Nu-Heat
UNDERFLOOR & RENEWABLES

ClipTrack® Screed OneZone®

installation manual

UNDERFLOOR HEATING
HEAT PUMPS
SOLAR THERMAL

working with you before, during & after your project

Nu-Heat Know-How

Contents

System Ref: _____

Installation manual – Nu-Heat OneZone® for screed floors with warm water underfloor heating

Congratulations on buying a Nu-Heat OneZone® underfloor heating system, which has been designed to make installation as simple as possible. Please read this manual fully before fitting. It assumes a basic knowledge of plumbing and electrical work, and of common terms used. If you are unsure you should consult Nu-Heat's Technical Support team or a qualified tradesperson.

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

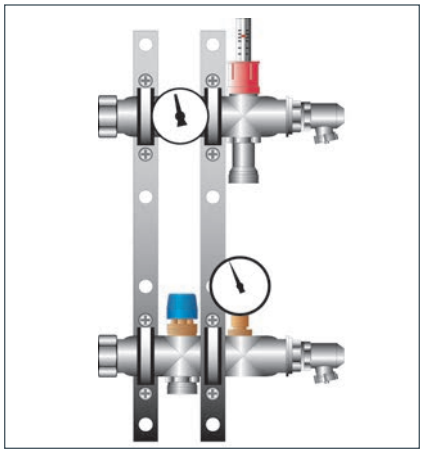
In line with the company policy of product development, Nu-Heat reserves the right to supply different components to those shown.

Please ensure that this manual remains with the homeowner when installation is complete.

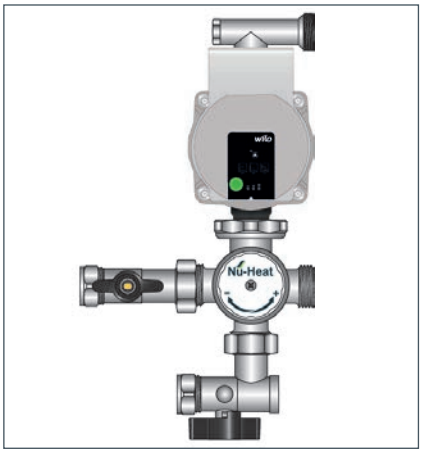
TAKING DELIVERY

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

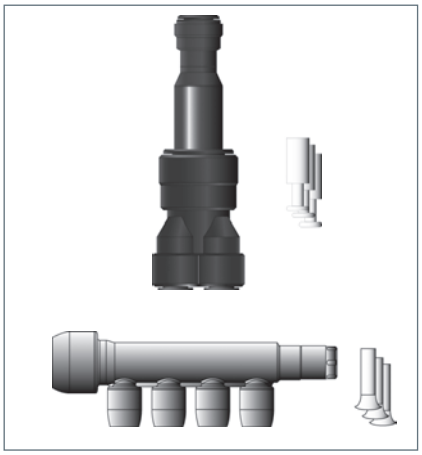
System components



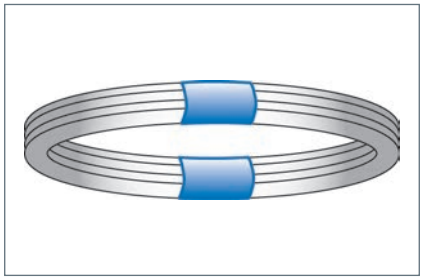
OneZone® manifold



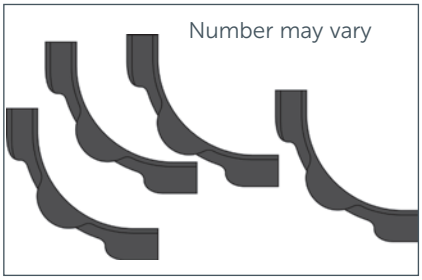
Pump and blending valve assembly



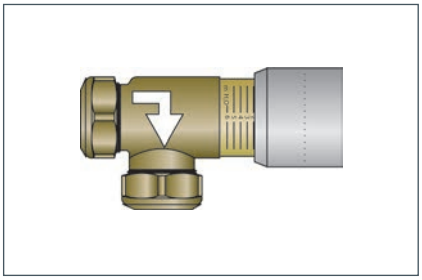
Distributors and blanking plugs



10mm Fastflo® floor heating pipe

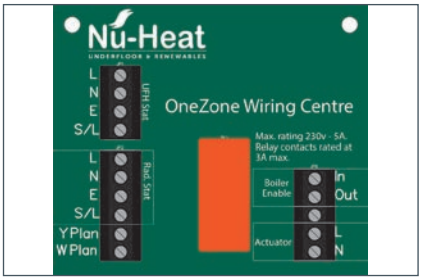


Pipe guide curves (<35m² kits)



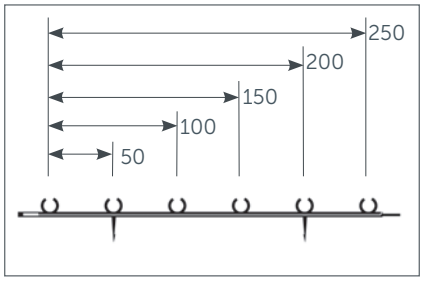
Automatic bypass valve

Edge expansion strip



OneZone® wiring centre

Programmable thermostat or wireless programmable thermostat



ClipTrack

Optional de-coupling membrane
For use with ceramic tiles and natural stone products. This can be purchased from Nu-Heat through the webstore or by telephone.

Preparation

Some preparation works are is required before starting, to ensure a successful installation

BOILER SIZING

A screed floor OneZone® system produces a heat output up to 124W/m². You must ensure your boiler has enough spare capacity for the additional heating load.

It is likely that the existing domestic heating boiler will have sufficient capacity to cover the extra load the floor heating zone requires. As a general rule-of-thumb the maximum heat input equates to 100 watts per m² of floor area; for example, a 20m² room would require 2000 watts (2kW) of heat from the boiler. If in doubt, a heating engineer should be able to check heat losses for the property and calculate spare boiler capacity.

Before installation of the OneZone® it is the responsibility of the homeowner/ installer to check the heat loss of the room in order to confirm that the UFH will meet the heating requirement taking into account the chosen floor finish and flow temperature.

OneZone® SCREED FLOOR HEAT OUTPUT TABLE

Flow water temperature	Carpet & underlay – 2 tog	Engineered hardwood	Tiles
40 °C	39 W/m²	41 W/m²	66 W/m²
45 °C	50 W/m²	54 W/m²	85 W/m²
50 °C	61 W/m²	67 W/m²	104 W/m²
55 °C	72 W/m²	80 W/m²	124 W/m²

FLOOR HEIGHTS

Check that the subfloor has sufficient height above it to incorporate the underfloor heating plus any floor covering. Consideration should also be made as to how the transition from the existing floor covering to the new floor covering will be made.

First fix system configuration

There are different ways to connect OneZone® to your existing heating system. Decide which is right for your installation before commencing work.

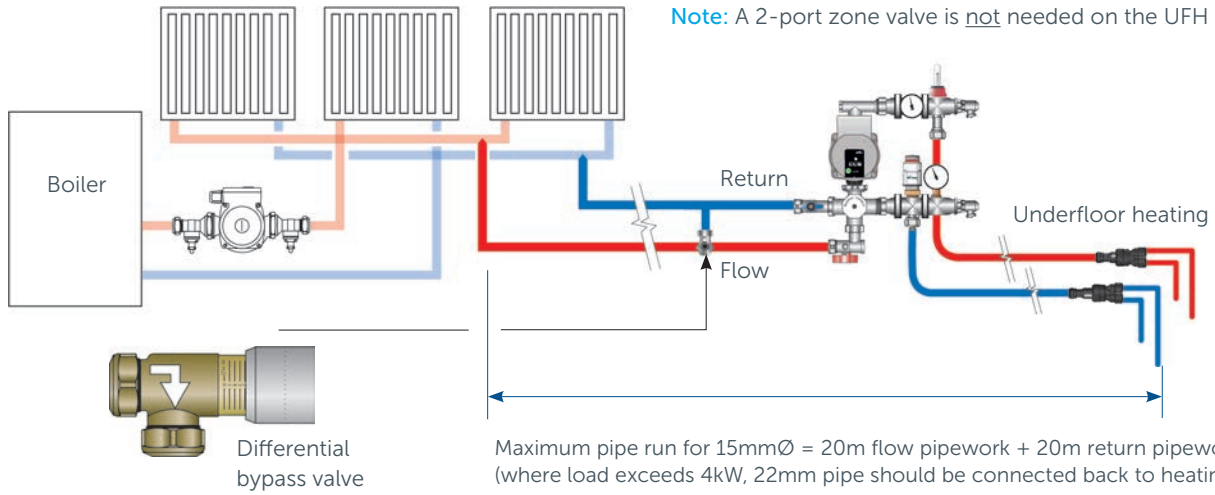
A – Connection to the radiator circuit
New pipework to OneZone® is connected at a convenient point in the radiator circuit. This means that heating times for OneZone® must correspond to those for the radiator circuit. Heating times for the whole system may have to be altered to allow for the longer warm-up time of underfloor heating compared to radiators and set-back operation will not be possible.

↓

Refer below for plumbing connections.

No direct control of the boiler

A – RADIATOR CIRCUIT CONNECTION – NO DIRECT CONTROL OF THE BOILER



Note: A 2-port zone valve is not needed on the UFH circuit.

Maximum pipe run for 15mmØ = 20m flow pipework + 20m return pipework (where load exceeds 4kW, 22mm pipe should be connected back to heating pipework of the same 22mmØ – not 15mmØ pipework). Where flow and return supply pipework exceeds these lengths the pipework should be increased to 22mm diameter.

DIFFERENTIAL BYPASS VALVE

The differential bypass valve should be fitted between the flow and return supply pipes, before the pump and blending valve assembly and as close as possible to it. It should be set to 0.5 bar (marked 5 on valve).

Note: The direction arrow must point from flow to return.

B – Connection at the boiler

This arrangement gives optimum performance. It allows time and temperature settings for OneZone® to be independent of other areas of the home. It also enables use of a set-back temperature to reduce warm-up times. Pipework is connected on the boiler side of any control valves.

What type of heating system do you have?

Combination boiler	Boiler & cylinder	Don't know
See below for plumbing connections.	What type of system control do you have?	Please consult your heating engineer or electrician.

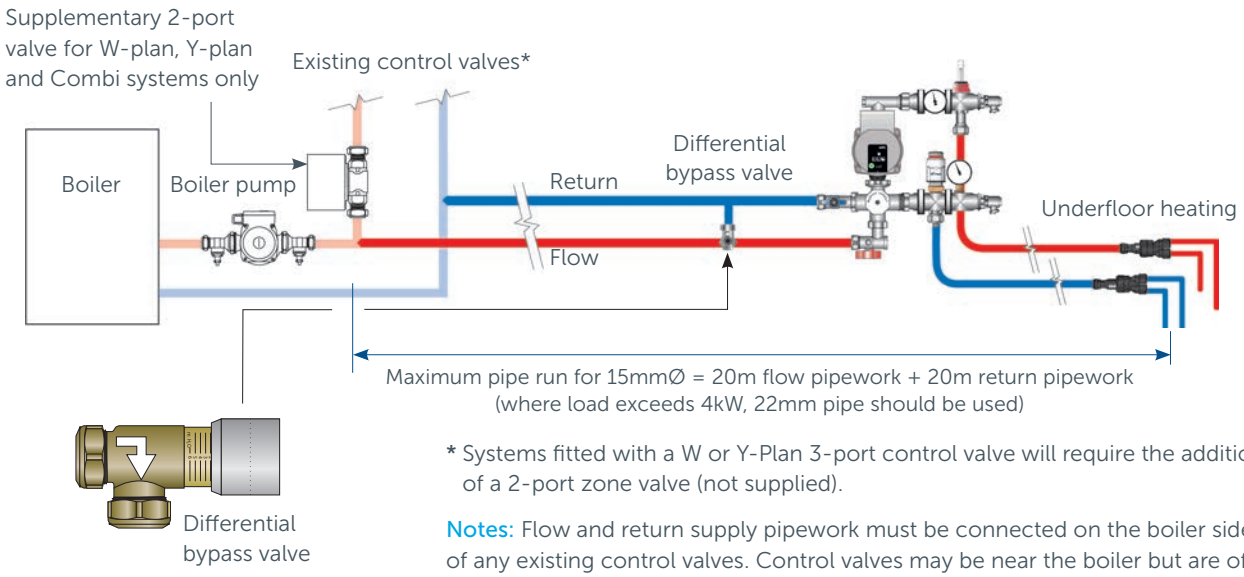
S Plan
The system has two 2-port zone valves, one controlling the radiator circuit and the other controlling the cylinder. See below for plumbing connections.

W or Y Plan
The system has a 3-port zone valve controlling both the cylinder and radiator circuits. This system type requires an additional 2-port zone valve to be fitted. See below for plumbing connections.

For details of wiring connections for all configurations, please refer to the *OneZone® Electrical Manual* supplied with your system.

Direct control of the boiler

B – DIRECT BOILER CONNECTION – DIRECT CONTROL OF THE BOILER



* Systems fitted with a W or Y-Plan 3-port control valve will require the addition of a 2-port zone valve (not supplied).

Notes: Flow and return supply pipework must be connected on the boiler side of any existing control valves. Control valves may be near the boiler but are often positioned in the cylinder cupboard.

A 2-port zone valve is not needed on the UFH circuit.

DIFFERENTIAL BYPASS VALVE

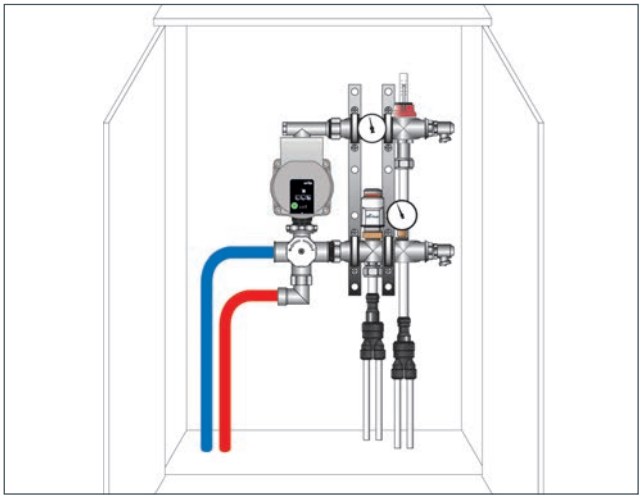
The differential bypass valve should be fitted between the flow and return supply pipes, before the pump and blending valve assembly and as close as possible to it. It should be set to 0.5 bar (marked 5 on valve).

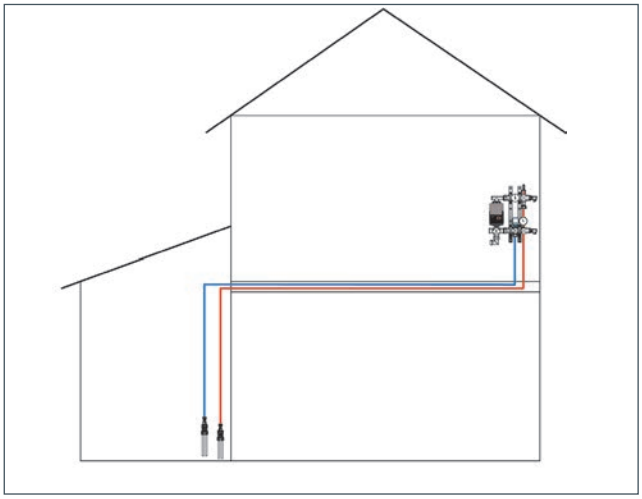
Note: The direction arrow must point from flow to return.

The manifold

POSITIONING

The manifold assembly can be installed in or near the room in which you are installing the underfloor heating, or remotely in a position that suits your property. The pump and manifold assembly have been designed to be low in profile and as small and compact as possible, this enables installation into tight spaces.





Internal cupboard dimensions (mm) should be no less than 450 wide x 600 high x 150 deep.

The OneZone® Pump Module will need to be connected to the flow and return central heating pipes, either off an existing radiator system or directly from the boiler prior to the existing control valves and this should be taken into account when considering position. The electrical control box should preferably be positioned near existing heating control equipment for '*direct boiler control*' setup or next to the pump for the '*no direct boiler control*' option.

When fitted vertically the manifold assembly should be fixed a minimum of 500mm off the floor. The assembly can be placed in an adjacent room if more convenient, and tube passed through the wall or floor; however the distance should not exceed 1 metre from the distributors to the room to ensure you have sufficient 10mm Fastflo® tube to complete the installation.

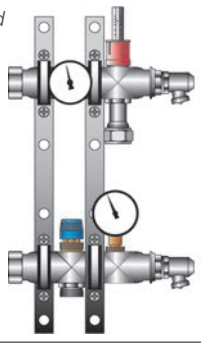
Note: The manifold brackets are designed such that one rail is offset for the pipes to pass behind it – the brackets should be orientated to take account of the direction of the pipes. The supply (flow) manifold must be the rail with the flow gauges.

The manifold is fed from the pump module and is connected to the captive nuts using the washers supplied to give a watertight seal. A proprietary sealing compound can be used in addition.

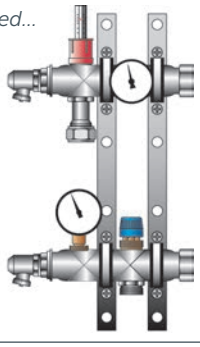
MANIFOLD ORIENTATION

OneZone® manifolds are supplied boxed and ready assembled, except for the temperature gauge, which must be pushed into the pocket on the flow manifold. However you may require to change the handing of the manifold.

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



or right-handed...



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

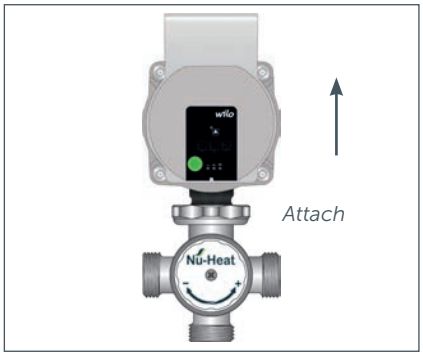
2 Remove the temperature gauge (this is a press fit), unscrew the boss, and the blanking screw on the reverse.

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

Assembling the pump module

The pump module can be assembled left- or right-handed to suit the project.

The pump module is supplied unassembled, however the packaging has been designed such that components are in their relative positions for connection to the left hand side of the manifold, in an exploded view style.

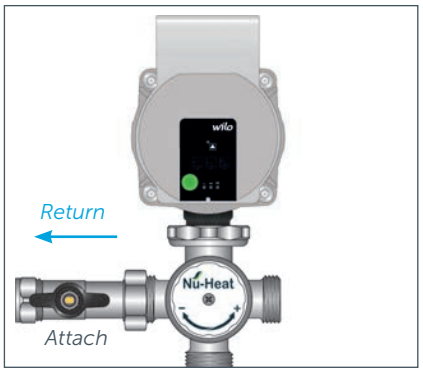


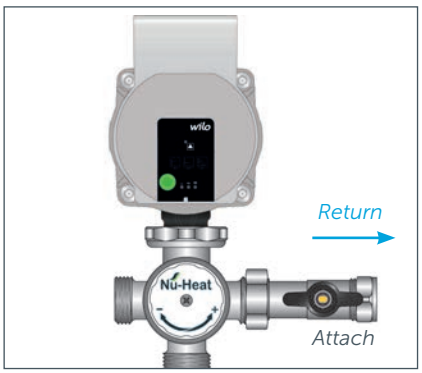
The first steps in the assembly of the pump module are independent of manifold orientation.

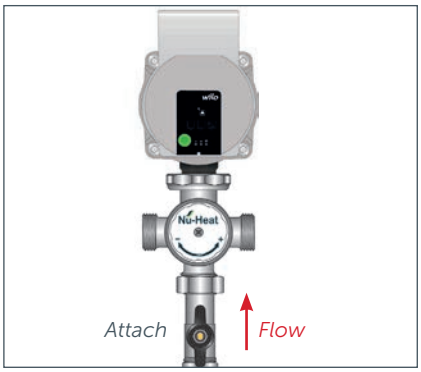
1 Note the direction of flow on the pump, indicated by an arrow on the cast body.

2 Attach the temperature blending valve to the input of the circulation pump using the valve's integral captive nut and the rubber washer.

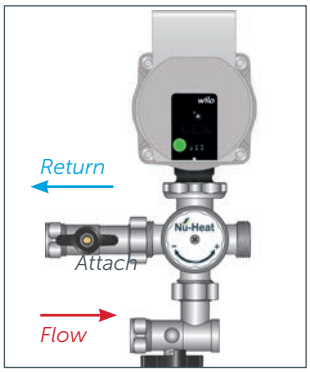
Alternative comnnection options for pipework

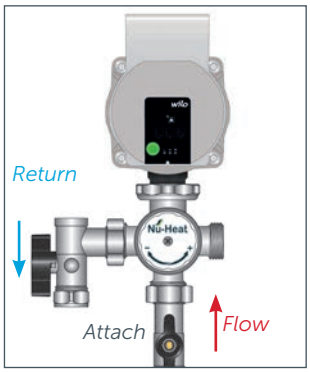


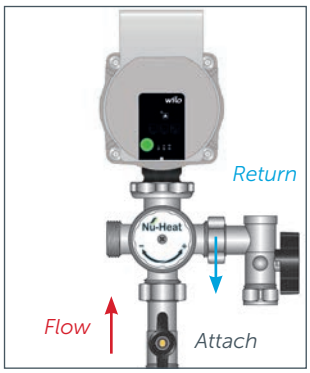


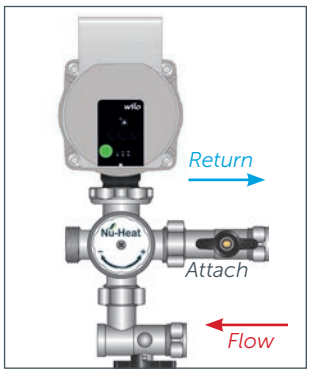


3 Take the straight isolating valve and attach to the left-, right-hand side or bottom of the blending valve as required.

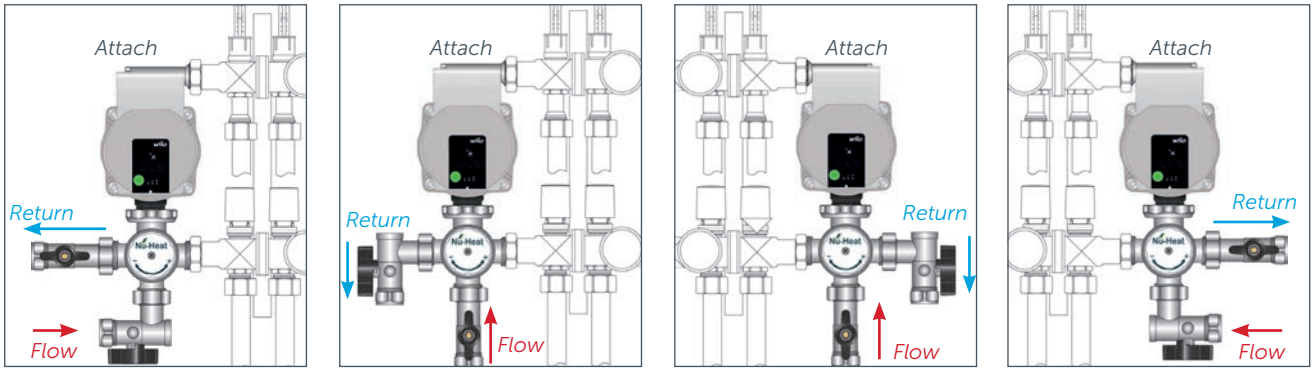








4 To the bottom of the temperature blending valve attach the elbowed isolating valve, using the attached captive nut and rubber washer provided. Note that the final position must be pointing the same direction as the previous straight valve.



5 Take the elbowed pump connector and attach this to the top of the pump with the free end pointing towards the opposite direction of the isolating valves.

6 Attach the manifold to the pump module making sure that the supplied washers are fitted. A proprietary sealant may be used in addition to this.

The isolation valves terminate in 22mm compression fitings to connect the flow and return pipes from the heat source.

Distributors

POSITIONING

Distributors can be fitted directly to the manifold assembly or positioned in, or very near to, the room being heated. The distance from the distributors to the room should not exceed 1 metre to ensure there is sufficient 10mm Fastflo® pipe to complete the installation.

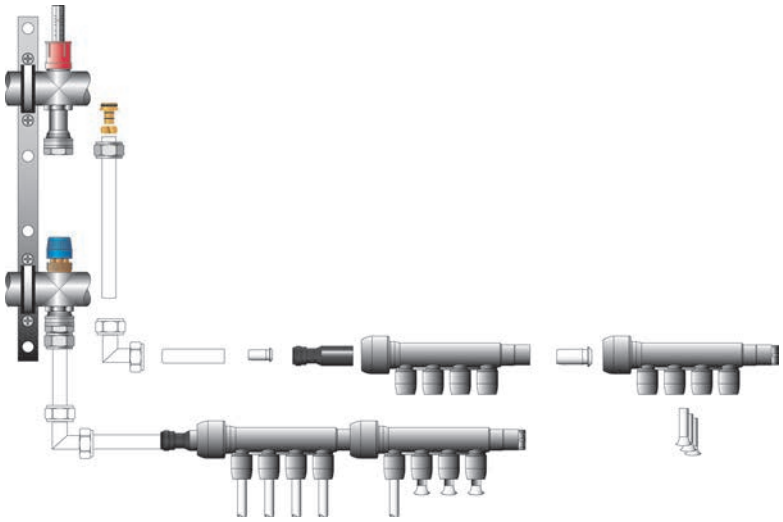
DISTRIBUTORS CONNECTED DIRECTLY ONTO THE PUMP MODULE

There are two ways of connecting Fastflo® to the Optiflo manifold.

- For OneZones® less than 35m², 4-port 'rocket' distributors are supplied for the 10mm pipe. Assembly instructions are in the following section.
- OneZones® of 35m² or over are supplied with 4-port 'in-line' distributors that join to make an 8-port assembly, as shown. Use either 15mm or 22mm plastic pipe and elbows instead (not supplied). In very large areas, positioning distributors centrally on a wall will make pipe connections easier.

OneZone® with 1-4 pipes

OneZone® with 5 or more pipes



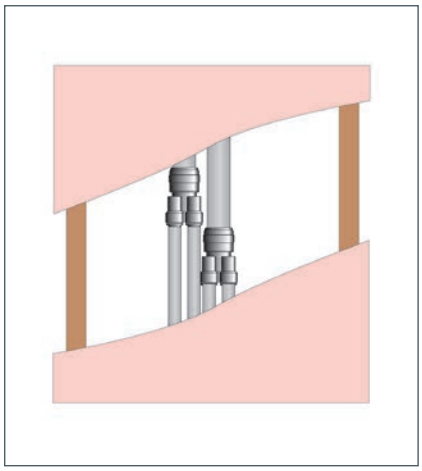
ASSEMBLY

Distributors are 4-port as standard. The number of ports can be reduced with the blanking plugs supplied. To remove blanking plugs, push the surrounding collar into the distributor and pull the plug out. In large zones requiring more than 4 ports the system will be supplied with distributors that can be fitted in-line using an insert as on following page.

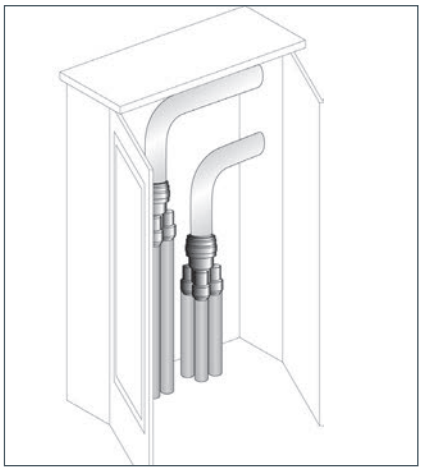
1. 15mm eurokonus fitting
2. 15mm pipe 280mm long
3. 15mm pipe 53mm long
4. 15mm pipe insert
5. 22mm x 15mm adaptor
6. Port splitter (4-way) 22mm x 10mm

Distributors may be positioned in a variety of places such as:

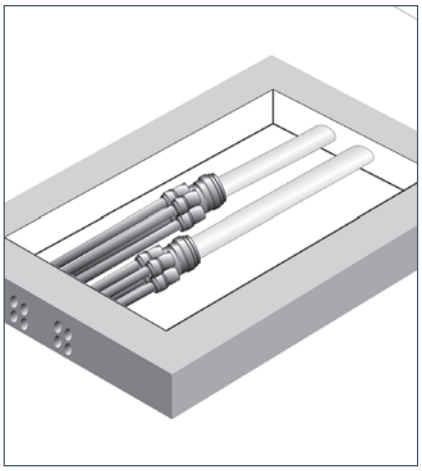
- In a studwork wall or other void such as a floor cavity,
- In an adjacent room, (in a cupboard, wall, or joisted floor cavity),
- In a cupboard.



Distributors can be placed in a studwork wall or other void with an access panel, ...



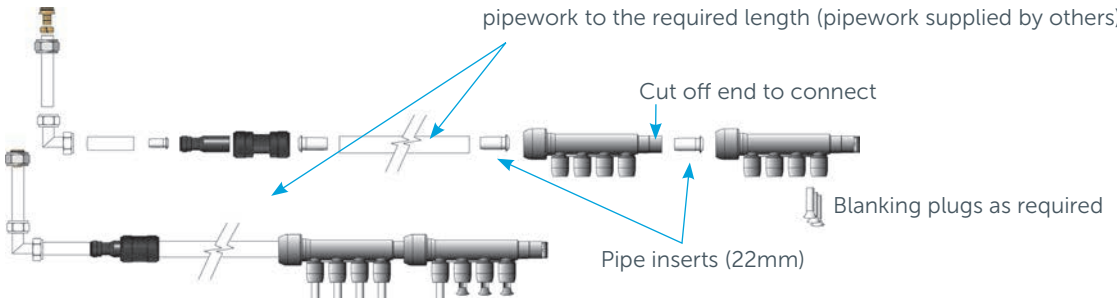
... in a cupboard ...



... or in a cavity constructed in the floor.

Note: The maximum distances and pipe sizing is given on pages 7 and 8.

The pipework between the manifold connecting pipe and the distributor can be extended with a component supplied and 22mm plastic or copper pipework to the required length (pipework supplied by others).

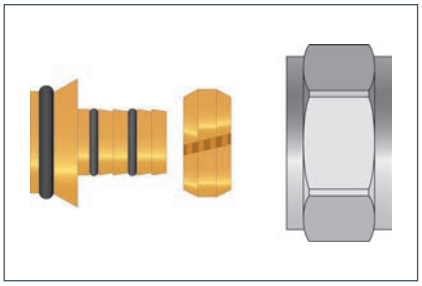


When mounting the distributors remotely and extending with 15 x 2mm pipe*, this is connected using the Eurokonus fitting supplied (see opposite).

If extending with 22mm pipe*, there is a fitting supplied with kits of 35m² and over to connect from the 15mm pipe stubs supplied to 22mm.

*Supplied by others

Note: In very large areas, positioning in-line distributors centrally on a wall will make pipe connections easier.



Eurokonus fitting supplied

Fastflo® – tube trimming chart

Installation of the pipe is done a coil at a time and it must be done with the length of pipe in mind. We have supplied lengths of pipe at pre-cut lengths, your system may require less pipe to cover your specific room area.

Please work out your actual room area in m^2 and refer to the table below for the required trim length for each coil.

Actual room area/kit size (m^2)		Amount of tube required (m)	Number of coils supplied	Trim each coil to: (m)
1	10	6.7	2 x 35m; use 1	6.7
2	10	13.4	2 x 35m; use 1	13.4
3	10	20.0	2 x 35m; use 1	20.0
4	10	26.7	2 x 35m; use 1	26.7
5	10	33.4	2 x 35m; use 1	33.4
6	10	40.0	2 x 35m	20.0
7	10	46.7	2 x 35m	23.4
8	10	53.4	2 x 35m	26.7
9	10	60.0	2 x 35m	30.0
10	10	66.7	2 x 35m	33.4
11	15	73.4	4 x 30m	18.4
12	15	80.0	4 x 30m	20.0
13	15	86.7	4 x 30m	21.7
14	15	93.4	4 x 30m	23.4
15	15	100.0	4 x 30m	25.0
16	20	106.7	4 x 35m	26.7
17	20	113.4	4 x 35m	28.4
18	20	120.0	4 x 35m	30.0
19	20	126.7	4 x 35m	31.7
20	20	133.4	4 x 35m	33.4
21	25	140.0	4 x 45m	35.0
22	25	146.7	4 x 45m	36.7
23	25	153.4	4 x 45m	38.4
24	25	160.0	4 x 45m	40.0
25	25	166.7	4 x 45m	41.7
26	30	173.4	4 x 55m	43.4
27	30	180.0	4 x 55m	45.0
28	30	186.7	4 x 55m	46.7
29	30	193.4	4 x 55m	48.4
30	30	200.0	4 x 55m	50.0
31	35	206.7	6 x 40m	34.5
32	35	213.4	6 x 40m	35.6
33	35	220.0	6 x 40m	36.7
34	35	226.7	6 x 40m	37.8
35	35	233.4	6 x 40m	38.9

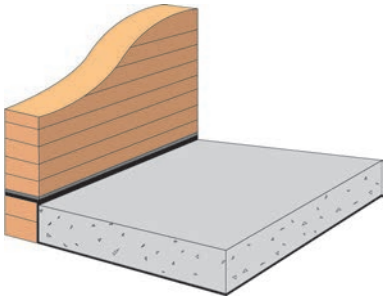
Actual room area/kit size (m^2)		Amount of tube required (m)	Number of coils supplied	Trim each coil to: (m)
36	40	240.0	7 x 40m	34.3
37	40	246.7	7 x 40m	35.3
38	40	253.4	7 x 40m	36.2
39	40	260.0	7 x 40m	37.2
40	40	266.7	7 x 40m	38.1
41	45	273.4	6 x 50m	45.6
42	45	280.0	6 x 50m	46.7
43	45	286.7	6 x 50m	47.8
44	45	293.4	6 x 50m	48.9
45	45	300.0	6 x 50m	50.0
46	50	306.7	7 x 50m	43.9
47	50	313.4	7 x 50m	44.8
48	50	320.0	7 x 50m	45.8
49	50	326.7	7 x 50m	46.7
50	50	333.4	7 x 50m	47.7
51	55	340.0	8 x 50m	42.5
52	55	346.7	8 x 50m	43.4
53	55	353.4	8 x 50m	44.2
54	55	360.0	8 x 50m	45.0
55	55	366.7	8 x 50m	45.9
56	60	373.4	8 x 50m	46.7
57	60	380.0	8 x 50m	47.5
58	60	386.7	8 x 50m	48.4
59	60	393.4	8 x 50m	49.2
60	60	400.0	8 x 50m	50.0
61	65	406.7	8 x 55m	50.9
62	65	413.4	8 x 55m	51.7
63	65	420.0	8 x 55m	52.5
64	65	426.7	8 x 55m	53.4
65	65	433.4	8 x 55m	54.2
66	70	440.0	8 x 60m	55.0
67	70	446.7	8 x 60m	55.9
68	70	453.4	8 x 60m	56.7
69	70	460.0	8 x 60m	57.5
70	70	466.7	8 x 60m	58.4

Example: a 3m wide by 4m length room has area of $12m^2$. The table above shows a cut length of 20m per coil, but the 4 coils of pipe supplied in your $15m^2$ kit are 30m in length. In this case you would have 10m excess per pipe run that will need to be cut off following the installation.

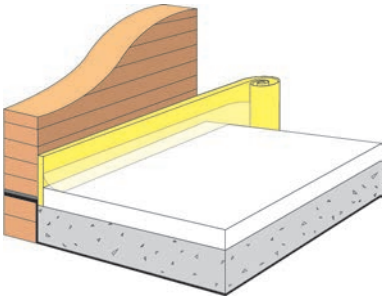
Notes:

- Do not cut off the excess pipe until the floor installation is complete, instead mark the pipe with tape or a pen and adjust and cut the pipes once all coils have been laid.
- It is not always possible to get the pipe runs equal. The final length of cut pipes may vary by up to 25% without compromising the heat output.

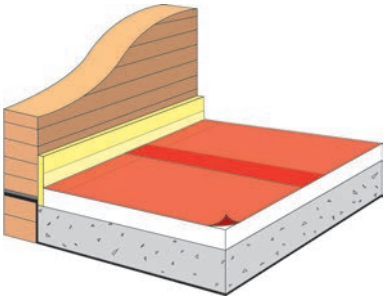
Sequence of laying the floor



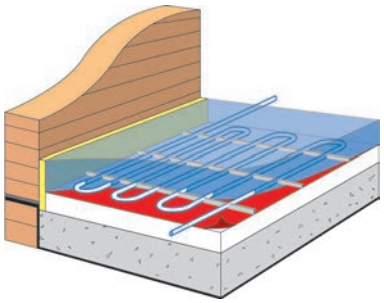
1 Lay the damp-proof membrane (dpm), concrete slab and damp-proof course (dpc) in accordance with current Building Regulations.



2 Roll out edge expansion strip around the sides of the room and lay the floor insulation in accordance with current Building Regulations.



3 Cover with a 125µm polythene protection layer, overlapping sheets by at least 65mm. This layer is a Building Regulation requirement to protect insulation from the screed.



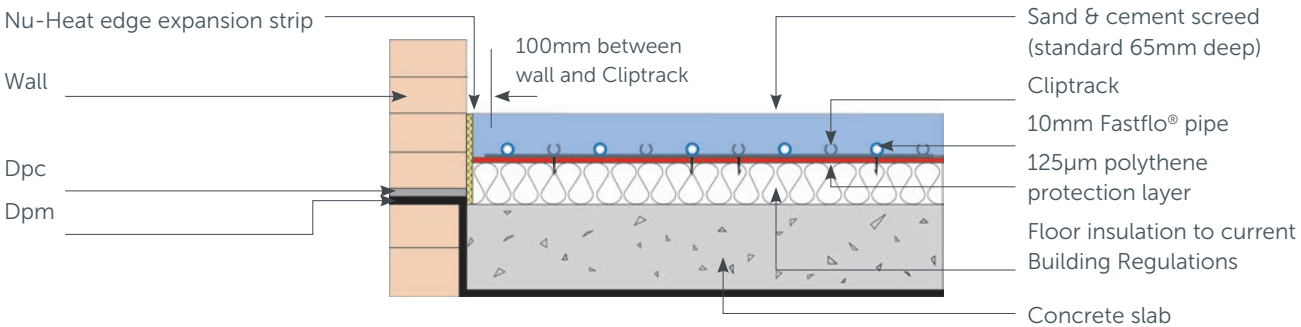
4 Fit the Cliptrack® and Fastflo® tube as in the instructions on pages 18–19.

5 Screed the floor whilst the system is under pressure.

6 When the screed is dry the excess edge insulation can be cut away to floor level.

CROSS-SECTION – SCREED WITH CLIPTRACK

Concrete or beam and block floor with sand and cement screed finish



Connecting 10mm Fastflo® to the distributors

If the distributors are to be remote from the pump module, then it does not matter whether the supply pipework or the 10mm Fastflo® tube is connected to the distributors first.

1 At the distributors, take one end of the floor heating tube and blow down it to make sure you have identified its other end correctly.

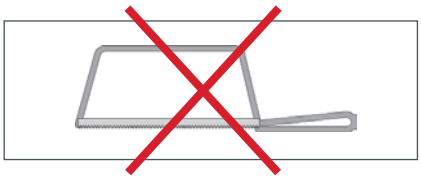
2 The Fastflo® tube should be cut squarely using pipe cutters and ensuring the tube is free from score marks.

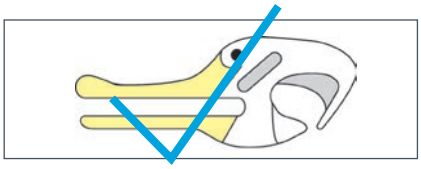
Note: If the tube has to be re-fitted for any reason, cut back the pipe to a clean, smooth surface. Never use a hacksaw to cut the tube.

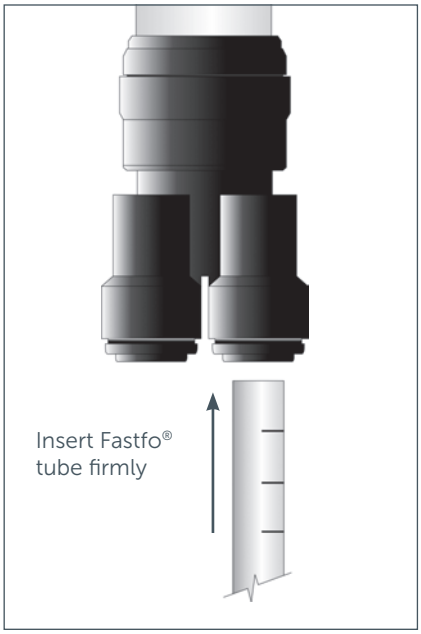
3 Push the Fastflo® tube firmly into the distributor connection. The pipe is marked every 25mm – if it is cut at one of the marks it should push into the distributor as far as the next mark.

4 Repeat steps 2 – 3 for the other end of the tube and connect to the return distributor.

Note: Only flow or return pipes can be fitted to a single distributor, not both.







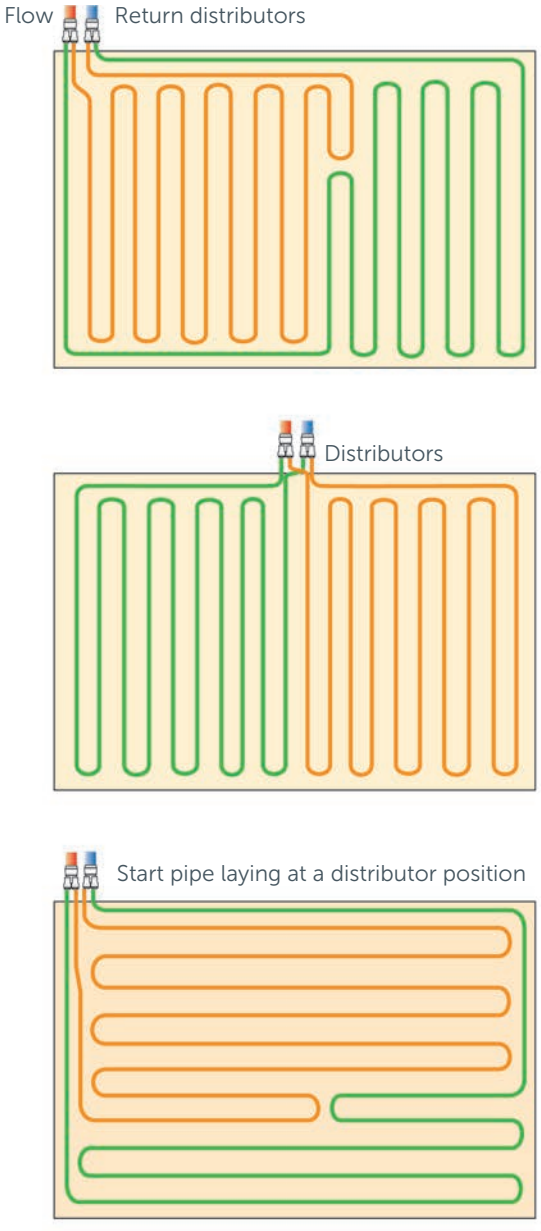
Installing 10mm Fastflo® tube

TYPICAL PIPE LAYOUTS

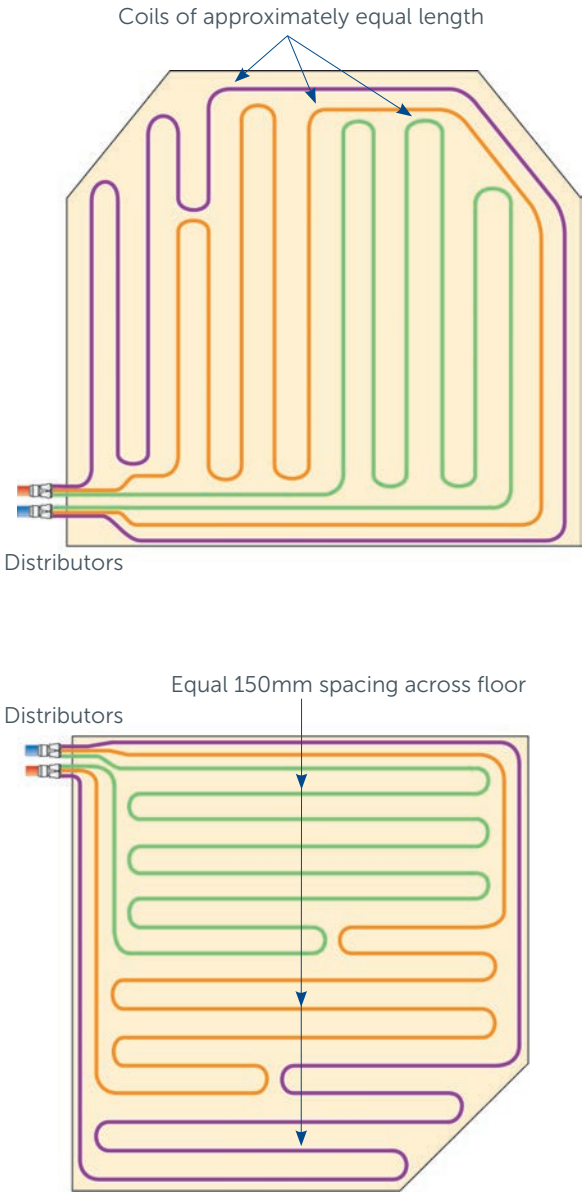
The principles of laying pipe in the floor are simple as long as these guidelines are followed:

- The spacing between coil runs should be a constant 150mm.
- Start the pipe laying at the distributor position.
- To avoid kinking, the minimum bend radius of the pipe is 50mm.
- Only flow **or** return pipe can be connected to a single distributor, not both.

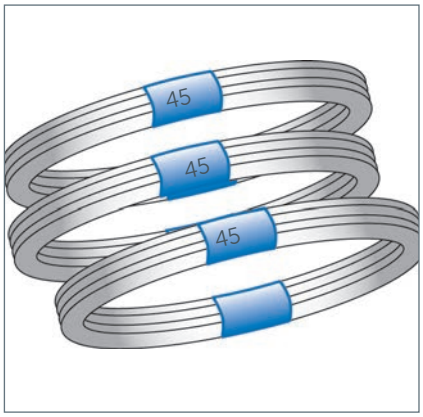
The following are examples of typical pipe layouts:



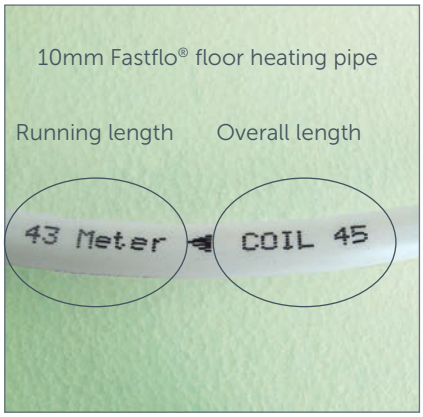
Examples of two-coil installations



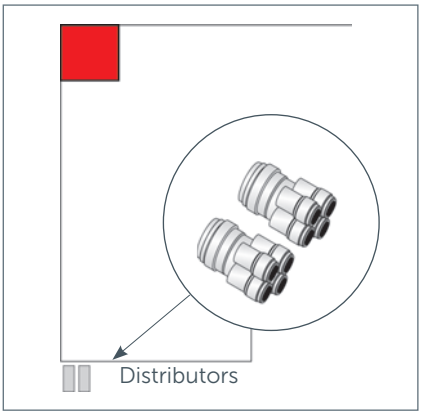
Examples of three-coil installations



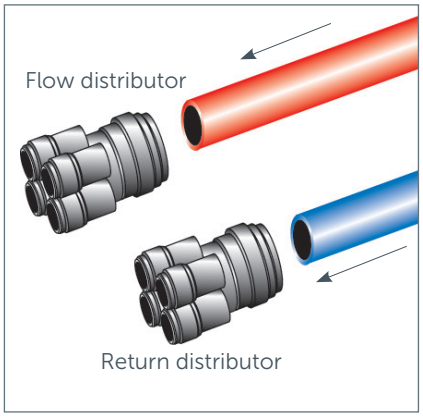
1 Check the *Delivery Note* to establish the correct number and lengths of the Fastflo® tube coils for the room.



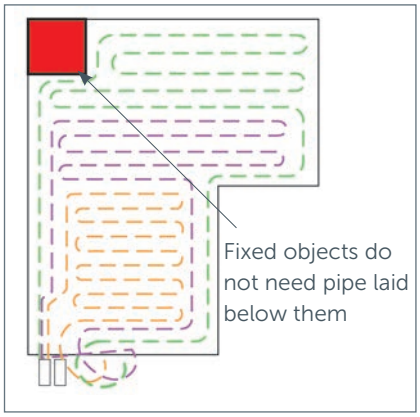
2 Each coil is marked every metre with its overall length and actual running length counting down to 0m. Note: The *Tube Trimming Chart* on page 15 gives the correct coil lengths for your room.



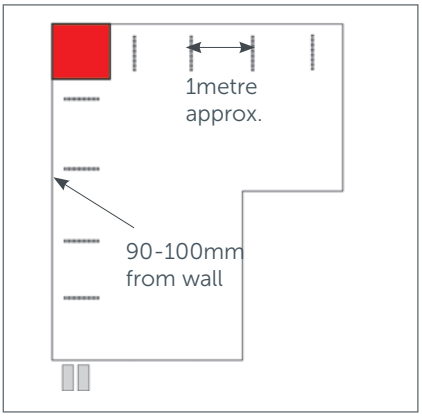
3 Place the distributors in a convenient position by the pump or in the wall as described on page 13. Note: the insulation can be channelled to recess the distributor if they are placed in the floor.



4 If the distributors are mounted remotely from the pump module then the flow and return pipe should be connected to the distributors. It is important to remember which distributor is flow and which return.

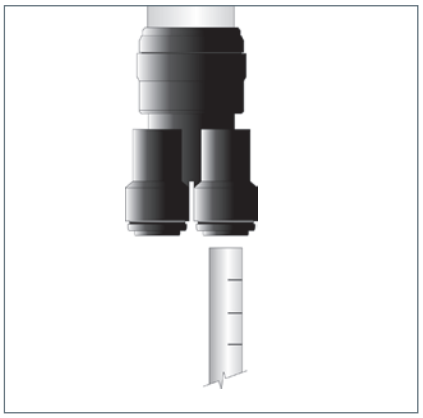


5 Plan the best layout for the floor heating tube before starting. The tubing should exit the distributor and run around the wall to the furthest point. It then doubles back on itself in a serpentine pattern to fill the space. Areas under kitchen units, WCs, hearths etc, should not be filled with tube.



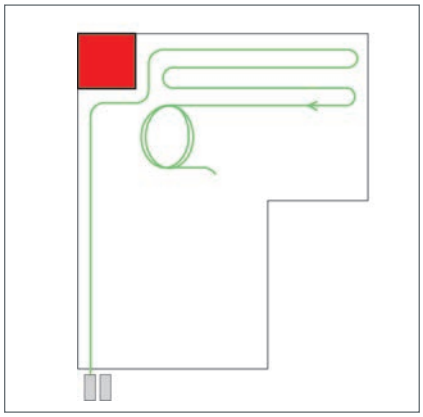
6 When the best layout has been determined, fix the Cliptrack at approximately 1m centres to suit. It should be 90–100mm from the walls.

Examples of suggested layouts are shown on page 17.

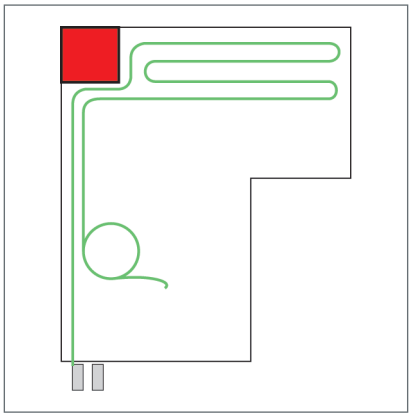


7 Insert one end of the 10mm tube firmly into the flow distributor (the one with the gauge).

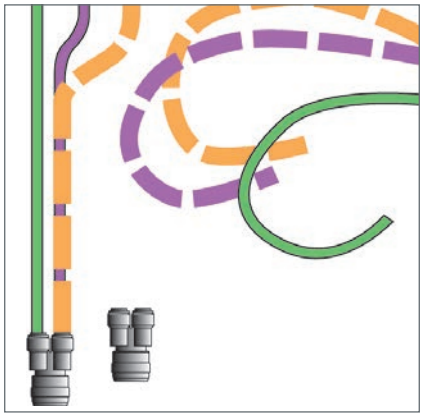
8 Roll out the pipe pushing it into the cliptrack. Do not kink the tube by trying to make a very tight turn. Unroll the pipe hand over hand to avoid twisting and push into the cliptrack. Maintain the correct pipe spacing of 150mm.



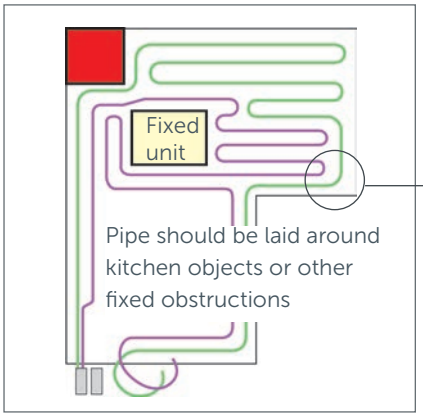
9 The tube should then be doubled back on itself filling the area at the correct spacing.



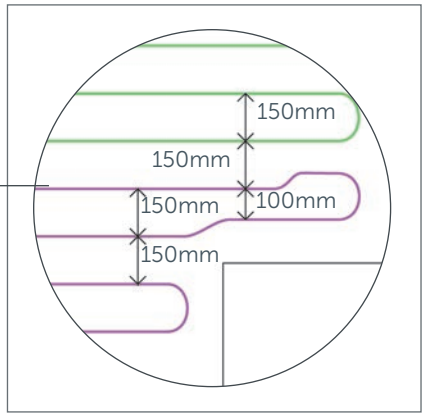
10 When there is just enough left, turn back and run the tube back to the return distributor. Any excess or shortfall can be adjusted at the turn-back point.



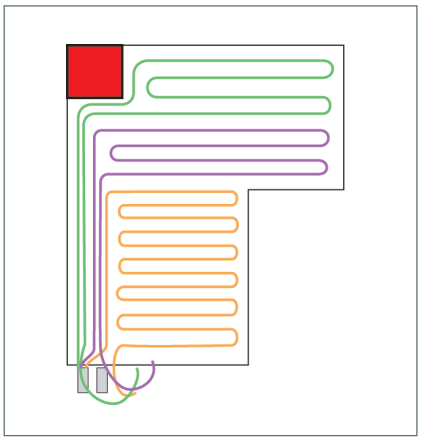
11 Exit the flow distributor with the second coil at a spacing to suit the connections. Resume the 150mm spacing as soon as possible.



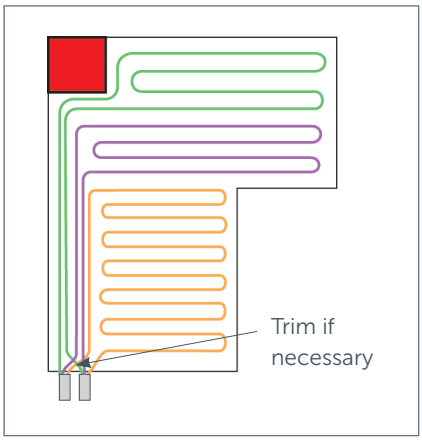
12 Use the same method as for the first coil of tube. Single clips can be used where necessary to hold the pipe in position.



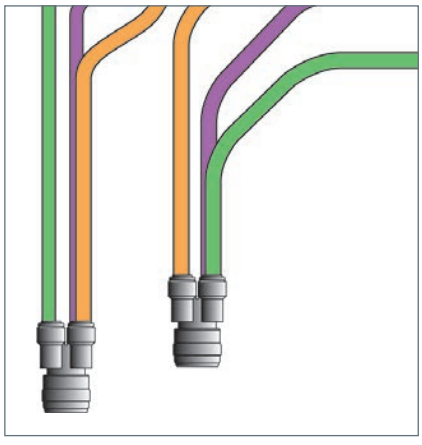
13 If the 150mm spacing cannot be maintained it is possible to make adjustments by reducing the spacing over small areas before resuming correct spacing.



14 Complete the installation using the same method for the remaining coils of tube.



15 Use the correct length of tube as detailed in the *Tube Trimming Chart* on page 24. If there is an excess, the spacing of the final coil can be tightened and an extra loop fitted or a maximum of 25% of the coil length can be cut off, (e.g. 10m cut from a 40m coil).



16 With all the tubing laid, trim to the correct length and insert the tubes firmly into the return distributor as shown in diagram 4.

Continue with the *Filling, flushing & pressure testing* as described on page 20.

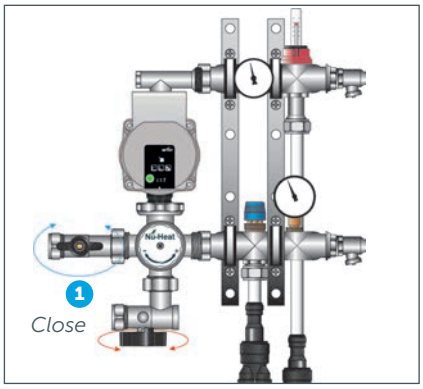
Filling, flushing & pressure testing floor heating tube

WHEN PUMP & BLENDING VALVE ASSEMBLY IS CONNECTED DIRECTLY TO THE DISTRIBUTOR ASSEMBLY

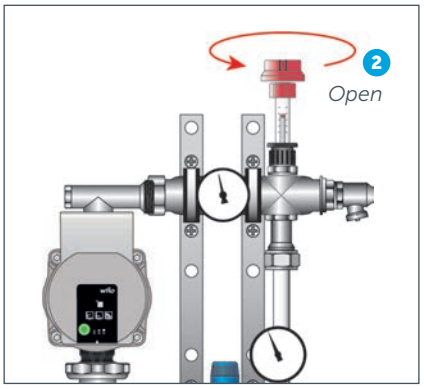
If the pump is not in the correct orientation then it must be changed now before filling the system with water, see pages 11 for details of how to change the pump orientation.

It is essential to remove all air from the pipework or the floor heating pump will not circulate water through the Fastflo® tube. This could take up to 2 hours. It must be flushed and pressure tested prior to laying the floor deck.

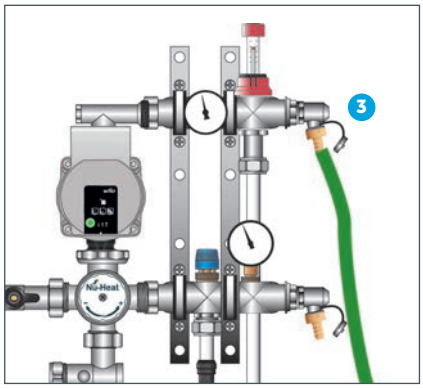
Note: Ensure all joints are tight before filling and flushing.



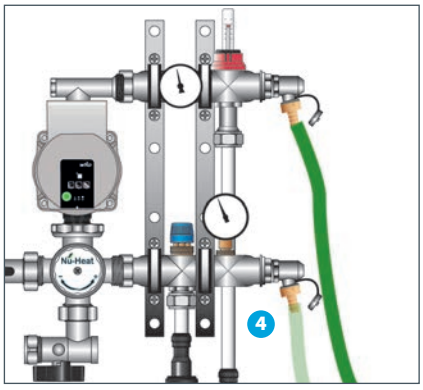
1 Close the isolating ball valves that are connected directly to the blending valve.



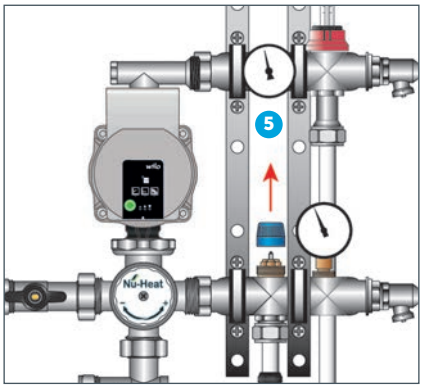
2 Open the flow adjuster fully on the supply (top) manifold by a lift the red collar, b undo the black locking nut c turn the red adjustment key fully anti-clockwise d tighten the black locking nut e replace the red collar.



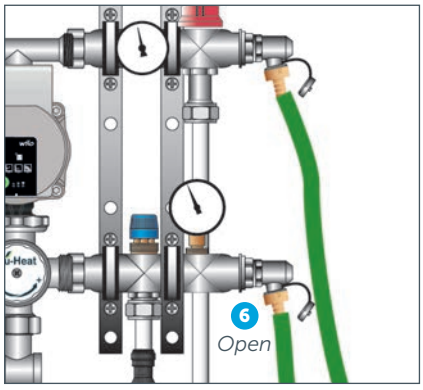
3 Remove the blanking cap from the filling valve on the flow (upper) manifold. Fit the connection nozzle and connect a suitable hose from the mains water supply. Open the filling valve using the key on the blanking cap.



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



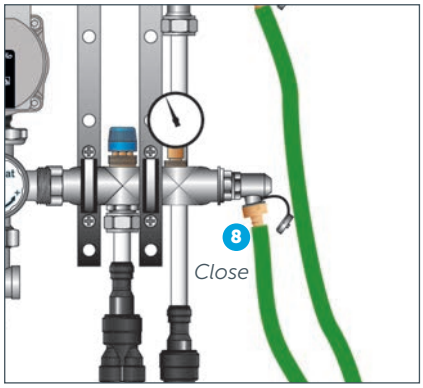
5 Fully loosen or remove the blue protection cap from on the return (bottom) manifold.



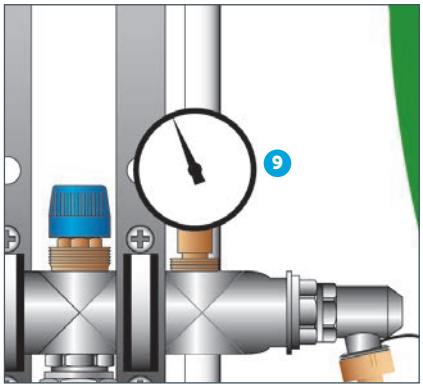
6 Open the tap on the mains water supply and open the drain valve on the return (lower) manifold using the key on the blanking cap.

7 Run the water until all air is expelled from the pipe.

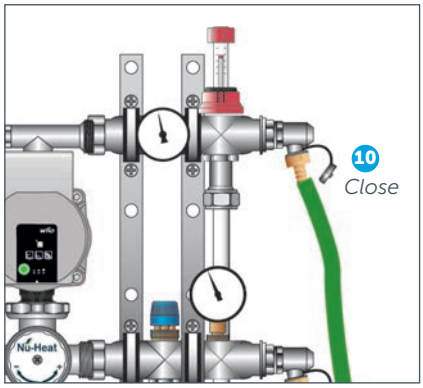
Tip: If the outflow is run into a bucket then air bubbles will be detectable.



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

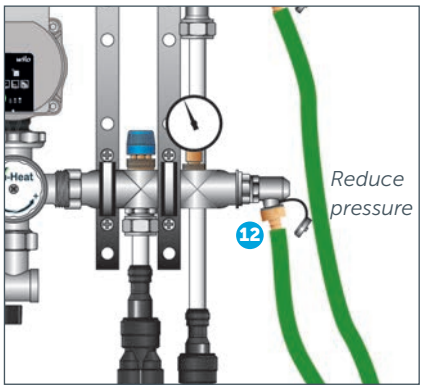


9 Allow the pressure to rise to a maximum of 6 bar.



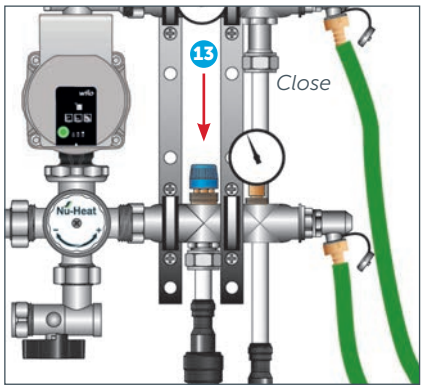
10 When the correct pressure is reached, close the filling valve.

11 All of the UFH pipework is 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 approx. 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.



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

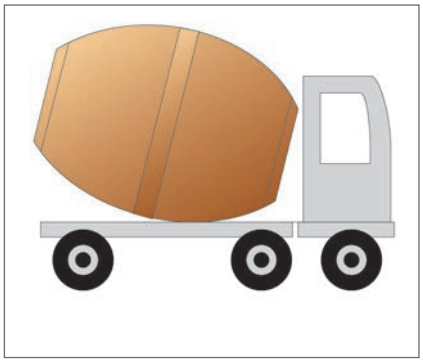
Note: The floor heating tube must be left under pressure whilst floor deck is laid. 1 bar is sufficient.

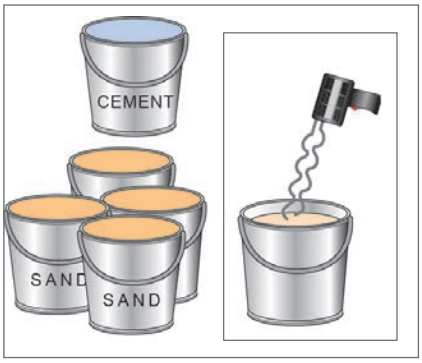


13 Close the blue protection cap and flow gauge to prevent air getting into the system.

Screed floors

The effectiveness of underfloor heating in a screed floor is, in part, reliant on the quality of the screed. A poorly mixed screed, unevenly laid with many air pockets will not conduct heat as well as a smooth, well compacted, level mix. The consistency of the screed mix must be maintained across the entire floor.

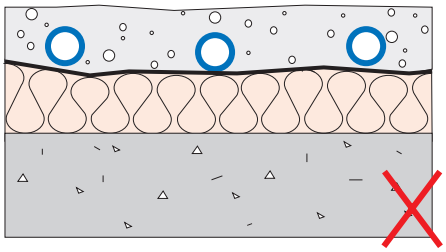




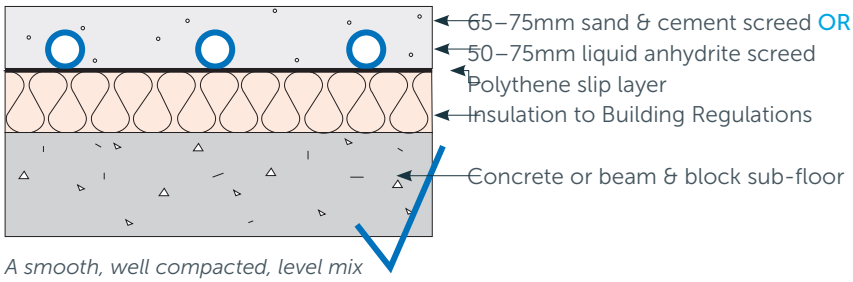
Pre-mixed screed is the preferred method. Alternatively, an accurate bucket-mix of 4 parts sharp sand to 1 part cement is acceptable.

Sub-floor construction – concrete slab or beam and block

The concrete sub-floor is laid in the normal way and must form a flat, stable base. Insulation is fitted on top of the slab (not below) when the building is wind, and weather-proof. The underfloor heating is then installed on top of the insulation.



Uneven, poorly mixed screeds with too many air pockets will not conduct heat efficiently



A smooth, well compacted, level mix will improve performance

TYPES OF SCREED

Traditional semi-dry, sand & cement screed

A traditional screed usually consists of 4-parts sand to 1-part Portland cement. This can either be mixed on site or delivered ready to lay.

Traditional screeds are laid over the UFH pipework to a minimum depth of 65mm, and an ideal maximum of 75mm.

It is essential to the effective running of the underfloor heating that the screed is properly compacted, particularly around the UFH pipe, in order to maximise thermal conductivity.

Pumpable self-smoothing (liquid) screed

There are numerous advantages to liquid screeds; speed of installation and drying, ease of finish due to self-levelling characteristics, and improved heat output due to conductivity. Pumpable screeds might be cement-based, or calcium sulphate based.

Another significant advantage is that the thickness of screed can be as low as 35mm above the top of the pipe, which implies a total depth of 50mm for 14mm pipe systems (allowing for the height of the cliprail).

FLOOR TEMPERATURE SENSOR

Nu-Heat recommends that the floor sensor supplied with room thermostats is fitted in order to meet the requirement of some flooring suppliers for a maximum surface temperature for their coverings.

A floor temperature sensor is recommended for all engineered timber floors, vinyls (including Amtico) and linoleum. Always follow the manufacturer's instructions and check that the floor covering is suitable for use with underfloor heating.

To enable increased comfort levels in bathrooms, wet rooms and en-suites the floor must be allowed to reach higher than usual temperatures. For this reason vinyl and engineered timber coverings are not recommended in bathrooms, wet rooms and en-suites. For safety reasons thermostats for these rooms will always be supplied with a remote AIR sensor but not usually with a remote floor sensor.

Floor temperature sensor

POSITIONING

The room thermostat should normally be fitted at light switch height, out of direct sunlight or draughts and not above heat sources.

The thermostat's remote floor sensor also controls the heating. The remote sensor is fitted with approximately 3m of 2-core low voltage flex, extendable up to 20m.

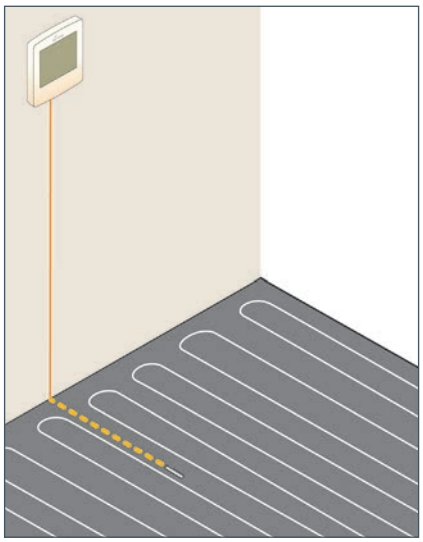
The floor sensor should be fitted as close to the top of the screed as practical and more than 300mm from the wall.

Note: For electrical safety, thermostats for wet areas will have a remote air sensor instead of a floor sensor. This is fitted in the bathroom at lightswitch height behind a a white protective cover (supplied).

1. Ensure the sensor is positioned at least 300mm away from the wall. It should be fitted approximately midway between underfloor heating pipe runs.

   Do not fit the sensor where pipes are spaced very closely together.

2. The sensor wire should be threaded through an offcut of floor heating pipe leaving the sensor tip just protruding. This will hold it in place whilst the screed is laid – the sensor tip must not protrude above the surface of the screed. Seal the end of the pipe with a small dab of mastic.



Run the sensor wire from the thermostat on the wall and across the castellated panel.

GENERAL CONSIDERATIONS

A polythene slip layer must be laid on top of the insulation before the underfloor heating pipe is installed. This is intended to prevent any chemical reaction between the insulation and the screed, and also prevents liquid screed from seeping between the sheets of insulation.

Increasing the depth of screed will increase the response time of the underfloor heating; anything thicker than 65mm will require the use of a setback temperature during night-times and unoccupied periods, rather than switching the heating off completely.

The screed should be finished flat and level to SR2 standard in order to receive floor coverings.

DRYING TIMES FOR SCREED

Drying times for any screed will be affected by climatic conditions, but the British Standard advises 1mm per day for the first 50mm, and 2mm per day for every additional millimetre.

The only sure way of assessing the moisture content is with a hygrometer, but a simple alternative is to tape a 1m^2 sheet of plastic to the floor. This is left for 24 hours, and if the underside is clearly wet after this period then moisture levels are too high to switch the heating on, and subsequently lay a floor finish.

Reduced drying times

With cement based screeds (either traditional or pumpable) the floor heating must not be used to accelerate the floor drying process as this causes increased risk of cracking. However with calcium sulphate screeds the heating may be used to accelerate drying after 7 days (always check with the supplier).

INITIALLY HEATING THE SCREED

In all cases the screed should be heated slowly to the operating temperature, and maintained at that temperature for several days before cooling down to room temperature (but not below 15°C) before installing the floor covering.

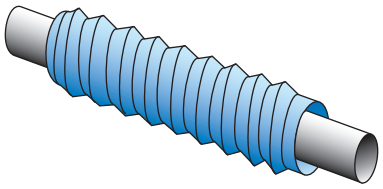
To achieve this, turn the floor heating on and set the heating mixing valve (or heat pump maximum flow temperature) to 40˚C. Increase this temperature daily by 5˚C up to a maximum of 60˚C (see A3 *Manifold and Zone Information* for correct set temperature). Note that calcium sulphate screed may be affected by high temperature. Please check with the supplier for any limitations.

EXPANSION/CONTRACTION (MOVEMENT) JOINTS

When the floor screed is dry, it will expand and contract with changes in temperature and allowance must be made for this. Edge isolation supplied by Nu-Heat will allow for a degree of movement around the perimeter of the room but large areas may need expansion joints to allow movement and prevent cracking due to stress build up in the screed.

In sand and cement screed floors expansion joints should be fitted when the surface area of screed is greater than 40m^2 or within any single length of screed greater than 8m.

For both liquid anhydrite and sand and cement screeds, expansion joints should be formed in high stress areas such as where large areas are in contact with smaller ones e.g. L or T shaped rooms and where tube passes through doorways (see diagram below).

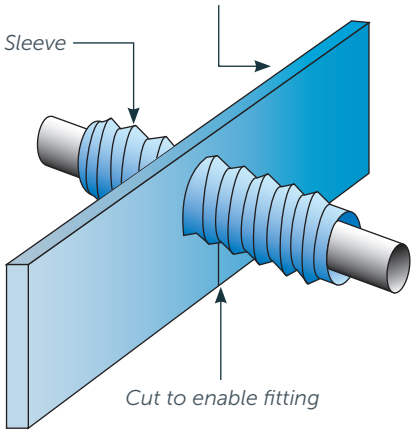


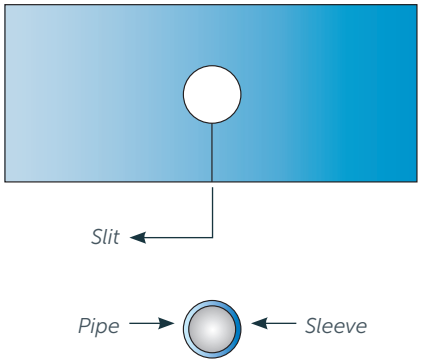
Expansion sleeving

It is essential that heating pipes are sleeved for 300mm either side of any expansion joint to prevent stresses building up in the pipe. It is important to anticipate the use of joints and to feed sleeving down the pipe during installation. Alternatively, slit the section of sleeve lengthwise, slip over pipe and fasten securely at the joint to prevent ingress of screed. If required, expansion sleeves can be purchased from Nu-Heat.

Expansion joints may be formed using Nu-Heat edge insulation or other flexible material, cutting holes around the pipe positions and from the bottom of the insulation so that the joint can be placed prior to screed laying.

Expansion joint (edge insulation)



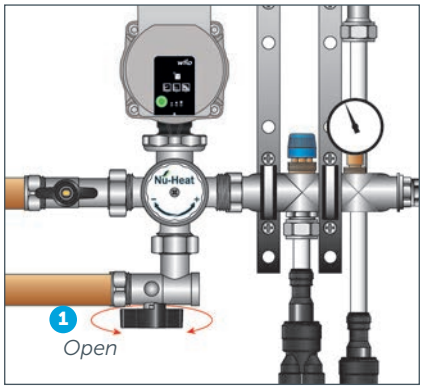


Where a soft medium such as Nu-Heat edge insulation is used to form the expansion joint, this will need mechanical support during the screeding and drying process in order to prevent partial slump or distortion of the floor.

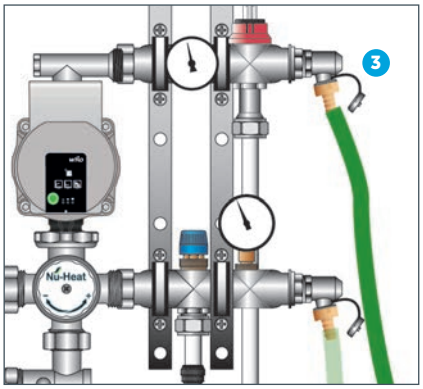
Filling the boiler and heating system pipework

FILLING THE BOILER

Fill the boiler via the boiler filling loop whilst venting the system and following the boiler manufacturer's instructions. The system should be cleansed and flushed in accordance with BS7593:1992 to remove all flux residue and other debris.
If connecting to an existing heating system it is important that this is cleansed and flushed to the same standard. If there are ferrous components in the system, Nu-Heat recommends that a magnetic filter should be installed.

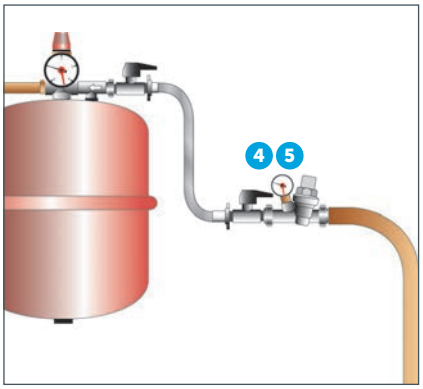


1 Open the flow isolation valve.



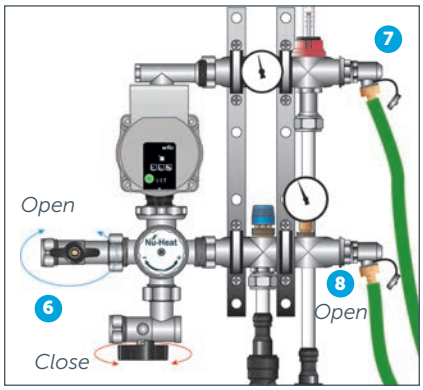
2 Find the hose tails from the tools and accessories pack and connect to the fill and flush hoses.

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.

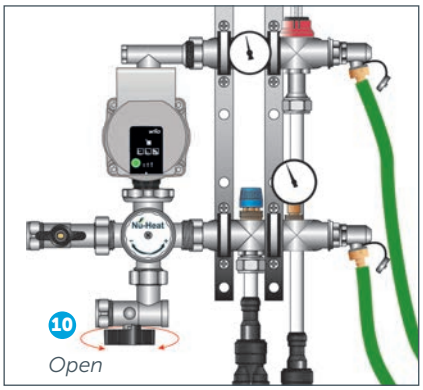
5 Close the boiler filling loop and drain cock.



6 Close 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.

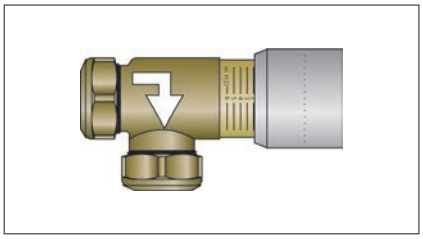
10 Open the flow isolation valve.

11 The temperature control valve on the pump module should be set to minimum.

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 regulations.

AUTOMATIC BYPASS VALVE

Setting the bypass valve is a required to prevent the blending valve from being overloaded. The bypass is adjusted between 0.1–0.6 bar using the grey knob. 0.5 bar (marked 5 on valve) is the recommended setting. Check that the arrow on the valve points from flow to return.



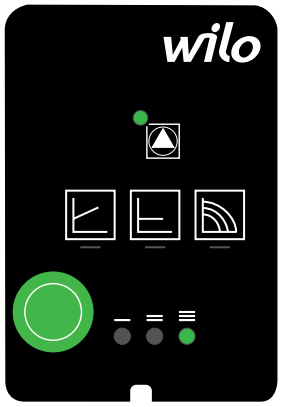
Setting flow rates and commissioning

Before starting check that:

1. The heating and hot water system is fully operational and the boiler has been commissioned.
2. The floor deck has been fitted over the underfloor heating layer.
3. The manifold has been filled, flushed and pressure tested. See pages 20–21.
4. The boiler and primary flow and return have been filled, flushed, cleansed and vented. See page 25.
5. All electrical work associated with the heating system is complete (please refer to the *OneZone® Electrical Manual)* and the actuator head has been fitted.
6. The system static pressure is set at 1 bar when cold or approximately 1.5 bar when hot.
7. The manifold isolating valves are open.
8. The pump has been wired. See the pages 10– 11 for installation and opposite for setting the pump mode.

Setting the pump mode

Press button to cycle to Constant Pressure 3. This corresponds to a 7m head.



Electrical connection

The pump is supplied with a separate, pre-terminated, 1-metre, 3-core lead ready for connection to the Optiflo UFH wiring centre. Ensure that the pump is filled and vented, use the controls to call for heat and then select the correct pump setting.

Setting the control mode

To select the control mode and set the desired delivery head/constant speed, press the button to cycle through the 9 options:

Variable differential pressure (Δp-v): DO NOT USE

Constant differential pressure (Δp-c): USE THIS SETTING, CURVE III

Constant speed (I, II, III): DO NOT USE

Reset to factory settings (Constant speed 3) by holding the button and removing power, release button and the next operation of the pump will be in factory default setting.

NOTE: All settings are retained if the mains supply is interrupted.

Venting

Press and hold the green button for 3 seconds to purge air from the pump, the pump returns to normal operation after 10 minutes and the purge program can be cancelled by pressing the button for 3 seconds.

Variable pressure
DO NOT USE

Constant pressure
USE THIS SETTING

Constant speed III
DO NOT USE

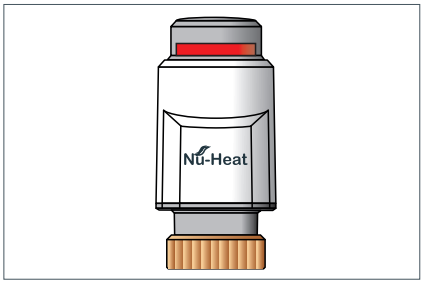
The LED indicator light.

LED	Fault	Cause	Remedy
Lights up red	Blocking	Rotor blocked	Activate manual restart or contact Nu-Heat Technical Support.
	Contacting/winding	Defective winding	
Flashes red	Under/over-voltage	Mains power supply too low/high	Check mains voltage and operating conditions and contact Nu-Heat Technical Support.
	Pump overheating	Pump interior too warm	
	Short-circuit	Motor current too high	
Flashes red/green	Generator operation	Water is flowing througj the pump hydraulics but there is no mains voltage at the pump.	Check the mains voltage, water quantity/pressure and the ambient conditions.
	Dry run	Air in the pump	
	Overload	Sluggish motor, pump is operated outside of its specification)e.g. high pump temperature). The speed is lower than during normal operation.	

Fitting the actuator

The Nu-Heat supplied actuator comes as shown. The metal slip ring below the body of the actuator attaches the actuator to the manifold.

If the manifold is to be fitted upside down, and the actuator inverted, please contact Nu-Heat for details.



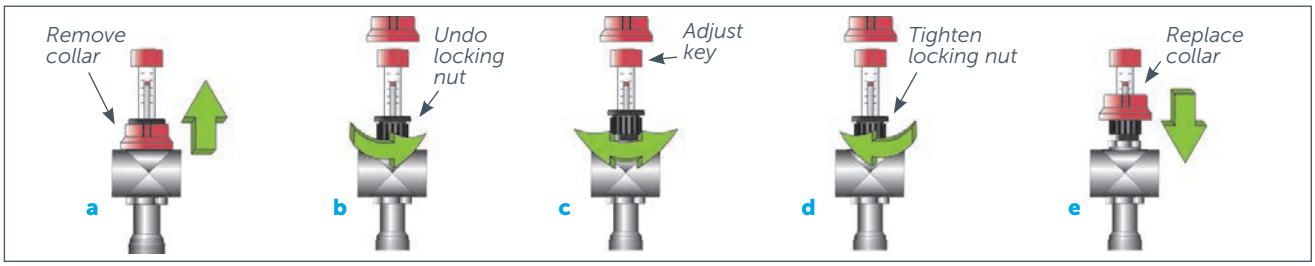
Flow and temperature settings

When all of the components have been set up the temperature of the water going into the floor heating tube can be set by adjusting the blending valve below the pump. Floor temperatures are linked directly to the temperature of the water flowing through the Fastflo® tube and controlled by the setting of the blending valve. Increasing the temperature setting will result in increased heat output from the floor. As a rule, the floor should feel no warmer than the palm of the hand and a maximum of 29˚C.

1 To adjust flow rates on the flow gauge (see diagrams below):

- **a** Remove red collar
- **b** Undo the black locking nut
- **c** Adjust the flow rate as required, by turning the gauge with the red 'key'
- **d** Re-tighten the black locking nut
- **e** Replace red collar

2 Adjust flow temperature as per the table below and as required to satisfy the demand of the room you are heating. The settings on the valve should be used as a guide and the thermostat and heating system should be working to allow the correct setting of the flow temperature.



OneZone® floating floor heat output table

Flow water temperature	Carpet & underlay – 2 tog	Engineered hardwood	Tiles
40˚C	35 W/m²	39 W/m²	42 W/m²
45˚C	46 W/m²	52 W/m²	54 W/m²
50˚C	58 W/m²	65 W/m²	69 W/m²
55˚C	70 W/m²	78 W/m²	82 W/m²

Example: A 3m wide by 4m length room has an area of 12m² and using a heat loss tool, it has been determined that the heat loss of the room is 738 Watts.

Divide the heat loss by room area to determine the required setting of the valve. 738/12=61.5 Watts/m². The room has engineered hardwood floors and so selecting 50°C would adequately heat the room with an output of 65 Watts/m².

FLOW BALANCING

For installation without boiler control (i.e. when connected connected onto the existing radiator circuit) it may be necessary to adjust the radiator lockshield valves to balance the system. The OneZone® pump speed may be reduced to prevent excess flow being drawn, or else the manifold flow gauge can be used to restrict the flow on the UFH.

SYSTEM INHIBITOR

Once the OneZone® installation and commissioning are complete the central heating inhibitor levels should be checked and fresh inhibitor added if necessary. This should be checked in line with the boiler manufacturer's advice.

Floor finishes over screed

Installation recommendations

Nu-Heat guidance on fixing, adhesives and primers for the most popular floor finishes as well as individual datsheets on tiles, engineered timber and carpet are available from the website at www.nu-heat.co.uk

Always follow the flooring manufacturer's instructions.

CERAMIC AND STONE FINISHES

The underfloor heating system should be turned off while tiling and remain off until adhesives and grouts have fully cured (see manufacturer's recommendations). Check before use that the colour of the adhesive does not cause staining or discolouration of light coloured or translucent tiles. When installing large format tiles, the tile association recommends using a category C2 FTE S1 or S2 (where applicable) adhesive and a suitable de-coupling membrane. If using soft or vulnerable natural stone products (e.g. travertine, marble, etc.) always follow any specific supplier recommendations.

Adhesives

To install the decoupling membrane and tiles a flexible tiling adhesive suitable for underfloor heating should be used. The tile association recommends using a category C2 adhesive when installing tiles on underfloor heating. Some suitable products include:

Brand	Category	Suitable products	Website
Mapei	Adhesives	Keraquick to bond tiles to decoupling membrane (add latex plus if tiles are greater than 60 x 60cm)	www.mapei.co.uk
Ultra Tile	Adhesive	ProFlex SP	www.ultratileadhesives.co.uk
Weber	Adhesives	Weber.set SPF / Weber.set (rapid) SPF for tiles up to 40x40cm. For larger tiles use Weber.set (rapid) plus and Weber AD50	www.netweber.co.uk

Note: In all cases manufacturer's recommendations should be followed.

ENGINEERED TIMBER

Engineered timber boards should be a minimum of 15mm thick and a maximum of 22mm. The flooring can be glued and butt-jointed and then free-floated on top of the screed to allow for expansion and contraction; alternatively it can be glued to the surface of the screed using SikaBond® or equivalent.

The timber flooring should have been kiln dried to have a moisture content of 6–9% and should not be stored in damp conditions prior to fitting. Refer also to manufacturer's instructions.

CARPET

The combined value of the carpet and underlay should not exceed 2.5 tog. Use nail-less gripper with gripfill when fitting carpets, do NOT use gripper with nails as this could damage the underfloor heating pipe.

VINYL, LINOLEUM, AMTICO, KARNDEAN, ETC.

If dusty, prime the surface of the screed.

Problem solving – UFH

Room thermostat calling for heat, but no response from the floor

A Check that the room thermostat is calling for heat; the flame symbol should be showing. See separate *Electrical Installation Manual & User Guide* for programming instructions.

B Check the zone valve actuator head is open with the blue button out; check wiring if necessary. Be aware that the actuator operates with a 1–3 minute time lag.

C Check that the floor heating pump is running and the boiler is on and producing heat; check wiring, bleed air from pump.

D Check the floor heating water temperature control valve is set appropriately (usually about 50˚C); adjust if necessary.

E Check that all the isolating valves are open to allow water flow through the floor and around the pump and blending valve assembly.

F Check that the flow gauge is fully open.

No heat to floor heating distributors

A Follow the sequence of checks on left; if they are unsuccessful, repeat the filling and flushing procedure on pages 20–21 of this manual to remove any airlocks which may prevent water circulating correctly through the floor heating pipework.

B If the problem persists, please telephone Nu-Heat Technical.

Room temperature low; poor heating performance

A Check the time and temperature settings on the room thermostat and adjust if necessary.

B Check that the flow gauge is fully open.

C Increase the temperature of the water in the floor heating tube by 5˚C increments until the room is comfortable. See section on System Commissioning on page 28.

D The floor temperature limiting via the floor sensor (where fitted) could be set too low. Increase the floor temperature settings by 1˚C until desired temperature is reached. Leave at least 24 hours between each increase to allow time for the effects to be felt.

For sensitive floor coverings, always follow manufacturer's guidance.

Boiler noise/boiler lockout

A Check the system is free of air and warm water is flowing through all of the floor heating tube. If not, drain, re-fill and re-flush the system as described on pages 20–21.

B Check that the differential bypass valve is set to 0.5 bar with the arrow pointing from flow to return. This prevents a closed circuit between the boiler and floor heating controls.

Thermostat E0, E1 or E2 message flashing

A If a floor or remote sensor has been fitted then check wiring termination in the thermostat.

B If a floor or remote sensor is not required then the thermostat will need reprogramming. See separate *Electrical Installation Manual & User Guide* for programming instructions.

C E0 message means the thermostat if faulty and requires replacement, please telephone Nu-Heat Technical.

Warranty Certificate - Nu-Heat Fastflo® tube

Nu-Heat Fastflo® tube (PE-Xc, PE-RT, and multi-layer composite tube) is manufactured to ISO9002 quality control standards.

– Fastflo® tube is guaranteed (third-party, insurance-backed for up to €1million per claim) against failure in Nu-Heat floor heating systems for full reinstatement for a period of ten (10) years from the date of delivery. The sum insured is combined for the General Third Party Liability Insurance and the Products Liability Insurance.

– Fastflo® tube is guaranteed for a further forty (40) years against defects in material and workmanship. This guarantee shall be limited to the replacement of the defective tube, at the sole discretion of Nu-Heat. It shall not extend to installation reinstatement or consequential loss of any kind.

APPLICATION

This warranty shall apply provided that the heating system in which the Fastflo® tube is used has been installed, pressure-tested and commissioned in compliance with the procedures set out in this Nu-Heat installation manual.

EXCLUSIONS AND LIMITATIONS

The warranty shall not apply where:

A – The tube has not been installed and pressure-tested in accordance with the procedures set out in this installation manual.

B – Damage has occurred due to slip or heave in the concrete slab.

C – The material has been subjected to misuse, neglect, abnormal conditions or physical damage.

D – The tube has been used to carry or been subject to contact with incompatible heat-transfer fluids such as petroleum-based oils.

CLAIMS

In the event of a problem arising with this product, the warranty holder should first notify Nu-Heat in writing within 30 days. After receiving such notification and after the verification of warranty cover, the warranty shall be effected (as stated above).

Please note that the initial 10-year insurance backed warranty of Fastflo® tubing is provided directly by the manufacturer (underwritten by their appointed insurers), and not by Nu-Heat itself.

Reduced statute of limitations: the period of limitations for any cause of action arising out of, based upon, or relating to defects in the product purchased hereunder is hereby reduced to and shall be for a period of ninety (90) days after such cause of action occurs.

This warranty does not affect the purchaser's statutory rights. This warranty remains valid irrespective of ownership of the property in which the Fastflo® tubing has been installed but may only be enforced by a subsequent owner if Nu-Heat has been notified of the change of ownership within three (3) months of the change.

WARRANTY ISSUED IN THE NAME OF:

DATE OF PURCHASE:

Online
www.nu-heat.co.uk

Freephone
0800 731 1976 **or** 01404 549770

Nu-Heat
UNDERFLOOR & RENEWABLES

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