SPC iTwelve Industrial Radiant Panels

Installation, Operation & Maintenance Manual

IOM 100 Issue 2

SPC

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1. General

1.1 General description

The SPC iTwelve radiant panels are manufactured from a flanged aluminium tray with specially profiled 'D' shaped 12mm copper tubes attached to the upper side via aluminium saddle pieces. The panels may be supplied with insulation mats for laying on top of the panels between the side flanges. Panels will be supplied with the necessary hydraulic connectors and hanging bracketry.

Panel pipework will typically terminate in 22mm copper manifold pieces; crimp connectors should be used to interconnect the panels, and these will usually be supplied as part of the contract.

Panels are suitable for hanging directly from the ceiling or via runs of Unistrut. The panels are supplied, by default, as 300mm wide modules, and bespoke hangers allow the panels to be held together up to 4 panels in width with 50mm gaps between panels.

The nature of the product is such that each application will be bespoke. It is critical, therefore, that the bespoke documentation supplied is followed and that this document is only considered as giving general advice.

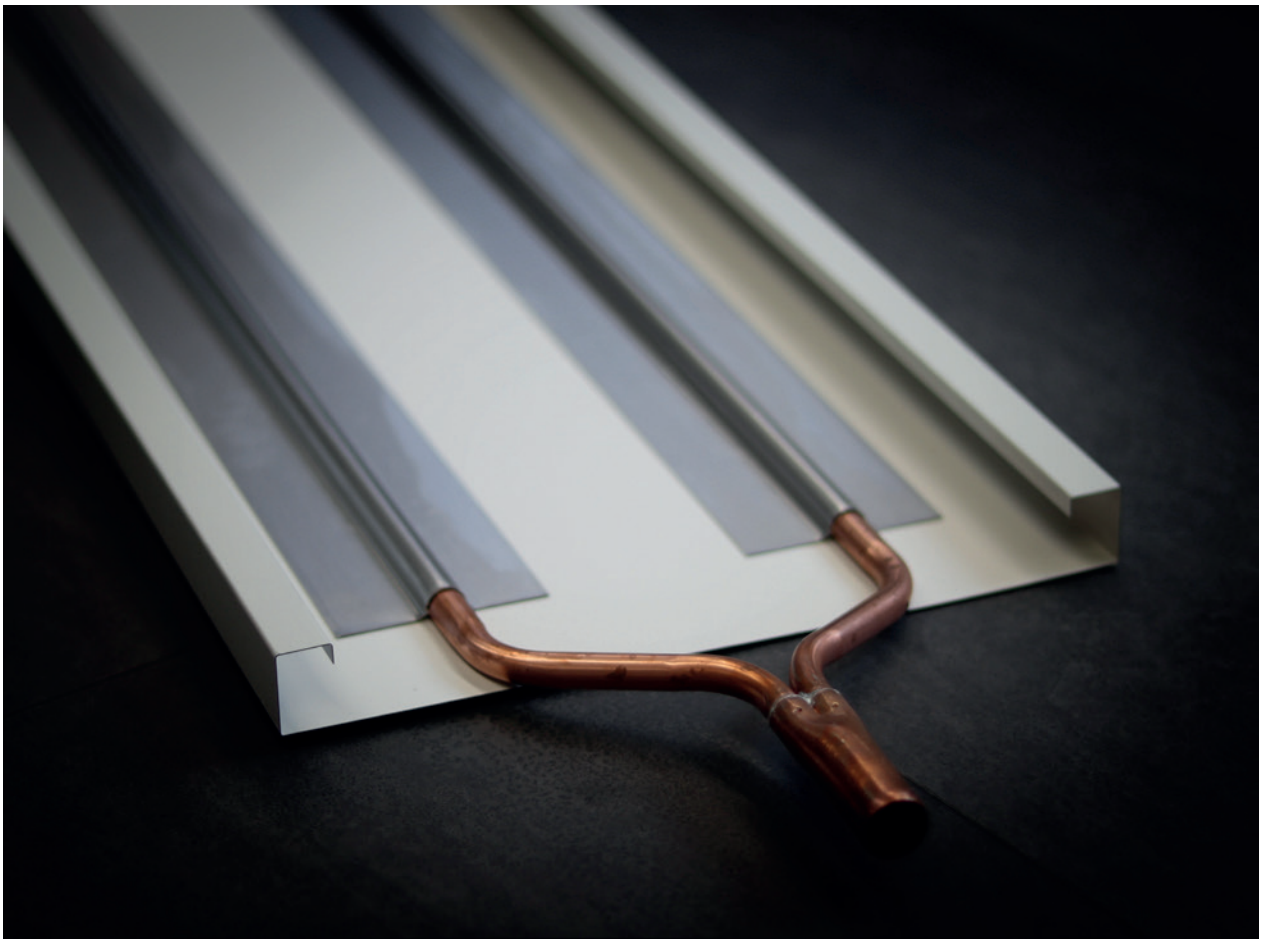


Figure 1. Standard 2 pipe modules

1.2 Receipt and preparation

Panels are supplied suitably stacked and packed with any ancillaries separately packed. An assembly drawing will have either previously been supplied or will be sent along with the panels. Panel preparation is covered later in this manual.

1.3. Storage and handling

Panels are packed and bear 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. On receipt, check that all details are correct in 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. Panels must not be handled or carried by the pipe connections; this can damage joints and will invalidate the warranty. Panels should be held vertically while being moved and must be handled by two persons, one on each end.

Figure 2. Lifting

1.4. Dimensional data

Panel runs can be supplied in a number of lengths; the widths of the panels are constrained to the sizes below for which weights are shown. These should be taken into consideration when determining the safe ceiling load.

Nominal Panel Width (mm)*	300	600	900	1200
Wet weight per metre length (kg)	4.6	6.6	8.7	10.7

*Plus 50mm gaps between modules when using multi-suspension bar

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 copper 'D' profile 0.35mm wall thickness
Size: WxH (length variable)	300mm to 1200mmWx25mmH
Panel material	Aluminium 1.0mm
Pipe connections (by default)	22mm copper
Maximum working pressure	6 bar
Maximum working temperature	85°C
Standard colour	White RAL9010
Surface emissivity	0.95
Insulation (if fitted)	25mm mineral fibre

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.

Black bulb sensors are suitable for use with radiant systems. Recommended control of panels is via mixing valves and suitable controllers. These should be weather compensated and arranged to allow gradual increases in temperatures so as to prevent rapid expansion of the different materials.

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 3m above the floor and more, there are no issues associated with discomfort and installations using iTwelve panels would typically have panels hung at a far greater height than would cause any problems.

2.3. Ceiling preparation

Panels are supplied, as standard, with suspension bars which automatically space the panels in the width. The suspension bars are affixed to the panels using the carabiners provided and the slots in the turned-in flanges on the sides of the panels. The suspension bars can then be hung from the ceiling via carabiners and wire/chain or threaded rod.

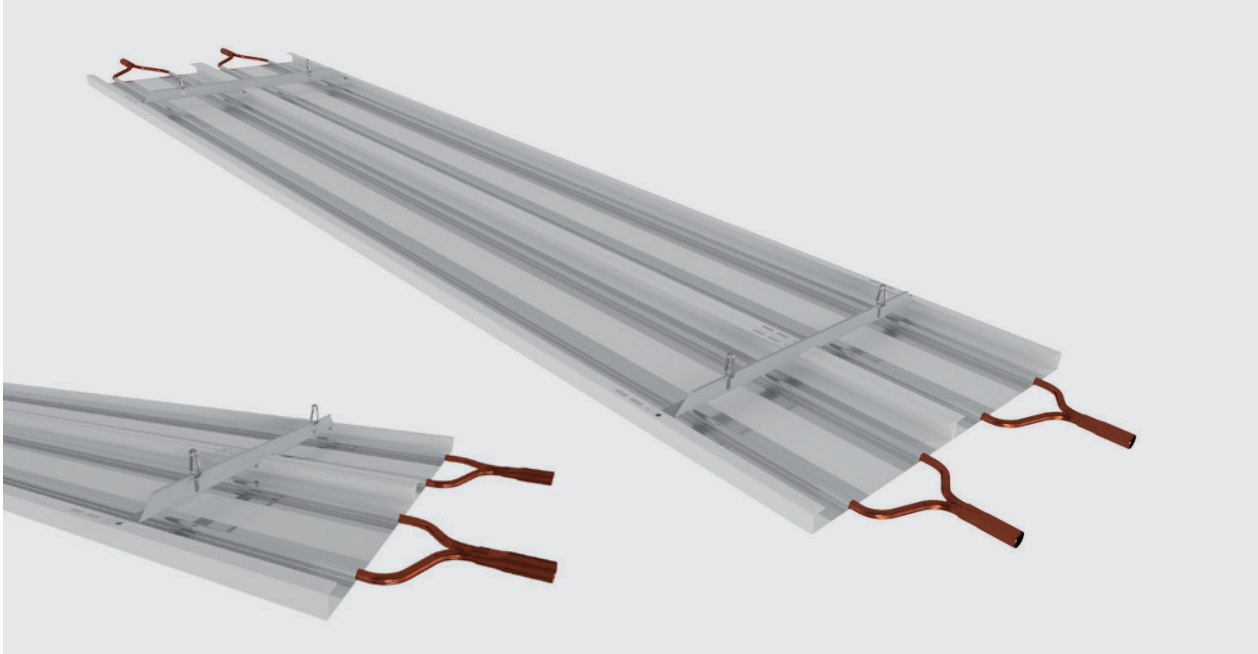


Figure 3. Standard panel

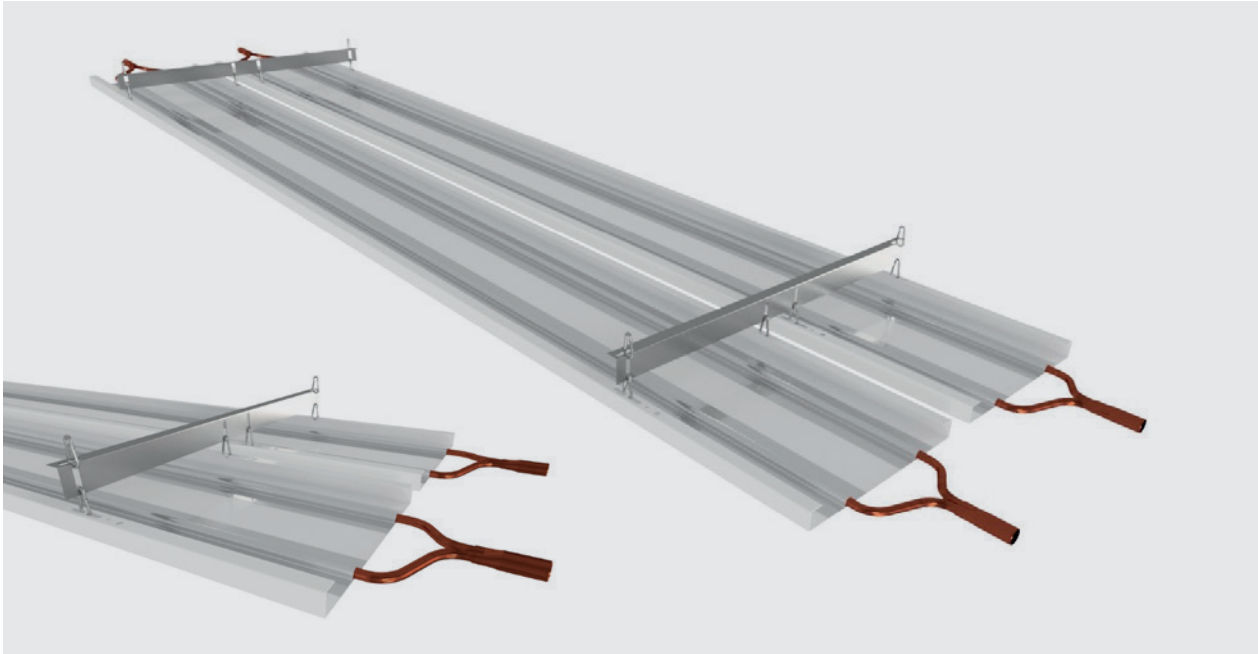


Figure 4. Multi suspension bar details

If the suspension wires/rods/chains are to be hung from Unistrut, it is recommended that full length runs of Unistrut are fixed to the ceiling. The continuous runs preclude the need to exactly mark out and attach fixing points above the panel fixing brackets. Any assembly drawings provided with the panels should be examined in order to determine the correct positions for the fixings prior to beginning any work.

Figure 5. Suspension wires tied off from the ceiling

2.4. Panel pre-preparation

Prior to hanging, any insulation which has been supplied loose can be fitted inside the flanges of the panels. If the panel quantity is greater than one in width, then the separate panels should be joined using the multi suspension bracket and the carabiners provided.

When working on the panels, they must be laid on a protective surface to prevent any damage to the radiating surface prior to hanging.

Figure 6. Scissor lift in use, note foam protection to prevent damage to the panels

2.5. Hanging

After the pre-preparation is complete, the panels can be hung. The first panel should be from one end of the run and mounting then continues in order to the other end of the run. It is critical that the panels are supported by a scissor lift or equivalent during the mounting process. The panel is supported at the height of the wire/rod/chain attached to the ceiling and then attached to the multi suspension bracket via carabiners or otherwise. All the brackets/fixings must be joined before the panel support is released.

It is recommended that a laser be used to level the panels.

2.6. Piping

iTwelve panels consist of parallel runs of 12m o/d copper tubes, typically terminating in 22mm copper manifold pieces at either end. Due to the manifolding, there is only one joint to be made between adjacent panels in a run. Panels are supplied with copper press fittings to allow all the panels in a run to be joined in line with the design. The panels are supplied with sufficient press fittings to allow all the pipes in all the runs to be connected. After hanging, the panels should be arranged such that the ends of the pipes from adjacent panels are lined up, and the press fit sleeves can then be fitted.

The press fittings are secured using a press-fit tool. Do not start the process of pressing until the complete run of panels has been levelled and the press fittings loosely pushed onto all tubes.

Flow and return connections to the complete panel run are made at the same or opposite end, depending on the design and will normally be in 22mm copper. The final connections can be hard piped to mains, though the recommendation is to use flexible hoses.

If flow-setting valves are used, these should be set to the required water flow rate for the run of panels that they are controlling; details of required flowrates can be found on the quotation or order paperwork. It is recommended that the valves be fitted to the return from the panel run and that they should be set prior to mounting rather than being adjusted when at high level.

The whole pipework assembly should be tested to ensure that there are no leaking joints. Press fittings are designed to leak at low pressure if they have not been properly crimped, so as to identify omissions at an early stage.

2.7. Centre coverplate fitting

If coverplates have been ordered, they should be fitted after the panels have been pressure tested. Coverplates will lap over the ends of adjacent panel flanges and can be secured with rivets or self-tapping screws.

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. Air separators are recommended and should be fitted at a point where the water temperature is at its highest to encourage any air to come out of solution.

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. It is recommended that mixing valves be used to blend the water to a temperature most applicable to the outside air conditions and that the control is arranged to provide a timed increase in water flow temperature.

3.1. Cooling applications

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 – setpoints 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 boiler and mixing valves
High water temperature in cooling mode	Check operation of chiller and 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

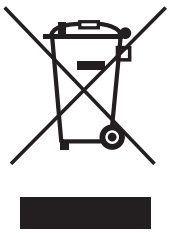
4. Maintenance

Radiant panels are largely maintenance free. The surface of the panel can be cleaned using a dry cloth or non-abrasive/corrosive detergents; if unsure, first try cleaning fluid on a small area of the panel.

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

5. Disposal

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



6. Appendix 1 – Sports Hall Panels

If panels are supplied to a sports hall specification, then they will be to a non-standard design, allowing them to comply with the requirements of standard DIN18032-3. To comply with the aforementioned, panels must be able to withstand bombardment from sporting equipment without suffering significant damage or becoming dangerous.

Panels to this design have a fully folded construction and pipe connections hidden behind the panels. They may also include domed, mesh ball guards, which are fitted after installation and held in place using additional brackets. Sports hall panels constructed from several modules in width will be continuous and will not incorporate a 50mm air gap, as is standard for the conventional panels. End coverplates cannot be fitted to sports hall panels and interconnections are all via flexible hoses.

When this type of panel is part of a continuous run, then panels are butted together directly and secured at the ends with screws through reinforcing plates.

Please refer to document IOM 102 for additional information regarding the hanging and installation of sports hall–type panels.

Figure 7. Sports Hall Panel details

7. Installation Support

For technical support with installing iTwelve panels, please contact the **SPC Technical Team**. For requotes or the ordering of spares, please contact the **Sales Office** - call 0116 2490044 or email spc@spc-hvac.co.uk.

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