.	Programming line
918	Summer comp start at OT
919	Summer comp end at OT
920	Summer comp setp increase

In summer the "cooling comfort setpoint" (902) is gradually increased according to the outdoor temperature. This saves on cooling power and prevents the differences between the ambient temperature of the room and the outdoor temperature being too high.

The resulting "room temperature setpoint" (cooling) can be viewed in the Info section.

Summer compensation start at OT

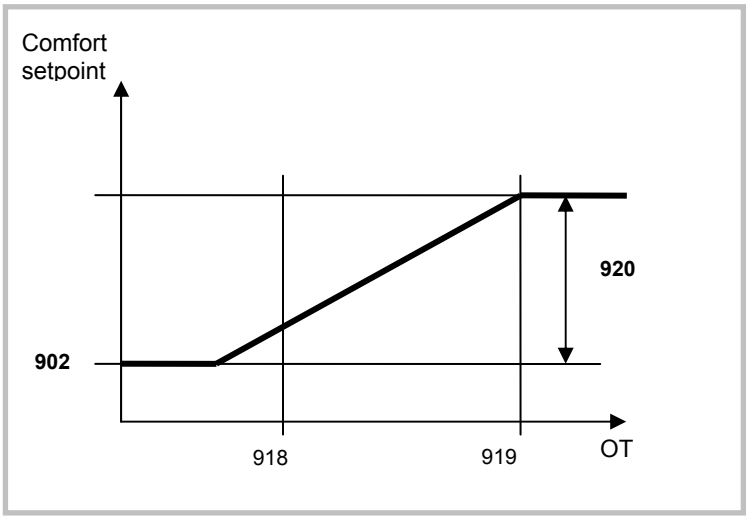
Summer compensation starts to be active from the outdoor temperature defined here. If the outdoor temperature continues to rise, the comfort setpoint will be gradually increased.

Summer compensation end at OT

At this outdoor temperature the summer compensation reaches its peak efficiency (920). If the outdoor temperature continues to rise, it will no longer influence the comfort setpoint.

Summer compensation setpoint increase

This setting defines the highest value to which the comfort setpoint can be increased.



Flow Setpoint Limitation

Line no.	Programming line
923	Flow temp setp min at OT 25°C
924	Flow temp setp min at OT 35°C

It is possible to assign a lower limit to the cooling flow temperature.
The limitation line will be defined by two reference points.
In addition the resulting flow setpoint will have a lower limit and may not be less than 5 °C.

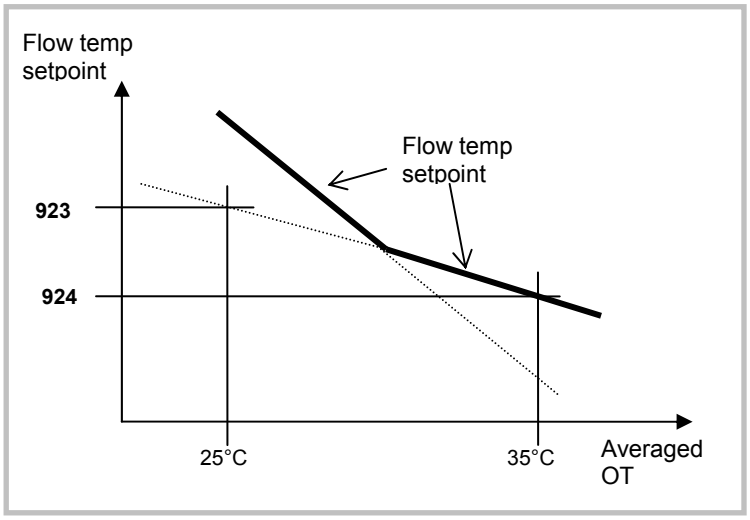
Flow temp setp min at OT 25°C

Determines the lowest flow temperature for a composite outdoor temperature of 25°C.

Flow temp setp min at OT 35°C

Determines the lowest flow temperature for a composite outdoor temperature of 35°C.

Warning:
If no outdoor temperature is available, the controller will use the "Min. flow setpoint at OT= 35°C" parameter.



Room Influence

Line no.	Programming line
928	Room influence

When using a room temperature sensor there are 3 different types of control to choose from.

SETTING	CONTROL TYPE
- - - %	Simple control according to outdoor conditions *
1...99 %	Control according to outdoor conditions with room influence *
100 %	Control according to room temperature only

** Requires the connection of an outdoor sensor*

Simple control according to outdoor conditions

The flow temperature is obtained from the composite outdoor temperature on the basis of the cooling characteristic.

This type of control requires the cooling curve to be properly adjusted, as the control does not take the room temperature into account for this adjustment.

Control according to outdoor conditions with room influence

The difference between the room temperature and the setpoint value is measured and taken into account for temperature control. This enables taking into account possible heat inputs and ensures a more even room temperature. Thus the differences with the room temperature are taken into account and the room temperature becomes more stable. The influence of the difference is defined as a percentage. The better the installation in the reference room (accurate room temperature, correct installation location, etc.) the higher will be the value that can be set.

Example:

- Approx 60%: the reference room is appropriate
- Approx 20 %: the reference room is inappropriate

Activation of the function requires taking into account the following requirements:

- A room sensor must imperatively be connected.
- The "room influence" parameter must be set between 1 and 99.
- The reference room (where the room sensor is installed) must not contain adjusted thermostatic valves. Any thermostatic valves present in the rooms must be fully open.

Control according to room temperature only

The flow temperature is adjusted according to the room temperature setpoint, the current room temperature and its evolution. A slight increase in room temperature, for example, causes an immediate drop in the flow temperature.

Activation of the function requires taking into account the following requirements:

- A room sensor must imperatively be connected.
- The "room influence" parameter must be set to 100%.
- The reference room (where the room sensor is installed) must not contain adjusted thermostatic valves. Any thermostatic valves present in the rooms must be fully open.

Room Temperature Limitation

Line no.	Programming line
932	Room temperature limitation

The "room temperature limitation" function enables shutting off the cooling circuit pump if the room temperature falls below the adjusted room temperature setpoint (with summer compensation line 920) by more than the adjusted differential.

The cooling circuit pump is reinitiated as soon as the room temperature rises again above the current room temperature setpoint.

If the room temperature limitation function is active, no cooling demand will be transmitted to production.

The function is deactivated if:

- no room temperature sensor is available
- "Room influence limit." = ---
- "Room influence" (928) = --- (simple control according to outdoor conditions)

Mixing Valve Control

Line no.	Programming line
938	Mixing valve cooling offset
941	Actuator running time
945	Mixing valve in heating mode

Mixing valve cooling offset

The cooling demand issued by cooling circuit 1 to production is reduced by the adjusted value.

If there is a second zone, this reduction should enable the second zone to be cooled. To achieve this result, the sub-cooling must be determined in accordance with the type of emitter and the parameter 963 "With prim control/prim pump" must be set to "yes" to switch on the pump for the second zone.

Example:

	Configuration	How the configuration affects control
Zone 1: Heating/cooling floor **Zone 2:** Fan coils	938 = 10°C, with 924 = 18°C 963 = yes	with a 35°C outdoor temperature the flow setpoint will be 18°C – 10°C i.e. 8°C while in the first zone (HCF) it will be 18°C through action of the mixing valve
Zone 1: Heating/cooling floor **Zone 2:** HCF	938 = 0°C, with 924 = 18°C 963 = yes	with a 35°C outdoor temperature the flow setpoint will be 18°C in both zones

WARNING:
If these settings are not chosen properly the heat pump may stop automatically due to the flow temperature being too low. A safety mechanism is triggered at 6°C to protect the exchanger from freezing.

Actuator running time

For the 3-position servomotor used, it is possible to adjust the travel time. With a 2-position servomotor, the adjusted travel time is inoperative.

Mixing valve in heating mode

Determines the position of mixing valve 1 (Y1 / Y2) during heating operation is activated.

This parameter is inoperative in installations where heating and cooling circuits are hydraulically separate.
Control: the valve controls in heating and cooling mode.
Open: the valve controls in cooling mode, and is open in heating mode.

Dewpoint Monitoring

Line no.	Programming line
946	Lock time dewpoint limiter
947	Flow temp setp incr hygro
948	Flow setp incr start at r.h.
950	Flow temp diff. dewpoint

These settings are useful only when a dewpoint sensor (hygrostat). is used.

Lock time dewpoint limiter

As soon as the dewpoint sensor detects condensation, it closes its contact and switches off the cooling process. When the contact reopens the "dewpoint sensor lock time" period begins. Cooling will resume only after this time period has elapsed.
The dewpoint sensor must be assigned to input H2 as "Dewpoint sensor".

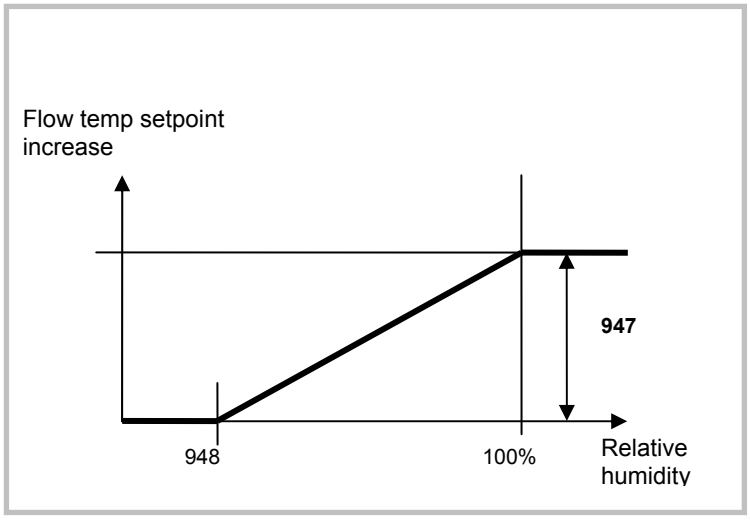
Flow temp setp incr hygro

To avoid condensation due to an excessively high humidity level in the room, a fixed increase in flow temperature can be obtained by means of a hygrostat. As soon as the humidity exceeds the value set on the hygrostat, the hygrostat closes its contact and activates the flow temperature increase defined here.

The hygrostat must be assigned to an Hx input as "Flow temp setpoint increase by hygrostat".

Flow setp incr start at r.h.

To avoid condensation caused by an excessively high humidity level in the room, a gradual increase in flow temperature can be performed by means of a humidity measurement 0... 10 V.
If the room's relative humidity exceeds the value "Beginning of flow temp increase at relative humidity", the flow setpoint is gradually increased. The increase beginning (line 948) and the maximum increase (line 947) can be adjusted.
The humidity sensor must be assigned to an H2 input as "room relative humidity 10V".



Flow temp diff. dewpoint

The relative humidity of the ambient air and the corresponding room temperature are used to compute the dewpoint temperature.
To prevent condensation forming on the surfaces, the value adjustable on line 950 determines the lower limit of the flow temperature above the dewpoint temperature.

This function can be deactivated with the setting **- - -** .
The humidity sensor must be assigned to an H2 input as "Room relative humid. 10V" and a room temperature sensor is required (input H2 as "Room temperature 10V" or "room unit").

With prim controller/system pump

Line no.	Programming line
963	With prim contr/system pump *(no / yes)*

This setting specifies whether the cooling circuit is supplied from the primary controller or from the primary pump (depending on the installation). It can also be used to provide cooling to the second zone.

Warning:
In the case of a radiator or any other emitter which does not support the cooling mode in zone 2, this setting must remain on "No".

Optg mode changeover

Line no.	Programming line
969	Optg mode changeover *(none / Off / Automatic)*

In case of an external change via inputs H2 the operating mode to which the changeover will be performed must be previously defined

6.3.6 DHW Functions

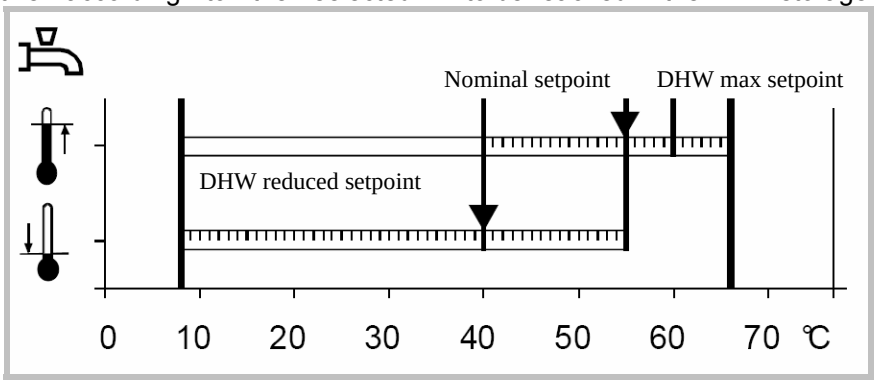
The control sets the DHW temperature, according to the time program or continuously, to the desired setpoint. The priority of DHW charging over room heating is adjustable in this case.

The controller has a configurable legionella function designed for protection against legionella in the storage tank and the pipes. The circulation pump is controlled according to the current time program and operating mode.

Setpoint value

Line no.	Programming line
1610	Nominal setpoint
1612	Reduced setpoint

The DHW is heated to various setpoint values. These setpoints are active according to the selected operating mode and allow the desired temperatures to be reached in the DHW storage tank.



Important:
For optimal operation we recommend reducing the setpoints to the lowest value.
Setpoints which are too high may interfere with heating and cause some discomfort. In this case DHW/Heating changeover cycles may successively occur.

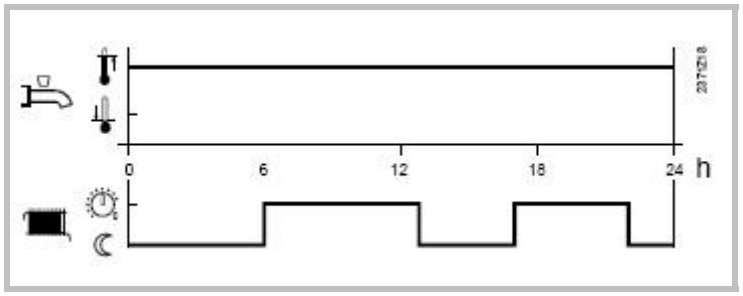
If DHW charge boosting is not desired during the day, we recommend adjusting the reduced temperature setpoint to 15°C. Full charging will occur during the night at the nominal temperature.

Release

Line no.	Programming line
1620	Release *(24h/day / Heating circ time pgm / Time program 4/DHW / Low-tariff/ Time pgm 4/DHW or Low-tariff)*

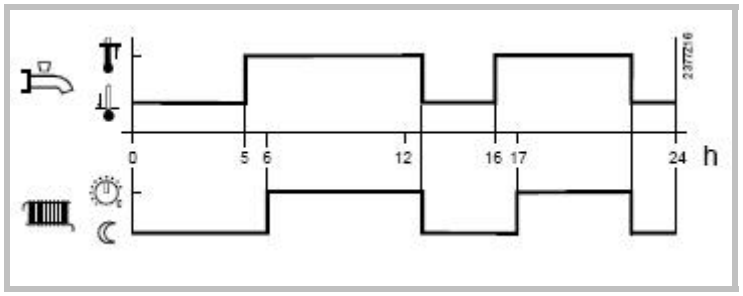
24h/day

(Not recommended)
Regardless of the time programs, the temperature of the domestic hot water is continuously maintained at the DHW nominal setpoint temperature.
Example:



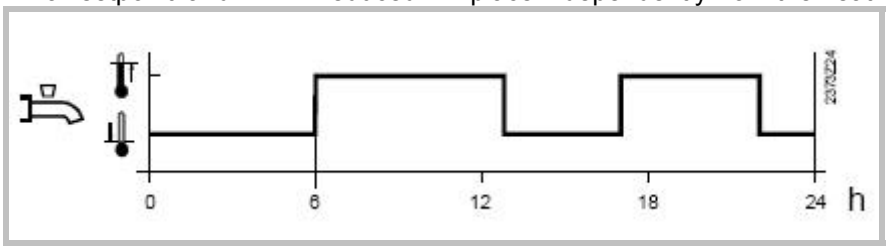
Heating circuit time programs:

(Not recommended)
Depending on the heating circuit time programs, the DHW setpoint is changed between the DHW temperature nominal setpoint and the DHW temperature reduced setpoint. The first switch-on point of each phase is advanced by one hour each time.
Example:



Time program 4 / DHW:

(Recommended)
Time program 4 of the local controller is taken into account for the DHW mode. The changeover between DHW nominal setpoint and DHW reduced setpoint occurs on the changeover times of this program. Thus, domestic hot water charging takes place independently from the heating circuits.



Low tariff

Released when the low tariff input is active (Input Ex5)

Time pgm 4/DHW or low tariff

Released when DHW program 4 is set to "Nominal" or if the low tariff input is active.

DHW mode	Holiday status	Release (settings 1620)	Time pgm status (Pgm 4)	Low tariff status (Ex5)	DHW mode level
Off	x	x	x	x	Frost protection
On	Yes	x	x	x	Frost protection
On	No	…	…	x	…
On	No	Low tariff (OPK)	x	Inactive	Reduced
On	No	Low tariff (OPK)	x	Active	Nominal
On	No	Time pgm 4 or OPK	Nominal	Inactive	Nominal
On	No	Time pgm 4 or OPK	Reduced	Inactive	Reduced
On	No	Time pgm 4 or OPK	Nominal	Active	Nominal
On	No	Time pgm 4 or OPK	Reduced	Active	Nominal

x = indifferent

Information:
Release by low tariff input always triggers forced DHW charging

If the low tariff input EX5 has not been configured and release via OPK has nevertheless been set, the DHW level will either continuously remain on reduced or will follow time program 4.

Legionella Function

Line no.	Programming line
1640	Legionella function
1641	Legionella funct periodically
1642	Legionella funct weekday
1644	Legionella funct time
1645	Legionella funct setpoint
1646	Legionella funct duration
1647	Legionella funct circ pump

Legionella function:

- **Periodic**

The legionella function occurs repeatedly according to the adjusted periodicity (command line 1641).

- **Fixed weekday**

The legionella function can be activated on a fixed day of the week (command line 1642). With this setting, heating up to the legionella setpoint occurs on the scheduled day of the week, regardless of the storage tank temperatures during the previous period.

Legionella function circulation pump:

The DHW circulation pump can be activated during the period of time the legionella function is performed.

Important:
During the period of time legionella function is carried out, there is a risk of scalding when opening the taps.

Circulation Pump

Line no.	Programming line
1660	Circulation pump release

Circulation pump release

The "DHW release" setting switches on the circulation pump when DHW production is released.

6.3.7 Swimming Pool Functions

Line no.	Programming line
2056	Setpoint source heating

The controller enables a swimming pool to be heated by the heat pump. An individual setpoint can be set by means of parameter 2056, which appears when the swimming pool function is activated by parameter 6046 being set to "Swimming pool release".

Use of input H2 requires an extension to be connected to the control. If an extension already exists (e.g. for a second zone) then the pool extension switches must always be addressed as "module2" and the additional heating circuit zone must be addressed as "module 1".

6.3.8 Heat Pump Functions

Line no.	Programming line
2844	Switch-off temp max
2882	Release integr electric flow
2884	Release el flow at OT
2910	Release above OT
2920	With electrical utility dock

Switch-off temp max

If the flow or the return temperature exceeds the maximum switch off temperature, the compressor will be switched off.

Release integr electric flow

After the release of the 1st stage (K25), the controller compares the temperature measured with the point of engagement and forms an integral and includes a possible deficit of heat. Once the value of the integral reaches the maximum value (2882), the 2nd stage is engaged (Stop K25, K26 regulates). The controller continuously compares the temperature measured at the point of engagement and new features to the deficit of heat in the full release. When the full release reaches the value set (2882), the 3rd stage of the heater is triggered (K25 and K26 regulates fixed).

Flow elec. release at OT

The heater will be activated only if the attenuated outdoor temperature is below the temperature set here.

Warning:
If this setting is too low, there may be a feeling of discomfort due to the fact that the heat pump is unable to meet the heating requirements alone at low outdoor temperatures, and heaters are not switched on.

Release above OT

The heat pump is released only when the composite outside temperature lies above the value set here. Below this outside temperature level, the amount of heat required must be delivered by some other heat source.

With electrical utility dock

This setting relates to input Ex4 (load-shedding or peak day clearing) and allows the electric heaters to be locked as follows:

- **Locked:**

The heat pump and all electric heaters are locked, both heat pump stages and the DHW tank electric auxiliary.
Only the boiler backup, if installed, continues to operate

- **Released**

The heat pump operates and all electric heaters are locked, both heat pump stages and the DHW tank electric auxiliary.
The boiler backup, if installed, continues to operate.

6.3.9 DHW Tank Functions

DHW charging at the nominal setpoint temperature (1610) always takes place in two stages. In the first stage, only the heating pump heats the DHW tank. The power supplied during this time is at its peak. Then, when the heat pump is no longer able to supply enough heat to reach the setpoint value, it switches on the DHW tank auxiliary if authorised. The auxiliary will be cut off when charging is complete.
While the DHW tank charging process via the electric auxiliary is finishing, the heat pump resumes heating.

Charging Control

Line no.	Programming line
5020	Flow setpoint boost
5024	Switching differential
5030	Charging time limitation

Flow setpoint boost :

The DHW demand made to the generator is comprised of the current DHW setpoint plus the adjustable setpoint boost.

Switching differential :

If the DHW temperature is lower than the current setpoint minus the differential set here, the DHW charging process is launched.
It ends when the temperature reaches the current setpoint.

Information:
Forced charging is triggered on the first DHW release of the day.
Charging is also launched when the DHW temperature is within the differential, and as long as it is not less than 1K above the setpoint.

Charging time limitation

During charging, the room heating (depending on the charging priority defined on line 1630 and on the hydraulic circuit) may be stopped or insufficient. Therefore it is often advisable to limit the charging process timewise to enable heating.

If "**- - -**" has been selected the charging time limitation will be deactivated. The DHW will be heated to the nominal setpoint, even if the room heating has not received enough power in the meantime.

If a value between 10 and 600 is selected, charging will be suspended after the time period set in minutes, and will remain suspended over that time before resuming. The generator power remains available in the meantime to heat the room. This cycle is repeated until the DHW nominal setpoint has been reached.

Information:
When the room heating is stopped (summer mode, economy function, etc.), DHW charging remains active, regardless of the setting.

Heater

Line no.	Programming line
5060	El imm heater optg mode
5061	Electric immersion heater release

El imm heater optg mode

- **Substitution**

The heater performs DHW charging as soon as the heat pump is stopped or becomes inoperative, or if the heat pump has finished charging without reaching the setpoint.
The DHW tank heater switch-on point is calculated so as to optimise the changeover level.
If the DHW temperature falls below the current setpoint (1610 or 1612) minus the differential (5024) the heat pump will resume operation.

- **Summer**

When all heating circuits change to summer mode, the heater performs DHW charging starting on the next day. The heat pump therefore stays off in summer mode.
Production of DHW by the heat pump will resume only if at least one heating circuit changes over to heating mode. In that case, the heater operating mode is the same as described in the "Substitution" setting.

- **Always**

DHW charging is always carried out by means of the heater.

- **Cooling mode**

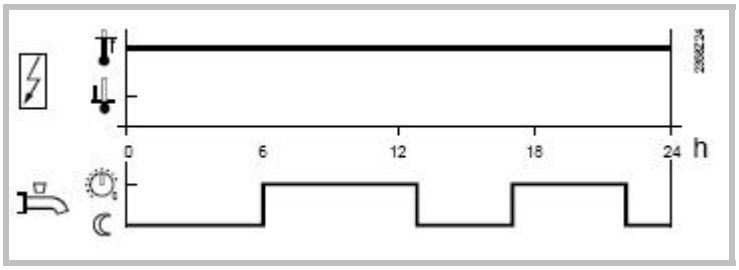
When the heat pump operates in cooling mode, it is possible to specify whether a DHW charging is to be carried out via the heater, without cooling being interrupted.
The DHW is prepared by the heater, if the heat pump is in cooling mode or is not available (e.g. out of order).

Information:
The DHW mode selection key also acts on the heater. In order for DHW charging to take place, the DHW key must be on.

Electric immersion heater : release

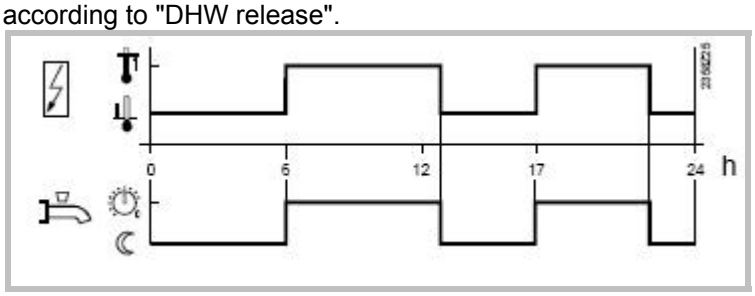
- **24h/day**

The heater is continuously active regardless of time programs.



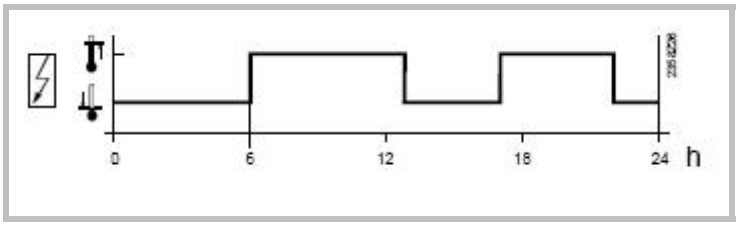
- **DHW release**

The heater is controlled according to "DHW release".



- **Time program 4/DHW**

Time program 4/DHW of the local controller is taken into account for the heater.



Information:
Switch-on will actually be in effect only if the heater is able to operate according to the "heater operating mode" setting.

6.3.10 Configuration Functions

When an installation is started up, the hydraulic diagram presetting for that installation must be entered.

Presettings

Line no.	Programming line
5700	Preselection

Cooling Circuit 1

Line no.	Programming line
5711	Cooling circuit 1 *(Off / 4-pipe system / 2-pipe system)*

Off
The cooling circuit is deactivated.

4-pipe system:
Not compatible with the Waterstage heat pump. This setting relates to passive cooling.

2-pipe system:
Activates the heat pump cooling mode. However, the cooling kit must have been previously connected.

Warning:
If the cooling kit has not been connected and the cooling mode is activated the heat pump will behave abnormally and might cause some unwanted discomfort.
Information:
Switching on the cooling mode causes the menu "'Cooling circuit 1" to appear.

Combi storage tank

Line no.	Programming line
5870	Combi storage tank

Cont type input EX

Line no.	Programming line
5987	Cont type input EX4
5989	Cont type input EX5

Input H2 Function

Input H2 is available only on the control extension module. No more than two extension modules can be fitted into an installation. In this case the settings on contact H2 will be assigned to the module with address 1. Only one function can be assigned to input H2 even if there are two modules.

Line no.	Programming line
6046	Function Input H2
6047	Contact type H2
6048	Function value Contact H2

Function Input H2

- **Operating mode changes:**

o Heating circuits

The operating mode for the heating circuit(s) is changed via terminal H2 (e.g. telephone contact) to protection mode.

o Domestic hot water

Domestic hot water charging lock is active only with setting 1 (heating circuits + DHW). All temperature demands from heating circuits and DHW are ignored. Frost protection is active during this time.

- **Error/alarm message**

The closing of input H2 causes an internal error message from the controller.

- **Dewpoint sensor**

A dewpoint sensor can be connected to input H2 to detect condensation.
If it responds, the cooling circuit is immediately switched off.
The cooling circuit is reactivated only if the sensor goes off after the adjustable lock time (line 946) has elapsed.

- **Swimming pool release**

This function enables the swimming pool to be directly heated with the boiler and pump H2 via an external device (e.g. manual switch).
Direct charging always requires release on input H2.
For configuration: set input H2 to "Swimming pool release" and wire the contact.

Warning:
If there are two extension modules (e.g.: 2nd zone + pool) the second zone module have the address 1 and the pool module must have the address 2 because contact H2 enabling the swimming pool mode must be wired to the address 1.

Contact type H2

- **Normally closed**

The contact is normally closed and must be open to activate the selected H2 function.

- **Normally open**

The contact is normally open and must be closed to activate the selected H2 function.

Function value Contact H2

The function value contact H2 is operated only when the parameter 6046 is setting on “release swimming pool”. This function allows to set the temperature of the water which goes on the swimming pool heat exchanger.

Sensor Corrections

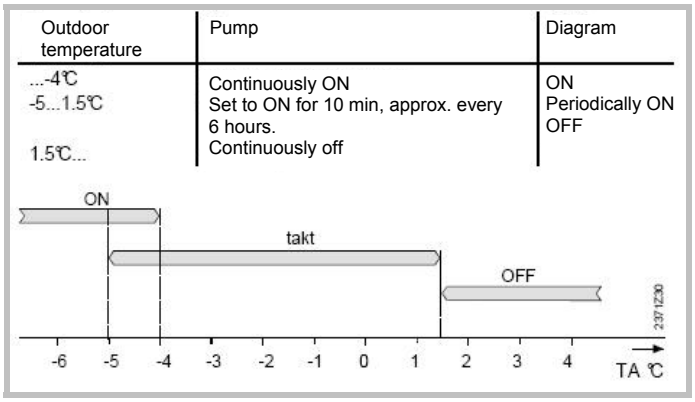
Line no.	Programming line
6100	Readjustm outside sensor

The outdoor temperature measuring value can be corrected within a range of +/- 3 K.

Installation Frost Protection

Line no.	Programming line
6120	Frost protection for the plant

According to the outdoor temperature, the heating circuit pump and the condenser pump are switched on although there is no demand for heat



Miscellaneous

Line no.	Programming line
6205	Reset to default parameters
6220	Software version

Reset to default parameters :

All parameters can be reset to factory settings, except when it comes to the following pages: Time and date, User interface and all time programs, as well as the operating hours and the various counters.

Software version:

The software version represents the controller software status at the time the unit is being produced. It is printed on the back of the unit.
The first two digits represent the software version, and the third is the revision number (e.g. 01.0)

6.3.11 Error Functions

When a fault occurs, the symbol appears and it is possible to display an error message in the Info section by pressing the Info key.

The display shows what caused the fault.

Reset (unlock) Heat Pump

Line no.	Programming line
6711	Reset HP

This line is used to clear the heat pump error messages. The predetermined switch-on delay in case of a failure is therefore ignored, which avoids waiting periods during servicing / troubleshooting.

This option should not be used in normal operating conditions.

Fault Indication Function

Line no.	Programming line
6740	Flow temp 1 alarm
6741	Flow temp 2 alarm
6745	DHW charging alarm
6746	Flow temp cooling 1 alarm

The difference between the setpoint value and the current temperature value is monitored. Any difference which continues after the set time period has elapsed will trigger an error message.

Fault History

Line no.	Programming line
6800 to 6818	Time stamp and history of faults 1 -10

The controller saves the last 10 faults which have occurred to a non volatile memory. Any new entry will delete the oldest entry from the memory.
A fault code and a time are saved for each fault.

Error Code List

Designation of error
The error designations in the table below are displayed in plain text on the user interface.
Location
The sensor or contact associated to the error message.
Reset
Reset is either automatic or manual, depending on the type of error (see table below with error messages).
Manual reset
Errors which are displayed in the Info section and accompanied by the "Reset?" question can be manually reset.
Press the "OK" key once, "yes" flashes on the display. Press the "OK" key again to confirm the "yes" and the error will be reset.
Automatic reset
Automatic clearing occurs after a previously set time (OEM setting) has elapsed. After this timeout (6 hours by default) has elapsed, the controller will attempt to reset the error.
If "Number" appears in the table, it is possible to define how many times the fault can be reset before the heat pump is declared out of order.

Heat pump operation

Shows whether or not the heat pump can continue to operate when the error occurs.

Yes
The heat pump continues to operate despite the error message.

No
The error interrupts operation of the heat pump.

No with glycol water
This error stops glycol water heat pumps, but does not prevent operation of water or air heat pumps.

No with water
This error stops water heat pumps, but does not prevent operation of glycol water heat pumps

No with air
This error stops air heat pumps, but does not prevent operation of water heat pumps or glycol water heat pumps.

Per diagram
The heat pump will be stopped according to the current installation diagram.

Alarm messages
Errors are ranked by priority. From priority 5 onward (i.e. priority levels 5 - 9) the alarm messages used in remote control (OCI) are sent. In addition, the alarm relay is switched on.

Table of error messages which can be displayed:

No.	Designation of error	Location	Reset		HP oper.	Priority
			Manual	Automatic		
0	No fault					
10	Outdoor sensor	B9	No	No	Yes	6
30	Flow sensor 1	B1	No	No	Yes	6
31	Cooling flow sensor 1	B16	No	No	Yes	6
32	Flow sensor 2	B12	No	No	Yes	6
33	Heat pump flow temp sensor error	B21	No	No	Yes	6
44	Heat pump return temp sensor error	B71	No	No	per diagram	6
50	DHW temp sensor 1	B3	No	No	Yes	6
60	Room sensor 1		No	No	Yes	6
65	Room sensor 2		No	No	Yes	6
76	Special sensor 1	BX	No	No	Yes	3
83	BSB wire short-circuit		No	No	Yes	8
84	BSB, address collision		No	No	Yes	3
85	Radio communication error		No	No	Yes	8
98	Extension module 1		No	No	Yes	8
99	Extension module 2		No	No	Yes	8
100	2 master clocks on bus		No	No	Yes	3
102	Clock without running supply		No	No	Yes	3
105	Maintenance message		No	No	Yes	5
121	HC1 flow temp too low		No	No	Yes	6
122	HC2 flow temp too low		No	No	Yes	6
126	DHW charge monitoring		No	No	Yes	6
127	Anti-legionella temperature		No	No	Yes	6
134	Heat pump alarm summary	E20	Yes	Number *	No	9
138	No heat pump control sensor		No	Yes	No	1
146	Sensor / control device configuration		No	No	Yes	3
171	Alarm contact 1 activated		No	No	Yes	6
172	Alarm contact 2 activated	H2	No	No	Yes	6
176	Hydraulic pressure 2 too high	H2	No	No	Yes	6
177	Hydraulic pressure 2 too low	H2	No	No	No	6
178	HC1 safety thermostat		No	No	Yes	3
179	HC2 safety thermostat		No	No	Yes	3
201	Frost alarm	B21/71	Yes	No	No	9
243	Swimming pool sensor	B13	No	No	Yes	6
325	BX/ext unit: same sensors		No	No	Yes	3
327	Ext modules: same functions		No	No	Yes	3
329	Ext modules/mixing grp: same functions		No	No	Yes	3
330	BX1 no function		No	No	Yes	3
331	BX2 no function		No	No	Yes	3
332	BX3 no function		No	No	Yes	3
333	BX4 no function		No	No	Yes	3
334	BX5 no function		No	No	Yes	3
335	BX21 no function		No	No	Yes	3
336	BX22 no function		No	No	Yes	3
357	cooling circuit flow temp not reached		No	No	Yes	6
359	no cooling valve Y21		No	No	Yes	3

	Reset			
360: no process reversing valve Y22	No	No	Yes	3
364: Heat pump cooling system error	No	No	Yes	3
369: External fault			No	
370: Outdoor unit fault			No	

Number* If such statuses or events occur for the first time, they will not directly generate a fault message, but only a status message.

Only if the anomaly occurs repeatedly over a predefined time period and at a given frequency (number) will an error message be generated.

6.3.12 Maintenance / Special Operating Mode Functions

Maintenance

Maintenance functions can be used as a preventive step for periodically monitoring the installation. All maintenance functions can be individually activated / deactivated.

The controller automatically generates maintenance messages if the settings defined are either exceeded or fail to be reached.

Line no.	Programming line
7070	HP interval
7071	HP time since maint
7072	Max starts compr1/hrs run
7073	Cur starts compr1/hrs run
7076	Diff condens max/week
7077	Cur diff condens max/week
7078	Diff condens min/week
7079	Cur diff condens min/week
7090	DHW storage tank interval
7091	DHW stor tank since maint

HP interval :

Defines the maintenance frequency (in months) for the heat pump.

HP time since maint :

Displays the time (months) elapsed since the last maintenance. If the value exceeds the "heat pump interval" setting (Line 7070), the symbol will be displayed and a maintenance message will appear in the Info section:
17: Heat pump maintenance Interval (Priority 6)

This setting can be reset with the associated rights of access.

Max starts compr1/hrs run :

Defines the maximum number of compressor 1 startups per hour of operation.

Cur starts compr1/hrs run :

The average number of compressor startups per hour of operation, obtained over a period of 6 weeks.
If the value exceeds the "Comp1 max startups/hr op" adjusted setting, the symbol will be displayed and a maintenance message will appear in the Info section:
8: Too many compressor 1 startups (Priority 9)

This setting can be reset with the associated rights of access.

Diff condens max/week :

This setting indicates how many times over 7 days the maximum temperature difference on the condenser can be exceeded.

Cur diff condens max/week:

Number of times the maximum temperature difference on the condenser has been exceeded during a 7-day period. If the value exceeds the setting "Max cond diff/week" (line 7076), the symbol will be displayed and a maintenance message will appear in the Info section:
13: Max cond diff (Priority 3)

This setting can be reset with the associated rights of access.

Diff condens min/week :

Indicates how many times over 7 days the minimum temperature difference on the condenser may fail to be reached.

Cur diff condens min/week (7079):

The number of times the minimum temperature difference on the condenser has not been reached over a 7 period. If the value is higher than the setting "Min cond diff/wk" the symbol will be displayed and a maintenance message will appear in the Info section:
14: Min cond diff (Priority 3)
This setting can be reset with the associated rights of access.

DHW storage tank interval (7090):

Adjustment of the maintenance frequency (in months) of the DHW tank.

DHW stor tank since maint (7091):

The time elapsed (in months) since the last maintenance. If the value is greater than the setting "DHW tank interval" (Line 7090), this symbol will be displayed and a maintenance message will appear in the Info section:
11: TWW DHW tank period (Priority 6)

Emergency mode

If the heat pump is not operating properly, a emergency service can be maintained. The emergency mode enables the installation to be run with the available heaters (flow, storage tank, DHW tank). In this case the compressor will remain off.

Line no.	Programming line
7141	Emergency operation
7142	Emergency operation function type

Emergency operation (7141):

Emergency operation can be activated and deactivated manually.

- **Off:**

Emergency operation is deactivated.

- **On:**

Emergency operation is activated.

Emergency operation function type (7142):

- **Manual:**

Emergency operation can be activated/deactivated only through the Emergency operation setting on line 7141.

- **Automatic:**

As soon as a fault occurs on the heat pump, emergency operation is automatically switched on. It stops when the fault is removed and, if necessary, cleared (reset). Emergency mode may however be activated / deactivated manually via the "Emergency operation" setting on line 7141.

Simulation

Line no.	Programming line
7150	Simulation outside temp

Simulation outside temp (7150):

To make the starting-up and troubleshooting processes easier, it is possible to simulate an outdoor temperature in the range of -50...+50°C. During simulation, the current, composite and attenuated outdoor temperatures are ignored and substituted with the adjusted simulation temperature.

Computation of the three outdoor temperatures based on the actual outdoor temperature continues to be performed during the simulation, and these temperatures are available again when the simulation is over.

This function can be deactivated by selecting -.- on this line or automatically, after a 5 hour waiting period.

Person in charge

Line no.	Programming line
7181, 7183	Telephone number of person in charge

These lines are used to specify the telephone numbers associated with the corresponding alarms.

6.3.13 Input / Output Testing Functions

Input/output testing is used to ensure that the connected components are in working order.

Relay Output Testing

Selection of a setting from relay testing closes the corresponding relay and therefore switches on the connected component. This makes it possible to check that the relays are in working order and that the wiring has been performed correctly.

Line no.	Programming line
7700	Relay test *(No test / All OFF / Relay output QX23 Module 1 / Relay output QX21 module 1 / Relay output QX22 module 1 / Relay output QX1 / Relay output QX2 / Relay output QX3 / Relay output QX4 / Relay output QX5 / Relay output QX6 / Relay output QX23 Module 2 / Relay output QX21 Module 2 / Relay output QX22 Module 2 / Relay output QX7)*

Warning:
During testing of an output, the heat pump is stopped, all outputs are "off" and only the controlled output is on.

Analog Input/Output Testing

Line no.	Programming line
7710	Output test UX
7711	Voltage signal UX
7720	Digital output test
7721	Digital output DO1
7722	Digital output DO2

Output test UX
Enables testing the outdoor unit control.

Voltage signal UX
Displays the voltage value at the UX output.

Digital output test
Enables testing outputs DO1 and DO2

Digital output DOx
Shows the output status.

Sensor Input Testing

Line no.	Programming line
7730	Outside temp B9
7820	Sensor temp BX1
7823	Sensor temp BX4
7824	Sensor temp BX5
7830	Sensor temp BX21 module 1
7831	Sensor temp BX22 module 1
7832	Sensor temp BX21 module 2
7833	Sensor temp BX22 module 2

Displays the temperature of each sensor.

H1, H2, H3 Input Testing

Line no.	Programming line
7841	Contact state H1
7846	Contact state H2
7855	Contact state H3

Displays the momentary status of contact Hx.

Input Testing

Line no.	Programming line
7914	Input EX4
7915	Input EX5
7916	Input EX6

If a test setting is selected, the associated input is displayed and can thus be checked.
The "0 V" display means that there is no voltage and that the respective input is currently inactive. The "230 V" display indicates that a 230 V voltage is present on the associated input and therefore, that the input is active.

6.3.14 Status Functions

The current operating status of the installation can be viewed by means of status displays.

Messages

Line no.	Programming line
8000	State heating circuit 1
8001	State heating circuit 2
8003	State DHW
8004	State cooling circuit 1
8006	State heat pump
8011	State swimming pool
8022	State supplementary source

State heating circuit

End user (Info level)	Startup, heating engineer
Thermostat response	Thermostat response
Manual action active	Manual action active
Controlled drying active	Controlled drying active
Heating mode restriction	Overeating protection active Restriction, Boiler protection Restriction, DHW priority Restriction, storage tank
Forced draft	Forced draft, storage tank Forced draft, DHW Forced draft generator Forced draft Switch-off delay active
Comfort heating mode	Optimis. at switch-on + accelerated heating Optimisation at switch-on Accelerated heating Comfort heating mode
Reduced heating mode	Optimisation at switch-off Reduced heating mode
Frost protection active	Room frost protection Flow frost protection active Install. frost protection active
Summer mode	Summer mode
Off	Eco day active Reduced decrease Frost protection decrease Room temperature limitation Off

State DHW (8003):

End user (Info level)	Startup, heating engineer
Thermostat response	Thermostat response
Manual action active	Manual action active
Draw-off mode	Draw-off mode
Adiabatic cooling active	Adiabatic cooling by collector adiabatic cooling via gen/HC
Charging lock active	Discharge protection active Charging duration limit. active Charging locked
Forced charging active	Forcing, DHW tank max temp Forcing, max charging temp Forcing, anti-legion. setpoint Forcing, comfort setpoint
Charging by heater	Charging by heater, anti-legion. setpoint Charging by heater, Comfort setpoint Charging by heater, Reduced setpoint Charging by heater, frost protection setpoint Heater released
Accelerated charging active	Flow active Anti-legion. accelerated charging
Charging active	Charging, anti-legion. setpoint Charging, Comfort setpoint Charging, Reduced setpoint
Frost protection active	Frost protection active
Switch-off delay active	Switch-off delay active
Charging on standby	Charging on standby
Charged	Charged, max tank temp Charged, max charging temp Charged, anti-legionella temp Charged, comfort temp Charged, reduced temp
Off	Off
Ready	Ready

State cooling circuit (8004):

End user (Info level)	Startup, heating engineer
Dewpoint sensor activated	Dewpoint sensor activated
Manual action active	Manual action active
Fault	Fault
Frost protection active	Flow frost protection active
Cooling mode locked	Locked, heating mode Lock time after heating Locked, generator Locked, storage tank
Cooling mode restricted	Flow temp setpoint increase by hygrostat Dewpoint flow min limit Outdoor temp flow min limit
Comfort cooling mode	Comfort cooling mode Switch-off delay active
Cooling protection mode	Cooling protection mode
Frost protection active	Frost protection active
OT cooling limit activated	OT cooling limit activated
Off	Off Room temperature limitation Flow limit reached
Cooling mode off	Cooling mode off

State heat pump (8006):

End user (Info level)	Startup, heating engineer
Emergency mode	Emergency mode
Fault	Fault
Locked	Locked, outdoor temperature Locked, external Locked, economy mode
Lim. time active	Consumer flow rate controller Min outdoor temp use limit Max outdoor temp use limit Max switchoff temp lim Max OT limit cooling Min switchoff temp limit Comp min switchoff time active Excess heat compensation
Frost protection active	Heat pump frost protection
Defrosting activated	Defrosting activated
Cooling mode active	Comp min ON time active Comp 1 ON
Heating	Comp min ON time active Heat deficiency compensation Max cond diff limit Min cond diff limit Comp.1 and heater ON Comp 1 ON Heater ON
Frost protection active	Install. frost protection active
Off	Flow active Switch-off delay active No demand

State swimming pool (8011):

End user (Info level)	Startup, heating engineer
Manual action active	Manual action active
Fault	Fault
Heating mode restriction	Heating mode restriction
Forced draft	Forced draft
Heating	Generator heating mode
Heated, max pool temp Heated	Heated, max pool temp Heated, generator setpoint
 Heating off	Solar heating mode OFF Generator heating mode OFF
Cooling	Cooling

State supplementary source (8022):

End user (Info level)	Startup, heating engineer
Locked	Locked, solid fuel boiler Locked, outside temperature Locked, economy mode
In operation for HC, DHW	In operation for HC, DHW
Released for HC, DHW	Released for HC, DHW
In operation for DHW	In operation for DHW
Released for DHW	Released for DHW
In operation for heating circuit	In operation for heating circuit
In operation for HC, DHW	In operation for HC, DHW
Released for HC, DHW	Released for HC, DHW
In operation for DHW	In operation for DHW
Released for DHW	Released for DHW
In operation for heating circuit	In operation for heating circuit
Released for HC	Released for HC
Overrun active	Overrun active
Off.	Off.

History:

Line no.	Programming line
8050 —8068	Timestamping and history status coding of faults 1 - 10

The last 10 status messages are saved and displayed with the associated codes. The most recent message is saved to History 1, the oldest to History 10.

Information:
Status displays for the end user can be viewed directly in the Info section on the room unit.

6.3.15 Generator Diagnosis Functions

Various setpoints and actual values, relay switch status data can be displayed for purposes of diagnosis.

Heat Pump:

Line no.	Programming line
8402	El imm heater 1 flow
8403	El imm heater 2 flow
8406	Condenser pump

These command lines are used to check the operating mode of the components controlled by the heat pump relays. The display "0" means that the associated components are currently disconnected. The display "1" means that the associated components are currently switched on.

Information
This information applies to relays defined as normally open contacts. For normally closed contacts, the action is reversed.

Setpoints and Measured Values

Line no.	Programming line
8410	Return temp HP
8412	Flow temp HP
8413	Compressor modulation
8425	Temp diff condenser

These lines allow the various setpoints and measured values for the heat pump to be viewed.

Hour / Startup Counter

Line no.	Programming line
8454	Locking time HP
8455	Counter number of locks HP
8456	Hours run el flow
8457	Start counter el flow

Locking time HP

Displays the cumulative locking time since start-up by the electrical services (via E6).

Heat pump lock counter

Displays the cumulative locks since start-up by the electrical services (via E6).

Hours run el flow, Start counter el flow

These lines are used to view the hours of operation and the number of startups of electric heater.

6.3.16 Consumer Diagnosis Functions

Various setpoints and actual values, relay switch status and timing status data can be displayed for purposes of diagnosis.

Outdoor Temperatures

Line no.	Programming line
8700	Outside temperature
8701	Outside temp min
8702	Outside temp max
8703	Outside temp attenuated
8704	Outside temperature composite

The current, minimum, maximum, attenuated and composite outdoor temperatures are displayed.

Heating Circuits

Line no.	Programming line
8730 and 8760	heating circuit pump
8731 and 8761	Heating circ mix valve open
8732 and 8762	Heat circ mix valve close
8740 and 8770	Room temp
8743 and 8773	Flow temp

The display "Off" means that the associated components are currently disconnected. The display "On" means that the associated components are currently switched on.

Cooling Circuit

Line no.	Programming line
8756	Flow temperature cooling 1

The actual values of the cooling mode are displayed.

The cooling mode room setpoint is displayed on programming line 8741.

Domestic Hot Water

Line no.	Programming line
8820	DHW pump
8821	Electric immersion heater DHW
8830	DHW temp 1
8840	Hours run DHW pump
8841	Start counter DHW pump
8842	Hours run el DHW
8843	Start counter el DHW

The measured values, the DHW circulation pump and charging temperature, operating hour and startup counters are displayed, as well as temperatures of the primary controllers and DHW heater.

Swimming Pool

Line no.	Programming line
8900	Swimming pool temp

The current temperature of the swimming pool is displayed.

Line

Line no.	Programming line
8950	Common flow temp

Multifunction Relay Status

Line no.	Programming line
9031	Relay output QX1
9032	Relay output QX2
9033	Relay output QX3
9034	Relay output QX4
9035	Relay output QX5
9036	Relay output QX6
9037	Relay output QX7

The switching status of multifunction relays 1 - 6 can be viewed individually on these lines. The display "Off" means that the components assigned to this output are currently disconnected. The display "On" means that the associated components are currently switched on.

Status of Relays for Extension Modules 1 and 2

Line no.	Programming line
9050	Relay output QX21 module 1
9051	Relay output QX22 module 1
9052	Relay output QX23 module 1
9053	Relay output QX21 module 2
9054	Relay output QX22 module 2
9055	Relay output QX23 module 2

The switching status of the relays connected to extension modules 1 and 2 can be viewed on these programming lines.

The display "Off" means that the components assigned to this output are currently disconnected. The display "On" means that the associated components are currently switched on.

7 Annual Maintenance Services

7.1 Hydraulic Circuit

- clean filter (if any)
- inspect heating system (system pressure, purging, leak test)
- inspect expansion vessel (preload with nitrogen at 1 bar)
- fix any leaks

7.2 Outdoor unit

- clean heat exchanger
- clean refrigeration and ventilation compartment
- check for correct condensation drain
- conduct refrigeration circuit leak test (required if charged > 2 kg)

7.3 Electrical

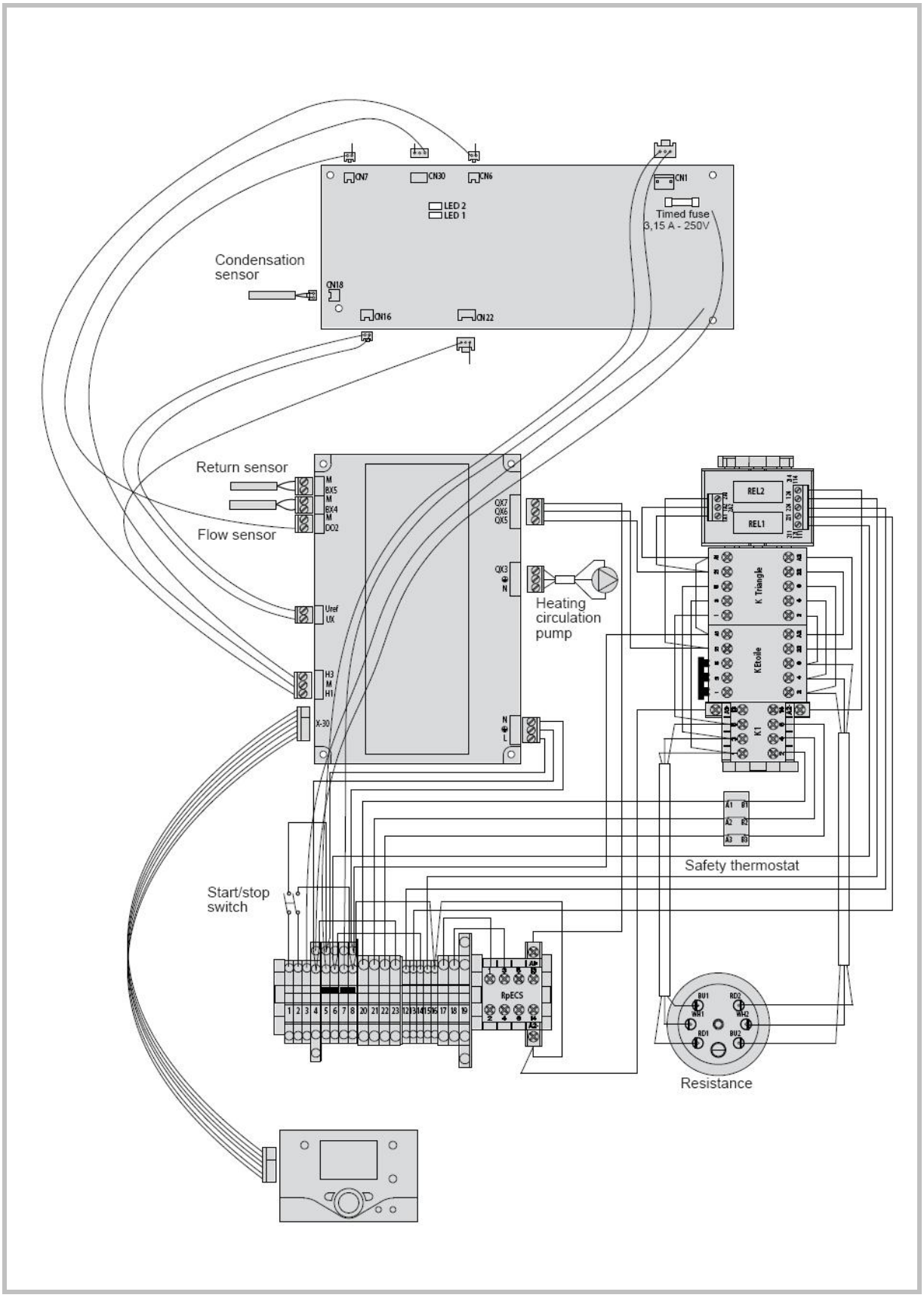
- Inspect connections and tighten where appropriate
- Check condition of wires and boards

7.4 Operating checks

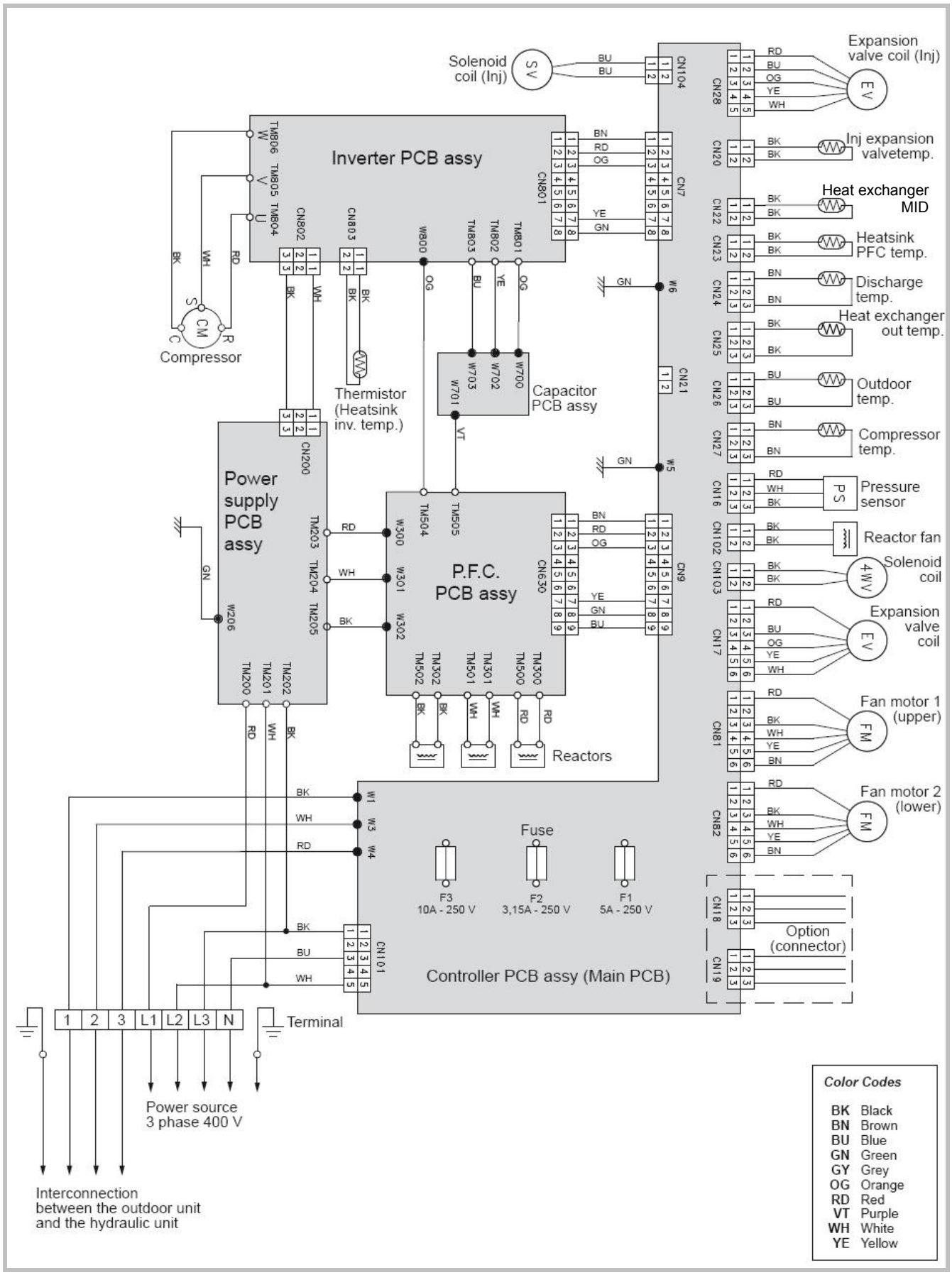
- conduct refrigeration readings at temperatures
- in case of malfunction, install pressure gauges for refrigeration diagnosis
- check voltage, current and control

8 Connection Diagrams

8.1 Connection Diagram of Hydraulic Unit



8.2 Connection Diagram of Outdoor Unit



9 Disassembly Process of Outdoor Unit

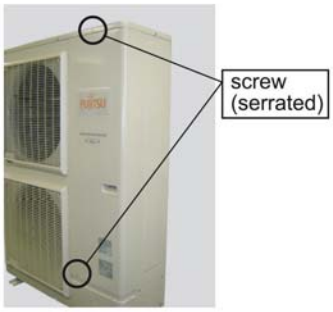
> Warning ! <

Before servicing the unit, turn the power supply switch OFF, then, do not touch electric parts for 10 minutes due to the risk of electric shock.

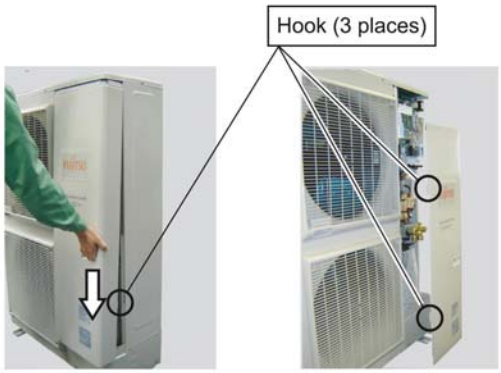
9.1 Appearance



9.2 Service panel removal

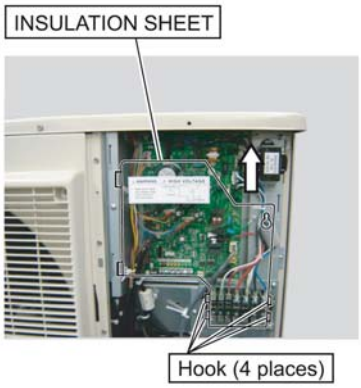


Remove the mounting screws.



Remove the SERVICE PANEL by sliding downward.

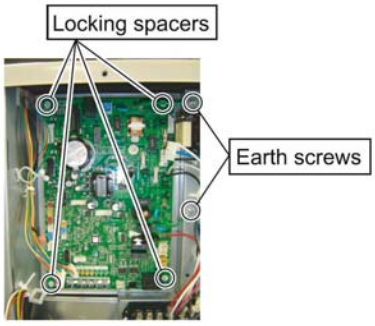
9.3 Insulation sheet removal



Remove the Hook. (4 places)
Remove the INSULATION SHEET by sliding upward..

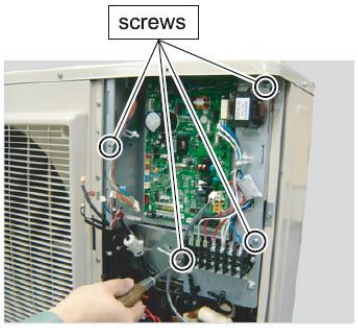
9.4 Main PCB removal

Remove the connectors.

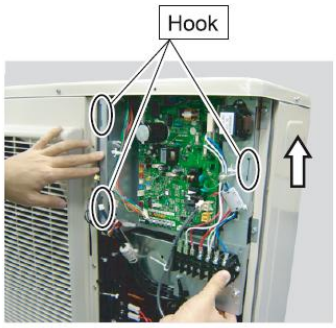


Remove the earth screws and the locking spacers.

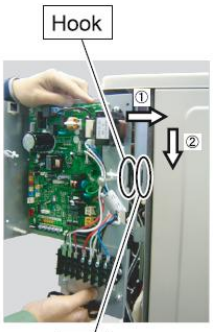
9.5 INVERTER, PFC, FILTER, and CAPACITOR PCB removal



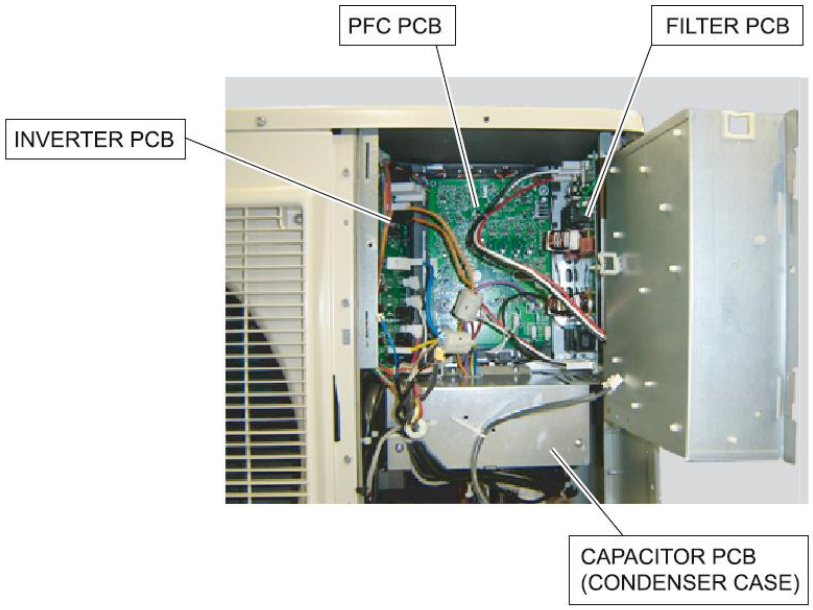
Remove the 4 mounting screws



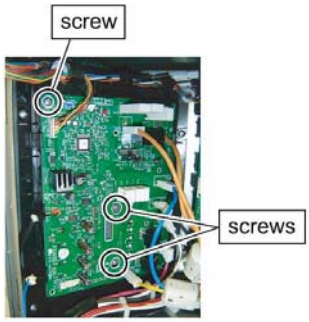
Remove the INVERTER CASE MAIN by sliding upward..



Hang the hook on the slit.

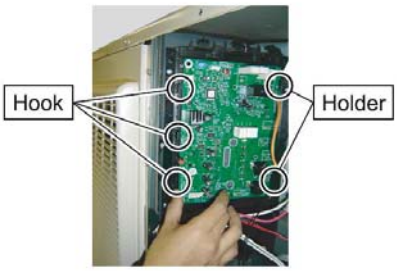


9.5.1 INVERTER PCB removal

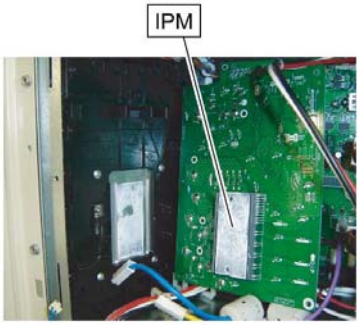


Remove the connectors and screws.

For screws of IPM.
Note the tightening torque at the installation.
Tightening torque is 1.2±0.2N•m

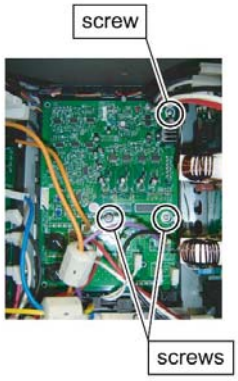


Remove the INVERTER PCB.



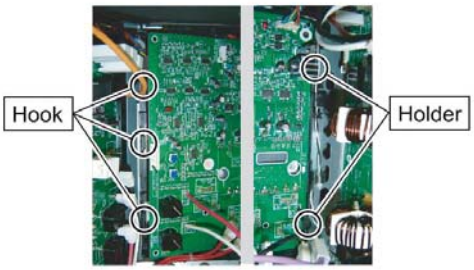
Spread the heat dissipation compound on the other side of IPM when you exchange INVERTER PCB by the repair.

9.5.2 PFC PCB removal



Remove the connectors and screws.

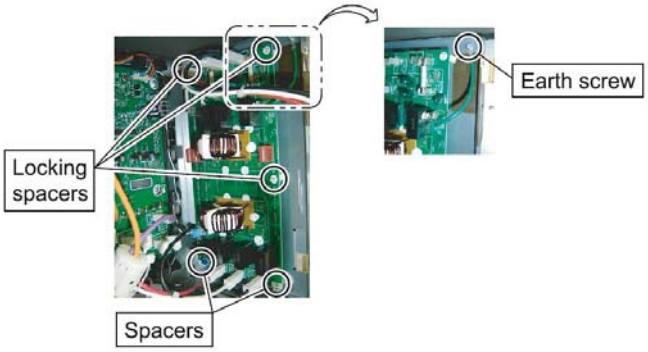
For screws of IPM.
Note the tightening torque at the installation.
Tightening torque is 1.2±0.2N•m



Remove the PFC PCB.

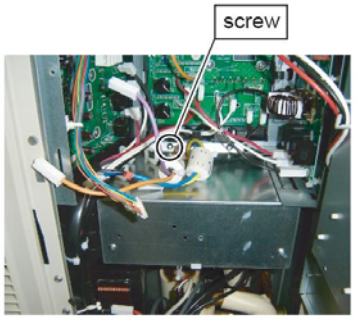
Spread the heat dissipation compound on the other side of IPM when you exchange PFC PCB by the repair.

9.5.3 FILTER PCB removal

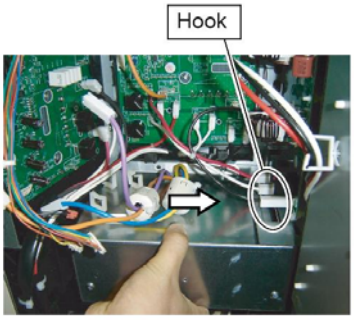


Remove the connectors, locking spacers, spacers, and earth screw.

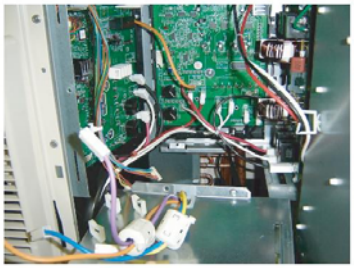
9.5.4 CAPACITOR PCB removal

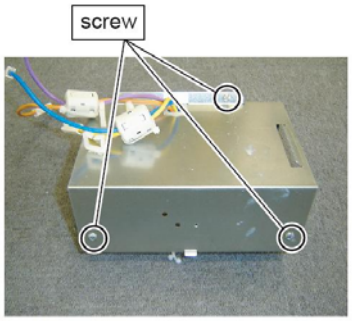


Remove the connectors, codes and screw.

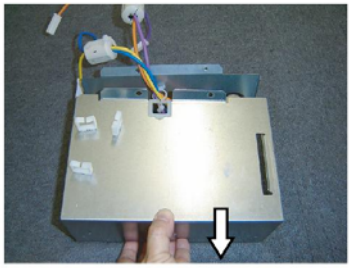


Remove the CONDENSER CASE by sliding rightward.

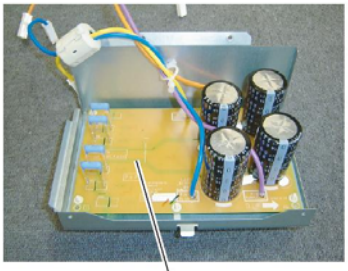


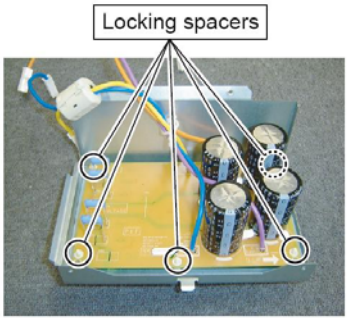


Remove the mounting screws.



Remove the CONDENSER COVER by sliding toward.

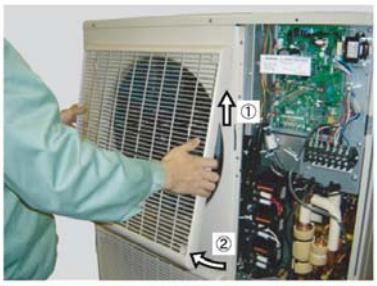




Remove the locking spacers.

9.6 FAN MOTOR removal

Remove the 4 mounting screws.



Remove the FAN GUARD
by sliding upward.

Remove the Hex Socket Screw.
And remove the PROPELLER FAN.

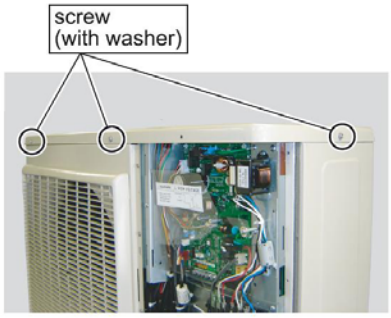
Note at the installation.
Insert propeller Fan and Moter shaft reference D cutting position.
And the tightening torque at the installation.
Tightening torque is from 10 to 15N•m.

Cut the binder.(2 places)

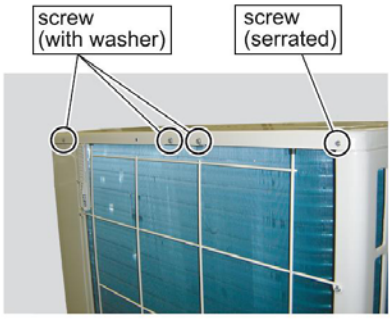
Loose the clamp, and
remove the lead wires.

Remove the 4 mounting screws.
Remove the FAN MOTOR.

9.7 TOP PANEL removal

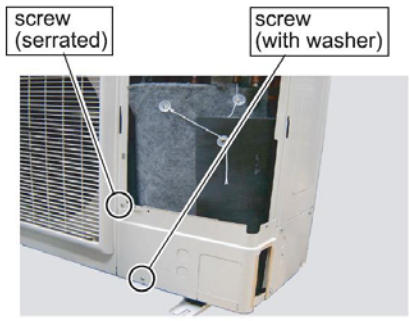


Remove the mounting screws.

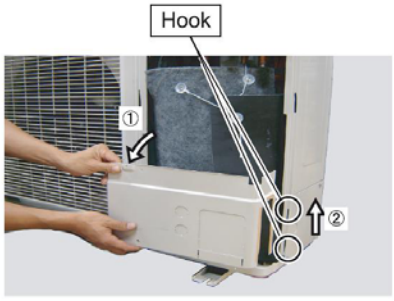


Remove the TOP PANEL.

9.8 PIPE COVER FRONT removal

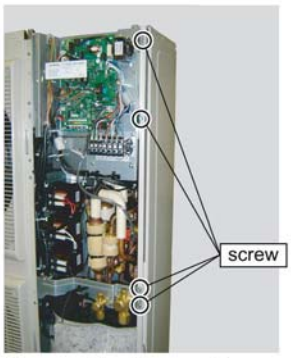


Remove the mounting screws.

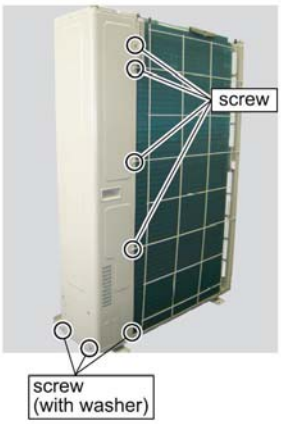


Remove the PIPE COVER FRONT.

9.9 RIGHT PANEL removal

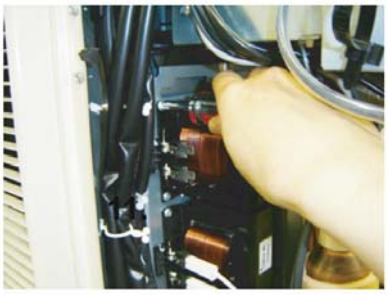


Remove the 11 mounting screws.
Remove the RIGHT PANEL by sliding upward.



9.10 REACTOR removal

Remove the connectors.



Remove the 3 mounting screws.

9.11 THERMISTOR removal

9.11.1 HEAT EXCHANGER (OUT) THERMISTOR

Remove the THERMISOTOR SPRING.

Remove the THERMISOTOR.

9.11.2 EXPANSION VALVE THERMISTOR

Remove the THERMISOTOR SPRING.

Remove the THERMISOTOR.

9.12 SOLENOID COIL removal

9.12.1 4WAY VALVE

Remove the mounting screw.

Remove the SOLENOID COIL.

9.12.2 INJECTION

Remove the mounting screw.

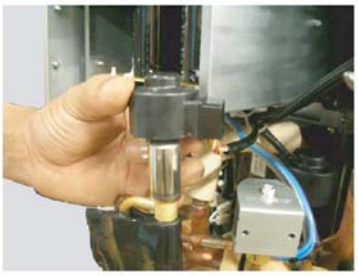
Remove the SOLENOID COIL.

9.13 EEV COIL removal

9.13.1 MAIN

Remove the EEV coil by hand.

9.13.2 INJECTION



Remove the EEV coil by hand.

9.14 PRESSURE SENSOR removal

Remove the PRESSURE SENSOR with wrench.

Note the tightening torque at the installation.
Tightening torque is 12±1.5N•m.

> Warning ! <

Wear gloves to prevent the frostbite, because a small amount of refrigerant leaks during work.

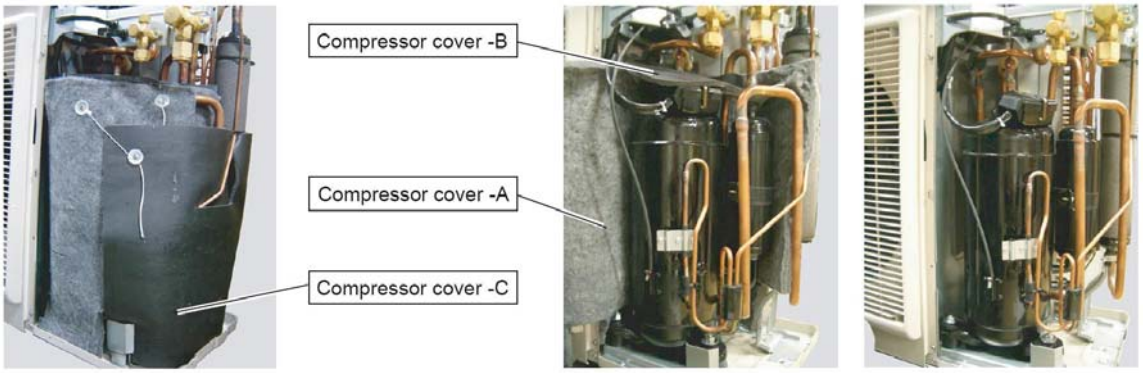
9.15 COMPRESSOR removal

Precautions for exchange of compressor.

Do not allow moisture or debris to get inside refrigerant pipes during work.

Procedure for compressor removal.

1 Turn off the power
2 Remove the service panel
3 Fully close the 3Way valve (gas) and 3Way valve (liquid)
4 Collect the refrigerant from the 3Way valve.
Start the following work after completely collecting the refrigerant.
Do not reuse the refrigerant that has been collected.

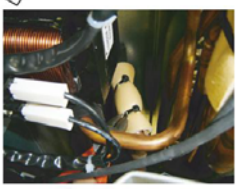


Remove the
COMPRESSOR COVER-C,COVER-B and COVER-A

Remove the TERMINAL COVER.

Remove the connectors.
[R : RED, C(T) : BLACK, S(W) : WHITE]

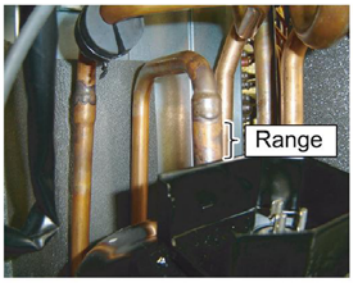
Remove the Thermistor (comp.temp.) and Thermistor (Discharge).



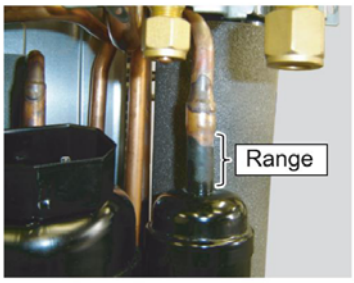
Cut the binder, and remove the heat insulation.

Remove the Thermistor(Discharge).

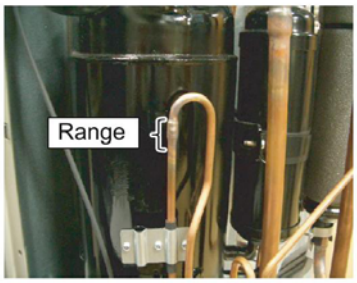
Remove the COMP BOLTS. (3 places)



Cut the Discharge pipe in this range.



Cut the Suction pipe in this range. Remove the COMPRESSOR.



Cut the Injection port in this range.

Caution
- Keep their shape better.
- There is a possibility of catching fire to oil when removing by the welding without cutting it.

Procedure for compressor installation

Reverse procedure to removing the compressor.

Precautions for installation of compressor.

1 When brazing, do not apply the flame on the terminal.
2 When brazing, be sure to replace the air in the pipe with nitrogen gas to prevent forming oxidization scale.

9.16 Precautions for exchange of refrigerant-cycle-parts

(1) During exchange the following parts shall be protected by wet rag and not make the allowable temperature or more.
(2) Remove the heat insulation when there is the heat insulation near the welding place.
Move and cool it when its detaching is difficult.
(3) Cool the parts when there are parts where heat might be transmitted besides the replacement part.
(4) Interrupt the flame with the fire-retardant board when the flame seems to hit the following parts directly.
(5) Do not allow moisture or debris to get inside refrigerant pipes during work.
(6) When brazing, be sure to replace the air in the pipe with nitrogen gas to prevent forming oxidization scale.

Part name	Allowable temperature	Precautions in work
EXPANSION VALVE (MAIN)	120°C	Remove the coil before brazing. And install the coil after brazing. Detaching necessity Sensor.
EXPANSION VALVE (INJECTION)	120°C	Remove the coil before brazing. And install the coil after brazing.
4WAY VALVE	120°C	Remove the suction temp. sensor before brazing. And install the suction temp. sensor after brazing.
3WAY VALVE (GAS)	100°C	
3WAY VALVE (LIQUID)		
UNION JOINT	100°C	Remove the pressure sensor before brazing. And install the pressure sensor after brazing.
PRESSURE SENSOR	100°C	Tighten the flare part gripping it. (Tightening torque :12±1.5N m) Do the static electricity measures.
SOLENOID VALVE	200°C	Remove the coil before brazing. And install the coil after brazing.

10 Spare Parts

The data is being prepared.

11 Accessories

11.1 DHW kit

See installation instructions "DHW kit" no. 1316.

11.2 Swimming pool kit

See installation instructions "Swimming Pool Kit" no. 1341.

11.3 2nd circuit kit

Management of 2 heating circuits requires installation of the 2nd zone kit, which includes a controller extension module, a Hydraulic Unit and a temperature sensor.

The pump installed on the heating flow pipe at the heat pump must be removed and installed on the zone 2 flow pipe.

One or two room thermostats may be installed, on either or both zones.

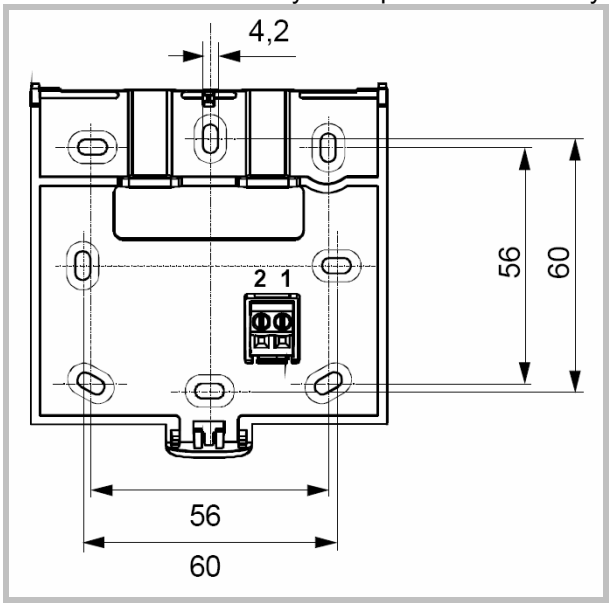
If the installation comprises radiators or fan coils and a heating floor, zone 1 will be the heating floor zone and zone 2 will be the radiator or fan coil zone. Zone 1 will be the one equipped with the mixing valve.

11.4 Room Sensor

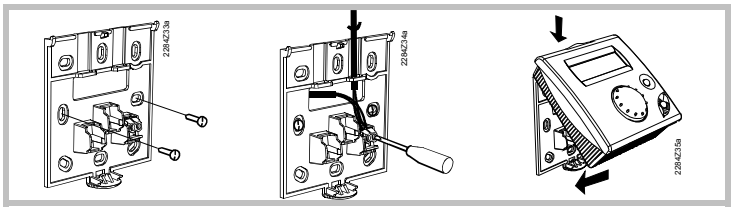
11.4.1 Room thermostat

The room thermostat is optional. Select an appropriate place for the room thermostat by following these rules:

- Central room
- Installation height, approx. 1.5 m
- Inner wall
- Away from drafts
- Away from direct sunlight
- Do not install the thermostat behind a door or in any other place where it may receive shocks.

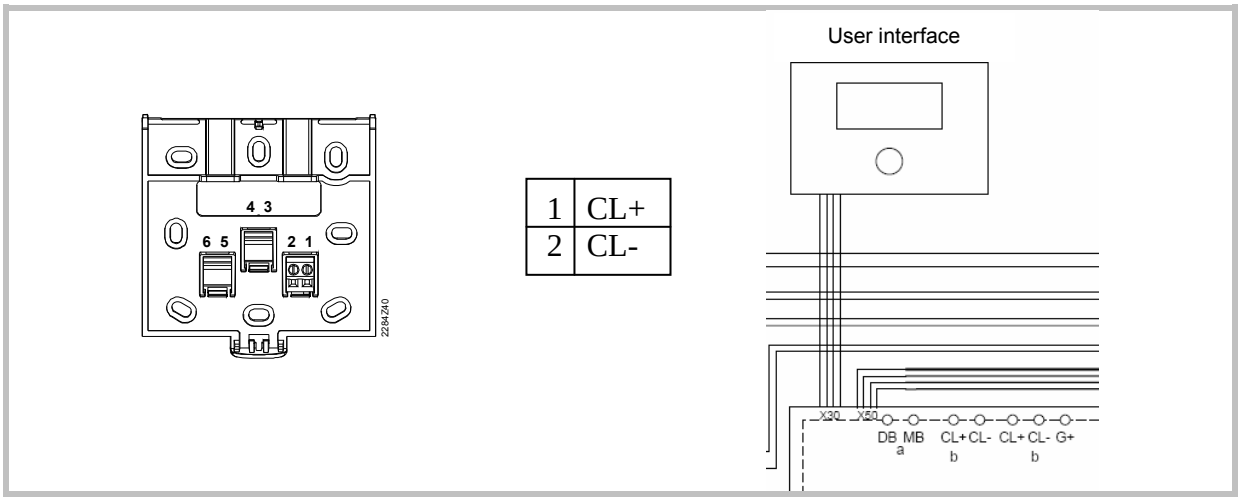


Air tightness faults in buildings often result in cold air being blown through the electrical sheathing. Do not hesitate to seal them off if a cold air draft comes into the back of the thermostat.



Connection:
The room thermostat must be connected to one of the terminals b (CL+, CL-) of the heat pump controller board. To do this, you can use a 0.5mm² cable of the two-pair telephone cable type.

If the cable is shielded, the shielding can be connected to the controller CL- terminal. It may under no circumstances be connected on both sides, i.e. controller side and room unit side.

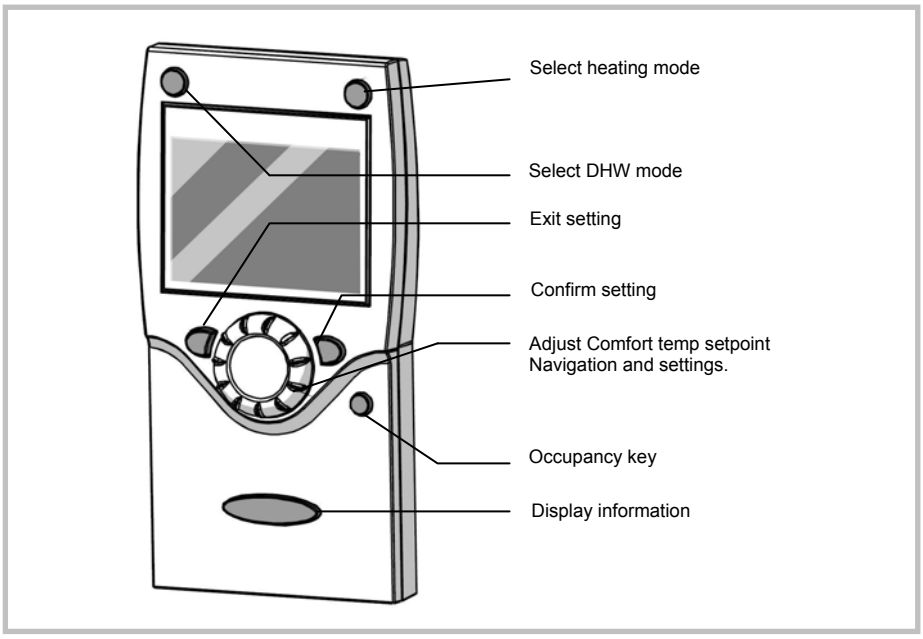


If the installation is equipped with 2 room thermostats, the second thermostat must be connected to the second terminal block b.

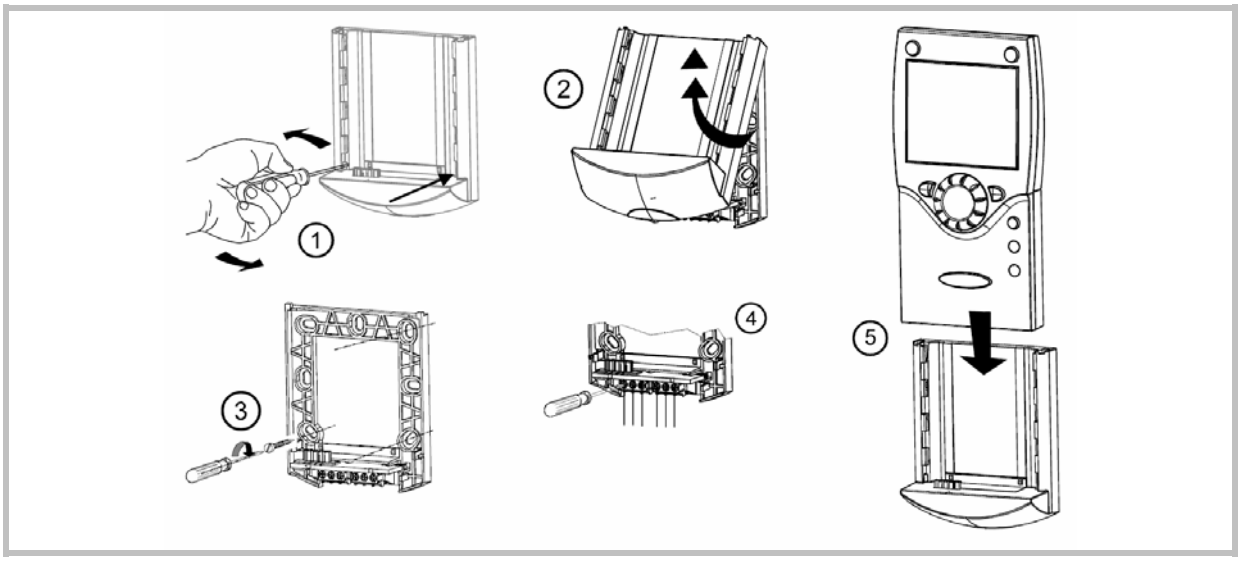
Configuration:
Gain access to the settings by continuously pressing the "Heating mode" key
fs = 1 (factory setting) → The room unit is addressed as ZONE 1
fs = 2 → The room unit is addressed as ZONE 2
fs = 3 → The room unit is addressed as ZONE 3 (factory setting)
P1 = 1 (factory setting) Automatic save:
Correction of the setpoint using the knob is accepted without special confirmation (timeout) or by pressing the operating mode key.
P1 = 2 Confirm save
Correction of the setpoint with the knob is accepted only after pressing the operating mode key.

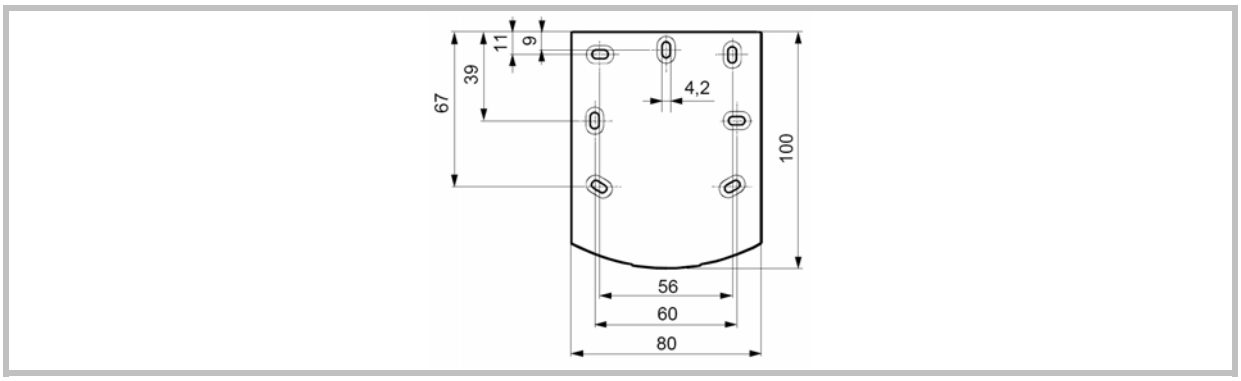
11.4.2 Remote control

The remote control includes the functions of the room unit together with those of the user interface mounted in series on the Hydraulic Unit.
It can be used, therefore, not only to measure the room temperature, but also to view the operating status of the heat pump, to enter the pump settings appropriate to the house and to the application's hydraulic circuit.



Installation





Connections

The room central unit must be connected to terminal b (CL+, CL-, G+) of the heat pump controller board. To do this, you can use a 0.5mm² cable of the two-pair telephone cable type.

If the cable is shielded, the shielding can be connected to the controller CL- terminal. It may under no circumstances be connected on both sides, i.e. controller side and room unit side.

Terminal T75	Control terminal	Function
1	CL+	BSB data
2	CL-	BSB ground
3	G+	Power supply 12

11.5 Boiler connection kit

An oil or gas boiler may be connected to the heat pump. Such a connection requires the purchase of the backup kit module, which includes a 3-way selection valve designed to isolate the boiler, and a pressure breaker.

When a boiler is connected to the heat pump, the electric auxiliaries installed in the heat pump must not be connected, as it is the boiler which provides additional heating on the coldest days.
The boiler is controlled by the heat pump. If the boiler has its own control system, you must disconnect or disable the system by assigning it the highest setpoint.

11.6 Cooling kit

See installation instructions "cooling kit" no. 1357.

11.7 High flow rate circulation pump kit

See installation instructions "High flow rate circulation pump kit" no. 1360.

11.8 Heat exchanger for swimming pool

See installation instructions "Heat exchanger for swimming pool" no. 1345.

11.9 DHW tank

See installation instructions "DHW tank".

11.10 Balancing vessel

See installation instructions "Balancing vessel".

11.11 External connect kit

See installation instructions "External connect kit".

12 Related Documents

12.1 Quick-Start Procedure

Before switching on the Hydraulic Unit:

1. Check the electric wiring
2. Check the refrigeration circuit and make sure the gas supply has been performed
3. Check the hydraulic circuit, with 1-2 bar pressure, check that the heat pump is purged, as well as the rest of the installation.
4. Check the DIP SW on the interface PCB. (All switches must be set OFF).

1. Set the front interface On
2. Configure the hydraulic circuit (setting 5700):

Presettings:

1. ***Waterstage** 1 heating circuit (by default)*
2. ***Waterstage** 1 heating circuit and DHW tank.*
3. ***Waterstage** 2 heating circuits.*
4. ***Waterstage** 2 heating circuits and DHW tank.*
5. ***Waterstage** boiler backup and 1 heating circuit.*
6. ***Waterstage** boiler backup and 2 heating circuits.*
7. ***Waterstage** boiler backup, 1 heating circuit and DHW tank.*
8. ***Waterstage** boiler backup, 2 heating circuits and DHW tank.*

3. Time, Date and time programs for HC1, HC2, DHW if other than default values (settings 500 – 576)
4. Adjust the heating curve slope (720; 1020) and displacement (721; 1021)

The heat pump is ready for operation!

You can also:

1. Adjust HC setpoints if other than default values (710 – 714; 1010-1014)
2. Adjust DHW setpoints (1610-1612) if other than default values
3. Start a legionella cycle (1640-1647)
4. Perform floor drying (850-857)

12.2 Startup Checklist

Date: ..... **Installation identification:** .....
.....

After Sales Service identification: **Installer identification:** .....
....

Unit reference number: ..... **Serial number:** .....

BEFORE STARTING UP

Sight Checks

Outdoor unit:
(See "Outdoor unit Installation" section of "Installation" instructions)

	OK	NON COMPLIANT	
location and fittings, condensate evacuation			
compliance with distances from obstacles			

Hydraulic Checks

Hydraulic unit:
(See "Hydraulic Connections" section of "Installation" instructions)

	OK	NON COMPLIANT	VALUE
connection of pipes, valves and pumps (1 or 2 circuits, DHW)			
installation water volume (expansion vessel of adequate capacity?)			
No leaks			
Main system pressure and degassing (0.3b > Exp vessel pre-loading)			

Refrigeration Connections and Checks

(See " Refrigeration Connections and Gas Supply" section of "Installation" instructions)

	OK	NON COMPLIANT	
Connections between units (pipe length, flared joints, etc.)			
Installation of HP, LP pressure switches on liquid line (small pipe)			
Pumpdown required			
Nitrogen leak test (~ 25 bar)			
Refrigerant filling of Hydraulic Unit and pipes			
opening of refrigeration valves to Outdoor Unit			

Electrical Checks

Outdoor unit:
See "*Electrical Connections*" section of "*Installation*" instructions)

	OK	NON COMPLIANT	VALUE
400v main power supply			
Protection by rated circuit breaker			
Cable cross-section			
Connection to earth			

Hydraulic unit:
*(*See *"Hydraulic unit Electrical Connections"* section of "*Installation*" instructions*)*

	OK	NON COMPLIANT	
Connection with OU (3 + Earth)			
Connection of Sensors (positioning and connections)			
Connection of 3-way valve and pumps.			
Power supply and protection of electric auxiliary			

OBSERVATIONS

ALL PERSONS PRESENT AT STARTUP MUST SIGN			
USER	INSTALLER	VENDOR	AFTER SALES

STARTING UP

Switching On

(See "Starting up" section of "Installation" instructions)

	OK	NON COMPLIANT	
Switching on			
Initialisation for a few seconds			
Operation of the pumps			
Outdoor unit starts after 3mins			

Checks on Outdoor Unit

	OK	NON COMPLIANT	VALUE
Operation of fan(s), compressor			
Current measurement			
After a few minutes, measurement of air temp delta			
Check condensation and evaporation pressure/temperature			

Checks on Hydraulic Unit

	OK	NON COMPLIANT	VALUE
after 15 minutes of operation			
primary water temp delta			
DHW priority (switching of selection valve)			
operation of heating, mixing valve, boiler backup, etc.			
Control settings			

Room Control

(See "Room Sensor Configuration" section of "Installation" instructions)

	OK	NON COMPLIANT	
Settings, manipulations, checks			
Setpoint display			
Explanations on use			

OBSERVATIONS

_____
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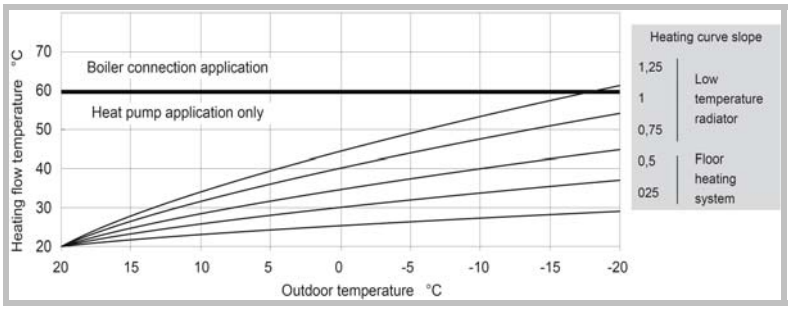
ALL PERSONS PRESENT AT STARTUP MUST SIGN			
USER	INSTALLER	VENDOR	AFTER SALES

12.3 Settings Sheet

Setting	Description	set to	Menus
	Preliminary settings		
20	language		*Op. section*
1	hour / minutes		*time and date*
2	day / month		*time and date*
3	year		*time and date*
5700	Preselection		*configuration*
	Heating circuit No. 1 if 2 circuits =less warmer one (e.g. floor)		
710	Comfort heating setpoint		*Heat. circuit 1*
712	Reduced setpoint		*Heat. circuit 1*
720	Heating curve slope		*Heat. circuit 1*
750	Room influence		*Heat. circuit 1*
790 / 791	Opt start/stop control max		*Heat. circuit 1*
834	Acutuator running time		*Heat. circuit 1*
850 / 851	Floor curing		*Heat. circuit 1*
501 to 516	time programs		*HC1 time pgm*
642 to 648	holiday programs		*Hol. HC1*
	Heating circuit no. 2 (with 2nd circuit option) = warmer one (e.g. radiators)		
1010	Comfort heating setpoint		*Heat. circuit 2*
1012	Reduced setpoint		*Heat. circuit 2*
1020	Heating curve slope		*Heat. circuit 2*
1050	Room influence		*Heat. circuit 2*
1090 / 1091	Opt start/stop control max		*Heat. circuit 2*
1134	Acutuator running time		*Heat. circuit 2*
1150 / 1151	Floor curing		*Heat. circuit 2*
521 to 536	time programs		*HC2 time pgm*
652 to 658	holiday programs		*Hol. HC2*
	Domestic Hot Water (if DHW kit)		
1610	Nominal setpoint		*DHW*
1612	Reduced setpoint		*DHW*
1620	Release		*DHW*
1640 to 1647	Legionella cycle		*DHW*
1660	Circulation pump release		*DHW*
5020	Flow setpoint boost		*DHW stor. tank*
5024	Switching differential		*DHW stor. tank*
5030	Charging time limitation		*DHW stor. tank*
5060	El imm heater optg mode	fill	*DHW stor. tank*
5061	Elec imm. heater:release		*DHW stor. tank*
5870	Combi storage tank		*configuration*
561 to 576	time programs		*prog.4 DHW*

Setting	Description	set to	Menus
	Boiler backup		
3700	Release below out. temp		*Suppl. source.*
3705	Overrun time		*Suppl. source.*
	Miscellaneous		
6046	Function Input H2	9	*configuration*
6100	Readjustm outside sensor		*configuration*
6120	Frost protect. for the plant		*configuration*
6205	Reset to default param.		*configuration*
6220	software version		*configuration*
6711	Reset HP		*errors*
7070 to 7183	maintenance		*Serv / special op.*
7700 to 7916	input/output testing		*I/O test*
8402 to 8457	generator diagnosis		*Diagn. heat source*
8700 to 9055	consumer diagnosis		*Diagn.consumers*
	Cooling		
5711	Cooling circuit 1	2 pipes	*configuration*
901 to 969	cooling settings		*cooling circuit 1*
	Faults If a fault occurs, press "Info" key		
No. 10	outdoor sensor		
No. 33	flow temp sensor		
No. 44	return temp sensor		
No. 50	DHW temp sensor		
No. 60	room sensor 1		
No. 65	room sensor 2		
No. 105	maintenance message		
No. 121	HC1 flow T not reached		
No. 122	HC2 flow T not reached		
No. 127	Leg. prot. T not reached		
No. 369	external fault (EX6)		
No. 370	Outdoor unit connect error		
6740 to 6746	alarm timeout		*errors*
6800 to 6818	last 10 alarms history		*errors*
6711	reset HP		*errors*
	Heat Pump		
2844	Switch-off temp max		*Heat pump*
2884	Release el flowat OT		*heat pump*
2920	In case of peak day clearing signal lock (EX4)		*heat pump*
	Swimming Pool (with"sw pool" kit option)		
2056	Setpoint source heating		*sw pool*
	Outdoor Unit Faults Refer to "installation" instructions		



12.4 Startup Data Sheet

Site:		Installer:	

Outdoor unit	Serial no.:		Hydraulic Unit	Serial no.:	
	Model:			Model:	

Refrigerant type:			Refrigerant charge:	kg	

Checks

- Compliance with positioning distances ☐
- Condensate evacuation correct ☐
- Electric connections/connections tightness ☐
- No GAS leaks (Unit ID No.: _____) ☐
- Installation of refrigeration connection correct (length: m)

Operating voltage and current on Outdoor Unit

- L1/N, L2/N, L3/N : _____ V
- L1/E, L2/E, L3/E : _____ V
- N/E: _____ V
- Icomp: _____ A

Reading in HEATING operating mode

Compressor discharge temperature: _____°C

- Liquid line temp _____ °C
- Condensation temp **HP = _____bars** _____ °C } Sub-Cooling =_____°C
- Tank water output temp _____ °C } ▲T condensation = _____°C
- Tank water input temp _____ °C } ▲T secondary = _____°C
- Evaporation temp **LP = _____ bars** _____ °C
- Suction temp _____ °C } Overheating =_____°C
- Heat exchanger air input temp _____ °C } ▲T Evaporation = _____°C
- Heat exchanger air output temp _____ °C } ▲T Heat exchanger = _____°C

Hydraulic system on Hydraulic Unit:

Secondary system:

- Low temp heating floor ☐
- LT Radiators ☐ } Pump brand: _____ Type:_____
- Fan coils ☐ } Pump brand: _____ Type:_____

Domestic hot water: tank type =_____ Pump brand: _____ Type:_____

Estimated water volume of secondary system: _____ L

Options & Accessories:

- Power supply for connected electric auxiliary ☐
- Operation in cooling mode possible ☐
- Location of room sensor correct ☐
- Cooling kit ☐
- DHW kit ☐
- 2-zone kit ☐

Room thermostat C 55 ☐

Remote control C75 ☐

Boiler kit: _____

Details:

Control Settings:

Configuration type:

Essential settings:

Observations

Startup Date	Name and signature of person in attendance	Name and signature of Technician

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