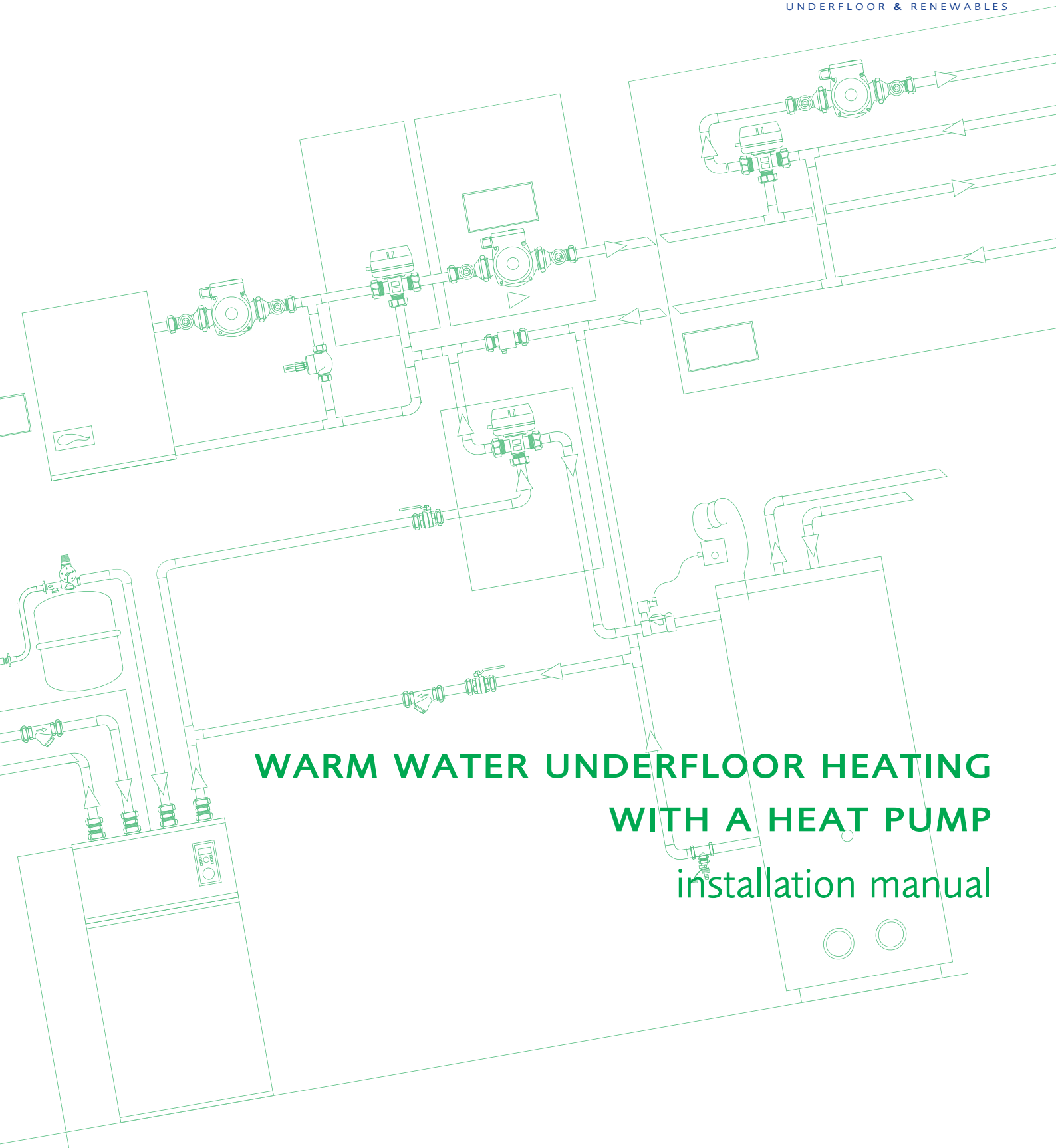
Nu-Heat
UNDERFLOOR & RENEWABLES



WARM WATER UNDERFLOOR HEATING WITH A HEAT PUMP

installation manual

design – innovation – expertise – service

V2A-JUN 08

System Ref: .....

INSTALLATION MANUAL FOR NU-HEAT WARM WATER UNDERFLOOR HEATING WITH FASTFLO TUBING AND OPTIFLO CONTROL WITH A HEAT PUMP

It is a condition of the warranty that the Certificate of Installation and Commissioning application form is completed and returned to Nu-Heat once the system is fully commissioned.

This manual will give you all the information needed to install your Nu-Heat warm water underfloor heating system. In order for the process to be achieved quickly and easily the principle of underfloor heating should be understood.

The following pages in conjunction with the A3 System Information, have comprehensive diagrams showing the purpose of each system component and its position in the overall scheme. Parts shown in colour are generally supplied by Nu-Heat and those shown in outline are generally supplied by others; this mostly consists of copperwork and general plumbing fittings.

Electrical wiring details are supplied in a separate manual.

The A3 Tube Layout will detail the number and lengths of tubing coils and their spacings for each individual room zone. The heat pump sizing is covered in your heat pump quote, or your supplier's information.

Attention to the advice given in this manual will help to ensure a trouble-free and effective installation. The requirements of the relevant British Standards, Water Bye-laws and other regulations should always be met.

If there is any aspect of the installation that you do not understand, please contact Nu-Heat Customer Support, quoting your system reference number, for advice.

In line with the company policy of product development, Nu-Heat reserves the right to supply different components to those shown.

For detailed, specific information on your heat pump and heating system see the **A3 Docking Drawings** and **A3 System Information**.

If you are using a Nu-Heat NIBE heat pump, please refer to the following information for full installation details.

i) NIBE installation and commissioning manuals.

ii) Nu-Heat ground trench and collector tube installation guide.

Commissioning will be carried out by a Nu-Heat approved commissioning engineer.

1.1 Checklist

Floor heights: Check that the height of the subfloor is correct for the depth of construction needed to incorporate the underfloor heating. This is especially important if more than one construction type or different floor finishes are used on the same floor. Information on your specific floor constructions is provided in the A3 Floor Constructions.

Timber frame buildings: Check that the sole-plate depth will accommodate the appropriate Nu-Heat floor construction. If the tubing is to be fitted from below in a suspended timber first floor, any cross-blocking must be reduced in height by 30mm to allow the tubing to pass through and, where possible, any joist notching/service holes must be drilled before laying the deck. If using Nu-Heat's ClippaPlate then it is easiest to fit this before the deck is layed. Contact us to arrange this.

Floor insulation materials: Ground floor insulation must meet Building Regulations 2006, Part L. A minimum requirement for ground floors is 75mm of PIR insulation (Celotex, Kingspan, Ecotherm, Xtratherm), or 110mm of EPS (Jablite, etc). Advice on this should be sought from your architect, builder or local authority planning department. For floating floors Nu-Heat supplies EHDN grade polystyrene tracked to accept the heat transfer plates and Fastflo tubing but this is not intended to meet Part L requirements for ground floors. If you are installing from below in a suspended timber floor using mineral wool insulation, a separate foil facing is supplied by Nu-Heat. All other insulation materials are readily available from builders' merchants. Always read the floor construction information in the A3 Floor Constructions before starting the tube installation. **It is the responsibility of the customer to make sure that insulation levels conform to the relevant British Standard and any other applicable building code.**

Fastflo tubing: The number and lengths of tubing coils and their spacings and flow rates for each individual room zone are detailed on the A3 Tube Layout.

Avoiding damage to the tubing: If it is necessary to store the tubing, keep it dry, out of direct sunlight and away from sharp objects or possible chemical spillage. Avoid any soldering near Fastflo tubing as overheating may result in failure. Tubing that may become frozen before or during installation or whilst the screed dries should have anti-freeze added and be thoroughly flushed afterwards. Do not kink the tube by over bending.

Heat pump: The heat loading for your underfloor heating system is indicated in the heat pump quote. Please refer to the heat pump manufacturer's recommendations for installation and commissioning.

- Ground source: Allow sufficient access to the ground connections when positioning a ground source heat pump.
- Air source: The heat pump is installed outside the building. Allow sufficient access around the heat pump (please refer to the manufacturer's installation manual).
- Exhaust air source: Allow for the necessary space for air ducts above ceilings. The heat pump must be installed below the level of all ducting to allow for drainback. The duct to the outlet air vent requires additional space around it for insulation.

Insulation of pipework: The sensible use of insulation is recommended on the flow and return pipework between the heat pump and Optiflo manifolds. Domestic hot water pipework should also be insulated, particularly on a pumped loop.

Taking delivery: Please check your delivery against the delivery note and report any discrepancies within 7 days of receipt.

Warranty: **In order to validate the warranty the** *Commissioning Checklist & Warranty Application* **form in the Commissioning Pack attached to this manual must be completed by the installer and returned to Nu-Heat.**

1.2 Recommended installation sequence

The general sequence of installation is as shown in this manual. Before starting check the positions of the main components such as Optiflo manifolds as agreed at the system design stage and noted on the A3 System Information. Make sure that room dimensions and joist spacings have not changed as this could affect the amounts of tube required. Full dimensions and suggested positions for components are supplied in this manual.

1. First-fix the main wiring. The positioning of the heat pump, cylinder (if used), thermostats (if used) and Optiflo wiring centres should be agreed with the customer or architect. Please refer to the separate *Electrical Manual* for detailed wiring diagrams.

2. First fix the domestic services if they are to run beneath the floor insulation. Then fix the remaining hot and cold domestic water pipework. In order to avoid heating the cold water supply, all domestic hot and cold service pipework should be insulated. If an Aquastar hot water loop has been specified, refer to the diagrams in section 3.1 for details.

3. First-fix the primary flow and return pipework between the heat pump, cylinder (if used) and the Optiflo manifolds. Follow the appropriate System Schematic.

4. Lay the floor insulation.

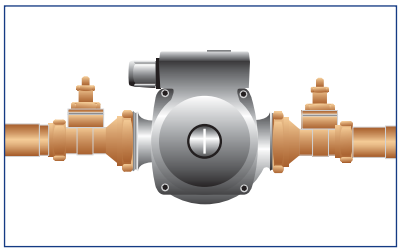
5. Fix the Optiflo manifolds in position. See Section 1.5 for fixing instructions. See system plans for locations.The manifolds are reversible to allow right- or left-handed pipe connection.

6. Install the underfloor heating tube.

7. Commissioning can only take place after all electrical installation has been completed and checked by the electrician (see *Electrical Manual*).

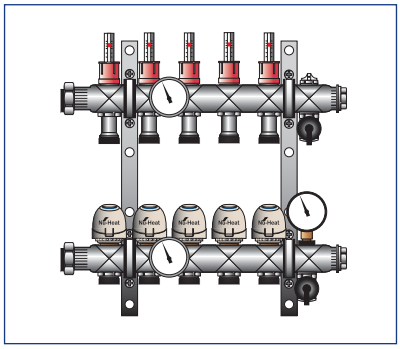
1.3 System components – Underfloor heating

Main underfloor heating pump



Circulates water from the heat pump to the Optiflo manifolds. This pump may already be fitted inside the heat pump.
Note: if there is an additional pump supplied this must be fitted to the primary heating supply pipework – see the A3 Docking Drawing for more information.

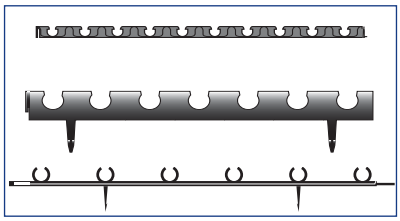
Optiflo Manifold – may be connected either left or right-handed



Hot water is circulated by the heat pump to the optiflo manifold(s). The design flow rate is set on the optiflo manifold for each zone during commissioning and is shown on the manifolds flow gauges. Manifolds are available with up to 12 ports. See Section 1.5.

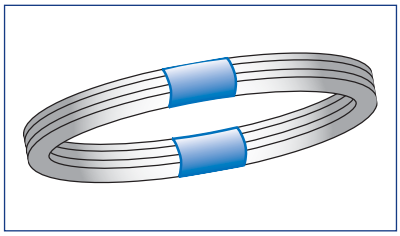
Zones with thermostats: When the air temperature of each room reaches the required level, the wall thermostat switches off its corresponding zone valve on the manifold. Thermostats are generally used to limit temperatures in bedroom zones, with other zones left open flow with no room stat or actuator.

Cliptrack



Cliptrack is used to secure Fastflo tube in place on the floor. The tubing is held at the correct spacings to ensure the room reaches its set temperature efficiently, note that these spacings are detailed on the A3 Tube Layout as they may vary from room to room.
Note: Design of Cliptrack may vary according to floor type and pipe size.

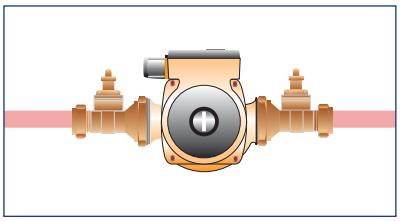
14/18mm Fastflo & 16mm Alupex floor tube



This is the tubing which runs warm water under the floor. It is connected directly to ports on the Optiflo manifold. The number of coils of tube and the spacing used in each zone are noted on the A3 Tube Layout.

1.3 System components – Optional plumbing components

Optional Aquastar Hot Water Loop for separate mains pressure hot water cylinders

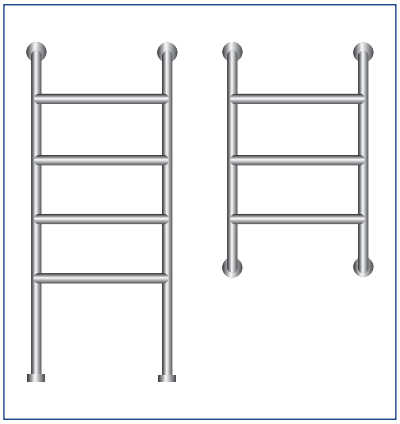


Hot water pump and timer

The hot water pump is connected to the return of the domestic hot water loop.
It is supplied with a dedicated timeclock to allow for separate control from the underfloor heating. It is important to connect the pump so that the arrow is pointing in the direction of flow back to the cylinder.

Additional features include a water temperature control thermostat and non-return valve.

Optional heated towel rails



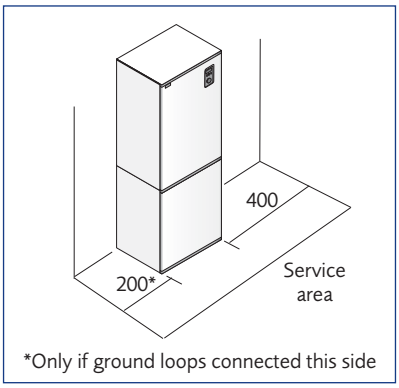
Heated towel rails

Heated towel rails are available for fitting onto the hot water loop. This has the advantage of not having to run a separate circuit from the heating system. To prevent corrosion by the mains water, any towel rail fitted must be manufactured from non-ferrous material or stainless steel. They operate all year round whether the heating is in use or not as they are entirely independent of the heating system.

A comprehensive range of suitable heated towel rails is available through Nu-Heat. For further details talk to our Sales Team on 01404 549770.

For instructions on installing towel rails, see Section 3.

1.3 Nu-Heat NIBE heat pump system components – Electrical, heatpump & peripherals



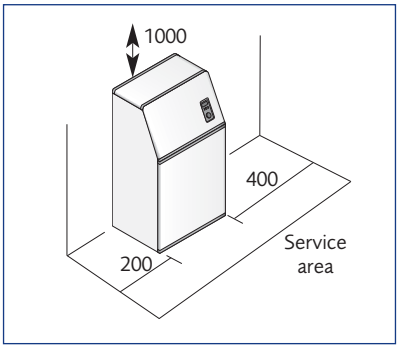
*Only if ground loops connected this side

NIBE 1240

A ground source heat pump with weather compensation. This unit has an integral hot water cylinder and heating controls.

Unit dimensions: 600w x 640d x 1865h max.

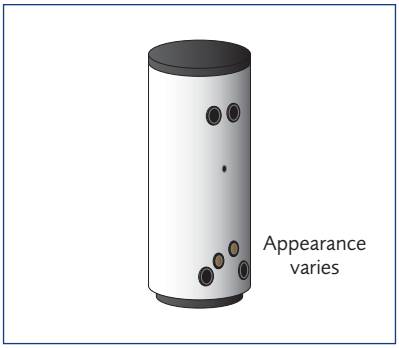
Minimum cupboard dimensions: 1200w x 1440d x 2300h (to allow sufficient access and for servicing)



NIBE 1140

A ground source heat pump with weather compensation.
Unit dimensions: 600w x 625d x 1125h max.

Minimum cupboard dimensions: 1200w x 1425d x 1200h (to allow sufficient access and for servicing)

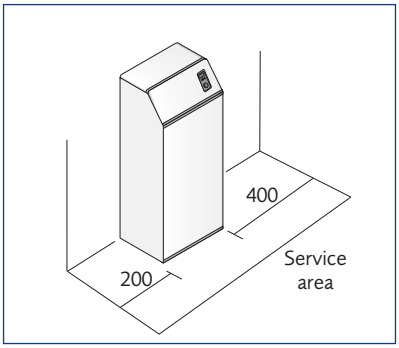


NIBE VPA/VPAS

A hot water cylinder suitable for use with ground source heat pumps. Requires VST11.

Unit dimensions	VPA200/70	VPA300/200	VPA450/300	VPAS300/450
Width (over jacket)	600	725	850	860
Depth (over jacket)	610	725	850	860
Height (over jacket)	1560	1725	2000	2120

Allow additional space for pipe connections above and in front of unit.

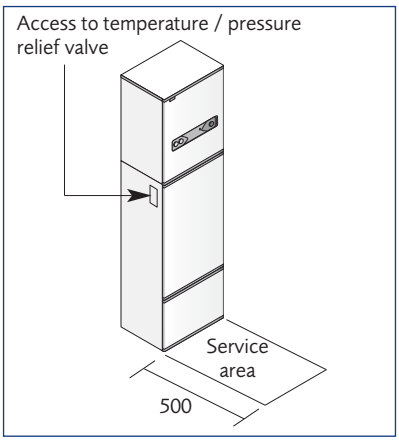


NIBE 1330

A two stage ground source heat pump with weather compensation.

Unit dimensions: 600w x 625d x 1630h max.

Minimum cupboard dimensions: 1200w x 1425d x 1700h (to allow sufficient access and for servicing)



NIBE 200P, 360P & 410

Unit dimensions: 600w x 615d x 2150h max.

Minimum cupboard dimensions: 610w x 1115d x 2200h
(to allow sufficient access and for servicing). Refer to installation manual for permitted pipe access through floor and ceiling.

Exhaust air source heat pumps with integral hot water cylinders and heating controls. 360 and 410 have weather compensation, 200P does not.

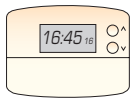
1.3 Nu-Heat NIBE heatpump system components – Electrical, heatpump & peripherals continued

NIBE 2005

An air source heat pump for installation outside the building. Can be supplied with a programmable thermostat TP5000, in which case the heat pump will run in fixed condensing mode, without weather compensation. The thermostat should be located in the open flow heated area of the property.

Unit dimensions: 1186w x 500d x 1095h max.
Allow 450mm behind, 1000mm in front, 400mm on each side for air circulation.

2005/2020



TP5000

NIBE SMO10

Alternative control module for the 2005. This unit allows weather compensation (requires sensor UG – included) so that the unit runs in the more efficient floating condensing mode. Supplied with a 15m modular cable for connecting to the heat pump. Extension cables are available.

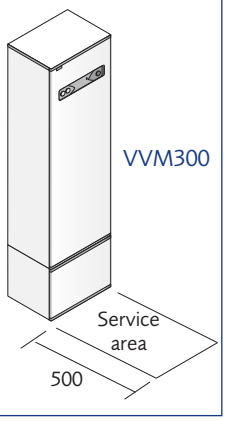
SMO10

NIBE VVM300

A hot water cylinder with integral heating controls, suitable for use with NIBE 2005. This unit provides weather compensation and SM010 is not required. Supplied with a 15m modular cable for connecting to the heat pump. Extension cables are available.

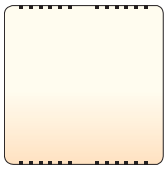
Unit dimensions: 520w x 615d x 1935h max.

Minimum cupboard dimensions: 530w x 1115d x 1950h (to allow sufficient access and for servicing)



NIBE UG

Externally mounted air sensor.

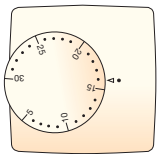


NIBE RT10

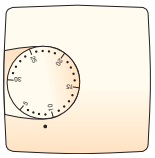
Room thermostat, an option when the NIBE 2005 is used with VVM300.

NIBE RG10

Room sensor, an option for use with NIBE ground source and exhaust air source heat pumps.



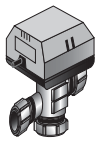
RT10



RG10

NIBE VST11

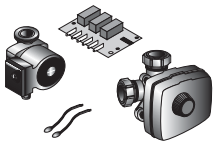
Heating/hot water control valve for the NIBE VPA cylinder.



VST11

Dual temperature circuit

Optional dual water temperature control kit for. See section 1.4.

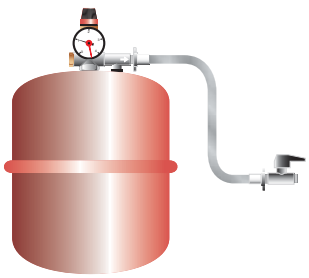


Dual temperature circuit

Expansion vessel

For assistance in sizing the expansion vessel refer to the A3 System Information.

If the expansion vessel has been supplied by Nu-Heat Uk Ltd then every effort has been made to supply a unit of suitable size for the installation. Nevertheless it remains the responsibility of the installer to verify that the size of the expansion vessel is sufficient, since this depends on site conditions such as the position of the expansion vessel and the overall height of the plumbing installation and also the water volume of any system components not supplied by Nu-heat.



Wiring and programming instructions

Detailed information is contained in the manufacturer's installation manuals.

1.4 Dual-temperature systems

A dual-temperature system is one in which two different underfloor heating flow temperatures are used in different areas of the property. This is only supplied with NIBE heat pumps.

Please refer to your specific A3 Docking Drawing for details of whether this is permissible.

Refer also to your A3 System Information for details of which manifolds require to be run at the higher and lower temperatures.

The supplementary pump and control valve must be added to the lower temperature circuit.

Plumbing schematics

For detailed, specific plumbing schematics please refer to the A3 Docking Drawings in conjunction with the A3 System Information at the beginning of this folder.

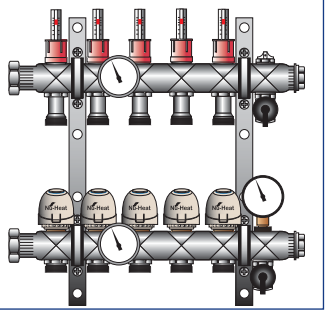
OR

In the case of user-supplied heat pumps please refer to your manufacturers information in conjunction with the A3 System Information at the beginning of this folder.

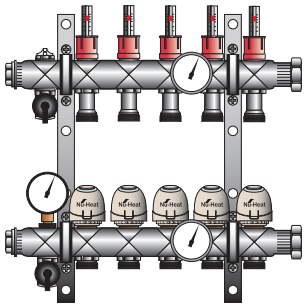
1.5 Optiflo manifolds

Optiflo manifolds are supplied boxed and ready assembled, except for the temperature gauges which must be pushed into the pocket on each manifold rail. However you may require to change the handing of the manifold, or orientate the outlets upwards.

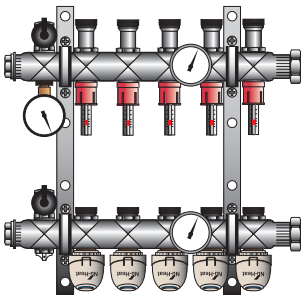
Orientate manifold to suit installation – left-handed...



Right- handed...



Upside down.



1. Unscrew the manifold-rail mounting clamps, turn the manifold to the correct orientation and re-fit the mounting clamps.

Note: The manifold brackets are designed such that one rail is offset for the pipes to pass behind it - the brackets should be orientated to take account of the direction of the pipes. The Supply (flow) manifold must be the rail with the flow gauges.

2. Remove the temperature gauges (these are a press fit), unscrew the boss, and the blanking screw on the reverse.

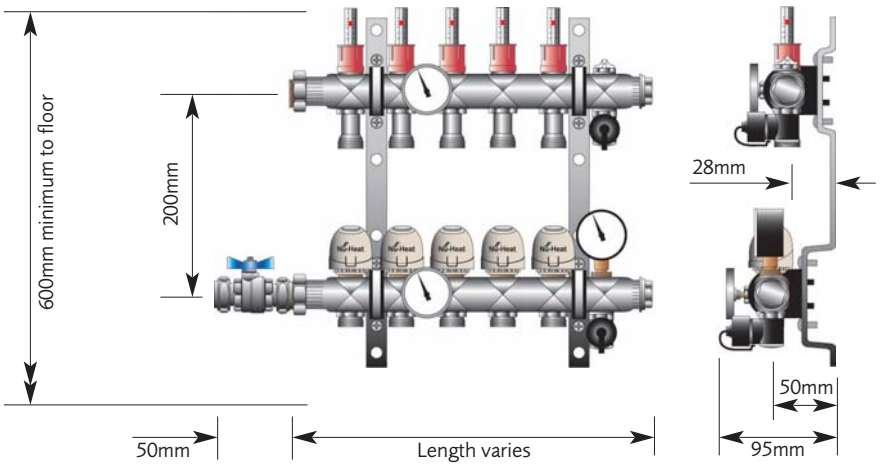
3. Refit the boss on the front of the rail, and the blanking screw on the back. Refit the temperature gauges.

The shut-off valves supplied should be connected directly to the captive nuts on the manifold, using the fibre washers supplied to give a watertight seal. A proprietary sealant may be used in addition to this. The female end of the valve will accept the brass compression to male iron fitting that is supplied. The threaded connection and the compression fitting should be made using either a proprietary sealing compound, or PTFE tape.

Connection valves and fittings are supplied in a separate kit.

Positioning

Place manifolds where they are easily accessible as settings may need to be changed. The size of manifolds varies depending on the number of room zones being connected and the cupboard or casing needs to be big enough to cater for this. See the A3 System Information for detailed location.



Installation

1. Screw the manifold assembly firmly to the wall by the fixing brackets. Position at least 250mm from floor.

Number of ports:	2	3	4	5	6	7	8	9	10	11	12
Length in mm:	195	245	295	345	395	445	495	545	595	645	695

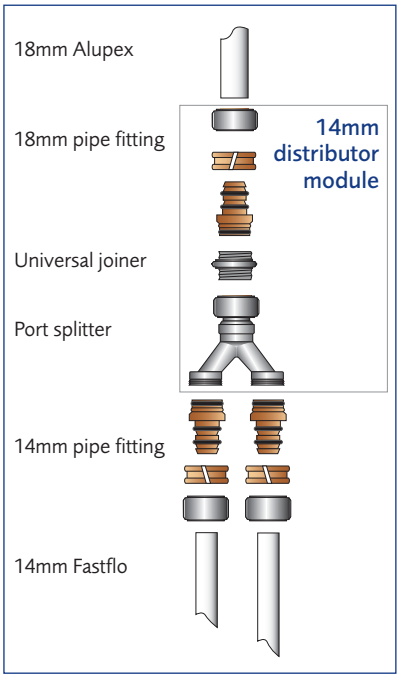
1.6 Alupex

In some floor constructions 18mm Alupex pipe is provided for the flow and return pipework between the Optiflo manifolds and the zone. A Distributor Module is then used to connect from 18mm Alupex to either one or two 14mm Fastflo pipes. Refer to the A3 Floor Constructions in the A3 System Specification for details.

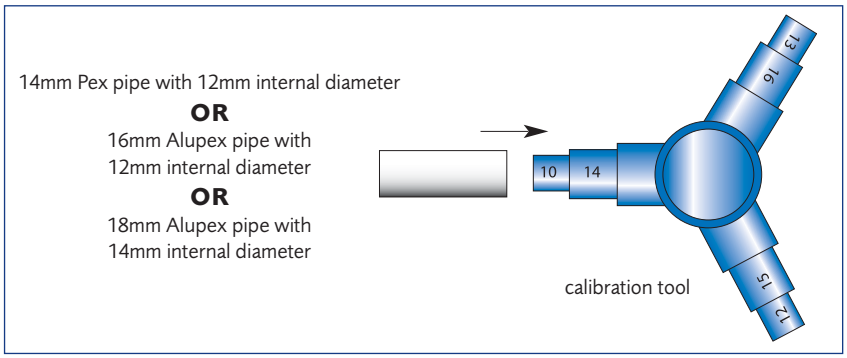
The 18mm pipe should follow the easiest, most direct route. Where appropriate it should be tracked into the insulation below the Fastflo tube using a router..

This 18mm pipe can be carefully bent to form curves of approximately 100mm radius. If right-angle elbows are required for tight turns, they can be purchased from Nu-Heat.

For systems using only plastic(PeX) pipe, if this is to be routed through a stud wall then a metallic tape should be located along the same route to make the pipe traceable. The tape is best attached to the wall behind the pipe, rather than to the pipe itself, as some adhesives affect the material properties of the pipe.

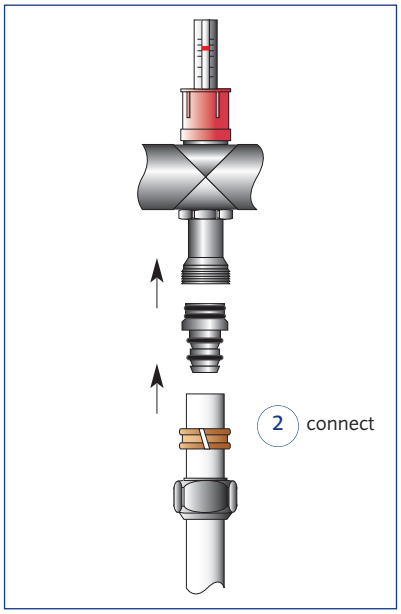


1.7 Connecting to the Optiflo Manifold



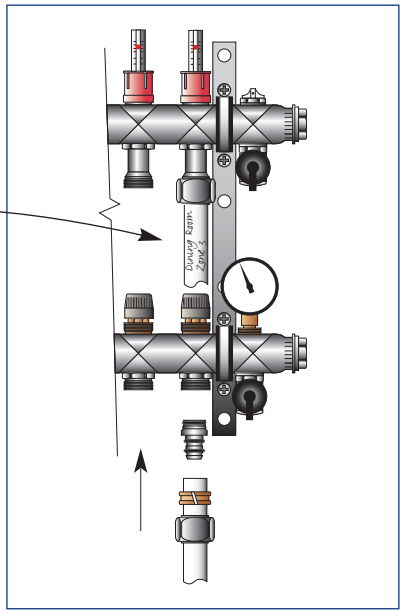
1. Re-shape the ends of the pipe using the calibration tool, opening out the ends to allow fitting of the insert without displacing the O-rings.

Note: Do not forget to place the nut and olive over the pipe before fitting the insert.



2. Connect the flow pipe to the ports on the upper manifold with the fittings supplied. It is important to make sure that the pipe is securely located. Make sure that the fitting has grasped properly by pulling the pipe.
Note: If necessary, remove the lower manifold to make access easier when fitting the pipe to the upper manifold.

3. Important: It is critical to clearly mark each pipe with its correct zone number and room name with the marker pen provided. The electrician will need this information to wire the system correctly. See the A3 Manifold & Zone Information for more information.



4. Re-attach the lower manifold to the fixing brackets (if removed).

5. Connect the return pipe to the correct ports in the same way.

2.1 Installation details

For installation details referring to the specific floor types and underfloor heating tube layouts within your property, please refer to the A3 Tube Layouts and A3 Floor Constructions at the beginning of this folder.

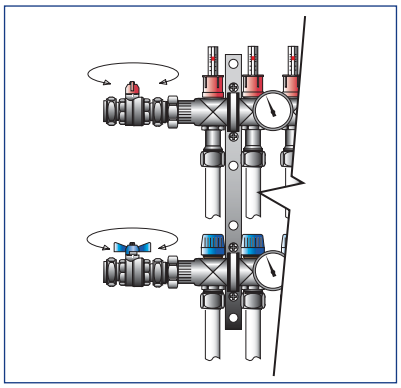
2.2 Filling, flushing and pressure testing room zones

Pressure testing room zones

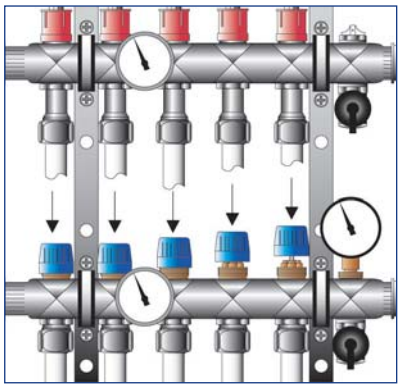
Zones must be pressure tested prior to screeding or covering the tube. Follow the full procedure for each zone and for each manifold assembly.

Note: Any unused ports on the Optiflo manifold can be isolated for future use by using the blue cap to close the return and the screwing down the flow adjustment on the supply manifold.

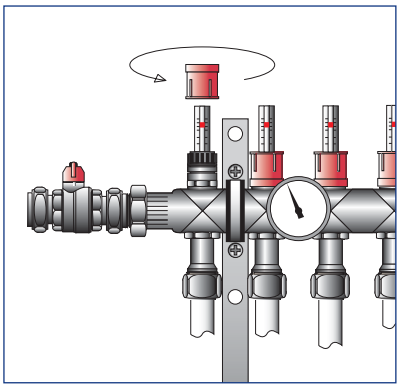
Filling, flushing and pressure testing



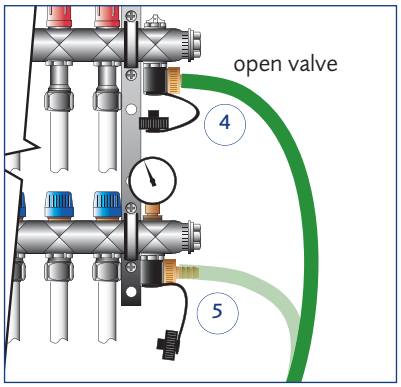
1. Close the isolating ball valves that are connected to the manifold



2. Isolate all zones by screwing down all the blue protection caps hand tight.

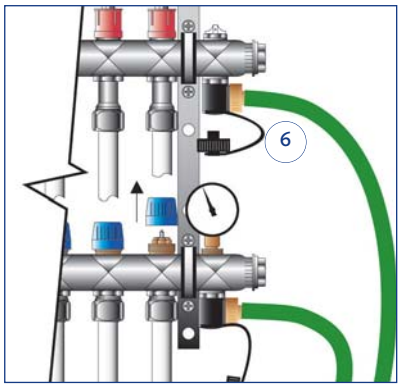


3. Fully open all the flow adjusters on the supply (top) manifold by lifting the red locking collar which may then be used to turn the black collar fully anti-clockwise.

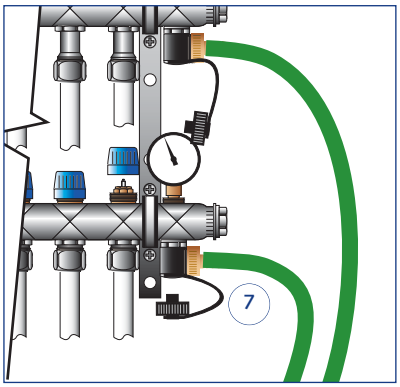


4. Remove the blanking cap from the filling valve on the flow (upper) manifold. Fit the hose connection nozzle (from the *tools and accessories pack*), and connect a suitable hose from the mains water supply. Open the filling valve using key on the blanking cap.

5. Similarly fix a suitable hose to the drain valve on the return (lower) manifold.

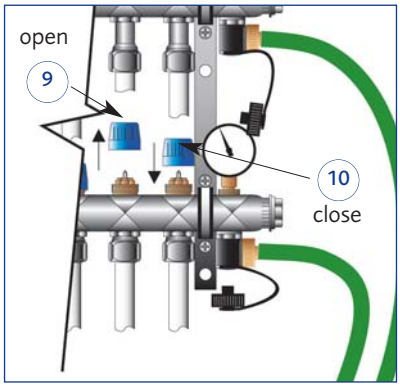


6. Fully loosen the protection cap from the first zone to be filled.



7. Open the tap on the mains water supply and open the drain valve on the return (lower) manifold using key on the blanking cap.

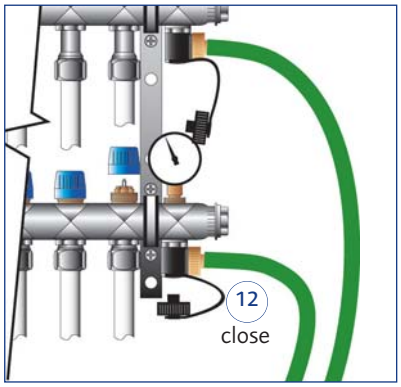
8. Run the water until all air is expelled from the pipe. This will take approx. 5 minutes.
Tip: If the outflow is run into a bucket then air bubbles will be detectable.



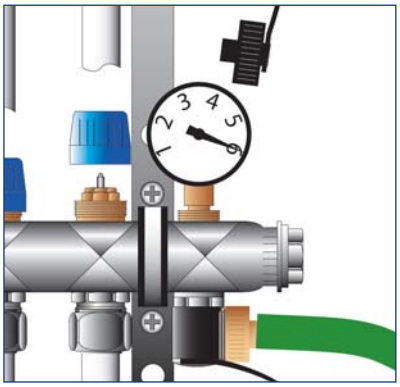
9. Open the next zone.

10. Close the flushed zone.

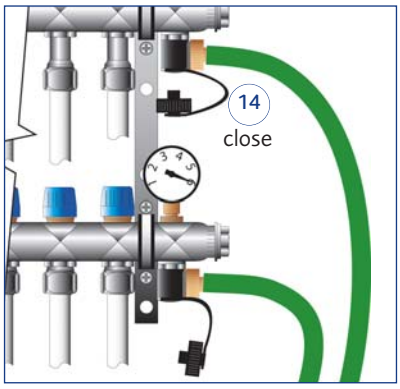
11. Repeat steps 8 – 10 for all zones on each manifold.



12. Close the drain valve on the return (lower) manifold.

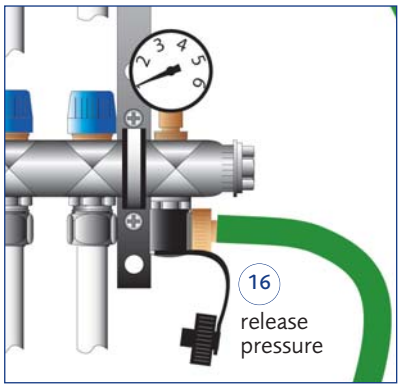


13. Allow the pressure to rise to a maximum of 6 bar



14. When the correct pressure is reached, close the filling valve.

15. All zones are now fully pressurised and should be left for at least 8 hours. Due to expansion and air temperature variations, a pressure drop of up to approximately 0.5 bar may occur. If greater pressure drops are experienced, thoroughly check all pipes and joints for evidence of water loss. If none is found, there may still be air in the system and the filling and flushing procedure should be repeated.



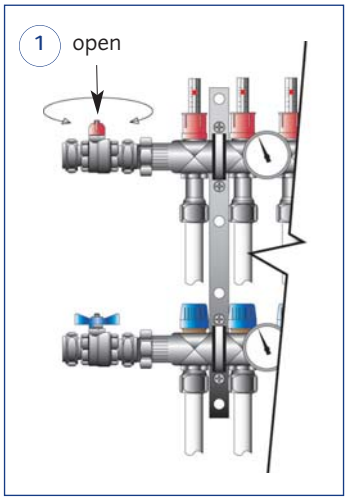
16. After testing, reduce the pressure to 1 bar-static by releasing the water from the drain valve on the return(lower) manifold.

Note: The floor heating tube must be left under pressure whilst floors are screeded. 1 bar is sufficient.

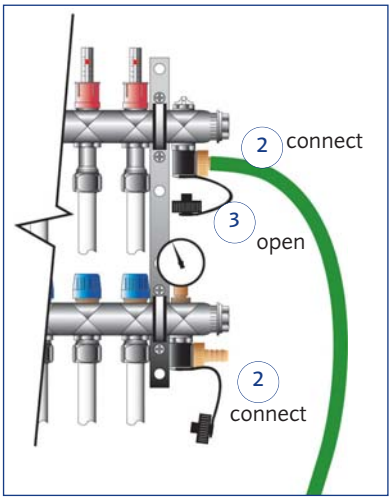
2.3 Filling the heat pump, hot water cylinder (if fitted) and system heating pipework

Filling the heat pump

Close the valves on the manifolds. Fill the heat pump and hot water cylinder (if fitted) whilst venting the system and following the heat pump manufacturer's instructions. The system should be cleansed and flushed in accordance with BS7593:1992 to remove all flux residue and other debris.

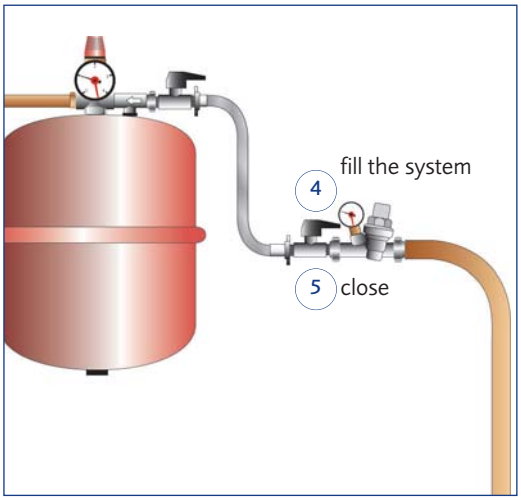


1. Open the flow isolation valve.



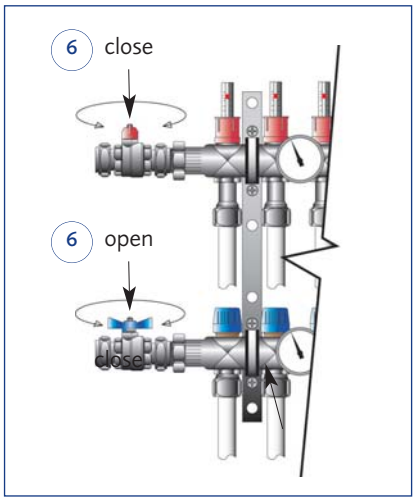
2. Connect a suitable hose to the drain cock on the flow (upper) manifold.

3. Use the cap end to open the drain cock on the flow (upper) manifold.

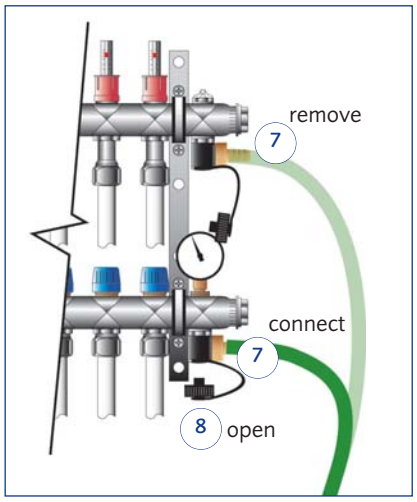


4. Fill the system via the boiler filling loop and run water through until the flow from the drain hose is free from air bubbles.

5. Close the boiler filling loop and drain cock.



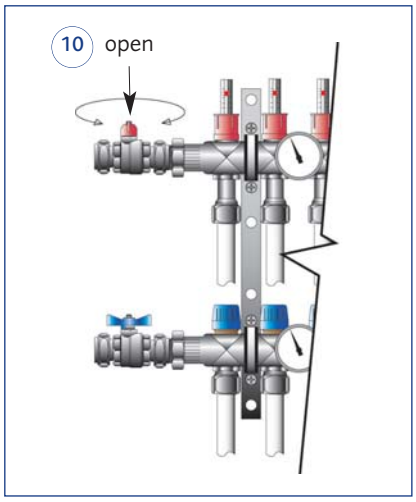
6. Shut the flow isolation valve and open the return valve.



7. Remove the hose from the upper drain cock and connect it to the return (lower) drain cock.

8. Use the cap end to open the drain cock on the return (lower) manifold.

9. Repeat steps 4 and 5.



10. Open the flow isolation valve.

11. Repeat steps 1 to 10 at each manifold that is fitted with a Direct Mounted Pump Module.

Note: **The system cold working pressure is 1.0 bar.** When the system pressure has been set, isolate the filling loop and disconnect in accordance with water authority regulations.

2.4 Setting flow rates and Commissioning

Before starting check that:

1. The heating and hot water system is fully operational and the boiler has been commissioned.

2. Screed floors have been left to thoroughly dry out. The drying process depends on screed type and thickness, (please refer to BS8204), but allow a minimum of four weeks. The floor heating should not be used to accelerate the drying process.

3. All underfloor zones served by the manifold have been filled, flushed and pressure tested. See Section 2.2.

4. The heat pump and primary flow and return have been filled, flushed, cleansed and vented. See Section 2.3.

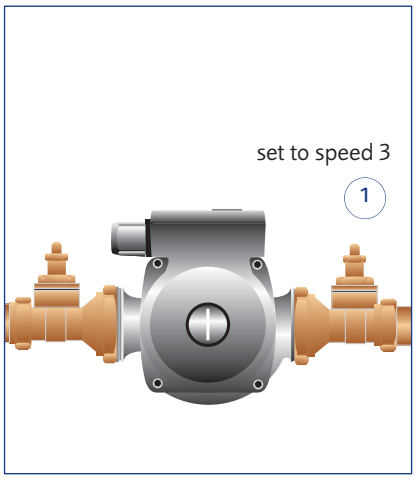
5. All electrical work associated with the heating system is complete and actuator heads are fitted. (where appropriate – see A3 Manifold & Zone Information for specific information)

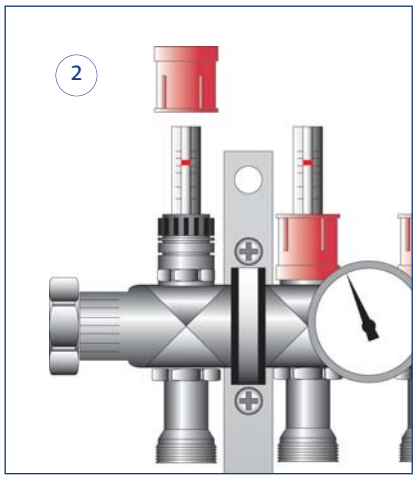
6. The system static pressure is set at 1 bar when cold or approximately 1.5 bar when hot.

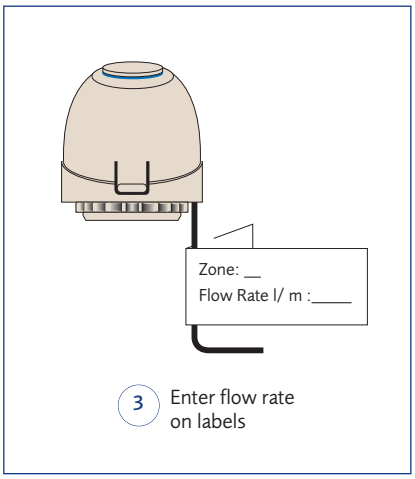
7. The main manifold isolating valves are open.

8. All pipes entering the manifold assembly have been clearly marked with their zone number and name as detailed on the system design.

9. All actuators cables have been similarly labelled.







To set the flow rates

1. Set the floor heating pump to speed 3 (where fitted) and start by turning up all the room thermostats (where fitted). Make sure all zones are flowing. When there is water circulation the flow marker drops to indicate flow in the flow gauge and the indicator on top of the actuator head (if fitted to thermostat zones) stands proud. There is a 3 minute delay before the actuators open fully.

2. Starting with the zone needing the least flow, lift the red locking collar around the flow gauge, reverse it and use it to turn the black nut. Turn the nut anti-clockwise to increase flow or clockwise to decrease the flow. Following the flushing procedure the valves are likely to be fully open. Replace the red locking collar.

Each zone has a specific flow rate which is detailed on the A3 Manifold & Zone Information. Settings detailed are balanced to allow for an even rate of heating. The setting should be gauged as closely as possible to the design value.

3. If removed refit the correct actuator onto each valve. Enter the flow rates on the labels provided. It is essential that actuators and zone pipes are correctly labelled. The room thermostat must control the actuator on the pipe serving that zone.
Note: Open circuit zones also need to be marked with the relevant flow rate and room name.

To set the temperature

Refer to the *Heat Pump Installation* manual, and the design flow temperature stated.
Note: for screed floors set the water temperature at minimum for the first three days.

Commissioning

The system must now be thoroughly checked in accordance with the Commissioning Checklist and Warranty Application form in the Commissioning Pack. This must be fully completed during the commissioning process and returned to Nu-Heat for registration.

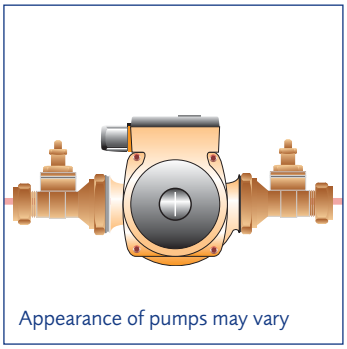
No warranty can be issued without the return of the completed Commissioning Checklist to Nu-Heat.

Installing the inhibitor

As soon as the commissioning is completed an inhibitor must be introduced into the heating system. For continued long-term protection the system inhibitor levels should be checked annually. The system pressure vessel and 3 bar safety must also be annually checked and serviced where required both on the primary heat pump side and on the domestic potable hot water cylinder side of the system.

3.1 Aquastar hot water loop

The Aquastar4 instant hot water loop may be used with many modern hot water cylinders to give hot water at the taps without delay. The hot water loop will remain hot as dictated by the timer settings. Hot water drawn outside of the set times will take time to flow hot, as if the hot water loop were not present. The Aquastar hot water loop provides the ideal basis for the connection of towel rails throughout the house as very little extra plumbing is required. Heat for the towel rails is drawn from the existing heat reservoir in the hot water cylinder, usually without the need to bring on the heat pump.



Appearance of pumps may vary

Notes:

The Aquastar hot water loop is only suitable for mains pressure hot water cylinders. Check that the installation of a pumped hot water loop is consistent with local water bye-laws.

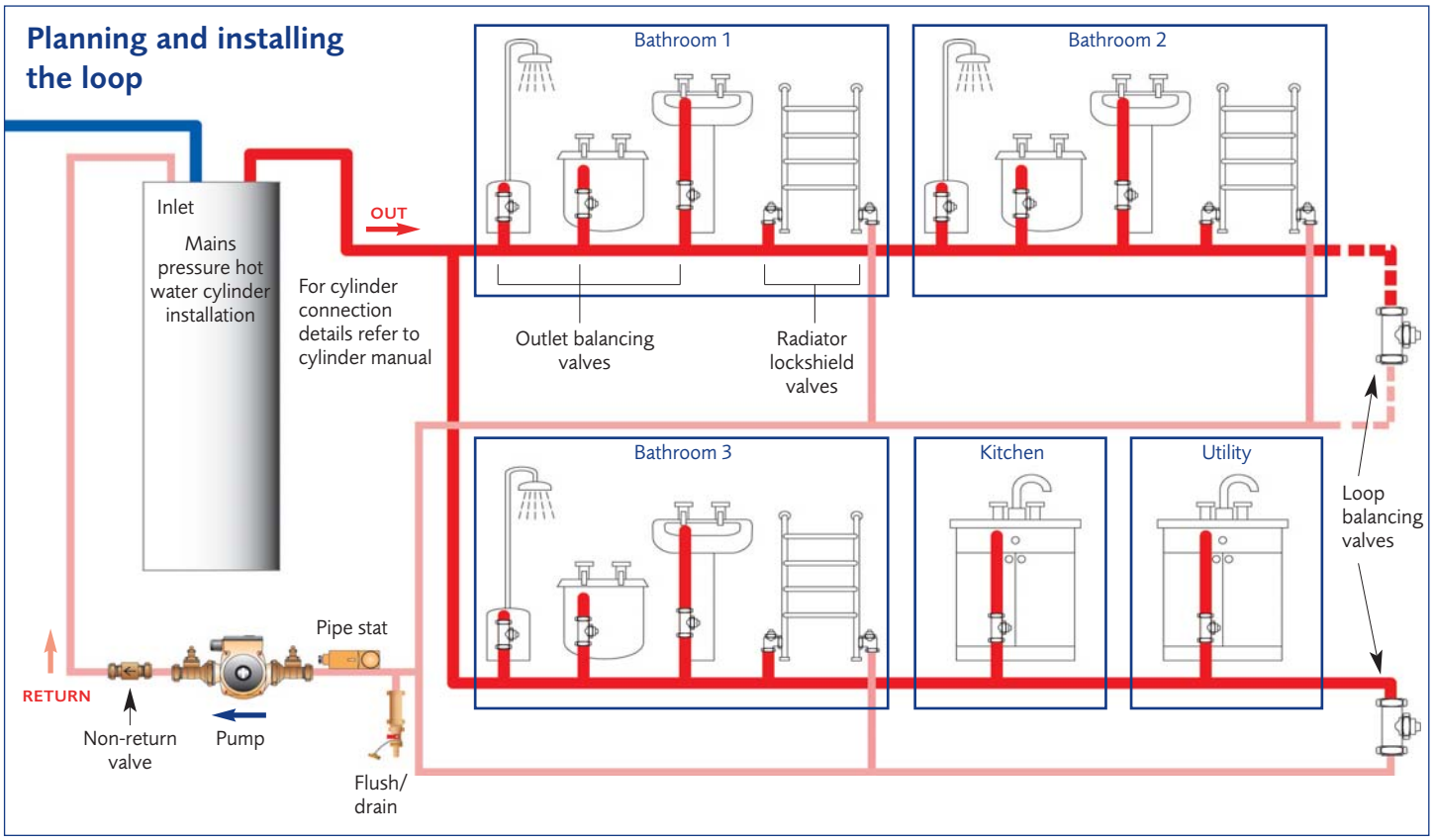
As the towel rails are heated by mains water they must be stainless steel or non-ferrous to prevent corrosion. The total output from all towel rails connected to the hot water loop must not exceed 5000 watts. Please contact Nu-Heat if the total output will be greater.

The temperature of the loop, and therefore of the towel rails, is thermostatically controlled to prevent scalding. This is achieved by a pipe-mounted thermostat that should be fitted near to the pump.

The return temperature of the hot water loop should be 50°C or greater in accordance with BS6700 and the HSC's *Legionnaires' disease: The control of legionella bacteria in water systems – Approved Code of Practice and Guidance*. If the temperature of circulation necessary to achieve this poses a significant risk of scalding then the temperature should be blended as close to the outlet as possible.

The hot water loop should be run throughout the year. If it is inactive for more than a week there is a risk of bacterial growth, such as legionella.

Planning and installing the loop



Careful thought should be given to the layout of the hot water loop and the fittings used on it. Flow pipework to bathrooms should be sized according to the hot water requirements of the household. Typically a small to medium sized installation will require 22mm flow pipework, a large installation may require 28mm or greater. 22mm pipe may be used for the last 2 metres where the pipe connects to the Aquastar4 pump. Individual hot water outlets should be fitted with flow-limiting valves to prevent unnecessarily high water flow rates affecting the water pressure at critical points such as shower units. It is recommended that only lockshield valves are used with towel rails on a secondary hot water loop. Towel rails should not be isolated from the loop for any significant amount of time (more than a few days) or there is a risk of bacterial growth, such as legionella. Fit a balancing valve or towel rail at the farthest end of each loop. If bathrooms are to be connected to the hot water loop in parallel, balancing valves must be fitted on each leg so that balancing between bathrooms can be effective (see illustration). **The hot water flow and return pipes should be insulated to prevent unwanted heatloss. This is particularly important where hot pipes run alongside the supply pipes to cold tap.**

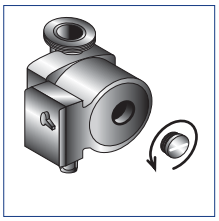
4.1 Problem solving – underfloor heating

Problem: Electrical components not operating

Solution: Please refer to the *Electrical Checklist* in the electrical manual to confirm the system and system components are wired correctly.

If the component still fails to work it should be replaced.

Problem: No flow rate at the Optiflo manifold



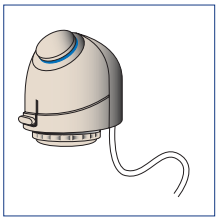
The air vent can be removed to check impeller rotation

Solution: Is there flow to any zone?

No – Check the pump and replace if faulty.

Yes – Are the actuators open?

No – Check the actuator lead is properly connected to the Optiflo wiring board.



The blue button will pop up when open

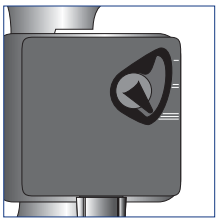
Yes – The ufh tubes may be air-locked – fill and flush the system again.

Check flow regulating valves have been opened.

The ufh tubes may be wrongly connected, ie, flow to flow and return to return with no circulation – reconnect correctly.

The ufh tube may be kinked – investigate and correct.

Problem: Low flow rate on the Optiflo manifold



The pump should be set to speed 3

Solution: Check – the pump is set to speed 3 and is circulating in the correct direction.
Note: if an additional heating pump is fitted in the heat pump, check this also.
Check – the ufh tube for air locks, wrong connections or kinks as above.

Following adjustment, are the design flow rates correct for the majority of zones?

No – Please contact Nu-Heat Technical.

Yes – Turn off all the zones, turn on one low flow zone.
Can the correct flow be set?

No – The ufh tube is air locked, kinked or wrongly connected.

Yes – Try each zone singularly in turn and re-balance all the flow rates. If all the design flow rates are still unachievable consult Nu-Heat Technical.

Problem: Low water temperatures on the Optiflo manifold

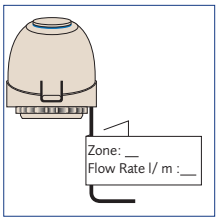
Note: Systems with weather compensation – full water temperature will only be achieved during periods of cold weather.

If the water temperature is insufficient to provide comfortable heating, turn up the heat pump flow water temperature. (Refer to manufacturers instructions).

If there is more than 15°C difference between the design flow temperature and the return temperature allow more time for warm up and then, if necessary, increase the flow rates.

4.1 Problem solving – underfloor heating, continued

Problem: No heat to one zone



Actuator heads must be correctly labelled

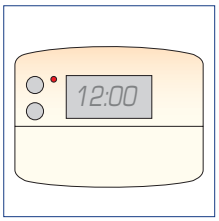
Solution: Is hot water flowing to the zone?

No – Check the electrics, flow rates and flow temperatures as detailed above.

Yes – The zone actuator heads are fitted to the wrong zones.
To check connections are correct:

- Turn all room thermostats down to 5˚C,
- Check one zone at a time (all other zones must be off),
- Turn the thermostat in the zone up high,
- If another zone is getting warm it indicates that the actuator controlled by the thermostat is probably fitted to the wrong zone valve,
- Continue to test all other zones and move actuators to their correct positions,
- Re-label actuator heads when you are happy that they are correctly connected.

Problem: Low heat to one/several zones



Adjust timeclock settings or programmable thermostat

Solution: Is the flow rate and temperature correct?

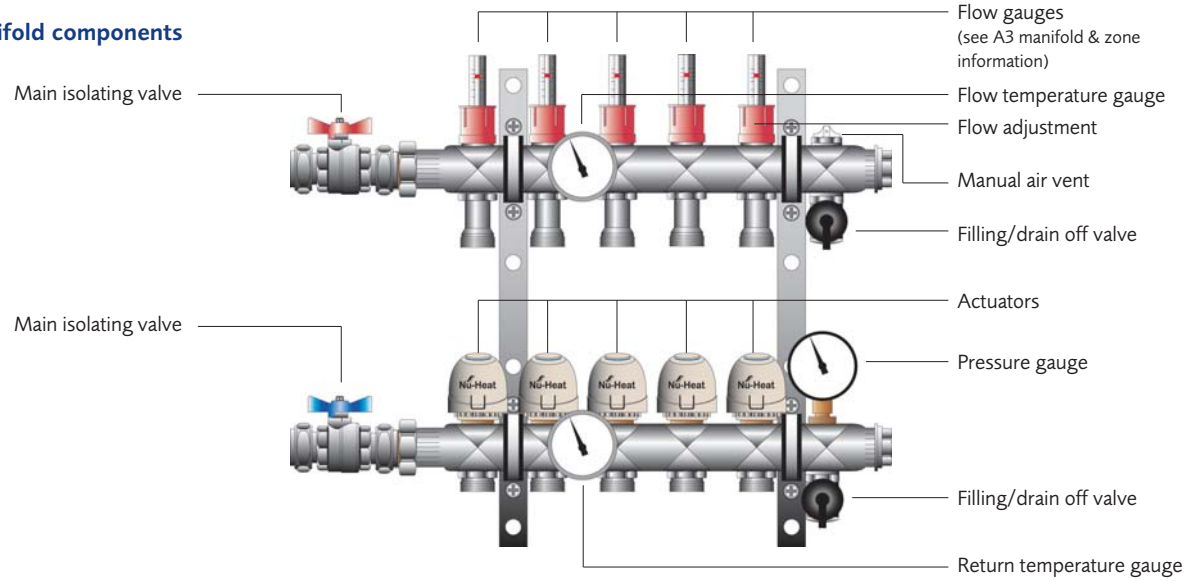
No – Check the flow rates and flow temperatures as detailed above.

Yes – Increase the flow rate to the maximum possible (see diagram below).
If the room(s) have a high heat loss, ie. a lot of external walls and windows, the timeclock settings may be insufficient to allow for extended warm-up times. Set the timeclock to turn on earlier.

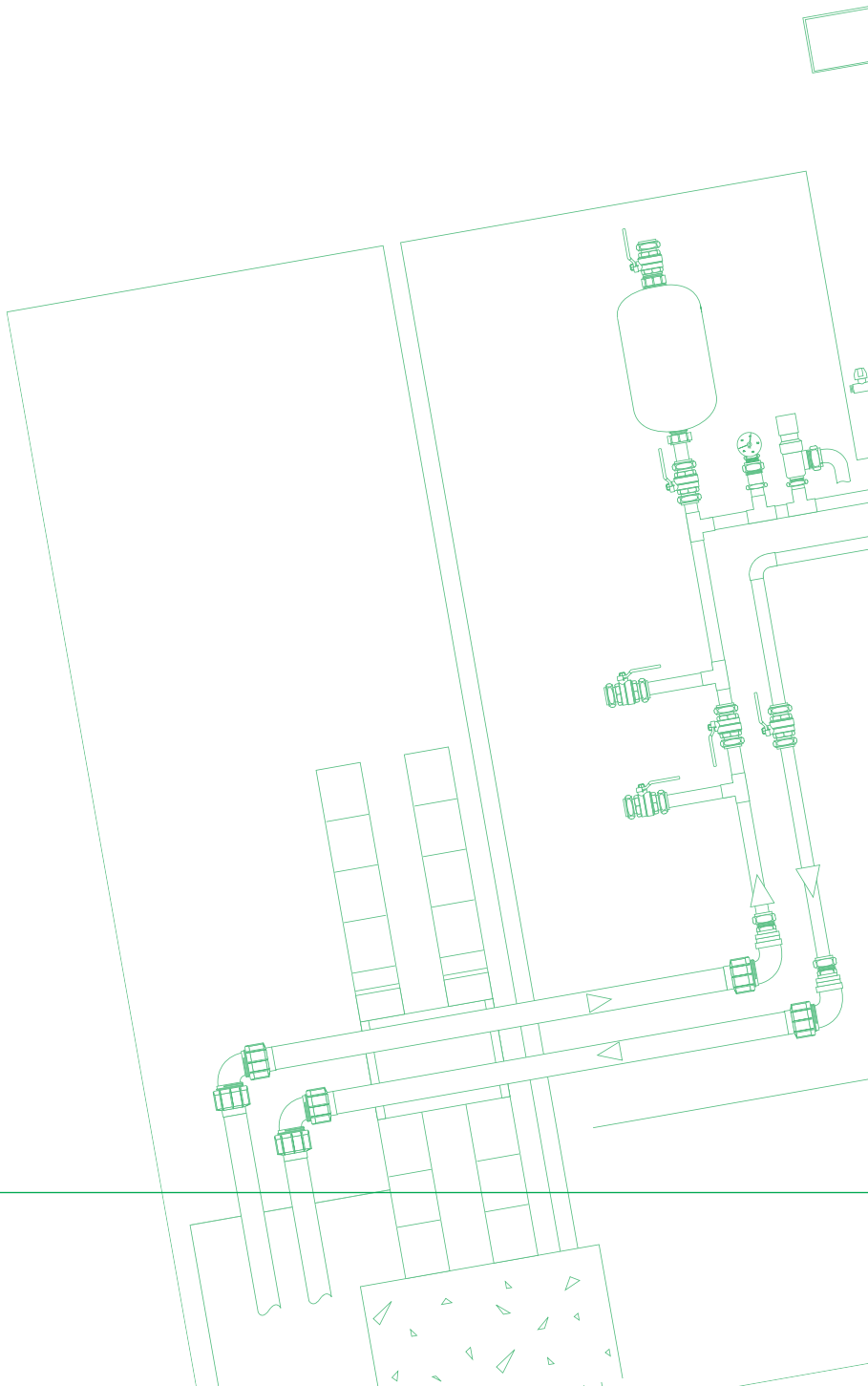
If the problem persists increase the flow temperature (see diagram below); do this gradually as excessive temperatures may damage natural flooring and tiles.

If problems are still experienced after following the above instructions, please contact Nu-Heat Technical.

Manifold components



If there is any aspect of the installation that you do not understand, please contact Nu-Heat Customer Support for advice.



Nu-Heat
UNDERFLOOR & RENEWABLES

Heathpark House, Devonshire Road
Honiton, Devon EX14 1SD
Tel: 01404 549770
Fax: 01404 549771
Web: www.nu-heat.co.uk
Email: ufh@nu-heat.co.uk