

Installation Guide

Mega



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

1.1 Introduction

The following documents are available for this product:

- **Installation Guide.** Gives thorough information on how to install the heat pump.
Available for download, see below.
- The **Commissioning Guide** contains the required information in order to commission the heat pump and tune the heating system.
Available for download, see below.
- The **Wiring Diagrams** for the heat pump intended for fault tracing and service.
Available for download, see below.
- The **User Guide** is intended for the end user and must be handed over and gone through with the end user when installation and commissioning is completed.
Supplied with the heat pump on delivery.
- The **Technical Description** contains information about the heat pump's function, fault tracing and technical data.
Available for download, see below.
- **Country specific instructions** and forms are available where relevant.
Supplied with the heat pump on delivery.
- **Self-adhesive decals** with translation text. Must be placed on the manufacturing plate in conjunction with installation.
Supplied with the heat pump on delivery.

Documents not delivered with the heat pump are available for download here:

www.thermia.com/documents

1.2 Symbols in documents

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 and three different symbols are used to indicate the degree of danger:

Danger



Indicates an immediate danger that leads to fatal or serious injury if necessary measures are not taken.

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.

A fourth symbol is used to give practical information or tips on how to perform a procedure.



Information regarding making the handling of the installation easier or a possible operational technical disadvantage.

1.3 Symbols on decals

The following symbols can occur on decals on the different parts of the heat pump. Which symbols are used depends on the heat pump model.

1.3.1 General



Warning, danger!



Read the documentation provided.



Read the documentation provided.



Warning, hazardous electrical voltage!



Warning, hot surfaces!



Warning, moving parts!



Warning, risk of crushing injury!

1.3.2 Electrical components

Explanation



Component, ordinary delivery according to proposed system solutions



Components, accessories according to proposed system solutions

1.3.3 Pipe connections



Tap water



Heating system



Brine system



Defrosting tank



Expansion tank with safety valve, brine



Air bleeding



Temperature and pressure relief valve



Outdoor unit



Water heater

2 Important information/Safety instructions

2.1 General safety precautions

Warning

This appliance can be used by children aged 8 years and above, and by persons with reduced physical, sensory or mental capabilities or lack of experience or knowledge, provided that they are supervised or have been instructed in the safe use of the appliance and understand the hazards involved. Children must not clean or carry out user maintenance on the appliance except under adult supervision.

Warning

Ensure that children do not play with the product.

Warning

The installation must only be carried out by a qualified installation engineer, following applicable rules and regulations in addition to these installation instructions.

Caution

The heat pump must be located in a frost-free environment!

Caution

Installation and connection should be carried out in accordance with the instructions, in order to avoid subjecting local residents to noise disturbance.

Caution

The heating appliance should be placed on a stable surface that can support the gross weight of the heating appliance.

Caution

Before the heat pump is powered, you must ensure that the heating system and coolant system, including the heat pump, are filled and bled; otherwise, their circulation pumps may be damaged.

Caution

If the electrician wishes to test the electrical connections before the above is carried out, this should only be done after ensuring that the heat transfer fluid pump and coolant pump are disconnected.

Caution



When filling the coolant system the coolant pump must be operating; you must ensure that the compressor and the heat transfer pump cannot start.

Caution



This appliance is intended for use by expert or trained users in shops, in light industry and on farms, or for commercial use by lay people.

Caution



In accordance with SS-EN 60335-2-40, this product is classified as not available to the general public. This means that the product is designated to be handled by trained personnel and installed in a machine room that meets the requirements stated in EN 378-3, section 5.1 - 5.14.

Caution



The maximum ambient temperature in the machine room must not exceed 30°C. For Mega S-E, if the heat pump is operating with B10W65, or higher, in combined use with the internal immersion heater, the ambient temperature must not exceed 25°C.

Caution



Isolate the power supply to the heat pump while servicing the appliance or replacing parts.

Caution



Only spare parts approved by Thermia Värmepumpar may be used for this appliance.



In normal operation the heat pump generates noise and vibrations. The appliance should be set up and connected in accordance with the instructions in order to avoid noise being spread to noise-sensitive areas.

2.2 Refrigerant

2.2.1 Refrigerant

Caution



Work on the refrigerant circuit must only be carried out by a certified refrigeration engineer.

Although the heat pump's refrigerant circuit is filled with a chlorine-free and environmentally-approved refrigerant that will not affect the ozone layer, work on this system may only be carried out by authorised persons.

The refrigerant circuit is hermetically sealed and is subject to the EC regulation 517/2011. According to EC regulation 517/2014, for heat pumps containing 10 tonnes of CO₂ equivalent or more, with hermetically sealed fluorinated greenhouse gases, an annual inspection of leakage must be carried out by qualified personnel.

2.2.2 Fire risk

The refrigerant is not combustible or explosive in normal conditions.

2.2.3 Toxicity

In normal use and normal conditions the refrigerant has low toxicity. Even though the toxicity of the refrigerant is low, it can cause injury (or even death) in abnormal circumstances or if deliberately abused.

Warning



Risk of personal injury! Spaces in which heavy vapor can collect below the level of the air must be well ventilated.

Refrigerant vapour is heavier than air, and in enclosed spaces or in areas below the level of the door, for example, seepage can give rise to high concentrations with a resultant risk of suffocation due to lack of oxygen.

Warning



Risk of personal injury! Refrigerant exposed to a naked flame creates a poisonous irritating gas. This gas can be detected by its odor even at concentrations below its permitted levels. Evacuate the area until it has been sufficiently ventilated.

2.2.4 Working on the refrigerant circuit

Caution



When the refrigerant circuit is repaired, the refrigerant must not be released from the heat pump - it must be handled appropriately.

Draining and refilling must only be carried out using new refrigerant (for the amount and type of refrigerant see manufacturer's plate) through the service valves.

Caution



All warranties will become void if a refrigerant, other than what Thermia specifies, is used for refilling.

2.2.5 Scrapping

Caution



When the heat pump is to be scrapped the refrigerant must be extracted for disposal. Local rules and regulations related to the disposal of refrigerant must be followed.

2.3 Electrical connection

Warning



Hazardous electrical voltage! The terminal blocks are live and can cause death through electric shock. All power supplies must be isolated before electrical installation is started. The heat pump is connected internally at the factory, for this reason electrical installation consists primarily of the connection of the power supply.

Caution



Electrical installation may only be carried out by an authorized electrician and must follow applicable local and national regulations.

Caution



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.

2.4 Maintenance check for frequency inverter

Warning



Work on the frequency inverter must be made by authorized personnel. Make sure that the main power is switched off.

Avoid dust from depositing on the drive surface, circuit boards and other electric components. These deposits act as insulation layers and hamper heat transfer to the ambient air, reducing the cooling capacity. The increased heat load causes an accelerated aging of the electrical components, thus decreasing the service life. Dust deposits that accumulate on the heat sink located on the back of the VFD will also decrease the service life of the unit.

The drive cooling fans have small bearings into which dust can penetrate and act as an abrasive. This leads to bearing damage and fan failure.

Under the conditions described above, it is advisable to clean the frequency converter during periodic maintenance. Remove dust off the heat sink and fans.

2.5 Water quality

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

It is recommended to use magnetite filter for all retrofit systems.

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.

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 (applies to heating system, hot water and brine circuit). The softening filter softens the water, cleans any impurities and prevents the build-up 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 (98/83/EC). With regards to chloride level this means that it is approved to up to 250 mg/l.

3 Transport, unpacking and setting-up

3.1 Transporting the heat pump

Caution



The heat pump must always be transported and stored upright in a dry environment. Secure the heat pump so that it cannot tip over during transportation.



The XL and L models are specifically designed to be able to be moved with a forklift or similar. Take necessary precautions to secure the load from overturning.

3.1.1 Unpacking

1. Check that there are no transportation damages.
2. Remove the packaging.

3.1.2 Delivery check

Check that the delivery includes the following items:

Name	Quantity
Heat pump	1
Document set	1

Sound plate kit, 086L3375 (Mega XL and L)		
Name	Article number	Quantity
Front and rear plate	086L3376	2
Left and right side plate	086L3377	2

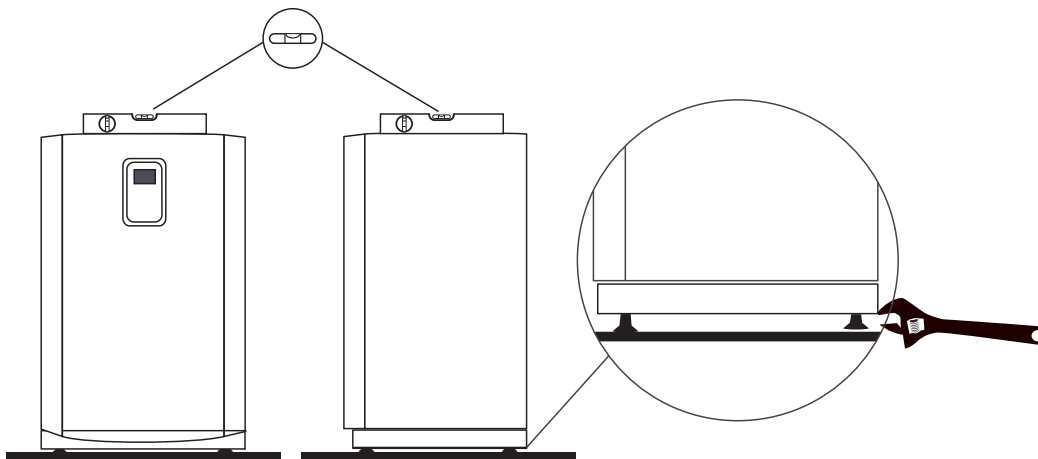
Sensor kit, 086L3546 (in the electrical cabinet)		
Name	Article number	Quantity
Outdoor sensor	086U3351	1
System supply line sensor	086L3356	1

3.2 Setting-up the heat pump

3.2.1 Recommended location

Positioning the heat pump

- The heat pump should preferably be placed against an outside wall (see chapter 'Heat pump data')
- Do not place the heat pump against walls facing noise-sensitive areas.
- Avoid placing the heat pump in the corner of a room.
- If possible, choose a location where the surfaces nearest the heat pump are soft. Avoid placing the heat pump close to large plastered or tiled areas.
- The heat pump is fitted with internal vibration isolation. However, the degree of vibration isolation achieved depends on the bearing strength of the floor. In order to achieve adequate vibration isolation, the heat pump should be placed on a concrete floor with a thickness of at least 100 mm, or another surface with equivalent characteristics.
- In order to minimise noise generation from the heat pump, the sound blocker base (included) should be fitted when the heat pump has been put into position.
- The heat pump must be placed in an area with a floor drain.
- The heat pump must be level. Make sure to adjust feet in a way that the pump stands steady. If the feet is not adjusted correctly it could cause some unwanted noise. Do the adjustment with the heat pump running on its most critical gear.



Noise and vibration

To prevent disturbing noise and vibrations from the heat pump, the following recommendations should be observed:

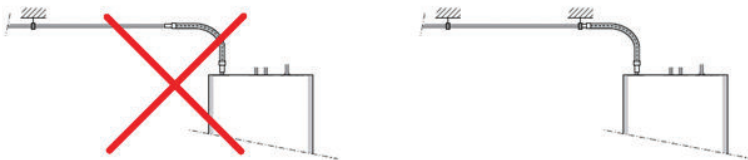
Noise

- In order to reduce the noise level inside the heat pump room, sound absorptive panels can be attached to the walls and ceiling.
- In order to reduce the noise level in adjacent rooms, reinforce the sound reduction of the heat pump room walls.
- Seal all openings from the heat pump room with air-tight material.
- Sound-dampen any joint ventilation chambers leaving the room.
- If necessary, change doors and windows to models with higher sound reduction.
- The brine and heat transfer fluid should normally be connected to the heat pump by means of a flexible hose.
- Pipes must not be attached to roofs or walls facing noise-sensitive areas.
- In cases where attachment of pipes to sensitive construction elements cannot be avoided, special elastic pipe attachments should be used.
- Not correctly adjusted feet, can cause unwanted noise.

Vibration and structure-borne sound

Structure-borne sounds can be dealt with by isolating the heat pump as much as possible from contact with sound-sensitive parts of the framework of the building.

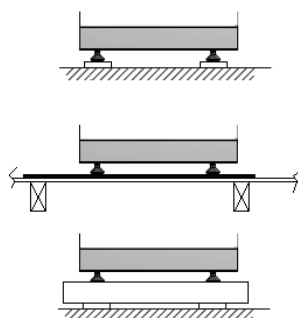
- If there are problems with specific frequencies, this can be adjusted in the display by tuning the actual gear. 50-100 rpm in either direction can make a significant improvement.
- Use flexible hoses between the heat pump and the radiator and brine system.
- The heat pump's pipe connections cause vibration. In order to prevent this vibration spreading to the heating system and frame, the pipes should be connected and laid with particular care.
- Extra weight attached tight to a pipe, or other vibrating parts, can change and dampen the vibration output due to the energy loss during the transfer to the added mass. The vibrating frequency will likely move to a lower range. Make sure to examine other gears of the compressor after making changes.



Floor preparations

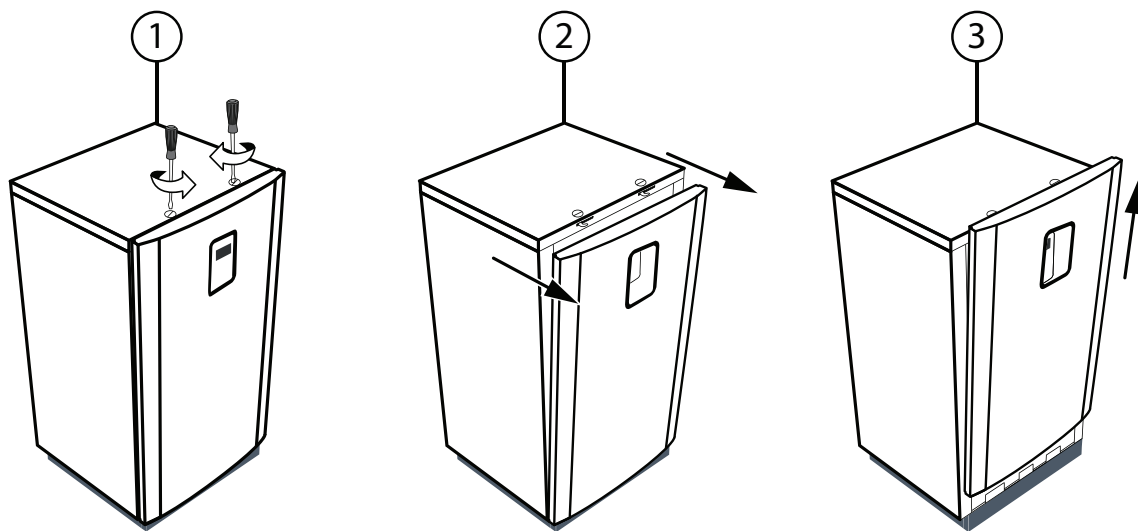
The heat pump is equipped with an internal insulation for vibrations and can therefore, in normal cases, be placed directly on the floor without taking further measures. If the heat pump is to be placed on a more sensitive floor, i.e. a wooden floor or a thinner concrete floor, some preparations might have to be made, to prevent a distribution of unwanted vibrations. See text and illustrations below.

- Lighter floors can be reinforced by supporting the weight of the heat pump with a steel plate covering, at least, one floor beam on each side of the heat pump. The plate should have a thickness of 6mm, minimum.
- Elastic shims can be placed under the feet of the heat pump, with a thickness of at least 4-6mm, depending on the weight of the heat pump.
- In extra sound sensitive spaces, a concrete base can be placed on top of elastic shims on the floor.



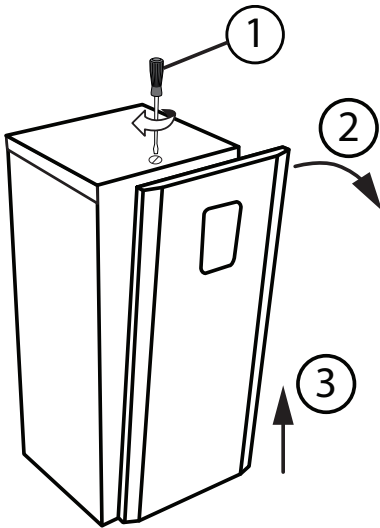
3.3 Dismantling the front cover

Mega XL and L



1. Turn the two locks on the top panel.
2. Push the front cover out by about 25 cm.
3. Lift the front upwards and lift off.

Mega M, S and S-E



1. Press against the front cover and turn the catch 90° degrees anti-clockwise to release the front cover.
2. Tilt the front cover outwards.
3. Lift the front cover upwards to remove it from the heat pump.

4 Heat pump dimensions and connections (mm)

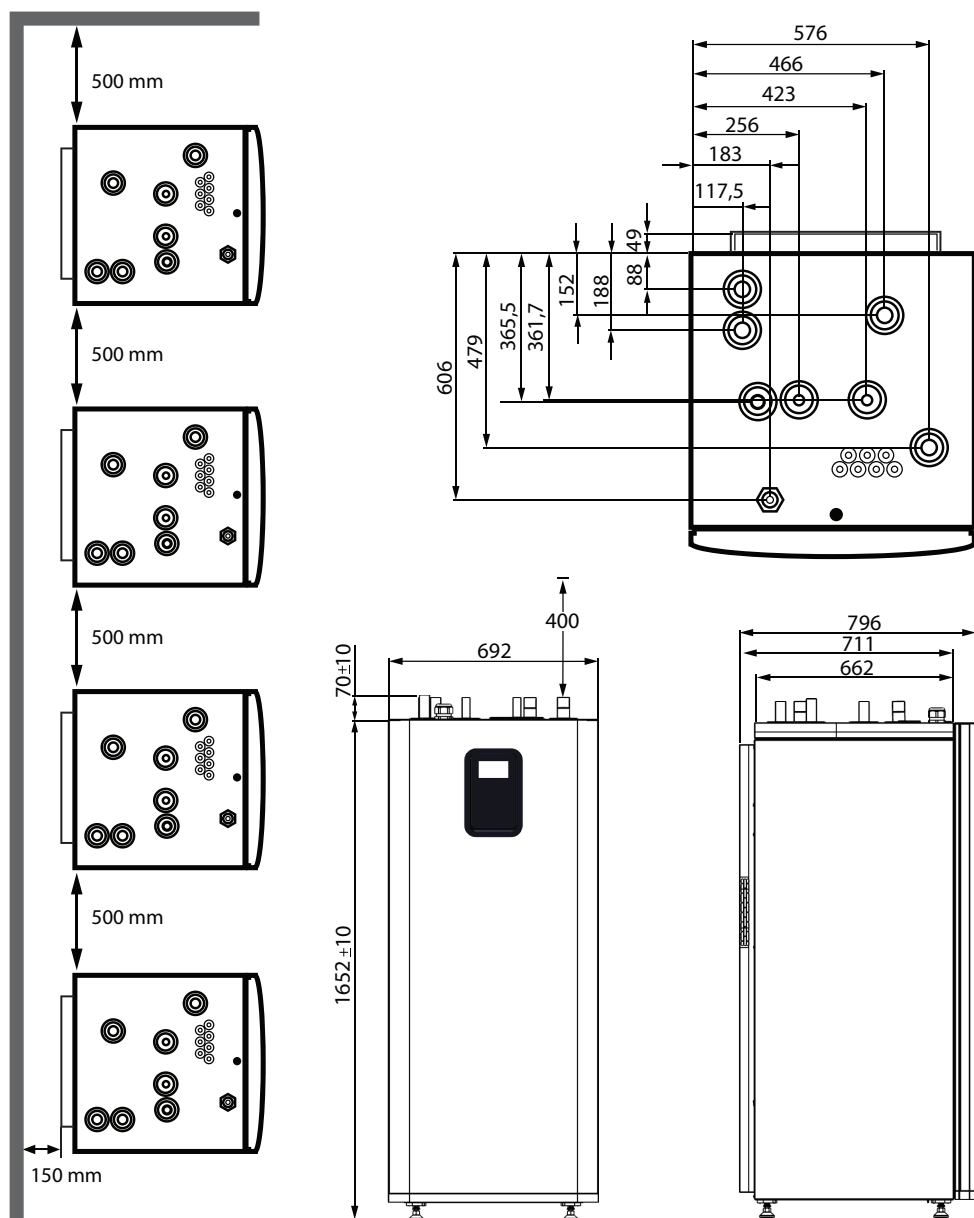
4.1 Minimum free space around the heat pump

To facilitate the installation and subsequent testing and maintenance, there must be sufficient free space around the heat pump.

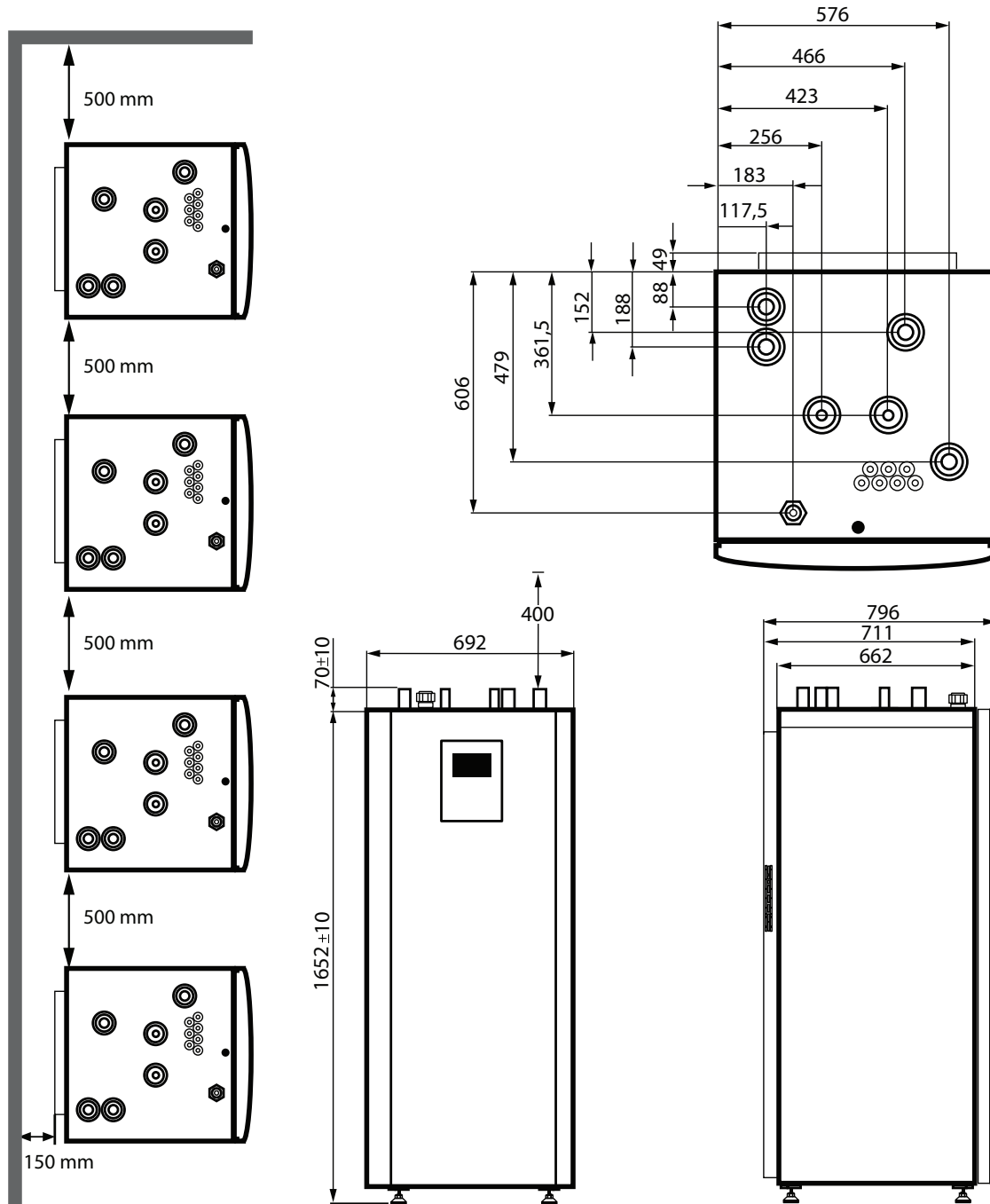
- Models S, M: Minimum free space on the back 150 mm.
- Models L, XL: Minimum free space on the back 300 mm.

Minimum free space on the right side is 300mm, for the fan to work as intended. Recommended free space for all models is 500mm on both the left and the right side, to facilitate any maintenance.

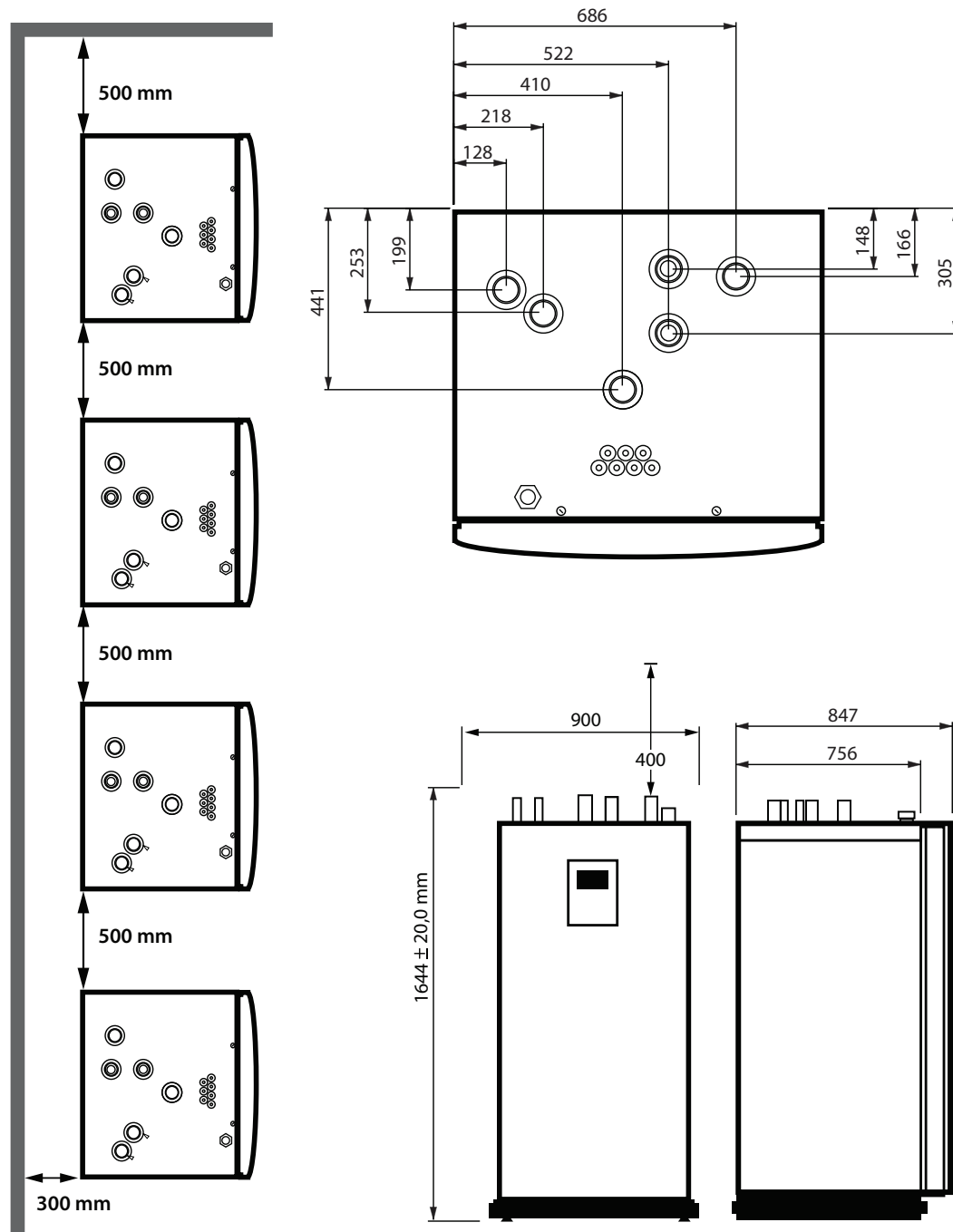
4.2 Mega S-E



4.3 Mega S and M



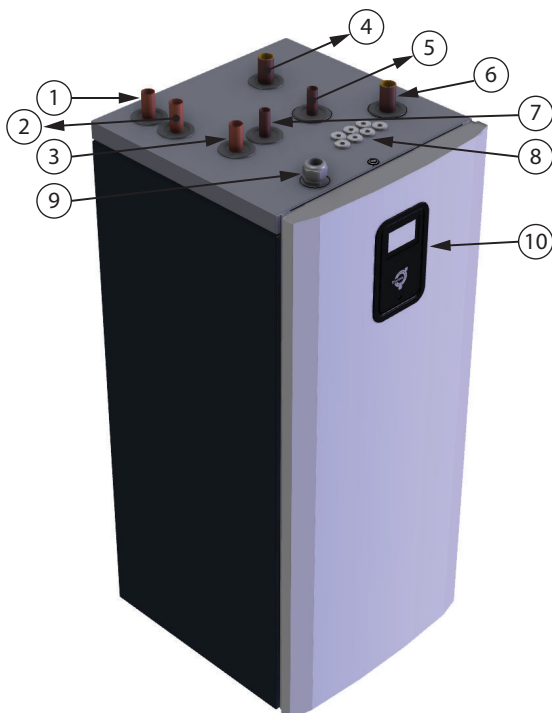
4.4 Mega L and XL



5 Components

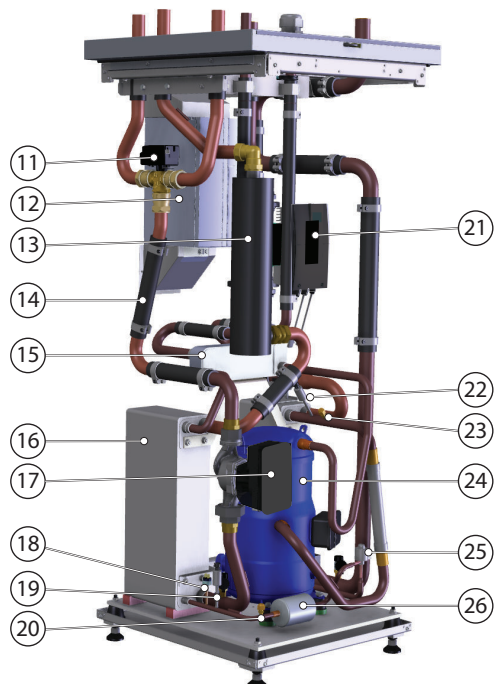
5.1 Mega S-E

Image shows the position of the components (brand of components can vary).



The arrows show input to and output from the heat pump.

1. Return pipe, heating system
2. Supply pipe, heating system
3. Return pipe, tap water system
4. Brine out
5. Hot gas to water heater
6. Brine in
7. Returning hot gas from water heater
8. Lead-ins for communication cable and sensor
9. Lead-in for incoming power supply
10. Control panel
11. Mixing valve, heating and tap water
12. Inverter
13. Internal immersion heater



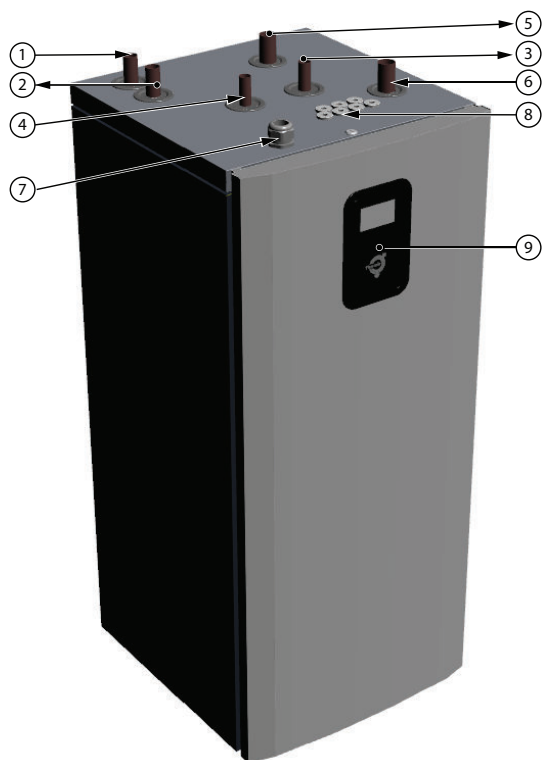
14. Flexible hose
15. Hot gas exchanger
16. Condenser
17. Condenser pump
18. High pressure switch
19. High pressure transmitter
20. Service output, high pressure
21. Brine pump
22. Low pressure transmitter
23. Service outlet, low pressure
24. Compressor
25. Electronic expansion valve
26. Drying filter

Mega S-E Connections, pipe diameter in mm

Brine	Heating system	Hot gas exchanger	Tap water
42	35	28	35

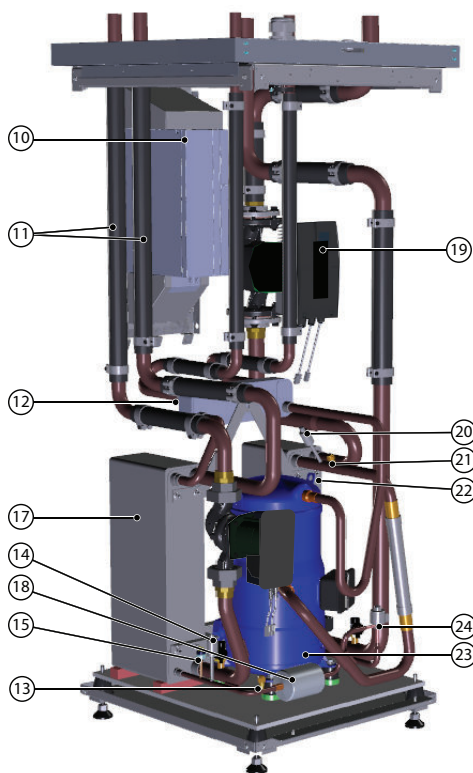
5.2 Mega S and M

Image shows the position of the components (brand of components can vary).



The arrows show input to and output from the heat pump.

1. Return pipe, heating system
2. Supply pipe, heating system
3. Hot gas to water heater
4. Returning hot gas from water heater
5. Brine out
6. Brine in
7. Lead-in for incoming supply
8. Lead-ins for communication cable and sensor
9. Control panel

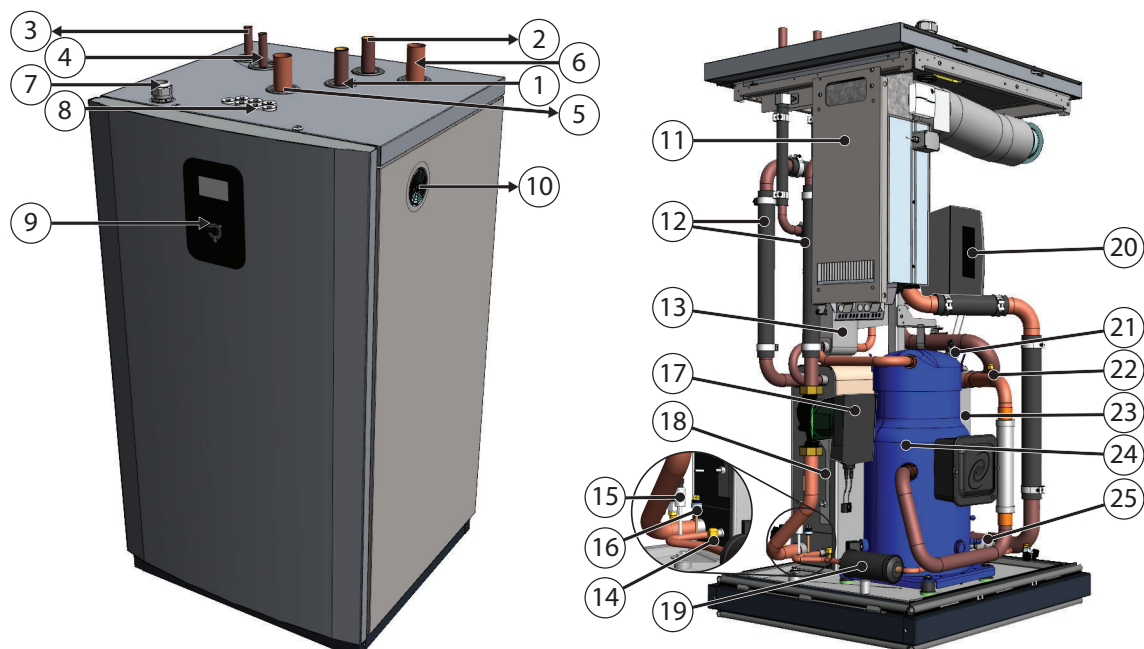


10. Inverter
11. Flexible hose
12. Hot gas exchanger
13. Service output, high pressure
14. High pressure transmitter
15. High pressure switch
16. Condenser pump
17. Condenser
18. Drying filter
19. Brine pump
20. Low pressure transmitter
21. Service outlet, low pressure
22. Evaporator
23. Compressor
24. Electronic expansion valve

Mega S and M Connections, pipe diameter in mm		
Brine	Heating system	Hot gas exchanger
42	35	28

5.3 Mega L and XL

Image shows the position of the components (brand of components can vary).



The arrows show input to and output from the heat pump.

1. Return pipe, heating system
2. Supply pipe, heating system
3. Hot gas to water heater
4. Returning hot gas from water heater
5. Brine out
6. Brine in
7. Lead-in for incoming supply
8. Lead-ins for communication cable and sensor
9. Control panel
10. Fan
11. Inverter
12. Flexible hose
13. Hot gas exchanger

14. Service output, high pressure
15. High pressure transmitter
16. High pressure switch
17. Condenser pump
18. Condenser
19. Drying filter
20. Brine pump
21. Low pressure transmitter
22. Service outlet, low pressure
23. Evaporator
24. Compressor
25. Electronic expansion valve

Mega L and XL Connections, pipe diameter in mm

Brine	Heating system	Hot gas exchanger
54	42	28

6 Piping installation

Caution



To prevent leaks, ensure that there are no stresses in the connecting lines

Caution



Pipe installation must be carried out by an authorised installer

Caution



Ensure that the pipe installation is carried out in accordance with the dimensions and connection diagrams

Caution



Bleed valves should be fitted if necessary

Caution



In a primary/secondary heat pump setup, a system circulation pump(36) **MUST** be installed, in order for the system to work. It is also recommended to use it in a stand-alone installation.

6.1 Safety valves

Warning



Radiator systems with a closed expansion tank must also be equipped with an approved manometer and safety valve. The safety valve should be to a minimum of DN 20 and have a maximum of 6 bar opening pressure, or according to country-specific requirements.

Warning



The overflow pipes from the safety valve must not be closed off. The pipes should discharge into an outlet in a frost-free area.

Warning



The connecting pipe between the expansion tank and the safety valve must slope continuously upwards. A continuous upwards slope means that the pipe must not slope downwards from the horizontal at any point.

Caution



Cold and hot water pipes and overflow pipes from safety valves must be made of heat-resistant and corrosion-resistant material, e.g. copper.

6.2 Supply and return pipes

6.2.1 Heating system supply pipe and return pipe

- Install a filter (max mesh size 0.7 mm) in the heating system's return pipe to protect the unit against foreign particles.
- Install the supply line with all the accompanying components.
- Ensure that the correctly dimensioned system pump is connected to the heating system's supply line, and connect the system pump's control cables to the correct terminal block (see connection of system pump).
- Install the return line with all the accompanying components.
- Insulate the supply and return lines.

6.2.2 Tap water connection, Mega S-E

If the tap water connection on Mega S-E is not used, it must be plugged with a bleed valve installed.

6.3 Connection brine

6.3.1 Drill holes for brine pipes

Caution



Ensure that the holes for the insert pipes are positioned so that there is room for the other installations.

Caution

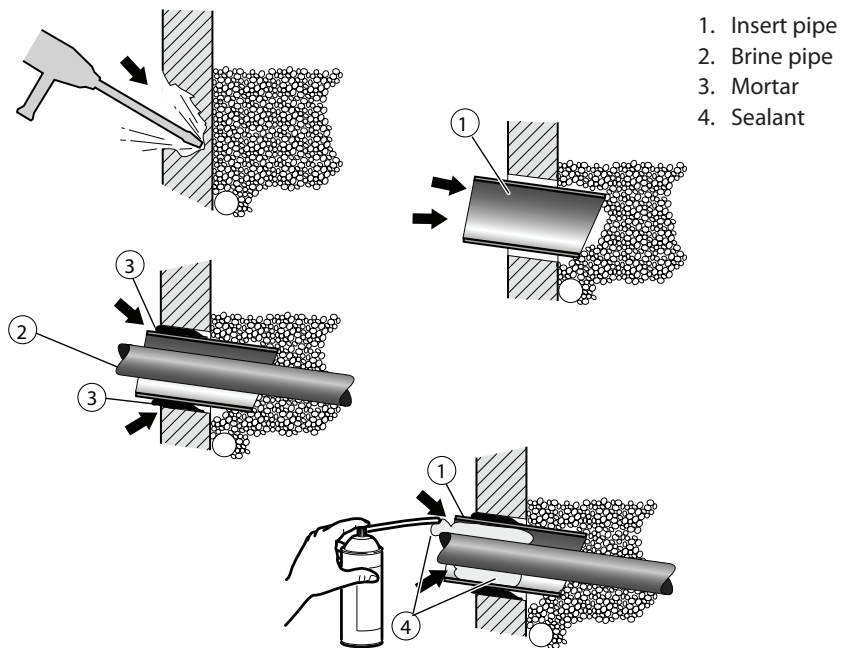


The brine pipes shall have separate lead-ins. If the wall lead-ins are below the highest ground water level watertight lead-ins must be used.

The brine pipes must be insulated from the heat pump, through the walls and outside the house all the way to the collector so as to avoid condensation and prevent heat loss.

If the brine pipes are to be routed above ground, drill holes in the walls for them.

If the brine pipes are to be routed below ground see the instructions below.

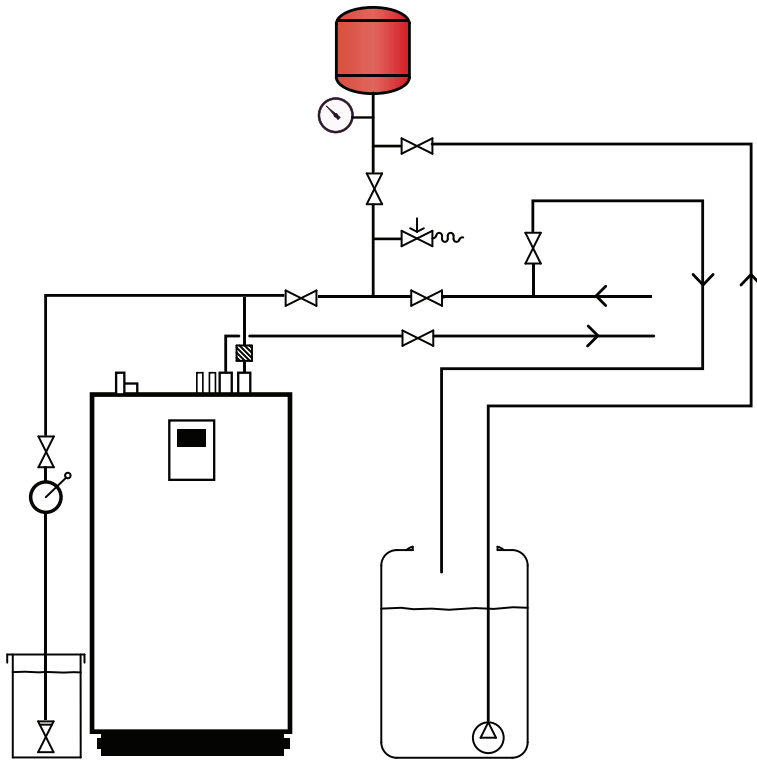


1. Drill holes in the wall for the insert pipes (1) for the brine pipes. Follow the dimension and connection diagrams. If there is any risk of groundwater infiltration at brine pipe lead-ins, watertight grommets must be used.
2. Position the insert pipes (1) in the holes sloping downwards. The inclination must be at least 1 cm every 30 cm. Cut them at an angle (as illustrated) so that rain water cannot get into the pipes.
3. Insert the brine pipes (2) into the insert pipes in the installation room.
4. Fill in the holes around the lines with mortar (3).
5. Ensure that the brine pipes (2) are centered in the insert pipes (1) so that the insulation is distributed equally on all sides.
6. Seal the insert pipes (1) with a suitable sealant (foam) (4).

6.3.2 Connection brine

Mega

- Install a filter (max. mesh size 0.7 mm) in the incoming brine pipe to protect the unit against foreign particles.
- Install the incoming brine pipe with all the accompanying components.
- Install the outgoing brine pipe with all the accompanying components.
- Fit both pipes with anti-diffusion condensation insulation.
- The expansion tank for brine is dimensioned in accordance with the manufacturer's instructions.
- Max. working pressure of heat source: 6 bar.



Antifreeze with anti-corrosive properties must be used in the brine collector circuit, so that frost protection down to $-17 \pm 2^{\circ}\text{C}$ is achieved.

7 Electrical installation

This equipment complies with IEC 61000-3-12 (provided is not applicable for 230V versions) that the short-circuit power S_{sc} is greater than or equal to, see table, at the interface point between the user's supply and the public system. It is the responsibility of the installer or user of the equipment to ensure, by consultation with the distribution network operator if necessary, that the equipment is connected only to a supply with a short-circuit power S_{sc} greater than or equal to see table.

S_{sc}	S-E	S	M	L	XL
MVA	2.1	2.1	2.1	2.4	3.2

The heat pump is connected internally at the factory, for this reason electrical installation consists mainly of the connection of the power supply.

Danger



Electrical voltage!
The terminal blocks are live and can be highly dangerous. All power supplies must be switched off before the electrical installation is started.

Warning



The electrical installation may only be carried out by an authorized electrician and must follow applicable local and national regulations.

Warning



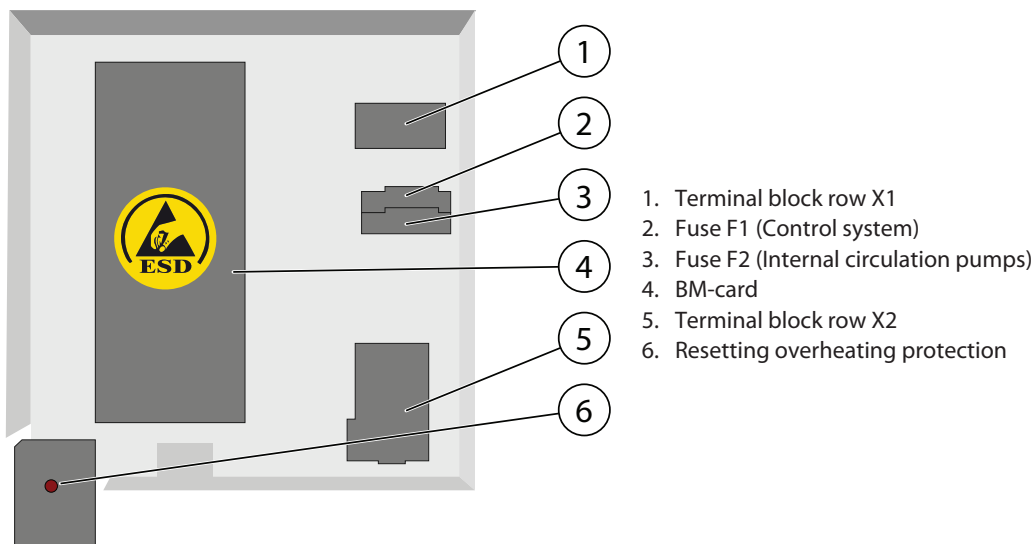
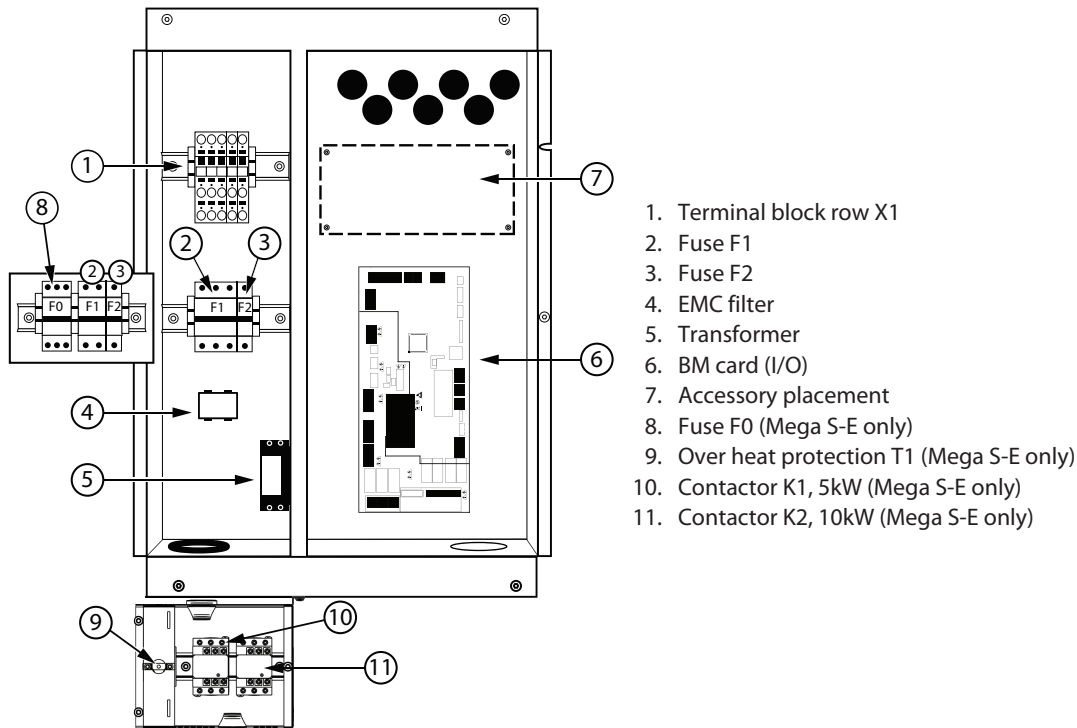
The power cable may only be connected to the terminal block intended for this purpose. No other terminal blocks may be used!

Caution



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

7.1 Electrical components



For Diplomat Inverter M 230 / Diplomat Duo Inverter M 230, Fuse F1 and Fuse F2 are combined.

1. Terminal block row X1
2. Fuse F1 (Control system)
3. Fuse F2 (Internal circulation pumps)
4. BM-card
5. Terminal block row X2
6. Resetting overheating protection

7.2 Fuse size

230V, three phases	Unit	Heat pump	Heat pump + Immersion heater			Immersion heater only		
			3 kW	6 kW	9 kW	3 kW	6 kW	9 kW
230V, 3~, 3-12 kW	A	25	32	40	50	10	20	25

230V, three phases	Unit	Heat pump	Heat pump + Immersion heater			Immersion heater only		
			2 kW	4 kW	6 kW	2 kW	4 kW	6 kW
230V, 3~, 1,5-7 kW	A	16	20	25	32	10	10	16

230V, one phase	Unit	Heat pump	Heat pump + Immersion heater			Immersion heater only		
			1,5 kW	3 kW	4,5 kW	1,5 kW	3 kW	4,5 kW
230V, 1N~, 3-12 kW	A	25	32	40	50	10	16	25

230V, one phase	Unit	Heat pump	Heat pump + Immersion heater			Immersion heater only		
			2 kW	4 kW	6 kW	2 kW	4 kW	6 kW
230V, 1N~, 1,5-7 kW	A	16	25	32	40	10	20	32

Heat pump	Unit	S	M	L	XL
400V~3N 50 Hz heat pump	A	C32	C40	C50	C63

Heat pump	Unit	Compressor only	Compressor + Step 1 (5kW)	Compressor + Step 2 (10kW)	Compressor + Step 3 (15kW)
Mega S-E 400V~3N 50 Hz	A	C32	C32	C40	C50

Heat pump	Unit	S	M
230V~3 50 Hz heat pump	A	C50	C63

7.3 Mega S and S-E ²

Rad out °C	Estimated current (A) for S & S-E (400V~3N)						
65 °C	-	-	15,0	25,2¹	25,2¹	25,1	25,0
60 °C	-	15,6	22,9	23,0	23,1	23,0	22,9
55 °C	14,1	20,8	21,1	21,2	21,2	21,2	21,0
50 °C	19,0	19,3	19,5	19,6	19,6	19,5	19,3
45 °C	17,8	18,0	18,2	18,2	18,2	18,0	17,8

Rad out °C	Estimated current (A) for S & S-E (400V~3N)						
40 °C	16,7	16,9	17,0	17,0	16,9	16,7	16,3
35 °C	15,8	15,9	15,9	15,8	15,6	15,3	14,9
30 °C	14,9	14,9	14,9	14,7	14,3	13,9	13,3
Brine in °C	-10	-5	0	5	10	15	20

1) Highest current

2) The table only includes estimated current in compressor-only operation. Since Mega S-E also have a built-in immersion heater, its estimated current must be added separately to the table values, with consideration on how many steps that are planned to be used. To include immersion heater estimated current,

- for Step 1 (5kW) : add 7,2 A to table value.
- for Step 2 (10kW): add 14,5 A to table value.
- for Step 3 (15kW): add 21,7 A to table value.

7.4 Connecting external supply voltage

7.4.1 Connect external supply voltage

Danger



Electrical voltage! The power cable may only be connected to the terminal block intended for this purpose. No other terminal block may be used.

Caution



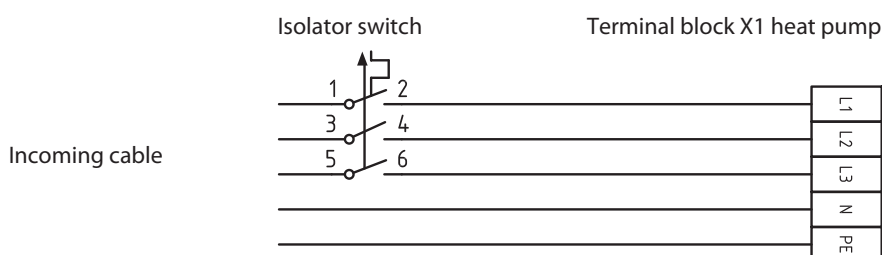
A 400V heat pump can not be wired to work on a 230V power grid, and vice versa. Make sure you follow the right wiring instructions, or it can result in critical material damage.

The frequency converter has a high leakage current and must be earthed appropriately for safety reasons according to EN 61800-5-1. The earth leakage current from the frequency converter exceeds 3,5 mA. Therefore is a good mechanical connection from the earth cable to the earth connection important, the cross-section for the protective earthing conductor must be at least 10 mm².

If the heat pump is connected to mains via a residual-current circuit breaker (RCCB). The RCCB should be of type B.

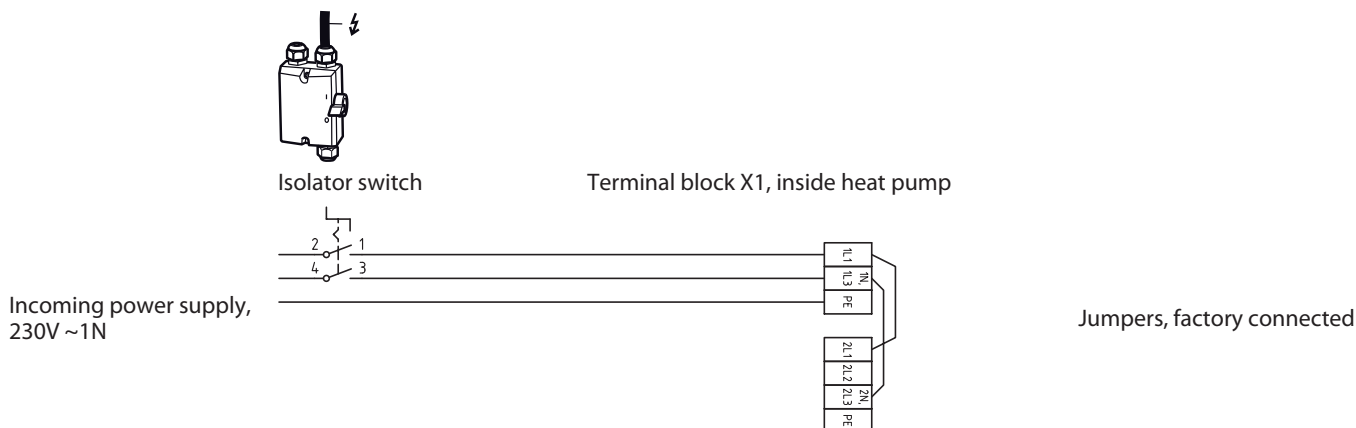
1. Remove the front cover from the heat pump.
2. Route the power cable through the opening in the top panel of the heat pump to the terminal blocks.
3. Localise terminal block row X1
4. Connect the power cables as follows.

7.4.2 Connection 400 V, 3-phase models

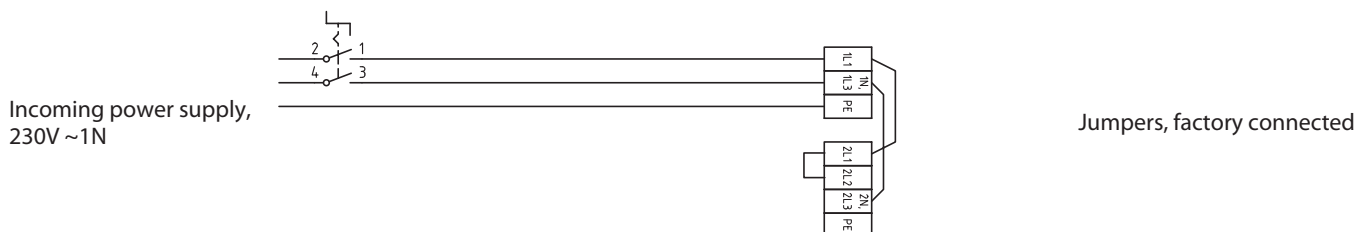


7.4.3 Connection 230V, 1-phase: Heat pump (compressor) and immersion heater with one supply line

Diplomat Inverter M, Diplomat Duo Inverter M

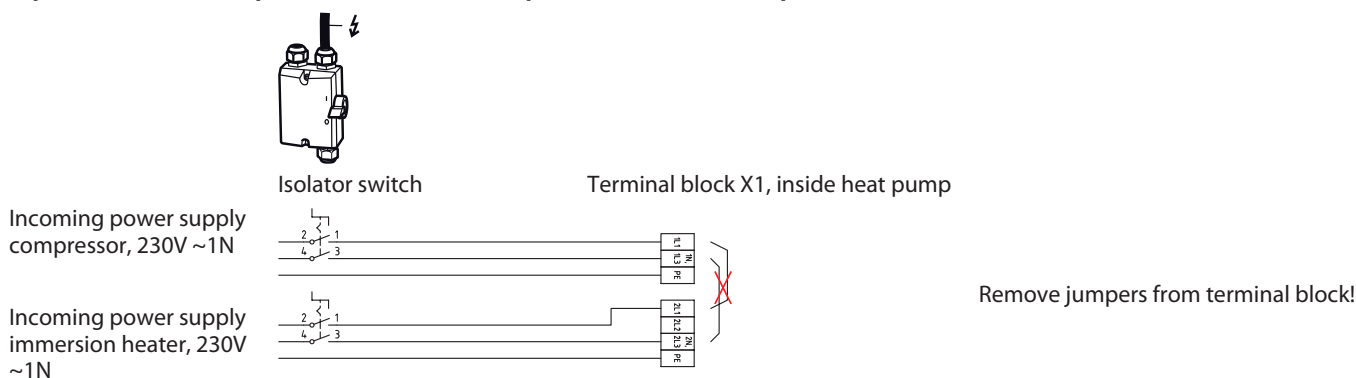


Diplomat Inverter Mini



7.4.4 Connection 230V, 1-phase: Heat pump (compressor) and immersion heater with two supply lines

Diplomat Inverter M, Diplomat Duo Inverter M Diplomat Inverter Mini, Diplomat Duo Inverter Mini



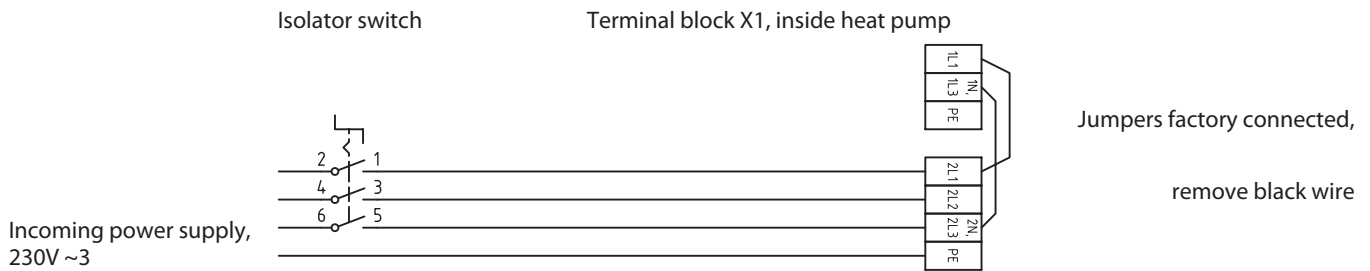
7.4.5 Connection 230V, 3-phase: Heat pump (compressor) and immersion heater with one supply line

Diplomat Inverter M, Diplomat Duo Inverter M Diplomat Inverter Mini, Diplomat Duo Inverter Mini



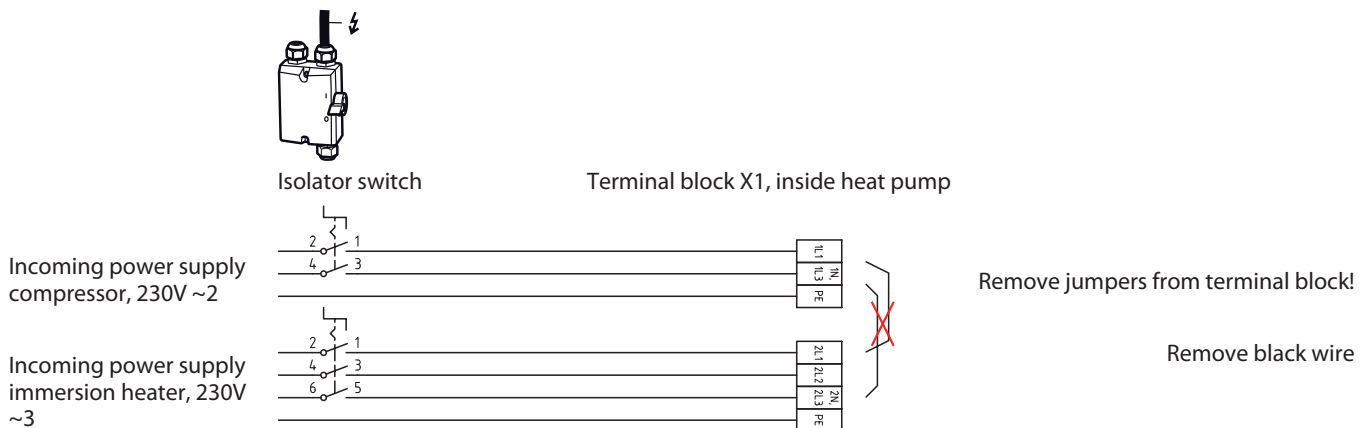
Installation Guide

Mega



7.4.6 Connection 230V, 3-phase: Heat pump (compressor) and immersion heater with two supply lines

Diplomat Inverter M, Diplomat Duo Inverter M Diplomat Inverter Mini, Diplomat Duo Inverter Mini



7.5 Network connection, Online and setting up primary and secondary functionality

Thermia Online

The heat pump is factory prepared for monitoring (and as an additional service being operated) remotely via internet. (Thermia Online) In order to use the Thermia Online service:

- Make sure that there is an available internet connection (router or equivalent) in the building
- An account and registration is required to use the Thermia Online service.
For more information, see:
www.thermia.com/documents
- Make a note of the heat pump MAC-address. The MAC-address is available in the Network menu in the display

Bear in mind that firewalls, deficient connections etc. can cause problems that will prevent desired functionality. Some operators, municipal networks etc. does not allow traffic through their firewalls.

Contact the internet service provider or network administrator if there are any such problems.

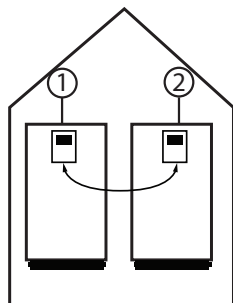
Connecting to internet

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 cross over cable).

Example below with no external network connection (for installations with only one secondary unit):

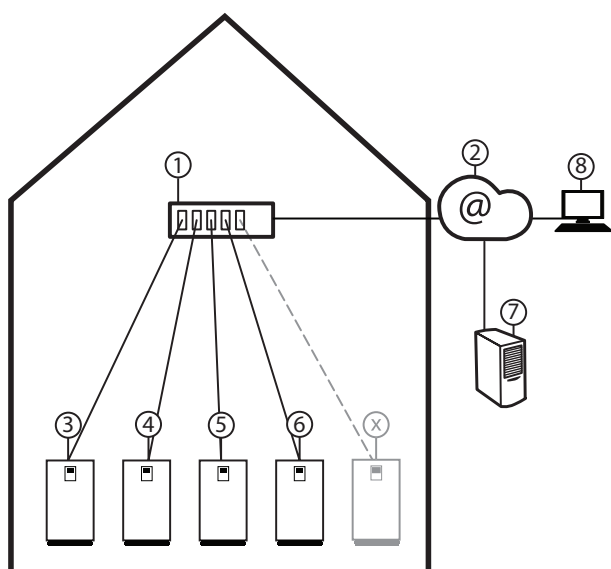
(This solution will NOT provide internet functionality. See next example if internet functionality, or router solution, is desired)

Ethernet cable: Standard Cat 5 network cable, RJ 45.



1. Primary (controlling) heat pump with IP address e.g. 192.168.0.100
2. Secondary heat pump with IP address e.g. 192.168.0.101

Example below with external network connection (for installations with one or more secondary units):

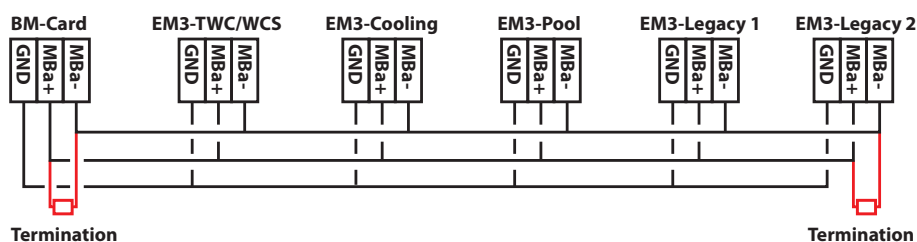


- 1 Router/Switch
- 2 Possibility of internet access via router
- 3 Primary (controlling) heat pump with IP address e.g. 192.168.0.100
- 4 Secondary heat pump with IP address e.g. 192.168.0.101
- 5 Secondary heat pump with IP address e.g. 192.168.0.102
- 6 Secondary heat pump with IP address e.g. 192.168.0.103
- X Secondary heat pump with IP address e.g. 192.168.0.XXX
- 7 Online Web server and database
- 8 Online web browser

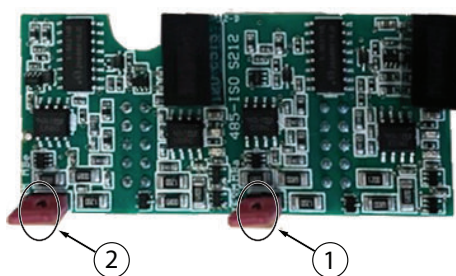
7.6 Termination on both ends of accessory- and/or BMS communication network

Termination of a communication network is needed whenever the Modbus connection is used. This to ensure that the receiver is getting the maximum signal power, by matching the characteristic impedance of the cabling using termination jumpers on each end of the communication network.

Below is a schematic example of a series of accessories and where to put the termination jumpers accordingly:



For mounting the jumper on an accessory unit, see the respective manual for that accessory. The jumpers on the BM-card in the heat pump are mounted as default, on the additional ISO-card (adjacent to the MBa2 and MBe inputs), see picture below. Remove relevant jumper if the heat pump is no longer at either end of the communication network.



1. MBa2 (expansion)
2. MBe (BMS)

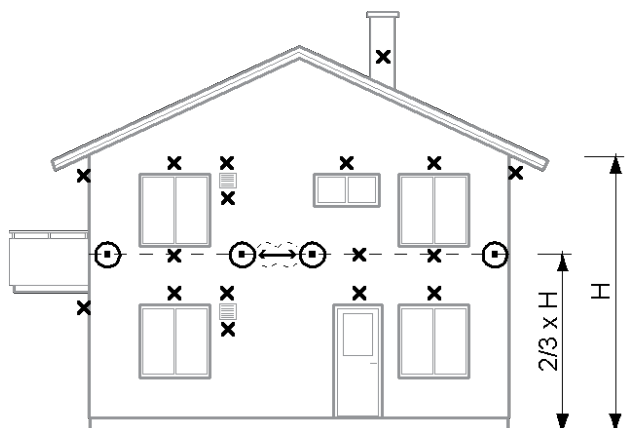
Galvanic isolation

The ISO-card mounted on the BM-card has two optocouplers serving as galvanic isolation. This to reduce any transmission errors caused by ground loop interference in the system's ground scheme.

7.7.2 Positioning and connecting outdoor sensor

Recommended location --> ●

Unsuitable location --> X



The outdoor sensor is connected by a two core cable. A maximum cable length of 50 m applies for a cross section of 0.75 mm². For greater lengths a cross section of 1.5 mm² is used, up to a maximum of 120 m.



For high buildings, the sensor should be positioned between the second and third storey. Its location must not be completely protected from the wind but not in a direct draft. The outdoor sensor should not be placed on reflective panel walls.



The sensor must be positioned at least 1 m from openings in the walls that emit hot air.

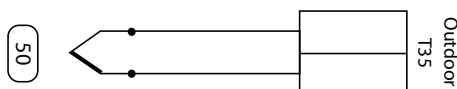


If the sensor cable is connected through a pipe, the pipe must be sealed so that the sensor is not affected by outgoing air.

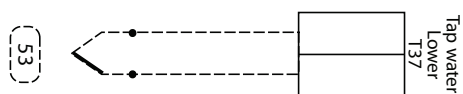


The outdoor sensor must be of PT1000 type.

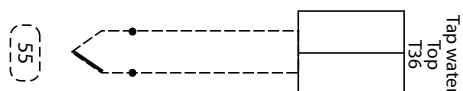
1. Position the outdoor sensor on the north or north west side of the house.
2. Connect the sensor to the heat pump's control system.



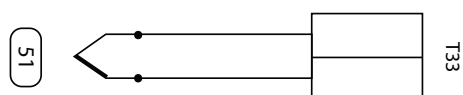
7.7.3 Connecting lower tap water sensor



7.7.4 Connecting top tap water sensor

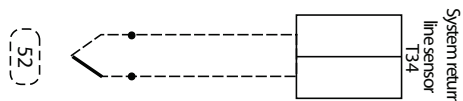


7.7.5 Connecting system supply line sensor



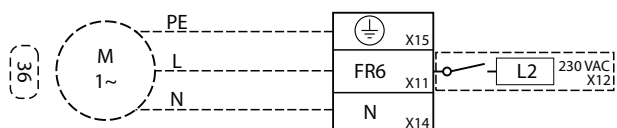
The system supply sensor must always be installed on the system's supply line after the auxiliary heating. The sensor must be positioned so that the hot water is mixed properly before passing the sensor.

7.7.6 Connecting system return line sensor



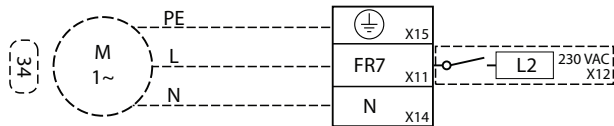
Depending on the design of the heating system it is possible to connect a system return line sensor as an accessory. This sensor is placed on the return line of the system before it goes back to the heat pump.

7.7.7 Connecting system pump

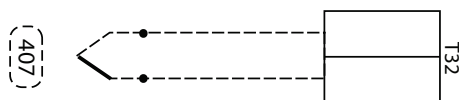


Start/stop of building's system pump 230 VAC.

7.7.8 Connecting hot gas pump with 230V supply

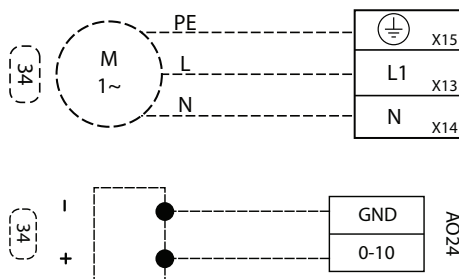


7.7.9 Connecting hot gas pump sensor

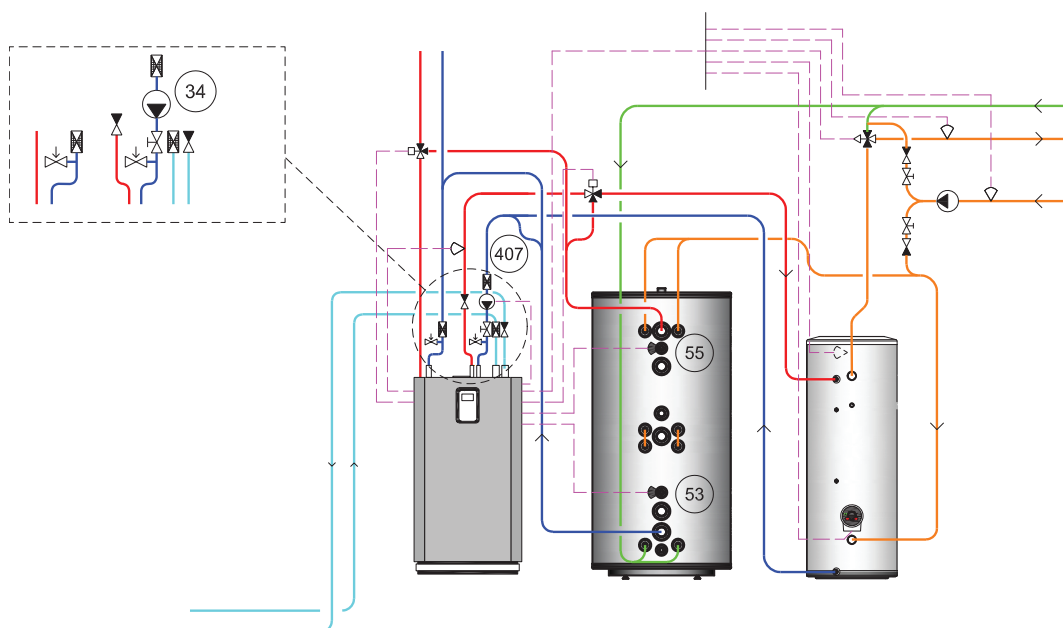


7.7.10 Connecting hot gas pump with 0-10V control signal

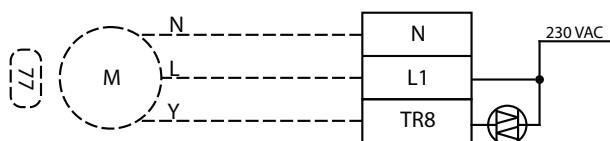
Note: You can only choose either one of the functions **Variable speed hot gas (34, 407)** or **Distribution circuit 1 (107, 108)**. So if you already installed **Distribution circuit 1**, **Variable speed hot gas** will not be an available connection.



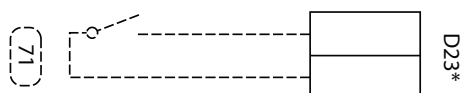
In order to get this function, **Hot water sensor top (55)** and **Hot water sensor lower (53)** needs to be installed, as seen in the system picture below.



7.7.11 Connecting reversing valve for tap water

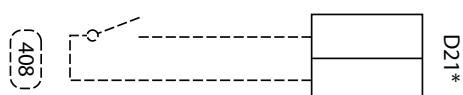


7.7.12 Connecting pressure sensor and/or flow sensor



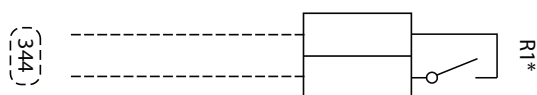
* See opening text in this chapter regarding "Dynamic allocation"

7.7.13 Connecting EVU



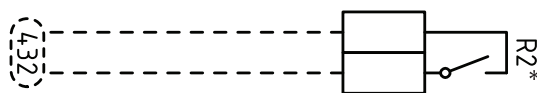
* See opening text in this chapter regarding "Dynamic allocation"

7.7.14 Connecting external sum alarm



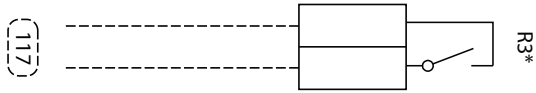
* See opening text in this chapter regarding "Dynamic allocation"

7.7.15 Connecting compressor in operation



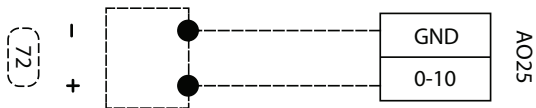
* See opening text in this chapter regarding "Dynamic allocation"

7.7.16 Connecting control signal (start/stop) for auxiliary heating



* See opening text in this chapter regarding "Dynamic allocation"

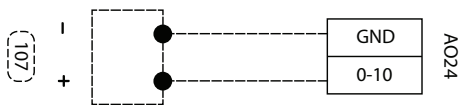
Connection 0-10V



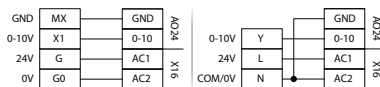
- **24V:** Connect control signal to input 0-10 and GND (AO25). Power supply is drawn from terminals AC1-AC2 (X16).
- **230V:** Power supply is drawn from terminals L1 (X13) and N (X14).

7.7.17 Connecting distribution circuit 1

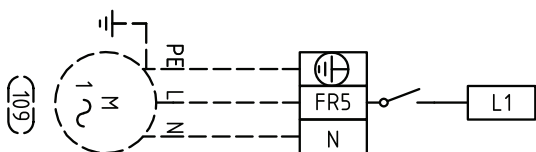
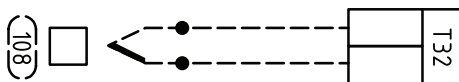
Note: You can only choose either one of the functions **Distribution circuit 1 (107, 108)** or **Variable speed hot gas (34, 407)**. So if you already installed **Variable speed hot gas**, **Distribution circuit 1** will not be available for connection.



Example 4-wire heat shunt and 3-wire heat shunt:



*When AC2 is connected to G0 then AC2 must be connected to G0 for all applications!



7.8 Conversion table for sensors, PT-1000

When reading the resistance of the sensors, the sensor leads must first be disconnected from the control equipment. First measure the sensor and cable. Then measure the sensor only.

°C	ohms
-30	882
-20	921
-10	960
0	1000
10	1039
20	1078
30	1117
40	1155
50	1194
60	1232
70	1270
80	1309
90	1347
100	1385
110	1422
120	1460
130	1497

8 Installation protocol and customer information

After installation and test operation, the customer must be informed about their new heat pump installation. In the *User guide* there is a checklist regarding the information that the installer must give the customer.



The serial number must always be given for warranty matters.
Always make a note of the serial number in the installation protocol in the User Guide.

8.1 Installation protocol

Fill in the Installation protocol in the *User Guide*.



Thermia AB
Box 950
SE 671 29 ARVIKA
Phone +46 570 81300
E-mail: info@thermia.com
Internet: www.thermia.com

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