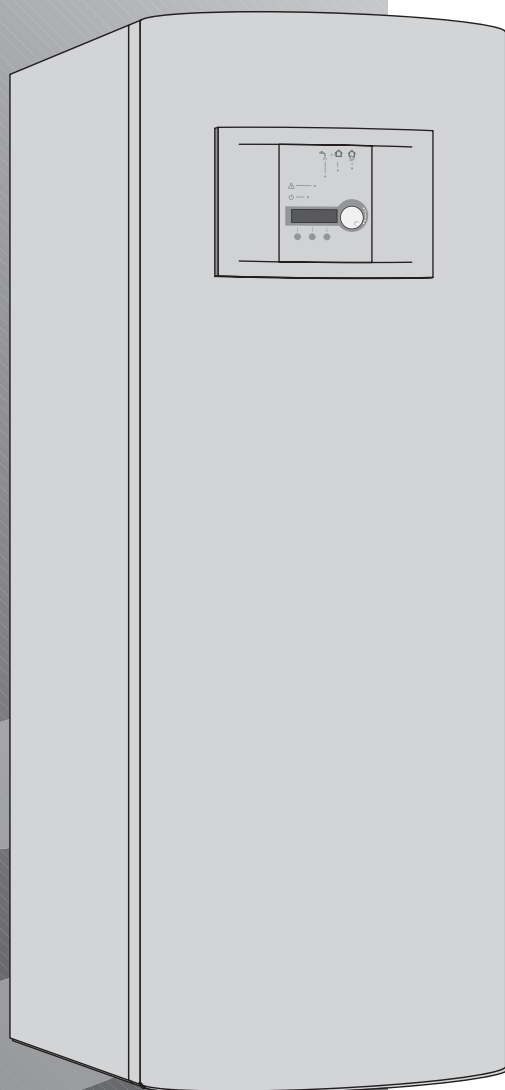


WORCESTER GREENSTORE

6kW, 7kW, 9kW & 11kW Combi

HEAT PUMP



GB/IE

INSTRUCTION MANUAL
INSTALLATION, COMMISSIONING
& SERVICING

 **WORCESTER**
Bosch Group

benchmark

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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

BS EN 814

BS EN 378

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 BBT Thermotechnology have been tested and found to comply with –

1. the requirements of the (Water Fittings) Regulations 1999 for England and Wales, the Water Byelaws 2000, Scotland and the Water Regulations Northern Ireland.
2. 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.

Installation manual for the Worcester Greenstore Combi heat pumps

Worcester, 05.02.07

Part number: 8-716-113-342

Issue: b

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PRODUCT CONTENTS LIST

Greenstore Combi Heat Pump.

Components included in delivery:

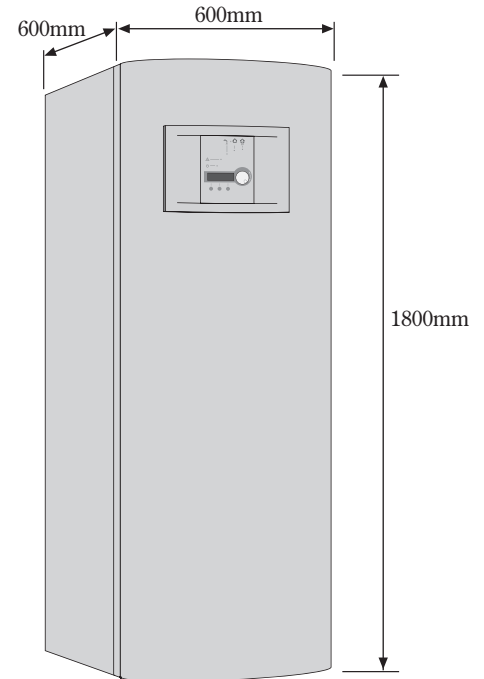
Rubber feet
Outdoor sensor T2 (GT2) with cable
Room sensor T5(GT5)
Return sensor T1 (GT1)
4 bar Pressure Relief Valve
Valve with filter
Circlip pliers
Drain plug
Ball valve
Expansion vessel
Filling link with insulation and filter

Unvented cylinder kit:

DHW expansion vessel
Expansion Vessel Hose
Wall mounting kit for expansion vessel
High flow rate inlet control set
Acetal tundish

Literature pack:

User manual
Installation manual
Guarantee card



For the Installer

Installation of the heat pump should be performed by a qualified installer. This chapter includes a section recommending how the heat pump installer should install, commission and service the heat pump. The installation manual consists of a plumbing section and an electrical section. These provide technical data such as measurements, wiring diagrams and installer menus.

Contents:

- Important information to the installer
- Checklist
- What the delivery includes
- Dimensions and plumbing connections
- The heat pump and collector hose in general
- Connecting the heat pump to the heating system
- Connecting the heat pump to the power supply
- External connections to the heat pump
- Commissioning the heat pump
- Maintenance
- Technical information



Note

It is important that the installer also reads through the User manual. It contains the information necessary to get a comprehensive understanding of the heat pump.

Important information to the installer

This manual provides all the information necessary to install the heat pump. The manual is divided into several sections. The order of these is based on the recommended installation sequence. Use the supplied checklist during installation.

Before installation remember:

- Installation of the heat pump should be performed by a qualified installer.
- If the heat pump needs to be tilted during transit it may be temporarily tilted with the compressor downwards. **However, never lay the heat pump down or transport it horizontally.**
- Before the heat pump is commissioned, the heat transfer systems, the hot water cylinder and the heat pump must be filled and vented.
- Check that pipe connections on the collector and primary circuits are intact and have not shaken loose during transport.
- Heat pump installation and collector installation must be carried out in accordance with applicable regulations.



Warning

The main power supply must be disconnected before working on the heat pump.

Technical support

For technical support please contact:

Technical Pre & Post sales
Tel: 08705-266241
Fax: 01905-752741

Checklist

Each heat pump installation is unique. However, the following checklist gives a general description of how the installation should be carried out.

1. Stand the heat pump on a flat surface. Adjust the height using the rubber feet.
2. Ensure that the bore hole (if used) for the collector hose is bored according to applicable regulations (responsibility of the drilling company). Check that the horizontal collector (if fitted) has been installed correctly.
3. Fit the incoming and outgoing pipes for the heating and heat transfer fluid circuits as well as the expansion tank.
4. Fit the particle filters and valves.
5. Connect any additional circulation pump, if required, to the heating system. Follow the instructions for the pump in question.
6. Install the outdoor sensor and a room sensor if used.
7. Fill and vent the primary and collector systems before commissioning.
8. Connect the heat pump to the electrical system via an external isolation switch. Use the appropriate wiring diagram.
9. Connect a general alarm and external control if used.
10. Commission the heat pump by making all the necessary settings on the control panel.
11. Check the heat pump after commissioning. Top up the collector system if required.

What the delivery includes

The following components are included in the delivery of the heat pump:



Rubber feet
Quantity: 4



Filling link with insulation and filter
Quantity: 1



Return sensor T1 (GT1)
Quantity: 1
Cable: 4 m



Valve with filter
Quantity: 1



Outdoor sensor T2 (GT2) with cable
Quantity: 1



Literature pack
User manual
Installation manual
Guarantee card



Room sensor T5 (GT5) with cable:
Quantity: 1



Expansion vessel
Quantity: 1



Circlip pliers
Quantity: 1



Drain plug
Quantity: 1



4 bar pressure relief valve
Quantity: 1



Ball valve
Quantity: 1



DHW expansion vessel
Quantity: 1



High flow rate inlet control set
Quantity: 1



Expansion vessel hose
Quantity: 1



Acetal tundish
Quantity: 1



Wall mounting kit for expansion vessel
Quantity: 1

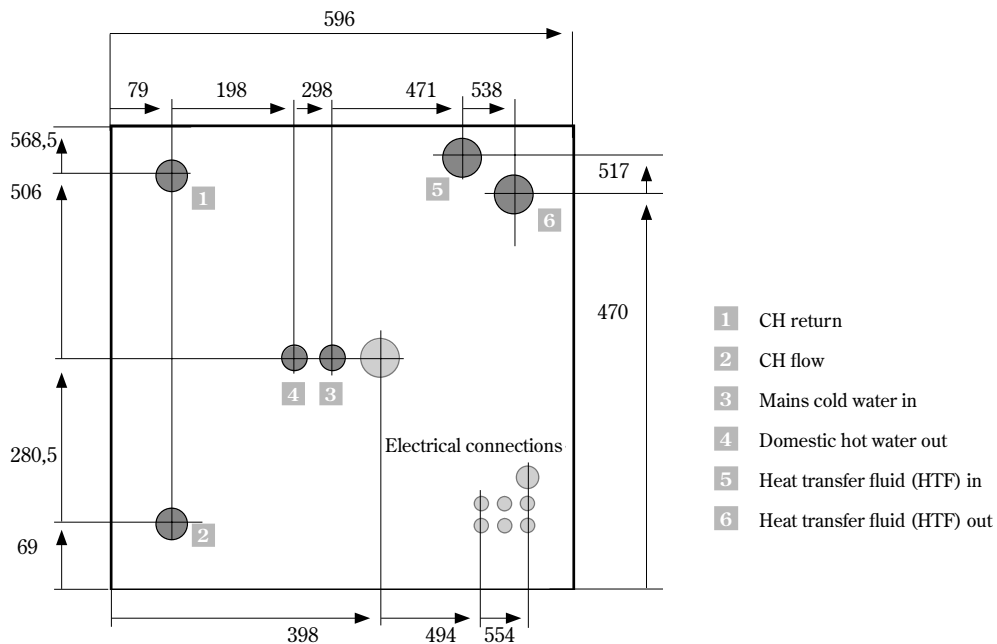
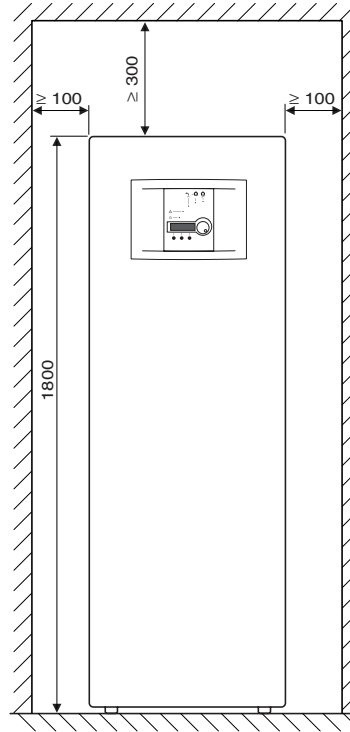
Dimensions and plumbing connections

The following illustrations show the dimensions of the heat pump and plumbing connections. All measurements are stated in millimetres.

Required installation space

In front of the heat pump a free area of 800 mm is required for installation and servicing.

Allow a side clearance of at least 100 mm on the sides and behind the heat pump.



The heat pump and collector hose in general

Transporting the heat pump

The heat pump should always be transported and stored in an upright position, never horizontally. Otherwise the suspension fittings inside the compressor can be damaged. If the heat pump must be tilted during entry to the installation site, this should be done for as short a time as possible. The outer cover panels should be removed to avoid damage, if the heat pump is moved without using the supplied pallet.

The heat pump must not be stored at temperatures below -10°C .

Positioning the heat pump

It is important that the heat pump stands on a flat surface as it contains sensitive parts. The floor must be stable and have a strength to carry at least 500 kg. Adjust the rubber feet so the heat pump does not lean.

The temperature surrounding the heat pump should be between 0°C and 35°C .

The installer should take sound insulation into consideration when positioning the heat pump.

Maximum working temperatures

The heat pump can work at a maximum return water temperature of approximately 57°C . If the temperature rises above this value the heat pump will stop for safety reasons.

The electric heater will stop if the temperature rises above 55°C . The maximum outgoing temperature to the heating system is around 65°C .

Minimum working temperatures

The heat pump supplied is preset to a minimum temperature of collector fluid -10°C inlet and -10°C outlet. The heat pump can operate at inlet temperatures down to -5°C , lower inlet temperatures are not recommended.

The preset values can be changed during commissioning.

Fit the filters

The task of the filters is to filter out dirt before it can enter the heat pump.

Fit the filter for the collector circuit on the incoming pipe from the collector.

Fit the filter for the primary circuit on the incoming pipe from the heating system.

Both filters should be fitted as close to the heat pump as possible and placed horizontally. Make sure that the direction of flow is correct.

Collector hose

The task of the collector hose is to convey the heat transfer fluid through the ground to gain a few degrees of heat. The hose is a thin-walled plastic hose of type PEM 40 x 2.4 PN 6.3. SDR11.

Installation and backfilling around the collector hose

Installation of the collector and backfilling the soil around the collector hose should follow applicable material and working descriptions and regulations.

It is important that the filling material does not contain stones or other sharp objects that can damage the collector hose.

Use hose pliers, not a saw, when cutting the collector hose. Deburr the end of the pipe internally and externally. It is important that no dirt or debris enters the system. Dirt and debris can cause a blockage in the heat pump.



Hose pliers

Minimum permitted bending radius

Minimum permitted bend radius is 1 metre. If sharper bends are required an elbow connector must be used. If the collector hose is damaged by too sharp a bend, it can be repaired by using a straight coupling.

Maximum length of the collector hose

The maximum length of the collector hose is based on the heat transfer fluid pressure drop. A heat transfer fluid consisting of bioethanol or glycol and water is recommended.

Heat pump model	Maximum length of collector hose with a single circuit (m) PEM 40x2.4 PN 6.3.	Collector hose with 2 circuits in parallel: Maximum length per circuit (m) PEM 40x2.4 PN 6.3.
Greenstore 6	600	-
Greenstore 7	500	1000
Greenstore 9	400	800
Greenstore 11	400	800



Note

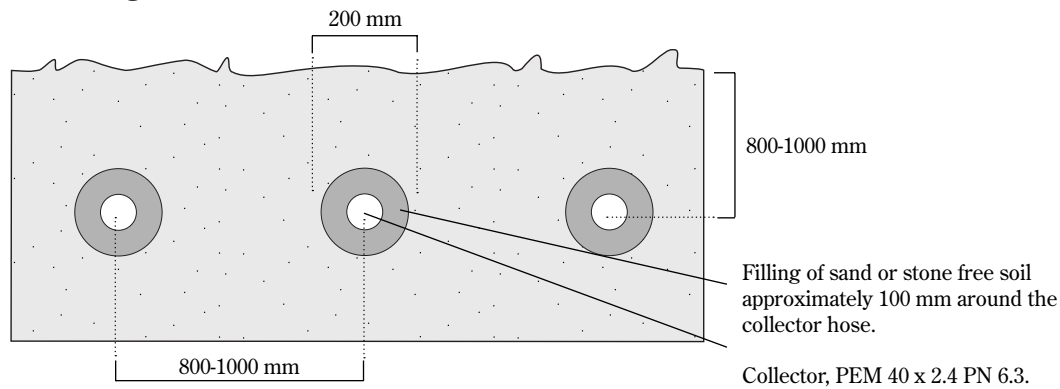
The maximum collector hose lengths for heat pump models are provided in the table.

In situations where the length of the collector hose needs to exceed the permitted value, you can connect the hoses in parallel.

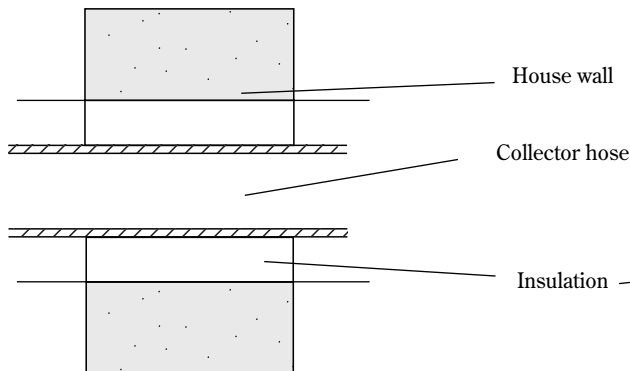
Outline drawings for the collector hose in the ground and through a wall

The drawings below show how to run the collector hose in the ground and through a wall. The soil filling around the hose must not contain stones.

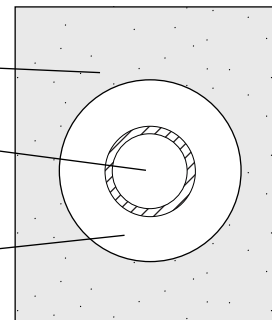
Collector in the ground



Example of the collector through the wall (from the side)



Example of the collector through the wall (cross section)



Insulation of pipework

All collector pipework should be insulated a minimum of 2 metres from the property. Pipework should also be insulated where the flow and return are closer than 800 mm to each other.



Note

Non-combustable pipe material must be used when routing the pipes indoors.

Connecting the collector hose to the heat pump

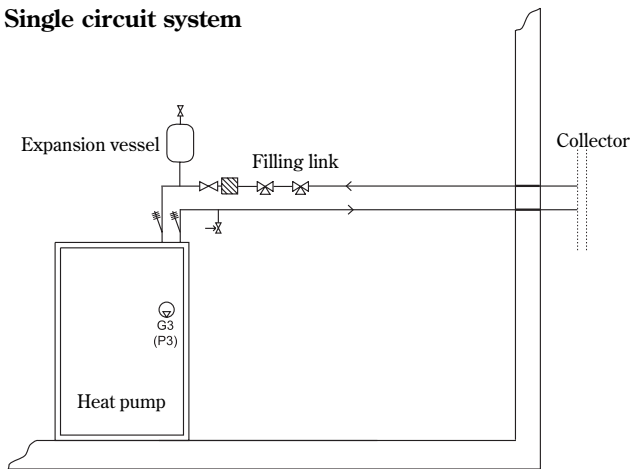
It is important that the collector hose has been leak tested before it is connected to the heat pump. The hose should be tested to 3-4 bar for a minimum of 1 hour to ensure there are no leaks. The leak test can be performed using an air compressor. The collector is usually pressurised during the laying process.

The collector hose can be connected to the heat pump with one or more circuits. In a multi-circuit system, the collector pipes are connected in parallel as illustrated below. The parallel pipes are connected to two manifolds. Each coil should have a shut off valve and a flow control valve. The flow control valve is adjusted so that the flow rate is the same in each coil. The coils should have the same length.

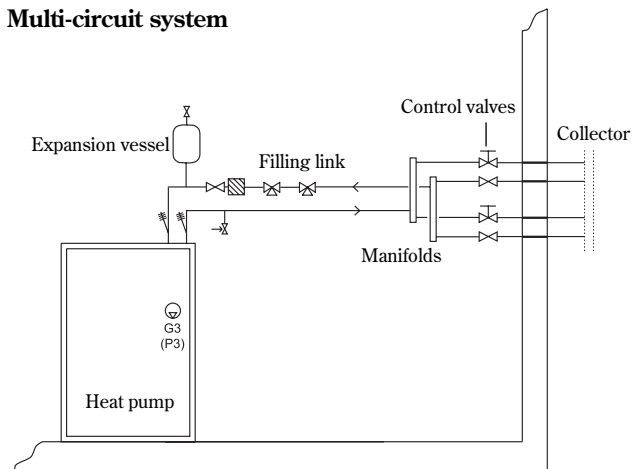
After the manifolds and the flow control valves, the coils are connected to a collecting pipe. A filling link, filter and the plastic expansion vessel supplied with the heat pump are connected to the collecting pipe. A pressure relief valve is connected to the outgoing pipe.

One circuit at a time is filled with heat transfer fluid. Keep the valves closed in the other loops during the process. Read more about filling under the heading *Connecting the heat pump to the heating system*.

Single circuit system



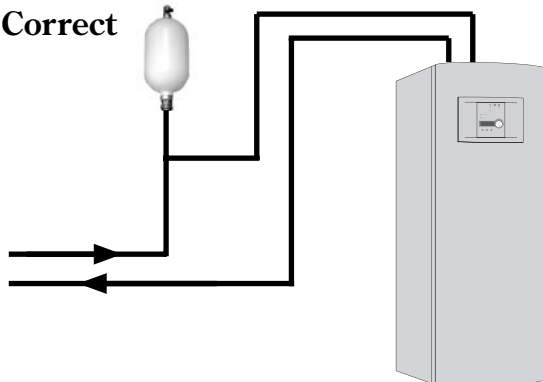
Multi-circuit system



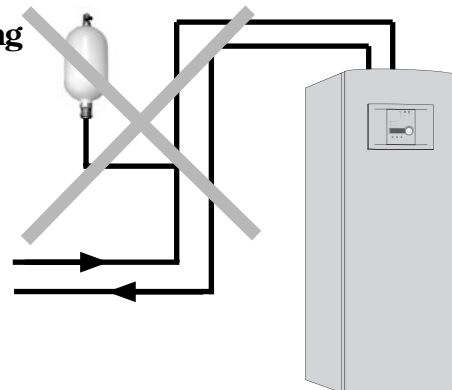
Installing the expansion vessel

The plastic expansion vessel for the collector circuit is supplied with the heat pump. It is important to position it at the highest point in the circuit, preferably above the heat pump. If there is a low ceiling making it impossible to fit the expansion vessel above the pump, it can be positioned as illustrated in the diagram to the left. It is important to install the expansion vessel so that any air disperses upwards. Air will remain in the circuit if the expansion vessel is fitted incorrectly (see the figure to the right).

Correct

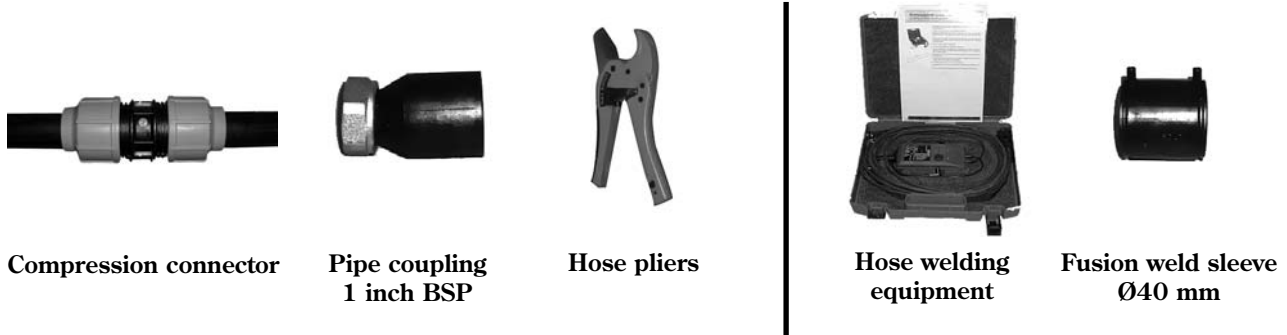


Wrong



Compact collector

The following equipment is used for the collector installation:



Install the collector as follows:

1. The compact collectors are installed horizontally. The collector should lean with the connection side at least 30 cm above the bottom to aid the venting process. Trench measurements: depth: 1 - 1.3 m, width: 2.5 m.
Minimum distance between two rows of compact collectors is 1 m.
Minimum distance between collectors and the house is 3 m. Trench digging must adhere to applicable regulations.
2. Installation of the collectors can be simplified by joining up to five collectors on the ground before they are positioned in the trench.
3. Place the collector modules in the trench, joined together using fusion welded or compression fittings.
4. Pressure test the system with air for 3-4 hours up to 4 bar prior to filling with heat transfer fluid. Reduce to 2 bar when backfilling.
5. Refill using sand or soil without stones.
6. Route the return line, 40 mm PEM, at a depth of 1 m.
7. Route the collector hoses up to the house wall. Hoses must be insulated over the final 2 metres towards the house. Non-combustable pipe material must be used when routing the pipes indoors.



Horizontal installation



Note

A maximum of 11 compact collectors can be installed in each row.

Insulation of pipework

All collector pipework should be insulated a minimum of 2 metres from the property. Pipework should also be insulated where the flow and return are closer than 800 mm to each other.



Note

Health and safety requirements to ensure that the sides of the trench are not liable to collapse must be observed.

Connecting the heat pump to the heating system

It is important that all previously mentioned preparations have been carried out before the heat pump is connected to the heating system. Also ensure the system has been power flushed before it is connected to the heat pump. Flushing protects the heat pump from contamination.

Oxygen must not enter the system. The heat pump is only intended to work in oxygen free systems. If oxygen enters the system it causes corrosion in the heat pump which could block the filter on the heating system side.



Note

Only qualified installers may carry out the installation. The installer should observe applicable regulations.

Fitting the unvented kit

Parts to assemble:



Expansion vessel



Expansion vessel hose



Wall mounting kit for expansion vessel



High flow rate inlet control set



Tundish

Connection:

Mount the expansion vessel with the wall mounting kit. Connect the expansion vessel hose to the expansion vessel.

Connect the expansion vessel, inlet control set and tundish as shown in the schematics on page 16-17.



Note

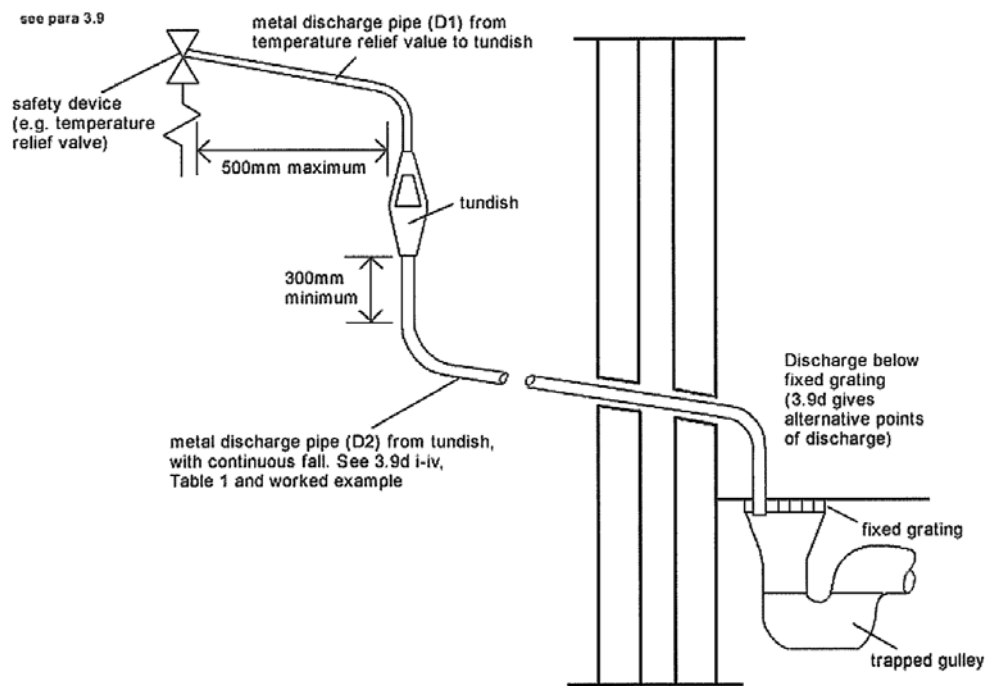
The relief valve connections should not be used for other purpose.

Detailed 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 500mm 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

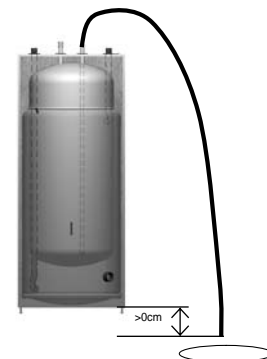
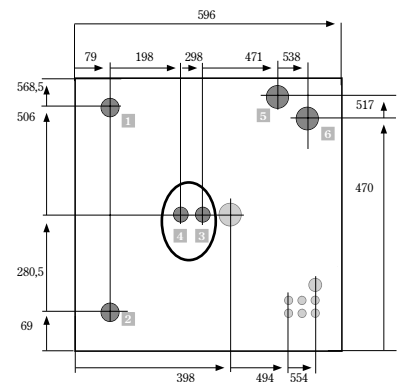
Diagram 1 – Typical discharge pipe arrangement.



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

How to drain the hot water cylinder

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 **3 - 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 **4 - 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.



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 4 (in the above diagram) and then flush the hot water tank.

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.

Connecting to the heating system without a bypass:

The heat pump can be connected to the heating system without a bypass, as the circulation in the heat pump and the heating system is managed by the integrated pump G2 (P2). However minimum flow of at least 70% of the nominal flow (see the table below) must be maintained throughout the year. Thermostatic radiator valves should be fully open and underfloor heating systems should have at least half of the coils fully open at all times. The control unit gives an alarm when the return differential temperature exceeds 13°C.

If the heating system is designed so that at least 70% of the nominal flow cannot be guaranteed, the heat pump should be connected using a bypass and an external main pump G1 (P1).

Hot water function:

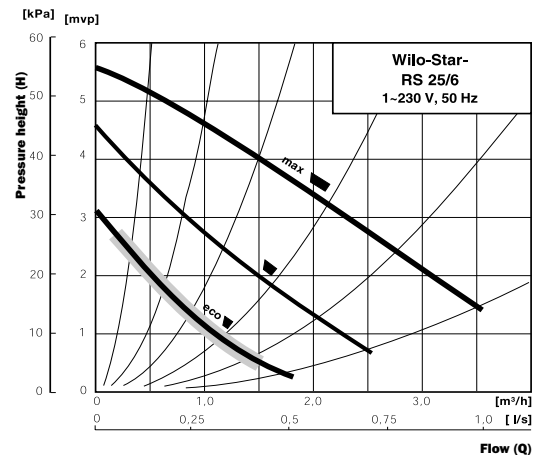
Hot water production is started by the hot water sensor T3 (GT3), and is stopped by the return sensor T9 (GT9).

Heating system pump

The circulation pump G2 (P2) is a Wilo Star 25/6-130.

Maximum system pressure drop in the heating system

The maximum system pressure drop and the minimum flow that the integrated circulation pump can operate with is presented in the table. **If the minimum flow cannot be guaranteed a bypass and an external main pump G1 (P1) should be installed.** Ensure that TRV's cannot close down and restrict the required flow.



Heat pump model	Nominal flow [*]	Minimum flow [*]	Max system pressure drop [**]
Greenstore 6	0.20 l/s	0.14 l/s	36.0 kPa
Greenstore 7	0.25 l/s	0.18 l/s	36.0 kPa
Greenstore 9	0.31 l/s	0.22 l/s	34.0 kPa
Greenstore 11	0.38 l/s	0.26 l/s	32.0 kPa

[*] litres/second

[**] kiloPascal

Connect heat pump Combi model to the heating system

The built-in control unit controls the heat pump using the outdoor sensor T2 (GT2) and the return sensor T1 (GT1) according to the outdoor compensated control curve. In the unlikely event the heat pump compressor is unable to meet the heating requirements, the electric heater starts automatically and together with the heat pump provides the required temperature. Hot water production is given priority over central heating. Hot water production is controlled by the sensor T3 (GT3), which is located in the hot water cylinder. When the water in the cylinder reaches the required temperature, heat is once more supplied to the heating system.

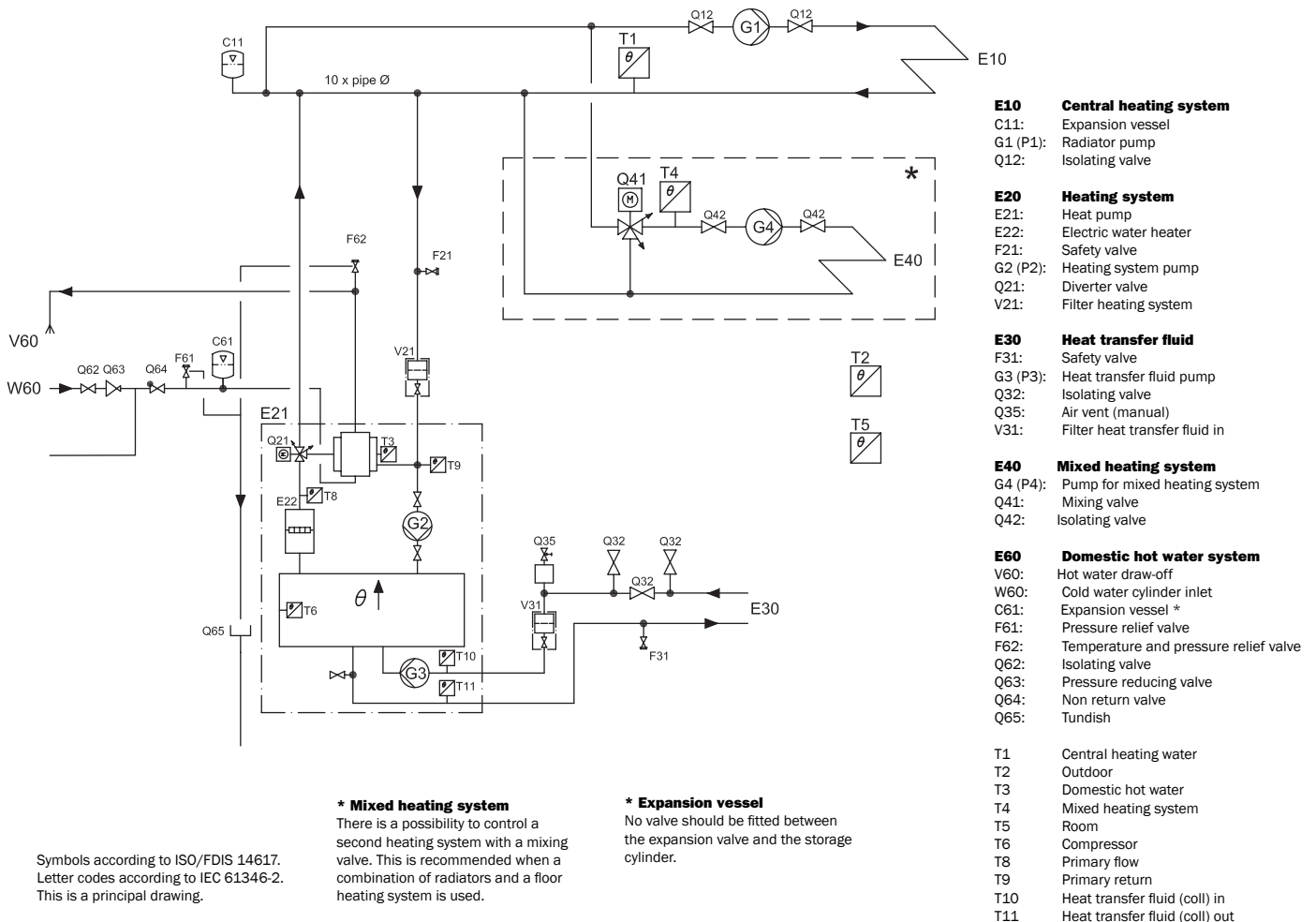
The control unit can also operate a second curve together with a mixing valve. The mixing valve curve must be set lower than the heat curve for the rest of the heating system. This extra function is used, for example, in a heating system that is a combination of radiators (higher temperature demand) and underfloor heating (lower temperature demand).

Connecting the sensors: Return sensor T1 (GT1) and Outdoor sensor T2 (GT2) must always be connected. Sensor T4 (GT4) is only connected if a mixing valve curve is used. The sensor T5 (GT5) is connected when the heat pump is to be influenced by a room sensor. A room sensor is supplied as standard with the heat pump.

An absolute prerequisite for this type of connection is that at least 70% of the nominal flow can be maintained throughout the year. Thermostatic valves must remain fully open in order to ensure this.

* If a bypass and external circulation pump is added, the flow over the heating system can be reduced down to 40% of the nominal flow for the heat pump. This means that at least 30% of the thermostatic valves must be fully open. If none of the above is possible, a 100 litre primary water storage tank should be fitted.

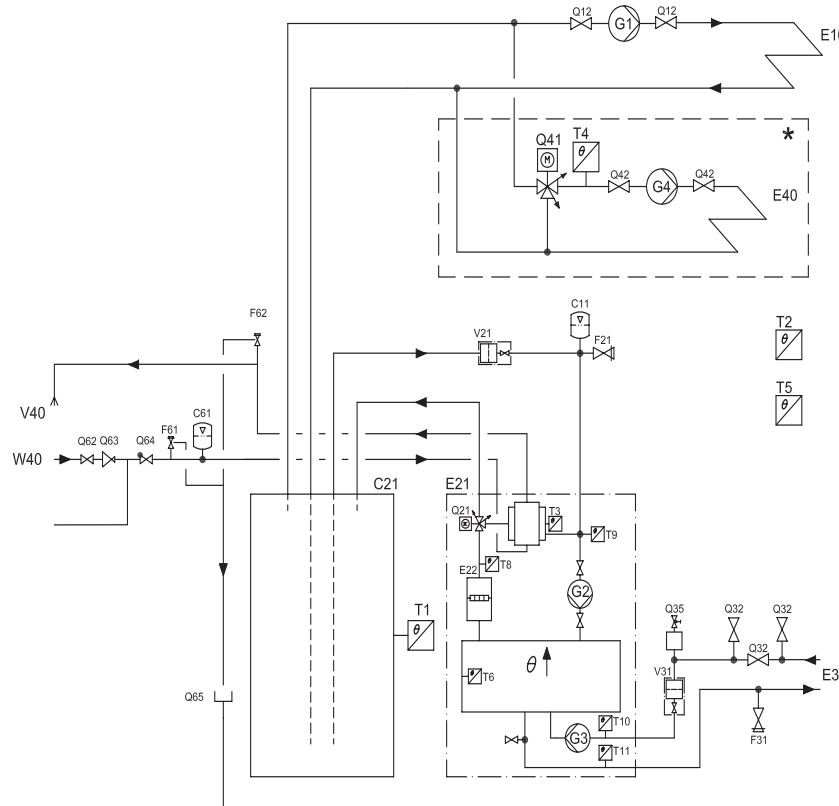
The length of the bypass should be at least 10 times the inner diameter of the pipe.



Individual temperature control in each room and increasing volume of internal water

This solution is used to control the temperature of each room, for example, where thermostatic valves are used on the radiators in each room. The function of the heat pump is to maintain a temperature in accordance with the heat curve (depending on outdoor temperature) in the 100 litre primary water storage tank. The water is then distributed from the store to the heating system. This solution also allows the overall volume of the installation to be increased if the volume of the heating system is inadequate, for example with one or two fan-assisted radiators.

This system design is intended to ensure that the heat pump is able to continue operating if the flow falls below 70% of the nominal system flow.



* Mixed heating system

There is a possibility to control a second heating system with a mixing valve. This is recommended when a combination of radiators and a floor heating system is used.

* Expansion vessel

No valve should be fitted between the expansion valve and the storage cylinder.

E10 Central heating system

C11: Expansion vessel
G1 (P1): Radiator pump
Q12: Isolating valve

E20 Heating system

E21: Heat pump
E22: Electric water heater
F21: Safety valve
G2 (P2): Heating system pump
Q21: Diverter valve
V21: Filter heating system

E30 Heat transfer fluid

F31: Safety valve
G3 (P3): Heat transfer fluid pump
Q32: Isolating valve
Q35: Air vent (manual)
V31: Filter heat transfer fluid in

E40 Mixed heating system

G4 (P4): Pump for mixed heating system
Q41: Mixing valve
Q42: Isolating valve

E60 Domestic hot water system

V60: Hot water draw-off
W60: Cold water cylinder inlet
C61: Expansion vessel *
F61: Pressure relief valve
F62: Temperature and pressure relief valve
Q62: Isolating valve
Q63: Pressure reducing valve
Q64: Non return valve
Q65: Tundish

T1: Central heating water
T2: Outdoor
T3: Domestic hot water
T4: Mixed heating system
T5: Room
T6: Compressor
T8: Primary flow
T9: Primary return
T10: Heat transfer fluid (coll) in
T11: Heat transfer fluid (coll) out

Filling the heating system

1. Open and close the filling loop between the cold water system and the heating system in short time intervals whilst observing the pressure guage.
2. Vent the system and refill to the correct pressure.

Filling the collector circuit

The collector circuit is filled with heat transfer fluid to be able to collect energy from the ground. A heat transfer fluid consisting of bioethanol or glycol and water is recommended. The freezing point should be approximately -15°C .

Fill the collector circuit

1. Connect the two hoses from the filling pump to the filling link as shown in Diagram 1.



Note

Care should be taken when filling the system, not to get any water on the electrical components. Keep the side panels on the heat pump when filling the system.

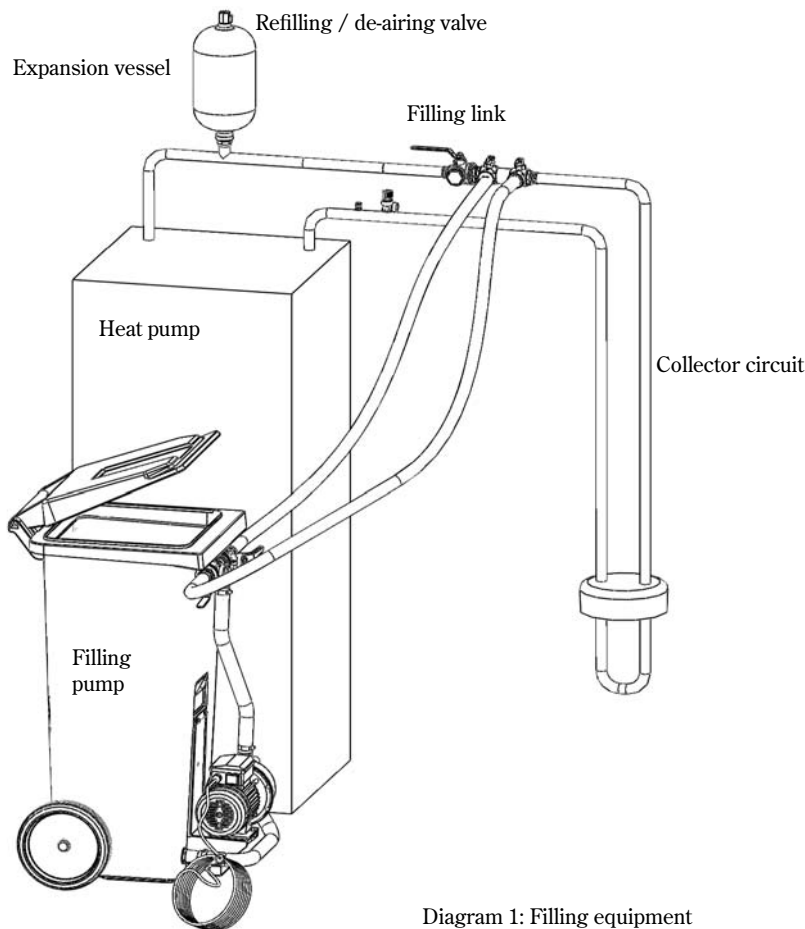


Diagram 1: Filling equipment

- Fill the filling pump with heat transfer fluid. If mixing the solution on site, pour water first into the filling pump, then anti-freeze liquid. See table 1 and 2 for correct mixture.

	Hose type: 40/35	
Anti-freeze type	Water (l)	Anti-freeze (l)
Bioethanol	0,71	0,29
Propylene/ethylene glycol	0,65	0,35

Table 1: Mixing ratio in litres/metre

Anti-freeze type	Water	Anti-freeze
Bioethanol	75%	25%
Propylene/ethylene glycol	65%	35%

Table 2: Mixing ratio in percentage by weight

- Set the valves on the filling link in filling mode.
- Set the valves on the filling pump in mixing mode.
- Start the filling pump to start mixing heat transfer fluid in the barrel. Mix for two minutes.

Repeat points 6 to 9 for each circuit where applicable. The other circuits must be closed.

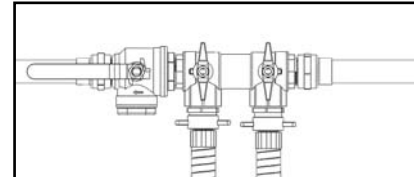
- Set the valves on the filling pump in filling mode to start filling the collector system.

Example:

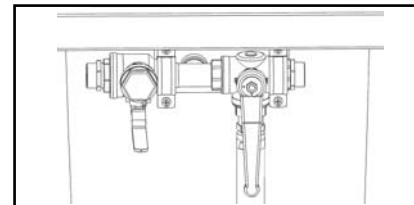
200 metres of hose with anti-freeze gives 200×0.29 litres anti-freeze/ metre = 58 litres of anti-freeze and 200×0.71 litres of water/ metre = 142 litres of water. 40/35 indicates 40mm outside diameter PEM pipe with 35mm inside diameter.

**Note**

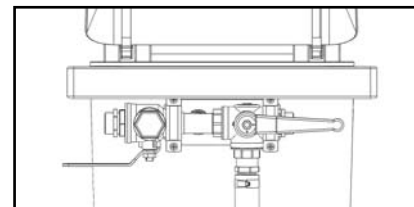
If using a premixed solution of glycol and water (e.g. Tyfocor L) the solution must be diluted to suit the requirements above



Filling link in filling mode



Filling pump in mixing mode



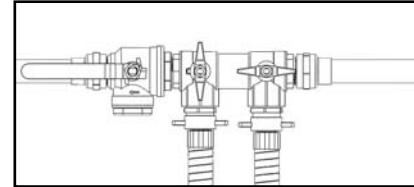
Filling pump in filling mode

**Note**

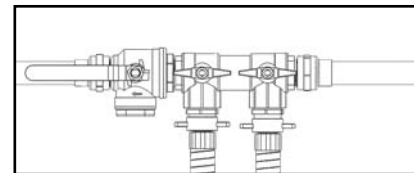
The first litres of fluid from the return pipe are often contaminated. Therefore collect these litres in a separate tank.

7. When the barrel is nearly empty, stop the pump and fill the barrel with more heat transfer fluid.
8. When the system is full and air no longer comes from the return pipe, run the system for at least a further 60 minutes. Use the internal HTF pump to speed up the air venting. Enter manual operation on the heat pump control panel under menu 5.3 and start the circulation pump G3(P3). See Commissioning the heat pump\Manual test run of the heat pump.
9. When venting is complete, set the valves on the filling link in pressurize mode and pressurize the system to 2 bar. Make sure that the expansion vessel has an air pocket corresponding to approximately 1/3 of the total volume, by using the de-airing valve on the expansion vessel.
10. Set the filling link in normal operation mode and stop the filling pump. Disconnect the hoses and insulate the filling link using the supplied insulation.

Commiss./Service	
Manual operation of	
all functions	5.3
Return	Select

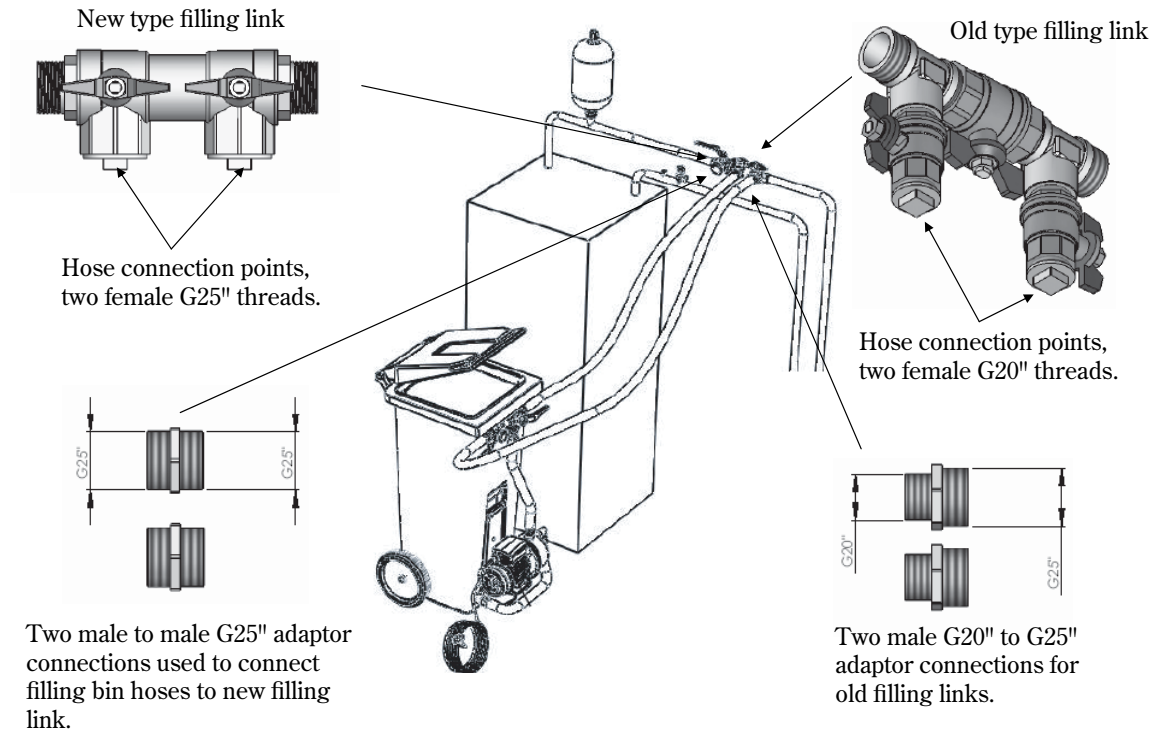


Filling link in pressurize mode



Filling link in normal operation mode

Adaptor fittings for different filling links



Connecting the heat pump to the power supply

Ensure the electricity has been switched off before connecting the heat pump to the mains. Check that cables and printed circuit boards are intact and connected.

High and low current cables should be routed separately in order to avoid interference on the sensors.

A wiring diagram is supplied with the heat pump.

A description of external connections is given in this section.

Examples of external connections include room and outdoor sensors and mixing valves.

The mains connection as well as the material used to make this connection must comply with current electrical regulations.

The heat pump electrical supply must be protected with an MCB or fuse as specified in the table on page 41. Wiring must be H07RNF type. Supply must be L+N+E 230V single-phase. Also a residual current device (RCD) with a rating of $\Delta I=300$ mA should be installed in the supply to the heat pump.

Installation of sensors

Install the **Return sensor T1** (GT1) in direct contact with the return pipe, approximately 1-2 m from the heat pump and, if possible, after a 90° bend.

Install the **Outdoor sensor T2** (GT2) on the North side of the house at least 50 cm from ground level.

Hot water sensor T3 (GT3) is factory fitted in the integrated hot water cylinder.

Install the **Room sensor T5** (GT5) in a room in the center of the house. The room sensor should not be influenced by other heat sources or direct sun light.



Warning

The electrical installation may only be performed by a qualified electrician.

The main power supply must be disconnected before working on the heat pump.



Note

A combined overcurrent and residual current device (RCBO) can be used in place of the two separate devices.



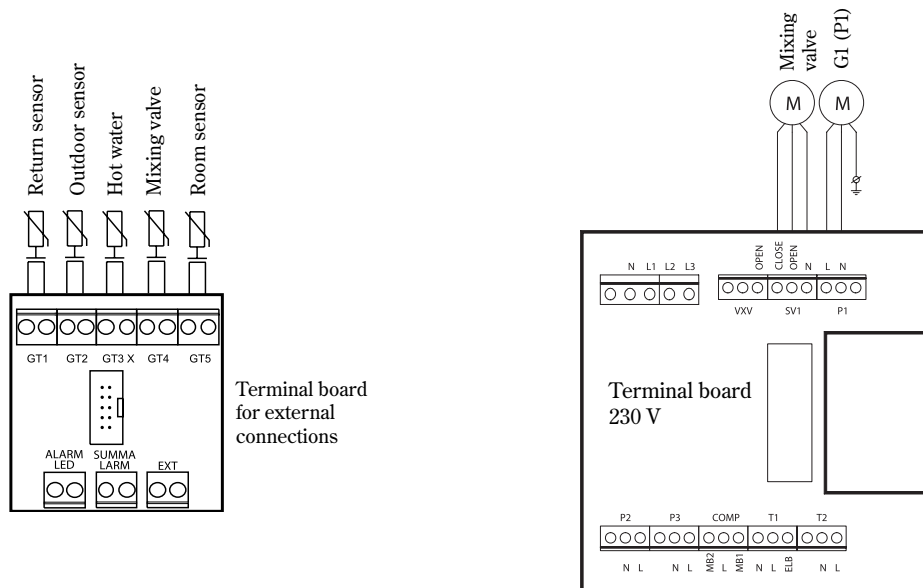
Note

Only the room where the room sensor is located can influence regulation of the temperature.

External connections to the heat pump

The external connections must be made for the heat pump:

- **Power supply 1-phase:**
The power supply is connected to terminals L, N, and Earth.
- **Mixing valve on the heating circuit:**
If a second heat curve with a mixing valve is to be used, the mixing valve is connected to terminal block SV1.
- **External main pump in the heating system G1 (P1):**
The external main pump must be connected to the terminal block if a bypass is required. The pump is connected to terminal P1.
- **Return sensor T1 (GT1):**
Must always be connected. Connect to terminal GT1.
- **Outdoor sensor T2 (GT2):**
Must always be connected. Connect to terminal GT2.
- **Hot water sensor T3 (GT3):**
Is connected to terminal GT3 X on the terminal block.
- **Mixing valve sensor T4 (GT4):**
Is connected when a mixing valve for a second heat curve is to be used. Connect to terminal GT4.
- **Room sensor T5 (GT5):**
Is connected if room sensor influence is required.

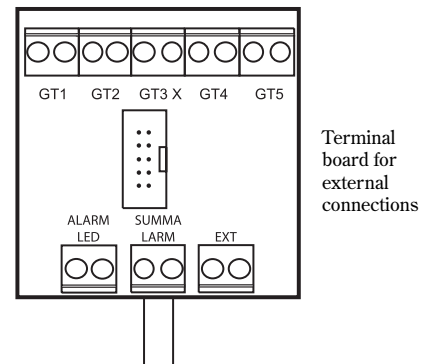


Connecting the general alarm, external input and softstart

General alarm

The general alarm is activated irrespective of which alarm has occurred. When a general alarm is required on the heat pump, it is connected according to the diagram opposite. The contact for the general alarm output carries no current and it closes at a general alarm.

Connect max 24 V and 100 mA on the contact.

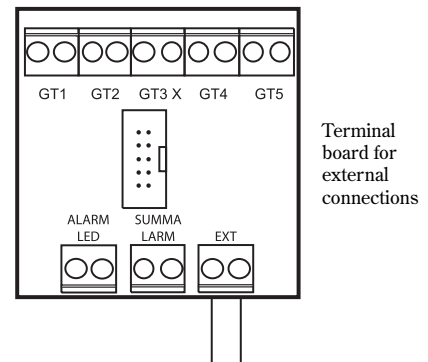


Terminal board for external connections

External input

The heat pump includes prepared functions to permit the heating to be controlled externally. The input to the heat pump can be programmed for different functions on the control unit. These Terminal functions are available from menu 5.7 (Select external controls).

The input must be short circuited to activate the function. Note that the contact must carry no current.



Terminal board for external connections

Softstart

The softstart reduces the compressors starting current.

The softstart wiring can be found on the electrical connection diagram supplied in the heatpump

Installer and service menu (I/S)

The controls contain an installer section of menus for settings, e.g. for commissioning. These are accessed from the control panel by holding down the menu button for approximately ten seconds.

The menu displays are divided into lines and each display has a number to make it easy to find. If there is no activity for 30 minutes the menu display automatically returns to Customer level 1.

The Installer level also includes Customer levels 1 and 2.

How to use the control panel

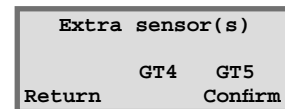
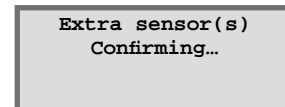
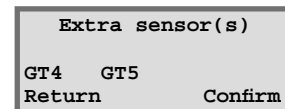
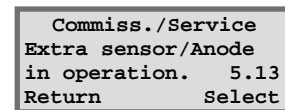
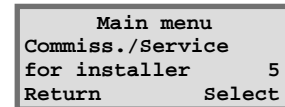
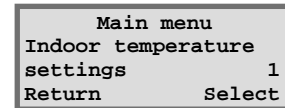
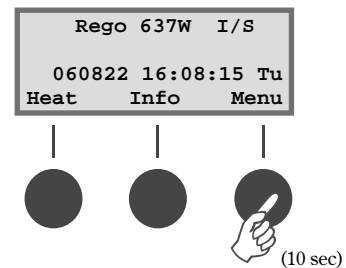
The following example shows how to use the control panel. The example shows how you move to menu display 5.13 and confirm the external sensors. More information about the control panel is found under the heading Control Panel in the User section.

1. Press and hold the menu button for approximately ten seconds until Access = SERVICE is shown on the menu display. Press the Menu button again.
2. The menu display Indoor temperature settings (menu 1) is shown.
3. Turn the menu dial clockwise (to the right) until the menu Commiss./Service for installer (menu 5) is reached. Now press the Select button.
4. Turn the menu dial clockwise until the menu Extra sensor/Anode in operation (menu 5.13) is reached. Now press the Select button again.
5. The menu display Extra sensor(s) is shown. Confirm the extra sensors that have been connected by pressing the Confirm button.
6. The text Confirming... is briefly shown in the menu display. This means the setting is being registered in the heat pump.
7. When the setting has been registered the previous menu display is shown. Press the Return button twice to return to the main menu again.



Warning

The Installer and service menu (I/S) is intended for use only by installers. Under no circumstances should the user access this level.



Commissioning the heat pump

The heat distribution and heat transfer fluid circuits should be filled and fully vented before commissioning. Always check that there are no leaks before back filling with earth.

If radiators are used, they should be fully open when connecting to an existing heating system. When connecting to an underfloor heating system at least half of all the floor coils should be open. When connecting a fan-assisted radiator system the fans are started first and then the valves on the fan-assisted radiators are opened fully.

Manual test run of the heat pump

Instead of starting the heat pump directly in normal mode, manually test run the circulation pumps and valves. This is recommended as in this mode possible faults can be found. In the menu display Manual operation of all functions (menu 5.3) all functions can be run manually. Press the Select button to start test operations. When exiting from the menu display the heat pump returns to normal mode.

Seized circulation pumps

Check that the circulation pumps have not seized before starting the heat pump for the first time.

Fully remove vent plug, check and if necessary free the pump rotor by turning the slotted end of the shaft with a screwdriver

Start the heat pump

1. Connect mains to the heat pump and press the ON/OFF switch on the control panel.
2. Activate the Installer/Service menu by pressing the Menu button until the text Access = SERVICE is shown on the menu display.
3. Temporarily adjust Temp. incr. / decr. to maximum value. To avoid having to wait for the heat pump restart timer go to the menu Fast restart of heat pump (menu 5.6) and quickly restart the heat pump. If the heat pump does not start, press the Info button to see if a heating demand exists.
4. Check the sight glass inside the heat pump during start up. Bubbles may appear in the sight glass for up to five minutes during start up after which time they should disappear. Bubbles present when the heat pump is running after this period are an indication of a fault. They are probably due to insufficient refrigerant. Read more about the fault symptom under the heading What to do if a fault occurs.

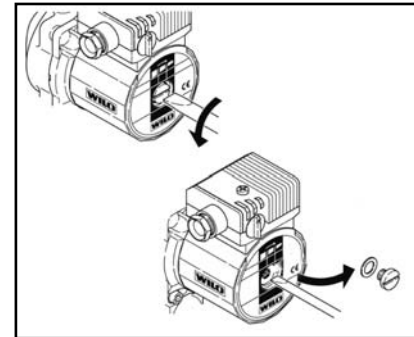


Note

Further important information on the control unit can be found in the user guide.

Therefore read the entire documentation before commissioning is started.

Commis./Service	
Manual operation of	
all functions	5.3
Return	Select



Press the power switch ON/OFF

Rego 637W I/S	
060822 16:08:15 Tu	
Heat	Info Menu

Commis./Service	
Fast restart	
of heat pump	5.6
Return	Select



Check the sight glass

5. Make the necessary settings on the control panel.

a. Confirm that external sensors are connected. If T3 (GT3), T4 (GT4) or T5 (GT5) have been connected, confirm these in the control panel so the control unit knows they are installed. The displays presented by the sensors are only shown if the sensors have been confirmed.

```

Commiss./Service
Extra sensor/Anode
in operation.    5.13
Return          Select
    
```

b. Set the maximum output to be used by the electric heater. Choose between 1/3, 2/3 and 3/3. It is important that the electrical installation is adapted to handle the maximum electrical output. On delivery the control unit is set to 2/3. For more information about this see section Technical information. Setting 1/3 provides an additional 3kW, 2/3 provides 6kW and 3/3 provides 9kW.

```

Commiss./Service
Select conn capacity
electrical cass. 5.2
Return          Select
    
```

Menu displays which may need adjustment or checking

Temperature settings

Set the hysteresis for heat pump on/off switching on the return sensor T1 (GT1). A lower value gives a shorter range between start and stop. Less than 5°C should be avoided when using regular radiators. For underfloor heating 3-4°C is recommended.

```

Temperature settings
Heat curve
hysteresis      1.4
Return          Select
    
```

Set the neutral zone for the mixing valve in a heating system with two heat curves. In the neutral zone the mixing valve receives no signal to open or close. Only applies when the sensor T4 (GT4) is connected.

```

Temperature settings
Mixing valve curve
neutral zone    1.8
Return          Select
    
```

Set the maximum temperature in the mixing valve circuit. Set a maximum temperature for the underfloor heating system if applicable. On delivery of the heat pump the value is 60°C. Only applies when the sensor T4 (GT4) is connected.

```

Temperature settings
Mixing valve curve
max at GT4     1.9
Return          Select
    
```

Hot water settings

Set the temperature in the hot water cylinder.

```

Hot water setting
Setting of hot water
temperature
Return          Select
    
```

Clock setting of electric heater

The control unit can be set so that the electric heater is fully blocked during certain periods of the day. Read more under the heading Extra functions (Customer level 2)/Timer control about how to set the control unit.

```

Clock setting
Clock sett. add heat
accord. to clock 4.2
Return          Select
    
```

Commissioning/Service

Set when the electric heater should be activated, if necessary. On delivery the heat pump is set to activate the heater when necessary. Choose between yes or no. If no is chosen, the electric heater only engages during alarms, extra hot water and hot water peaks.

```

Commiss./Service
Select function
add.heat yes/no 5.5
Return          Select
  
```

The Fast restart function avoids having to wait for the normal restart time to start the heat pump. If there is a need for heating or hot water the heat pump starts within 20 seconds. The setting must be repeated each time a fast restart is made.

```

Commiss./Service
Fast restart
of heat pump    5.6
Return          Select
  
```

Wait approximately 5 minutes after switching off the compressor before activating Fast restart of the heat pump, to allow the cooling circuit time to equalise pressure.

In the menu 5.7 set whether the heat pump, additional electric heater and hot water charging should be controlled externally. When the external input on the control unit is short circuited one of the following choices can be made:

```

Commiss./Service
Select external
controls        5.7
Return          Select
  
```

- 0 : No effect (factory setting).
- 1 : HP, electric heater and hot water stop.
- 2 : HP no effect, electric heater and hot water stop.
- 3 : HP and hot water no effect, electric heater stops.
- 4 : HP and electric heater no effect, hot water stops.

Select the language required for the menu texts. The default is English.

```

Commiss./Service
Selection of
language menu  5.8
Return          Select
  
```

The heat pump is set for continuous operation of the heating system pump on delivery. In systems with a bypass, you can choose whether the heating system pump starts and stops with the compressor.

```

Commiss./Service
Select operation
alt. for P2    5.10
Return          Select
  
```

Choose whether the heat transfer fluid pump shall run continuously or start and stop with the compressor. The heat transfer fluid pump should in normal mode always start and stop with the compressor.

```

Commiss./Service
Select operation
alt. for P3    5.11
Return          Select
  
```

Select this menu to see the version number of the control unit.

```

Commiss./Service
Display software
version number 5.12
Return          Select
  
```

Confirm the extra sensors T3 (GT3), T4 (GT4) and T5 (GT5) that are connected externally. On confirmation, the control unit stores information about the sensors to be used.

```

Commiss./Service
Extra sensor/Anode
in operation.  5.13
Return          Select
  
```

Timer readings

There are a number of different menu displays to help check the status of the heat pump. The heat pump status is shown by the timer readings in menu 6.

Read the electric heater timer

The function shows the amount of time remaining before the electric heater is activated. If there is no countdown then there is no need of additional heat.

```

Timer readings
Read
add. heat timer 6.2
Return          Select
    
```

Read the start delay

The function shows the time remaining until the heat pump starts again after a previous stoppage. The heat pump will not start if there is no heating or hot water demand.

```

Timer readings
Read
start delay      6.4
Return          Select
    
```

Setting the electric heater

Additional heat timer

The function gives the possibility to set the time that should elapse before the electric heater starts if the heat pump cannot produce sufficient heat on its own. On delivery the timer is set to one hour.

```

Additional heat
Setting additional
heat timer      8.1
Return          Select
    
```

Ramp time open

Here you set the time that is required for the electric heater to go from 0 to 100%.

```

Mixed add. heat
Setting of
ramp time open 8.3.4
Return          Select
    
```

Ramp time close

Here you set the time that is required for the electric heater to go from 100 to 0%.

```

Mixed add. heat
Setting of ramp
time close     8.3.5
Return          Select
    
```

Show connected electric capacity

Check how much the electric heater (in percent) has been enabled. See more information under the heading Technical information.

```

Additional heat
Show connected elec.
capac. in op.  8.5
Return          Select
    
```

Return to factory settings

Return to the factory settings in menu 12. If on Customer level 2 when selecting Return to factory settings, only the settings in the displays accessible from Customer level 1 and 2 will be reset. If on the Installer/Service level when selecting Return to factory settings only the displays accessible from Installer / Service level are reset.

```

Main menu
Return to
factory settings 12
Return          Select
    
```

Drying program for floor screed

When the heat pump has been installed in a newly built house with under-floor heating, the Drying for floor screed function can be used.

The function is designed to slowly heat up the floor for a set number of days. The temperature is then maintained for a set number of days, finally allowing the floor to cool slowly for a set number of days. The heat pump works during drying operations with the hysteresis set in the display 1.4.

Set how many days you want the heating phase to last.

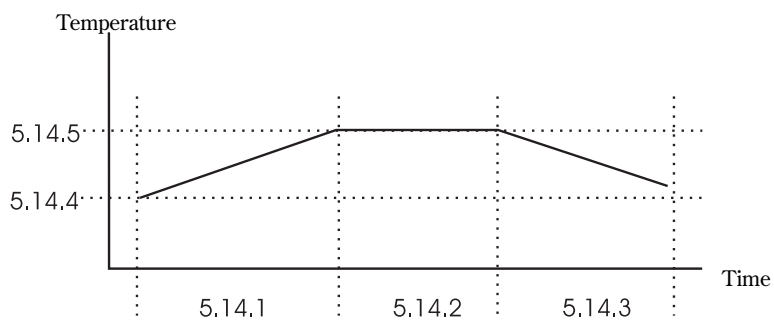
Set how many days you want the floor heating system to maintain the maximum drying temperature.

Set how many days you want the cooling phase to last.

Set the start and stop temperatures for the drying program.

Set the maximum temperature that the drying program should work at.

The function is activated and deactivated here. Drying program.



Note

Due to the continuous operation which this function requires the electrical energy usage will be more than in normal operation. This will be reflected in the heat pump running costs during the drying process.

During drying operations the heat pump does not produce any hot water and is not affected by timer controls. Once the drying program has finished the heat pump returns to normal mode.

Drying program	
No. of days for heating	5.14.1
Return	Select

Drying program	
No. of days for max temp	5.14.2
Return	Select

Drying program	
No. of days for cooling	5.14.3
Return	Select

Drying program	
Start/stop temperature	5.14.4
Return	Select

Drying program	
Max temp. during drying	5.14.5
Return	Select

Drying program	
Active drying	5.14.6
Return	Select



Note

When a second heat curve with mixing valve is installed, it works according to the normal heat curve. The mixing valve must be opened manually when this circuit is to be included in the drying program.

Start the heat pump with only additional heat

It might be necessary to run the heat pump before work on the heat transfer fluid circuit is complete. Start the heat pump with heat from the electric heater only. The heating system must have been filled and vented to run the heat pump with electric heater only. Go to the menu display Select function only add. heat (menu 5.4) and press the Select button. If the arrow points towards Normal operation press the Adjust button. Turn the menu dial until the arrow points towards Only add. heat. Now press the Save button. This function ensures that the electric heater heats both the central heating water and the domestic hot water (DHW).

Commiss./Service	
Select function	
only add. heat	5.4
Return	Select



Note

Do not forget to return this function to normal mode.

Important points to check after start up

In the first period after commissioning particular attention should be paid to the pressure and levels in the heat distribution and heat transfer fluid circuits. After a short period of operation it may be necessary to top up the heat transfer fluid.

On delivery the motor cut-out setting is determined by a value produced during hot water charging and a stable voltage. The recommended motor cut-out setting may not always be suitable as the voltage in the mains can fluctuate. The setting may therefore, from case to case, need to be adjusted. Adjust the setting using a clip-on ammeter when the heat pump is producing hot water. Set the motor cut-out level 10% above the highest measured value.

For the heat pump to perform at its best, it is important to check the flow on the primary circuit of the heat pump. Usually, the heating system pump has a speed selector switch. This must be set correctly for the pressure drop in the systems. A recommended temperature difference over the heat pump on the primary circuit is between 7-10 °C and on the collector circuit between 2-4 °C. Check this by going to menu display 3 and reading the sensors T8 (GT8) and T9 (GT9) as well as T10 (GT10) and T11 (GT11).

It is important in systems with a bypass that the flow in the heating system exceeds the flow over the heat pump. If this is not the case, the heat pump flow goes back via the bypass to the heat pump return, which may cause the heat pump to give an alarm for a high return temperature. The flow over the heating system should be enough to ensure that the entire radiator surface is kept warm. In this way the heat emitting surface increases and in doing so the flow temperature from the heat pump is kept down.

The heating system should be vented once again after test operations and the system pressure checked and topped up if necessary.

Motor cut-out setting



Maintenance

The heat pump requires a minimum of maintenance, however, it is recommended that the heat pump is checked annually by a qualified installer.

- Sight glass
- Expansion vessel
- Particle filter



Warning

The main power supply must be disconnected before working on the heat pump.

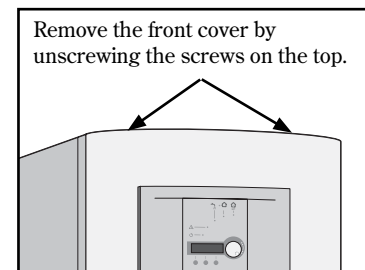
Only an accredited refrigeration company is permitted to work on the refrigerant circuit.

Unscrew the front cover

Open the front cover to access some of the maintenance areas, e.g. the sight glass and filter. The front cover is secured at the top by two screws.

To remove the front cover from the heat pump:

1. Unscrew the two screws on the top. (See picture)
2. Tilt the front cover forwards.
3. Lift the front cover up to release the lower edge.



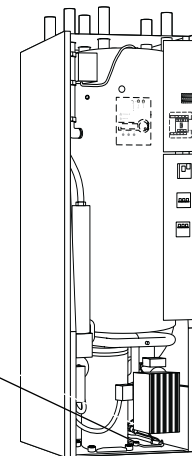
Sight glass

Bubbles may be seen for several minutes during the initial start up of the appliance. If bubbles are there continuously during operation, contact the customer service department.

Sight glass



If the sight glass shows green this means there is no moisture in the system. If it is yellow, there is moisture in the system. If this happens, contact the customer service department.



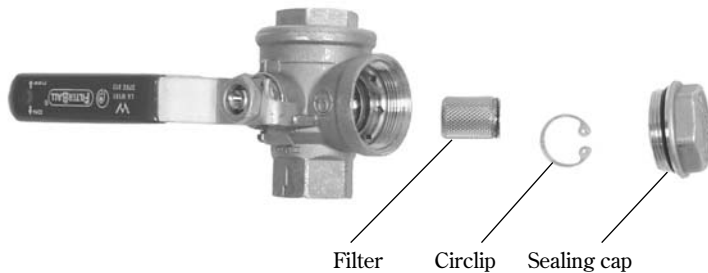
Filters

The filters ensure that no debris enters the heat exchangers. Over time the filters can become blocked and will require cleaning. There are filters on both the primary and collector circuits. To clean the filters:

1. Disconnect the heat pump from the mains electricity supply.
2. Close the valve and unscrew the sealing cap.
3. Remove the circlip holding the filter in the valve using the circlip pliers supplied.
4. Lift out the filter from the valve and wash clean with water.
5. Refit the filter, the circlip and sealing cap.
6. Open the valve and start the heat pump.

**Note**

The filters may be concealed by insulation material or an enclosure.



Protective anode

A protective anode is located in the top of the cylinder with the task of preventing corrosion. The hot water cylinder must be filled with water in order for the anode to work.

If an error occurs, an alarm is activated in the control unit.

Expansion vessel

A plastic expansion vessel is connected to the heat pump heat transfer circuit (collector circuit). The level in the expansion vessel should not fall below the minimum level of 1/3 of the volume in the vessel.

The heat pump **must** be operating all the time while filling.

1. Remove the plug from the valve on top of the tank. Now carefully open the valve (figure 1).
2. Check that the valve is fully open (figure 2).
3. Fill with anti-freeze or water (to 2/3) with a clean watering can or similar (figure 3).
4. Close the valve and refit the plug (figure 4).

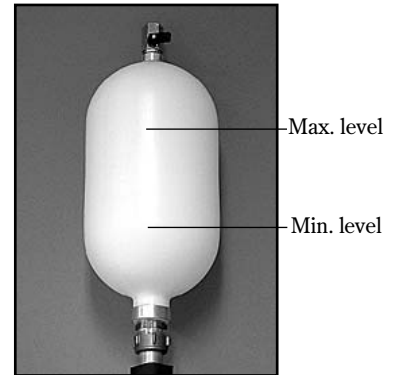


Figure 1



Figure 2



Figure 3



Figure 4

What to do if a fault occurs

The control unit has an advanced monitoring system that gives alarms if anything unforeseen happens in the heat pump. Most alarms are rectified by the user without any damage to the heat pump. Contact the Technical support in case of repeated alarms.

Technical support

Technical Pre & Post sales
Tel: 08705-266241
Fax: 01905-752741

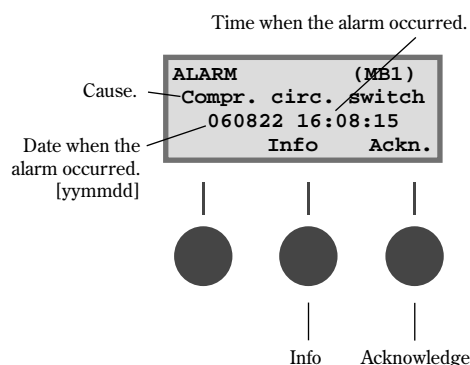
Example of an alarm:

Info button:

Press the Info button and turn the menu dial to display information of possible actions to rectify the alarm.

Ackn. button:

Press the Ackn. button, the alarm indicator on the control panel goes out and the heat pump starts again within 15 minutes if there is a heating requirement. If the fault has not been rectified the indicator will remain illuminated. Should several alarms have occurred on the heat pump, turn the menu dial clockwise for more information of each alarm.



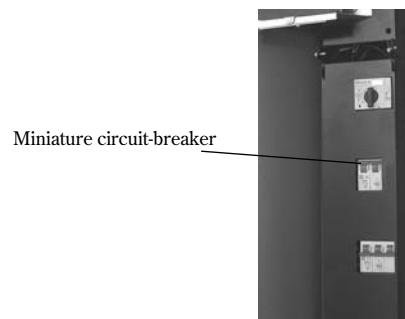
Menu display dimmed

Possible cause 1: Power failure in the property consumer unit.

- Action:
1. Check the fuses in the property consumer unit.
 2. If a miniature circuit-breaker has tripped, reset the circuit breaker. Change the fuse if necessary.
 3. The heat pump automatically returns to its operating mode 15 minutes after the fault has been rectified.

Possible cause 2: The heat pump's miniature circuit-breaker has tripped.

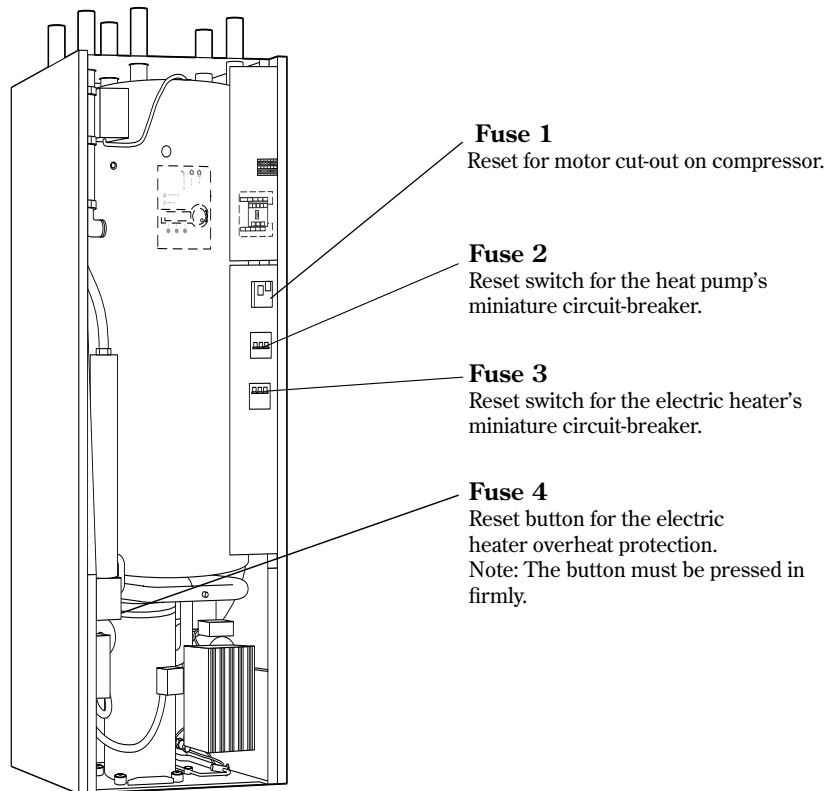
- Action:
1. Reset the heat pump's miniature circuit-breaker by pushing up the centre toggle switch.
 2. The heat pump automatically returns to its operating mode 15 minutes after the fault has been rectified.



Note

For technical reasons the heat pump does not restart until 15 minutes after a stoppage.

Fuses and reset buttons on the heat pump



All alarms

There are many reasons why an alarm occurs. However, there is never a risk involved in resetting an alarm. All the alarms that can appear in the menu display are described on the following pages. The descriptions give an idea about the nature of the alarm and how to rectify it. The text often refers to different fuses and reset buttons on the heat pump as shown in the diagram above.

List of all alarms:

- Motor cut-out compressor
- Motor cut-out HTF pump
- Compressor temperature
- Low pressure switch
- High pressure switch
- Electric heater
- High return temperature to the heat pump
- Heat transfer fluid temperature
- High heat transfer fluid delta
- Sensor fault
- Heat transfer fluid temperature in under limit and heat transfer fluid temperature out under limit
- Protective anode

Motor cut-out compressor (MB1)

Possible cause 1: Intermittent fault or overload on the power supply.

- Action:
1. Press the Ackn. button.
The alarm indication goes out even if the fault has not been rectified.
 2. Reset the motor cut-out on the heat pump (Fuse 1).
 3. Wait for the heat pump to start.

Possible cause 2: Current level (A) on the motor cut-out is set too low.

- The current drawn by the compressor varies during summer/winter operations.
- Action:
1. Contact the Technical Support Department.

Possible cause 3: Contactor or cut-out faulty, or loose electrical connections to the compressor.

- Action:
1. Contact the Technical Support Department.

Possible cause 4: Compressor error.

- Action:
1. Contact the Technical Support Department.

The menu display shows:

ALARM	(MB1)
Compr. circ. switch	
060822 16:08:15	
Info	Ackn.



Note

The reset switch for the compressor can be found under heading *Fuses and resetting buttons on the heat pump.*

Motor cut-out HTF pump (MB2)

Possible cause 1: The HTF pump is blocked due to contamination.

- Action:
1. Press the Ackn. button.
 2. Loosen the vent screw and remove the dirt.
 3. The pump may be freed with the aid of a small screwdriver. The alarm indication goes out even if the fault has not been rectified.

Possible cause 2: Faulty electric motor on HTF pump.

- Action:
1. Contact the Technical Support Department.

Possible cause 3: Temporary error.

- Action:
1. Contact the Technical Support Department at repeated alarms.

The menu display shows:

ALARM	(MB2)
HTF c-pump switch	
060822 16:08:15	
Info	Ackn.



Note

The alarm indication goes out when acknowledging the alarm even if the fault has not been rectified.

Compressor temperature T6 (GT6)

Possible cause 1: The working temperature of the compressor is too high.

Action:

1. Press the Ackn. button.
2. Contact the Technical Support Department at repeated alarms.

Possible cause 2: Intermittent temperature rise due to abnormal operating conditions.

Action:

1. Press the Ackn. button.
2. Monitor to see if fault clears.

The menu display shows:

ALARM	(GT6)
Compr. superheat	
060822 16:08:15	
Info	Ackn.

Low pressure switch (LP)

Possible cause 1: The HTF pump has stopped or is set at too low a speed.

Action:

1. Press the Ackn. button.
2. Check that the pump has not stopped or is set at the wrong speed.

The menu display shows:

ALARM	(LP)
Low pressure switch	
060822 16:08:15	
Info	Ackn.

Possible cause 2: The filter on the collector circuit is blocked.

Action:

1. Check the filter.
2. Clean the filter if necessary.
3. Press the Ackn. button.

Possible cause 3: Air in the collector system.

Action:

1. Press the Ackn. button.
2. Check the expansion vessel.
3. Fill with fluid if necessary.
4. Listen for air in the system. If air is heard constantly, contact the Technical Support Department.

Possible cause 4: Ice formation in the evaporator due to a lack of anti-freeze in the collector circuit.

Action:

1. Contact the Technical Support Department.

Possible cause 5: Faulty expansion valve (the alarm appears in time periods of 3-4 weeks).

Action:

1. Contact the Technical Support Department.

Possible cause 6: Lack of refrigerant in the refrigerant circuit.

Action:

1. Press the Ackn. button.
2. Wait for the heat pump to start.
3. Check whether it bubbles continuously in the sight glass.
4. If it bubbles continuously, contact the Technical Support Department.

High pressure switch (HP)

Possible cause 1: Insufficient primary flow over the heat pump.

- Action:
1. Press the Ackn. button.
 2. Check that the heating system pump has not stopped.
 3. Check that all the valves are open. Radiator thermostat valves should be fully open and underfloor heating systems should have at least half of the coils fully open.
 4. Possibly increase the speed of the heating system pump.

Possible cause 2: The filter on the primary circuit is blocked.

- Action:
1. Press the Ackn. button.
 2. Check the filter.
 3. Clean the filter if necessary.

Possible cause 3: Air in the primary circuit.

- Action:
1. Press the Ackn. button.
 2. Check whether there is air in the radiators/under-floor circuit.
 3. Fill the heating system and vent if necessary.

```
ALARM (HP)
High press. switch
060822 16:08:15
Info Ackn.
```



Note

Increase the speed of the heating system pump:

Use a screwdriver or a coin to increase the speed of the heating system pump. Turn one step anti-clockwise.



Electric heater (EK)

(Shown as *Electrical cassette* in the menu display)

Possible cause 1: The electric heater miniature circuit-breaker has tripped.

- Action:
1. Press the Ackn. button.
 2. Reset the miniature circuit-breaker button on the heat pump (circuit-breaker 3) by pushing up the toggle switch.
 3. Contact the Technical Support Department if the miniature circuit-breaker trips again.

Possible cause 2: The electric heater's overheat protection has tripped.

- Action:
1. Press the Ackn. button.
 2. Reset the overheat protector (circuit-breaker 4) by pressing in the button on the electric heater's protective casing. The circuit-breaker is reset when you hear a clicking sound.
 3. Check that the filter on the primary circuit is clean.

```
ALARM (EK)
Electrical cassette
060822 16:08:15
Info Ackn.
```



Note

The miniature circuit-breaker button for the electric heater can be found under the heading Fuses and reset buttons on the heat pump.

The most frequent cause for the overheat protection tripping is a poor flow through the primary circulating pump, which can be due to air in the primary pump or a blocked filter.

High Heat transfer fluid delta T8/T9 (GT8/GT9)

The heat pump gives an alarm when the temperature difference between the sensors T8 (GT8) and T9 (GT9) is too high.

Possible cause 1: Insufficient flow over the heat pump.

- Action:
1. Check that the heating system pump has not jammed.
 2. Check that all the valves are open. The thermostat valves should be fully open and in underfloor heating systems at least half of the coils should be fully open.
 3. Increase the speed of the heating system pump.

If the actions above do not work please refer to page 13 reference fitting bypass and an external main pump G1(P1).

Possible cause 2: The filter on the primary circuit is blocked.

- Action:
1. Clean the filter.

ALARM	GT8/GT9
High HTF delta	
060822 16:08:15	
Info	Ackn.



Note

Increase the speed of the heating system pump:

Use a screwdriver or a coin to increase the speed of the heating system pump. Turn one step anti-clockwise.



High return to the heat pump T9 (GT9)

Sensor T9 (GT9) in the heat pump stops the compressor if the temperature of the return water from the radiators becomes too high. The limit is at approximately 57°C.

Possible cause 1: The temperature setting is too high.

- Action:
1. Lower the temperature setting (Temp. incr. / decr.).

Possible cause 2: The hot water temperature is set too high.

- Action:
1. An alarm is given in hot water mode. Contact the Technical Support Department to adjust the hot water temperature.

Possible cause 3: The valves on the radiators or underfloor heating system are closed.

(Only applies if a bypass is fitted)

- Action:
1. Open all valves.
 2. Press the Ackn. button.

Possible cause 4: The flow across the heat pump is greater than the flow in the heating system.

(Only applies if a bypass is fitted.)

- Action:
1. Reduce the speed of the heating system pump or increase the speed of the main pump in the heating system.

ALARM	(GT9)
High return HP	
060822 16:08:15	
Info	Ackn.



Note

The heat pump starts automatically when the temperature drops.

Lower the speed of the heating system pump:

Use a screwdriver or a coin to lower the speed of the heating system pump. Turn one step clockwise. The lowest speed should be avoided.



Heat transfer fluid out max T8 (GT8)

Sensor T8 (GT8) in the heat pump stops the compressor if the temperature of the water going out to the heating system becomes too high.

Possible cause 1: Insufficient flow over the heat pump.

- Action:
1. Check that the heating system pump has not jammed.
 2. Check that all the valves are open. Radiator thermostat valves should be fully open and underfloor heating systems should have at least half of the coils fully open.

Possible cause 2: The filter on the primary circuit is blocked.

- Action:
1. Clean the filter.

ALARM	(GT8)
Heat tran fluid out	
060822 16:08:15	
Info	Ackn.



Note

The heat pump starts automatically when the alarm is reset and the water temperature has dropped to its normal value.

Sensor fault

All sensors connected to the heat pump can give an alarm when defective. In the example to the right it is sensor T1 (GT1), Return radiator, which has given an alarm. All sensors give alarms in the same way. Read more about the sensors under heading Read the temperatures on the heat pump.

Possible cause 1: Temporary error.

- Action:
1. Monitor performance of the heat pump.

Possible cause 2: Short circuit or broken sensor cable.

- Action:
1. If you have a multimeter you can disconnect the sensor and check the cable's resistance. Compare with the sensor table in the section Technical information.

Possible cause 3: Defective sensor or incorrect connection.

- Action:
1. Replace sensor/check connection.

ALARM	(GT1)
Sensor return rad.	
060822 16:08:15	
Info	Ackn.



Note

Switch off the power before checking the resistance of the cable.

HTF in under limit T10 (GT10) and HTF out under limit T11 (GT11)

Possible cause 1: Temporary low heat transfer fluid temperature.

- Action:
1. Monitor performance of the heat pump.
 2. If the alarm returns, contact the Technical Support Department.

Possible cause 2: Too low flow on the collector circuit.

- Action:
1. Check the filter.
 2. Clean the filter if it is blocked.

Possible cause 3: The minimum heat transfer fluid temperature has been set too low.

- Action:
1. Monitor performance of the heat pump.
 2. If the alarm returns, contact the Technical Support Department.

```
ALARM          (GT10)
HTF (coll) in
060822 16:08:15
Info          Ackn.
```

```
ALARM          (GT11)
HTF (coll) out
060822 16:08:15
Info          Ackn.
```

Anode error

Possible cause 1: Temporary error.

- Action:
1. When large amounts of hot water are used (e.g. with a bath) the alarm may be given without there being a fault. Contact the Technical Support Department at repeated alarms.

```
Alarm
Anode error
040622 16:08:15
Return      Info
```

Possible cause 2: Faulty electric anode.

- Action:
1. Contact the Technical Support Department.

Commissioning report

Client / Installation address:

Installer:

Heat pump description:

Commissioning date:

Heat pump serial number:

Type of ground collector (bore hole, horizontal loop, compact collector):

Total length of collector:

Other components of the installation:

Additional heat source Room sensor T5 (GT5)

(boiler, solar etc)

Three-way valve Hot water cylinder temperature sensor T3

(mixing valve, zone valve)

Mixing valve sensor T4 (GT4)

Others:

Points to be checked prior to commissioning

Heating system filled checked Notes:

(pressurised and vented):

Collector system filled checked Notes:

(pressurised and vented):

Electric heater kW: set checked Notes:

Filters: checked cleaned Notes:

Sight glass (green): checked Notes:

Heating system pump G2 (P2) working correctly:..... Heat transfer fluid pump G3 (P3) working correctly:.....

Temperatures after 10 minutes heating or hot water mode:

Heat flow out T8 (GT8):/.....°C Heat return in T9 (GT9):/.....°C

Collector fluid in T10 (GT10):/.....°C Collector fluid out T11 (GT11):/.....°C

Commissioning report

Pressure test of collector carried out

Checks on fluid concentrations carried out (collector hose)

System pressure levels checked

Functional test carried out

Ensure that primary circuit has been correctly flushed

Menu settings 1.1, 1.4, 5.2 and 5.13. carried out

Heat curve 1.1 and 1.2 set to:

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 the installer:

Technical information

The heat pump's factory settings

This table indicates the factory settings for all the settings likely to be changed by the installer.

Menu	Setting	Factory setting
1.1	Temp. incr. / decr.	4
1.2	Temp. Fine-tune	0°
1.3	Heat curve adjust. (break)	n/a
1.4	Heat curve hysteresis	5°
1.5	Mix. valve incr/decr	4
1.6	Mix. valve fine-tune	0°
1.7	Adapting the mixing valve curve	0°
1.8	Mixing valve curve neutral zone	3°
1.9	Mixing valve curve max at GT4	60°
1.10	Setting the room temperature	20°
1.11	Setting the room sensor influence	5
1.12	Setting of holiday function	0 day
1.13	Remote control temperature	Inactive
1.14	Setting of summer disconnection	18°
2.1	Number of hours for extra hot water	0 hours
2.2	Interval for hot water peak	Inactive
2.3	Setting of hot water temperature	52°
4.1	Clock setting HP accord. to clock	00:00 - 00:00 (inactive)
4.1.1	Setting level heat pump +/-	0°
4.2	Clock setting additional heat according to clock	00:00 - 00:00 (inactive)
4.3	Clock setting hot water according to clock	00:00 - 00:00 (inactive)
5.2	Select connection capacity electric heater	2/3
5.4	Select function only additional heat	Normal operation
5.5	Select function additional heat	yes
5.7	Select external controls	0
5.10	Select operation alt. P2	P2 running cont.
5.11	Select operation alt. P3	P3 with Compres.
8.1	Setting additional heat timer	120 minutes
8.3.4	Ramp time open	20 min
8.3.5	Ramp time close	3 min
9.4	Min. temp pump inlet	-10°
9.5	Min. temp. pump outlet	-10°

Sensor table

This table indicates the values of the sensor resistors to different temperatures.

Temperature (°C)	kΩ
-40	154.00
-35	111.700
-30	81.700
-25	60.400
-20	45.100
-15	33.950
-10	25.800
-5	19.770
0	15.280
5	11.900
10	9.330
15	7.370
20	5.870
25	4.700
30	3.790
35	3.070
40	2.510
45	2.055
50	1.696
55	1.405
60	1.170
65	0.980
70	0.824
75	0.696
80	0.590
85	0.503
90	0.430

Technical information

Greenstore Combi, Brine/Water heat pump		6	7	9	11
Emitted/ Supplied output at 0/45°C ¹	kW	5.19/1.80	6.55/2.20	8.20/2.67	9.63/2.92
COP ¹		2.89	2.97	3.06	3.29
Minimum flow heating side	l/s	0.14	0.18	0.22	0.26
Nominal flow heating side	l/s	0.20	0.25	0.31	0.38
Maximum pressure available heating side (at nominal flow)	kPa	36	36	34	32
Nominal flow of antifreeze mixture to the collector hose	l/s	0.30	0.38	0.46	0.57
Maximum pressure available to collector hose (at nominal flow)	kPa	49	45	44	80
Type of antifreeze		Bioethanol - water or Propylene/ethylene glycol - water			
Freeze protection temperature	°C	-15			
Maximum pressure heating side of heat pump	bars	2.5			
Maximum pressure on collector hose side	bars	4			
Maximum outgoing temperature to the heating system	°C	65			
Maximum return temperature from heating system	°C	57			
Working temperatures on collector hose side	°C	-5 to +20			
Integrated collector hose and heating system pump		Yes			
Power supply		230V 1N~ 50Hz			
Additional heat settings	kW	3,0 / 6,0 / 9,0			
The recommended type of fuse according to electrical output ²					
6 kW electric heater	AaM	40	40	50	50
9 kW electric heater	AaM	50	63	63	63
Starting current, soft start	A	22,9	23,8	30,9	34,6
Compressor		Scroll			
Type R-407C HFC refrigerant	kg	1.35	1,4	1.5	1.9
Connection for heat fluid out/in	mm	Cu 22			
Out/in collector hose connection	mm	Cu 28			
Dimensions of heat pump (LxDxH)	mm	600x640x1800			
Weight of heat pump (empty)	kg	213	217	219	222
Weight of heat pump (full)	kg	438	442	444	447
Integrated hot water cylinder with double shell		Stainless steel			
Volume of integrated hot water cylinder	l	185 / 40			
Control unit		Rego 637W			
Ambient temperature (indoor use)	°C	+10 to +30			
Maximum relative humidity	rH	60%			
Sound power level ³	dB(A)	47.2	50.1	51.9	48.3
Sound pressure level ⁴	dB(A)	34.5	37.4	39.2	35.6

¹ Data at 0/45°C according to the European standard EN 14511. Data applies to a new unit with clean heat exchangers.

² aM type fuse, D characteristic MCB.

³ Measurement according to EN ISO 3743-2.

⁴ Calculated values at 1 m distance according to EN ISO 11203.

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 liters	3 bar

Cylinder reheat times, Inner cylinder 185 Litres of DHW

To heat the full tank volume from 15° C to 60° C takes approx. 144 minutes

To reheat 70% of the tank volume to 60° C takes approx. 47 minutes.

Manufacturer

Appliance: IVT Industrier AB, part of BBT Thermotechnik GmbH
Box 1012, SE-57343 Tranås, Sweden

Cylinder: BoRö Pannan AB
Bangårdsv. 1, SE-95231 Kalix, Sweden

Part no: 8-716-113-342 Issue b
12168, Issue 1.0

EXCELLENCE COMES AS STANDARD

Worcester, Bosch Group

Cotswold Way, Warndon, Worcester WR4 9SW.

Tel. 01905 754624 Fax. 01905 754619

Worcester, Bosch Group is a brand name of BBT

Thermotechnology UK Ltd.

www.worcester-bosch.co.uk

CONTACT INFORMATION

WORCESTER, BOSCH GROUP:

TECHNICAL: 08705 266241

SERVICE: 08457 256206

SPARES: 01905 752571

LITERATURE: 01905 752556

TRAINING: 01905 752526

SALES: 01905 752640

WEBSITE: www.worcester-bosch.co.uk



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