

InvaHeat Underfloor Heating Installation & Maintenance Manual



**REGISTER THIS PRODUCT
ONLINE WITHIN 28 DAYS OF
COMMISSIONING**

UNITED KINGDOM / IRELAND




<https://register-products.joule.ie>



Warranty Card

Please register your product online



MUST BE COMPLETED AND
THEN REGISTERED ONLINE TO
COMPLETE WARRANTY

Homeowner
Name

Address

Contact Tel.

Contact Email

Installer
Name

Address

Contact Tel.

Contact Email

Design Parameters

Type Of System

Commissioning
Date

Design Flow
(°C)

Design Return
(°C)

General Checks

Time clock/programmers are calling for heat

☐

All room thermostats are initially set to 20°C

☐

Floor thermostat initially set to 25-30°C
(if installed)

☐

All actuators are operating correctly

☐

Water flow temp. at the manifold is as design

☐

Recording

Manifold 1

Record adjusted water flow-rate of every circuit flow meter (from left to right)					
No.	Name	L/min	No.	Name	L/min
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		

Temperature

- Check the new manifold return temperature

Manifold Heat Output
total L/min * T (flow temp - return temp) * 0.7
- All valves are tight and system is operating

☐ Yes
- Room temperatures reach design setting

☐ Yes
- Manifold pump and mixing assembly has been correctly installed as depicted in the instruction manual

☐ Yes
- The mixing set is operating correctly, set at design flow tem

☐ Yes
- Record water pump speed setting

☐ Yes

Manifold & Mixing Set

Recording

Manifold 2

Record adjusted water flow-rate of every circuit flow meter (from left to right)					
No.	Name	L/min	No.	Name	L/min
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		

Temperature

Check the new manifold return temperature

Manifold Heat Output
total L/min * T (flow temp - return temp) * 0.7

All valves are tight and system is operating

☐ Yes

Room temperatures reach design setting

☐ Yes

Manifold pump and mixing assembly has been correctly installed as depicted in the instruction manual

☐ Yes

The mixing set is operating correctly, set at design flow tem

☐ Yes

Record water pump speed setting

☐ Yes

Manifold & Mixing Set

Recording

Manifold 3

Record adjusted water flow-rate of every circuit flow meter (from left to right)					
No.	Name	L/min	No.	Name	L/min
1			1		
2			2		
3			3		
4			4		
5			5		
6			6		
7			7		
8			8		
9			9		
10			10		
11			11		
12			12		

Temperature

- Check the new manifold return temperature

Manifold Heat Output
total L/min * T (flow temp - return temp) * 0.7

All valves are tight and system is operating

☐ Yes

Room temperatures reach design setting

☐ Yes
- Manifold pump and mixing assembly has been correctly installed as depicted in the instruction manual

☐ Yes

The mixing set is operating correctly, set at design flow tem

☐ Yes

Record water pump speed setting

☐ Yes

Manifold & Mixing Set

Joule Product Warranty Terms & Conditions

Registration

It is a condition of the warranty that the Commissioning Checklist is completed and left in the Handover Pack, and the online Warranty Application is completed once the system is fully commissioned.

The heating system must be registered with Joule within 30 days of purchase. This is carried out by fully completing and returning the warranty registration form that accompanied the heating system.

Warranty

Joule hereby guarantees to you, the purchaser of the underfloor heating system to which this warranty is attached that the product will be free from defects in materials and workmanship, for a period of ten (10) years and (2) years dependent on the product from the date such product was purchased; provided that the product is installed in accordance with

- (a) The accompanying InvaHeat Underfloor Installation Manual;
- (b) Any special written design or installation guidelines provided by Joule;
- (c) All applicable laws, rules, regulations, codes and standards applying in the territory in which the product is installed, including without limitation, all applicable local building and electrical codes.

This warranty is transferable to subsequent owners of the product.

Thermostats or other accessories (excluding pipe) sold are warranted for parts and materials for two (2) year.

Underfloor Pert and Pert-Al-Pert Pipe sold are warranted for parts and materials for ten (10) year.

Exclusions

If Joule finds the product to be defective as a sole result of defects in material or workmanship – then, during the Warranty Period, upon receipt of due notice from you and subject to the terms of this Warranty –

Joule shall:

- 1. Repair the product
- 2. Refund the cost for repair of the Product, as well as labour and materials required to repair the Product
- 3. Replace the Product, or parts thereof; or
- 4. Refund part or all of the original purchase price.

The warranty does not cover and Joule shall not be held liable for any of the following damages:

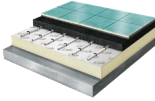
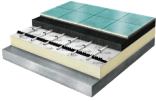
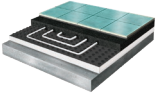
- a) damages caused, wholly or partially, due to abuse, misuse, negligence, application and/or maintenance not as recommended by Joule
- b) damages to the product caused by workers, visitors on the job site, or post-installation work;
- c) damages caused by accident, natural disasters (such as fire, floods, lightning, etc.) force majeure, sabotage or any unforeseen circumstances;
- d) special, indirect, incidental, secondary, consequential or any other damages of any nature arising out of ownership or use of the Product including inconvenience or loss of use.

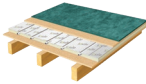
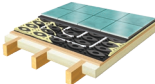
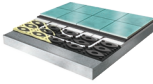
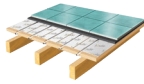
Joule disclaims any warranty not provide herein, including any implied warranty of the merchantability or implied warranty of fitness for a particular purpose. There are no warranties, which extend beyond the face of this document. No agent or representative of Joule has any authority to extend or modify this warranty unless such extension or modification is made in writing by a corporate officer.

Table Of Contents

2	Warranty Card
3	System Details
5	Warranty Terms & Conditions
8	System Guide
10	System Selector
14	Pre-installation Notes
15	Selecting The Right Pipe
16	Manifold
18	Water Temperature Controls
20	Manifold Installation
22	Pipe Installation
24	Screed Fixing
26	Inva Clip & Rail
28	Inva Matt
30	Suspended Floor Fixing
30	Inva Plate
32	Floating Floor Fixing
32	Inva Screed
34	Inva Lite
36	Inva Board
38	Inva Struct
42	Single Zone Systems
43	System Filling
45	System Testing
47	System Output
48	Notes

System Guide

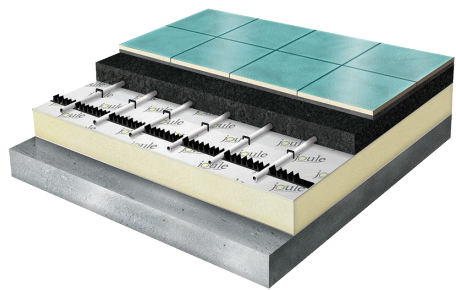
	Inva Clip	Inva Rail & Clip	Inva Matt	Inva Plate
				
	UFH Pipe laid on insulation prior to screeding which sits with 45-70mm screed			UFH Pipe is laid between floor joists via alum. spreader plate
New Build	•	•	•	•
Extension	•	•	•	•
Renovations	•	•	•	•
Apartments	•	•	•	•
Offices	•	•	•	
Ground Floor	•	•	•	
1st Floor, Concrete Slab	•	•	•	
1st Floor Joist				•
Finished Floor				
Typical Floor Build Up	45-70mm	45-70mm	45-70mm	45-70mm
Pipe Size	16mm	16mm	16mm	16mm
Pipe Type	Pert-Al-Pert	Pert-Al-Pert	Pert	Pert
Drying Time	1 day/mm	2 day/mm	3 day/mm	No drying time
Installer System Benefits	High heat output	High heat output	High heat output	Suitable for sprung floor systems
	Used in any size room	Used in any size room	Accurate pipe spacing	No floor build up
	Minimum fixing materials required	Accurate pipe spacing	Simple, accurate installation	Suitable for 400mm centre joists
Homeowner System Benefits	Ideal for new build, extensions			No affect on room heights
	Ideal for heat pump systems			System used after installation
	Suitable for all common floor coverings			

Inva Lite	Inva Screed	Inva Board	Inva Struct	
				
UFH Pipe laid in pre-grooved panels between structural floor and floor covering			UFH Pipe is laid in pregrooved structural chipboard panels	
•	•	•	•	New Build
•	•	•	•	Extension
•	•	•	•	Renovations
•	•	•	•	Apartments
•	•	•	•	Offices
•	•	•	•	Ground Floor
•	•	•	•	1st Floor, Concrete Slab
•	•	•	•	1st Floor Joist
Finished Floor				
Engineered timber	Engineered timber	Engineered timber	Engineered timber	Typical Floor Build Up
25mm	15mm	18mm	22mm	Floor
43mm	33mm	36mm	22mm	Tiles
16mm	12mm	12mm	12mm	Pipe Size
Pert	Pert	Pert	Pert	Pipe Type
No drying time	8hr - foot traffic	8hr - foot traffic	No drying time	Drying Time
	72hr - floor covering	72hr - floor covering		
No screed required	High heat output	Ideal single room application	No need of 1st floor concrete slab	Installer System Benefits
Easy installation	Fast response time	Low profile system	Low floor build up option	
Low floor build up	Readymade pipe spacings	Readymade pipe spacings	No screed required	
System used after installation	High heat output	High heat output	No need of 1st floor concrete slab	Homeowner System Benefits
New build option for new build	Fast response time	Fast response time	Low floor build up option	
			No affect on roo	

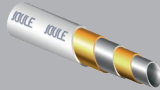
System Selector

Rail & Clip

This is the most common system installed in new build properties where the floor is being laid is a screed solution. The installer simply covers the insulation boards with polyurethane sheets, removes the sticky cover on the back of the rapid rails and then lays them out parallel to one of the walls keeping one meter between each row. They then lay the pipe down on to the surface clipping it to the rails as it passes over the rails in a configuration detailed in the installation instructions provided.



70 mm	90 w/m ²	*****	****
Floor Build Up	Output	Cost	Ease Of Instal- lation

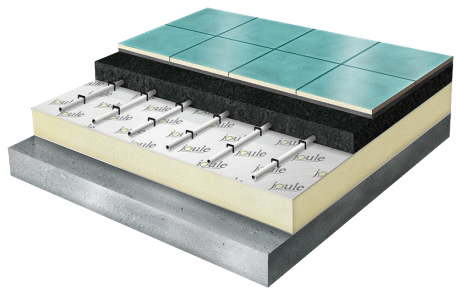


Size: 16mm
Type: PERT/AL/PERT

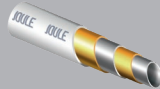
Solid Floor System

Clip

This is identical to the rapid Rail & Clip system only it does not use the rapid rails. This means that you must work out the spacings manually. Normally to use this method a staple gun is a good idea as there will be a high volume of staples to fix to keep all the pipe secure to the insulation.



70 mm	90 w/m ²	*****	***
Floor Build Up	Output	Cost	Ease Of Instal- lation

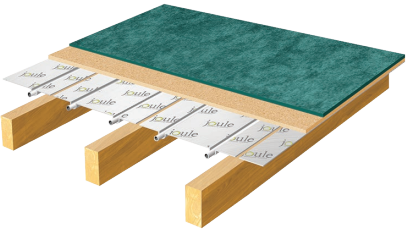


Size: 16mm
Type: PERT/AL/PERT

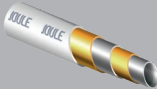
Solid Floor System

Plate

The aluminium spreader plate system is an ideal solution for a suspended timber floor both upstairs or downstairs. The spreader plates fix to the joists and have preformed channels built in to take the pipe and also help radiate the heat from the pipe to the space above it. The finished floor can be laid directly over the spreader plates.



0 mm	55 w/m ²	***	*
Floor Build Up	Output	Cost	Ease Of Instal- lation

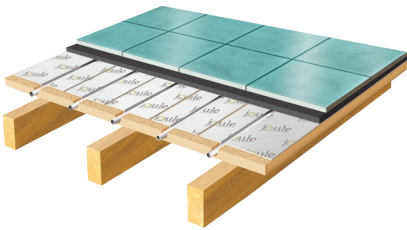


Size: 16mm
Type: PERT

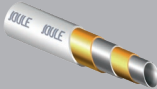
Suspended Floor System

Struct

Our grooved board system is uniquely designed to offer a slim line alternative. At only 22mm total floor build-up this is a popular option for both new build and refurbishment applications. This range is most often used in refurbishment projects where door and ceiling heights are fixed. Another development of the low floor build up range that provides a structural floor solution over suspended timber floors, ideally for engineered joists that cannot be notched.



22 mm	55 w/m ²	**	**
Floor Build Up	Output	Cost	Ease Of Instal- lation



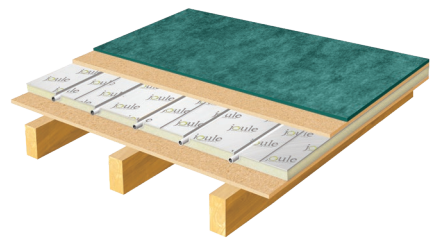
Size: 12mm
Type: PERT

Suspended Floor System

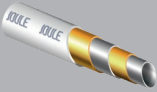
System Selector

Lite

This is an ideal solution where you have the available floor to ceiling height to have a 50mm floor build up. It provides the best thermal insulation to prevent heat transferring downwards. Effectively four products in one, these Insulation Panels comprise a rigid thermal insulation material with grooves positioned in the upper surface.



43/25 mm	65 w/m ²	***	**
Floor Build Up Tiles/Timber	Output	Cost	Ease Of Instal- lation

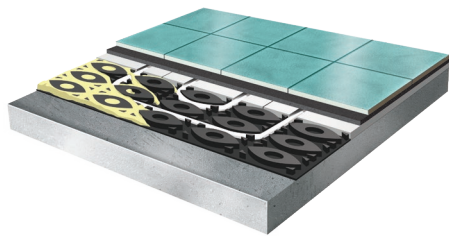


Size: 16mm
Type: PERT

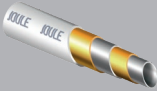
Floating Floor System

Board

InvaHeats' pre-grooved cement boards offer an ideal fast-fit, 18mm floor build up with a high output under-floor heating system. Used in conjunction with our structural plastic floor panel at either end of the room to enable turning and routing of pipe this unique system can be installed directly onto both screed or wood floors.



18/36 mm	65 w/m ²	*	**
Floor Build Up Concrete/Joists	Output	Cost	Ease Of Instal- lation

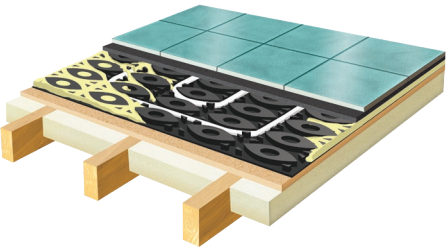


Size: 12mm
Type: PERT

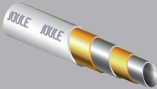
Overlay Floor System

Screed

The structured plastic panel, when combined with a low profile quick drying selflevelling screed and a warm water underfloor heating system, provides a unique low thickness/high heat output floor heating solutions for both new build and retro fit projects. This revolutionary new system can deliver high heat outputs even at relatively low water temperatures, which makes it an ideal solution for use with heat pumps.



15/33 mm	95 w/m ²	***	*****
Floor Build Up Concrete/Joists	Output	Cost	Ease Of Instal- lation

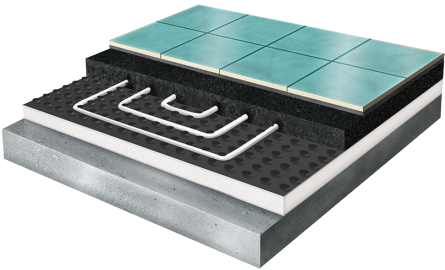


Size: 12mm
Type: PERT

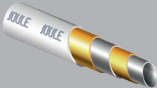
Overlay Floor System

Matt

InvaHeat's castellated matting panels are interlocking vacuum formed sheets of recycled plastic which incorporate pipe-locating castles. Sheets are laid over the sub floor, thermally insulated in accordance with Building Regulations, overlapping the edges by 75mm and interlocking them to form a continuous layer. Castellated sheets are useful where there is a restricted floor depth. InvaHeat 16mm pipework is clipped into the panels and the installation is complete and ready for the specified screed to be laid.



70 mm	90 w/m ²	****	****
Floor Build Up	Output	Cost	Ease Of Instal- lation



Size: 16mm
Type: PERT

Solid Floor System

Pre-installation Notes

Planning And Organising Your Project

The design and operation of an underfloor heating system has a direct link to its output and efficiency. Consideration should be given to underfloor heating at an early stage in any project as the system requires to be integrated with construction and building project process.

Things To Remember

- Insulation depth as required by design or building regulations and to ensure that any downward heat loss does not exceed 10W/m² in accordance with BSEN1264.

Organising Your Underfloor Heating Project Customer / Client

- Supply up to date plans and relevant information to system designer.

System Designer

- Prepare design calculations, specifications, material schedules and layout drawings to BSEN1264

Installer



Ensure the design drawings and specifications are followed and installed correctly.

While an underfloor heating system can be installed easily in most homes, consideration is required in order to match the output of the underfloor heating to the needs of a room. When installing the underfloor heating system, consider high heat loss areas which may affect performance of the system.

These include

- Conservatories
- Un-insulated / poorly insulated walls.
- Single glazed or draughty windows.
- Open fireplace.
- Un-insulated lofts and floors.
- Areas with a high proportion of glazing.
- Room with a high perimeter wall to floor ratio.

In these situations, the thermal envelope of the buildings should be brought up to current building insulation standards.

Selecting The Right Pipe

InvaHeat offer three different types of pipe for use in our underfloor heating systems

Pert-AI-Pert

A special welding technique ensures high reliability. With our five layer composite pipe, we have developed an advanced product that unites the advantages of metal and plastic pipes and eliminates the disadvantages of both materials at the same time.

InvaHeats’ Pert-AI-Pert underfloor pipe is manufactured using a 5 layer technology. It has an aluminium middle layer that protects the pipe from accidental damage during installation and prolongs its use over the life span of the system. Intermediate adhesive layers permanently together bond all layers.

Pert Pipe - 16mm

This ultra-flexible barrier pipe lends itself perfectly to systems where ease of handling is essential, such **Inva Lite**, **Inva Matt** or **Inva Plate**. The pipe incorporates an oxygen diffusion barrier so as to prevent the ingress of any oxygen into the system.

Pert Pipe - 12mm

InvaHeats’ Pert 12mm pipe is constructed using five layers in total; cross linked polyethylene, adhesive, EVOH gas diffusion oxygen barrier, adhesive, cross linked polyethylene.

This ultra-flexible barrier pipe lends itself perfectly to low profile systems where ease of handling is essential, such **Inva Screed**, **Inva Board** or **Inva Struct**.

16mm Pert-AI-Pert	16mm Pert	12mm Pert
Inva Clip	Inva Plate	Inva Screed
Inva Rail & Clip	Inva Matt	Inva Board
	Inva Lite	Inva Struct
	Inva Clip	
	Inva Rail & Clip	

Manifold

InvaHeat manifolds are supplied boxed and ready assembled.



The manifold brackets are designed 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 flow manifold must be the rail with the flow gauges.

InvaHeat manifolds are available for 2-13 underfloor heating circuits ports and are supplied with fully assembled fixing brackets. Each manifold is provided with 1" flow/return headers and is produced as a single unit from high quality stainless steel.

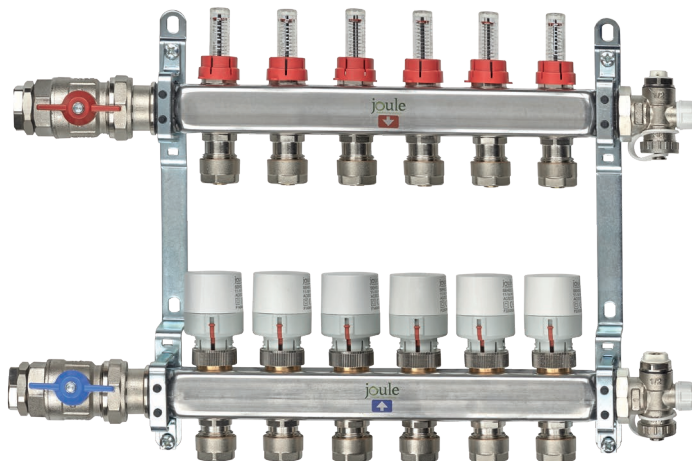
Fittings

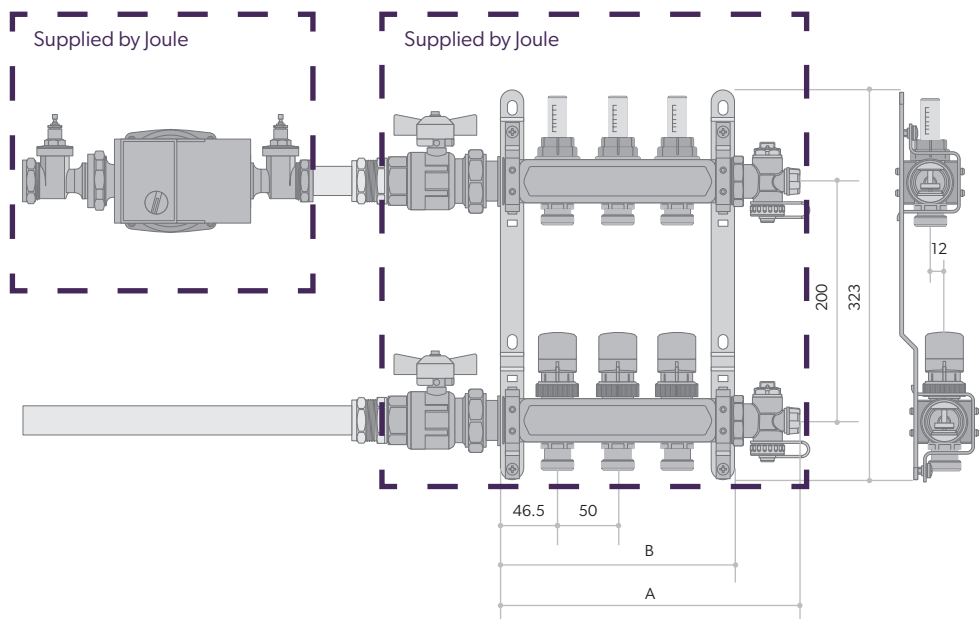
All manifolds are supplied with:

- Two 1" isolation ball valves - red for flow and blue for return.
- Two combination valves with manual air vent and fill/drain point. Both can be mounted either side of the headers.

Fixings

The manifolds should be fixed directly to a solid structure, or within a manifold cabinet.





Port No.	3	4	5	6	7	8	9	10	11	12	13
A (mm)	249	299	349	399	449	499	549	599	649	699	749
B (mm)	193	243	293	343	393	443	493	543	593	643	693

Circuit Length (m)	20-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Flow Rate (l/min)	0.30	0.42	0.54	0.66	0.78	0.90	1.02	1.13

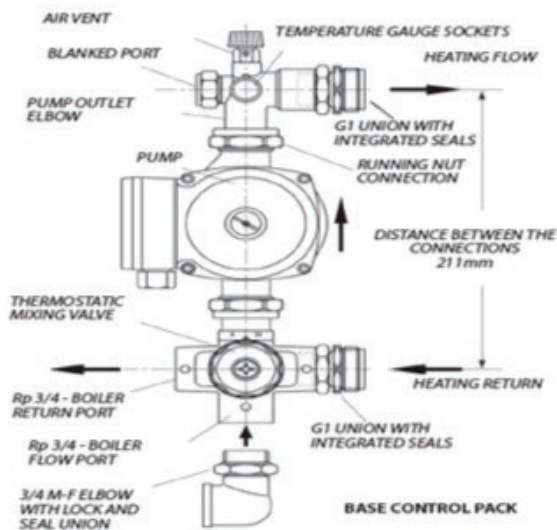
Water Temperature Controls

Joule Manifold UFH Control Pack

The Joule Manifold UFH Control Pack or pump set is designed to make a quick and easy installation by a simple screw connection to the underfloor heating manifold with washers included, the Joule ufh control pack has both the underfloor heating pump and thermostatic blending valve for reducing the water temperature down to be suitable for underfloor heating systems.

The temperature range of the blending or mixing valve is adjustable between 35 to 65°C to $\pm 2^\circ\text{C}$ even with changing boiler flow and return temperatures. The Wilo Pump is 'A' rated to comply with the recent requirements of the Energy Using Products Directive (EuP) to minimise energy use and environmental impact.

The Manifold pump set has $\frac{3}{4}$ " flow and return connections on the left with the flow manifold being the top manifold and the return manifold beneath. The Underfloor Heating Control Pack will heat up to 14 kW UFH system.



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.

Assembling Instructions

Remove the pump from the packaging and note the direction of flow, indicated by an arrow on the pump.

Step 1

Attach the mixing valve to the input of the circulation pump using the valve's nut and the rubber washer.

Step 2

Attach the pump elbow outlet to the top of the pump with the free end pointing towards the opposite direction of the isolating valves.

Step 3

Connect the both the flow and return union for connection to the manifold isolation valves.

Step 4

Connect the elbow union to the mixing valve return connection.

Step 5

Ensure all connections are water tight.

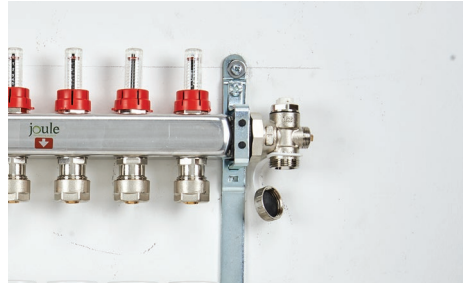
The Mixing Set is now ready for right hand assembly to the manifold.



Manifold Installation

Step 1

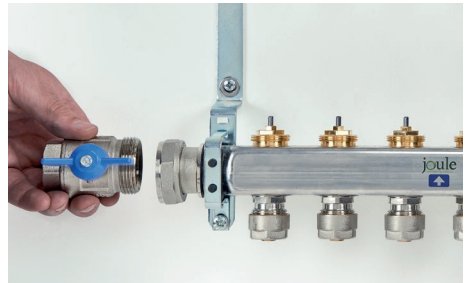
Fix the manifold onto the wall using the fixing holes on the bracket and the plugs/screws provided. It must be 650mm from the top of the EPS floor insulation to the top header and level.



Step 2

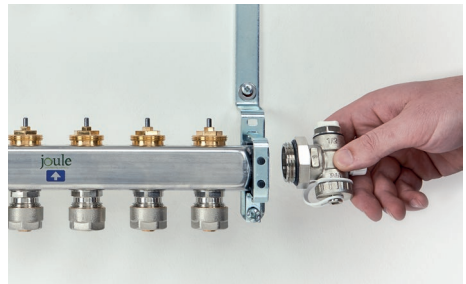
Connect the 1" quarter turn isolation valves to the top and bottom headers (same end) of the manifold. To avoid leaks, ensure that the fibre washers provided are positioned between the valve face and the manifold prior to tightening the union nut.

Step 3



Connect the combined drain valve and air vent to the top and bottom headers of the manifold on the opposite side to the isolation valves. Again, to avoid leaks ensure that the fibre washers are in position between the valve face and the manifold prior to tightening the union nuts.

Step 4



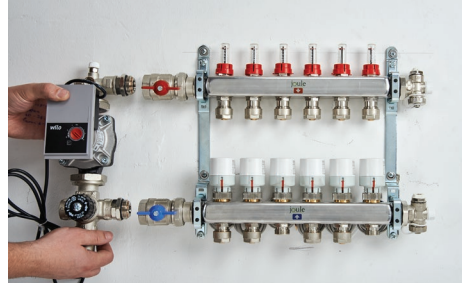
Primary flow and return can be connected from the left or right-hand sides. Labels for identifying individual floor heating circuits and assembly instructions are provided for recording purposes.



Manifold With Pump Set Installation

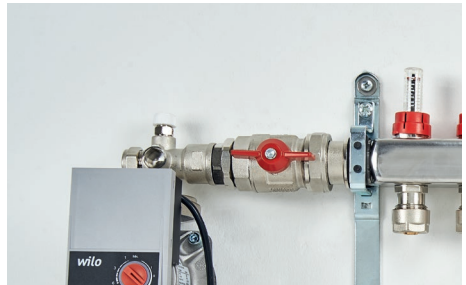
Step 5

Line up pump set connections with manifold isolators.



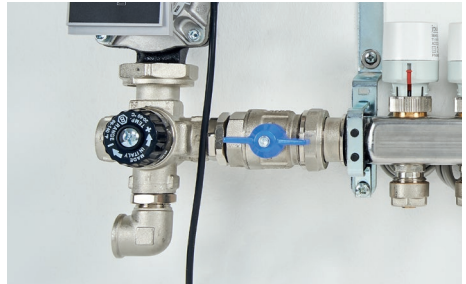
Step 6

Connect the elbow to the flow manifold by means of mixing set flat faced union connection.



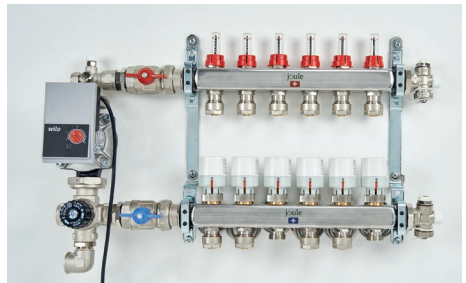
Step 7

Connect the mixing valve manifold return connection to the return manifold by means of mixing set flat faced union connection.



Step 8

To adjust the temperature simply rotate the temperature control handle clockwise or anti-clockwise as indicated on the mixing valve cover, until you reach the required setting.



Pipe Installation

Pipe Bending Radius

The 16mm x 2mm Pert Al Pert pipe can be bent easily by hand to the flowing bend radius.
 $5 \times OD = 80\text{mm}$

Joining

The 12/16mm pipe is connected to the underfloor heating manifold by the use of 12/16mm unions. In order to make the joint correctly the following procedure should be used.

Step 1

Cut the pipe at right angles using a suitable pipe cutter.



Step 2

Use the chamfering tool to de-bur the inner wall of the pipe.



Step 3

Place the cap-nut and split ring over the pipe.



Step 4

Insert the brass body of the connector into the pipe.



Step 5

Install the pipe and connector to the manifold and tighten. Ensure that the outer and inner walls of the pipe are clean.



Special jointing consideration

Where risk of exposure to aggressive gases such as ammonia or where there is a possibility that excessive moisture will occur, it is recommended that any exposed joints be wrapped in a suitable adhesive water proof tape.



Please contact the Joule Technical Helpline for more details

Storage recommendations

Consideration should be given to protect the pipe when stored in temperatures below -10°C, as failure to do so could result in damage to the pipe composition. The pipe should also be protected from UV light exposure.

Screed Fixing

All Solid Floor Systems



Prior to installation it is recommended that the building is secured against the elements and that the sub floor is level, free from any residue and is swept clean.

Step 1

In accordance with Building Regulations, a specified layer of insulation material should be included within the floor construction. It is the responsibility of the builder or architect to ensure compliance. Insulation must be installed beneath the underfloor heating system in order to ensure that any downward heat loss does not exceed 10W/m^2 , in accordance with BS EN 1264.



Step 2

When laying the insulation boards, ensure that the joints of each board are staggered and securely taped so as to minimise risk of movement.



Step 3 - Fitting the edging strip

Edge expansion strip allows expansion of the floor screed. The expansion strip comes with a self-adhesive strip which attaches the panel to the wall, it should be installed around the perimeter wall and around constructions such as columns and steps.



Step 4 - Fitting the protective membrane

A protective membrane should be placed over the insulation boards with 80mm overlaps. The sheet prevents contamination of the insulation by the screed. It also prevents liquid screeds from flowing between the gaps in the insulation and 'floating' the boards during the installation process.

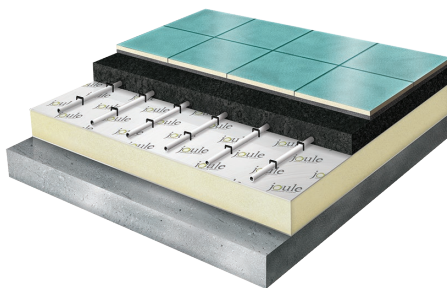


Screen Fixing

Inva Clip



Prior to installation it is recommended that the building is secured against the elements and that the sub floor is level, free from any residue and is swept clean.



Follow steps 1 - 4 at section 'Screed Fixing - All Solid Floor Systems' (page 24)

Step 5

With the underfloor clip gun load the underfloor clips from the top and secure with the plastic weight so to ensure the staples stay in position.



Step 6

With the underfloor clip gun clip the pipe as the pipe is being laid.



Step 7

The pipe should be laid in the same specified pattern with the clips fixed at a minimum of 500mm centres.

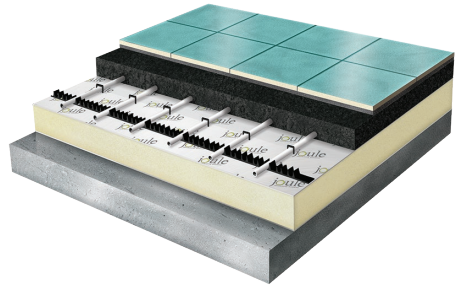


Screed Fixing

Inva Clip&Rail



Prior to installation it is recommended that the building is secured against the elements and that the sub floor is level, free from any residue and is swept clean.



Follow steps 1 - 4 at section 'Screed Fixing - All Solid Floor Systems' (page 24)

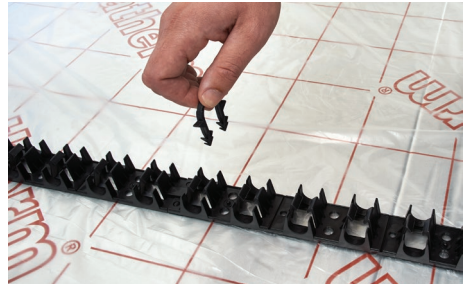
Step 5

Secure the rails to the insulation board via the rail's adhesive strip. Firmly push the rails into the insulation so as to ensure that the rails are fully secured and lays flat to the insulation.



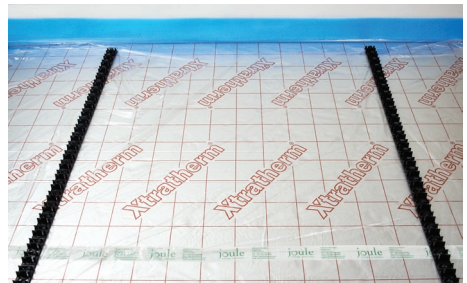
Step 6

While secure the rails to the insulation board via the rail's adhesive strip. Firmly push the staples through the rail ensuring the rail is fully secured to the insulation boards.



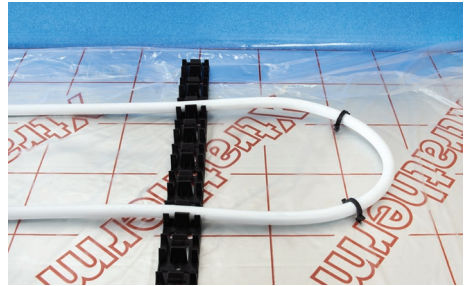
Step 7

Continue to fit the rapid rail across the room at 1m spacings making sure that sufficient space is left around the perimeters of the room (approx. 800mm) so to accommodate any pipe returns or connection lengths back to the manifold.



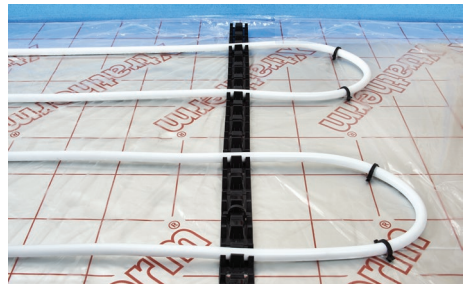
Step 8

Install the pipe into the rapid rail at the pipe centres specified centres as requested by InvaHeat in a specified pattern and then bend the pipe at 180° at the end of each circuit ensuring that the edge of the bend is parallel with the adjacent circuit.



Step 9

Continue laying the pipe in the specified pattern until you have reached the end of the circuit.



Step 10

Fix the pipe down using the pipe clips as you exit the pipe from the circuit.

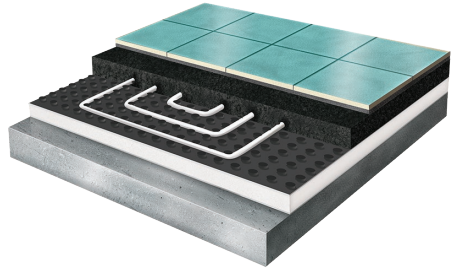


It is recommended an expansion joint is installed for every 40m² of floor area at a maximum length of 8m and an aspect ratio of 2:1. An expansion joint is required along long areas such as hallways etc.

Screed Fixing Inva Matt



Prior to installation it is recommended that the building is secured against the elements and that the sub floor is level, free from any residue and is swept clean.



Follow steps 1 - 4 at section 'Screed Fixing - All Solid Floor Systems' (page 24)

Step 5

The castellated floor panels are laid over the pre-installed insulation and should be overlapped at the edges.



Step 6

All of the panel joints are made correctly and that no panels are to be 'butt-up' as this may allow the screed to flow below the panels causing them to rise up.

Step 7

The Inva Matt panels should not be used at the base of a manifold as pipes need to be closer together than the floor panels will allow. Pipes around this area should be secured using pipe clips.



Step 8

Once you have completed installing the Inva Matt panels the pipe can be fitted starting at the manifold position.

With the pre-designed centres; 16mm Pert pipe can be laid as required. The minimum bend radius is achieved by encircling two castellations for a 90° bend or three castellations for a 180° bend



Step 9

Cover the required area in the designed pattern and return the pipework to the manifold.



Step 10

Once the pipes circuits have been installed and pressure tested the screed cover can be applied.

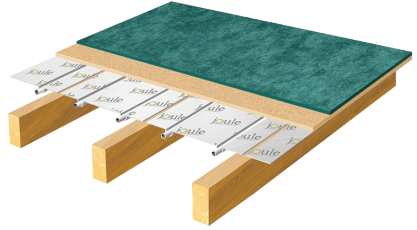


It is recommended an expansion joint is installed for every 40m² of floor area at a maximum length of 8m and an aspect ratio of 2:1. An expansion joint is required along long areas such as hallways etc.

Suspended Floor Fixing Inva Plate



Prior to installation it is required that insulation is installed below the plates. It is important that the floor covering is in contact with the aluminium plates to maximise outputs.



Step 1

Before installing a suspended floor system it is necessary to insulate between the joists. InvaHeat recommends that a rigid polystyrene or foam insulation material.



Step 2

The insulation layer should fit tightly between the joists directly below the spreader plate to ensure that the spreader plate is supported and therefore remains in contact with the underside of timber floor covering. This is necessary to eliminate any air gaps or draughts between the underfloor heating system and the floor.

The floor joists then need to be notched or drilled in accordance with Building Regulations. This facilitates the passage of the pipe between the joist gap to allow the entry and exit of the pipe to and from the room. The spreader plates can then be fixed evenly across the joists.





Prior to installation it is required that insulation is installed below the plates. It is important that the floor covering is in contact with the aluminium plates to maximise outputs.

Step 3

Install the pipework as per InvaHeat design drawings ensuring the plates remain flush with the top of the joists. The pipework can enter the plate system at either end.



Step 4

Fix the plates to the top of the joists ensuring the fixing will not protrude and prevent the floor from having a good contact with the floor.



Step 5

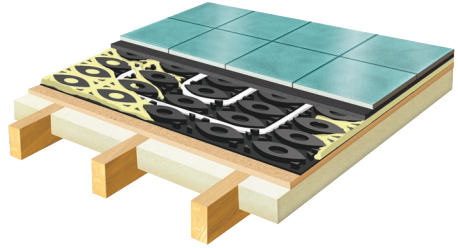
Care should be taken when installing the pipe to ensure the spreader plates are not pushed downwards and away from the underside of the timber finished floor covering as this could lead to potential under performance of the system.



Floating Floor Fixing Inva Screed



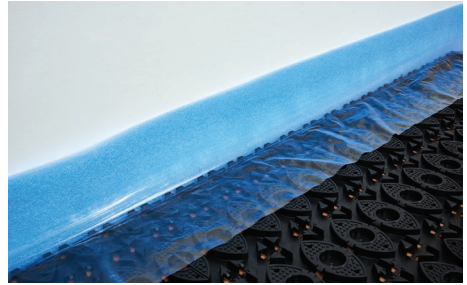
Prior to installation it is recommended that the building is secured against the elements and that the sub floor is level, free from any residue and is swept clean.



The structural plastic panel can be walked on instantly and ensures fast and efficient installation of the Inva-Heat UFH pipes by a single installer. They are suitable for all room geometries.

Step 1

The self-adhesive edging strip with self-adhesive panel allows for a proper seal along the walls.



Step 2

For irregular shaped rooms there are multiple break points with V shaped notches aid in cutting knife alignment.



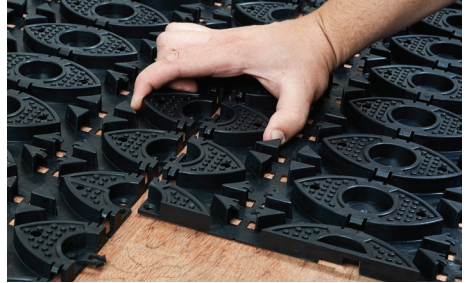
Step 3

Cover the floor entirely with the structural plastic floor panel. The snap clips on the structural plastic panel helps to fasten the panels together.



Step 4

Ensure all panels are fastened together. The snap clips on the structural plastic panel helps to fasten the panels together.



Step 5

The 12mm Pert UFH pipe is placed in the prepared grooves of the structural plastic panel. The pipes are held in place by the castellation of the panel, ensuring that the installation meets the relevant standards.



Step 6

Continue laying the pipe in the specified pattern until you have reached the end of the circuit. Ensure all pipework is fixed securely in the panel.



Step 7

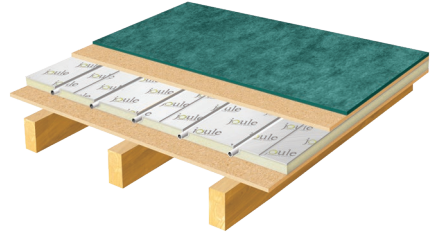
Following the system pressure test; cover the structural floor panel with self-levelling compound. Areas up to 60m² can easily be mixed in a tub using a hand-held drill with mixing paddle in a couple of hours. For areas between 60m² and 100m² it is more efficient to use either a paddle mixer or a forced-action mixer. Fast drying time - can be walked on after just 8 hours, floor finishes can be fitted after as little as 72 hours.



Floating Floor Fixing Inva Lite



Prior to installation it is recommended that the building is secured against the elements and that the sub floor is level, free from any residue and is swept clean.



Step 1

The number of runs and pipe run routes should be considered before laying the pre-grooved Inva Lite panels. If more transit grooves are needed then the grooves at the opposite ends can be cut off and used. If possible route pipes through the walls rather than around walls and doorways to cut down on pipework congestion. To line up each panel correctly it is recommended to use a short length of pipe placed in the grooves to align them together.



Step 2

As the pipe changes direction cut the foil in the re-turn loops using a knife to prevent damage to the board. This will ensure a tight fit for the pipework.

Step 3

Install the pipework by pressing it firmly into the grooves. Where the pipework is connected to the manifold there will be a need to use plain insulation and clips to take into account the closer pipe centres.



Step 4

Continue laying the pipe in the specified pattern until you have reached the end of the circuit. Ensure all pipework is fixed securely in the panel.



Step 5

Once the pipe has been laid complete the installation by taping up all of the remaining joints including those where the panels meet the end returns.



Step 6

Upon completing the pipework and subsequent testing proceed to lay the plywood over the Inva Lite Boards.

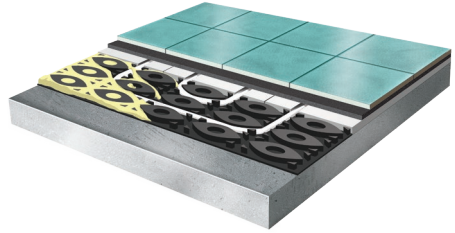


Adhesive tape should be used to secure the pipe after laid. Normally fixed in 500mm intervals. Tape sold separately.

Floating Floor Fixing Inva Board



Prior to installation it is recommended that the building is secured against the elements and that the sub floor is level, free from any residue and is swept clean.



Take note of the InvaHeat floor plan layout, and check manifold locations are correct. There may be alterations to the design, and changes may need to be applied to the pipe runs.

Step 1

Start by laying the first two plastic end panels into the corner of the room and fix to the wood floor using the available screw holes. If installing on a concrete floor, fix directly through to the concrete by rawl plug and screw.



Step 2

Install the first Inva Board panels against the first two end panels. It is recommended to install a short cutting of pipe to line up the Inva Board and the plastic ends.



Step 3

Ensure the boards are clean and put a 3mm bead of adhesive along the edges to secure to each other.





Adhesive tape should be used to secure the pipe after laid. Normally fixed in 500mm intervals. Tape sold separately.

Step 4

Ensure that the Inva Board panels line up with the plastic end panels; adjust the boards to suit if required. Ensure the pipe leaving the board is aligned central to the opening within the end panel.



Step 5

Install the 12mm Pert pipe into the Inva Board, ensuring the pipe is fixed beneath the surface of the board.



Step 6

Lay the pipe along the room until you reach the opposite end; use the plastic end panel to return the pipe back towards the other end.



Step 7

Following completion of the first row, start the process again by placing two more Inva Board end panels next to the existing end panels. Proceed as per first row installation.

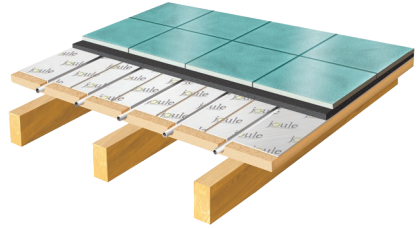


Floating Floor Fixing

Inva Struct



Prior to installation it is required that insulation is installed below the Inva Struct boards.



Read the InvaHeat floor plan layout, and check manifold locations are correct. Ensure the area is correctly prepared, dry and protected from the weather. Check all joists are level and even. These should be clean from debris and any surface deviation such as knots and nails should be corrected.

Step 1

Initially install the boards at the furthest position from the manifold to enable easy installation of the transfer pipes between the piping and the manifold. The first panel in a room is always laid into a corner leaving a minimum 10mm gap between the end and edge of the panel and the walls.



Step 2

Each tongue and groove must be fully glued using an approved waterproof PVA adhesive. Adhesive must be applied to both sides of the tongue and groove



Step 3

In place, the panels must be screwed and glued to the top of the joist. At each joist four fixings should be used equidistant between each routed channel. A pilot hole should be drilled at these points with 8 particle board screws being used to fix the floor deck to the batten. The screws should be 2.5 times the panel thickness in length.



Step 4

When the Inva Struct boards have been laid the pipe work can be inserted into the grooves piercing the aluminium diffuser as necessary. Care should be taken as debris may have fallen into grooves that could cause damage to the pipe during installation.

Step 5



Starting from the manifold and following the Inva-Heat design, loop the pipework into the channels of the chipboard in a serpentine pattern and return back to the manifold or to the point the 12mm pipe connects to the flow and return.

Step 6

Where the 12mm pipe must drop into the joist space



it can be connected to a flow and return. A method described below will allow connecting flow and return pipe work.

- **Access from below** - drilling through the routed panel. A 12.5mm hole can be drilled through the Inva Struct panel at the point at which the pipe needs to drop into the joist space.
- **Access from above** - notching the joist (for solid wood joist only) Where the pipe needs to drop into the joist space a solid wood joist can be notched by drilling at a 20° angle through the routed channel of the Inva Struct panel where it sits on the joist and through the corner of the joist. The pipe will then sit below the neighbouring plain panel when it is installed to complete the floor.

Step 7

With the system installed it is recommended the system is kept under pressure while the finished floor is being laid, if this is not possible the pressure test must be carried out following the completion of the entire floor build up installation. This ensures no fixings have damaged the pipe.

Over the Inva Struct Boards a 6mm ply is laid and fixed in the opposing direction to the Inva Struct boards. The plywood should be glued and pinned to the top of the Inva Struct boards.



Adhesive tape should be used to secure the pipe after laid. Normally fixed in 500mm intervals. Tape sold separately.

Floating Floor Fixing

Inva Board - General Guidance

Ceramic Tiles, Slate, Stone etc.

Tile or stone finished floor coverings can be laid onto a thin layer separating the Inva Board from the tile, for example, a 6mm thick ply board. It is recommended that a high quality flexible adhesive and grout is used to improve the integrity of the heated tiled floor.

Engineered Hardwoods

Engineered hardwood floors can be installed directly onto the Inva Board system, as the Inva Board below provides a structural base and support for the floor above. Care needs to be taken when selecting the thickness of the engineered wood floor, as the thicker the board, the lower the available heat output. InvaHeat recommend a maximum thickness of 18mm on top.

Carpet & Underlay

InvaHeat recommend an intermediate plywood layer of 6mm, to be fixed prior to the laying of the carpet and underlay.

Linoleum & Vinyl

When applying a lino and vinyl finish to the InvaBoard, a flat surface is required. Typically, a 10mm intermediate dry screed board, or a 10-12mm layer of self-levelling compound can be applied. Using one of these two methods will improve the efficiency of the underfloor heating system.



Floating Floor Fixing

Inva Struct - General Guidance

The Inva Struct boards are 2400x600mm; most joists are set nominally at 400mm or 600mm centres, it maybe a situation where not every panel automatically ends on the centre-line of a support. In this scenario, panels are required to be shortened so that the cut ends are fully supported by the centre point of a joist.

Each panel has four straight line pre-grooved channels running the length of the panel and each end has a group of loops. When the panels are fitted, it is important to ensure that each row of panels has a group of loops at each end.

If the supports are set nominally at 400mm centres, the shortest length should be 800mm. This ensures that, when subjected to a load, a section of floor panel will be able to transfer and share the load with the adjoining panels.

When installing any chipboard floor system the requirement is to install floors which not only function well thermally but which also satisfy the standards set for structural strength, and minimise the risk of squeaking.

It is very important to follow the following guidelines with respect to gluing T+G panel edges because the required strength of the floor deck will only be achieved if the gluing instructions are followed precisely.

With Inva Struct boards, it is important that every floor fitted in any building must withstand the minimum concentrated loads and body impact loads that are specified for domestic and residential activities. When chipboard panels are being installed, it is essential that the impact loads being applied to one panel are satisfactorily transferred to and shared with the adjoining panels. This is achieved if the tongue and grooved edges of panels are fully glued using weatherproof PVA adhesive and then fully driven together.



Single Zone Systems

Single Zone

All InvaHeat underfloor heating systems can be installed in single rooms and connected to the existing heating system. In rooms greater than 30m² it is recommended that the connection to the underfloor heating system is made via a manifold and installed in the same way as a multiple room installation with single area control. Areas of up to 30m² can install a Single Zone Pump Set providing an easier method of integrating into the existing system, without the need for expensive hydraulic or electrical changes.

- Water temperature control (30°C to 60°C) for the underfloor heating
- The correct flow rate the underfloor heating
- Can be connected to operate the underfloor heated room independently with the existing system

The single zone pump set should be installed close to the room in which you are installing the underfloor heating, or remotely in a position that suits your property. The Single Zone Pump Set has been designed to be as compact as possible, thus enabling installation into tight spaces.

The Single Zone Pump Set will need to be connected to the flow and return central heating pipes, either off an existing radiator system or directly from the boiler before the existing control valves.

Mixing Set For Manifold



The Joule Manifold UFH Control Pack or pump set is designed to make a quick and easy installation

Pert-Al-Pert Aluminium Barrier Pipe



The Joule Pert-Al-Pert multilayer aluminium barrier pipe is manufactured using a 5 layer technology.

UFH Pipe Clips



Underfloor heating clips are used to fix the pipe to the insulated board below. The clips fit into any standard fixing gun and is a quick and simple way of fixing underfloor pipe in place.

Joule Touchscreen Room Stat



The newly launched Joule Touchscreen room stat is a state-of-the-art solution to use in every underfloor heating system.

UFH Rapid Rails



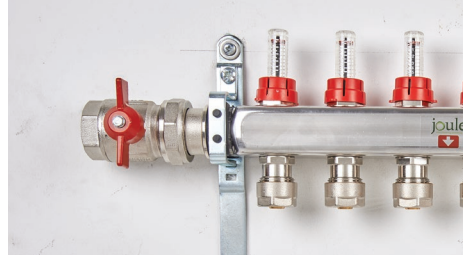
Our Clip Rail and Tacker systems enable you to install pipe loops quickly and accurately.

System Filling

Once installed, InvaHeat underfloor heating systems should be tested thoroughly to ensure they are working correctly, including initial filling of the system and system balancing. If you require any further information please contact the Joule Technical Team.

Step 1

Isolate the manifold from the heating system by turning the isolating valves to the off position.



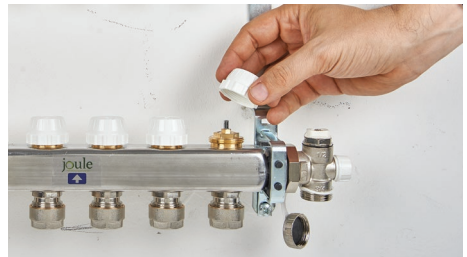
Step 2

Open all flow meters at the top of the manifold by lifting the locking cover and turn the adjuster anti-clockwise.



Step 3

Ensure all actuator caps are in the closed position by turning clockwise.



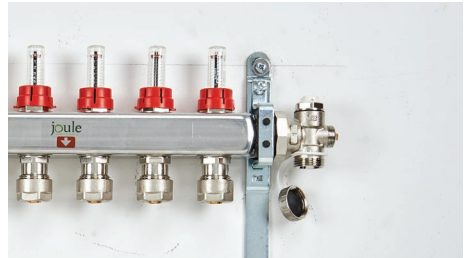
Step 4

Connect a drain hose to the bottom hose connector valve on the return manifold rail and run to a convenient drain point. Ensure the valve is in the open position.



Step 5

Connect the fill hose to the top hose connector valve on the manifold flow rail. Ensure the valve is in the open position.



It is important to ensure the water is forced around the Underfloor Heating loops one at a time to prevent short circuiting from one manifold rail to the other. Starting at one end of the manifold, open one pipe run at a time. Open the each circuit, turn on the water supply to the top flow manifold rail and run the water until the loop is thoroughly flushed through and the water exits the lower drain point on the bottom manifold.

Close the filled circuits following filling and repeat the process for each loop on the manifold. This process will ensure air is purged thoroughly from each pipework loop on the manifold leaving the whole system free of air.

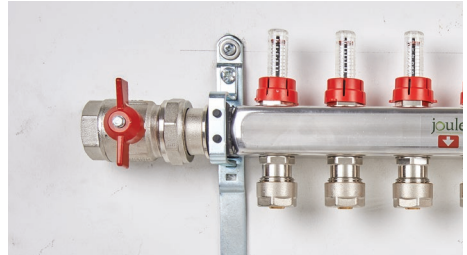
If the Underfloor Heating is being installed when there is a possibility of freezing conditions, antifreeze should be added to protect the pipework. The system will need to be flushed out and refilled prior to operation.

System Testing

Once the system has been filled a hydraulic pressure test should be carried out on all loops in the system prior to the installation of floor coverings.

Step 1

Isolate the manifold from the heating system by turning the isolating valves to the off position.



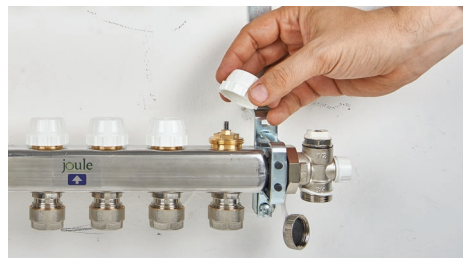
Step 2

Open all flow meters at the top of the manifold by lifting the locking cover and turning the adjuster anti-clockwise.



Step 3

Ensure all actuators are in the open position by turning the adjuster heads anti-clockwise.



Step 4

Connect a suitable pressure testing kit to one of the fill valves. With the valve open, pump up the pressure to 2 bar. Isolate the pressure at the tester and leave for 10 minutes while checking for leaks or pressure drops.



Step 5

If all is well, increase the pressure to 6 bar and leave for a further 10 minutes while checking for leaks or pressure drops.



Step 6

If all remains well, reduce pressure to operating pressure. For screeded floors, pipework should be left to approximately 3-6 bar until the screed has been laid and dried to protect pipework from damage. Consult screed supplier for drying out and curing time.



System Output

Mean Water Temperature			30		35		40		45	
System Type	Floor Covering	TOG	Heat Outp. W/m ²	Fl. Surf. Temp °C	Heat Outp. W/m ²	Fl. Surf. Temp °C	Heat Outp. W/m ²	Fl. Surf. Temp °C	Heat Outp. W/m ²	Fl. Surf. Temp °C
Inva Screed	Tiles	-	56.6	25.24	84.9	27.86	113.2	30.48	141.5	33.1
	Hardwood	1	40.2	23.72	60.32	25.59	80.43	27.45	100.53	29.31
	Carpet	1.5	30	22.78	45	24.17	60	25.56	75	26.94
Inva Board	Tiles		39.1	23.62	58.7	25.44	74	26.85	92.5	28.56
	Hardwood	1	26.2	22.43	39.3	23.64	52.4	24.85	66.5	26.06
	6mm Ply + Carpet & Underlay	1.5	17.5	21.62	26.19	22.43	34.92	23.23	43.65	24.04
Inva Clip	Tile		55.5	25.3	84.3	27.7	112.8	30	141.3	32.3
Inva R&Clip	Hardwood		33	23.3	50.1	24.8	67.1	26.3	84.1	27.7
Inva Matt	Carpet	1.5	27.8	22.8	42.2	24.1	56.5	25.4	70.8	26.6
Inva Plate	Tiles	-	-	-	45	24.4	61	25.7	76	27
	Hardwood	1	-	-	35	23.5	47	24.5	58	25.5
	Carpet	1.5	-	-	28	22.9	38	23.7	47	24.5
Inva Lite	Tiles	-	-	-	57.9	25.5	77.2	27.1	96.5	28.7
	Tiles, Hardwood	1	-	-	38.2	23.8	52.2	25	65.3	26.1
	Carpet	2	-	-	30.9	23.1	41.2	23.7	51.5	24.9
Inva Struct	Tiles	-	-	-	42	24.1	55	25.6	68	26.4
	Tiles, Hardwood	1	-	-	35	23.5	47	24.5	58	25.5
	Carpet	2	-	-	28	22.9	38	23.7	47	24.5

- The heat output data table shown should be used for comparative purposes between systems and floor coverings only.
- The performance of warm water underfloor heating systems can be influenced by many factors and differences in actual heat outputs achieved on site may be observed when compared to the above data.
- Contact the technical support team for further details.

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Notes

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

JOULE IE

Unit 407 NW Business Park,
Cappagh Road, Ballycoolin,
Blanchardstown, Dublin
+353 (1) 623 7080
+353 (1) 626 9337
info@joule.ie
www.joule.ie

tel
fax
mail
web

JOULE UK

Unit 1 & Unit 3,
Leftfield Park, Park Road, West Yorkshire,
WF8 4PS, United Kingdom
+44 (0) 330 808 8488
+44 (0) 1513 568 336
info@jouleuk.co.uk
www.jouleuk.co.uk

tel
fax
mail
web

JOULE PL

Strzegomska 55D,
53-611 Wrocław, Polska
+48 (0) 128811171
+48 (0) 814709046
biuro@joule-pl.pl
www.joule-pl.pl

tel
fax
mail
web