

# How to implement heating zone controls

When you're heating a large building, not all areas will require heat at the same time or at the same temperature. Zoning lets you split your heating system into smaller sections that you can then control separately.

It's a simple concept, but one which can be quite complex to implement because you need to know the details of your heating system pipework. You'll need to work closely with a good heating contractor, but you could save around a third of the energy used for heating each area.

## The business case

A zone controller and 25mm motorised isolation valve will cost around £800 for a simple installation.

Let's say the area concerned is 150m<sup>2</sup>, which would use around 30,000kWh a year to heat. Saving 30% of that energy would equate to £225 a year, with gas at 2.5p/kWh, including the Climate Change Levy. You'd recoup your costs in less than four years.

## The technology

Heating zone control systems usually have two main components – a motorised isolation valve to interrupt the flow of hot water to the heating zone, and a controller to regulate the operation of the valve.

Controllers can adjust the heating system based on time, temperature or both.

To make fitting easier on existing systems, you can get battery operated controllers that communicate wirelessly with their control valve.

The control valve itself usually needs a mains electricity supply. It also needs to be installed into the area's heating pipework, which involves local isolation and draining.

## Time control

You can use a traditional time switch if operating times are predictable and regular, or infrared detectors and run-back timers if heating times need to vary more. If you're using detectors, the heating system does need a higher output and to be very responsive, so that the area warms up quickly as soon as people are detected.

## Temperature control

Temperature control is usually via one or more room thermostats.

## Combined control

Combined time and temperature control uses a programmable room thermostat. This allows different temperature settings to be programmed for different times of the day. This is useful when you want to limit the cooling down of an area during unoccupied periods – to prevent condensation, for example.

## Applications

You can use heating zone controls with all hot water central heating systems, but they're especially useful in:

- Areas with variable heat gains – south-facing elevations that get a lot of sunshine, for example.
- Areas that aren't used continuously – single shift areas of a building that's otherwise occupied round the clock.

The main limitation tends to be the arrangement of the heating pipework. To be cost-effective, it must be possible to isolate the heating supply to a particular zone using only one or two motorised valves. On top of this, interrupting the flow to the required zone mustn't affect heating for other areas.

The only way to plan for this is to understand the pipework layout. New systems may have 'as installed' drawings. If not, you'll need to do a survey of the pipework, or ask your heating contractor to do that for you.

It can actually be cost-effective to alter pipework so that zone controls can be installed. In many cases, though, the costs will outweigh the benefits.

## Specification checklist

The table below outlines the main points to discuss with your supplier when considering a heating zone control system.

## Commissioning procedure

Heating zone controls need to be installed and commissioned by a qualified controls contractor.

Handover should include:

- checks that the controls work as required
- clear, written operating instructions
- a demonstration for the user of:
  - time switches
  - thermostats
  - motorised valves
  - presence detectors
  - any other control devices

At least once a year, you should make sure the controls still operate well, by manually changing the time switch and thermostat settings and checking for a reaction from the control valve.

**Table 1** Specification checklist

Considerations	Comments
Time, temperature or combined control.	
If you need time control, will this use a seven-day time switch or detection.	Consider occupation patterns and the heating system warm-up time.
Mains voltage or battery operated controller.	
Hard-wired or wireless communication.	Maximum range for wireless communication is around 30m.
Location and size (pipe diameter) of isolation valve.	See Applications section.

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## Common problems

### Operational issues

At specification stage, you need to consider carefully how the zone controls will be used. If not, the system might not be as flexible as you need, controls may be over-ridden and savings will be disappointing. An example would be opting for a simple 24-hour time switch, when a more sophisticated, electronic seven-day time switch is really needed.

Heating zone controls tend to be accessible to staff – and that brings the risk of people changing their settings. If that's a problem, you can fit the controllers in lockable compartments or choose devices with password protection.

### Hydraulic issues

The main problem comes when trying to fit a motorised control valve into existing heating pipework. It's a particular issue if pipework is old and badly corroded – in buildings without water treatment, for example. You may need to replace sections of pipework, which will add to the cost.

You may also have problems with hydraulics if most of the heating system is fitted with zone valves. In these cases, there might not be enough water flow through the boiler plant when most of the valves are shut. The solution is to fit a pressure relief 'spillback' valve in the boiler house or to use three-port diverter valves rather than two-port isolation valves for each heating zone.

## Finding a supplier

Heating zone controls come under the Government's Enhanced Capital Allowances scheme. You can see a list of ECA approved suppliers at <http://eti.decc.gov.uk/eti>

Heating zone controls should always be installed by a reputable contractor. You may already know of a good contractor; if not, contact a trade association.

### The Heating and Ventilating Contractors' Association (HVCA)

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