

Unit 208: Central heating systems

Outcome 4

Mechanical central heating controls

Controls

Circulator

The circulator is located in position by pump flanges – these either have rubber or fibre washers to maintain the watertight seal. The full bore valves either side of the flanges can be closed to allow the pump to be removed without draining the system.



Controls

Circulator

The correct positioning of the circulator in the system is of great importance to avoid corrosion by aeration of the system water:

- Pumping over
- Drawing air in

If air is drawn into the system water, corrosion will take place.

Controls

Circulator

Inhibitor is added to the system water to reduce corrosion and the build-up of scale, and the level of inhibitor in the system should be tested on a regular basis.

The neutral point of the system is at the base of the cold feed, where it joins the system.

The pump must always draw on the cold feed.

VENT → COLD FEED → PUMP

Controls

Circulator

VENT → COLD FEED → PUMP

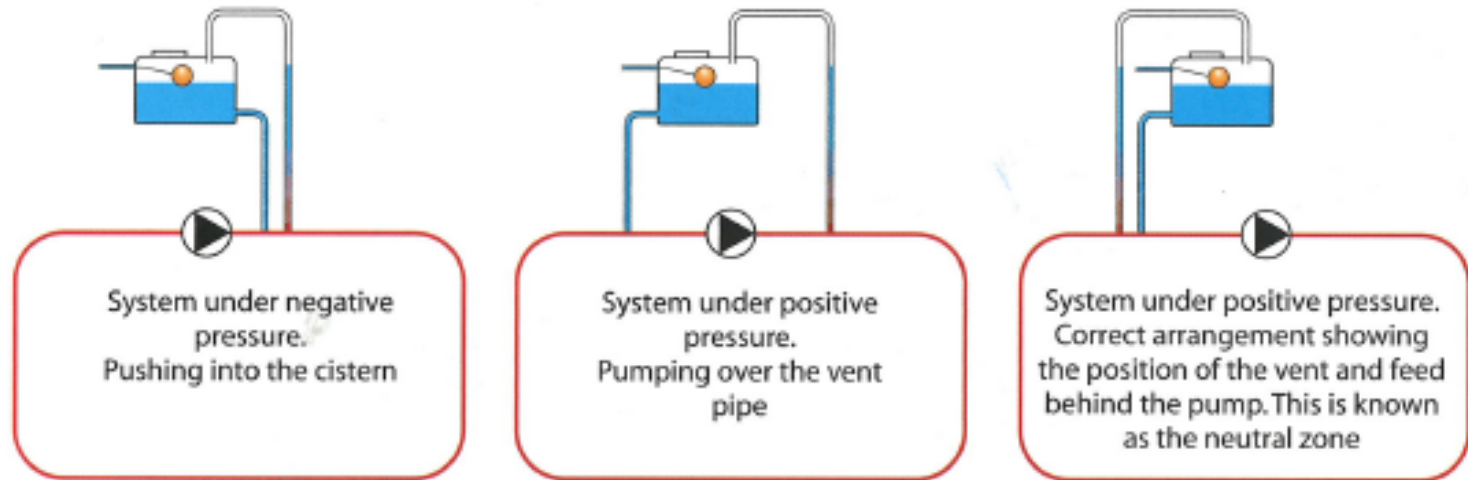
If this is correctly followed, the system water will be circulated under a positive pressure.

If this is not followed, the system water could be circulated under a negative pressure, thus drawing in air, pumping over and creating corrosion.

Controls

Circulator

As the system requires positive pressure, the position of the circulator is important in relation to the cold feed and vent pipe.



Controls

Circulator

Air (oxygen) + water (system water) + iron (radiator)

= Corrosion (rust)

= Magnetite

Magnetite will block components, restricting flow, and will also start to cause cool/cold areas on the radiators.

Controls

Two port motorised valve

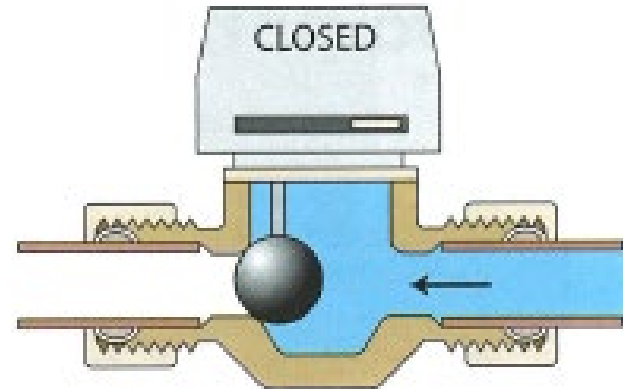
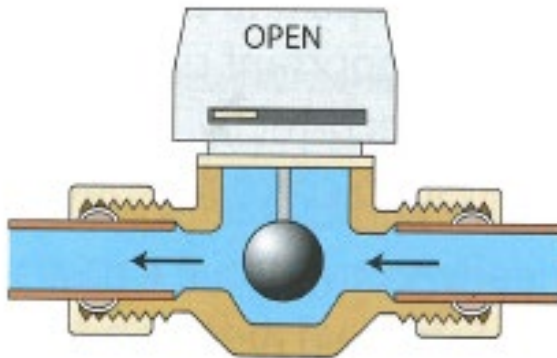
Commonly known as a **zone valve**, this can be activated by a room or cylinder thermostat. This allows both hot water and the heating circuits to be controlled separately.



Controls

Two port motorised valve

When there is a call for heat, the zone valve opens and allows water from the boiler to circulate around the pipework. Likewise, when the thermostat is up to temperature, the zone valve is closed (isolates).



Controls

Two port motorised valve

With both the room thermostat and the cylinder thermostat satisfied, the zone valves will close.

When the zone valves close, the boiler switches off and when the heat is dissipated from the heat exchanger, the circulator will switch off. This is known as **boiler interlock**.

An electrical arrangement of controls ensures the boiler does not operate when there is no demand. This will avoid the boiler to cycle and so save fuel, reduce emissions and save on some wear and tear.

Controls

Two port motorised valve

The paddle in the zone valve is powered by a synchronmotor. As this rotates, it opens or closes the valve.



This can be replaced if there is a fault, without releasing any system water. Safe isolation procedures will need to be followed.

Controls

Three port mid-position valve

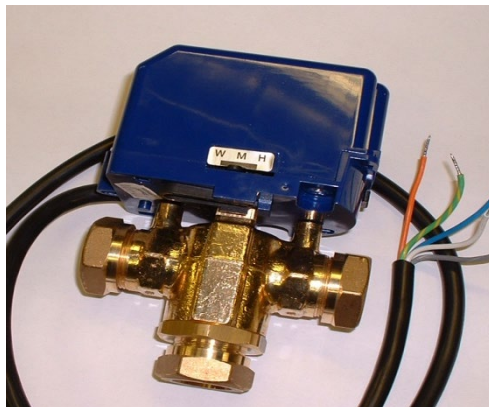
This valve controls the flow of water to both the heating and hot water circuits. It reacts to both the cylinder and room thermostat but cannot completely stop the flow of water like the zone valve can: water is always able to flow.

The three ports are labeled:

AB = flow for the boiler

A = central heating

B = hot water

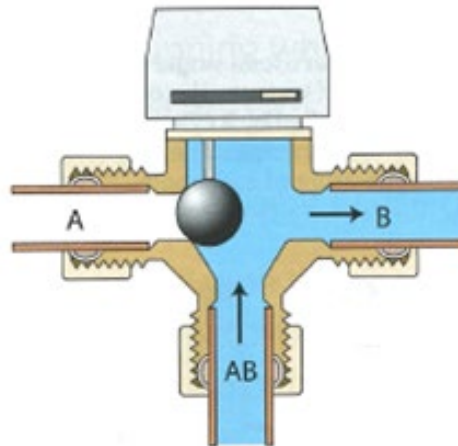


Controls

Three port mid-position valve

When at rest, the valve paddle sits in the hot water position, so always allows the flow of water.

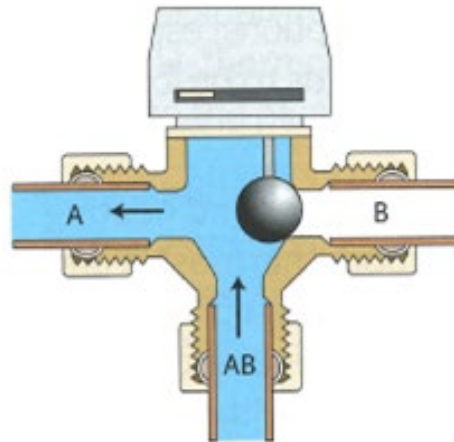
When there is a call for heat from the cylinder thermostat, the valve does not need to activate, as the system water can flow to the cylinder coil.



Controls

Three port mid-position valve

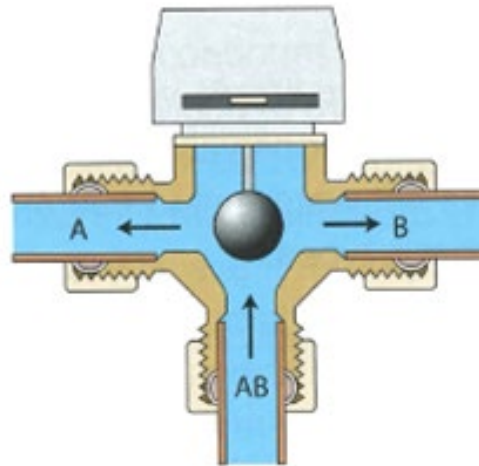
When there is a call for heat from the room thermostat, the valve activates and the paddle moves the A port across and blocks the B port. This allows the system water to flow around the central heating circuit.



Controls

Three port mid-position valve

When there is a call for heat from both the cylinder and room thermostat, the valve paddle moves to the mid-position, allowing system water to flow around both circuits.



Controls

Three port diverter valve

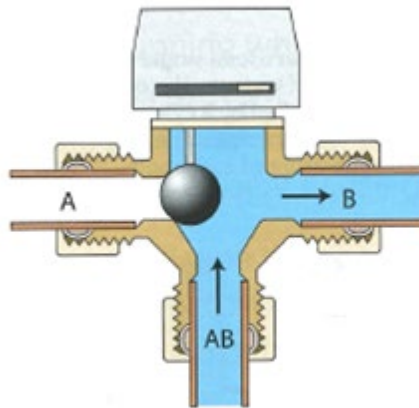
These valves are commonly found in combination boilers and some older systems (W plan). When at rest, the valve paddle sits in the hot water position, which allows the flow of water.

This valve is unable to remain in the mid-position and can only divert the water flow to one or the other circuits. It is known as a W plan – water priority.

Controls

Three port diverter valve

When there is a call for heat from the cylinder thermostat (W plan) or a hot tap is opened (combination boiler), the valve does not need to activate, as the system water can flow to the cylinder coil or plate heat exchanger.



Controls

Three port diverter valve

When there is a call for heat from the room thermostat, the valve activates and the paddle moves from the A port and blocks the B port. This allows the system water to flow around the central heating circuit.

If there is a demand for hot water at any point, the valve will revert back to its original position until that demand is satisfied.

