heat cloud

SPC Heat Cloud

Installation, Operation & Maintenance Manual

IOM 88 Issue 3

SPC

Contents

		Page
1	General	3
1.1	General description	3
1.2	Receipt and Preparation	3
1.3	Storage and Handling	4
1.4	Dimensional Data	4
1.5	Technical Data	4
2	Installation	5
2.1	Electrical connections	5
2.2	Mounting height	5
2.3	Ceiling Preparation	5
2.4	Panel pre-preparation	9
2.5	Hanging	9
2.6	Piping	9
2.7	Hose Connections	10
3	Operation	13
3.1	Cooling applications	13
3.2	Sensors	13
3.3	Fault finding	13
4	Maintenance	14
5	Disposal	14

1. General

1.1 General description

Heat Cloud panels are designed to be fitted during a first fix prior to the plasterboarding of the ceiling. When fitted, the plasterboard will be in contact with the panels and will become 'activated', that is, either heated or cooled by the warm or cool water flowing through the panel above it. The panels 'hang' from bespoke brackets that are attached to either the timber joists or metal top-hats of an MF ceiling. In some instances the Heat Cloud panels may be designed to screw directly into the supporting timbers without the need for brackets.

While Heat Cloud panels share features in common they are largely custom designed to suit the particular application. As a result, this instruction manual is general in nature and bespoke technical documents and information generated for the application must be used when installing. This document will assist if and when other documentation is unavailable.

1.2 Receipt and Preparation

Panels are supplied suitably stacked and packed with any ancillaries separately packed. Standard order documentation will be included with the packaging while bespoke documentation may have already been received. If in doubt contact SPC.

Figure 1. Heat Cloud panels being unpacked

1.3 Storage and Handling

Panels are packed in boxes bearing works order numbers, model references and site references where appropriate. Installation, operation and maintenance instructions may be packaged or can be downloaded from the SPC website. Any special drawings or instructions required for the project and not previously received should be requested from SPC or the system designer. On receipt check that all details are correct to the schedule and report any damage or missing parts to the carrier and SPC immediately.

It is recommended that the panels remain in the packaging until they are required. When handling panels safety gloves must be worn.

1.4 Dimensional Data

Panels can be supplied in a continuous range of lengths and widths. The approximate wet 'filled' weight of panels is 5kg /square metre. This should be taken into consideration when determining the safe ceiling load. The approximate internal volume of the panels is 0.7 litre/square metre. If more accurate data is required for a specific project please contact SPC. The overall height of the panel is 15mm without insulation.

1.5 Technical Data

The table below lists general technical features; these may be subject to change if special features are ordered.

Tube diameter/material/thickness	12mm o/d 'D' profile copper, 0.35mm wall thickness
Size: WxH	Variable to suit application
Panel material	Aluminium 1.0mm
Pipe connections (by default)	12mm plain copper
Maximum working pressure	10 bar
Maximum working temperature	50°C
Standard colour	Black underside RAL9005

2. Installation

2.1 Electrical connections

There are no electrical connections to the panels themselves. The arrangement of panels will normally be in zones and these will be controlled by valves which will require electrical power and control wiring. The control of valves within the hydronic system is beyond the scope of the panel supply but all wiring will need to be carried out by a certified person in line with all relevant local regulations. For the majority of applications the panels will be fed by manifolds and the control valve(s) associated with each separate zone will be included on the manifold.

Black bulb sensors are suitable for use with radiant systems and these may be coupled to thermostats which accept a suitable remote signal and power open or close a zone valve. Modulating valve control could be considered but on/off control of zones would normally be consistent with control of low temperature radiant emitters.

2.2 Mounting height

Recommended minimum mounting heights for radiant panels have been developed which provide information regarding a minimum height to prevent discomfort resulting from asymmetric radiation. These are based on static occupancy and as a result tend to be conservative. At the low hot water temperatures used with Heat Cloud there will be no issues with discomfort.

2.3 Ceiling Preparation

Panels are supplied, as standard, with upturned flanges along the longer edges and these flanges have rectangular holes punched in them for hanging through the brackets. For standard applications the brackets would be supplied loose with the panels. In order to hang the panels the brackets need to first be fixed to the ceiling. There are several methods of fixing and other bespoke means which could be used, below are the more common methods.

For an MF type metal ceiling the panels will have been designed to fit between the 'top-hats' of the construction with an allowance for the space required for the brackets. The type of bracket used is a clip that fits over the width of the top-hat and the holes in the panel flanges push over the hooked end of the brackets. The spacing of the brackets is not fixed and the panel flanges are continuously perforated but we would recommend using brackets at centres of approximately 450 to 600mm (the flanges in the panels are perforated at 150mm centres).

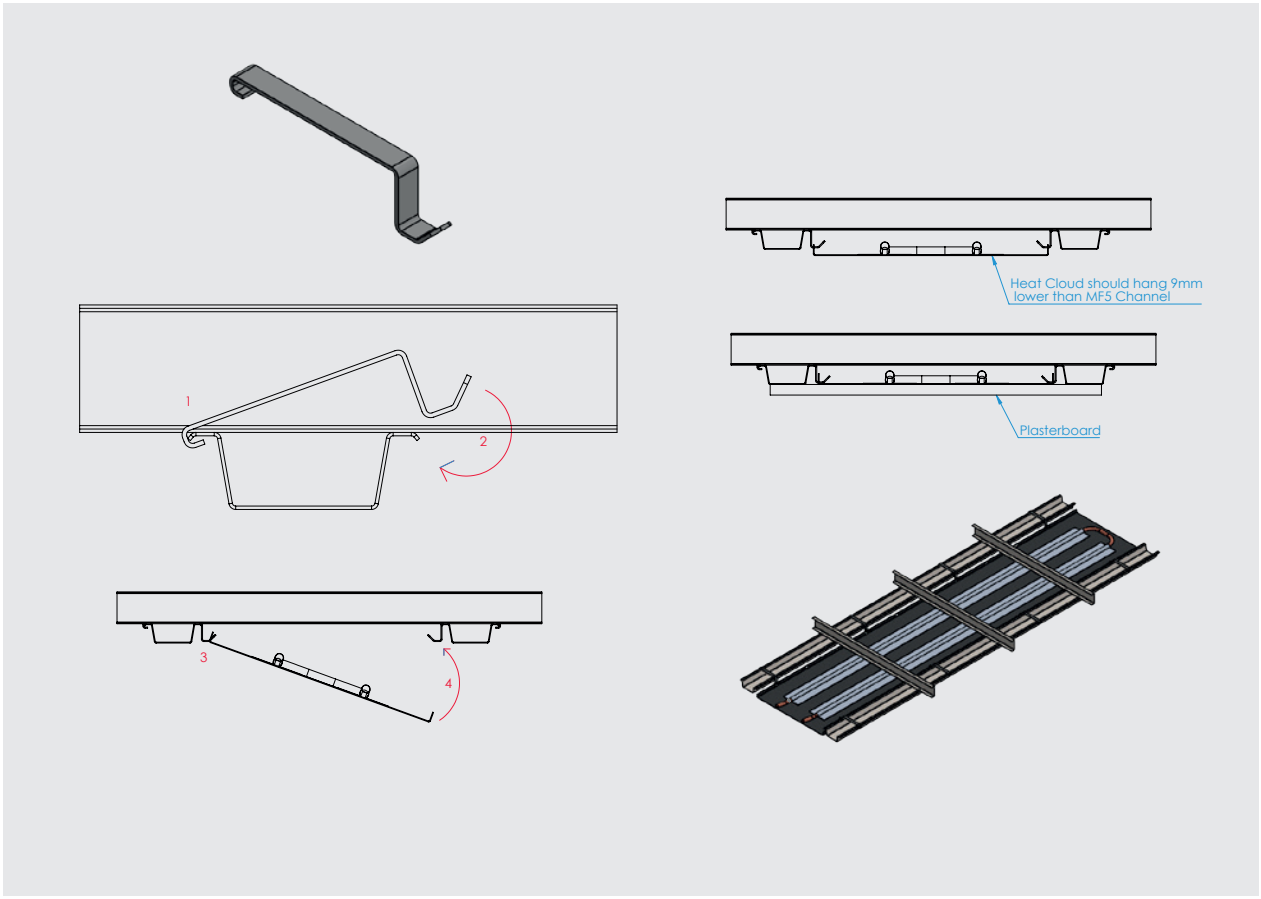


Figure 2. Hanging in MF ceiling

The figure the shows the MF bracket being fitted around one lip of the top hat (1) and then clipped around the other (2). The panel is dropped onto the brackets on one side and then rotated upwards and clipped into the brackets on the other side. The bracket is designed so that it is not fixed but can be slipped along the length of the top hat section.

If a timber joist construction is used then there are other options for hanging brackets but spacings should be approximately as above. For a solid timber joist or 'I' beam then brackets are designed to be screwed directly into the timber, flush with its base. Panels will be sized to specifically match the spacing between adjacent joists. This type of hanging can also be used for metal web joists though an alternative which sits around the top of the lower timber chord is available. The spacings of brackets are limited to the same spacing as the perforations in the flanges of the panels (150mm). The figure below shows the panels being hung on one side via brackets (1) then swung up to fix to the brackets on the other side (2).

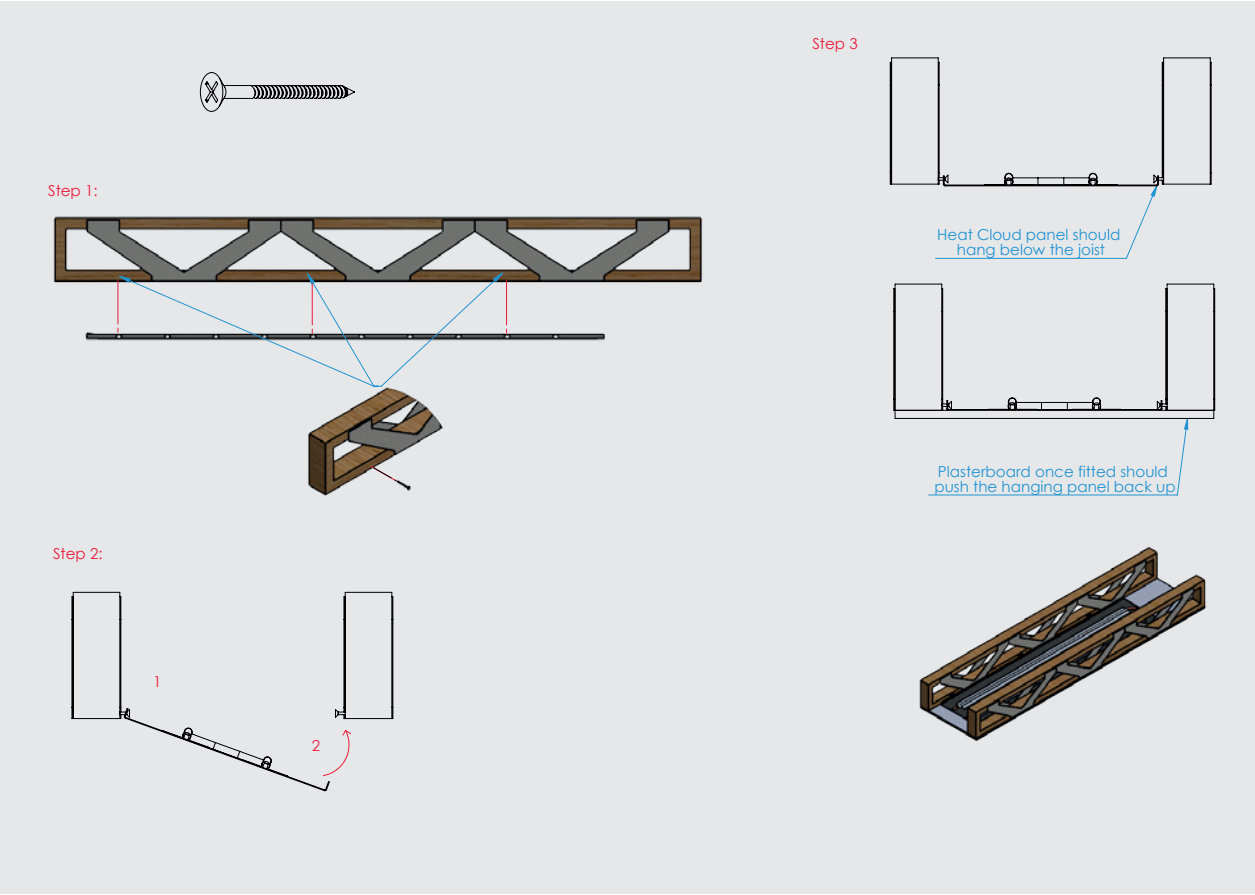


Figure 3. Hanging in timber joists

Figure 4. Panels in metal web type joists

If the intention is to screw the Heat Cloud panels directly to the timber joists then they will have been sized to suit and no ceiling preparation is needed; the panels are offered up to the timbers and screwed directly in. Recommended screw centres for this approach are 1m or less depending on panel length and a minimum of 3-off will be required along each side.

Figure 4. Panels in metal web type joists

2.4. Panel pre-preparation

The panels as supplied are ready for installation into the pre-prepared ceiling without further work. If the final connection to the panels is to be made via a flexible hose then it may be appropriate to fit the hoses to the pipe ends prior to suspending in the ceiling. The ends of the pipe connections are deburred and prepared in the factory but should be checked and treated again if necessary before fitting the push fit or compression fittings.

2.5 Hanging

After the pre-preparation is complete the panels can be hung. The hanging technique will depend upon the type of ceiling that the panels are being supported in.

If the panels are to be hung from brackets then it is recommended that the panel is first hung via the brackets on one side and then rotated upwards to rest in the brackets hanging from the joist on the other side. A minimum of two persons are required to safely hang the panels and until they are secured by plasterboard during final fix care must be taken not to dislodge the panels from their brackets or they could fall from the ceiling. When hanging panels, gloves must be worn as there are sharp edges which could cause cuts.

If the panels are to be insulated on their upper surface consideration needs to be given to the space available above the panels and the type of insulation to be used. Heat Cloud panels are normally supplied without insulation and the installer will supply the insulation as and where required. If individual pads/blankets are to be laid on each panel then that may be easiest undertaken during the hanging process if height above the panels is limited. The panels can be allowed to hang from one side while the insulation is laid on the back and then rotated back into position. At least two people are required and care must be taken to ensure that the panel cannot fall while this is being undertaken.

The Heat Cloud panels are fitted as a first fix item prior to plasterboards being screwed into position. As the plasterboard panels are screwed into the timber joist or MF top hat sections the Heat Cloud panels are pushed upwards to rest on the plasterboard under gravity. This optimises the thermal contact and system performance. Plasterboard of thickness between 10 and 15mm can be successfully used with Heat Cloud.

2.6 Piping

The interconnection of the Heat Cloud panels and the incorporation of separate zones into the complete heating/cooling system will have been covered by documentation which is bespoke to the installation and this must be consulted and pipe routings planned based upon these documents.

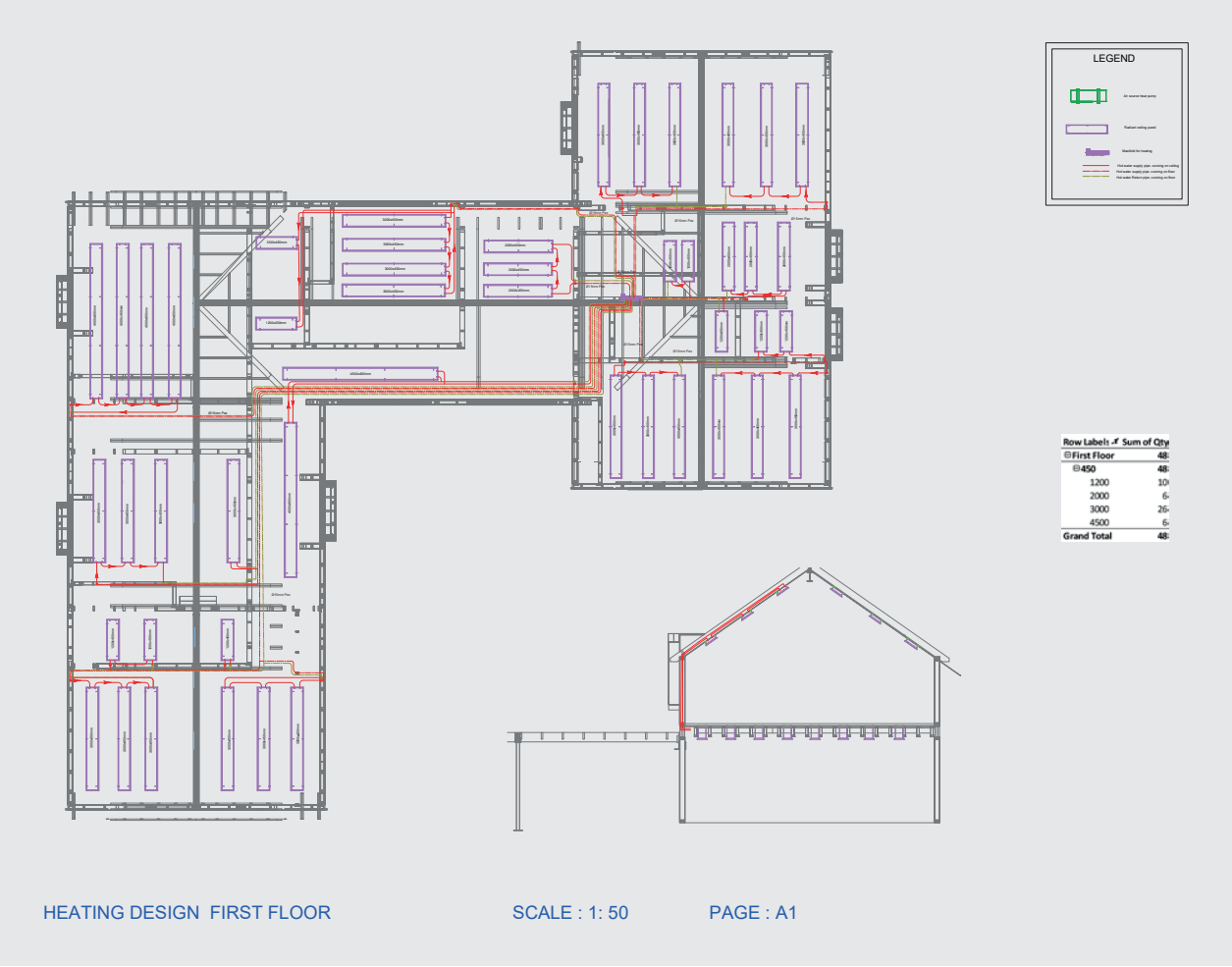


Figure 6. Example of piping schematic

The panels can be interconnected in single zones and zones piped in parallel via standard manifolds and controlled via two port valves on the manifold. The manifold may also incorporate flow setting valves on each circuit; these would be set at the design water flowrate for the individual zones.

The panels terminate in 12mm copper tails and it is contingent to inter-connect panels using flexible hoses. Similarly the flow and return to the panels at the end of the zone run can most easily be connected to hard copper piping or PEX using a flexible hose – both copper and PEX are suitable for use at the temperatures considered; copper tube should be insulated though the low operating temperatures mean that heat losses would be lower than for conventional systems.

High points in pipework runs should be fitted with air vents to allow the system to be bled.

Heat Cloud panels can be used in systems with or without secondary circuits. When combined with heat pumps as the heat generator it is common to have a primary and secondary circuit so as to ensure sufficient water flow through the heat pump at all times. The primary and secondary circuits can be linked via a buffer tank or low loss header.

When sizing pumps the flow rate and pressure drop for the system will need to be taken into account; this should have been listed on one of the design documents generated, if not then seek confirmation from the system designer.

The Heat Cloud panels just contain copper pipe so are suitable for cleaning and dosing along with the rest of the system.

Figure 7 shows an example of a system piped in a single control zone. This example shows three parallel runs of panels fed by a manifold which would contain standard flow setting and control valves. Figure 8 is a wider ranging system which has been split into four zones which can be separately controlled.

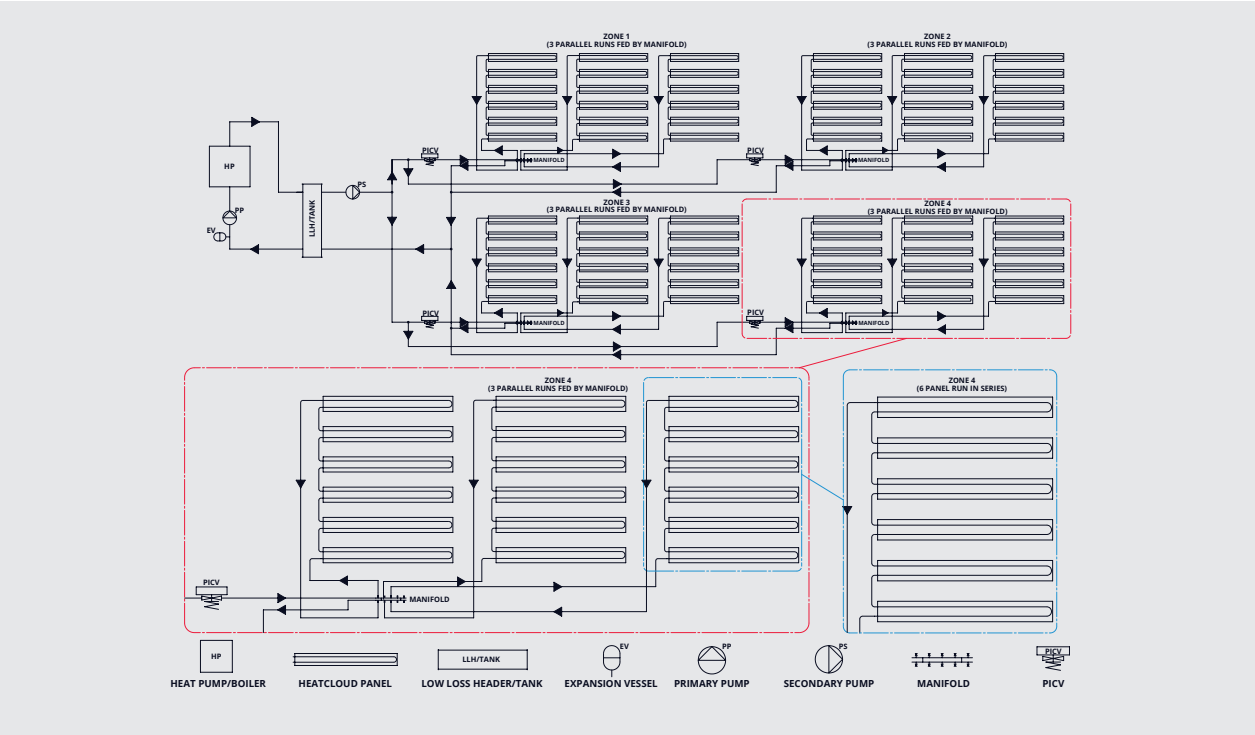


Figure 7. Example of single zone piping

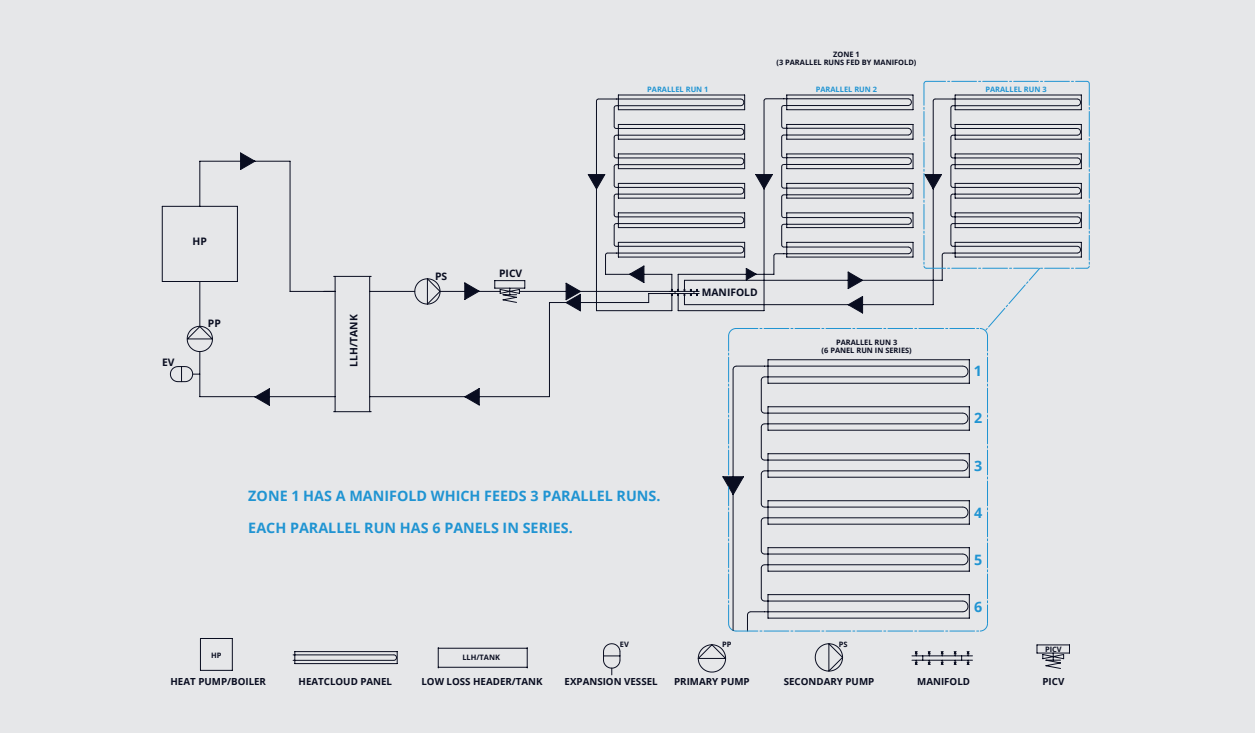


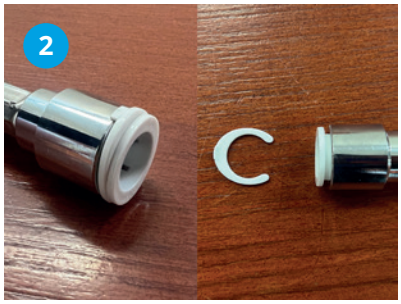
Figure 8. Multi-zone piping example

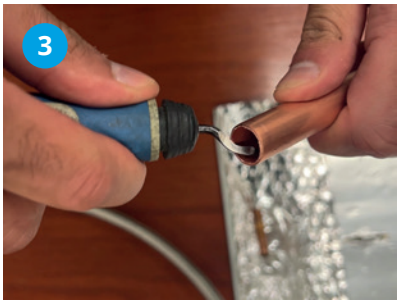
The schematics show a primary and secondary hydronic system couple by a buffer tank or low loss header. Smaller systems may just be designed with a primary system though, especially when using heat pumps, it is critical to ensure that the minimum required flowrate through the heat pump is maintained. The schematics do not include all the standard ancillaries that would be required (expansion vessels, automatic bypass, strainers etc.).

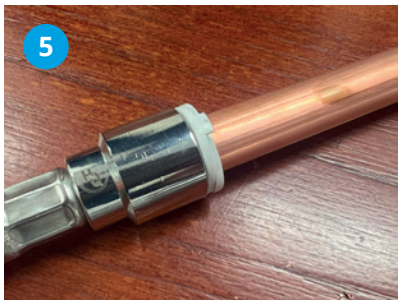
2.7 Hose Connections

1. Connect the 10mm push fit on the hose to the panel flow and return connections
2. Remove the spacer clip from the 15mm push fit side on the hose
3. It is important that the ends of the pipework are rounded and filed (deburred)
4. Fit the pipework to the 15mm push fit on the hose
5. Fit back the spacer clip on the 15mm push fit to lock the hose in place

Scan the QR code below or click the link to watch the full instructional video:
https://youtu.be/K2tkbn8NYwA?feature=shared







SCAN FOR INSTRUCTION VIDEO

3. Operation

Ensure that the panels are piped together and into the heating (cooling) system as required by the application. Manual and or automatic air vents should be fitted at high points in the piping systems. Ensure that all manual valves are opened and allow fluid to circulate through the heating system. Open air vents to ensure that there is no air trapped; close manual vents as soon as water is released.

Zone valves should open and close in response to the sensed room or zone temperature and sensors should be positioned in representative positions within the space to achieve optimum comfort.

3.1 Cooling applications

If the panels are to be used for cooling during the summer then this will be as part of a changeover system; the panels are 2-pipe emitters with the same pipes being used for heating/cooling. When chilled water is used it is important that its temperature is not less than the dewpoint of the air in the space; in this way the panels will not sweat. The temperature of the chilled water must be controlled in response to the humidity in the space and/or condensation sensors must be fitted. Note that the pipework to and from the panels will also sweat and should be insulated/vapour sealed wherever possible.

3.2 Sensors

For radiant systems black bulb sensors are often used as they give a better indication of the effective temperature in the space. If standard air temperature sensors are used then allowance needs to be made for the radiant effect – set points can be a couple of degrees lower in heating mode and higher in cooling mode.

3.3 Fault finding

Fault	Remedy
Air in system	Open vent plug(s)
Low water temperature in heating mode	Check operation of heat pump/boiler and any mixing valves
High water temperature in cooling mode	Check operation of heat pump in reverse cycle/chiller and any mixing valves
Low water flow rate	Check operation of pump and diverting valves. Ensure any flow-setting valves are correctly calibrated
No water flow	Check valves open and pump operating

4. Maintenance

Heat Cloud panels are largely maintenance free. If access to the top surface of the panel is available then this can be periodically cleaned using a dry cloth or non-abrasive/corrosive detergents; if unsure first try cleaning fluid on a small area of the panel. The underside of the panel is not normally accessible unless the plasterboard is first removed.

The waterways consist of copper pipes and any flexible hoses supplied will normally be EPDM rubber, any flushing undertaken or inhibitors used need to be suitable for use with these materials.

Should panels need to be removed after fitting then only the plasterboard associated with these panels should be removed; not the whole ceiling. In typical designs the Heat Cloud will not extend to the very edges of the room with a 'service area' of around 300mm around the perimeter.

5. Disposal

Panels are constructed from copper tubes, aluminium panel sections and steel hanging accessories. These can be separated. It is not recommended that the units are disposed of with domestic waste but that the components are recycled as far as possible.

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