

Freedom[^]
Heat Pumps

Samsung Eco Heating System

Pre Sales Technical Information

Powerful and eco-friendly air to water solutions for heating



SAMSUNG



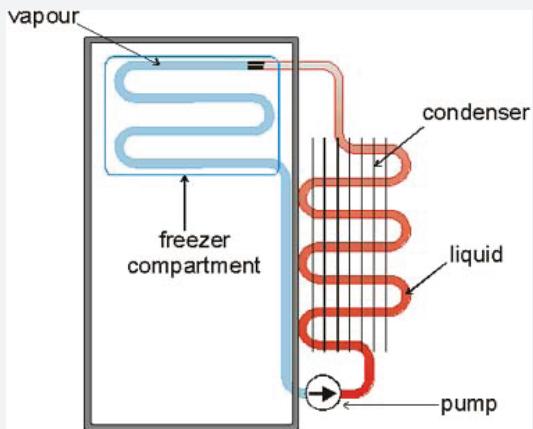
This pre-sales manual has been developed for both the installer and end user to help you understand the sometimes confusing world of Air-to-Water Heat Pump technology. We hope that you will find all the information you require to make an informed choice. This technology when applied correctly will provide savings, comfort and control and with our help we are sure that the transition to future heating technology will be a smooth one.

	Section:	Page:
Why Choose A Heat Pump?	4	
How Much Will I Save?	5	
Renewable Heat Incentive (RHI)	6	
Samsung EHS 2015 Lineup	7	
Sizing Your Samsung EHS System	9	
EHS Mono	10	
EHS Split	12	
EHS Smart MCS Calculator	14	
System Schematics	15	
System Design & Components	38	
Installation Siting	40	
Other Components	42	
Warranty Details & Approved Installers	43	
Splits Technical Data	44	
Mono Technical Data	45	

Why Choose a Heat Pump?

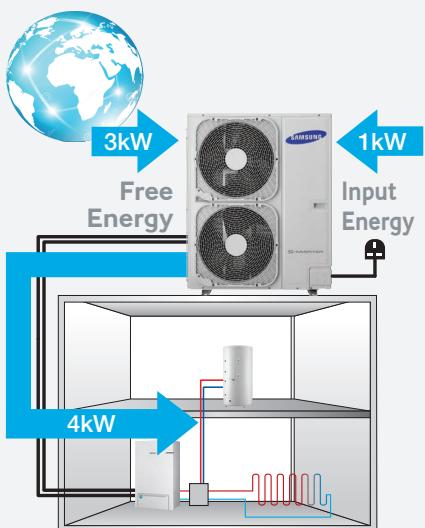
The Technology

A heat pump is an energy-efficient system that uses the heat from the ambient air for heating and hot water. By using the ambient air and transferring this heat into the house through a hydronic system, such as underfloor heating, a heat pump requires less power input and offers greater power output than conventional boilers.



How it Works

A heat pump is essentially a big fridge or freezer. If we look at what your fridge or freezer in detail it uses a refrigerant inside the pipework to suck the heat out of your food, the compressor or refrigerant pump moves the refrigerant around the system so that it can take all the heat and throw it away using a coil on the back of the Fridge. Your freezer is using the heat in your food to heat the kitchen, it's a food to kitchen heat pump. For every 1 kWh of energy input, a heat pump can deliver up to more than 4 kWh in energy output. This is an energy efficiency ratio of more than 400%, which is far superior to high energy efficiency boiler systems. Since conventional boiler systems can only reach an efficiency ratio of up to 95%, they consume more energy than they can ever deliver.



The Benefits

Integrating a heat pump system for basic heating and hot water in the home is an energy-efficient and environmentally friendly solution. The most noticeable advantage of the heat pump's energy efficiency is a sizeable reduction in energy bills. The EU has defined heat pump systems as renewable products. Under this classification, end users can apply for government subsidies or tax refunds when installing heat pump systems.

The Renewable Heat Incentive (RHI)

The Renewable Heat Incentive is a government financial incentive introduced by the Department of Energy and Climate Change to promote the use of renewable heat. Its aim is to cut carbon emissions and help the UK meet its EU renewable energy targets.

People joining the Domestic RHI scheme and keeping to its rules receive quarterly payments for seven years. For more information visit our section on [Claiming the RHI](#) on page 6

MCS

Micro Generation Certification Scheme (MCS) is a quality assurance scheme, supported by the Department of Energy and Climate Change. MCS certifies technologies used to produce electricity and heat from renewable sources.

The Scheme is designed to inspire confidence in renewable technologies with a financial backing from the government.

Both the equipment installed and the installer themselves must have MCS accreditation and work within the guidelines set out by MCS for the system installed to be eligible for any government grants.

MCS offers the end user peace of mind that the equipment you are supplying will work and will be installed correctly. MCS also has a complaints procedure that the end user can use if they perceive they have any problems with the installation.

Over the last couple of years MCS has been the standard all installer have worked to.

All Samsung heat pump products are MCS accredited for domestic use, they are listed on the MCS website.

If you are not MCS accredited it's possible to partner up with an MCS installer or to become MCS accredited yourself.

How Much Will I Save?

How Much Money can a Heat Pump Save?

The efficiency of a heat pump is effected by two external factors, the temperature you want to heat your radiators up to and the temperature of the air outside.

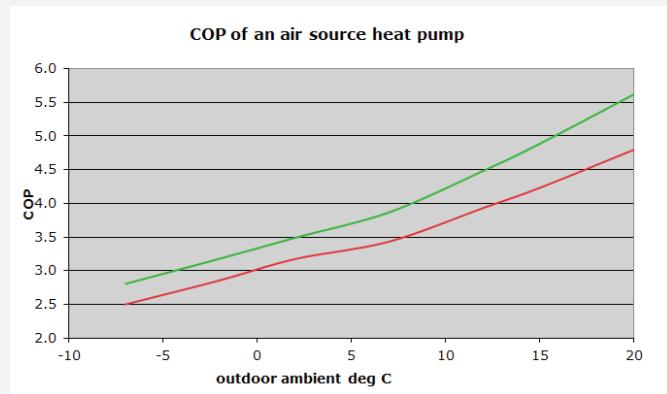
As it gets colder outside there is less heat to capture so the unit has to work harder.

Efficiency and COP

Heat pumps use electrical energy to capture renewable heat from the air in the garden, typically you can capture 2 kWs of energy for every 1 kW of electrical energy. This means you get 3kW of heat for only 1kW of electrical input making the unit 300% efficient.

To avoid confusion we don't use % efficiency with heat pumps, we use a different measure called Coefficient of performance. COP is just efficiency divided by 100. So 300% efficient = a COP of 3.00.

Below is a graph showing how the efficiency of the units is affected. Note how the efficiency falls as it gets colder outside and also as you raise the water temperature.



The problem with the graph above is it only shows the efficiency at each temperature, it doesn't show you what the average efficiency over a full year will be, for this we use a new measure called seasonal COP or SCOP.

Seasonal Coefficient of Performance SCOP

In September 2015 all manufacturers will have to submit the seasonal efficiencies of their equipment to MCS and have this data externally tested. It will be possible to download the seasonal COP or SCOP from the MCS database.

If you take a 9kW Mono heat pump, AE090JXYDEH it will have a seasonal COP of 4.409 at 35C and 3.127 at 55C flow temperature.

Run cost comparison

Existing systems	Fuel bills savings (£/year)	Renewable Heat Incentive (RHI) payment (£/year)	Carbon dioxide savings (kg CO2/year)
		1 April 2015 to 30 June 2015	
Gas older (non-condensing)	£295 to £425	£905 to £1,365	1,600 to 2,400 kg
Electric (old storage heaters)	£715 to £1,295		6,700 to 11,400 kg
Oil older (non-condensing)	£360 to £555		2,500 to 3,900 kg
LPG older (non-condensing)	£1,200 to £1,805		2,300 to 3,500 kg
Coal	£525 to £875		7,100 to 11,000 kg

source: www.energysavingtrust.org.uk

According to Ofgem in July 2011 an average house (3 bed semi of 1000sq ft.) uses 20500 kWhrs of gas to heat the house and hot water.

The average boiler is 83.5% efficient so it produces 17015kWhrs of heat.

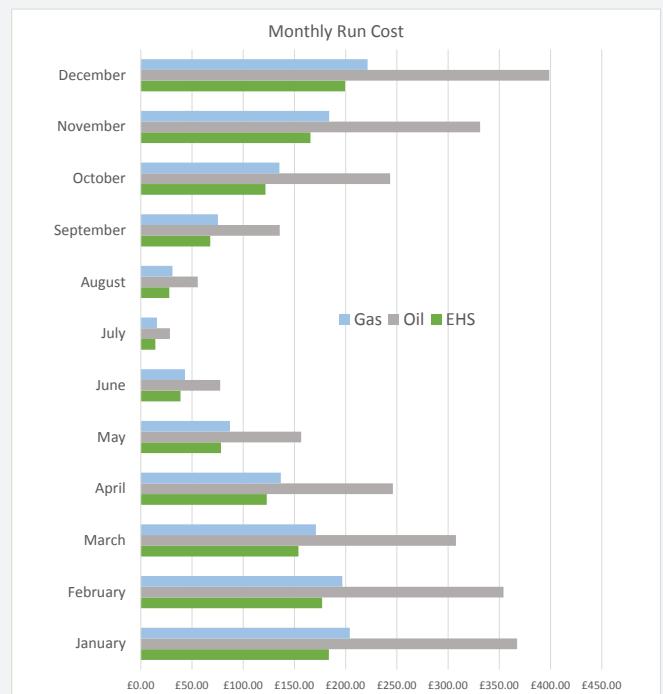
This represents a Gas bill of £998 for heating and hot water and Electric bill of £462 per year for lighting, domestic appliances etc.

Assumes 4.9p/kWhr for gas and 14p/kWhr for electricity

How much would a heat pump cost to heat the same house?

To provide 17015kWhrs of heat with an SCOP of 3.127 we would need to use 5441kWhrs of electricity, this would cost £761.

This would offer a saving of £237 against a modern gas boiler.



Renewable Heat Incentive (RHI)

What Is It?

The Renewable Heat Incentive is a government financial incentive introduced by the Department of Energy and Climate Change to promote the use of renewable heat. Its aim is to cut carbon emissions and help the UK meet its EU renewable energy targets.

People joining the Domestic RHI scheme and keeping to its rules receive quarterly payments for seven years.

Have a Green Deal Assessment

Before applying for the Domestic RHI you must have a Green Deal Assessment carried out for your property. If recommended you must then install loft and cavity wall insulation. If you already have it, you're still required to have a Green Deal Assessment.

RHI Calculation - Air Source Heat Pump Typical 3 Bedroom House

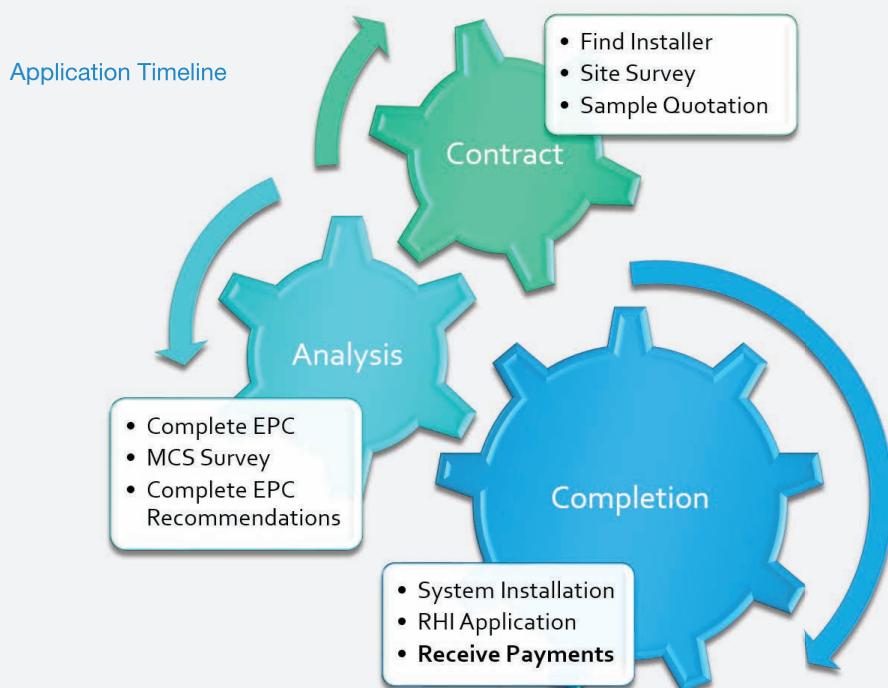
Estimated Annual Heat Load (from EPC)	15,0000kWh
SPF (from MCS Heat Emitter Guide)	2.7
RHI ASHP Tarriff (1st July 2015)	7.42 p
Estimated Annual Heat Load (total heat demand x (1 - 1/SPF))	$15,000\text{kWh} \times (1 - 1/2.7) = 9,444\text{kWh}$
Total Annual Domestic RHI Payment (tariff x estimated annual heat load)	£700.74
Quarterly Domestic RHI Payment	£175.18

The property must obtain a domestic Energy Performance Certificate (EPC)

The Domestic RHI scheme is designed to promote the uptake of renewable heating systems in domestic homes. To join, your renewable heating system must only heat a single domestic property which has, or is able to get, a domestic Energy Performance Certificate (EPC).

An EPC gives information about a property's energy use together with recommendations on how to reduce energy and save money. It's required every time you buy, sell or rent a property.

RHI will be available to retrofit and self builds only, NOT new builds.



Samsung EHS 2015 Lineup



	EHS mono		EHS split		
Outdoor Unit	CAPACITY				
	POWER	1P 220-240 V 50 Hz	3P 380-415 V 50 Hz	1P 220-240 V 50 Hz	3P 380-415 V 50 Hz
4.0kW					
5.0kW		●			
6.0kW				●	
9.0kW		●	●	●	●
12.0kW		●	●	●	●
14.0kW		●	●	●	●
16.0kW		●	●	●	●
8.0kW					
Hydro Unit	9.0kW			●	●
	16.0kW			●	●
Control Kit		●	●		
Key Features		<ul style="list-style-type: none"> • Easy installation • High reliability • Compact and light outdoor unit • Base plate heater (9~16kW) • Newly designed fan 		<ul style="list-style-type: none"> • High reliability • Newly designed fan • Base plate heater (9~16kW) • Flexibility • In built backup heater 	

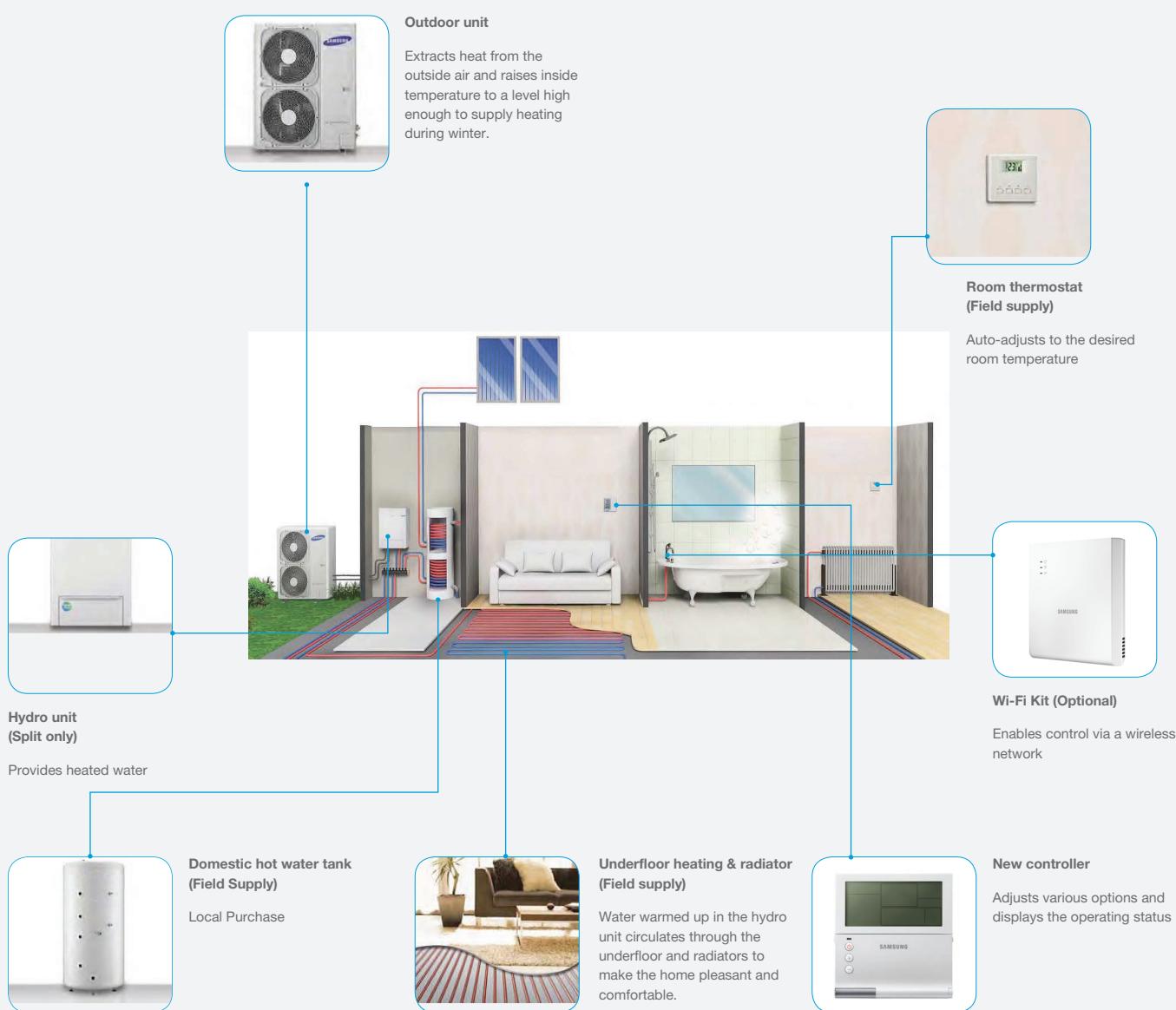
Eco Heating System

Experience eco-smart temperature control with efficiency and economy in mind

In the wake of rising greenhouse emissions and oil costs, Samsung offers an energy-smart, all-in-one heating and hot water for today's residences.

The Samsung Eco Heating System (EHS) uses highly efficient heat pump technology to deliver supreme comfort and low operating costs year-round.

This economical and ecological air conditioning system uses significantly less energy than conventional boiler systems, thereby lowering power costs and CO₂ emissions. Plus, it provides various combinations of water solutions for heating that satisfy varied users' needs throughout all four seasons.



Sizing Your Samsung EHS System

Sizing your System - Quick Method

The most important part of any heat pump installation is making sure that the correct size heat pump is installed in the house.

In 2013 the MCS defined a calculation which we now have to use to work out the heat load. All heat pump calculations must use the approved calculation method.

The problem with a full MCS calculation is that it can take a long time to complete as it requires a detailed survey of every room in the house.

To make the process more efficient we have created a couple of tools which can be used to build estimations of run costs, savings and installed costs. These cannot be used in place of an MCS calculation but are useful to give prospective customers some ideas. Go to www.samsungehs.co.uk/calculators

Bill Details		
Start Date of Bill	01/01	
End Date of Bill	31/01	
Cost of Bill	150.00	
Existing Heating Type	New heating oil boiler*	
Current Annual Fuel Bill	£1,104	
Heat Pump Required	Samsung mono 16kW	
Annual kW/hr's	16554	
Approx. Building Heat Loss	10000	
Heat Pump Annual Heating Costs		
Fuel Type	Cost of Heat per kWhr	Annual Heating Bill
Samsung Eco Heating System	£0.052	£858.33
Existing New heating oil boiler*	£0.067	£1,103.57
Estimated Domestic RHI Savings (Heat Pump Only)		
Domestic RHI Heat Pump Only		£608.07
Annual Fuel Saving		£245.24
Total Saving Over 7 Years		£5,973.17
Hybrid Systems Annual Run Costs		
Oil + heat pump		£1,057.59
LPG+ heat pump		£1,077.67
Nat Gas + heat pump		£981.72
Estimated Domestic RHI Savings (Heat Pump Hybrid)		
Domestic RHI Heat Pump Only		£456.05
Est Annual Fuel Saving		£1,038.99
Total Saving Over 7 Years		£10,465.32

Sizing your System - Full MCS

If the customer wants a full MCS quality heat loss carried out you must complete a full calculation.

In summary to meet the new MIS 3005 regs you have to do the following:

A heat loading calculation must be carried out to BS EN 12831.

The heat load must be done on a room by room basis using design temperatures clearly laid out in the regs, you cannot use your own figures. For example the heat loss is calculated at -1.8C in the South East of England. The figure gives the heat required to cope with the load 99% of the time. The 1% shortfall can be made up using backup heaters if required.

Using the figures from the heat loss calcs a heat pump must be selected which meets this design load unassisted. Figures must prove the real output and must include reductions for defrost.

There will be no RHI if the installation is not carried out to MCS standards. We think that everyone should complete an MCS sizing exercise; it's the only way to make sure the system you are recommending is correct and will operate well.

The first step is to go to site and gather all the data, this means you need to carry out a full survey.

The Survey

To carry out this sort of heat loss you need to do a full survey. In the survey you need to measure every room, each window and door, every radiator and work out if there is a heat loss through the roof and the floor.

For example in most houses the lounge will have a bedroom above it. If the two rooms are at the same temperature there is no heat lost between the two.

Rooms on the top floor will leak heat through the roof and rooms on the ground floor will leak heat into the ground.

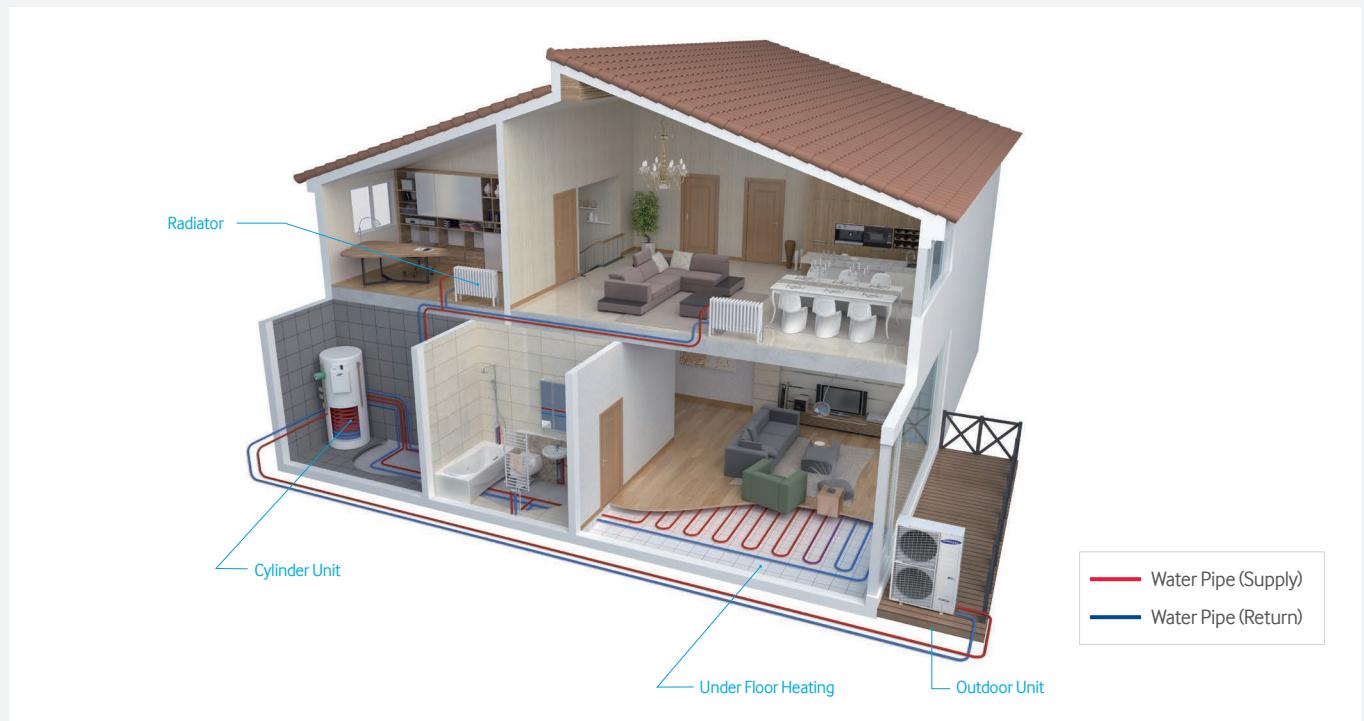


For the purposes of our heat loss in semi-detached or terrace houses we assume the dividing walls are external, as we cannot work out the temperature the neighbouring property.

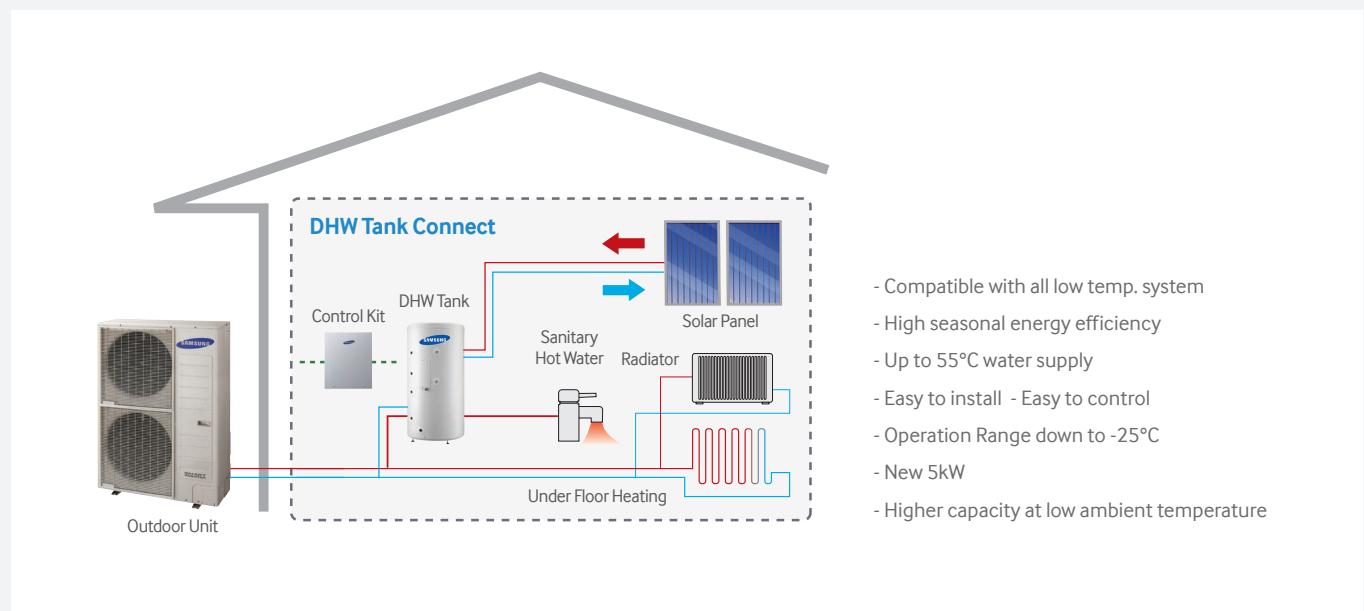
EHS Mono

Maintain optimal comfort and convenience with energy- and cost-efficient units

The Samsung EHS Mono is an outdoor unit that includes all of the hydronic parts. Therefore, EHS Mono does not require refrigerant pipes.



EHS Mono process overview (air-to-water)



Enjoy a pleasant environment with streamlined, energy-efficient heating

The EHS Mono offers a host of features that deliver energy-smart performance and usability.

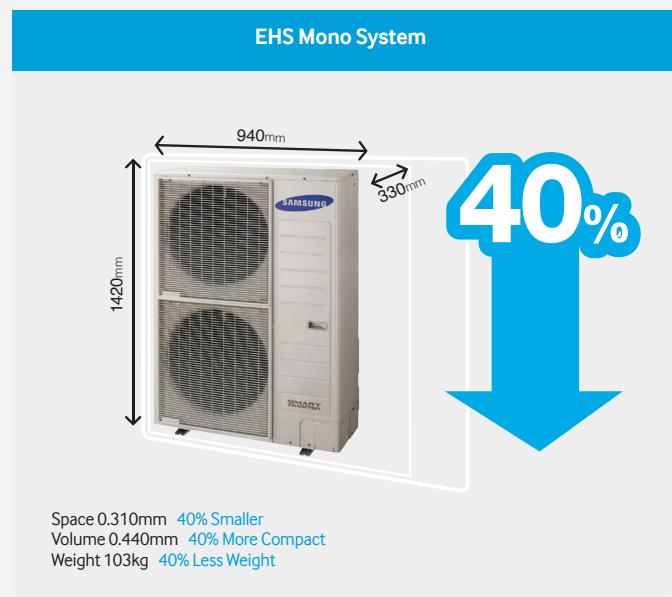
High performance at low temperature

Samsung EHS Mono is made up of an inverter compressor optimally operated according to the outdoor temperature, offering heating capacity of 90% at -10°C and reliable antifreezing protection at -25°C.



Compact, lightweight units for easy installation

Samsung EHS Mono features a compact, lightweight outdoor unit. Its unique frame considerably saves installation labour and costs, satisfying both installers and customers.



Control kit

Control kit is an interface to allow connection to other auxiliary hydronic and heating equipment. Samsung Mono outdoor units can be used with this interface box, creating an ideal solution when hydronic and heating equipment is required.



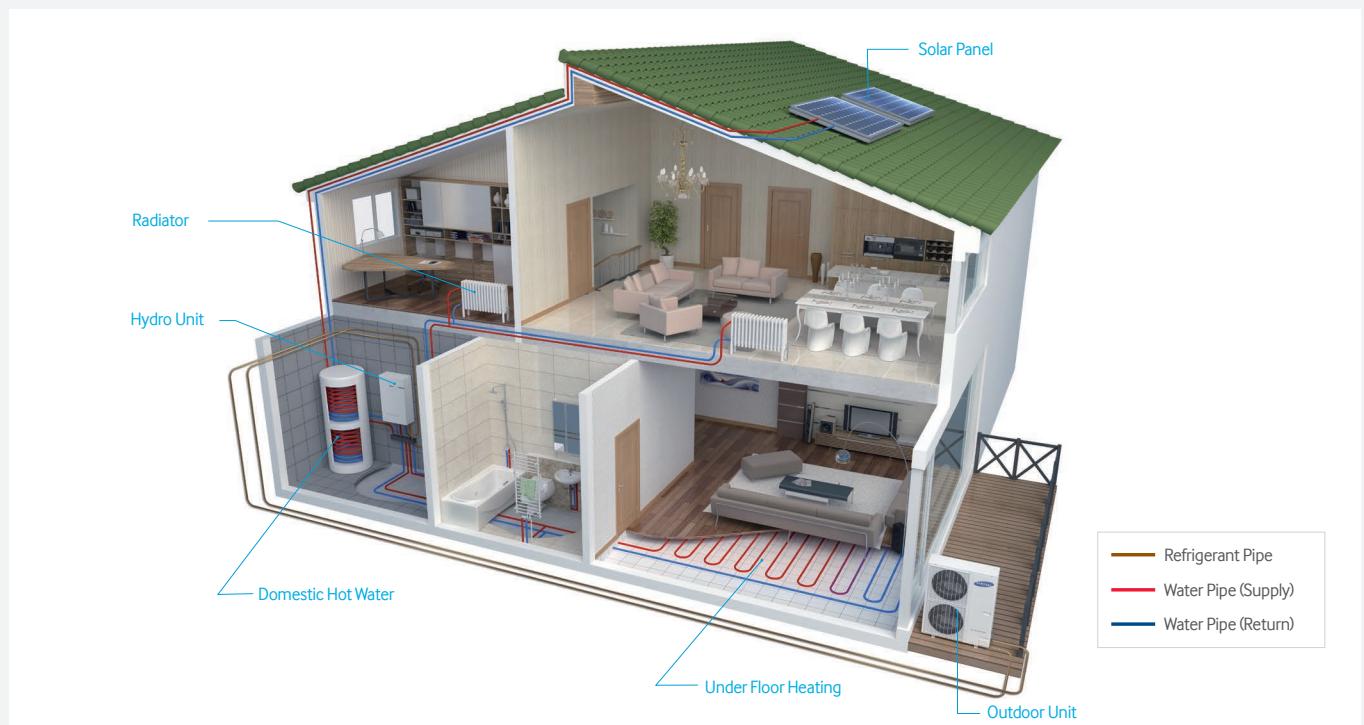
Efficiency (EHS MONO)



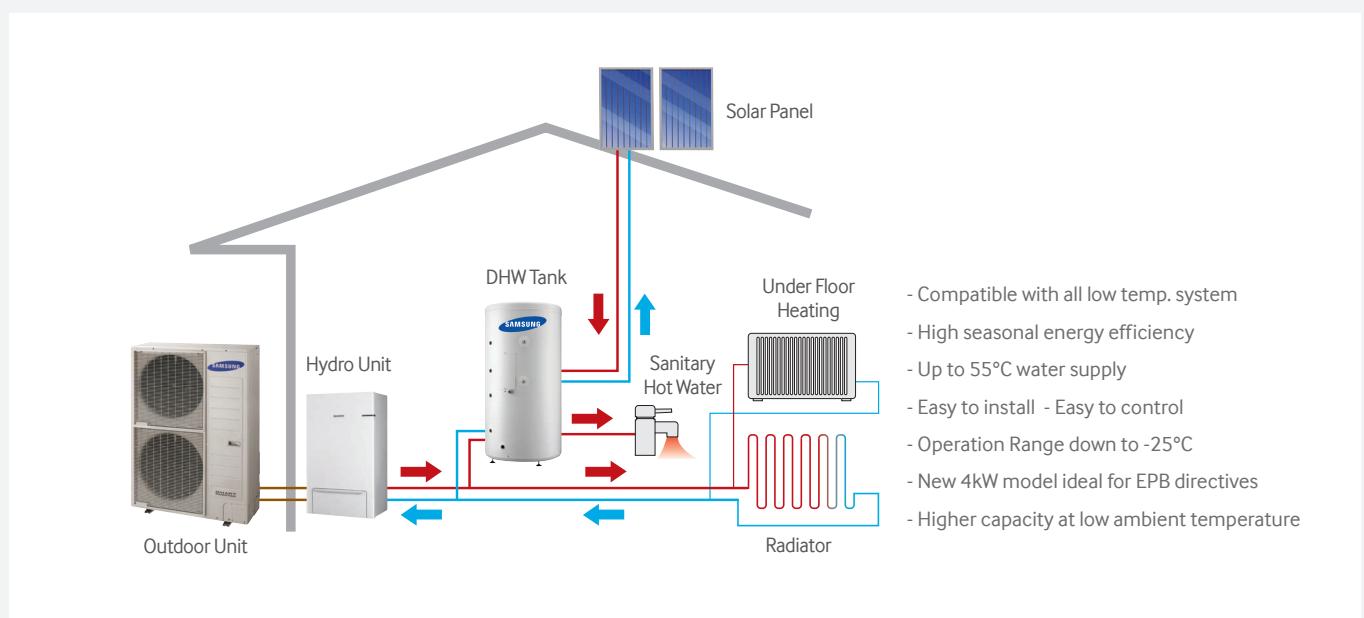
EHS Split

Temper every room perfectly in any climate

Samsung EHS Split is the newest system designed to meet the up-to-date heating demands of today's households. Built especially for optimized heating, this air-to-water heating system delivers superior comfort even in extreme temperatures.



EHS Split process overview (air-to-water)

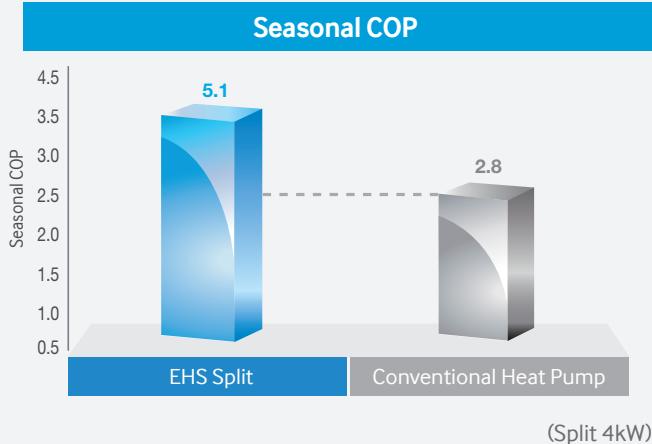


Enjoy consistent comfort even in the coldest weather conditions

Samsung EHS Split features enhanced efficiency, flexibility and performance to ensure a comfortable home atmosphere year-round.

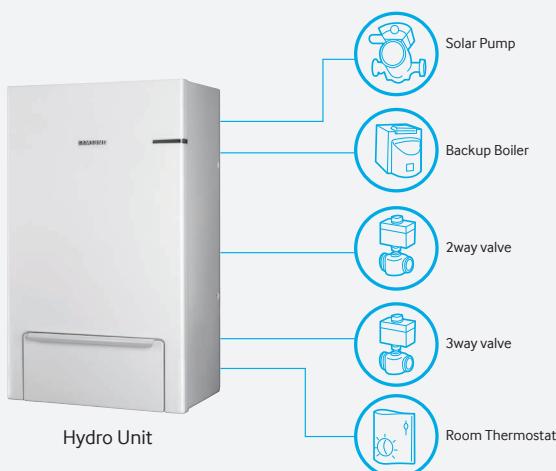
Optimized seasonal efficiency

EHS Split provides consistently efficient performance all season long. It optimizes heating performances at the actual operating temperature, -2°C to 2°C, while providing outstanding SCOP in compliance with eco-design directives.



Flexibility for increased control

Samsung EHS Split offers broad compatibility for easier control. The unit can be implemented with a domestic hot water tank, thermostat, pump, solar panel or back-up boiler, making it exceptionally versatile.



Maximum reliability

EHS Split has been optimized to meet up-to-date heating and cooling demands with features such as low noise fan, and super quiet operation.

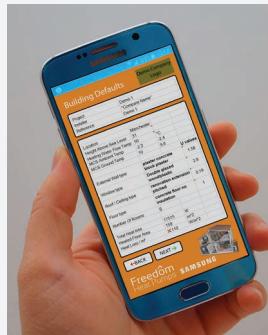


Efficiency (EHS SPLIT)



EHS Smart MCS Calculator

Through Freedom's EHS Smart MCS software you can carry out this survey on your mobile device or in the comfort of your office on the web. By using our software you can ensure you input all of the required information for an accurate calculation. The Software will then choose the correct sized system for you. Once selected the software will provide you with all of the information sheets required for the homeowner and MCS compliance.



Information Where You Need It.

Our software allows you to easily complete the survey when you need to - on site. Available on both Android and Apple devices the app works offline and saves your data to upload when you connect to the web.

Once the survey is complete you can email the results and documentation directly to the homeowner. Saving you time and reassuring your customer.



Your Own Personalised Assistant.

EHS Smart MCS remembers your preferences, defaults and previous projects. It allows you to quickly access all of your information and it is synchronised across your all of your devices, giving you access 24 hours a day.

You can also upload your own company logo and contact details to ensure that all documentation is personalised and your customers can contact you quickly and easily.

Freedom - test Projects					
Project	Installer	Reference	MCS Location	Height Above Sea Level	Heating Water Flow Temp
Demo	Company	Test	Glasgow	31	59
Demo	Company	Test	Glasgow	31	59
Demo	Company	Test	Glasgow	31	59
Demo	Company	Test	Glasgow	31	59
Demo	Company	Test	Glasgow	31	59
Demo	Company	Test	Glasgow	31	59
Demo	Company	Test	Glasgow	31	59
Demo	Company	Test	Glasgow	31	59
Demo	Company	Test	Glasgow	31	59
Demo	Company	Test	Glasgow	31	59
Demo	Company	Test	Glasgow	31	59

Copyright © 2015 Heat Pumpx All rights reserved.

Detailed Analysis for Pin Point Accuracy.

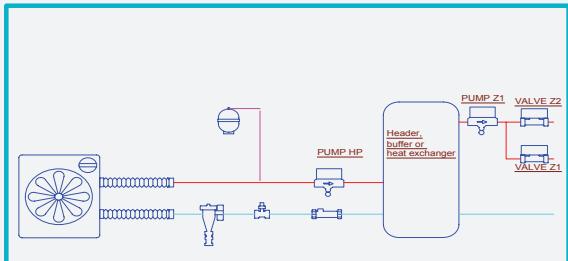
EHS Smart MCS plots your calculated heat load against the real world output of Samsungs EHS systems. This allows you to accurately show the performance of the system at any ambient temperature. The software also allows you to predict with precision the running costs of the system on a month by month basis. This information can quickly be accessed by your support staff to keep your customers informed and remove any concerns they may have,



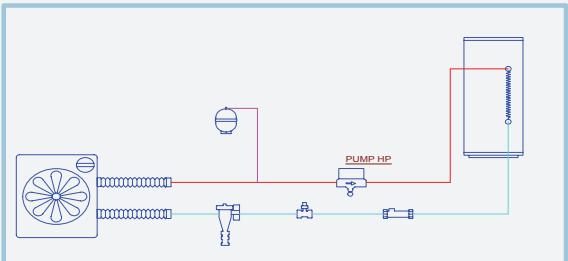
System Schematics

1. Hot Water Only - page 16
2. Heating Only - page 18
3. Heating & Hot Water - page 20
4. Reduced Glycol System - page 22
5. Multiple Heat Source - page 24
6. District Heating - page 26
7. Multiple Heat Pumps - page 28
8. Multiple Heat Pumps (Low Glycol) - page 30
9. Combi Hybrid - page 32
10. Heating Only Hybrid - page 34
11. Heat Pump with Back Up - page 36

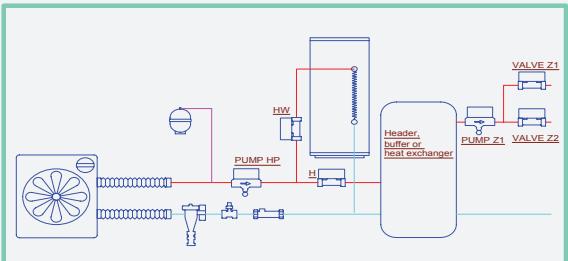
2.



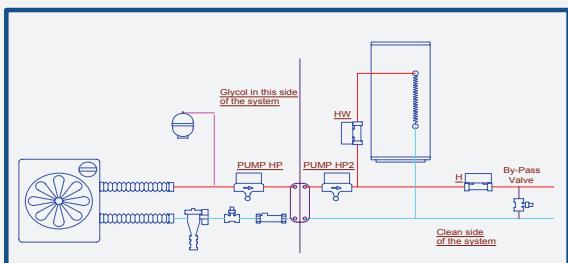
1.



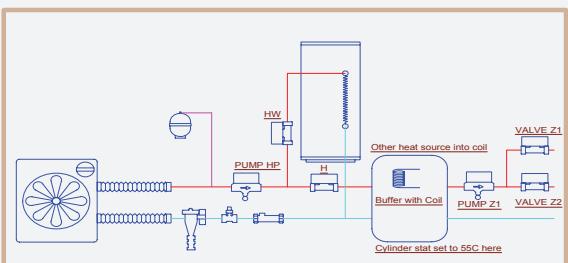
3.



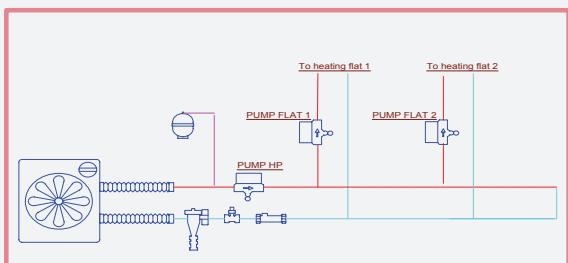
4.



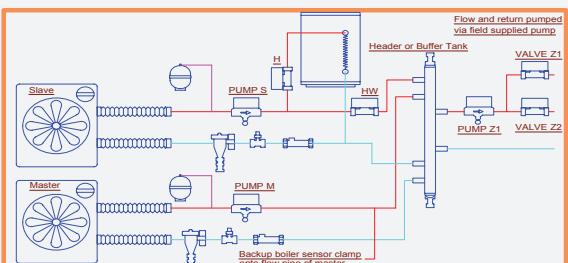
5.



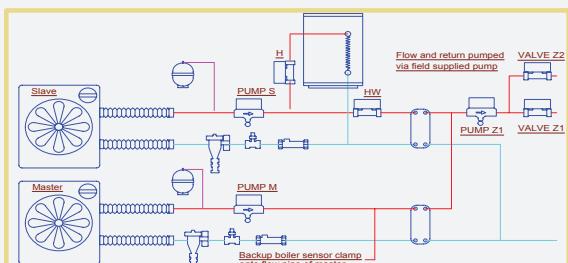
6.



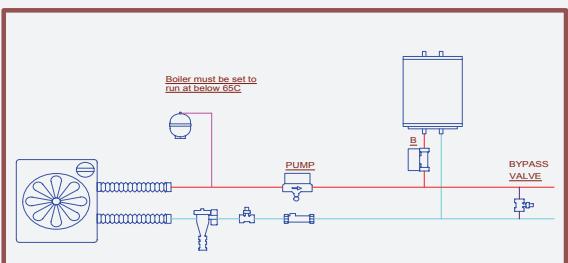
7.



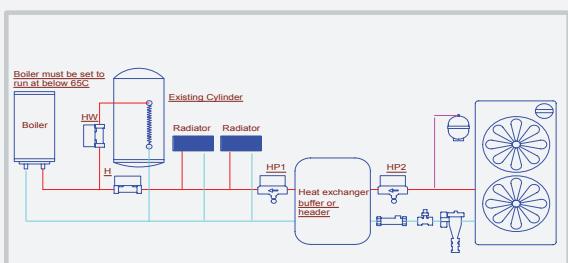
8.



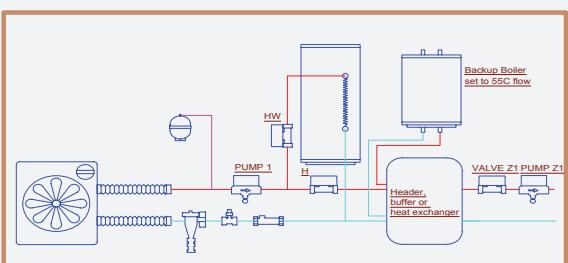
9.



10.

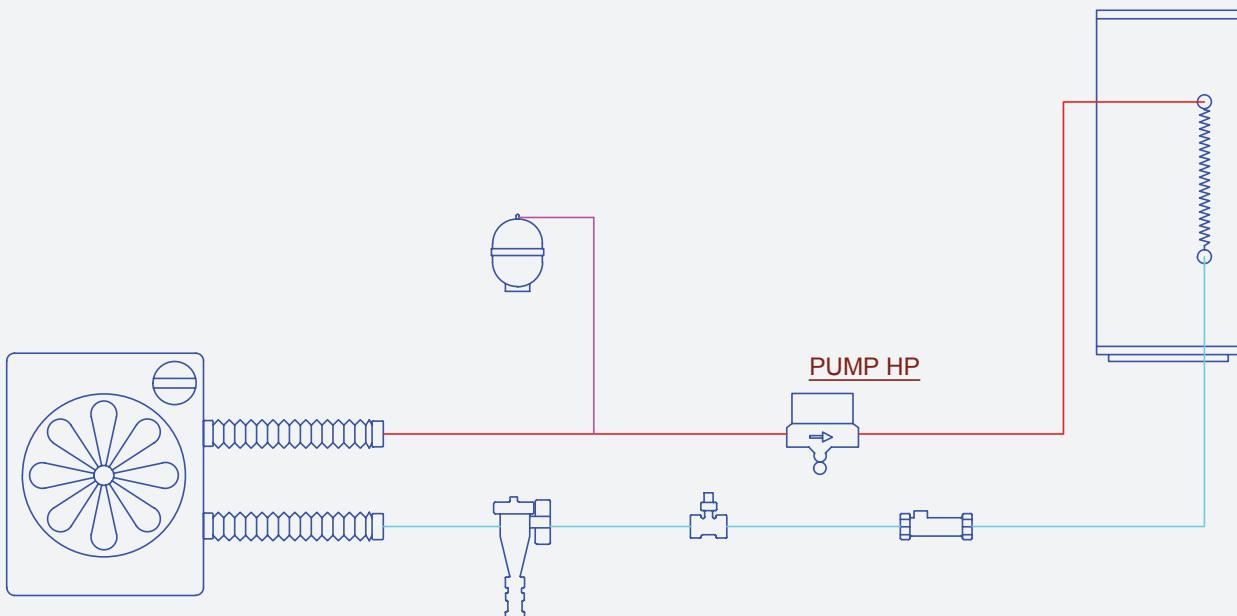


11.

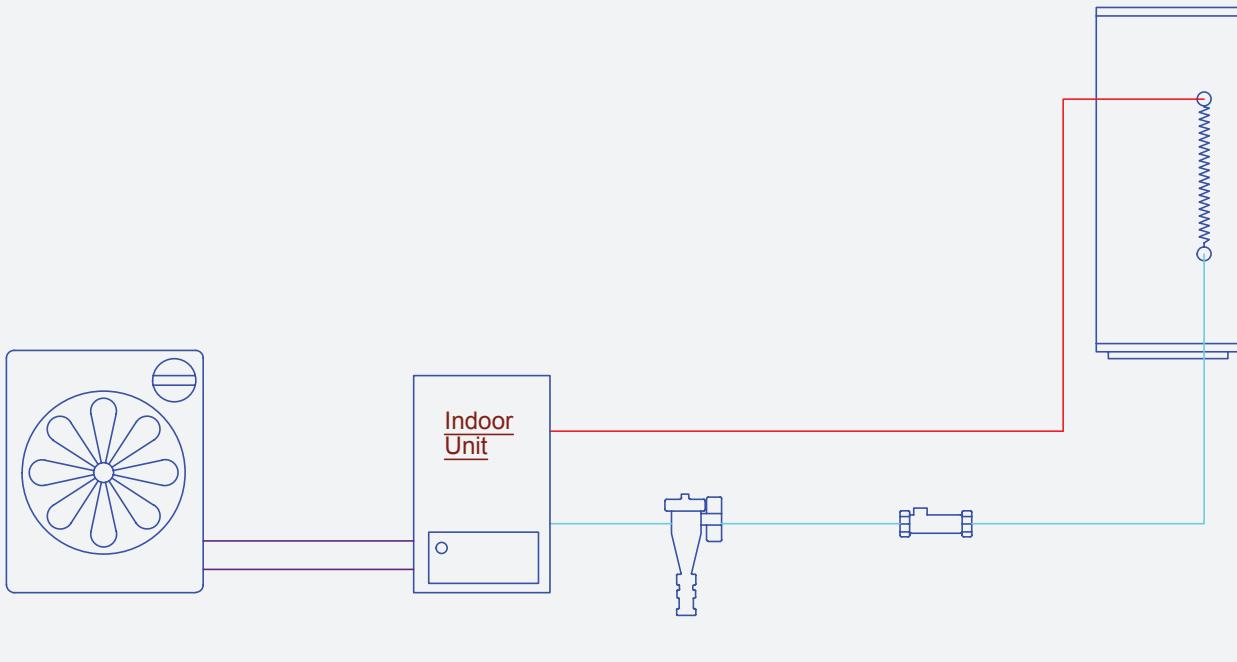


Hot Water Only System

Hot Water Only - Mono



Hot Water Only - Split



Hot Water Only System

Operational Description

The hot water only system is very simple in operation. It is controlled using the Samsung cylinder sensor and controller supplied.

This controller has inbuilt time clock control and includes both a daily and weekly legionella sterilisation function.

The system can be either open vented or pressurised.

The cylinder must have a coil at least 2.5m²

Cylinder size normally allows 55l of water per person per day.

We would recommend sizing the heat pump to recover the cylinder in 1 hour.

It is possible to connect this system to solar PV powered immersion heaters (I boost, Immersun etc.)

Samsung Monobloc Equipment List

1 x Heat pump AE***JXYDEH

1 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

A Cylinder with 2.5m² coil

Flexible water hoses

Mounting feet

An expansion vessel, pressure gauge, pressure relief valve and filling loop

A Pump we recommend a 25/80

Flow meter 0-40l

Magnetic filter and strainer

Glycol 25% propylene glycol and inhibitor

1 x Electrical Isolator 32Amp for outdoor unit.

1 x Electrical Isolator 16Amp for control box.

Samsung Split Equipment List

1 x Heat pump outdoor unit AE***JXEDEH

1 x Heat pump Hydro box AE***JNYDEH containing cylinder sensor, controller, sensors and flow switch, Pump, expansion vessel, pressure gauge and backup heaters.

A Cylinder with 2.5m² coil

Refrigerant pipework 1/4 and 5/8

Mounting feet

Filling loop

Flow meter 0-40l

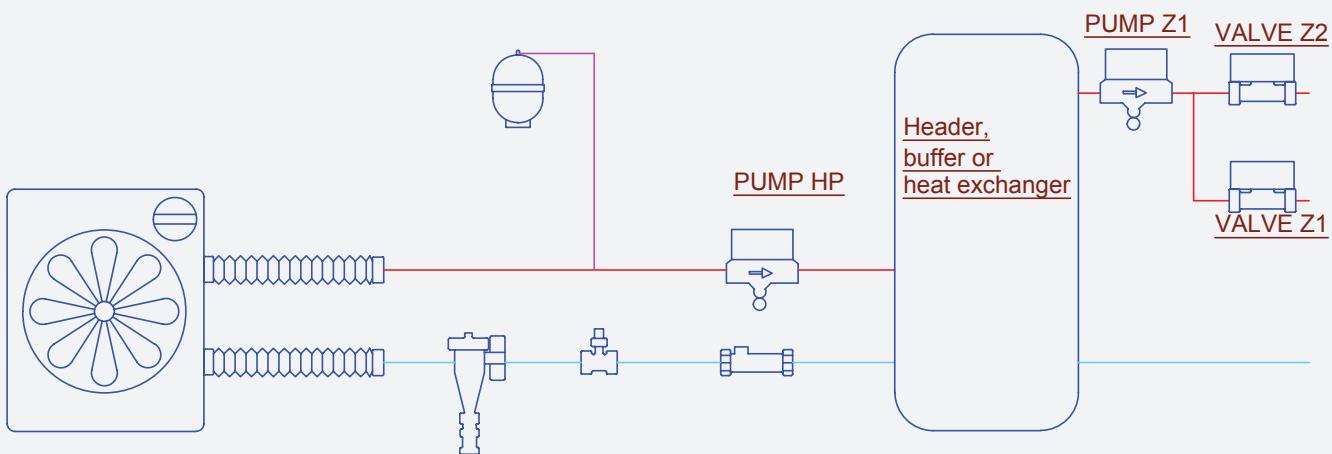
Magnetic filter and strainer

Electrical Isolator 32Amp for outdoor unit.

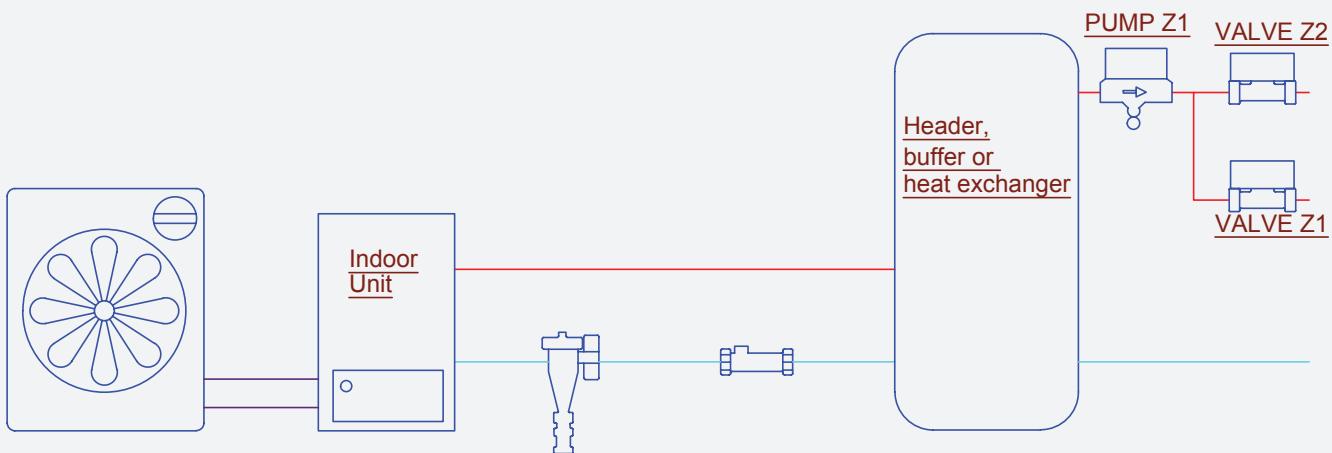
2 isolators for the indoor unit 1 x 16Amp and 1 x 24 Amp

Heating Only System

Heating Only - Multiple Zones - Mono



Heating Only - Multiple Zones - Split



Heating Only System

Operational Description

The heating only system is very simple in operation. It is controlled using a wall mounted thermostat / time clock (field supplied).

There are no limits to the number of heating zones which can be connected to this system. This system shows 2 heating zones.

Each zone has its own thermostat / timer which drives a dedicated zone valve. The zone valve will control the pump and send a run signal to the heat pump.

The system will run in a fully adjustable weather compensated mode adjusting the water temperature to suit the ambient conditions.

The system can be either open vented or pressurised.

We recommend a buffer, low loss header or heat exchanger is used to simplify the installation.

Samsung Monobloc Equipment List

1 x Heat pump AE***JXYDEH

1 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

Flexible water hoses

Mounting feet

An expansion vessel, pressure gauge, pressure relief valve and filling loop

A Pump we recommend a 25/80

A Pump to supply each heating zone

Flow meter 0-40l

Magnetic filter and strainer

1 x 2 port diverter valves for each heating zone

Glycol 25% propylene glycol and inhibitor

Heat exchanger, Buffer vessel or Low loss header

1 x Electrical Isolator 32Amp for outdoor unit.

1 x Electrical Isolator 3Amp for control box.

1 x Wall thermostat / time clock to control each heating zone

Samsung Split Equipment List

1 x Heat pump outdoor unit AE***JXEDEH

1 x Heat pump Hydro box AE***JNYDEH containing cylinder sensor, controller, sensors and flow switch, Pump, expansion vessel, pressure gauge and backup heaters.

Refrigerant pipework 1/4 and 5/8

Mounting feet

Filling loop

A Pump to supply each heating zone

Flow meter 0-40l

Magnetic filter and strainer

1 x 2 port diverter valves for each heating zone

Buffer vessel or Low loss header

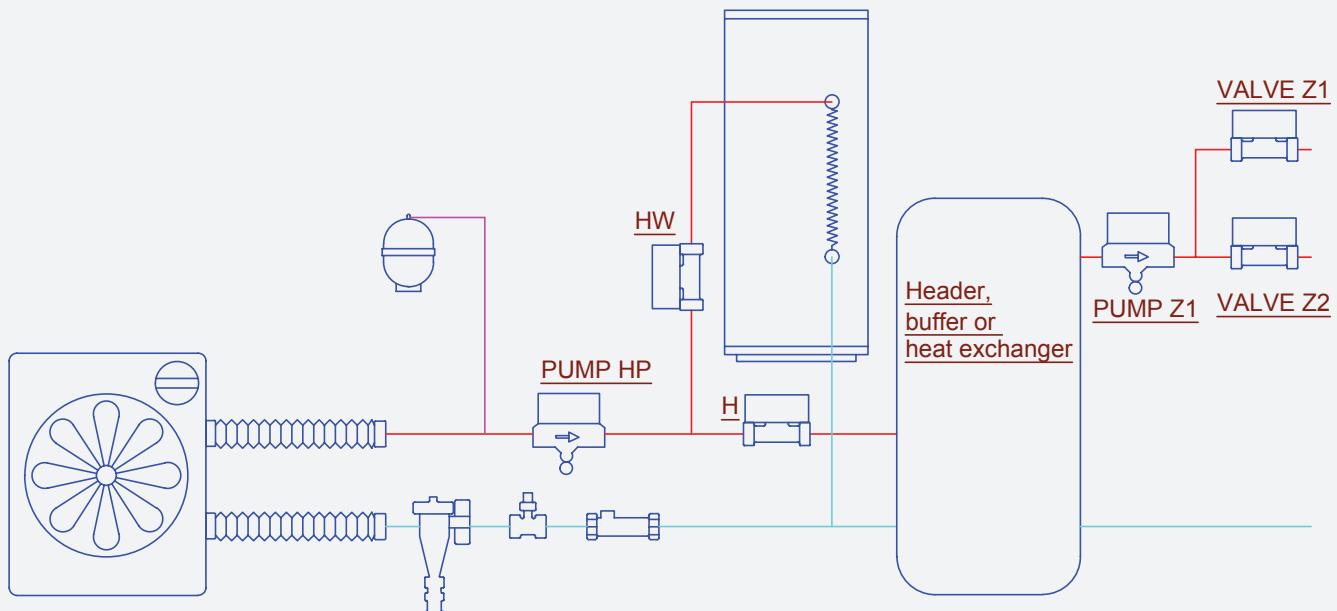
Electrical Isolator 32Amp for outdoor unit.

1 x Wall thermostat / time clock to control each heating zone

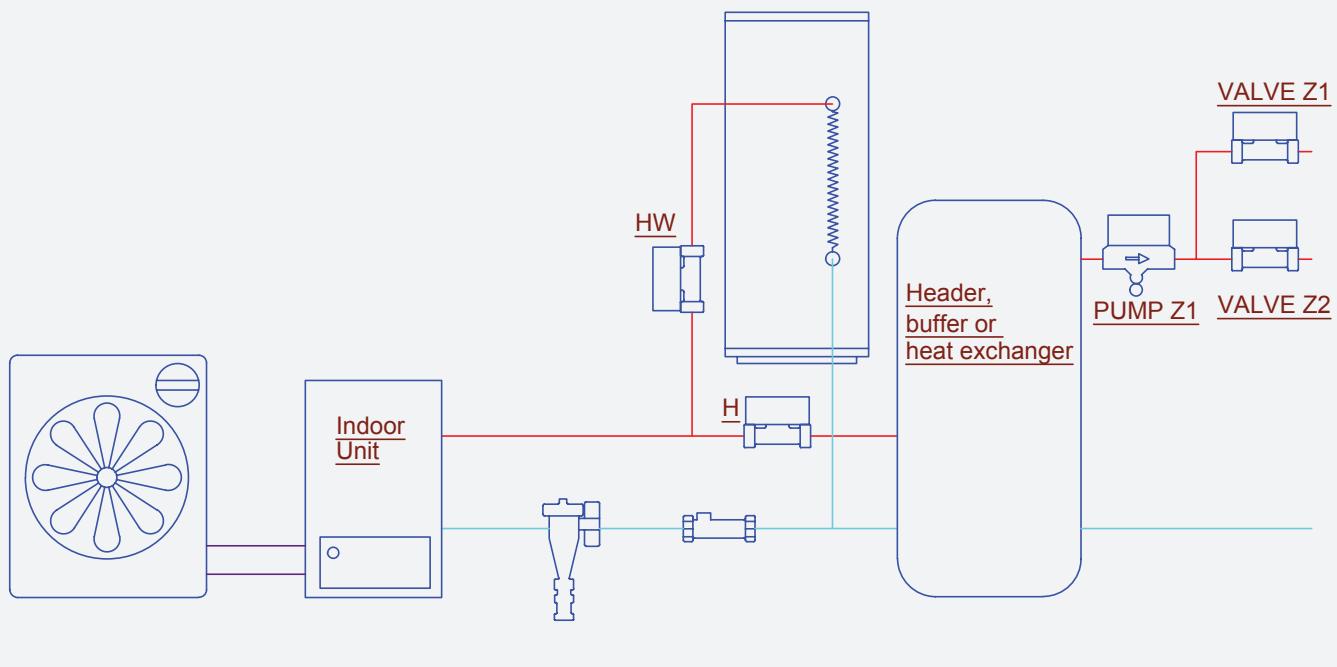
2 isolators for the indoor unit 1 x 16Amp and 1 x 24 Amp

Heating & Hot Water Only System

Heating & Hot Water Multiple Zones - Mono



Heating & Hot Water - Multiple Zones - Split



Heating & Hot Water System

Operational Description

Hot water is controlled using the Samsung cylinder sensor and controller supplied. This controller has inbuilt time clock control and includes both a daily and weekly legionella sterilisation function.

The system can be either open vented or pressurised.

The cylinder must have a coil at least 2.5m². Cylinder size normally allows 55l of water per person per day.

We would recommend sizing the heat pump to recover the cylinder in 1 hour.

It is possible to connect this system to solar PV powered immersion heaters (I boost, Immersun etc.)

Heating is controlled using a wall mounted thermostat / time clock (field supplied).

There are no limits to the number of heating zones which can be connected to this system. This system shows 2 heating zones. (Pump 2 and Pump 3)

Each zone has its own thermostat / timer which drives a dedicated zone valve. The zone valve will control the pump and send a run signal to the heat pump.

The system will run in a fully adjustable weather compensated mode adjusting the water temperature to suit the ambient conditions.

We recommend a buffer, low loss header or heat exchanger is used to simplify the installation.

Samsung Monobloc Equipment List

1 x Heat pump AE***JXYDEH

1 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

A Cylinder with 2.5m² coil

Flexible water hoses

Mounting feet

An expansion vessel, pressure gauge, pressure relief valve and filling loop

A Pump we recommend a 25/80

A Pump to supply each heating zone

Flow meter 0-40l

Magnetic filter and strainer

2 x 2 port diverter valves 28mm

1 x 2 port diverter valves for each heating zone

Glycol 25% propylene glycol and inhibitor

Heat exchanger, Buffer vessel or Low loss header

Electrical Isolator 32Amp for outdoor unit.

1 x Electrical Isolator 16Amp for control box.

1 x Wall thermostat / time clock to control each heating zone

Samsung Split Equipment List

1 x Heat pump outdoor unit AE***JXEDEH

1 x Heat pump Hydro box AE***JNYDEH containing cylinder sensor, controller, sensors and flow switch, Pump, expansion vessel, pressure gauge and backup heaters.

A Cylinder with 2.5m² coil

Refrigerant pipework 1/4 and 5/8

Mounting feet

Filling loop

A Pump to supply each heating zone

Flow meter 0-40l

Magnetic filter and strainer

2 x 2 port diverter valves 28mm

1 x 2 port diverter valves for each heating zone

Buffer vessel or Low loss header

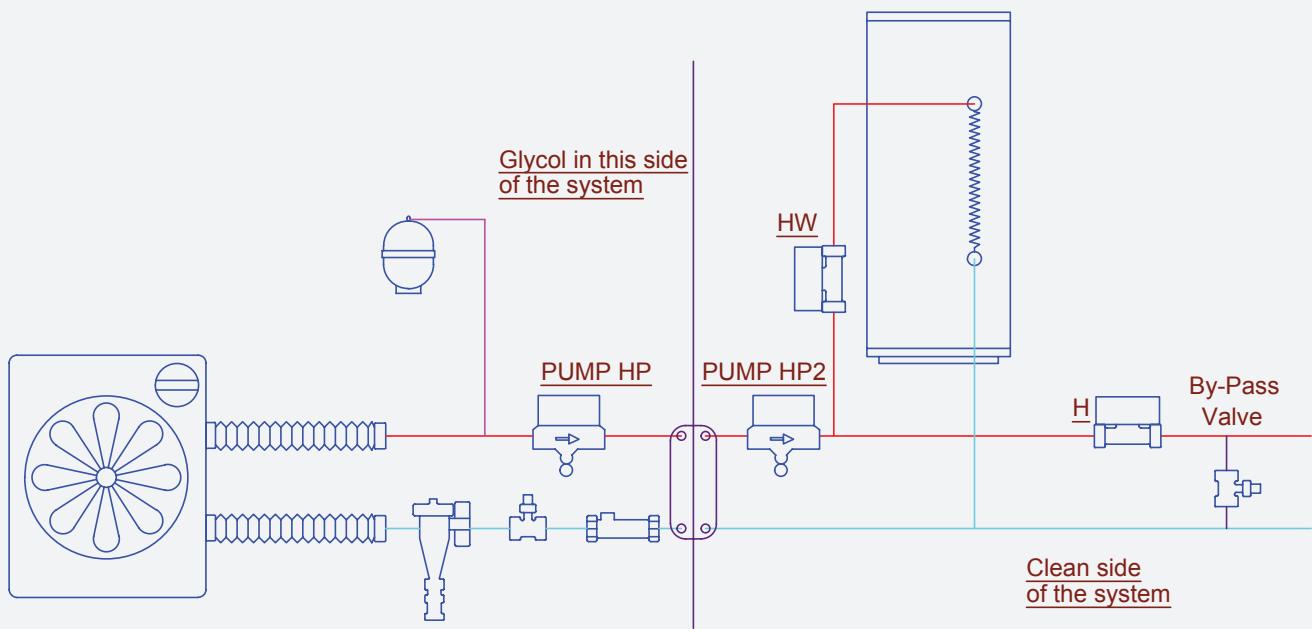
Electrical Isolator 32Amp for outdoor unit.

2 isolators for the indoor unit 1 x 16Amp and 1 x 24 Amp

1 x Wall thermostat / time clock to control each heating zone

Reduced Glycol System

Reduced Glycol System - Mono



Reduced Glycol System.

If you want to reduce the amount of Glycol to be used in the system you can install a plate heat exchanger in the primary pipework. The heat exchanger needs to be suitably sized and a pump installed on either side. The pumps are wired together to act as a single unit

Reduced Glycol System

Operational Description

Hot water is controlled using the Samsung cylinder sensor and controller supplied. This controller has inbuilt time clock control and includes both a daily and weekly legionella sterilisation function.

The system can be either open vented or pressurised.

The cylinder must have a coil at least 2.5m². Cylinder size normally allows 55l of water per person per day.

We would recommend sizing the heat pump to recover the cylinder in 1 hour.

It is possible to connect this system to solar PV powered immersion heaters (I boost, Immersun etc.)

Heating is controlled using a wall mounted thermostat / time clock (field supplied).

There are no limits to the number of heating zones which can be connected to this system. This system shows 1 heating zone.

Each zone has its own thermostat / timer which sends a run signal to the heat pump.

The system will run in a fully adjustable weather compensated mode adjusting the water temperature to suit the ambient conditions.

Samsung Monobloc Equipment List

1 x Heat pump AE***JXYDEH

1 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

A Cylinder with 2.5m² coil

Flexible water hoses

Mounting feet

An expansion vessel, pressure gauge, pressure relief valve and filling loop

2 Pumps we recommend a 25/80

Flow meter 0-40l

Magnetic filter and strainer

2 x 2 port diverter valves 28mm

Glycol 25% propylene glycol and inhibitor

Heat exchanger sized to suit the heat pump (we can advise here)

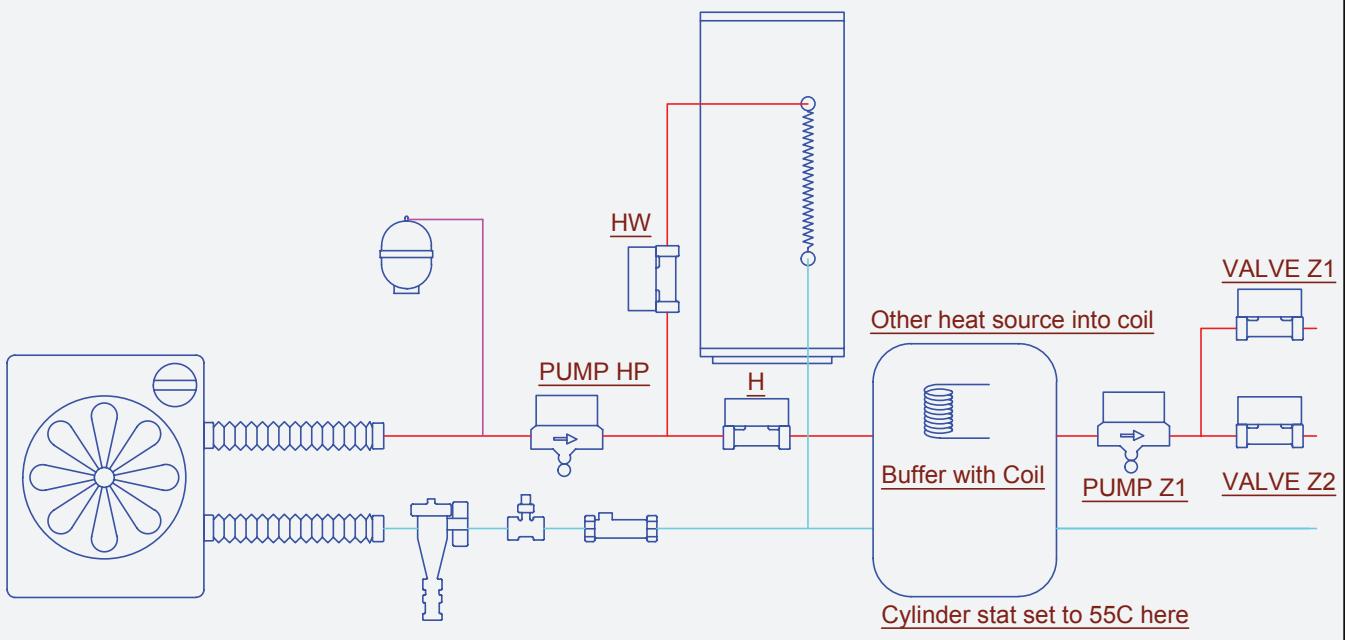
Electrical Isolator 32Amp for outdoor unit.

1 x Electrical Isolator 16Amp for control box.

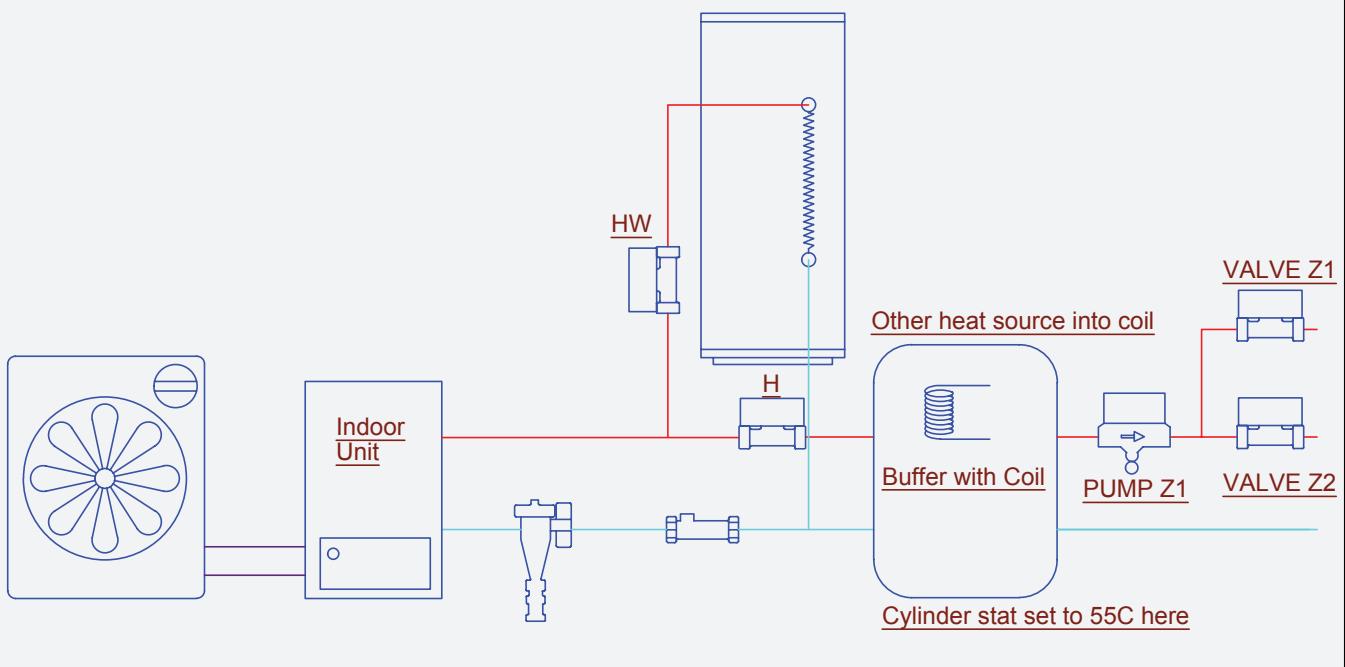
1 x Wall thermostat / time clock to control each heating zone

Multiple Heat Source System

Multiple Heat Source System - Mono



Multiple Heat Source System - Split



Multiple Heat Source Systems

It is very popular to connect other heat sources into the heating system, this can be wood burning stoves or other fossil fuel boilers. The easiest way to do this is to run them into a buffer store with an inbuilt coil separating the heat pump from other heat sources. We have to make sure that the water never returns to the heat pump at more than 55C to do this we recommend a tank thermostat (field supplied) cuts the run signal to the heat pump at 55C.

Multiple Heat Source System

Operational Description

Hot water is controlled using the Samsung cylinder sensor and controller supplied. This controller has inbuilt time clock control and includes both a daily and weekly legionella sterilisation function.

The system can be either open vented or pressurised.

The cylinder must have a coil at least 2.5m²

Cylinder size normally allows 55l of water per person per day.

We would recommend sizing the heat pump to recover the cylinder in 1 hour.

It is possible to connect this system to solar PV powered immersion heaters (I boost, Immersun etc.)

Heating is controlled using a wall mounted thermostat / time clock (field supplied).

There are no limits to the number of heating zones which can be connected to this system. This system shows 1 heating zone.

Each zone has its own thermostat / timer which sends a run signal to the heat pump to run.

Samsung Monobloc Equipment List

1 x Heat pump AE***JXYDEH

1 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

A Cylinder with 2.5m² coil

Flexible water hoses

Mounting feet

An expansion vessel, pressure gauge, pressure relief valve and filling loop

A pump we recommend a 25/80

A Pump to supply each heating zone

Flow meter 0-40l

Magnetic filter and strainer

2 x 2 port diverter valves 28mm

1 x 2 port diverter valves for each heating zone

Glycol 25% propylene glycol and inhibitor

Buffer vessel with coil

Cylinder thermostat set to 55C

Electrical Isolator 32Amp for outdoor unit.

1 x Electrical Isolator 16Amp for control box.

1 x Wall thermostat / time clock to control each heating zone

Samsung Split Equipment List

1 x Heat pump outdoor unit AE***JXEDEH

1 x Heat pump Hydro box AE***JNYDEH containing cylinder sensor, controller, sensors and flow switch, Pump, expansion vessel, pressure gauge and backup heaters.

A Cylinder with 2.5m² coil

Refrigerant pipework 1/4 and 5/8

Mounting feet

Filling loop

A Pump to supply each heating zone

Flow meter 0-40l

Magnetic filter and strainer

2 x 2 port diverter valves 28mm

1 x 2 port diverter valves for each heating zone

Buffer vessel with coil

Cylinder thermostat set to 55C

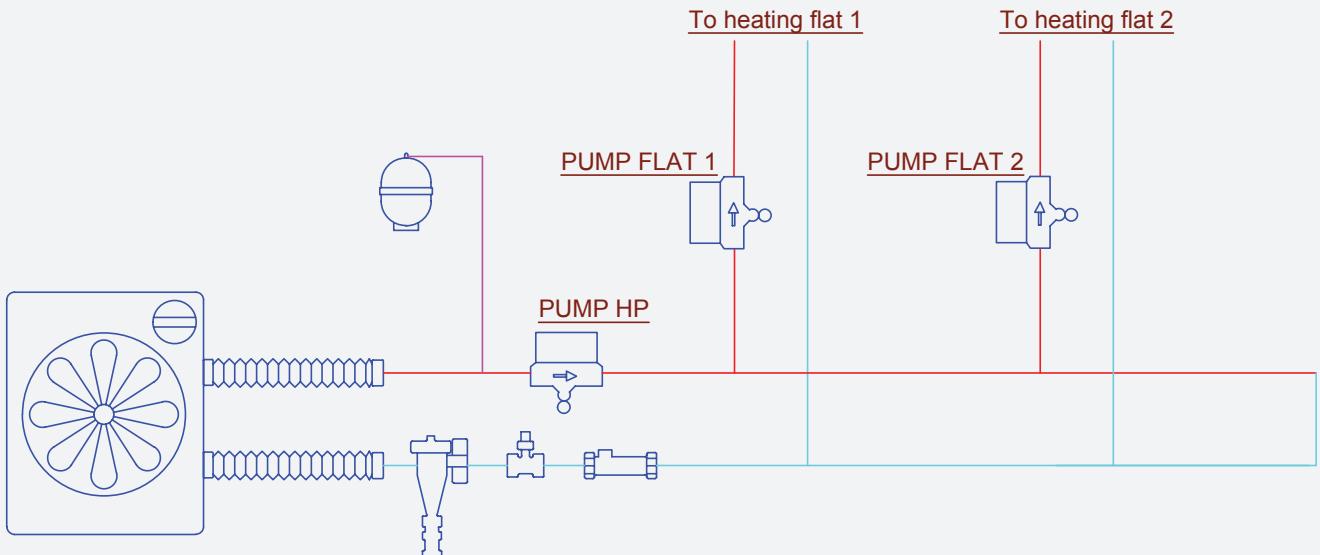
Electrical Isolator 32Amp for outdoor unit.

2 isolators for the indoor unit 1 x 16Amp and 1 x 24 Amp

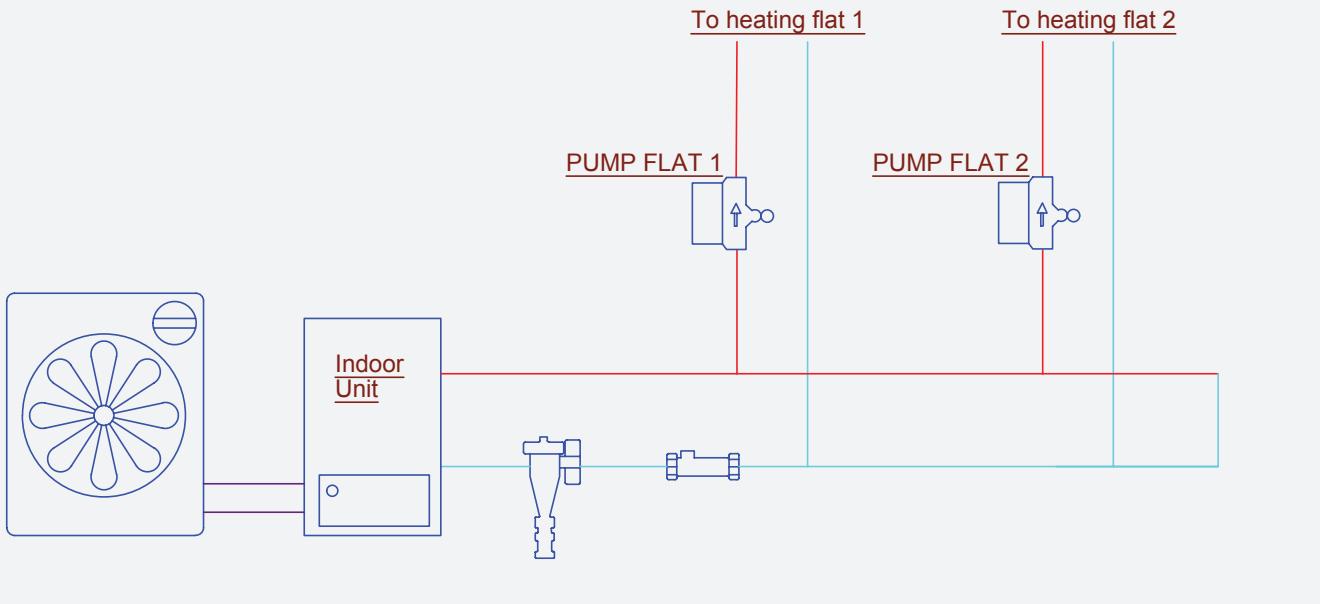
1 x Wall thermostat / time clock to control each heating zone

District Heating System

District Heating System - Mono



District Heating System - Split



District Heating Systems

District heating is where a single heat pump is connected to serve a number of rooms or flats.

The Heat Pump is connected up using a single pipe system. Each flat is connected to this loop with its own circulation pump.

District Heating System

Operational Description

Heating

Each flat has its own thermostat, when switched on a run signal goes to the heat pump and the circulation for that flat runs.

A run hours meter measures how long the heating has been used in each flat. A kWhr meter measures the run cost of the heat pump.

Energy usage is divided up using the run hours in each flat.

Hot water

We recommend hot water is supplied from another source i.e. instant hot water heater, electric showers or an Economy 7 cylinder.

It's impossible to keep everyone happy using a common cylinder across a number of flats.

Samsung Monobloc Equipment List

1 x Heat pump AE***JXYDEH

1 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

Flexible water hoses

Mounting feet

An expansion vessel, pressure gauge, pressure relief valve and filling loop

A Pump we recommend a 25/80

A Pump to supply each flat

Flow meter 0-40l

Magnetic filter and strainer

Glycol 25% propylene glycol and inhibitor

Electrical Isolator 32Amp for outdoor unit.

1 x Electrical Isolator 3Amp for control box.

1 x Wall thermostat / time clock to control each flat

Samsung Split Equipment List

1 x Heat pump outdoor unit AE***JXEDEH

1 x Heat pump Hydro box AE***JNYDEH containing cylinder sensor, controller, sensors and flow switch, Pump, expansion vessel, pressure gauge and backup heaters.

Refrigerant pipework 1/4 and 5/8

Mounting feet

Filling loop

A Pump to supply each flat

Flow meter 0-40l

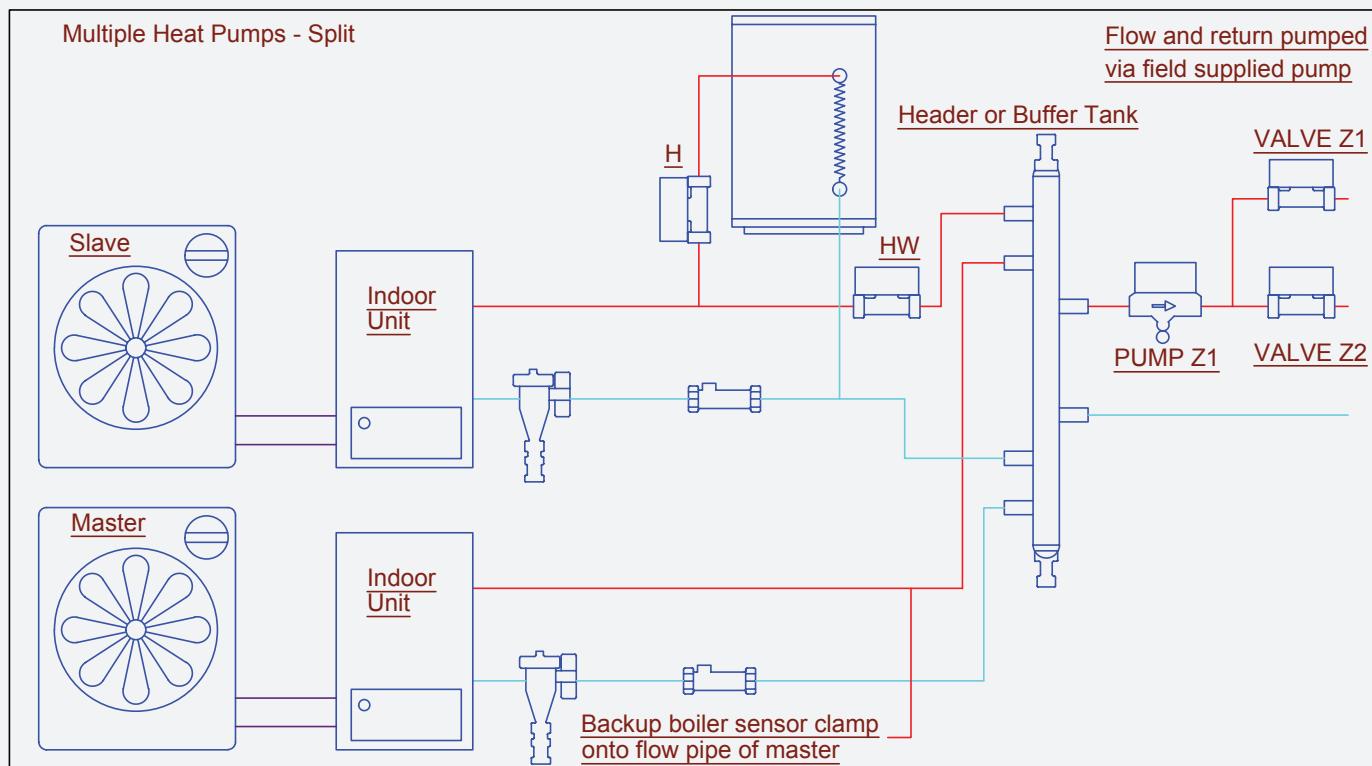
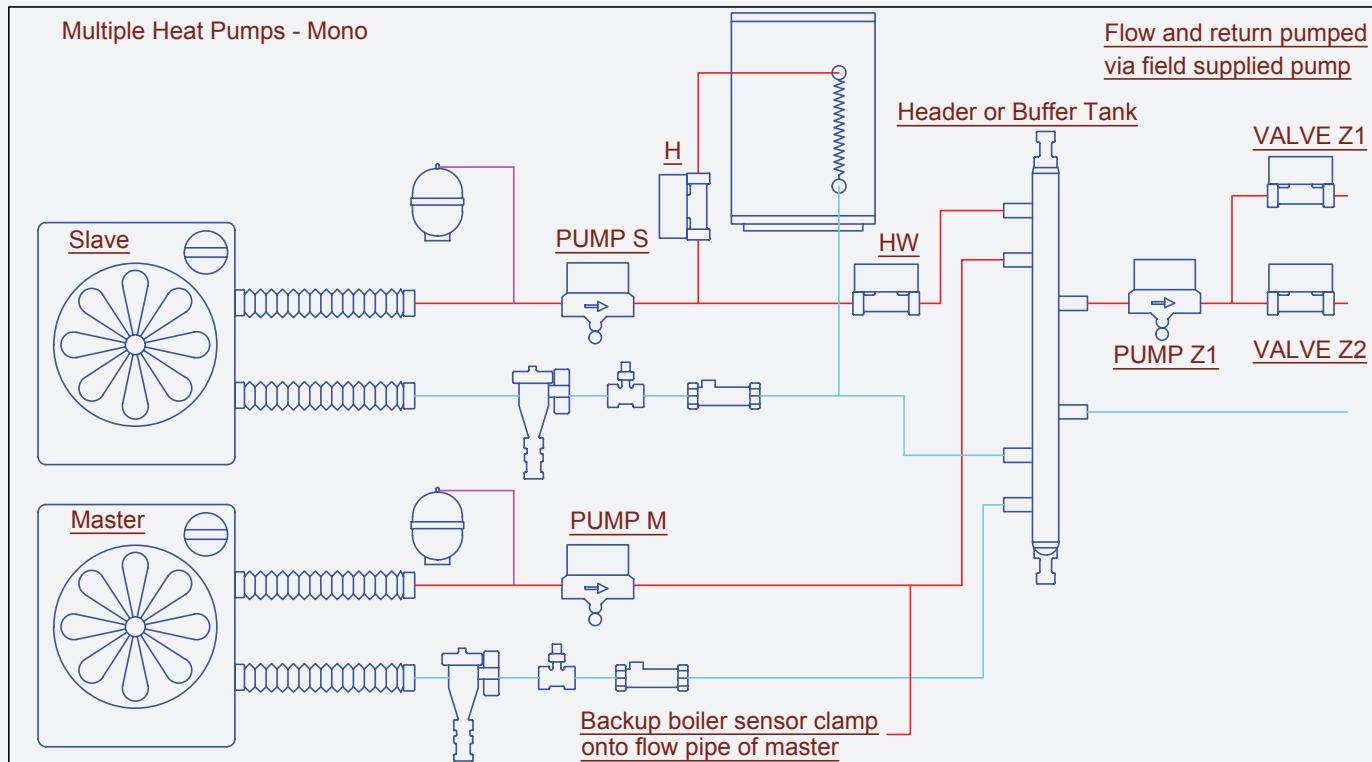
Magnetic filter and strainer

1 x Wall thermostat / time clock to control each flat

Electrical Isolator 32Amp for outdoor unit.

2 isolators for the indoor unit 1 x 16Amp and 1 x 24 Amp

Multiple Heat Pump System



Multiple Heat Pump Systems

When a single heat pump is not big enough to cover the heat loss in the house we need to use two heat pumps. To comply with MCS rules they must form a single hydraulic circuit so they should be connected together.

To try and equalise the load on the systems the slave unit does hot water and helps with the heating and the master does the majority of the heating. We have to separate the flow from one heat pump to another, this is done with a header, a buffer or 2 heat exchangers.

Multiple Heat Pump System

Operational Description

Hot water is controlled by the slave heat pump using the Samsung cylinder sensor and controller supplied. This controller has inbuilt time clock control and includes both a daily and weekly legionella sterilisation function.

The system can be either open vented or pressurised.

The cylinder must have a coil at least 2.5m²

Cylinder size normally allows 55l of water per person per day.

We would recommend sizing the heat pump to recover the cylinder in 1 hour.

It is possible to connect this system to solar PV powered immersion heaters (I boost, Immersun etc.)

Heating is controlled using a wall mounted thermostat / time clock (field supplied). There are no limits to the number of heating zones which can be connected to this system. This system shows 2 heating zones.

Each zone has its own thermostat / timer which drives a dedicated zone valve. The zone valve will control the pump and send a run signal to the master heat pump. The heat pumps are connected in a master / slave configuration, the master unit, receives a run signal from the heating controls and starts to heat the house.

If the temperature outside is below 10C and the master is struggling to get to temperature it will send a run signal to the slave to ask for assistance.

The system will run in a fully adjustable weather compensated mode adjusting the water temperature to suit the ambient conditions. This system can heat the cylinder and the house at the same time

Samsung Monobloc Equipment List

2 x Heat pump AE***JXYDEH

2 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

A Cylinder with 2.5m² coil

2 sets of Flexible water hoses

2 sets of Mounting feet

An expansion vessel, pressure gauge, pressure relief valve and filling loop

2 Pumps we recommend a 25/80

A Pump to supply each heating zone

2 x Flow meters 0-40l

2 x Magnetic filters and strainers

2 x 2 port diverter valves 28mm

1 x 2 port diverter valves for each heating zone

Glycol 25% propylene glycol and inhibitor

A Buffer vessel or Low loss header

2 x Electrical Isolator 32Amp for outdoor units.

1 x Electrical Isolator 3Amp for master control box. 1 x Electrical Isolator 16Amp for slave control box.

1 x Wall thermostat / time clock to control each heating zone

Samsung Split Equipment List

2 x Heat pump outdoor unit AE***JXEDEH

2 x Heat pump Hydro box AE***JNYDEH containing cylinder sensor, controller, sensors and flow switch, Pump, expansion vessel, pressure gauge and backup heaters.

A Cylinder with 2.5m² coil

Refrigerant pipework 1/4 and 5/8

2 sets of Mounting feet

A filling loop

A Pump to supply each heating zone

2 x Flow meters 0-40l

2 x Magnetic filters and strainers

2 x 2 port diverter valves 28mm

1 x 2 port diverter valves for each heating zone

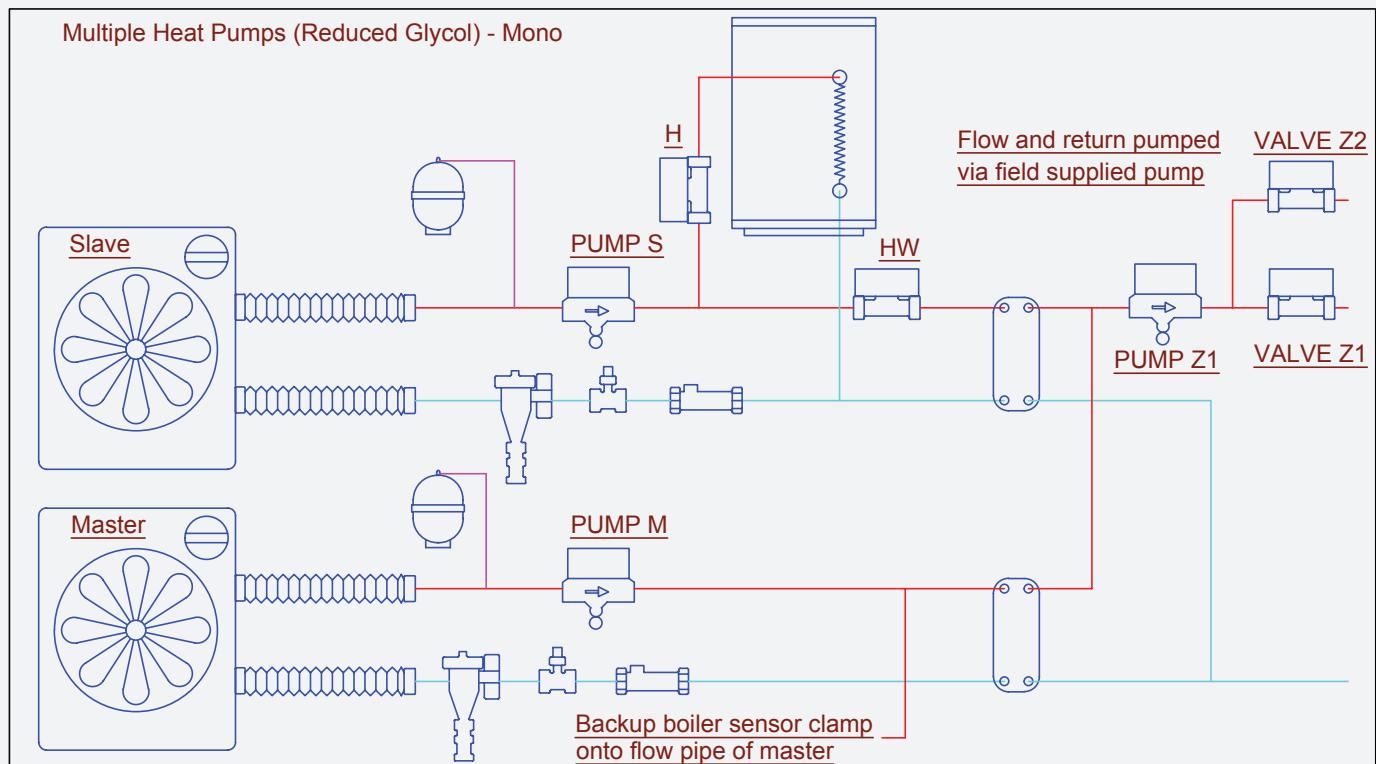
A Buffer vessel or Low loss header

2 x Electrical Isolators 32Amp for outdoor unit.

4 isolators for the indoor unit 1 x 16Amp and 1 x 24 Amp for each hydro box

1 x Wall thermostat / time clock to control each heating zone

Multiple Heat Pump (Reduced Glycol) System



Multiple Heat Pump Systems (Reduced Glycol)

When a single heat pump is not big enough to cover the heat loss in the house we need to use two heat pumps. To comply with MCS rules they must form a single hydraulic circuit so they should be connected together.

To try and equalise the load on the systems one heat pump (the slave) does hot water and helps with the heating and the master does the majority of the heating. We have to separate the flow from one heat pump to another, this is done with a header, a buffer or 2 heat exchangers.

Multiple Heat Pump (Reduced Glycol) System

Operational Description

Hot water is controlled by the slave heat pump using the Samsung cylinder sensor and controller supplied. This controller has inbuilt time clock control and includes both a daily and weekly legionella sterilisation function.

The system can be either open vented or pressurised.

The cylinder must have a coil at least 2.5m², Cylinder size normally allows 55l of water per person per day.

We would recommend sizing the heat pump to recover the cylinder in 1 hour.

It is possible to connect this system to solar PV powered immersion heaters (I boost, Immersun etc.)

Heating is controlled using a wall mounted thermostat / time clock (field supplied). There are no limits to the number of heating zones which can be connected to this system. This system shows 2 heating zones.

Each zone has its own thermostat / timer which drives a dedicated zone valve. The zone valve will control the pump and send a run signal to the master heat pump. The heat pumps are connected in a master / slave configuration, the master unit, receives a run signal from the heating controls and starts to heat the house.

If the temperature outside is below 10C and the master is struggling to get to temperature it will send a run signal to the slave to ask for assistance.

The system will run in a fully adjustable weather compensated mode adjusting the water temperature to suit the ambient conditions. This system can heat the cylinder and the house at the same time

Samsung Monobloc Equipment List

2 x Heat pump AE***JXYDEH

2 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

A Cylinder with 2.5m² coil

2 sets of Flexible water hoses

2 sets of Mounting feet

2 expansion vessels, pressure gauges, pressure relief valves and filling loops

2 Pumps we recommend a 25/80

A Pump to supply each heating zone

2 x Flow meters 0-40l

2 x Magnetic filters and strainers

2 x 2 port diverter valves 28mm

1 x 2 port diverter valves for each heating zone

Glycol 25% propylene glycol and inhibitor

2 x Heat exchangers

2 x Electrical Isolator 32Amp for outdoor units.

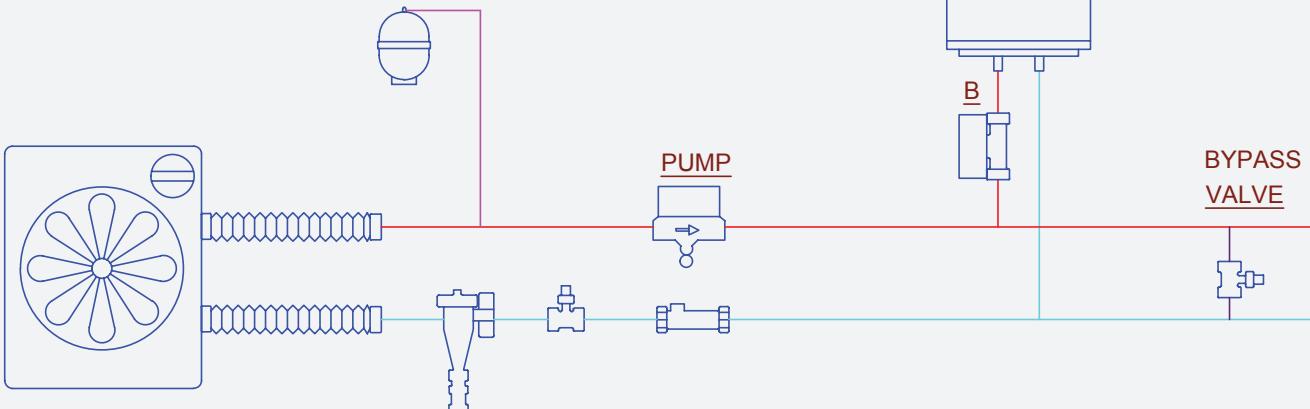
1 x Electrical Isolator 3Amp for master control box. 1 x Electrical Isolator 16Amp for slave control box.

1 x Wall thermostat / time clock to control each heating zone

Combi Hybrid System

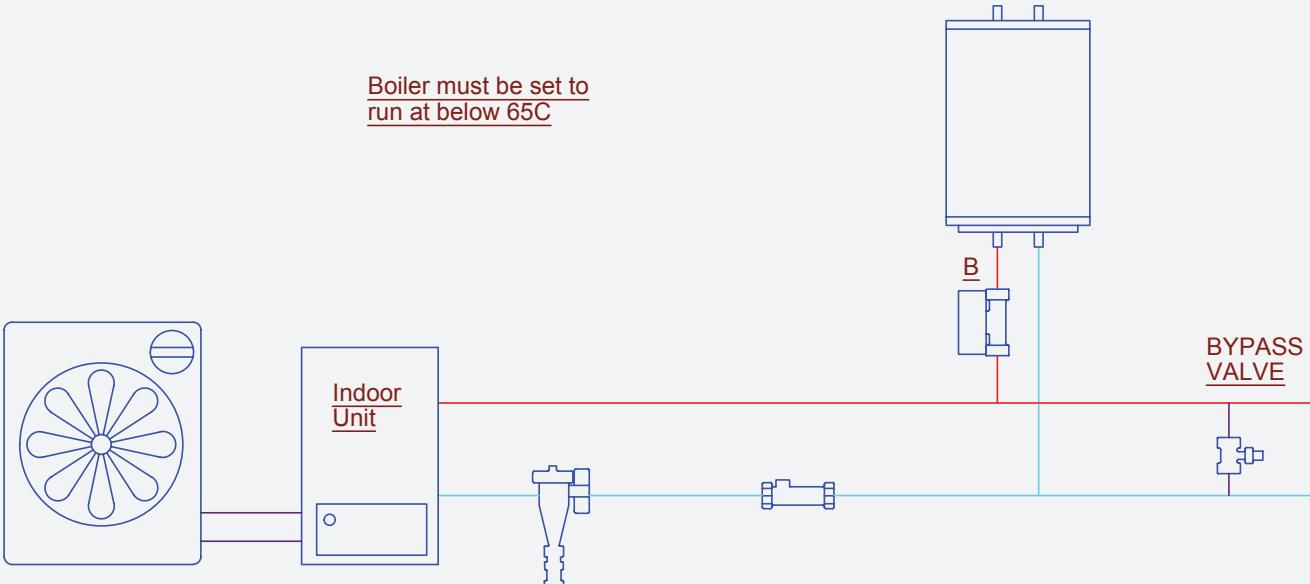
Combi Hybrid - Mono

Boiler must be set to run at below 65C



Combi Hybrid - Split

Boiler must be set to run at below 65C



Combi Hybrid Systems

A hybrid is a system which uses both a fossil fuel boiler and a heat pump. The heat pump only heats the house it cannot heat the hot water. In a hybrid system the boiler and heat pump NEVER heat the house at the same time.

Combi Hybrid System

Operational Description

Hot water is controlled by the Combi boiler, it is not heated by the heat pump.

Heating is controlled using the existing wall mounted thermostat / time clock (field supplied). The run command is sent into the existing heating controls to drive the boiler.

The system will run in a fully adjustable weather compensated mode adjusting the water temperature to suit the ambient conditions.

We programme a changeover temperature into the unit. I.e. 3C. If the temperature outside falls below 3C the heat pump stops and a run command is sent to the boiler.

When the ambient temperature rises to 5 degrees C the boiler stops and the heat pump restarts.

RHI will be paid on the heat provided by the heat pump only, a meter is used to measure this heat.

Samsung Monobloc Equipment List

1 x Heat pump AE***JXYDEH

1 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

Flexible water hoses

Mounting feet

1 Pump we recommend a 25/80

Flow meters 0-40l

Magnetic filters and strainers

1x 2 port diverter valve 28mm

1 x 22mm bypass valve

Glycol 25% propylene glycol and inhibitor

1 x Electrical Isolator 32Amp for outdoor units.

1 x Electrical Isolator 3Amp for control box.

1 x Heat meter

1 x Electricity meter

Samsung Split Equipment List

1 x Heat pump outdoor unit AE***JXEDEH

1 x Heat pump Hydro box AE***JNYDEH containing cylinder sensor, controller, sensors and flow switch, Pump, expansion vessel, pressure gauge and backup heaters.

Refrigerant pipework 1/4 and 5/8

Mounting feet

Flow meters 0-40l

1 x 22mm bypass valve

Magnetic filters and strainers

1x 2 port diverter valve 28mm

1 x Electrical Isolator 32Amp for outdoor unit.

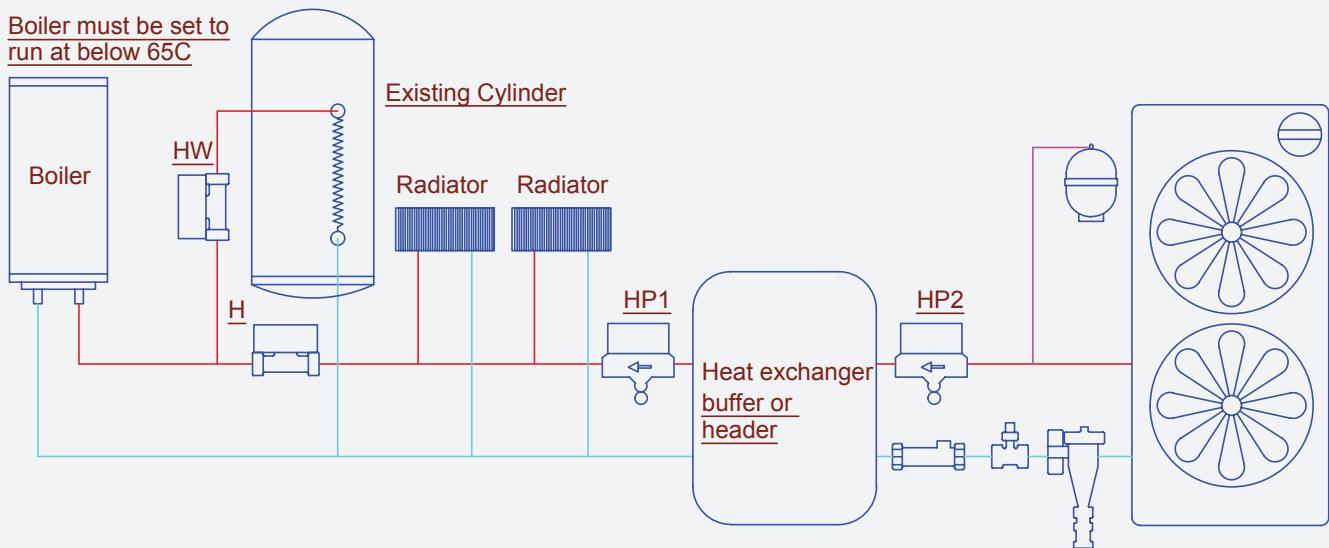
2 ix Electrical Isolators for the indoor unit 1 x 16Amp and 1 x 24 Amp

1 x Heat meter

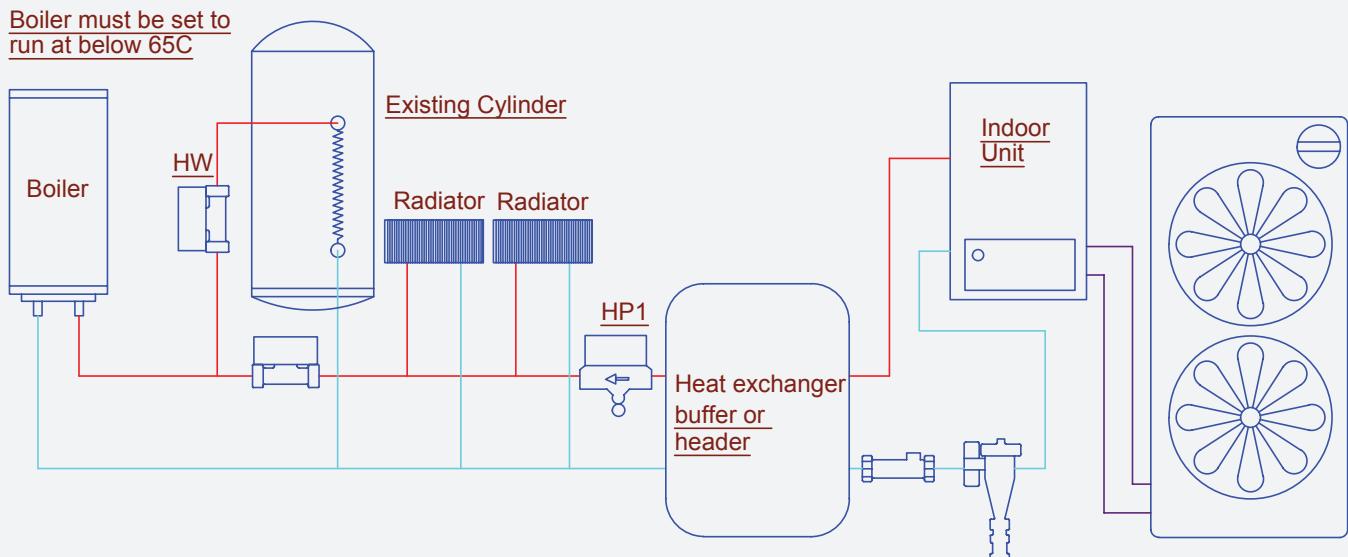
1 x electricity meter

Heating Only Hybrid System

Heating Only Hybrid - Mono



Heating Only Hybrid - Split



Heating Only Hybrid Systems

A hybrid is a system which uses both a fossil fuel boiler and a heat pump. The heat pump only heats the house it cannot heat the hot water. In a hybrid system the boiler and heat pump NEVER heat the house at the same time.

Heating Only Hybrid System

Operational Description

Hot water is controlled by the boiler, it is not heated by the heat pump. In this case it means that the old cylinder can be kept.

Heating is controlled using the existing wall mounted thermostat / time clock (field supplied). The run command is sent into the existing heating controls to drive the boiler.

The system will run in a fully adjustable weather compensated mode adjusting the water temperature to suit the ambient conditions.

We programme a changeover temperature into the unit. I.e. 2C. If the temperature outside falls below 2C the heat pump stops and a run command is sent to the boiler.

The heat pump stops and a boiler run symbol shows on the Samsung remote controller.

When the ambient temperature rises to 5 degrees 5C the boiler stops and the heat pump restarts.

RHI will be paid on the heat provided by the heat pump only, a meter is used to measure this heat.

Samsung Monobloc Equipment List

1 x Heat pump AE***JXYDEH

1 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

Flexible water hoses

Mounting feet

2 Pumps we recommend a 25/80

Flow meters 0-40l

Magnetic filters and strainers

A buffer, heat exchanger or low loss header.

Glycol 25% propylene glycol and inhibitor

1 x Electrical Isolator 32Amp for outdoor units.

1 x Electrical Isolator 3Amp for control box.

1 x heat meter

1 x electricity meter

1 x 240Volt double pole relay

Samsung Split Equipment List

1 x Heat pump outdoor unit AE***JXEDEH

1 x Heat pump Hydro box AE***JNYDEH containing cylinder sensor, controller, sensors and flow switch, Pump, expansion vessel, pressure gauge and backup heaters.

Refrigerant pipework 1/4 and 5/8

Mounting feet

Flow meters 0-40l

Magnetic filters and strainers

A buffer or low loss header.

Electrical Isolator 32Amp for outdoor unit.

2 isolators for the indoor unit 1 x 16Amp and 1 x 24 Amp

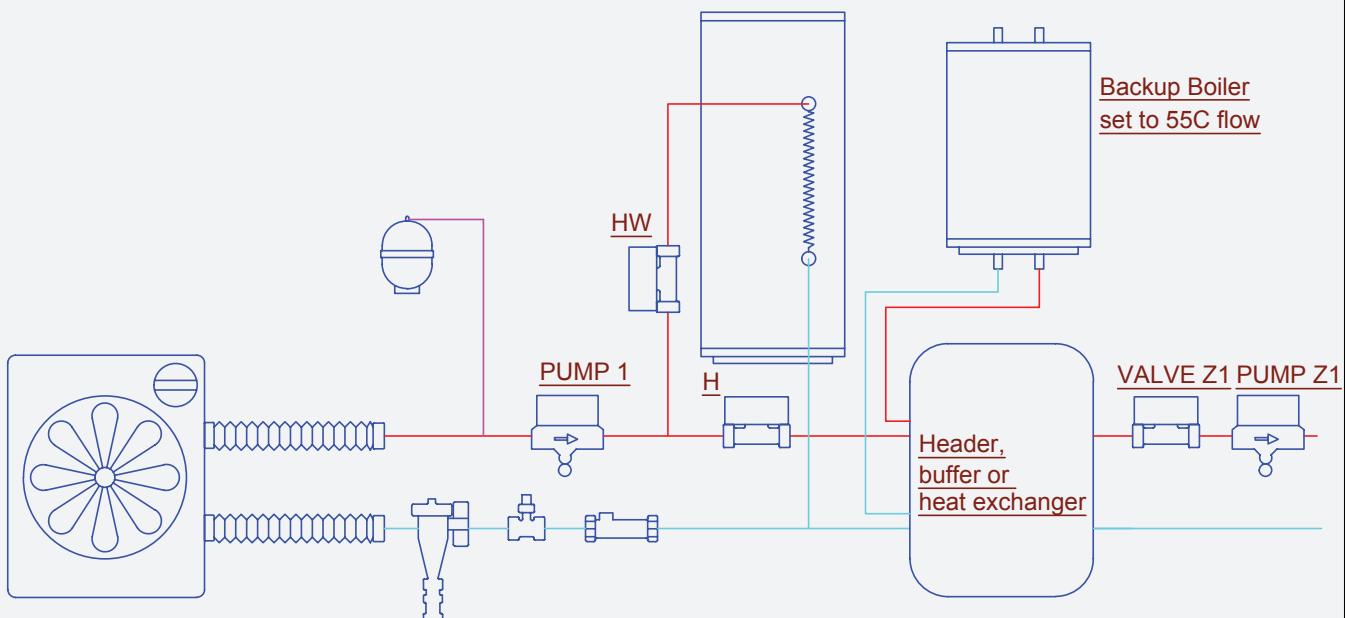
1 x heat meter

1 x electricity meter

1 x 240Volt double pole relay

Heat Pump With Backup Heater

Heat Pump With Backup Heater - Mono



Heat Pump With Backup Heater

In this system the heat pump can ask the boiler to help if it's struggling. The heat pump and another heat source run together at the same time and temperature.

We don't use these systems very often as you are limited to a run temperature of only 55 C meaning in many cases the radiators will still need changing.

Heat Pump With Backup Heater

Operational Description

Hot water is controlled using the Samsung cylinder sensor and controller supplied. This controller has inbuilt time clock control and includes both a daily and weekly legionella sterilisation function.

The system can be either open vented or pressurised.

The cylinder must have a coil at least 2.5m²

Cylinder size normally allows 55l of water per person per day.

We would recommend sizing the heat pump to recover the cylinder in 1 hour.

It is possible to connect this system to solar PV powered immersion heaters (I boost, Immersun etc.)

Heating is controlled using a wall mounted thermostat / time clock (field supplied).

There are no limits to the number of heating zones which can be connected to this system. This system shows 2 heating zones. (Pump 2 and Pump 3)

Each zone has its own thermostat / timer which drives a dedicated zone valve. The zone valve will control the pump and send a run signal to the heat pump to run.

The system will run in a fully adjustable weather compensated mode adjusting the water temperature to suit the ambient conditions.

We recommend a buffer, low loss header or heat exchanger is used to simplify the installation.

If the temperature outside is below 10C and the master is struggling to get to temperature it will send a run signal to the slave to ask for assistance.

Samsung Monobloc Equipment List

1 x Heat pump AE***JXYDEH

1 x Heat pump control box MIM-E03AN containing cylinder sensor, controller, sensors and flow switch.

A cylinder

Flexible water hoses

Mounting feet

An expansion vessel, pressure gauge, pressure relief valve and filling loop

A Pump we recommend a 25/80

A Pump to supply each heating zone

Flow meter 0-40l

Magnetic filter and strainer

2 x 2 port diverter valves 28mm

1 x 2 port diverter valves for each heating zone

Glycol 25% propylene glycol and inhibitor

A Heat exchanger, Buffer vessel or Low loss header

Electrical Isolator 32Amp for outdoor unit.

1 x Electrical Isolator 3Amp for control box.

1 x Wall thermostat / time clock to control each heating zone

System Design & Components

Which System is Right for Me?

The Split Type heat pump system comprises of an indoor boiler or hydro box containing a pump, expansion vessel, backup heaters and the refrigerant to water heat exchanger. This is connected using refrigerant pipes to the outdoor unit which contains the other refrigeration components.

The advantage of this system is that it's easy to mount the outdoor unit along way (up to 75m, model specific) from the house. As there is no water outside you also don't need antifreeze.

The disadvantage is that the system needs an Fgas (refrigeration) engineer to install the refrigeration pipework and to maintain the system

Qualifications required to install a split heat pump:

WRAS or BSEN806 Spec for Installations Conveying Water for Human Consumption

Part G (G3 Hot water storage) Building Regulation 2000

IEE and Part P (Electrical Safety) Building Regulations 2006

CITB/C&G certified, specialist Refrigerant Pipe Work engineers

F-Gas reg. By CITB/C&G accredited engineers in the handling of refrigerant

The Monobloc Type heat pump has all the refrigeration components pre piped and housed in the outdoor unit. The connection to the house is made using water pipes. A Monobloc is a boiler that lives in the garden.

The advantage of this system is that there is no refrigeration pipe work required on site so no fgas engineer is required for the installation or maintenance of the system.

The disadvantage is that the system needs food grade Glycol (anti-freeze) in the circuit to avoid freeze up.

Qualifications required to install a monobloc heat pump:

WRAS or BSEN806 Spec for Installations Conveying Water for Human Consumption

Part G (G3 Hot water storage) Building Regulation 2000

IEE and Part P (Electrical Safety) Building Regulations 2006

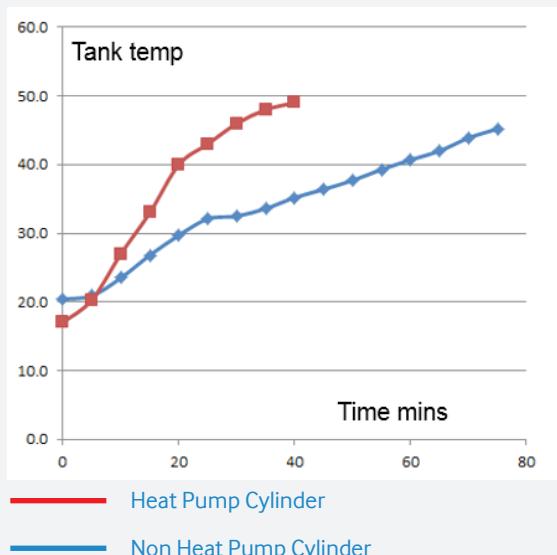
Hot Water Cylinder

If you want to heat hot water with a heat pump you need a hot water cylinder. There is no such thing as a Combi heat pump, the unit cannot heat the water instantly. Heat Pump Cylinders come in every shape and size and can be dressed (pre plumbed) or undressed.



Modern cylinders are well insulated and can be installed in lofts, garages or out buildings. If there is already an existing cylinder installed it cannot be used with a heat pump. Heat pump cylinders need very large coils to make them operate effectively, typically we ask for a coil area of more than 2.5m^2 .

Using an old cylinder is not recommended, the hot water cylinder will take a long time to heat up. When the unit is heating the cylinder it is not heating the house, which is why a more efficient heat pump cylinder is always used.



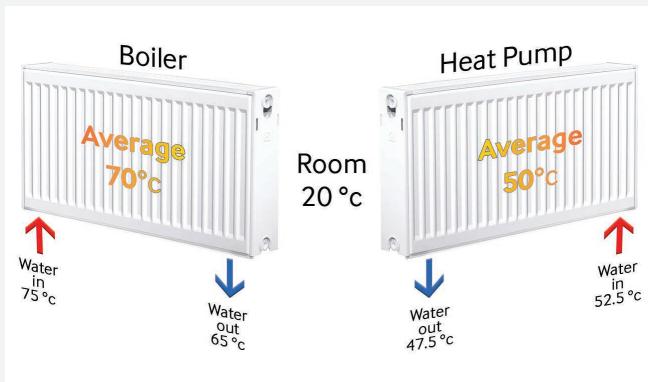
System Design & Components

Radiators

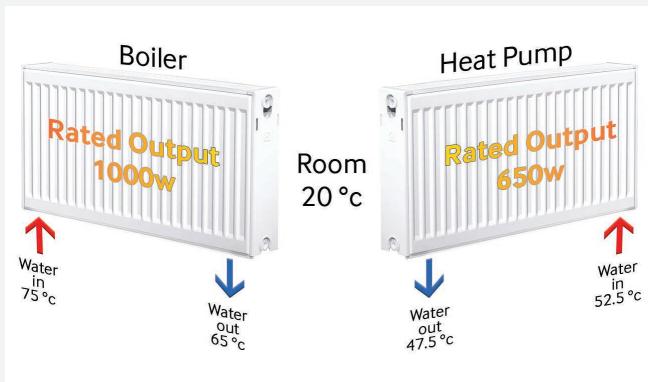
The water temperature that is produced by a heat pump is not as high as that produced by a boiler, this reduces the output of the radiators.

The capacity's shown in the radiator catalogues are stated at a 50 degree difference between the air temperature and the average temperature of the water inside. This is called the Delta T.

In a boiler system the water enters the radiator at 75C and leaves at 65C so the average radiator temperature is 70C. If the room is at 20C the radiator is 50 degrees higher than the room temperature (delta T = 50).



In a heat pump system the water enters the radiator at 52.5C and leaves at 47.5C so the average radiator temperature is 50C. If the room is at 20C the radiator is 30 degrees higher than the room temperature (delta T = 30)



If the average temperature of the radiator falls from 70C to 50C the Delta T falls from 50 to 30C.

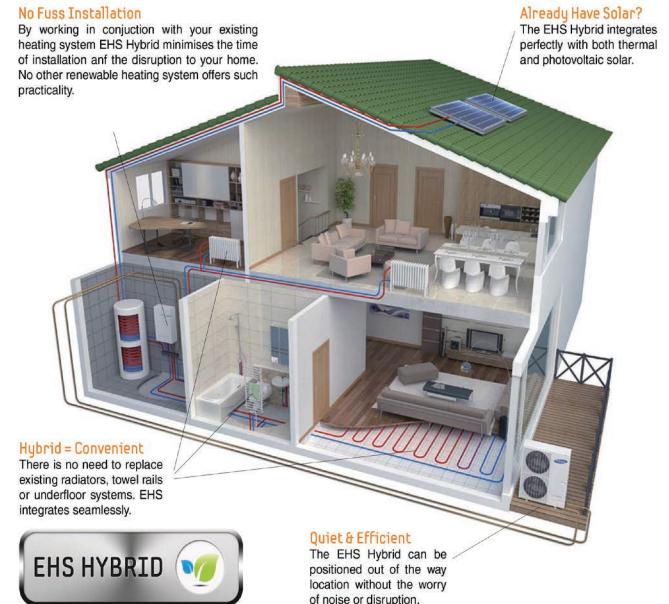
The output of the radiator at a 30 degree Delta T (on a heat pump) is only 3/5 of the output figure in the catalogue. This is why we have to increase the radiator size when heat pumps are installed.

The EHS Smart MCS Calculator will calculate the size of the radiator required to work effectively at the lower temperatures.

Hybrid and Bi-Valent Heat Pumps

A hybrid system uses a heat pump and the existing boiler together. It tends to be used as a solution when people would like a greener renewable solution but with minimum disruption. Hybrids work very well in older and badly insulated properties.

Samsung EHS Hybrid In Your Home



In a hybrid system the heat pump will heat the house only when the temperature is above +3C. At temperatures below 3C the existing boiler will automatically take over the heating duties and the heat pump will stop

We always recommend that the heat pump only covers the heating. All hot water functions are still handled by the old system. This reduces the installation cost and makes it much easier to control. If you have a combi boiler installed it will do the hot water, the heat pump will be heating only.

Why do this?

The cost of installing more than one heat pump can be prohibitive. If more than one heat pump is installed planning permission may be required.

The oil consumption can be reduced by up to 80%

All the radiators and pipework in the property can be kept

The existing hot water cylinder can be reused

The installation can be quick and easy to do the heat pump can be connected directly into the existing system with very little disruption.

Installation Siting

Where to mount the outdoor unit:

An air source heat pump works by pulling its heat from the air in the Garden. As the air goes through the unit it is cooled, the waste product from the unit is huge quantities of cold air. In 60 seconds our unit will move 100m³ of air. That's enough air to fill a 3 bed house every 3 minutes. To maintain efficiency we need to make sure that none of this waste cooled air goes through the unit again. The colder the air going through the unit the more work it has to do.

If you mount the unit in an enclosed space it will not operate efficiently. For example if we mount the unit in the loft you will end up with a freezer and a flood.

It is important to make sure that in very windy conditions the fan doesn't have to struggle. For this reason we try to mount the unit with its back against a wall or solid barrier. Mounting a unit in a completely exposed condition is not a good idea.

Choose a location where the noise of the Air to Water Heat Pump when running and the discharged air do not disturb any neighbours.

Install the outdoor unit on a flat, stable surface with plenty of drainage, gravel or grass is ideal; make sure the base can support its weight

The units have an anti-corrosion coating but this will not protect the unit in Salty conditions, if you can see the sea from the position of the outdoor unit you need to apply Blygold, Bronze glow or equivalent anti-corrosion coating on the whole unit.

The unit will not benefit from being mounted on the north or south of the building, it can be faced in any direction.

The unit needs to be securely mounted at least 100mm off the ground on rubber feet. The unit must be bolted down for security using 10mm bolts and Zebedee bolts (provided in the feet).

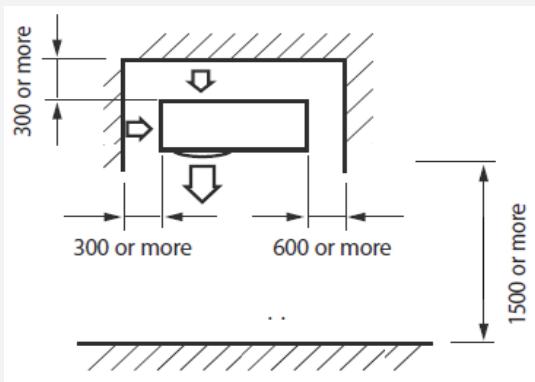
If wall brackets are used we recommend 600mm unistrut cantilever arms are used. Caution should be applied when wall mounting because any vibration from the unit can be transmitted into the wall creating noise.

Monobloc Sizes

Model Size	Height (mm)	Width (mm)	Depth (mm)	Weight (Kg)
Size 5	798	880	310	59
Size 9	998	940	330	75
Size 16	1420	940	330	103

Split Outdoor Sizes

Model Size	Height (mm)	Width (mm)	Depth (mm)	Weight (Kg)
Size 4	638	880	310	48.5
Size 6	638	880	310	48.5
Size 9	998	940	330	68
Size 12	1420	940	330	100
Size 14	1420	940	330	100
Size 16	1420	940	330	100

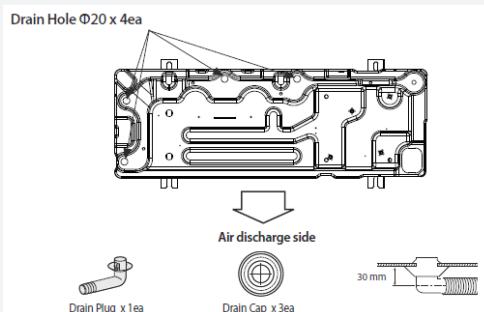


Drainage

The unit must have adequate drainage away from the unit; it can produce up to 6 L / hour.

There is a drainage kit included which we recommend you don't use, it's best to let the unit drain into the ground. The drain holes in the unit are clearly shown, if a drip tray is used it must be 25mm longer and wider than the base of the unit to catch all the drips.

If the unit is mounted on concrete you can end up with a frozen puddle so we avoid this, normally putting the unit on ground which provides drainage like grass, mud etc. is ideal. To make the unit look neat it's not uncommon to scatter a couple of bags of gravel before putting the unit on the ground.



Planning permission:

In a recent change to the rules installers will no longer require planning permission for heat pumps. As part of the PDR (Permitted Development Rights) planning permission will no longer be required as long as a few rules are adhered too.

Planning permission rules for air source heat pumps:

Only one heat pump can be installed without planning permission, if you install two units or more you need planning permission

The unit must be less than 1m³ in size, It must not be mounted on the side of the building facing the highway or be visible from the highway. It must be installed by MCS installer as part of the MCS scheme

And Finally....

You need to prove the noise from the unit does not exceed 45dBa as measured at the nearest window of the next door neighbour's property. Our calculator does this for you.

Installation Siting

Fencing the Unit In

It is essential that the airflow to the unit is not restricted so there are some simple rules:

This photo shows an example of a bad installation, the air will bounce off the fence and recirculate through the unit.

You cannot mount the unit inside a building

It's a good idea if a roof is installed over the unit that it is at least 1000mm above the unit



If You Want to Build a Surround

Specialist enclosures can be used if they have been tested and don't affect the airflow. Contact us for details.



Indoor Unit Placement

Monobloc

When the heat pump is delivered it comes with a control box called a MIM this also contains the flow switch, cylinder temperature sensor (blue), backup heater sensor (red) and a Samsung remote controller.

You need one control box for every heat pump so, if you have 3 heat pumps you need 3 MIM control boxes

Install the control unit indoors, ideally in a heated area of the building, it's not waterproof. It needs to be sited within 15m of the hot water cylinder. The water temperature sensor is 15m long and cannot be extended. The control box should also be as near as possible to the pump, flow switch and any zone valves.

The box is 323mm wide, 339mm high, 131mm deep



Split Hydro Box

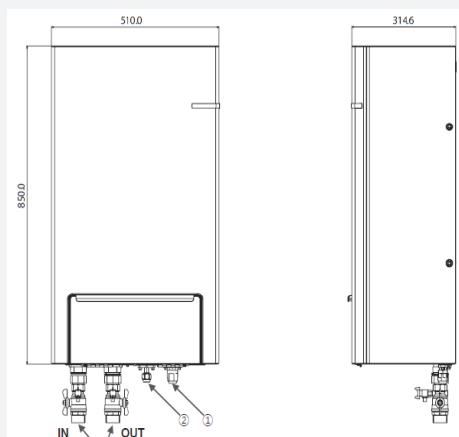
The hydro box contains the flow switch, a pump, an expansion vessel, a pressure gauge, inline heaters, cylinder sensor (blue) a red safety sensor and the controller.

Install the hydro unit indoors, it's not waterproof.

It needs to be sited within 15m of the hot water cylinder, less than 75m from the outdoor unit., unit specific and as near as possible to any zone valves.

The box is 850mm high, 510mm wide and 315mm deep.

You need to allow 100mm clearance above, 100mm either side and at least 300mm below the hydro box for access.



Other Components

Flexible Hoses (Monobloc Only):

The water connections to the back of the unit are 1 inch BSP male. We recommend connecting the water pipework with flexible hoses for ease of maintenance and to avoid any vibration from the unit going into the house.



All external pipework has to be insulated to meet MCS standards. *these are not need on a split system as the outdoor unit is joint to the indoor using refrigerant piping.

Mounting Feet



The outdoor units need to be mounted 100mm above the ground, we recommend using rubber feet with unistrut channel. These come with mounting bolts.

Expansion Vessel, Pressure Gauge, Pressure Relief Valve & Filling Loop (Monobloc Only)

In pressurised heating systems most heating engineers use a Robokit which combines all these components into one box. The expansion vessel is sized exactly the same way as when using a boiler. If you want to run the system open vented you don't need these components, the Samsung units are happy to run at anywhere from 0 – 3Bar pressure. Split systems have these components in the hydro box.



Pump (Monobloc Only)



Your pump needs to supply 12l/min for the 5kW, 20l/min for the 9kW and 30l/min for the 16kW unit.

The static resistance through the unit, 10kPa for the 5 and 9kW and 15kPa for the 16kW unit. The flow meter has a resistance of around 5kPa

Cylinders typically have a static resistance of 5kPa for the heat pump coil.

You need to use a big pump or two smaller pumps to get the correct flow rate. Using a single 15/60 pump WONT WORK. We recommend at least a 25/80 pump at least. *the split systems indoor unit is fitted with a single circulation pump, additional pumps may be required depending on the installation.

Divertor valves

If you require domestic hot water and heating, 2 x 2 port divertor valves are required, you need to supply these and they need to be 28mm diameter



Water Filter

In all cases a magnetic filter and strainer needs to be installed in the return to the heat pump. The filters ensure that debris/foreign materials do not cause damage to the heat exchanger in the unit, voiding warranties.

Flow Switch & Flow Meter

The heat pumps have to have continuous un-interrupted flow at all times despite the loading on the system. To measure that the flow is correct there is a paddle type flow switch which needs to go into the primary pipework. If the flow rate falls the water doesn't push the paddle switch and an error will occur E911.

To avoid this it is common to use a hydraulic break in the system like a buffer or a low loss header. In radiator circuits you can avoid this by allowing a couple of radiators with lock shield valves and auto bypass valves. *the flow switch comes pre-installed into the split unit hydro box.



In Monobloc systems the flow switch comes with the control box, which must be installed by the heating engineer.

The flow Switch can be installed either horizontally or vertically with at least 150mm of straight pipe either side, connection is 1" female BSP. The wire is 2m long and needs to connect into the wiring station. This wire can be extended to suit.

We recommend a flow meter is installed into the flow side of the flow switch. Adaptors may be required to enable this join. The flow switch is not IP65 rated (weatherproof) and so must not be installed externally.

Glycol / Anti-freeze (Monobloc Only)



In Monobloc heat pumps the water goes outside the building. The unit can protect itself from freezing up but if the power goes off there is a risk that the unit will freeze up causing damage. To prevent this we recommend putting propylene glycol mixture in the system. It is important that the glycol concentration is adequate to protect the unit, if the unit freezes up there will be no warranty. Manufacturer dependant, a mix of 25% is normal for UK conditions.

Adding too much glycol is not a good idea as it reduces the capacity of your system. *No Glycol is required in split units.

Buffer vessels, heat exchangers and low loss headers

Historically every heat pump had a buffer vessel, the reason for this is that heat pumps were once single speed machines. In low load conditions this meant the heat pump had to cycle on / off to match the demand. A buffer vessel allowed the heat pump to operate for longer periods and to rest for longer periods.

Warranty & Approved Installer Scheme

Warranty

Warranty MUST be registered within 30 days of delivery to site. You must send proof of delivery with the warranty card.

Warranty will start from the date the unit is delivered. All registrations made more than 30 days after this period will be subject to a late registration fee.

If commissioning data is not available at this time, register the unit and send the data at a later date, the warranty certificate will be returned to you when the whole form is completed.

This warranty covers only the Samsung components of the installation, it is parts only with a pre-set labour allowance only. The warranty is between Freedom Heat pumps and the installation company only, this is NOT an end user warranty.

It is the role of the installer to offer a warranty to the end user covering all of the heating system including the heat pump.

The standard warranty is valid for 12 months from date of delivery as entered on the warranty card. If the unit is installed by a Samsung approved installer and this card is sent back within 30 days of delivery date the warranty is automatically extended to 36 months.

Approved installers also have access to warranty extensions at the time of registration for warranty; a 4 year extension to the warranty can be purchased from your distributor or directly from Freedom

Heat Pumps. Call 02380274833 for details and pricing

Samsung EHS commissioning and maintenance sheet

You will need a thermometer and a pen to complete this form:

The Unit

Model Number	From outdoor unit right hand side
Serial Number	From outdoor unit right hand side
Ambient air temp	measure this in the garden
Have you cleaned the filter	
Glycol concentration %	measure this
Have you cleaned the coil	
Have you polished the unit?	

In Heating Mode

Water flow temp	from remote controller
Water return temp	measure this
Flow rate l/min	from flow meter
Temp of air at the back of the unit	
Flow rate l/min when radiators and uflow manifolds closed	from remote controller
	from flow meter

Cylinder

Hot water cylinder model and serial no	
Cylinder water temp at start up	press view button on rc
And after 30 mins	press view button on rc
Water flow temp	from remote controller
Water return temp	measure this
Flow rate l/min	from flow meter
Immersion heater current	press immersion button on rc
Immersion heater cutout setting	remove cover and adjust to 70C

Commissioning Data not required at maintenance

Where was the unit purchased	
Date Installed	
Date delivered proof of delivery required	warranty starts from this date
Date Commissioned	
Are you a Samsung approved installer?	
Would you like to be an approved installer?	
Warranty required years	3 / 5 / 7 years
Installation Address	

You

Engineers name	
Company	
Address	
Engineers phone number	
Email address	
Signature of engineer	
Date	

Samsung EHS Approved Installer Scheme:

What is an Approved Installer?

Samsung EHS Installers are approved to install Samsung heat pumps to the highest standard and have completed the Samsung EHS training courses. They can use our selection tools and will provide you with full details of the products, the run costs, grants available, RHI, potential savings and be able to advise you how to get the best out of your Samsung EHS system.

Although these heating engineers are not directly employed by us, we are happy to promote their businesses to you through our where to buy EHS search. We suggest that you contact more than one approved installer, to ensure you can make a fully informed decision. Many of the installation companies are also accredited for government grants and rebate schemes but do please check with them individually.

What can Approved Installers offer me?

As well as specialising in Samsung products, these heating engineers can also offer:

- Extended guarantees* between 3 and 7 years, depending on the installer and the product

- Advice and prices on a new heat pump installation
- Central heating installation and heating system tips
- Heat pump servicing and maintenance
- Heat pump repair or replacement

How do you become an Approved installer?

To join this scheme a representative of your company must complete both of the Samsung EHS training courses and complete at least one Samsung EHS installation. For experienced MCS heat pump installers there is a fast track joining scheme using a multiple choice questionnaire, please contact us for details. On completion of your qualifying installation you need to send the warranty registration card along with pictures of the outdoor unit, hot water cylinder, pipework and the property it has been installed in, to sales@samsungehs.co.uk.

You will be contacted by one of our representatives to discuss the installation, its sizing and how you chose this particular unit for this application. We will also discuss what details you would like us to include on the web, twitter, Facebook etc. Once this has been completed you will be issued with Samsung EHS accredited installer logos, certificates, accredited installer number and your details entered on the www.samsungehs.co.uk web site.

Splits Technical Data



Outdoor Units

Model Name			AE040JXEDEH	AE060JXEDEH	AE090JXEDEH	AE120JXEDEH	AE140JXEDEH	AE160JXEDEH
Compatible Hydro Unit			-	AE090JNYDEH	AE090JNYDEH	AE090JNYDEH	AE160JNYDEH	AE160JNYDEH
Power Supply			Ø, #, V, Hz	1,2,220-240,50	1, 2, 220-240, 50	1, 2, 220-240, 50	1, 2, 220-240, 50	1, 2, 220-240, 50
Performance (A2W #1)	Nominal Capacity * ¹⁾	Heating	W	4,400	6,000	9,000	12,000	14,000
	Nominal Current Input * ¹⁾	Heating	A	4.1	5.7	9.2	11.7	14.3
	SCOP * ¹⁾		-	4.522	4.539	4.577	4.627	4.560
Electric Specification	Max current		A	20.0	20.0	22.0	28.0	30.0
Refrigerant Side	Refrigerant	Type	-	R410A(GWP>150)				
	Piping Connections	Liquid	Ø, mm (inch)	6.35 (1/4")	6.35 (1/4")	6.35 (1/4")	9.52 (3/8")	9.52 (3/8")
		Gas	Ø, mm (inch)	15.88 (5/8")	15.88 (5/8")	15.88 (5/8")	15.88 (5/8")	15.88 (5/8")
	Installation Limitation	Length	m	30	30	50	50	50
		Height	m	20	20	30	30	30
Sound	Sound Pressure * ³⁾	Heating	dB(A)	46	47	49	50	50
	Sound Power		dB(A)	63	63	63	64	66
External Dimension	Weight	Net	kg	48.5	48.5	68	100	100
	Dimensions (WxHxD)	Net	mm	880 x 638 x 310	880 x 638 x 310	940 x 998 x 330	940 x 1,420 x 330	940 x 1,420 x 330

*1)~*3) A2W rating conditions in accordance with Eurovent Rating Standard for Liquid Chilling Packages RS-6/C/001-2011.

*1) A2W Condition #1: (Heating) Water In/Out 30°C/35°C, Outdoor Air DB/WB 7°C/6°C.

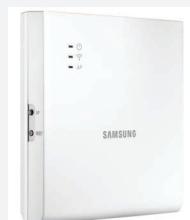
*3) Sound Pressure was acquired in an anechoic room. Thus actual noise level may be different depending on the installation conditions.

Hydro Units



Wi-Fi Kit (MIM-H03N)

Model Name			AE090JNYDEH	AE160JNYDEH
Power Supply			Ø, V, Hz	1,220~240, 50
Performance	Nominal Capacity	Heating	W	4,400 / 6,000 / 9,000
	Leaving Water Temperature Range	Heating	°C	15~55 (H/P : 25~55)
Water Side			Piping Connections	In/Out Ø, inch 1 1/4" (BSPP)
Hydro Parts	Water Pump	Flow Rate	kg/min	13 / 17.5 / 26
	Electric Heater	Input Power	W	4,000
	Expansion Vessel	Volume	Liter	8
External Dimension	Weight	Net	kg	45
	Dimensions (WxHxD)	Net	mm	510 x 850 x 315



EHS Control built-in to Hydro Unit.

Wi-Fi Kit (MIM-H03N) optional accessory.

Control App available to download. (Phone not included.)

Mono Technical Data



Outdoor Units

Model Name			AE050JXYDEH	AE090JXYDEH	AE120JXYDEH	AE140JXYDEH	AE160JXYDEH	
Power Supply			Ø, #, V, Hz	1,2,220-240,50	1,2,220-240,50	1,2,220-240,50	1,2,220-240,50	
Performance (A2W #1)	Nominal Capacity ^{*1)}	Heating	W	5,000	9,000	12,000	14,000	
	Nominal Current Input ^{*1)}	Heating	A	5.1	9.2	12	14.3	
	SCOP ^{*1)}		-	4.510	4.409	4.454	4.489	
Electric Specification	Max current		A	16	22.0	28.0	30.0	
Water side	Piping Connections	In/Out	Ø, inch	1"(BSPP)	1"(BSPP)	1"(BSPP)	1"(BSPP)	
Refrigerant Side	Refrigerant	Type	-	R410A(GWP>150)				
Sound	Sound Pressure ^{*3)}	Heating	dB(A)	45	48	50	51	
	Sound Power		dB(A)	61	63	64	65	
External Dimension	Weight	Net	kg	59	76	108	108	
	Dimensions (WxHxD)	Net	mm	880x798x310	940x998x330	940x1,420x330	940x1,420x330	
Operating Range	Leaving Water	Heating	°C	25~55	25~55	25~55	25~55	

*1~2) A2W rating conditions in accordance with Eurovent Rating Standard for Liquid Chilling Packages RS-6/C/001-2011.

*1) A2W Condition #1 : (Heating) Water In/Out 30°C/35°C, Outdoor Air 7°CDB/6°CWB.

*3) Sound Pressure was acquired in an anechoic room. Thus actual noise level may be different depending on the installation conditions.

Control Kit



Model Name			MIM-E03AN	MIM-E03BN
Use with			-	9,12,14&16kW mono
Power Supply			Ø, V, Hz	1, 220-240, 50
External Dimension	Weight	Net	kg	3.5
	Dimensions (WxHxD)	Net	mm	290x370x110

*External Control Options - 230V: (Max A)

Booster Heater (20A), hybrid (0.5A), water pump (2A), 2/3way valve (0.5A),

Thermostat (10mA), solar pump (10mA), Inverter pump (2A), 3way mixing valve (0.5A)

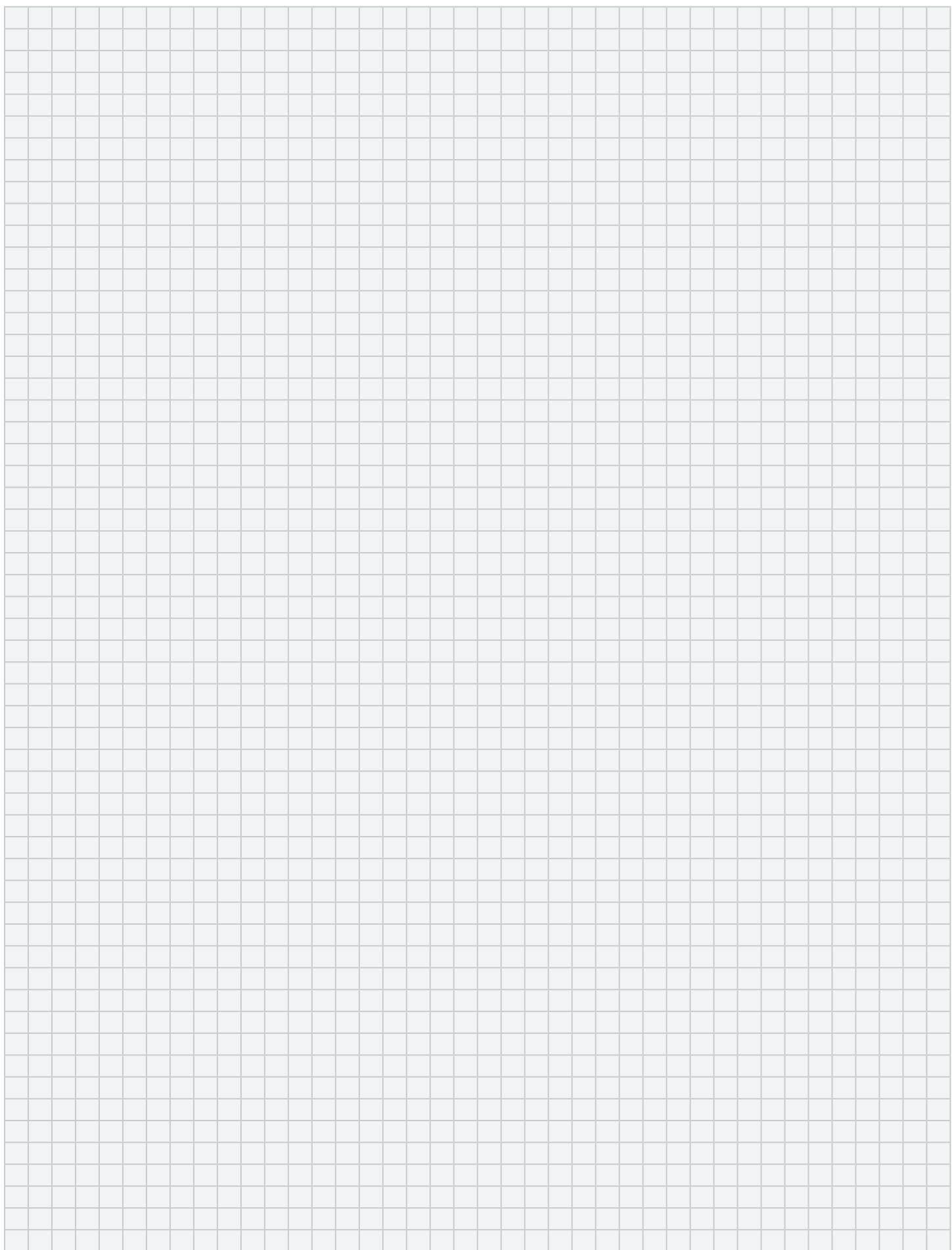
Wi-Fi Kit (MIM-H03N) optional accessory.

Control App available to download. (Phone not included.)

Wi-Fi Kit (MIM-H03N)



Notes



Notes



Legal and additional information

About Freedom Heat Pumps Ltd.

Freedom Heat Pumps are one of the world's largest importers and distributors of Samsung Heating Products. Founded in 2010 to specifically support the introduction of Samsung EHS in the UK we have quickly grown to be the supply chain support for all of the UK's largest plumbing suppliers and wholesalers. Our staff members include refrigeration & air conditioning engineers, mechanical designers and experts from the plumbing sector.

For more information

For more information about Freedom & Samsung EHS visit
www.samsungehs.co.uk.co.uk

Freedom Heat Pumps Ltd
Unit 2 Warrior Industrial Park,
Eagle Close
Chandlers Ford,
Hampshire
SO53 4NF
Tel: 02380 274 833
Email: sales@freedomhp.co.uk

About Samsung Electronics Co., Ltd.

Samsung Electronics Co., Ltd. inspires the world and shapes the future with transformative ideas and technologies, redefining the worlds of TVs, smartphones, wearable devices, tablets, cameras, digital appliances, printers, medical equipment, network systems and semiconductors. We are also leading in the Internet of Things space through, among others, our Digital Health and Smart Home initiatives. We employ 307,000 people across 84 countries. To discover more, please visit our official website at www.samsung.com and our official blog at global.samsungtomorrow.com

For more information

For more information about Samsung, visit
www.samsung.com

Dealer Details

Copyright © 2015 Freedom Heat Pumps Ltd. All rights reserved. Samsung is registered trademarks of Samsung Electronics Co., Ltd. Specifications and designs are subject to change without notice. Nonmetric weights and measurements are approximate. All data were deemed correct at time of creation. Samsung is not liable for errors or omissions. All brand, product, service names and logos are trademarks and/or registered trademarks of their respective owners and are hereby recognized and acknowledged.