Guidance on how to comply with Part L of the Building Regulations from April 2018

Version 1.0 – 21 March 2018

This guide supports the official 2013 guidance covering the control of gas and oil fired wet central heating installations in domestic premises under the revised Building Regulation Part L1 for England, with amendments coming into force from 6 April 2018.

Following the recommended system layouts in this document will provide confidence that designs and installations are in accordance with the guidance and therefore comply with the relevant parts of the Building Regulations. Underfloor heating systems are covered in the BEAMA Underfloor Heating guide to Part L.

For further information contact BEAMA Heating Controls via email: BRegs@beama.org.uk

This guide has been prepared by members of BEAMA Heating Controls, the association for UK manufacturers and suppliers of heating and hot water controls. Its members are Baxi, Danfoss, Honeywell, Horstmann, Myson, Pegler Yorkshire, Schneider Electric, Siemens, Vaillant, and Worcester Bosch.

New for 2018

The Domestic Building Services Compliance Guide has been amended for 2018. Informally referred to as 'Boiler Plus,' these amendments aim to improve the efficiency of installed heating systems, particularly through the installation of additional controls. The specific requirements that installers will now have to follow when replacing a boiler are as below:

1. Ensure that the system meets minimum standards for boiler interlock, time and temperature control as they would for a new system. (This was generally accepted as a requirement by industry and Building Control in the current building regulations, but it is good that this is now more clearly stated.)
2. When installing a gas combination boiler only (both new and replacement) a minimum of one of the following should also be installed:
   - Flue gas heat recovery
   - Weather compensation
   - Load compensation
   - Smart thermostat with automation and optimisation

   These options are covered in more detail below.

Additional measures required with a gas combination boiler (one of the following):

1. Flue gas heat recovery

This is defined as '*a device which pre-heats the domestic hot water supply by recovering heat from the boiler's flue emissions*.' These devices are not part of a standard condensing boiler but may be built in to some boilers or will be a separately supplied device. You should always check with the boiler manufacturer regarding compatibility and installation.

2. Weather compensation

For weather compensation two elements are required:

i. A means of measuring the local outdoor temperature. This can be either by a sensor fixed to an external wall of the property (in a position where it will not be affected by solar gain), or, with certain devices, by receiving location specific weather data (e.g. from an internet source.)

ii. A control functionality that varies the flow temperature from the boiler in relation to the measured outside temperature, thereby matching heating output to the heating load. This is achieved either by directly modulating the output of the heater (which requires some communication protocol between the boiler and the control; the boiler instructions will define which protocols are applicable) or by controlling the on/off operation of the heater.

In practice, this can be achieved by either directly connecting an outdoor temperature measuring device directly into the boiler (if this facility is available), by connecting to the boiler a stand-alone weather compensator with an outdoor temperature measuring device, or by replacing the room thermostat and timer with a programmable room thermostat that incorporates weather compensation and is connected to, or incorporates, an outdoor temperature measuring device. System diagrams incorporating these options can be found in page 7. Manufacturers' instructions for both boiler and controls should be consulted.

3. Load compensation

Load compensation operates in a similar way to weather compensation except that it measures internal rather than outdoor temperature. The control will incorporate a functionality that varies the flow temperature from the boiler in relation to the difference between the measured room temperature and the room thermostat set point. This is achieved by either directly modulating the output of the boiler (which requires some communication protocol between the boiler and the control; the boiler instructions will define which protocols are applicable) or by controlling the on/off operation of the boiler, providing that this varies the flow temperature from the boiler.

A load compensation control will usually replace the room thermostat in a dwelling and does not usually require an additional sensor.

4. Smart thermostat with automation and optimisation

While the definition of a 'smart thermostat' will vary depending on who you ask, in this context there are three clear functionalities that must be incorporated:

- It must include a room thermostat, delivering both time and room temperature control, and therefore replacing any existing thermostat and programmer, or programmable room thermostat.
- It must have the functionality to automatically adjust time and temperature settings based on either manual entries from the occupants or occupancy detection.
- It must be capable of starting the boiler at the optimum time to achieve the set-point temperature at the start of the occupancy period (i.e. optimum start.) Implicit in this is some form of learning within the device.

In the context of Part L, this definition of a smart thermostat does not require the measure to offer remote control or internet connectivity.

Quick Guide - Recommended Minimum Standards for Control of New Heating Systems

Dwelling over 150m2[1]	**With hot water cylinder**	Boiler interlock[2]
		At least two space heating circuits[3], each with independent time control, a room thermostat and TRVs[4]
		A hot water circuit with independent time control and a cylinder thermostat
	No hot water cylinder (combi boiler)	Boiler interlock
		At least two space heating circuits, each with independent time control, a room thermostat and TRVs
		One of: • Flue gas heat recovery • Weather compensation • Load compensation • Smart thermostat with automation and optimisation
Dwelling up to 150m2	**With hot water cylinder**	Boiler interlock
		A space heating circuit with independent time control, a room thermostat and TRVs
		A hot water circuit with independent time control and a cylinder thermostat
	No hot water cylinder (combi boiler)	Boiler interlock
		A space heating circuit with independent time control, a room thermostat and TRVs
		One of: • Flue gas heat recovery • Weather compensation • Load compensation • Smart thermostat with automation and optimisation

Customer information

It is also a requirement in the building regulations to provide users with information on how to use their controls to reduce energy consumption. This should ensure that the customer is able to operate the specific controls that have been installed and to leave the operating instructions with them. It should also help them understand the best way to use the controls to maintain comfort and minimise energy use. A detailed guide to use of controls is available to download from www.beama.org.uk/heatingcontrols and this can be left with customers.

For new systems the regulations suggest that a set of operating and maintenance instructions should be left with the occupants in a durable and easily understood format.

[1] A 2006 report by Nationwide showed that most four-bedroom detached houses fall into this category with the average floor area of such properties being 157m2 (the average for five-bedroom detached was over 200m2.) Older houses can be larger than modern ones, with the average of all pre-war detached homes being over 150m2.

[2] Boiler interlock means that controls are wired so that when there is no demand for space heating or hot water the boiler and pump are switched off. Use of TRVs alone does not provide interlock.

[3] Each heating circuit will form separate heating zone in the dwelling. One zone must cover the 'living area' and heating zones will often be divided to cover 'living' and 'sleeping' areas, or upstairs and downstairs. There are usually significant opportunities for energy saving by matching zones to the lifestyle of occupants (for example with home offices) and installers should look for opportunities to set up zones beyond the minimum requirements.

[4] It would also be acceptable for each heating circuit to be controlled by individual networked radiator controls in each room on the circuit.

Quick Guide - Recommended Minimum Standards for Control When Replacing Components of Heating Systems

Replacement boiler[5]	**With hot water cylinder**	Gravity-fed systems upgraded to fully pumped.
		Boiler interlock
		Maintain existing space heating circuit(s), each with independent time control and a room thermostat. TRVs strongly recommended.
		A hot water circuit with independent time control and a cylinder thermostat
	No hot water cylinder (combi boiler)	Boiler interlock
		Maintain existing space heating circuit(s), each with independent time control and a room thermostat. TRVs strongly recommended.
		One of: • Flue gas heat recovery • Weather compensation • Load compensation • Smart thermostat with automation and optimisation
New heating system with existing pipework[6]	**With hot water cylinder**	Gravity-fed systems upgraded to fully pumped.
		Boiler interlock
		Maintain existing space heating circuit(s), each with independent time control, a room thermostat and TRVs
		A hot water circuit with independent time control and a cylinder thermostat
	No hot water cylinder (combi boiler)	Boiler interlock
		Maintain existing space heating circuit(s), each with independent time control, a room thermostat and TRVs
		One of: • Flue gas heat recovery • Weather compensation • Load compensation • Smart thermostat with automation and optimisation
Radiator replacement	**Emergency**	Good practice to fit a TRV to the replacement radiator(s) if in a room without a room thermostat
	Planned	Good practice to fit TRVs to all radiators in rooms without a room thermostat
Hot water cylinder[7]	**Emergency**	A cylinder thermostat.
	Planned	Boiler interlock
		A hot water circuit with independent time control and a cylinder thermostat

Customer information

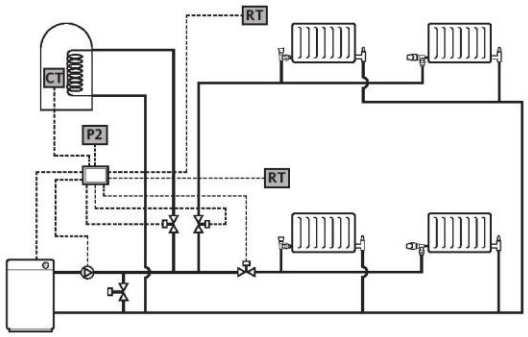
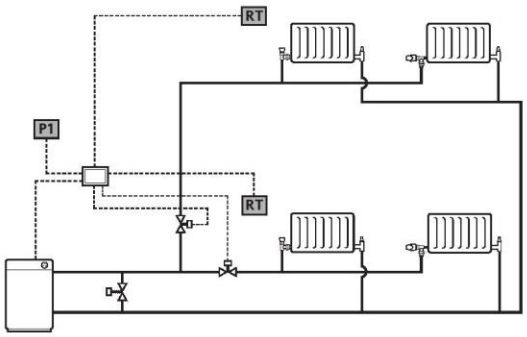
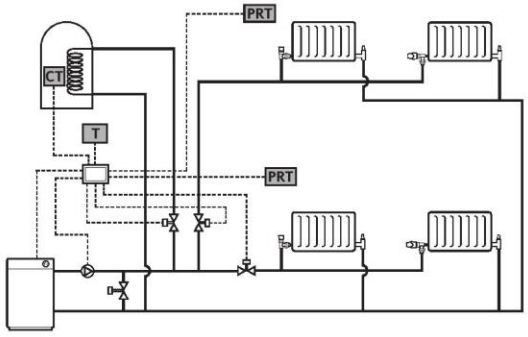
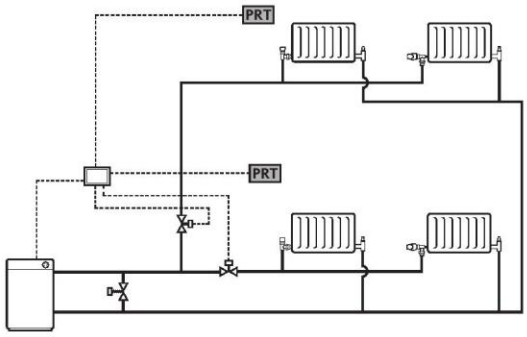
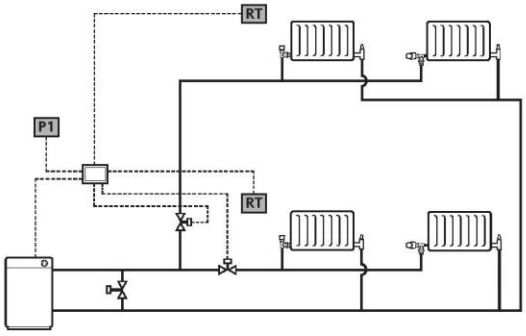
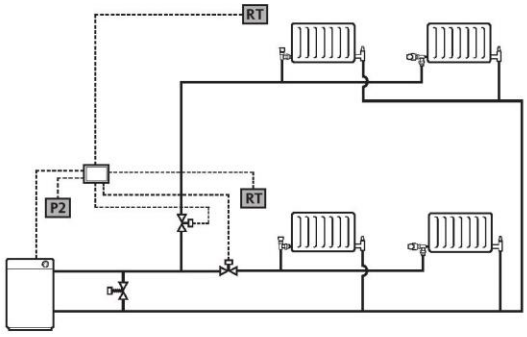
It is also a requirement in the regulations to provide users with information on how to use their controls to reduce energy consumption. This should ensure that the customer is able to operate the specific controls that have been installed and to leave the operating instructions with them. It should also help them understand the best way to use the controls to maintain comfort and minimise energy use. A detailed guide to use of controls is available to download from www.beama.org.uk/heatingcontrols and this can be left with customers.

[5] TRVs are only recommended as good practice with replacement boilers, but BEAMA Heating Controls strongly recommend that the opportunity is taken to install these when the system is drained down to ensure effective control of the heating system

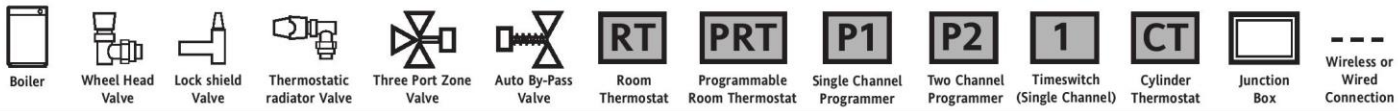
[6] For dwellings over 150m2 it is recommended as good practice to upgrade to at least two space heating circuits if only one currently exists.

[7] It is good practice to upgrade gravity-fed systems to fully pumped, and to install a separate hot water circuit with independent timing even in emergency situations.

Example layouts for **new systems** to ensure compliance

	Boiler with hot water cylinder	Combination boiler
Dwellings up to 150m2		
	Timer, room thermostats and thermostatic radiator valves	Timer, room thermostats and thermostatic radiator valves
Dwellings over 150m2		
	Programmable room thermostats and thermostatic radiator valves	Programmable room thermostats and thermostatic radiator valves
		
	Multi-channel programmer, room thermostats and thermostatic radiator valves	Two heating zone programmer, room thermostats and thermostatic radiator valves

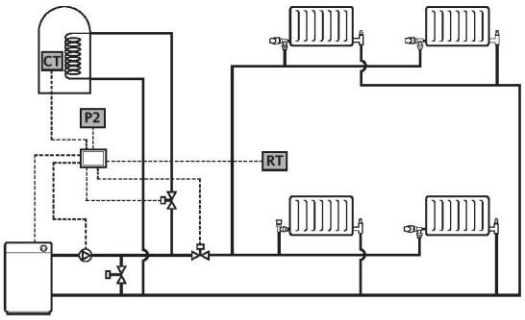
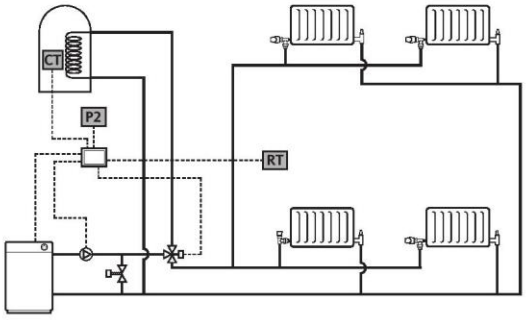
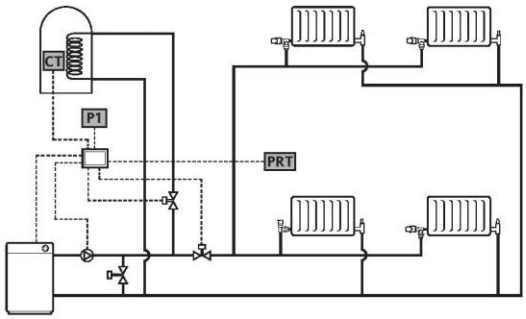
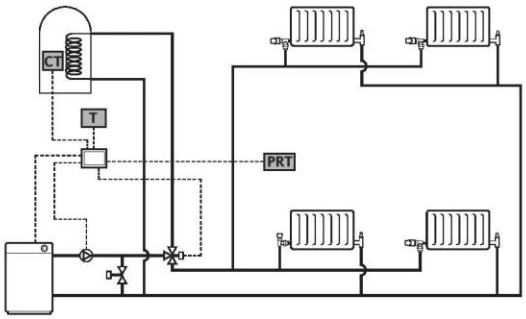
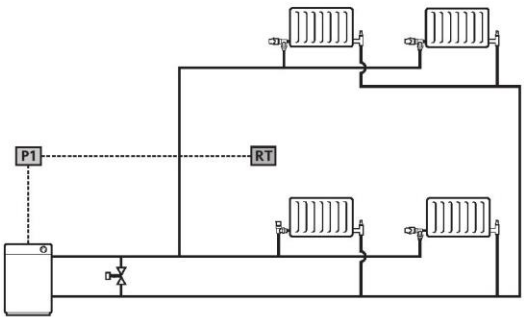
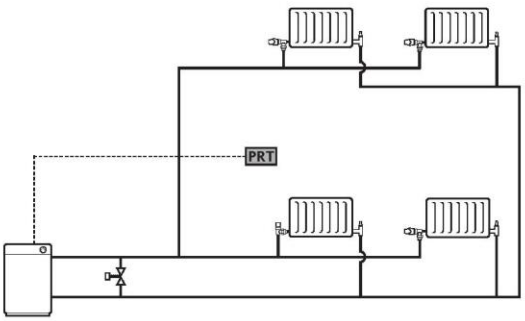
KEY TO SYMBOLS



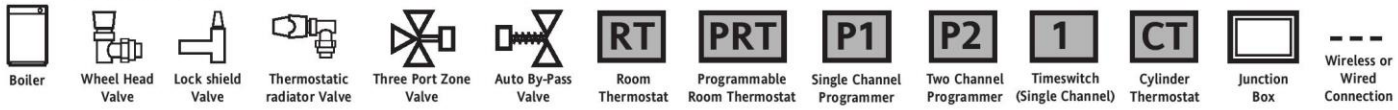
NOTES

- Systems specified for dwellings over 150m2 will also satisfy compliance for dwellings under 150m2 but will provide additional benefits to occupants by providing both time and temperature control in each zone at little additional cost.
- All of these systems can be applied in retrofit situations to provide additional operational benefits compared to the example systems specified for replacement boilers. However pipework changes can incur significant additional work in existing homes.

Example layouts for **replacement boilers** to ensure compliance

	2 port valve control	3 port valve control
Boiler with hot water cylinder		
	Timer, room thermostats and thermostatic radiator valves	Timer, room thermostats and thermostatic radiator valves
Combination boiler		
	Programmable room thermostats and thermostatic radiator valves	Programmable room thermostats and thermostatic radiator valves
		
	Programmer, room thermostat and thermostatic radiator valves	Programmable room thermostat and thermostatic radiator valves

KEY TO SYMBOLS



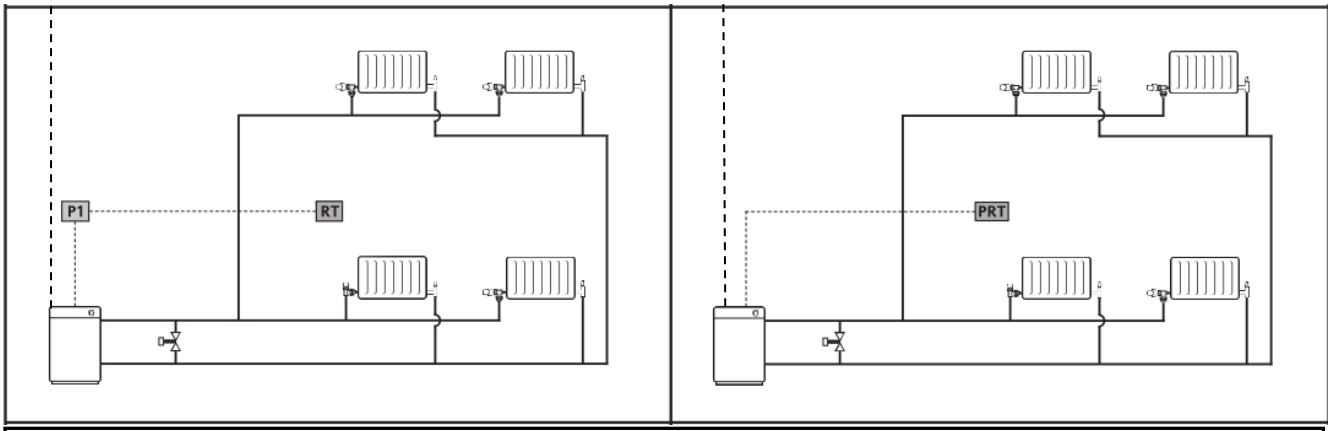
NOTES

- Where the system is of a semi-gravity type and therefore requires conversion to a fully pumped system consideration should be given to adoption of the system layouts specified for new systems.
- It is defined good practice to fit thermostatic radiator valves to all radiators when the system is drained down. TACMA recommends that his should always be done unless the type of existing radiators or pipework layouts makes it impractical.

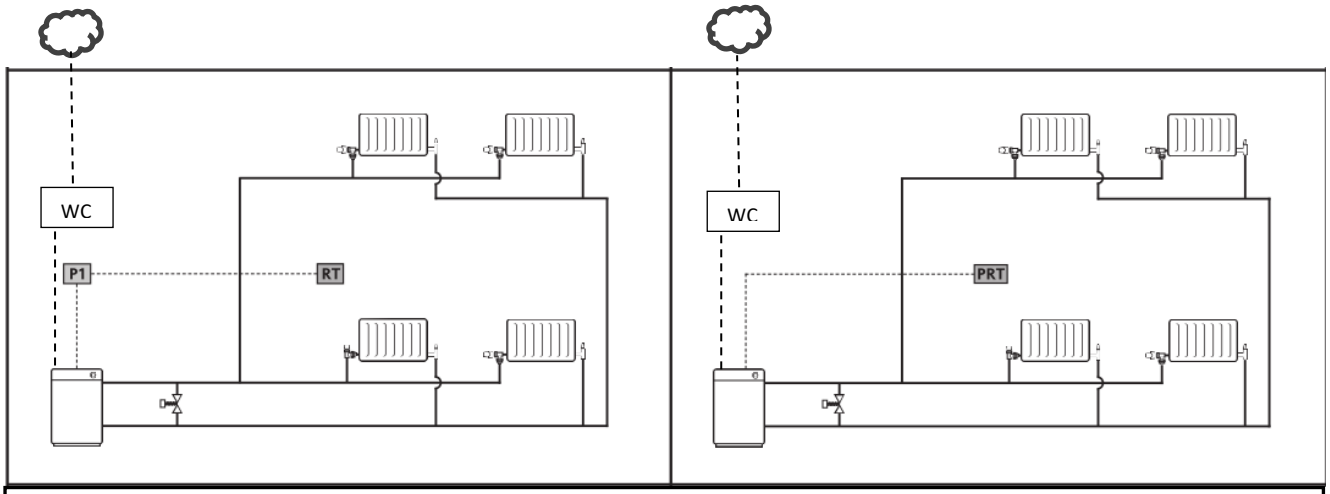
Weather compensation installation options (Draft diagrams to be formatted)

Programmer, room thermostat and thermostatic radiator valves	Programmable room thermostat and thermostatic radiator valves

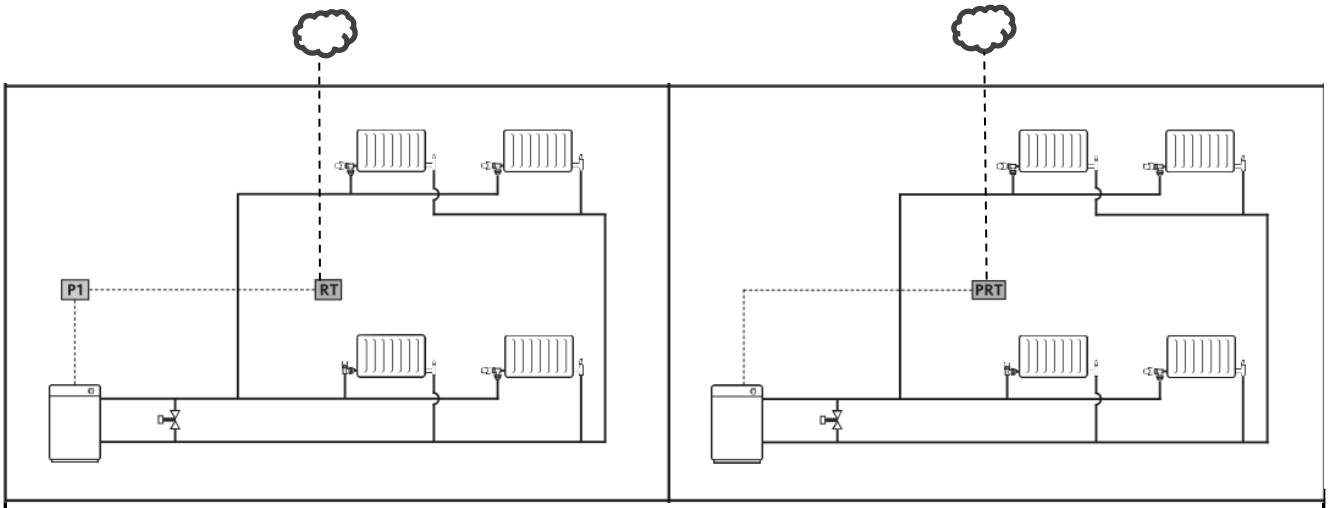
= local *outdoor sensor or internet weather data*



Outdoor temperature measuring device connected directly to the boiler



Stand-alone weather compensator with an outdoor temperature measuring device



Room thermostat with weather compensation, connected to, or incorporates, an outdoor temperature measuring device