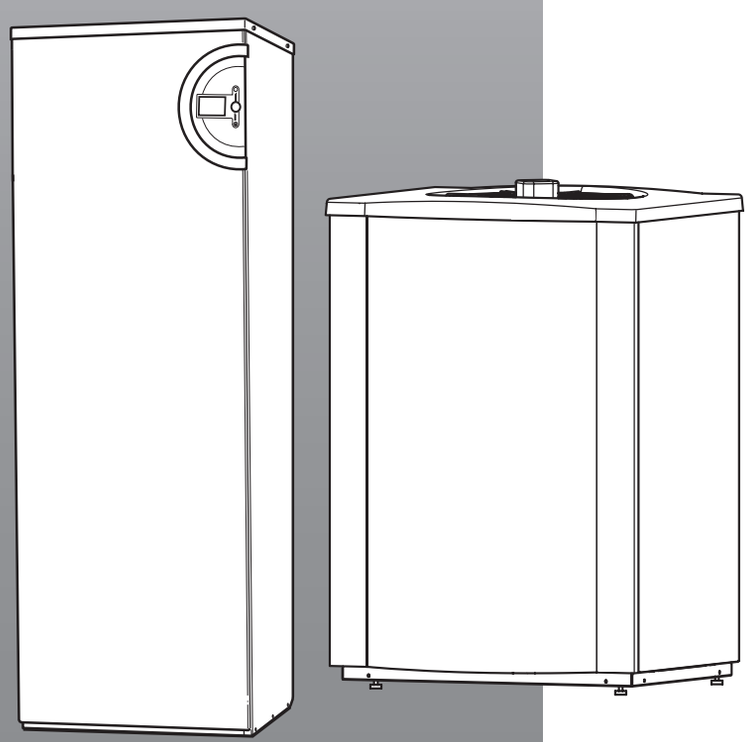
INSTALLATION MANUAL

AIR TO WATER HEAT PUMP WITH DOMESTIC HOT WATER DISTRIBUTION UNIT

GREENSOURCE

The passcode requires you to add use the American date and add 1 to each date, e.g. 18th February (0218) becomes 1329

6 KW, 7 KW AND 9.5 KW



6 720 641 467-00.1I

UK/IE

benchmark
COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

WORCESTER
Bosch Group

6 720 641 467(2010/01)

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1 EXPLANATION OF SYMBOLS AND SAFETY INFORMATION

1.1 EXPLANATION OF SYMBOLS

WARNING SYMBOLS

Safety instructions in this document are framed and identified by a warning triangle which is printed on a grey background.

Electrical hazards are identified by a lightning symbol surrounded by a warning triangle.

Signal words indicate the seriousness of the hazard in terms of the consequences of not following the safety instructions.

- **NOTICE** indicates possible damage to property or equipment, but where there is no risk of injury.
- **CAUTION** indicates possible injury.
- **WARNING** indicates possible severe injury.
- **DANGER** indicates possible risk to life.

IMPORTANT INFORMATION

Notes contain important information in cases where there is no risk of personal injury or material losses and are identified by the symbol shown on the left. They are bordered by horizontal lines above and below the text.

ADDITIONAL SYMBOLS

Symbol	Meaning
▶	a step in an action sequence
→	a reference to a related part in the document or to other related documents
•	a list entry
–	a list entry (second level)

Tab. 1

1.2 SAFETY PRECAUTIONS

GENERAL

- ▶ Read the guide carefully and keep it to hand for future use.

INSTALLATION AND COMMISSIONING

Installation and commissioning may only be carried out by a qualified installer.

RISK OF DAMAGE DUE TO OPERATOR ERROR

Operator errors can result in injury and damage to property.

- ▶ This heat pump must only be operated by a responsible adult who has been instructed in, understands and is aware of the heat pump's operating conditions and effects.

SERVICE AND MAINTENANCE

- ▶ Only qualified personnel may carry out repairs. Incorrect repairs can lead to serious risks to the user, and may invalidate your warranty.
- ▶ Only use original Bosch spare parts.
- ▶ Service and maintenance must be carried out annually by an suitably qualified service representative.

2 BENCHMARK

Benchmark places responsibilities on both manufacturers and installers. The purpose is to ensure that customers are provided with the correct equipment for their needs, that it is installed, commissioned and serviced in accordance with the manufacturer's instructions by competent persons and that it meets the requirements of the appropriate Building Regulations. The Benchmark Checklist can be used to demonstrate compliance with Building Regulations and should be provided to the customer for future reference.

Installers are required to carry out installation, commissioning and servicing work in accordance with the Benchmark Code of Practice which is available from the Heating and Hotwater Industry Council who manage and promote the scheme. Visit www.centralheating.co.uk for more information.

3 BUILDING REGULATIONS

This appliance must be installed and serviced only by a competent person in accordance with the current: IEE Regulations, Building Regulation, Building Standards (Scotland) (Consolidation), Building Regulations (Northern Ireland), local water by-laws, Health & Safety Document 63S (The Electricity at Work Regulations 1989), IS 813 (Eire) and other local requirements.
The relevant Standards should be followed, including:
BS7074:1: Code of practice for domestic and hot water supply
EN:12828: Central heating for domestic premises
BS7593: Treatment of water in domestic hot water central heating systems
BS EN 14511: Requirements heat pumps for space heating and cooling
BS EN 378 : Safety and environmental requirements for heat pumps
The Health and Safety at Work Act 1974
The Management of Health and Safety at Work Regulations 1999
The Construction (Health, Safety and Welfare) Regulations 1996
The Construction (Design and Management) Regulations 1994
The Lifting Operations and Lifting Equipment Regulations 1998
Where no specific instruction is given, reference should be made to the relevant codes of Practice.
Potable water: All seals, joints, compounds (including flux and solder) and components used as part of the secondary domestic water system must be approved for use with potable water supplies.

This is to certify that the above ranges of products manufactured by Bosch Thermotechnology have been tested and found to comply with:

- the requirements of the (Water Fittings) Regulations 1999 for England and Wales, the Water Byelaws 2000, Scotland and the Water Regulations Northern Ireland.
- the requirements of the UK Building Regulations:

The Building Regulations 1991 (England & Wales) Requirements G3, L1 and Regulation 7.
The Building Standards (Scotland) Regulations 1990. Regulation 10 (B2), 22 (J3.3a and J3.4), 27 and 28 (P2.6 and P3).
The Building Regulations (Northern Ireland) 2000.

4 INCLUDED IN THE DELIVERY

4.1 GREENSOURCE 6, 7 & 9.5 WITH INTERNAL UNIT HWDU-151

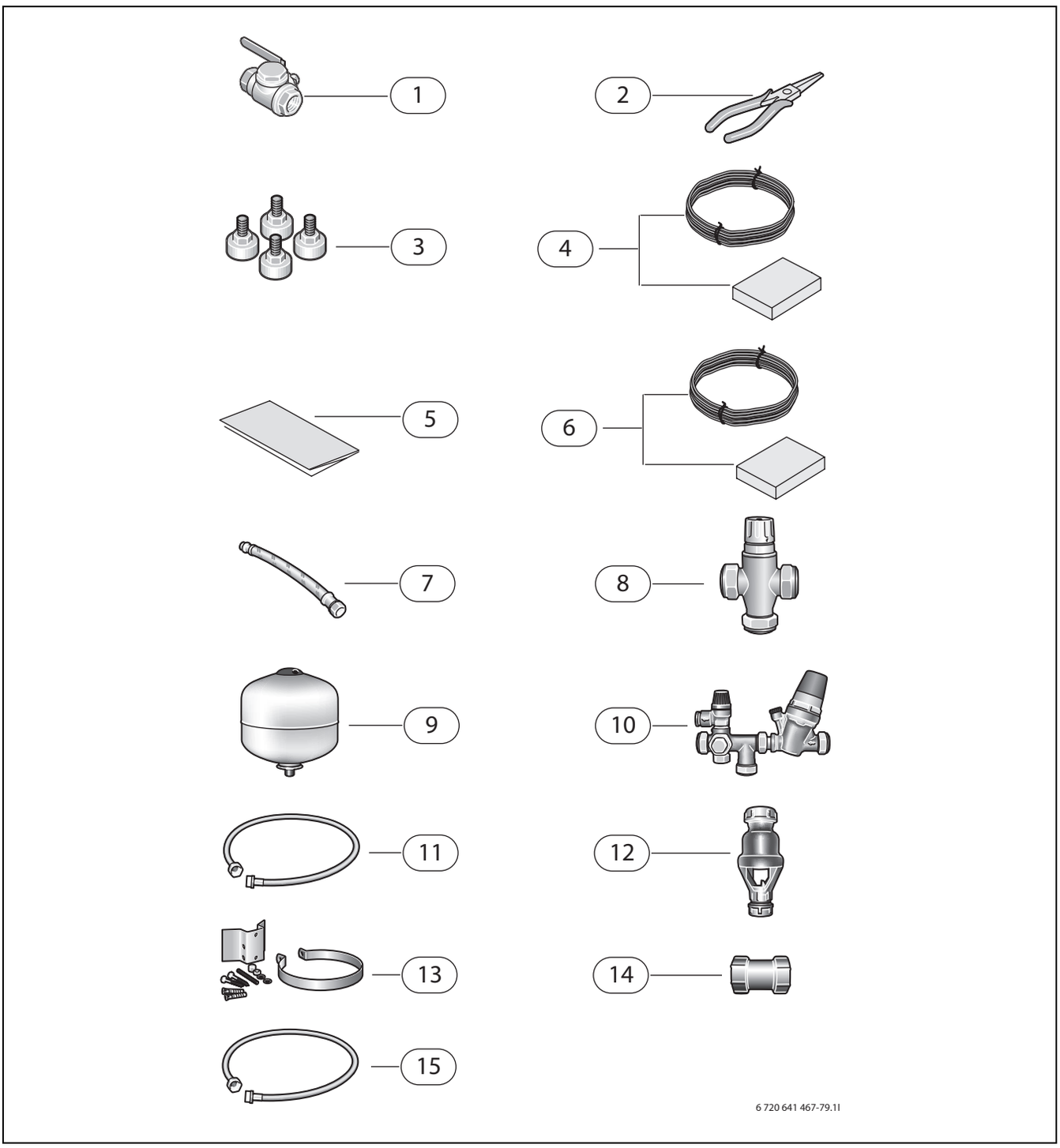

Fig. 1

With heat pump:

1 Valve with filter
2 Circlip pliers
3 Rubber feet
4 Outdoor sensor T2 with cable (with HWDU)
5 Literature pack
6 Room sensor T5 with cable (with HWDU)
7 Flexible connection hose

With unvented air to water kit:

8 Blending valve
9 DHW expansion vessel
10 High flow rate inlet control set
11 Expansion vessel hose
12 Acetal tundish
13 Wall mounting kit for expansion vessel
14 Waste coupler
15 Filling loop with valve

5 GENERAL

Only qualified installers may carry out the installation. The installer must follow applicable rules and regulations and recommendations from the manufacturer.

5.1 TRANSPORT AND STORAGE

The heat pump should always be transported and stored in an upright position. However, the heat pump may be tilted temporarily, but must not be laid down on its back or sides.

5.2 SETTING UP

- The heat pump must be installed outside the building on a level, hard standing area.
- The installer should take the sound level of the heat pump into consideration when siting (→ chapter 15.3).
- The hdwu must be installed inside the property. Pipework between the heat pump and the internal unit should be kept as short as possible. All pipe work between the outdoor and indoor unit must be well insulated using class 0 insulation or better.
- Condensate drain water from the heat pump should be led to a suitable drain area and the pipe work insulated using class O insulation.
  The pipe work must fall and terminate **above** the drain.
- The drain pipe can also be routed into a foul water drain outside.
- The heat pump must be installed with the specified clearances for airflow.
- The heat pump must not be positioned so that the recirculation of cold air can occur.
- Consideration should be given to siting the outdoor unit directly below eaves and possible snow fall onto the fan.
- Removing transport stay.

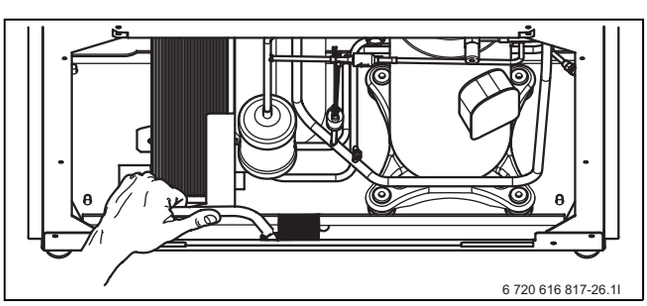

Fig. 2 Transport stay

5.3 MINIMUM AND MAXIMUM OPERATING TEMPERATURES

Maximum operating return temperature: The heat pump can operate with a maximum return temperature of approx. 59 °C. For safety reasons the heat pump stops as soon as this temperature is exceeded.

Maximum operating temperature heat only: The maximum operating flow temperature is factory set to 62 °C. This can be changed by the installer to a maximum of 70 °C. It is recommend that the factory supplied blending valve be fitted in line with G3 regulations.

Minimum operating temperature: The heat pump stops when the outside temperature is below - 20 °C. Only the internal unit will then generate heat. The heat pump restarts automatically when the outside temperature rises again.

5.4 WEATHER COMPENSATION CONTROL

The control unit regulates heat generation for the heating either exclusively via the outside temperature sensor (weather-compensated control) or via a combination of outside temperature sensor and room temperature sensor (room temperature-dependent control).

For more detailed information regarding the control unit, see the heat pump operating instructions.

5.5 DEFROSTING METHOD

The principle of defrosting in the heat pump is known as hot gas defrosting. During defrosting, the flow in the refrigerant circuit is reversed by means of an electrically-controlled four-way valve.

The hot gas melts the ice on the evaporator fins. As this happens, the heating water cools down a little. The defrost duration depends on the thickness of the ice and the current outside temperature. This process is controlled by the T2, T11 and T12 temperature sensors.

An additional function enables defrosting of the fan. Warm air is drawn through the fan and thereby prevents it from freezing up again.

5.6 CHECKLIST

Each heat pump installation is unique. The following checklist will give you a general description of how the installation should be carried out.

5.6.1 GREENSOURCE 6-9.5 WITH INTERNAL UNIT HWDU-151

1. Position the heat pump on a level and stable base.
2. Connect the flow and return pipes to the heat pump.
3. Fit the valve with filter.
4. Fit the drain pipe to the heat pump.
5. Fit the corresponding flow and return pipes to the internal unit.
6. Connect the relief valve discharge pipe.
7. Connect the HWDU unit to the heating system or buffer cylinder.
8. Fit the outside temperature sensor and, the room temperature sensor.
9. Connect the CAN-BUS cable to the hwdu unit and the heat pump.
10. Fill and vent the heating system.
11. Connect the power supply RCD and isolation switches to both indoor and outdoor units.
12. Switch on the system. Make all required settings at the control panel.
13. Check the heating installation after commissioning and insulate all external pipe work.

5.7 LOCATIONS OF THE TEMPERATURE SENSORS

5.7.1 GREENSOURCE 6-9.5 WITH INTERNAL UNIT HWDU-151

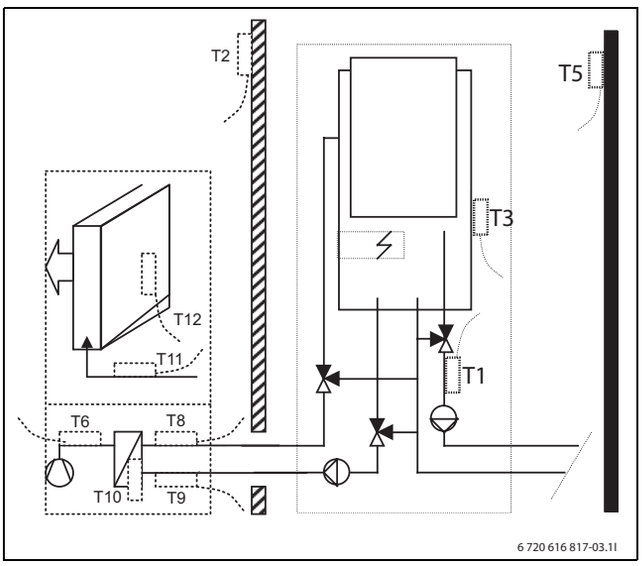

Fig. 3 Greensource 6-9.5 - internal unit HWDU-151

T1 Flow temperature sensor
T2 Outside temperature sensor
T3 Cylinder temperature sensor
T5 Room temperature sensor
T6 Hot gas temperature sensor
T8 Heating water temperature sensor, flow out
T9 Heating water temperature sensor, return in
T10 Condenser temperature sensor
T11 Refrigerant temperature sensor, evaporator
T12 Air temperature sensor, evaporator

5.8 CAN-BUS

The various circuit boards in the heat pump and hwdu are connected by a CAN-BUS communications cable. CAN (Controller Area Network) is a two-wire system for communication between microprocessor based modules/circuit boards, which are connected in series.

The Greensource outdoor unit holds the PCB - IOB board, all other pcbs are located in the indoor HWDU.

CAUTION: Interference.

- The CAN-BUS cable must be screened and laid separately from the power cable.

A suitable cable for the external connection is a CAT 5 E FTP 2x2x0.5A. The cable must be multi-core and screened. The screen may only be earthed at one end and only at the casing.

The cable may be up to 20 m long.

CAN-BUS cable must **not** be laid alongside power supply cables. Minimum distance 100 mm between cables. They may be laid alongside sensor cables.

Ensure that the external CAN- BUS cables when routed into the hwdu are not in connect with the mains cable.

CAUTION: Do not mix up the 12V and CAN-BUS connections!

The processors are destroyed if 12V is connected to the CAN-BUS.

- Check that the four cables are connected to the contacts with the corresponding marking on the circuit board.

The connection between the circuit boards is by four wires, because the 12V-supply between the circuit boards must also be connected. The circuit boards have markings for both the 12V and CAN-BUS connections.

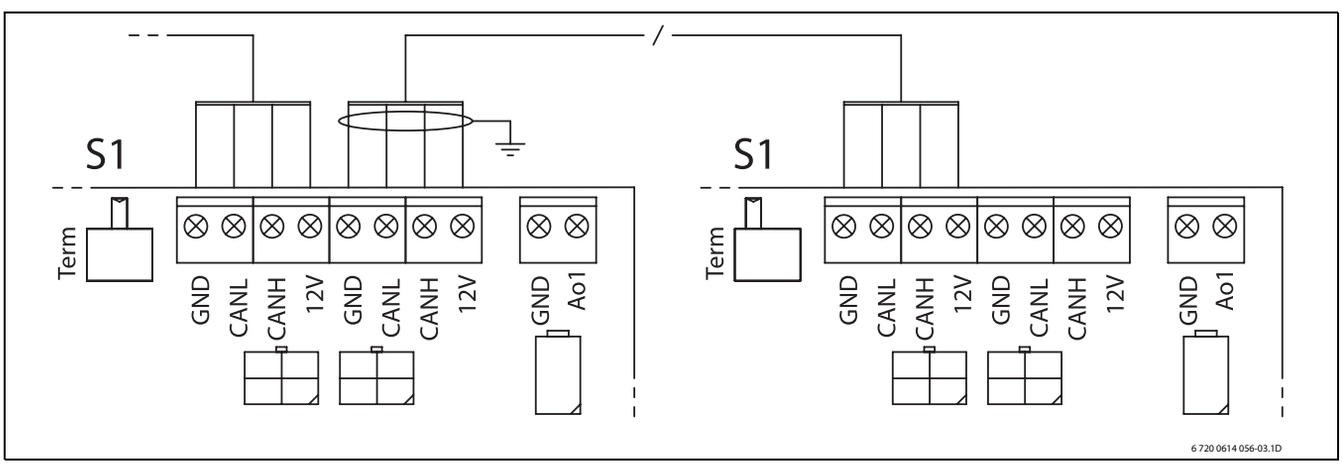

Fig. 4

Switch S1 highlights the beginning and end of the CAN-BUS cable. This means that the CPU board in the internal unit and the IOB board in the heat pump must be terminated by S1. For this, set S1 to *Term*.

5.9 HANDLING CIRCUIT BOARDS

Circuit boards with control electronics are sensitive to discharges of static electricity (ESD – ElectroStatic Discharge) when handled. To prevent damaging the components, special care is therefore required when handled.

CAUTION: Wearing a ground-connected bracelet is highly recommended.

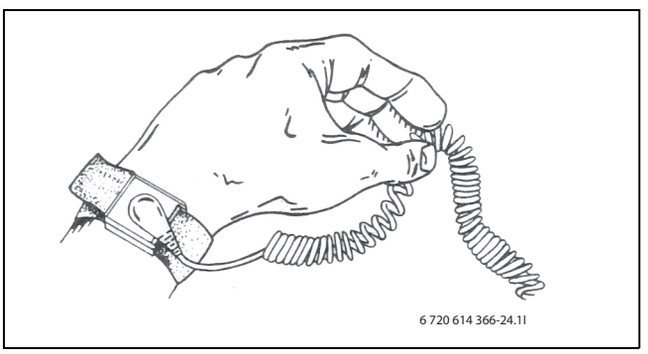

Fig. 5 Bracelet

Damage is usually hidden due to the nature of the failure, and a circuit board can operate impeccably during commissioning but show signs of problems later. Charged objects may only be problematic if they are in close proximity to the electronics. Keep a distance of at least one metre from expanded polystyrene, protective plastic and other packaging, synthetic material (e.g. fleeces) and similar before starting work.

Anti-static protection facilities (e.g. mats, wrist bands etc) should always be used if available. If not available, the following handling precautions must be observed ; touch the boiler earth immediately prior to removing the part from the packaging. Handle the PCB only at the edges. Touch earth on a regular basis whilst the board is being fitted and connected. Do not touch any electronic components.

A condition for good ESD protection is a ground-connected bracelet when handling electronics. This bracelet should be put on before opening the screened metal bag/packaging or before exposing an installed board. The bracelet should be worn until the circuit board is enclosed in its screen packaging or closed electric box. Replaced, returned circuit boards should be handled in the same way.

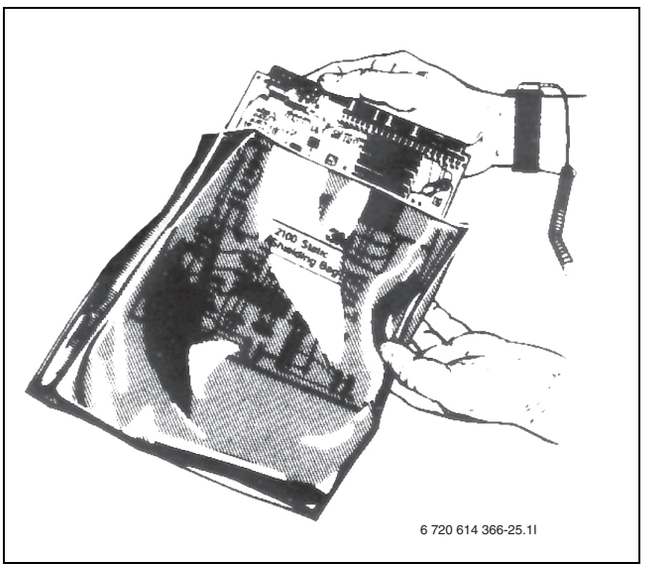

Fig. 6

5.10 APPLIANCE LAYOUT

5.10.1 HEAT PUMP

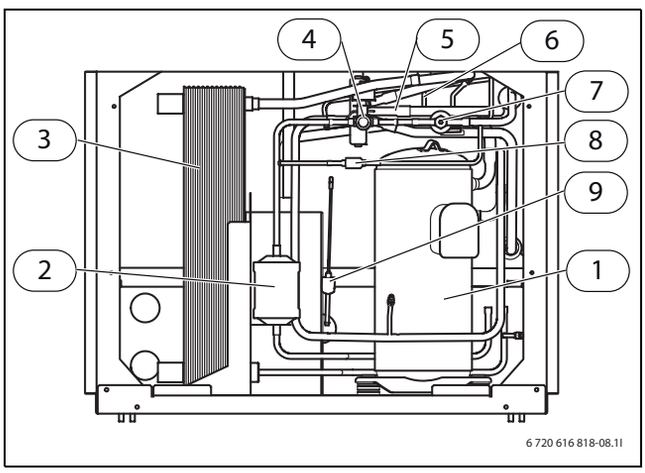

Fig. 7 Greensource 6-9.5

1 Compressor
2 Dry filter
3 Heat exchanger
4 Sight glass
5 4-way valve
6 Low pressure switch
7 Expansion valve
8 Non-return valve
9 High pressure switch

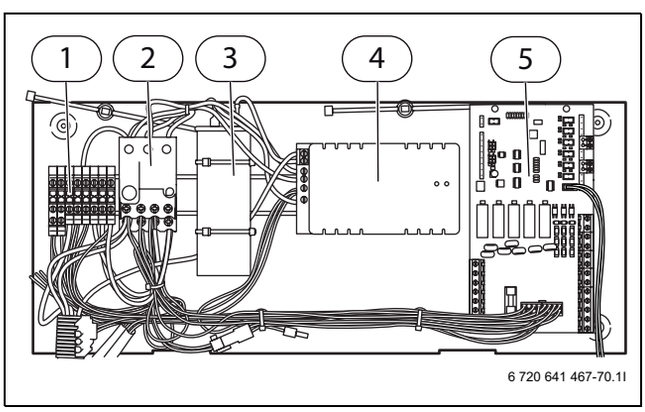

Fig. 8 Greensource 6-9.5 control panel

1 Terminal
2 Overload relay
3 Capacitor
4 Soft starter
5 PCB (IOB board)

5.10.2 INTERNAL UNIT HWDU-151

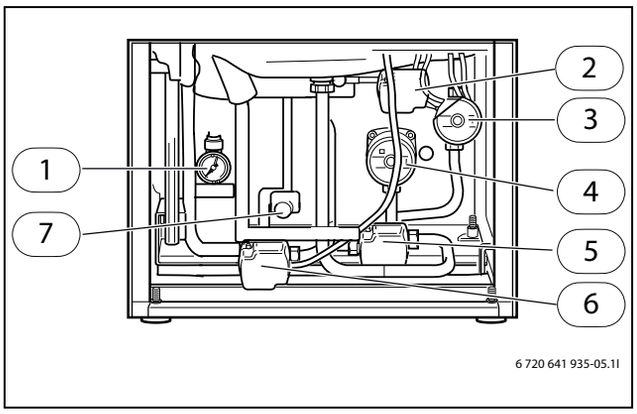

Fig. 9 Connection chamber, internal unit

1 Pressure gauge (System operating pressure 0.5 – 1.5 bar)
2 Mixing valve
3 Heat carrier pump (G2)
4 Pump for heating system (G1)
5 Heating three-way valve
6 Hot water three-way valve
7 Drain point

6 DIMENSIONS, CLEARANCE AND PIPE CONNECTIONS

6.1 HEAT PUMP

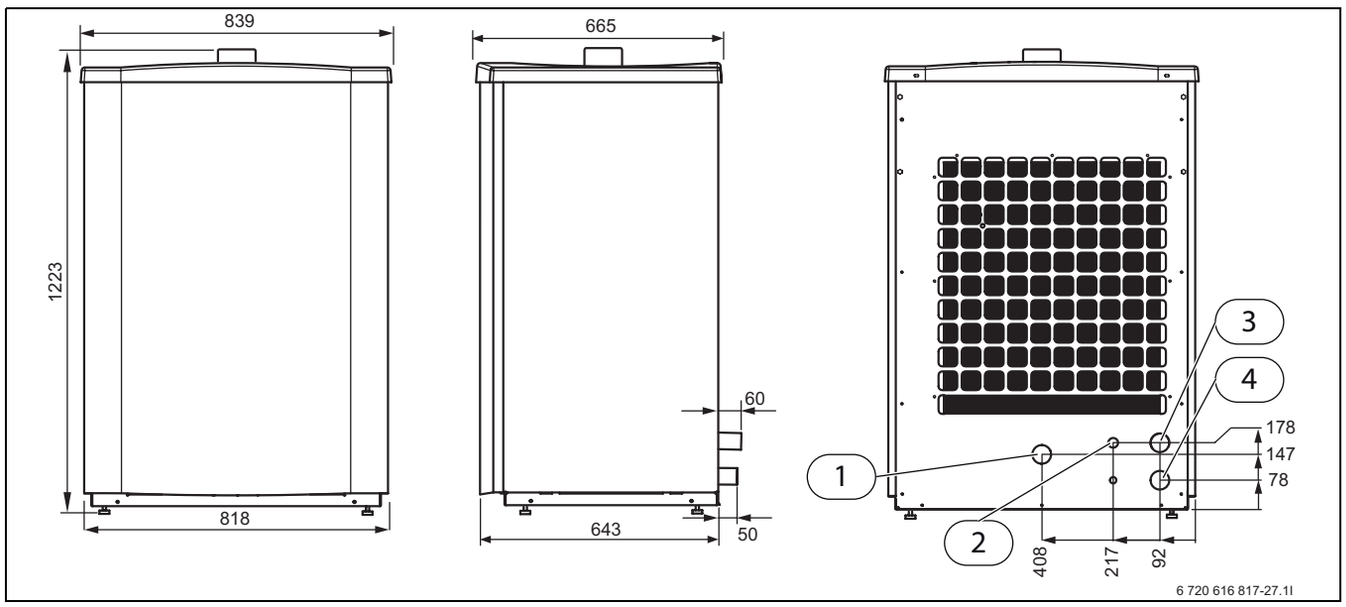

Fig. 10 Greensource 6-9.5 dimensions

1 Drain
2 Cable entry
3 Flow to the HWDU (hose, 1" fem. thread)
4 Return from the HWDU (hose, 1" fem. thread)

REQUIRED MINIMUM CLEARANCES FOR THE HEAT PUMP

A minimum clearance of 1 m is required in front of the pump; the minimum clearance to the back and sides is 0.3 m.

If a roof is installed it must be positioned at least 1.5m above the heat pump to avoid the recirculation of cold.

6.2 INTERNAL UNIT

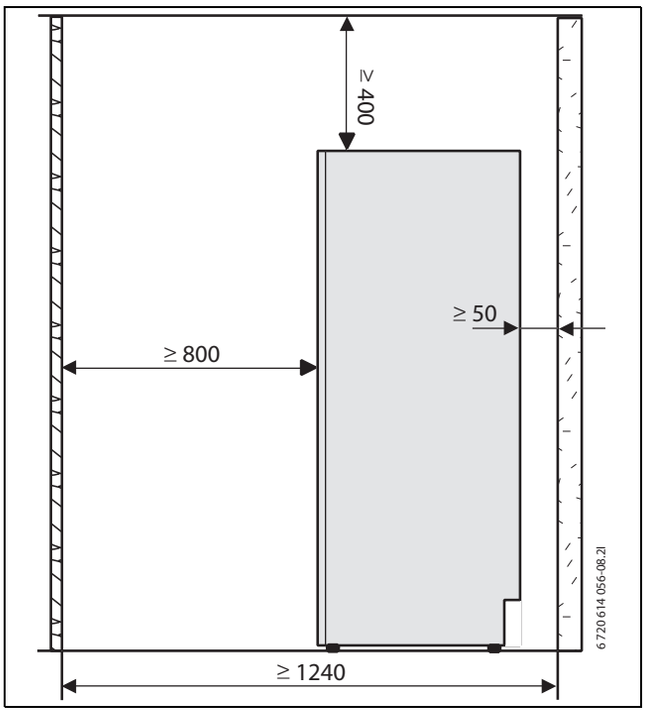

Fig. 11 Internal unit

REQUIRED MINIMUM CLEARANCES FOR THE INTERNAL UNIT

A minimum clearance of 0.8 m is required in front of the internal unit. No clearance to the sides is required.

A minimum clearance of 50 mm is required between the internal unit and fixed installations, such as walls, wash basins etc. Preferably install the unit on external walls or insulated intermediate walls.

PIPE CONNECTIONS

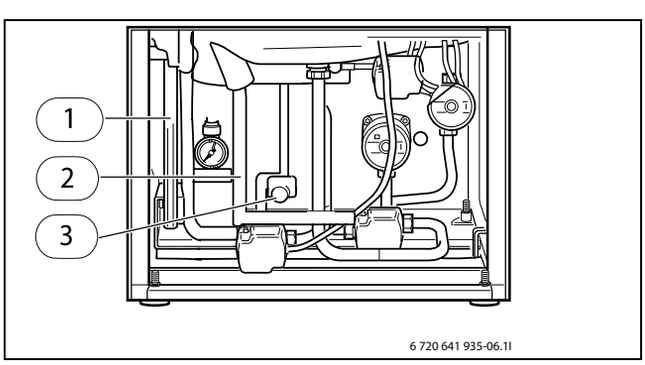

Fig. 12 Internal unit front

1 Hot water
2 Cold water
3 Drain point

The following connections must be made at the internal unit:

- Connect the heating flow to the outlet marked flow.
- Connect the heating return to the outlet marked return.
- Connect the cold water supply to the outlet marked cold water.
- Connect the DHW pipe to the outlet marked DHW.

The following connections must be made at the heat pump:

- A 32 mm drain pipe from the drain connection to the drain.

Installation of the valve with filter

- Install the valve with filter horizontally in the return to the heat pump and as near to the heat pump as possible.

Pipe dimensions	mm
Heating	
Locking ring connection	Ø 22
Cold water and domestic hot water	
Locking ring connection	Ø 22
Heating water inlet, heating water outlet and drain	
Locking ring connection	Ø 22
Waste water/drain	Ø 32

Tab. 2

Between the heat pump and the house we recommend 22 mm pipe to be used, the maximum distance is 15 metres. The external pipe must be insulated using class 0 insulation.

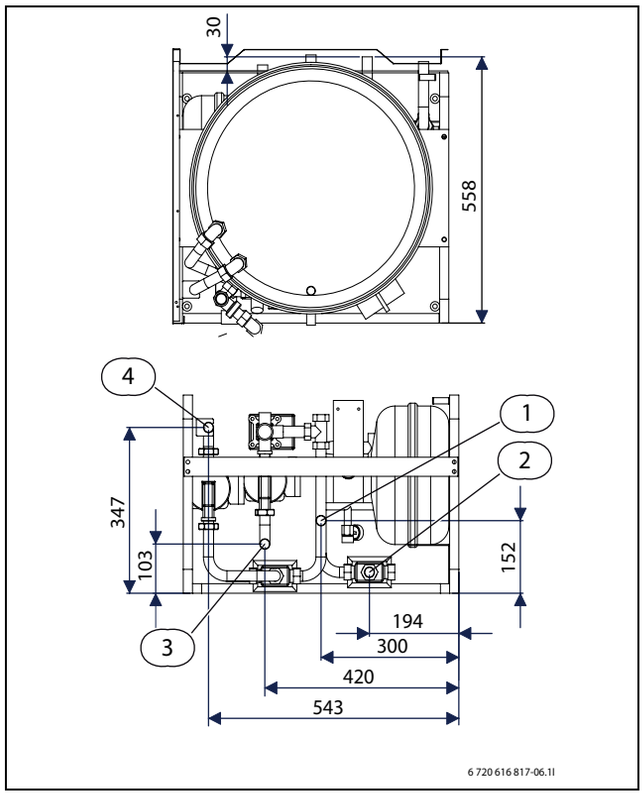

Fig. 13 Back and top view of the internal unit

1 Heating return
2 Heating water inlet (from the heat pump)
3 Heating flow
4 Heating water outlet (towards the heat pump)

6.3 FITTING THE FILTER VALVE

The task of the particle filter is to filter out dirt before it can enter the heat pump. Accordingly, the supplied filter valve must always be fitted on the return pipe, between the HWDU and the outdoor heat pump. It should be fitted as close to the heat pump as possible and be horizontal.

7 HEATING SYSTEM CONNECTION

7.1 FITTING THE UNVENTED KIT

7.1.1 PARTS TO ASSEMBLE

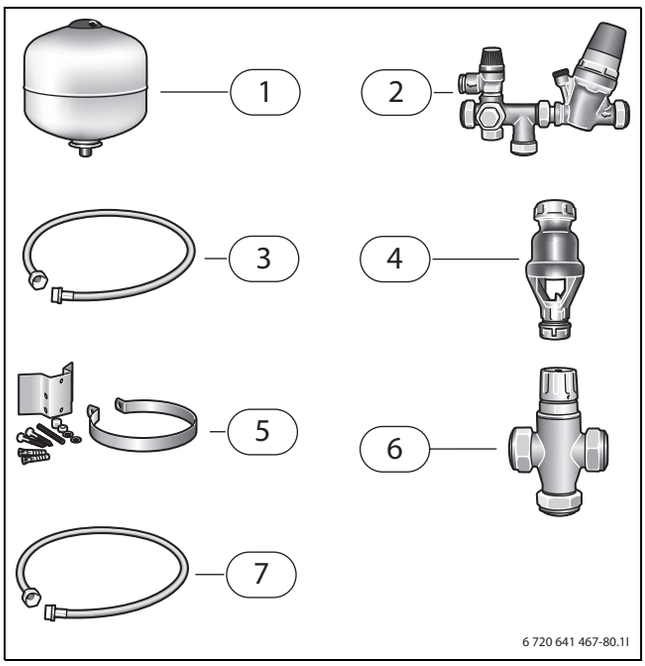

Fig. 14

1 Expansion vessel
2 High flow rate inlet control set
3 Expansion vessel hose
4 Tundish G1" x 28 mm incl. straight fitting. Tundish 15 mm x 22 mm
5 Wall mounting kit for expansion vessel
6 Blending valve
7 Filling loop with valve

7.1.2 CONNECTION

- ▶ Mount the expansion vessel with the wall mounting kit. Connect the expansion vessel hose to the expansion vessel.
- ▶ Connect the expansion vessel and inlet control set externally to the appliance in line with G3 regulations. We recommend that this be positioned above the HWDU.

The blending valve should be fitted between the cold and the DHW outlet to the tap.

7.2 USE IN HARD WATER AREAS

Normally there is no need for water treatment to prevent scale formation. In areas where temporary water hardness exceeds 200ppm, consideration may need to be given to the fitting of a scale prevention device. In such circumstances the advice of the local water authority should be sought.

7.3 DETAILED G3 DISCHARGE PIPE INSTALLATION REQUIREMENTS

The discharge pipework must be routed in accordance with part G3 of schedule 1 of the building Regulations. The tundish should be vertical, located in the same space as the unvented hot water cylinder and be as close as possible and within 600mm of the safety device e.g. the temperature relief valve. The discharge pipe from the tundish should be:

- made of metal
- at least one pipe size larger than the nominal outlet size of the safety device (larger sizes may be required if the equivalent hydraulic resistance exceeds that of a straight pipe 9m long - refer to BS6700)
- terminate in a safe place where there is no risk to persons in the vicinity of the discharge, and position safely from electrical devices.
- have a vertical section of pipe at least 300mm long below the tundish before any elbows or bends in the pipework
- installed with a continuous fall
- visible at both the tundish and the final point of discharge or where this is not possible or practically difficult there should be clear visibility at one or the other of these locations

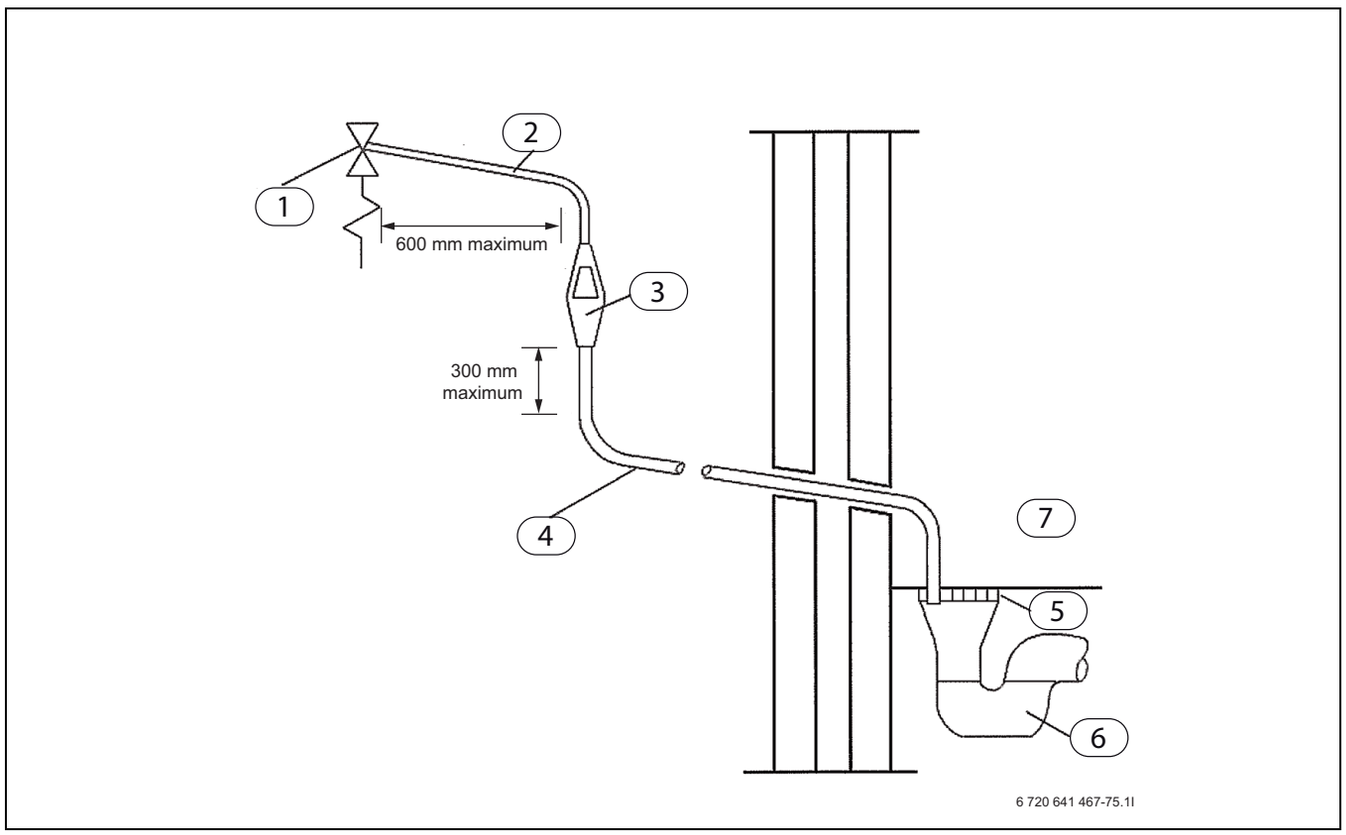

Fig. 15 Typical discharge pipe arrangement

1 Safety device (e. g. temperature pressure relief valve)
2 Metal discharge pipe (D1) from temperature relief value to tundish
3 Tundish
4 Metal discharge pipe (D2) from tundish, with continuous fall. See 3.9d i-iv, Table 1 and worked example.
5 Fixed grating
6 Trapped gulley
7 Discharge below fixed grating (3.9d gives alternative points of discharge)

7.4 TUNDISH (HWDU)

Fit the tundish and straight fitting G1" x 28 mm as shown on the illustration. The tundish and fitting are supplied together with the HWDU as part of the G3 regulations.

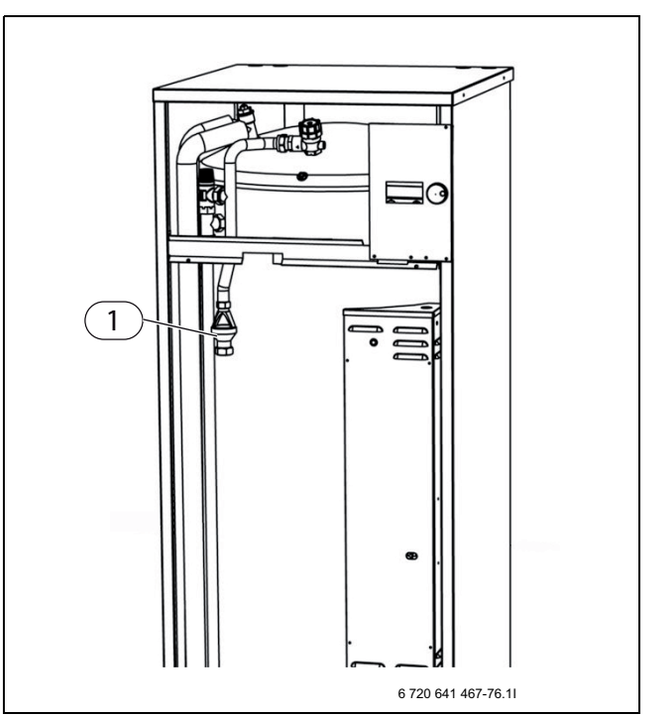

Fig. 16

1 Tundish

Valve outlet size	Size of discharge pipework D1	Size of discharge pipework D2	Maximum length of straight pipe (no bends or elbows)	Deduct the figure below from the maximum length for each bend or elbow in the discharge pipe
		22 mm	Up to 9 m	0.8 m
G1/2	15 mm	28 mm	Up to 18 m	1.0 m
		35 mm	Up to 27 m	1.4 m
		28 mm	Up to 9 m	1.0 m
<G3>/4	22 mm	35 mm	Up to 18 m	1.4 m
		42 mm	Up to 27 m	1.7 m
		35 mm	Up to 9 m	1.4 m
G1	28 mm	42 mm	Up to 18 m	1.7 m
		54 mm	Up to 27 m	2.3 m

Tab. 3 Valve outlet size

7.5 HOW TO DRAIN THE HOT WATER CYLINDER

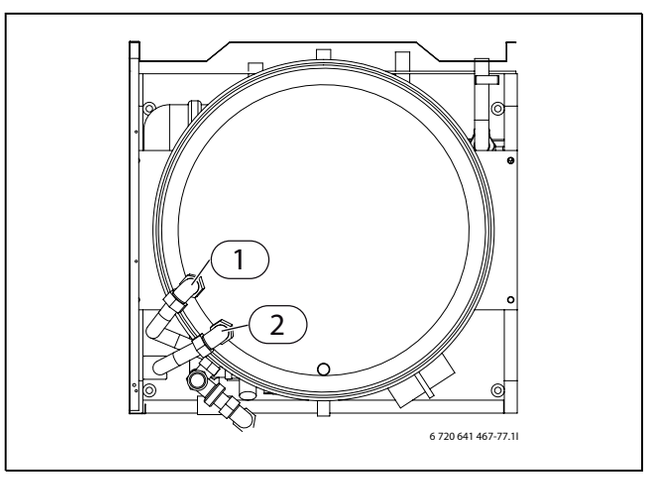

Fig. 17

1 Mains cold water in
2 Domestic hot water out

1. Turn off the main water supply to the cylinder.
2. Open a hot water tap with a position as low as possible in the building, in order to reduce the pressure.
3. Remove the pipe connection 1 - Mains cold water in and connect one end of the hose pipe to the connection. Terminate the other end of the hose to a drain or to outside. Ensure that the drain end of the hose is at a lower level than the bottom of the cylinder. The greater the fall on the hose, the higher the flow rate.
4. Disconnect connection 2 - Domestic hot water out.
5. Start the siphon effect by pumping or sucking at the drain end of the hose.
6. Let the whole volume drain out.

7.6 HOW TO FLUSH THE SYSTEM & TANK

To flush the tank use the above proposed setup, add a hose onto the hot water outlet position number 2 (in the above diagram) and then flush the hot water tank.

7.7 FLUSHING THE HEATING SYSTEM

The heat pump is a part in a heating system. Faults in the heat pump can be caused by poor water quality in the radiators/under floor heating or air penetrating the system continuously.

Oxygen causes the formation of corrosion products in the form of magnetite and deposits.

Magnetite has a grinding effect on the heating system's pumps, valves and components with turbulent flows such as the condenser.

Heating systems which require regular filling or where the heating water is not clear when drained, require remedial measures before the installation of a heat pump, for example the heating system must be fitted with filters and air vents.

Do not use any water treatment additives except agents for raising the pH level. Recommended pH value is 7.5 – 9.

The water inside the heating system must be neither aggressive nor indicate a high chloride content. Very high and very low pH values are not allowed.

To protect the heat pump against contamination:

- Thoroughly flush the pipework prior to connecting the heat pump.

7.8 CONNECTING THE HEAT PUMP TO THE HEATING SYSTEM

- The heating system pipes must be laid so that they withstand temperature differences in the heating water, without the risk of noise or clicking in the heating system.

To prevent vibrations between the heat pump and the remaining system:

- Install the flexible hoses at the inlet and outlet for the heat pump supplied as standard.

For the connection between the internal unit and the heat pump, up to 20 m length with a 28 mm diameter such as Microflex or Ecoflex.

- Outdoor pipes must be insulated with a material that cannot absorb moisture, such as Armaflex class 0.

PUMP CURVES

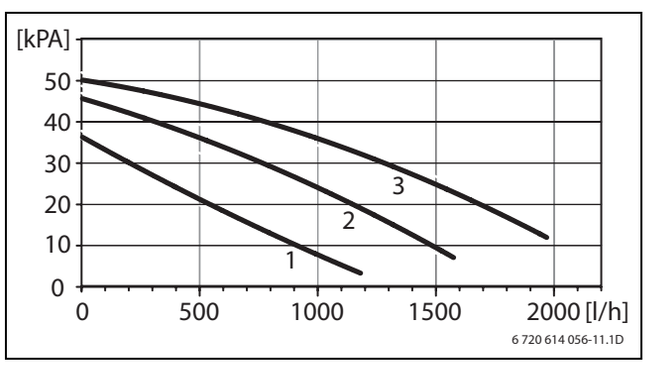

Fig. 18 Heating circuit pump

7.9 CONNECTION PRINCIPLE OF THE INTERNAL UNIT

The principle method of operation is based on the vapour compression cycle with any additional heat being provided by the built in electric heater. The control unit regulates the heat pump in accordance with the set heating curve with the actual temperatures captured by outside temperature sensor T2 and flow temperature sensor T1.

When the heat pump can no longer meet the entire heating demand on its own, the electric additional heat in the internal unit starts and generates the temperature required inside the building together with the heat pump.

DHW heating has priority. DHW is regulated by means of the actual temperature captured by cylinder temperature sensor T3. Heating is switched off via the 3-way valve when the DHW cylinder is being heated up. The heating system will be supplied with heating water again once the DHW cylinder has reached its set temperature.

Operation in extreme cold conditions:

At an outside temperatures below approx. – 20 °C, the heat pump stops automatically and can no longer heat DHW. Under those conditions, the additional electric heater in the internal unit automatically takes over the DHW heating.

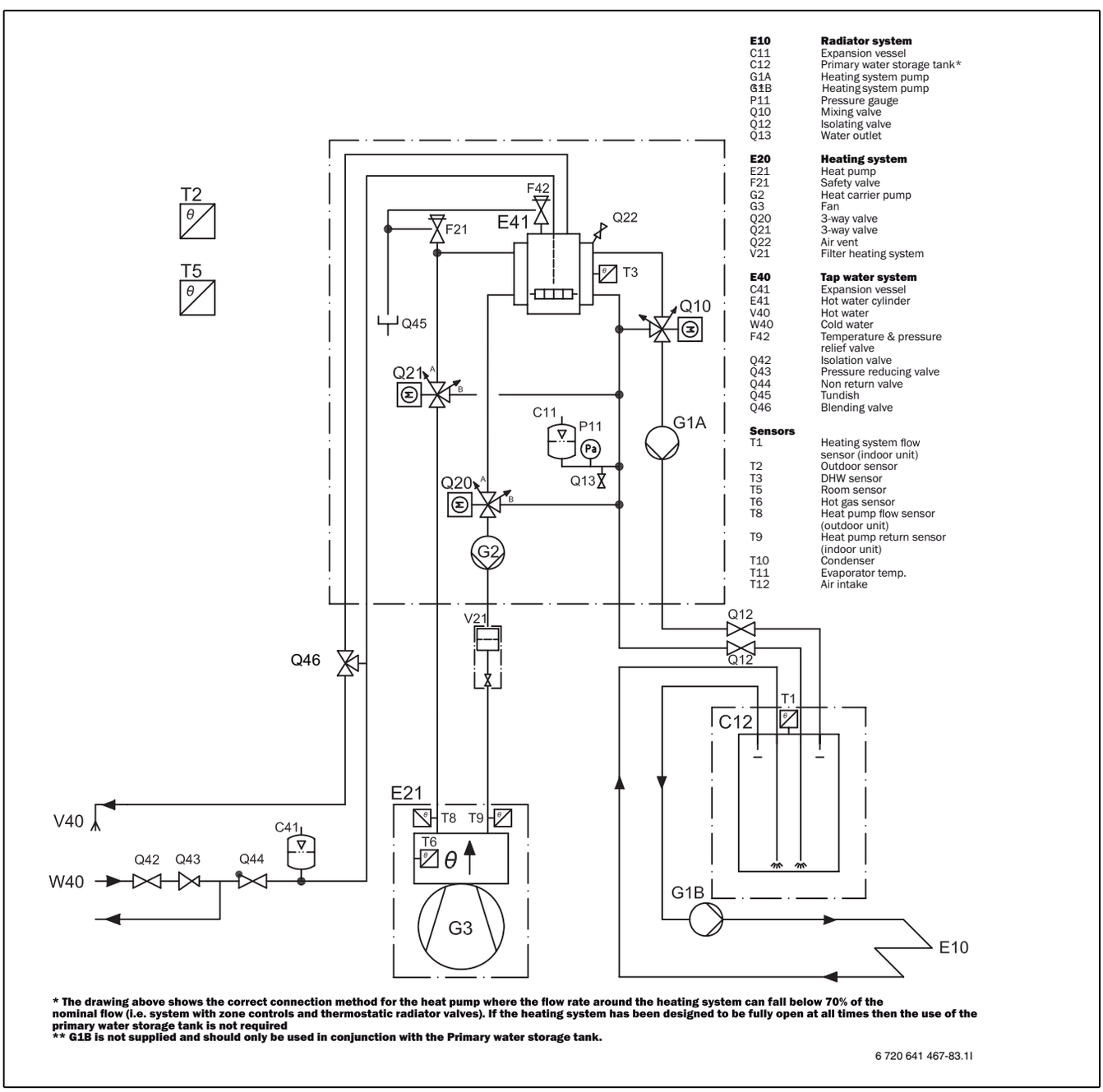

Fig. 19 Internal unit

7.10 FILLING THE HEATING SYSTEM

After flushing the heating system the hot water heater must be filled with water. The heating system is then filled.

WARNING: The water heater can crack if filling is performed in the wrong order.

- ▶ Fill and pressurise the hot water heater **before** the heating system is filled.

Fill the heating system:

1. Open the shut-off valve with non-return valve to fill the DHW cylinder.
2. Open the valve to fill the system with heating water.
3. Open the air vent valve at the top of the DHW cylinder to vent the heating system.
4. Also vent via the heat pump air vent valve.
5. Fill the heating system up to the correct pressure. The standard pressure is 1-2 bar.
6. Shut the heating water filling cock when the correct pressure is reached.

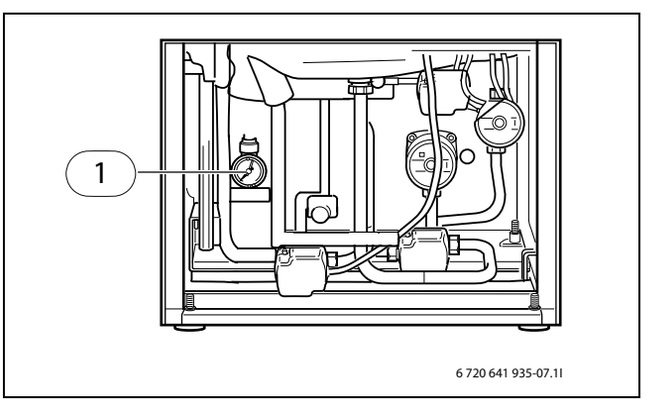

Fig. 20 Connection chamber, internal unit

1 Pressure gauge (0.5-1.5 bar)

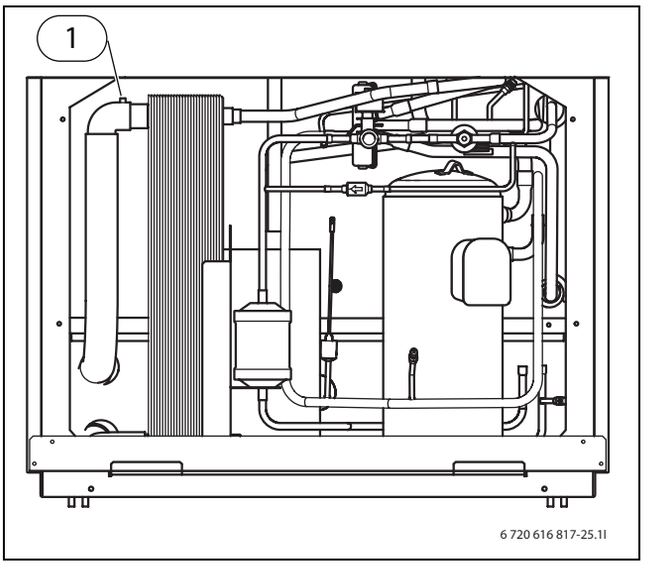

Fig. 21 Heat pump

1 Air vent valve

8 POWER SUPPLY

DANGER: From electric shock!

- Prior to connecting the power supply, isolate the heating system from the mains power.

WARNING: The system will be damaged if the power is switched on without it being filled with water.

- Fill the DHW cylinder, pressurise it and fill the heating system. **Then** switch on the power supply.

CAUTION: The PCB can be damaged through electrostatic discharge. This can cause faults in the electronic components.

- Handle PCBs with the greatest care.

Check that the cable and board are OK. To prevent inductive influences, route LV cables separately from cables carrying 230 V or 400 V (minimum 100 mm apart).

Residual current device (RCD): If the heating system should be connected via an RCD, provide a separate RCD for this purpose (300 mA fire safety response current). Observe all applicable regulations.

CONNECTING THE TEMPERATURE SENSOR, INTERNAL UNIT

- Install outside temperature sensor T2.
- Connect the power supply (→ chapter 8.4.2).
- Fit the safety switch.
- Connect the primary heating circuit pump G2.
- Install accessories.

8.1 ACCESSORY

Install **Room temperature sensor T5:** in the lead room of the building. Connection in accordance with (→ chapter 8.4.3).

Fit and connect a heater cable to the drain pipe (→ chapter 8.3.1) to prevent ice forming on the heat pump drain pipe.

8.2 EMERGENCY OPERATION

The system is able to operate in emergency mode. The heat generation is taken over by the electric additional heat if the control unit experiences a fault. See the operating instructions for further information regarding emergency mode.

On the IOB board, there is a thermostat for regulating the flow temperature in emergency mode. At the factory, the thermostat is set to 35 °C. This standard setting applies to systems with underfloor heating. If a house is exclusively heated by radiators, this setting may be raised to 55 °C.

A switch, S2, is mounted on the control panel; this switch activates emergency mode.

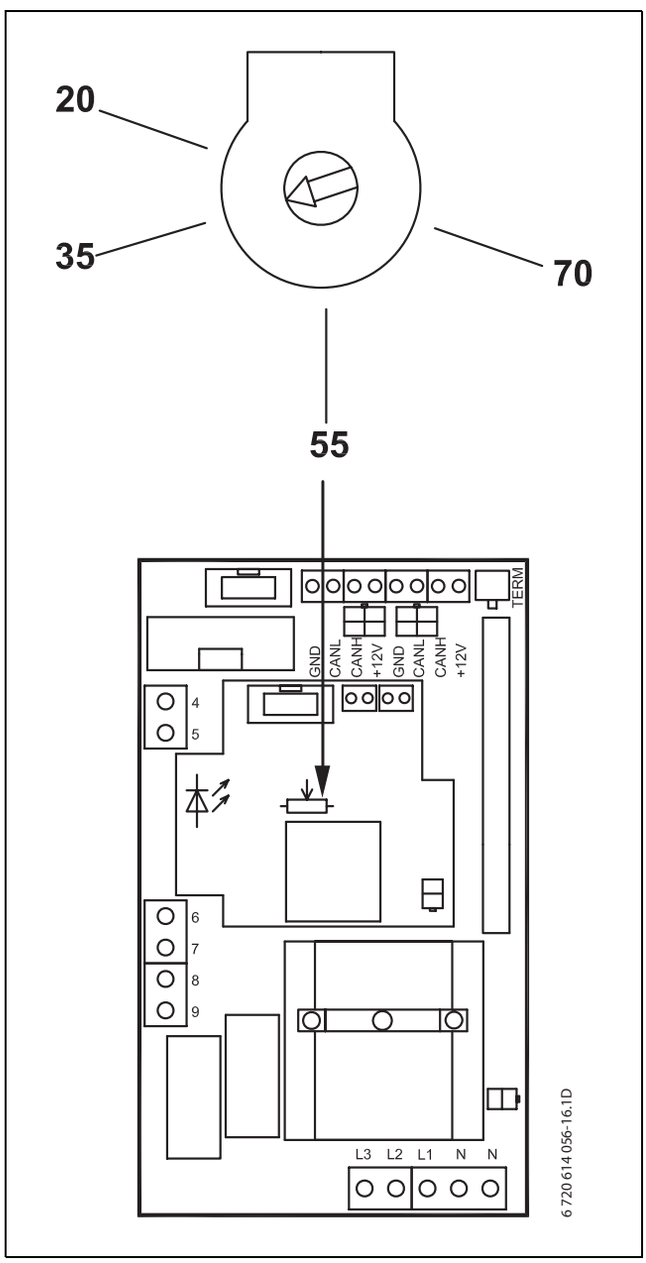

Fig. 22 IOB board

8.3 HEAT PUMP

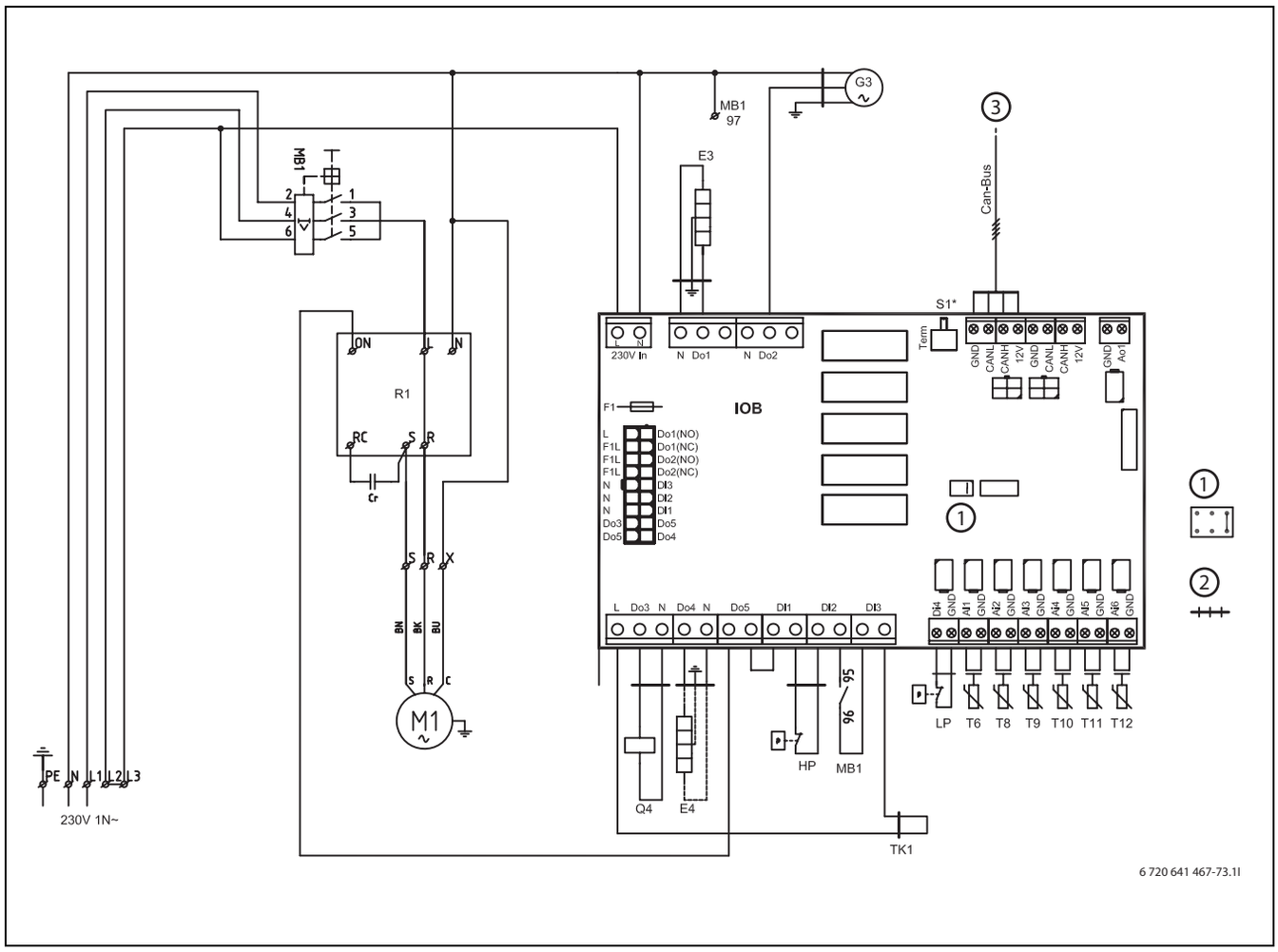

Fig. 23 Greensource 6-9.5 wiring diagram

B1 Phase sequence relay
E3 Casing heater
E4 Optional heater cable
F1 Fuse
G3 Fan
K1 Compressor contactor
M1 Compressor
MB1 Compressor overload relay
Q4 4-way valve
R1 Soft starter
HP High pressure switch
LP Low pressure switch
S1 Termination switch
T6 Hot gas temperature sensor
T8 Heating water temperature sensor, out
T9 Heating water temperature sensor, in
T10 Condenser temperature sensor
T11 Refrigerant temperature sensor, evaporator
T12 Air temperature sensor, evaporator
1 Compressor type function jumper
2 Contact
3 Internal unit HWDU-151

8.3.1 EXTERNAL HEAT PUMP CONNECTIONS

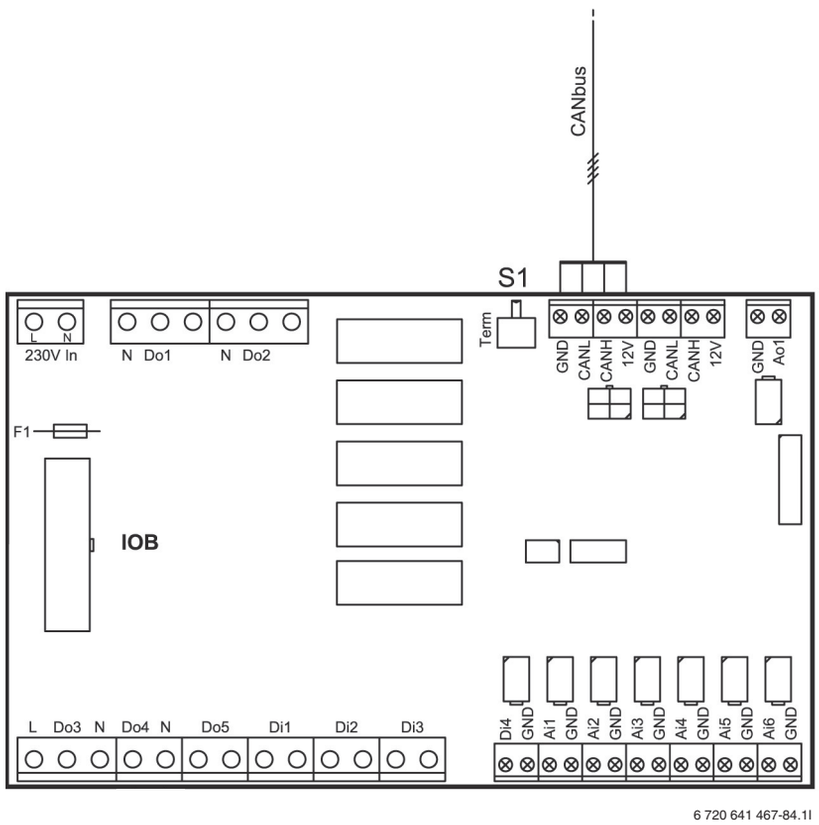

Fig. 24 External connections

POWER SUPPLY

Connect the power cable to terminals L1, N and PE (→ chapter 8.4). Ensure connection to the same phase sequence as the internal unit.

CAN-BUS

Connect the screened communication cable between the internal unit and the heat pump to terminals GND, CANL, CANH and 12V (→ chapter 5.8).

CAUTION: Do not mix up the 12V and CAN-BUS connections!

The processors are destroyed if 12V is connected to the CAN-BUS.

- Check that the four cables are connected to the contacts with the corresponding marking on the circuit board.

8.4 INTERNAL UNIT HWDU-151

8.4.1 WIRING DIAGRAM

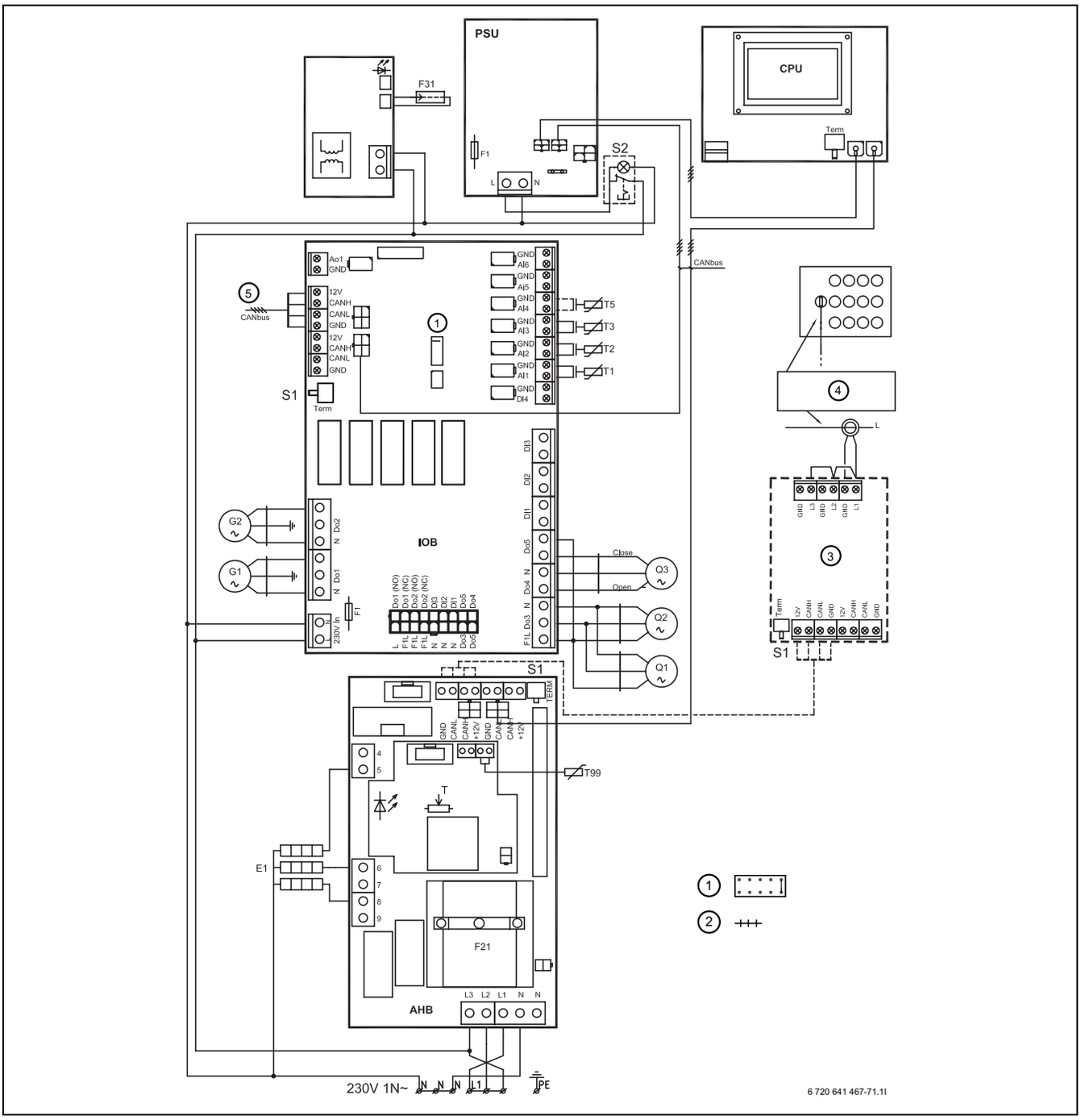

Fig. 25 Wiring diagram

Do4 Open
Do5 Close
E1 Electric additional heater 4.5 kW
F1 Fuse
F21 Overheat protection
F31 Impressed current anode inside the DHW cylinder
G1 Heating circuit pump, secondary
G2 Heating circuit pump, primary
Q1 3-way valve
Q2 3-way valve
Q3 Mixer
S1 Termination switch
S2 Emergency switch
T Thermostat for emergency operation
T1 Flow temperature sensor, heating
T2 Outside temperature sensor
T3 Cylinder temperature sensor
T5 Room temperature sensor (accessory)
T99 Temperature sensor for emergency operation
1 Function jumper
2 Contact
3 Power guard (accessory)
4 Connect the power transformers to the incoming power supply
5 Heating water outlet (towards the heat pump)

8.4.2 CONNECTION AT THE HEAT PUMP

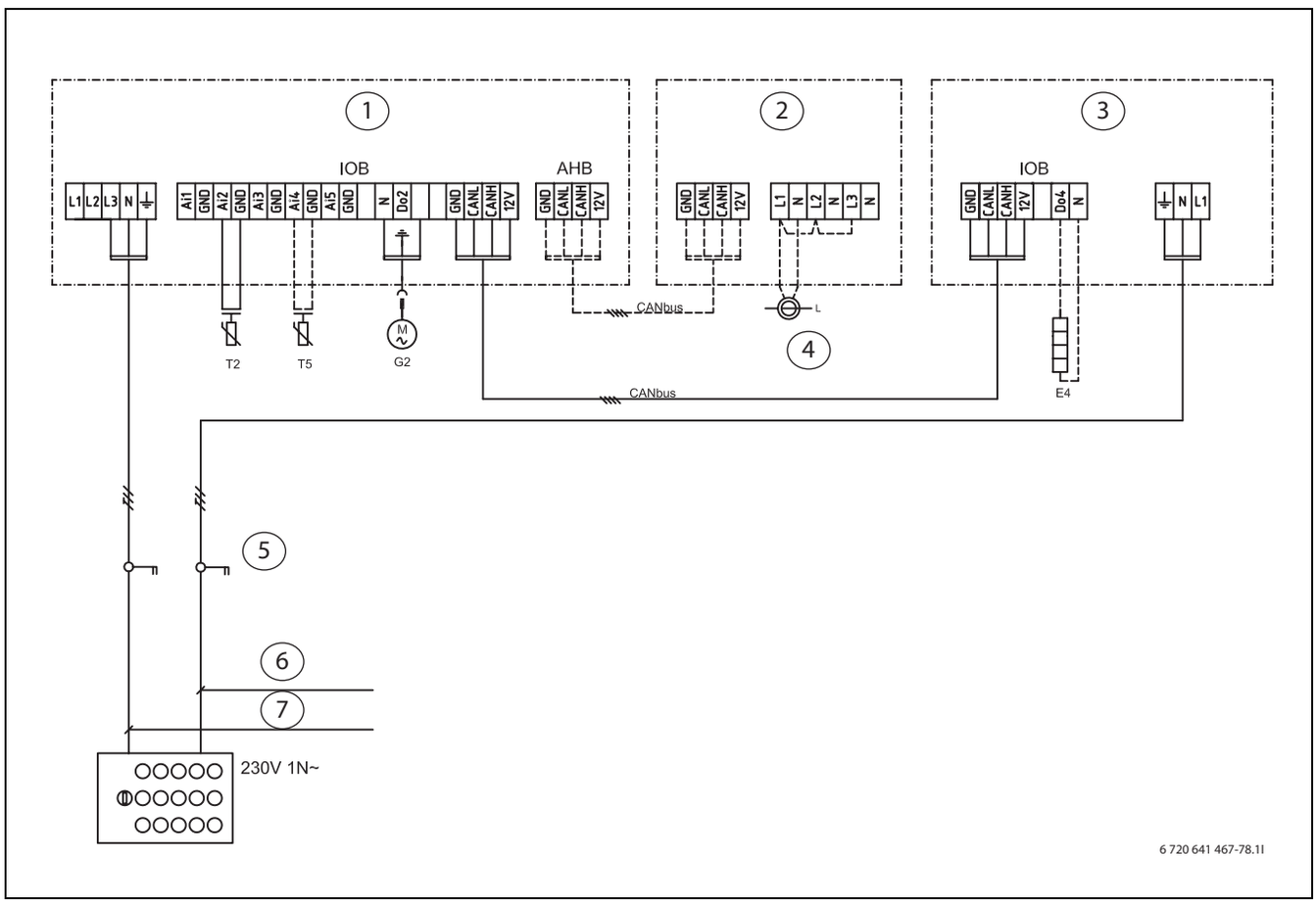

Fig. 26 Connection diagram, heat pump - HWDU-151

E4 Heater cable (accessory)
G2 Primary heating circuit pump, not connected in the delivered condition
T2 Outside temperature sensor
T5 Room temperature sensor (accessory)
1 Internal unit
2 Power guard (accessory)
3 Heat pump
4 Transformer for the voltage supplied by the large control panel
5 Safety switch
6 Fuse:
Greensource 6: 16A
Greensource 7: 25A
Greensource 9.5: 25A
7 Fuse: HWDU-151: 25A

8.4.3 EXTERNAL CONNECTIONS – HWDU-151

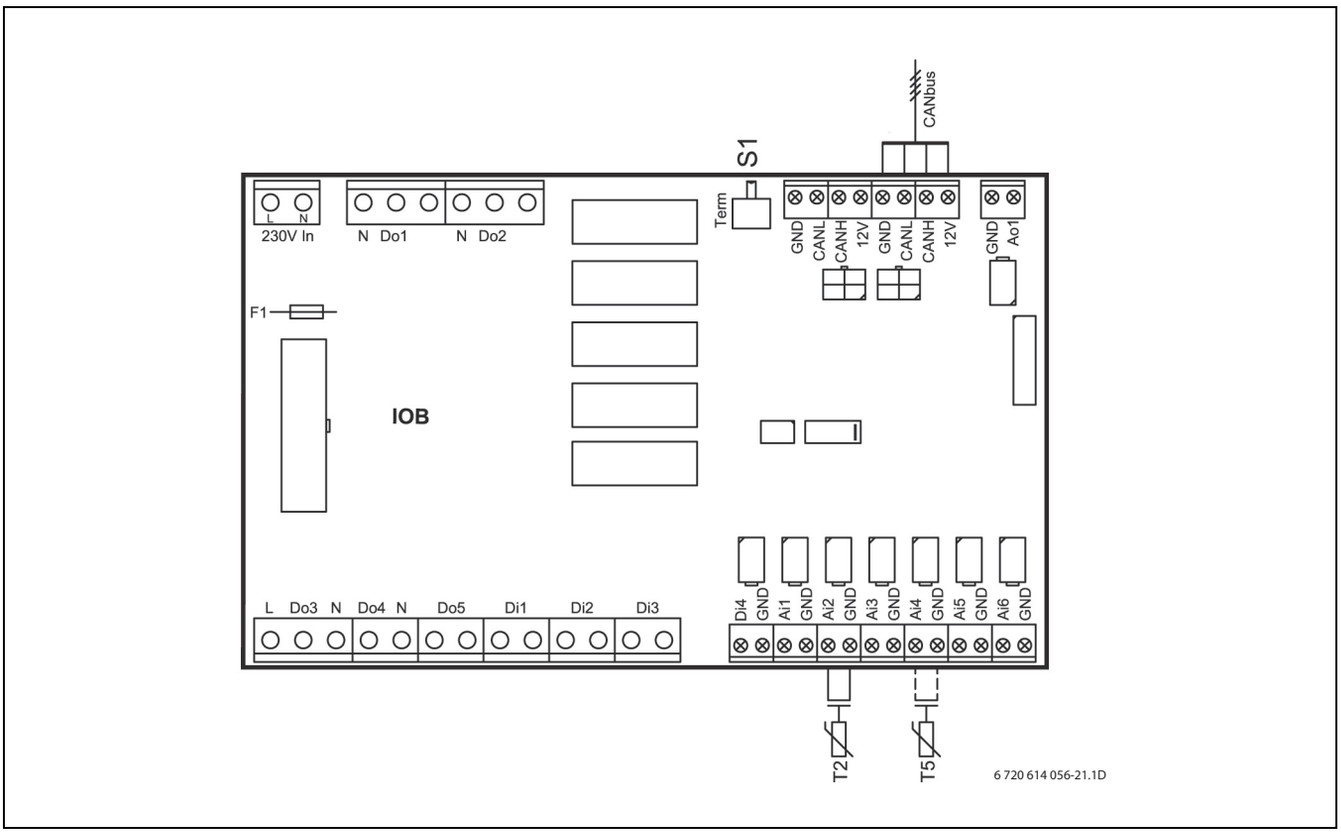

Fig. 27 External connections – HWDU-151

POWER SUPPLY

Connect the power cable to terminals L1, N and PE (→ chapter 8.4). Ensure connection to the same phase sequence as the heat pump.

OUTSIDE TEMPERATURE SENSOR (T2)

Connect the outside temperature sensor to terminals Ai2 and GND.

ROOM TEMPERATURE SENSOR (T5)

If you want to influence the temperature via a room temperature sensor (accessory), connect the sensor to terminals Ai4 and GND.

CAN-BUS

Connect the screened communication cable between the internal unit and the heat pump to terminals GND, CANL, CANH and 12V (→ chapter 5.8).

CAUTION: Do not mix up the 12V and CAN-BUS connections!

The processors are destroyed if 12V is connected to the CAN-BUS.

- Check that the four cables are connected to the contacts with the corresponding marking on the circuit board.

9 CONTROL PANEL

All settings are made and possible alarms are displayed via the control panel. The control panel enables the control unit to be controlled in accordance with user requirements.

If the heat pump is supplied together with an internal unit, control panel and control unit are integrated into the internal unit.

9.1 CONTROL PANEL DISPLAY

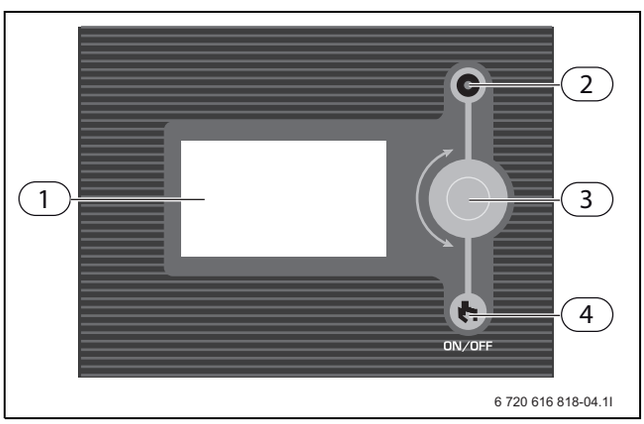

Fig. 28 Control panel HWDU-151

1 Display
2 ON and fault indicator
3 Menu dial
4 Main ON/OFF switch

STATUS LAMP

- ***Lamp lights green:*** Switch in ON position.
- ***Lamp flashes green:*** Switch in OFF position.
- ***Lamp not lit:*** No voltage to control unit.
- ***Lamp flashes red:*** an alarm has been triggered and the alarm has not been acknowledged (→ Chapter 14).
- ***Lamp lights red:*** a fault has occurred. Contact the installer.

The ON and fault indicator of the control panel are located on the outside of the control panel.

MENU DIAL

The menu dial is used to navigate between the menu windows and to change the values of different settings. The menu dial is also used to confirm selections.

SWITCH

The power switch button is used to start and switch off the heating installation.

MENU DISPLAY

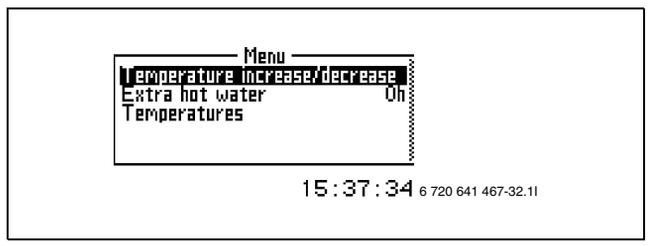

Fig. 29

9.2 CONTROL PANEL FUNCTION

The menu dial is used to navigate the menus.

- Turn the menu dial anti-clockwise to scroll down through the menus.
- Turn the menu dial clockwise to scroll up through the menus.
- Press the menu dial to confirm the selection, when the desired row is marked.

At the top and bottom of each sub menu there are back arrows to take you back to the previous menu.

- Press the menu dial when the back arrow is marked.

9.2.1 SYMBOL OVERVIEW

Symbols for different functions and components that are in operation are displayed in the lower part of the menu window.

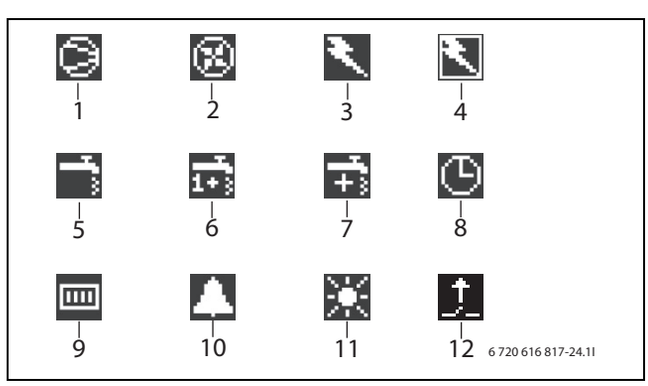

Fig. 30

1 Compressor
2 Fan
3 Electric additional heater
4 Power guard
5 DHW mode
6 DHW peak (pasteurisation)
7 Additional hot water
8 Time control
9 Heating mode
10 Alarm
11 Holiday mode
12 External input enabled

9.3 MENU LEVELS

- **Menu** Customer level, the most common functions.
- **Advanced menu** Customer level, other functions.
- **Installer/Service** Basic settings for installers or service representatives.

The system user only sees the menu points shown on both user levels. See the operating instructions for a description of these two user levels.

10 INSTALLATION AND SERVICE MENU (I/S)

CAUTION: Changes in the installation and service menu (I/S) can have severe consequences for the system.

- Only qualified contractors should make adjustments in the installation and service menu (I/S).

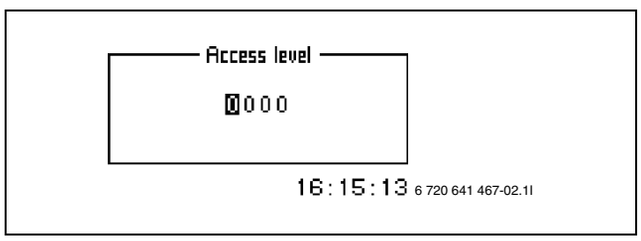

Fig. 31

A 4-digit access code is required to open the installation and service menu (I/S).

1. Hold down the menu dial for 5 seconds to open **Advanced menu**.
2. Select **Access level**.
3. Enter the 4-digit access code with the menu dial and press to confirm your entry. The access code is the current date and comprises two digits for the month and two for the day (e.g. 0920 for the 20th September). The display shows Access = service.
4. Press menu dial to open **Menu**. The most commonly used menu points are accessible at the user level; the menu points of the installation and service menu (I/S) are only accessible at **Menu**. Hold down the menu dial for 5 seconds to open **Advanced menu**.
5. In **Advanced menu** select point **Access level**. Enter access code 0000 to return to the user level.

120 minutes after the last entry, the control unit returns automatically to the user level.

11 MENU OVERVIEW

The **Menu** and **Advanced menu** tables show the respectively upper level of available menu points. The preset values are listed in tables **Factory settings** (→ chapter 15.1).

Menu		
Fast restart of heat pump? (only 400V)		I/S
Start up	Setting the clock	I/S
	Connected extra sensors	I/S
	Air/Water pump in operation	I/S
	Connection capacity	I/S
	Manual operation?	I/S
	Additional heat options	I/S
	Language	I/S
	Correct sensor	I/S
	Fan defrost interval	I/S
	Fan defrost time	I/S
	Forced defrost	I/S
	Block crankcase heater at high outdoor temperature	I/S
	Anti-jamming mode time	I/S
	Activation time alarm buzzer	I/S
	T1 Set point value maximum	I/S
	Display	I/S
	Electrical connection	I/S
	Heat pump size	I/S
Room temperature setting(T5)		K
Temperature increase/decrease (not T5)		K
Temperature increase/decrease settings (not T5)	Limit value for V or H	I/S
	Much colder/warmer, change	I/S
	Colder/warmer, change	I/S
Extra hot water		K
Temperatures		K

Tab. 4

Advanced menu		
Temperature	Lowest outdoor temperature	I/S
	Heating system temperature	K
	Room sensor settings (T5)	K
	Time limited settings	K
	External control heating	K
	Heating season	K
	Heating, maximum operating time at hot water demand	K
	Shut down protection, change over hot water to heating	I/S
	Compressor working area settings	I/S
Hot water	Extra hot water	K
	Hot water peak	K, I/S
	Hot water temperature	K, I/S
	Time control hot water	K
	External control hot water	K
	Hot water additional heat	I/S
Temperatures	Display of Temperatures, Inputs, Outputs	I/S
	Correct temperature sensor	I/S
Defrost settings	T12-T11 settings	I/S
	Maximum outdoor temperature	I/S
	T11 Maximum temperature	I/S
	Maximum time	I/S
	Delay after compressor start	I/S
	Minimum time between defrosts	I/S
	Compressor pressure equalisation time	I/S
	4-way valve pressure equalisation time	I/S
	Forced defrost	I/S
	Heating cable time after defrost	I/S
	Fan defrost	I/S
Timers	Timer display	K, I/S
Additional heat settings	Start delay	I/S
	Time control additional heat	I/S
	Additional heat options	I/S
	Electric additional heat settings	I/S
	Connected electrical capacity	I/S
	Mixing valve settings	I/S

Tab. 5

Advanced menu		
Setting the clock	Set date	K, I/S
	Set time	K, I/S
Display	Contrast	K, I/S
	Brightness	K, I/S
Alarm	Alarm log	K, I/S
	Alarm history	I/S
	Warning log	I/S
Access level		K, I/S
Return to factory settings		K, I/S
Deactivate alarm buzzer		K
Program version		K, I/S
Connected I/O cards		I/S

Tab. 5

12 COMMISSIONING

At the time of commissioning, complete all relevant sections of the Benchmark Checklist located on the inside back pages of this document.

Before commissioning:

- Open all radiators or underfloor heating systems.
- Fill the heating system.
- Vent the heating system.
- Check the heating system for leaks.

When connecting a fan coil system the fans are to be started first and any shut-off valves for the fan coils fully opened.

12.1 SWITCHING ON THE HEAT PUMP

1. Switch the power supply to the heat pump on. Start the heat pump by briefly pressing the ON/OFF switch on the control panel. The available languages are displayed.

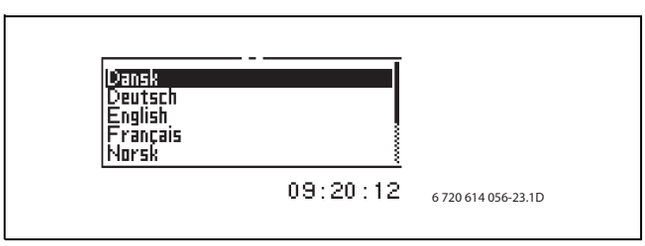

Fig. 32

2. Select the required display language. The selected language is automatically adopted as standard setting and will not be changed at **Return to factory settings**. You can later select a different **Language** under **Start up** in the menu.

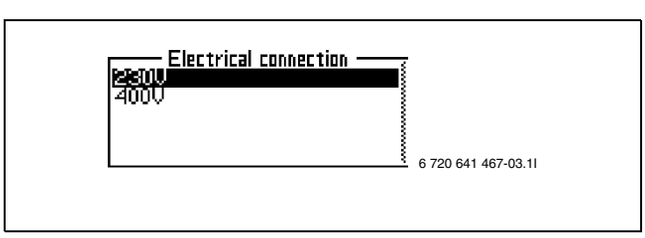

Fig. 33

3. Select the voltage.

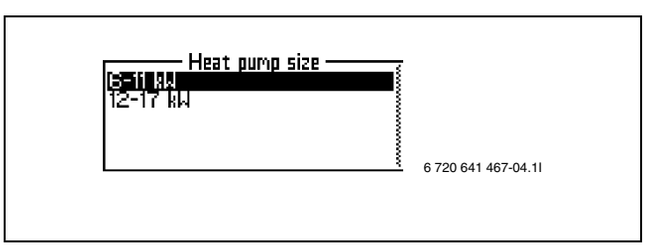

Fig. 34

4. Select the heat pump output.

Greensource 6-9,5 kW = 6-11kW

12.2 START-UP

All functions to carry out the basic settings in the heating unit are gathered in this menu. Carry out these in turn and order.

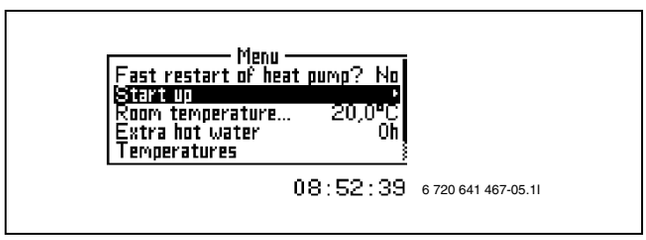

Fig. 35

- Select function **Start-up**.

12.2.1 CONNECTED EXTRA SENSORS

If room temperature sensor T3 or T5 is installed, **Yes** must be displayed underneath menu point **T3 acknowledged** or **T5 acknowledged**.

12.2.2 AIR/WATER PUMP IN OPERATION

Internal units can also be commissioned without connected heat pump.

If no heat pump is connected:

- Select **No**.

12.2.3 CONNECTION CAPACITY

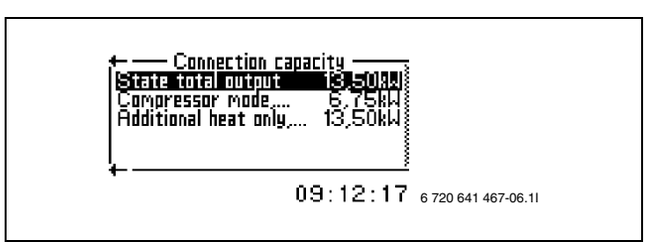

Fig. 36

State total output: Setting of total connected output on the electrical additional heat. The factory setting is 13.5 kW. **Change this to 4.5 kW**.

Compressor mode, output limitation: Setting permitted output when the compressor is in operation. The factory setting is 50% of the setting in **State total output**. **Change this to 4.5 kW.**

Additional heat only, output limitation: Setting permitted output when the compressor is not in operation. The factory setting is the value in **State total output**.

12.2.4 MANUAL OPERATION?

Before commissioning the heating installation, all functions can be checked, by manually starting and stopping them.

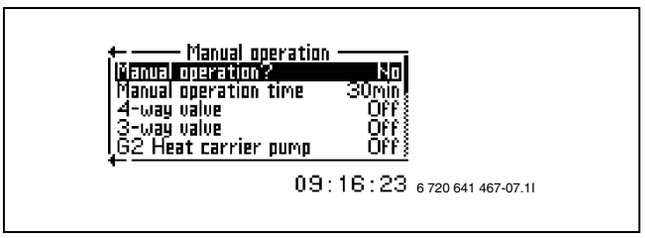

Fig. 37

▸ Select **Yes** to activate.

The function must be deactivated afterwards by selecting **No** on **Manual operation?**.

12.2.5 ADDITIONAL HEAT OPTIONS

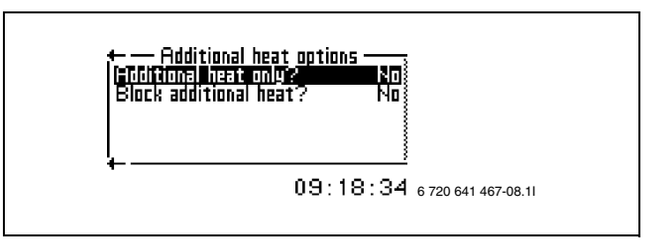

Fig. 38

To block the start of compressor and fan:

▸ Select **Additional heat only?**.

The function **Block additional heat?** blocks the additional heat function, but not during alarm mode, hot water peak, extra hot water or operation with additional heat only.

Block additional heat? normally this is not recommended.

12.2.6 LANGUAGE

To change the language to one other than that selected when the heat pump was first started:

▸ Select **Language**.

The selected language automatically becomes the factory setting and is therefore not changed when **Return to factory settings**.

12.2.7 CORRECT SENSOR

All sensors can be corrected a maximum of 5 °C up or down. The value is given directly in °C. Sensors should only be corrected in exceptional cases.

12.2.8 FAN DEFROST INTERVAL AND FAN DEFROST TIME

Hot air is blown through the fan to defrost it. If the fan is at risk of freezing up, change the factory setting.

The fan defrost function is active if the value under menu point **Fan defrost interval** lies between 1 and 10 (standard setting = 1).

With value 1 the fan will be defrosted each time defrost is activated. With value 3 the fan will be defrosted every third time defrost is activated.

Select 0 under **Fan defrost interval** if you want to disable this function.

▸ Select the duration of fan defrost under menu point "Fan defrost time". Minimum = 1 minute and maximum = 5 minutes. Factory setting = 1 minute.

The temperature limit for fan defrost is set to -5 °C. Below this temperature, the fan is not defrosted. You can change this value in **Advanced menu** under **Fan defrost**.

The compressor stops for up to 60 s when defrosting is activated or deactivated.

12.2.9 FORCED DEFROST

The **Forced defrost** function is used to ignore all defrost timer and temperature settings. However, the temperature T11 (evaporator refrigerant temperature) must be below the selected defrost stop temperature.

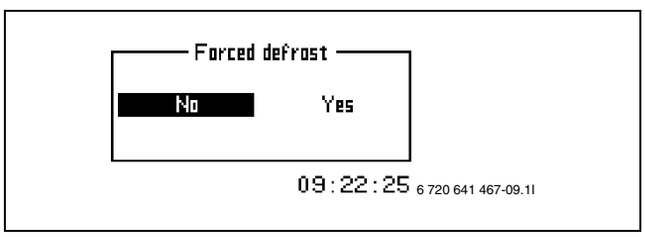

Fig. 39

Activate **Forced defrost**:

▸ In the display, select **Yes**.

▸ Select **Save**.

12.2.10 BLOCK CRANKCASE HEATER AT HIGH OUTDOOR TEMPERATURE

The crankcase temperature is monitored by temperature sensor T12. The crankcase heating inside the compressor stops if the outside temperature exceeds the selected value. The crankcase heater is active when the compressor is idle and the outside temperature falls below the selected value.

Set the temperature value:

- Set the required value by turning the menu dial.
- Select **Save**.

Factory setting = 10 °C. Minimum = 5 °C and maximum = 20 °C.

12.2.11 ANTI-JAMMING MODE TIME

Pumps G1 and G2, the 3-way valve VXV and the fan start at the set time for one minute following one day idle. Factory setting = 2, which represents 02:00 h. Minimum = 0, maximum = 23

12.2.12 ACTIVATION TIME ALARM BUZZER

Set the delay between an alarm occurring and the alarm signal becoming audible. 1 min is set at the factory. Maximum value = 10 min.

12.2.13 T1 SET POINT VALUE MAXIMUM

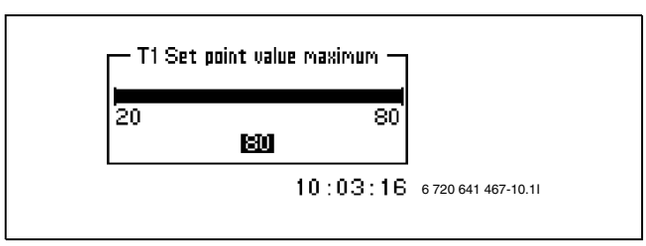

Fig. 40

This value is set to a maximum = 80 °C in the delivered condition. Set the value correspondingly lower if only an underfloor heating system is installed.

12.2.14 DISPLAY

In this menu, you can select the **Contrast** and the **brightness** of the display. In the delivered condition, **Contrast** is set to 5 and **brightness** to 10.

12.2.15 ELECTRICAL CONNECTION

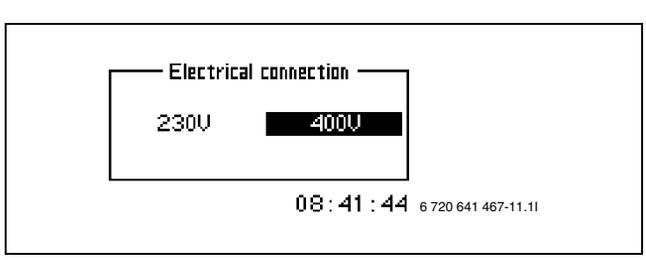

Fig. 41

- Select the heat pump voltage, **230V** or **400V**.

12.2.16 HEAT PUMP SIZE

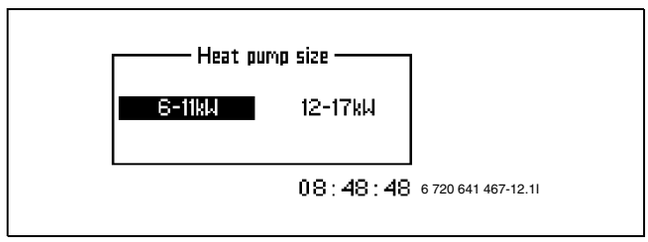

Fig. 42

Set the heat pump output. For a heat pump output between 6 and 11 kW:

- Select **6-11kW**

For an output between 12 and 17 kW:

- Select **12-17kW**

Greensource 6-9,5 kW = 6-11kW

12.2.17 ALARM DURING START-UP

An alarm may be triggered during start-up if a temperature is captured in the condenser that is too low. The reason for this is that water has been filled in that is too cold (lower than +5 °C).

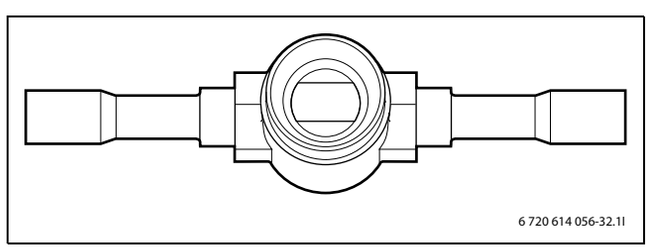

Fig. 43 Sight glass

Check the sight glass in the heat pump. Bubbles may be visible in the sight glass for a few minutes after start-up. No bubbles should form after a few minutes. If bubbles continue to form, this is a fault indicating a lack of refrigerant. Under certain operating conditions, bubbles can form even if there is no refrigerant shortage.

12.3 OTHER SETTINGS

Scroll through the menu points for heating and DHW settings in sequence under **Menu** and **Advanced menu**. If required, adjust the settings of these menu points as required for the local system.

Menu **Lowest outdoor temperature** enables the lowest outside temperature to be set to between -35 and 0 °C; the factory setting is -20 °C. The selected temperature influences the r.h. value of the heating curve. The heating curve may need to be adjusted if **Lowest outdoor temperature** was changed.

Adjust the heating curve. For example, the heating settings for underfloor heating systems could be below the factory default settings. Set a suitable H and V value.

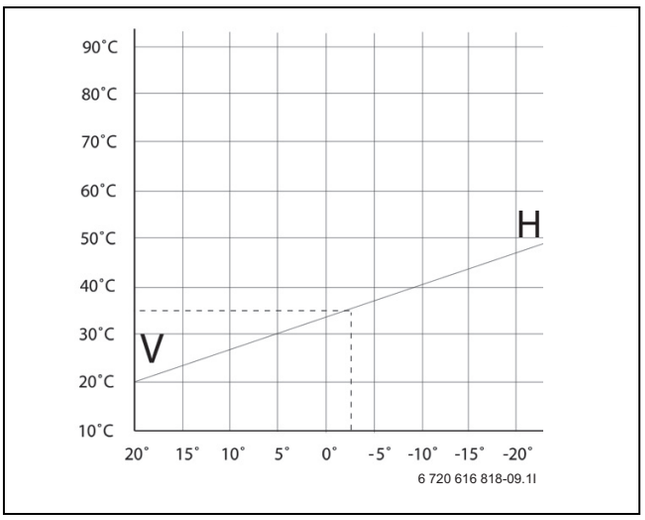

Fig. 44

The heat pump stops at outdoor temperatures lower than approx -20 °C. The heating installation then goes over to additional heat mode only.

Temperature sensor T3 limits the maximum flow temperature if the electric additional heater provides the total heat input. Therefore change the H value of the heating curve if it is set higher than 62 °C.

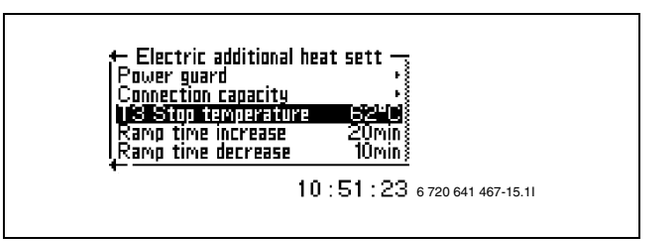

Fig. 45

Permitting a higher flow temperature:

- In the installation and service menu (I/S) select **Advanced menu**.
- Select **Additional heat settings**.
- Select **Electric additional heat settings**.
- Select **T3 Stop temperature**.
- Set the required value. Factory setting = 62 °C and maximum = 70 °C.

Install a mixer if a setting higher than 65 °C is selected.

The table of **Factory settings** (→ Chapter 15.1) shows all functions, which can be adjusted by customer and installer. Go through the table and check if any further values need changing.

12.4 POST COMMISION CHECKING

To safeguard the optimum system function, check the temperature on the hot side of the heat pump. The recommended value lies between 5 and 10 °C.

Checking the temperature differential:

- Check the displayed values for temperature sensor T8 (Off) and temperature sensor T9 (On).

The temperature differential should be between 5 and 7 °C if you commission the system at an outside temperature below 0 °C.

The temperature differential should be between 8 and 10 °C if you commission the system at an outside temperature in excess of 15 °C.

The flow rate in the heating system must be adequate to fully heat all radiators. This maximises the heat radiating surface and keeps the flow temperature low.

- Vent the heating system after the test run and top up with water if required (→ chapter 7.10).

12.4.1 SOFT STARTER

The soft starter has two indication LEDs on the cover. The green LED indicates the status of the power supply and the red LED indicates an alarm condition.The soft starter is located in the electrical box of the heat pump.

Condition	Green LED	Red LED	Effect
Normal Conditions	ON	OFF	-
Mains voltage <90VAC	Flash	OFF	Soft starter prevents the start
Mains voltage <190VAC; >1 sec (running condition)	ON	ON	Prevented operation as long as Mains voltage <190VAC
Mains voltage restored (>190VAC)	ON	Flash (2.5 Hz)	Prevented operation for 5 min then restart
Overcurrent >80A for 1 sec.	ON	Flash (0,25 Hz)	Prevented operation for 5 min then restart attempt. If still overcurrent after second attempt prevented until manualy reset.

Tab. 6 Soft starter

12.4.2 SYSTEM FLOW

For the installation to perform at its best, it is important to check the flow on the hot side of the heat pump. Usually, the heat carrier pump has a speed selector switch. This must be set correctly for the pressure drop in the system. A recommended temperature difference across the heat pump on the hot side is between 5-10ºC. The nominal flows provided in Technical information shows a difference of 7ºC in operating mode +7/45ºC. Check this by reading the sensors T9 (heat transfer fluid in) and T8 (heat transfer fluid out). When commissioning is carried out at a low outdoor temperature (below 0ºC) the temperature difference should be between 5ºC and 7ºC. When commissioning is carried out at an outdoor temperature above 15ºC the temperature difference must be between 8ºC and 10ºC. The flow through the heating system should be sufficient to keep the whole radiator warm and thereby increase the heat emitting surface. This means that the flow temperature is kept low. After testing, vent the heating system again and top up with cold water if necessary. See Filling the heating system.

13 TIMER FUNCTIONS

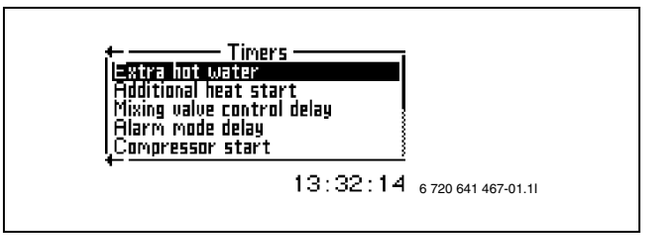

Fig. 46

There are a number of timers in the control unit. The statuses for these are shown in the menu **Timers**.

EXTRA HOT WATER

Displays the remaining time for requested extra hot water.

ADDITIONAL HEAT START

Displays the countdown of the timer for delay of additional heat.

MIXING VALVE CONTROL DELAY

Displays the time that the mixing valve function is delayed after the additional heat timer has counted down.

ALARM MODE DELAY

Displays the remaining time until the additional heat is activated when an alarm is triggered.

COMPRESSOR START

Displays remaining time of compressor start delay.

DELAY BEFORE DEFROST

Indicates the remaining time until defrost is activated.

T12 - T11 REACHED TEMPERATURE DIFFERENCE

Indicates the remaining time for the deviation from the calculated defrost set value. The indicated time starts if the temperature differential between T12 and T11 exceeds the set value for defrost. Defrost will be enabled after the time has expired if the temperature differential is permanently above the set value for defrost.

To enable defrost, the **Delay before defrost** must also have expired.

DEFROST

Indicates the remaining time until defrost is activated for the evaporator.

HEATING CABLE

Indicates the remaining time until the heater cable in the heat pump drain pipe is activated.

HEATING, MAXIMUM OPERATING TIME AT HOT WATER DEMAND

Displays the remaining time before the maximum time in heating mode is reached if there is a simultaneous hot water requirement.

HOT WATER, MAXIMUM OPERATING TIME AT HEATING SYSTEM DEMAND

Displays the remaining time before the maximum time for hot water production is reached if there is a simultaneous heating requirement.

HEATING SEASON CHANGE DELAY

Indicates the remaining time before the heating season is activated in the heat pump.

BLOCK LOW PRESSURE SWITCH

Indicates the remaining time until the low pressure switch is blocked.

BLOCKING ROOM SENSOR INFLUENCE

Indicates the remaining time until the room temperature sensor influence is blocked.

HOT WATER PEAK

Indicates the remaining time until the DHW peak is activated.

14 ALARM FUNCTIONS AND DISPLAYS

After servicing, complete the relevant Service Interval Record section of the Benchmark Checklist located on the inside back pages of this document.

Menu **Alarms** contains the following:

- **Alarm log**
- **Alarm history**
- **Warning log**

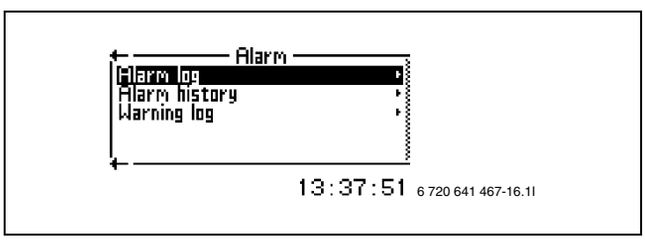

Fig. 47

All alarm and warning messages are described in the operating instructions.

The user menu enables access to the alarm information in the alarm log.

The installation and service menu (I/S) also enables access to the following menu points:

- **Delete alarm log?**
- Information regarding the **Alarm history**
- Information regarding the **Warning log**
- **Delete warning log?**

14.1 ALARM HISTORY

ALARM INFORMATION

Alarms are stored in chronological order. Turn the menu dial to read off all information about the most recent alarm, continuing to turn will show the previous alarm.

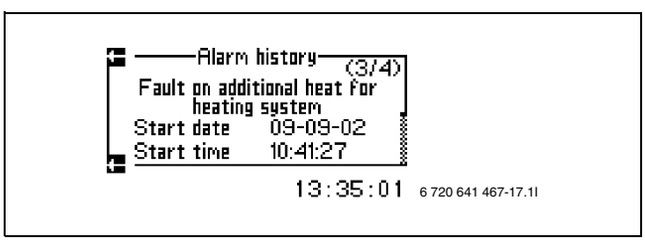

Fig. 48

Alarm information consists of a heading and then detailed information about the time, temperatures of all sensors and status for each output at the alarm point.

14.2 WARNING LOG

The alarm log and the warning log stores alarms and warnings in chronological order.

▸ Delete **Warning log** and **Alarm log** after commissioning has been completed.

14.3 EXAMPLE OF AN ALARM:

When an alarm is triggered, an alarm window is displayed and a warning signal sounds. The alarm window displays the alarm causes and the time and date that the alarm occurred.

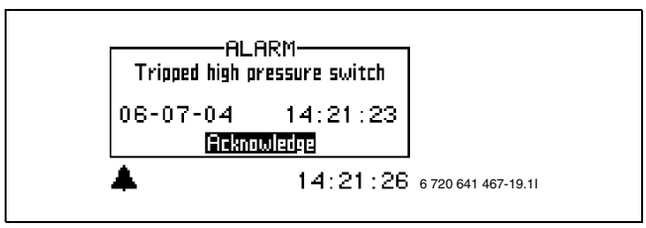

Fig. 49

If the menu dial is pushed when **Acknowledge** is marked, the alarm symbol goes out in the menu window and in the alarm log and the warning signal is muted. The heat pump starts again within 15 minutes if heating is required.

The alarm symbol continues to be displayed if a fault is not remedied. The ON and fault indicators change from flashing red to constant red indications. Every alarm is stored in the fault log. Active alarms are indicated by the alarm symbol.

14.4 DIMMED MENU DISPLAY

14.4.1 POSSIBLE CAUSE 1: BLOWN FUSE IN THE HOUSE'S FUSE BOX/DISTRIBUTION BOX.

▸ Check the fuses in the house's fuse box.

▸ Replace the fuse / reset the circuit breaker if necessary.

The heat pump automatically returns to operating mode within 15 minutes after the fault has been rectified.

14.4.2 POSSIBLE CAUSE 2: AN MCB IN THE INTERNAL UNIT HAS TRIPPED.

▸ Notify your customer service.

14.5 EMERGENCY OPERATION

An emergency switch is located at the top of the electric box of the internal unit. In standard mode this switch illuminates green. Emergency mode is activated automatically when the required temperature is selected simultaneously. The emergency switch continues to

illuminate. Emergency mode can also be selected manually. For this, activate the switch. The lamp inside the switch extinguishes.

In emergencies heat generation is covered by the electric additional heater. This enables heat to be provided until the customer service remedies the fault.

Emergency mode must not be confused with Alarm mode, which means that the heat pump stops due to an active alarm. Heating production is then still controlled by the control unit.

14.6 OVERHEATING PROTECTION

A reset button is located inside the electric box of the internal unit to reset the overheat protection of the electric additional heater. Generally, this overheat protection does not respond.

- Reset the overheat protection by pushing in the button firmly.

14.7 FILTER

The filter prevents particles and dirt from entering the heat pump interior. Over time, the filter can become blocked and must be cleaned.

Fit the filter into the heat pump return.

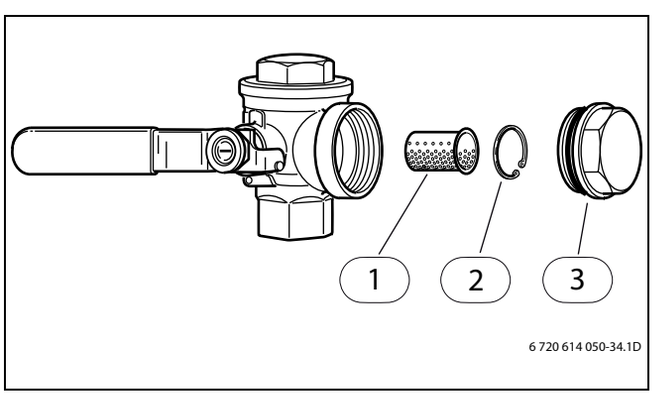

Fig. 50

1 Filter
2 Locking ring
3 Plug

Cleaning the filter:

- Switch off the heat pump with the ON/OFF switch.
- Remove the valve and plug.
- Remove the locking ring that retains the filer inside the valve. For this use the pliers supplied.
- Remove the filter from the valve and flush the filter with water.
- Refit the filter, locking ring and plug.
- Open the valve and start the heat pump via the ON/OFF switch.

14.8 ALL ALARMS AND WARNING WINDOWS

An alarm can occur temporarily due to various reasons. However, there is never a risk involved in resetting an alarm. All the alarms that can appear in the menu display are described in this section. The descriptions give an idea about the nature of the alarm and what can be done to rectify it.

The alarm log (see **Advanced menu**) shows the alarms and warnings that have occurred.

14.8.1 LIST OF ALL ALARMS:

- **Tripped low pressure switch**
- **Tripped high pressure switch**
- **Failure / Short circuit on sensor**.
- **Faulty function in 4-way valve**
- **T6 High hot gas temperature**
- **Fault on electric additional heat**
- **T8 High flow temperature**.
- **Low temperature in condenser**
- **Tripped motor cut-out**
- **Air/Water pump not connected**
- **Fault in I/O card control cabinet/electric boiler**
- **Tripped motor cut-out fan**

14.8.2 LIST OF ALL WARNINGS:

- **Is the heat pump fused for this output?**
- **High temperature difference heat transfer fluid**

14.8.3 LIST OF ALL INFORMATION WINDOWS

- **Heat pump is now working at its highest permitted temperature**
- **Add. heat is now working at its highest permitted temperature**
- **This setting means that additional heat can take over operation**
- **Temporary stop of hot water production**
- **Temporary stop of compressor operation**

14.9 ALARM WINDOW

14.9.1 TRIPPED LOW PRESSURE SWITCH

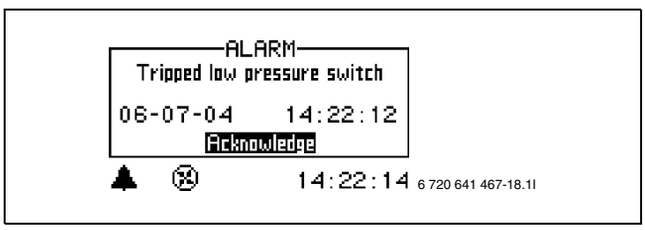

Fig. 51

POSSIBLE CAUSE 1: EVAPORATOR BLOCKED.

- Clean the evaporator.
- Select **Acknowledge**.
- Wait until the heat pump starts again.

POSSIBLE CAUSE 2: FAN BLOCKED.

- Remove debris that blocks the fan.
- Select **Acknowledge**.
- Wait until the heat pump starts again.

POSSIBLE CAUSE 3: REFRIGERANT FAULT IN THE REFRIGERANT CIRCUIT.

- Check the amount of refrigerant.
- Check the refrigerant circuit for tightness.
- Select **Acknowledge**.
- Wait until the heat pump starts again.

POSSIBLE CAUSE 4: FAULTY DEFROST SYSTEM OR FAN MOTOR.

- Check the function of the 4-way valve. Manually switch the 4-way valve in the corresponding menu point at the control panel on and off.
- Check the defrost settings.
- Check the fan motor function.
- Select **Acknowledge**.
- Wait until the heat pump starts again.

POSSIBLE CAUSE 5: EXPANSION VALVE FAULTY.

- Check expansion valve.
- Check for overheating and excessive cooling.
- Select **Acknowledge**.
- Wait until the heat pump starts again.

14.9.2 TRIPPED HIGH PRESSURE SWITCH

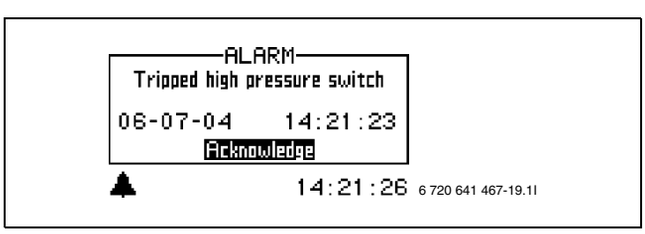

Fig. 52

POSSIBLE CAUSE 1: AIR IN THE HEATING SYSTEM.

- Select **Acknowledge**.
- Check whether air is in the heating system.
- Fill the heating system and vent if required.

POSSIBLE CAUSE 2; BLOCKED PARTICLE FILTER:

- Select **Acknowledge**.
- Check filter.
- Clean filter if required (→chapter 14.7).

POSSIBLE CAUSE 3: INADEQUATE FLOW RATE ACROSS THE HEAT PUMP.

- Select **Acknowledge**.
- Check whether the heat pump has stopped (→ Fig. 53 on page 41).
- Check that all the valves are open. The thermostat valves in heating systems should be fully open and in floor heating systems at least half of the coils should be fully open.
- Select a higher speed for the heat transfer medium pump (G2). Also set a higher speed for the heating circuit pump (G1), as it needs to run with a higher speed than the heat transfer medium pump.

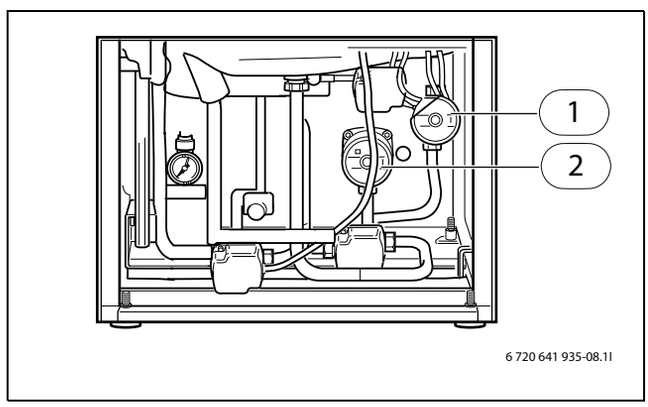

Fig. 53 Connection chamber, internal unit

1 Heating circuit pump, primary
2 Heating circuit pump, secondary

14.9.3 FAILURE / SHORT CIRCUIT ON SENSOR

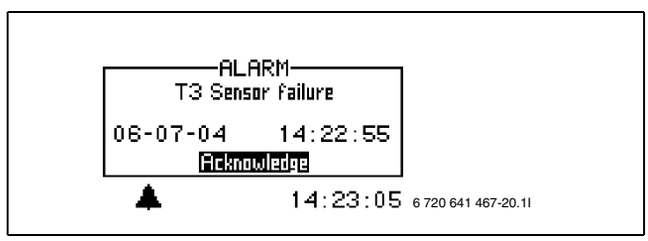

Fig. 54

All sensors connected to the heating installation can give an alarm in the event of a fault. In the example, it is sensor T3, hot water, which has given an alarm. All sensors give alarms in the same way.

PROBABLE CAUSE 1; TEMPORARY FAULT:

- Wait and see.

PROBABLE CAUSE 2; DEFECTIVE SENSOR OR INCORRECT CONNECTION:

- Check the temperature sensor connection.
- Check the temperature sensor resistance (→ chapter 15.4).

14.9.4 FAULTY FUNCTION IN 4-WAY VALVE

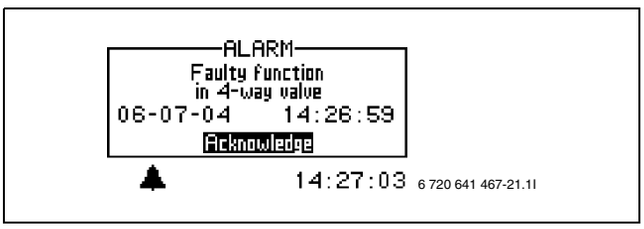

Fig. 55

POSSIBLE CAUSE 1: 4-WAY VALVE FAULTY.

- Select **Acknowledge**.
- Check the function of the 4-way valve. Manually switch the 4-way valve in the corresponding menu point at the control panel on and off.

14.9.5 T6 HIGH HOT GAS TEMPERATURE

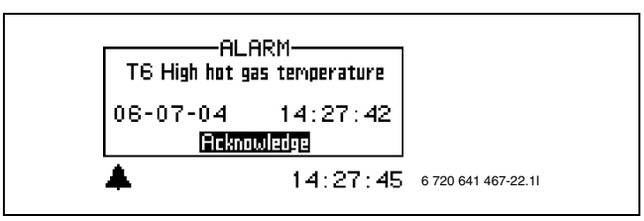

Fig. 56

POSSIBLE CAUSE 1: OCCASIONALLY EXCESSIVE TEMPERATURE CAUSED BY UNUSUAL OPERATING CONDITION.

- Select **Acknowledge**.
- Check the temperature differential between temperature sensors T8 and T9 in the heat pump (→ chapter 12.4).

POSSIBLE CAUSE 2: EXCESSIVE COMPRESSOR OPERATING TEMPERATURE.

- Select **Acknowledge**.
- Check for overheating.

14.9.6 FAULT ON ELECTRIC ADDITIONAL HEAT

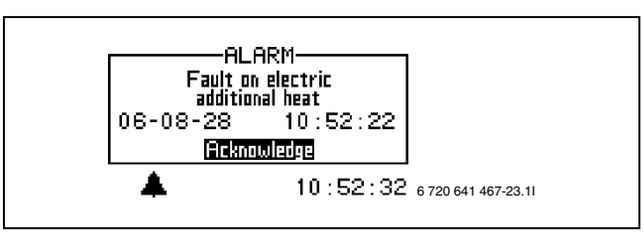

Fig. 57

Possible cause 1: Overheat protection of the additional heater has tripped.

- Select **Acknowledge**.
- Reset the overheat protection on the additional heater (→Chapter 14.6).

14.9.7 T8 HIGH FLOW TEMPERATURE

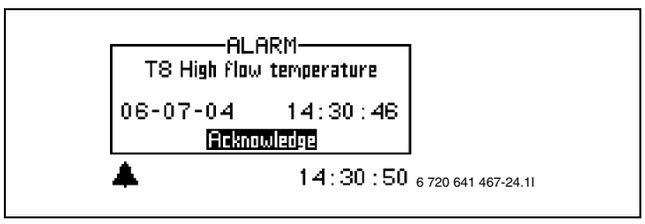

Fig. 58

Temperature sensor T8 is fitted inside the heat pump. This stops the compressor for safety reasons as soon as the flow temperature exceeds the selected value.

PROBABLE CAUSE 1; INSUFFICIENT FLOW OVER THE HEAT PUMP:

- Select **Acknowledge**.
- Check whether the primary heating circuit pump has stopped (→ Fig. 53, [1], page 41)..
- Check that all the valves are open. The thermostat valves in heating systems should be fully open and in floor heating systems at least half of the coils should be fully open.
- Select a higher speed for the heat transfer medium pump (G2). Also set a higher speed for the heating circuit pump (G1), as it needs to run with a higher speed than the heat transfer medium pump.

POSSIBLE CAUSE 2; BLOCKED PARTICLE FILTER:

- Select **Acknowledge**.
- Check filter.
- Clean filter if required (→chapter 14.7).

14.9.8 LOW TEMPERATURE IN CONDENSER

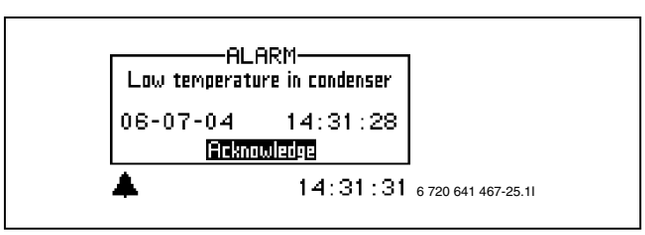

Fig. 59

The alarm is triggered because the temperature inside the heat pump is too low. Initially, a warning is issued. Following four warnings within two hours, an alarm is triggered.

POSSIBLE CAUSE 1: AIR IN THE HEATING SYSTEM.

- Select **Acknowledge**.
- Check whether air is in the heating system.

- Fill the heating system and vent if required.

POSSIBLE CAUSE 2; BLOCKED PARTICLE FILTER:

- Select **Acknowledge**.
- Check filter.
- Clean filter if required (→chapter 14.7).

POSSIBLE CAUSE 3: PRIMARY HEATING CIRCUIT PUMP FAULT.

- Check whether the primary heating circuit pump has stopped (→ Fig. 53, [1], page 41)..

POSSIBLE CAUSE 4: INADEQUATE/NO FLOW RATE ACROSS THE HEAT PUMP.

- Select **Acknowledge**.
- Check whether the primary heating circuit pump has stopped (→ Fig. 53, [1], page 41)..
- Check that all the valves are open. The thermostat valves in heating systems should be fully open and in floor heating systems at least half of the coils should be fully open.
- Select a higher speed for the heat transfer medium pump (G2). Also set a higher speed for the heating circuit pump (G1), as it needs to run with a higher speed than the heat transfer medium pump.

POSSIBLE CAUSE 5: INADEQUATE AMOUNT OF WATER IN THE DOMESTIC HEATING SYSTEM.

- Fill the heating system and vent if required.

14.9.9 TRIPPED MOTOR CUT-OUT

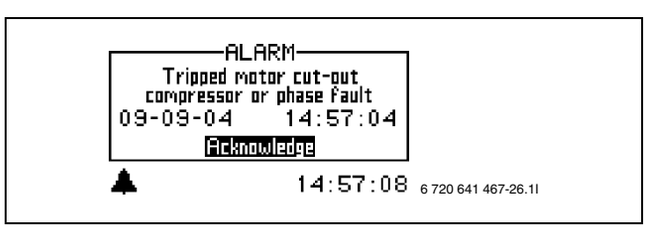

Fig. 60

POSSIBLE CAUSE 1: OCCASIONAL FAULT OR ELECTRICITY NETWORK OVERLOADED.

- Select **Acknowledge**.
- Wait until the heat pump starts again.

POSSIBLE CAUSE 2: AMPERAGE (A) SET TOO LOW AT THE OVERLOAD RELAY.

- Change setting to its correct value.

POSSIBLE CAUSE 3: CONTACTOR, OVERLOAD RELAY OR ELECTRICAL CONNECTION FAULT.

- Check components for faults.

POSSIBLE CAUSE 4: COMPRESSOR FAULT.

- Check the compressor function.

14.9.10 HEAT PUMP NOT CONNECTED

Communication error between the internal unit and the heat pump.

- Check CAN-BUS.

14.9.11 FAULT AT THE I/O BOARD, INTERNAL UNIT CONTROL BOARD

Internal communication error in the internal unit.

- Check whether the LED at the I/O board is flashing.

14.9.12 TRIPPED MOTOR CUT-OUT FAN

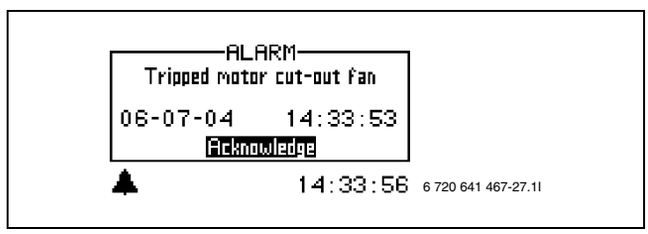

Fig. 61

POSSIBLE CAUSE 1: OCCASIONAL FAULT OR ELECTRICITY NETWORK OVERLOADED.

- Select **Acknowledge**.
- Wait until the heat pump starts again.
- Notify customer service if the alarm occurs frequently.

Possible cause 2: Power supply to the fan failed.

- Contact the dealer.

14.10 WARNING WINDOW

14.10.1 HIGH TEMPERATURE DIFFERENCE HEAT TRANSFER FLUID

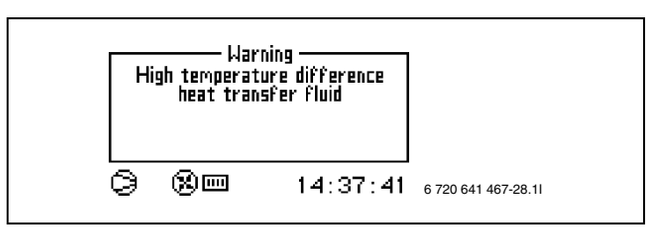

Fig. 62

This warning window is displayed when the temperature difference between sensors T8 and T9 becomes too high.

PROBABLE CAUSE 1; INSUFFICIENT FLOW OVER THE HEAT PUMP:

- Select **Acknowledge**.
- Check whether the primary heating circuit pump has stopped (→ Fig. 53, [1], page 41)..
- Check that all the valves are open. The thermostat valves in heating systems should be fully open and in floor heating systems at least half of the coils should be fully open.

- Select a higher speed for the primary heating circuit pump (G2). Also set a higher speed for the heating circuit pump, as it needs to run with the same or a higher speed than the primary heating circuit pump.

POSSIBLE CAUSE 2; BLOCKED PARTICLE FILTER:

- Select **Acknowledge**.
- Check filter.
- Clean filter if required (→chapter 14.7).

14.11 INFORMATION FROM THE HEAT PUMP

14.11.1 HEAT PUMP IS NOW WORKING AT ITS HIGHEST PERMITTED TEMPERATURE

Fig. 63

Temperature sensor T9 is fitted inside the heat pump. This stops the compressor for safety reasons as soon as the return temperature is too high. The limit is approx. 59 °C.

PROBABLE CAUSE 1; THE HEAT SETTING IS SET SO HIGH THAT THE HEATING SYSTEM'S RETURN TEMPERATURE IS TOO HIGH:

- Reduce the temperature setting.

PROBABLE CAUSE 2; THE HOT WATER TEMPERATURE IS SET TOO HIGH:

- Set a lower DHW temperature.

PROBABLE CAUSE 3; THE UNDER FLOOR HEATING SYSTEM OR RADIATOR VALVES ARE CLOSED:

- Open the valves.

PROBABLE CAUSE 4; THE FLOW ACROSS THE HEAT PUMP IS GREATER THAN THE FLOW IN THE HEATING SYSTEM:

- Check the speed of heating circuit pump (G1). The speed of the heating circuit pump must be higher than the speed of the heat transfer medium pump (G2).

14.11.2 ADD. HEAT IS NOW WORKING AT ITS HIGHEST PERMITTED TEMPERATURE

Temperature sensor T9 is fitted inside the heat pump. This stops the compressor for safety reasons and limits the electric additional heater as soon as the return temperature is too high. The limit for the electric additional heater is approx. 58 °C.

PROBABLE CAUSE 1; THE HEAT SETTING IS SET SO HIGH THAT THE HEATING SYSTEM'S RETURN TEMPERATURE IS TOO HIGH:

- Reduce the temperature setting.

14.11.3 THIS SETTING MEANS THAT ADDITIONAL HEAT CAN TAKE OVER OPERATION

Information appears if **Electric cassette limitation start temperature**, **Electric cassette forced shut off**, **Mixing valve limitation start temperature** or **Mixing valve force close** are set more than 1 degree lower than T9 high return temperature.

POSSIBLE CAUSE 1: THE INSTALLER SETS A HIGH VALUE FOR ONE OF THE ABOVE SETTINGS.

- Select a lower value.

14.11.4 TEMPORARY STOP OF HOT WATER PRODUCTION

In case of DHW operation and if the temperature captured ar senor T6 is higher than for envelope stop (factory-set value: 117 °C), this message is issued until T3 has fallen 5 K below the temperature which was captured by T3 when the message appeared. This message stops the compressor for DHW heating.

POSSIBLE CAUSE 1: EXCESSIVE TEMPERATURE DIFFERENTIAL BETWEEN EVAPORATION AND CONDENSING. THE COMPRESSOR PERMITS THE ADDITIONAL HEATER TO SUPPLY THE CORRECT TEMPERATURE IF IT CANNOT DO SO ON ITS OWN.

POSSIBLE CAUSE 2: LOW REFRIGERANT LEVEL.

14.11.5 TEMPORARY STOP OF COMPRESSOR OPERATION

Could occur for two different reasons:

1. If the temperature captured by sensor T2 is lower than the lowest temperature envelope. Switches back when the temperature captured by sensor T2 is higher than the lowest temperature envelope for 30 minutes.
2. In case of heating operation and if the temperature captured by sensor T6 is higher than for envelope stop (factory-set value: 117 °C). Switches back when the temperature captured by sensor T2 has risen by 2 K.

The compressor stops and the additional heater starts.

POSSIBLE CAUSE 1: OUTSIDE TEMPERATURE LOWER THAN -20 °C.

POSSIBLE CAUSE 2: EXCESSIVE TEMPERATURE DIFFERENTIAL BETWEEN EVAPORATION AND CONDENSING. THE COMPRESSOR PERMITS THE ADDITIONAL HEATER TO SUPPLY THE CORRECT TEMPERATURE IF IT CANNOT DO SO ON ITS OWN.

POSSIBLE CAUSE 3: LOW REFRIGERANT LEVEL.

15 TECHNICAL INFORMATION

15.1 FACTORY SETTINGS

The table displays the factory values (F value) of the settings that you, as a customer, (K) can change via the customer menus **Menu** and **Advanced menu**.

The menu points in the installation and service menus (I/S) listed in the following table become accessible to the installer after changing the **Access level**, either under menu or under **Advanced menu**.

Menu	Level	F-value
Fast restart of heat pump?	I/S	No
Start up		
_“_\Setting the clock		
_”__”_\Set date	I/S	YY-MM-DD
_”__”_\Set time	I/S	hh:mm:ss
_”_\Connected extra sensors		
_”__”_\T5 confirms (room temperature sensor T5)	I/S	No
_”_\Air/Water pump in operation	I/S	Yes
_”_\Connection capacity (electric element)		
_”__”_\State total output	I/S	13.5 kW
_”__”_\Compressor mode, output limitation	I/S	4.5/6.75 kW
_”__”_\Additional heat only, output limitation	I/S	9.0/13.5 kW
_”_\Manual operation?	I/S	No
_”_\Additional heat options		
_”__”_\Additional heat only?	I/S	No
_”__”_\Block additional heat?	I/S	No
_”_\Language	I/S	Selected
_”_\Correct sensor	I/S	0
_”_\Fan defrost interval	I/S	1 ggr
_”_\Fan defrost time	I/S	1.0 min.
_”_\Forced defrost	I/S	No
_”_\Block crankcase heater at high outdoor temperature	I/S	10.0 °C
_”_\Anti-jamming mode time	I/S	02:00
_”_\Alarm buzzer signal length	I/S	1 min.
_”_\T1 Set point value maximum	I/S	80 °C
_”_\Display		
_”__”_\Contrast	I/S	10
_”__”_\Brightness	I/S	10

Tab. 7

Menu	Level	F-value
_”_\Electrical connection	I/S	230V/400V
_”_\Heat pump size	I/S	6-11kW/ 12-17kW
Room temperature setting (T5)	K	20°C
Temperature increase/decrease (T5)	K	=
Temperature increase/decrease settings (T5)		
_”_\Limit value for V or H	I/S	2 °C
_”_\Change when much colder/warmer	I/S	8%
_”_\Change when colder/warmer	I/S	3%
Extra hot water	K	0 h
Temperatures	K	

Tab. 7

Advanced menu	**Level**	**F-value**
Temperature		
_”_\Lowest outdoor temperature	K	20 °C
_”_\Heating system temperature		
_”__”_\Heat curve	K	V=20.0 °C H=45.6 °C
_”__”_\Hysteresis		
_”__”_\Maximum	K	16 °C
_”__”_\Minimum	K	4 °C
_”__”_\Time factor	K	10
_”_\Room sensor settings (T5)		
_”__”_\Room temperature setting	K	20 °C
_”__”_\Room sensor influence		
_”__”__”_\Change factor	K	5.0
_”__”__”_\Blocking time	K	4 h
_”_\Time limited settings		
_”__”_\Time control heating		
_”__”__”_\Day and time	K	Off
_”__”__”_\Change in temperature	K	-10 °C
_”__”_\Holiday		
_”__”__”_\Date	K	Off
_”__”__”_\Change in temperature	K	-10 °C
_”__”_\Remote control		
_”__”__”_\Remote control	K	Off
_”__”__”_\Change in temperature	K	0 °C
_”_\External control heating	K	Off

Tab. 8

Advanced menu	Level	F-value
_”_\Heating season		
_”__”_\Heating season limit	K	18 °C
_”__”_\Delay	K	4 h
_”__”_\Direct start limit	K	10 °C
_”_\Heating, maximum operating time at hot water demand	K	20 min.
_”_\Shut down protection, change over hot water to heating	I/S	300 s
_”_\Compressor working area settings		
_”__”_\Delay after temporary stop	I/S	30 min.
Hot water (T3)		
_”_\Extra hot water		
_”__”_\Number of hours	K	0
_”__”_\Stop temperature	K	65 °C
_”_\Hot water peak		
_”__”_\Interval	K	0 days
_”__”_\Start time	K	03:00
_”__”_\Stop temperature	I/S	65.0 °C
_”_\Hot water temperature		
_”__”__”_\T3 Start temperature	I/S	52 °C
_”__”__”_\T8 Stop temperature	I/S	59 °C
_”__”__”_\T9 Stop temperature	I/S	54 °C
_”__”_\Additional heat only?		
_”__”__”_\T3 Stop temperature	I/S	56 °C
_”__”__”_\T3 Hysteresis	I/S	1.0 °C
_”__”_\Hot water, maximum operating time at heating demand	K	30 min.
_”_\Time control hot water	K	Off
_”_\Hot water additional heat		
_”__”_\T3 Start value offset	I/S	5.0 °C
_”__”_\T3 Hysteresis	I/S	2.0 °C
Temperatures		
_”_\Correct sensor	I/S	.0
Defrost settings		
_”_\T12 - T11 settings (6-11 kW)		
_”__”_\Time for reached temperature difference	I/S	60 s
_”__”_\Difference at +10 °C	I/S	12 °C
_”__”_\Difference at 0 °C	I/S	8 °C
_”__”_\Difference at -10 °C	I/S	6 °C
_”_\T12 - T11 settings (12-17 kW)		

Tab. 8

Advanced menu	Level	F-value
_”__”_\Time for reached temperature difference	I/S	60 s
_”__”_\Difference at +10 °C	I/S	8 °C
_”__”_\Difference at 0 °C	I/S	4 °C
_”__”_\Differential at -10 °C	I/S	2 °C
_”_\Maximum outdoor temperature	I/S	13 °C
_”_\T11 Maximum temperature	I/S	20 °C
_”_\Maximum time	I/S	15 min.
_”_\Delay after compressor start	I/S	10 min.
_”_\Minimum time between defrosts	I/S	30 min.
_”_\Compressor pressure equalisation time	I/S	60 s
_”_\4-way valve pressure equalisation time	I/S	0 s
_”_\Forced defrost	I/S	No
_”_\Heating cable time after defrost	I/S	15 min.
_”_\Fan defrost		
_”__”_\Fan defrost interval	I/S	1 ggr
_”__”_\Fan defrost time	I/S	1.0 min.
_”__”_\Temperature limit	I/S	-5 °C
Timers		
Additional heat settings		
_”_\Start delay	I/S	60 min.
_”_\Time control additional heat	I/S	Off
_”_\Additional heat options		
_”__”_\Additional heat only?	I/S	No
_”__”_\Block additional heat?	I/S	No
_”_\Electric additional heat settings		
_”__”_\Power guard		
_”__”__”_\Power guard	I/S	Off
_”__”__”_\Supply voltage	I/S	400 V
_”__”__”_\Main fuse	I/S	16 A
_”__”__”_\Display/Correction of Current transformer	I/S	.0 A
_”__”__”_\Current margin	I/S	0.5 A
_”__”__”_\Time from tripped power guard to possible reconnection	I/S	60 s
_”__”_\Connection capacity (electric element)		
_”__”__”_\State total output	I/S	13.5 kW
_”__”__”_\Compressor mode, output limitation	I/S	4.5/6.75 kW
_”__”__”_\Additional heat only, output limitation	I/S	9.0/13.5 kW

Tab. 8

Advanced menu	Level	F-value
_”__”_\Ramp time increase	I/S	20 min.
_”__”_\Ramp time decrease	I/S	10 min.
_”_\Mixing valve settings		
_”__”_\Mixing valve delay	I/S	20 min.
_”__”_\Neutral zone	I/S	1.0 °C
_”__”_\Running time extension		
_”__”__”_\Increase signal extension	I/S	1
_”__”__”_\Decrease signal extension	I/S	1
_”__”_\Additional heat maximum temperature		
_”__”__”_\Mixing valve limitation start temperature	I/S	57 °C
_”__”__”_\Mixing valve force close	I/S	58 °C
_”__”_\Limitation at temperature increase	I/S	Yes
_”__”_\Limitation time	I/S	20 s
Setting the clock		
Set date	K	YY-MM-DD
Set time	K	hh:mm:ss
Display		
Contrast	K, I/S	5
Brightness	K, I/S	10
Alarm		
_”_\Alarm log		
_”__”_\Delete alarm log?	I/S	No
_”_\Warning log		
_”__”_\Delete warning log?	I/S	No
Access level	K, I/S	K(0)
Return to factory settings	K, I/S	No
Deactivate alarm buzzer	K	No

Tab. 8

15.2 TECHNICAL DATA

Heat pump		6	7	9.5
Output/input at +7/35°[1)]	kW	5,43 / 1,50	7,27 / 2,20	8,36 / 2,45
Output/input at +2/35°[2)]	kW	4,56 / 1,45	6,13 / 2,16	7,14 / 2,41
COP at +7/35º		3,62	3,31	3,41
COP at +2/35º		3,15	2,83	2,96
Nominal flow rate, refrigerant	l/s	0.19	0.29	0.34
Internal pressure drop, refrigerant	kPa	5	6	7
Air flow rate	m^3/h	2200		
Power consumption, fan motor	A	0.44		
Power supply		230V 1N~ 50Hz		
Fuse rating [3)]	AT	16	25	25
Starting current (softstart)	A	23,43	30,56	32,05
Compressor		Scroll		
Compressor oil		FV 50S		
Lowest/highest outgoing heat carrier temperature	°C	20/65		
Refrigerant mass R-407C[4)]	kg	2.5	2.6	2.95
Connection, refrigerant		Hose 1 inch internal thread		
Defrost system		Hot gas with 4-way valve		
Operating temperature	°C	-20 – +35[5)]		
Dimensions (WxDxH) [6)]	mm	840 x 665 x 1223		
Weight	kg	140	144	152
Outer casing		Zinc-plated painted sheet steel		

Tab. 9 Specification

1) Output details in accordance with EN 14511.
2) Output details in accordance with EN 14511.
3) Safety fuse type gL-gG or MCB type C.
4) Global warming potential; GWP_{100}=1526
5) Tested at -17°C according to the European standard EN 14511-4.
6) Dimensions excl. adjustable feet; subject to adjustment plus 20 mm (minimum) - 30 mm (maximum).

Internal unit		HWDU
Output of the internal unit	kW	4.5
Circulation pump rating	kW	0.2
Power supply		230V 1N~ 50Hz
Maximum power consumption	kW	4.7
Fuse rating [1]	AT	25
Maximum operating pressure	bar (MPa)	2.5 (0.25)
Available capacity, DHW cylinder	l	151
CH buffer volume	l	55
Expansion vessel	l	12
Expansion vessel, pre-charge pressure	bar (MPa)	1 (0.1)
Overheat protection	°C	90
Min. flow rate, heating system	l/s	0
Heating circuit pump, secondary G1"	Wilo Star RS 25/6-3	
Heating circuit pump, primary G2"	Wilo Star RS 25/6-3	
Dimensions (W×D×H)[2]	mm	600×615×1660
Dry weight	kg	122
Wet weight	kg	347

Tab. 10 Internal unit 290 A/W

1) aM type fuse, D characteristic MCB. Both units require a means of electrical isolation.

2) Dimensions excl. feet, supplied min 20 mm - max 30 mm depending on adjustment.

15.3 SOUND PRESSURE LEVEL

	LW [1] sound pressure level (dB(A))
6	64.9
7	64.9
9.5	64.9

Tab. 11

1) Measured in accordance with EN ISO 3743-1

15.4 TEMPERATURE SENSOR RESISTANCE VALUES

Temperature (°C)	k Ω
– 40	154.30
– 35	111.70
– 30	81.70
– 25	60.40
– 20	45.10
– 15	33.95
– 10	25.80
– 5	19.77
0	15.28
5	11.90
10	9.33
15	7.37
20	5.87
25	4.70
30	3.79
35	3.070
40	2.51
45	2.055
50	1.696
55	1.405
60	1.17
65	0.98
70	0.824
75	0.696
80	0.59
85	0.503
90	0.43

Tab. 12 Temperature sensor test values

15.5 SUPPLEMENTARY TECHNICAL INFORMATION

Maximum water supply pressure to the pressure reducing valve	16 bar
Operating pressure DHW	3 bar
Expansion vessel charge pressure	3 bar
Expansion valve setting	6 bar
Maximum primary working pressure	2,5 bar
Set opening pressure of the combined temperature and pressure relief valve	7 bar / 95°C
Expansion vessel, 19 Litres	3 bar

Tab. 13 Supplementary technical information

Cylinder reheat times, Inner cylinder 151 Litres of DHW. Full volume heat-up from 15°C to 55°C with a primary flow temperature of 60°C takes 2 hours and 15 minutes. Full volume re-heat to 55°C after 70% of the cylinders contents were drawn off takes 1 hour and 50 minutes

Manufacturer
Appliance: IVT Värmepumpar, part of Bosch Thermotechnik GmbH Box 1012, SE-57343 Tranås, Sweden
Cylinder: BoRö Pannan AB Bangårdsv. 1, SE-95231 Kalix, Sweden

Important note:
Only genuine Bosch Thermotechnology spare parts can be used with these products.

16 COMMISSIONING REPORT

Customer/system user:	
System installer:	
Type of heat pump:	Heat pump serial number:
Commissioning date:	HWDU serial number:
Other system components: Outdoor sensor T2 ☐	Room temperature sensor T5 ☐
Hot water cylinder temperature sensor T3 ☐	
Others:	
Points to be checked prior to commissioning Heating system: Filled ☐ Checked ☐ Electric heater set to 4.5 kW: Set ☐ Checked ☐ Filters: Checked ☐ Cleaned ☐ Sight glass: Checked ☐ Comments:	
Heating system pump G1A/G1B working correctly: ☐	Heat carrier pump G2 working correctly: ☐
Operating temperature after 10 minutes in heating/DHW mode:	
Heat flow out T8:..... °C	Heat return in T9:..... °C
Sensor condensor temp T10:..... °C	Refrigerant temp T11:..... °C
Defrost sensor T12:..... °C	
System pressure levels checked ☐.....	
Functional test carried out ☐.....	
Ensure that primary circuit has been correctly flushed ☐.....	
Check fan operation on outdoor unit ☐.....	
Check for insulation of pipe work ☐.....	
Check that CANbus is fitted correctly ☐.....	
Check term switches positioned correctly ☐.....	
Check condensation drain operates ☐.....	
Hot water peak set ☐.....	
Electricity reading on the house taken ☐.....	
The instructions about how to use the heat pump have been given to the client / to the user ☐.....	
Documentation about the heat pump has been handed over:.....	
Date and signature of system installer:	

Tab. 14

17 BENCHMARK LOG BOOK

AIR TO WATER HEAT PUMP COMMISSIONING CHECKLIST

This Commissioning Checklist is to be completed in full by the competent person who commissioned the heat pump and associated equipment as a means of demonstrating compliance with the appropriate Building Regulations and then handed to the customer to keep for future reference.

Failure to install and commission this equipment to the manufacturer's instructions may invalidate the warranty but does not affect statutory rights.

Customer Name

Address

Telephone Number

Heat Pump Make and Model

Heat Pump Serial Number

Commissioned by (print name) | Certified Operative Reg. No. [1]

Company Name & Address | Commissioning Date

Telephone No.

Building Regulations Notification Number (if applicable) [2]

CONTROLS - SYSTEM AND HEAT PUMP

Tick the appropriate boxes if applicable

1.	Time & Temperature Control to Heating	Room Thermostat & Programmer/Timer ☐	Programmable Roomstat ☐	Load/Weather Compensation ☐	Optimum Start Control ☐		
2.	Time & Temperature Control to Hot Water			Cylinder Thermostat & Programmer/Timer ☐	Combined with Heat pump main controls ☐		
3.	Heating Zone Valves (including underfloor loops)			Fitted ☐	Not Required ☐		
4.	Hot Water Zone Valves			Fitted ☐	Not Required ☐		
5.	Thermostatic Radiator Valves			Fitted ☐	Not Required ☐		
6.	Heat Pump Safety Interlock [3]			Built In ☐	Provided ☐		
7.	Outdoor Sensor			Fitted ☐	Not Required ☐		
8.	Automatic Bypass System			Fitted ☐	Not Required ☐		
9.	Buffer Vessel Fitted			Yes ☐ No ☐	If YES, Volume	Litres	

ALL SYSTEMS

The heating system has been filled and pressure tested	Yes ☐
Expansion vessel for heating is sized, fitted & charged in accordance with manufacturer's instructions	Yes ☐
The heat pump is fitted on a solid/stable surface capable of taking its weight	Yes ☐
The system has been flushed and cleaned in accordance with BS7593 and heat pump manufacturer's instructions	Yes ☐
What system cleaner was used?	
What inhibitor was used?	Qty litres
Is the system adequately frost protected?	Yes ☐

OUTDOOR UNIT

Are all external pipeworks insulated?	Yes ☐
Is the fan free from obstacles and operational?	Yes ☐
Has suitable consideration been made for waste water discharge?	Yes ☐

CENTRAL HEATING MODE

Heating Flow Temperature ☐ °C Heating Return Temperature ☐ °C

DOMESTIC HOT WATER MODE

Measure and Record

Is the heat pump connected to a hot water cylinder? Unvented ☐ Vented ☐ Thermal Store ☐ Not Connected ☐

Hot water has been checked at all outlets Yes ☐ Have Thermostatic Blending Valves been fitted? Yes ☐ Not required ☐

ADDITIONAL SYSTEM INFORMATON

Additional heat sources connected: Gas Boiler ☐ Oil Boiler ☐ Electric Heater ☐ Solar Thermal ☐ Other _____

ALL INSTALLATIONS

The heating, hot water and ventilation systems complies with the appropriate Building Regulations	Yes ☐
All electrical work complies with the appropriate Regulations	Yes ☐
The heat pump and associated products have been installed and commissioned in accordance with the manufacturer's instructions	Yes ☐
The operation of the heat pump and system controls have been demonstrated to the customer	Yes ☐
The manufacturer's literature, including Benchmark Checklist and Service Record, has been explained and left with the customer	Yes ☐

Commissioning Engineer's Signature

Customer's Signature

(To confirm demonstration of equipment and receipt of appliance instructions)

Notes: [1] Installers should be members of an appropriate Competent Persons Scheme. [2] All installations in England and Wales must be notified to Local Area Building Control (LABC) either directly or through a Competent Persons Scheme. A Building Regulations Compliance Certificate will then be issued to the customer. [3] May be required for systems covered by G3 Regulations

benchmark COLLECTIVE MARK
THE MARK OF QUALITY FOR THE INSTALLATION, COMMISSIONING AND SERVICING OF DOMESTIC HEATING AND HOT WATER SYSTEMS

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Fig. 64

Service Record

It is recommended that your heating system is serviced regularly and that the appropriate Service Interval Record is completed.

Service Provider

Before completing the appropriate Service Interval Record below, please ensure you have carried out the service as described in the manufacturer's instructions.

Always use the manufacturer's specified spare part when replacing controls.

Service 1 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 2 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 3 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 4 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 5 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 6 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 7 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 8 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 9 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

Service 10 Date:
Engineer Name:
Company Name:
Telephone No.
Operative ID No.
Comments:
Signature:

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Fig. 65

WORCESTER, BOSCH GROUP:

TECHNICAL:	08705 266241
SERVICE:	08457 256206
SPARES:	01905 752571
LITERATURE:	0844 892 9800
TRAINING:	01905 752526
SALES:	01905 752640
WEBSITE:	**worcester-bosch.co.uk**

Worcester, Bosch Group
Cotswold Way, Warndon, Worcester WR4 9SW.
Tel. 0844 892 9900
Worcester, Bosch Group is a brand name of Bosch Thermotechnology Ltd.
worcester-bosch.co.uk

6 720 641 467

WORCESTER
Bosch Group