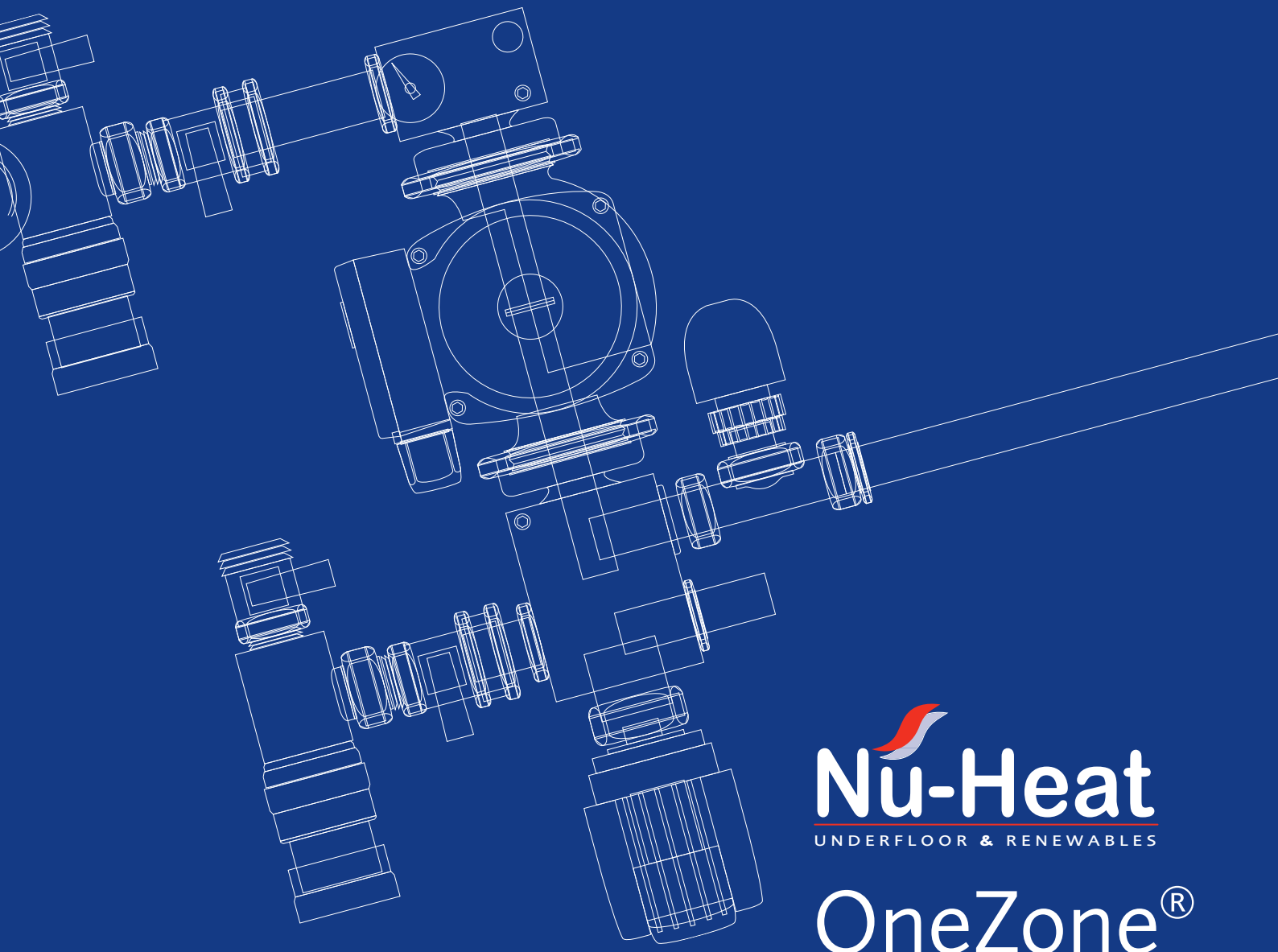
INTEGRATED RENEWABLE & HEATING SOLUTIONS



Nu-Heat
UNDERFLOOR & RENEWABLES

OneZone®
UNDERFLOOR HEATING

INSTALLATION MANUAL

underfloor heating
ground source heat pumps
air source heat pumps
solar thermal
rainwater harvesting

INSTALLATION MANUAL FOR NU-HEAT OneZone® WARM WATER UNDERFLOOR HEATING IN CONSERVATORIES, EXTENSIONS AND SINGLE ZONES

Please read this manual fully before fitting your Nu-Heat floor heating system. It assumes a basic knowledge of plumbing and electrical wiring, and of common terms used.

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 customer when installation is complete.

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.

Floor insulation materials: Ground floor insulation must meet Building Regulations 2001, Part L. Advice on this should be sought from your architect, builder or local authority planning department. **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.**

Floor finishes: For information on carpet, wood, ceramic and natural stone floor finishes please see the OneZone® brochure or visit the Nu-Heat website.

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.

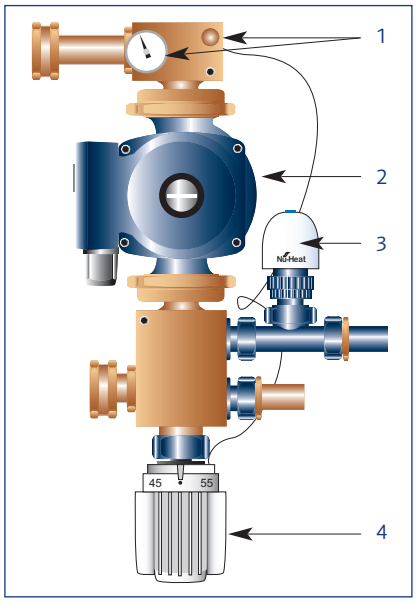
Boiler sizing: A OneZone® system produces a maximum heat output of 100W/m^2. You must ensure your boiler has enough spare capacity for the additional heating load.

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

Tool requirements: In order to install ONEZONE™ you will need:

- Pipe cutters
- Adjustable wrench
- Bucket
- Screwdrivers
- Drill
- Hosepipe

PAGE	CONTENTS



PUMP AND BLENDING VALVE ASSEMBLY

This assembly can be placed in the room to be heated or in a convenient cupboard remotely; ie. airing cupboard, under-stair cupboard, kitchen cupboard, utility room or garage. It may be connected right- or left-handed and consists of:

1. TEMPERATURE GAUGE & TEMPERATURE SENSING PHIAL

The temperature gauge indicates the temperature of the water flowing into the underfloor heating tube. The phial should be located in the brass block.

2. FLOOR HEATING PUMP

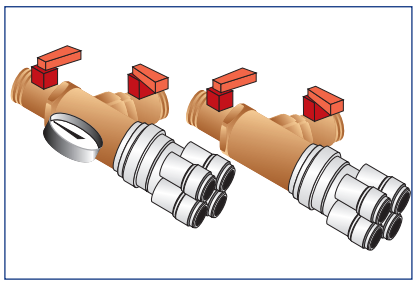
The floor heating pump circulates the hot water from the boiler or central heating circuit around the floor heating tube.

3. ZONE ACTUATOR

The zone valve, connected from the floor heating to the room thermostat, opens or closes the flow to the central heating circuit as required.

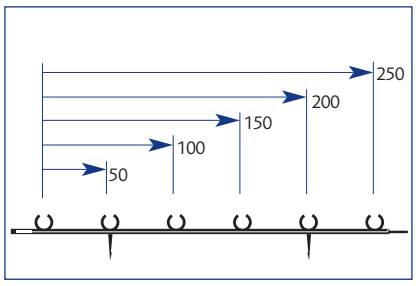
4. WATER TEMPERATURE CONTROL VALVE

The floor heating temperature control valve regulates the temperature of the water flowing into the floor heating tube. It mixes colder water returning from the floor heating tubes with the hotter water coming from the boiler to create the temperature set on the valve head.



DISTRIBUTOR ASSEMBLIES

Distributors take water from the heating pipework connected to the pump and blending valve assembly and direct it to the 10mm Fastflo® tube in the room. Distributors with more than four ports are also available. Blanking plugs are supplied for unused ports. **Distributors should be fitted in, or within 1 metre of, the room being heated even if the pump and blending valve assembly is installed remotely.** See page 16.

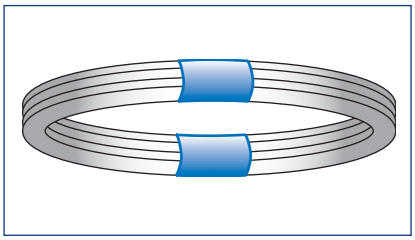


CLIPTRACK™

Cliptrack is used to secure the 10mm Fastflo® tube in place on the floor insulation before screeding takes place. The tubing is held at the correct spacings to ensure the room reaches its set temperature efficiently with an even spread of heat. All tube should be installed at 150mm centres unless otherwise stated by Nu-Heat.

FASTFLO-10™ FLOOR TUBE

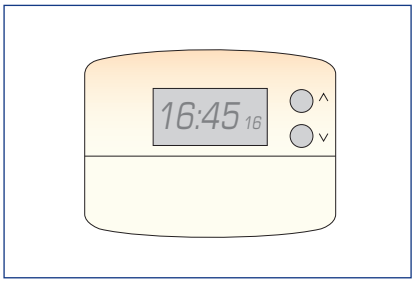
This is the tubing which runs the warm water under the floor. It is connected to the flow and return ports of the distributors. The number of coils of tube and the spacing used in the room have been calculated for the floor area quoted. Detailed instructions on how to lay the tubing in the floor are included on pages 23 – 25.



PROGRAMMABLE ROOM THERMOSTATS

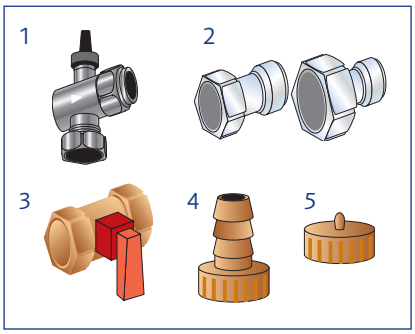
The room zone is individually programmed for temperature and times of use. This can be independent control or in conjunction with existing radiator systems. Allowance should be made for the longer warm-up time of underfloor heating. In order to comply with wiring regulations bathroom zones must have the thermostat fitted outside the room, ie. next to the door at light-switch height.

Wiring diagrams are shown on pages 8 – 14.



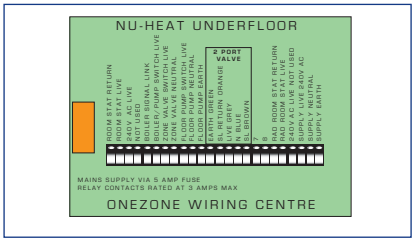
MANUAL BYPASS VALVE, PIPE MANIFOLD CONNECTORS, DRAIN OFFS, HOSE CONNECTORS, LEAK PROOF CAPS

1. **Differential bypass valve** – aids smoother system performance.
   Note: direction arrow must go from flow to return.
2. **Pipe manifold connectors** – to connect flow and return pipework to the pump and blending valve assembly.
3. **Drain-offs** – fitted to the distributors to allow pipework to be isolated for the filling and flushing process. See pages 26 – 27 for more details.
4. **Hose connectors** – to allow filling and flushing of pipework.
5. **Leak-proof cap** – to seal distributors after filling and flushing.



OneZone™ WIRING CENTRE

The centre can either be fitted beside or remotely from the heating components. It can be wired to suit individual system requirements. See pages 8 – 14 for detailed wiring diagrams.



PRINCIPLE OF OPERATION

INDEPENDENT CONTROL OF THE BOILER

The system is designed to operate by taking heat from an existing central heating system. A programmable room thermostat controls a two-port thermal valve to allow warm water to flow to the floor heating. The warm water is circulated through the floor heating tube by a pump, which is also controlled by the room thermostat.

CONTROL OF THE SYSTEM

Important – There are two ways to connect the system.

(A) Direct boiler connection

This arrangement gives optimum performance. It allows time and temperature settings for the conservatory or extension to be independent of other areas of the home. It also enables use of a set-back temperature facility to reduce warm-up times, (see pages 24 & 25). Pipework is connected back to the boiler side of any control valves, (see page 6).

What type of heating system do you have?

Combination boiler	Boiler and cylinder	Don't know
Refer to page 9 for paperwork connections and wiring details	What type of system control do you have?	Please consult your heating engineer or electrician.

S Plan	W or Y Plan	Don't know
The system will have two 2-port zone valves, one controlling the radiator circuit and the other controlling the cylinder. Refer to page 7 for pipework connections and wiring details.	The system will have 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. Refer to page 8 for pipework connections and wiring details.	Please consult your heating engineer or electrician.

OR (B) Radiator circuit connection

Pipework is connected directly to the radiator circuit meaning that time settings will correspond to the radiator circuit and set-back operation is not possible, (see pages 24 & 25). Heating operation times for the whole system may have to be altered to allow for the longer warm-up time of underfloor heating compared to radiators, (see page 6).

Refer to page 10 for pipework connections and wiring details.

EXISTING SYSTEM REQUIREMENTS

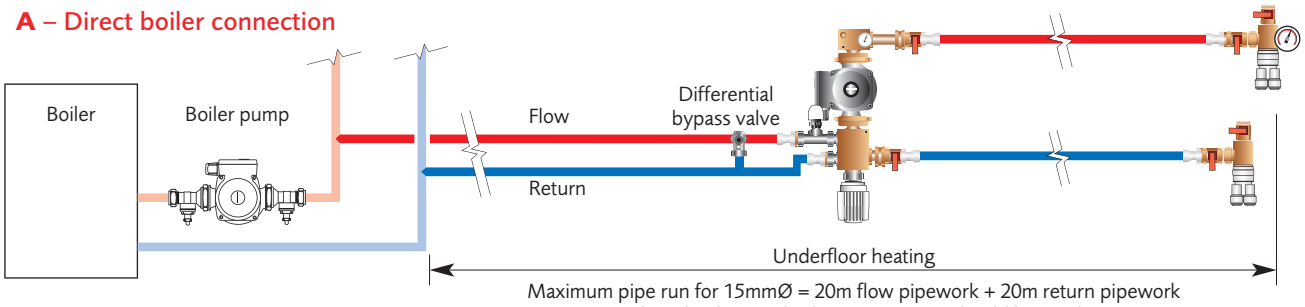
BOILER HEAT OUTPUT REQUIREMENT

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 100watts per m^2 of floor area; for example, a $20m^2$ 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.

FLOW AND RETURN PIPEWORK

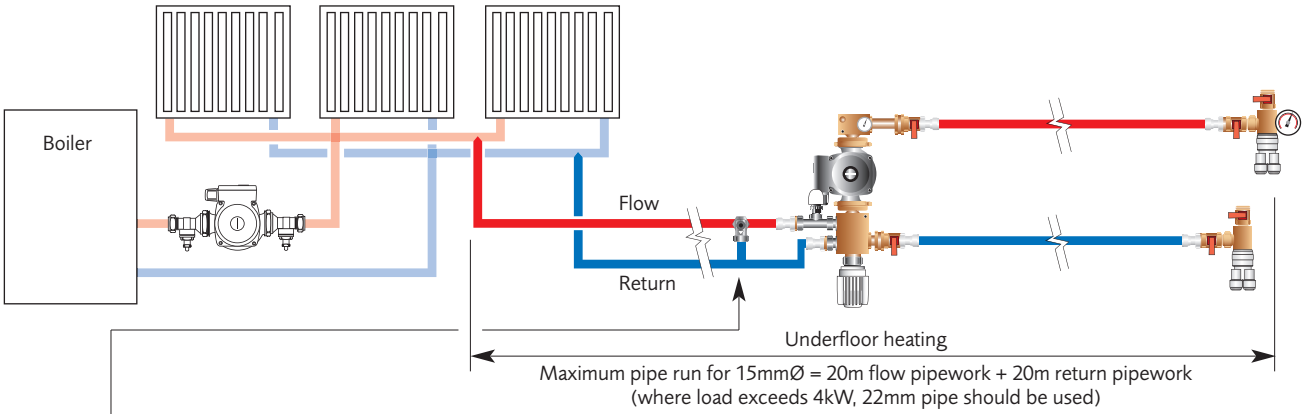
Flow and return pipework from the existing central heating may be run to the position of the floor heating components using either copper or plastic pipe. The size of the pipework must be sufficient to heat the new floor area (see below).

A – Direct boiler connection



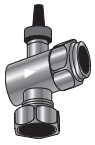
Note: Flow and return supply pipework must be connected on the boiler side of any existing control valves, (see pages 8 – 14 for specific system schematics). Control valves may be near the boiler but are often positioned in the cylinder cupboard.

B – Radiator circuit connection



Where flow and return supply pipework exceeds these lengths the pipework should be increased to 22mm diameter. The new flow and return pipework must be connected to existing pipework of the same size or larger and at a position suitable for the type of floor heating system.

DIFFERENTIAL BYPASS VALVE

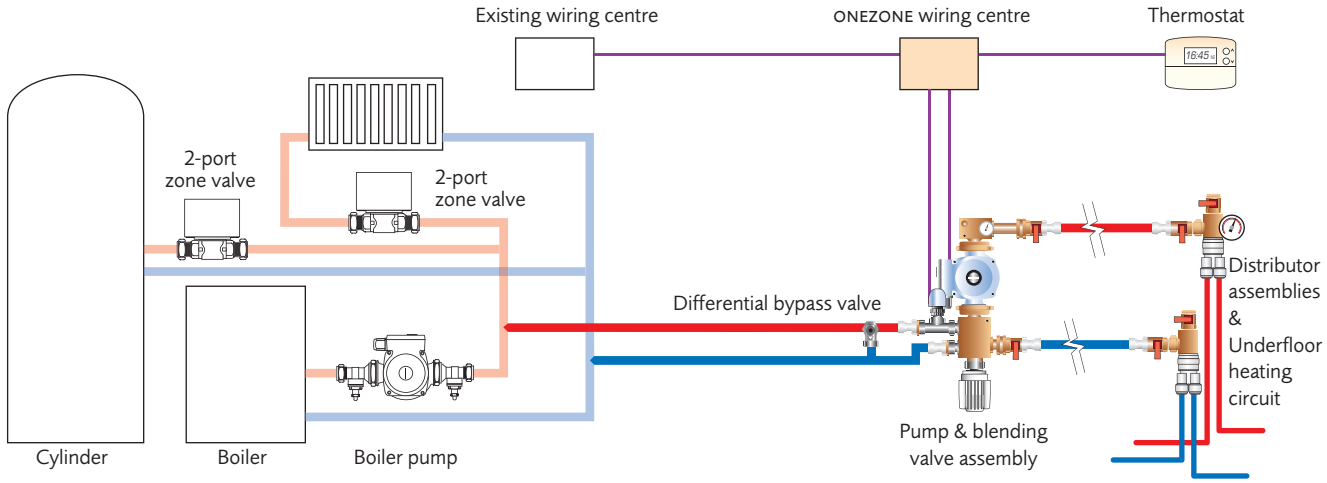


The differential bypass valve should be fitted between the flow and return supply pipes, before the pump and blending valve assembly and as close as possible. It should be set to 0.5 bar.
Note: the direction arrow must point from flow to return.

SYSTEMS WITH DIRECT BOILER CONTROL

S-PLAN (2X2-PORT CONTROL VALVES) 240V AC BOILER SWITCHING

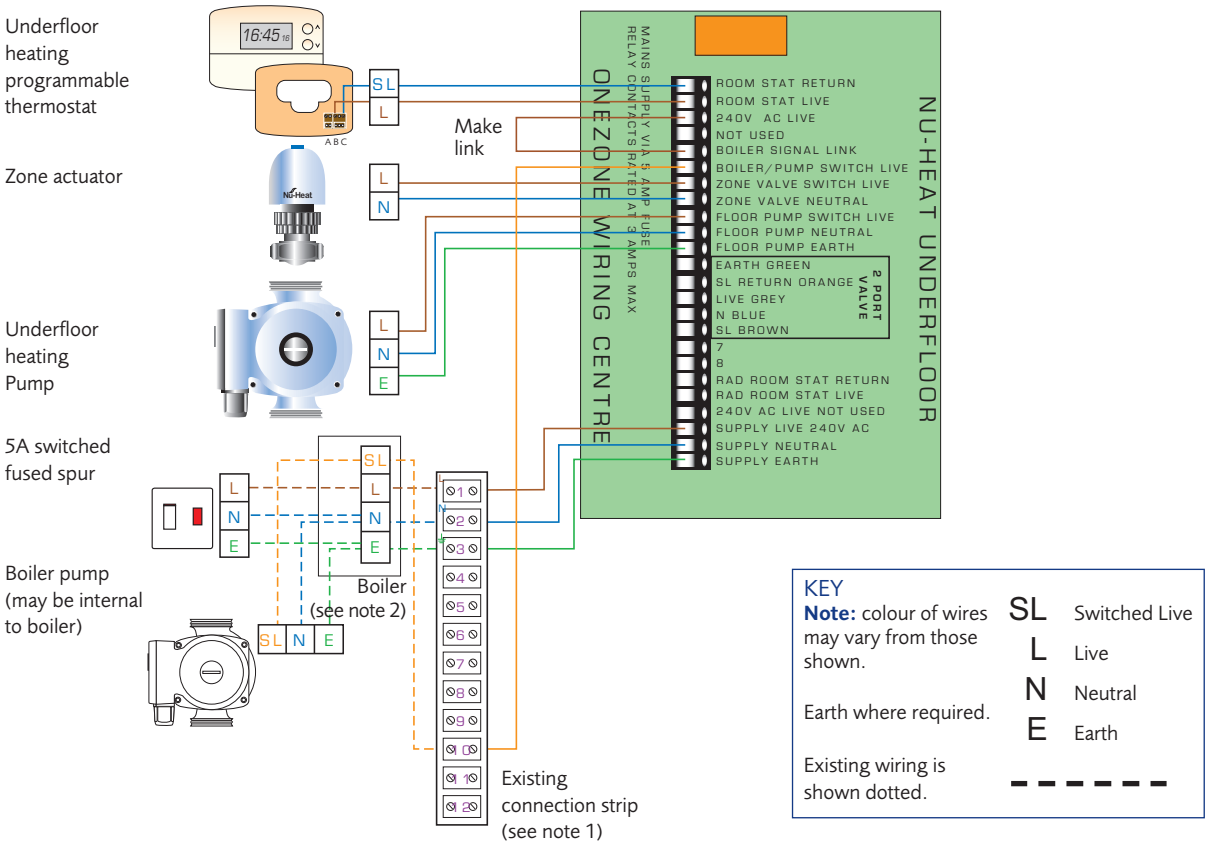
SCHEMATIC



SYSTEMS WITH DIRECT BOILER CONTROL cont.

S-PLAN (2X2-PORT CONTROL VALVES) 240V AC BOILER SWITCHING

WIRING DIAGRAM



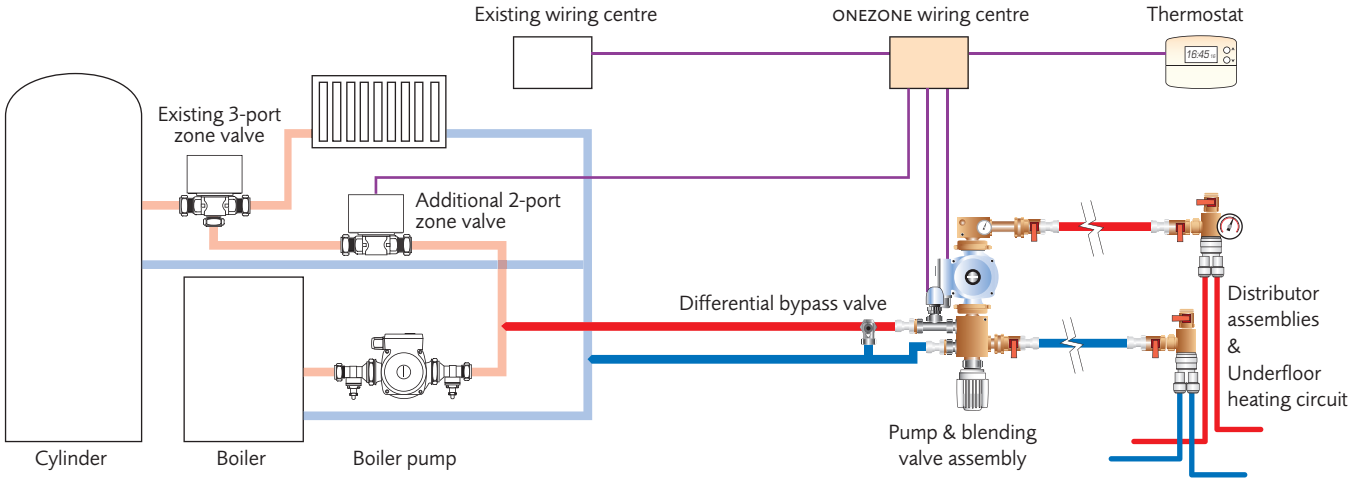
Notes:

1. The existing connection strip shown should be wired according to Honeywell or Danfoss standard wiring schematics for S-plan (two-port valve), with the addition of the connections detailed here.
2. Ensure that BOILER/PUMP SWITCHED LIVE on the Nu-Heat wiring box is connected to the boiler's switched live input, available at terminal 10 on the existing connection strip.
3. If the existing terminal strip is not as shown, ensure that boiler switched live input is also connected to the radiator and cylinder zone valves' orange wire (switched live return).
4. See pages 15 – 17 for alternative positions for pump and blending valve and distributor assemblies.
5. All new electrical works must comply with IEE Regulations and health and safety requirements, and be tested by a competent person before connection to mains voltage.
6. Components shown in outline are not supplied.

SYSTEMS WITH DIRECT BOILER CONTROL

W-PLAN AND Y-PLAN (3-PORT CONTROL VALVES) 240V AC SWITCHING

SCHEMATIC

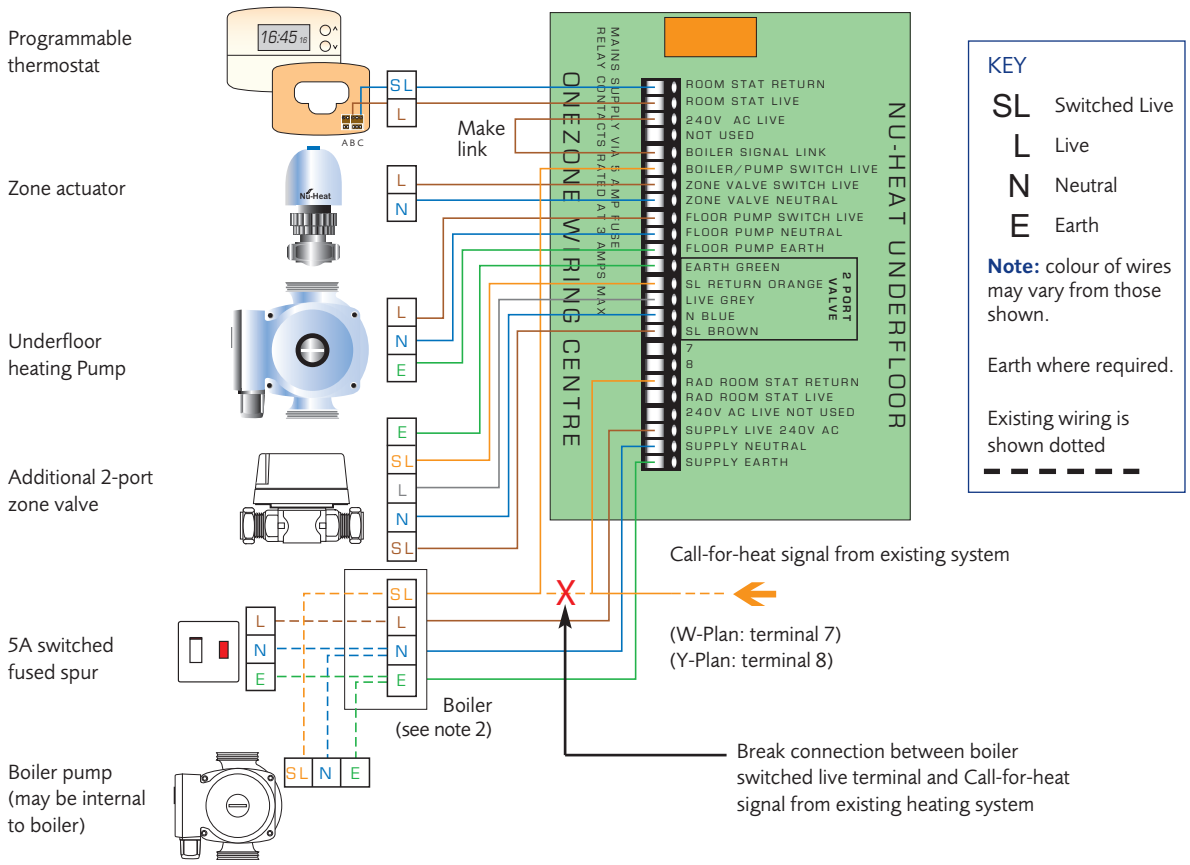


Note: To ensure there is no flow through the 3-port valve when both the radiator or cylinder system is off but the underfloor heating is on, an additional 2-port control valve must be fitted as shown.

SYSTEMS WITH DIRECT BOILER CONTROL cont.

W-PLAN AND Y-PLAN (3-PORT CONTROL VALVES) 240V AC SWITCHING

WIRING DIAGRAM



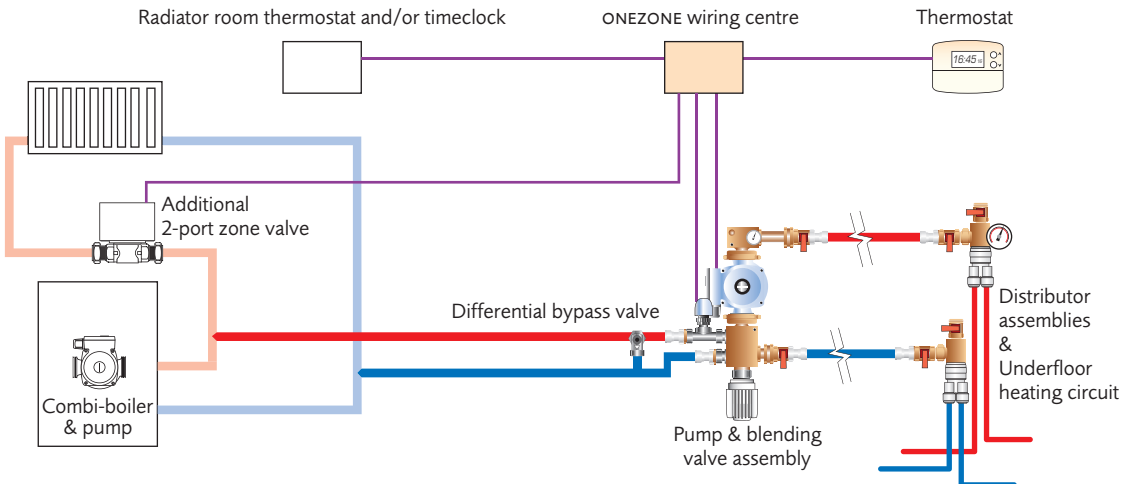
Notes:

1. See pages 11 – 12 for alternative positions for pump and blending valve and distributor assemblies.
2. All new electrical works must comply with IEE Regulations and health and safety requirements, and be tested by a competent person before connection to mains voltage.
3. Components shown in outline are not supplied.

SYSTEMS WITH DIRECT BOILER CONTROL

COMBINATION BOILERS AND BOILERS WITH LOW-VOLT SWITCHING

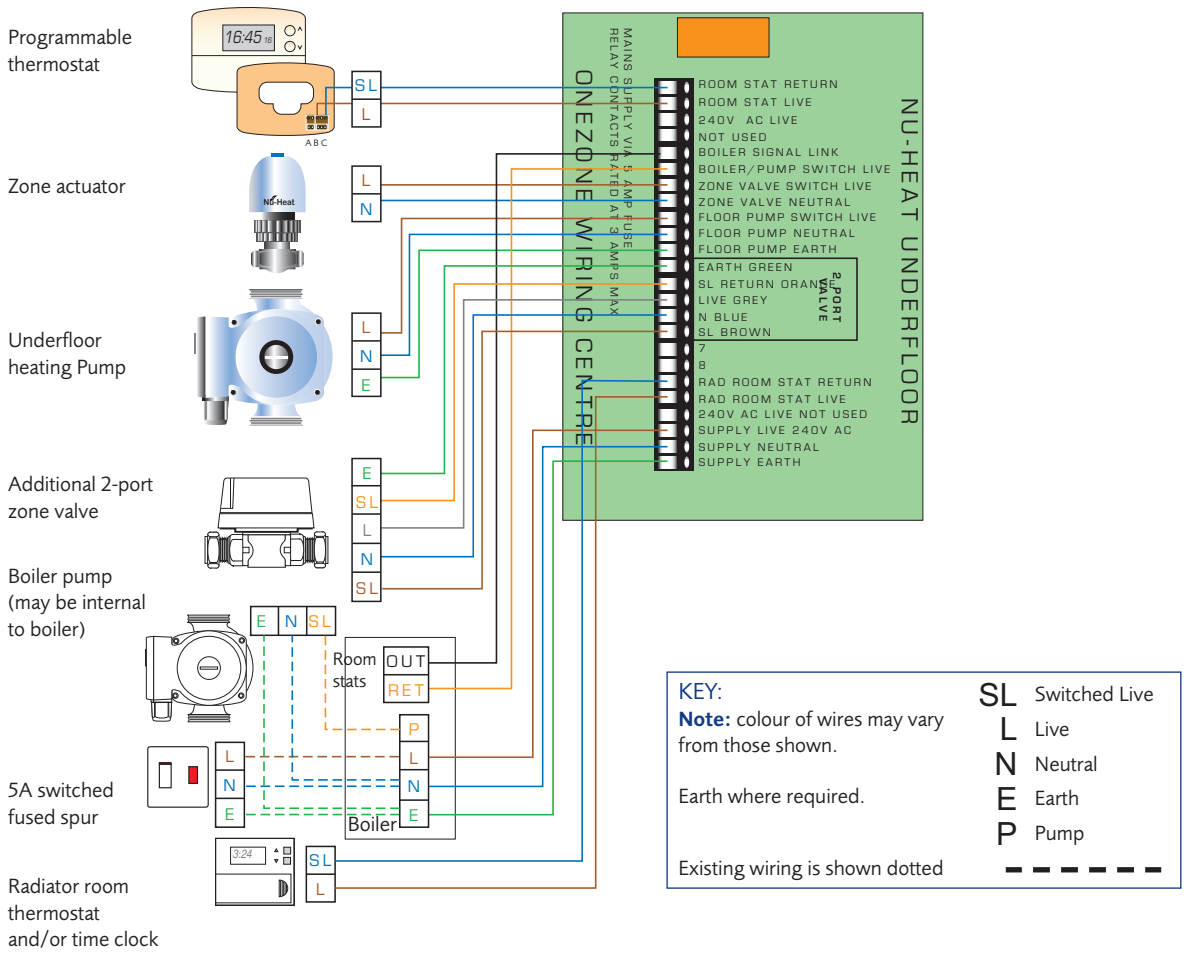
SCHEMATIC



SYSTEMS WITH DIRECT BOILER CONTROL

COMBINATION BOILERS AND BOILERS WITH LOW-VOLT SWITCHING

WIRING DIAGRAM

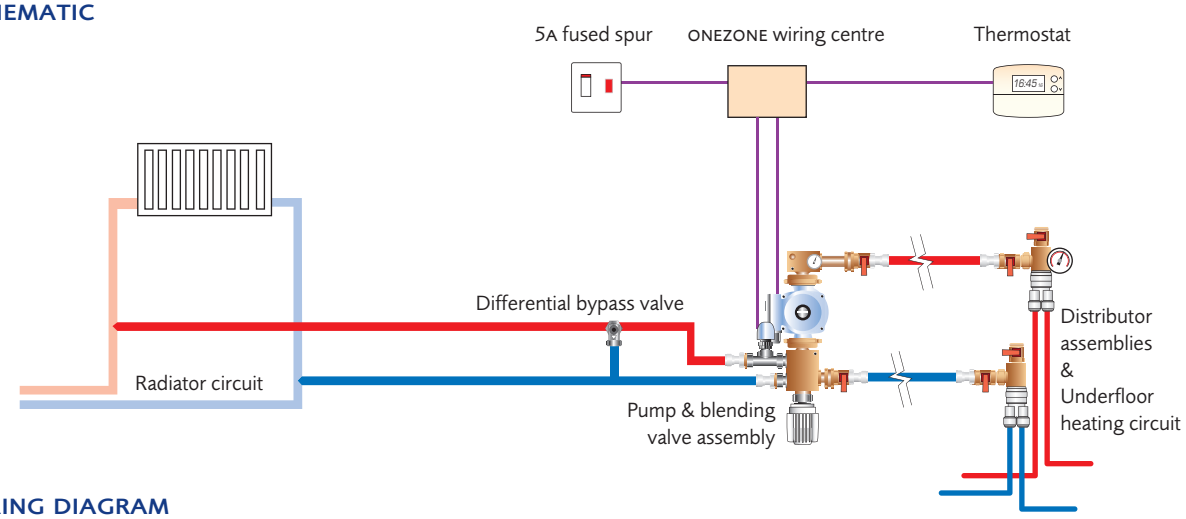


Notes:

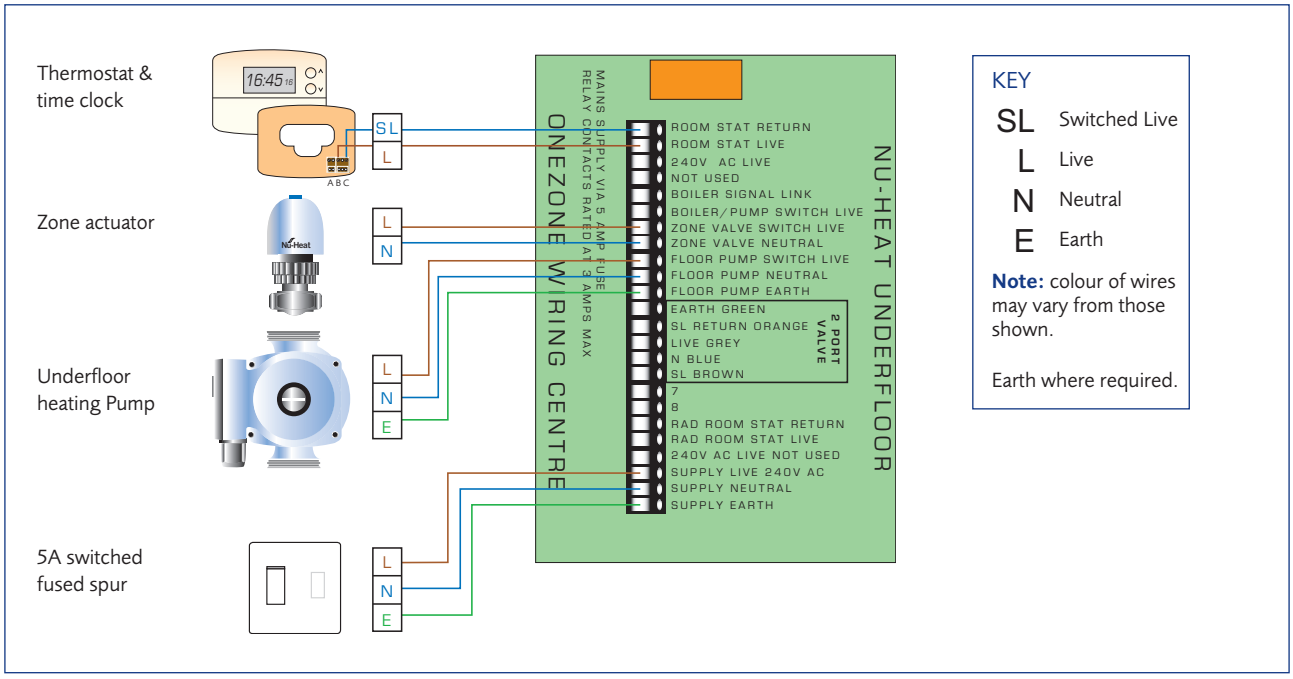
1. Refer to boiler manufacturer's instructions for connection details and system recommendations.
2. Ensure radiator room thermostat (if used) is suitable for 240v AC switching.
3. See pages 15 – 17 for alternative positions for pump and blending valve and distributor assemblies.
4. All new electrical works must comply with IEE Regulations and health and safety requirements, and be tested by a competent person before connection to mains voltage.
5. Components shown in outline are not supplied.

SYSTEMS WITHOUT DIRECT BOILER CONTROL

SCHEMATIC



WIRING DIAGRAM



Notes:

1. The Nu-Heat underfloor heating time clock/thermostat must be set so that heating periods coincide with the availability of hot water in the radiator circuit.
2. See pages 15 – 17 for alternative positions for pump and blending valve and distributor assemblies.
3. All new electrical works must comply with IEE Regulations and health and safety requirements, and be tested by a competent person before connection to mains voltage.
4. Components shown in outline are not supplied.

FIRST FIX – POSITIONING OF THE PUMP AND BLENDING VALVE ASSEMBLY

PIPEWORK

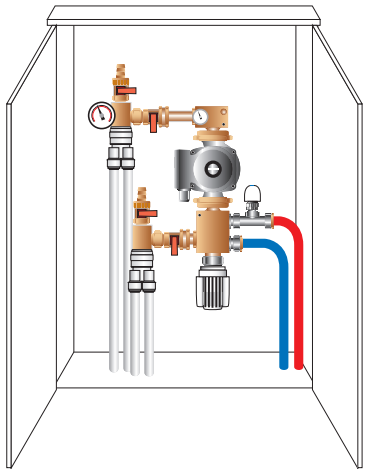
15mm flexible plastic barrier pipe with plastic push-fittings or copper pipe with brass fittings are both suitable as flow and return supply pipe to the pump and blending valve assembly.

ALTERNATIVES

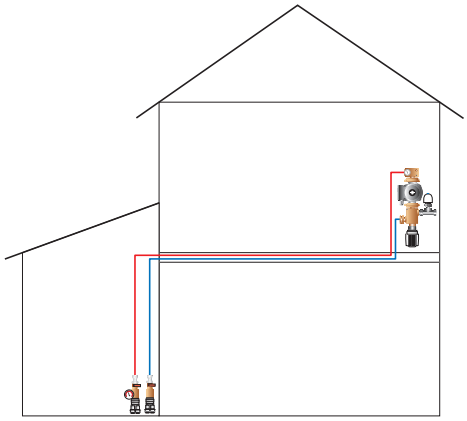
The pump and blending valve assembly can be positioned in any convenient place in the building. This could be in the room to be fitted with underfloor heating, connected to or near the distributor assemblies; or it could be in an airing cupboard or beside the boiler.

It 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. See pages 8 –14.

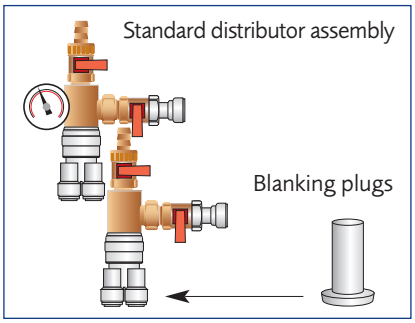


The assembly can **either** be positioned with the distributors directly attached in, or adjacent to, the room to be heated...



Or in another part of the building; for instance in an airing cupboard, utility room or garage remote from the distributors.

Internal cupboard dimensions (mm) should be no less than 350 wide x 450 high x 140 deep.

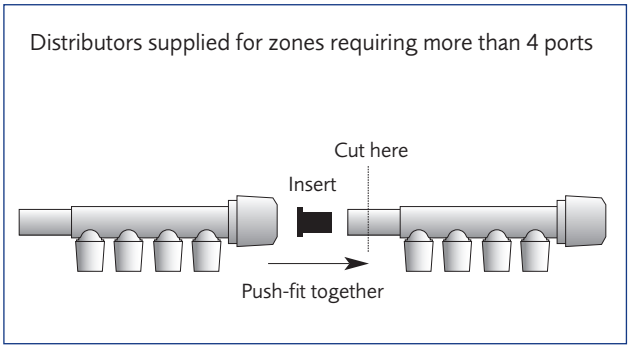


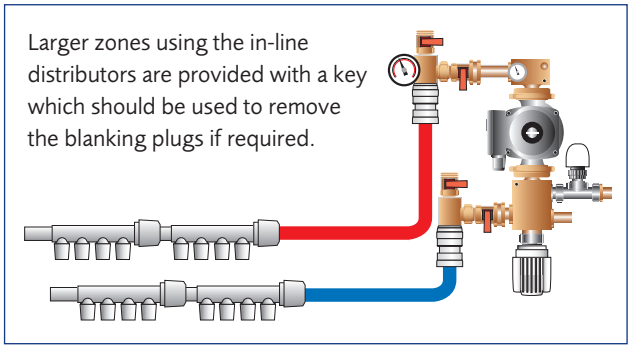
DISTRIBUTORS

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 below.





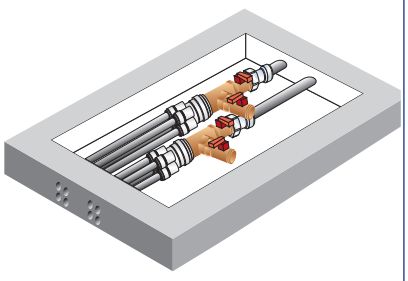
POSITIONING

Distributors can be fitted directly to the pump and blending valve assembly and then positioned in, or very near to, the room being heated. When fitted vertically the assembly should be fixed a minimum of 100mm 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 1metre.

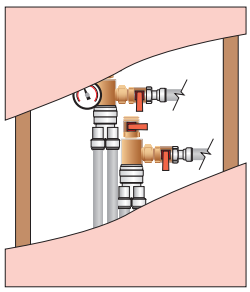
ALTERNATIVE POSITIONS

The pump and blending valve assembly may be fitted remotely from the distributors, such as in an airing cupboard. This allows the distributors to be positioned in a variety of places such as:

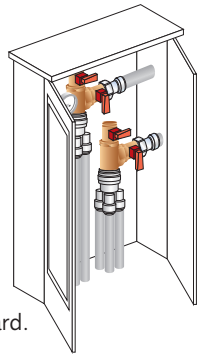
- In the floor (this will require a small area to be shuttered off during screeding),
- In a stud wall,
- In an adjacent room, (in a cupboard, wall, or joisted floor cavity),
- In a cupboard.



Distributors can be placed in the floor,



in a studwork wall,



in a cupboard.

CONNECTING FASTFLO-10™ HEATING TUBE TO THE DISTRIBUTORS

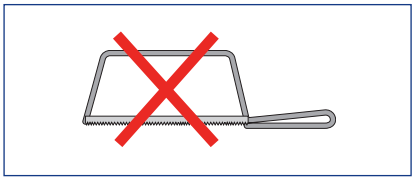
Note: It does not matter whether the supply pipework or the 10mm Fastflo® tube is connected to the distributors first.

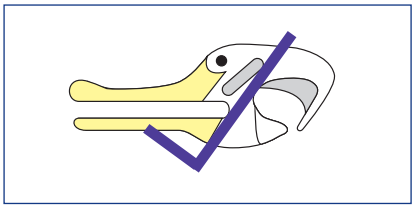
1. At the distributors, take one end of the floor heating tube and blow down it to make sure you have identified its other end correctly.
2. The Fastflo® tube should be cut squarely using pipe cutters and ensuring the tube is free from score marks.

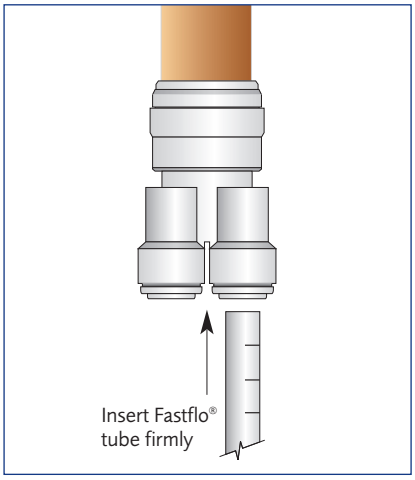
Note: If the tube has to be re-fitted for any reason, cut back the pipe to a clean, smooth surface. Never use a hacksaw to cut the tube.

3. Push the Fastflo® tube firmly into the distributor connection.
4. Lay floor heating tube as on following pages 18 – 30.
5. Repeat steps 1 – 4 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.







FLOOR CONSTRUCTIONS

TUBE TRIMMING CHART

Fastflo-10™ floor heating tube is supplied in coils which have to be trimmed to the correct length for your room.

Use this chart to determine the correct trim length. Each coil is marked every metre with its overall length and actual running length counting down to 0m.

Actual room area (m^2)	Amount of tube required (m)	Number of coils supplied	Trim each coil to: (m)
1	6.7	1	7.0
2	13.4	1	13.5
3	20.1	1	20.5
4	26.8	1	27.0
5	33.5	1	33.5
6	40.2	2	20.5
7	46.9	2	23.5
8	53.6	2	27.0
9	60.3	2	20.5
10	67.0	2	33.5
11	73.7	3	25.0
12	80.4	3	27.0
13	87.1	3	29.0
14	93.8	3	31.5
15	100.5	3	33.5
16	107.2	4	27.0
17	113.9	4	28.5
18	120.6	4	30.5
19	127.3	4	32.0
20	134.0	4	33.5
21	140.7	4	35.5
22	147.4	4	37.0
23	154.1	4	38.5
24	160.8	4	40.5
25	167.5	4	42.0
26	174.2	4	44.0
27	180.9	4	45.5
28	187.6	4	47.0
29	194.3	4	49.0
30	201.0	4	50.5

FLOOR CONSTRUCTIONS cont.

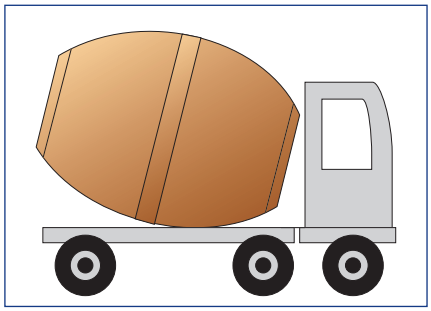
TUBE TRIMMING CHART

Actual room area (m^2)	Amount of tube required (m)	Number of coils supplied	Trim each coil to: (m)
31	207.7	6	35.0
32	214.4	6	36.0
33	221.1	6	37.0
34	227.8	6	38.0
35	234.5	6	39.5
36	241.2	7	34.5
37	247.9	7	35.5
38	254.6	7	36.5
39	261.3	7	37.5
40	268.0	7	38.5
41	274.7	6	46.0
42	281.4	6	47.0
43	288.1	6	48.0
44	294.8	6	49.5
45	301.5	6	50.5
46	308.2	7	44.0
47	314.9	7	45.0
48	321.6	7	46.0
49	328.3	7	47.0
50	335.0	7	48.0
51	341.7	8	43.0
52	348.4	8	44.0
53	355.1	8	44.5
54	361.8	8	45.5
55	368.5	8	46.5
56	375.2	8	47.0
57	381.9	8	48.0
58	388.6	8	49.0
59	395.3	8	49.5
60	400.0	8	50.0

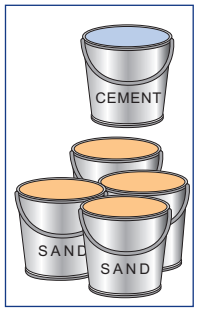
Note: Do not trim any coils until all coils have been laid in the floor.

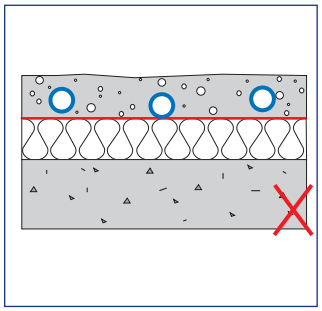
SCREEDED FLOORS

The effectiveness of underfloor heating in a screeded 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.

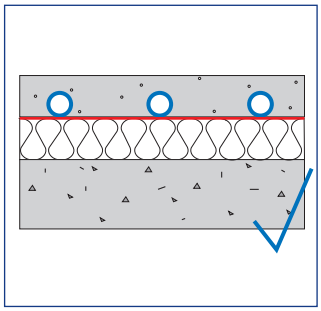


Pre-mixed screed is the preferred method. Alternatively, an accurate bucket-mix of 4 parts sharp sand to 1 part cement is acceptable.





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



A smooth, well compacted, level mix will improve performance.

Screed: The mixture for screeds should be four parts sharp sand to one part Portland cement. It must be laid level and well compacted to within a tolerance of 3 – 4mm over 2 metres.

Screed depth: Screed should be 65mm minimum, or as recommended by the screed supplier.

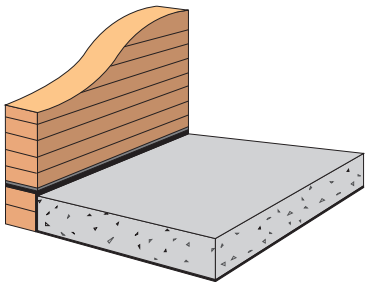
Drying the screed: The floor heating must not be used to accelerate the floor drying process. Three weeks after the screed has been laid, turn the floor heating on and set the heating mixing valve to 40˚C. Increase this temperature daily by 5˚C up to a maximum of 60˚C. The moisture level of the screed should be as specified by the flooring and adhesive suppliers.

FLOOR CONSTRUCTIONS – SOLID FLOORS USING CLIPTRACK™ (SC)

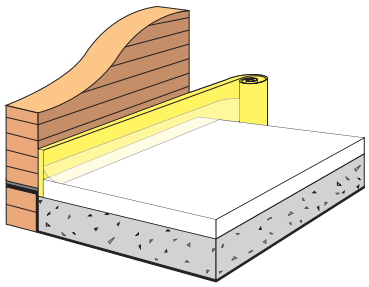
SEQUENCES OF LAYING THE FLOOR

Fastflo-10™ floor heating tube is supplied in coils which have to be trimmed to the correct length for your room.

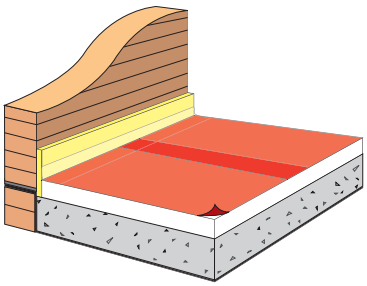
Use this chart to determine the correct trim length. Each coil is marked every metre with its overall length and actual running length counting down to 0m.



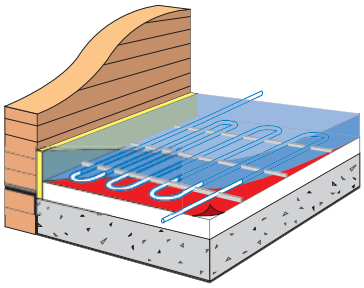
1. Lay the damp-proof membrane (dpm), concrete slab and damp-proof course (dpc) in accordance with current Building Regulations.



2. Roll out edge insulation 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.

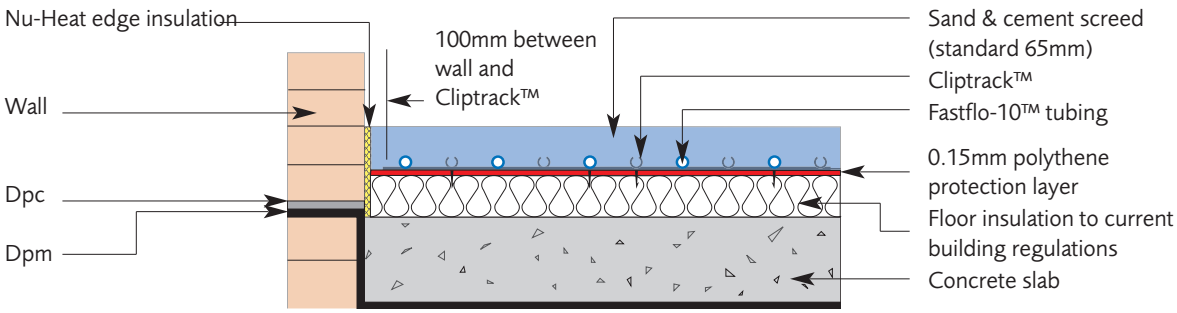


4. Fit the Cliptrack™ and Fastflo-10™ tubing as in the instructions on pages 22 – 25.

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.

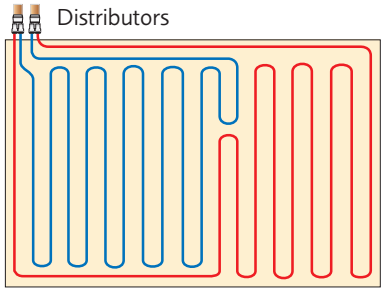
CROSS-SECTION

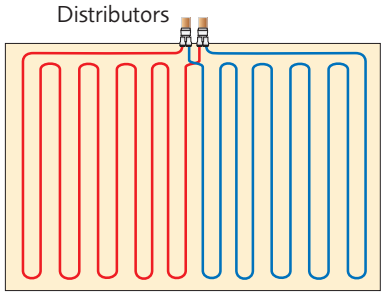


SC – Screed with Cliptrack™

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

TYPICAL TUBE LAYOUTS



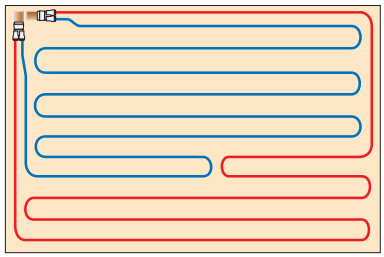


The principles of laying tube in the floor are simple as long as these guidelines are followed:

- The spacing between coil runs should be constant and as specified by Nu-Heat for the floor construction, (150mm unless otherwise stated).
- Always leave an expansion gap around the edge of the room – Nu-Heat supplies edge insulation for this purpose.
- Start the tube laying at the distributor position.
- To avoid kinking, the minimum bend radius of the tube is 50mm.
- Only flow **or** return tube can be connected to a single distributor, not both.

The following are examples of typical tube layouts:

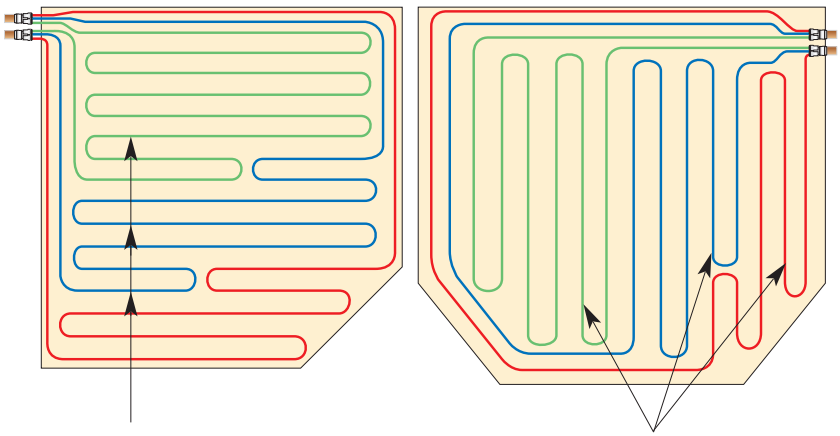
Start tube laying at distributor position



Alternative configurations for a two-coil installation

Distributor

Distributor



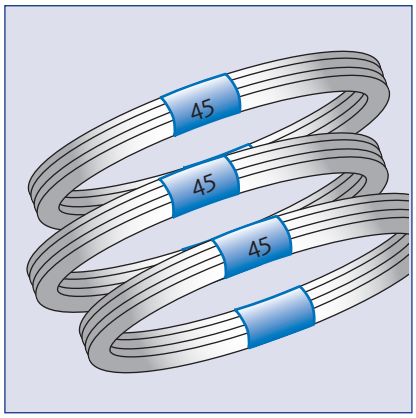
Equal spacing across floor
(150mm unless otherwise stated)

Coils of approximately
equal length

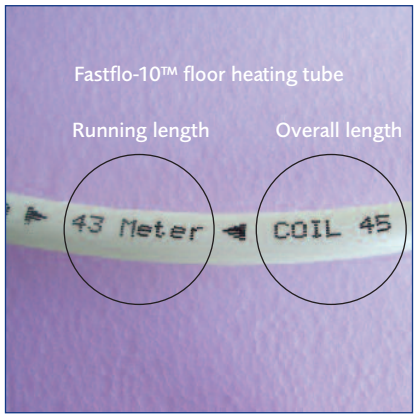
Typical conservatory/extension shaped rooms with three coils of tubing installed

TUBING LAYOUTS IN SOLID FLOORS USING CLIPTRACK™

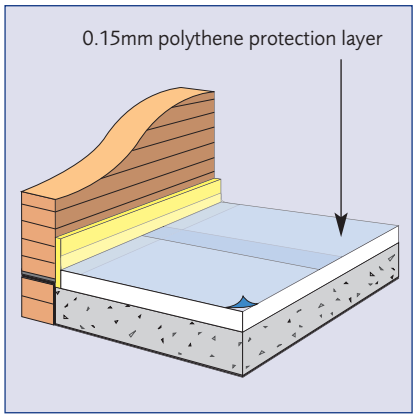
SEQUENCES OF LAYING FASTFLO-10™ TUBING IN THE FLOOR



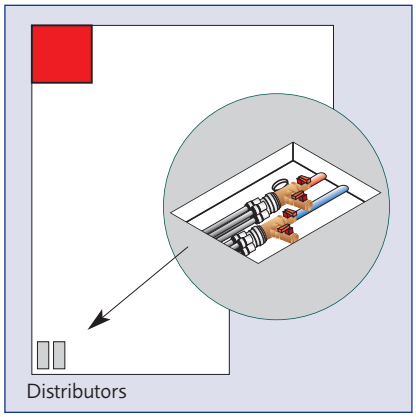
1. Check the *Delivery Note* to establish the correct number and lengths of the Fastflo-10™ tube coils for the room. This sheet also gives information on non-standard tube spacing.



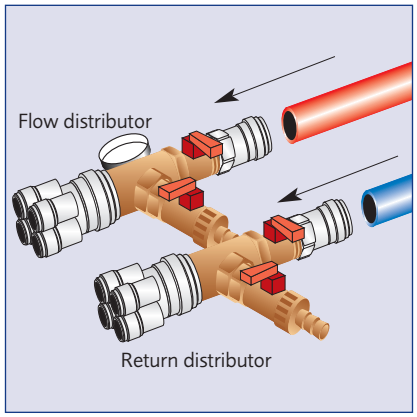
2. Each coil is marked every metre with its overall length and actual running length counting down to 0m. **Note:** The *Tube Trimming Chart* on page 13 gives the correct coil lengths for your room.



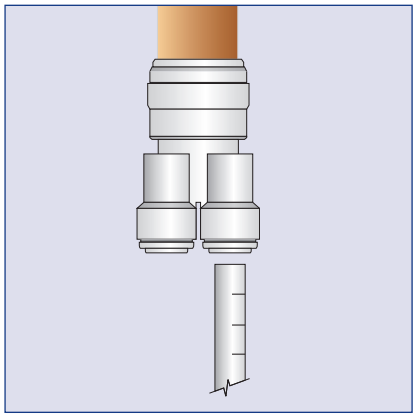
3. Roll out the edge insulation around the sides of the room and lay the floor insulation to the correct thickness as detailed in current building regulations. Cover with 0.15mm polythene with at least 80mm overlap.



4. Place the distributors in a convenient position as described on pages 15–17. In this example, in the floor to be screeded.

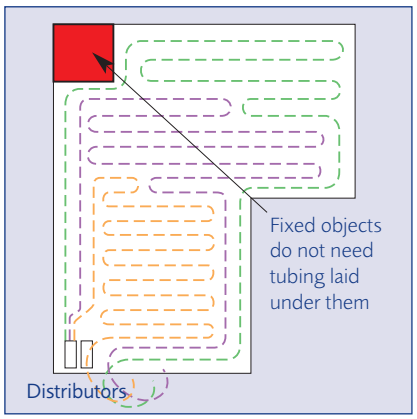


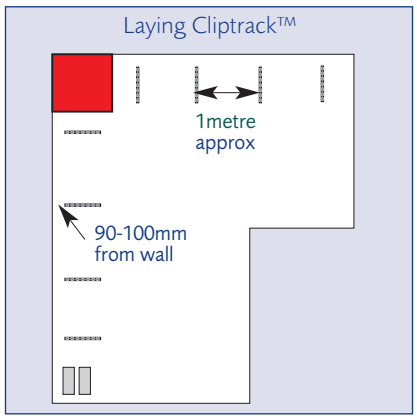
5. The flow and return pipe should be connected to the distributors at this stage.It is important to remember which distributor is flow and which return.

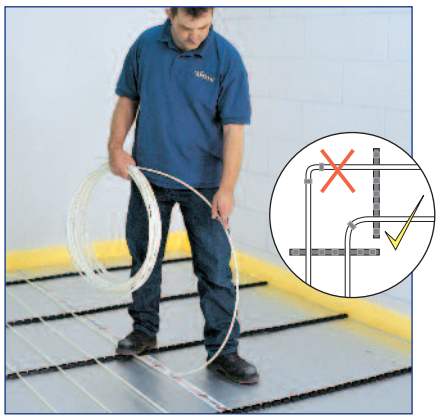


6. Insert one end of the 10mm tube firmly into the flow distributor.

TUBING LAYOUTS IN SOLID FLOORS USING CLIPTRACK™ cont





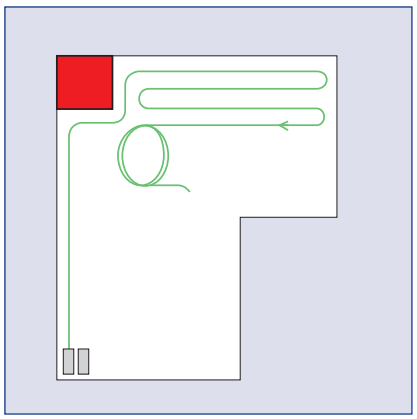


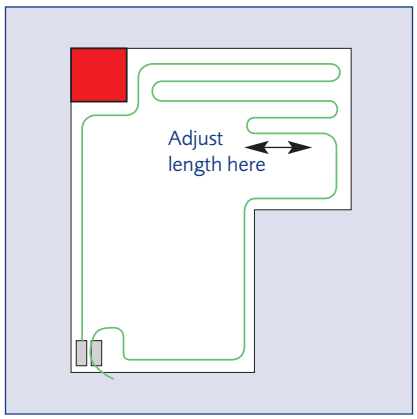
7. Plan the best layout for the floor heating tube before starting. The tubing should exit the distributor and run around the wall to the furthest point. It should then be doubled back on itself in a serpentine pattern to fill the space. Areas such as kitchen units, WCs, hearths etc, should not be filled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

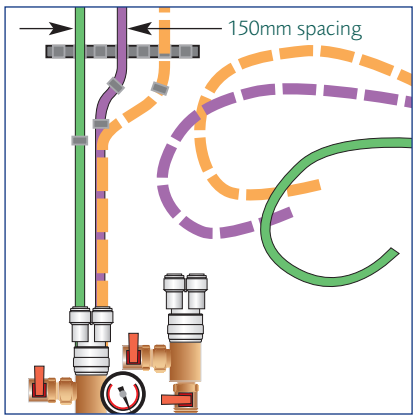
8. When the best layout has been determined, fix the Cliptrack™ at approximately 1m centres to suit. It should be 90–100mm from the walls.

Examples of suggested layouts are shown on page 22.

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





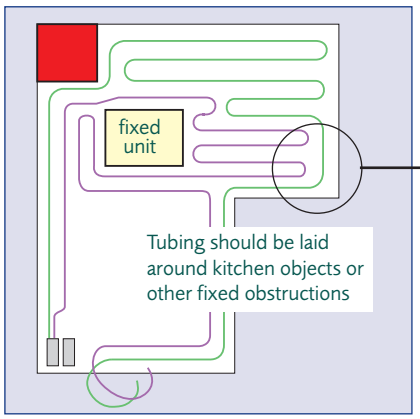


10. The tube should then be doubled back on itself filling the area at the correct spacing.

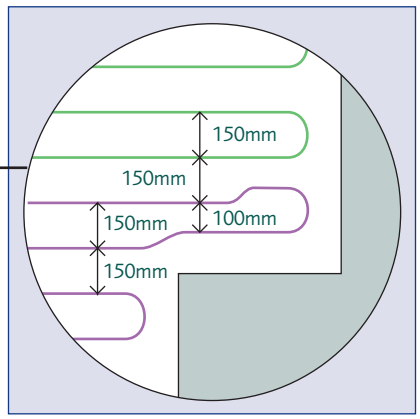
11. When there is just enough left, turn back and run the tube around the edge of the room to the return distributor. Any excess or shortfall can be adjusted at the turn-back point.

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

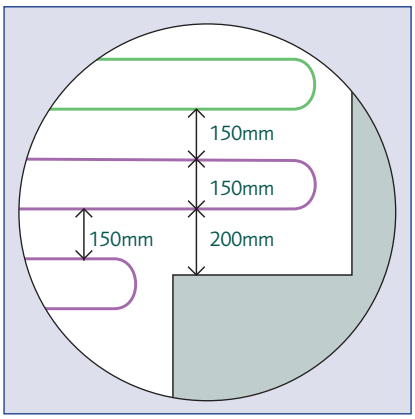
TUBING LAYOUTS IN SOLID FLOORS USING CLIPTRACK™ cont



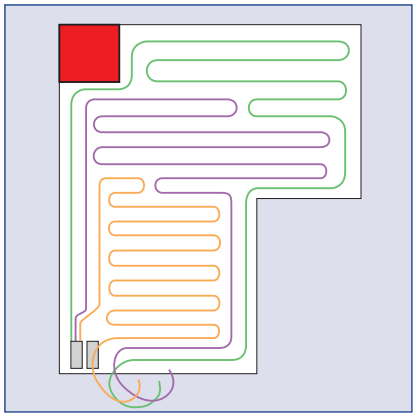
13. Use the same method as for the first coil of tube. Single clips can be used where necessary to hold the tube in position.



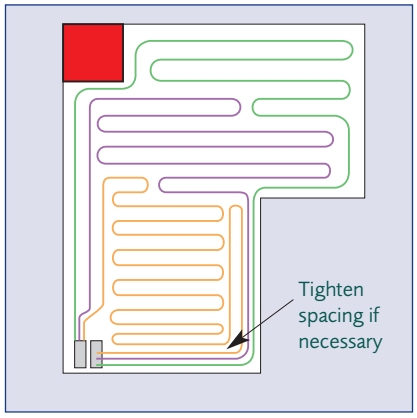
14. If the 150mm spacing cannot be maintained it is possible to make adjustments by reducing the spacing over small areas before resuming correct spacing.



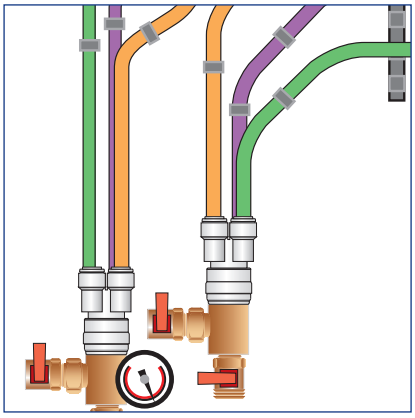
15. If the restricted area is too small to lay and turn the tube, leave a small area with larger spacing, but resume 150mm spacing as soon as possible.



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



17. Use the correct length of tube as detailed in the *Tube Trimming Chart* on p.18. 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, (eg.10m cut from a 40m coil).



18. With all the tubing laid, trim to the correct length and insert the tubes firmly into the return distributor as shown in diagram 6.

Continue with the Filling, flushing & pressure testing section on page 31.

FLOOR CONSTRUCTIONS USING NU-HEAT EHD TRACKED POLYSTYRENE AND HEAT TRANSFER PLATES

Notes: When used on ground floors or over a void, the total insulation must comply with current building regulations.

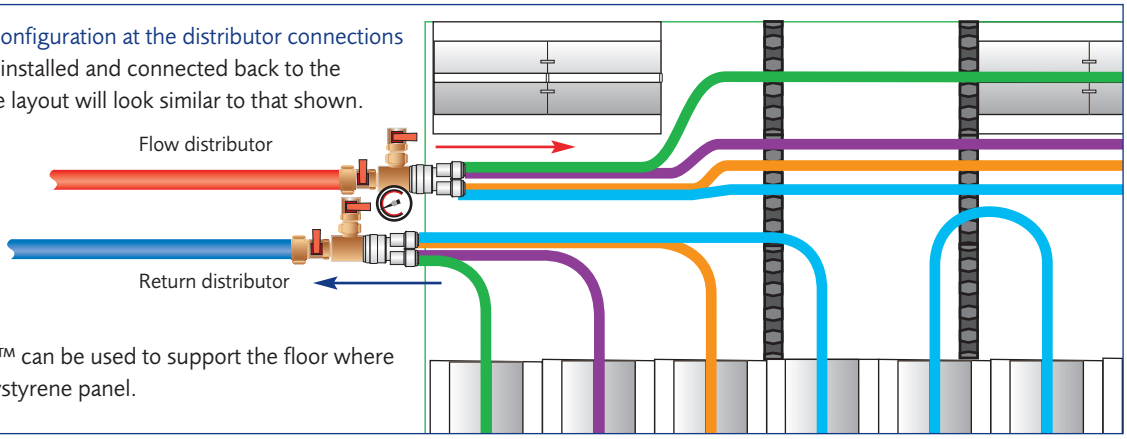
The thermal conductivity of the tracked polystyrene is 0.035W/mK.

Battens may be incorporated into these floor constructions to allow timber decking to be secured.

It is unlikely that the panel widths will fit a room exactly; use trimmed diffuser panels to fill any gaps.

To avoid injury always wear gloves when handling plates.

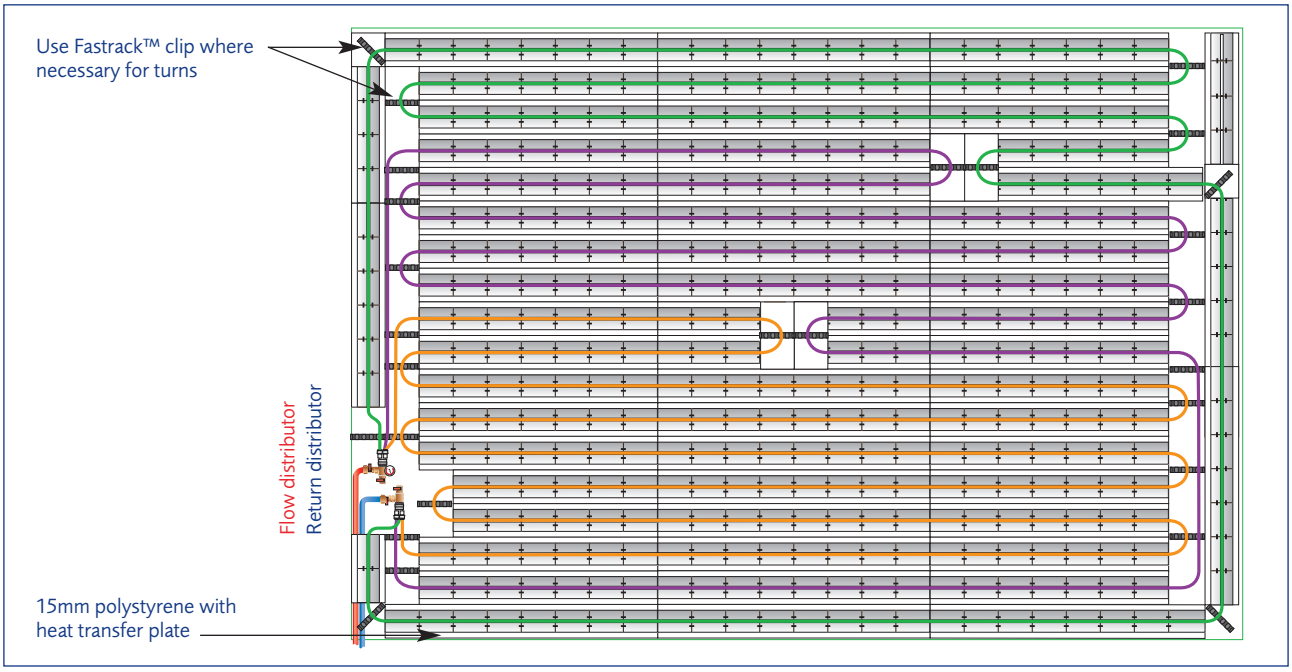
Detail of tube configuration at the distributor connections
With all tubing installed and connected back to the distributors, the layout will look similar to that shown.



Note: Fastrack™ can be used to support the floor where there is no polystyrene panel.

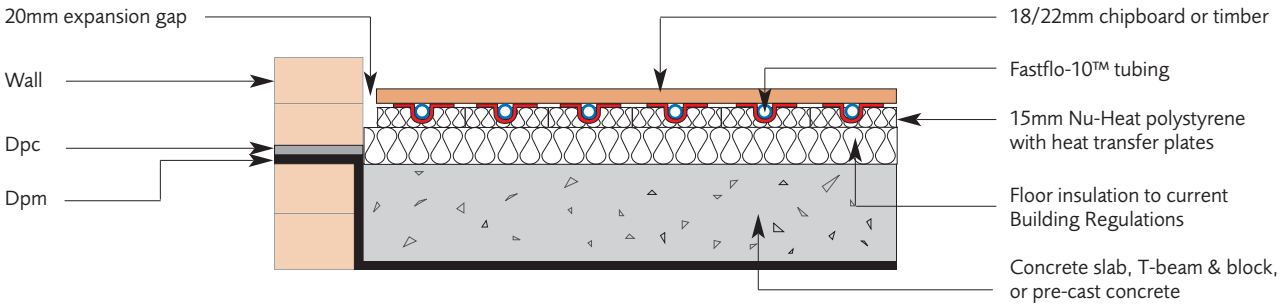
TUBING LAYOUT USING HEAT TRANSFER PLATES ON TRACKED POLYSTYRENE

TYPICAL LAYOUT SHOWING USE OF FASTRACK™ CLIPS, HEAT TRANSFER PANELS AND FASTFLO® TUBING

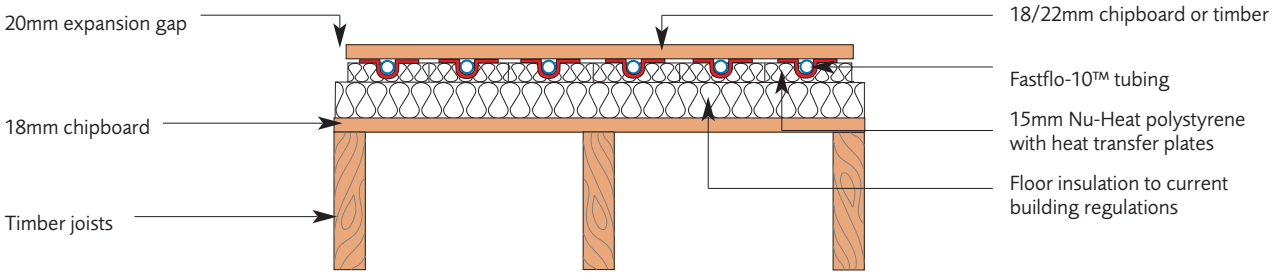


FLOOR CONSTRUCTIONS USING NU-HEAT EHD TRACKED POLYSTYRENE AND HEAT TRANSFER PLATES cont.

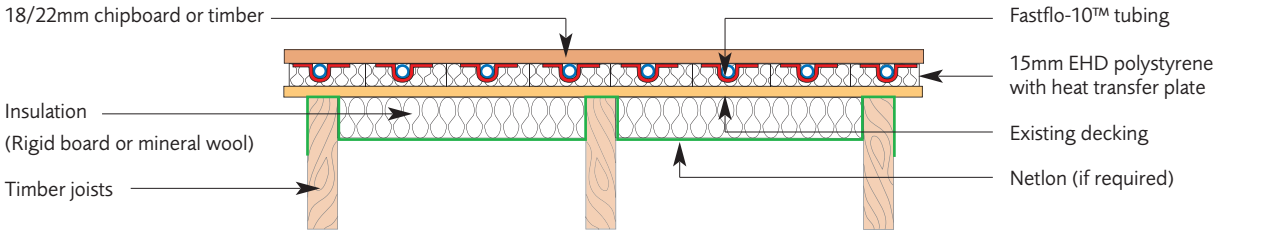
FLOATING TIMBER FLOOR ON A CONCRETE OR BEAM AND BLOCK BASE



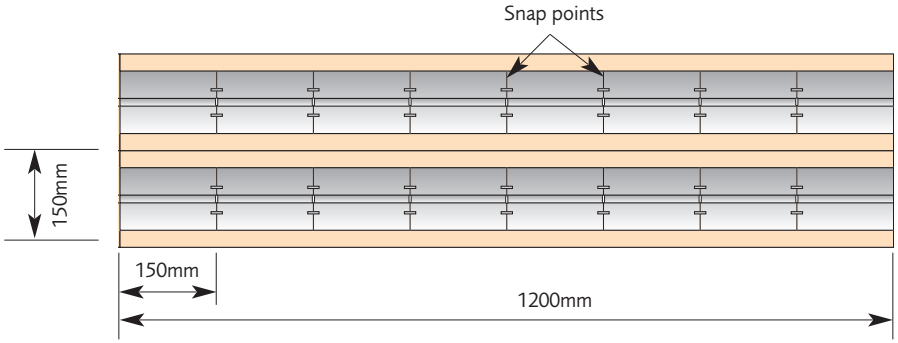
FLOATING TIMBER FLOOR ON A TIMBER DECK



ALTERNATIVE FLOATING TIMBER FLOOR ON A TIMBER DECK WITH INSULATION BETWEEN JOISTS (LOW HEIGHT BUILD-UP)

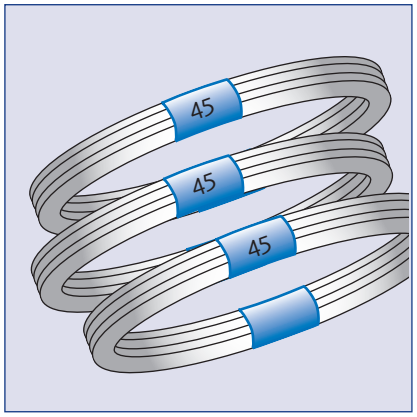


POLYSTYRENE PANELS WITH HEAT DIFFUSER PLATES

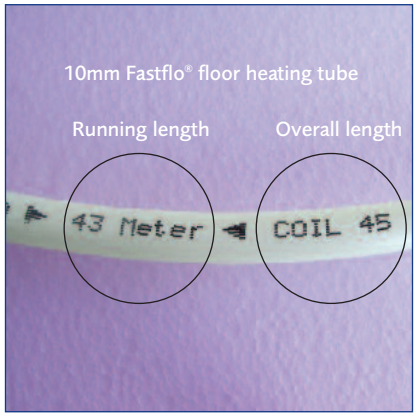


TUBING LAYOUTS USING HEAT TRANSFER PLATES ON TRACKED POLYSTYRENE

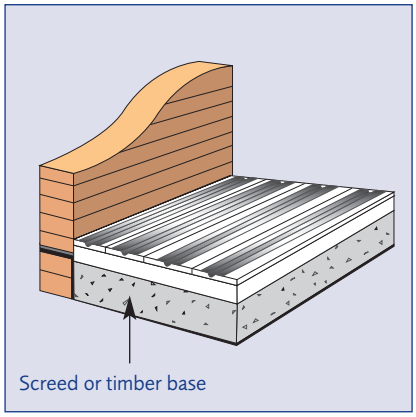
SEQUENCES OF LAYING FASTFLO-10™ TUBING IN THE FLOOR



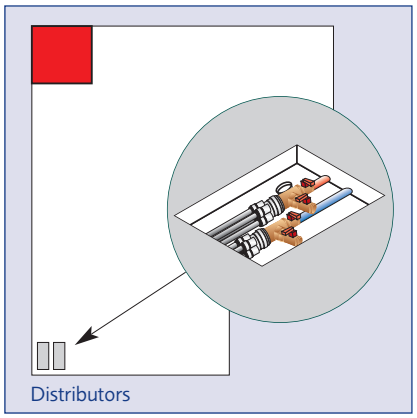
1. Check the *Delivery Note* to establish the correct number and lengths of the Fastflo-10™ tube coils for the room.



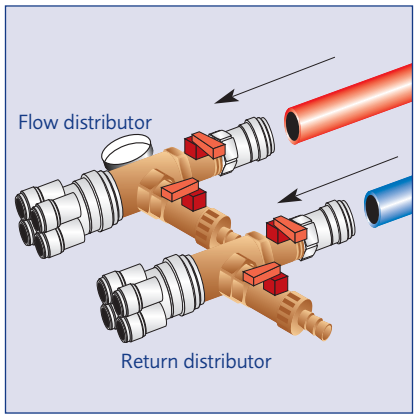
2. Each coil is marked every metre with its overall length and actual running length counting down to 0m. **Note:** The *Tube Trimming Chart* on page18 gives the correct coil lengths for your room.



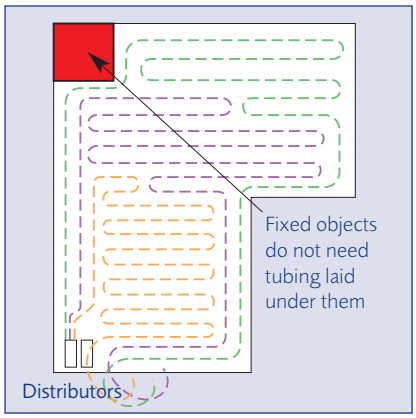
3. Nu-Heat supplies heat diffuser plates on 15mm polystyrene. This should be combined with sufficient insulation to meet current Building Regulations. **Note:** Take care to align panels accurately.



4. Place the distributors in a convenient position as described on pages 15–17. For this example in the floor, the insulation should be channelled to recess the distributors.



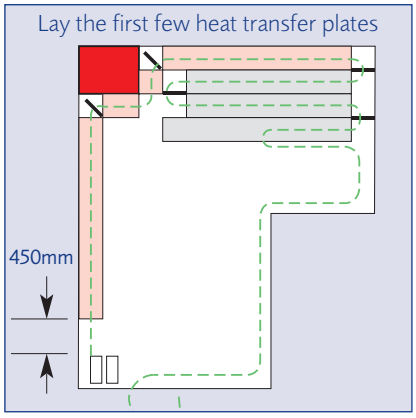
5. The flow and return pipe should be connected to the distributors at this stage. It is important to remember which distributor is flow and which return.



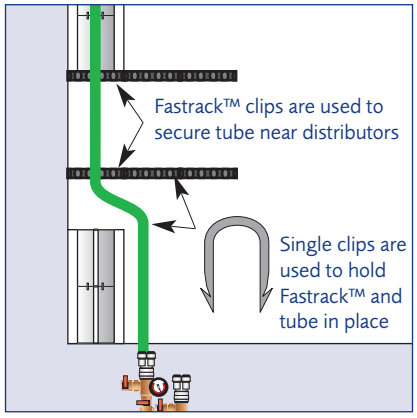
6. Plan the best layout for the floor heating tube before starting. The tubing should exit the distributor and run around the wall to the furthest point. It then doubles back on itself in a serpentine pattern to fill the space. Areas such as kitchen units, WCs, hearths etc, should not be filled with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

TUBING LAYOUTS USING HEAT TRANSFER PLATES ON TRACKED POLYSTYRENE cont.

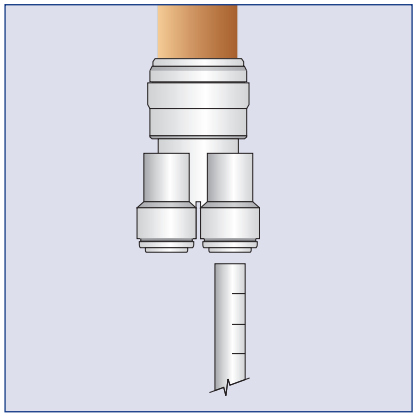
SEQUENCES OF LAYING FASTFLO-10™ TUBING IN THE FLOOR



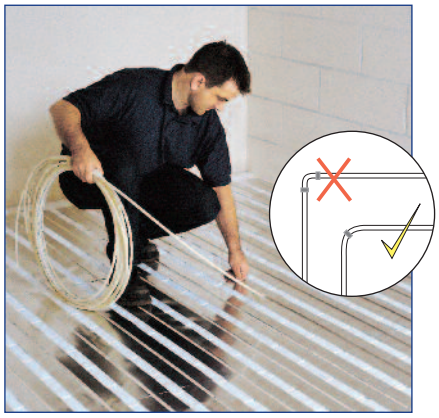
7. Examples of suggested layouts are shown overleaf. When the best layout has been determined, start laying the panels. Working away from the distributors, leave a gap of 450mm and then lay one width of panel along the edge of the wall and across the room to the furthest point.



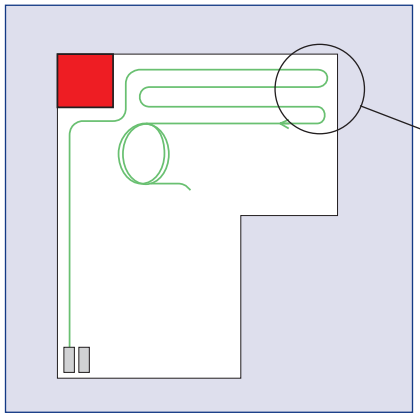
8. Lay approximately enough panels for the first coil of tube. Fastrack™ clips are provided to hold tube in place near the distributors. Single clips can also be used where necessary to secure tube, Fastrack™ or panels in place.



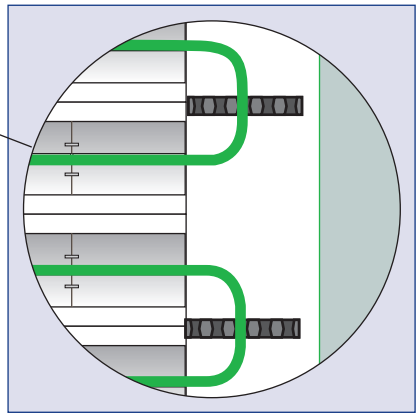
9. Insert one end of the 10mm tube firmly into the flow distributor (the one with the gauge).



10. Roll out the tube pushing it into the plates. Do not kink the tube by trying to make a very tight turn. Unroll the tube hand over hand to avoid twisting and push into the plates.



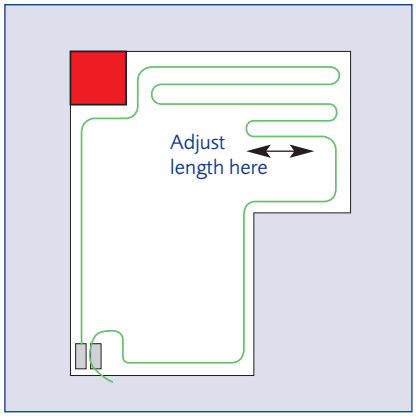
11. The tube should then be doubled back on itself filling the area at the correct spacing of 150mm as determined by the plates.



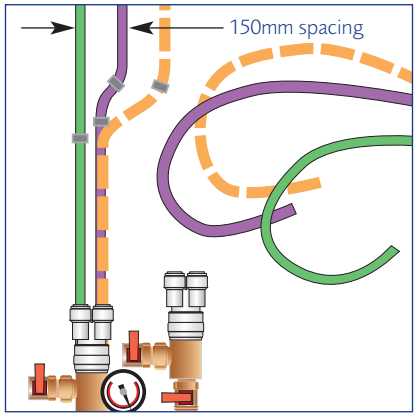
12. Use the Fastrack™ clip provided for turns.

TUBING LAYOUTS USING HEAT TRANSFER PLATES ON TRACKED POLYSTYRENE cont.

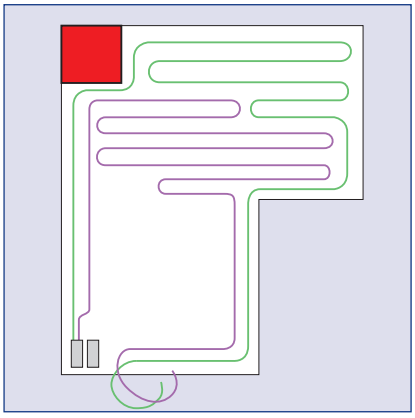
SEQUENCES OF LAYING FASTFLO-10™ TUBING IN THE FLOOR



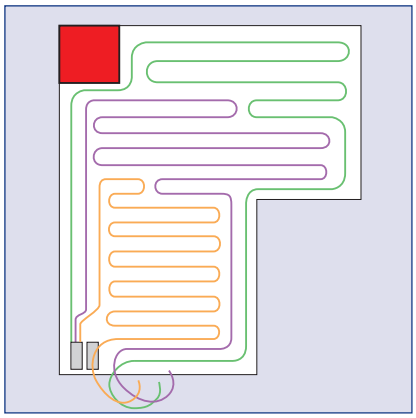
13. When there is just enough left, turn back and run the tube around the edge of the room to the return distributor. Any excess or shortfall can be adjusted at the turn-back point. Again, use Fastrack clip for turns.



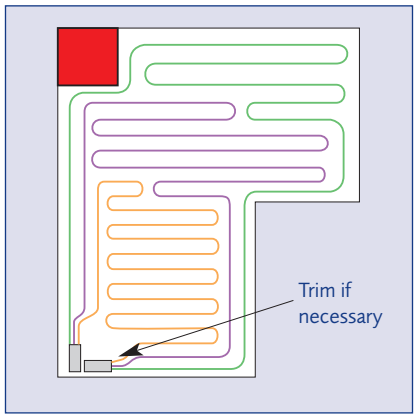
14. Exit the flow distributor with the second coil at a spacing to suit the connections. Use Fastrack™ clip to hold tube in place until it goes into the panel, (see page 26).



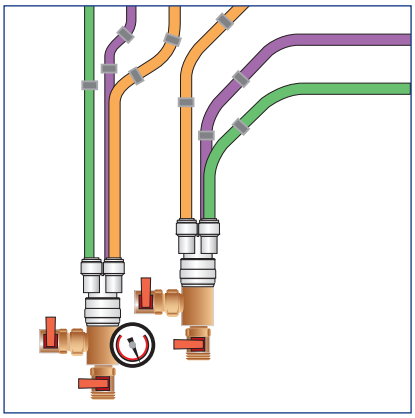
15. Use the same method as for the first coil of tube.



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



17. Use the correct length of tube as detailed in the *Tube Trimming Chart* on p.13. 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, (eg.10m cut from a 40m coil).



18. With all the tubing laid, trim to the correct length and insert the tubes firmly into the return distributor as shown in diagram 9.

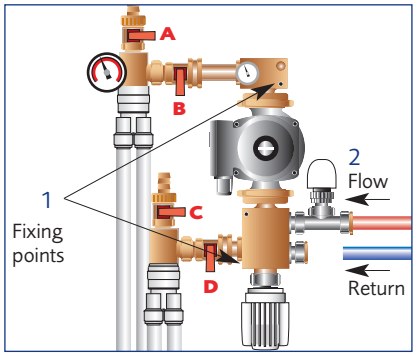
Continue with the Filling, flushing & pressure testing section on page 31.

FILLING, FLUSHING AND PRESSURE TESTING FLOOR HEATING TUBE

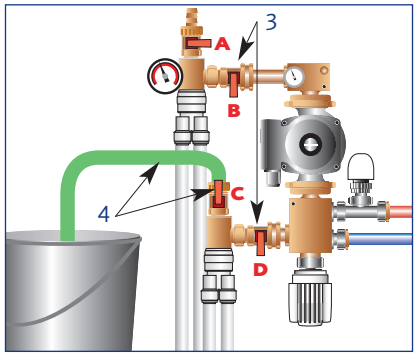
WHEN PUMP & BLENDING VALVE ASSEMBLY IS CONNECTED TO THE DISTRIBUTOR ASSEMBLY

It is essential to remove all air from the pipework or the floor heating pump will not circulate water through the Fastflo® tube.

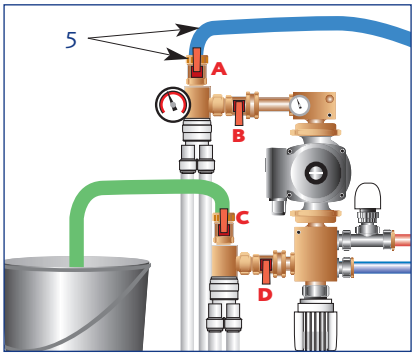
Note: Tighten all manifold joints before filling and flushing.



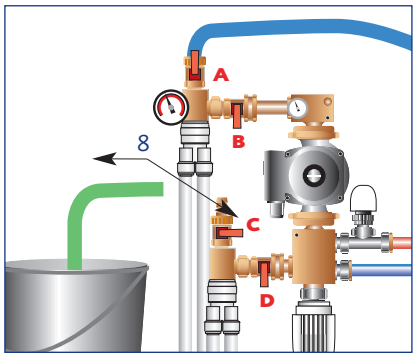
1. Put the assembly together and fix to the wall incorporating rubber spacers.
2. Connect flow and return pipework.



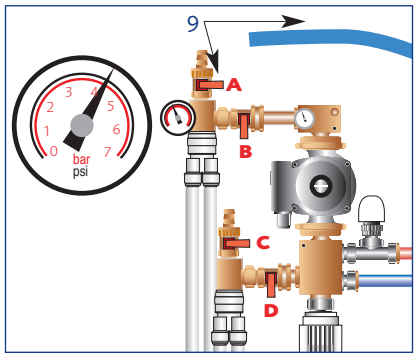
3. Close D. Close B.
4. Connect drain hose to C and run into a bucket. Open C.



5. Connect hose from cold mains to A which is closed. Open A.
6. Turn on the water supply tap.



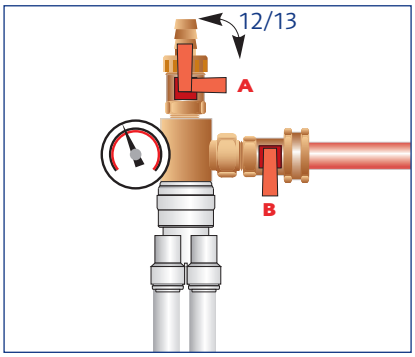
7. Run for 2 – 3 minutes until water is clear of all large bubbles.
8. Close C and remove hose.



9. When pressure gauge shows between 2 and 6-bar, close A and remove hose.

Note: Do not allow the pressure to exceed 6.0-bar.

10. After 1 hour check that there has been no more than 0.5-bar drop in pressure from original reading.

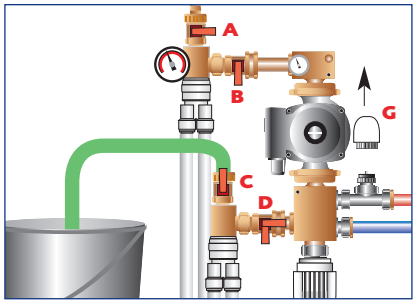


11. Lay the sand and cement screed whilst the system is under a working pressure of 1 bar.
12. When the screed is dry, open A to release the pressure to zero (there could be a small amount of water released).
13. Close A.

FILLING THE PUMP AND BLENDING VALVE ASSEMBLY

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

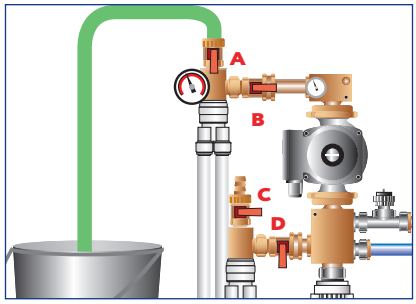
Before filling the assembly ensure the flow and return heating pipes are connected so that air can be purged by heating system water.



1. Remove actuator head G before filling the pump & blending valve assembly.

2. Attach hose to C and into a bucket, open C.

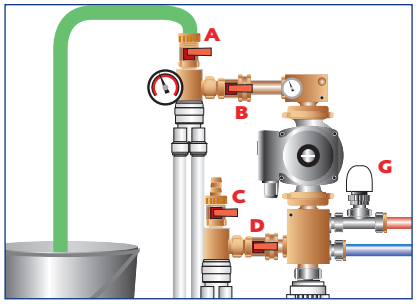
3. Open D. Run boiler filling loop for 2 – 3 minutes until water is clear of all large bubbles.



4. Close C and remove hose. Close D.

5. Attach hose to A and into bucket, open A.

6. Open B. Run for 2 – 3 minutes until water is clear of all large bubbles.



7. Close A, leave B open. Remove hose.

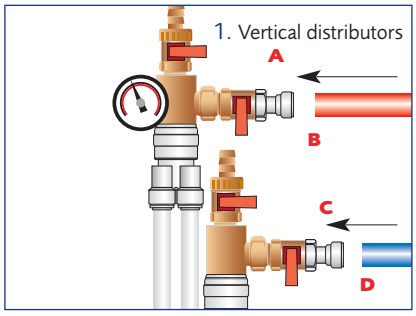
8. Replace valve head G.

9. Open D. Ports D and B should be left open, A and C should remain closed.

FILLING, FLUSHING AND PRESSURE TESTING FLOOR HEATING TUBE

WHEN DISTRIBUTORS ARE REMOTE FROM THE PUMP & BLENDING VALVE ASSEMBLY

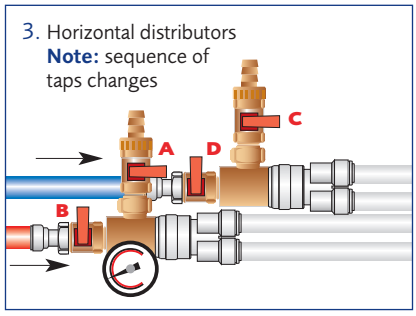
It is essential to remove all air from the pipework or the floor heating pump will not circulate water through the Fastflo® tube.



1. Place distributors in position

either: Vertically –

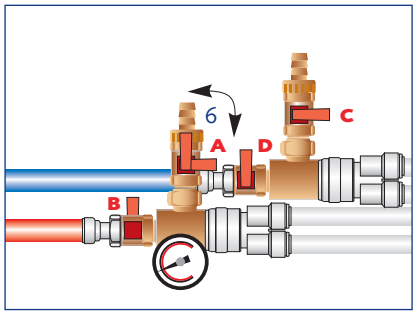
2. Follow steps 2 – 12 opposite then go to section on filling the pump and blending valve assembly below with the sequence of taps as above.



or: Horizontally –

3. Attach water supply pipes from pump and blending valve assembly to distributors.

4. Reconfigure and follow steps 3 – 9 opposite.



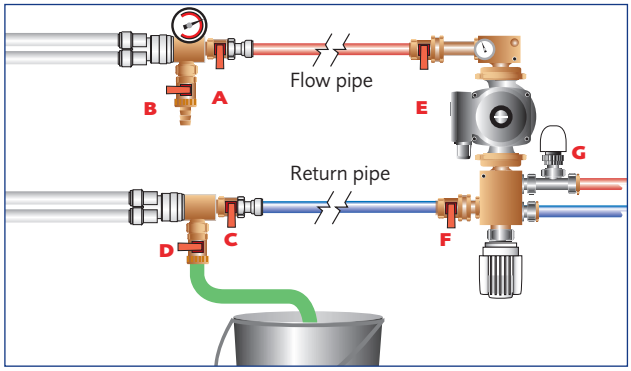
5. Screed the floor whilst the system is under a working pressure of 1 bar.

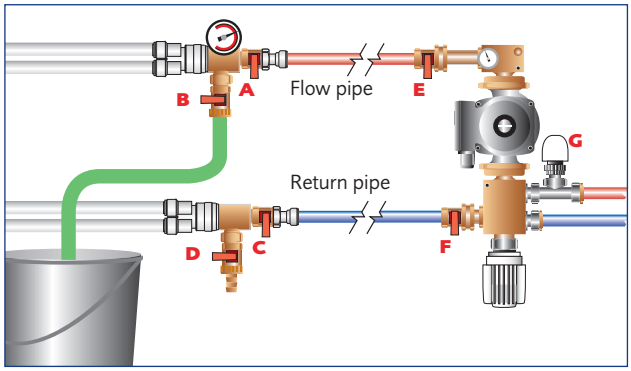
6. When the screed is dry, open A to release the pressure to zero (there could be a small amount of water released). Close A.

FILLING THE PUMP AND BLENDING VALVE ASSEMBLY AND DISTRIBUTOR SUPPLY PIPEWORK

WHEN DISTRIBUTORS ARE REMOTE FROM THE PUMP AND BLENDING VALVE ASSEMBLY

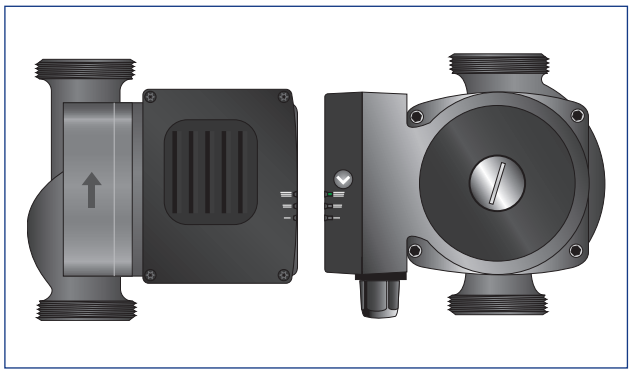
Before filling the assembly ensure the flow and return heating pipes are connected so that air can be purged by heating system water.





1. On installation of pump and blending valve assembly ensure E and F remain closed.
2. Attach hose to D and into a bucket.
3. Open F, open C, open D.
4. Run boiler filling loop for 2 – 3 minutes until water is clear of all large bubbles.
5. Close D and remove hose.
6. Attach hose to B and into bucket.
7. Open E, open A, open B. Remove actuator head G.
8. Run boiler filling loop for 2 – 3 minutes until water is clear of all large bubbles.
9. Close B and remove hose.
10. Open A, E, C, and F.
11. Replace actuator head G.
12. Ports B and D remain shut unless the flushing process needs to be repeated.

Note: There will be no flow of water through the floor heating zone until power is received and the zone actuator head G has opened. Manually removing the head will also allow water flow.



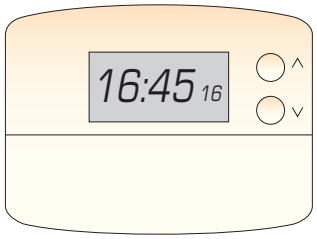
THE PUMP

Press ⌄ to cycle through the options untill the indicator light alongside speed III is lit. Do not keep the button depressed or the pump will go into proportional pressure mode which is not suitable for underfloor heating. Should the indicator light start flashing, press ⌄ to cycle through the options until the indicator light alongside speed III is constantly lit.

THERMOSTATS – TP5000

Warm water underfloor heating works at its best when the temperature of the room is maintained above a certain level. The use of a set-back temperature enables this.

Programmable room thermostat



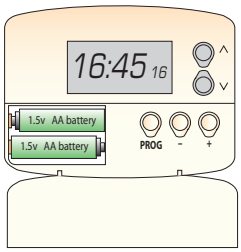
PROGRAMMABLE ROOM THERMOSTATS

Thermostats should be located in the room to be heated unless it is a bathroom in which case it it should be fitted outside on the separating wall. They should be fitted at approximately head height and out of direct sunlight.

To set the thermostat see below and the manufacturer's instructions supplied.

Detailed wiring diagrams for thermostats are shown on pages 8 – 14.

1/2/3

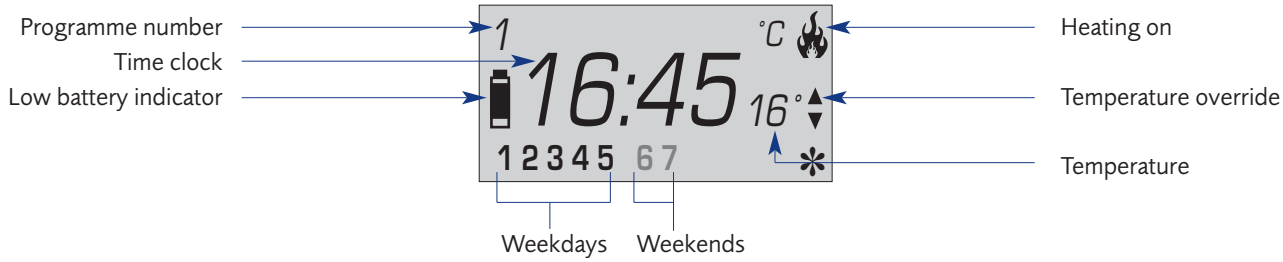


FITTING BATTERIES

1. Open the cover.
2. Remove the battery cover
3. Insert 2 x 1.5v, AA batteries as shown and replace battery cover.

Note: When replacing batteries the programming will not be lost if the process is completed within one minute.

TP5000 SYMBOLS AND FUNCTIONS



PROGRAMME CAPABILITIES

The TP5000 allows different times and temperatures to be programmed for weekdays and weekends. During programming the day is indicated by a number at the bottom of the display. 1 – 5 (weekdays) and 6 – 7 (weekends).

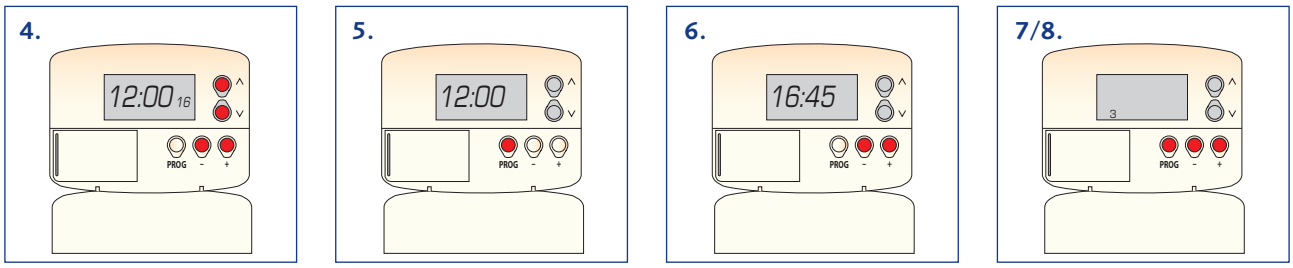
There are up to 6 programmes available for weekdays which will be repeated on all 5 days, and 6 programmes for weekends, repeated on both Saturday and Sunday.

When the thermostat is programmed to be on, a temperature between 5°C and 30°C can be selected. OFF can also be selected.

Whenever the thermostat calls for heat a flame symbol appears in the top right hand corner of the display.

A factory set programme is included which can be amended to suit personal requirements.

THERMOSTATS – TP5000 cont.



PROGRAMMING – SETTING THE TIME CLOCK

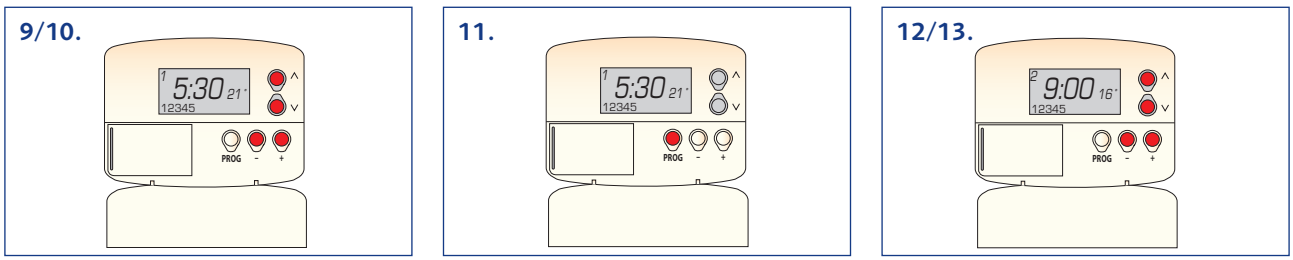
4. Press the + & -, ^ & v buttons at the same time and hold down to clear the memory. The time will revert to 12:00.

5. Press the PROG button once.

6. Use the + & - buttons to set the correct time.

7. Press the PROG button and use the + & - buttons to set the current day of the week (1 = Monday, 2 = Tuesday, etc).

8. Press the PROG button once.



PROGRAMMING – SETTING ON-OFF TIMES

9. Use the + & - buttons to set the first ON time.

10. Use the ^ & v buttons to set the required temperature.

11. Press the PROG button again.

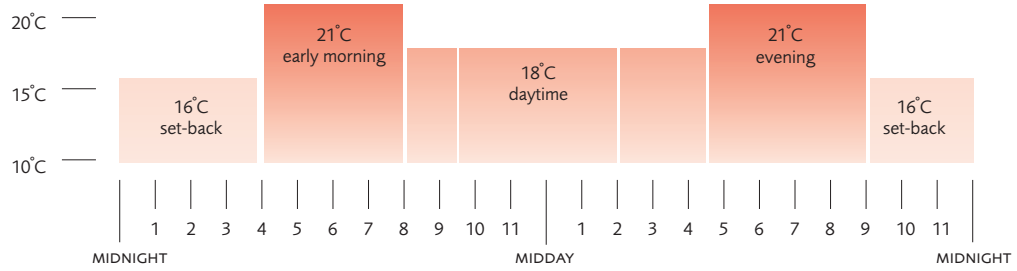
12. Use the + & - buttons to set the first OFF time. Use the ^ & v buttons to set the required temperature.

13. Repeat steps 8 – 12 for the other daily cycles (days 1 – 5).

14. Repeat steps 8 – 13 for weekend cycles (days 7 & 8).

SET-BACK FACILITY – EXAMPLE SETTINGS (FOR ILLUSTRATION ONLY

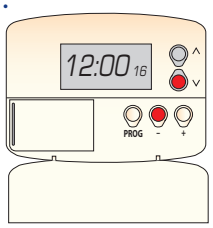
Systems with direct boiler control – There are up to 6 time settings available in each 24 hour period and separate programmes for weekends. At times when the underfloor heating is not required a set-back temperature of 16˚C should be programmed.



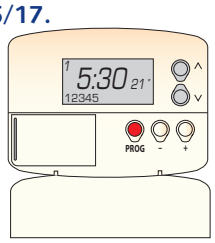
THERMOSTATS – TP5000 cont.

Systems without direct boiler control – If the system is controlled via the radiator circuit, the room thermostat times should be set to coincide with the existing heating time clock. It may be necessary to set the heating time clock to come on earlier to allow for the slower response time of underfloor heating. Outside normal heating times there is no set-back facility and the room thermostat should be set to 5˚C.

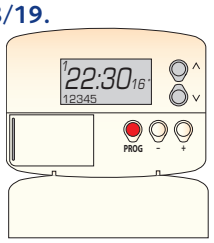
15.



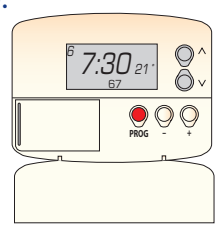
16/17.



18/19.



20.



PROGRAMMING – OPTIONAL SETTINGS. WHEN ONLY ONE ON AND OFF SETTING PER DAY ARE REQUIRED:

15. Follow steps 1 – 8. Press - & buttons together.

16. Enter start time and temperature as before.

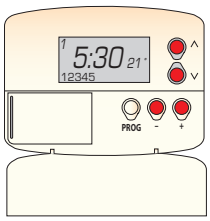
17. Press PROG button again.

18. Enter finish time and temperature as before.

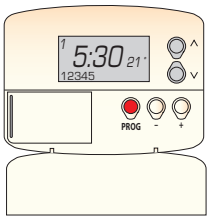
19. Press PROG button and repeat sequence for weekend (days 6 & 7).

20. Press PROG again to finish.

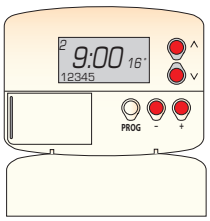
A



B



C



PROGRAMMING – SYSTEM OVERRIDES

A. Use the ^ & v buttons to override the current temperature setting. The override is automatically cancelled at the next programme setting.

B. Temporary use of weekend setting during the week – useful for holidays, etc. Press ^ & v buttons together once. The setting cancels at the end of the daily cycle. To cancel and return to normal settings, press ^ & v buttons together twice.

C. Hold mode. The thermostat will maintain a constant temperature. All programmes are disregarded. Press ^ & v buttons together twice. The set temperature will default to 5˚C; use the ^ & v buttons to select the required temperature. Press the ^ & v buttons together for a third time to return to pre-set programme.

SYSTEM COMMISSIONING

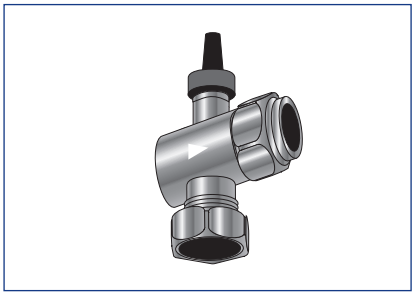
CHECKLIST:

1. All elements of the heating system must be installed.

2. The boiler must be operational.

3. Screed floors should be left to dry for at least three weeks.

4. The differential bypass valve should be set to 0.5 bar to allow water to pass between the flow and return pipework preventing a closed circuit. Check that direction arrow points from flow to return.

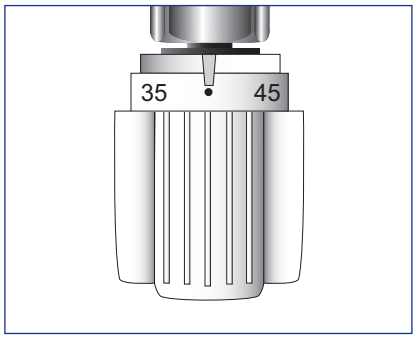


Differential bypass valve
Set to 0.5 bar

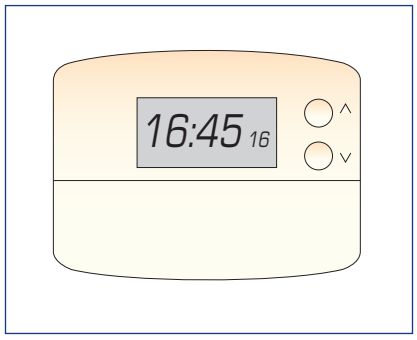
SETTING THE BLENDING VALVE TEMPERATURE

When the above checklist has been completed the temperature of the water going into the floor heating tube can be set by adjusting the blending valve at the bottom of the pump and blending valve assembly.

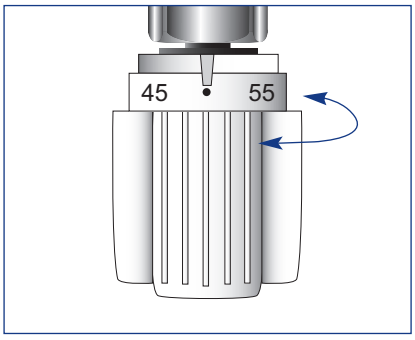
Floor temperatures are linked directly to the temperature of the water flowing through the Fastflo® tube and controlled by the setting of the blending valve; increasing the temperature setting will result in increased heat output from the floor. As a rule, the floor should feel no warmer than the palm of the hand and a maximum of 29˚C.



1. Set the blending valve to 40˚C.



2. Turn on the underfloor heating using the thermostat and leave for at least two hours to allow the floor to heat up. Set the thermostat as required (see above).



3. After 4 – 5 days of operation open the valve to between 50˚ and 60˚C to suit.

Note: Due to the different floor coverings which may be used a precise flow temperature setting cannot be given so there will inevitably be a short period of trial and error.

JOIST NOTCHING & DRILLING FOR FEED PIPES

POSITION AND SIZES OF SERVICE HOLES AND NOTCHES IN FLOOR JOISTS

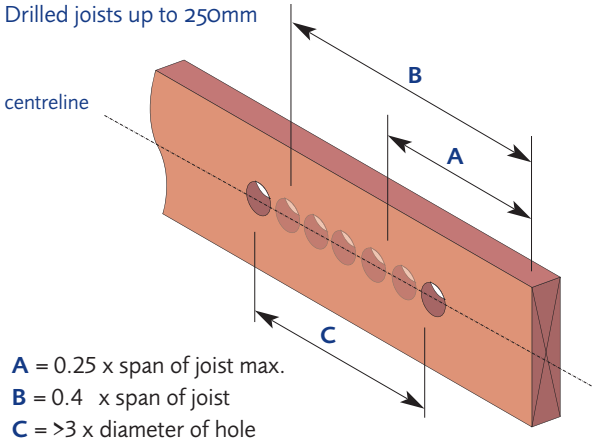
This work should be done before laying the floor deck. Do not force the tubing through a gap that is too small, either widen the notch or cut a new one. Distributor supply pipes are usually run through holes drilled on the centreline of the joist.

Timber engineered joists should not be notched. Tubing should pass through the pre-formed knock-out holes.

Timber joists should only be notched and drilled within the limits shown below and in accordance with current building regulations, APPROVED DOC.A SECTION 1B6.

Measurements should be taken from the point of support. In timber frame constructions the frame manufacturer should be consulted for specific requirements. If in doubt always consult a structural engineer.

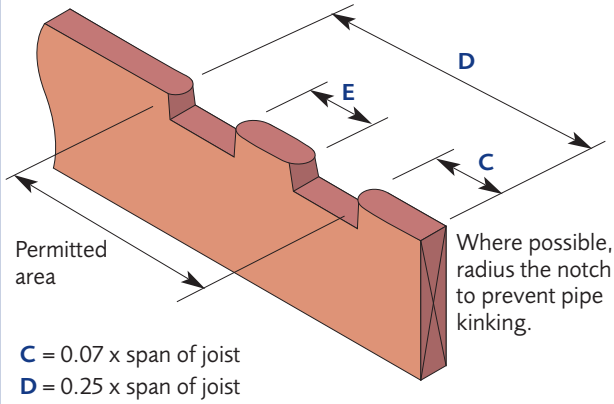
Drilled joists up to 250mm



A = 0.25 x span of joist max.
B = 0.4 x span of joist
C = >3 x diameter of hole

Distance from support – Centre line of joist between **A** and **B**
Maximum diameter of holes – 0.25 x joist depth
Drill holes on centreline of joist
No hole to be within 100mm of a notch
Adjacent holes to be no closer than 3 x diameter of the hole

Notched joists up to 250mm



C = 0.07 x span of joist
D = 0.25 x span of joist
E = Nu-Heat suggest a minimum of 100mm between joist notches within **C** and **D**

Distance from support – Top edge of joist between **C** and **D**
Maximum depth of notch – 0.125 x depth of joist
Notches to be on top edge of joists only

If there is any aspect of the installation that you do not understand, please telephone Nu-Heat Technical for advice, quoting your QR number.

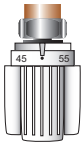
PROBLEM SOLVING

Problem: Room thermostat calling for heat, but no response from the floor.
Solution:

A Check that the room thermostat is calling for heat; the flame symbol should be showing in the top right-hand corner of the display. See pages 34 – 37 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 to at least 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.

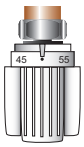
Problem: No heat to floor heating distributors.
Solution:

A Follow the sequence of checks above; if they are unsuccessful, repeat the filling and flushing procedure on pages 31 - 33 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.

Problem: Room temperature low; poor heating performance.
Solution:

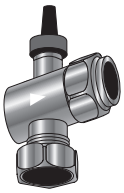
A Check the time and temperature settings on the room thermostat and adjust if necessary; underfloor heating has a longer heat-up time than radiators.



B 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 opposite.

Problem: Boiler noise/boiler lockout.
Solution:

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 31 – 33.



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.

WARRANTY

Nu-Heat Fastflo® tubing is extruded under ISO9002 quality control standards in cross-linked polyethylene (PE-Xc). It is guaranteed (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 purchase.

APPLICATION

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

EXCLUSIONS AND LIMITATIONS

The warranty shall not apply where:

A – The tubing has not been installed and pressure-tested in accordance with the procedures set out in the 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 tubing has been used to carry or been subject to contact with incompatible heat-transfer fluids such as petroleum-based oils.

This warranty shall be limited to the replacement of the defective tubing or refunding of the purchase price of the tubing applying at the time, at the sole discretion of Nu-Heat. It shall not extend to consequential loss of any kind.

CLAIMS

In the event of a problem arising with this product, the purchaser should first notify Nu-Heat in writing. As soon as possible after receiving such notification and after the verification of warranty cover, replacement of the tubing or refunding of the purchase price will be effected. Nu-Heat shall not be liable for any direct, consequential, or special damages resulting from the use of this product or caused by any defect, failure or malfunction of the product whether a claim for such damage is based on warranty, contract, negligence or otherwise.

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.

Nu-Heat
UNDERFLOOR & RENEWABLES

DESIGN | INNOVATION | EXPERTISE | SERVICE

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INVESTOR IN PEOPLE