

Central Heating Controls Guide



When planning a central heating system, one of the most important aspects to consider is the way the system will be controlled. With most Kiwis never having lived with central heating previously, they rely on advice from the supplier, installer, or other experts to ensure the control system suits their needs.

From the experience of designing and supplying over 10,000 central heating systems throughout New Zealand, Central Heating New Zealand has experimented with numerous controller types and methods. From this experience, we feel we now have a good understanding of the control solutions that suit most Kiwis to ensure they have the right level of comfort in their home without excessive costs or complexity.

The best control system for any given project should consider the following factors:

1. The type of heating system installed and how it will be balanced – Both radiator and underfloor systems can be accurately balanced to ensure the right amount of heat is delivered to each area of the home. With regulating valves installed in the radiator itself or at the manifold for an underfloor

heating system, the installer can set the ideal valve settings to achieve the correct amount of flow in each area. Our engineering team will provide the installer with these settings during the detailed design. Setting these regulating valves matches the heat output rate to the heat loss rate in each area, allowing all areas of the home to warm up evenly, preventing overheating or underheating in specific areas. When this balancing is done correctly, the thermostat installed in any area of the home should result in all areas meeting the desired temperatures.

2. How the home will respond to solar gain – The size, shape, and amount of glazing for a home will determine how the home responds to solar gain. Rooms with a large amount of north-facing glazing might need heating in the morning and afternoon but stay relatively warm in the middle of the day with heat from the sun alone. As a comparison, rooms with predominantly south, east, or west-facing glazing are likely to have shorter total sun hours in the winter, and these rooms will need more consistent heating throughout the day to remain warm. For some homes, these differences



in sun hours between different parts of the home will result in very different heating needs. When reviewing the plans for a home, our engineering team will consider these factors, and where required, additional control zones will be added to the system to help manage these varied heating needs.

3. KISS (Keep it simple, stupid) – One of the biggest learnings over the last 20+ years for Central Heating New Zealand has been that simple systems achieve the best results. The goal should be to reduce the number of controllers as much as possible while still achieving the required heat balance for the home. Central heating systems are not a system where the user needs to be constantly adjusting the system to feel warm. Over the course of the first heating season, the set points and time schedule for heating will be adjusted to suit the needs of the occupants, and for every heating season thereafter, the heating would just be turned on at the start of the heating season and off at the end of the season with no or minimal interaction with the controller in between. The best control solution for most homes is a single thermostat; for some larger or more complex homes, a controller per zone of the home may be needed, but thermostats for each room are not recommended or required when the balancing mentioned in point 1 is done correctly.

4. Thermostat Locations – The location of the thermostat or thermostats in a home can have a big impact on how well the system will work. There are three critical considerations when locating a thermostat.

- a. Internal Walls Only - Thermostats must not be installed on external walls; the conduction through the wall alters the thermostat's temperature reading, resulting in unpredictable operation.
- b. Avoid Direct Sunlight – Thermostats should be installed in internal walls of the home that will receive no or minimal sunlight directly on the thermostat. Sun allowed to shine on the thermostat will result in the temperature reading increasing, potentially causing the heating to turn off before the room is sufficiently warmed.
- c. Away from heat sources – the thermostat should not be installed directly next to a radiator or over the "hot track" of an underfloor heating system. If installed in these locations, the thermostat could turn off early as the local temperature will be higher than the remaining areas of the home or control zone.

All these factors for thermostat placement will be considered by our engineering team when designing the heating system. If you need to move the thermostat locations from the designed location, ensure you consider all these factors carefully.

5. How the home will be used – The last factor to be considered is how the home will be used. It is important that the control solution suits the lifestyle of the occupants and ensures the system is easy to use, achieves the comfort levels required, and is energy-efficient. The following factors need to be considered:

- a. The hours the home is occupied - Central heating systems are generally not recommended to be turned on and off throughout the heating season. To allow some reduced comfort and energy savings outside the main comfort times, a programmable thermostat can be used to allow lower temperatures to be set during these periods.
- b. How much of the home is used – If only parts of the home are regularly used and some areas need to be turned off, we need to consider what the best method for this control requirement is. If this is just a few rooms of a home, the most cost-efficient solution is to just close the radiator or underfloor valves to stop the flow to these areas when not in use. If large areas of the home need to be shut down when not in use, additional thermostats may need to be added to make turning these areas on and off easy.

- c. Holiday Homes – Homes that are used occasionally typically need to be able to be remotely turned on to allow the home to be warmed up prior to arrival. When this is a requirement, we need to ensure the control solutions have remote access via mobile applications or similar.

When we don't have any direct contact with the clients for a new opportunity, it can be difficult to know all of these factors, but our engineering team tries to imagine how they would use the home and tailor the control solution to consider the above carefully.

When all these five factors are considered in the design and installation of a central heating system, the comfort levels and energy efficiency can be improved significantly, resulting in high levels of occupant satisfaction. Central Heating New Zealand takes care to consider all these factors when designing systems and is happy to provide advice to any clients on the best ways to control their central heating systems.

