

Greenstore Ground source heat pump

Fact sheet

Available Worcester products

Product Description	Part Number
6 kW Greenstore System	7 716 180 009
7 kW Greenstore System	7 716 180 010
9 kW Greenstore System	7 716 180 011
11 kW Greenstore System	7 716 180 012
100 litre Primary Store	7 716 192 418
120 litre Primary Store	7 716 192 638
180 litre Greenstore Cylinder	7 716 180 017
280 litre Greenstore Cylinder	7 716 180 018
6 kW Greenstore Combi	7 716 180 013
7 kW Greenstore Combi	7 716 180 014
9 kW Greenstore Combi	7 716 180 015
11 kW Greenstore Combi	7 716 180 016
Compact Collector	7 716 192 419

Please refer to the schematic diagrams for details of a typical system layouts.

Electrical supply

A 230V single phase fused supply is required (Fuse Rating 6 kW = 50A 7, 9 & 11 kW = 63A). Wiring must be HO7RNF type. A residual current device (RCD) $\Delta I=300$ mA should also be fitted.

Heat emitters

For a heat pump to perform to its highest energy-efficiency, the central heating emitter circuit should be designed so that the flow temperature is as low as possible.

As a guide, the system should be designed using the following maximum flow temperatures;

Underfloor heating: 35-40°C
Radiators: 45-50°C
Skirting heating: 45-50°C

If underfloor heating is being installed, it is important to remember to inform the underfloor system designer that the heat source will be from a ground source heat pump. It is also important to remember that radiators and skirting heating must be sized to work effectively with lower flow temperatures.

Further guidance is available in Worcester Technical Bulletin No. TB 0029 available to download from the Worcester website. Dependant on the design of the heat emitter circuit and the controls installed, a primary store may be required.

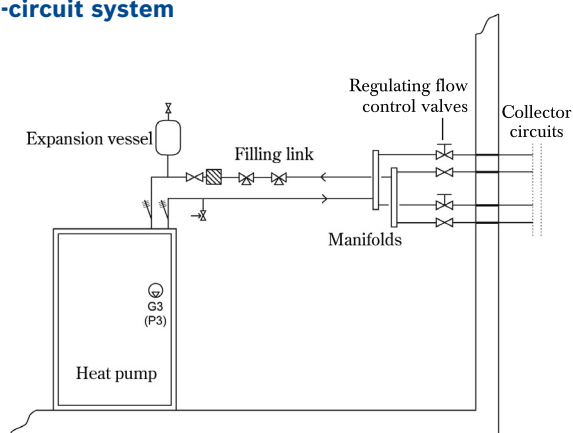
General ground loop information

The ground collector pipe should be PE 40 x 2.4 PN 6.3 SDR17. The length of pipe work specified in the Worcester heat pump sizing calculation refers to active collector only. Additional pipe work will be required to connect the heat

pump to the active section of the collector; the specific length should be established on site.

To limit pressure losses, total pipe work lengths exceeding 400 metres usually require multiple circuits in parallel and should be fitted via manifolds with flow balancing and isolation valves. e.g.

Multi-circuit system



All collector pipe work within 2 metres of the property or where flow and return pipes are less than 0.8 metres from each other, should be insulated using 19 millimetre thick class 'O' insulation.

Suggested suppliers

Suitable Pipe work, manifolds and fittings can be purchased from Go Geothermal Ltd. Tel: 01388 720228.

Pipe is available from Uponor Tel: 01455 550355 or Rehau Tel: 01989 762537.

Flow balancing valves can be purchased from Go Geothermal Ltd. or Watts Industries Tel: 01386 446997. Suitable insulation can be purchased from Armacell UK Ltd. Tel: 0161 287 7100.

Compact collector option

Compact Collectors are 1.8 metres wide and 2 metres long. Additional connectors will be required between each collector plus one at the end of each row to join them together. The compact collector connections should be made using suitable 40mm compression fittings or fusion weld joints.

The maximum permissible number of collectors in a single row is 11. It is recommended, to aid natural balancing in multiple rows, that the number of collectors in each row should be equal. However, this is not always possible and a flow regulating valve must be fitted to any case to each circuit to allow the flow rates of heat transfer fluid to be matched. Additional pipe work and spacing to connect from row to row and to connect the collectors back to the heat pump will also be required.

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Borehole (vertical) option

This work needs to be carried out by a specialist contractor and we advise that you obtain a clear understanding of the work necessary before commencement.

The Worcester heat pump sizing software program used for estimating the length of boreholes is based on the ground being rock and soil. Consequently, before proceeding with a borehole it is essential that a full Geological Prognosis Report is obtained from a reputable geological survey company. Your borehole contractor will either arrange this for you or will supply the name of a company they would recommend you use.

The report will provide essential details for the borehole driller with regard to the geological make up of the ground. This will determine the method of drilling, the length of boreholes and, if necessary, the number of boreholes required.

Suggested suppliers

Geological Prognosis Reports can be obtained from Carbon Zero Consulting Tel: 0844 8550115 or GeoReports (BGS) Tel: 0115 9363143.

Some ground types require longer boreholes to collect the required amount of heat to ensure the heat pump runs effectively and efficiently. Where multiple boreholes serve one heat pump, it is essential as with ground loops, that all loops or boreholes are balanced with each other to give an equal flow rate of heat transfer fluid.

The borehole length specified in the Worcester heat pump sizing calculation is the active collector pipe work. Additional pipe work will be required to connect the active borehole and the heat pump. Active collector describes pipe work below the water table or in contact with a suitable thermal grout.

Some borehole contractors may supply their own pipe which can be 32mm in diameter. The Worcester heat pump sizing programme estimates the borehole depth and length of pipe based on a 40mm diameter pipe and where 32mm pipe is to be used, the stated length will need to be increased by a minimum of 12% to accommodate the smaller pipe bore.

Suggested suppliers

Suitable contractors include WB & AD Morgan Tel: 01544 267980 or those found by contacting the British Drilling Association Tel: 01327 264622.

Heat transfer fluid

Sufficient heat transfer fluid (Propylene Glycol) to fill the system and collector must be provided. The fluid should achieve an antifreeze protection level of -15°C and should

ideally be checked using a refractometer. An approximate method of achieving the required protection level is by ensuring a 35:65% glycol:water mixture. The amount of glycol and water can be calculated:

For every 1 metre of 40mm Dia. x 2.4 mm pipe 0.35 litres of Glycol & 0.65 litres of water will be required.

Suggested suppliers

Suitable fluids can be purchased from Go Geothermal Ltd. Tel: 01388 720228, Sentinel Tel: 01928 588330 or Fernox Tel: 0870 601 5000.

Prior to filling and commissioning the ground loop collector circuit should be flushed to remove debris. Suitable flushing agents and post filling additives should also be considered to minimise biological contamination.

Suggested suppliers

Suitable products and further information is available from Sentinel Tel: 01928 588330 or Fernox Tel: 0870 601 5000.

Commissioning

Additional one off purchase items are available and essential if filling your own system and include:

Product Description	Part Number
1 x Filling Pump Unit	7 716 192 420
1 x Filling Pump Hose Set	7 716 192 421
1 x Air Compressor	7 716 192 422
1 x Compressor Connection	7 716 181 103

Worcester, Bosch Group offer a full commissioning service should you require it. This entails the filling of the ground collection system with heat transfer fluid and the setting of the operating parameters of the heat pump, the charge for this work is currently £400-£550*.

For filling and commissioning to be completed, the ground loop must be sound and have been pressure tested upon installation and prior to our arrival. Please note:- heat transfer fluid is not supplied by Worcester, Bosch Group.

Purchase

Prices for heat pumps and associated equipment can be obtained through your nearest major merchant.

Suggested suppliers

Worcester products can be purchased from major merchants including:- Plumb Center, PTS, City Plumbing, Graham Group and Plumbase Limited etc.

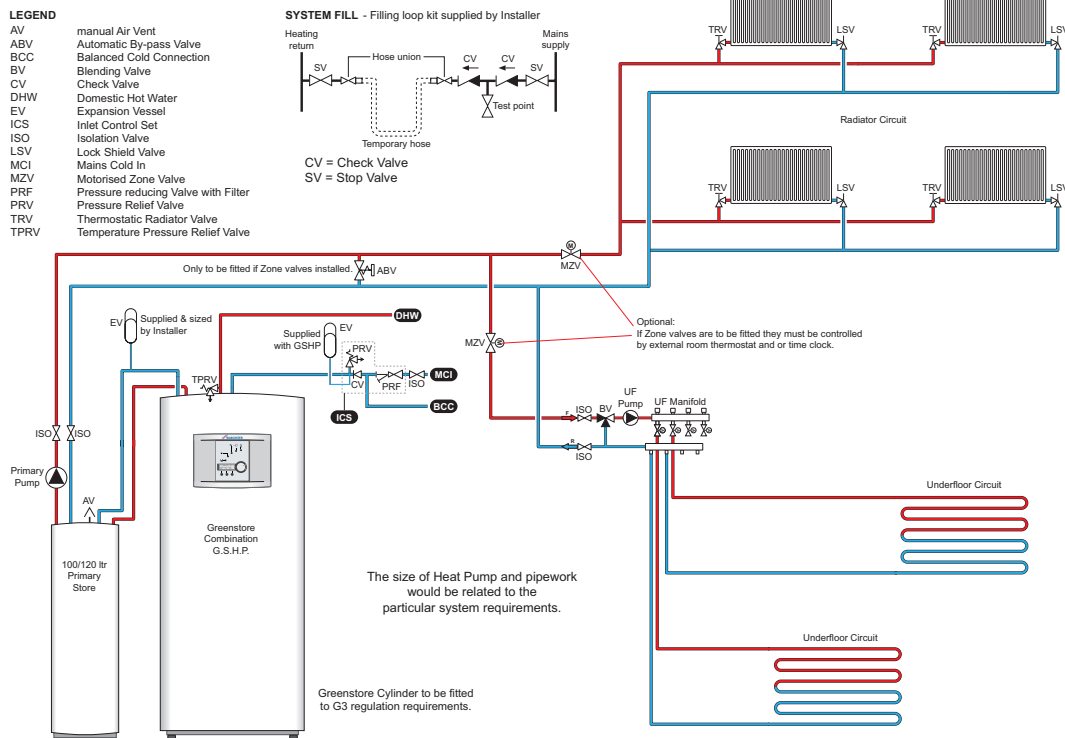
*Subject to terms and conditions

Please Note: Heat pumps should be installed in accordance with the installation instructions and in conjunction with good practice guides and applicable legislation.

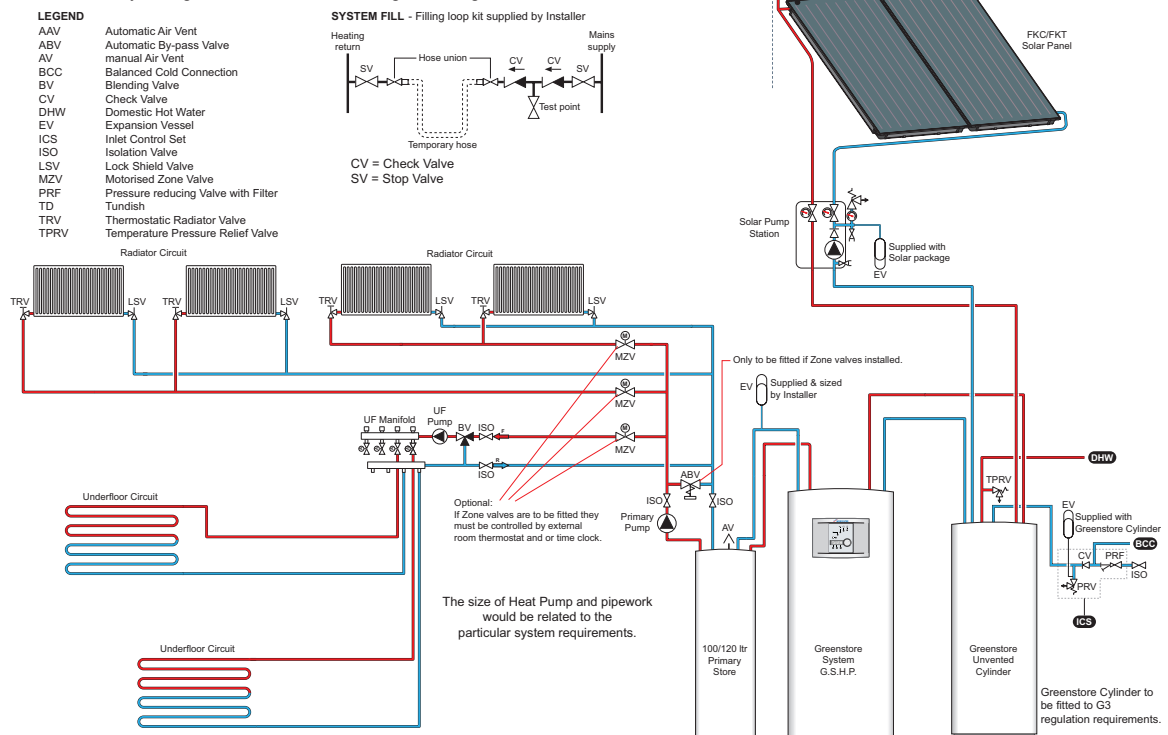
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Worcester Greenstore Combination G.S.H.P. with 100/120 Litre Primary storage Vessel.



Worcester Greenstore System G.S.H.P. with Greenstore Unvented Cylinder, with 100/120 Primary storage vessel and Solar Package showing zoned heated areas.



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Specification sheet

Product Description	Part Number	Quantity
Greenstore 6 kW system	7 716 180 009	
Greenstore 7 kW system	7 716 180 010	
Greenstore 9 kW system	7 716 180 011	
Greenstore 11 kW system	7 716 180 012	
Greenstore 6 kW combi	7 716 180 013	
Greenstore 7 kW combi	7 716 180 014	
Greenstore 9 kW combi	7 716 180 015	
Greenstore 11 kW combi	7 716 180 016	
Greenstore 180 litre DHW cylinder (solar compatible)	7 716 180 017	
Greenstore 280 litre DHW cylinder (solar compatible)	7 716 180 018	
100 litre primary buffer storage tank	7 716 192 418	
120 litre primary buffer storage tank	7 716 192 638	
Compact collectors	7 716 192 419	
Filling pump unit	7 716 192 420	
Filling pump hose kit	7 716 192 421	
Air compressor	7 716 192 422	
Compressor connection kit	7 716 181 103	
*40mm Plastic to 28mm copper reducers (Typical requirement - 2, ground collector loop flow/ return connection to heat pump)		
*Compact collector compression / fusion weld fittings (As required and dependant on number of collectors)		
*Plastic Pipe - PE 40 x 2.4 PN 6.3 SDR17 or equivalent Length of active horizontal or borehole (If required, length detailed in heat pump sizing report)		metres
*Plastic Pipe - PE 40 x 2.4 PN 6.3 SDR17 or equivalent (Length of additional horizontal pipe work between active collector and heat pump unit)		metres
*Heat transfer fluid (Propylene Glycol) (Total Volume = Total length of active and additional pipe work multiplied by 0.35)		litres
*Manifold (As required, type dependant on number of loops)		
*Manifold housing (as required)		
*Flow balancing & Isolation valves (As required for number of loops, 1 balancing and isolation valve per loop)		
*Pipe insulation 19 millimetre thickness Class 'O' insulation (As required)		metres
*Heating emitters (radiators / underfloor / skirting heating), controls, expansion vessel, isolation valves etc. (As required, sized correctly to work with low temperature heat pump system)		
*Central heating 'shunt' pump (Required if primary buffer tank is fitted, sized to suit system e.g. Grundfos 15/60)		
Worcester commissioning service required		Yes / No

*Not available from Worcester, Bosch Group.

Please Note: The Specification sheet above provides a typical equipment list for a ground source heat pump installation. The information is not exhaustive and is provided to indicate the major components for consideration. The heat pump should be fitted in accordance with the Installation and Service Manual available to download via the website link detailed below or by contacting the literature line on 0844 892 9800.

<http://www.worcester-bosch.co.uk/installer/literature/ground-source-heat-pumps-literature>

This document is accurate at the date of issue but may be superseded and should be disregarded if information and/or appearances are changed in the interest of continued improvement. The statutory rights of the consumer are not affected. SD 03 (2010/11)