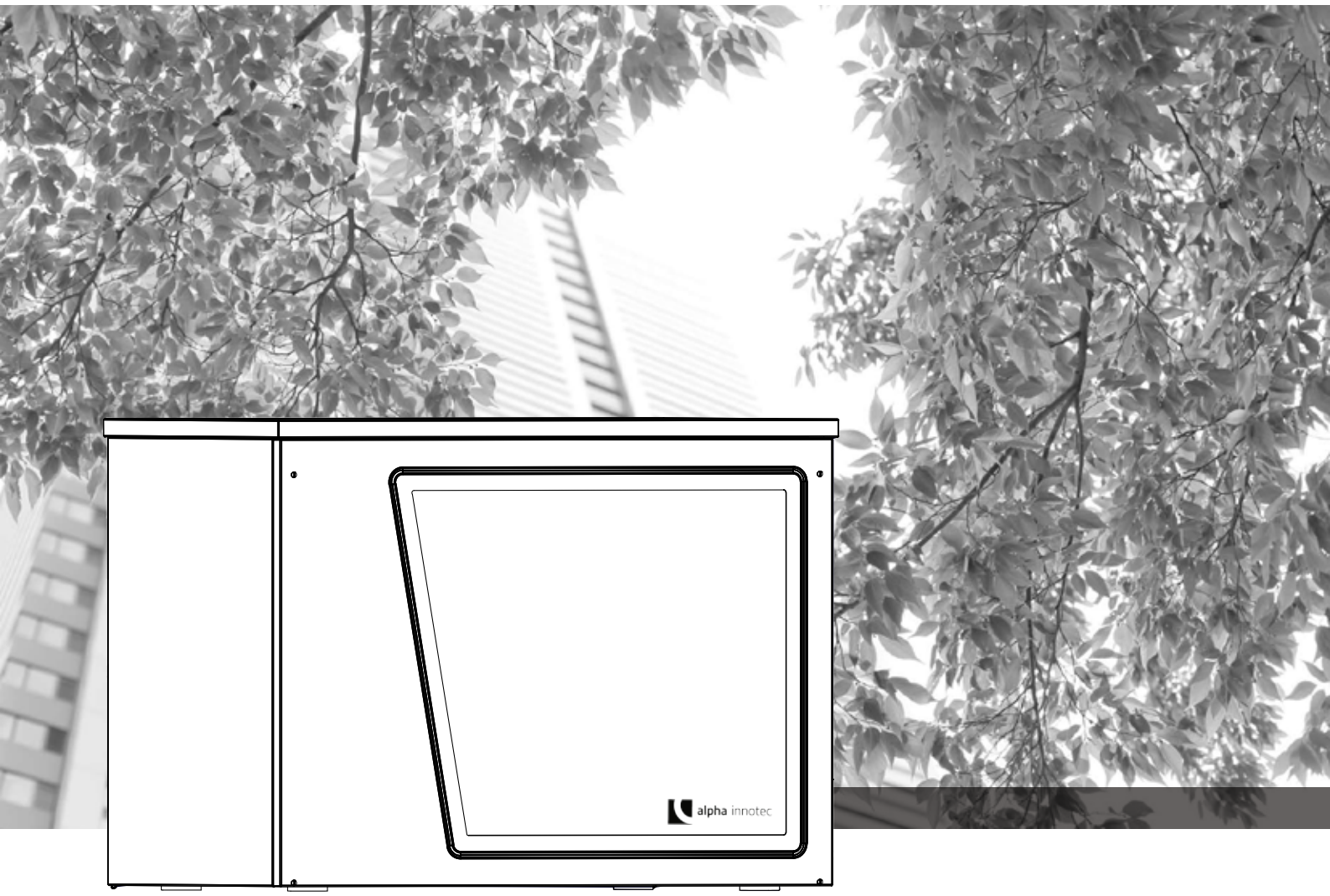
the better way to heat

alpha innotec



Brine/Water Heat Pumps
Professional

Operating Manual
SWP series
Construction unit 1

UK

8305370001UK

1 Please read first

This operating manual provides important information on the handling of the unit. It is an integral part of the product and must be stored so that it is accessible in the immediate vicinity of the unit. It must remain available throughout the entire service life of the unit. It must be handed over to subsequent owners or users of the unit.

In addition to this operating manual, you must also have the operating manual for the heating and heat pump regulator and the operating manual for your heat pump.

Read the operating manual before working on or operating the unit. This applies in particular to the chapter on safety. Always follow all instructions completely and without restrictions.

It is possible that this operating manual may contain instructions that seem incomprehensible or unclear. In the event of any questions or if any details are unclear, contact the factory customer service department or the manufacturer's local partner.

Since this operating manual was written for several different models of the unit, always comply with the parameters for the respective model.

This operating manual is intended only for persons assigned to work on or operate the unit. Treat all constituent parts confidentially. The information contained herein is protected by copyright. No part of this manual may be reproduced, transmitted, copied, stored in electronic data systems or translated into another language, either wholly or in part, without the express written permission of the manufacturer.

2 Symbols

The following symbols are used in the operating manual. They have the following meaning:

Information for uers.

Information or instructions for qualified technicians.

DANGER
Indicates a direct impending danger resulting in severe injuries or death.

WARNING
Indicates a potentially dangerous situation that could result in serious injuries or death.

CAUTION
Indicates a potentially dangerous situation that could result in medium or slight injuries.

IMPORTANT
Indicates a potentially dangerous situation, which could result in property damage.

NOTE
Emphasized information.

✓ Prerequisite for an action.

► Single-step instruction for action.

1., 2., 3., … Numbered step within a multi-step instruction for action. Adhere to the given sequence.

• List.

→ Reference to further information elsewhere in the operating manual or in another document.

ENERGY SAVING TIP
Indicates suggestions that help to save energy, raw materials and costs.

Table of contents

3 Contact

Addresses for purchasing accessories, for servicing or for answers to questions about the unit and this operating manual can be found on the internet and are kept up-to-date:

- Germany: www.alpha-innotec.de
- EU: www.alpha-innotec.com

4 Intended use

The unit may be used only for the intended purpose. This means:

- For heating
- For domestic water heating
- For cooling (active + passive through external hydraulics)

The unit may be operated only within its technical parameters.

→ “Technical data / scope of delivery“, from page 22

NOTE
Notify the responsible power supply company of the use of a heat pump or heat pump system.

5 Disclaimer

The manufacturer is not liable for losses resulting from any use of the unit which is not its intended use.

The manufacturer’s liability also expires:

- If work is carried out on the unit and its components contrary to the instructions in this operating manual
- If work is improperly carried out on the unit and its components
- If work is carried out on the unit which is not described in this operating manual, and this work has not been explicitly approved by the manufacturer in writing
- If the unit or components in the unit have been altered, modified or removed without the explicit written consent of the manufacturer

6 Safety

The unit is safe to operate when used for its intended purpose. The construction and design of the unit conform to current state-of-the-art standards, all relevant DIN/VDE regulations and all relevant safety regulations.

The operating manuals supplied with the product are intended for all users of the product.

The product is intended for use by end customers / operators, and it can be operated via the heating and heat pump controller and worked on by persons of any age who understand the tasks and potential consequences, and who are able to carry out these necessary tasks.

Children and adults who are inexperienced with the product and who do not understand the tasks and potential consequences must be briefed and, if necessary, supervised by persons who know how to handle the product and who are responsible for safety.

Children must not play with the product.

The product may only be opened by qualified specialist personnel.

All instructions in this operating manual are solely directed at qualified specialist personnel.

Only qualified specialist personnel are able to carry out work on the unit safely and correctly. Interference by unqualified personnel can cause life-threatening injuries and damage to property.

- ► Ensure that the personnel are familiar with the local regulations, especially those on safe and hazard-aware working.
- ► Ensure that the personnel are qualified to handle flammable (primary) refrigerant.
- ► Work on the refrigerating circuit may only be carried out by qualified personnel with appropriate qualifications for refrigeration system installation.
- ► Qualified personnel with electrical training are the only people permitted to work on the electrics and electronics.
- ► Other work on the system should only be carried out by qualified specialists, such as:
  - Heating engineers
  - Plumbers

During the warranty and guarantee period, servicing and repairs may only be carried out by personnel authorised by the manufacturer.

6.1 Personal protective equipment

During transport and work on the unit, there is a risk of cuts due to the sharp edges of the unit.

► Wear cut-resistant protective gloves.

During transport and work on the unit, there is a risk of foot injuries.

► Wear safety shoes.

When working on liquid-conveying lines, there is a risk of injury to the eyes due to leakage of liquids.

► Wear safety goggles.

6.2 Residual risks

Injuries caused by electric shock

Components in the unit are energised with life-threatening voltage. Before working on the unit:

► Disconnect unit from power supply.

► Protect unit against being switched back on again.

Existing earthing connections within housings or on mounting plates must not be changed. If this should nonetheless be necessary in the course of repair or installation:

► Restore earthing connections to their original state once repair or installation is complete.

Injuries caused by high temperatures

► Before working on the unit, let it cool down.

Injury due to flammable liquids and potentially explosive atmospheres

Constituents of antifreeze mixtures, e.g. ethanol, methanol, are highly flammable and form an explosive atmosphere:

► mix antifreeze in well-ventilated rooms.

► Note the hazardous substance markings and comply with the relevant safety regulations.

Injuries and environmental damage due to refrigerant

The unit contains flammable (primary) refrigerant that is hazardous to health and the environment. If (primary) refrigerant leaks from the unit, there is a risk of an explosion:

1. Switch off unit.
2. Keep the unit away from ignition sources.
3. Thoroughly ventilate installation room.
4. Notify authorised customer service.

6.3 Disposal

Environmentally harmful media

Improper disposal of environmentally harmful media ((primary) refrigerant) damages the environment:

► Collect media safely.

► Dispose of the media in an environmentally-friendly manner according to the local regulations.

6.4 Avoiding damage to property

! IMPORTANT
Do not disconnect the unit from the power supply, unless the unit is being opened.

Decommissioning / Draining heating

If the system / heat pump is taken out of operation or drained after it has already been filled, you must ensure that the condenser and any existing heat exchangers are completely drained in the event of frost. Residual water in heat exchangers and the condenser can lead to damage to the components.

1. Completely drain the system and condenser, and open the vent valves.
2. If necessary, blow out with compressed air.

Improper action

Requirements for minimising scale and corrosion damage in hot water heating systems:

- Proper planning, design and commissioning
- Corrosion-resistant system
- Integration of an adequately dimensioned device for maintaining pressure
- Use of demineralised heating water or VDI 2035 equivalent water
- Regular servicing and maintenance

If a system is not planned, designed, started up and operated in accordance with these requirements, there is a risk that the following damage and malfunctions will occur:

- Malfunctions and failure of components, e.g. pumps, valves
- Internal and external leaks, e.g. from heat exchangers
- Restrictions and blockages in components, e.g. heat exchanger, pipes, pumps
- Material fatigue
- Gas bubbles and gas cushion formation (cavitation)
- Impaired heat transfer caused by formation of coatings, deposits etc., and associated noises, e.g. boiling noises, flow noises

► Observe the information in this operating manual for all work on and with the unit.

Impact of low-quality filling and top-up water in the heating circuit

The quality of the heating water is crucial for the efficiency of the system and the service life of the heat generator and the heating components.

If the system is filled with untreated drinking water, calcium deposits form as limescale on the heat transfer surfaces of the heating system. This reduces the unit's efficiency and increases energy costs. In extreme cases, this will damage the heat exchangers.

► Only fill the system with demineralised heating water or with VDI 2035 equivalent water (for low-salt operation of the system).

Unsuitable quality of the water-antifreeze mixture in the heat source

IMPORTANT
Use of pure water in a flat-plate collector or a borehole heat exchanger (vertical collector) is not permitted.

► For operation of the heat source with a water-antifreeze mixture, ensure that the water used fulfils the quality specifications of the heating water side.

→ „19.1 Flushing and filling the heat source“, from page 18

7 Warranty / Guarantee

For warranty and guarantee conditions, please refer to the purchase documents.

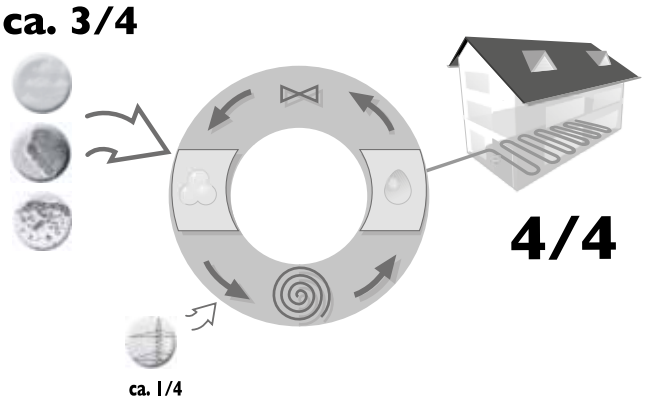
NOTE
Please contact your dealer about all matters concerning warranties and guarantees.

8 Operating principle of heat pumps

Heat pumps operate on the same principle as a refrigerator: same technology, only with reversed benefits. The refrigerator extracts heat from foods, which is released into the room through fins on the back.

The heat pump extracts heat from our environment: air, earth or ground water. The extracted heat is conditioned in the unit and supplied to the heating water. Even when it is extremely cold outside, the heat pump draws enough heat to heat a house.

Example: drawing of a brine/water heat pump with floor heating:



¾ = usable energy
approx. ¾ = environmental energy
approx. ¼ = external electrical energy

9 Area of utilisation

Taking into consideration the ambient conditions, limits of application and the applicable regulations, every heat pump can be utilised in new or existing heating systems.

→ “Technical data / scope of delivery“, from page 22

10 Heat metering

In addition to proof of the unit’s efficiency, the EEWaermeG also requires heat metering (hereafter referred to as HQR). Heat metering is mandatory for air/water heat pumps. Heat metering for brine/water and water/water heat pumps only have to be installed for a flow temperature ≥ 35 °C. The heat metering must record the total thermal energy released (heating and domestic hot water) in the building. In heat pumps with heat metering, the analysis is carried out by the regulator. The regulator displays the thermal energy discharged in the heating system in kWh.

11 Operation

Your decision to purchase a heat pump or a heat pump system is a long-term contribution to protecting the environment through low emissions and reduced primary energy use.

To ensure that your heat pump or heat pump system operates efficiently and ecologically, the following are especially important:

ENERGY SAVING TIP
Avoid unnecessarily high flow temperatures.A lower flow temperature on the hot water side increases the efficiency of the system.

ENERGY SAVING TIP
Preferably use purge ventilation. Compared to continuously open windows, it is better to air rooms by fully opening windows for a short period, two to three times a day (so-called “rapid” or “purge” ventilation); this reduces energy consumption and your heating bill.

You can operate and control the heat pump system with the control element of the heating and heat pump regulator.

NOTE
Make sure that the control settings are correct.

→ Operating manual of the heating and heat pump regulator

12 Cooling

There are two ways to use the heat pump for air conditioning in rooms, through: „passive cooling“ and „active cooling“.
The main difference is the compressor operation. While the compressor is not needed for passive cooling, i.e. it is passive, the compressor operates during active cooling, i.e. it is active.
Another difference is that both passive and active cooling is possible with the ground and groundwater heat sources. But only active cooling is possible with the outside air heat source.
Passive cooling is the more cost-effective option. Lowering the temperature by 3-4 K is often fully sufficient to produce a comfortable room temperature in the summer.
Whereas higher cooling output is possible with active cooling.
Passive cooling uses the fact that the ground and groundwater, from a depth of around 8 metres, are more or less a constant temperature all year round and in the summer are around 9 °C to 10 °C cooler than the outside air or the interior rooms.
This temperature difference is sufficient to cool a building with energy from the ground and groundwater. Additional fan coils, cooling ceilings, underfloor heating and thermo active building systems (embedding cooling pipes), such as concrete core thermal activation, can be used for direct cooling.

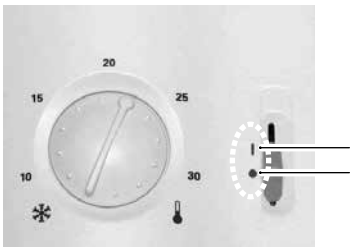
IMPORTANT
By cooling with low flow temperatures, condensate can be expected to form on the heat distribution system as the temperature falls below the dew point. If the heat distribution system is not designed for these operating conditions, it must be protected by appropriate safety devices, e.g. dew point monitor (purchasable accessory).

NOTE
If the heating surfaces are used for heating and cooling, the control valves must be suitable for heating and cooling.
In addition, a dew-point monitor should be used for cooling.

NOTE
Use recommended accessory dew point monitors.

The room thermostat of the cooling function
(purchasable accessories, optional)

The room thermostat is used to release and to switch off the cooling function:



I Cooling function switched on
● Cooling function off

Use of the cooling function

The heating and heat pump regulation program activates the cooling function only if the following conditions are fulfilled:

- Heat pump type with integrated cooling function
- Room thermostat of the cooling function is switched on
- Temperature of the heat source is ≥ +5 °C
- Heat pump is currently not being used for „heating“ nor for „domestic water heating“. If the heat pump control program sends the “domestic water heating” request to the heat pump, the cooling function of the heat pump stops automatically for the duration of the domestic water heating
- The „Automatic“ setting is selected under the „Cooling mode“ heading
- The outside temperature release set at the control is exceeded

→ Operating manual of the heating and heat pump regulator

The cooling function can be used in two variants:

Variant 1:

Manual switching from heating to cooling mode (and vice versa). This uses a fixed pre-set flow temperature.

→ Operating manual of the heating and heat pump controller.

Variant 2:

Automatic switching from heating to cooling mode (and vice versa). This variant can operate using a cooling curve.

NOTE
Variant 2 is only possible if the expansion board (purchasable accessories) is installed in the heating and heat pump controller.

→ Comfort board operating manual

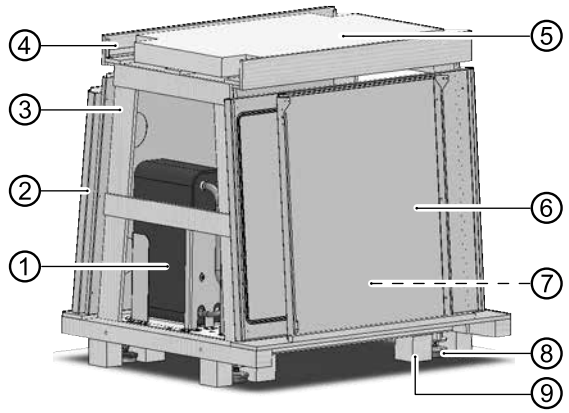
13 Care of the unit

The outer surfaces of the unit can be cleaned with a damp cloth and standard cleaning products.

Do not use cleaning or care products that contain abrasives, acids and/or chlorine. Such products would destroy the surfaces and could also damage the technical components of the unit.

14 Scope of delivery

Example of scope of delivery:



1 Heat pump = complete indoor unit
2 Facing panels*) placed to the side
3 Transport frame
4 Profile rails
5 Insulation panel, which is then pushed under the baseplate (sound insulation)
6 Facing panels placed to the side (5 panels)
7 Extra box with accessories (indoors)
8 Pre-fitted adjustable feet (4)
9 Spacer blocks (4), which can be unscrewed after installation

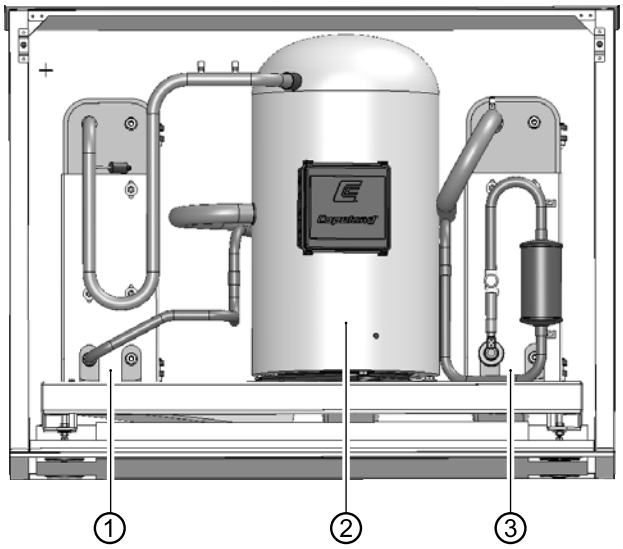
*) a total of 5 panels

1. Check the delivery for outwardly visible signs of damage.
2. Check that nothing is missing from the scope of supply.
   Any defects or incorrect deliveries must be reported immediately.

NOTE
Note the unit model.

→ “Technical data / scope of delivery“, from page 22

14.1 Main components



1 condenser
2 compressor
3 evaporator

15 Installation

Observe the following when performing all work:

NOTE
Always comply with the applicable local accident prevention regulations, statutory regulations, ordinances, guidelines and directives.

NOTE
Observe the sound levels of the respective model.

→ “Technical data / scope of delivery“, from page 22, “Sound” section

15.1 Installation room

NOTE
Note and follow the local regulations and standards regarding the installation room and space requirements. The table shows the regulations as per EN 378-1 relevant in Germany.

Refrigerant	Limit [kg/m³]
R 134a	0.25
R 404A	0.52
R 407C	0.31
R 410A	0.44
R 410A	0.44
R 448A	0.39

→ “Technical data / scope of delivery“, from page 22, “General unit data” section

$$\textbf{Minimum room volume} = \frac{\text{Refrigerant capacity [kg]}}{\text{Limit [kg/m}^3\text{]}}$$

NOTE
If several heat pumps of the same type are installed only one heat pump need to be taken into account. If several heat pumps of different types are installed, only the heat pump with the largest refrigerant volume needs to be taken into account.

✓ Minimum volume corresponds to the requirements for the refrigerant used.

✓ Installation inside the building only.

✓ Installation room is dry and frost-free.

✓ Clearance dimensions are met

→ “Installation plans“, from page 44

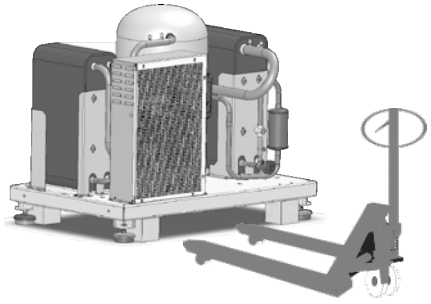
✓ The surface/floor is suitable for installation of the unit:

- level and horizontal
- load-bearing capacity for the unit’s weight

15.2 Transport to installation location

1. Before transporting the heat pump to the final installation location the packaging and wooden frame can be dismantled.
   To do this, remove the facing panels on the long sides, undo the wooden boards and remove the two machine screws (M8) in each of the sides.

2. You can now lift the unit with the help of a pallet truck or fork lift truck and transport it to its final installation location.



NOTE
The unit has ground clearance for easy access from all sides.

NOTE
The baseplate is 76 cm wide, so that the heat pump can be transported through a standard door opening.

NOTE
Keep the components enclosed in the scope of delivery in a safe place until the assembly.

WARNING
Several people are required to transport the unit. Do not underestimate the weight of the unit.

→ “Technical data / scope of delivery“, from page 22, “General unit data” section

IMPORTANT
Never use components and hydraulic connections on the unit for purposes of transport.

IMPORTANT
Do not tilt the unit more than a maximum of 45° (in any direction).

15.3 Installation

WARNING
Several people are required to install the unit.

NOTE
Take into account the size of the unit.

→ “Technical data / scope of delivery“, from page 22, “General unit data” section

NOTE
Always follow the installation plan for the respective model. Note the size and minimum clearances.

→ “Installation plans“, from page 44, for respective model

IMPORTANT
The heat pump must be installed on a firm, horizontal surface. Make sure that the foundation is designed for the weight of the heat pump.

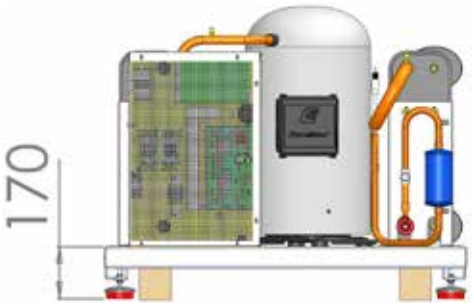
Do not use a rigid foam boiler pedestal!

→ “Technical data / scope of delivery“, from page 22, “General unit data” section

NOTE
Set up the unit so that the operating side is accessible at all times!

IMPORTANT
Do not tilt the unit more than a maximum of 45° (in any direction).

1. Lower the basic heat pump module on the 4 wooden transport blocks in its final installation location. Now use the vibration-decoupling, adjustable machine feet to align the unit horizontally. Ensure the distance from the finished floor level to the top of the heat pump baseplate is 170 mm. Lock this setting by locking the nuts.



2. The four transport blocks (each with 2 universal wood screws) must then be removed.

16 Installation of the hydraulic connections

16.1 Buffer tank

The hydraulic connection of the heat pump requires a buffer tank in the heating circuit. The required volume of the buffer tank is calculated based on the following formula:

$$V_{\text{Buffer tank}} = \frac{\text{minimum flow rate of heat circuit volume flow / hour}}{10}$$

→ For the minimum flow rate of the heat circuit volume flow: “Technical data / scope of delivery“, from page 22, “Heating circuit” section

16.2 Domestic water heating

The domestic water heating with the heat pump requires an additional hot water circuit, parallel to the heating circuit. When installing, make sure that the domestic hot water charge is not fed through the buffer tank of the heating circuit.

→ “Hydraulic connection” instructions

16.3 Domestic hot water tank

If the heat pump is to be used for domestic water heating, you must integrate special domestic hot water tanks in the heat pump system. Choose a storage volume so that the required quantity of hot water is available even during a power cut.

NOTE
The heat exchanger surface of the domestic hot water tank must be dimensioned so that the heating capacity of the heat pump is transferred with minimum spread.

We offer a variety of domestic hot water tanks for you to choose from. They are optimised for use with your heat pump.

IMPORTANT
Connect the unit to the heating circuit according to the hydraulic diagram for the respective model.

→ “Hydraulic connection” instructions

IMPORTANT
The heat source system must be designed according to the specifications of the planning manual.

→ Planning manual and “Hydraulic connection” documents

NOTE
Check to make sure that the diameters and lengths of the pipes for the heating circuit and the heat source are sufficiently dimensioned.

NOTE
Circulating pumps, which pump the volume flow through the heat pump, must be designed as multi-stage pumps. They must at least provide the minimum throughput rate required for your model.
In the case of heat source pumps, the viscosity of the brine liquid must also be taken into account!

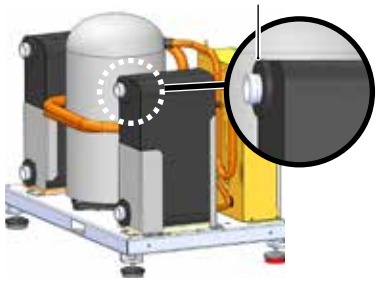
→ “Technical data / scope of delivery“, from page 22, “Heat circuit” and “Heat source” sections

IMPORTANT
The hydraulic system must be equipped with a buffer tank, the required volume of which depends on the model of your unit.

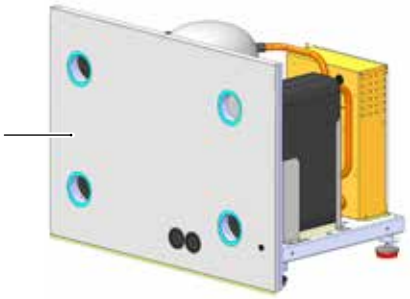
IMPORTANT
When installing the connections, always secure the connections on the unit against twisting, in order to prevent damage to the components inside the unit.

The following steps are to be carried out on all 4 hydraulic connections of the heat pump:

1. Push the insulation elements included in the scope of delivery onto the plate heat exchanger.

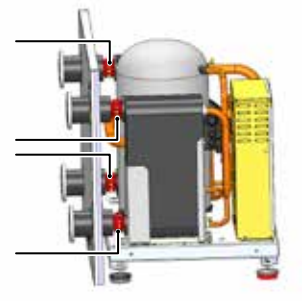


2. Position the back panel of the heat pump on the basic heat pump module.

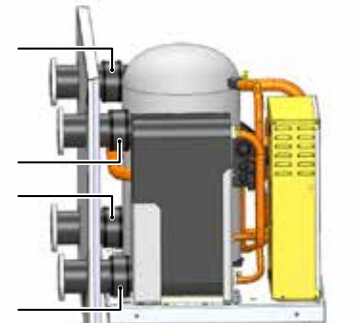


3. Connect the piece of pipe supplied to the threaded flange and insulate it with the enclosed insulating hose.

4. Connect the connectors to the connection clip included in the scope of supply to the corresponding connection on the heat pump.



5. Use the insulating tape supplied to insulate the connection clip. Use the enclosed fastening materials to additionally fix the insulation.



NOTE
We recommend completing step 5 after the leak test.

NOTE
The heat source and heating side must be insulated from the heat pump; to this end we recommend using the IPFK hydraulic connection set in our range of products (not included in the scope of delivery).

6. Install shut-off devices at the heating circuit.
7. Install shut-off devices at the heat source.
8. Place a bleeder at the highest point of the heat source in the heat source outlet.
9. We recommend installing a dirt filter (screen size 0.9 mm) on the heat source inlet connection.

   The hot water and heat source connections are marked accordingly on the unit.

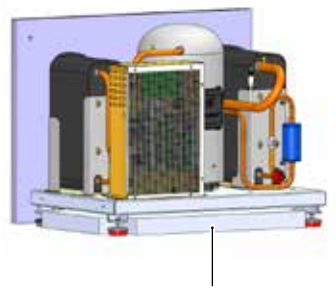
→ For the positioning of the connections: “Dimensional drawings“, from page 38, for the respective model

16.4 Installing the housing

NOTE
Remove the protective film from all facing panels.

NOTE
The screws for installing the heat pump housing are included in the scope of delivery.

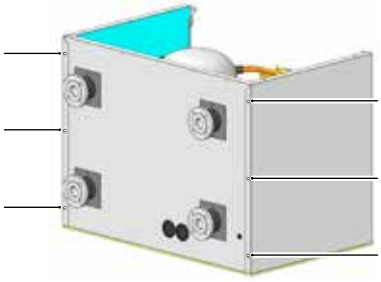
1. Position the insulation included in the scope of delivery under the baseplate.



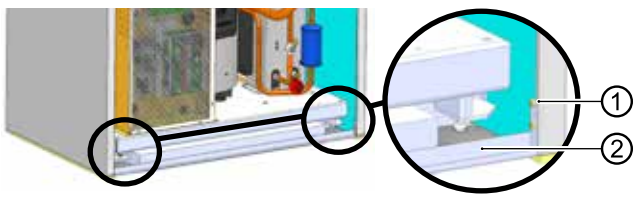
NOTE
Before screwing on the side panels, feed the patch cable and + LIN bus cable through the rear panel!

→ “17 Electrical connections”, page 15

2. Screw the two side panels onto the back panel using 3 screws for each.

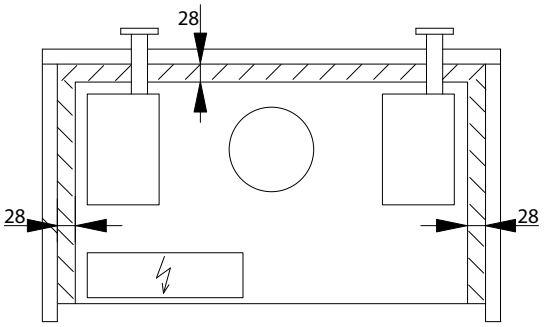


3. Mount the profile rail onto the front of the unit, between the two side panels, using 2 screws for each side.

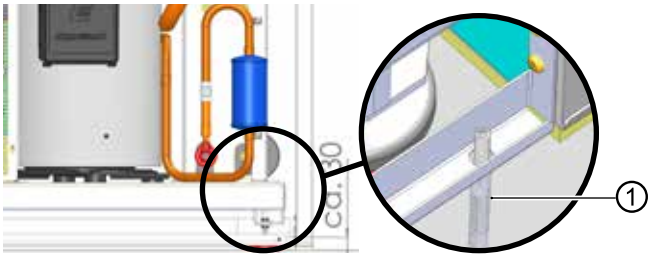


1 Screw
2 Profile rail

4. Align the facing with the baseplate as shown in the following sketch

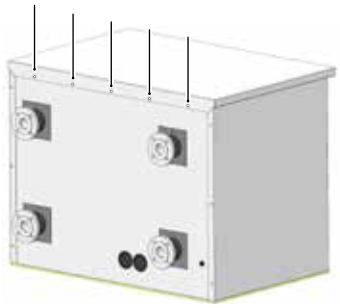


5. Secure and fix the facing on the profile rail using the fastening materials included in the scope of delivery (2 x 10mm anchors and 2 x M8 hanger bolts). Twist the hanger bolt into the floor up to the start of the thread.

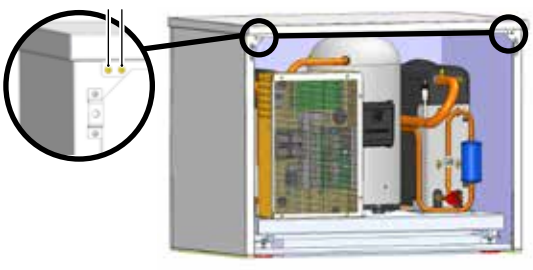


1 hanger bolt with anchor

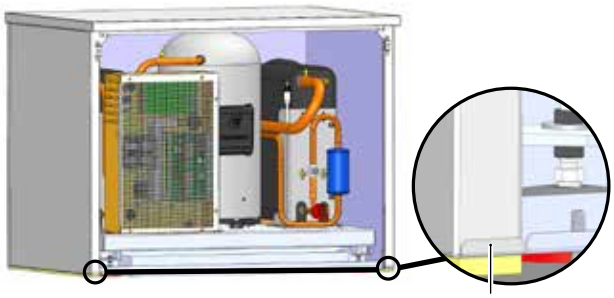
6. Align the insulating board under the unit with the middle of the unit (see 1).
7. Fix the housing cover onto the rear panel (5 screws)



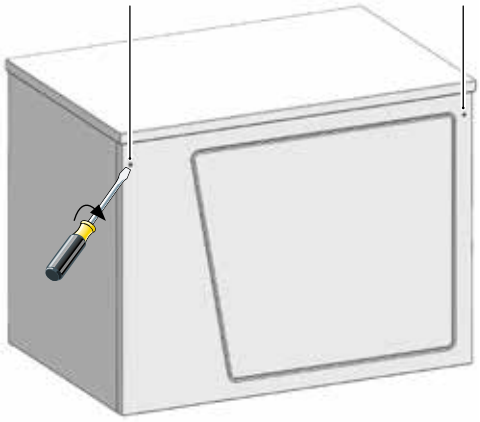
and the two side panels (2 screws each) onto the front.



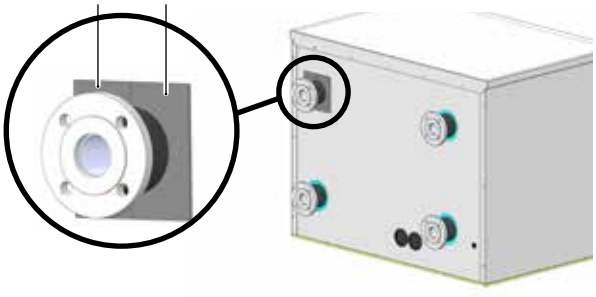
8. The front panel can now be hung into the clips provided at the bottom.



and locked by means of the two quarter-turn screws.



9. Glue the insulating half-shells included in the scope of delivery around the pipe pieces in the rear panel.



17 Electrical connections

The following applies to all work to be done:

DANGER
Risk of fatal injury due to electric shock!
All electrical connections must be carried out by qualified electricians only.

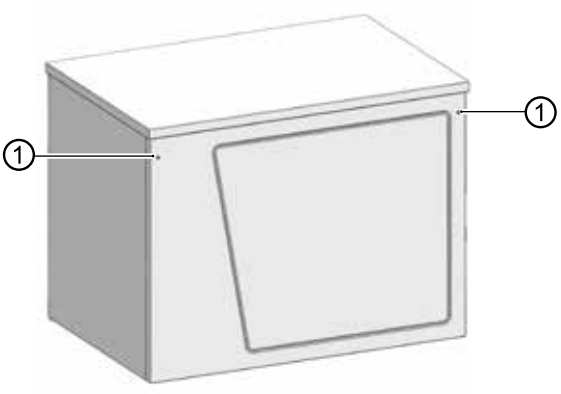
Before opening the unit, disconnect the system from the power supply and prevent it from being switched back on!

WARNING
During installation and while carrying out electrical work, comply with the relevant EN-, VDE and/or local safety regulations.

Comply with technical connection requirements of the responsible power supply company (if required by the latter)!

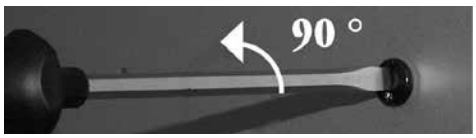
NOTE
All cables must be fed through the openings in the back panel!

1. The front panel is hung in at the bottom and is held in place at the top by 2 quarter-turn screws.

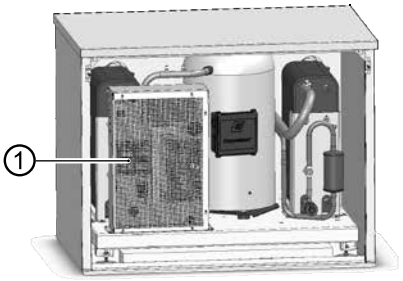


1 Quarter-turn screws

2. Open the quarter-turn screws of the front panel by turning them through 90° anticlockwise.

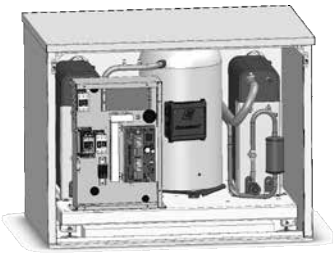


3. Lift out front panel and set aside in a safe place.
4. Open the unit's electrical switch cabinet.



1 Electrical switch cabinet

Undo the 6 screws slightly, in order to unhook the cover panel by lifting it slightly.

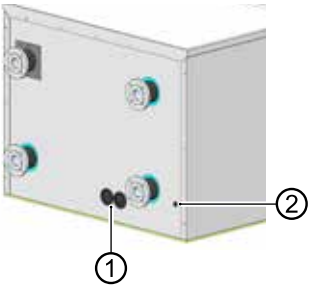


5. Several openings are provided at the back of the unit for passing through the cables.

NOTE
When laying the cable, ensure that unshielded power supply cables and shielded cables (LIN bus) are laid separately from each other.

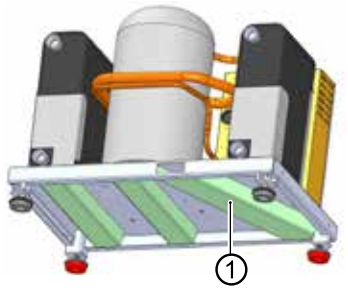
NOTE
LIN bus length may not be increased. However, they can be shortened.

→ For further details: "Installation plans", from page 44, for the respective model



1 Electric cable penetration
2 Penetration, LIN bus and patch cable for the heating and heat pump regulator

The external electric cables to be provided must be fed through the grommets cut out in the bottom of the rear panel and then fed into the electrical switch cabinet by means of the cable duct, which is integrated into the baseplate of the heat pump.



1 Cable duct

The cables laid in the switch cabinet for the regulator (patch cable, LIN bus) must be fed through the grommet cut out in the bottom of the rear panel.

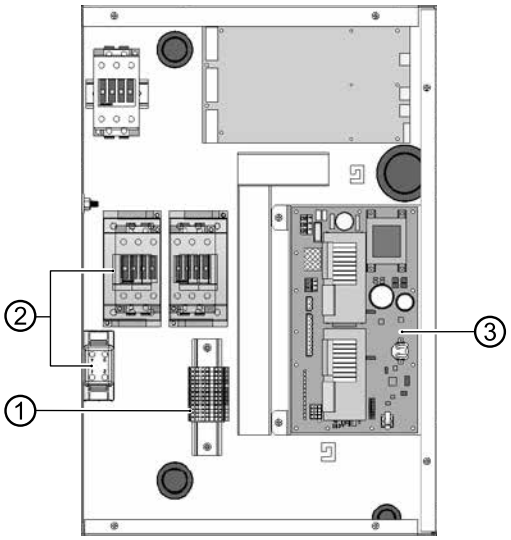
6. Make electrical connections according to the terminal diagram.

→ “Terminal diagram”, page 48

IMPORTANT
Ensure clockwise rotary field of the load power supply (compressor).
Operation with the incorrect rotary direction of the compressor can cause serious, irreparable damage to the compressor.

IMPORTANT
The power supply for the heat pump must be equipped with an all-pole automatic circuit-breaker with at least 3mm contact spacing to IEC 60947-2.
Note the level of the tripping current.

→ “Technical data / scope of delivery“, from page 22, “Electrics” section



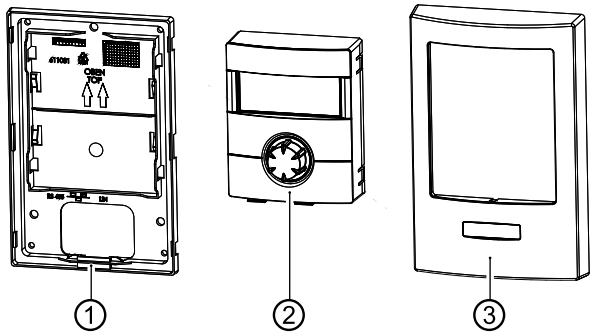
1 Control voltage connection
2 Compressor output connection
3 Regulator board

NOTE
The control element of the heat and heat pump regulator can be connected to a computer or network using a suitable network cable, enabling the heating and heat pump regulator to be controlled remotely from there. If such a connection is required, lay a shielded network cable (category 6, with RJ-45 connector) up to the control element while carrying out the electrical connection work.

7. After completion of all electrical installation work, close the switch cabinet inside the unit.
8. Screw on the front panel of the unit if no further installation work inside the unit is to be performed immediately.

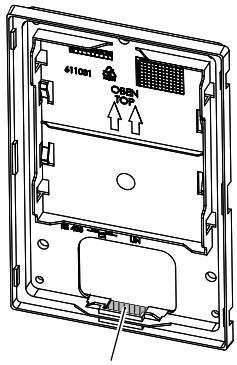
18 Installation of the control element

The separate package contains:



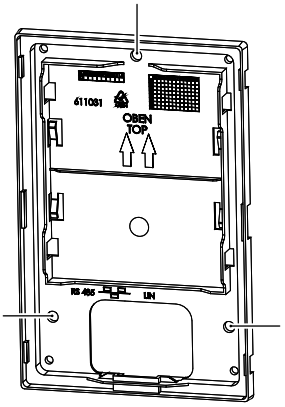
1 wall bracket
2 control unit
3 cover

1. The cables are laid either through the wall (e.g. flush cable box) or from underneath.
   When routing cables from underneath, you must break out the plastic strip (hatched area) on the wall bracket.



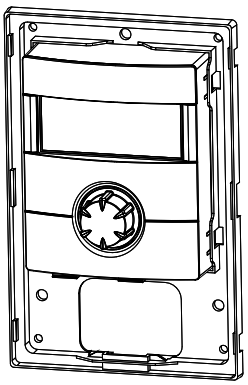
! IMPORTANT
Mount the wall bracket with control panel **only vertically** on a wall!

2. Fasten the wall bracket using the 3 screws (plus dowels) included in the scope of delivery.



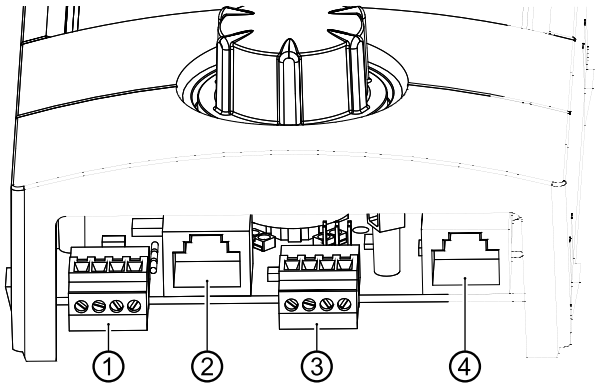
→ “Wallbracket for control unit”, page 42

3. Plug the control unit onto the wall bracket.



Connections

The connections are located on the underside of the control unit:



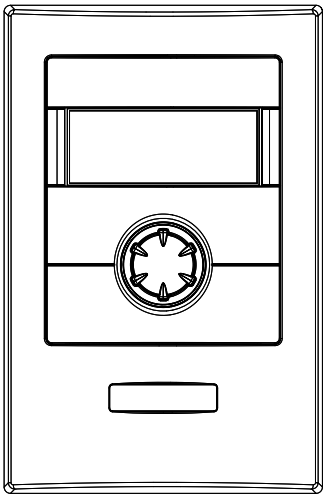
1 Connection room control unit RBE RS 485 (accessory)
2 RJ45 connection cable to the network link
3 Connection LIN bus to the regulator board
4 RJ45 connection regulator board

NOTE
A connection to a computer or a network can be made via socket 2, in order to enable the heating and heat pump controller to be controlled remotely from there. This requires a shielded network cable (category 6).

→ Operating manual for the heating and heat pump controller, part 2, “Web server” section

NOTE
The network cable can be retrofitted at any time. However, in order to connect it, the cover must be removed first.

► If the connection work has been completed, the cover can be fitted onto the wall bracket.



19 Flushing and filling the unit

CAUTION
The system must be absolutely free from air before commissioning.

19.1 Flushing and filling the heat source

Contamination and deposits in the heat source can cause malfunctions.

Frost protection must be provided in the heat source.

Below are the approved antifreeze agents based on:

- Monopropylene glycol
- Monoethylene glycol
- Ethanol
- Methanol

Antifreeze agents based on salt are not permitted.

► When selecting the antifreeze agent, it must be ensured that it is compatible with the following materials:

  - Brass (CW602N and CW614N)
  - Stainless steel (AISI304, AISI316 and AISI316L)
  - Copper (Cu-DHP CW024A - EN1652)
  - Cast iron (EN-GJL-150)
  - Composite (PES 30% GF)
  - EPDM (ethylene propylene diene rubber)
  - PTFE (Polytetrafluoroethylene)
  - FKM (fluororubber)

  If an antifreeze agent is not compatible with one of these materials, it may not be used.

  Antifreeze agents from our product range are safe with regard to our units and the accessories purchased from us and guarantee compatibility with the listed materials.

► Pressure losses must be observed when selecting the antifreeze agent.

► The antifreeze agent that is selected and used must comply with the specifications and requirements of the local authorities and water management authorities.

WARNING
Methanol and ethanol can give off flammable and explosive gases. Therefore, the safety provisions for the anti-freeze must be noted and followed!
The hazard markings of all anti-freezes used must be noted and the relevant safety provisions must be followed.

► Make sure that the mixing ratio of water and antifreeze agent meets the required minimum antifreeze temperature in the heat source.

→ “Technical data / scope of delivery“, from page 22, “Heat sorce” section

► For operation of the heat source with water or water-antifreeze mixture, ensure that the water used fulfils the quality specifications of the heating water side.

→ “Heating water quality“, page 19

✓ Drain pipe of the safety valve is connected.

✓ Room is ventilated.

1. Flush the heat source system thoroughly.
2. Mix antifreeze with water thoroughly with the required ratio, before adding to the heat source.
3. Check the concentration of the water-antifreeze mixture.
4. Fill the heat source with the water-antifreeze mixture.
   Fill until the system is air-free.

19.2 Flush and fill the heating circuit

Unsuitable quality of the water for filling up and replenishing the heating circuit

The efficiency of the system and the service life of the heat generator and the heating components depend decisively on the quality of the heating water.

If the system is filled with untreated drinking water, calcium deposits will form as scale. Lime scale deposits accumulate on the heat transfer surfaces of the heating. The efficiency is reduced and energy costs increase. In extreme cases, the heat exchangers will be damaged.

Heating water quality

NOTE
- For detailed information refer, among other things, to the VDI Guidelines 2035 “Vermeidung von Schäden in Warmwasserheizanlagen”
- Required pH value: 8.2 … 10;
  for aluminium materials:
  pH value: 8.2 … 8.5

► Fill the system with deionised heating water (VE water) or with water corresponding to VDI 2035 only (low-salt operation of the system).

Advantages of low-salt operation:

- Low corrosion-promoting properties
- No formation of mineral scale
- Ideal for closed heating circuits
- Ideal pH value due to self-alkalisation after filling the system

► If the required water quality is not achieved, consult a company specialising in the treatment of heating water.

► Keep a system log for hot water heating systems in which relevant planning data is entered (VDI 2035).

Monitoring

Analytical recording and monitoring of the relevant water values and the added active conditioning substances is of decisive importance. Therefore, they should be monitored regularly using appropriate water test equipment.

Flushing and filling

✓ Drain pipe of the safety valve is connected.

1. Flush heating circuit system thoroughly.
2. Fill heating circuit.
3. Bleed heating circuit.

20 Insulating the hydraulic connections

NOTE
Insulate the heating circuit and the heat source according to relevant local standards and guidelines.

1. Check all hydraulic connections for leaks. Perform leak test.
2. Insulate all connections, vibration isolation, connections and pipes of the heating circuit and the heat source. Insulate the heat source so that it is **vapour-diffusion tight**.

21 Commissioning

NOTE
The commissioning has to be in the heating mode.

1. Carry out a thorough installation check and work through the general checklist.

→ Manufacturer's homepage

By checking the installation you prevent damage to the heat pump system, which could be caused by work carried out improperly.

Check that.

- **clockwise rotary field** of the load power supply (compressor) is ensured
- The heat pump **installation and assembly** have been carried out according to the requirements of this operating manual
- the electrical installation work has been completed properly
- The power supply for the heat pump must be equipped with an all-pole automatic circuit-breaker with at least 3 mm contact spacing to IEC 60947-2
- The heating circuit is flushed, filled and thoroughly vented
- All valves and shut-off devices of the heating circuit are open
- All pipe systems and components of the system are leaktight

2. Carefully fill out and sign the completion report for heat pump systems.

→ Manufacturer's homepage

3. Within Germany:
   Send completion report for heat pump systems and general checklist to the manufacturer's factory customer service department.

   In other countries:
   Send completion report for heat pump systems and general checklist to the manufacturer's local partner.

4. The heat pump system is commissioned by customer service personnel authorised by the manufacturer. There is a fee for starting up!

22 Maintenance

NOTE
We recommend that you sign a maintenance agreement with an accredited heating company.

22.1 Basic principles

The cooling circuit of the heat pump requires no regular maintenance.

Local regulations – e.g. EU Regulation (EC) 517/2014 – among other things, require leak checks beforehand and/or for a logbook to be kept for certain heat pumps.

The hermetic tightness and refrigerant fill quantity are criteria for whether a logbook has to be kept and leak tests performed or not, and at what time intervals.

► Ensure compliance with local regulations with regard to the specific heat pump system.

22.2 Maintenance as required

- Checking and cleaning the components of the heating circuit and the heat source, e.g. valves, expansion vessels, circulation pumps, filters, dirt traps
- Test the function of the safety valve for the heating circuit

22.3 Clean and flush the evaporator and condenser

► Clean and flush the evaporator/condenser strictly according to the manufacturer's regulations.

► After flushing the evaporator/condenser with chemical cleaning product: neutralise any residues and flush the evaporator/condenser thoroughly with water.

22.4 Yearly maintenance

► Record the quality of the heating water analytically. In case of deviations from the specifications, take suitable measures without delay.

23 Faults

► Read out the cause of the fault via the diagnostics program of the heating and heat pump controller.

► Contact the local partner of the manufacturer or the factory's customer service. Have the fault message and unit number (→ Name plate) to hand.

24 Dismantling and Disposal

24.1 Dismantling

► Collect all media safely.

► Separate components by their materials.

24.2 Disposal and Recycling

► Dispose of media harmful to the environment according to local regulations, e.g. antifreeze mixture, refrigerant.

► Recycle or ensure proper disposal of unit components and packaging materials according to local regulations.

24.3 Removal of the buffer battery

IMPORTANT
Before scrapping the heating and heat pump regulator, remove the buffer battery on the processor board. The battery can be pushed out using a screwdriver. Dispose of battery and electronic components in an environmentally friendly way.

Technical data / scope of delivery — Brine operation

Heat pump type	Brine/Water ı Air/Water ı Water/Water			• relevant ı — not relevant
Installation location	Indoors ı Outdoors			• relevant ı — not relevant
Conformity				CE
Power data	Heating power/COP at			
	B0/W35	Standard point as per EN14511	2 Compressors	kW ı ...
			1 Compressor	kW ı ...
	B0/W50	Standard point as per EN14511	2 Compressors	kW ı ...
			1 Compressor	kW ı ...
	B-5/W35	Standard point as per EN14511	2 Compressors	kW ı ...
			1 Compressor	kW ı ...
	B-0/W45	Standard point as per EN14511	2 Compressors	kW ı ...
			1 Compressor	kW ı ...
Operating limits	Heat circuit			°C
	Heat source			°C
	Additional operating points			...
Noise	Sound pressure level at 1m gap around the machine averaged (in free field)			dB(A)
	Sound power level as per EN12102			dB
Heat source	Volumetric flow: minimum throughput ı nominal throughput ı maximum throughput			l/h
	Pressure loss in heat pump Δp ı Volumetric flow			bar ı l/h
	Recommended brine circulating pump			...
	Total compression of the recommended pump at nominal brine volumetric flow			bar ı l/h
	Antifreeze			Monoethylene glycol
	Minimum concentration ı frostproof to			% ı °C
Heat circuit	Volumetric flow: minimum throughput ı nominal throughput ı maximum throughput			l/h
	Pressure loss in heat pump Δp ı Volumetric flow			bar ı l/h
	Free compression of heat pump Δp ı Volumetric flow			bar ı l/h
	Temperature spread for B0/W35			K
General device data	Earth (see dimensional diagram for the size indicated)			Size
	Total weight			kg
		Extra weight of construction unit 1		kg
		Extra weight of construction unit 2		kg
	Connections	Heat circuit		...
		Heat source		...
	Refrigerant	Refrigerant type ı Filling capacity		... ı kg
Electrics	Voltage code ı All-pole circuit breaker for pump *)			... ı A
	Voltage code ı Control voltage circuit breaker *)			... ı A
	Voltage code ı Electrical heating element circuit breaker *)			ı A
Heat pump	Effect. power consumption in the normal point B0/W35 as per EN14511: Power consumption ı Current consumption ı cosφ			kW ı A ı ...
	Maximum machine current within the operating limits			A
	Starting current: direct ı with slow-starter			A ı A
	Protection type			IP
	Power of electrical heating element 3 ı 2 ı 1-phase			kW ı kW ı kW
Components	Circulating pump for heat circuit at nominal throughput: Power consumption ı Current consumption			kW ı A
	Circulating pump for heat source at nominal throughput: Power consumption ı Current consumption			kW ı A
	Setting range for motor protection switch of heat source circulating pump			A
Passive cooling function	Data only for devices with ID K: Cooling power at nominal volumetric flow rates (15 °C heat source, 25 °C hot water)			kW
Safety devices	Safety assembly for heat circuit ı Safety assembly for heat source			in scope of supply: • yes — no
Heating and heat pump control				in scope of supply: • yes — no
Electronic soft-starter				integrated: • yes — no
Expansion vessels	Heat source: Scope of supply ı Volume ı Supply pressure			• yes — no ı l ı bar
	Heat circuit: Scope of supply ı Volume ı Supply pressure			• yes — no ı l ı bar
Overflow valve				integrated: • yes — no
Vibration isolation	Heat circuit ı Heat source			in scope of supply: • yes — no

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*) Observe local regulations n.n. = cannot be demonstrated

	SWP371	SWP451	SWP581	SWP691	SWP291H	SWP561H
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	-	-	-	-	-	-
	45,4 I 5,60	55,0 I 5,70	71,1 I 5,80	84,1 I 5,40	31,5 I 5,10	65,9 I 5,20
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	-5 - 25	-5 - 25	-5 - 25	-5 - 25	-5 - 25	-5 - 25
	B3/W65	B0/W65	B0/W65	B0/W65	B4/W70	B0/W70
	39	41	42	44	43	44
	54	56	57	59	58	59
	6900 I 9200 I 11100	8100 I 10800 I 13000	10200 I 13600 I 16300	13000 I 17300 I 21000	4900 I 6500 I 7800	9400 I 12600 I 19100
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	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566
	R410A I 7,2	R410A I 8,2	R410A I 11,2	R410A I 13,4	R134a I 6,7	R134a I 12,8
	3~/PE/400V/50Hz I C32	3~/PE/400V/50Hz I C40	3~/PE/400V/50Hz I C50	3~/PE/400V/50Hz I C50	3~/PE/400V/50Hz I C40	3~/PE/400V/50Hz I C50
	1~/N/PE/230V/50Hz I B16	1~/N/PE/230V/50Hz I B16	1~/N/PE/230V/50Hz I B16	1~/N/PE/230V/50Hz I B16	1~/N/PE/230V/50Hz I B16	1~/N/PE/230V/50Hz I B16
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	813428c	813429c	813430c	813431c	813432d	813433b

Technical data / scope of delivery — Water operation

Heat pump type	Brine/Water ı Air/Water ı Water/Water			• relevant ı — not relevant
Installation location	Indoors ı Outdoors			• relevant ı — not relevant
Conformity				CE
Power data	Heating power/COP at			
	W10/W35	Standard nominal conditions based on EN14511	2 Compressors	kW ı ...
			1 Compressor	kW ı ...
	W10/W55	**)	2 Compressors	kW ı ...
			1 Compressor	kW ı ...
Operating limits	Heat circuit			°C
	Heat source			°C
	Additional operating points			...
Noise	Sound pressure level at 1m gap around the machine averaged (in free field)			dB(A)
	Sound power level as per EN12102			dB
Heat source	Volumetric flow: minimum throughput ı nominal throughput ı maximum throughput			l/h
	Pressure loss in heat pump Δp ı Volumetric flow			bar ı l/h
	Recommended brine circulating pump			...
	Total compression of the recommended pump at nominal brine volumetric flow			bar ı l/h
	Antifreeze			Monoethylene glycol
	Minimum concentration ı frostproof to			% ı °C
Heat circuit	Volumetric flow: minimum throughput ı nominal throughput ı maximum throughput			l/h
	Pressure loss in heat pump Δp ı Volumetric flow			bar ı l/h
	Free compression of heat pump Δp ı Volumetric flow			bar ı l/h
	Temperature spread for W10/W35			K
General device data	Earth (see dimensional diagram for the size indicated)			Size
	Total weight			kg
		Extra weight of construction unit 1		kg
		Extra weight of construction unit 2		kg
	Connections	Heat circuit		...
		Heat source		...
	Refrigerant	Refrigerant type ı Filling capacity		... ı kg
	Medium in the intermediate circuit			Heating water according to VDI 2035
Electrics	Voltage code ı All-pole circuit breaker for pump *)			... ı A
	Voltage code ı Control voltage circuit breaker *)			... ı A
	Voltage code ı Electrical heating element circuit breaker *)			ı A
Heat pump	Effect. power consumption in the normal point W10/W35 as per EN14511: Power consumption ı Current consumption ı cosφ			kW ı A ı ...
	Maximum machine current within the operating limits			A
	Starting current: direct ı with slow-starter			A ı A
	Protection type			IP
	Power of electrical heating element 3 ı 2 ı 1-phase			kW ı kW ı kW
Components	Circulating pump for heat circuit at nominal throughput: Power consumption ı Current consumption			kW ı A
	Circulating pump for heat source at nominal throughput: Power consumption ı Current consumption			kW ı A
	Setting range for motor protection switch of heat source circulating pump			A
Passive cooling function	Data only for devices with ID K: Cooling power at nominal volumetric flow rates (15 °C heat source, 25 °C hot water)			kW
Safety devices	Safety assembly for heat circuit ı Safety assembly for heat source			in scope of supply: • yes — no
Heating and heat pump control				in scope of supply: • yes — no
Electronic soft-starter				integrated: • yes — no
Expansion vessels	Heat source: Scope of supply ı Volume ı Supply pressure			• yes — no ı l ı bar
	Heat circuit: Scope of supply ı Volume ı Supply pressure			• yes — no ı l ı bar
Overflow valve				integrated: • yes — no
Vibration isolation	Heat circuit ı Heat source			in scope of supply: • yes — no

UK813198a

*) Observe local regulations n.n. = cannot be demonstrated **) Flows according to standard nominal conditions

	SWP371	SWP451	SWP581	SWP691	SWP291H	SWP561H
	— ı — ı •	— ı — ı •	— ı — ı •	— ı — ı •	— ı — ı •	— ı — ı •
	• ı —	• ı —	• ı —	• ı —	• ı —	• ı —
	•	•	•	•	•	•
	-	-	-	-	-	-
	49,8 ı 6,0	60,2 ı 6,10	77,1 ı 6,10	92,8 ı 5,80	36,9 ı 5,30	73,7 ı 5,30
	-	-	-	-	-	-
	44,6 ı 3,6	54,9 ı 3,80	71,4 ı 3,80	85,4 ı 3,70	33,2 ı 3,30	73,7 ı 5,30
	20 - 65	20 - 65	20 - 65	20 - 65	20 - 70	20 - 70
	7 - 25	7 - 25	7 - 25	7 - 25	7 - 25	7 - 25
	41	41	42	44	43	44
	56	56	57	59	58	59
	15500 ı 15500 ı 23200	15500 ı 15500 ı 23200	19300 ı 19300 ı 28900	24700 ı 24700 ı 37000	10000 ı 10000 ı 15000	19400 ı 19400 ı 29100
	0,32 ı 15500	0,32 ı 15500	0,31 ı 19300	0,33 ı 24700	0,38 ı 10000	0,38 ı 19400
	—	—	—	—	—	—
	—	—	—	—	—	—
	—	—	—	—	—	—
	— ı —	— ı —	— ı —	— ı —	— ı —	— ı —
	5200 ı 10400 ı 13000	5200 ı 10400 ı 13000	6600 ı 13200 ı 16500	8000 ı 16000 ı 20000	3200 ı 6400 ı 8000	6300 ı 12600 ı 15800
	0,21 ı 10400	0,21 ı 10400	0,22 ı 13200	0,24 ı 16000	0,22 ı 6400	0,24 ı 12600
	— ı —	— ı —	— ı —	— ı —	— ı —	— ı —
	5	5	5	5	5	5
	1	1	1	1	1	1
	385	385	441	484	319	521
	—	—	—	—	—	—
	—	—	—	—	—	—
	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566
	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566	DN50 DIN2566
	R410A ı 8,2	R410A ı 8,2	R410A ı 11,2	R410A ı 13,4	R134a ı 6,7	R134a ı 12,8
	•	•	•	•	•	•
	3~/PE/400V/50Hz ı C40	3~/PE/400V/50Hz ı C40	3~/PE/400V/50Hz ı C50	3~/PE/400V/50Hz ı C50	3~/PE/400V/50Hz ı C40	3~/PE/400V/50Hz ı C50
	1~/N/PE/230V/50Hz ı B16	1~/N/PE/230V/50Hz ı B16	1~/N/PE/230V/50Hz ı B16	1~/N/PE/230V/50Hz ı B16	1~/N/PE/230V/50Hz ı B16	1~/N/PE/230V/50Hz ı B16
	— ı —	— ı —	— ı —	— ı —	— ı —	— ı —
	34	34	40	48,5	34	45,6
	174 ı 45	174 ı 45	225 ı 97	272 ı 105	174 ı 91	310 ı 125
	20	20	20	20	20	20
	— ı — ı —	— ı — ı —	— ı — ı —	— ı — ı —	— ı — ı —	— ı — ı —
	— ı —	— ı —	— ı —	— ı —	— ı —	— ı —
	— ı —	— ı —	— ı —	— ı —	— ı —	— ı —
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	—	—	—	—	—	—
	— ı —	— ı —	— ı —	— ı —	— ı —	— ı —
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	•	•	•	•	•	•
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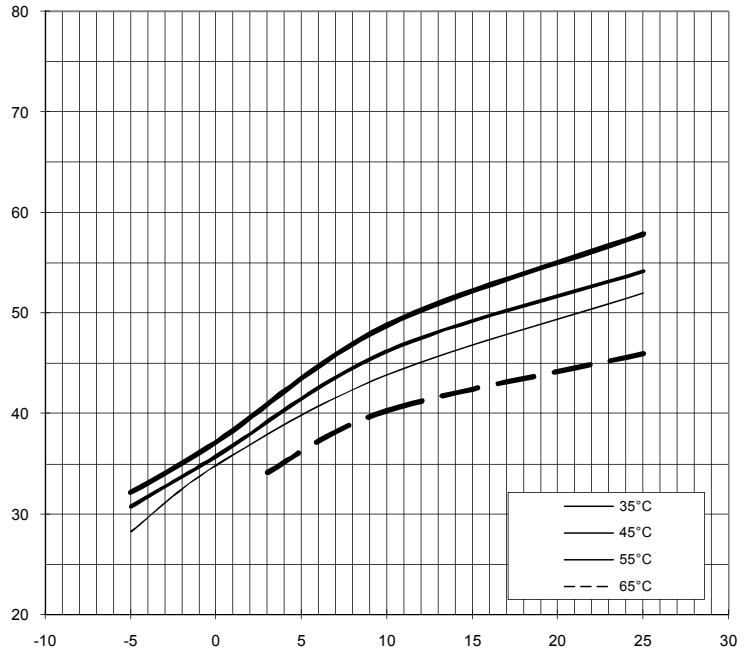
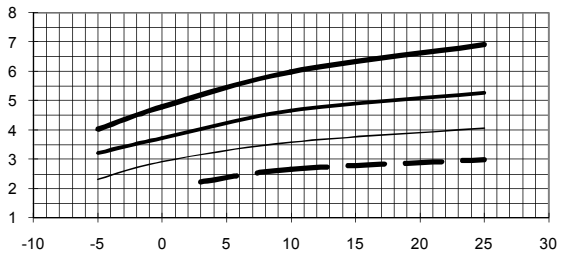
	— ı —	— ı —	— ı —	— ı —	— ı —	— ı —
	—	—	—	—	—	—
	—	—	—	—	—	—
	813444a	813445a	813446a	813447a	813448a	813449a

Qh (kW)



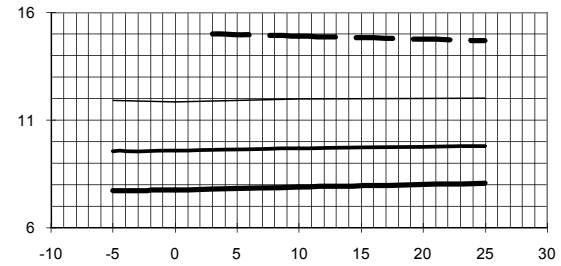
$Temp_{WQ}$ (°C)

COP



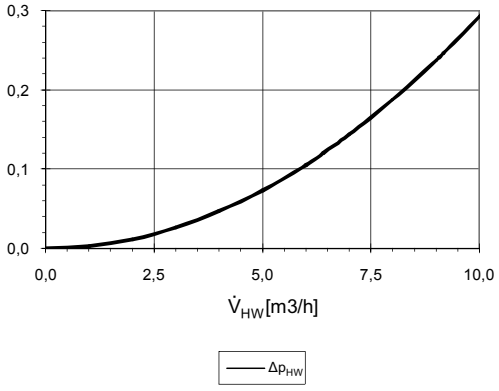
$Temp_{WQ}$ (°C)

Pe (kW)

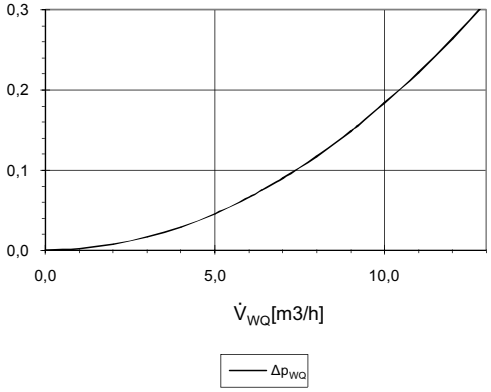


$Temp_{WQ}$ (°C)

Δp (bar)

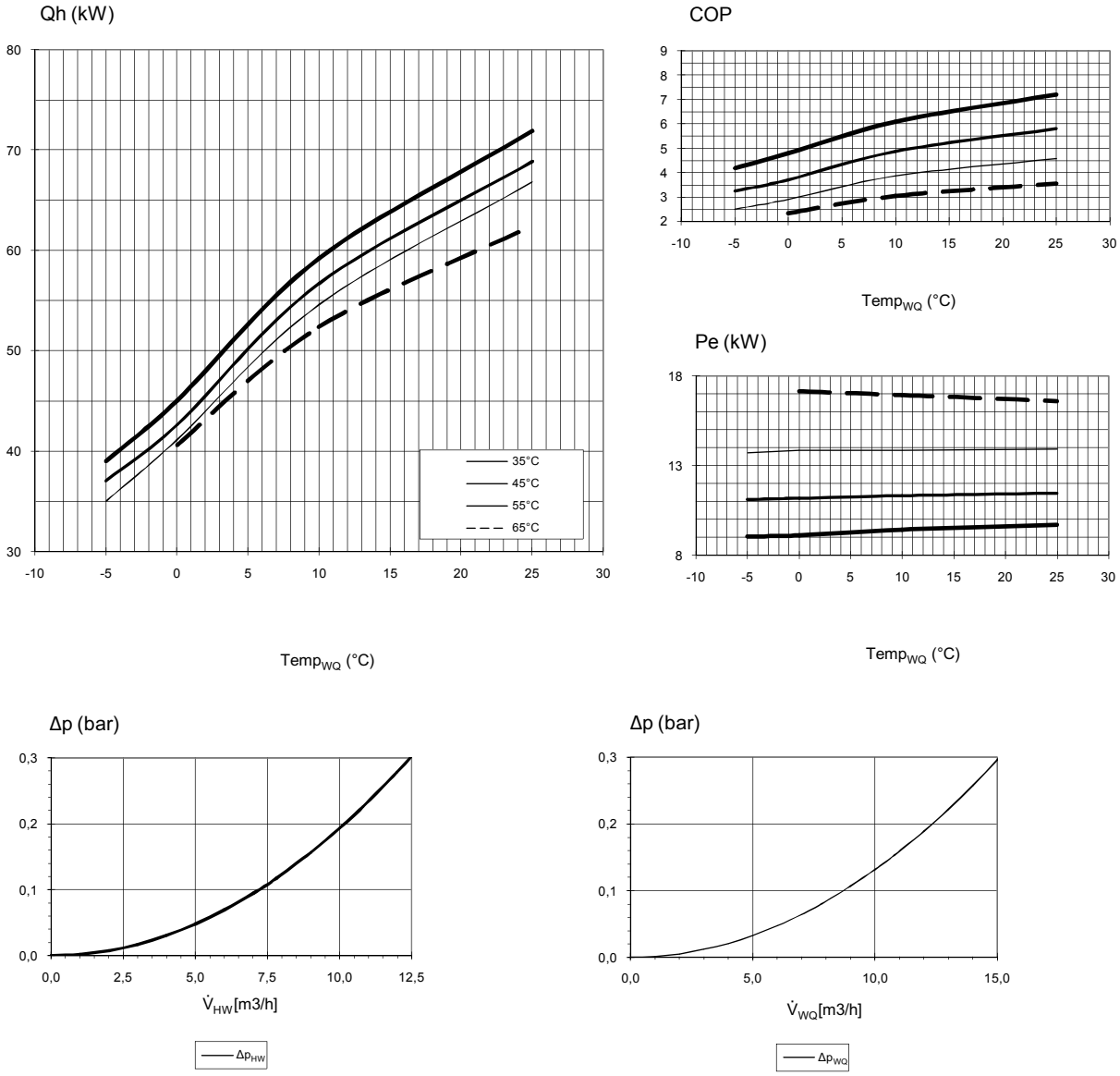


Δp (bar)



823077a

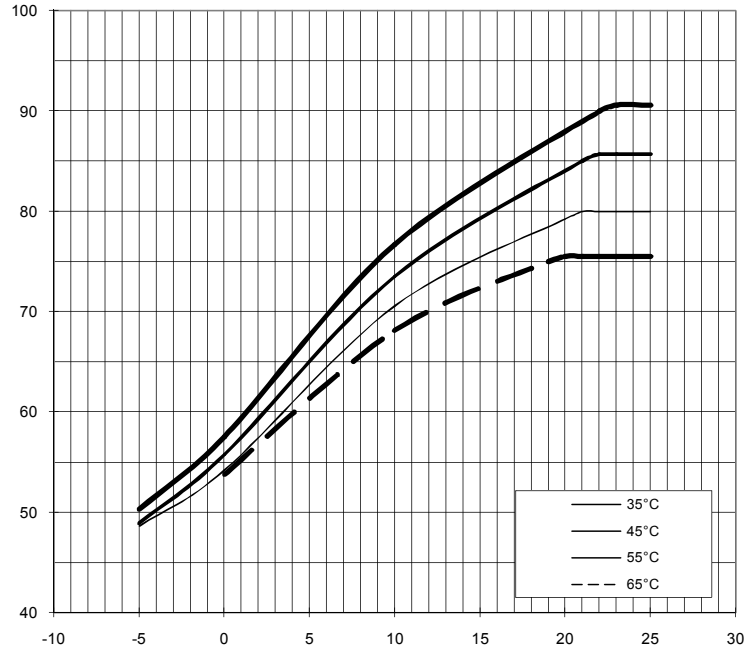
Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
$Temp_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)



823078a

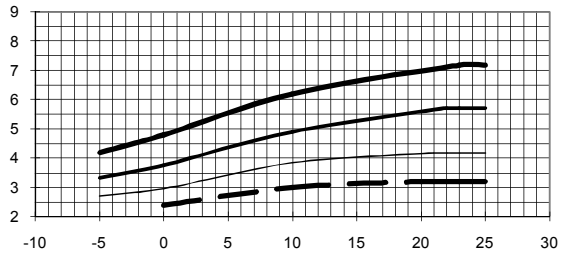
Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
$Temp_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)

Qh (kW)



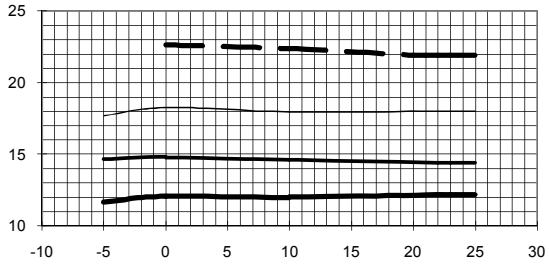
$Temp_{WQ}$ (°C)

COP



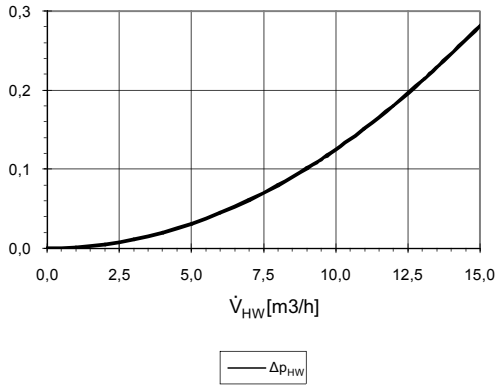
$Temp_{WQ}$ (°C)

Pe (kW)

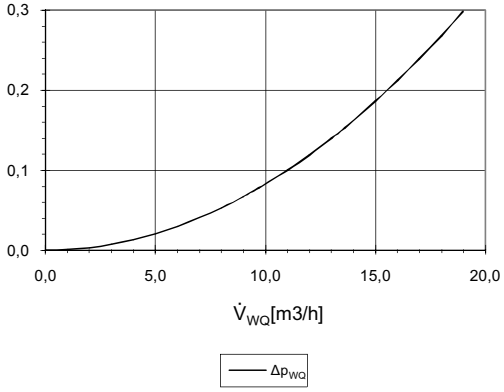


$Temp_{WQ}$ (°C)

Δp (bar)



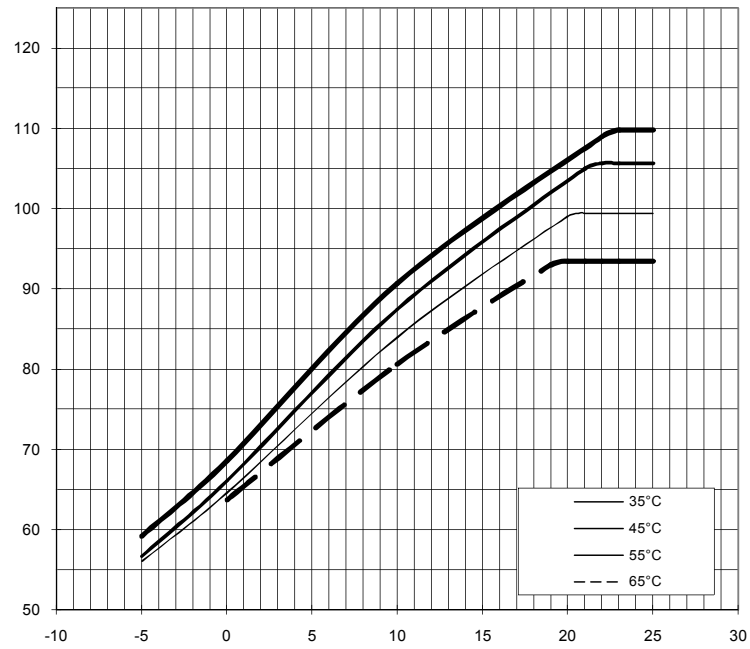
Δp (bar)



823079a

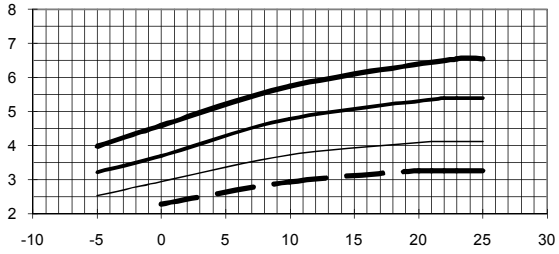
Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
$Temp_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)

Qh (kW)



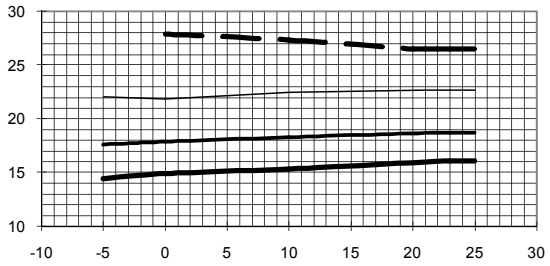
$Temp_{WQ}$ (°C)

COP



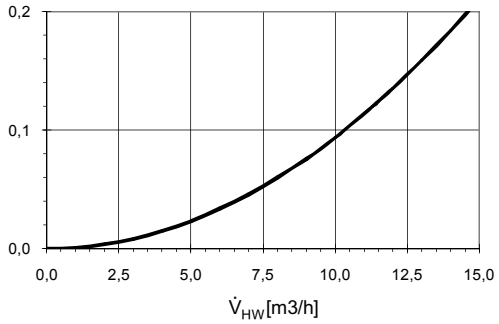
$Temp_{WQ}$ (°C)

Pe (kW)

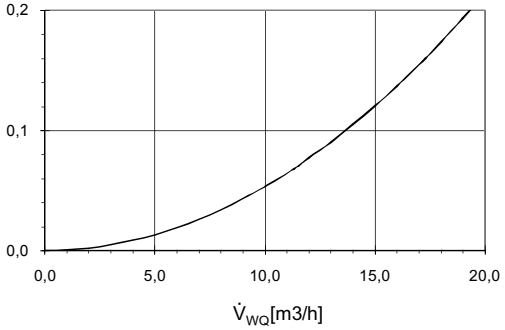


$Temp_{WQ}$ (°C)

Δp (bar)

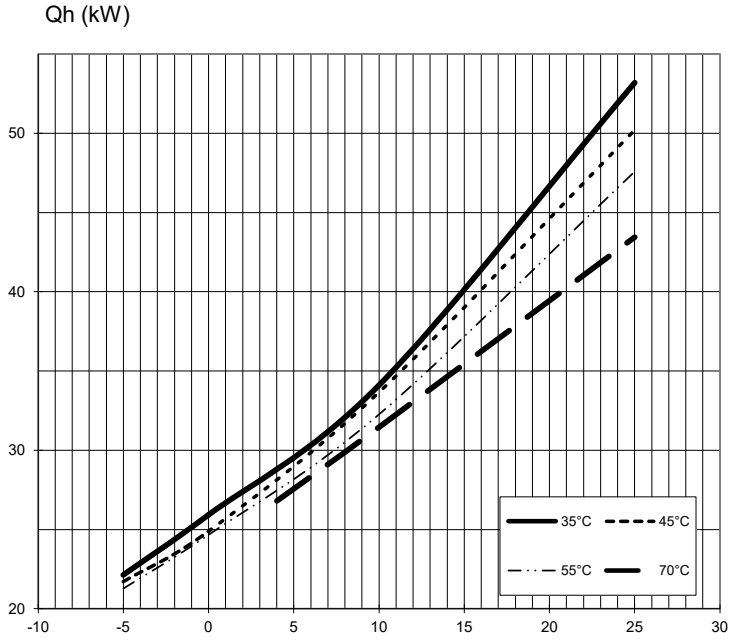


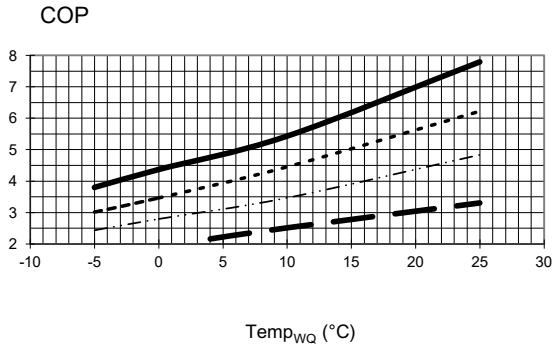
Δp (bar)

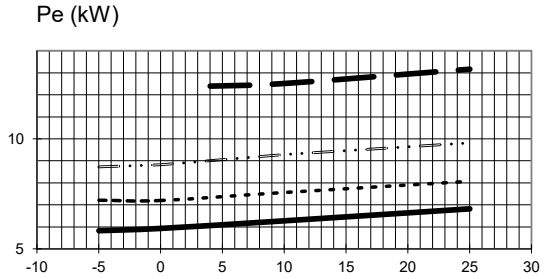


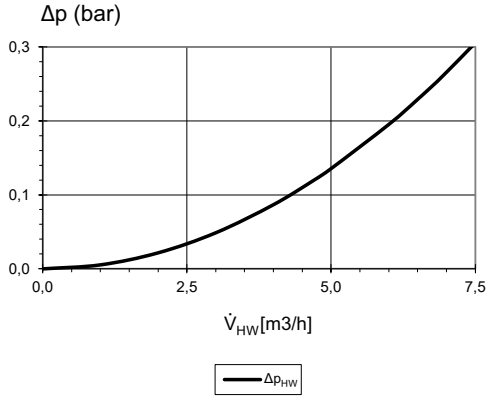
823080a

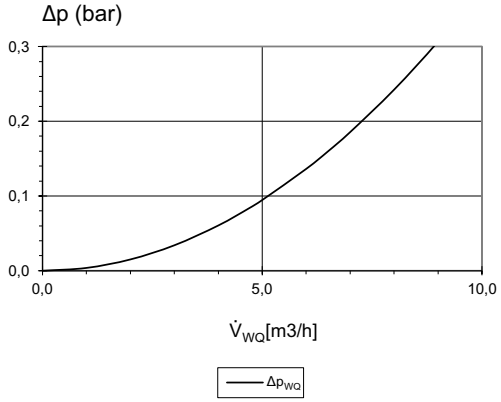
Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
$Temp_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)







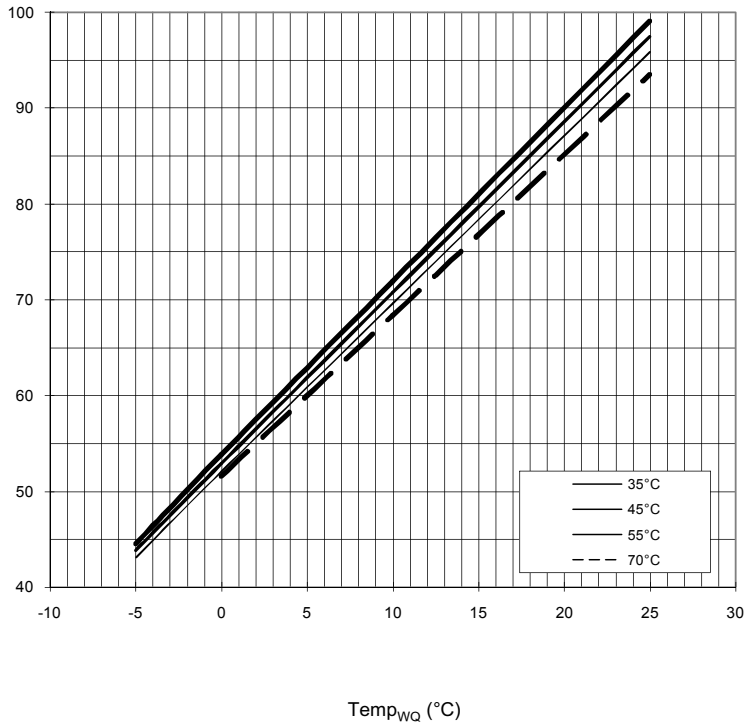




823081a

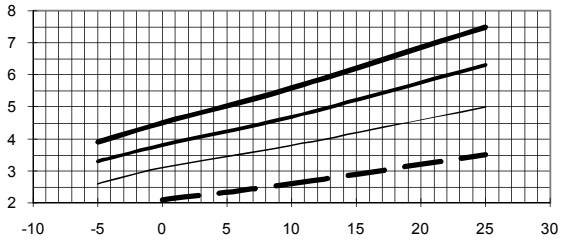
Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
$Temp_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)

Qh (kW)



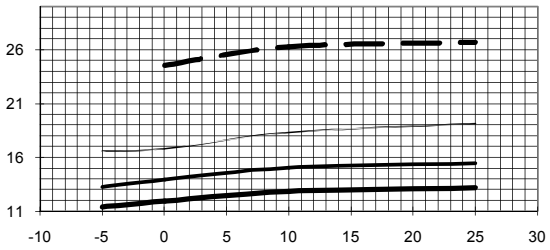
$Temp_{WQ}$ (°C)

COP



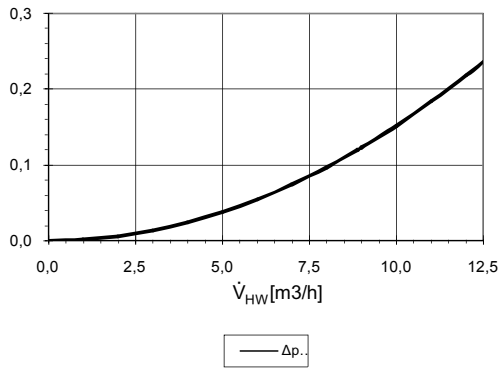
$Temp_{WQ}$ (°C)

Pe (kW)

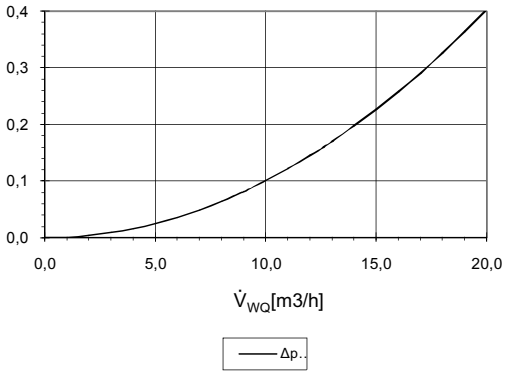


$Temp_{WQ}$ (°C)

Δp (bar)

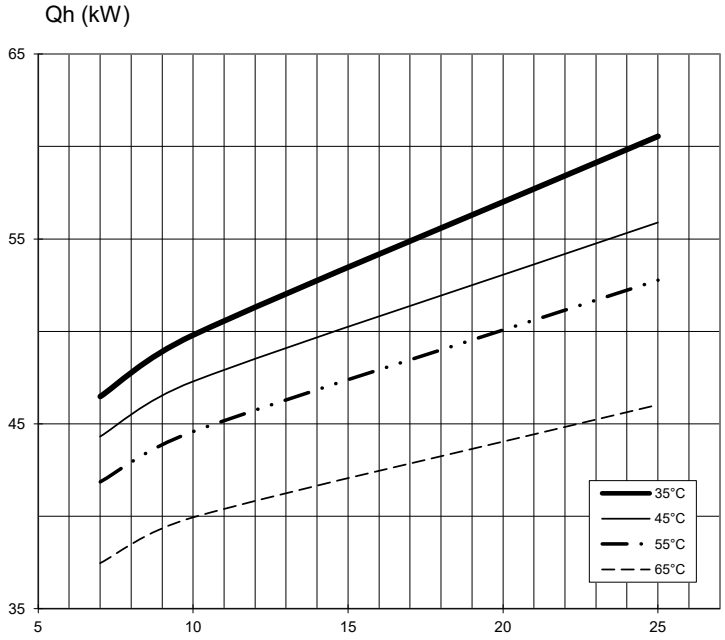


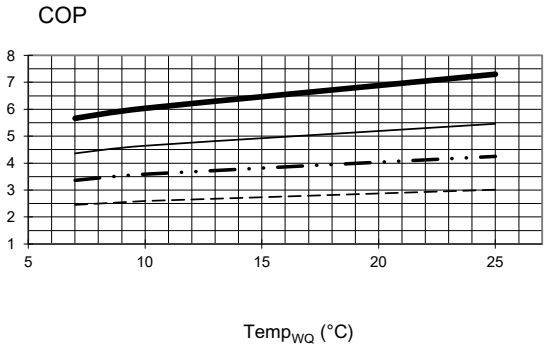
Δp (bar)

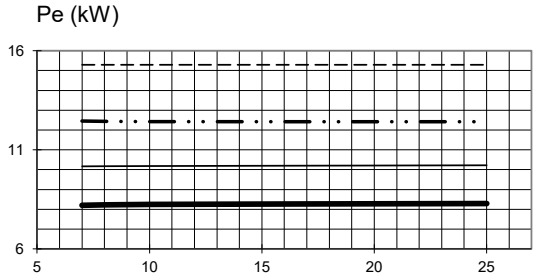


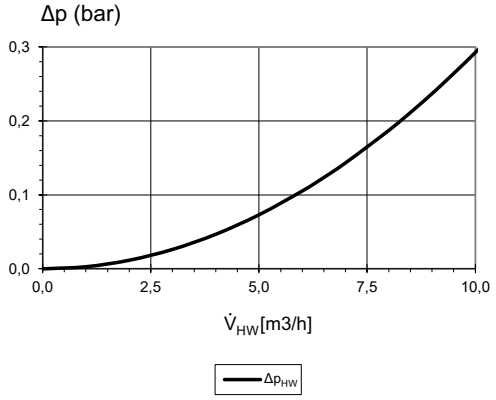
823082

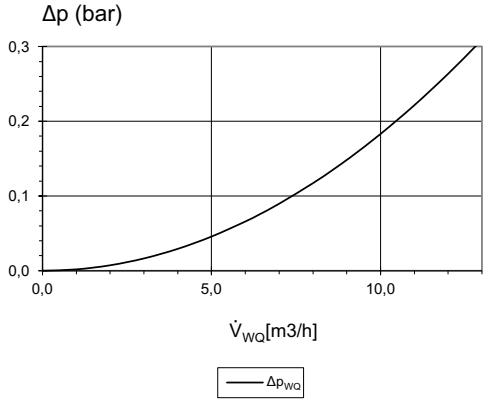
Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
$Temp_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)





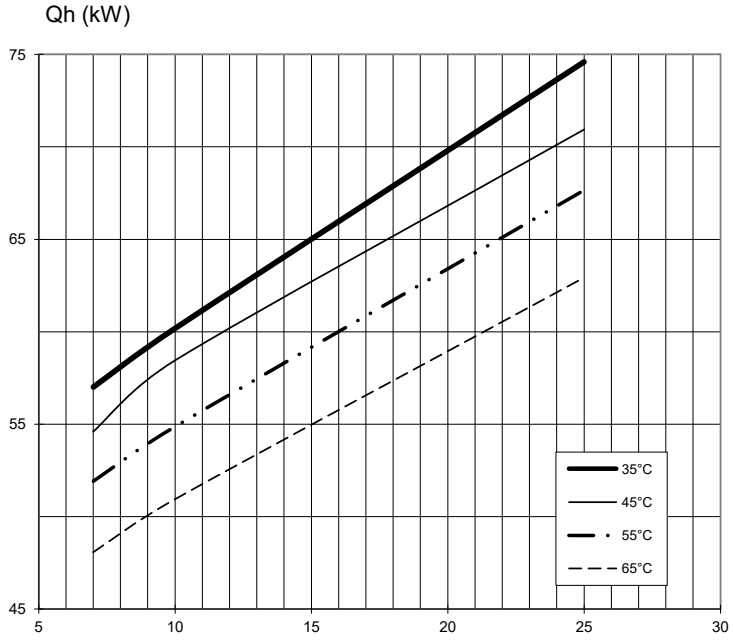


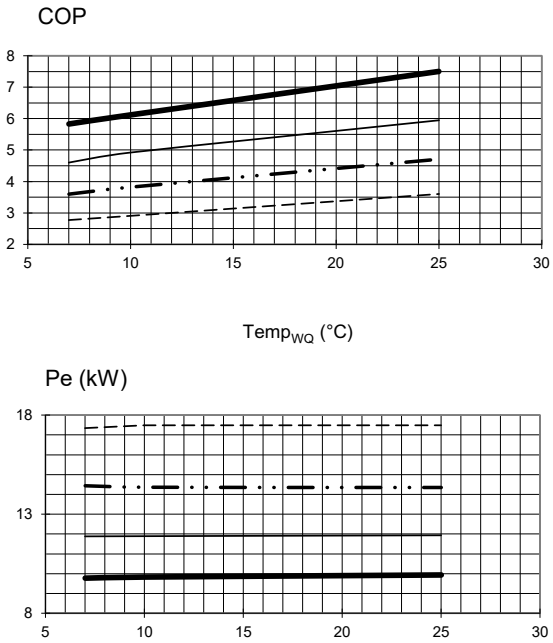


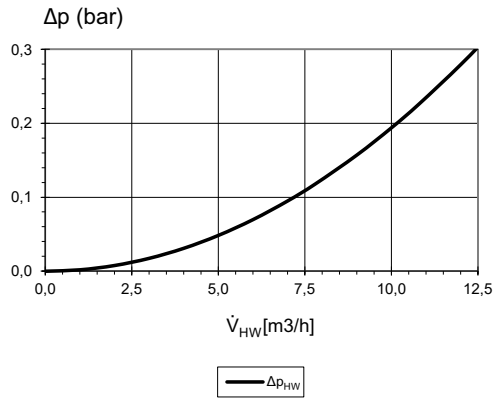


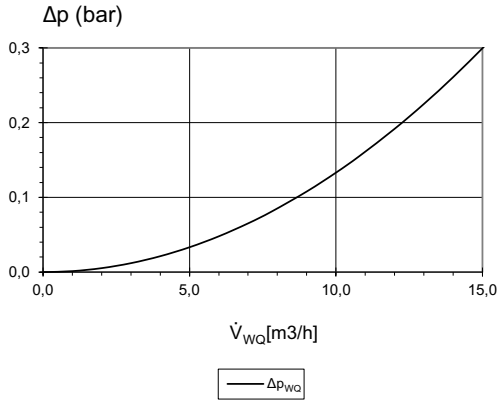
823077a

Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
Temp$_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp$_{HW}$	Pressure loss heat circuit
Δp$_{WQ}$	Pressure loss heat source
VD	Compressor(s)



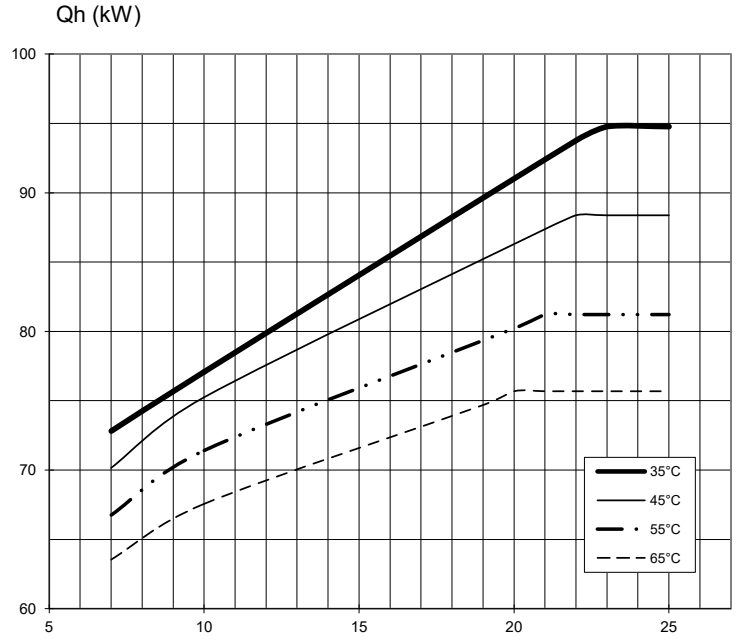


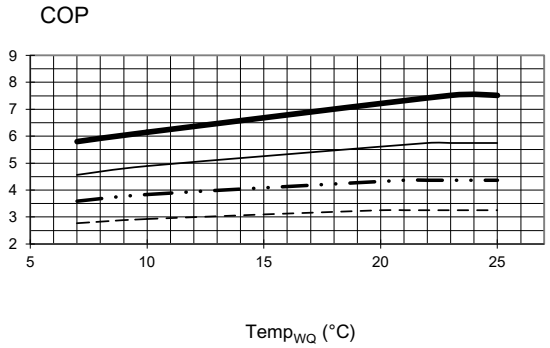


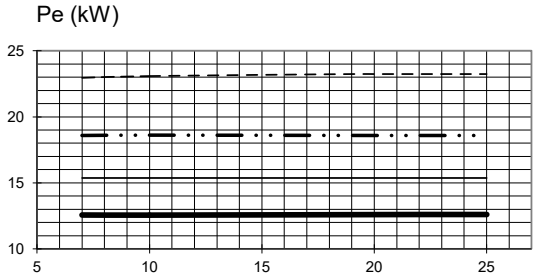


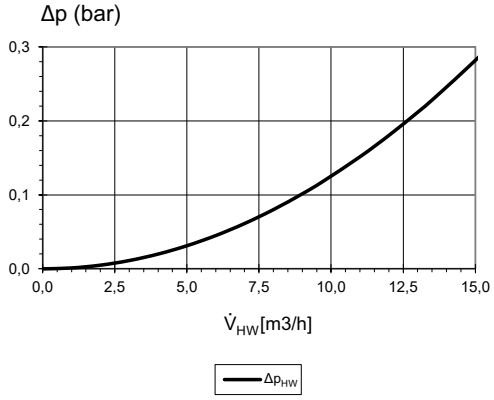
823078a

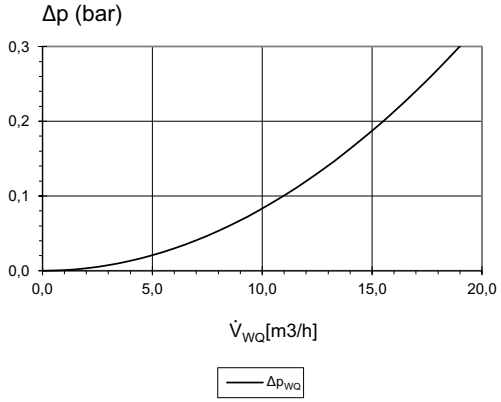
Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
Temp$_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)





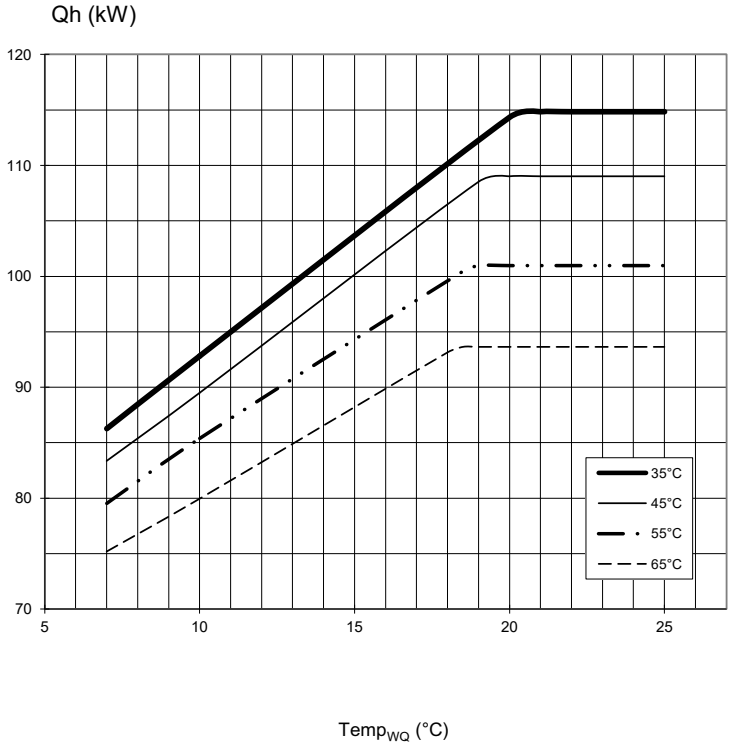


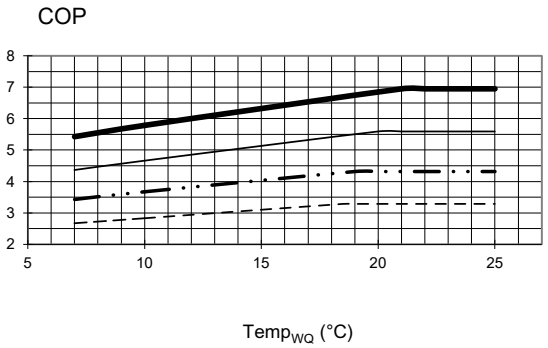


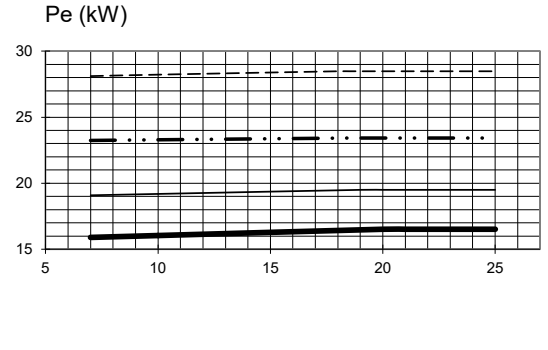


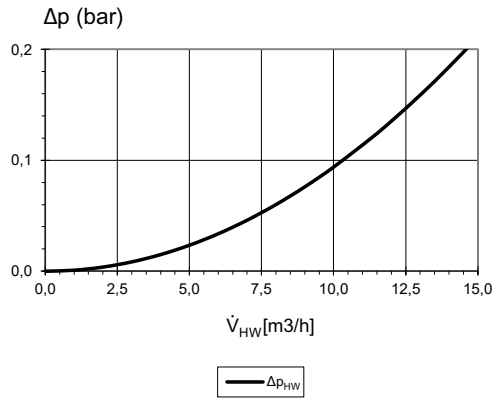
823079a

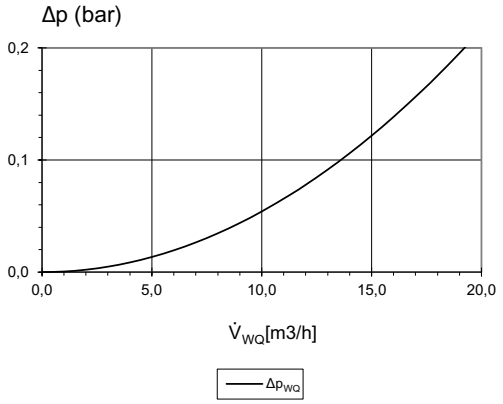
Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
$Temp_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)





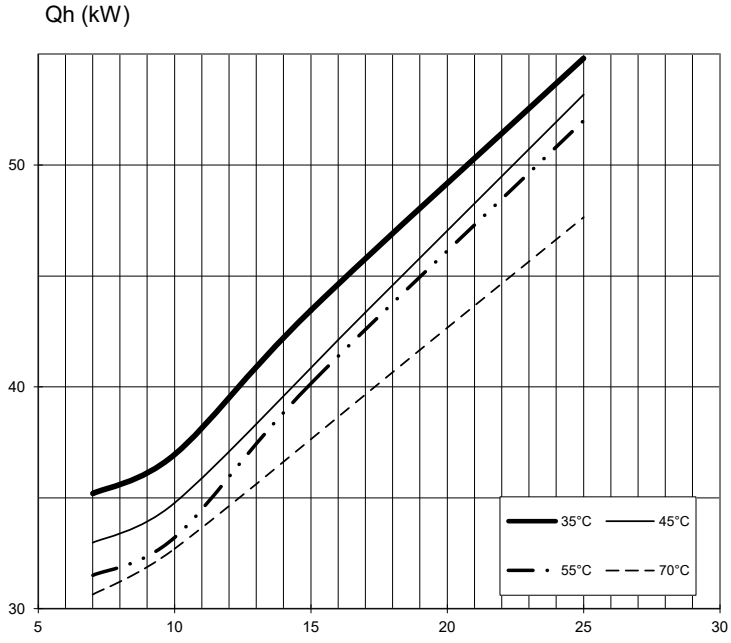


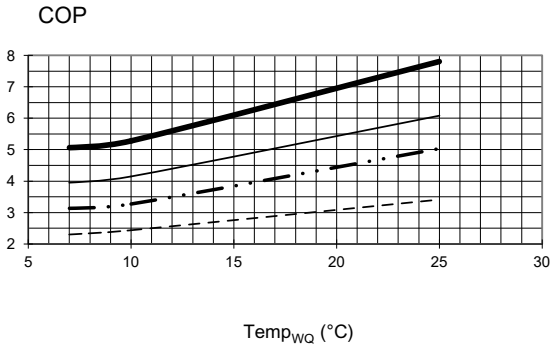


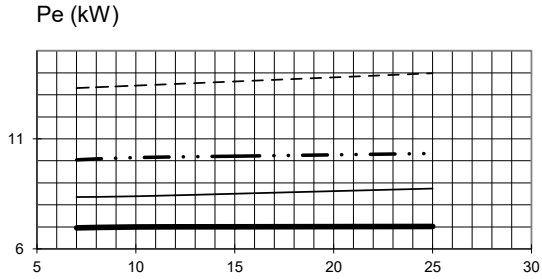


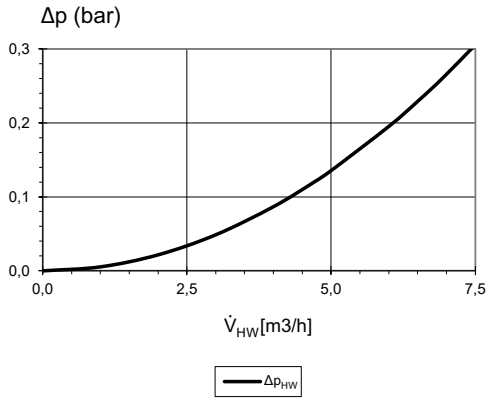
823080a

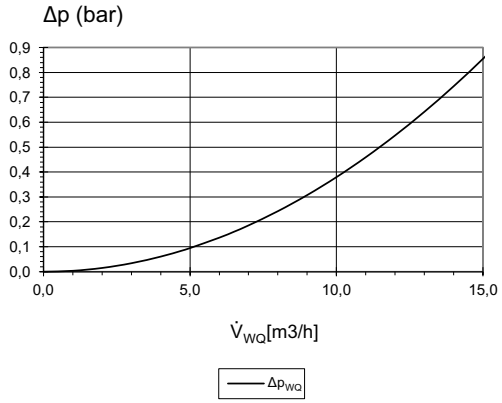
Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
Temp$_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)





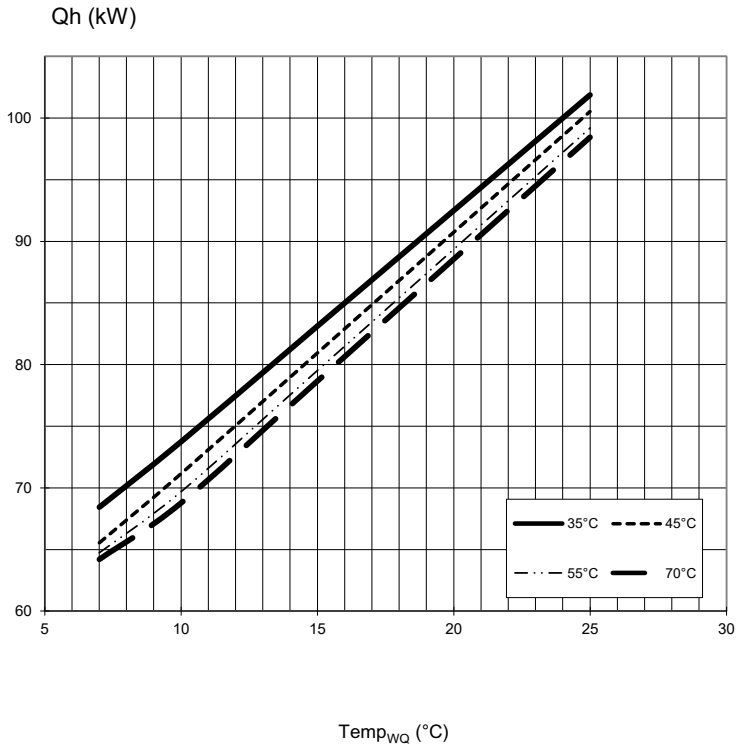


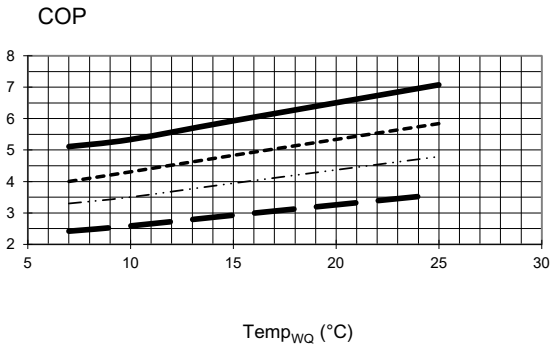


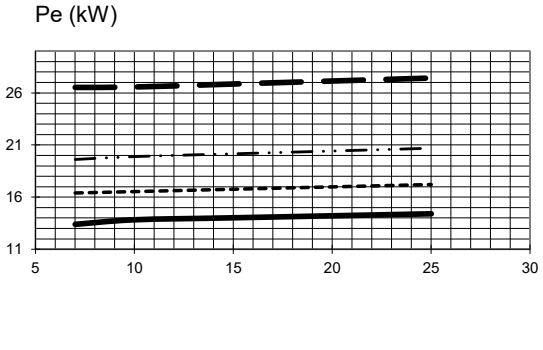


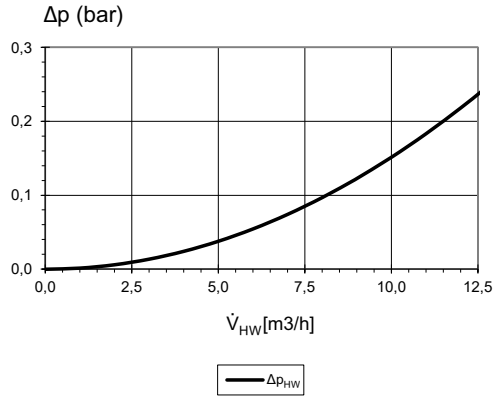
823081

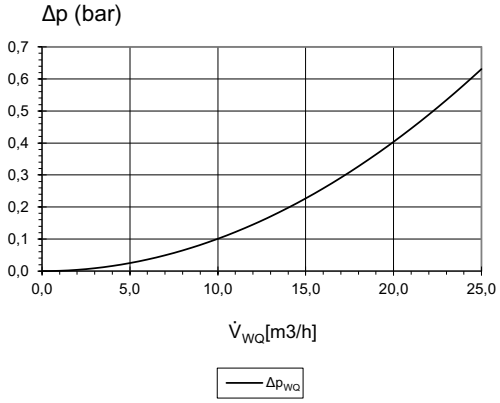
Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
$Temp_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)







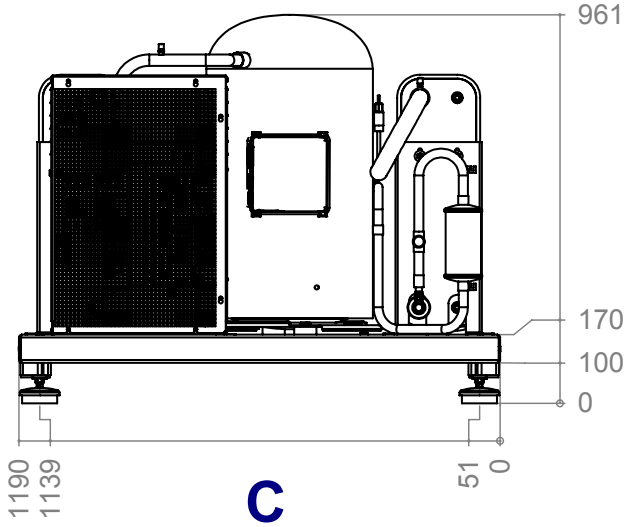




823082

Keys	UK823025L
$\dot{V}_{HW}$	Volume flow, heating water
$\dot{V}_{WQ}$	Volume flow, heat source
Temp$_{WQ}$	Temperature, heat source
Qh	Heating capacity
Pe	Power consumption
COP	Coefficient of performance / efficiency rating
Δp_{HW}	Pressure loss heat circuit
Δp_{WQ}	Pressure loss heat source
VD	Compressor(s)

A



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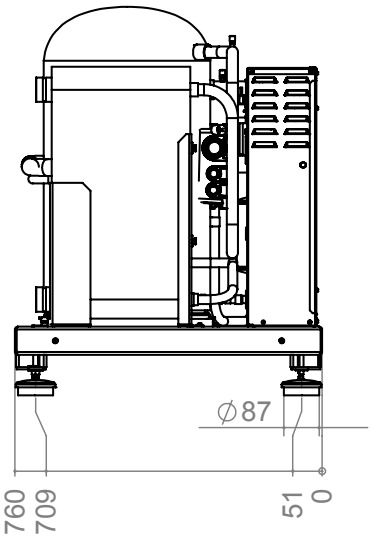

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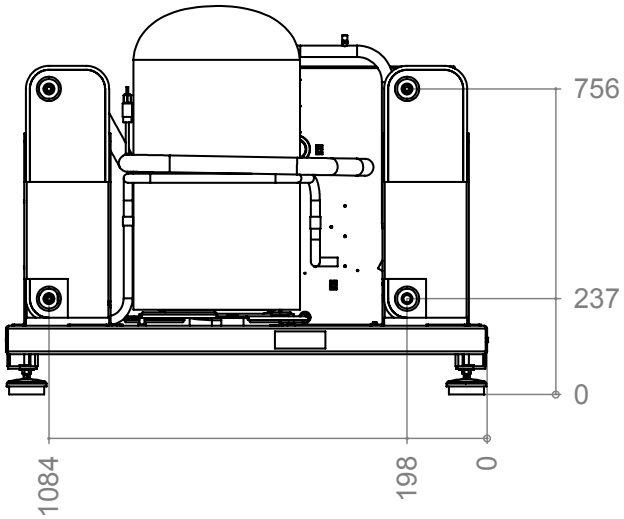
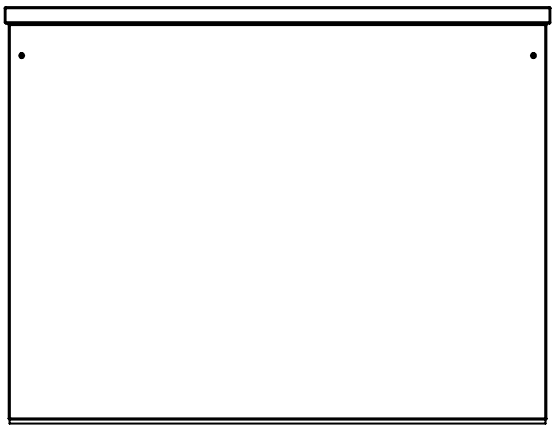


Keys: UK819407

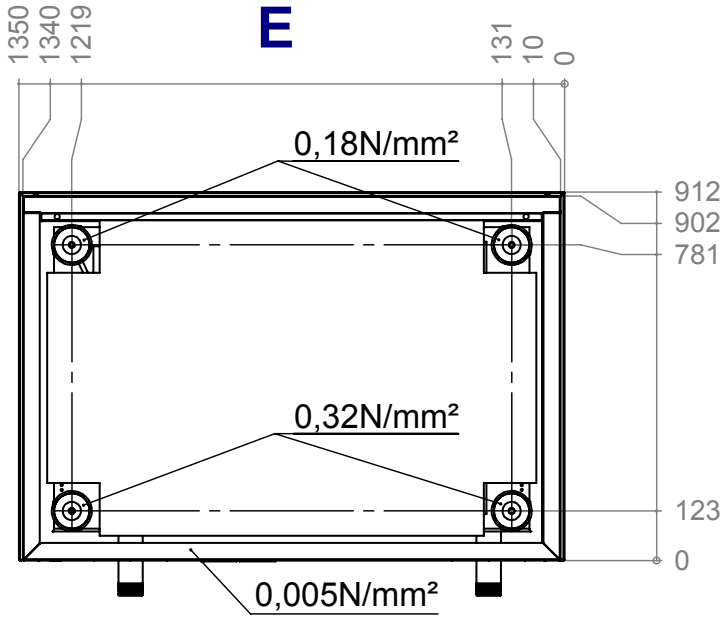
All dimensions in mm.

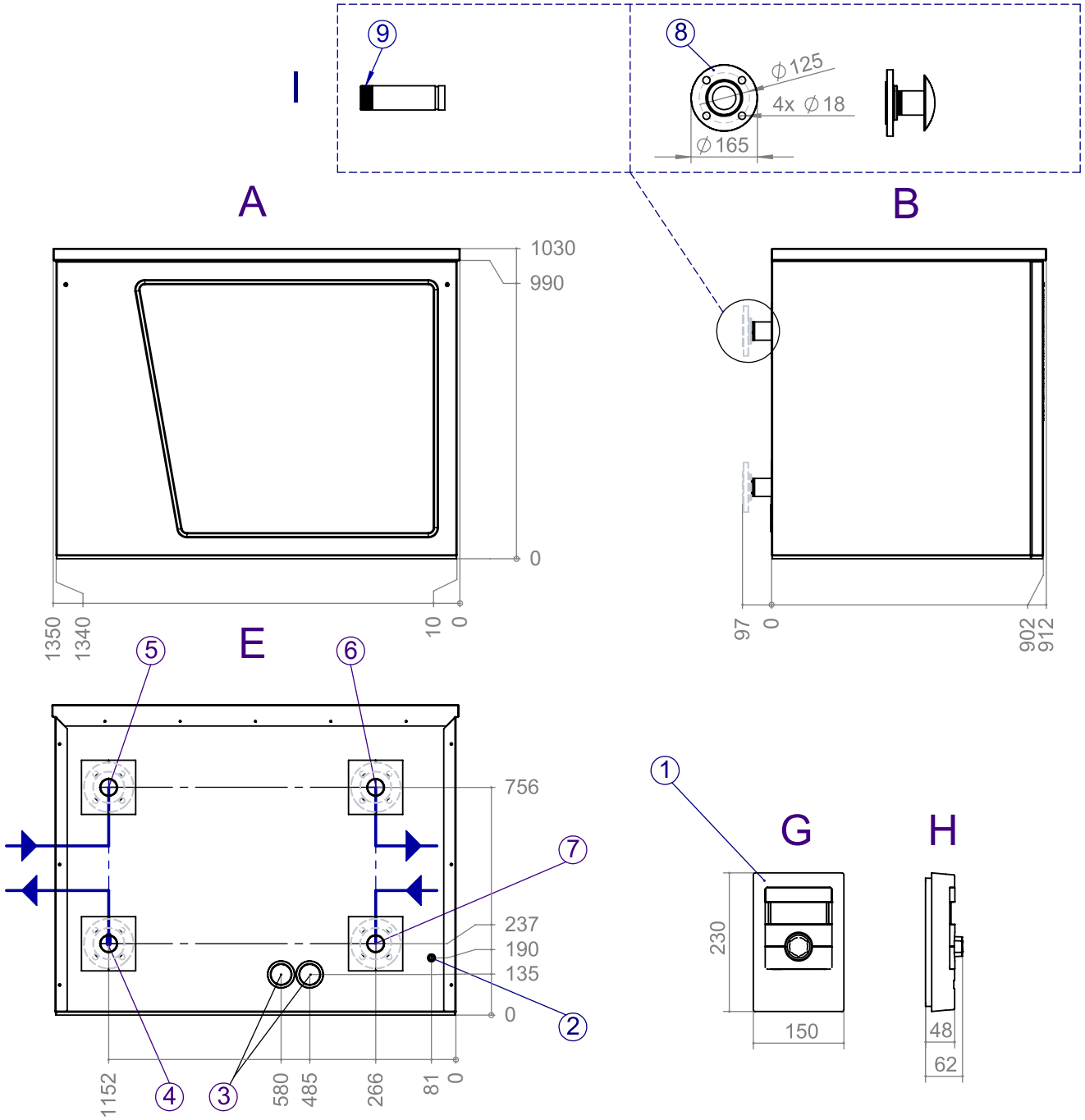
A	Front view
B	Side view from left
C	Rear view
D	Front view with facing
E	View from underneath with facing

D

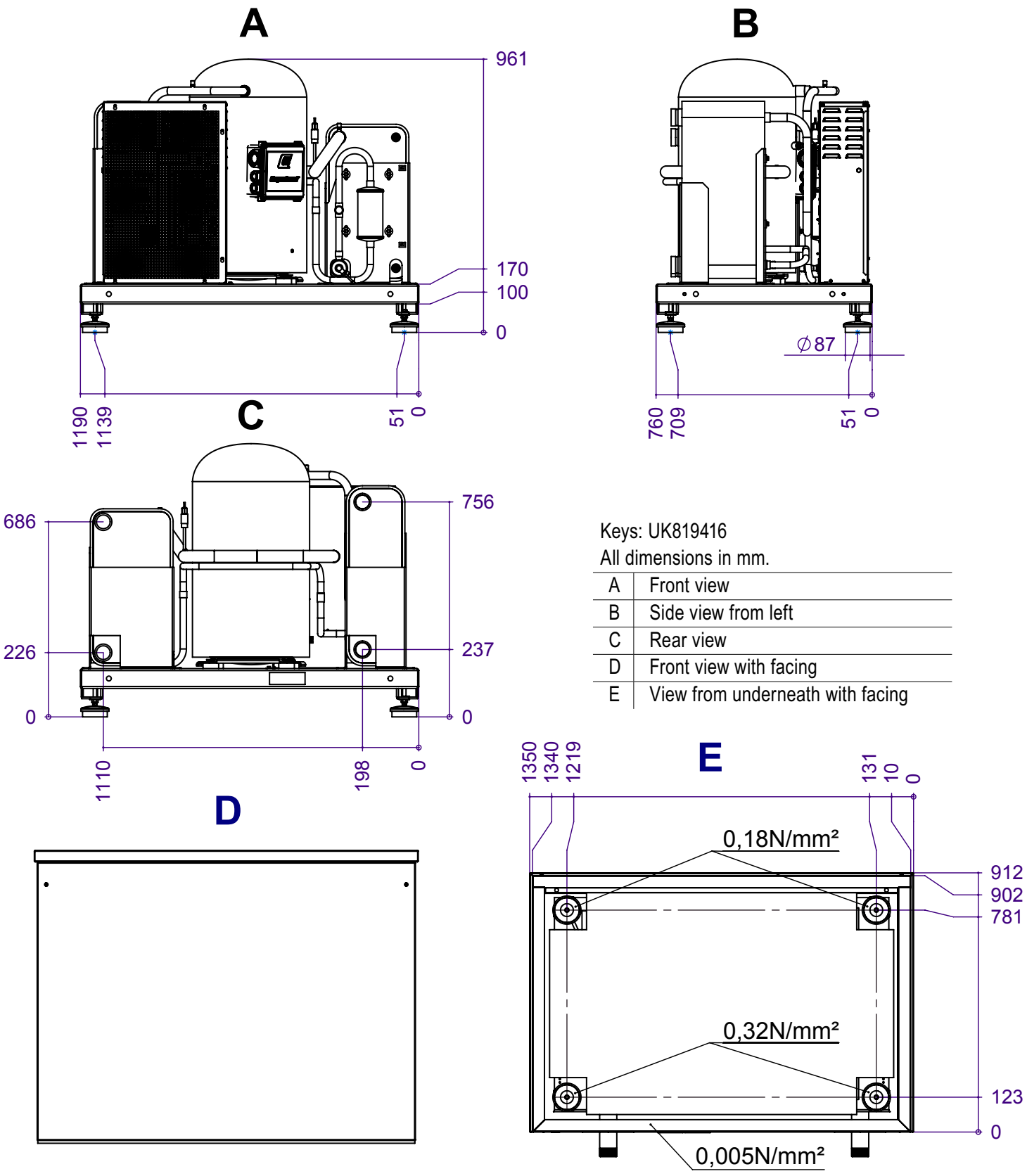


E



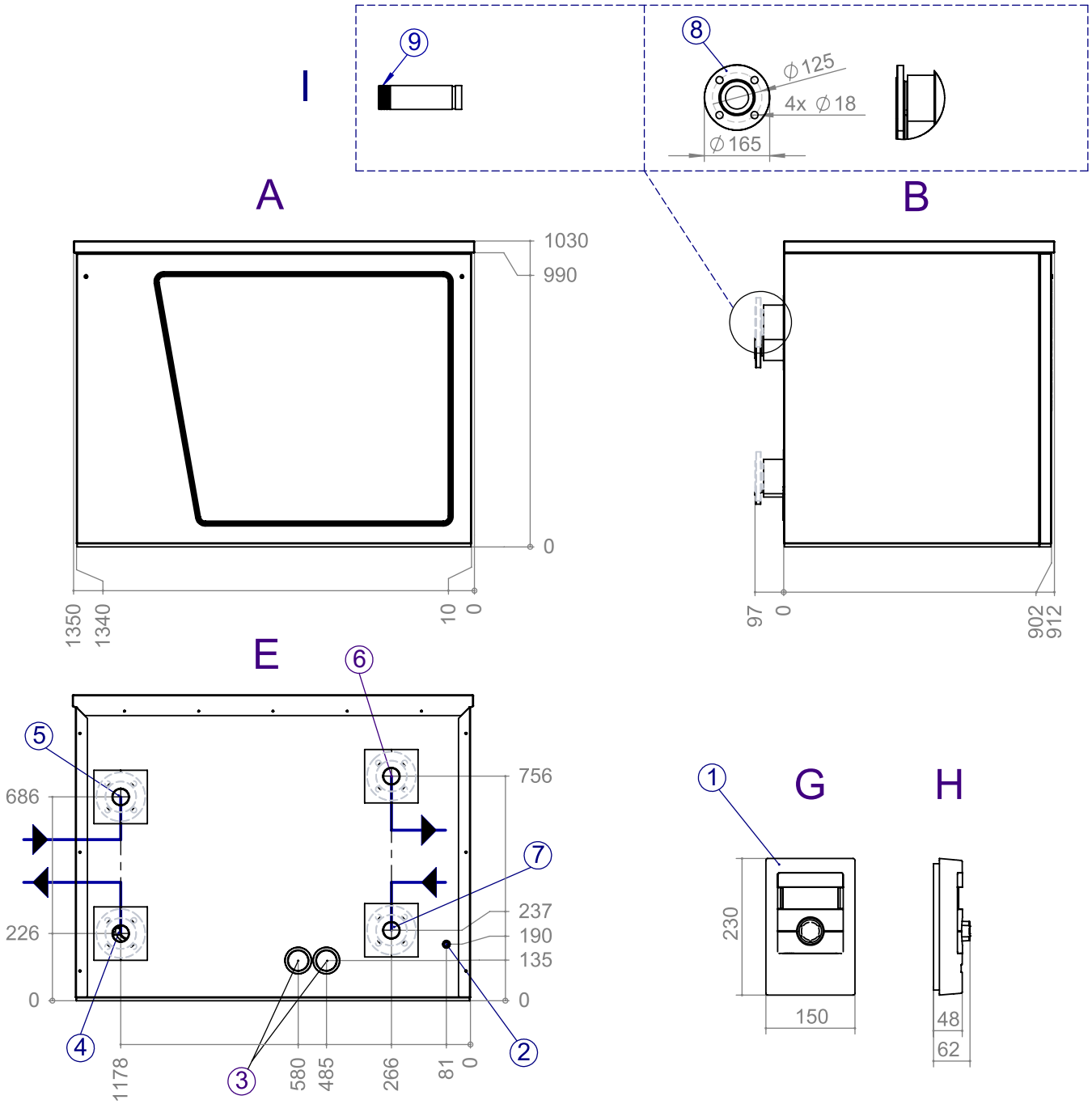


Keys: UK819406b All dimensions in mm.		Item	Designation
A	Front view	1	Control element (for wall mounting, in extra box)
B	Side view from left	2	Penetration for connection and LIN bus cable
E	Rear view	3	Penetration for electric cable
G	Front view control element	4	Heat source outlet (from heat pump)
H	Side view from left control element	5	Heat source inlet (in heat pump)
F	Connection options	6	Heating water outlet (flow)
		7	Heating water inlet (return)
		8	Flange DN50 PN10/16
		9	R2" male thread



Keys: UK819416
All dimensions in mm.

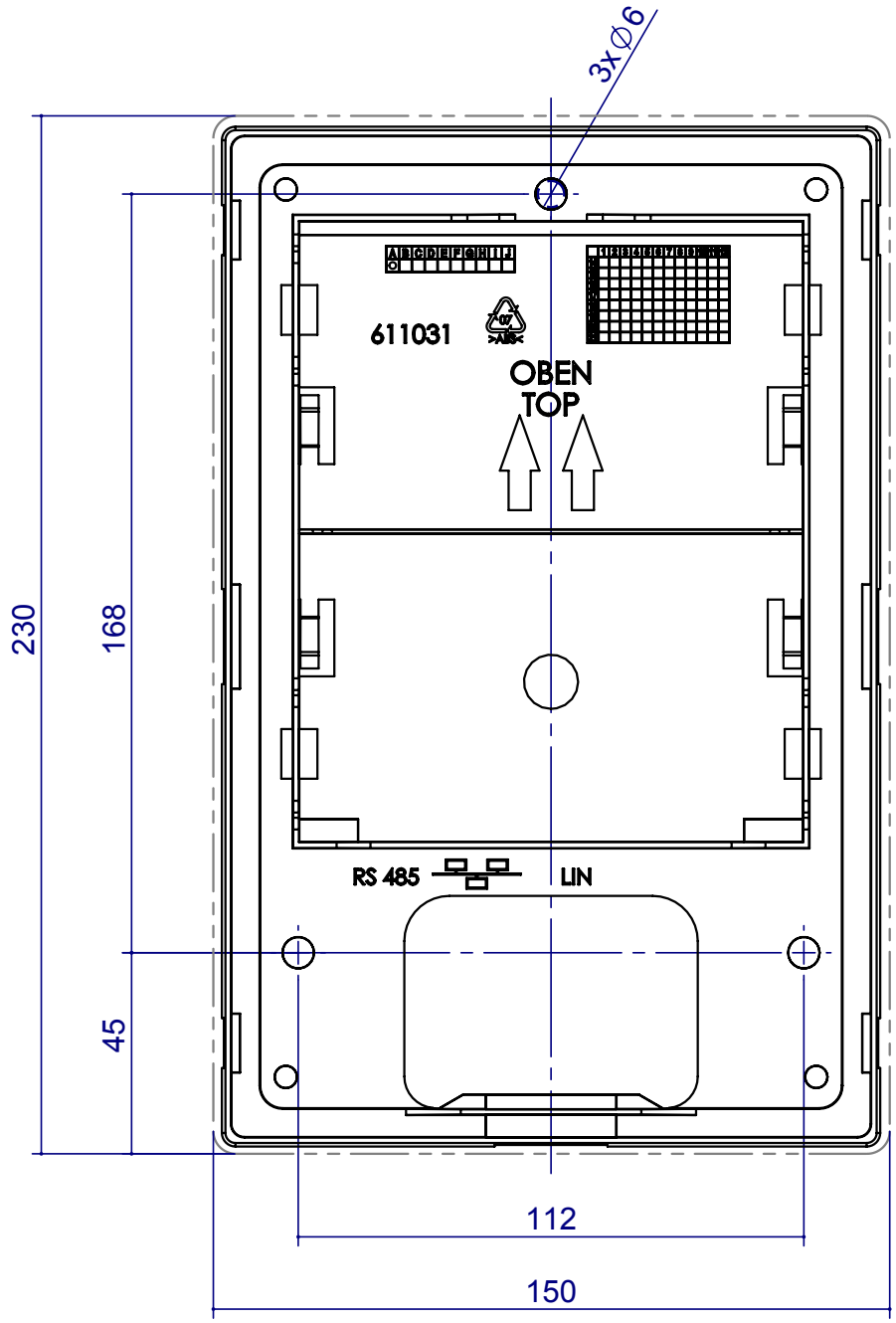
A	Front view
B	Side view from left
C	Rear view
D	Front view with facing
E	View from underneath with facing



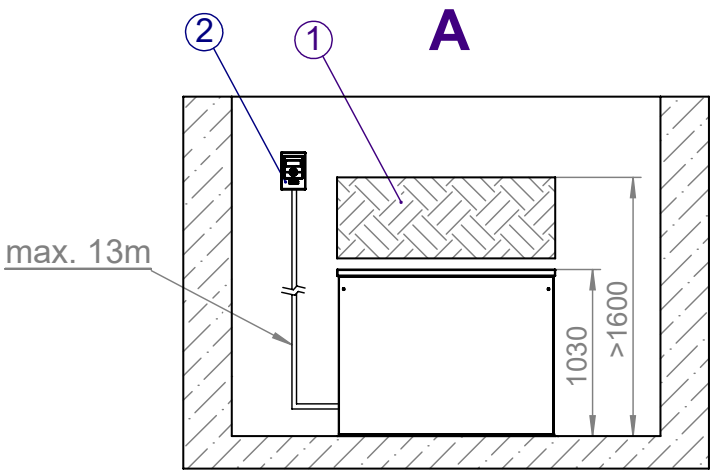
Keys: UK819414b		Item	Designation
All dimensions in mm.		1	Control element (for wall mounting, in extra box)
A	Front view	2	Penetration for connection and LIN bus cable
B	Side view from left	3	Penetration for electric cable
E	Rear view	4	Heat source outlet (from heat pump)
G	Front view control element	5	Heat source inlet (in heat pump)
H	Side view from left control element	6	Heating water outlet (flow)
F	Connection options	7	Heating water inlet (return)
		8	Flange DN50 PN10/16
		9	R2" male thread

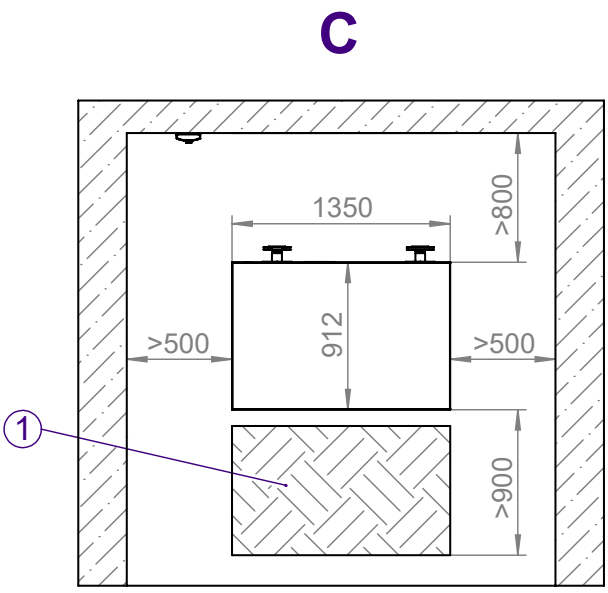
Wallbracket for control unit

Dimensional drawing



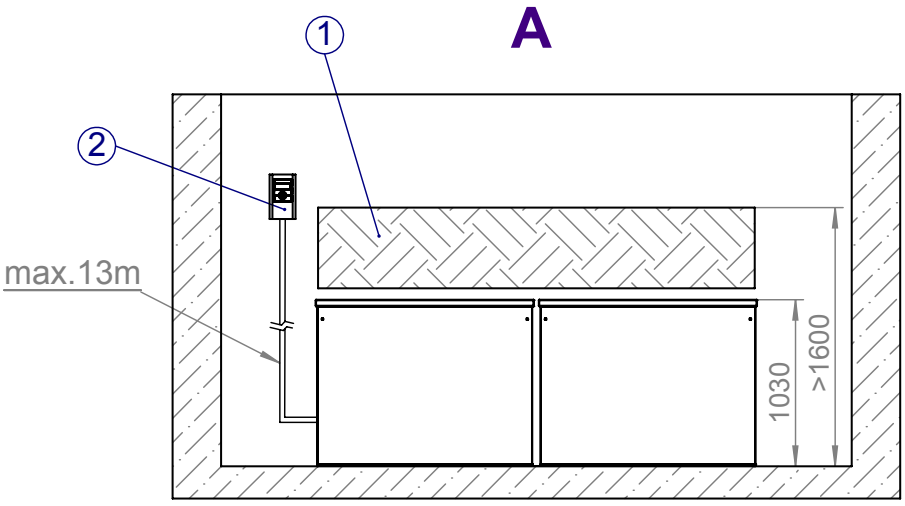
Keys: UK819444a
All dimensions in mm.

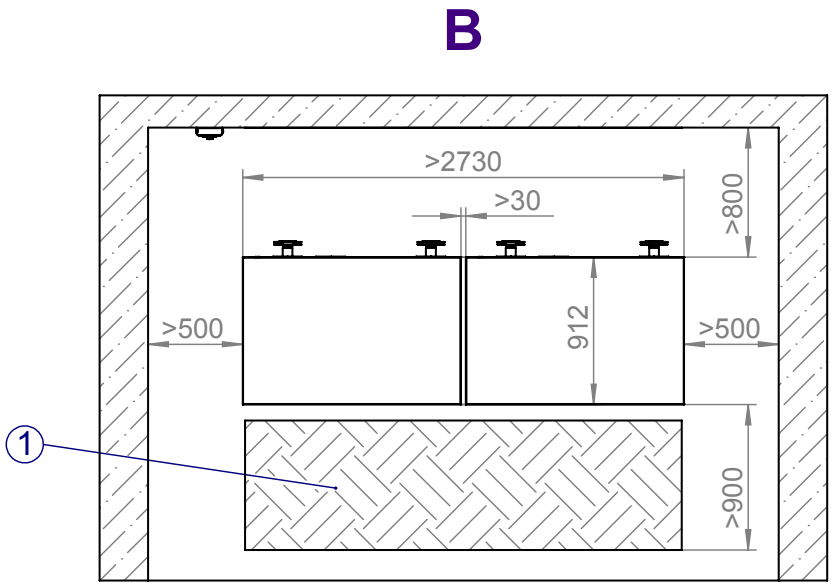




Keys: UK819408a
All dimensions in mm.

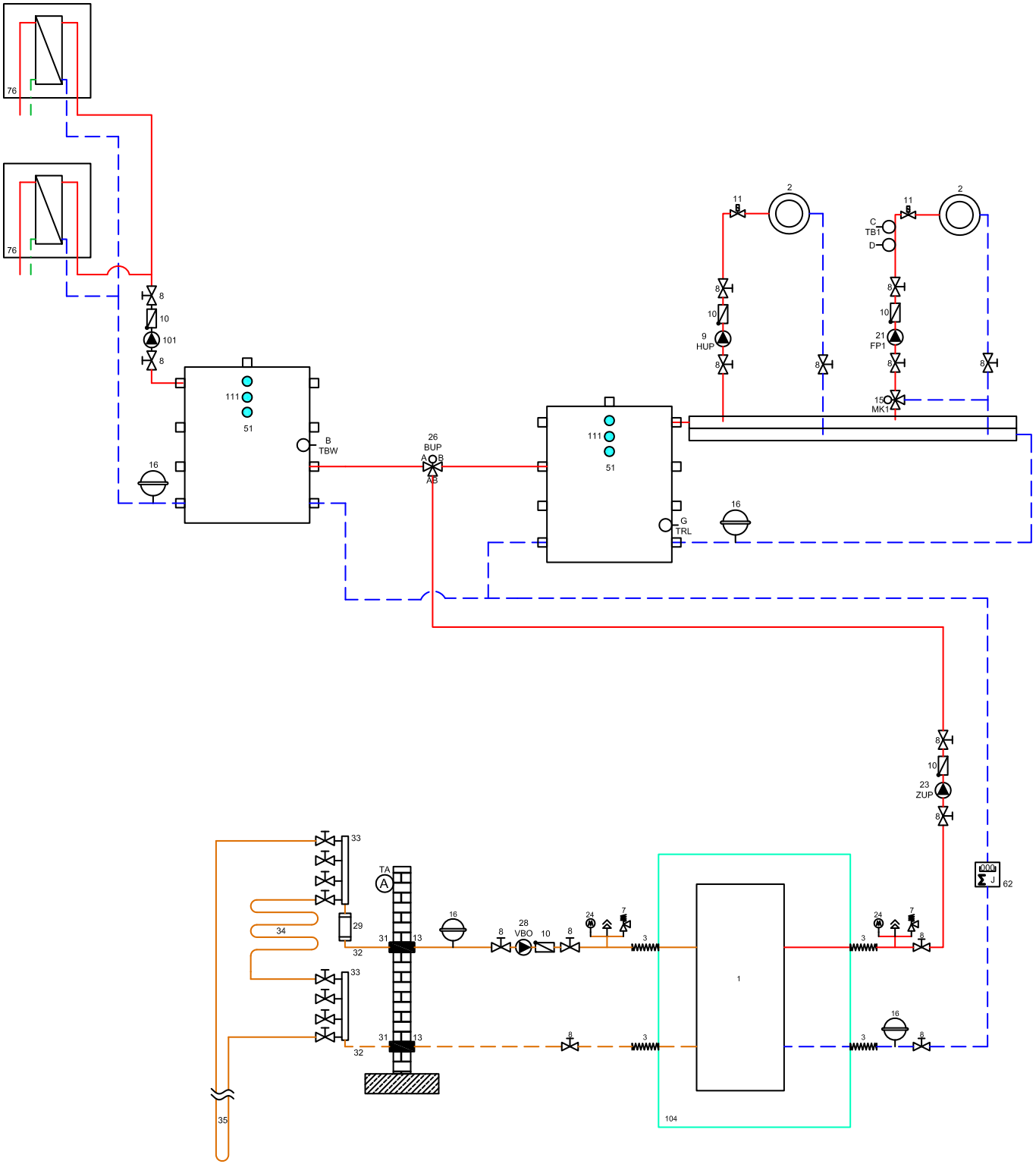
A	Front view
C	Plan view
1	Hatched area: space for service purposes
2	Control element





Keys: UK819409
All dimensions in mm.

A	Front view
B	Plan view
1	Hatched area: space for service purposes
2	Control element


76
76
8
10
101
8
111
51
16
B
TBW
26
BUP
A
B
AB
111
51
G
TRL
16
11
2
8
10
9
HUP
8
8
11
2
C
TBT
D
8
10
21
FP1
8
8
15
MK1
8
10
23
ZUP
8
33
34
29
32
33
32
TA
31
13
31
13
16
8
28
VBO
10
8
24
7
3
8
3
1
104
24
7
3
8
3
16
8
62
35

Legend hydraulic diagramm

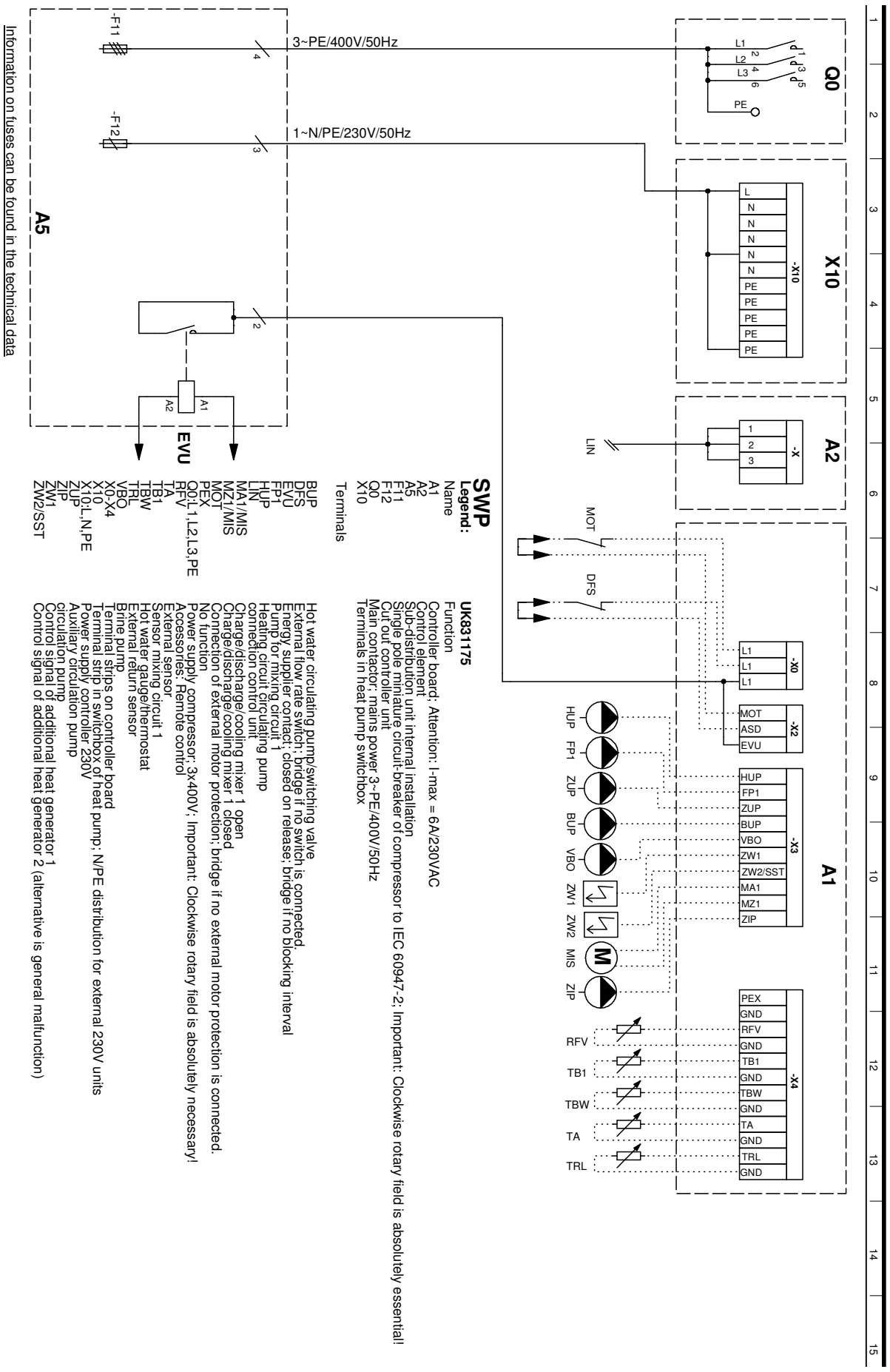
1	Heat pump
2	Underfloor heating / radiators
3	Vibration isolation
4	Sylomer strip machine underlay
5	Closure and drainage
6	Expansion vessel packing list
7	Safety valve
8	Closure
9	Heating circulation pump
10	Non return valve/ one way valve
11	Individual room regulation
12	Overflow valve
13	Steamtight insulation
14	Service water circulation pump
15	Mixer circuit three-way mixer (MK1 discharge)
16	Expansion vessel supplied by customer
18	Heating rod (heating)
19	Mixer circuit four-way mixer (MK1 charge)
20	Heating rod (SW)
21	Mixer circuit circulation pump (FP1)
23	Feed circulating pump (reconnect the integrated circulating pump in the heat pump)
24	Manifuld
25	Heating circulation pump
26	Switching valve (heating/service water)(B = normally open)
27	Heating element
28	Brine circulation pump
29	Dirt-trap 0.6 mm mesh
30	Spill-tray für brine mix
31	Wall breakthrough
32	Inlet pipe
33	Brine manifuld
34	Ground collector
35	Ground slinkies
36	Groundwater spring pump
37	Wall bracket
38	Flow switch
39	Suction well
40	Inverted well
41	Rinse fitting heating circuit
42	Circulation pump
43	Brine / Water heat exchanger (cooling function)
44	Three-way mixer valve (cooling function MK1)
45	Cap valve
46	Filler and drainage valve
48	Domestic hot water charging pump
49	Direction of groundwater flow
50	Buffer storage
51	Seperation tank
52	Gas- or oil-boiler
53	Wood boiler
54	Hot water cylinder
55	Brine pressure switch
56	Swimming pool heat exchanger
57	Geothermal heat exchanger
58	Ventilation system
59	Plate heat exchanger
61	Cooling cylinder
65	Compact distributor
66	Fancoils
67	Solar/ service water cylinder
68	Solar/ service water cylinder
69	Multifunction tank
71	Dual hydraulic module
72	Buffer tank wall mounted
73	Pipe lead-in
74	Ventower
75	Scope of delivery, hydraulic tower, dual
76	Fresh water station
77	Scope of supply water/water booster
78	Accessories water/water booster optional
100	Room thermostat for cooling (optional)
101	Controls supplied by customer
102	Dew-point monitor (optional)
103	Room thermostat for reference space in packing list
104	Supply heat pump
105	Cooling circuit module box removeable for installation
106	Specific glycole mixture
107	Scald protection / thermostatic mixer valve
108	Solar pump assembly
109	Overflow valve must be closed
110	Packing list hydraulic tower
111	Mounting for additional heating element
112	Minimum distance to thermal decoupling of the mixing valve
TA/A	External sensor
TBW/B	Domestic hot water sensor
TB1/C	Feedwater sensor mixer circuits 1
D	Floor tmperature limiter
TRL/G	Sensor external return
STA	Line pressure regulator valve
TRL/H	Sensor return (hydraulic module, dual)
79	Motor valve
80	Mixing valve
81	Split heat pump outdoor unit
82	Split heat pump indoor unit
83	Circulation pump
84	Switching valve
113	Connection 2nd heat generator
BT1	Outdoor temperature sensor
BT2	Flow temperature sensor
BT3	Return temperature sensor
BT6	Domestic hot water temperature sensor
BT12	Flow temperature liquefier
BT19	Temperature sensor immersion heater
BT24	Temperature sensor 2nd heat generator

Comfort board / Expansion board:

15	Mixer circuit three-way mixer (MK2-3 discharge)
17	Temperature difference regulator
19	Mixer circuit four-way mixer (MK2 charge)
21	Mixer circuit circulation pump (FP2-3)
22	Swimming pool circulating pump
44	Three-way mixer valve (cooling function MK2)
47	Changeover valve swimming bath preparation(B = normally open)
60	Changeover valve cooling operation(B = normally open)
62	Heat meter (optional)
63	Changeover valve solar circuit(B = normally open)
64	Cooling circulation pump
70	Solar seperation module
TB2-3/C	Feedwater sensor mixer circuits 2-3
TSS/E	Sensor, temperature difference control (low temperature)
TSK/E	Sensor, temperature difference control (high temperature)
TEE/F	Sensor external energy source

Important notice !

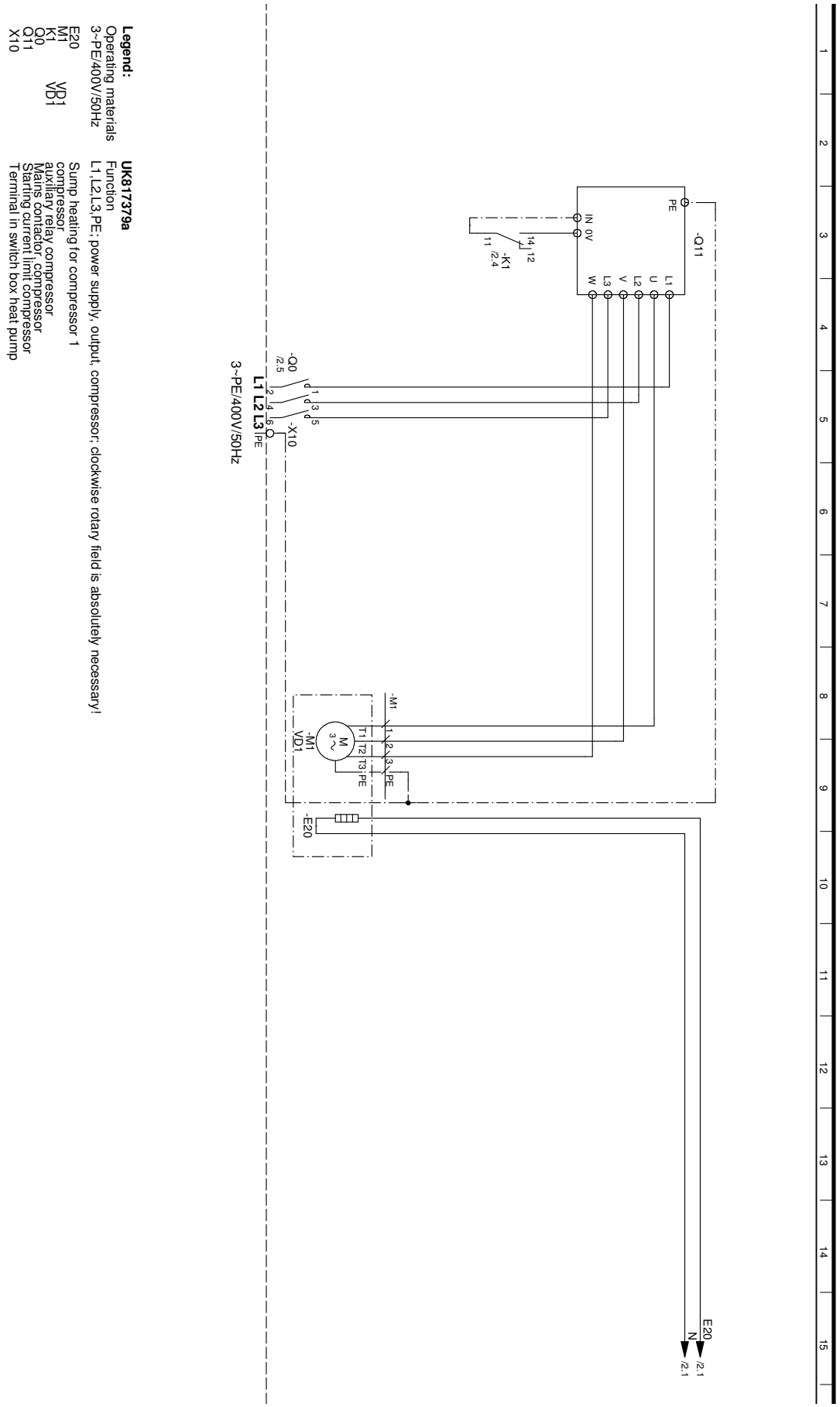
These hydraulic diagrams are schematic representations and are for assistance only. They do not relieve of the obligation to carry out appropriate planning! They do not include all necessary shut-off valves, ventilator fittings or safety devices. These must be incorporated in accordance with the standards and regulations applicable to the respective installation. All country-specific standards, laws and regulations must be observed! The tubes have to be dimensioned according to the nominal volume flow of the heat pump resp. the free pressing of the integrated circulating pump. For detailed information and advice please contact our local sales partner!

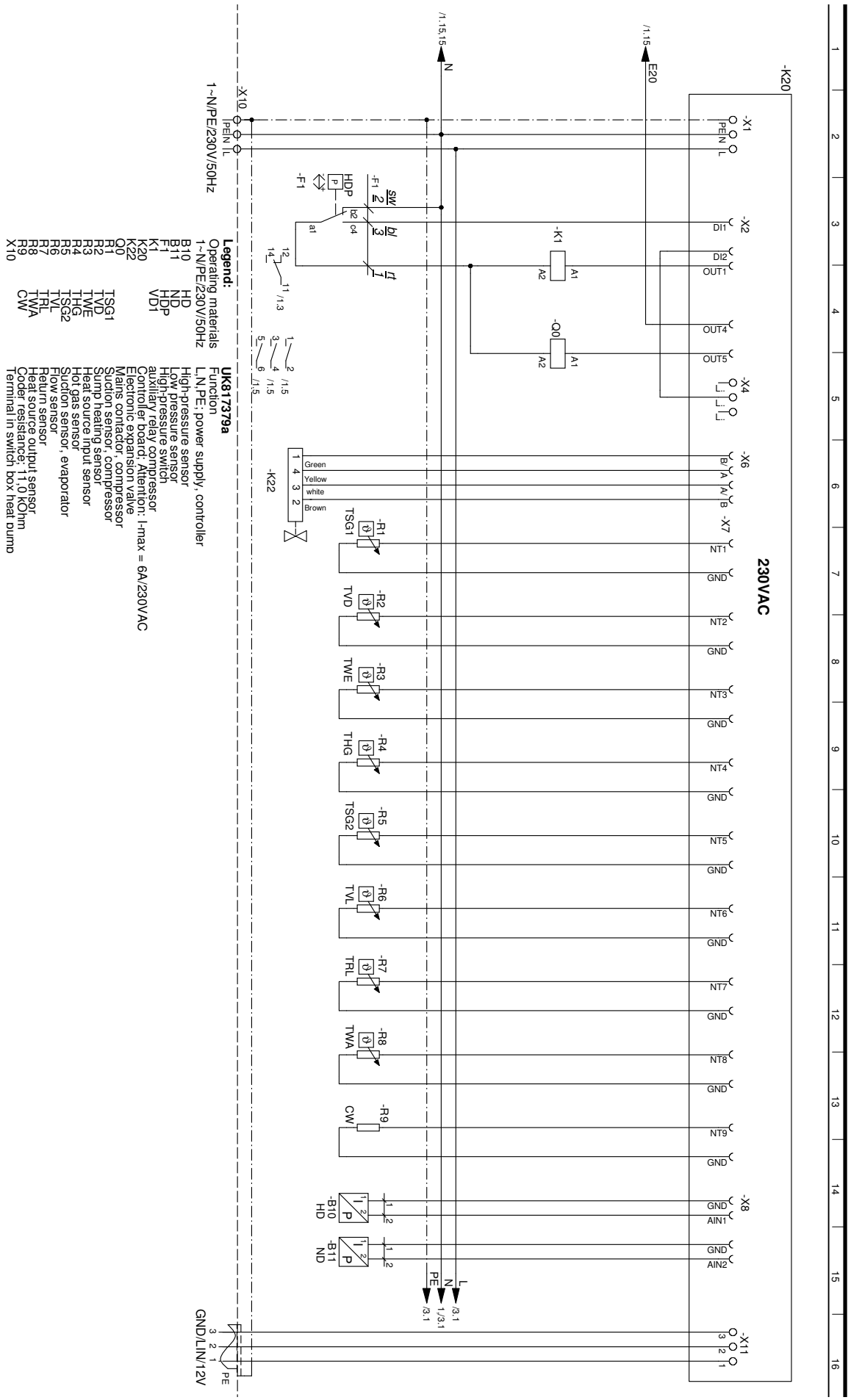


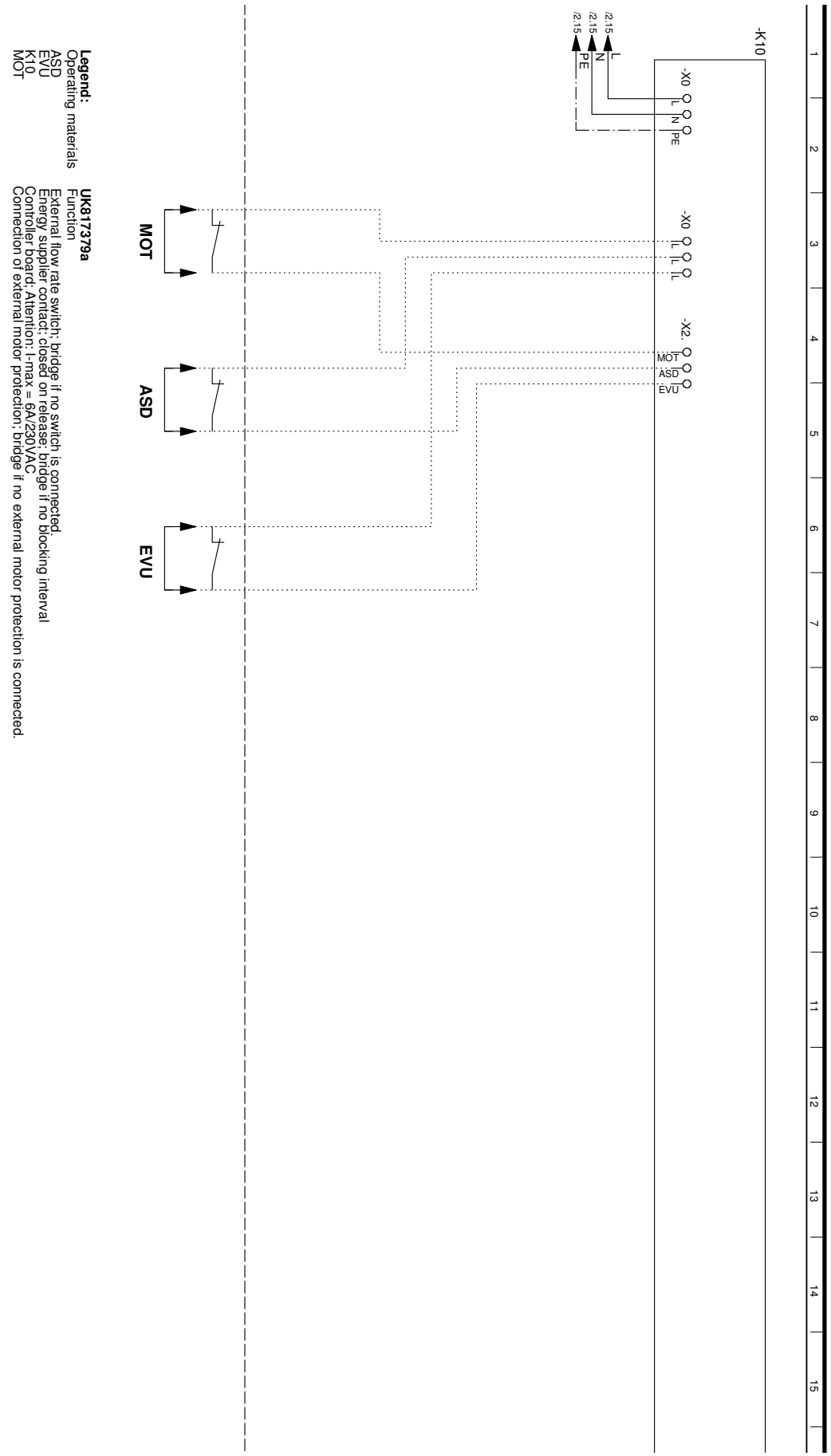
SWP

Legend:

Name	UK831175 Function
A1	Controller board; Attention: I-max = 6A/230VAC
A2	Control element
A5	Sub-distribution unit internal installation
F11	Single pole miniature circuit-breaker of compressor to IEC 60947-2; Important: Clockwise rotary field is absolutely essential!
F12	Cut out controller unit
Q0	Main contactor; mains power 3~PE/400V/50Hz
X10	Terminals in heat pump switchbox
Terminals	
BUP	Hot water circulating pump/switching valve
DFS	External flow rate switch; bridge if no switch is connected
EVU	Energy supplier contact; closed on release; bridge if no blocking interval
FP1	Pump for mixing circuit 1
HUP	Heating circuit circulating pump
LIN	connection control unit
MA1/MIS	Charge/discharge/cooling mixer 1 open
MZ1/MIS	Charge/discharge/cooling mixer 1 closed
MOT	Connection of external motor protection; bridge if no external motor protection is connected.
PEX	No function
Q0:L1,L2,L3,PE	Power supply compressor; 3x400V; Important: Clockwise rotary field is absolutely necessary!
RFV	Accessories: Remote control
TA	External sensor
TB1	Sensor mixing circuit 1
TBW	Hot water gauge/thermostat
TRL	External return sensor
VBO	Brine pump
X0-X4	Terminal strips on controller board
X10	Terminal strip in switchbox of heat pump; N/PE distribution for external 230V units
X10:L,N,PE	Power supply controller 230V
ZUP	Auxiliary circulation pump
ZW1	Control signal of additional heat generator 1
ZW2/SST	Control signal of additional heat generator 2 (alternative is general malfunction)

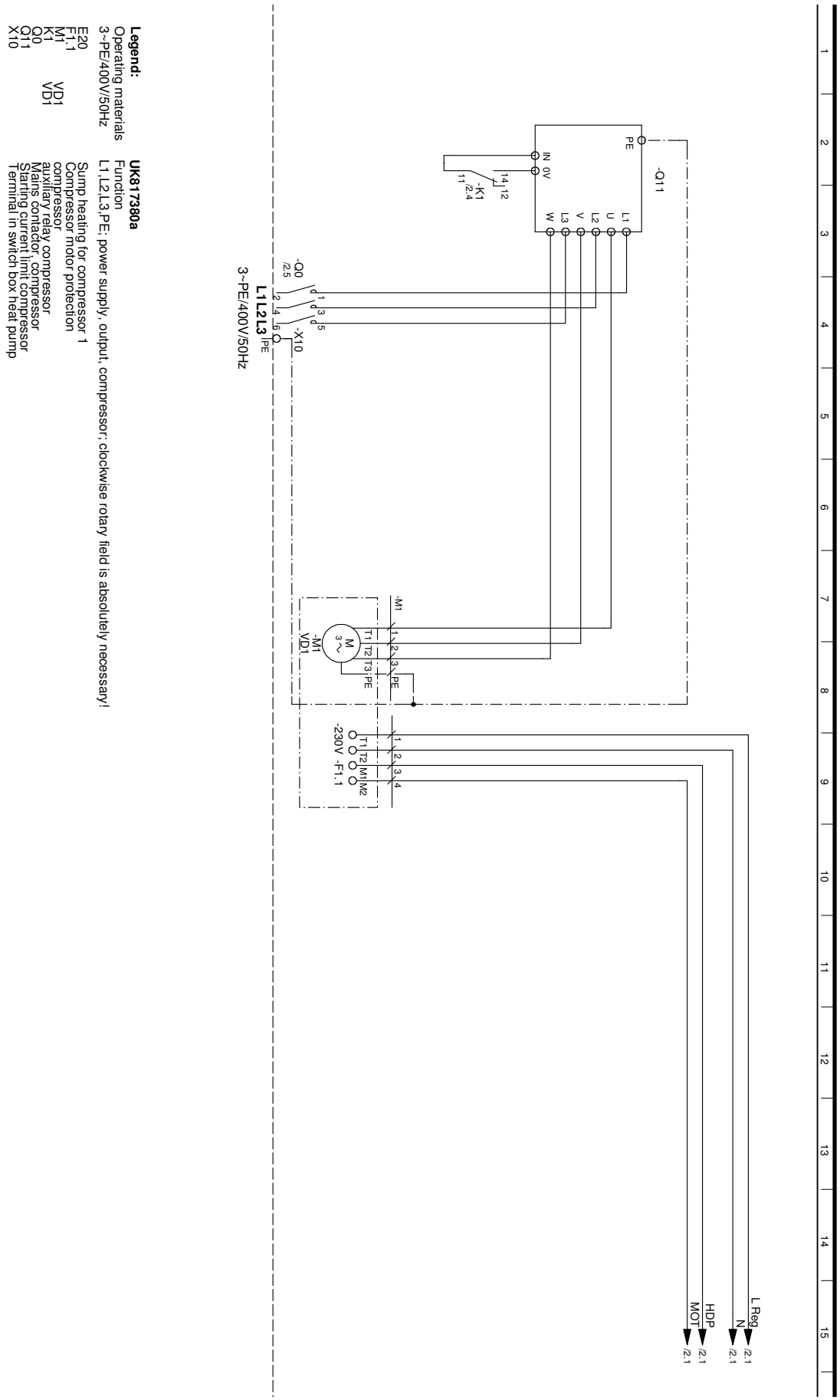

Legend:
Operating materials
3~PE/400V/50Hz
E20
M1
K1
Q0
Q11
X10
VD1
VD1
UK817379a
Function
L1,L2,L3,PE; power supply, output, compressor; clockwise rotary field is absolutely necessary!
Sump heating for compressor 1
compressor
auxiliary relay compressor
Mains contactor compressor
Starting current limit compressor
Terminal in switch box heat pump
3~PE/400V/50Hz
L1 L2 L3 PE
-X10
-Q0
/2.5
-K1
/2.4
-Q11
PE
IN 0V
L1
U
L2
V
L3
W
-M1
-M1
VD1
T1 T2 T3 PE
1 2 3 PE
-E20
E20
N
/2.1
/2.1

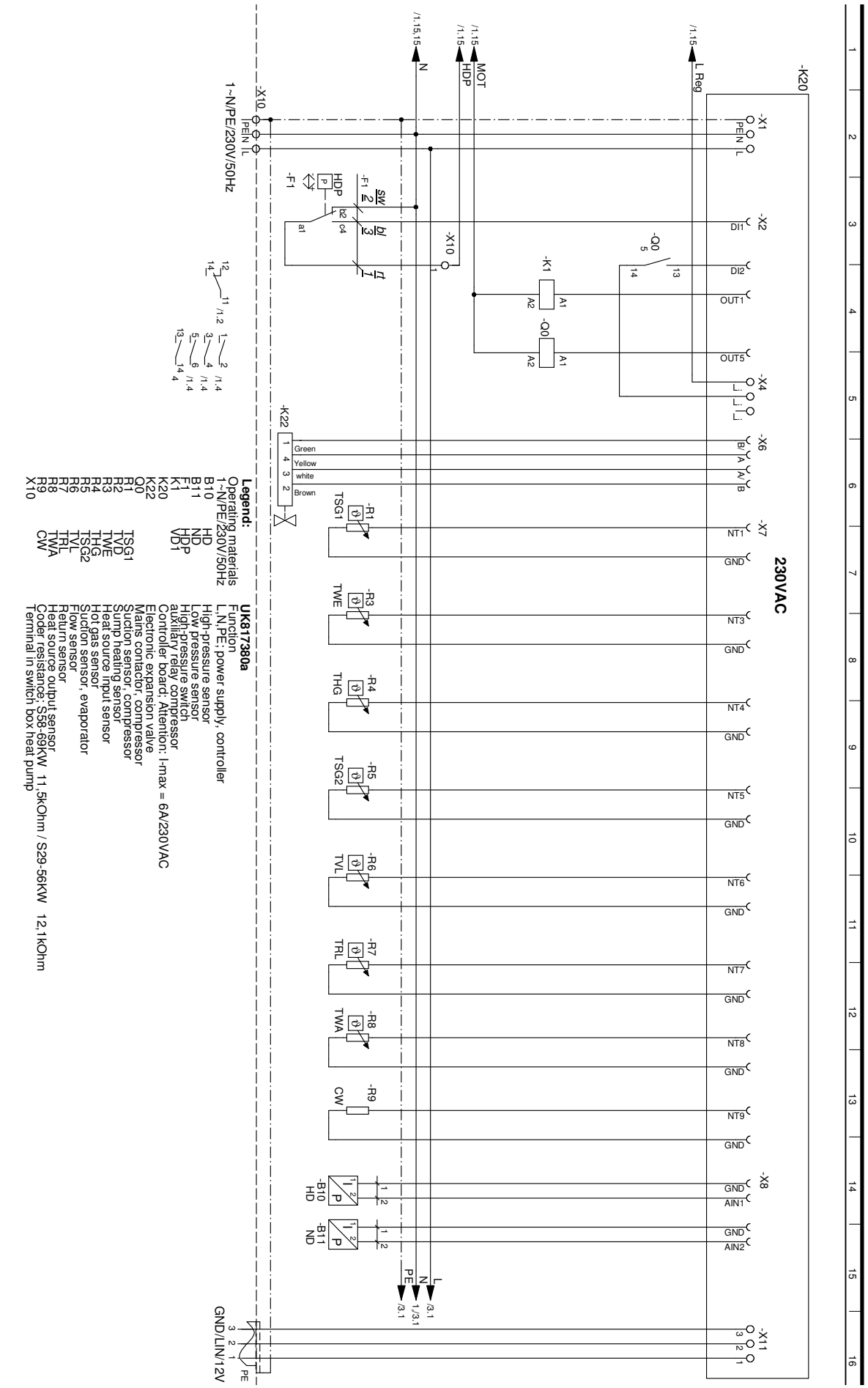

-K20
-X1
PE
N
L
-X2
DI1
DI2
OUT1
OUT4
OUT5
-X4
-X6
-X7
-X8
-X11
230VAC
-K1
-Q0
-K22
-F1
HDP
sw
bl
rt
Green
Yellow
white
Brown
TSG1
TVD
TWE
THG
TSG2
TVL
TRL
TWA
CW
NT1
NT2
NT3
NT4
NT5
NT6
NT7
NT8
NT9
GND
AIN1
AIN2
-B10
HD
-B11
ND
E20
/1.15
/1.15.15
-X10
1~N/PE/230V/50Hz
GND/LIN/12V
Legend:
UK817379a
Operating materials
Function
1~N/PE/230V/50Hz
L,N,PE; power supply, controller
B10
High-pressure sensor
B11
Low pressure sensor
F1
High-pressure switch
K1
auxiliary relay compressor
K20
Controller board; Attention: I-max = 6A/230VAC
K22
Electronic expansion valve
Q0
Mains contactor, compressor
R1
Suction sensor, compressor
R2
Sump heating sensor
R3
Heat source input sensor
R4
Hot gas sensor
R5
Suction sensor, evaporator
R6
Flow sensor
R7
Return sensor
R8
Heat source output sensor
R9
Cooler resistance; 11,0 kOhm
X10
Terminal in switch box heat pump



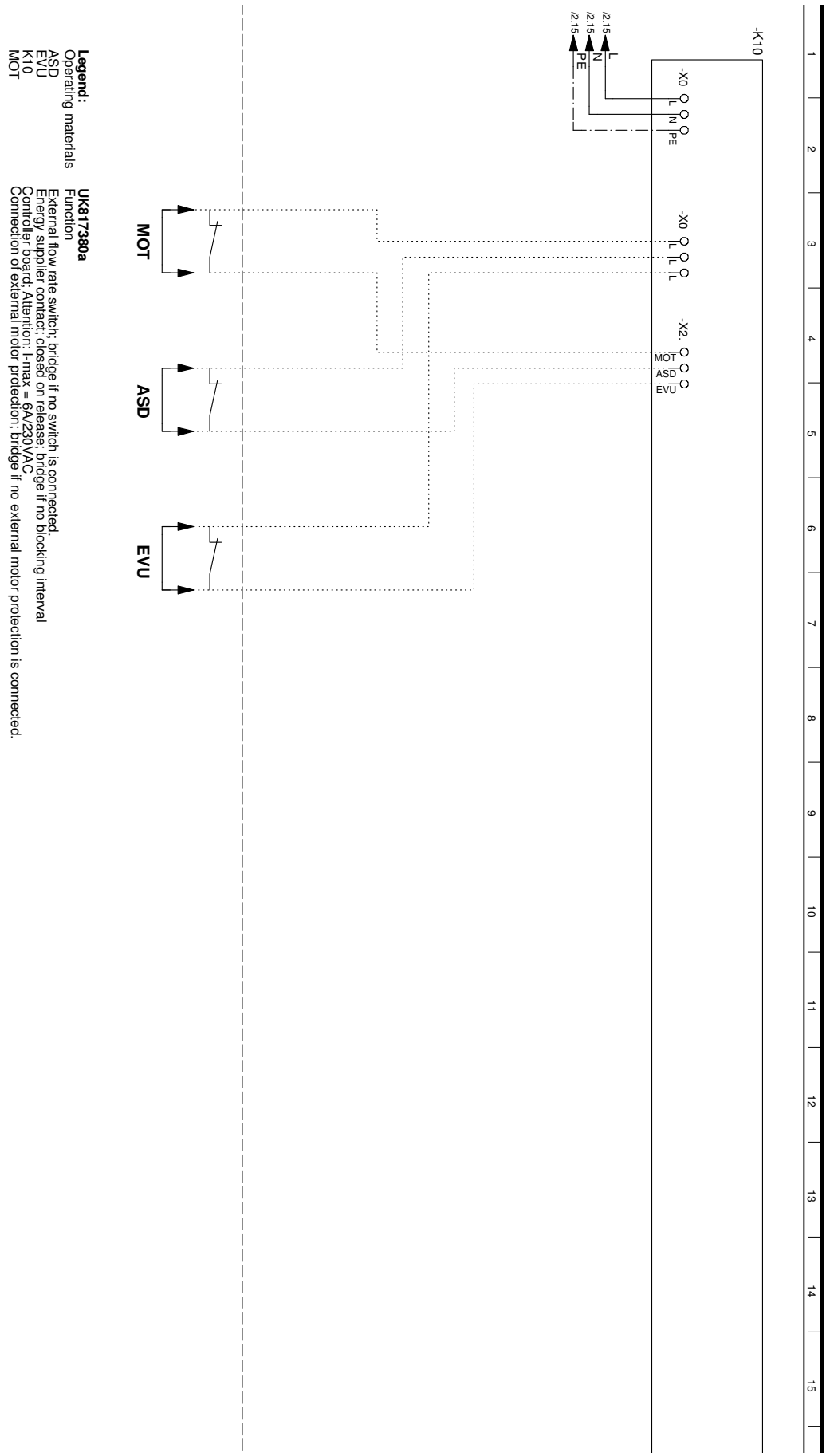
Legend:
Operating materials
ASD
EVU
K10
MOT

UK817379a
Function
External flow rate switch: bridge if no switch is connected.
Energy supplier contact: closed on release: bridge if no blocking interval
Controller board: Attention: I-max = 6A/230VAC
Connection of external motor protection: bridge if no external motor protection is connected.


Legend:
Operating materials
3~PE/400V/50Hz
E20
F1.1
M1
K1
Q0
Q11
X10
VD1
VD1
UK817380a
Function
L1,L2,L3,PE; power supply, output, compressor; clockwise rotary field is absolutely necessary!
Sump heating for compressor 1
Compressor motor protection
compressor
auxiliary relay compressor
Mains contactor compressor
Starting current limit compressor
Terminal in switch box heat pump
3~PE/400V/50Hz
L1 L2 L3
PE
-Q0
/2.5
-X10
-K1
1.1
/2.4
14
12
-Q11
PE
IN
0V
L1
U
L2
V
L3
W
-M1
VD1
M
3~
T1
T2
T3
PE
1
2
3
PE
-230V -F1.1
T1
T2
M1
M2
1
2
3
4
L Reg
N
HDP
MOT
/2.1
/2.1
/2.1
/2.1


-K20
230VAC
-X10
1~N/PE/230V/50Hz
L Reg
N
MOT
HDP
-F1
-K1
-Q0
-K22
Green
Yellow
white
Brown
-R1 TSG1
-R3 TWE
-R4 THG
-R5 TSG2
-R6 TVL
-R7 TRL
-R8 TWA
-R9 CW
-B10 HD
-B11 ND
-X1
-X2
-X4
-X6
-X7
-X8
-X11
DI1
DI2
OUT1
OUT5
NT1
NT3
NT4
NT5
NT6
NT7
NT8
NT9
GND
AIN1
AIN2
GND/LIN/12V
Legend:
Operating materials
1~N/PE/230V/50Hz
B10 HD
B11 ND
F1 HDP
K1 VD1
K20
K22
Q0
R1 TSG1
R2 TVD
R3 TWE
R4 THG
R5 TSG2
R6 TVL
R7 TRL
R8 TWA
R9 CW
X10
UK81738Oa
Function
L,N,PE; power supply, controller
High-pressure sensor
Low pressure sensor
High-pressure switch
auxiliary relay compressor
Controller board: Attention: I-max = 6A/230VAC
Electronic expansion valve
Mains contactor, compressor
Suction sensor, compressor
Sump heating sensor
Heat source input sensor
Hot gas sensor
Suction sensor, evaporator
Flow sensor
Return sensor
Heat source output sensor
Coder resistance: S58-69KW 11,5kOhm / S29-56KW 12,1kOhm
Terminal in switch box heat pump

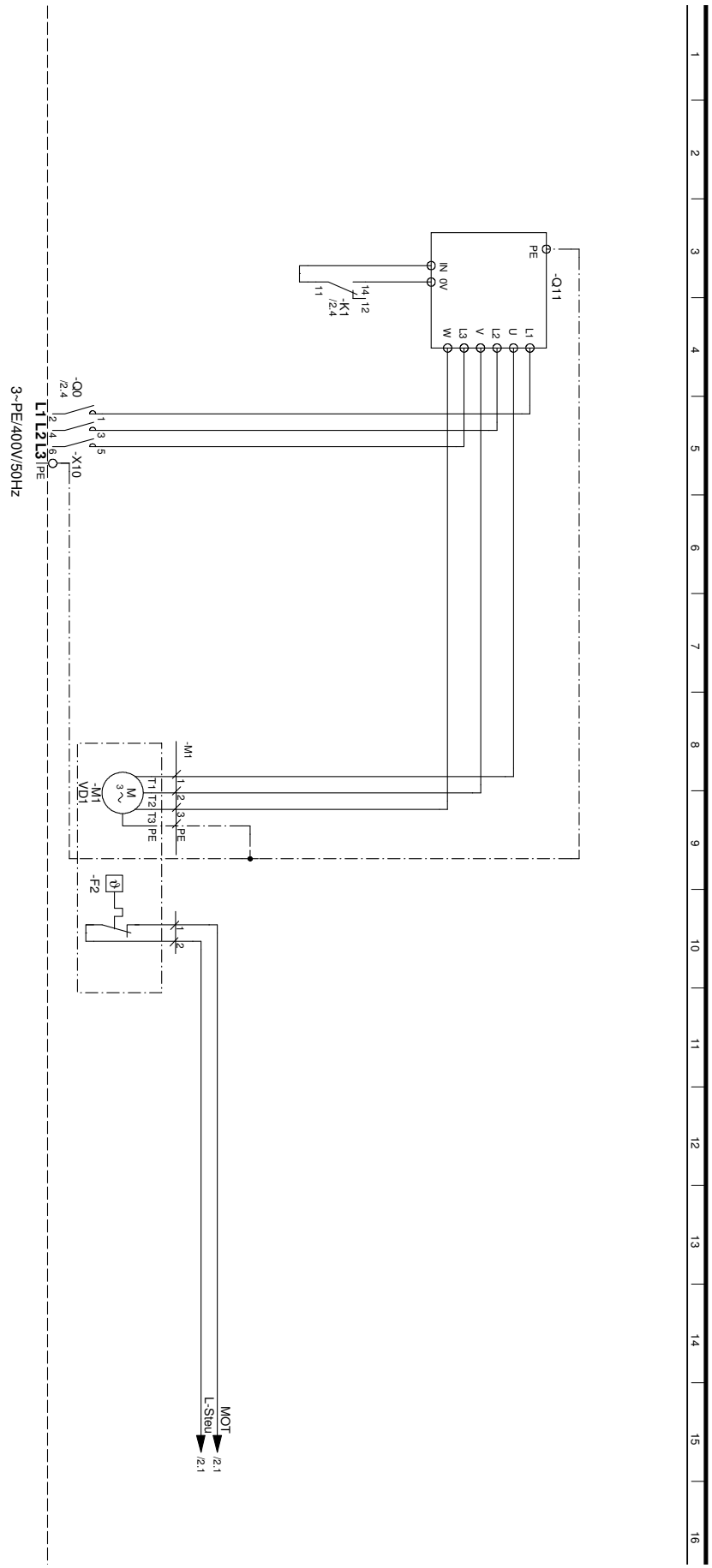
Circuit diagram 3/3



Legend:
Operating materials
ASD
EVU
K10
MOT

UK817380a
Function
External flow rate switch; bridge if no switch is connected.
Energy supplier contact; closed on release; bridge if no blocking interval
Controller board; Attention: I-max = 6A/230VAC
Connection of external motor protection; bridge if no external motor protection is connected.

Circuit diagram 1/3

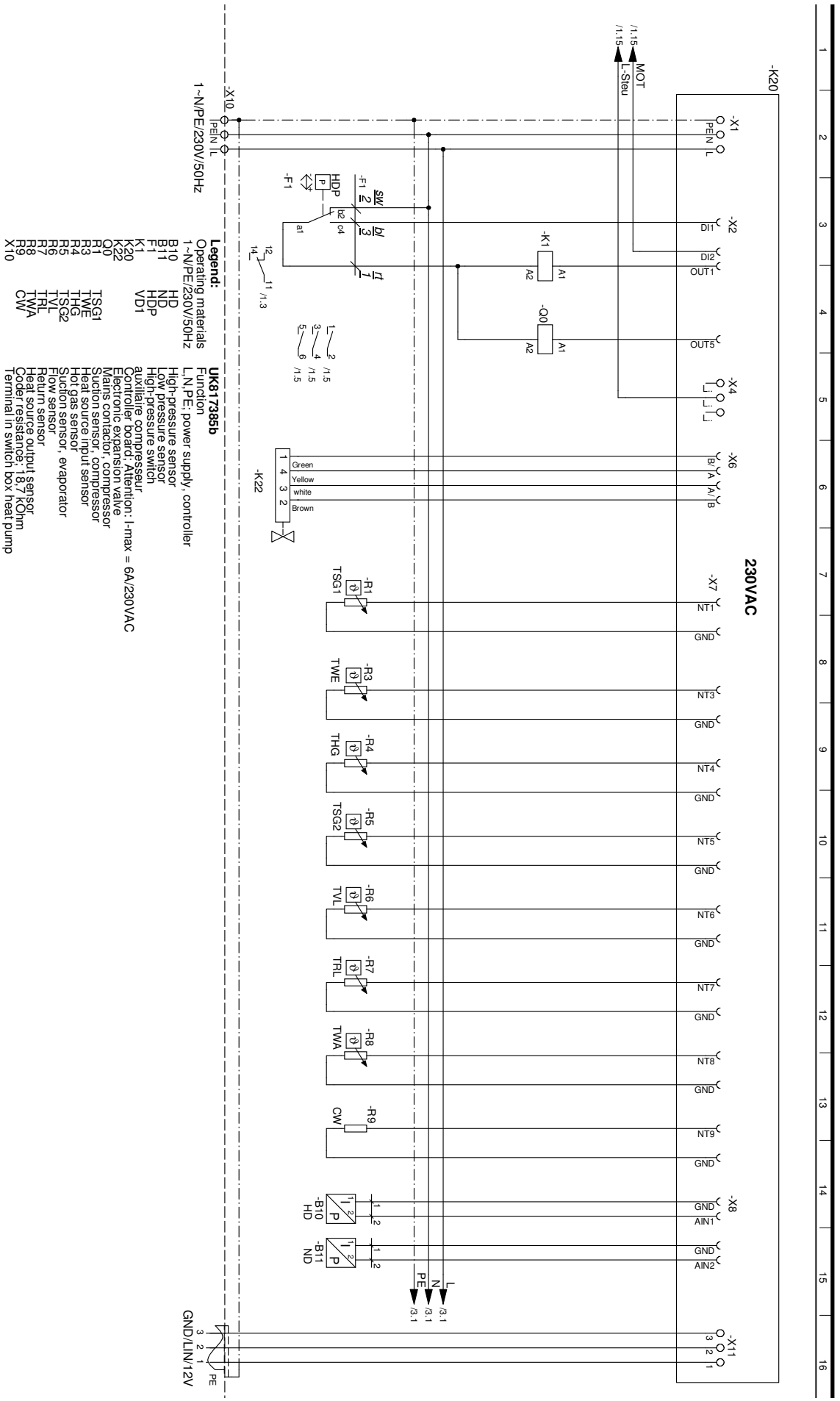


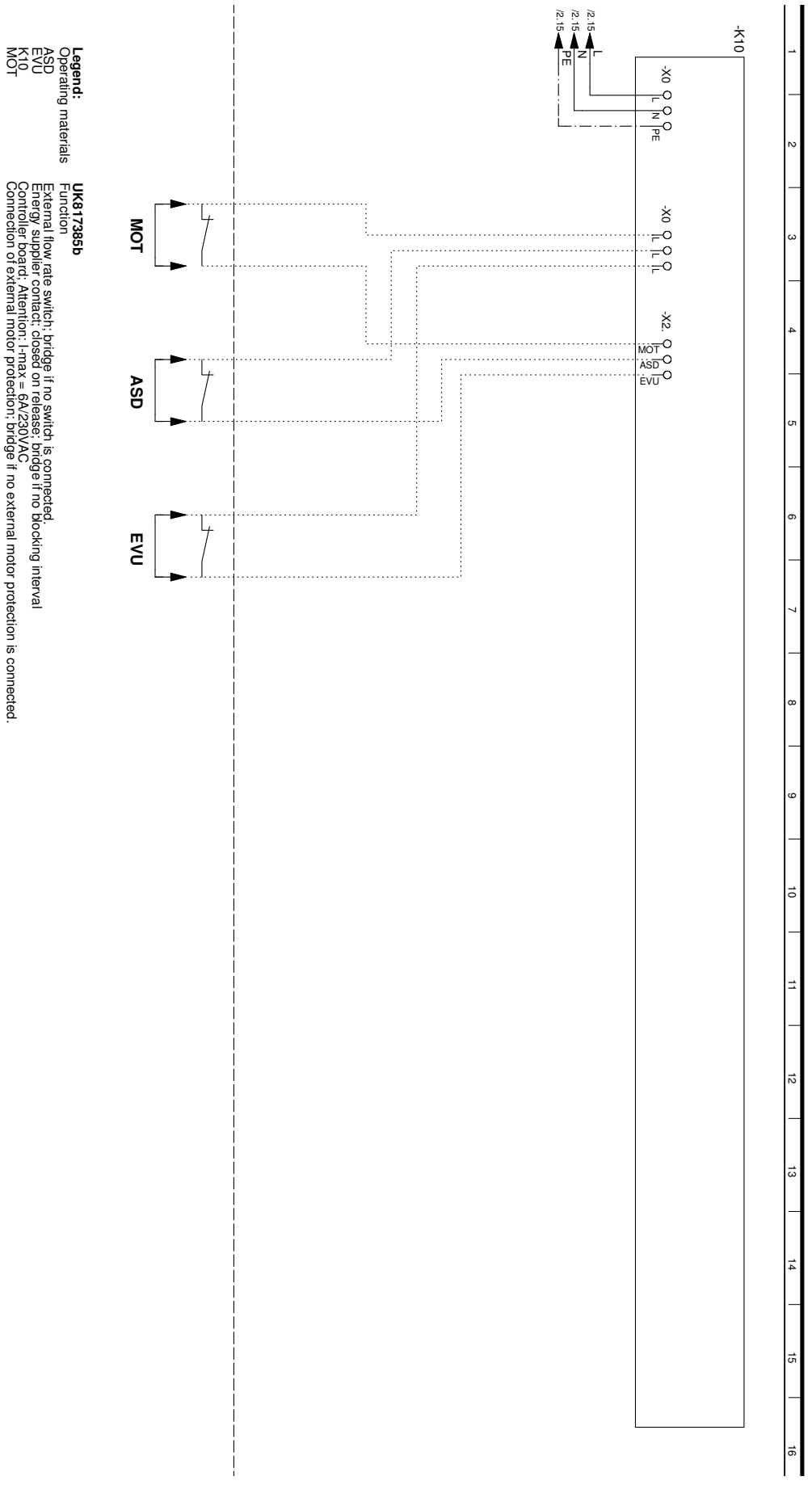
Legend:
Operating materials
3~PE/400V/50Hz

F2	
M1	
K1	
Q0	
Q11	
X10	
	VD1
	VD1

UK817385b
Function
L1,L2,L3,PE; power supply, output, compressor; clockwise rotary field is absolutely necessary!

	Compressor motor protection
	compressor
	auxiliaire compresseur
	Mains contactor, compressor
	Starting current limit compressor
	Terminal in switch box heat pump


-K20
-X1
PE
N
L
-X2
DI1
DI2
OUT1
OUT5
-K1
-Q0
A1
A2
-X4
-X6
B/
A
A/
B
-K22
Green
Yellow
white
Brown
230VAC
-X7
NT1
GND
-R1
TSG1
-R3
TWE
NT3
-R4
THG
NT4
-R5
TSG2
NT5
-R6
TVL
NT6
-R7
TRL
NT7
-R8
TWA
NT8
-R9
CW
NT9
-X8
AIN1
AIN2
-B10
HD
-B11
ND
-X10
1~N/PE/230V/50Hz
-F1
HDP
MOT
L-Steu
/1.15
-X11
GND/LIN/12V
Legend:
UK817385b
Operating materials
Function
1~N/PE/230V/50Hz
L,N,PE; power supply, controller
B10
HD
High-pressure sensor
B11
ND
Low pressure sensor
F1
HDP
High-pressure switch
K1
VD1
auxiliaire compresseur
K20
Controller board; Attention: I-max = 6A/230VAC
K22
Electronic expansion valve
Q0
Mains contactor, compressor
R1
TSG1
Suction sensor, compressor
R3
TWE
Heat source input sensor
R4
THG
Hot gas sensor
R5
TSG2
Suction sensor, evaporator
R6
TVL
Flow sensor
R7
TRL
Return sensor
R8
TWA
Heat source output sensor
R9
CW
Cooler resistance; 18,7 KOhm
X10
Terminal in switch box heat pump



Legend:
Operating materials

ASD
EVU
K10
MOT

UK817385b
Function
External flow rate switch; bridge if no switch is connected.
Energy supplier contact: closed on release; bridge if no blocking interval
Controller board: Attention: I-max = 6A/230VAC
Connection of external motor protection; bridge if no external motor protection is connected.

UK

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