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Unit E2, Telford Road, Bicester, Oxfordshire, OX26 4LD

Piping/Wiring Guide

Drawn	Checked	Date	Drawing No
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SAMSUNG

5 core 0.75 mm cable for valve and plate pump, extra heating pump if needed.

An additional primary return pump is only needed on 12 and 16kw units.

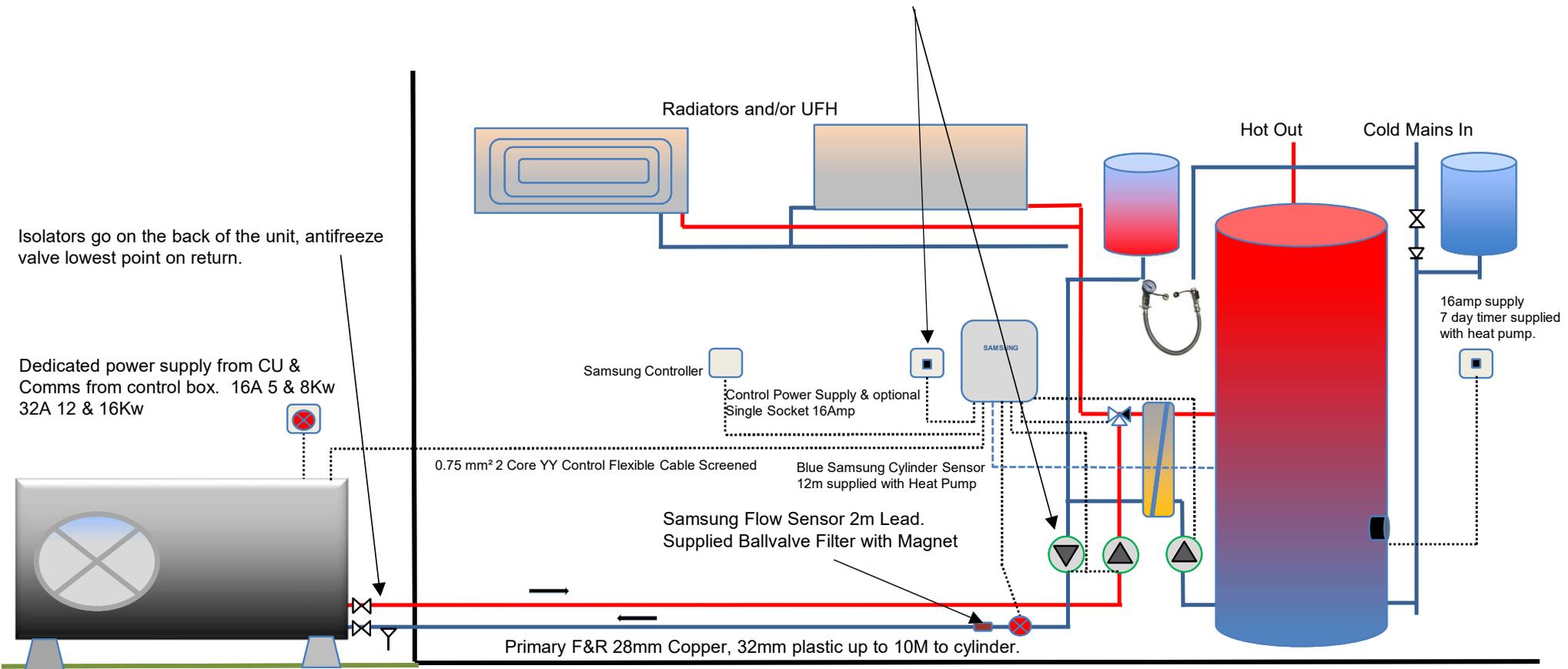


Plate Loading Cylinder:

- Plate loading replaces the job of having a coil, may need a little more space in a cupboard.
- Works best on a scheduled basis. Wire the bronze pump **Brown L** wire to the same terminal as the **3 Port Green Wire**. This means that the bronze pump will run when there is a DHW cycle from the heat pump.
- **Don't forget to add a filling loop and gauge to the system.**



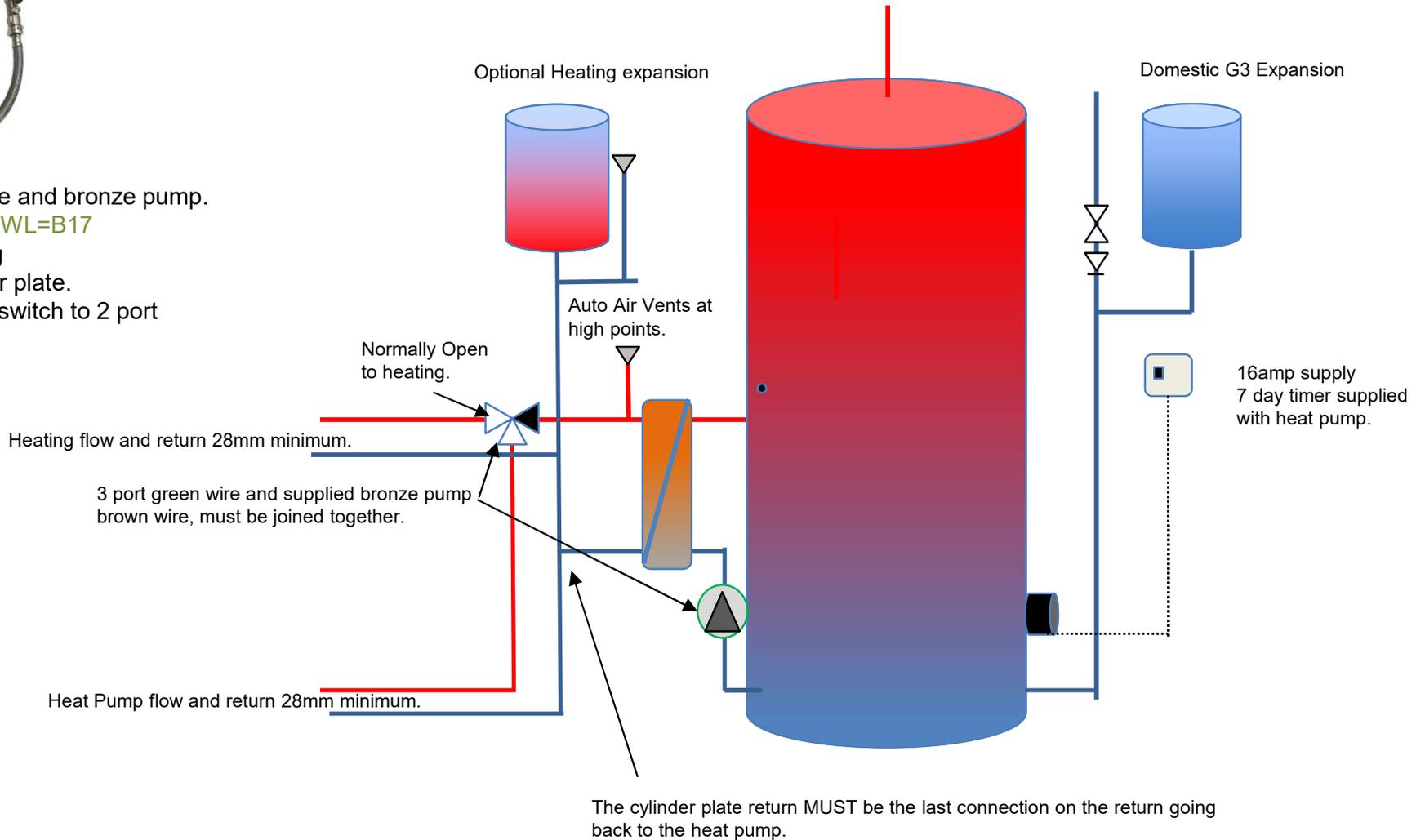
Three Way Valve and bronze pump.

N=B15 L=B20 SWL=B17

A port to heating

B port to cylinder plate.

Switch actuator switch to 2 port

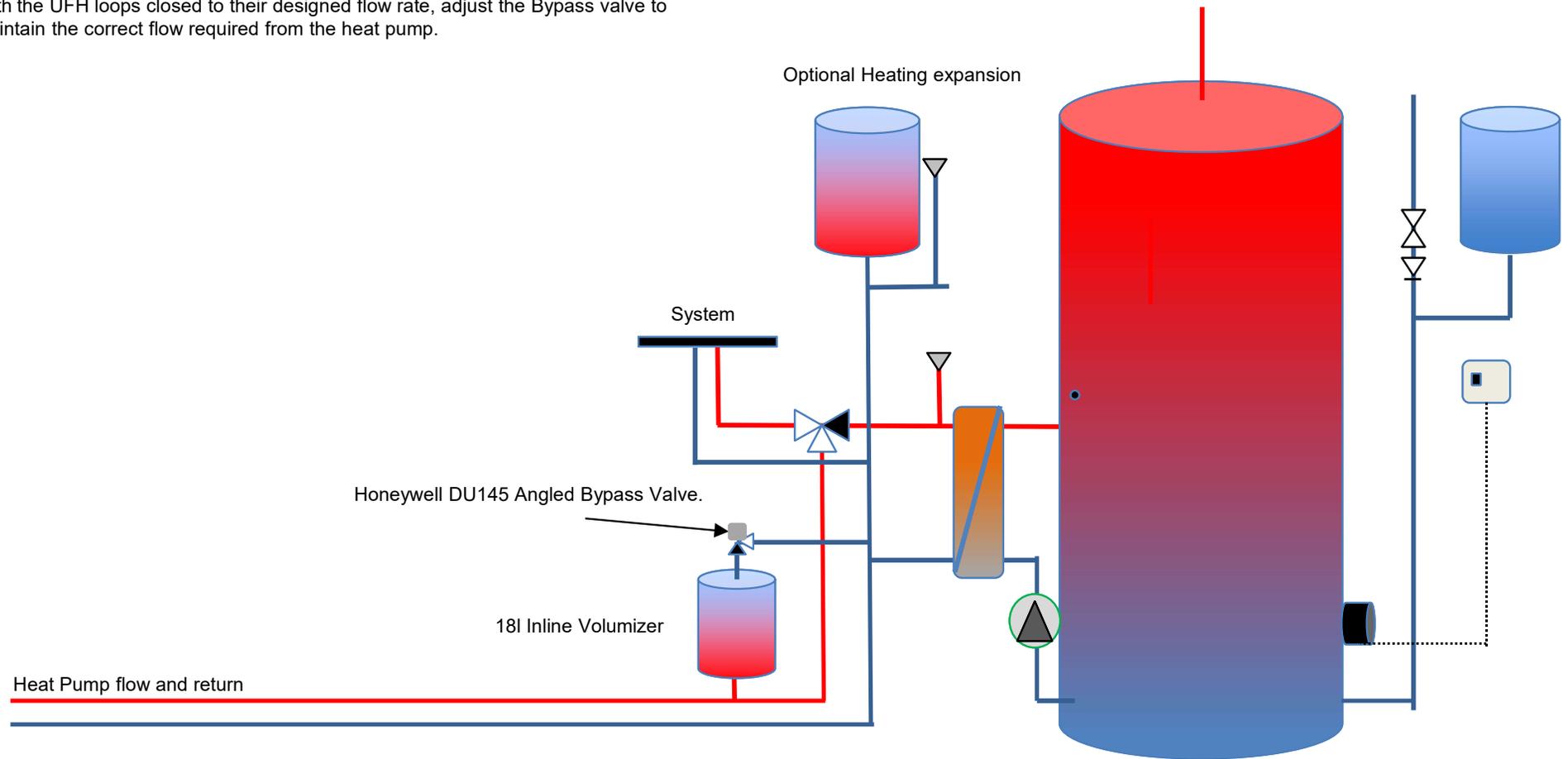


Adding additional volume:

This for open loop systems, may not have enough open circuits to maintain flow rates.

Careful balancing may be required between the UFH circuits and the auto bypass valve.

With the UFH loops closed to their designed flow rate, adjust the Bypass valve to maintain the correct flow required from the heat pump.





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Piping Schematic Samsung

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Flow sensor 2m long, you can extend this

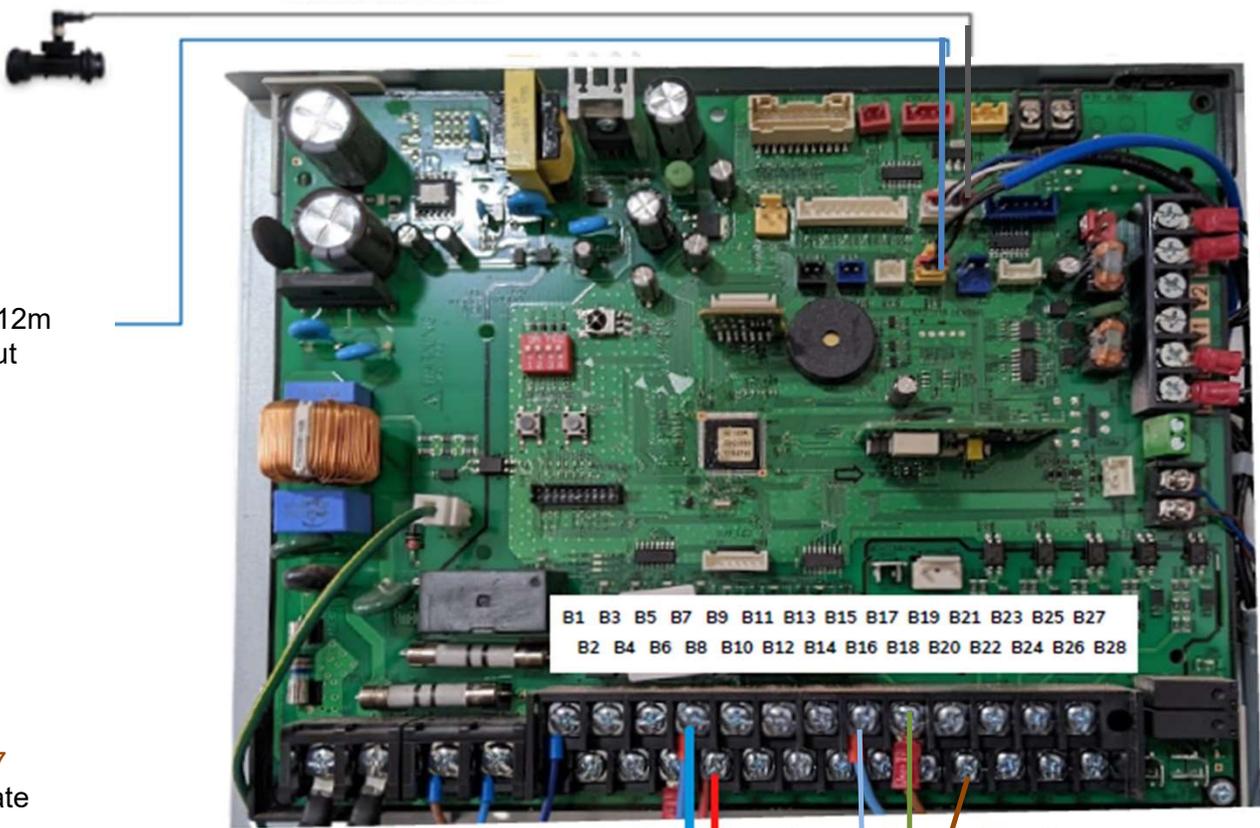


Tank sensor 12m long do not cut



N=B15 L=B17
Hot Water Plate Bronze Pump.

Three Way Valve and bronze pump.
N=B15 L=B20 SWL=B17
A port to heating
B port to cylinder plate.
Switch actuator switch to 2 port

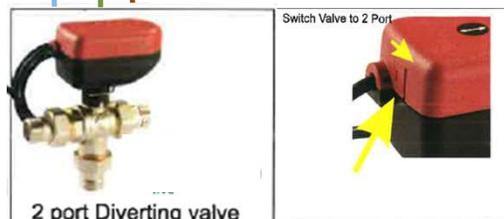


B1 B3 B5 B7 B9 B11 B13 B15 B17 B19 B21 B23 B25 B27
B2 B4 B6 B8 B10 B12 B14 B16 B18 B20 B22 B24 B26 B28

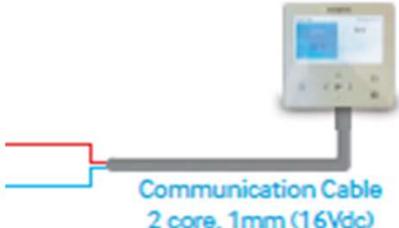
Power Input 16 Amps



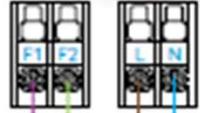
Dual pumps



2 port Diverting valve
AB to Heat Pump
A to Central Heating
B to Hot Water Cylinder



Communication Cable 2 core, 1mm (16Vdc)



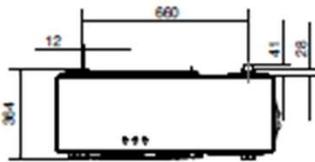
Power supply 240v
16 Amp for 5kw
20 Amp for 8kw
32 Amp for 12-16kw

3/14/2024

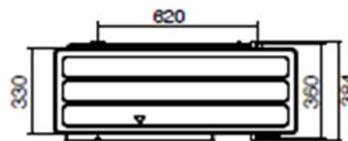
Provision of the heat pump base:

All heat pumps must be installed on a firm base, with drainage provision for the defrost cycles and condensation.

Here are some examples of units installed, any advice needed please contact our office.



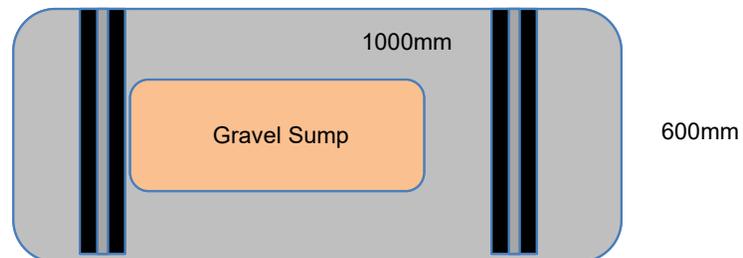
Size 5



Size 8



Size 12-16



Lagging of pipework:

- This is one of the most important elements of a heat pump project.
- Below I have both good and bad examples of outside lagging.



- To the left, non-UV rated lagging, the taped joints will soon come apart, even though these are antifreeze valves, they should be lagged.
- Below our supplied Isolators and antifreeze valves lagged with Primary Pro lagging, sealed with the supplied Primary Pro bond and seal.



Best practice:

- Please check the following before commencing start-up of the unit, as these are important conditions of the Samsung Warranty*
- Use the supplied **Ball Valve Filter and Magnet** has been installed on the return to the monoblock, inside and in a place that's serviceable.
- The system should be flushed, this is especially important if the system is an old gas or oil system. Flushing should be completed in accordance to **BS7593**.
- The pipe work diameter should be sized in relation to the length of the pipework run, number of fittings and components but should have an internal bore no less than **28mm** copper pipework. Be aware that plastic pipework tends to have a smaller internal bore and needs to be sized correctly.
- The external monoblock should be installed on a base suitable for withstanding the weight of the unit and should be level.
- There shall be a proper means of disposal of the condensate, this should be via a drain or soak away.
- The external monoblock unit should be positioned so that there is good air flow around the unit.

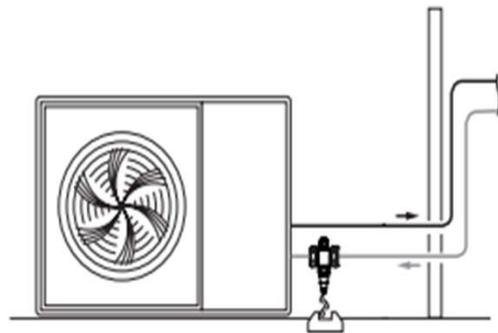
Installation of antifreeze valve:

The antifreeze valve must only be installed in a vertical position, with the outlet facing downwards, to allow the draining water to flow out free from obstructions.

The antifreeze valve must be installed outdoors, where the lowest temperatures can be reached if the heat pump is not operating.

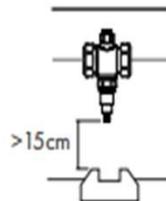
The antifreeze valve should be properly insulated and sealed to reduce heat loss. Only the vacuum breaker and discharge point should be exposed.

The valve must also not be placed close to heat sources which could interfere with their function. For the valves to work properly, always keep the system under pressure.

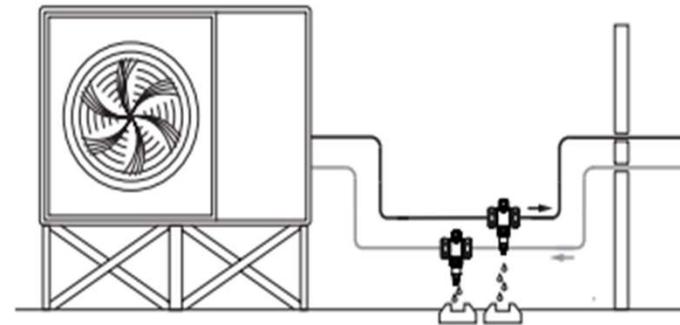


We recommend at least 15cm clearance between the valve and the ground as discharged water could freeze and hinder the operation of the valve.

The discharge from anti-freeze valves must be collected in a suitable drain and routed to a suitable collection point.



Where the heat pump is elevated so the pipework goes down into a U shape (as shown below), this would then require 2 anti-freeze valves to completely drain all the pipework and system.



Secondary hot water circuits:

- On larger property's the use of a secondary hot water circuit is very common. This is great for the end user but must be managed accordingly with any heat pump.
- **DO** The secondary must be fully **LAGGED** for the entirety of its circuit to and from the cylinder.
- **DON'T** Radiators or towel rails must **NOT** be connected to the secondary circuit.
- **CONTROLS** A good way to control the secondary pump is using **PIR** sensors in every shower/bathroom/cloakroom, this means that the circuit only runs when someone enters that room. Most **PIRs** have run times settings built into them.
- **DON'T** They must not be left running 24/7.
- Using the inbuilt heat pump control of the secondary, **NOTE** not all heat pumps have this facility.
- Use a basic timer, combined with a pipe stat, setup to various peak demand points during the day.



When commissioning this system, you need to follow the procedure below don't skip this, if you do the unit won't work properly.

Start-up procedure:

Filling and flushing, when installing any Heat pump, we insist on a thorough system flush prior to connection in line with the Building Regulations for England and Wales, Part L, 2006. Using a power flusher machine really helps to fill the system, there is no pressure sensor in the outdoor unit so we can operate from open vented to 3 bar maximum.

Setting up the cylinder immersion heater:

For the legionella cycle, please check that the stat in the immersion heater is set to 60°C minimum, on a Telford cylinder set it to 4.

Cylinder legionella cycle:

For the legionella cycle, setup the supplied Immersion Timer to once a week, say on a Tuesday at 3 am.

Check the tank sensor:

The blue tank sensor **MUST** be installed above the immersion heater, it must be securely fixed in the tank right into the back of the pocket, I would use heat paste and cable ties to do this.

System water side:

Makes sure that the system is completed filled, with as much air removed as possible, especially UFH circuits. Hot water cylinders are filled.



Powering up:

In really cold weather the system must be power on at least 8 hours before trying to run the system.

Please ask our office for the Cold Weather starting procedure sheet.

Apply power to outdoor and indoor control unit, you should see red lights on the PCBs of both units. If there are no lights you will need the electrician to check for power.

The remote controller will light up after a short time, it will say scanning 0, after a few seconds it will say scanning 1.

Scanning 0 means the indoor unit is ok, scanning 1 means the outdoor unit is ok.

If scanning1 does not show after 30 seconds check the outdoor unit is powered up.

Remove the cover and check the PCB is lit up.



Setting up the controller and the time:

- Press the gear button, bottom right. Press v, then > option, press OK
- User Mode, press ok.
- Wired remote controller, press ok
- LED > to on
- Button Mute > on
- Current time >
- Date > ok
- Adjust day with ^ and v, press > adjust the Month with ^ and v, press > adjust Year adjust with ^ and v press, ok.
- Go to Time, adjust hour with ^ and v, press > adjust the mins with ^ and v, press ok.



Field settings for heating:

- Press ok to wake the controller up.
- Press ^ and v together for 6 seconds, password shows, enter 0202, you are now in service mode.
- Go to 20** Water Law.
- 201* Outdoor Temp For Water Law, set Low to 15°C and set High to -2 (-5°C in Scotland).
- 202* Water Out(FLOW) Temp for WL1 Heat, set Low to 30°C and set High to 50°C for radiators and 45°C for underfloor heating using.
- 2091 External Thermostat Application, set this to **Not Use**.
- 2093 Remote Controller, set to Room Temp On/Off.
- 4013 Outdoor Temp Heating cutoff. 18°C (sometimes you need to set this high this when commissioning in the summer)
- Whilst in Service mode go to Indoor Zone Option and change Standard Temperature to Water Outlet, or Indoor.
- Whilst in Indoor Zone Option, check that Temperature Sensor Option is set to Wired Remote Controller.
- You have now set up the weather compensation. The water in the rads UFH will be warmer in cold weather and cooler in warm weather.

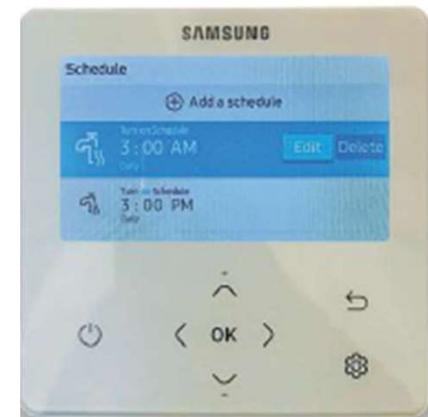
Field settings for Hot Water 30**:

- 3011 Set DHW Application to, Use Hysteresis Thermos ON/OFF state.
- Go to 302* Heat Pump.
- 3025 Set Max DHW operating time, set to 60 mins for 200 Litre or 90 mins for 300 Litre cylinders.
- Go to 303* Booster Heater.
- 3031 Set Application to, Not Use.
- Go to 304* disinfection.
- 3041 Set Application to, Not Use, as this is being done via out timed relay switch.
- 3031 and 3041 are not used, as we recommend the Immersion be controlled by a third-party timer, this allows for easy switch on by the end user, if the heat pump fails for any reason.



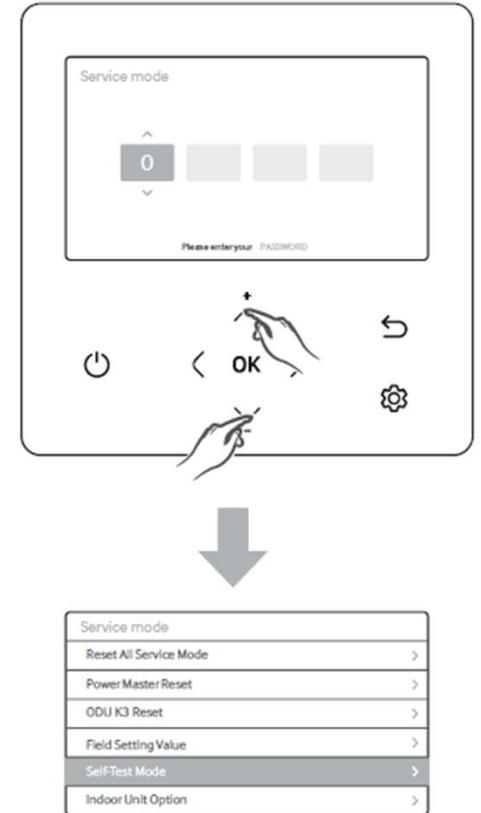
Cylinder timer, if you are heating a hot water cylinder:

- To avoid the cylinder heating being switched off accidentally we normally add 2 on timers a day, one at 12:30 am and one at 15:00 pm. This stops nuisance tripping, resets the unit after power cuts and ensures the cylinder is hot 24 hours a day. We don't normally set any off times.
- To set the cylinder up as above:
- From the front screen press the gear button, scroll right > to schedule, press ok.
- If any timers are showing highlight them and select delete. When no timers are shown we can add some new ones.
- Highlight + add schedule, press ok.
- Highlight daily schedule, press ok.
- Type - quiet will show, press v to DHW, do not use quiet.
- Press > press ^ to set to Standard, press >, adjust hour to 3, am press ok
- Scroll up ^ to + add a timer.
- Highlight + add schedule, press ok.
- Highlight daily schedule, press ok.
- Type quiet will show, press v to DHW, do not use quiet.
- Press > press ^ to set to Standard, press >, adjust hour to 3, pm press ok.



Use of self-test mode:

- Press **power** to wake the controller up.
- Press **^** and **v** together for 6 seconds, password shows.
- You need to set 0202 pressing **>**, then **^** twice, **>** twice, **^** twice then press **OK**
- Press **v** 7 times to self-test mode, press **ok**.
- Press **v** to water pump press **>** the main water pump will come on, leave it on.
- Press **v** to booster heater, press **>** to switch it on, this is the immersion heater in the tank, check it works, press **<** to switch it off again.
- Press **v** to DHW (3 port valve) this is the hot water valve, it will be closed, check it, press **>** to on, the valve will open, check it, press **>** to close it again.
- Press **v** to Zone 1 valve this is the heating valve before the header or plate hex, it will be open, check it, press **>** to on, the valve will now close, check it, press **>** to open it again.
- Now check the flow rate as per instructions below.



Checking flow rate:

- **First you need to clean the filter. Shut the valve, undo the back of the valve, remove the strainer, clean it and replace it then open the valve.**
- Start the pump, see above, the unit will be running in heating mode.
- **Check the flow rate, we need 12l/min on the 5kW unit, 20l/min of flow on the 8kW unit and 30l/min on the 12 and 16kW unit.**
- If there is not enough flow the unit will never operate and it will give fault **E911** see fault code page.
- Make sure you clean the filter, turn up all the pumps, open all the valves and get rid of the air to keep flow rate up.
- **How to read the flow rate from the controller:**
 - Press OK to wake the controller up
 - Press ^ and v together for 6 seconds, password shows >, then ^ twice, > twice, ^ twice then press OK.
 - Press v to indoor zone option, press ok
 - Press v to indoor status information press ok



Starting the unit in heating mode:

- Press the left button so the Zone is highlite in blue, press the power button a temperature will show.
- Turn up your thermostats or underfloor heating to send a run signal to the unit, the display will change to set 0.0c the pump will start within 3 minutes.
- The compressor in the outdoor unit starts after 3 minutes, the pipework will begin to heat up.
- If you press the ok button, you can see the water outlet flow temperature rising.
- If the outdoor unit doesn't start after 5-minutes, see problems page.
- Over time the unit will warm up, now check all the radiators or under floor loops are hot as well.

In really cold weather the system must be power on at least 8 hours before trying to run the system. Please ask our office for the Cold Weather starting procedure sheet.



Run test in hot water mode:

- Make a note of the hot water cylinder temperature, after 15 minutes of running check the hot water temperature again, it should have risen, again note the temperature.
- Now clean the filter again.
- The Water storage temperature is lower (48°C) than a normal cylinder. It's important to check that any shower or bath mixers do not further reduce the water temperature. Using your thermometer check that the hot water comes out the tap.

Starting the system in hot water mode:

- Check the filter again.
- Press return to get to the normal screen. With the zone highlighted in blue press the power button, heating will stop. Now press > to highlight the DHW and press the power button again.
- The DHW will start the display will show 48°C set standard press ok.
- The cylinder set temperature and current temperature will show.
- To adjust the temperature press ^ and v set it to 48°C.
- Press ok to switch between standard , eco (cold water).
- The heat pump will start heating the cylinder if its colder than 43°C and will heat it up to 50°C then it will stop. The unit will take up to 6 minutes to start in Hot water mode, be patient.

How to read the flow rate from the controller:

- Press OK to wake the controller up.
- Press ^ and v together for 6 seconds, password shows.
- You need to set 0202 pressing >, then ^ twice, > twice, ^ twice then press ok.
- Press v to indoor zone option, press ok.
- Press v to indoor status information press ok.
- All the sensors are listed including flow sensor.
- Press return 4 times to return to normal screen.

More advanced testing:

- In the service menu:
- Press ok to wake the controller up.
- Press ^ and v together for 6 seconds, password shows.
- You need to set 0202 pressing >, then ^ twice, > twice, ^ twice then press ok.
- Press v 9 times to Self test mode, press >.
- You can see all the sensors on the unit at once.

Resetting the controller back to factory settings:

- Press ok to wake the controller up.
- Press ^ and v together for 6 seconds, password shows.
- You need to set 0202 pressing >, then ^ twice, > twice, ^ twice then press ok.
- Press v until you get to reset all service modes, press ok.
- Erase all service modes, ok.
- Erase all service mode data, press ok.
- Initialize remote controller, press ok.
- The controller goes blank for 30 seconds and then wakes up.
- All field settings will still stay on the PCB.

Trouble shooting:

In really cold weather the system must be power on at least 8 hours before trying to run the system. Please ask our office for the Cold Weather starting procedure sheet.

00 shows on the remote controller:

00 shows when the MIM control box is first powered up it means the MIM PCB has activated but no outdoor unit can be seen. Check the F1 F2 wiring is ok between the outdoor and indoor unit and check the outdoor unit has power.

01 shows on the remote controller:

01 means that the remote controller has power and it can see the outdoor unit too, this is good, in a few seconds this will disappear.

E911 low flow alarm:

If your flow rate is good (see above) but you see an E911 low flow alarm.

E911 is not a fault, it's a warning, it stops the unit because the water is moving too slowly through the system. With the pump running test the flow rate.

Check the filter again.

If your flow rate is less than recommended you need to turn up the pumps, open any valves that might be closed, clean filters and get rid of any air. The unit MUST have the correct flow rate before it will try to run. Also check the flow switch is in the right way round (there is an arrow on it) and its plugged in.

Cold Weather Protection, my unit won't start:

Check the flow temperature. If this is below 10°C the compressor will not start.

You must warm up the water to get the unit to run, the easiest way to do this is to add a cylinder and use the immersion to warm up the cylinder first, the warm water from the cylinder will preheat the heat pump and it will start to operate.