PROCEDURE FOR OPERATION AND INSTALLATION

HEAT PUMPS
TERMET HEAT TITANIUM

Reversible heat pump with inverter compressor

Please read these operating instructions and keep them for the entire duration of the heat pump's use.

CONTENTS

1. INTRODUCTION

1.1. Explanation of symbols

The manual uses warning slogans that must be observed.

⚠ DANGER

Danger means a risk of injury that threatens health or even life.

⚠ WARNING

Warning means risk of damage to property.

ⓘ

Important information that does not signal a risk of damage or injury is marked with the above symbol.

1.2. Safety guidelines

⚠ WARNING

Before installing the unit, read the warnings and information in the following instructions. Failure to heed warnings may result in serious personal injury, death or property damage. This manual contains important information that will facilitate the operation and maintenance of the heat pump. It should be kept for future reference.

Before starting installation work and before operating the appliance, read this manual in its entirety and the instructions of other cooperating devices.

1.2.1. Working conditions

The product may only be used in accordance with its intended use and the guidelines in this manual. Use of the product for other purposes may involve a risk of danger to human health and life as well as material damage. Installation and commissioning of the unit must only be carried out by persons with the required qualifications for this.

The heat pump is a Monoblock unit designed for outdoor installation.

The heat source for the unit is the outside air. The air flow in and out of the unit must not be obstructed.

The unit is designed for the central heating system and the heating of domestic hot water when a hot water cylinder is connected.

Intended use requires adherence to the operating instructions for the appliance and all associated equipment.

A prerequisite for the safe operation of the heat pump is timely, regular inspection and maintenance.

Only persons who are properly trained in the safe operation of the equipment, who understand the risks and principles of protection against hazards, are permitted to operate and maintain it.

Minors and individuals with reduced physical, sensory, or mental capabilities may only operate the equipment under appropriate supervision and should not be left unattended in the protection zone of the device.

⚠ WARNING

The heat pump must only be operated in closed heating systems equipped with appropriate safety devices, including safety valves in accordance with the applicable standards and regulations.

⚠ DANGER

It is not permitted to use the product contrary to with a purpose.

1.2.2. Required qualifications

In order to carry out work on the equipment, such as installation, commissioning, inspection and maintenance, servicing, dismantling - you must be qualified. Proceed in accordance with local laws and current technical knowledge.

1.2.3. Safety of electrical equipment

⚠ DANGER

A heat pump is an electrical appliance. To avoid the associated risks, the following recommendations should be observed:

- in the event of damage to the power cable or any other cable installed on the installation, switch off the power supply and have the cable replaced immediately by a qualified specialist or company service,
- do not use the appliance if any of the electrical components are damaged,
- the installation of the power supply to the appliance must be carried out by a qualified person in accordance with legal requirements.
- all installation and service work involving the removal of external covers must be carried out with the electricity supply switched off.
- it is forbidden to start up and operate the appliance without the external covers in place.
- cleaning and maintenance of the appliance components including the external covers and system components must be carried out with the electrical voltage switched off.
- any repairs relating directly to the appliance must only be carried out by an authorised service centre.

1.2.4. Danger from flammable refrigerant

⚠ DANGER

The unit is filled with the flammable refrigerant R290 (propane). If a leak occurs, leaking refrigerant can form a flammable mixture with air. Accordingly, a protection zone meeting the specified requirements must be set up around the installation site.

In the event of a leak, leaking refrigerant collects near the ground. Refrigerant must not enter building openings, cavities or drainage systems. The refrigerant must not accumulate in such a way as to create a dangerous, explosive atmosphere. Potential sources of ignition such as electrical switches, electrical sockets, lamps or other potential sources of spark that could cause ignition must not be located in the protection zone. The use of open flames and flammable gases or aerosols is not permitted in the protection zone. Work involving access to the inside of the unit must only be carried out by qualified fitters and service technicians - familiar with the principles of handling flammable refrigerants. Tools and servicing equipment must be approved for working with flammable refrigerants, including R290. Use suitable gas detectors to check for leaks in the refrigeration system. Appropriate safety measures must be in place when working on the refrigeration system - marking the work area, securing it against unauthorised access, eliminating potential sources of ignition, securing it with fire extinguishing agents.

Appropriate protective clothing and other personal protective equipment must be used during the work.

The provisions of the relevant local law must be observed.

1.2.5. Maintenance and Inspections

Regular maintenance is a prerequisite for the correct and safe operation of the heat pump and the heating system.

We recommend that regular maintenance is carried out by authorised installation companies to ensure the correct operating conditions of the unit.

Inspection of the heat pump should take place at least once a year.

1.2.6. Repairs and replacement of parts

The heat pump does not contain any components that can be repaired or altered by the user.

⚠ DANGER

Improperly performed repairs or alterations can cause injury to persons, danger to life or damage to property.

No modifications to the device are permitted.

Safety devices must not be bridged (i.e. blocked from functioning properly).

The safety devices must not be tampered with.

Seals must not be removed.

Any service work must only be carried out by an authorised company service centre.

1.2.7. Safeguards for installation and equipment

The installation diagrams in the manual are for reference only and may not include all the required and necessary safeguards for professional installation of the unit.
When installing the heat pump, all necessary safety features required by local laws, regulations, standards and guidelines must be installed.

1.2.8. Danger of too high or too low a temperature

Certain surfaces of the appliance and installation can be a potential cause of burns or frostbite. Do not touch uninsulated pipe surfaces, heat exchangers. Carry out all service and installation work after the equipment has been switched off and has reached ambient temperature.
Domestic hot water at the point of use can have a high temperature. Water flowing out at the point of use at temperatures above 50°C can cause scalding, so it is recommended that a thermostatic mixing valve is fitted to the hot water system.

1.2.9. Frost damage

⚠ WARNING

In the event of a power failure, there is a risk of freezing of system components located outside as well as inside the building. It is advisable to keep the installation running at all times to prevent possible freezing. If it is required to shut down the system for an extended period of time, the system must be drained of water.
It is necessary to protect the installation in case of power cuts by using a suitable solution. Damage resulting from inadequate frost protection of the installation is not covered by the guarantee.

1.3. Warning signs

Symbols are displayed on the unit to warn of the danger of the flammable refrigerant R290.

	Fire hazard - Flammable materials
	Open flames prohibited - Smoking prohibited

Do not remove stickers with warning symbols.

1.4. Applicable law

The user and the installer are obliged to act in accordance with the provisions of local law, to comply with the provisions of standards, directives, regulations and laws.

1.5. Transport and storage

The heat pump is delivered on a pallet to which it has been bolted for transport.

⚠ DANGER

When transporting, always ensure that the pump is moved in a safe manner. Due to its heavy weight, there is a risk of injury in the event of a fall.
The heat pump must always be transported and stored in an upright position. Detailed transport requirements are included later in this manual.

1.6. Decommissioning and treatment of waste equipment

The symbol of the crossed-out rubbish bin on the product, its packaging or instructions means that the product must not be disposed of in normal waste containers.
The user is responsible for handing over the waste equipment to a designated collection point for proper processing.

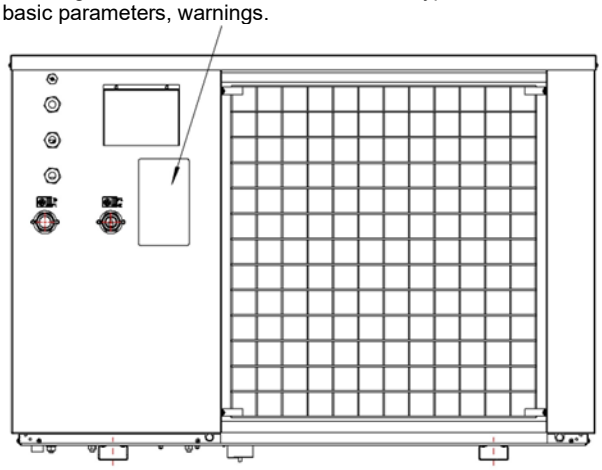
2. DOCUMENTATION

2.1. Products covered by the manual

Observe the provisions of this manual and other instructions concerning components built into the installation and working with the appliance.
This manual applies to the following products:
Termet Heat Titanium Pro 8
Termet Heat Titanium Pro 12
Termet Heat Titanium Pro 15
Termet Heat Titanium Pro 18

2.2. Rating plate

The rating plate is located on the back of the appliance and contains the following information: manufacturer's data, type, index, information on basic parameters, warnings.



2.3. Declaration of Conformity

The heat pump was manufactured in accordance with European directives and national regulations and requirements. Conformity is confirmed by CE marking. A declaration of conformity can be obtained at any time. To do so, please write to the address on the back cover.

2.4. Warranty and service

Detailed warranty conditions and service information can be found in the Termet Heat Pump Warranty and Terms and Conditions.

3. PRODUCT OVERVIEW

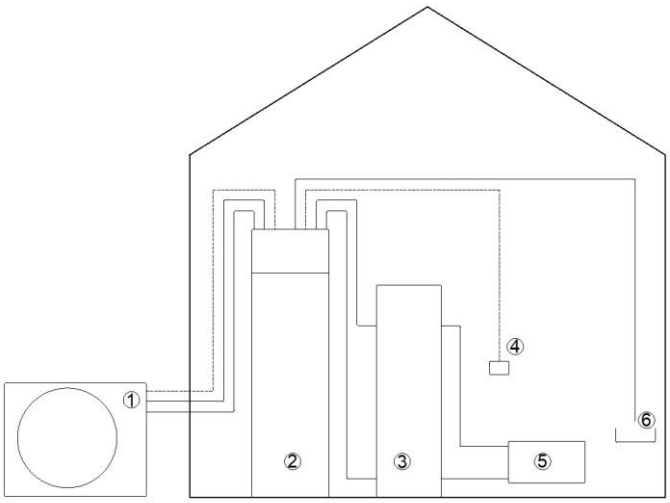
3.1. General information

The Termet Heat Titanium heat pump is designed to supply central heating - central heating, heating of domestic hot water - hot water, it can also perform the cooling function.

The role of the heat pump is to transfer heat from a lower-temperature bottom source to a higher-temperature top source. The air-to-water heat pump uses the outside air as the bottom source for heating the building and preparing domestic hot water. The conversion of energy from outside air to heat the building takes place in three different circuits. In the downstream medium circuit, free thermal energy is extracted from the environment and transported to the heat pump. In the refrigerant circuit, the heat pump transfers heat from the lower source to the heating medium circuit. In the heating medium circuit, heat is transferred to the upper source and distributed around the building.
In cooling mode, heat is extracted from the inside of the building and returned to the outside air (the cycle is reversed).
During the process of transferring heat from the lower source to the upper source, electrical energy is consumed, among other things, to drive the compressor. The amount of electricity consumed and, at the same time, the efficiency of this process strictly depends on the temperature difference between the lower and upper sources. The smaller the difference, the greater the efficiency. However, as the temperature difference increases, the efficiency decreases. Knowing

this relationship, the heating system should be designed and operated in such a way as to make the best possible use of the advantages of a heat pump unit.

The Termet Heat Titanium heat pump is a monoblock unit, i.e. only pipes with water or antifreeze solution transferring heat to the building are run from the heat pump to the building, and the refrigerant circuit installation is hermetically sealed inside the heat pump (mounted outside the building).



Examples of monobloc heat pump system components:
1 - air source heat pump,
2 - hydronic tower with built in controller, hydronic fittings including integrated hot water cylinder,
3 - buffer storage tank,
4 - touch panel,
5 - central heating,
6 - domestic hot water.

The working medium in the Termet Heat Titanium heat pump is the environmentally friendly refrigerant R290 (propane) with a very low GWP.

***GWP** . Global Warming Potential) is an indicator used to quantify the impact of a substance on the greenhouse effect.*

The heat pump is equipped with an inverter, i.e. it automatically regulates the compressor output to match the amount of heat energy supplied to demand.

A reversible 4-way valve is built into the unit to change the direction of the refrigerant flow and, as a result, reverse the direction of the heat flow during the external exchanger defrosting process or in the cooling function.

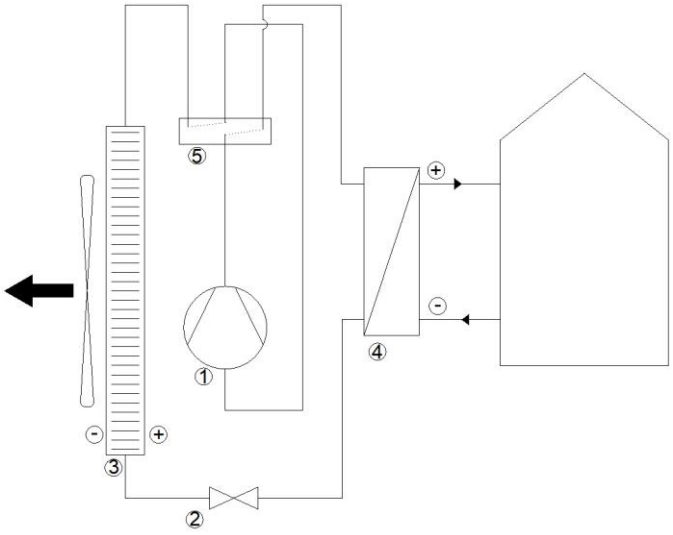
The operation of the heat pump and associated equipment is managed by an HPmulti controller located inside the building. The controller manages the entire operation of the plant, i.e. plant operating parameters, sensor readings, operation of operating schedules. The HPmulti controller is connected to the heat pump via a communication cable. Parameter changes can be carried out locally at the pump using the touch panel or via a wireless connection. For details on how to connect and control, please refer to the rest of this manual and to the HPmulti controller manual.

When the heat pump is operating in heating mode, the external heat exchanger of the heat pump is always colder than the surrounding air as a result of which the water condensing on it freezes. The heat pump controller automatically activates the defrost process, or 'defrost', as required. Thermal energy for defrosting is taken from the heating system. To maintain the heat pump's defrost capability, the temperature of the heating water in the buffer cylinder must not fall below 20°C.

The unit is built with high-quality components and optimised for the highest possible efficiency. The whole is enclosed in an enclosure made of sheet metal protected against external influences.

3.1.1. Heating operation

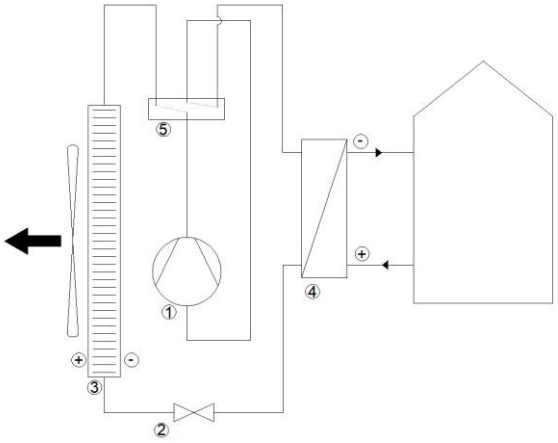
In heating mode, the heat pump extracts heat from the outside air and carries out central heating and DHW preparation.



1 - compressor,
2 - expansion valve,
3 - heat pump-air exchanger
4 - exchanger heat pump - heating system

3.1.2. Cooling operation

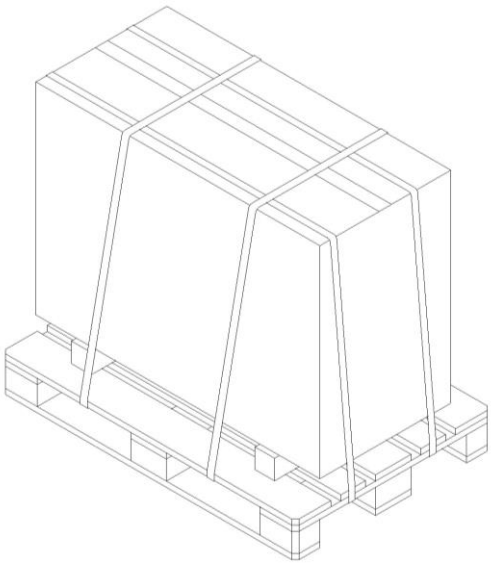
In cooling mode, the circuit is reversed and the heat pump removes heat from the room and transports it outside through the system. For cooling operation, the installation must be specially prepared by the installer.



1 - compressor,
2 - expansion valve,
3 - heat pump-air exchanger
4 - heat pump heat exchanger - cooling system

3.2. Transportation

The heat pump is delivered on a pallet to which it has been bolted. During transport, the pallet should be properly restrained. Lifting of the heat pump should be carried out using forklift trucks, cranes or other devices that guarantee stability.
The maximum permissible tilt during transport is 10°.



For short distances, the heat pump can be lifted and transported by hand.
Heat pump stacking is not allowed.

⚠ DANGER

To prevent injury, those transporting the equipment must use protective clothing including cut-resistant gloves and boots with toe-lifts.
A minimum of 4 people will be required when transporting by hand.
During manual transport, a maximum temporary deviation of 45° is permissible.

⚠ WARNING

If the pump has been tilted more than the above requirements during transport, contact the company service before attempting installation and commissioning.

3.3. Scope of delivery

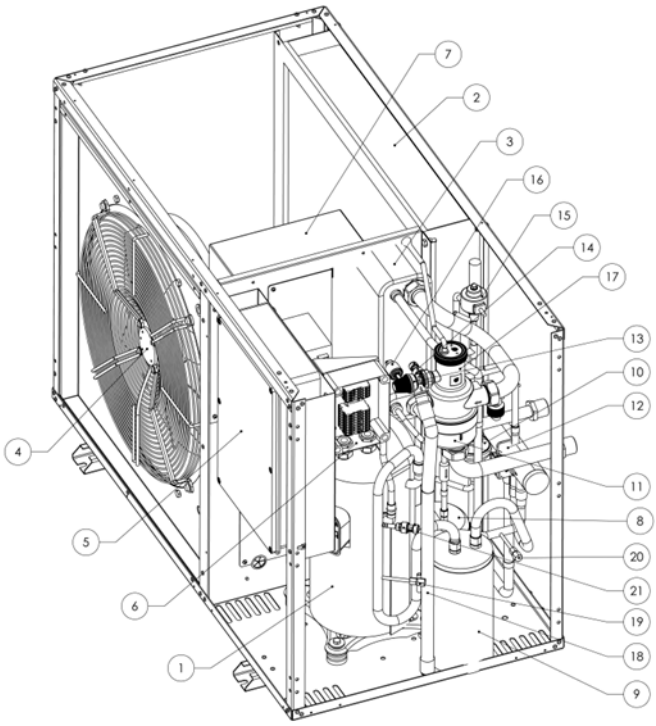
The following components are included in the delivery, depending on the configuration of the kit:

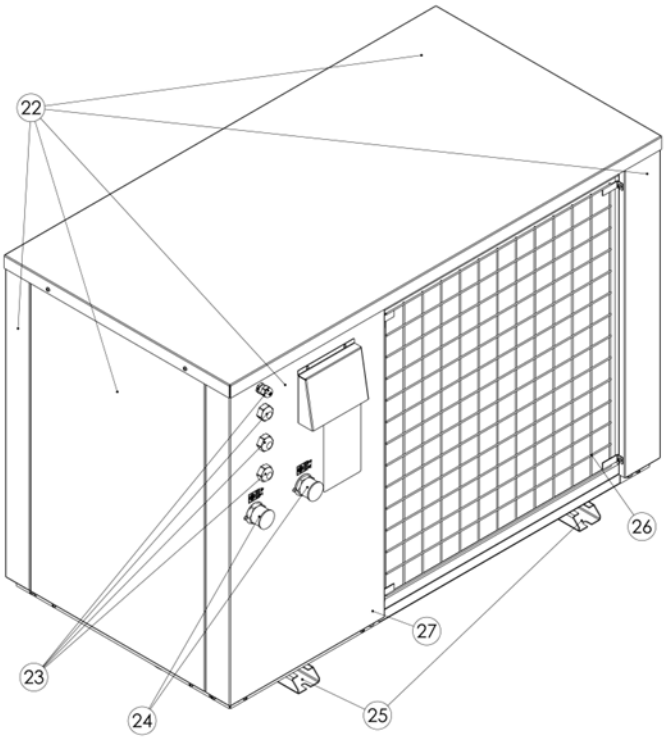
- Termet Heat Titanium heat pump, HPmulti controller,
- Termet Heat Titanium heat pump, hydraulic moduleT-Box
- Termet Heat Titanium heat pump, hydronic module with DHW cylinder T-Block

3.4. Design of the device

The Termet Heat Titanium heat pump is manufactured in two size versions. In addition, high-capacity units have two fans.
The exact external dimensions of each type and how to remove the covers are given later in this manual.
The unit is suitable for outdoor installation and has been manufactured from materials resistant to prolonged exposure to adverse weather conditions.
There are special brackets at the base of the unit for permanent fixing to a concrete foundation or an adapted frame.
The view below shows the main components inside the unit:

1 - compressor,
2 - fin exchanger,
3 - plate heat exchanger,
4 - fan,
5 - main electrical switchboard,
6 - switchboard with electrical connection rail,
7- inverter
8 - agent tank,
9 - liquid separator,
10 - low pressure side transducer,
11 - filter,
12 - air separator,
13 - reversible 4-way valve,
14 - 2.5bar safety valve,
15 - high pressure side transducer,
16 - expansion valve,
17 - high pressure side pressure switch,
18 - air separator vent,
19 - safety valve drain pipe
20 - low pressure side service valve,
21 - high pressure side service valve,
22 - external covers,
23 - electrical cable grommets,
24 - water connections,
25 - handles,
26 - lamella exchanger cover,
27 - condensate tray drain





3.5. Safety devices

3.5.1. Permitted operating range

The heat pump controller controls operating parameters including the temperature and pressure of the refrigerant circuit. If operating conditions are outside the permitted range, the compressor will be switched off or will not start.

3.5.2. Flow sensor

The flow sensor is installed in the return of the heating medium from the system. If the flow rate of the heating medium is too low, the heat pump will not start or will be switched off during operation. The reason for too low a flow rate can be an insufficient capacity of the upstream circulation pump, too much system resistance, a closed valve, a dirty filter, a vented system, too low a heating medium pressure.

3.5.3. Compressor crankcase heater

When the heat pump is at standstill, if the compressor discharge side temperature falls below 8°C, the compressor crankcase heater will activate to prevent the refrigerant from remaining in the liquid phase, which could damage the compressor during start-up.

3.5.4. High pressure switch

The unit is equipped with a high-pressure switch installed in the refrigerant circuit. The pressure switch has the function of protecting against excessive pressure build-up on the discharge side of the compressor. Its tripping will switch off the compressor. Excessive pressure build-up on the discharge side of the refrigerant circuit can be caused by insufficient heat removal from the condenser.

3.5.5. Air separator with safety valve

The air separator is installed in the upper source heating circuit at the condenser outlet. The device has two safety functions:

- Protects the circuit from being clogged,
- In the event of condenser failure due to condenser leakage, there is a risk of the refrigerant entering the heating system and further into the building through the vents installed - the separator's task is to capture the refrigerant and discharge it through the safety valve installed on the separator and further through a drain pipe outside the heat pump to the outside atmosphere.

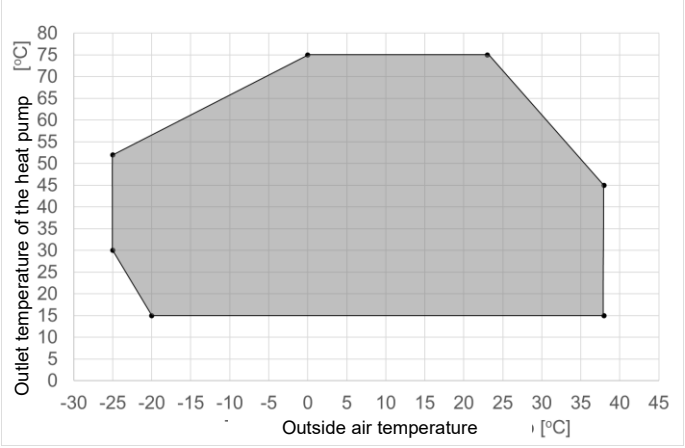
3.5.6. Protection against freezing when stationary

If the return temperature of the system falls below 4°C, the frost protection will be activated when the heat pump is at a standstill. The upper source circulation pump will start. This protection is effective when the heat pump is connected to an efficient power supply and is in heating standby mode.
Irrespective of this protection, additional frost protection must be provided in the event of a power failure or interruption.

3.6. Operational Boundaries

The heat pump operates within certain outside air temperature ranges (minimum and maximum). The external ambient temperature influences the boundary conditions in heating and cooling mode.
Outside the permitted operating area, the unit will not start up or will shut down during operation if conditions are outside the permitted range.

3.6.1. Limiting conditions for heating mode



3.6.2. Limiting conditions for cooling mode

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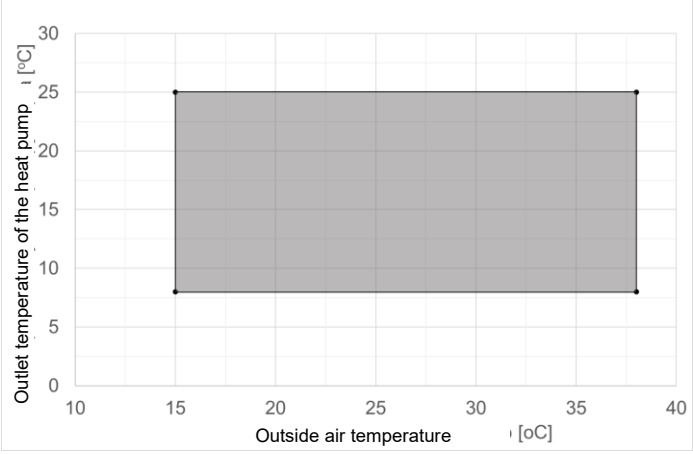


3.7. Table of parameters

Heat pump model			TERMET HEAT TITANIUM PRO 8	TERMET HEAT TITANIUM PRO 12
Energy class for space heating (A7/W35)			A++	A++
Energy class for space heating (A7/W55)			A++	A++
Heating (PN-EN 14511-3:2023)	Heating capacity [kW] Electric power [kW] COP	A7/W35	8,4 1,9 4,5	10,7 2,6 4,1
	Heating capacity [kW] Electric power [kW] COP	A7/W55	8,4 3,0 2,8	10,0 3,8 2,6
Cooling (PN-EN 14511-3:2023)	Cooling capacity [kW] Electric power [kW] EER	A35/W7	4,3 1,9 2,2	6,4 3,1 2,0
	Cooling capacity [kW] Electric power [kW] EER	A35/W18	5,0 1,9 2,6	7,6 3,5 2,2
Heating (PN-EN 14825:2022) Temperate climate conditions	Heating capacity [kW] Electric power [kW] COP	A-10/W35	6,6 3,0 2,2	8,7 4,9 1,8
	Heating capacity [kW] Electric power [kW] COP	A-10/W55	7,4 4,3 1,7	8,4 5,0 1,7
	Heating capacity [kW] Electric power [kW] COP	A-7/W34	6,8 2,5 2,7	8,6 3,9 2,2
	Heating capacity [kW] Electric power [kW] COP	A-7/W52	6,7 3,3 2,0	8,9 5,0 1,8
	Heating capacity [kW] Electric power [kW] COP	A2/W30	4,1 1,0 4,0	5,2 1,2 4,2
	Heating capacity [kW] Electric power [kW] COP	A2/W42	4,0 1,2 3,3	5,3 1,7 3,2
	Heating capacity [kW] Electric power [kW] COP	A7/W27	3,6 0,6 6,0	3,8 0,6 6,5
	Heating capacity [kW] Electric power [kW] COP	A7/W36	3,5 0,7 4,7	4,0 0,8 4,8
	Heating capacity [kW] Electric power [kW] COP	A12/W24	4,1 0,6 7,3	3,8 0,48 7,9
	Heating capacity [kW] Electric power [kW] COP	A12/W30	4,0 0,7 6,0	3,8 0,6 6,1
Power supply			400 V, 50Hz, 3~/N/PE	400 V, 50Hz, 3~/N/PE
Ambient temperature during operation, °C			-25 ÷ 43	-25 ÷ 43
Temperature range of the heating medium, °C			20 ÷ 65[1] 20 ÷ 75[2]	20 ÷ 65[1] 20 ÷ 75[2]
Maximum DHW temperature, °C			55	55
Refrigerant R290 (GWP: 3) [kg]			1.5	1.7
Compressor			scroll	scroll
Evaporator			finned heat exchanger	
Condenser			plate heat exchanger	
Electronic expansion valve			electronic	
IP degree (protection level)			IPX4D	IPX4D
Sound power level dB(A)			64	64
Water pressure drop, kPa			8	10
Minimum water flow, m³/h			0,9	0,9
Heating medium circuit connections (male thread)			G 1”	G 1”
Device dimensions (width x depth x height), mm			1150×620×1500	1150×620×1500
Packaging dimensions (width x depth x height), mm			1200×800×1069	1200×800×1069
Net/gross unit weight, kg			153/175	157/179

1–without additional heater in the system 2 – with an additional heater in the system

4. INSTALLATION

4.1. General guidance

The heat source for the heat pump is the outside air, so it must be installed outside the building in a place where there will be free flow of atmospheric air. The heat pump is designed to be installed on a firm and level base capable of supporting the weight of the unit.

In order to minimise hydraulic resistance, it is recommended that the heat pump is placed as close to the building as possible, with a minimum distance from walls and protection zones. The pipework then has the smallest length, this is beneficial in terms of potential heat loss and minimises hydraulic resistance.

4.2. Site selection

The following guidelines should be observed when selecting a heat pump installation site:

- take into account the minimum installation distances,
- position the unit for easy service access,
- respect the protection zone,
- installation parallel to the building wall is recommended (air outlet perpendicular to the wall),
- choose a location sheltered from strong winds; if necessary, plan to erect a curtain wall,
- do not install the unit in a recess in the ground or between walls to ensure easy air exchange,
- air must not be recirculated,
- the air must not be contaminated with dust or aggressive pollutants,
- mount away from inlet and outlet grilles of ventilation systems, eaves, etc.
- install away from sources of heat, sparks, flammable gases, open flame,
- the ground must be stable in order to ensure a firm foundation for the heat pump that excludes any movement due to precipitation, ground freezing or strong winds,
- the unit can be sited on a concrete foundation or system bases selected to take into account the weight of the heat pump,
- the heat pump must be levelled,
- plan a passage through the building wall for plumbing and electrical cables,
- provision must be made for the condensate from the heat pump to be discharged into a sewer or suitably absorbent substrate,
- condensate drainage must be ensured under all temperature conditions, even during frosty weather, to avoid the formation of water ponding or icing,
- installation on the north side of the building is recommended so that the heat pump is not exposed to intense sunlight during the summer months,
- avoid exposing the unit to dirt from plants; fallen leaves and other parts of trees or shrubs can contaminate the heat pump exchanger,
- the air outlet of the heat pump should be located at a sufficient distance from pedestrian walkways, min. 3m, the air escaping from the heat pump may be at a negative temperature following which there is a risk of ice forming on the pavement,
- the air outlet must not be directed towards drainpipes or other components for which the negative outlet temperature from the heat pump fan could cause potential damage,
- for reasons of noise, installation in the corners of the building or between walls that may reflect noise is not recommended,
- it is advisable to install in a location where the ground around the heat pump diffuses noise (lawns, gravel surfaces, flower beds), paved surfaces are less favourable,
- if installed in manoeuvring areas where vehicles are moving, provide protection against potential damage from moving vehicles,
- avoid installation in places where a lot of snow may accumulate, in the event of heavy snowfall continuously remove snow from the area around and under the unit, snow accumulation may lead to blockage of the exchanger and the fan,
- the unit must not be flooded with water from leaking or obstructed gutters,
- protect the unit against snow sliding off the roof or icicles breaking off by placing the unit at a suitable distance from the building or building a special canopy,
- it is recommended to install away from bedrooms, rest areas, balconies,
- it is recommended to install as far as possible from the windows of buildings on neighbouring plots,
- provide sufficient noise protection for neighbouring plots, e.g. by erecting a noise barrier (planting vegetation, noise-diffusing fencing).

⚠ DANGER

Potential ponding of water or ice can cause slipping and falling, posing a potential risk to human health and life, so it is important to follow the recommendations related to the correct drainage of condensate generated during heat pump operation, and to ensure adequate distance from pedestrian walkways.

4.3. Protection zones

The heat pump contains the flammable refrigerant R290 (propane). If a leak occurs, leaking refrigerant can form a flammable mixture with air. The refrigerant R290 has a density greater than air and can therefore accumulate near the ground and in cavities. Accordingly, a protection zone meeting the specified requirements must be set up around the installation site.

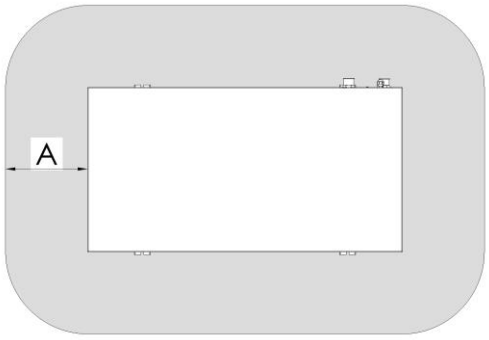
In the event of a leak, leaking refrigerant collects near the ground. Refrigerant must not enter building openings, cavities or drainage systems. The refrigerant must not accumulate in such a way as to create a dangerous, explosive atmosphere. Potential sources of ignition such as electrical switches, electrical sockets, lamps or other potential sources of spark that could cause ignition must not be located in the protection zone. The use of open flames and flammable gases or aerosols is not permitted in the protection zone. Do not use spark-generating tools in the protection zone. There must be no hot surfaces in the protection zone, the temperature of which may exceed 360°C.

The protection zones must not enter the area of window and door openings, ventilation grilles, sewer grilles. Protection zones must not extend beyond the plot boundary and public thoroughfares.

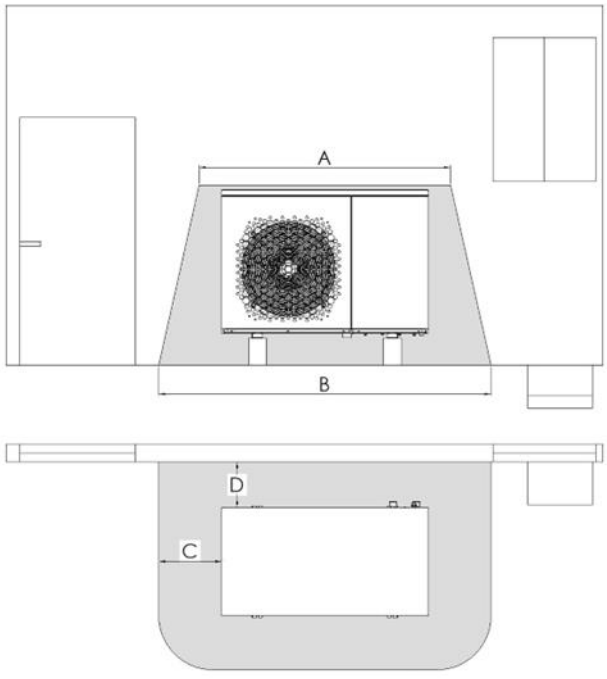
It is the responsibility of the heat pump user to maintain the protection zones.

No changes are permitted within the conservation zones affecting the above guidelines.

Protection zone in case of installation away from building
A 1000mm



Protection zone in case of installation next to a building
A 2250mm
B 3150mm
C 1000mm
D 500mm

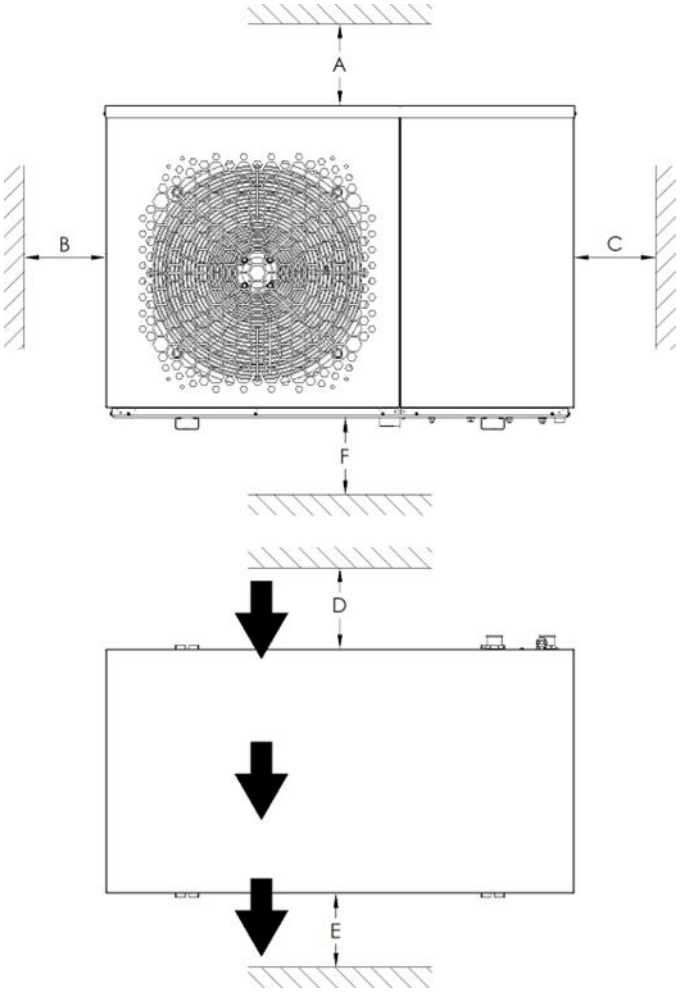


4.3.1. Minimum distances

In addition to the protection zones, minimum foundation distances must be applied to ensure proper operation of the heat pump and to allow for servicing:

A,D 500mm
B,C 1000mm
E 2000mm
F 200mm

Note: The bold arrows show the direction of airflow through the heat pump exchanger.



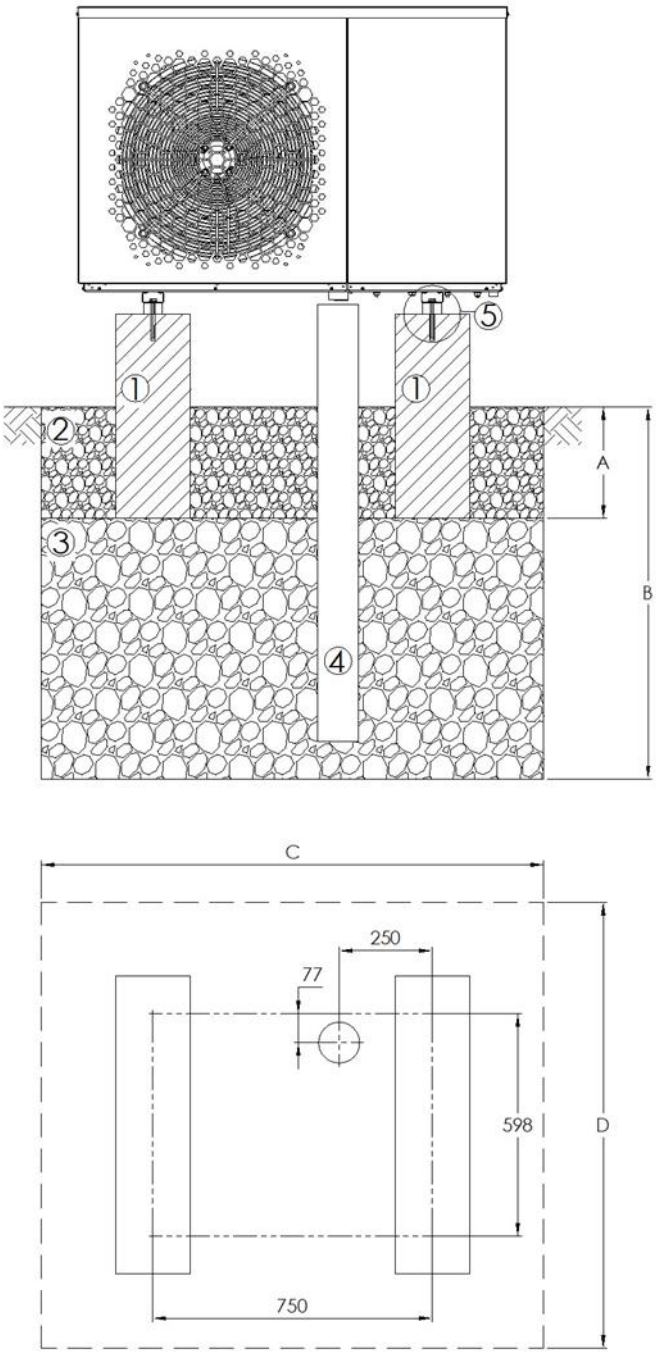
4.3.2. Heat pump mounting base

The unit can be placed on a concrete foundation or on system brackets/frames. When selecting the bracket, attention should be paid to the spacing of the holes for fixing the heat pump and the permissible load.
Local terrain and climatic conditions should be taken into account. The ground on which the heat pump will be set must be strong and stable to ensure a firm foundation that excludes any movement due to precipitation, ground freezing or strong winds.
The heat pump has profiles with holes at its base through which the unit must be screwed to the foundation or to the frame.
The use of rubber cushioning pads/bushes is recommended.

4.3.3. Condensation

During operation, the heat pump exchanger, which extracts heat from the outside air, is always colder than the ambient temperature. This difference causes condensation of water from the air flowing through it. When the heat pump is operating in heating mode, the heat exchanger (evaporator) draws heat from the environment, potentially causing its temperature to fall below the air dew point. In such conditions, moisture can accumulate on the surface of the exchanger and condense. The amount of condensation depends on temperature and humidity. To ensure proper operation of the unit, it is necessary to ensure that the condensate is properly drained into a sewer or a suitably absorbent substrate—a drain. Condensate drainage must be maintained under all temperature conditions, including frosty weather, to avoid water ponding or icing up. The heat pump is equipped with a condensate tray to collect most of the condensation water. Water from the condensate tray is drained through a hole at the bottom of the heat pump, which is terminated by a section of pipe with an external diameter of 50mm. The condensate tray includes a heating cable with a free length of 50cm. The free section of the heating cable should be routed outside through a pipe placed in the condensate tray.

Example of heat pump foundation with drainage system in place.



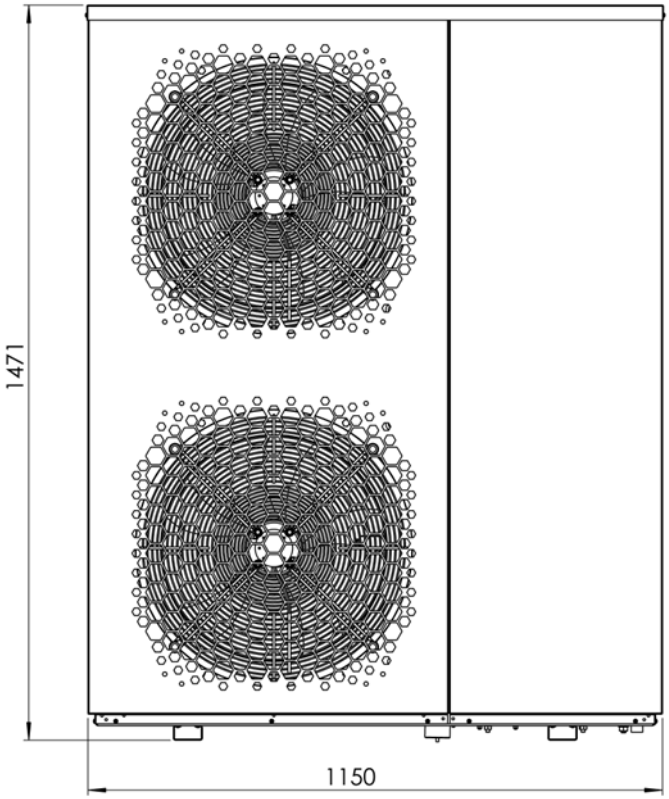
1 - frost-resistant concrete foundation,
2 - layer of fine gravel, dimension A min. 300mm
3 - compacted layer of coarse gravel / ballast, dimension B min to a depth greater than the local ground frost zone.
4 - sewer pipe with a diameter of min. 100mm
5 - anchoring to concrete with anchors with a shank diameter of 10mm to a depth of min. 100mm.

Outline of the completed heat pump substructure minimum dimensions:
C 1400mm
D 1200mm

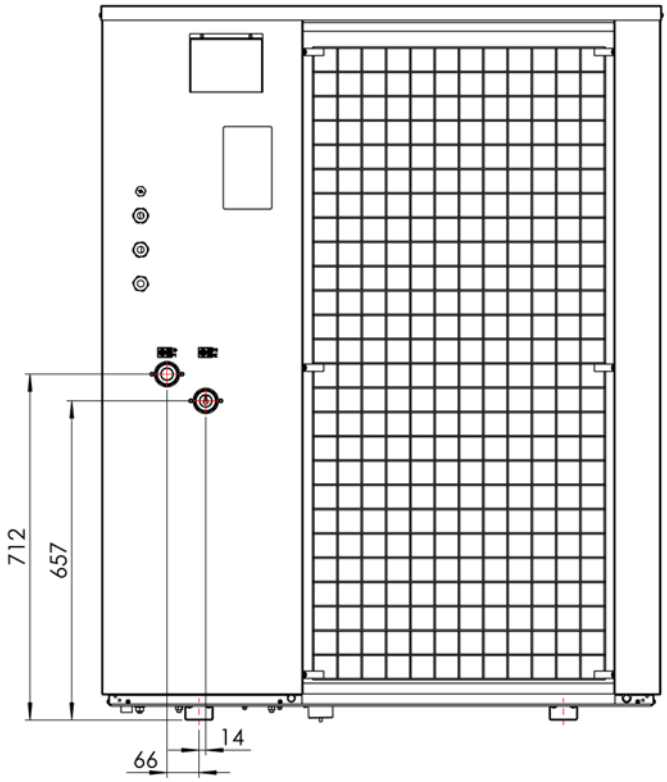
4.4. Dimensions and connections

4.4.1. External dimensions

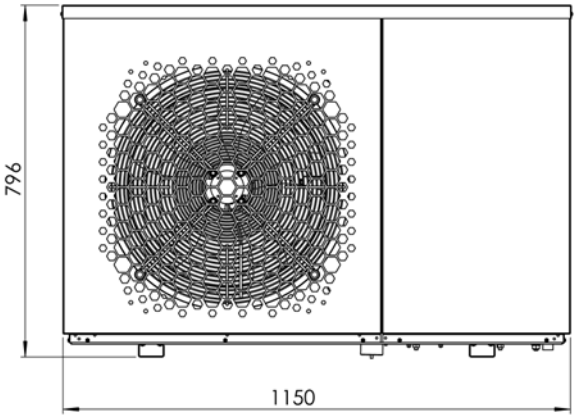
Front view
TERMET HEAT TITANIUM PRO 15-18



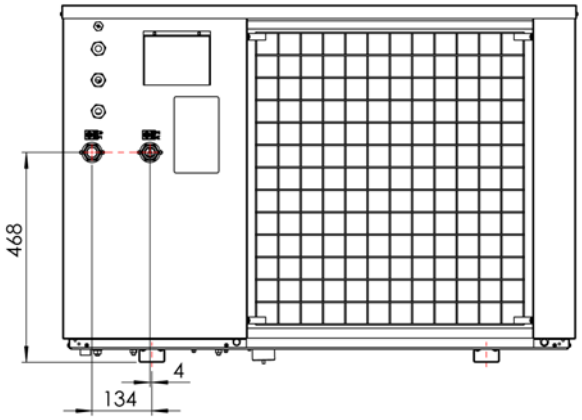
Rear view
TERMET HEAT TITANIUM PRO 15-18



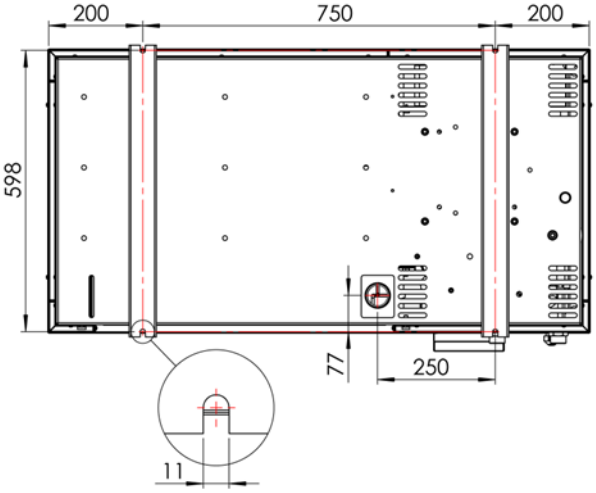
Front view
TERMET HEAT TITANIUM PRO 8 - 12



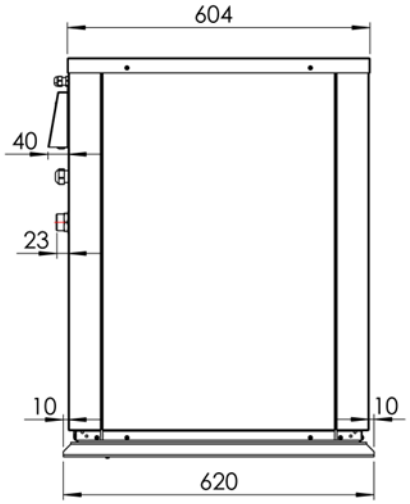
Rear view
TERMET HEAT TITANIUM PRO 8 - 12



Bottom view
TERMET HEAT TITANIUM PRO 8 – 18



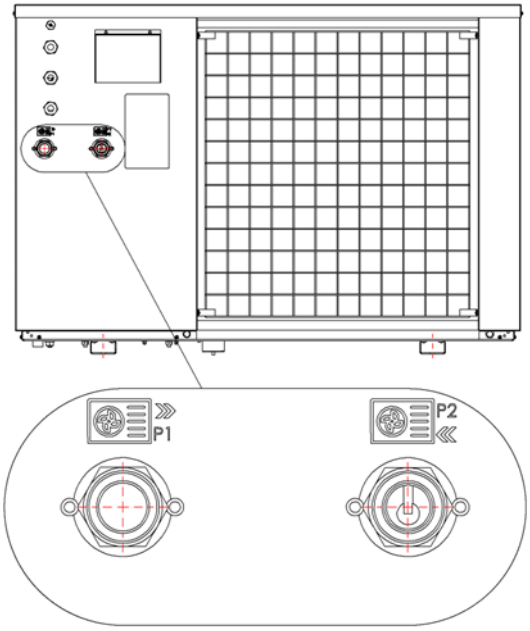
Side view
TERMET HEAT TITANIUM PRO 8 - 18



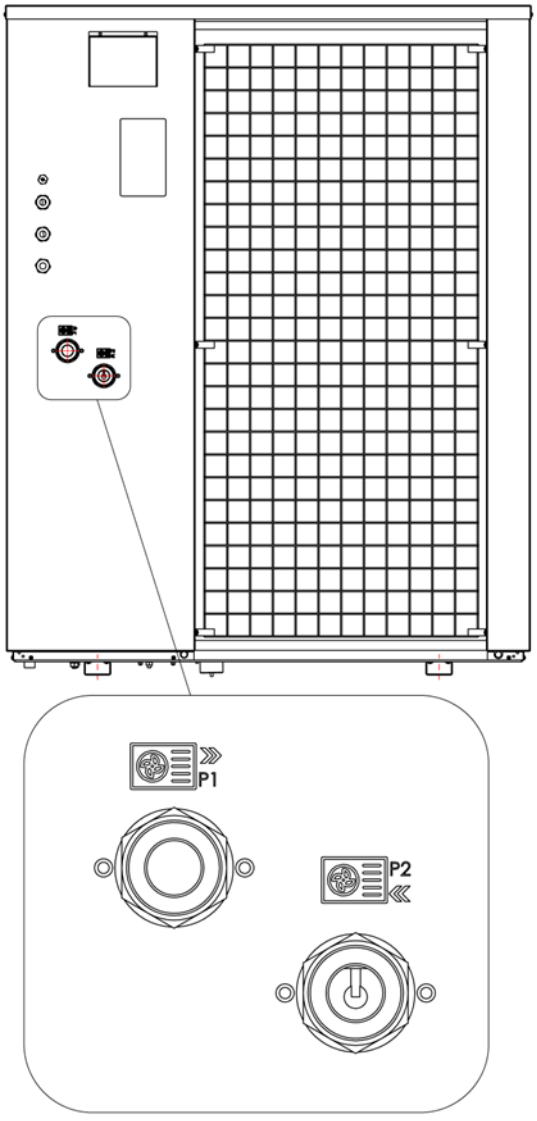
4.4.2. Hydraulic connections

Connection spigots:
P1 - heat pump outlet (heating/cooling system supply)
P2 - inlet to heat pump (return from heating/cooling system)

TERMET HEAT TITANIUM PRO 8 – 12 - 1" male thread



TERMET HEAT TITANIUM PRO 15 - 18 - 1 1/4" male thread



4.5. Heat pump housing

The heat pump casing is made of corrosion-protected sheet metal. The outer panels are attached to a support frame, together forming a rigid, compact structure.

⚠ WARNING

It is recommended that the heat pump is seated and levelled with the covers fully in place to avoid possible deformation of the pump.

4.6. Removal of external covers

External shrouds are essential during continuous normal operation of the heat pump. For installation and service purposes, the covers can be removed by unscrewing the relevant screws as described below (after first turning off the electrical supply).

⚠ WARNING

It is forbidden to operate the heat pump without external covers, this may cause the unit to fail.

⚠ DANGER

Before carrying out work on the assembly/disassembly of the external covers, switch off the electrical voltage and check the effectiveness of the voltage disconnection, wait at least 5 minutes for the capacitors to discharge.

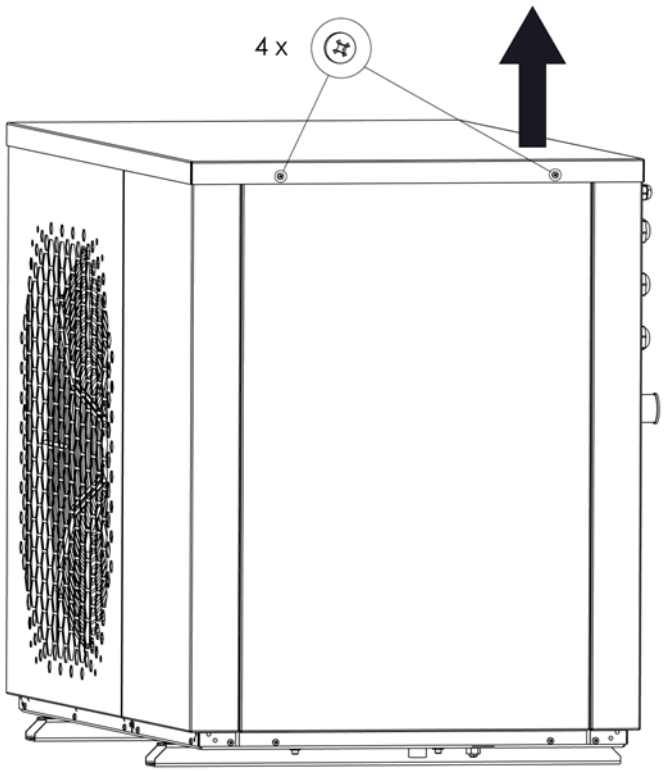
It is recommended that the disassembly and assembly of the enclosure be carried out by two people.

The following views show how to remove the outer covers.
Removal of the outer covers should be carried out in the following order:
1 - side covers on the compressor side
2 - fan side cover
3 - top cover
4 - front cover from the compressor system side
4a - cover of main electrical switchboard
5 - fan side front cover

ⓘ To make the electrical connection to the system, it is required to remove the side cover on the compressor system side.

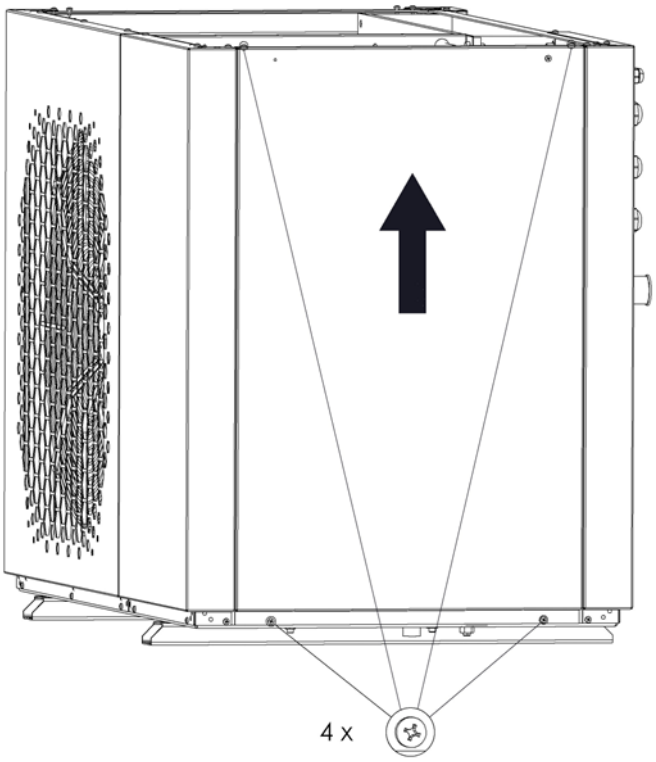
4.6.1. Removing the top cover

To remove the top cover, unscrew the screws as shown in the view and on the opposite side, then lift the cover as indicated.



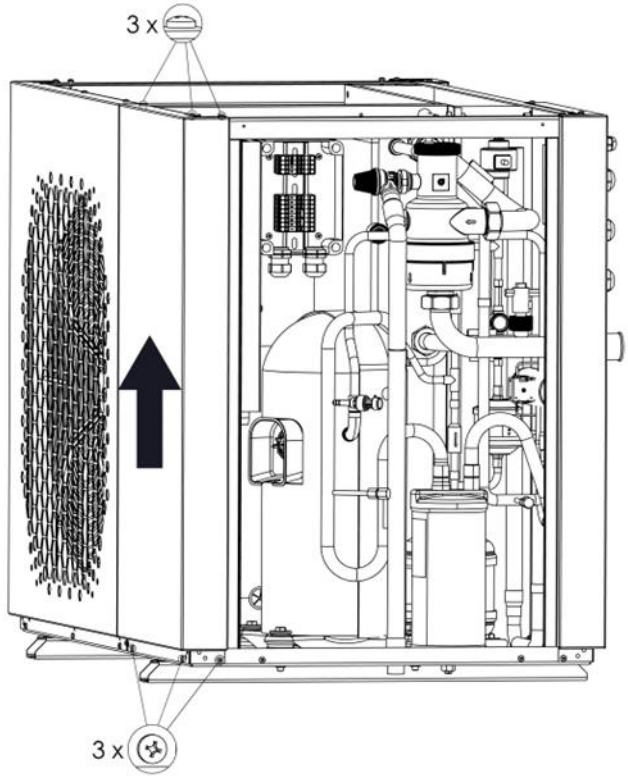
4.6.2. Removing side covers

To remove the left or right-side covers, unscrew the screws as shown and then slide the cover as indicated.



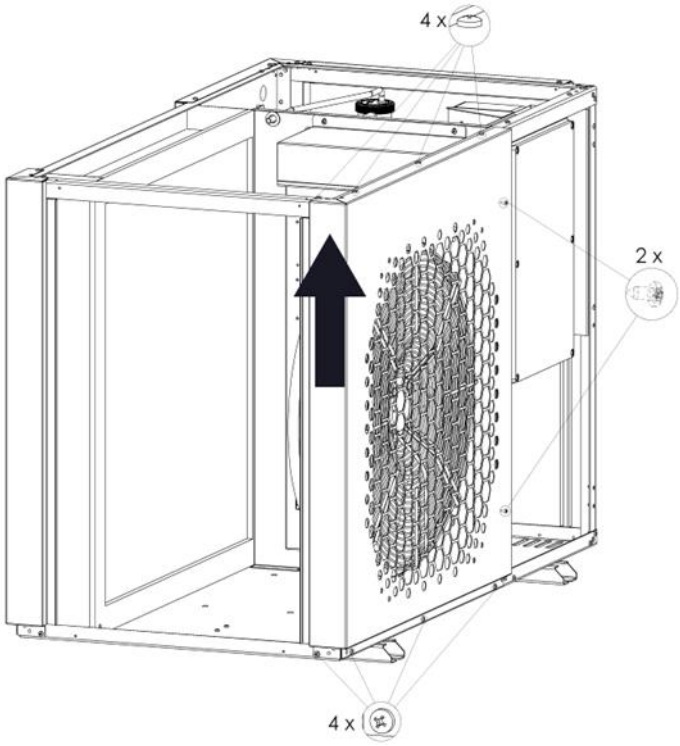
4.6.3. Removing the front cover from the compressor system side

To remove the front cover, unscrew the screws as shown in the view and then lift the cover as indicated.



4.6.4. Removing the fan-side front cover

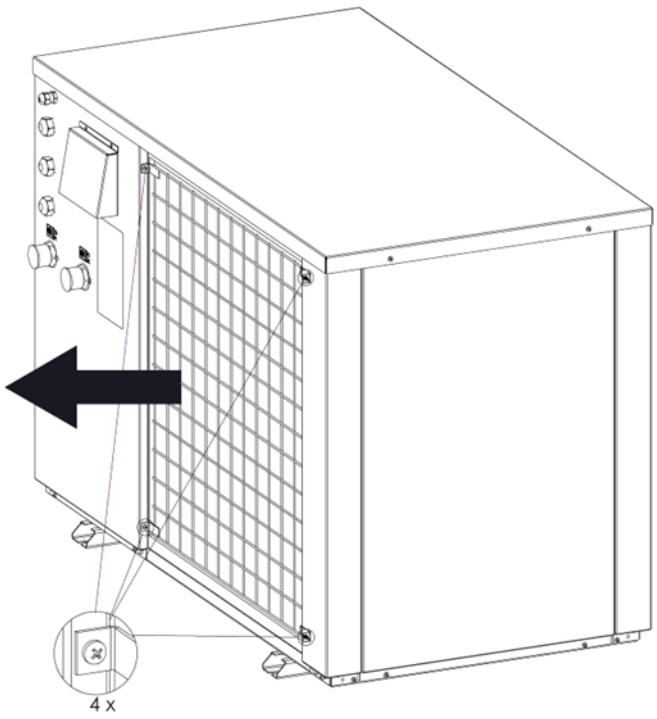
To remove the front cover, unscrew the screws as shown in the view and then lift the cover as indicated.



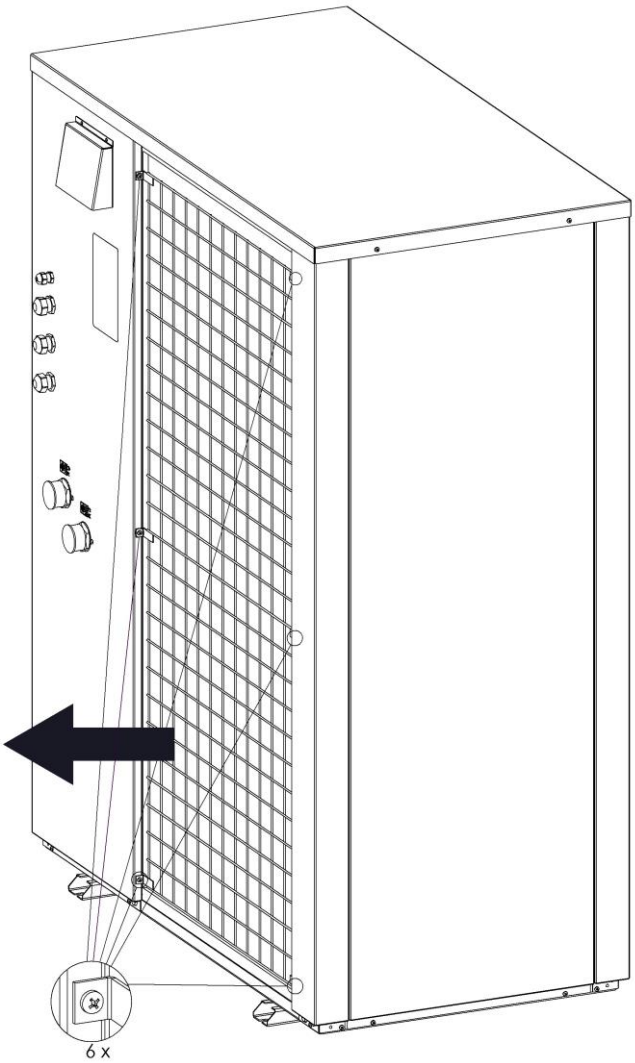
4.6.5. Removing the evaporator cover

To remove the evaporator cover, unscrew the screws as shown in the view and then pull the cover out as indicated.

TERMET HEAT TITANIUM PRO 8 - 12



TERMET HEAT TITANIUM PRO 15 - 18

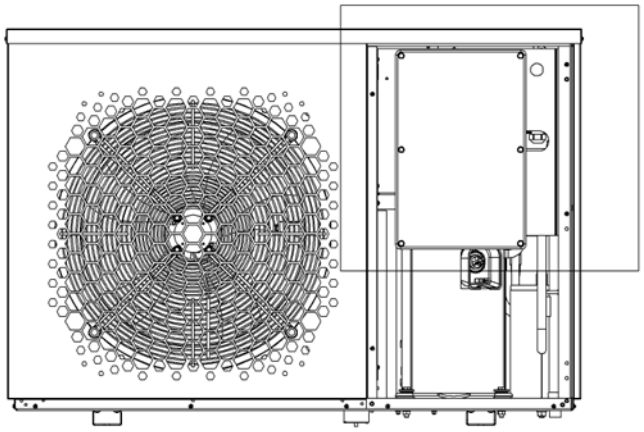


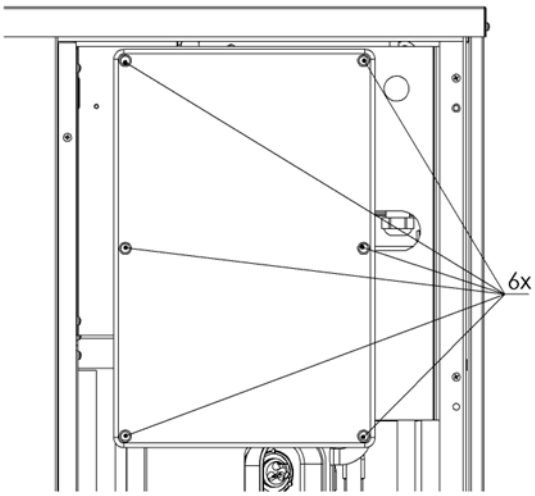
4.6.6. Removing the main electrical switchboard cover

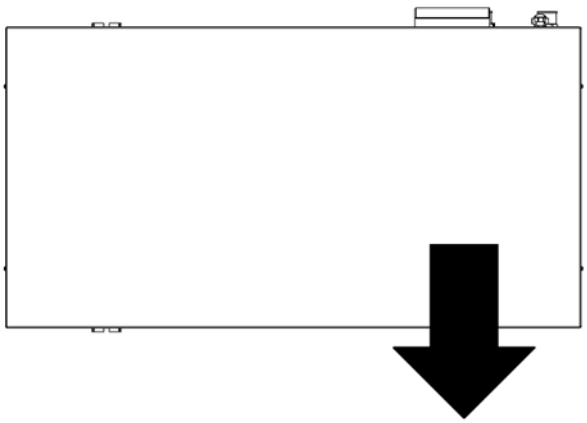
To remove the cover, unscrew the screws as shown in the view and then pull the cover out as indicated.

⚠ DANGER	

When reassembling the cover, ensure that earthing conductors terminated with sockets are connected to the earthing connectors of the switchboard and its cover.







5. HYDRAULIC SYSTEM

5.1. Principles of hydraulic installation

- The plumbing installation must be carried out by a qualified installer in accordance with current national and local regulations.
- The installation materials used in the construction of the installation must be certified according to local regulations.
- Only new and clean pipes and fittings should be used for the installation.
- Heat pumps require high flow rates. Care must be taken to ensure that the pipes, fittings and elbows used do not introduce excessive constrictions.
- The capacity of the upstream circulation pump (heat pump - buffer) should be adjusted as required by changing the setting on the front panel of the circulation pump.
- All appliance connections should be fitted with isolation valves and screw fittings to allow easier servicing and disconnection of the installation.
- Drain valves should be installed to allow filling and draining of the system.
- The heating circuit and hot water system must have safety features - central heating safety valve. (3bar), hot water safety valve. (6bar), expansion vessels matched to the capacity and temperature of the installation.
- The quality of the water used in the installation must meet the requirements for the prevention of scale formation and must not have corrosive properties to the components of the installation.
- The use of magnetic cartridge purge filters is recommended.
- Install air vents at the highest points of the system.
- When cutting and deburring pipes, care must be taken to ensure that swarf is not left behind.
- Protect the pipes from the possibility of dust, swarf, seal residue or grease getting into them. Take special care when running pipes through walls and partitions.
- When tightening or loosening threaded connections, grip the parts to be joined with two spanners to avoid damage.
- Hydraulic lines going outdoors must be protected from frost by insulation, antifreeze or other recommended means.
- If the heat pump will be used for cooling, all pipes and connections should be insulated with a dedicated lagging for this purpose to avoid condensation.
- Insulation of pipework extending outside the building must be resistant to UV radiation and high temperatures resulting from intense sunlight.

⚠ WARNING

Material damage caused by frost is not covered by the warranty conditions.

⚠ WARNING

Do not connect the electrical supply before filling the system and checking for leaks.

5.2. Hydraulic system diagrams

Carry out the hydraulic installation with the Termet Heat Titanium heat pump in accordance with the recommended hydraulic diagrams - see Appendix A at the end of this manual:

- Termet Heat Titanium heat pump with Termet T-Box hydronic module;
- Termet Heat Titanium heat pump with hydronic module with integrated DHW cylinder. T-Block;
- Termet Heat Titanium heat pump;

It is recommended that a buffer is fitted to the installation. The use of a buffer ensures: an adequate amount of heating medium (accumulated heat) in the system for de-icing the external exchanger, prevents too frequent switching cycles of the heat pump, hydraulically separates the heat pump circuit from the heating circuits so that any method of controlling the heating circuits can be used.

The hydraulic diagrams shown do not include all the necessary installation components. The system designer is responsible for the overall selection of system components including the required safeguards.

When installing a heat pump with a T-Box or T-Block hydronic module, the operating and installation instructions for these units must be read and followed.

5.2.1. Minimum diameters of the heat pump connection system

The connection of the heat pump to the heating system of the building must be made by piping with a minimum internal diameter in accordance with the table below.
Elbows, T-pieces, valves and other system components must not cause constrictions that cause excessive hydraulic resistance resulting in a reduction in the flow of the heating medium.

Heat pump	Minimum internal piping diameter in mm
Termet Heat Titanium Pro 8	25
Termet Heat Titanium Pro 12	25
Termet Heat Titanium Pro 15	32
Termet Heat Titanium Pro 18	32

When selecting the pipework, the requirements for ensuring a minimum fluid flow through the heat pump must be observed. When installing a Termet Heat Titanium heat pump together with a T-Box or T-Block hydronic module, refer to the characteristics of the circulating pump installed in these units. If the upper source circulation pump is selected individually, a minimum water flow rate must be guaranteed in accordance with the table below.

Heat pump	Minimum water flow in m^3/h
Termet Heat Titanium Pro 8	0,9
Termet Heat Titanium Pro 12	0,9
Termet Heat Titanium Pro 15	1,5
Termet Heat Titanium Pro 18	1,5

5.3. Preparing installation

Pipes that come into contact with the outside air and inside the engine room must be thoroughly insulated. In particular, attention should be paid to the insulation of pipes leading outside the building, where there are high heat losses and a risk of the heating medium freezing. The recommended thickness of pipework insulation on the exterior of the building is a minimum of 25mm. In addition, the insulation should be protected against mechanical damage. The insulation on the outside of the building should be UV-resistant.

ⓘ Before connecting the pump on the heating water side, the heating system must be flushed to remove any impurities, residues of sealing material, etc. An accumulation of impurities in the condenser can lead to failure of the heat pump.
When screwing the bolts to the heat pump, it is necessary to hold both sides of the bolt with spanners so as not to twist the pipes inside the heat pump.

5.3.1. Cleaning the system and treating the water for filling the central heating system.

All components of the central heating system are susceptible to scaling, corrosion, and other fouling processes. Since the heat pump is the most expensive part of the installation, special care must be taken to protect its heat exchanger from these issues. Proper preparation of the central heating system involves two key steps: cleaning the system and treating the water to ensure optimal operation.

5.3.2. System cleaning

In a new installation, there may be residues from the treatment of the installation such as solder and welding residues, flux residues, oil, grease or corrosion products (common in old installations). As a first step, both new and old installations should be flushed with clean water to remove solid waste. This operation must absolutely be carried out without a hydraulically connected heat pump. The next step is to perform a chemical cleaning of the installation. Use a suitable cleaning agent, e.g. **BM3 Cleaner** from **BoilerMag**, to clean the new as well as the old installation. After this cleaning, the installation should be rinsed again with clean water.

5.3.3. Water treatment for plant filling

Use water with the following parameters for filling the system: pH between 6.5 and 8.5 units, total hardness of no more than 10°dH (~18°F). Demineralised water or distilled water must not be used for filling. A suitable inhibitor (passivator), e.g. **BM1 Protector** from **BoilerMag**, should be used to ensure adequate protection against scaling and corrosion of the system. In addition, **antifreeze** can also be used, e.g. **BM Zero Antifreeze** from **BoilerMag**.

5.3.4. Low-temperature circuits

In low-temperature areas, it is recommended to treat the water with **BM7 Biocide**.

5.3.5. Filtering technique

Metallic impurities are the main reason for the failure of circulation pumps installed in a heating system. To protect these components, we recommend the use of magnetic filters that allow an effective method of separating metallic impurities present in the system. In addition, this type of filter has a positive effect on corrosion protection and extends the life of the installation. You will find our current offer on our website.
NOTE:

- the manner and quantity of use of the various products for cleaning the installation and water treatment must be applied in accordance with the manufacturer's instructions for the product in question.
- leave the cleaning of the installation and the treatment of the water to an authorised installer or service technician.

The T-Box and T-Block hydraulic modules are equipped with magnetic filters.

5.4. Heating system pressure

The pressure of the medium (treated water or antifreeze, as appropriate) in the heating system should be maintained at 1.5 - 2bar.

5.5. Heating system buffer

Due to the need to provide sufficient heating medium to accumulate heat in the system, a minimum buffer volume is required. The accumulated heat in the buffer provides:

- correctness of the de-icing process of the external heat pump exchanger,
- stabilisation of heat pump operation to reduce the number of heat pump start-up cycles,
- no significant drop in the heating medium in the heating circuits when the heat pump cannot operate in the central heating function. (when heating hot water or during brief power cuts).

The use of a buffer as shown in the recommended hydraulic diagrams separates the heat pump system from the heating circuits. The buffer in this scheme is responsible for heat accumulation and acts as a hydraulic coupling. This allows full control of the heating circuits to be used.
Recommended minimum buffer size depending on the heat pump being installed:

Heat pump	Minimum buffer volume in dm^3
Termet Heat Titanium Pro 8	80
Termet Heat Titanium Pro 12	100
Termet Heat Titanium Pro 15	120
Termet Heat Titanium Pro 18	150

Larger buffer tanks are permitted.

5.6. Domestic hot water storage tank

Termet Heat Titanium heat pumps enable the preparation of domestic hot water. This requires the installation of a hot water cylinder with an adequate heat exchanger (coil) exchange surface.
Recommended minimum replacement area for the coil installed in the hot water cylinder.

Heat pump	Minimum DHW coil area in m^2
Termet Heat Titanium Pro 8	2,0
Termet Heat Titanium Pro 12	3,2
Termet Heat Titanium Pro 15	3,7
Termet Heat Titanium Pro 18	4,5

5.7. Anti-freeze protection

The heat pump and pipework outside are exposed to temperatures below 0oC. In the event of a power outage, these parts of the heating system are most susceptible to damage as a result of the heating medium - water - freezing. Therefore, installations must be adequately protected against potential failure.
In the event of prolonged interruptions in the operation of the system, parts of the system filled with water may freeze. In this case, provision should be made to drain the system before a prolonged break in operation.

The working medium in the central heating system can be suitably treated water or an antifreeze solution. If a freezing medium is used, one of the ways of protecting the installation against freezing must be used:

- anti-freeze relief valves,
- emergency power supply for the top source circulation pump (heat pump - buffer),
- secondary circuit with indirect exchanger.

The manufacturer of the heat pump is not liable for frost damage caused by the lack of anti-freeze protection or its malfunction.

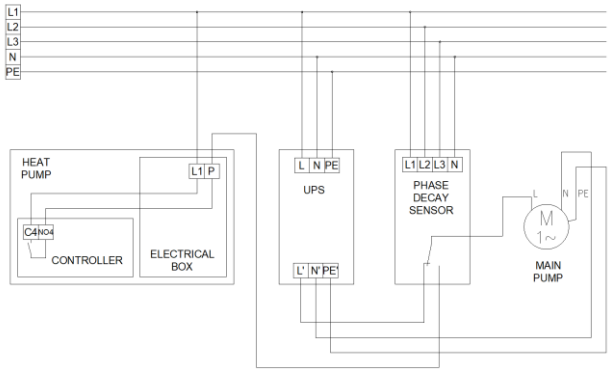
5.7.1. Anti-freeze relief valves

If anti-freeze valves are used, the instructions and installation recommendations of the valve manufacturer must be followed, e.g.: Caleffi Series 108.
The manufacturer of the heat pump is not liable for damage caused by the malfunction of the anti-freeze relief valves.

5.7.2. Emergency power supply for upstream circulating pump

If an emergency power supply is used for the upstream circulating pump, the electrical connection must be made according to the diagram below. The backup time for the power supply to the circulating pump depends on the size (capacity) of the UPS battery. The correctness of the power supply to the circulation pump via the UPS should be checked with the circulation pump fitted to the installation.

The manufacturer of the heat pump is not liable for damage caused by malfunctioning components of the UPS backup system.



5.7.3. Secondary circuit with indirect exchanger

The heating circuit can be divided into primary and secondary by using an intermediate exchanger. In this case, the primary circuit includes the heat pump together with the pipework outside the building where the working medium is antifreeze. The secondary circuit is the heat exchanger and the rest of the plumbing inside the building filled with water. The parameters of the heat exchanger must be selected depending on the heat pump being installed and the design temperatures of the system.

5.8. Electrical connections

⚠ DANGER

Before starting installation or servicing work, disconnect the unit and other system components that may be live from the electrical supply.

Do not start the electrical system before checking for leaks, filling and bleeding the system - risk of damage to system components and electric shock.

All installation and servicing work must only be carried out by qualified and authorised persons in accordance with local law.

The parameters relating to the electrical network must correspond to those indicated on the heat pump nameplate.

The 1-phase 230V mains voltage must be within the tolerance range of +/- 10%. The 3-phase 400V mains voltage must be within a tolerance of +/- 10%. Voltage difference between phases +/- 2%.

Additional components not included in the scope of supply, but required for the proper operation and protection of the electrical installation, must be certified and approved for use in accordance with local law.

Make the connections of the heat pump and other components of the installation in accordance with the wiring diagram corresponding to the supplied version of the unit. Electrical diagrams can be found at the end of this manual (see Appendix B). The electrical diagram is also pasted on the main cover of the heat pump electrical switchgear.

It is recommended to run the power cables at a distance from the signal cables to avoid possible interference. If possible, keep a min. 5 cm Alternatively, shielded cables can be used.

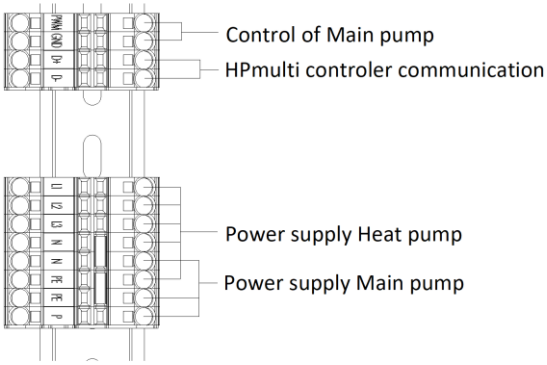
The minimum cross-sectional area of the electrical conductors supplying the heat pump and other electrical components of the installation must be selected in accordance with the applicable standards and the table below. The power supply to the heat pump must be provided by a separate electrical circuit (used only to power the heat pump). This circuit must be fitted with suitable protection: isolating switch, residual current circuit breaker, overcurrent circuit breaker (see table below).

Heat pump model	TERMET HEAT TITANIUM PRO 8	TERMET HEAT TITANIUM PRO 12	TERMET HEAT TITANIUM PRO 15	TERMET HEAT TITANIUM PRO 18
Maximum electric power [kW]	~3,0 kW	~5,0 kW	~5,3 kW	~7,1 kW
Supply conductor cross-sectional area	5x4mm2	5x4mm2	5x4mm2	5x4mm2
3P switch disconnector	16A	16A	20A	25A
3P residual current circuit breaker (type A) IΔ>30mA	16A	16A	20A	25A
3P overcurrent circuit breaker	B10A	B16A	B16A	B20A

To make the electrical connection, unscrew the side cover (see section 4.6 Removing the external covers), feed the wires into the appliance, from the cable glands accessible on the rear wall of the appliance to the electrical box at the front of the appliance.

Once the four screws have been removed and the electrical box casing has been removed, electrical installation is possible by inserting stripped (11-13mm) "wire" type or "cable" type wires into the terminal blocks using the WAGO 210-658 or 210-720 mounting tool.

The electrical connection bus is shown in the illustration below. Make the connections in accordance with the markings on the terminal blocks and the following description.



L1 - L1 power supply
L2 - L2 power supply
L3 - L3 power supply
N - supply - neutral conductor
N - neutral conductor of the upstream pump
PE - power supply - protective conductor
PE - protective conductor of the upstream pump
P - power supply to upstream pump (L1 from the heat pump controller)
PWM control of upstream pump
GND - ground wire - top source pump control
D+ - HPmulti controller communication cable (B/D+)
D- - HPmulti controller communication cable (B/D-)

⚠ DANGER

The appliance must be connected to an effective earth ground. Do not use an ungrounded device. It is forbidden to connect the earthing conductor to the neutral conductor.
All installation and service work involving the removal of external covers must be carried out with the electricity supply switched off.
It is forbidden to start up and operate the unit without the external covers in place.

5.9. HPMulti heat pump controller

The operation of the Termet Heat Titanium heat pump heating system is managed by the HPmulti controller. Using the touch panel attached to the HPmulti controller, the user can view the operating parameters of the heat pump and the system, and set the required temperatures, operating schedules, cooperation with additional heat sources, the number of heating circuits, and the way the heating circuits are regulated. We can connect to the HPmulti controller remotely when it is connected to the Internet.
A detailed description of the HPmulti controller, its functions and how to operate it are described in its separate manual.

Connect the HPMulti controller to the heat pump via a 2 x 0.75mm2 communication cable. On the HPmulti controller, connector B (terminals D+ and D-) is used for this purpose on the heat pump, the terminals on the electrical connection rail D+ and D-.

ⓘ The HPMulti controller is installed inside the equipment:
- termet T-Box hydronic module
- termet T-Block hydronic module

ⓘ The HPMulti controller is equipped with all the necessary temperature sensors, outputs and inputs to operate the equipment installed on the plant.
Temperature sensors (required for heat pump operation and optional):
- external (required),
- hot water storage tank (optional),
- buffer (required),
- regulated circuit 2 (optional),
- regulated circuit 3 (optional).

The temperature sensors must be placed in the correct locations in accordance with the HPmulti controller instructions. The temperature sensors must be installed so that their measurement is not affected in any way. The proper fixing of the temperature sensors is to prevent them from accidentally slipping out or coming loose. The use of thermal paste is recommended.

5.10. Additional heat source

A heat pump under certain ambient conditions may not have sufficient capacity to provide the heat demand. To supplement demand, an additional heat source (so-called peak source) can be installed in the system: an electric heater, a gas-fired boiler e.g. EXTRA POWER. The connection of the additional heat source should be made in accordance with the hydraulic diagram at the end of manual section 9.3. The additional heat source is controlled by the HPmulti controller. The HPmulti controller has potential-free contacts H1 (terminals 21-22) and H2(11-12) for switching an additional heat source. For detailed connection and description of the control of the additional heat source, refer to the HPmulti controller manual.

⚠ WARNING

Contacts H1, H2 are not designed to carry operating currents. If an electric heater is used as an additional heat source, contactors matched to the heater load should be used for additional connection.

ⓘ The T-Box and T-Block hydronic modules have an integrated peak source in the form of an electric heater.

ⓘ The EXTRA POWER gas boiler is a specially designed unit for use with a heat pump as a peak source.

6. HEAT PUMP COMMISSIONING

6.1. Activities before initial start-up

Before starting the heat pump for the first time, take precautions and perform the following steps:

- read all operating instructions,
- check that the electrical network parameters are appropriate for the heat pump being installed,
- check the correctness of the electrical connections of the heat pump and other equipment installed in the system, such as circulation pumps,
- check the effectiveness of the earthing system,
- check that the temperature sensors are placed in the correct positions,
- check that the hydraulic connections and pipework are correct,
- check the correct position of the levers of the installed shut-off valves,
- check the hydraulic system for leaks,
- carry out effective venting of the plumbing system,
- check the pressure of the heating medium in the system; the recommended pressure should be between 1.5 and 2.0 bar
- check the thermal insulation of the pipework,
- check that all covers are in place on the heat pump and other equipment on the installation,
- check that the air supply to the heat pump is not impaired in any way,
- check that there are no objects in the vicinity of the heat pump and other equipment that could cause equipment malfunction or breakdown.

⚠ DANGER

If any electrical components are flooded, do not start up. Contact an authorised service centre to inspect the unit.

6.2. First start-up

The following steps must be carried out when the heat pump is started up for the first time and after any prolonged shutdown of the unit:

- switch on the power supply to the heat pump and the HPMulti controller and other associated equipment,
- configure the HPMulti controller in accordance with the installation diagram you have made - see the HPMulti controller manual for precise instructions,
- preset the operating parameters of the system - temperatures of the buffer, hot water, heating circuits and operating schedules.

⚠ WARNING

- leave the heat pump in OFF mode for at least 2 hours before starting the compressor for the first time or after a standstill with no electrical power on - the heating of the compressor is activated to evaporate the refrigerant from the oil, failure to do so may lead to failure of the compressor,
- start the heat pump by setting it to ON mode on the touch panel of the HPmulti- controller - after a few minutes the fan, the upstream circulation pump and the compressor will start,
- check for error messages - if any occur, follow the instructions in the error table,
- after the operating conditions have stabilised (i.e. after a minimum of 20 minutes), check the correctness of the following parameter ranges during heat pump operation:
  - the flow and return temperatures of the heat pump,
  - the suction and discharge pressures of the refrigeration circuit (low- and high-pressure side),
  - current consumption values.

7. HANDOVER FOR USE

7.1. User instructions

Carry out user instructions for the heat pump installation:

- communicate information important for safety (use of electrical appliances, flammable refrigerant R290, frostbite and burn hazards),
- inform the user about the antifreeze protection of the heat pump and the system and how it works,
- inform the user of necessary inspection and maintenance,
- hand over all necessary operating instructions and all documents accompanying the heat pump.

8. MAINTENANCE

8.1. Persistent operation

The air source heat pump together with the installation are highly automated, regular maintenance must be carried out to ensure the operational reliability and lifetime of the entire system:

- keep the heat pump and its surroundings clean to avoid fouling of the external exchanger or fan (remove dirt from plants, fallen leaves, other parts of plants, dust) - a fine brush can be used to clean the external heat exchanger, taking care not to damage the fins,
- shovel snow from around the heat pump in winter, if necessary,
- do not place objects in the vicinity of the heat pump which may obstruct the free exchange of air and access for maintenance and servicing,
- maintain cleanliness and access to equipment mounted on the installation inside the building - in the event of a fault, it may be necessary to close valves or turn off the electricity,
- take care to preserve the protection zones associated with the flammable agent R290,
- make regular visual inspections of the condition of the thermal insulation,
- carry out regular visual inspections of the cabling - in the event of damage, carry out ongoing repairs by authorised persons.

⚠ DANGER

Maintenance work on the heat pump and system components must be carried out with the power switched off.

8.2. Tips to reduce energy consumption

In order to reduce the electricity consumption of the heat pump, it is recommended:

- perform regular maintenance,
- keep clean any filters installed on the installation,
- maintain the correct pressure in the system,
- set the central heating and hot water temperatures for comfort (without overheating),
- use operating schedules that allow temperatures to be reduced or the unit to be switched off when users are away from home.

8.3. Controller fault codes

If a fault occurs during heat pump operation, the fault code and description of the fault will be displayed on the main window of the touch panel.

Index	Description	Impact on heat pump operation
1002	Controller memory failure	Message info
1003	Controller memory failure	Message info
1005	NTC sensor fault: supply from the installation	No temperature control
1007	NTC sensor fault: outdoor temperature	Message info
1010	No flow water pump	Stopping the operation
1019	Anti-freeze alarm	Message info
1022	NTC sensor fault: return from installation	Stopping the operation
1029	Anti-freeze alarm	Message info
1030	Anti-freeze alarm	Stopping the operation
1034	Defrost interrupted	Message info
1035	Pressure transmitter error: discharge	Stopping the operation
1036	Pressure transmitter error: suction	Stopping the operation
1037	NTC sensor fault: discharge	Stopping the operation
1038	NTC sensor fault: suction	Stopping the operation
1040	Discharge/suction pressure ratio too high	Stopping the operation
1041	Discharge pressure too high	Stopping the operation
1042	Excessive compressor power consumption	Stopping the operation
1043	Suction pressure too high	Stopping the operation
1044	Discharge/suction pressure ratio too low	Stopping the operation
1045	Pressure differential too small	Stopping the operation
1046	Discharge pressure too low	Stopping the operation
1047	Suction pressure too low	Stopping the operation
1048	Discharge temperature too high	Stopping the operation
1049	Superheat of the refrigeration system too low	Stopping the operation
1050	Coolant system operating pressure too low	Stopping the operation
1051	Coolant system operating pressure too high	Stopping the operation
1052	Condensation temperature too high	Stopping the operation
1053	Coolant suction temperature too low	Stopping the operation
1054	Compressor motor fault	Stopping the operation
1055	Expansion valve error	Stopping the operation
1056	Expansion valve error	Stopping the operation
1057	Expansion valve error	Stopping the operation
1058	Expansion valve error	Stopping the operation
1059	Expansion valve error	Message info
1060	Expansion valve error	Message info
1061	Expansion valve error	Stopping the operation
1062	Expansion valve error	Stopping the operation
1063	Expansion valve error	Stopping the operation
1064	Inverter fault: no communication	Stopping the operation
1065	Inverter fault: compressor current too high	Stopping the operation
1066	Inverter fault: motor overload	Stopping the operation
1067	Inverter fault: DC bus voltage exceeded	Stopping the operation
1068	Inverter fault: DC bus voltage too low	Stopping the operation
1069	Inverter fault: drive temperature too high	Stopping the operation
1070	Inverter fault: drive temperature too low	Stopping the operation
1071	Inverter fault: HW current exceeded	Stopping the operation
1072	Inverter fault: motor temperature exceeded	Stopping the operation
1073	Inverter fault: IGBT module	Stopping the operation
1074	Inverter error: CPU	Stopping the operation
1075	Inverter error: default parameters	Stopping the operation
1076	Inverter error: DC bus ripple	Stopping the operation
1077	Inverter error: communication error	Stopping the operation
1078	Inverter fault: drive thermistor fault	Stopping the operation
1079	Inverter error: autotuning error	Stopping the operation
1080	Inverter fault: drive disabled	Stopping the operation
1081	Inverter fault: phase loss	Stopping the operation
1082	Inverter error: internal fan error	Stopping the operation
1083	Inverter error: speed error	Stopping the operation
1084	Inverter error: PFC module error	Stopping the operation
Index	**Description**	**Impact on heat pump operation**

1085	Inverter fault: PFC voltage too high	Stopping the operation
1086	Inverter fault: PFC voltage too low	Stopping the operation
1087	Inverter error: STO detection error	Stopping the operation
1088	Inverter error: STO detection error	Stopping the operation
1089	Inverter fault: ground fault	Stopping the operation
1090	Inverter error: ADC synchronisation error	Stopping the operation
1091	Inverter error: HW synchronisation error	Stopping the operation
1092	Inverter error: drive overload error	Stopping the operation
1093	Inverter error: general error	Stopping the operation
1094	Inverter fault: unexpected restart	Stopping the operation
1095	Inverter fault: unexpected stop	Stopping the operation
1096	Compressor fault: failure to start	Stopping the operation
1097	Compressor fault: differential pressure too high at start-up	Stopping the operation
1101	Anti-freeze alarm	Stopping the operation
1108	High pressure switch alarm	Stopping the operation
1109	Low pressure switch alarm	Stopping the operation
1110	Compressor fault: overload	Stopping the operation
1112	Compressor fault: pump-down time exceeded	Message info

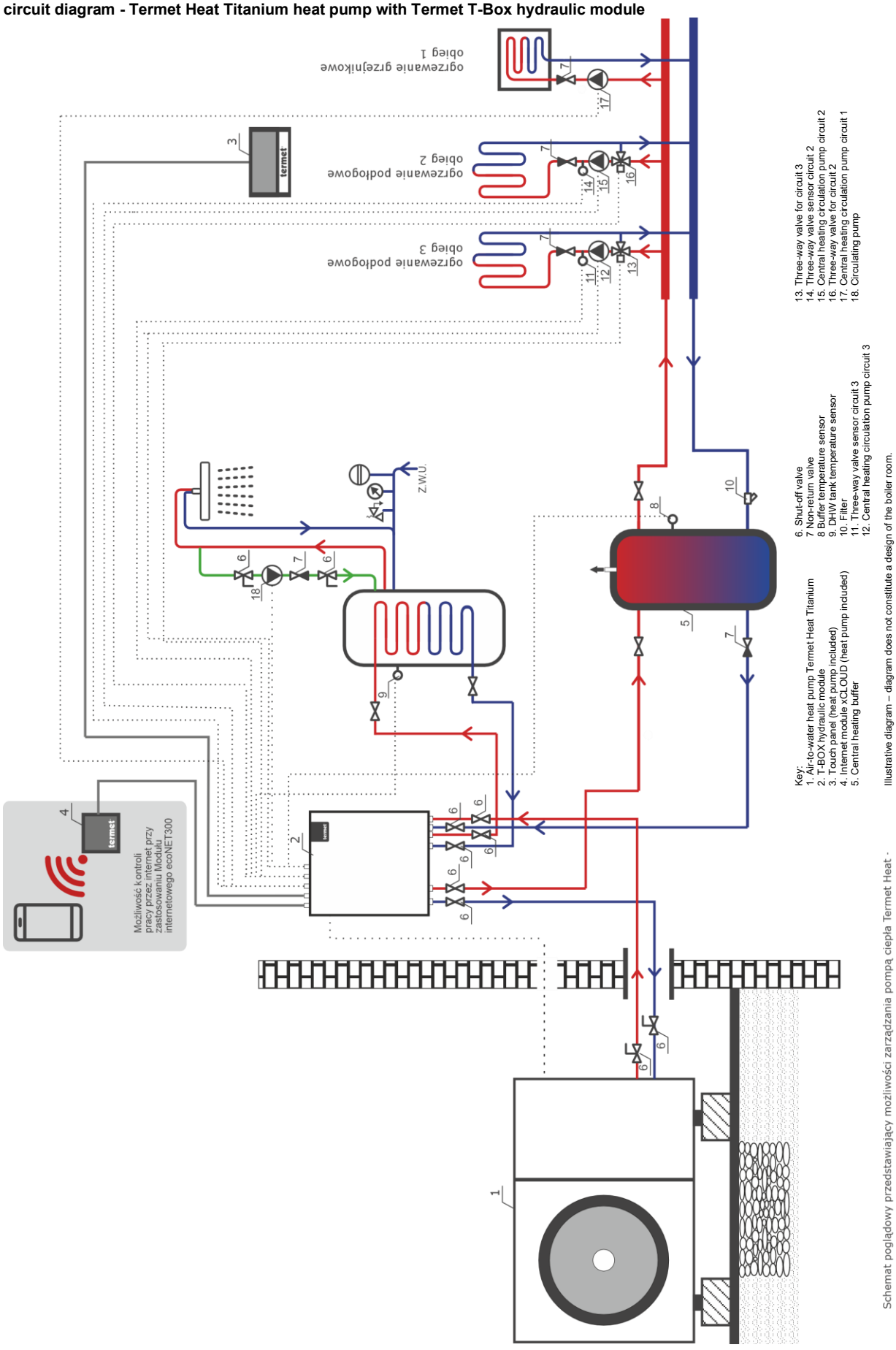
8.4. Potential emergency situations and their resolution

Emergencies can occur during start-up and during operation. To solve the problems, follow the recommendations outlined. Problem solving may require a service call.

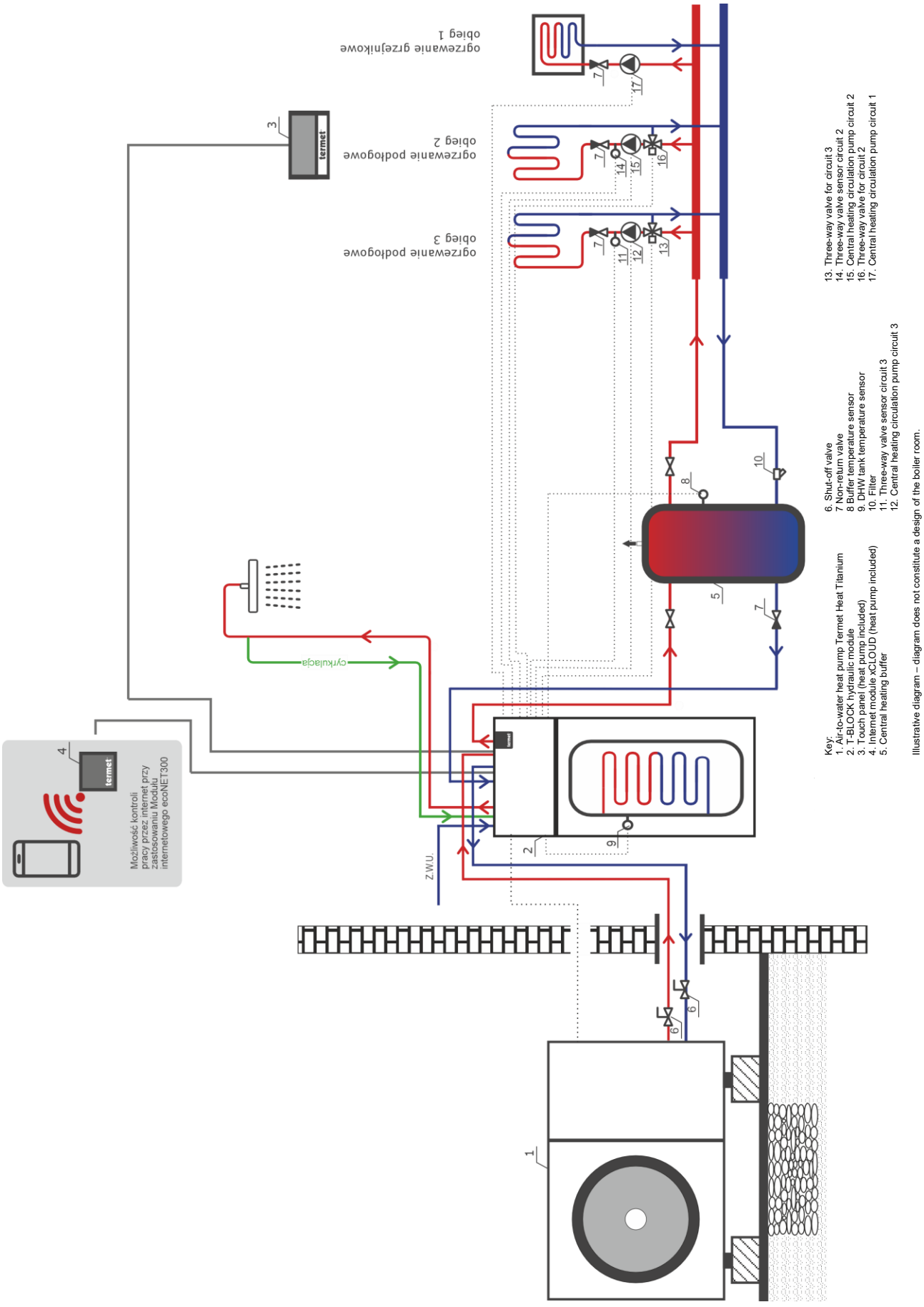
Error description	Possible cause	Solution
Heat pump not working	Power supply failure Loose cables Blown fuse Thermal overload protection deactivated Heating system water pressure too low	Switch off the unit with the power switch, check the power supply Locate the point of loosening and make repairs Replace blown fuse Check voltage and current Check the water pressure in the heating system
The water pump is running, but there is no water in the circuit, or the pump is very noisy	No water in circulation Air in the water circuit Not all valves have been opened Contaminated heating system water filter	Check the filling system and top up the water in the circuit Remove air from the water circuit Open the water circuit valve Clean water filter
Low heating capacity	No refrigerant Incorrect insulation of water pipes Clogged refrigeration system dryer Blocked airflow through the evaporator Water flow rate too low	Locate the leak, seal the refrigeration system and top up with refrigerant - call for service Improve insulation of the water system Replace the refrigeration system drier Clean the evaporator Clean water filter
Compressor not working	Power supply failure Loose cables Compressor overheating protection has tripped Water outlet temperature too high Water flow rate too low Compressor overload protection has tripped	Determine causes and resolve power failure issues Locate the point of loosening and make repairs Check the pressure in the refrigeration system and the discharge gas temperature of the compressor Reduce outlet water temperature Clean the water filter and remove air from the system Check the value of the operating current and that the overload protection has not been damaged
Compressor running too loud	Liquid refrigerant enters compressor Damage to internal compressor components The supply voltage is too low	Check that the expansion valve is working properly Replace the compressor Check supply voltage
Fan does not work	Fan fixing screw loose Fan motor failure	Tighten the screw Replace the fan motor.
Compressor works, but heat pump does not provide heating	Refrigerant leakage Compressor fault Incorrect choice of heat pump for the heated object	Locate the leak, repair it and inject the refrigerant Replace the compressor Reduce heat demand by carrying out thermal upgrading or installing an additional heat source
Insufficient water flow protection has tripped	Too low a water flow rate in the system Water flow sensor fault	Clean the water filter and remove air from the system Check the water flow sensor and replace it

9. ANNEX A - HYDRAULIC DIAGRAMS OF THE INSTALLATION

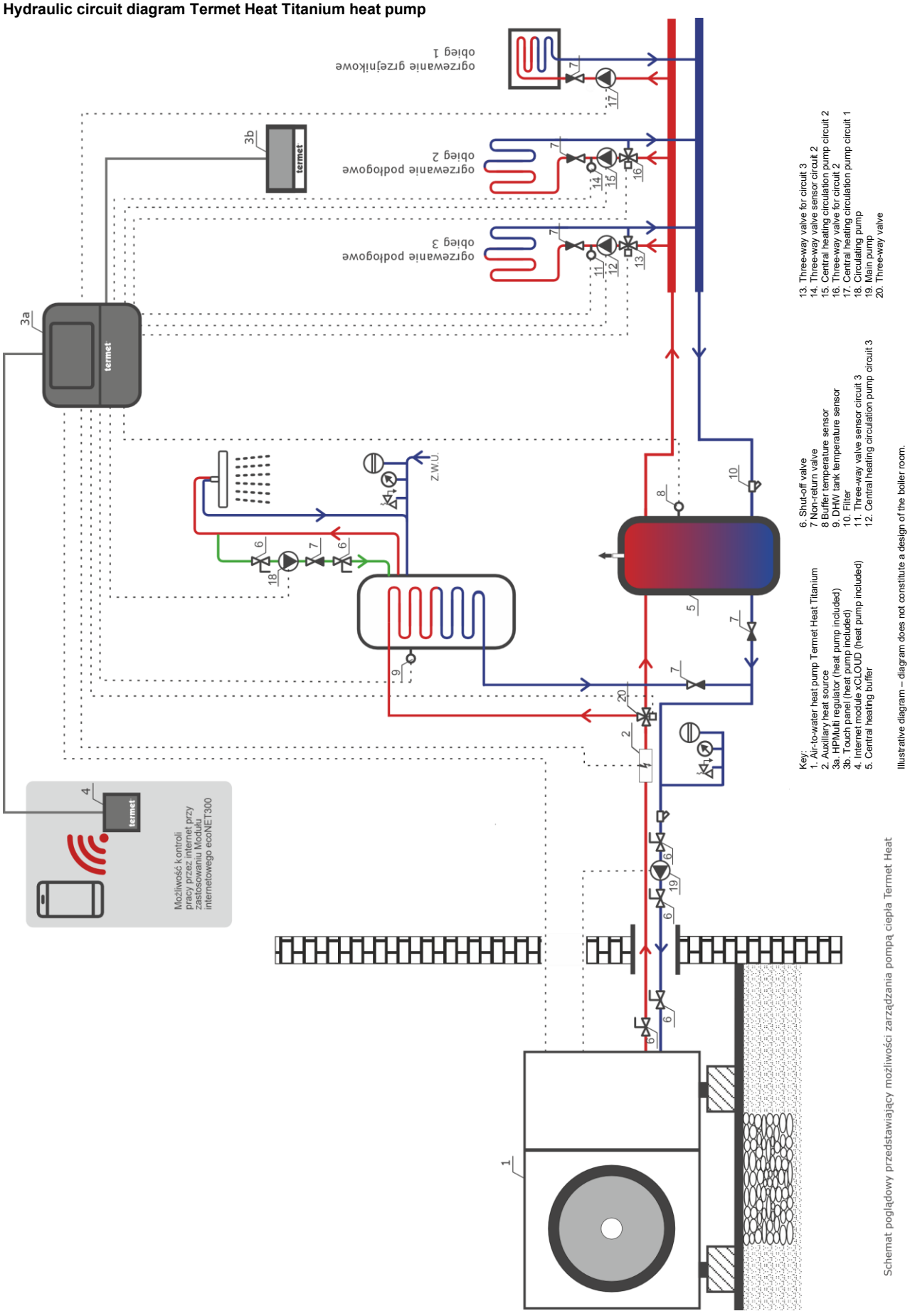
Hydraulic circuit diagram - Termet Heat Titanium heat pump with Termet T-Box hydraulic module



Hydraulic circuit diagram - Termet Heat Titanium heat pump with hydraulic module with integrated DHW cylinder. T-Block

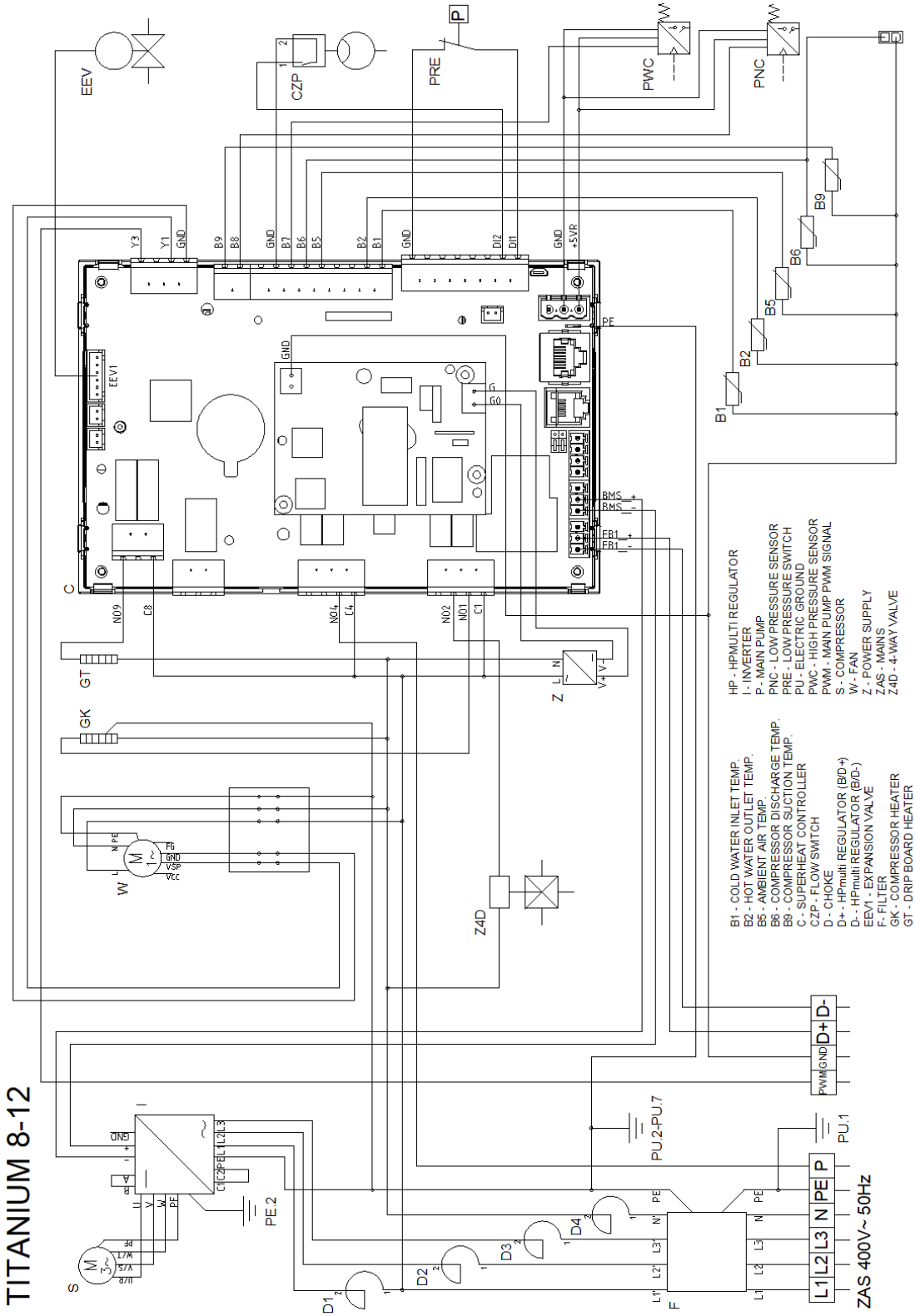


Hydraulic circuit diagram Termet Heat Titanium heat pump

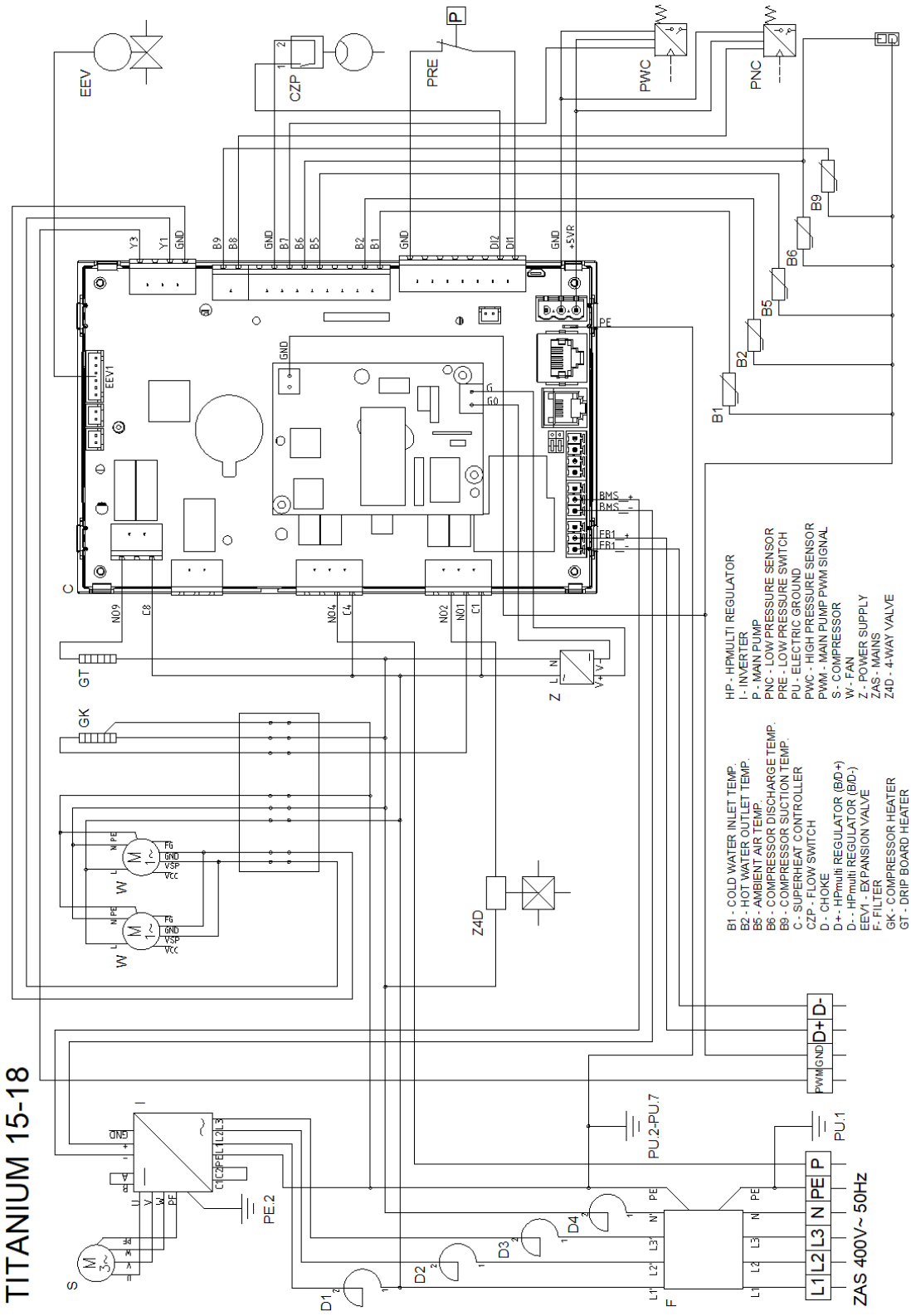


10. ANNEX B - ELECTRICAL DIAGRAMS

Electrical diagram of heat pumps: Termet Heat Titanium Pro 8, Termet Heat Titanium Pro 12



Electrical diagram of heat pumps: Termet Heat Titanium Pro 15, Termet Heat Titanium Pro 18



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