Greensource air to water heat pump series

WORCESTER
Bosch Group

Worcester and you. Making a difference.

BOSCH
Invented for life

As part of the Bosch Group, Worcester products are designed and manufactured to provide customers with the highest levels of quality and reliability which are synonymous with the Bosch name throughout the world.

As part of Europe's largest supplier of heating products, Worcester, Bosch Group has the UK-based resources and support capability to offer you the value-added solutions you deserve. Worcester employs a nationwide network of Service Engineers and technically trained Field Sales Managers supported by an experienced technical services team which is able to provide comprehensive support and advice from designing system layouts through to installation.

Worcester is dedicated to providing energy efficient gas- and oil-fired condensing boilers, as well as an extensive range of renewable technologies. All of our products have been developed and introduced with the aim of helping the UK to achieve the Government's efficiency targets.

The reception and main entrance at our Worcester headquarters

"At Worcester we recognise the vital role you play in the specification and installation of energy efficient appliances in homes across the UK. We will continue to invest in our products, people, facilities and added value services to ensure you have all you require in order to deliver only the best solutions to your customers' requirements."

Carl Arntzen,
Managing Director,
Bosch Thermotechnology Ltd.

Contents **Page**

The Greensource air to water heat pump series

The Certification Mark for Onsite Sustainable Energy Technologies

Advanced renewable energy technology from Worcester that's leading the way to a greener and more sustainable future.

As part of the Bosch Group, Worcester is committed to environmental protection. Product development is prioritised in the interests of people's safety, the economical use of resources and environmental sustainability.

In just a few short years, Britain's domestic heating and hot water industry has changed dramatically.

With approximately 25% of the UK's carbon dioxide emissions being produced by home energy consumption, 75% of which is for the provision of heating and hot water, such change has been not only inevitable but crucial.

Words and expressions such as "renewable energy", "sustainable technology" and "carbon footprint" have become part of everyday conversation and have been fuelled by extreme weather and stark television images of melting polar ice caps.

Worcester, Bosch Group has taken the lead in developing heating and hot water solutions which reduce the impact on the environment by reducing harmful CO_2 emissions, while continuing to satisfy the daily demand for domestic heating and hot water comfort – not only for today, but well into the future.

With this in mind, Worcester is proud to offer a range of G3 compliant air to water heat pumps which allow the consumer to take advantage of renewable and sustainable energy.

As well as being fuelled by the free and inexhaustible supply of latent energy, Worcester air source heat pumps offer additional advantages including simple and cost-effective installation, suitability for a wide variety of property types and sizes and, at a time when fuel costs are rising, the chance to help your customers reduce their heating and hot water bills.

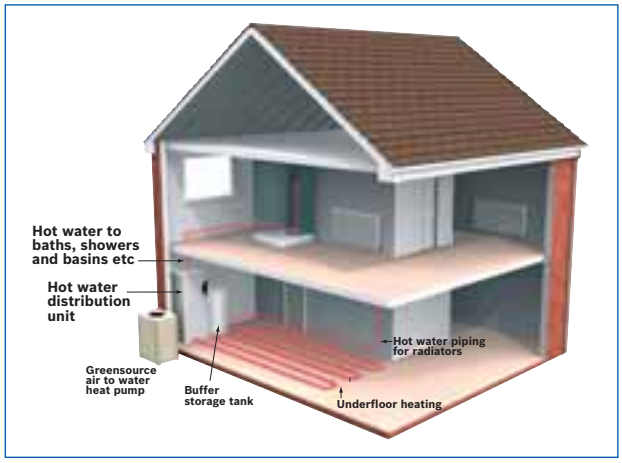
Microgeneration Certification Scheme

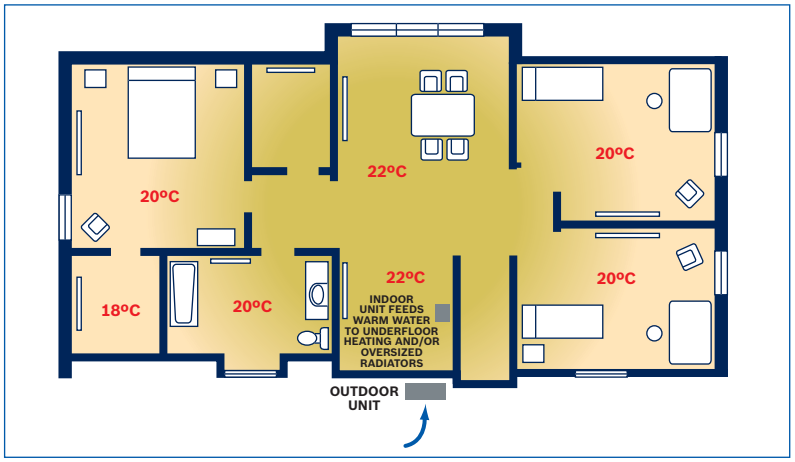
The Microgeneration Certification Scheme (MCS) is an internationally recognised quality assurance scheme. It certifies microgeneration technologies used to produce electricity or heat from renewable sources. You must be an MCS certified installer to benefit from this scheme.

Worcester offers a MCS Made Easy programme to help you prepare in readiness for a MCS accreditation assessment. For further information visit **www.worcestermcs.co.uk**

Model	Certification no.
Greensource 6kW Outdoor Heat Pump and Hot Water Distribution Unit	*MCS HP0015/09*
Greensource 7kW Outdoor Heat Pump and Hot Water Distribution Unit	*MCS HP0015/10*
Greensource 9.5kW Outdoor Heat Pump and Hot Water Distribution Unit	*MCS HP0015/11*

How Greensource air to water heat pumps distribute heat





The Greensource air to water heat pump range at a glance

Outdoor unit			
	6kW	7kW	9.5kW
Height	1,223mm	1,223mm	1,223mm
Width	818mm	818mm	818mm
Depth	643mm	643mm	643mm
Weight	140kg	144kg	152kg
Outer casing	Galvanised powder coated steel		
Emitted/supplied output at +7/35°C**	5.5/1.5kW	7.2/2.2kW	8.4/2.5kW
CoP -7/35°C**	2.0	2.3	2.3
CoP 2/35°C**	3.2	2.8	3.0
CoP 7/35°C**	3.7	3.3	3.4
Heat carrier flow nominal (l/s)	0.19	0.29	0.34
I.P. rating	x4	x4	x4

Indoor hot water distribution unit	
Height	1,660mm
Width	600mm
Depth	615mm
Weight without water	122kg
Weight with water	347kg
Output of electric electric heater	4.5kW
DHW volume	151 litres
CH volume	55 litres
Power consumption of circulation pump	0.2kW
Mains electrical voltage	1 x 230V N AC 50Hz
I.P. rating	x4

**Without feet, additionally depending on the adjustment min. 20mm – max. 30mm.*
***Output data according to EN 14511 European Standards.*
CoPs are calculated using EN 14511.

See page 26 for Heat Pump Kits and part numbers.

Features	Benefits
Scroll compressor	Flow temperatures up to 65ºC
Low noise output	Quiet operation
2 years parts and labour guarantee*	Peace of mind
No flue system	Ease of siting
No gas or oil required	Ease of siting
Automatic defrost, -20ºC outside operation	Melts snow and ice automatically
Fast and easy installation	Through offering a complete system with indoor and outdoor unit
65°C water temperature – wide application range	More retrofit installations possible e.g. connection to radiators
Compact size	600mm^2 internal hot water distribution unit
Fully integrated controls	Easy operation
Integrated stainless steel cylinder	Space saving and corrosion resistant
Fully integrated circulation pumps	Quicker installation and no need to purchase additional components
Built-in expansion vessels	Quicker installation and no need to purchase additional components
Diverter valves	Quicker installation and no need to purchase additional components
Inlet control set†	No need to purchase additional component

**Terms and conditions apply †Supplied in unvented kit*

Hot water distribution unit

Outdoor unit

The Greensource air to water heat pump series

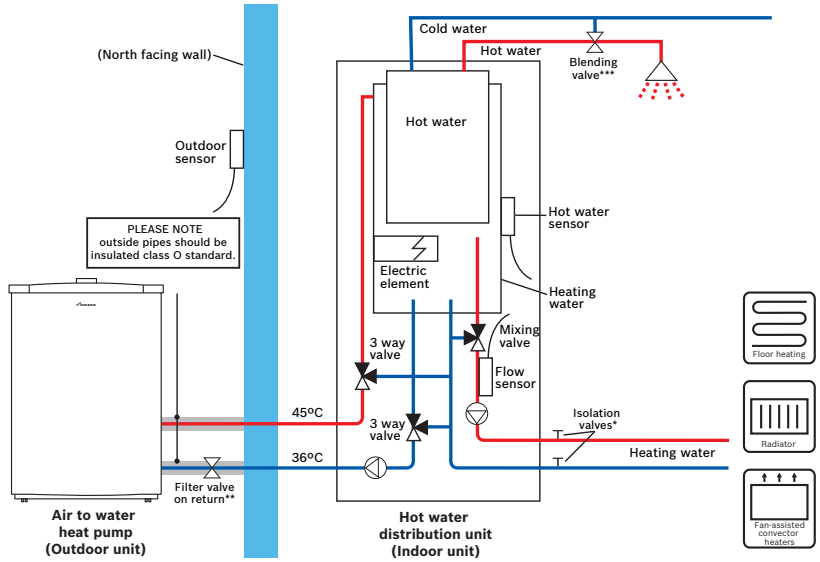
Worcester heat pumps make use of the latent energy from the outside air by converting it into heat which can be used with a typical wet heating and hot water system.

The heat pumps use the constant energy available in the air with a refrigerant circuit to allow the temperatures to be boosted to a useful level for the provision of heating or hot water for the home.

The system comprises an external energy collector and an internal Building Regulation G3 compliant heating and hot water distribution unit with a hot water store and heat delivery system, preferably to underfloor heating or alternatively to oversized radiators.

Worcester air to water heat pumps are intended to be the sole source of heating and hot water production for the home, giving the homeowner the option of removing the existing heat source from the property.

Principles of operation – how an air to water heat pump works



Note: *The heating system should be designed to maintain 70% of the nominal flow of the system across the heat pump at all times.*

Underfloor heating systems should have at least half of the coils fully open at all times.

Alternatively, or where TRVs are used, a by-pass may be fitted. This must still maintain 40% of the nominal flow across the heat pump.

Where it is not possible, due to the design of the heat emitters, to maintain this flow rate a Worcester primary store of around 100 litres should be fitted. See diagram on page 18.

**Recommended isolation valve*

***Filter valve fitted on return*

****A blending valve is supplied as standard and should be fitted prior DHW outlet*

In the outdoor unit the refrigerant meets the outdoor air in the evaporator (heat exchanger). The air is drawn through the evaporator by a fan located on top of the heat pump. The refrigerant, which is in a liquid state absorbs free energy from the air and evaporates in this process. A sensor in the expansion valve ensures that the liquid refrigerant collects the correct amount of the “free energy” before the refrigerant (now in a gas state) is led into the compressor.

The compressor increases the pressure of the refrigerant. The temperature of the vapour reaches approximately 100°C. The warm gas is then led into the condenser.

The condenser is the heat pump’s heat emitting part. In the condenser, which is a fully brazed heat exchanger in stainless steel, the refrigerant (gas state) meets the water from the heating system (radiators and/or floor coils). When the warm gas is cooled by the circulating heating water, it changes into a liquid state (condenses). Energy is emitted in this process to the heating system or the hot water. After the condenser, the refrigerant, which is now in liquid form, continues through a drying filter.

The drying filter is used to collect any moisture in the system. After the filter, the refrigerant passes through a sight glass.

The sight glass is used to check the level in the system. There should be no bubbles in the sight glass during normal operations. However, there might be bubbles when the heat pump is started and stopped or during defrosting. After the sight glass, the refrigerant continues on to an expansion valve.

The refrigerant pressure is lowered in the expansion valve. This also causes the temperature to drop. When the refrigerant has left the valve and passes the evaporator it changes to vapour again. This completes the refrigerant circuit. The expansion valve is equipped with a sensor (bulb) just before the compressor. The sensor controls the amount of fluid entering the evaporator.

Worcester offers a choice of 3 air to water heat pumps (6kW, 7kW and 9.5kW) which are intended to provide all the heating and hot water requirements of the home.

Performance

Greensource air to water heat pumps feature a highly efficient and effective scroll-type compressor which allows around 65ºC flow temperature from the appliance. This higher output temperature allows Greensource heat pumps to be effectively combined with radiators which should be sized correctly. However, wherever possible, Worcester recommends an underfloor heating system as the most compatible heat emitter system. The scroll compressor allows Greensource heat pumps to offer excellent CoP ratings.

Coefficient of Performance

The performance and efficiency of an air source heat pump system is commonly measured by the Coefficient of Performance (CoP). The CoP is a simple calculation which works out how much energy the heat pump is able to extract from the energy source compared to the amount of electrical energy used by heat pump.

$$\text{CoP} = \frac{\text{Heat output of system (useful heat)}}{\text{Electrical input from compressor and circulating pumps}}$$

E.g.:

$$\text{CoP of 3.3} = \frac{\text{9kW heat pump}}{\text{2.7kW of electrical input}}$$

The CoP depends on the temperature that can be extracted from the outdoor unit and the temperature required by the heating system of the house. The best combination for a high CoP would be a higher source temperature (e.g. 10ºC) and a lower flow temperature for the heating (e.g. 35ºC). The return on the energy employed in this case is higher since the heat pump has to increase the temperature by only 25ºC. If the energy from the source is lower in temperature and the required flow temperature is higher the CoP will be reduced.

The equation shown results in 2.7kW of heat provided by the pump (which is provided by electrical consumption) and 6.3kW of energy extracted from the atmosphere.

The table below shows the relationship between flow temperature and CoP. The CoP stated is for use only as typical examples and will differ between installations.

Relationship between flow temperature and CoP		
Heat delivery method	**Typical CoP**	**Flow temperature**
Radiators	3	40 - 50ºC
Underfloor heating	4 - 5	30 - 40ºC

Operation of the heat pump and heating and hot water distribution unit

The control unit uses two different methods to control the heat pump.

Control with outdoor sensor

A sensor is installed outside on a north facing wall of the property. Control with an outdoor sensor means that the heat pump automatically regulates the heating in the house depending on the outdoor temperature. If the outdoor temperature drops, the underfloor heating/radiators inside the house will become warmer.

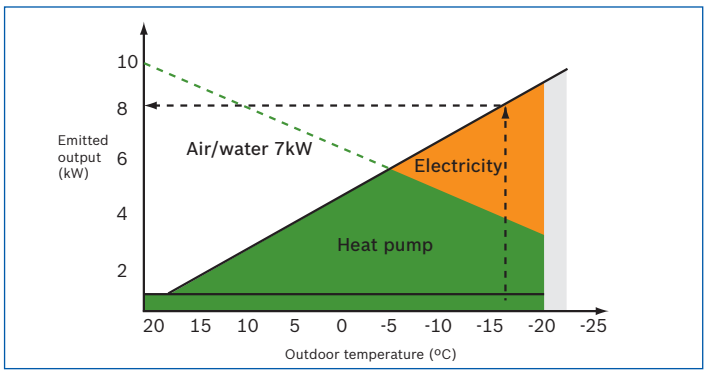
The user determines the response from the heat pump in relation to the outdoor temperature, with the help of a number of settings such as selecting the heat curve on the control unit.

Control with outdoor sensor supplemented with room sensor

Control with an outdoor sensor supplemented with a room sensor means that a sensor can be placed in a reference position inside the house. This is connected to the heat pump and provides the control unit with information about the room temperature. The signals affect the control unit's settings (heat curves) and ensure the heat pump gives the best possible energy savings.

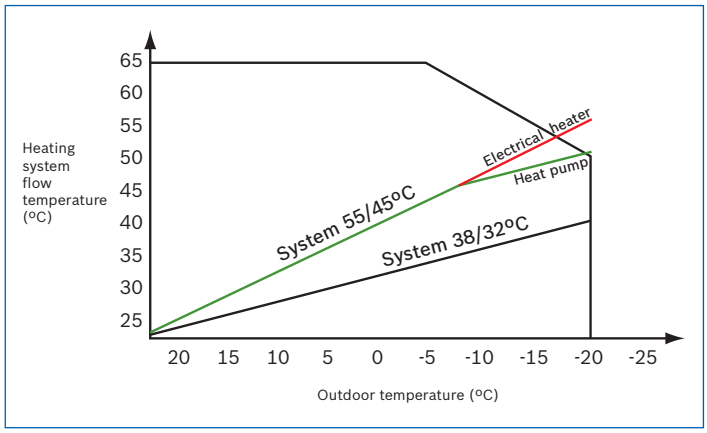
The heat curve slope can be changed to increase or decrease the heating in the house.

Emitted output air/water



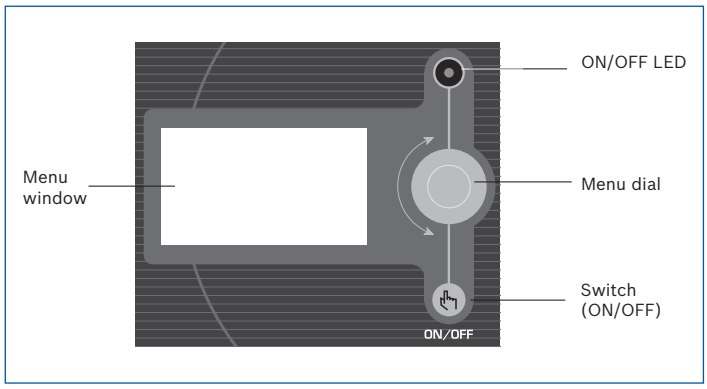
Curve slope settings:
The unit is already factory preset, however you can adjust the heat curve to a level for the heating system to suit your property type.

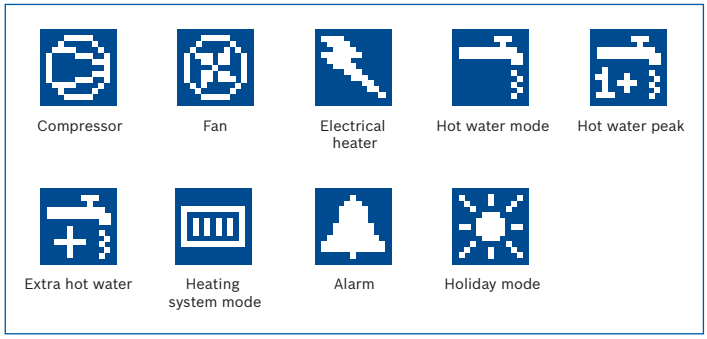
Weather compensation control method
If the outdoor temperature drops, the flow temperature increases. If the outdoor temperature increases, the flow temperature drops.



Heat curve

Controls
Greensource air to water heat pumps are controlled by a Rego 800 control unit. The unit ensures that the heat pump works efficiently when required and dictates that the hot water heating is given priority over space heating. The control unit has a simple main “Menu” and “Advanced Menu”.





Greensource air to water heat pump control panel

Working temperatures
Maximum working temperatures
The heat pump can work with a maximum return temperature of approximately 59°C. If the temperature rises above this value the heat pump will automatically stop.

Minimum working temperatures
The heat pump is designed to stop if the outdoor temperature falls below -20°C. Supporting additional heat could be produced by the additional elective heater from temperatures below -3°C. The heat pump re-starts automatically when the outdoor temperature climbs above -20°C.

Defrosting the heat pump
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 compressed gas from the compressor is fed into the top of the evaporator, causing the ice on the outside to melt. During this process, the heating water is cooled slightly. Hot gas is sprayed into the evaporator and a sensor ensures that the process functions correctly. The time required for defrosting depends on the amount of ice and the outdoor temperature. This also acts as a fan defrost function, which blows hot air upwards through the fan to prevent it freezing solid.

Greensource air to water components list
1 x tundish factory fitted 22mm x 1"
1 x tundish 15mm x 22mm
4 x rubber feet
1 x circlip pliers
2 x flexible connection hoses
1 x particle filter valve
2 x indoor/outdoor sensors with cable
1 x unvented kit
1 x hot water blending valve
1 x 32mm (1¼") universal waste fitting
1 x heating system filling loop
1 x user guide (heat pump)
1 x user guide (heating and hot water distribution unit)
1 x installation manual and guarantee card

Electrical isolation
Note: Both the indoor and outdoor units require a means of electrical isolation. It is recommended that the outdoor and indoor units are supplied by an aM type fuse or a C and D characteristic McB.

Renewable Heat Incentive (RHI) Scheme for Domestic Properties

Overview

The Renewable Heat Incentive (RHI) scheme for industry, business and the public sector was introduced by the Government in November 2011 as part of its commitment to reduce the country's carbon emissions by 20% by 2020.

The scheme is now extended to domestic users who are able to generate and use renewable energy to heat their properties.

This provides installers with an opportunity to inform homeowners of the RHI scheme and the money they can expect to receive by switching, even in part, to approved renewable energy sources instead of using fossil fuels.

Who is eligible?

The domestic RHI scheme applies to both off-grid and on-grid properties in England, Scotland and Wales.

The scheme covers single domestic dwellings and is open to owner-occupiers, private landlords, registered providers of social housing, third party owners of heating systems and self-builders.

The scheme is open to all of the previous who have had applicable renewable technologies installed since 15th July 2009. However, applications will be dealt with on a phased basis over a period of time by the scheme administrator, Ofgem.

Who isn't eligible?

Housing developers are excluded from the scheme although it is possible that they could be eligible under the existing non-domestic scheme.

Tariffs

When discussing the RHI scheme with your customers, the first question you'll probably be asked is "how much will I get and for how long?"

Tariffs have been calculated by The Department of Energy and Climate Change (DECC) and will change annually in-line with the previous year's Retail Price Index.

All payments are made directly to the homeowner retrospectively every quarter over a period of seven years.

The tariffs are per kilowatt hour of renewable energy produced by each of the following technologies:

Renewable product	Price per kWh
Air Source Heat Pumps	7.3p per kWh
LECP Ground Source Heat Pumps	18.8p per kWh
Solar thermal	19.2p per kWh

Heat pumps and solar tariffs can be jointly claimed providing they are in the same property.

How will the payments be calculated?

Air and ground source heat pumps

The amount of renewable energy qualifying for payment is based on a deemed estimate of the heat demand from the property's Energy Performance Certificate (EPC). This is combined with an estimate of a heat pump's efficiency minus the energy required to run it.

Solar thermal

The amount of renewable energy qualifying for payment is based on a deemed estimate of the solar thermal performance completed as part of a Microgeneration Certification Scheme (MCS) installation.

Metering and monitoring incentive

Heat pump installations should be meter-ready wherever possible. To help improve the performance of renewable heating systems, there is an additional incentive for selected properties to have metering and monitoring service packages installed. For heat pumps this is £230 a year.

Space heating

Applications for space heating systems where there is already a back-up fossil-fuelled heating system in place, for example with a gas-fired condensing boiler, are required to install metering systems on which their RHI payments will be based. This also includes hybrid systems.

What criteria are required to apply for the scheme?

Training

All installations must be carried out by an MCS approved installer and meet the relevant standards for each technology. Worcester runs MCS, Green Deal and individual renewables product courses at each of its training academies. For further information visit **www.worcester-bosch.co.uk/training** or call **0330 123 0166**.

Green Deal Assessment (GDA)

All applicants for the scheme, including those who have had renewable technologies installed since 15th July 2009, will need to have a Green Deal assessment carried out on their property to determine which renewable technologies are the most cost-effective. Where recommended by the GDA, properties must meet the energy efficiency requirements of a minimum of 250mm of loft insulation together with cavity wall insulation.

Energy Performance Certificates (EPC)

In situations where the loft and cavity wall insulation have not been installed, the property's EPC will need to be updated when the work has been carried out. In properties where installation is not feasible, an EPC will also be required as proof.

The only exception is for self-builders whose properties will meet Building Regulation requirements for energy efficiency and will therefore already qualify for the scheme. They will, however, require an EPC to enable Ofgem to calculate payments.

Payments for energy from renewable products to householders will be made until 2021.

Please note: Renewable Heat Premium Payments or other public funds previously claimed for a system will be deducted from RHI payments.

Inside story – Greensource heat pump outdoor unit

Technical data –
Greensource air to water heat pump outdoor unit

Output	6kW	7kW	9.5kW
Height	1,223mm	1,223mm	1,223mm
Width	818mm	818mm	818mm
Depth	643mm	643mm	643mm
Weight	140kg	144kg	152kg
Outer casing	Galvanised powder coated steel	Galvanised powder coated steel	Galvanised powder coated steel
Emitted/supplied output at +7/35ºC	5.5/1.5	7.2/2.2	8.4/2.5
Heat output / CoP -7/35ºC[1]	2.8/2.0	5.0/2.3	5.6/2.3
Heat output / CoP 2/35ºC[1]	4.6/3.2	6.1/2.8	7.1/3.0
Heat output / CoP 7/35ºC[1]	5.5/3.7	7.2/3.3	8.4/3.4
Heating system flow nominal	0.19 l/s	0.29 l/s	0.34 l/s
Internal pressure drop heat carrier	5kPa	6kPa	7kPa
Air flow	2,200m³/h	2,200m³/h	2,200m³/h
Electrical consumption fan	0.44A	0.44A	0.44A
Fuse size – Amperes time delay[4]	16	25	25
Starting current – softstart	23.43A	30.56A	32.05A
Electrical supply	230V 1N ~ 50Hz	230V 1N ~ 50Hz	230V 1N ~ 50Hz
Compressor	Scroll	Scroll	Scroll
Compressor oil	FV 50S	FV 50S	FV 50S
Maximum outgoing flow temperature	65ºC	65ºC	65ºC
Refrigerant filling R-407C	2.5kg	2.6kg	2.95kg
Defrost system	Hot gas with four-way valve	Hot gas with four-way valve	Hot gas with four-way valve
Operating temperature[5]	-20 to +35ºC	-20 to +35ºC	-20 to +35ºC
HTF connection, clamping ring (mm)	Hose 1" internal thread	Hose 1" internal thread	Hose 1" internal thread
Sound power level[2] (dB(A))	65dB(A)	65dB(A)	65dB(A)
Sound pressure level[3]	53dB(A)	53dB(A)	53dB(A)
I.P. rating	x4	x4	x4

** Without feet, additionally depending on the adjustment min. 20mm – max. 30mm.*
[1] Output data at +7/35ºC, +7/45ºC are stated according to the European Standard EN 14511.
[2] Calculated value at 1m distance according to EN ISO 3743-2.
[3] Calculated value at 1m distance according to EN ISO 11203.
[4] aM type fuse, C characteristic McB.
[5] Tested at -17ºC according to the European standard EN 14511-4.
CoPs are calculated using EN 14511.

Inside story – Greensource heating and hot water distribution unit

G3 unvented kit includes a filling loop, blending valve, a 19 litre expansion vessel and hose, inlet control set, 15mm x 22mm tundish and waste coupler is supplied with each unit.

Technical data –
Greensource indoor hot water distribution unit

Model		Greensource heating and hot water distribution unit
Height		1,660mm
Width		600mm
Depth		615mm
Weight without water		122kg
Weight with water		347kg
Output of electric heater		4.5kW
Power consumption of circulation pump		0.2kW
Mains electrical voltage		230V IN - 50Hz AC
Fuse rating**		25A
Maximal power consumption		4.7kW
Maximum working pressure		2.5bar (0.25MPa)
Volume DHW cylinder/Primary water		151/55 litres
Recovery time for cylinder	Full volume from 15ºC to 55ºC	2hrs 15mins
	70% volume from 15ºC to 55ºC	1hr 50mins
Expansion vessel size		12 litres
Pump for the heating system G1		Wilo Star RS 25/6-3
Heating fluid pump G2		Wilo Star RS 25/6-3

** Without feet, additionally depending on the adjustment min. 20mm – max. 30mm.*
*** aM type fuse D characteristic type McB means of electrical isolation required.*

Heat pump data

Heat pump system

Model	Greensource air to water heat pump 6kW	Greensource air to water heat pump 7kW	Greensource air to water heat pump 9.5kW
Rating or aggregate rating	50A	63A	63A
Standard compliance	BS EN 61000-3-11	BS EN 61000-3-11	BS EN 61000-3-11
Complies with technical requirements	–	–	BS EN 61000-3-3
Harmonics standard compliance	BS EN 61000-3-12	BS EN 61000-3-12	BS EN 61000-3-12
Stages	3 x 3kW	3 x 3kW	3 x 3kW
Time delay between stages	20 min ramp up 0 - 100%	20 min ramp up 0 - 100%	20 min ramp up 0 - 100%

Heat pump compressor

Model	Greensource air to water heat pump 6kW	Greensource air to water heat pump 7kW	Greensource air to water heat pump 9.5kW
Rating or aggregate rating	1.94kW	1.94kW	2.99kW
Maximum starting current	22.9A	23.8A	30.9A
Minimum time between starts	30mins	30mins	30mins
Compressor method of starting	Electronic soft start	Electronic soft start	Electronic soft start
Starting power factor	0.30	0.30	0.30

Additional heating elements

Model	Greensource air to water heat pump 6kW	Greensource air to water heat pump 7kW	Greensource air to water heat pump 9.5kW
Aggregate rating	4.5kW	4.5kW	4.5kW
Stages	1.5kW x 3	1.5kW x 3	1.5kW x 3
Time delay between stages	20 min ramp up 0 - 100%	20 min ramp up 0 - 100%	20 min ramp up 0 - 100%

Is a heat pump suitable for the property?

It is essential that heat pump systems are designed to operate efficiently in order to meet the heating needs of the building, and the expectations of the customer. In order to achieve this, the following design activities must be completed prior to the installation:–

- ***Pre-design assessment***
  Determine the suitability of a heat pump system for the building based on the customer's requirements, expectations and building type.
- ***Detailed design***
  Complete building heat loss calculations and domestic hot water usage assessment.
- ***Specification***
  Select a suitable heat pump and system components based on the detailed design. Calculate and communicate the predicted energy use and running costs of the system to the customer.

Heat loss

The total heat loss of the property (or building) is calculated from the addition of fabric and ventilation heat losses. Fabric heat loss is the transmission of heat by conduction through the building structure, i.e. windows, walls, roof and floor. Ventilation heat loss is heated air escaping from the house which is replaced by cold air from the outside.

Calculating the heat loss of the property

It is essential to accurately calculate the heat loss of the property to ensure correct sizing of the heat pump system. The heat loss is dependent on the construction of the building, room sizes, external and internal design temperatures and air change rates. The heat loss calculations should satisfy the requirements of BS EN 12831.

Estimating heat loss

Estimating the heat loss of the building is useful in determining the suitability of a heat pump system. However, assumptions based on floor area (e.g. 50 W/m^2 for new build etc.) and SAP (the Government's Standard Assessment Procedure) should not be used for the detailed design and specification stage. It should be noted that the heat loss for non-standard houses i.e. houses with large areas of glazing, high ceilings, log burners etc. or houses in exposed locations may deviate significantly from any rules of thumb.

In existing properties, boilers are often oversized and should therefore not be used to determine the actual heat requirements of the house.

However, estimates may be made on the basis of the existing energy consumption of the space to be heated.

This brochure does not cover all the necessary details to calculate the heat loss. The information given here is provided to remind the heating system designer and installer of the process and considerations.

Worcester design service

Worcester's design team offers design support across all of the Worcester, Bosch Group product range. The design team produces technical drawings and provides specification advice for a range of customers; all of our team are authorised SAP assessors and hold an IDHEE Domestic Heating Certificate. Worcester provides a range of indemnified design solutions in support of our core range of Greenstar gas- and oil-fired boilers, Greenfloor heating and a growing portfolio of renewable technologies – including Greenskies solar thermal panels as well as Greenstore ground source and Greensource air source heat pumps.

The design service for Worcester Greensource air to water heat pumps includes calculations for:

- Heat pump sizing
- Estimated annual running costs
- Fact sheets.

For more information on the suitability of heat pumps for your home visit **www.worcester-bosch.co.uk**
For information and guidance on planning permission for air to water heat pumps visit **www.energysavingtrust.org.uk**

Site preparations and guidance

Heat pump installations should be made in accordance to the current MIS3005 micro generation installation standards, including MCS020 planning standards.

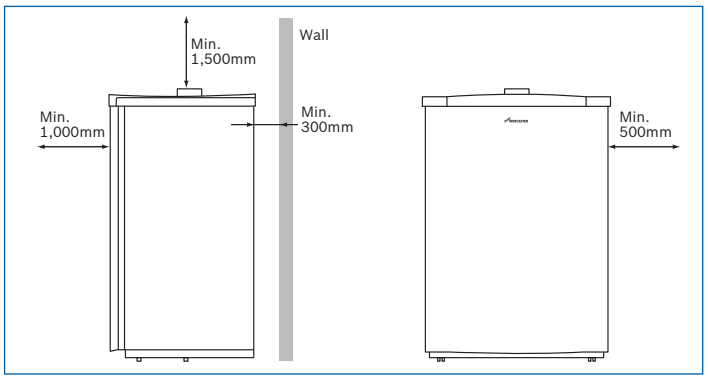
Siting of the outdoor unit

The heat pump is located outdoors and contains a number of sensitive parts. It is important that it is stood on a flat, solid base, e.g. concrete slabs*. The heat pump should be positioned at least 300mm from the building into which it connects with the internal heating and hot water distribution unit. The internal heating and hot water distribution unit should be located as close as possible to the heat pump and the outdoor connecting pipes should be suitably insulated with Class O insulation to prevent freezing and the fluid dosed with inhibitor and antifreeze.

The heat pump will produce between 15 - 25 litres of condensation per day, depending on external temperatures, and this should be diverted to a mains drain or a soak away. **In order to prevent freezing the condensate pipe must be insulated and the drainage pipe must slope towards a drain.**

The outdoor heat pump can be sited up to 15 metres from the property using 19mm thick Class O pre-insulated plastic pipe available from:
Watts Industries UK Ltd,
Grosvenor Business Park,
Evesham,
Worcestershire WR11 1GA
Tel: 01386 446997

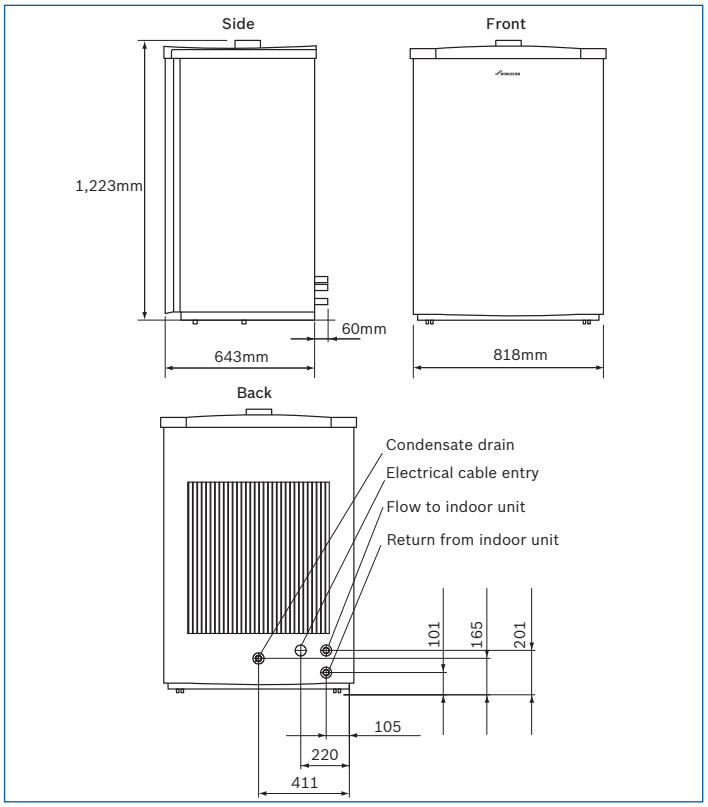
Installation clearances



Outdoor unit clearances	
Minimum distance from pump to wall	300mm
Minimum distance in front of pump	1,000mm
Minimum distance to the side	500mm
Minimum distance above	1,500mm

The outdoor unit must be installed at least 2,000mm below a roof to avoid the recirculation of cold air.

Outdoor unit casing dimensions and pipework connections



The flow is connected to the inlet marked ‘forward flow’.

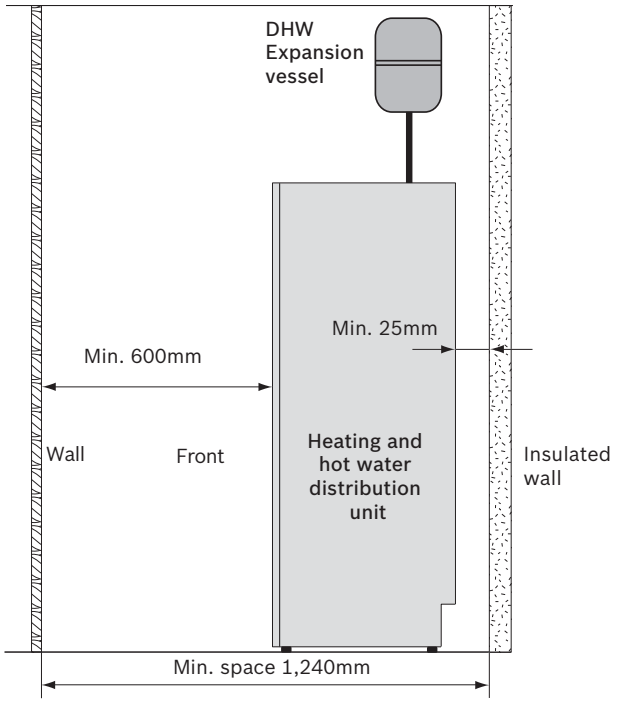
The following connections are made to the heat pump:
A 32mm plastic pipe is taken from the drainage pipe to the drain.

*Rubber matting can be used directly under the heat pump as a sound proofing method if required.

Siting of the heating and hot water distribution unit

Installation clearances

A minimum of 600mm is required in front of the unit. The other sides can be blocked. A minimum of 25mm is required between the unit and other permanent installations e.g. walls, sinks, etc.



Heating and hot water distribution unit pipework connections

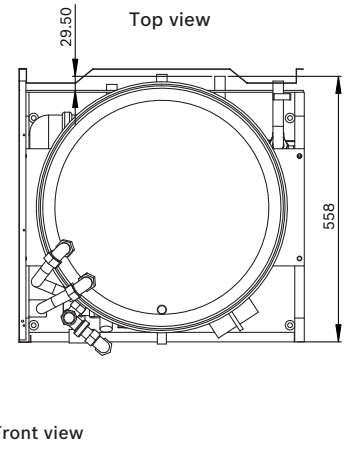
The return is connected to the inlet marked ‘return flow’. Cold water and hot water are connected to inlets marked ‘cold water’ and ‘hot water’.

Pipework dimensions

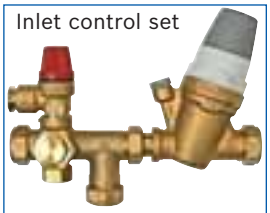
Heating and hot water distribution unit pipework dimensions	
Heating flow and return	
Connection size	22mm dia.
Hot and cold water	
Connection size	22mm dia.
To/from connections	
Connection size	22mm dia. (in HWDU)
To indoor unit	
Connection size	28mm dia. (in heat pump)
From heat pump	
Waste water/drainage	32mm dia. (in both)

All connections must be made using the sizes listed above.

Hot water distribution connection layout

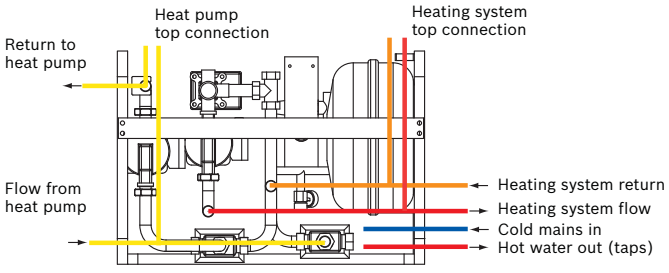


Inlet control set



The inlet control set supplied should be mounted externally in line with G3 regulations.

Connection area seen from behind



The unit can be connected either from the top or from the rear connections.

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

Floor preparation

The appliance is designed to be free standing and should be located on a flat surface which is able to support the weight of the product, accessories and fluid content. The appliance has rubber feet which can be adjusted to suit the installation.

Installation requirements

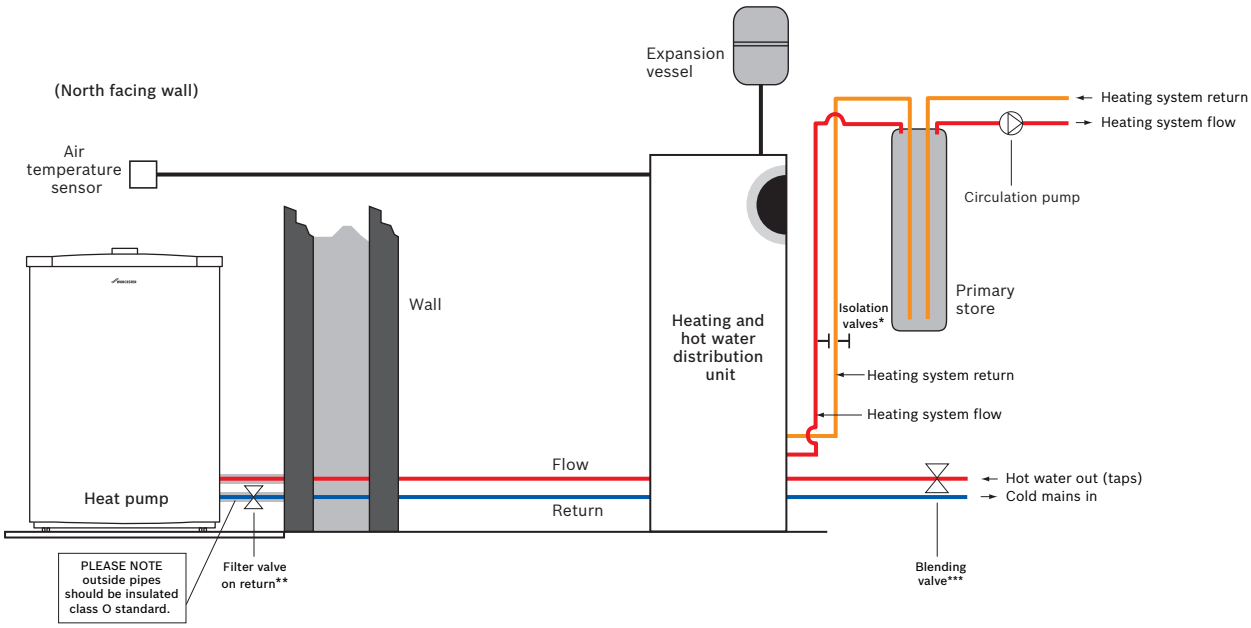
System design requirements

The heating system should be designed to maintain 70% of the nominal flow of the system across the heat pump at all times.

Underfloor heating systems should have at least half of the coils fully open at all times.

Alternatively, or where TRVs are used a by-pass may be fitted. This must still maintain 40% of the nominal flow across the heat pump.

Where it is not possible, due to the design of the heat emitters, to maintain this flow rate a Worcester primary store of around 100 litres should be fitted.



*Recommended isolation valve **Filter valve fitted on return ***Blending valve fitted to DHW pipe

System layout

Connecting the heat pump to the heating system

Care should be taken to avoid excessive use of flux on copper pipe connections to minimise the amount of debris and blocking of the filter.

System flushing and care

Central heating systems must be flushed before the heat pump is installed. The system should be prepared in accordance with the guidelines of BS 7593 : 2006.

The filter on the primary circuit should be checked during the first week of operation to ensure that any debris is removed.

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 pipe system has been well flushed before it is connected to the heat pump. Flushing protects the heat pump from contamination.

The heat pump is a part of the heating system. Faults in the heat pump can be caused by poor water quality in the radiators or underfloor coils or because air is penetrating the system continuously. Oxygen causes corrosion products in the form of magnetite and sediment. This is detrimental to the heat pump components and reduces their working life. Existing heating systems which require regular filling or where the heating water is not clear when drained, require cleaning and flushing before the installation of a heat pump, for example the heating system must be fitted with filters and vents.

Heat pump sizing

Although the sizing of the heat pump can only be accurately carried out by taking all factors into consideration, this section offers some explanation of the principles behind the sizing of heat pump according to the energy requirement of the property.

The following examples are for demonstration purposes only:

An air source heat pump is typically sized to provide around 85% of the peak load of the house on the coldest day. Since the number of days in a year that this requirement occurs is relatively low, the heat pump is typically sized to provide 95% of the total heating requirement for a property over the year. The remaining energy is provided by the built-in electrical heater.

The benefit of sizing the heat pumps below the peak load requirement is that the pump, for the majority of the year, is able to remain on and deliver a 'trickle charge' of heat to the property, rather than being oversized and constantly cycling in and out of operation. This helps the heat pump to offer better efficiency.

There are significant climatic differences across the UK and this should be taken into consideration when sizing the heat pump. The Worcester system design service is able to provide information on an individual basis.

For more information on the suitability of heat pumps for your home visit **www.worcester-bosch.co.uk**

Communication cable

In the control unit the different circuit boards are connected by a data communications cable (CANbus). This cable is **NOT SUPPLIED** by Worcester, Bosch Group. A cable similar to CAT 5 E FTP 2 x 2 x 0.5 screened CANbus can be used.

CANbus cable must be a twisted pair, screened and earthed. Maximum cable length is 20 metres. CANbus cables **MUST NOT** be laid alongside power cables.

Warning: These connections must not be mixed up. If 12 volts are supplied on either CANL or CANH the processors may result in damage. The four cables should be attached on contacts with corresponding marking on the Greensource air to water heat pump and the heating and hot water distribution unit.

Dip switch S1

All CANbus pcbs should be connected in series and the dip switch marks the beginning and the end of a CANbus net. Therefore, the dip switch on the HWDU display and on the heat pump must be in the 'TERM' position. All others must be in the opposite position (not terminated).

Refrigerants

The Worcester Greensource air to water heat pump system uses R407c pre-charged refrigerant.

Maintenance on the outdoor heat pump

The outdoor heat pump unit should be checked regularly for leaves and debris, especially on the evaporation fins and water tray. These must only be cleaned using a watering can with a rose and a soft cloth to prevent damage.

Maintenance on the indoor unit

This should be serviced annually in accordance with G3 requirements.

Spare parts

Only genuine Worcester, Bosch Group spare parts can be used with these products.

Standards

The installation of the Worcester Greensource air to water heat pump system must be carried out in accordance with the relevant requirements for safety, current Wiring Regulations, local Building Regulations, Building Standards (Scotland), (Consolidation) Regulations and Bylaws of the local water company and Health and Safety document No. 63S (Electricity at Work Regulations 1989). It should be in accordance with the relevant recommendations of the following British Standards and Regulations:

CoPs are calculated using EN 14511 which includes the compressor and all pumps.

BS EN 378
Refrigerating systems and heat pumps. Safety and environmental requirements.

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, and any other relevant regulations in force at this time.

The manufacturer's notes must not be taken in any way as overriding statutory regulations.

System design requirements

The heating system should be designed to maintain 70% of the nominal flow of the system across the heat pump at all times. Underfloor heating systems should have at least half of the underfloor coils fully open at all times.

The heating system to which the heat pump is connected must always have an uncontrolled volume of at least 25l, otherwise a buffer tank (primary water storage) must be installed.

System flushing and care

Flushing the system in line with BS 7593

- Fill the system with cold water and check for leaks
- Open all drain cocks and drain the system
- Close drain cocks and add a suitable flushing agent compatible with aluminium at the correct strength for the system conditions and in accordance with the manufacturer's instructions
- Circulate the flushing agent before the heat pump is connected
- Run the system at normal operating temperature as directed by the manufacturer of the flushing agent
- Drain and thoroughly flush the system to remove the flushing agent and debris
- It may be necessary to use a power flushing machine to aid the cleansing procedure in some circumstances
- Close the drain cocks and refill with fresh water and a suitable inhibitor
- Vent any air from the boiler and system
- Clean the particle filter.

The heating system must not contain more than 200ppm chlorine.

Filling the heating system

First flush the heating system. If the water heater is connected to the system, it must be filled with clean water. The heating system is then filled.

Filling the heating system with clean water

Worcester recommends the fitting of an in-line system filter to help ensure that the heating system can perform at its optimum level.

- Set the pre-pressure for the expansion vessel in the premises according to the heating unit's static height
- Open the heating system's valves
- Top up the heating water in the system and fill system to appropriate operating pressure
- Vent the heating system by opening the shut off valve. This may have to be repeated a couple of times and is very important to ensure the correct operation of the heat pump
- Also bleed via the heating system's other bleed valves (e.g. radiators)
- Refill to the correct pressure. Normal pressure is 1.0-2.5bar, but depends on the expansion vessel's pre-pressure and the height of the building
- Shut the heating water filling valve when the correct pressure is reached.

Inhibitor

If the system is exposed to freezing conditions, add a suitable inhibitor or combined inhibitor/anti-freeze in accordance with the DWTA code of practice and manufacturer's guidelines.

The Worcester Greenstar System Filter

Modern heat pumps are precision engineered and designed to run with a clean water-heating system. Over time, dirty system water will develop, damaging a heat pump and its components, causing failures, shortening the life of the overall system and dramatically reducing the efficiency of the heat pump.

A highly effective solution

The Worcester Greenstar System Filter has been specifically designed to combat the damaging effects of system debris and pollutants, protecting the heat pump and heating system for a fraction of its cost.

At the centre of its innovative design is a powerful magnet that removes the magnetic debris that is present in the heating system water. The central location of the magnet ensures that the debris is collected quickly and retained. Any non-magnetic debris is caught by the twin-action cyclonic trap, maximising overall protection.

Greenstar System Filter features and benefits:

- Highly effective – safeguards the boiler against damage and can save up to 6% a year on energy bills*
- Prevents blockages in radiators – a warmer home and quieter system
- Twin action – effective against magnetic and non-magnetic system debris.

The filter can be fitted under or away from the heat pump.

Product info	
Part number	7 716 192 609

*Independent research.

Communication cable

The printed circuit boards in the Hydrolight/Hydrocomfort unit, and accessories board if applicable, are connected via the CANbus communication line. The CAN (Controller Area Network) is a system that facilitates communication between microprocessor-based units/printed circuit boards.

A room controller is available as an accessory and must be connected by a CANbus cable – also available as an accessory.

Suitable cable for external laying is cable type LIYCY (TP) 2 x 2 x 0.5.

The cable must be twisted pair and screened. The screen must only be earthed at one end and to the chassis.

Maximum cable length is 30m between the internal room controller and the internal Hydro unit.

The CANbus cable must not be routed together with the mains cable that carry 230V or 400V. The minimum clearance is 100mm. Routing of these cables together with the sensor cables is not permitted.

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 CANbus connections.

Refrigerants

The air to water heat pump is filled with R410A refrigerant. It is therefore a requirement that the owner of a Worcester Greensource Split Heat Pump has the refrigerant circuit checked by a refrigerant engineer. Leak tests must be performed at installation and then repeated every 12 months.

Maintenance of the outdoor heat pump

The outdoor heat pump unit should be checked regularly for leaves and debris, especially on the evaporation fins and water tray. To prevent damage these must only be cleaned using a watering can with a rose attachment and a soft cloth.

Maintenance on the indoor unit

This should be serviced annually. If a cylinder is fitted this would have to be serviced annually in accordance with G3 Building Regulations.

Frequently asked questions

What benefits do air to water heat pumps offer over ground source heat pumps?
There are significant benefits – lower installation costs – no need to dig trenches or boreholes. The Greensource air to water heat pump is a self contained unit that simply needs connecting to the mains electricity supply and the building's wet heating system. They also take up much less space too as you don't need a large area for the collector trenches required for ground source heat pumps.

What refrigerant is used in Greensource air to water heat pumps?
Greensource air to water heat pumps use R407C. It is an approved refrigerant featuring zero Ozone Depleting Potential. It also has a low Global Warming Potential which is more environmentally friendly.

What is the lower limit operating temperature?
The lower limit operating temperature of Greensource air to water heat pumps is -20°C.

What are the key maintenance requirements for Greensource air to water heat pumps?
It will need servicing once a year by a qualified maintenance technician. The technician will need to check a number of things during the service, including:

- A temperature pressure relief valve is fitted – in line with G3 requirements for unvented cylinders
- Check the unit for signs of damage or corrosion
- Check the panels to ensure there is no vibration and that they are properly fastened
- All water connections must be checked for tightness or signs of leakage and the system water pressure must be checked
- The air path to and from the unit must be checked to ensure it is clear
- The heat pump water drain tray and the pipe to it must be checked to ensure it is clear and clean.

The technician should then turn the unit on and check that:

- the controls are operating properly
- the water pump is free and operating properly
- the unit's fan is operating
- that the unit is increasing the water to the correct operating temperature.

How should the unit be sited to ensure the airflow and access it needs?
What's important is to ensure there is sufficient space for airflow into the unit and enough clearance at the front of the heat pump to stop cold air re-circulation. You'll also need to ensure that there is adequate space for access for service and maintenance. You should try to ensure that the unit is sheltered from high winds as this will improve the unit's efficiency level by lowering the fan power requirement. The minimum clearances required are shown on pages 18 and 19.

What size of cable should be used to connect the air to water heat pump to the mains electricity supply?
Consideration should be given to the size of the unit, the length of the cable run and the type of cable being used. Only have installation work carried out by qualified technicians who will be able to calculate the correct cable size for each installation.

What is the most efficient flow water temperature setting?
The lower the flow water temperature the less hard the heat pump has to work and the more efficient it will be. It depends on the type of heating system the heat pump is working alongside, but we recommend that the operating temperature for an underfloor heating system is 35°C and for a typical radiator system is 50°C.

What size of radiators should be used on installations linked to air to water heat pumps?
We recommend that radiators are appropriately sized based on the heat loss of the home. Most radiator manufacturers will supply selection tables and offer advice on this.

Can you combine radiators and underfloor heating when using an air to water heat pump?
Yes you can. However, the heat pump return water temperature should be set for a radiator system at the higher return temperature and a mixing valve should be fitted to reduce the water temperature for the underfloor heating part of the system.

Can the external air to water heat pump unit be hidden behind bushes, trees and fences?
Yes, but you have to be aware that wherever you position the unit it has to have adequate airflow available to it and that the discharge air can't be re-circulated back to the inlet. If you don't take enough care in this respect, it will result in lowering the air temperature and can significantly reduce the efficiency of the unit. Our recommended clearances should be noted on page 18.

Is planning permission required for the installation of an air to water heat pump?
Planning permission varies and is installation specific. For information and guidance on planning permission for air to water heat pumps visit **www.energysavingtrust.org.uk**

Can an air to water heat pump be used to cool the home as well as providing heat?
Our Greensource air to water heat pumps are designed to produce heating and hot water only. Greensource air to air heat pumps can cool the home as well as heating it.

What guarantee is available?
Greensource air to water heat pumps come with a 2 year manufacturer's guarantee provided that the guarantee is registered within 30 days of installation. For more information please call 0330 123 2552.

Is there a training course available?
Yes, Worcester offers a range of training courses including a 1 day Greensource Air to Water training course. Please call 0330 123 0166 for more information.

www.energysavingtrust.org.uk

Greensource air to water heat pump range and accessories

Greensource 6kW Outdoor Heat Pump and Hot Water Distribution Unit*

Worcester Part No.
7 716 150 008

Greensource 7kW Outdoor Heat Pump and Hot Water Distribution Unit*

Worcester Part No.
7 716 150 009

Greensource 9.5kW Outdoor Heat Pump and Hot Water Distribution Unit*

Worcester Part No.
7 716 150 010

120 litre buffer storage tank

Worcester Part No.
8 718 544 081

Greenstar system filter

Worcester Part No.
7 716 192 609

**Comes complete with 19 litre unvented kit.*

The total training experience

Worcester expertise that will build your skills

Worcester has always placed great emphasis on technical support and training for installers and service engineers. Advances in heating technology, including the increasing use of renewables, make the need for training greater than ever.

To ensure the highest levels of competence and expertise in the installation of all Worcester products, we run intensive training courses for installers, commissioning engineers and operatives involved with servicing and fault finding.

Courses available

Our training facilities offer a number of courses suitable for the installer and commissioning engineers, and more in-depth courses for the servicing and fault finding engineers.

Training centres throughout the UK

To enable us to meet the growing demand for training we have invested in additional facilities at the award-winning training academy at our Worcester headquarters. In addition to the original academy there is now a new 400m^2 unit, 25% of which is devoted to an open-plan domestic training area with life-size single-storey brick buildings. These feature working Greenskies solar thermal systems which enable installers to get up onto the roof of the building to get more realistic training. There are bays full of all Greenstar gas-fired appliances, so installers can really get to grips with the importance of system design. The additional space also contains dedicated training areas for our renewable and future products. The training centre also runs certified domestic and commercial ACS training and assessment.

Further academies are located at West Thurrock in Essex, Wakefield and Clay Cross in Derbyshire, all offering our full suite of courses. Please phone 0330 123 0166 for more information about a course near you. Each course is run by specialist trainers and is superbly equipped to deliver a combination of classroom theory and practical hands-on experience that's second to none.

College-linked Learning

As well as offering training at our own centres, Worcester has established close partnerships with many colleges around the UK, equipping them with our latest products. Call us on 0330 123 0166 to find out when we will be running the course of your choice at a college in your area.

Mobile training

To complement our training venues across the country, we can also bring training to you.

We have mobile vehicles fully equipped with operational Greenstar gas-fired boilers, dry strip-down models and even a Greensource air to air heat pump, ensuring that quality training in a comfortable environment can be achieved on your doorstep!

If it's oil training you require, our 7.5 tonne mobile oil vehicle is available throughout the country for hands-on product training and OFTEC assessments.

Distance learning/web based learning

Worcester has produced a selection of Distance Learning CD ROMs/DVDs which are packed with information. Call 0330 123 9119 for your copies, or visit **www.worcester-bosch.co.uk** for information on Web Based Learning.

Get on course for a more profitable future now.

Call now for more information 0330 123 0166

Heat pump product courses

All academies allow customers to gain hands-on experience with our entire range of renewable products and inform installers about the true benefits of installing heat pumps and underfloor heating. The introduction to heat pumps course is designed for installers and heating engineers who have no experience in installing heat pumps. The various one day heat pump courses are designed for those with more practical experience in heat pump technology.

Renewable courses

- **Introduction to heat pumps.**
- **Greenstore LECP ground source heat pumps.**
- **Greensource split air to water heat pumps.**
- **Greensource air to water heat pumps.**
- **Greensource air to air heat pumps.**
- **Greenstar Plus Hybrid heat pumps.**
- **Renewable range overview.**

	Intro to heat pumps	GSHP	Split AW	AWHP	AAHP	Hybrid	Renewable Overview
Duration	1 Day	1 Day	1 Day	1 Day	1 Day	1 Day	1 Day
Cost	Free*	Free*	Free*	Free*	Free*	Free*	Free*
Training course covers							
Specification	✓	✓	✓	✓	✓	✓	✓
Installation	✓	✓	✓	✓	✓	✓	✗
Commissioning	✓	✓	✓	✓	✓	✓	✗
Servicing	✓	✓	✓	✓	✓	✓	✗
Maintenance	✓	✓	✓	✓	✓	✓	✗
Product overview	✓	✓	✓	✓	✓	✓	✓
System design	✓	✓	✓	✓	✓	✓	✗
Course locations							
Worcester	✓	✓	✓	✓	✓	✓	✓
Clay Cross	✓	✓	✓	✓	✓	✓	✓
Wakefield	✓	✓	✓	✗	✓	✓	✓
West Thurrock	✓	✓	✓	✓	✓	✓	✓
College Links†	✓	✓	✓	✓	✓	✓	✓
Mobile†	✗	✗	✗	✗	✓	✗	✗

*A holding fee of £65 applies to free courses and is refunded on attendance of the course. If a booking is cancelled more than 10 working days before the course date, the fee will be fully refunded. The fee is non-refundable if a cancellation is made less than 10 working days before the course date.
†Please contact Worcester Training for specific colleges and mobile dates.

To complement the above courses, Worcester also runs the **Hot Water Systems and Safety course, IDHEE domestic heating design, QCF Level 3 Award, MCS Made Easy and Green Deal courses.** For more information turn to page 29.

Please note: it is recommended that unless you have experience installing/commissioning/servicing heat pumps or have worked previously with heat pump technology, that the one day introduction to heat pumps course be attended before commencing with any specific heat pump product courses.

Additional product and industry training courses

The diversity of products in today's heating industry gives you the opportunity to expand your expertise, whilst offering more choice to your customers. Worcester provides comprehensive training from all its academies on its entire range of technologies.

We are here to provide you with training and assistance for all areas of your business, not just product training. Call us on **0330 123 0166** to order a full course training brochure or to book yourself onto a training course, alternatively, you can visit **www.worcester-bosch.co.uk/training**

Gas-fired condensing boiler courses

- **Greenstar CDi Classic gas-fired condensing combi boilers.**
- **Greenstar CDi Compact and NEW Greenstar Si Compact gas-fired condensing combi boilers.**
- **Greenstar i Junior gas-fired condensing combi boilers.**
- **Greenstar system & regular gas-fired condensing boilers** (covers NEW Greenstar 27Ri & 30Ri, Greenstar 12Ri-24Ri, Greenstar CDi Classic Regular, Greenstar FS CDi Regular, Greenstar 30CDi Classic System, NEW Greenstar 27i & 30i System and Greenstar 12i-24i System boilers).
- **Greenstar Highflow CDi & FS CDi Regular floor standing gas-fired condensing combi and regular boilers.**
- **LPG Changeover.**

Oil-fired product courses

- **Greenstar oil-fired products.**
- **Oil advanced fault finding.**
- **OFTEC 50.**
- **OFTEC 101 & 105e.**
- **OFTEC 600a.**
- **OFTEC 101/105e/600a.**

Accessories training courses

- **Worcester controls.**

Worcester commercial product courses

- **Greenspring CWi47 water heater.**
- **GB162 overview.**
- **GB162 domestic.**
- **GB162 commercial.**
- **Greenstar Heat Distribution Unit.**
- **Commercial ACS training and assessment – CODNCO1.**

Bosch commercial product courses

- **GB312 & GB402 overview.**
- **Solar thermal product overview.**
- **GWPL Gas Absorption Heat Pumps overview.**
- **CHP overview.**
- **Commercial controls overview.**

Industry focused courses

- **Hot water systems & safety.**
- **Chemical water treatment.**
- **Construction skills F-Gas training/ assessment certification.**
- **IDHEE domestic heating design.**
- **Domestic ACS training and assessment – reassessment. CCN1 + 3 appliances.**
- **QCF Level 3 Award**
  - **Air source and ground source heat pumps.**
  - **Air to water and split air to water heat pumps.**
  - **Solar thermal.**
- **MCS Made Easy.**
- **Green Deal.**

A complete after-sales service

As part of the worldwide Bosch Group, Worcester strives to maintain the highest possible standards of after-sales care.

In addition to the no-nonsense parts and labour guarantee applicable to all Worcester products, you and your customers have the assurance that every Worcester product is manufactured to both the appropriate British and European standards.

Worcester Contact Centre

Should you require support, our award winning Contact Centre team, based at our head office in Worcester, are ready to take your calls. Whatever your query our contact centre operators along with our nationwide team of engineers are ready to help you.

Tel: 0330 123 9559

Opening times

Monday – Friday: 7.00am – 8.00pm
Saturday: 8.00am – 5.00pm
Sunday: 9.00am – 12 noon
Bank Holidays: 8.00am – 4.30pm

TOP 50 CALL CENTRES FOR CUSTOMER SERVICE 2011

EXCELLENCE 2012

All the technical advice you need

Spares

Genuine replacement parts for all supported Worcester products are readily available from stock, or on a next day delivery basis. Visit our website **www.worcester-bosch.co.uk/spares** to find your local stockist.

Customer Technical Support

The Worcester Technical Helpline is a dedicated phone line – committed to providing a comprehensive service to complement the brand name and quality of our products. Our experienced team of technical experts provides answers to queries of a technical nature across the entire Worcester range.

Worcester also has a pre-sales department, which provides assistance in selecting a heating system to suit a particular application, along with full guidance on installation. For more information please contact the Technical Helpline or alternatively visit our website where literature can be downloaded **www.worcester-bosch.co.uk**

Technical

Tel: 0330 123 3366
Fax: 01905 752 741
Email: technical.enquiries@uk.bosch.com

Opening times

Monday – Friday: 7.00am – 8.00pm
Saturday: 8.30am – 4.00pm
Bank Holidays: 8.00am – 4.30pm

Notes

Useful numbers

Sales
Tel: 0330 123 9669
Fax: 01905 456445
sales.mailbox@uk.bosch.com

Spare Parts
Tel: 0330 123 9779
Fax: 01905 754620
spares.mailbox@uk.bosch.com

Technical Helpline (Pre & Post Sales)
Tel: 0330 123 3366
Fax: 01905 752741
technical.enquiries@uk.bosch.com

Renewables Technical Helpline
Email: renewable.energy@uk.bosch.com
or telephone 0330 123 9229

Training
Tel: 0330 123 0166
Fax: 01905 752535
training@uk.bosch.com

Literature
Email: literature@uk.bosch.com
or download instantly from our website
or telephone 0330 123 9119

Customer Service

Engineer Appointments
Email: appointment.worcester@uk.bosch.com
or telephone 0330 123 9339

Enquiries
Email: service.mailbox@uk.bosch.com
or telephone 0330 123 9559

Guarantee Registration
To register your Worcester guarantee,
please visit our website
www.worcester-bosch.co.uk/registration
or telephone 0330 123 2552

Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls. These rules apply to calls from any type of line, including mobile, BT, other fixed phone line or payphone. Calls from mobiles and some other networks may vary. Calls to and from Bosch Thermotechnology Ltd may be recorded for training and quality assurance purposes.

www.worcester-bosch.co.uk

In partnership with energy saving trust™

Part No. 8 716 115 319 D 05/14

Sustainable Forests
Totally Chlorine Free

BBT3272

WORCESTER
Bosch Group
Worcester, Bosch Group,
Cotswold Way, Warndon,
Worcester, WR4 9SW