

# How to implement optimum start control

Optimum start controls vary the times your heating systems come on, depending on the weather and the heat in the building. Using optimum start instead of fixed time controls could save you up to 10% in energy costs – and make your building more comfortable.

Because they make your heating system far more responsive, optimum start controls can really improve working conditions and give you substantial carbon and cost savings.

## The business case

An optimum start controller costs between £80 and £300, and should take no longer than a day to install. With savings of around 10%, you should recoup your costs in less than five years.

## The technology

The warm-up time needed for building heating systems depends on the outside air temperature and the residual temperature in the building. Optimum start controllers continually measure these temperatures and vary the heating start times accordingly.

You programme in the times the building is occupied and the inside temperature you want to maintain. The controller then automatically starts the heating to give you the required temperature by the time people start to arrive.

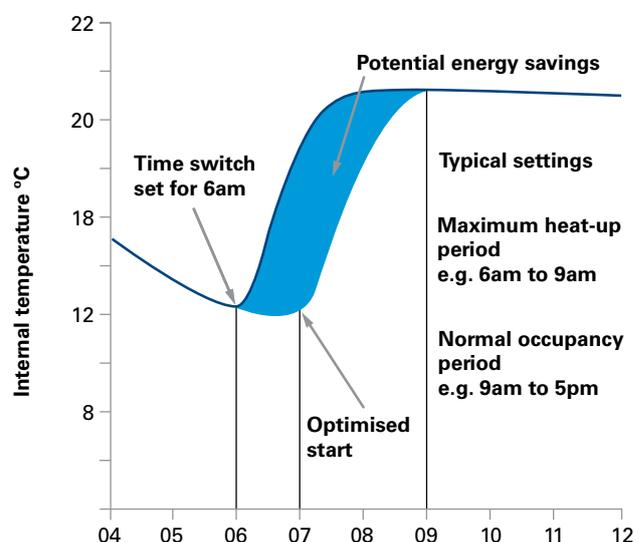
Most optimum start controllers can also be configured to:

- turn off the heating during the day if the outside temperature rises above a set level – day economisation.
- turn off the heating early if the inside temperature will still be comfortable until people leave for the day – optimum off.

Optimum start controllers can be standalone devices or may be combined with other control functions, such as weather compensation. Many can be connected into site-wide building energy management systems (BEMS).

The standard, standalone controller is a simple box that replaces the heating timer. It's relatively straightforward for your heating contractor or your maintenance staff to wire in, but you also need internal and external temperature sensors wired to the controller. Connecting the sensors is generally by simple 0.5mm<sup>2</sup> two-core cable with no special protection or sheathing needed.

**Figure 1** The effect of optimum start control



**Table 1** Specification checklist

Considerations	Comments
Optimum start required?	Essential
Optimum off required?	Recommended
Day economisation required?	Recommended
Does it need to be combined with another control function, such as weather compensation?	
Does it need to communicate with other controllers, such as a building management system?	
Wireless sensors?	

For smaller heating systems, you can make installation even simpler by getting sensors that can communicate wirelessly with the control box. The sensors need to be within around 30m of the box.

## Specification checklist

The table above lists the points to consider when specifying an optimum start controller.

## Commissioning procedure

How well your start controller does its job depends on how well you set it up.

- The set time for the optimum start controller should be your occupancy time without any pre-heating. The controller will start your heating system each morning so that it's at the right temperature in time for people arriving.
- You need to consider whether the building should be heated for security, cleaning or maintenance staff who start at an earlier time.
- Be patient. It will take the controller a week or two to learn how long the building takes to warm up and cool down. After that, it should help control the temperature very accurately.
- Make sure people in your building know about the new system, as it will switch off the heating during warmer afternoons when the building temperature is high enough.

## Common problems

- The location of the sensors is very important. The external sensor needs to be on a north-facing wall, so that it doesn't get sun at any point of the day. The internal sensor needs to be in a typical location in a colder (but heated) area of the building. Avoid direct sunlight, heat from process equipment, office equipment or draughts. Don't put the sensor in an office where people like to open the windows or switch off their heating in the winter.
- When programming the start time, it's important not to build in any pre-heat time. The programmed start time should be the start of occupancy – the controller will bring the heating on in advance of this, as needed.

## Finding a supplier

Optimum start controllers should be fitted by a good heating or controls contractor. You may already know of a contractor; if not, try contacting a trade association.

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

020 7313 4900  
[www.hvca.org.uk](http://www.hvca.org.uk)

### The Energy Systems Trade Association (ESTA)

01268 569010  
[www.esta.org.uk](http://www.esta.org.uk)