INSTALLATION GUIDE

Calibra RXT

Brine/water heat pump

www.thermia.com

Thermia AB is not liable or bound by warranty if these instructions are not adhered to during installation or service.

The English language is used for the original instructions. Other languages are a translation of the original instructions. (Directive 2006/42/EC)

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1 About documents and decals

This manual is intended for installers with a prior experience in installing heat pumps. Industrial standards, common practise and local regulations must always be followed even if the explicit requirements may not be stated in this manual.

Manuals with more extensive information and technical information can be found and downloaded here:

www.thermia.com under the tab **Partner Login**.

1.1 Important information

The instructions contain different warning symbols, which, together with text, indicate to the user that there are risks involved with actions to be taken.

The symbols are displayed to the left of the text with two different symbols used to indicate the degree of danger and one symbol to give extra attention:

Warning

Risk of personal injury! Indicates a possible danger that can lead to fatal or serious injury if necessary measures are not taken.

Caution

Risk of installation damage. Indicates a possible hazard that can lead to item damage if necessary measures are not taken.

Note

Information regarding making the handling of the installation easier or anything that may need further attention.

2 General product information

2.1 Refrigerant: General

Note

Service maintenance and repair such as: breaking into the refrigerant; opening of sealed components; opening of ventilated enclosures, shall be performed by competent personnel only.

Note

Compliance with national gas regulations shall be observed.

2.2 Refrigerant: Additional precautions for R290 (A3 refrigerant)

This appliance is charged with R290, a highly flammable refrigerant.

The unit is equipped with a refrigerant leak detector and ventilation system for safety. To be effective, the unit must be electrically powered at all times after installation, other than when serviced.

Warning **Storing appliance with R290 refrigerant**

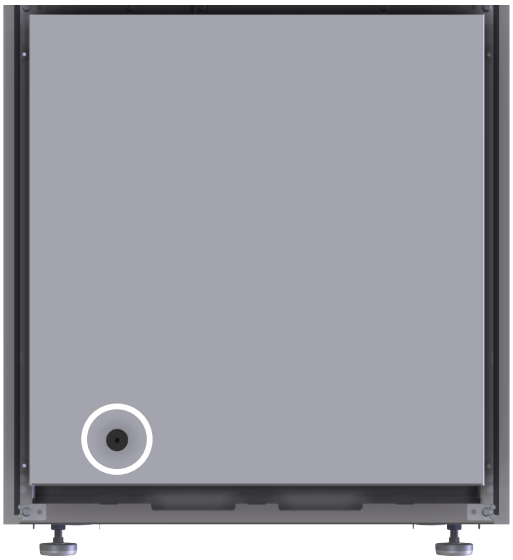
In accordance to IEC60335-2-40:2022, prior to installation, the application shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating appliance, an operating electric heater or a hot surface with a temperature above 370°C). Not adhering to this standard can lead to serious personal injury and/or material damage.

Warning **Installation room**

The installation site must fulfil that the room can not, under any circumstances, have any open flames, operating appliances, or anything that is a potential source of ignition, present at any given time during or after the installation.

Warning **Gas leak detection**

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used. Do not pierce or burn. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system. Not adhering to these instructions can lead to serious personal injury and/or material damage.



The rubber plug in the lower left corner of the refrigerant circuit cover should be removed for a recommended first leak inspection. Put the plug back in its position when done.

Ensure that the area is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere, in case of unintended refrigerant release.

The following leak detection methods are deemed acceptable for R290 refrigerant:

- Electronic leak detectors may be used to detect refrigerant leaks. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential source of ignition and is suitable for R290. Leak detection equipment shall be set at a percentage of the LFL (Lower Flammability Limit) of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (1.7%, maximum) is confirmed.
- Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

For maximum refrigerant charge (max), see type plate on heat pump for refrigerant change.

2.3 Scrapping

Caution **Appliance disposal**

When the heat pump has reached end-of-life and is subject to scrapping, it should be sent to a recycling/treatment facility to ensure correct handling of disassembly, recycling, and disposal. Local rules and regulations related to correct extraction and disposal of refrigerant and compressor oil must be followed.

To empty the water in the water tank, follow the instructions below:

1. Turn off the power.
2. Turn off the water supply from the main water line.
3. Empty the tank from the top using a siphon hose.

2.4 Water quality

This heat pump and its components is developed to reliably and efficiently work with water qualities in line with VDI 2035. In practice this means that some general precautions should be taken:

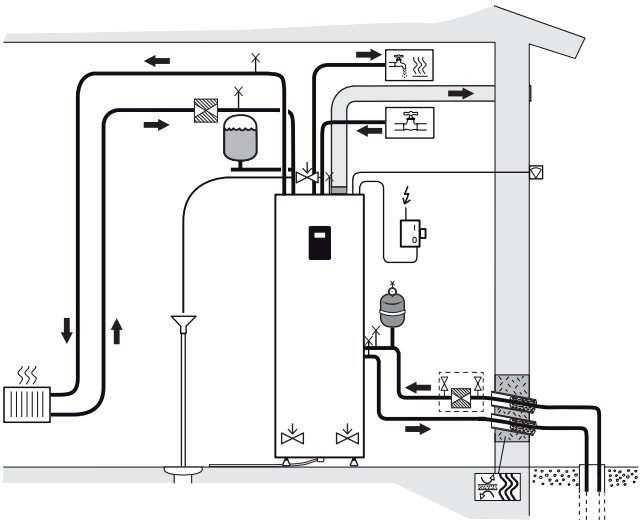
As a heating system often contains small amounts of suspended solids (rust) and sludge products from calcium oxide, precaution should be taken to ensure that the water in the heating system is as clean as possible to ensure long lasting performance and minimize the risk of reliability issues. If magnetite can be expected in the heating system, cleaning of system and /or installation of magnetite filters should always be considered. Any filters supplied with the heat pumps should always be installed. The dirt strainer should be fitted on the return line from the heating system, as close to the heat pump as possible.

Heating system, hot water and brine circuit:

Chemical and/or oil contamination shall always be avoided. In areas where there are exceptional water conditions with regards to hard water, a softening filter may be necessary to use/install. The softening filter softens the water, cleans any impurities and prevents the buildup of calcification. The hot water tank is designed to work well in all normal drinking water qualities in line with the European drinking water directive (2020/2184). With regards to chloride level this means that it is approved to up to 250 mg/l.

2.5 Overview image

2.5.1 Overview image Calibra RXT



- Hot water
- Heating system
- Power
- Brine
- Fan duct
- Outdoor sensor

Warning Venting valves and safety valves

This heat pump must **NOT** use automatic venting valves, only manually operated valves allowed.

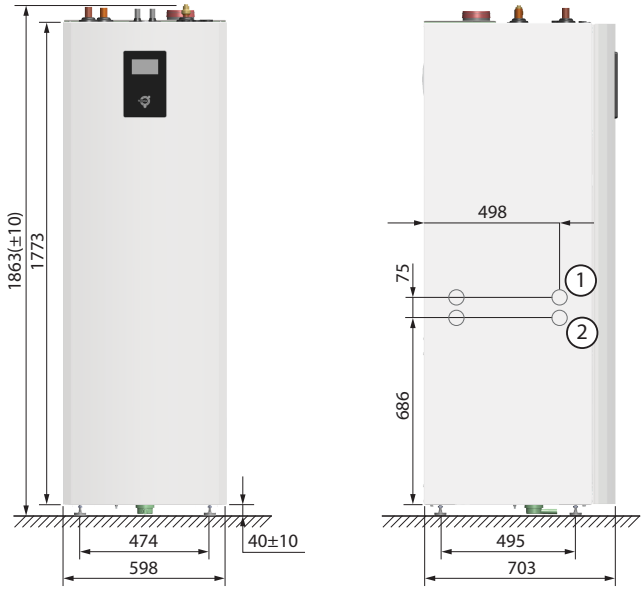
In cases where additional safety valves must be installed, the valve MUST be an EN ISO 4126-1 safety valve with a release pressure of 3 bar in the heating system and more than 3 bar in the brine circuit (recommendation 4 bar).

If the heating system requires extra safety valves, make sure to put them higher, than the safety valve in the heat pump unit. Also make sure, to avoid placement downstream a circulation pump, which could increase the system pressure significantly.

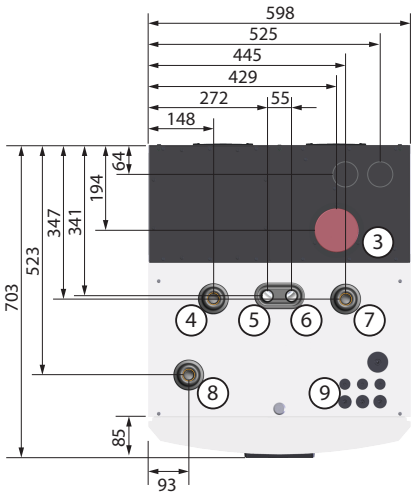
Cold and hot water pipes and overflow pipes from safety valves must be made of heat resistant and corrosion-resistant material, e.g. copper. The safety valve overflow pipes must have an open connection to the drain and visibly flow into this in a frost-free environment. The fan duct must exit to an outdoor environment at least 1m above ground and 1m from the outdoor sensor, other electrical equipment, possible ignition sources and open flames.

3 Heat pump data, dimensions and connections

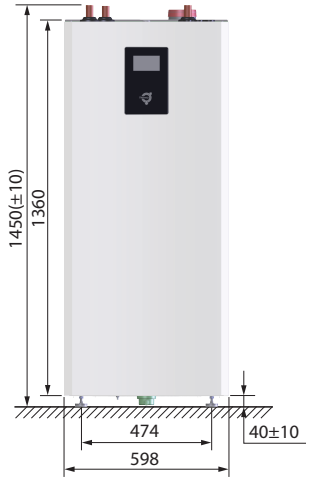
3.1 Calibra RXT 7 & Calibra RXT 12

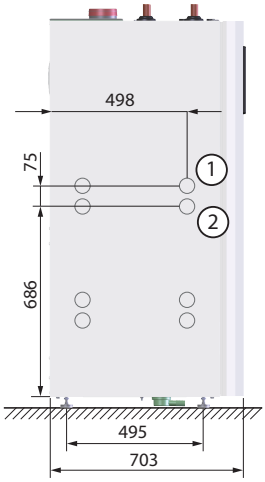


1. Brine in, 28mm
2. Brine out, 28mm
3. Fan duct, 100mm
4. Heating system return, 28mm
5. Hot water line, 22mm
6. Cold water line, 22mm
7. Connection for bleed valve, 22mm
8. Heating system supply, 28mm
9. Lead-in for power supply, sensor and communication cables

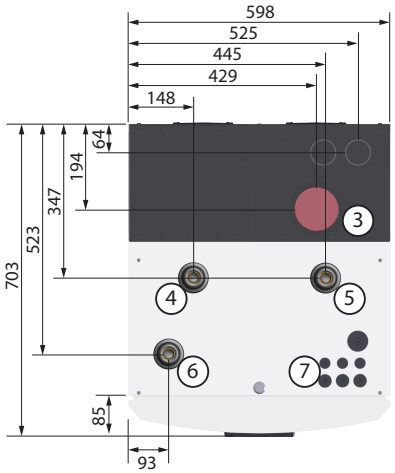


3.2 Calibra RXT 7 Duo & Calibra RXT 12 Duo





1. Brine in, 28mm
2. Brine out, 28mm
3. Fan duct, 100mm
4. Heating system and hot water tank return, 28mm
5. Heating supply to hot water tank, 28mm
6. Heating system supply, 28mm
7. Lead-in for power supply, sensor and communication cables



3.3 Delivery content

3.3.1 Calibra RXT

Installation kit 369305

Description	Article number
Insulation tape	086L5810
Plastic manual holder	086L3233
Push-fit elbow 28	086L5337
Cable inlet M40 black	354364
Cable inlet M20 black	354361
Cable inlet M25 black	354362
Grommet	353434
Outdoor sensor	084N1024
Safety valve 9 bar	086U2369
Filter ball DN25 PN16	086L0401
A3 Information	369502
Cardboard box 270x205x57	369299

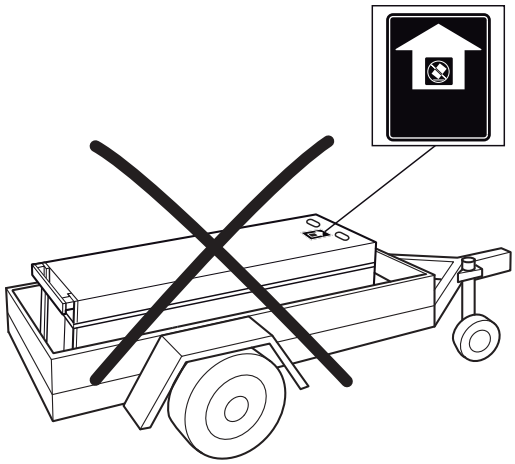
Brine assy install kit 369306

Description	Article number
Pipe insulation	086L5809
Pipe insulation	086L5879
Pipe insulation	086L5808
Brine pipe out	086L5335
Brine pipe in	086L5336

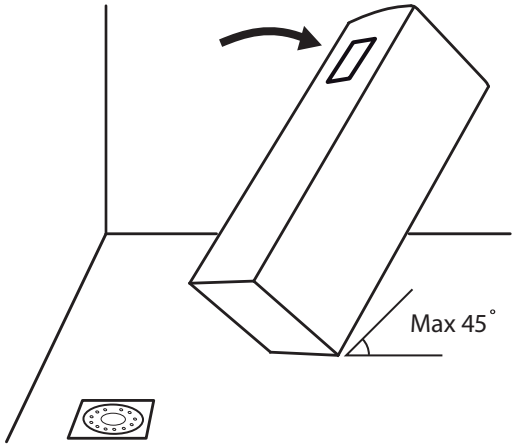
Delivered, but not included in any of the above kits: 367232 Vent adapter 100/80

4 Transportation, space requirements and recommended location

4.1 Transportation

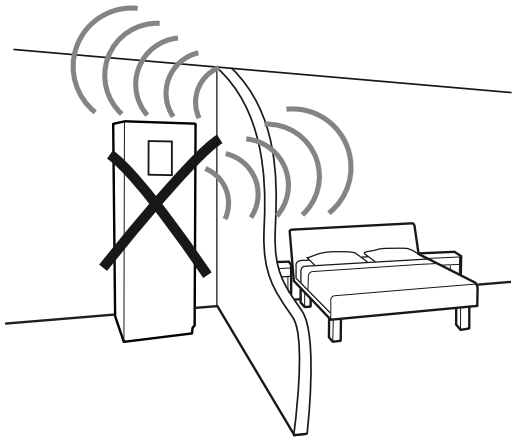


The heat pump must not be transported lying down.

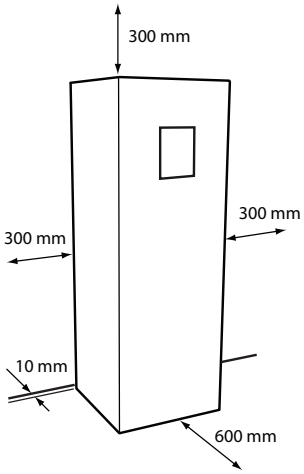


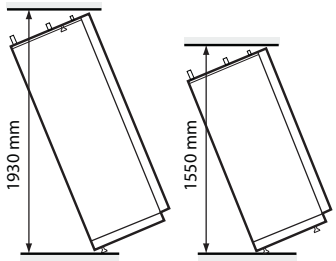
Maximum tilt 45°.

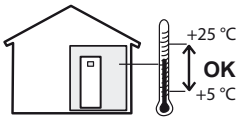
4.2 Space requirements and recommended location



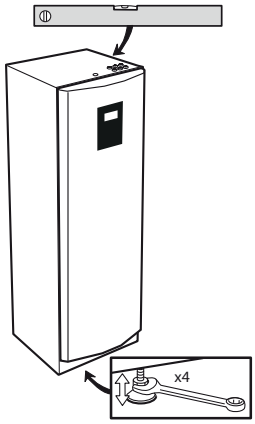
Avoid placing the heat pump in a corner or near a bedroom, since the surrounding walls can amplify the sound from the heat pump.

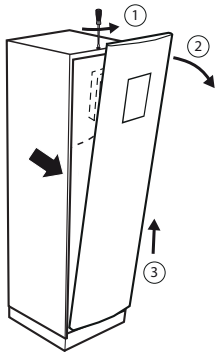






The maximum ambient temperature in the room where the heat pump is installed must not exceed 25 °C.



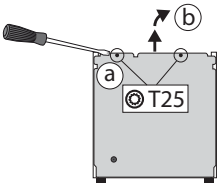


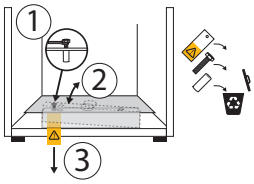
Adjust the heat pump using the adjustable feet so that it is horizontal to the floor.

NOTE: Only qualified installers are allowed to open the cabinet door.

There are two cables attached to the front door, the ground cable and the communication cable to the display, make sure not to pinch the cables when putting the door back in place.

The appliance shall be stored and installed so as to prevent mechanical damage from occuring.





Remove the refrigerant circuit cover to access the transport screw (a & b).

When the heat pump is in position, remove the transport screw (1), carefully lift the metal box (2) and pull the paper slip towards you (3), to release the sleeve and pull it out with the paper slip. Let the box down gently in its resting position. (If the heat pump should be moved further, put the transport safety screw back in its original position.) Make sure all parts of the transport safety is removed!

NOTE: Be sure to put the cover back properly, otherwise the gas leak sensor will not work as intended!

The heat pump **must be placed on a stable floor with a floor well**, preferably a concrete floor. When placed on a wooden floor, the floor must be able to hold the weight of the heat pump, including a filled water heater. Consider that condensation water may drip from the drain hole, so take the necessary steps to protect the floor.

5 Evacuation ventilation

This heat pump requires the heat pump to be ventilated to an outdoor environment. Lead the ventilation duct (Ø100mm) on the top of the heat pump to the outside of the house.

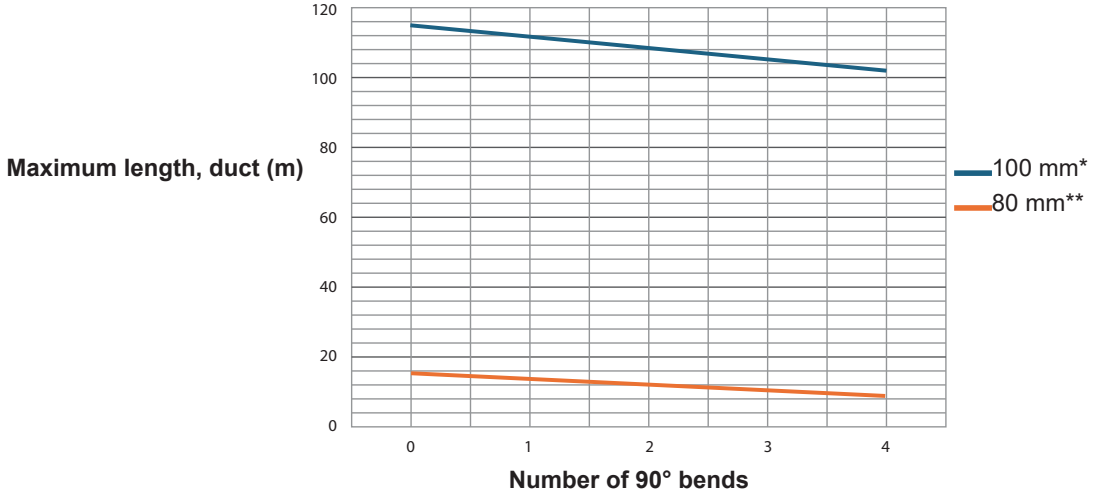
The ventilation duct must not be connected to any other function, and be independent from any other ventilation systems in the building.

The area next to the end of the ventilation outlet on the outside is an Ex Zone 2 classified space. No ignition- or open flame sources can be any closer than 1m to the ventilation outlet.

Make sure that there is no risk of the outlet being blocked by snow, ice, leaves or any other debris. Install the outlet according to local height recommendations, especially when it comes to snow depth.

Dimensioned ventilation flow: 19 l/s

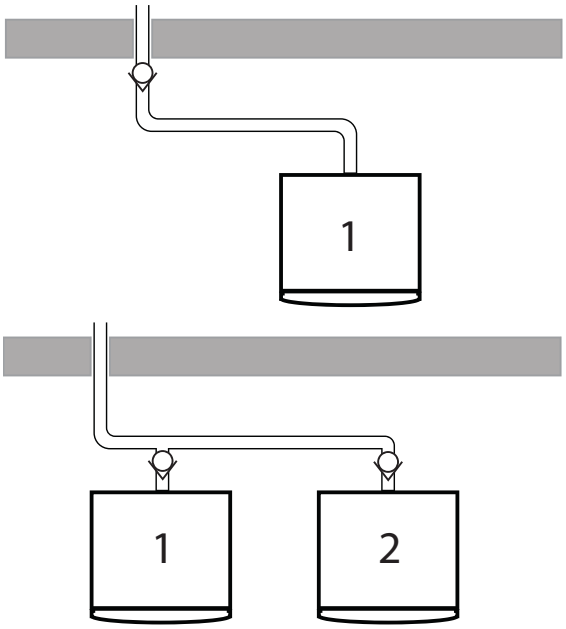
Available ambient pressure: 200 Pa



* including reverse flow damper and outlet grille

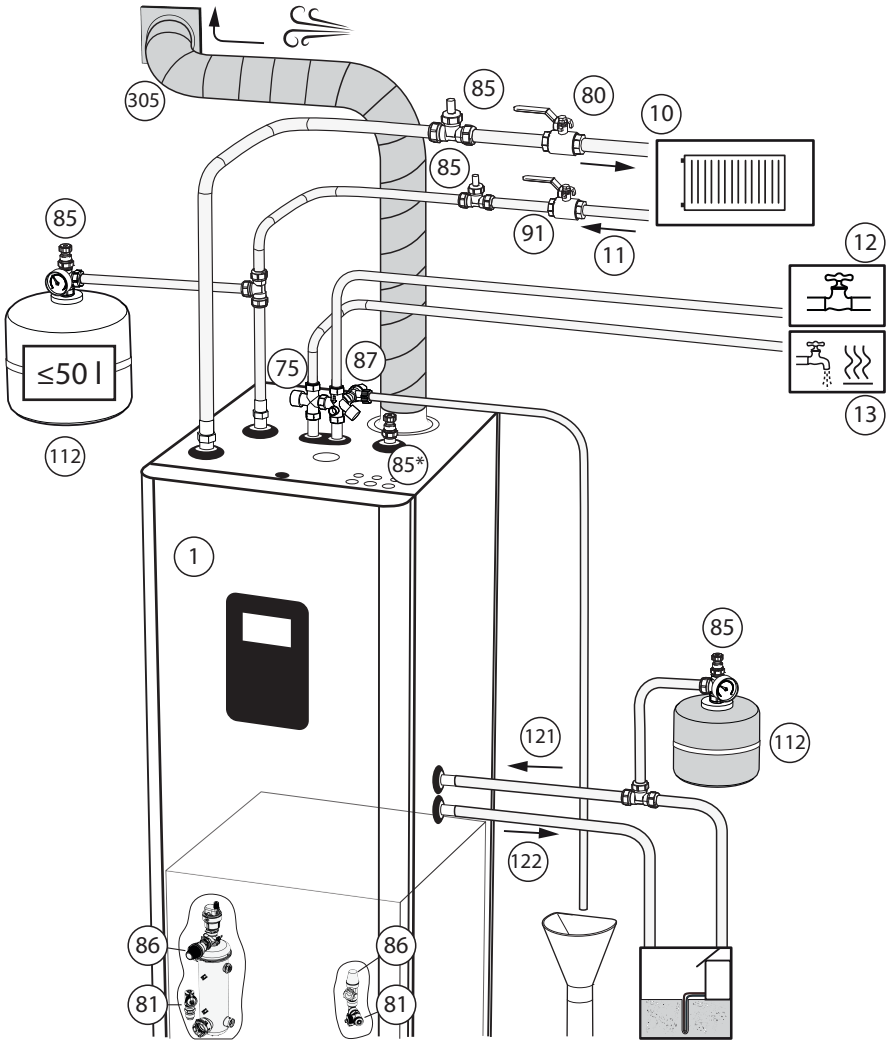
** reduction 100mm->80mm (vent adapter 100/80 included in delivery), including reverse flow damper and outlet grille

When connecting multiple heat pumps to a single ventilation duct, see example below. Use non-return ventilation valves to keep air from going back.



6 Heating and hot water connections

6.1 Heating and hot water connections Calibra RXT



1	Heat pump
10	Heating system supply line
11	Heating system return line
12	Cold water line
13	Hot water line
75	Mixing valve hot water, with exchange valve*
80	Shut-off valve
81	Draining/filling valve (**Left**: Heating circuit, **Right**: Brine circuit)
85	Manual air bleeding valve (85* showing venting valve for TWS coil in water heater)
86	Safety valve (**Left**: Heating circuit 2,5 bar, **Right**: Brine circuit 3 bar)
87	Safety valve (9 bar, hot water)
91	Dirt strainer with shut-off valve, DN 25
112	Expansion vessel (For radiator circuit: Max volume, 50 l)
121	Brine in
122	Brine out
305	Fan duct. It is very important that the ventilation duct is installed correctly, according to the instructions in this manual.

Important! Everything in the picture is NOT included in delivery, but a representation of an installation.

Make sure that a free flow is **always** possible on the heating circuit. Very small water volumes or stop in the heating circuit may cause operational disturbances, shorted lifetime or high pressure alarms.

* This valve (venting valve for TWS coil in hot water tank) should preferably enable a rather high flow when venting, as this may simplify air removal in the hot water coil.

Warning **Venting valves and safety valves**

This heat pump must **NOT** use automatic venting valves, only manually operated valves allowed.

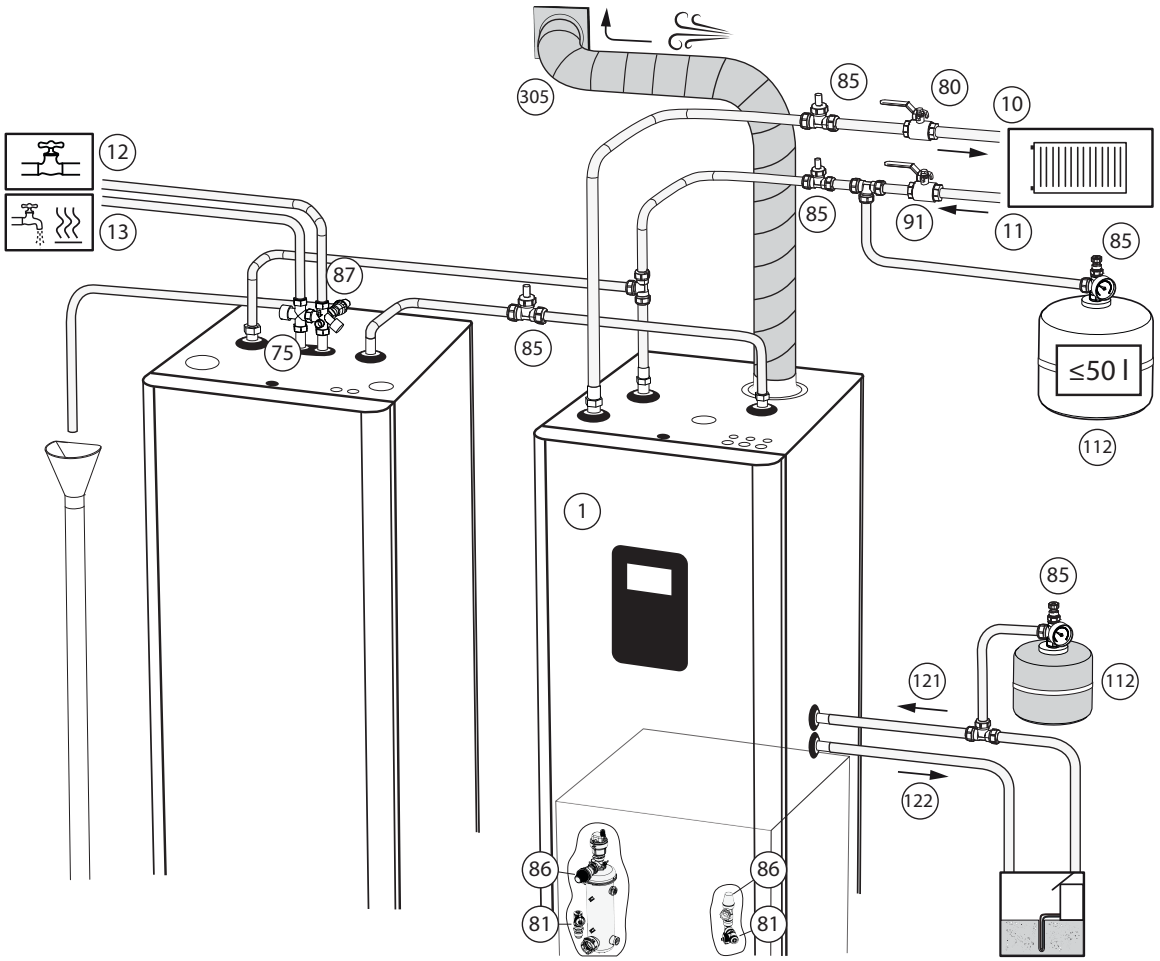
In cases where additional safety valves must be installed, the valve MUST be an EN ISO 4126-1 safety valve with a release pressure of 3 bar in the heating system and more than 3 bar in the brine circuit (recommendation 4 bar).

If the heating system requires extra safety valves, make sure to put them higher, than the safety valve in the heat pump unit. Also make sure, to avoid placement downstream a circulation pump, which could increase the system pressure significantly.

Warning **Expansion vessel volume (radiator circuit)**

The expansion vessel volume on the radiator circuit (112) must never exceed 50 litres, regardless if there are more heat pumps connected in a primary/secondary setup or a single unit.

6.2 Heating and hot water connections Calibra RXT Duo



1	Heat pump
10	Heating system supply line
11	Heating system return line
12	Cold water line
13	Hot water line
18	Coil tank
75	Mixing valve hot water, with exchange valve**
80	Shut-off valve
81	Draining/filling valve (**Left**: Heating circuit, **Right**: Brine circuit)
85	Manual air bleeding valve
86	Safety valve (**Left**: Heating circuit 2,5 bar, **Right**: Brine circuit 3 bar)
87	Safety valve (9 bar, hot water)
88	Valve pipe (cold water)
91	Dirt strainer with shut-off valve, DN 25
112	Expansion vessel (For radiator circuit: Max volume, 50 l)
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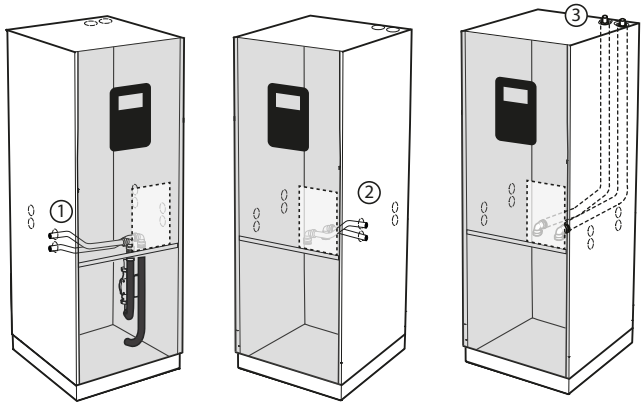
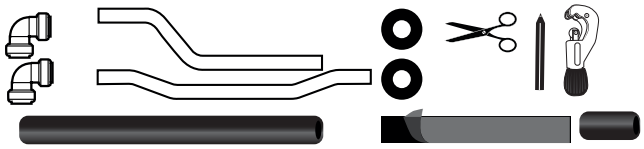
7 Brine connections

7.1 Brine connections, alternatives

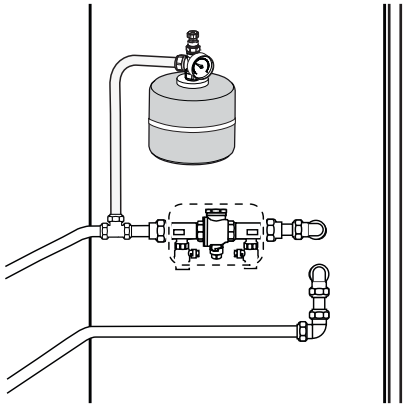
1. Left knock-out
2. Right knock-out
3. Top knock-out



Equipment setup for installing:

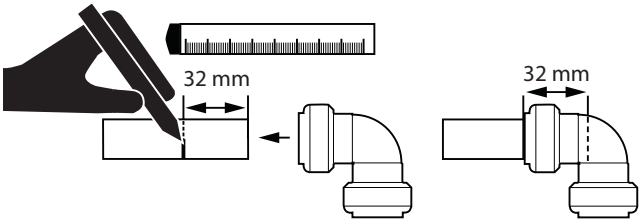


Expansion vessel and filling device, brine:



7.2 General information for brine connections

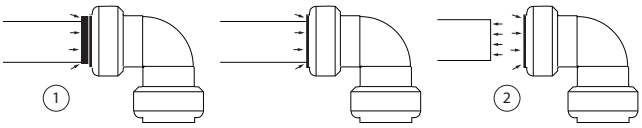
The quick couplings included are tool-free and pushed in place. The coupling locks automatically. Before mounting, check that there are no sharp edges or irregularities on the pipe that could damage the rubber sealing in the couplings and cause leakage. The coupling can be rotated after mounting on pipes.



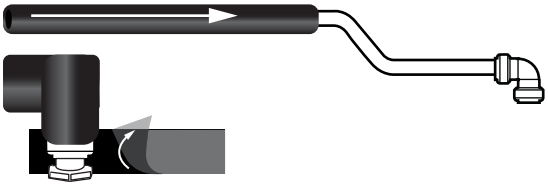
Press the coupling on to the pipe and make sure it reaches the 32mm mark.

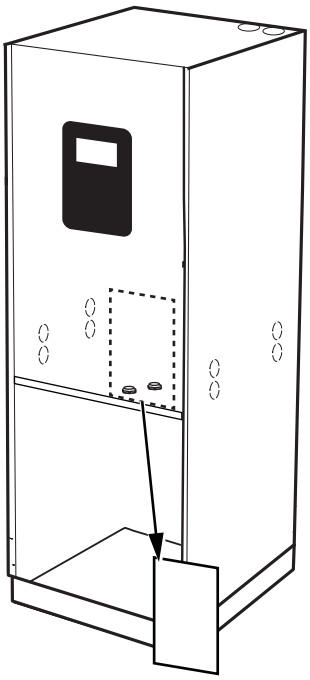
Do the following to disassemble:

1. Push the plastic ring inwards
2. Pull the pieces apart

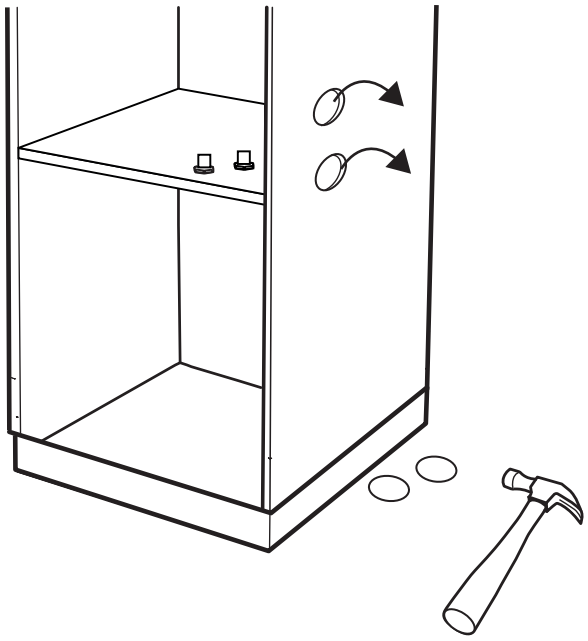


Insulate the brine pipe and prepare with the insulation tape before installing the pipe in the heat pump. Loosen the tape from the protective film partly, and place it behind the clutch when mounted on the pipe. This makes it easier to complete the insulation when the pipe is in place in the heat pump.





In order to access the brine connections, the heat pump front and the metal plate to the electrical cabinet must be removed.

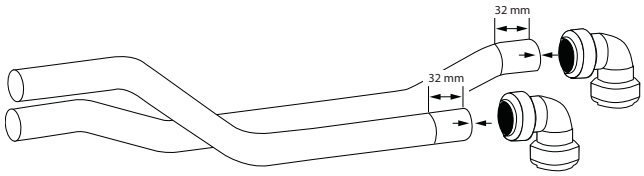


Remove knock-out holes to the left, right or on top.

7.3 Alternative 1 (left)

For connections on the left hand side, when facing the heat pump.

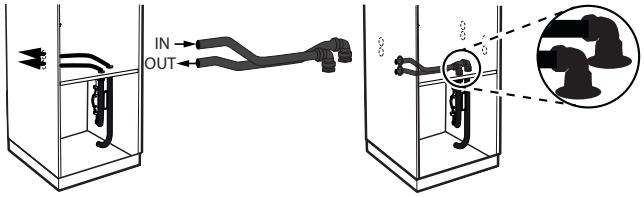
1. Press the quick couplings (delivered with the heat pump) on to the pipes according to the picture . Make sure the coupling reach the 32 mm mark.



2. Insulate before mounting the pipes.

3. Install the insulated pipes from the inside of the heat pump and out. Pay attention to which one of the pipes are brine in and brine out (see picture below).

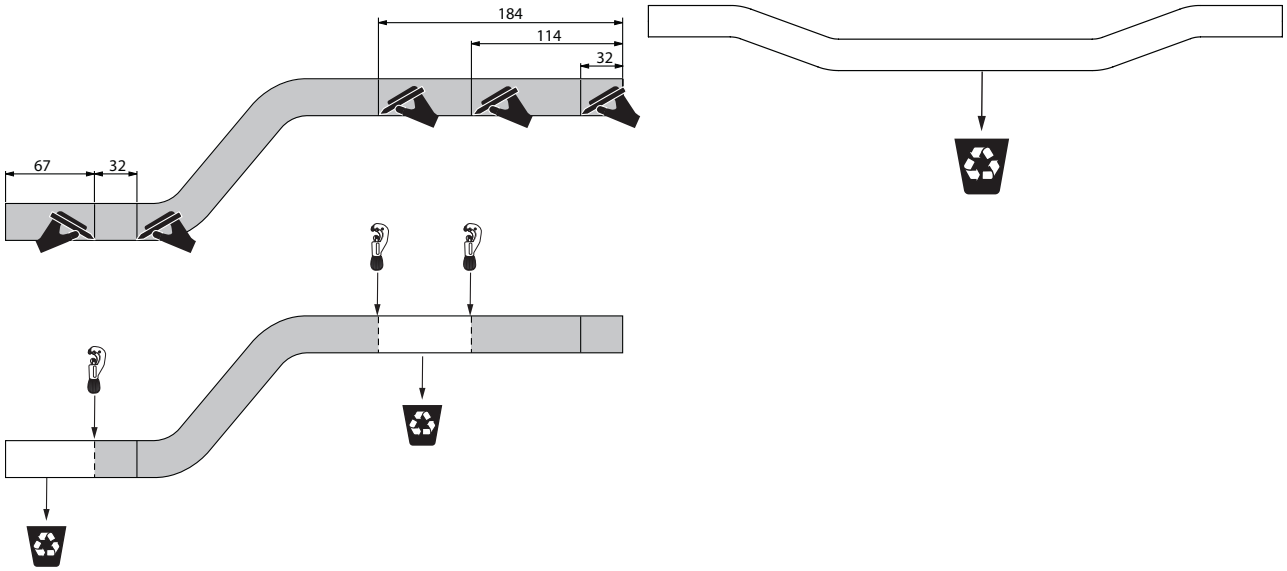
4. Press the pipes on to the connections in the heat pump (the pipe connections are located behind the electrical cabinet in the heat pump, remove the metal plate). Isolate with insulation tape so that it is partially seated against the plate.

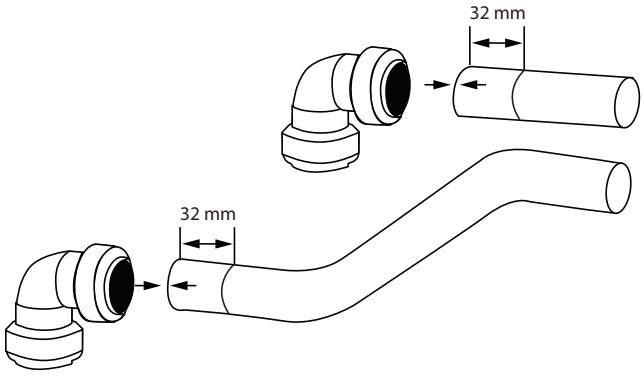


5. Fit the rubber sleeves into the knock-out holes.

7.4 Alternative 2 (right)

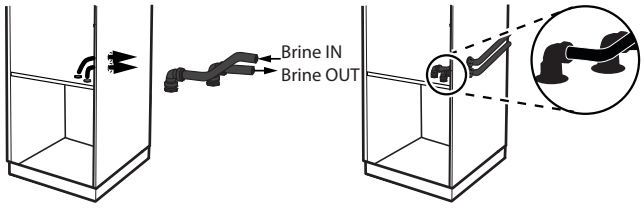
For connections to the right hand side, when facing the heat pump.





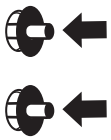
1. Press the quick couplings (delivered with the heat pump) on to the pipes . Make sure the coupling reach the 32 mm mark.

2. Insulate before mounting the pipes.



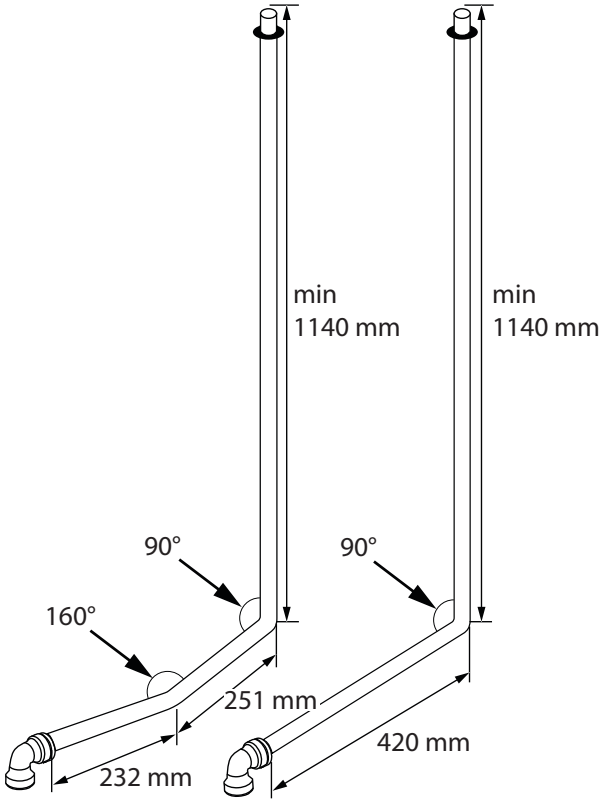
3. Press the pipes on to the connections in the heat pump (see picture above). Install the insulated pipes from the inside of the heat pump and out. Pay attention to which one of the pipes are brine in and brine out (the pipe connections are located behind the electrical cabinet in the heat pump, remove the metal plate). Isolate with insulation tape so that it is partially seated against the plate.

4. Fit the rubber sleeves into the knock-out holes.

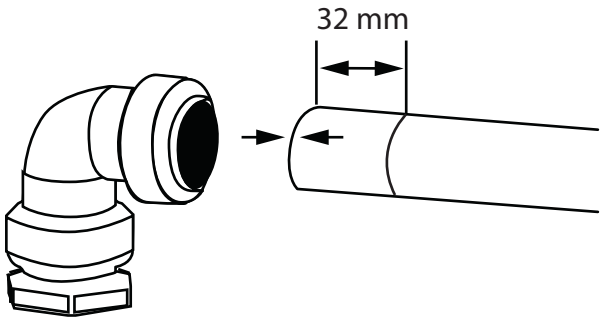


7.5 Alternative 3 (top)

Connections through the top knock-out holes. For this option, pipes are not included in the delivery.

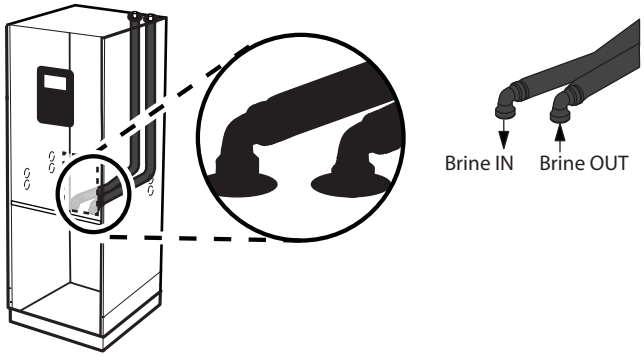


1. Prepare the pipes according to the dimensions in the picture. Cu 28 mm is the recommended material and dimension intended for brine pipes.

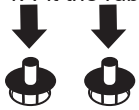


2. Insulate before mounting the pipes.

3. Press the pipes on to the connections in the heat pump (see picture below). Install the insulated pipes from the inside of the heat pump and out. Pay attention to which one of the pipes are brine in and brine out (the pipe connections are located behind the electrical cabinet in the heat pump, remove the metal plate). Isolate with insulation tape so that it is partially seated against the plate.



4. Fit the rubber sleeves into the knock-out holes.



8 Sensors and power supply Calibra RXT

Warning **Electrical voltage!**

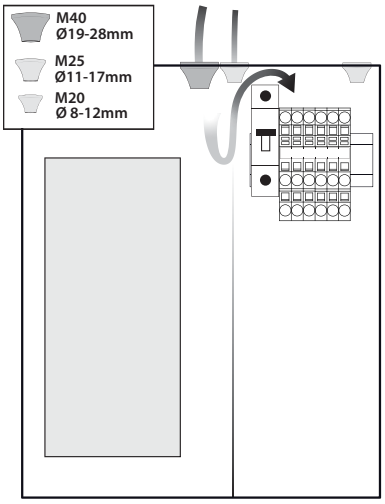
The connection terminals are powered and can cause life hazards due to electrical shock. All power supplies must be disconnected before electrical installation can commence.

Caution **Cables, power supply**

The electrical installation must be carried out using permanently routed cables and must follow applicable local and national regulations. It must be possible to isolate the power supply using an all-pole circuit breaker with a minimum contact gap of 3 mm.

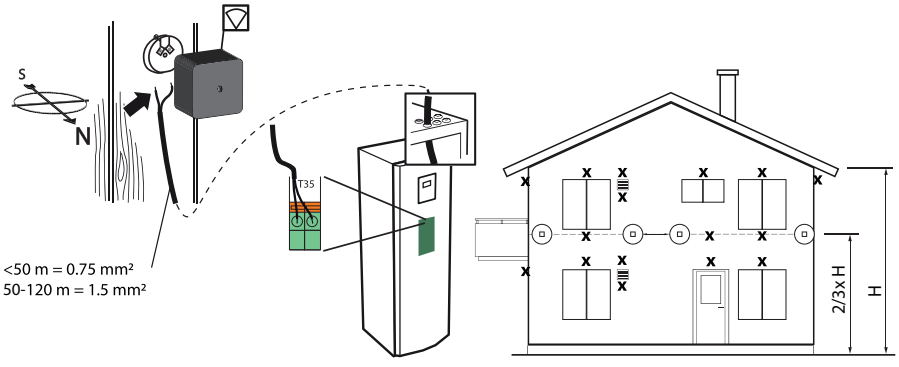
Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. Also take into account the effects of aging or continual vibration from sources such as compressors or fans. The wiring shall be installed in accordance with national wiring regulations.

230 V versions complies with IEC 61000-3-12 without conditional connection. 400 V version Calibra RXT 7 and Calibra RXT 7 Duo complies with IEC 61000-3-2 without conditional connection. Calibra RXT 12 and Calibra RXT 12 Duo complies with IEC 61000-3-12 provided that the short-circuit power Ssc is greater than 0,7 MVA, at the interface point between the user´s supply and the public system. It is the installer or user responsibility to ensure with the network operator, if necessary, that the equipment is connected to a supply with a sufficient short circuit power.



Make sure that all grommets are put in place in the top of the heat pump and the electrical cabinet, regardless of which ones are used for power supply or sensors. This to ensure a tight seal of the enclosures and to meet the IP rating requirements.

8.1 Outdoor sensor

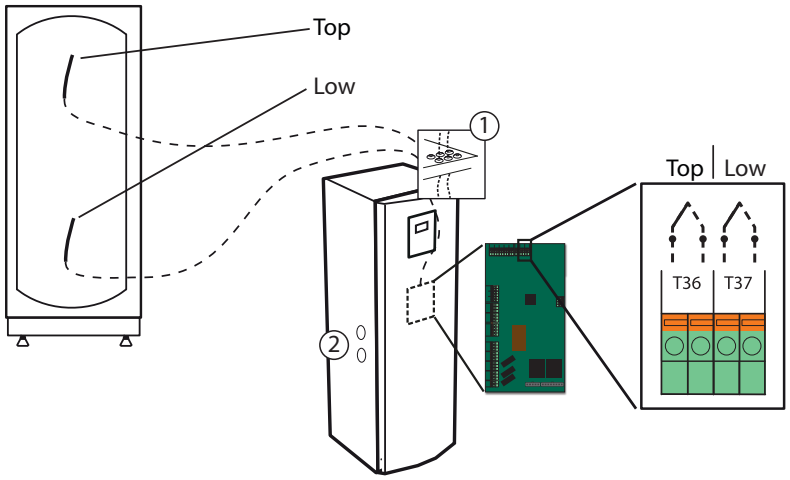


X Improper placement

Ⓞ Proper placement

Sensor type PT1000

8.2 Tap water sensor for Duo models



(Factory fitted with built in water tank)

1.  For easy installation, cut the grommet to fit the sensor cable.
2. The knock-out holes, on each side of the heat pump cabinet, can also be used as lead-in for the sensor cable.

Attach the cables according to the picture above.

8.3 Refrigerant leakage sensor

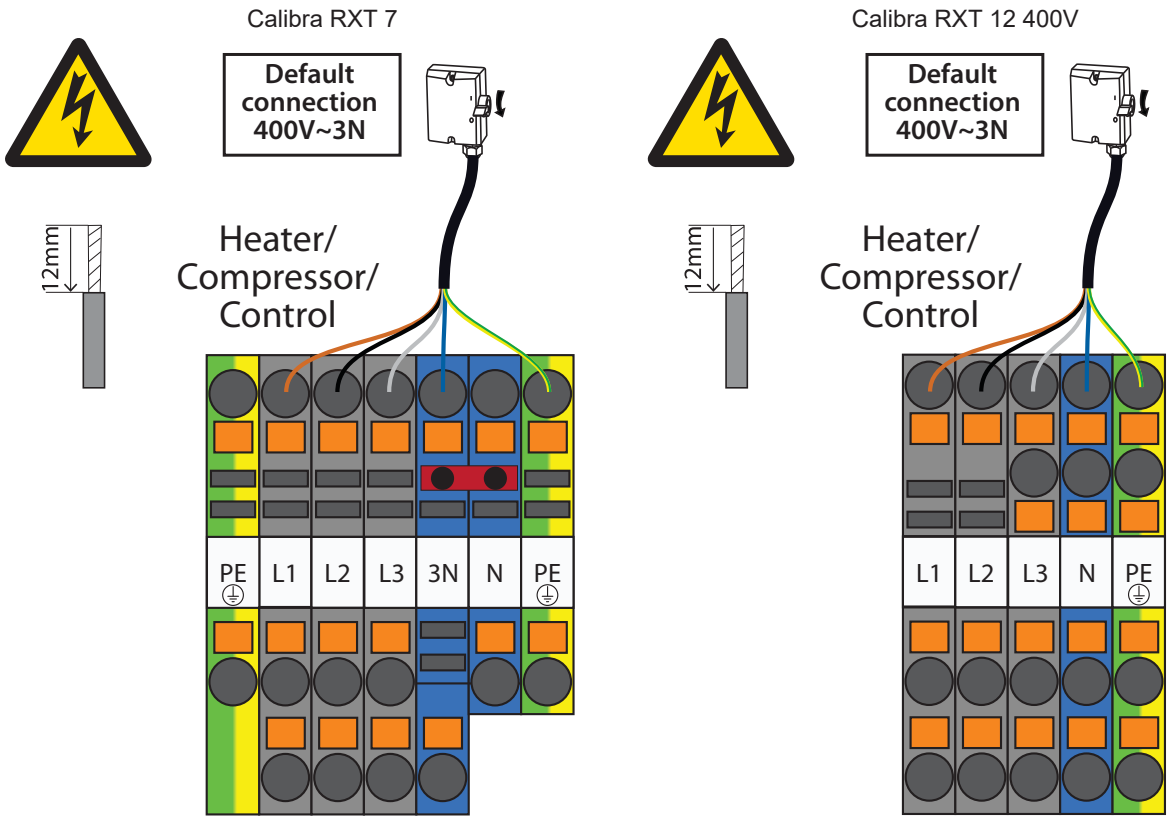
The refrigerant leakage sensor is located at the bottom of the heat pump, in the enclosed space together with the cooling-/heating circuit, see image below.

Warning	Refrigerant leakage sensor
	It's important NOT to remove the sensor from the drainage tray. Be extra careful of NOT touching the bottom side of the sensor, where the membrane is located.

If the tray is removed temporarily, when removing the transport screw or doing maintenance on the refrigerant circuit, adhere to the above measures to ensure a secure functionality of the sensor.

Refrigerant leakage sensor placement in the heat pump cabinet.

8.4 Power supply connections for 400V feeding



8.5 Fuse sizes for 400V~3N feeding

The internal immersion heater can be limited in the heat pump control.

Settings for the immersion heater in the controller can be set differently, with/without compressor.

Step 1 = 3kW (2kW for Calibra RXT 7)

Step 2 = 6kW (4kW for Calibra RXT 7)

Step 3 = 9kW (6kW for Calibra RXT 7)

Factory settings are:

Max steps: 2

Max steps with compressor: 2

Initial delay: 30 minutes

(Setting in controller for **"Max steps"** can be set equal or higher than **"Max steps with compressor"**. Lowest possible setting is "step 1".) Recommended minimum fuse sizes (recommended fuse characteristic is C)

Model	Compressor	+ immersion heater		
	Compressor	+2kW	+4kW	+6kW
(Terminal inputs)	(L3+3N)		(L1+L2+N)	
Calibra RXT 7	13A	13A	13A	13A

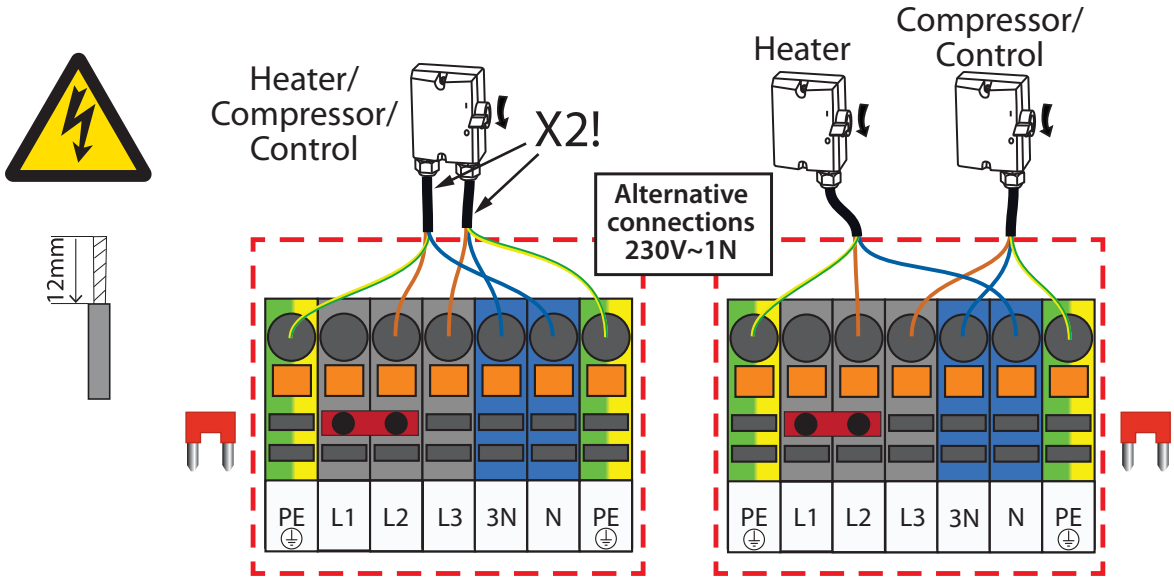
Model	Compressor	+ immersion heater		
	Compressor	+3kW	+6kW	+9kW
(Terminal inputs)	(L1+L2+L3)		(L1+L2+L3)	
Calibra RXT 12 400V	10A	13A	20A	25A

Fuse needed for backup heating (setting max steps without compressor)

Immersion heater only		
2/3kW (step 1)	**4/6kW (step 2)**	**6/9kW (step 3)**
6A	10A	13A

8.6 Power supply connections for 230V~1N feeding

Power supply for 230V~1N:



8.7 Fuse sizes for 230V~1N feeding

The internal immersion heater can be limited in the heat pump control.

Settings for the immersion heater in the controller can be set differently, with/without compressor.

Step 1 = 2kW

Step 2 = 4kW

Step 3 = 6kW

Factory settings are:

Max steps: 2

Max steps with compressor: 2

Initial delay: 30 minutes

(Setting in controller for **"Max steps"** can be set equal or higher than **"Max steps with compressor"**. Lowest possible setting is "Step 1"). Recommended minimum fuse sizes (recommended fuse characteristic is C):

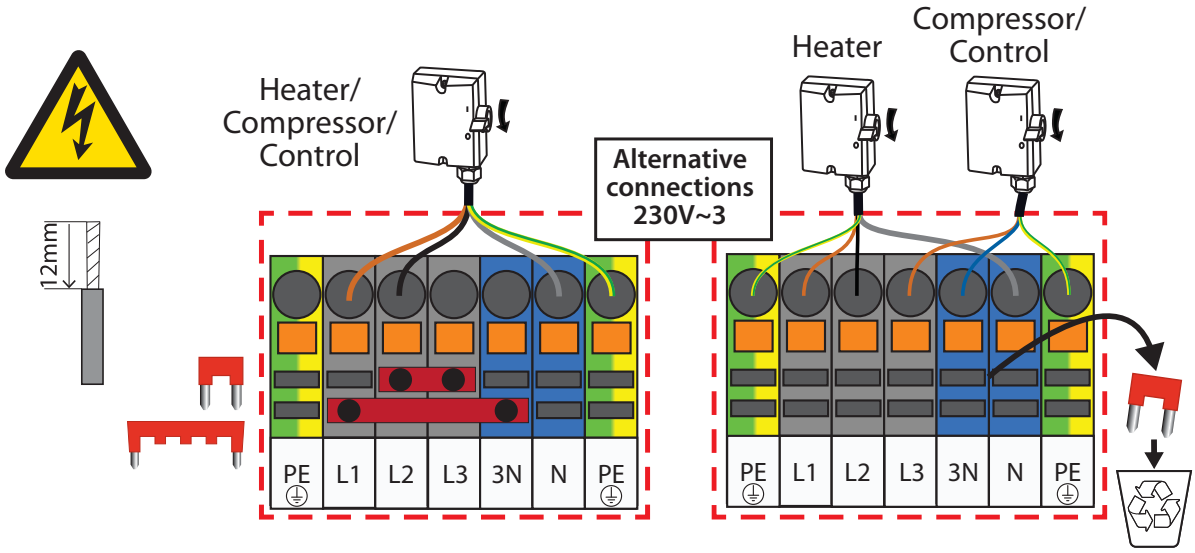
Model	**Compressor**	**+ immersion heater**		
	Compressor	+2kW	+4kW	+6kW
(Terminal inputs)	(L3+3N)		(L1+L2+N)	
Calibra RXT 7	13A	25A	32A	40A
Calibra RXT 12 230V	20A	25A	40A	50A

Fuse sizes needed for backup heating (setting max steps without compressor):

Immersion heater only		
2kW (step 1)	**4kW (step 2)**	**6kW (step 3)**
10A	20A	32A

8.8 Power supply connections for 230V~3 feeding

Power supply for 230V~3 :



8.9 Fuse sizes for 230V~3 feeding

The internal immersion heater can be limited in the heat pump control.

Settings for the immersion heater in the controller can be set differently, with/without compressor.

Step 1 = 2kW

Step 2 = 4kW

Step 3 = 6kW

Factory settings are:

Max steps: 2

Max steps with compressor: 2

Initial delay: 30 minutes

(Setting in controller for **"Max steps"** can be set equal or higher than **"Max steps with compressor"**. Lowest possible setting is "Step 1"). Recommended minimum fuse sizes (recommended fuse characteristic is C):

Model	**Compressor**	**+ immersion heater**		
	Compressor	+2kW	+4kW	+6kW
(Terminal inputs)	(L3+3N)		(L1+L2+N)	
Calibra RXT 7	13A	20A	25A	32A
Calibra RXT 12 230V	20A	25A	25A	32A

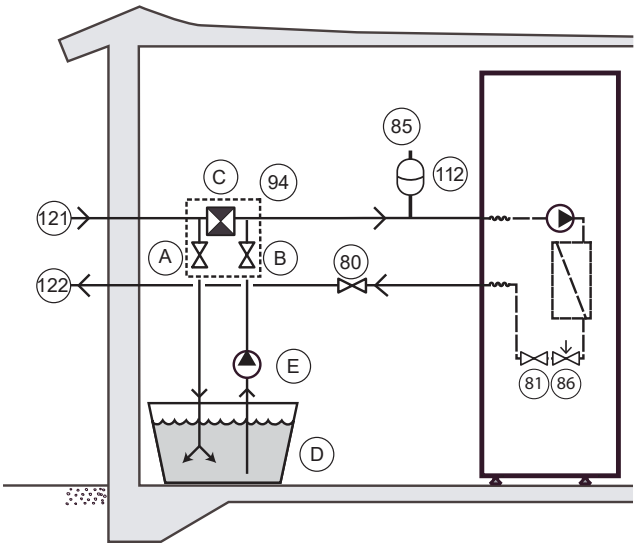
Fuse sizes needed for backup heating (setting max steps without compressor):

Immersion heater only		
2kW (step 1)	**4kW (step 2)**	**6kW (step 3)**
10A	16A	25A

9 Filling and bleeding

9.1 Filling and bleeding the brine circuit

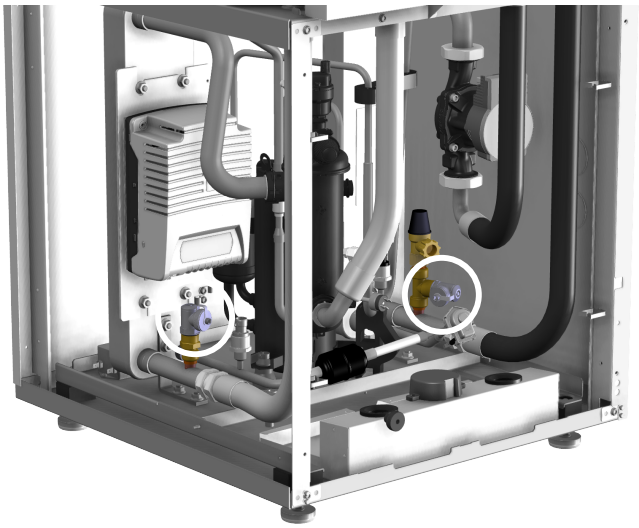
1. Mix clean water and antifreeze ethanol, for heat pump use, to the correct freezing point in a clean external container.
2. Use a refractometer to check the freezing point, for the brine collector circuit, -17 ±2°C.
3. Use an external pump to fill the brine system. Connect the pressure side of the pump to the filling device.
4. Follow the instructions that comes with the filler unit.
5. Start the external pump and fill the brine circuit, proceed until all air is gone and the pressure reaches approximately 1 bar.
6. Shut the valve and turn off the pump.



- 80 Shut-off valve
- 81 Draining/filling valve
- 85 Manual air bleeding valve
- 86 Safety valve, 3 bar
- 94 Filling device brine
- 112 Expansion vessel
- 121 Brine in
- 122 Brine out
- A Shut-off valve
- B Shut-off valve
- C Dirt strainer with shut-off valve
- D External container
- E External pump

9.2 Filling and bleeding the water heater and heating system

Filling and bleeding the water heater and heating system



Note: As the air bleed is placed on the suction side of the circulation pump, the circulation pump must be off while bleeding, to avoid air ingress.

1. Fill the water heater with cold water by opening the shut-off valve on the incoming cold water pipe. Open one of the hot water taps in the house, with water flowing. (= water tank is filled.)
2. Then fill the water heater coil and the heating system with water to a pressure of approximately 1 bar.
3. Open all heating system valves fully, bleed all heating systems and the water heater coil thoroughly from the bleed valve fitted on the top of the water tank (venting valve for TWS coil).
4. Refill the heating system to a pressure of approximately 1 bar. Maximum 1,5 bar
5. Repeat the procedure until all air has been removed.
6. Check the system for leakage.
7. Leave the radiator valves fully open.

10 Commissioning

10.1 Installer access

Certain functions will be locked and only accessible with the correct access code. To gain access, the following steps must be made:

1. Press ☰ on the start screen to open the Menu screen.
2. Press 🔒
3. Press the input area to open up the number pad.
4. Enter the code for installer access, **607080**, and confirm by pressing the white tic in the lower right corner.
5. Press the green tic to make the final confirmation.

Note: To activate other functions than heat and tap water, the heat pump needs to be set to Off mode, then go Settings/ Installation and activate desired function. Some functions may need additional accessories to work.

The access code is active for 8 hours, after which, it will log out automatically. Logging out manually is done by leaving the input area empty, or typing a "false" code, and pressing the green tic. Restarting the heat pump will also force a log out.

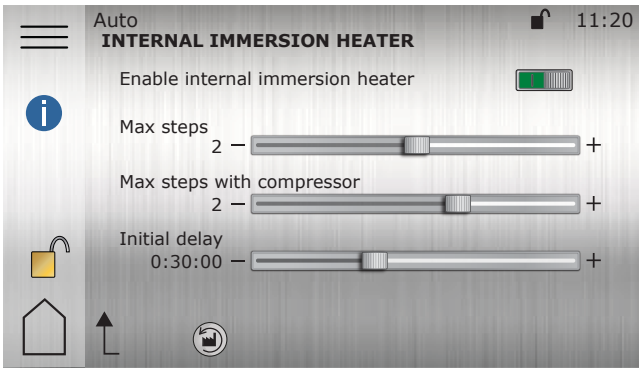
10.2 Select display language

1. Press ☰ in the upper left corner of the Start screen.
2. Press
3. Press on the text **Language**.
4. Select language.
5. Press ↰ to return to System Settings, or press ☰ in the upper left corner to return to the Menu screen.

10.3 Setting date and time

1. Press ☰ in the upper left corner of the Start screen.
2. Press
3. Press on the text **System settings**.
4. Press on the text **Date/time**.
5. Press + or - for each field to change the setting.
6. Press to confirm settings.
7. Press ↰ to return to **System settings**, or press ☰ in the upper left corner to return to the Menu screen.

10.4 Internal immersion heater



1. Press ☰ on the Start screen to open the Menu screen.
2. Press Settings:
3. Press › to go to the menu page for Internal immersion heater.
4. Make the desired changes.
5. Confirm settings by pressing .

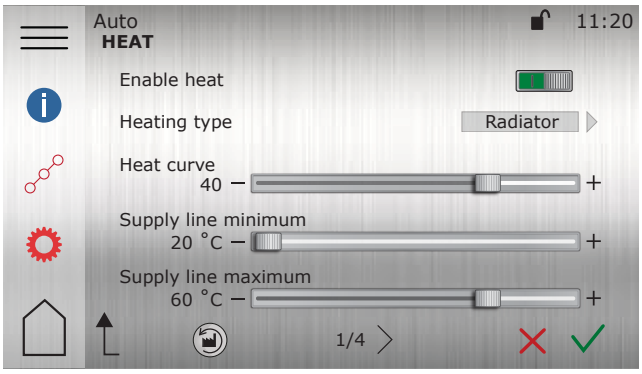
(For steps, kW and fuse sizes, see electrical installation chapter.

10.5 Radiator and floor heating

Important: If the system shall be configured to floor heating or similar, the heat pump's default value must be set to floor heating. If this is not done, the "factory reset" button will reset the heat curve and max/min supply line temperatures to default values for radiator systems, which may cause damages on systems with e.g. floor heating.

If the house has floor heating, the supply line temperature must not exceed the values recommended by the floor manufacturer. Otherwise the floor might get damaged.

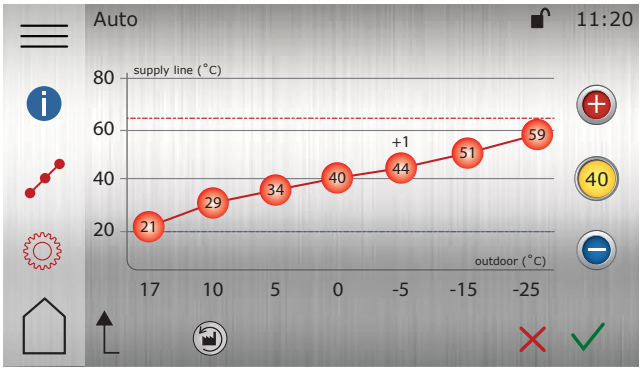
To change default heat settings from radiator- to floor heating (or reverse):



1. Press ☰ on the start screen to open the menu screen.
2. Press
3. Press if the Heating settings window is not shown.
4. Choose heating type for under floor heating systems or radiator systems.
5. Make the desired changes.
6. Confirm settings by pressing

10.6 Adjusting the Heat Curve

The heat curve indicator (40) has two modes that can be toggled by pressing it. See below for more detailed instructions.



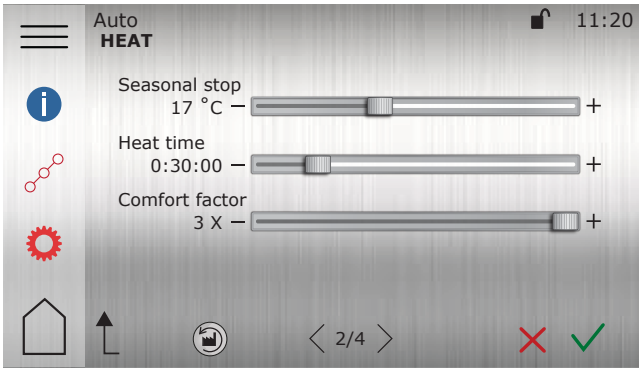
1. Press ☰ to open the menu screen.
2. Press
3. Press if the heat curve is not shown.
4. There are two ways of adjusting the heat curve:
   – If the heat curve indicator (40) is lit, press ⊕ or ⊖ to adjust the entire curve.
   Or:
   – If the curve indicator (40) is not lit, individual points can be moved separately by pressing the desired point and pressing ⊕ or ⊖ to the desired temperature
5. Confirm the changes by pressing

The heat curve indicator value shows the temperature of the water supplied to the heating system ("supply line temperature") at an outdoor temperature of 0 °C.

10.7 Heating settings

In Heating settings, you can set seasonal stop, min/max supply line temperature and comfort factor.

(The Comfort factor (value: 0-3) determines how much influence 1 step +/- on the comfort wheel will have on the desired Supply line (HP) value. If the Comfort factor is set to, for example 3, an increase of the Comfort wheel setting with +1 will result in an increase of the supply line temperature with +3 °C).

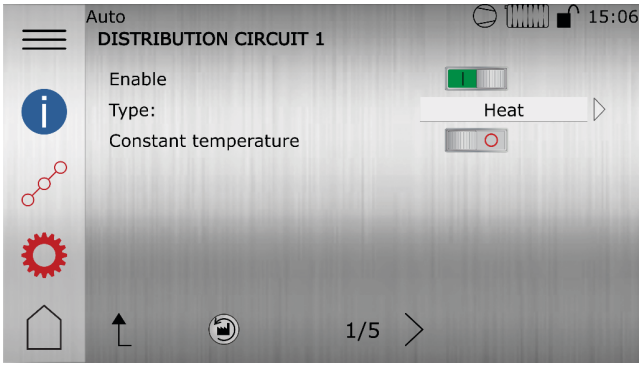


1. Press ☰ to open the menu screen.
2. Press
3. Press to show heating settings.
4. Navigate to the correct page and make desired changes.
5. Confirm by pressing .

Important! If your house has floor heating, the supply line temperature must not exceed the values recommended by the floor manufacturer. Otherwise the floor might get damaged.

10.8 Distribution circuit 1

Distribution circuit 1 is available as an additional heating- or cooling circuit without having to use an expansion module.



1. Press ☰ to open the menu screen.
2. Press
3. Press "Distribution circuit 1"
4. Activate the function and set the type (heat or cool).
5. Navigate to the other views to make additional changes.
6. Confirm changes by pressing .

Mixing dynamics setting

Mixing dynamics is a value that controls how fast or slow the shunt motor on the circuit should regulate. Depending on the type of shunt, the table below can be used as a recommendation on what approximate value to set. A lower value will cause the shunt motor to open and close faster, a higher value will cause it to open and close slower.

The range is between 30-240. Default value is 140.

Default value and effects:

Setting	Effect
< 140 (30-140)	Faster regulation
140	Default value
>140 (140-240)	Slower regulation

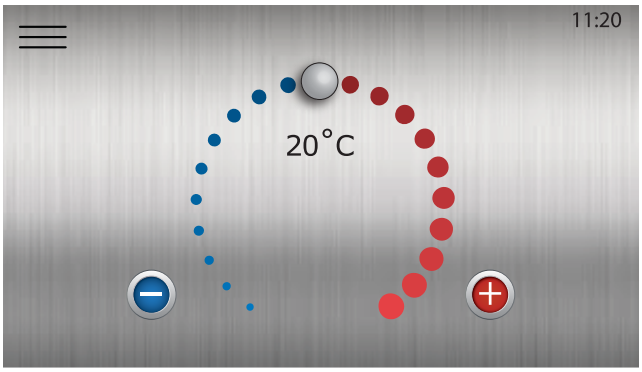
Approximate values depending on shunt motor and system characteristics:

Mixing dynamic value	Shunt motor characteristic
50	300 seconds
100	200 seconds
150	100 seconds

10.9 Adjusting the indoor temperature

Comfort adjustment, change temperature

On the start screen, "comfort adjustment" of the indoor temperature may be done very easily, provided that the heat curve is set properly.



Press or , alternatively drag the ball clockwise or counterclockwise to raise or lower the temperature. Each step represents an increase/decrease of approximately 1 °C of the indoor temperature, depending on comfort factor settings.

10.10 Additional information about heating settings

The heat curve is the base for all space heating adjustments. The curve number (example "40") corresponds to what target temperature the supply line will have to the heating system when the outdoor temperature is 0 °C (if not adjusted with any offset). A higher set heat curve will increase the desired supply line temperature when the outdoor temperature gets lower and vice versa.

Enable heating is default on, and should normally never be deactivated as this will stop heating (risk of freezing).

Start with setting **Heating type** (Radiator/floor heating) . Floor heating will limit max adjustable supply line temperature for end customer to 45 °C for installations with floor heating . Floor heating will also set the default heat curve to «30» instead of 40. Note that the value for the heat curve should be adjusted and fine tuned for the installation to get desired indoor climate.

Supply line minimum is the minimum supply line temperature used as base line for the heat curve.

Supply line maximum is the max temperature used to limit the heat curve maximum supply line temperature. (Note: For certain floor heating applications, a too high set max supply line temperature may cause damages to the floor.)

Seasonal stop is the set outdoor temperature condition where the heat pump will begin to prepare to stop (or start) heating. Often set to around 17°C.

Comfort factor: When the heat curve is set properly, changes made with the comfort wheel will parallel offset the heat curve up or down, and will not change the inclination of the heat curve. Each step up or down on the comfort wheel will increase the desired supply line temperature with the setting of the "Comfort factor". The factory setting of the comfort factor setting is 3 and is often suitable for radiator systems, meaning that one step increased on the comfort wheel will increase the desired supply line temperature with 3°C / step. In floor heating systems a comfort factor of 2 is often more suitable. This means that when the heat curve and comfort factor is set properly, the comfort wheel will affect the room temperature with 1°C /step.

(Note: Fixed supply line set point that may be available in the menu is not used in normal installations and should normally not be activated.)

The heat curve shows the desired supply line temperature based on the outdoor temperature. The heat curve incline can be changed by pressing the curve indicator 40 and adjust with +/- in the heat curve view, (or in the settings view). Also each of the seven heat curve coordinates can be individually adjusted to get a perfectly adjusted heat curve for the application by pressing +1 and adjusting with +/-. The individual adjustment is often found useful in temperatures around 0°C, where the supply line temperature may need to be somewhat increased (1-2°C) to get a perfect indoor climate.

Note that most changed settings needs to be confirmed with to be stored.

General guidance: To increase the indoor temperature by around 1 °C (at a given outdoor temperature), the supply line temperature normally needs to be increased by 2-3 °C in the heat curve setting, depending on the heating system.

The temperature reference (e.g. 20 °C) shown on the comfort wheel (start page) may deviate from the actual indoor temperature, and is intended as a reference value to facilitate understanding and adjustment for the end customer.

10.11 Symbol description

Symbol description for heating menu

Symbol	Description
+1 	Shows when the curve is comfort adjusted. The digit shows how much the deviation is from the default value.
	Shows information about the heat curve.
	Shows that the heat curve window is inactive. Press on the symbol to open heat curve settings.
	Shows that the heat curve window is active. This window is the default window.
	Shows that the heating settings window is inactive. Press the symbol to open heating settings.
	Shows that the heating settings window is active.
	Press to reset the heat curve to the factory settings.
	When the curve indicator is lit, press ⊕ or ⊖ to move the whole curve up or down.
	When the curve indicator is not lit, press ⊕ or ⊖ to move individual curve points up or down.

10.12 Activate manual test

Ensure that the main circuit breaker is on. The display will start up within 1 minute.

1. Press ☰ on the Start screen to open the Menu screen.
2. Press Settings .
3. Navigate to the menu page for Manual test.
4. Press  to activate Manual test.
5. Select test case on the various pages.

During manual test, this symbol is shown as a watermark on every screen (as a reminder to turn off Manual test mode when the testing is done):

Note:

- Start the circulation pump, listen for air. Run the reversing valve to Hot water, listen for air. If necessary, bleed for air.
- Start the brine pump, listen for air. If necessary, bleed for air.
- Run the fan ventilation test.
- If necessary, the compressor and the internal immersion heater can also be run in manual testing. Additional testing may apply if external devices are installed and activated.
- After completion, turn off "Manual test".

Parameter	Meaning
Circulation pump	0 = stop circulation pump, 1 = start circulation pump
Brine pump	0 = stop brine pump, 1 = start brine pump
Compressor	0 = stop compressor, set compressor gear
Internal immersion heater	Three steps: 1, 2 and 3
Reversing valve	0 = Heating, 1 = Hot water
Ventilation test	"Run fan only" 0 = Off, 1 = On, "Safety ventilation test" 0 = Off, 1 = On

10.13 Selecting operating mode

Set the heat pump to the desired operating mode in the menu:

1. Press ☰ on the start screen to open the Menu screen.
2. Press ⚙. A new window opens.
3. Press the appropriate symbol for the desired operating mode.

If the compressor has been in operation for the past 20 minutes, a restriction time may occur, temporarily preventing the compressor from starting. In that case, the following symbol in the top of the display:

Symbol	Description
	Operating mode **OFF**. All functions are off. Note that components inside the heat pump are still current carrying. No heat or hot water will be produced.
	Operating mode **Auxiliary heater only**. Compressor is off, but with custom settings, the unit can produce heating and hot water with the internal immersion heater. This may be useful in case of certain alarms, and/or during installation and commissioning of the heat pump. External functions are on, when applicable.
	Operating mode **ON/AUTO**. All activated functions are on. By factory default, heating and hot water is produced. Compressor and internal immersion heater are controlled automatically.

If the heating system is very cold, auxiliary heater may be used initially to simplify start up. Tap water production is enabled (factory setting). The heat pump will start producing hot water before space heating.

Note: Do not shut off the electrical power to the heat pump when the compressor is running. (When planned, set the operating mode to off position and allow compressor to stop completely before shutting off the electrical power to the heat pump.)

10.14 Primary/secondary mode

A primary/secondary system solution, enables the end user to control up to 15 heat pumps simultaneously with a single heat pump unit via a network router/switch. It requires all heat pumps to be connected to the same heating system and brine circuit.

Configuration:

1. Enable primary/secondary mode on all heat pumps.
2. Select one heat pump to be the primary unit, and the rest of the heat pumps to be secondary units.
3. Enable Genesis heat pumps on the primary unit.
4. Assign a unique ID (1-15) to all secondary units.
5. Follow the network setup guide on all units.

6. When the configuration is done, the heat pumps should connect to the primary unit automatically. A list of connected units can be viewed on the primary unit's starting page and all secondary units should display their respective heat pump ID.

Network setup

1. Connect all heat pumps to a router/switch via the RJ45 connection located on the CM card (front door needs to be removed). If you are using only two units, the connection can be made directly between the two units.
2. Go to Settings/Network settings and check the unit's IP-address.
3. a. If you are using a router and DHCP mode, an IP-address should appear automatically and no further network configuration is needed.

   b. If you are using a switch or direct connection, you need to manually configure the network setting in Static mode.

Example:

- Primary - IP address: 192.168.0.100, Network mask: 255.255.255.0
- Secondary 1 - IP address: 192.168.0.101, Network mask: 255.255.255.0
- Secondary 2 - IP address: 192.168.0.102, Network mask: 255.255.255.0

Primary

The primary unit controls all secondary units and accessories in the system. Only one primary unit is allowed on the same network by default.

Secondary

The secondary unit is controlled by the primary unit.

Heat pump ID

Heat pump ID (1-15) needs to be unique for every secondary.

10.15 Online

The heat pump is factory prepared for monitoring remotely via internet (Thermia Online).

In order to use the Thermia Online service:

- Make sure that there is an available internet connection in the building (router or equivalent).
- Connect the commissioned heat pump to an existing internet connection (router or equivalent). Use the RJ45 connection placed below the display (CM module) behind the front panel. Use a patch cable (not a cross over cable).
- 1. Press ☰ on the start screen to open the menu screen.

  2. Press Settings .
  3. Press the text **System settings**.
  4. Press the text **Online**.
  5. Press  to activate.
- Make a note of the MAC-address of the heat pump. The MAC-address is also available in the Network menu in the display.
- An account and registration is required to use the Thermia Online service.

For more information, see www.thermia.com/online

10.16 Brine monitoring

In cases where there is a risk that the energy outtake becomes too large for the collector (and the borehole becomes too cold), "Brine in monitoring" can be enabled in the display. This function will limit the compressor 1-2°C before the stop limit (Brine in min). If the heat pump power is insufficient, the internal immersion heater will be used, resulting in increased energy consumption.

If Brine monitoring function is not visible in the menu after logging in, press Settings and go to Installation menu. Go to brine monitoring and enable brine monitoring with the switch. This will make the functionality visible in the installation menu so that it can be activated in the settings menu, with the following steps:

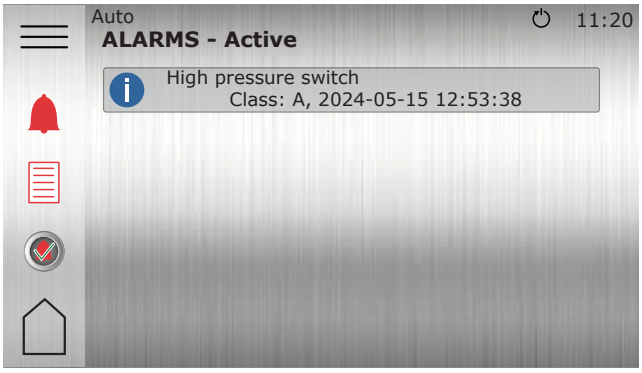
1. Press ☰ on the Start screen to open the Menu screen.
2. Press Settings .
3. Press the text **Heat pump**.
4. Navigate to **Brine in, monitoring**.
5. Set desired minimum temperature.

6. Press  to activate.

7. Confirm settings by pressing .

10.17 Alarms

During commissioning and start up, alarms sometimes may appear. Press ⚠ to get more information about the alarm when it has occured. Press ⓘ in the alarm log (A more detailed technical information will appear for the logged in installer compared to the end user).



Some common alarms are:

Internal immersion heater: This is most often caused by poor flow or air in the coil inside the hot water tank or heating circuit, or before the circulation pump. Bleed for air thoroughly and reset overheat protection T1 on the electrical cabinet when the temperature has decreased.

High pressure: This is most often caused by poor flow or air in the coil inside the hot water tank or heating circuit, or before the circulation pump. Bleed for air and reset alarm.

Low pressure: This is most often caused by poor flow or air in the brine circuit. Bleed for air and reset alarm.

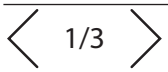
10.18 Selecting hot water settings

Hot water settings:

1. Go to Settings and press
2. Select one tap water mode according to the customer demands:
   - **"Economy"** will give the most energy efficient hot water production and is often sufficient for households with low to moderate hot water consumption.
   - **"Normal"** can be selected as the best compromise between energy efficiency and hot water availability.
   - **"Comfort"** is the choice for customers with large demands of hot water availability.

Remember to inform the end customer that the settings can be changed in the settings menu.

10.19 Display symbol description

Symbol	Description
	Opens the menu screen from the start screen. Return to the menu screen from any sub-menu.
	Confirm settings. Changes which has been made is confirmed and becomes the new setting.
	Ignore settings. Changes which are not confirmed with are reset to the previous value.
	Page navigation. To browse through pages and sub-menus. Press arrows to switch between pages. "1/3" means you're on page 1 out of 3.
	Home. Press to go back to the start screen.
	Infomation. Shows information about the respective page.
	This symbol indicates whenever a text can be pressed to open up a new page.
	Alarm. Press the symbol to go to the alarm view, which shows current and historic alarms.
	Alarm. Indicates that there are active class A or class B alarms. Press the symbol to go to the alarm view.
	Select operating mode. Press the symbol to select operating mode in the next view.
	Operating data. Opens a number of sub-menus.
	Factory reset. Resets values in the current view to factory default values.
	Settings. Opens a number of sub-menus such as: – Language – System settings – Heating – Etc.
	Back. Back to previous view.
	Push/pull control. Used for raising or lowering values. Press and drag the handle left or right, alternatively press + or -.
	Activate function/equipment and/or push/pull control. Indicates that a function/equipment and/or push/pull control is activated.
	Deactivate function/equipment and/or push/pull control. Indicates that a function/equipment and/or push/pull control is deactivated.
	Certain menu selections are locked, to prevent unauthorized use. An authorization code is required. Press to enter code.
	Internal immersion heater mode. Visible in the top of the display when the heat pump is producing heat or hot water with the internal immersion heater. The number indicates which step is used.

Symbol	Description
	Restart icon. Visible in the top of the display when the heat pump has a pending restart demand. Execute a restart in the Operating view.
	Switch buttons. Switch between 1 and 2 functions.
	Internet connection. Visible in the top of the display when the heat pump has an internet connection.
	Network connection. Visible in the top of the display when the heat pump has a network connection.
	Pool heating mode. Visible in the top of the display when the heat pump is in pool heating mode.
	Space heating mode. Visible in the top of the display when the heat pump is in space heating mode.
	Restriction timer. Visible in the top of the display when the heat pump has a restriction that prevents it from starting.
	Tap water mode. Visible in the top of the display when the heat pump is in tap water heating mode.
	Virtual keyboard. Opens up a virtual keyboard. Changes must be acknowledged in the keyboard window AND the view in which the changes are made.
	Anti Legionella. Visible in the top of the display when the heat pump is in Anti Legionella mode.
	Ventilation fan. Visible in the top of the display when the ventilation fan is active. Schedule can be set in Settings/ Ventilation test in the display.

11 Additional functionality

11.1 Functions table

In addition to the standard functionality (heating and hot water production etc), a wide range of extra functionality is available as accessory, or from factory, depending on the heat pump and selected application.

Accessories that interact with the heat pump are shown in table below.

Explanation:

- "**BM**" stands for Building Module (I/O) and means that the functionality is standard and available on the BM-card fitted in the heat pump.
- "**EM4**" stands for Expansion Module 4 and means that the functionality is available with the expansion module only. EM4 is available as accessory. For functions that require EM4, read the installation manual for EM4 on how to set it up.
- Space is available to fit the EM4-card inside the electrical cabinet in the heat pump.
- The functions of the different input/output connections are set in the display, in the Installation menu.
- Sensors used are PT1000 type. Mixing valves are 230V.

Functionality	Connection	Terminal connections BM/EM4	Position numbers	Description
Room sensor, PT1000	BM	T34	132	
Room sensor, Modbus	BM	MBa	62	Room sensor, Modbus type connected to MBa connection (Modbus Accessory).
BMS (Connection to Building Management System)	BM	MBa	173	
Buffer tank control	BM	TR10-11	29	Shunt valve 230VAC
	BM	FR1	36	Circulation pump 230VAC
	BM	T33	51	Supply line sensor
	BM	T31	136	Buffer tank sensor
External auxiliary heater (relay)	BM	TR10-11	29	Shunt valve 230VAC
	BM	FR1	36	Circulation pump 230VAC
	BM	T33	51	Supply line sensor
	BM	R3	117	External auxiliary heater
				Not in combination with External brine pump or alarm relay without EM4.
External auxiliary heater (control)	BM	FR1	36	Circulation pump 230VAC
	BM	T33	51	Supply line sensor
	BM	AO25	72	External auxiliary control 0-10V
Smart Grid/EVU	BM	D21	408	EVU/Smart grid 1
	BM	D22	409	Smart grid 2
Flow guard/Level guard	BM	D23	71	Not in combination with Start internal brine pump on external signal without EM4.
Start internal brine pump on external signal	BM	D23	345	Not in combination with Flow guard/Level guard without EM4.
Distribution circuit 1 (extra under shunt group for heating or cooling)	BM	TR12-13	107	Shunt valve 230VAC
	BM	T32	108	Supply line sensor
	BM	FR2	109	Circulation pump 230VAC
				Possible to use as a second lower set heat curve or for certain cooling applications. For passive cooling, also see Cooling function below.
Current limiter	BM	MBa	456	Modbus type connected to MBa connection (Modbus accessory).
Passive cooling (with Distribution 1 on BM, or Cooling on EM4)	BM	TR12-13	107	Shunt valve 230VAC
	BM	T32	108	Supply line sensor
	BM	FR2	109	Circulation pump 230VAC
	EM4	T84	59	Cooling tank sensor

Functionality	Connection	Terminal connections BM/EM4	Position numbers	Description
	EM4	TR70	38	Shunt valve 230VAC
	EM4	T83	58	Supply line sensor
	EM4	FR63	74	Circulation pump 230VAC
				Passive cooling on BM uses the same Inputs/Outputs as Distribution circuit 1 and can therefor not be combined. If both are required, use EM4 (Cooling). Enable Cooling on BM in Installation menu and navigate to Cooling and select BM.
Alarm relay (Sum alarm output)	BM	R3	344	Not in combination with External brine pump or External aux heater without EM4.
	EM4	R52	344	
External brine pump	BM	R3	172	On/off control of External brine pump. Not in combination with External aux heater or alarm relay without EM4.
	EM4	R51	172	
Distribution circuit 2 (extra under shunt group for heating or cooling)	EM4	TR68	207	Shunt valve 230VAC
	EM4	T81	208	Supply line sensor
	EM4	FR61	209	Circulation pump 230VAC
	EM4	(U91-92)	(422)	(Dew point/temperature sensor)
				Possible to use as a second lower set heat curve or for certain cooling applications. It is possible to use dew point sensor (422) for cooling mode.
Distribution circuit 3 (extra under shunt group for heating or cooling)	EM4	TR69	207	Shunt valve 230VAC
	EM4	T82	208	Supply line sensor
	EM4	FR62	209	Circulation pump 230VAC
	EM4	(U93-94)	(422)	(Dew point/temperature sensor)
				Possible to use as a second lower set heat curve or for certain cooling applications. It is possible to use dew point sensor (422) for cooling mode.
Active cooling	EM4	TR70	74	Shunt valve 230VAC
	EM4	T83	58	Supply line sensor
	EM4	T84	59	Cooling tank sensor
	EM4	T85	57	Return line sensor
	EM4	FR63	38	Circulation pump cooling 230VAC
	EM4	FR64	39	Circulation pump cooling 230VAC
	EM4	TR65	79	Reversing valve 230VAC
	BM	TR9	310	Reversing valve 230VAC on BM
Pool	EM4	TR67	101	Reversing valve 230VAC
	EM4	T86	183	Supply line sensor
	EM4	T87	60	Return line sensor
	EM4	D96	342	External pool off
External alarm (Sum alarm input)	EM4	D95	444	

11.2 How to set up additional accessories, functions etc.

For more detailed information and system solutions see separate instructions or system solution generator on Thermia's website.

Note: Functions not activated/enabled from factory must be enabled and activated in the control system before they can be used.

Below is an example on how to enable a function. Enable other functions in a similar way.

1. Login: 607080
2. Go to SETTINGS/INSTALLATION and select desired function. Activate by selecting "BM" if function is connected to BM-card, select "EM4" if connected to EM4.

3. Go to SETTINGS menu again and select the function previously activated in the installation menu and activate the function by pressing the switch.
4. Make the desired settings and confirm.
5. Restart the heat pump and check functionality.

11.3 Distribution circuit 1

In heating systems where there is a need of a separately controlled heating circuit (in addition to the open main circuit) with a lower heat curve, it is possible to control a separate circuit (mixing valve, temperature sensor and circulation pump) with a lower set heat curve.

The supply line temperature for distribution circuit 1 is determined from the Temperature sensor (108), and is used to regulate the mixing valve actuator (107). The circulation pump (109) is running when the heat pump is in heating season.

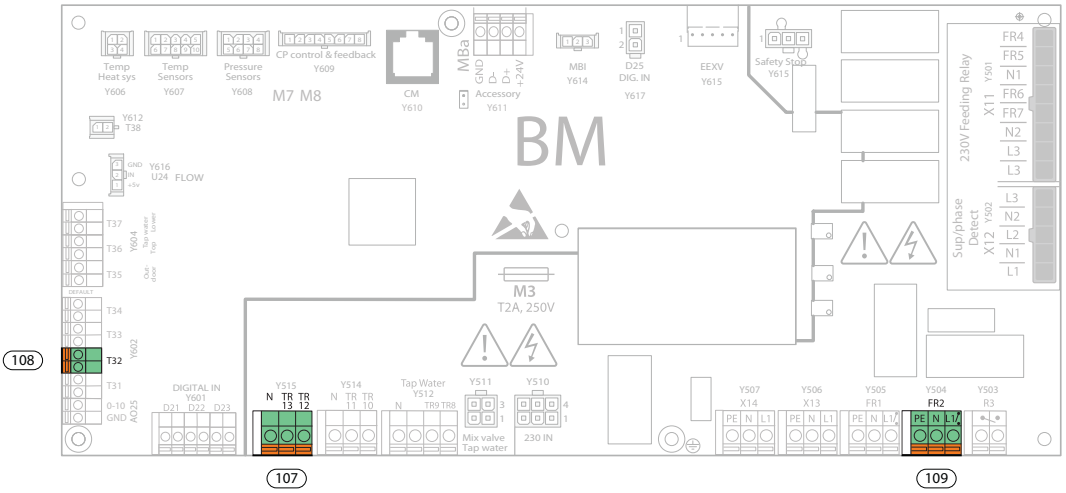


Table item number	Terminal	Description
107	TR12-13	Shunt valve 230VAC
108	T32	Supply line sensor
109	FR2	Circulation pump

11.4 Buffer tank

There are two different setups of buffer tank supported. Both enable connections to different heat sources (such as wood, solar heating or waste heating) to be connected to the same accumulator tank as the heat pump, and will make it possible for the heat pump and other sources of non-controllable heat to work together.

(Please note that if a mixing valve controlled by the heat pump is not fitted (= tank is to be used only as a volume tank), buffer tank control should not be activated.)

Alt 1: Heat pump physically connected to charge buffer tank (without external auxiliary heater controlled by heat pump).

With this setup the heat pump will charge the tank, meaning that heating will be supplied from the tank to the heating system.

As the heat pump in this application is charging the tank and always has the water volume of the hot water tank to work with, it is often possible to achieve long running time for the compressor with few stops also when the heat demand is low. The heat pump will use the buffer tank sensor (136) and the system supply line sensor (51) to regulate the buffer tank (shunt valve, 29) and heat pump. The shunt will then control on the calculated set point from the main curve, using the system supply line sensor to calculate the heat demand. The system circulation pump (36) is required and running when the heat pump is in heating season.

Alt 2: Heat pump NOT connected to charge tank (not in combination with external aux heater)

With this setup, the heat pump is never charging the tank ("heat pump connected to tank" should be "off" in the controller menu), but when the tank temperature, measured by buffer tank sensor (136), exceeds set overcharge temperature above desired supply line temp, the compressor will stop and the buffer tank shunt / Shunt valve (29) will regulate the shunt according to set heat curve and use the energy in the tank before the heat pump is started again. When the temperature in the buffer tank is colder than the system set point, the system shunt is completely switched off and the compressor starts based on the demand calculation as usual.

This alternative does not use the volume available in the tank to achieve longer running time but may be preferred in certain applications where it is not desired to charge the accumulator tank. This solution requires a system circulation pump.

The function requires a system pump and is not supporting external auxiliary heater controlled by heat pump or Pool functionality.

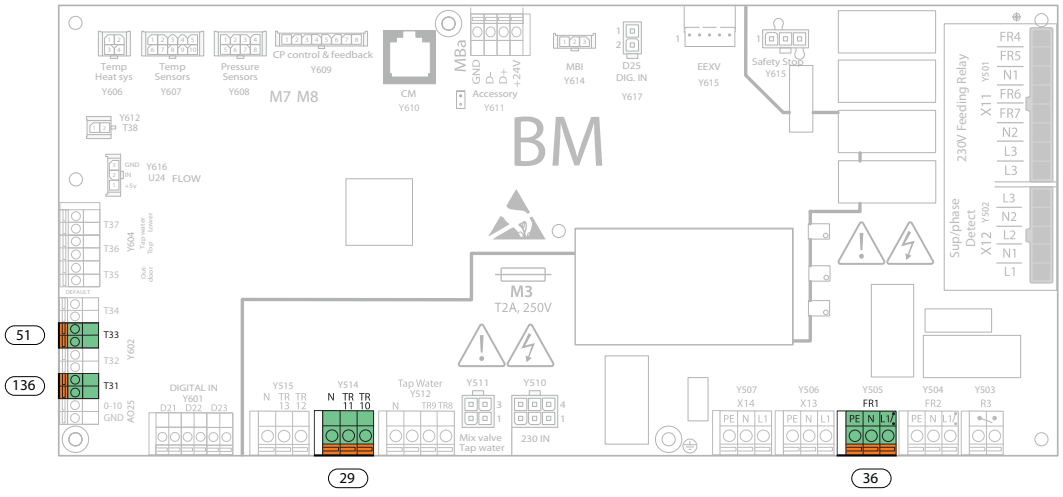


Table item number	Terminal	Description
29	TR10-11	Shunt valve 230VAC
36	FR1	Circulation pump 230VAC
51	T33	Supply line sensor
136	T31	Buffer tank sensor

11.5 System circulation pump & system supply line sensor

In certain systems (such as systems with a volume tank where there is no shunt valve) it may be desired to let the heat pump control a system pump (circulation pump for heating) and make the heat pump calculate the demand based on the system supply line sensor that can be positioned after the volume tank. To do this (provided that no other function uses these connections), install according to wiring diagram (position number 51 & 36) and enable "system pump" in the circulation pump menu, then go to SETTINGS/INSTALLATION and activate Auxiliary heater or Buffer tank, in order to establish a connection. There is no need to activate the functions in their respective settings view for the system to communicate.

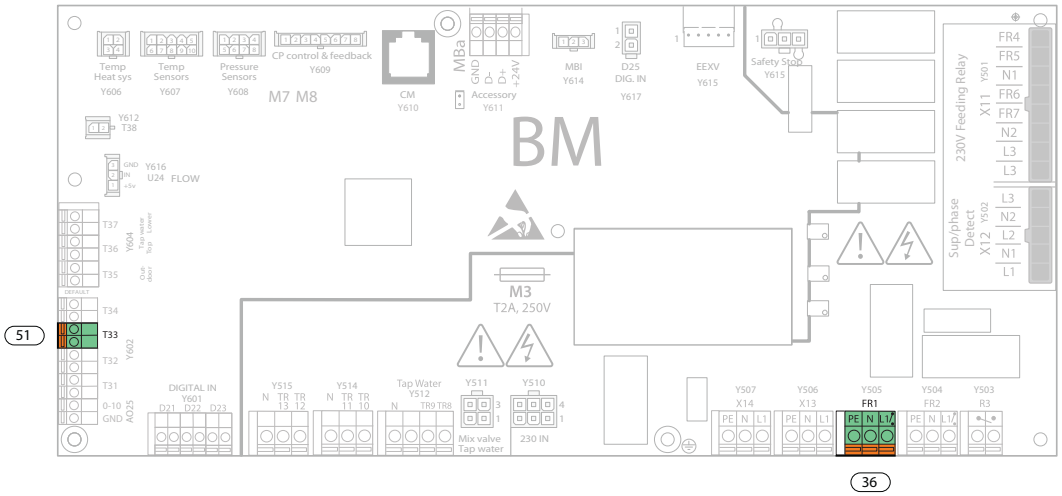


Table item number	Terminal	Description
36	FR1	System circulation pump (Needs to be activated in display to be activated. SETTINGS/CIRCULATION PUMPS/SYSTEM PUMP)
51	T33	System supply line sensor

11.6 Smart grid/EVU

Smart grid/EVU consists of two digital inputs which gives four different combinations including normal operation. (EVU, Normal, Comfort and Boost)

SG-1	SG-2	Description (closing=1)
0	0	**Normal:** Normal operation
0	1	**Comfort:** Increased start and stop temperature of hot water (default 45°C and 60°C). The wheel is replaced internally in the software with "Desired room temperature - Comfort" (default 22°C).
1	0	**EVU:** The function blocks compressor operation and internal immersion heater. Other components such as circulation pumps, exchange valves and external auxiliary heater are still controlled.
1	1	**Boost:** Increased start and stop temperature of hot water, increased room setting (default 22°C) and triggers anti-legionella if the tank is two degrees below stop temperature for anti-legionella. **Buffer tank:** sets desired tank temperature to 55°C, and if "Allow immersion heater during boost" is set in GUI, internal immersion heater is also used.

Note: The EVU functionality will prevent the compressor from starting. If the compressor is running, trigger of the EVU signal will cause a compressor stop to be initiated. Note that the compressor will need up to 5 minutes to stop depending, on running circumstances. Physical power cut off, before the compressor has stopped, is not permitted, as repeated cut off power supply when the compressor is running, could cause operational disturbances/damage.

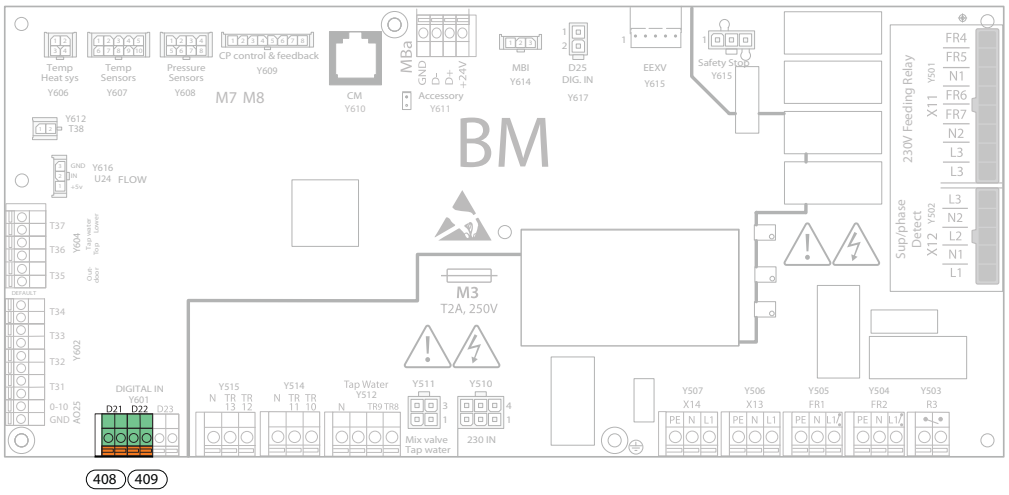


Table item number	Terminal	Description
408	D21	EVU/Smart grid 1
409	D22	Smart grid 2

11.7 Passive cooling (with Distribution 1)

With the Passive cooling function, it is possible to produce a very energy efficient passive cooling by circulating the brine to a separate circuit (with or without intermediate heat exchanger). A requirement to make passive cooling useful is that the brine temperatures are not too high. When Passive cooling is desired due to e.g. high outdoor temperatures, leading to high indoor temperatures, it is possible to control and regulate a separate circuit to a fixed cooling temperature set point.

The temperature reading from the supply line sensor cooling circuit (108) is used for regulating the shunt valve cooling circuit (107) (shunt valve). The shunt valve and cooling circuit circulation pump (109) is active when the heat pump is in cooling season (which is determined by the cooling integral and settings made for seasonal cooling temp) in the controller and a cooling demand is detected.

When cooling is produced, the internal brine pump and the cooling circulation pump is running. The mixing valve will strive to keep desired cooling supply line temperature to the set value (desired cooling temp) in the controller.

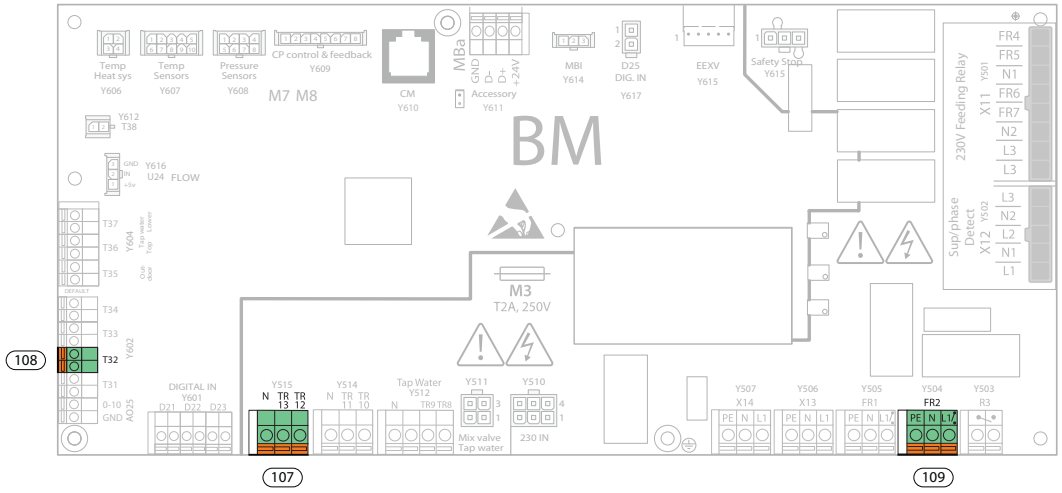


Table item number	Terminal	Description
107	TR12-13	Shunt valve 230VAC
108	T32	Supply line sensor
109	FR2	Circulation pump 230VAC

11.8 External auxiliary heater

The heat pump can, in addition to heat pump and internal immersion heater also control external aux heater (0-10V and on/off). The external auxiliary heater requires a system supply line sensor.

The external auxiliary heater also controls a 0-10 V signal which regulates system supply line temperature in accordance with calculated set point and desired delay.

The relay (117) is potential free.

External auxiliary heater can only produce heating and pool (if pool after external auxiliary heater is activated).

External auxiliary heater (relay)

(Not in combination with External brine pump or Alarm relay without EM4.)

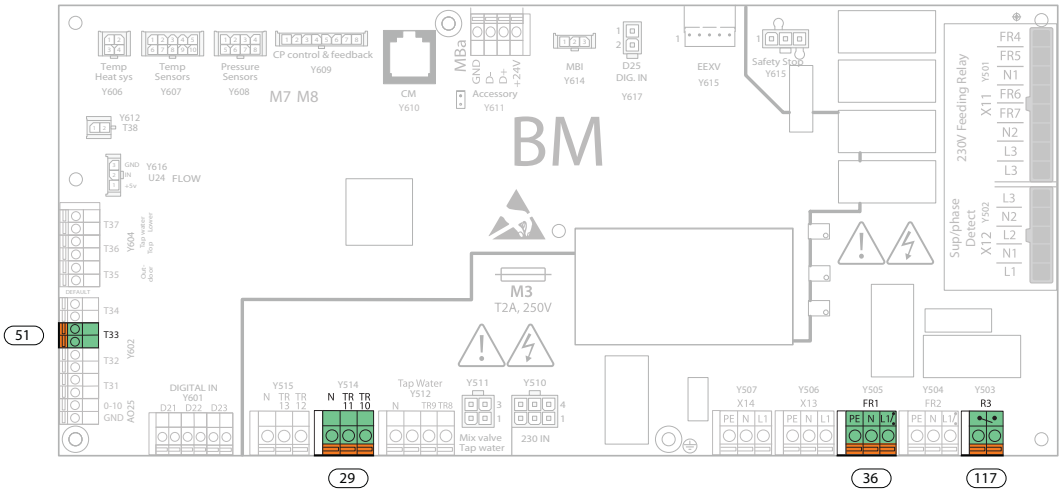


Table item number	Terminal	Description
29	TR10-11	Shunt valve 230VAC
36	FR1	Circulation pump 230VAC
51	T33	Supply line sensor
117	R3	External auxiliary heater

External auxiliary heater (control)

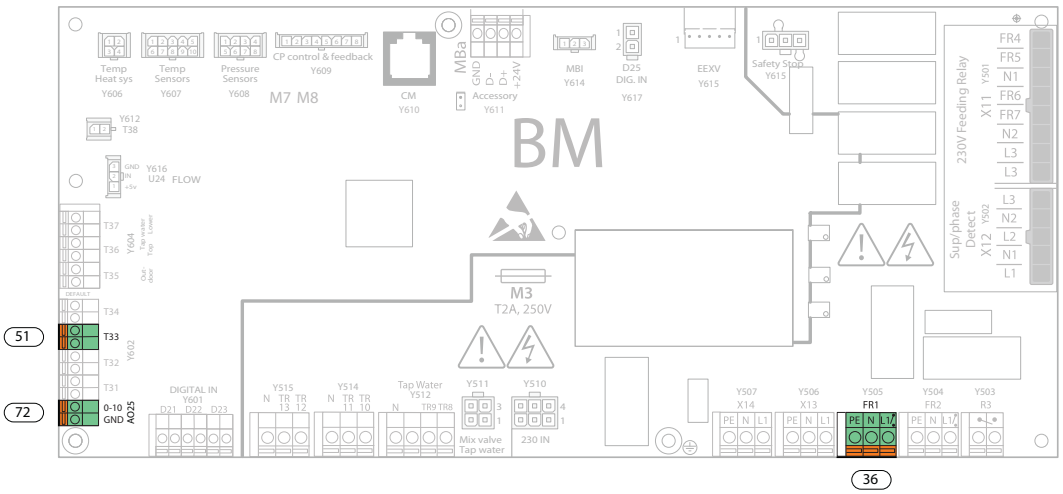


Table item number	Terminal	Description
36	FR1	Circulation pump 230VAC
51	T33	Supply line sensor
72	AO25	External auxiliary control 0-10V

11.9 Flow guard/pressure switch

In applications where a flow guard or pressure switch is required to stop or prevent starting the compressor in the case of a lack of flow or pressure, this can be installed and monitored with a digital input (open / closed loop. Flow = Closing)

Flow sensor monitoring is active when the internal/external brine pump is running, or the compressor is running. During the start sequence, the flow sensor has default 25 seconds (start delay compressor - 5 seconds) to report flow. If the flow disappears while the compressor is in operation, the compressor will stop directly. If there is a loss of flow an alarm is triggered immediately, but a restart attempt may be permitted. When a restart attempt is activated, an alarm is triggered if the flow disappears more than three times in two hours. Time between stop and start is 20 minutes (not restriction time).

The flow sensor alarm prevents the brine pump from running until the alarm has been acknowledged. This blocks passive cooling.

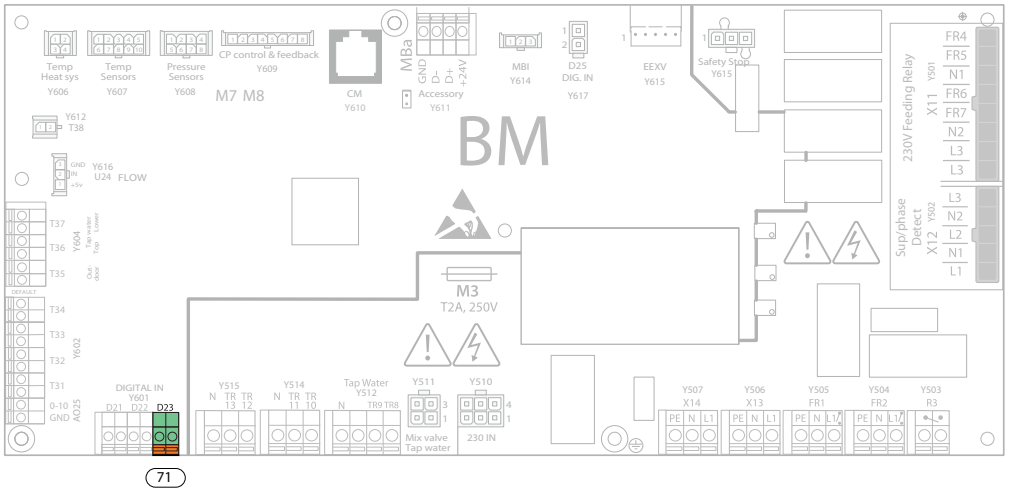


Table item number	Terminal	Description
71	D23	Not in combination with Start internal brine pump on external signal without EM4.

11.10 External brine pump

In applications where an external brine pump or ground water pump needs to be controlled, this can be done with the BM card. The signal is active when the internal brine pump is active. If continuous operation of the brine pump is activated, the external brine pump also operates continuously.

The relay is potential free.

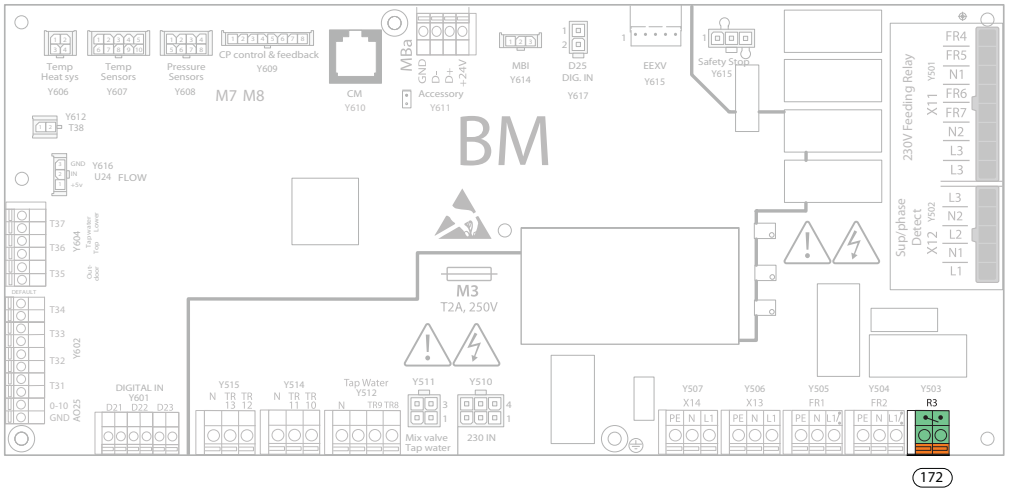


Table item number	Terminal	Description
172	R3	On/off control of external brine pump. Not in combination with External auxiliary heater or Alarm relay without EM4.

11.11 Internal brine pump on external signal

In applications where e.g. cooling is achieved by a separate system, (not controlled by the heat pump) the internal brine pump can be activated on external command using the BM card. The digital in (Open/closed loop) is then activating the internal brine pump when required. The internal brine pump will run when the control signal loop is closed.

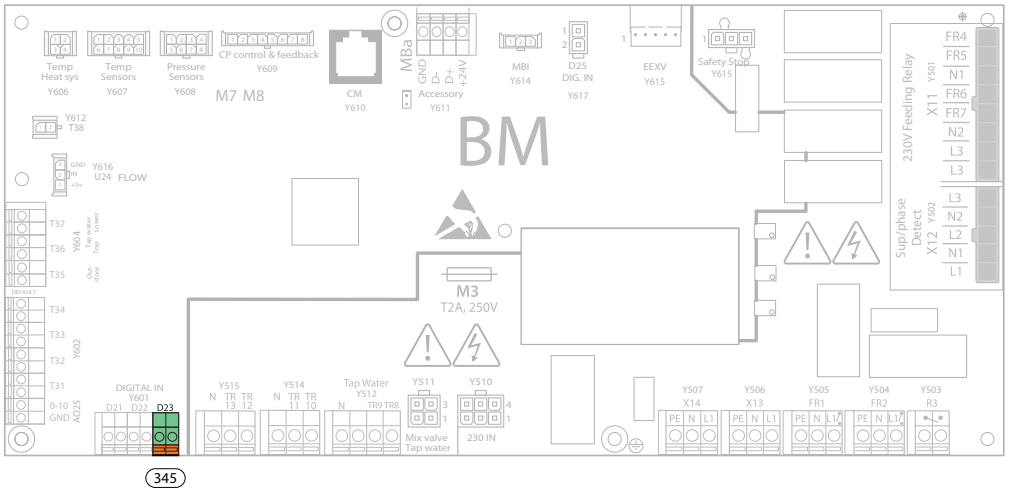


Table item number	Terminal	Description
345	D23	Not in combination with Flow guard/level guard without EM4.

11.12 Alarm relay (sum alarm output)

With the sum alarm function, it is possible to make alarms trigger a relay output signal that can be connected to for example a strobe light.

It is possible to set the alarm level that shall activate the signal in 3 levels:

- Alarms class A+B+C (= all alarms)
- Alarms Class A+B (=only alarms that may affect function etc.)
- Alarms Class A (=only alarms that stops compressor etc.)

For connection, see wiring diagram "Alarm relay" (position number 344). Relay is potential free.

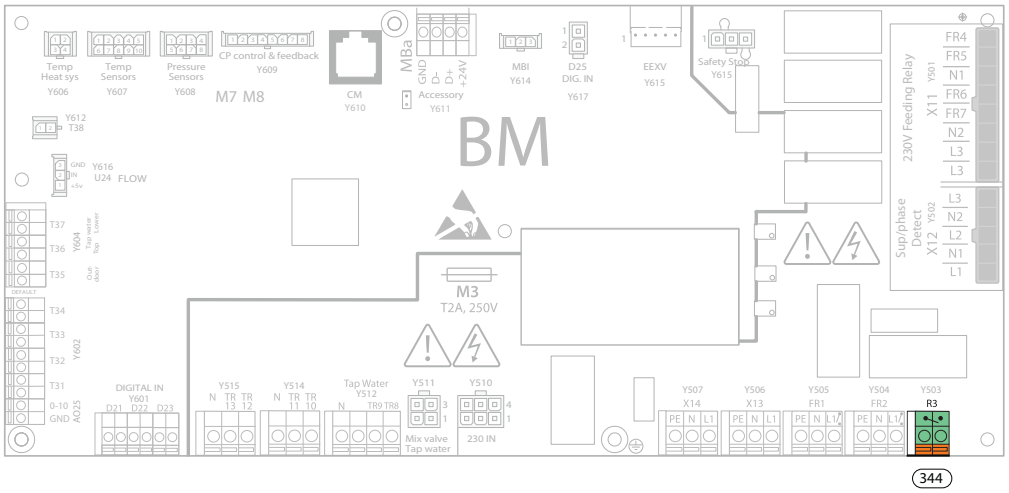


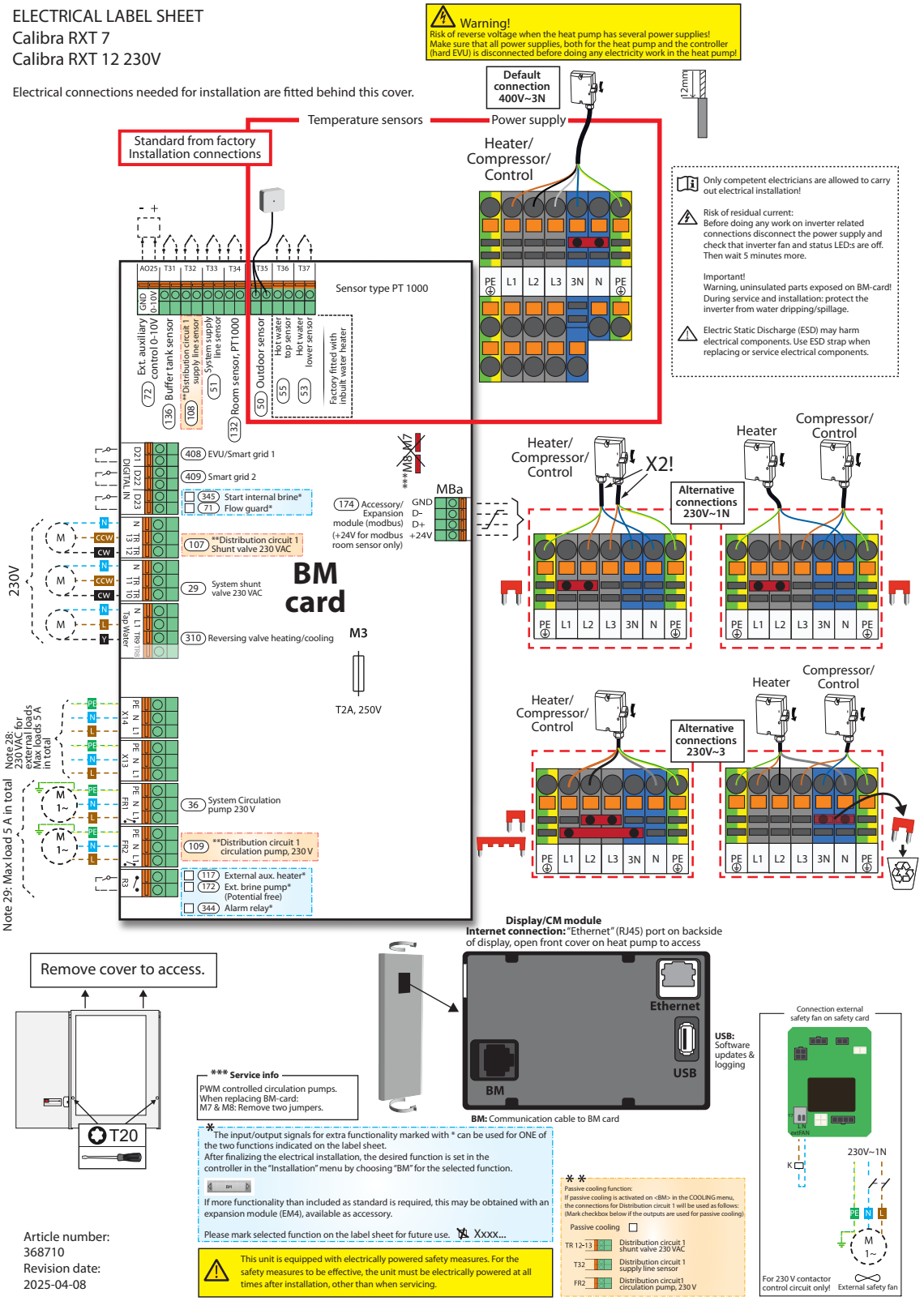
Table item number	Terminal	Description
344	R3	Not in combination with External brine pump or External auxiliary heater without EM4.

12 Electrical connections

12.1 Electrical connections Calibra RXT 7 & Calibra RXT 12 230V (this label is also fitted on the electrical cabinet of the heat pump)

ELECTRICAL LABEL SHEET
Calibra RXT 7
Calibra RXT 12 230V

Electrical connections needed for installation are fitted behind this cover.

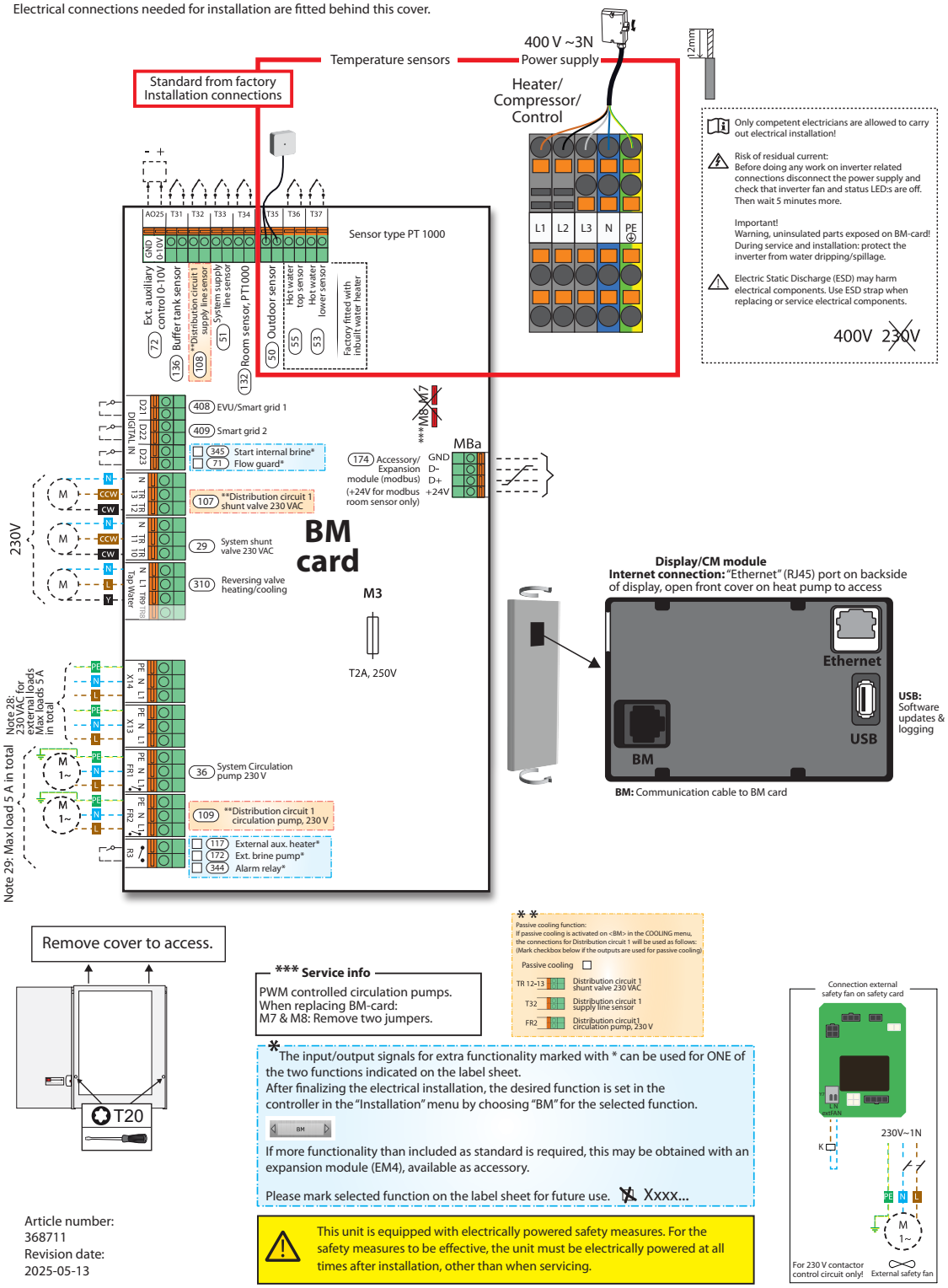


Article number:
368710
Revision date:
2025-04-08

12.2 Electrical connections Calibra RXT 12 400V (this label is also fitted on the electrical cabinet of the heat pump)

ELECTRICAL LABEL SHEET
Calibra RXT 12 400V

Electrical connections needed for installation are fitted behind this cover.



Article number:
368711
Revision date:
2025-05-13

13 Recovering and filling R290 refrigerant

13.1 General service instructions

13.1.1 Checks and preparations

Note

Compliance with national gas regulations shall be observed.

Note

Service, maintenance and repair, such as: breaking into the refrigerant circuit; opening of sealed components; opening of ventilated enclosures, shall be performed as recommended by Thermia and only by competent personnel.

Note

All maintenance staff, and others, working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

Warning

In accordance to IEC60335-2-40:2018, prior to installation, the appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance, an operating electric heater or a hot surface with a temperature above 700°C for A2L and 370°C for A3).

Warning

Under no circumstances shall potential sources of ignition be used in the searching for, or detection of, refrigerant leaks. A halide torch (or any detector using a naked flame) shall not be used. Be aware that refrigerants may not contain an odour. Do not pierce or burn. If a leak is suspected, all naked flames shall be removed/extinguished. If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system.

Prior to work taking place, the area around the equipment is to be surveyed to make sure that there are no flammable hazards or ignition risks. "No smoking" signs shall be displayed.

A3 (e.g. R290) symbol

Service personnel shall have competence about:

- The explosion potential of flammable refrigerants to show that flammables may be dangerous when handled without care.
- Potential ignition sources, especially those that are not obvious, such as lighters, light switches, vacuum cleaners, electric heaters, etc.
- The different safety concepts (Unventilated, Ventilated enclosure, Ventilated room).
- Refrigerant detectors.
- The concept of sealed components and sealed enclosures according to IEC60079-15:2010.
- The correct working procedures for commissioning, maintenance, repair, decommissioning and disposal.

Ensure that the area is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that work is carried out. The ventilation should safely disperse any refrigerant and preferably expel it externally into the atmosphere.

The following leak detection methods are deemed acceptable for flammable refrigerants:

- Electronic leak detectors may be used to detect refrigerant leaks. Detection equipment shall be calibrated in a refrigerant-free area. Ensure that the detector is not a potential source of ignition and is suitable for the refrigerant. Leak detection equipment shall be set to 20% of the LFL (Lower Flammability Limit) of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (A3: 1,7% maximum, A2L: 25% maximum) is confirmed.

– Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine may react with the refrigerant and corrode the copper pipe-work.

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available at hand. Have a dry powder or CO_2 fire extinguisher adjacent to the charging area.

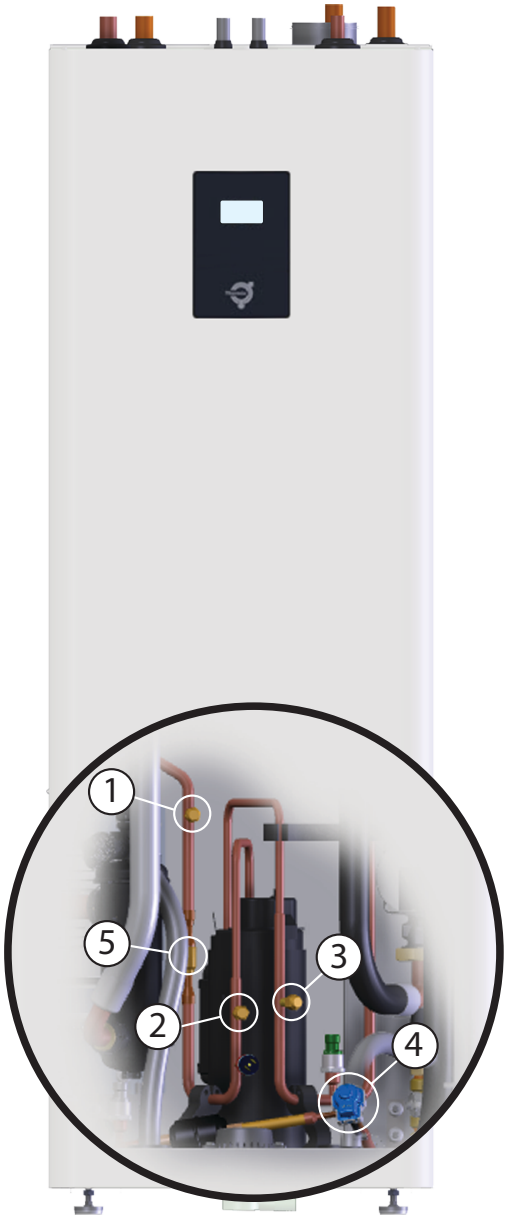
For maximum refrigerant charge (mmax), see type plate on the heat pump.

13.2 Recovering and filling the refrigerant

13.2.1 Preparations before opening the refrigerant circuit

The following instructions are in accordance with Swedish national gas regulations and make no difference between A2, A2L & A3 refrigerants.

Make sure that you use tools and equipment that are suitable for the actual refrigerant and its characteristics. Always have a Class C powder extinguisher nearby when performing the work.



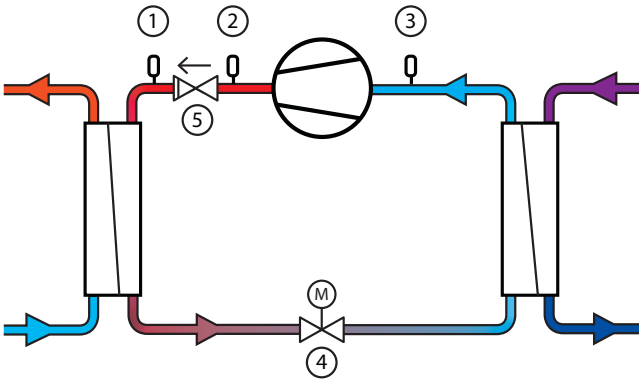
Reference picture for instructions referring to the refrigerant circuit

1. Drain valve, high pressure side
2. Vacuum*/flush valve, high pressure side
3. Flush/refill**/vacuum* valve, low pressure side
4. Expansion valve with stepper motor
5. Non return valve

* When performing a vacuum operation, both valve 2 and 3 should be used simultaneously.

** Refill valve for top-up when the compressor is running.

Schematic view of the refrigerant circuit. Numbers correlate to the list above:



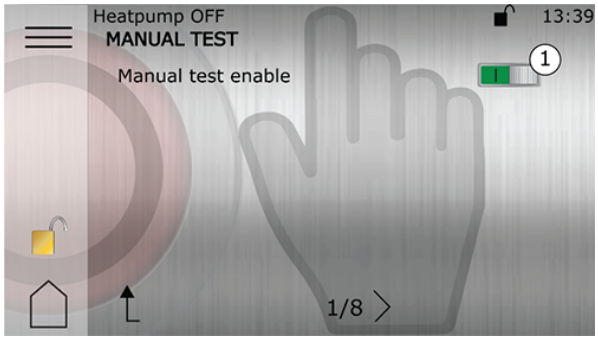
13.2.2 Before recovering the refrigerant

Before starting:

– Make sure that the expansion valve is fully open. This is done in the display, in Manual test. Log in and set the opening degree to 100%. This is done to allow for an easy evacuation of the refrigerant and for the flushing (nitrogen gas) and for the vacuum suction of the circuit.

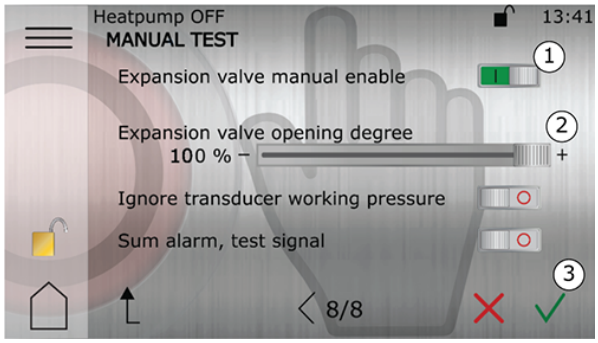
– Press Settings and navigate to MANUAL TEST.
– On the first page, activate MANUAL TEST by pressing the switch (1), so it turns green and the hand appears.

–



– Navigate to the expansion valve page. Activate (1) and pull the slider for the opening degree to 100 % (2).

–



– Confirm settings by pressing (3).
– When the expansion valve is fully open (after about 10 seconds from confirming in the display), remove the stepper motor from the valve (chapter 13.2.1, reference picture, 4)
– Cut the power to the heat pump (to be able to connect the gauge manifold with an equipotential bonding). The expansion valve is now open.

The refrigerant circuit should not be open any longer than necessary, to avoid air from entering the circuit. Therefore don't open the refrigerant circuit before all the necessary preparations are done and all the required tools are in place. If the work is aborted, the circuit has to be closed and filled with Nitrogen gas to a small overpressure, to prevent any ingress of air. The filter dryer shall always be exchanged when the circuit has been opened.

Additional safety measures:

– Always start the personal leakage detector or electronic leakage detector before entering the work area. Don't turn off the detector before the work is done. The gas detector shall be calibrated to the refrigerant.
– Ventilate the work area.
  Eliminate ignition sources and keep a Class C powder extinguisher close by.
– If an indirect refrigerating circuit is being used, the secondary unit shall be checked for the presence of refrigerant.
– Make sure that the markings of the equipment are visible and correct for the specific job (type of refrigerant). If indicated as unsuitable, change to proper equipment.

– Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue the operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment so all parties are advised.
– Make sure that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking.
– Make sure that no live electrical components and wiring are exposed while charging, recovering or purging the system.
– Make sure that there is continuity of earth bonding.

13.2.3 Recovering the refrigerant, step by step

1. Check and make sure that the atmosphere is safe before starting the work with a gas detector, fulfilling the requirements above mentioned.
2. Place a fan so that a good circulation of the air is achieved at the working area. Connect it to a socket at least 3 m away from the point of the circuit being opened.
3. Connect the power supply to the recovering unit at least 3 m away from the circuit being opened.
4. Make sure that the refrigerant cylinder, the refrigerant circuit and the recovering unit are equipotentially bonded.
5. Make sure that the necessary valves are open.
6. Start recovering the refrigerant (chapter 13.2.1, reference picture, 1).
7. Check the connections on the recovering unit and the refrigerant cylinder with a leakage detector during the work procedure, to make sure that there is no leakage that can create a dangerous atmosphere.
8. Recover the system down to 0,6 bar(a) or lower. Empty completely for scrapping.
9. **It is important to make sure that no oxygen enters the circuit!** Prevent this by closing all valves before connecting the Nitrogen. Flush the system with Nitrogen gas for at least 5 min on the low pressure service valve (chapter 13.2.1, reference picture, 3) and expansion valve fully OPEN, with the pressure set to around 1,0 bar (e). Release Nitro-gen from the drain valve on the low pressure side (chapter 13.2.1, reference picture, 1). When performing the flushing, use a Schrader needle opener, to adjust the flow of Nitrogen and thus reducing the amount of Nitrogen being used.
10. Place the end of the hose connected to the vacuum pump in a well ventilated space or outdoors. Check that any leaking gas from the vacuum pump cannot create a dangerous atmosphere.
11. Connect the vacuum pump to a power source at least 3m from the point of the circuit being open. Set the ON/OFF button on the vacuum pump to ON and Start suction to around 0,3 bar (a) (chapter 13.2.1, reference picture, 2 & 3).
12. In this step, the stepper motor (chapter 13.2.1, reference picture, 4) needs to be put back into place with the expansion valve set to 0% opening degree in the display. Flush the system again with Nitrogen gas for at least 5 min as soon as the compressor starts moving, on the high pressure service valve (chapter 13.2.1, reference picture, 3) and the expansion valve CLOSED, to ensure that the compressor gets thoroughly flushed.
13. Before work on the refrigerant circuit, the pressure in the circuit has to get lower still, with more vacuum suction down to a pressure of 2 mBar, before cut off with dry Nitrogen gas. When the recovering unit is emptied, flushed with Nitrogen gas, vacuum sucked and protectively filled with dry Nitrogen gas, the work on the refrigerant circuit can start in a safe manner.

13.2.4 Refilling the refrigerant, step by step

When refilling the refrigerant, be sure not to over fill the circuit. The amount must be weighed according to the amount printed on the manufacturers sign on top of the heat pump or be filled after subcooling (no bubbles in the sight glass).

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow-up leak test shall be carried out prior to leaving the site.

1. Place the fan so that sufficient ventilation is achieved at the work area. Then connect the fan to a power supply at least 3m from the point of the circuit being open.
2. Place the refrigerant cylinder on a scale prepared for the refrigerant amount.
3. Connect the refrigerant cylinder and make sure that the refill hose is vacuum suctioned.
4. Make sure the refrigerant cylinder and the refrigerant circuit are equipotentially bonded.
5. Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimize the amount of refrigerant contained in them.
6. Cylinders shall be kept in an appropriate position according to the instructions.

7. Ensure that the refrigerating system is earthed prior to charging the system with refrigerant.
8. Label the system when charging is complete (if not done already).
9. Extreme care shall be taken not to overfill the refrigerating system.
10. Check with a leakage detector to make sure that no leakage is present that can create a dangerous atmosphere.
11. Start filling the refrigerant.
12. Do leakage tracing with spray or soap water or with an electronic leakage detector.
13. Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges or any other adverse environmental effects. Also take into account the effects of aging or continual vibration from sources such as compressors or fans.

13.3 Dismantling

13.3.1 Dismantling

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its details. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to reuse of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

NOTE! No tools that might produce flames or sparks shall be used when dismantling the refrigerant circuit. If necessary, use a mechanical pipe cutter.

1. Become familiar with the equipment and its operation.
2. Isolate system electrically.
3. Before attempting the procedure, ensure that:
   – mechanical handling equipment is available, if required, for handling refrigerant cylinders;
   – all personal protective equipment is available and being used correctly;
   – the recovery process is supervised at all times by a competent person;
   – recovery equipment and cylinders conform to the appropriate standards.
4. If a vacuum is not possible, make a manifold so that the refrigerant can be removed from various parts of the system.
5. Make sure that the cylinder is situated on the scales before recovery takes place.
6. Start the recovery machine and operate in accordance with instructions.
7. Do not overfill cylinders.
8. Do not exceed the maximum working pressure of the cylinder, even temporarily.
9. When the cylinders have been filled correctly and the process is completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
10. Removed refrigerant shall not be charged into other refrigerating systems until it has been cleaned and checked.

Labeling

Equipment shall be labeled stating that it has been decommissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing flammable refrigerants, ensure that there are labels on the equipment stating that the equipment contains flammable refrigerant.

Recovery

When moving refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is available. All cylinders to be used are designated for the recovered refrigerant and labeled for that refrigerant (i.e. special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, flammable refrigerants. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult the manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that flammable refrigerant does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the supplier. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

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