ADDING CONTROLS

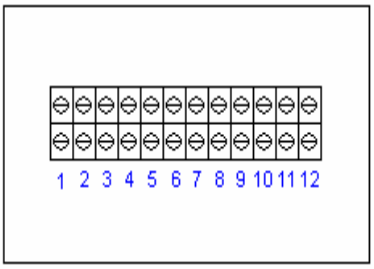
To add controls to a heating system is comparatively easy, saves a great deal of energy and reduces carbon emissions by a corresponding amount. If you don't have room and cylinder thermostats you have no control over room temperature or stored hot water temperature. Even worse is having no programmer or time clock, as the heating system can only be turned off by the switch supplying power to the heating system or by turning the boiler off; this results in the heating system running when it's not required, or worse, from a comfort point of view, not being on when you return home and having a cold house.

Don't attempt any electrical work unless you are competent to do so and are able to follow wiring diagrams. Always use the correct cable to wire controls etc. If you need 5 or 6 core cable for wiring from a Programmer, don't use two 3 core etc. or you will make mistakes and if at a later date you need to replace a heating component you'll get confused. You can obtain cable by the metre from Electrical suppliers so don't cut corners.

When connecting any controls to your heating system, the easiest way to do it is via a junction box. This enables you to follow wiring diagrams easily, as the terminals in the box are numbered and every component on your heating system is connected electrically in the same place. The junction boxes only cost a couple of pounds and if you don't have one, you are advised to fit one.



JUNCTION BOX



A JUNCTION BOX, ASIT'S NAME IMPLIES, IS A PLASTIC BOX THAT HAS A ROW OF ELECTRICAL TERMINALS INSIDE. THERE ARE NORMALLY 12, AND THE BOX ALLOWS ALL THE HEATING SYSTEM WIRING TO BE CONNECTED INTO IT. THE TERMINALS ARE NUMBERED SO THAT IT'S VERY EASY TO FOLLOW WIRING GUIDES.

TERMINALS INSIDE JUNCTION BOX

All heating systems should be protected by a 3amp fuse, whether it's from a Fused Spur or an ordinary Three Pin Plug; a fuse of any higher rating can cause damage to Circuit Boards, Pumps etc.



SWITCHED & FUSED SPUR OUTLET

SWITCHED SOCKET

ORDINARY THREE PIN PLUGS

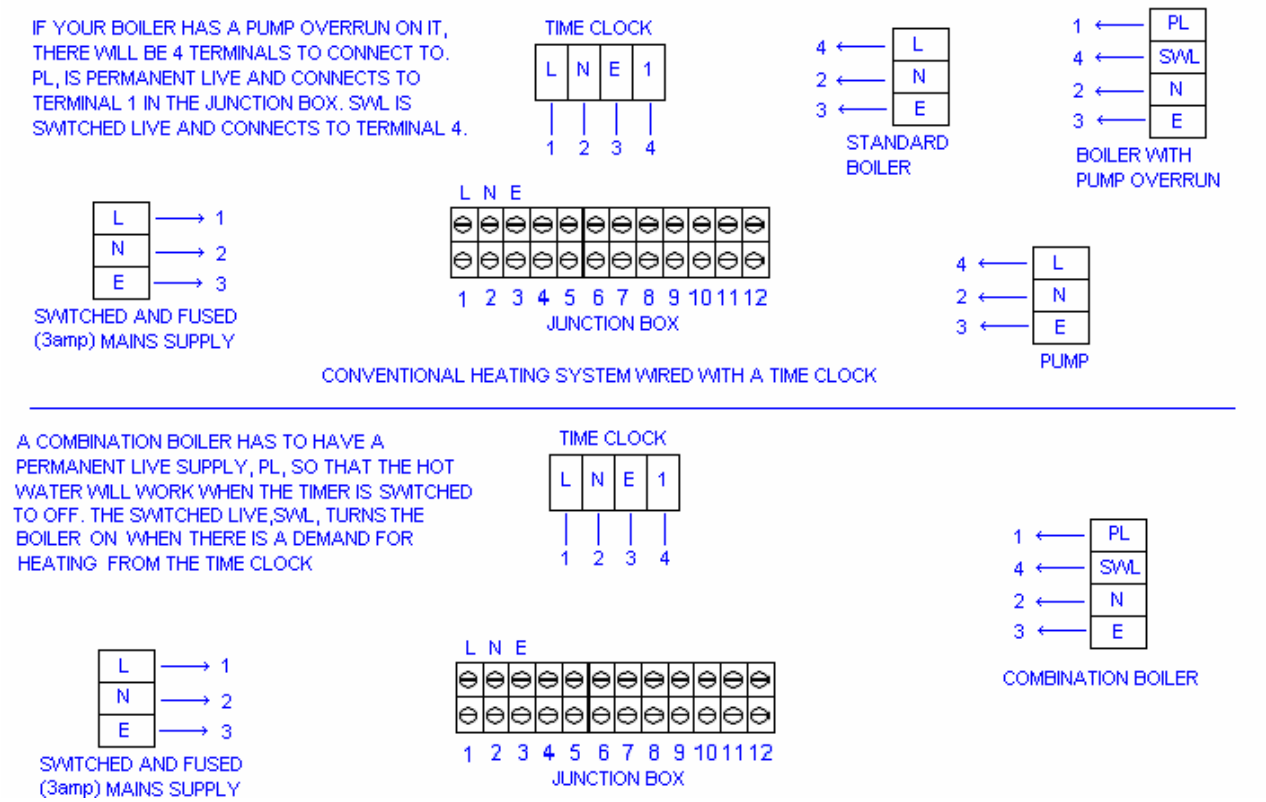
TIME SWITCHES AND PROGRAMMERS



A Time Clock controls the on and off periods of a heating system, with no independent control of the heating and hot water functions. They should only really be fitted to Combination Boiler systems and Heating Only systems.

If your central heating has a hot water Cylinder, of any type, you should fit a programmer to control hot water and central heating separately.

HEATING ONLY AND COMBINATION BOILER SYSTEMS



COMBINATION BOILER WIRED TO TIME CLOCK



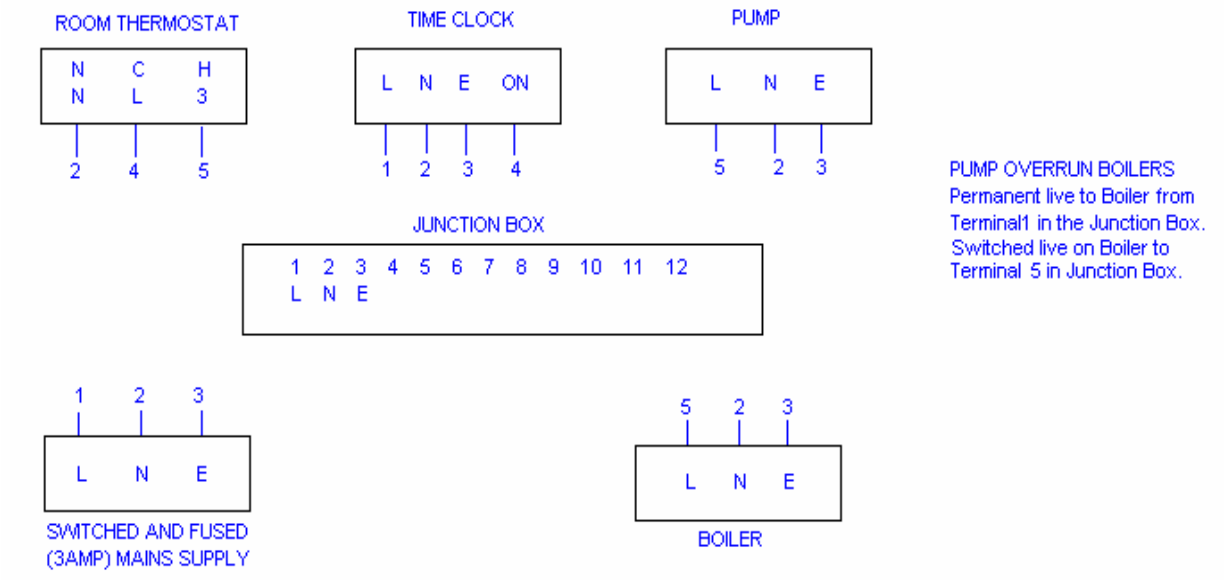
To fit a Room Thermostat on the Conventional Heating System (top diagram)

- The on supply from the Time Clock goes to terminal 4 in the Junction Box and from there goes to the Common, or Live, supply on the Room Thermostat.

- The demand terminal, 3, goes to terminal 5 in the junction box and then to the boiler and pump.

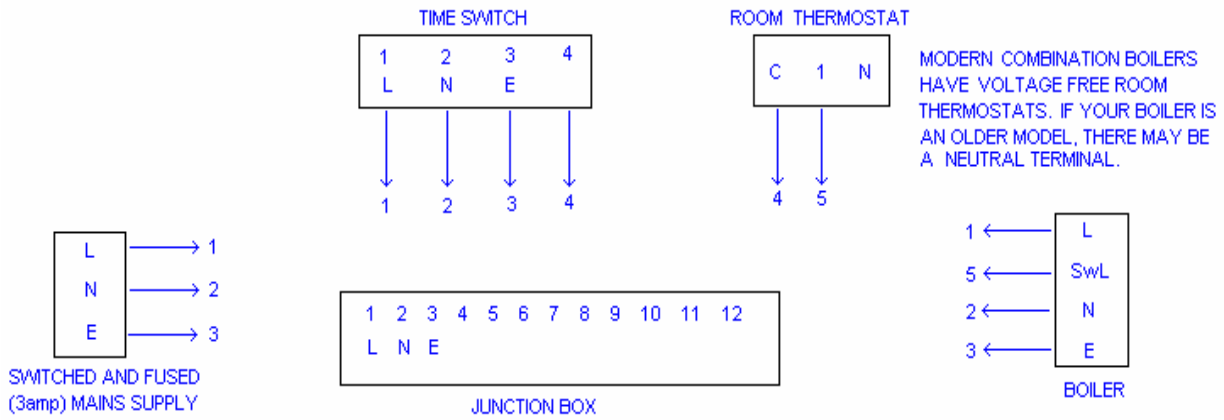
- The Room Thermostat you purchase will normally also have a Neutral connection that connects to terminal 2 in the Junction Box.

Some Room Thermostats only have two terminals, but these are usually only used on Combination Boilers.



To fit a Room Thermostat on a Combination Boiler system is very easy, as most Combination Boilers require Voltage Free Thermostats that only have two terminals and it doesn't matter which way round you connect them as they are only making a Low Voltage link and not providing power to the boiler.

If you have an older Combination Boiler it will be wired as below, and in many cases will require a Neutral connection to terminal 2 in the Junction Box, it depends on your Room Thermostat.



COMBINED HEATING AND HOT WATER SYSTEMS

We can only give you the wiring diagrams for these types of systems, complete with all controls, fitted. The accompanying diagrams will help you identify your Heating System

GRAVITY HOT WATER WITH PUMPED CENTRAL HEATING

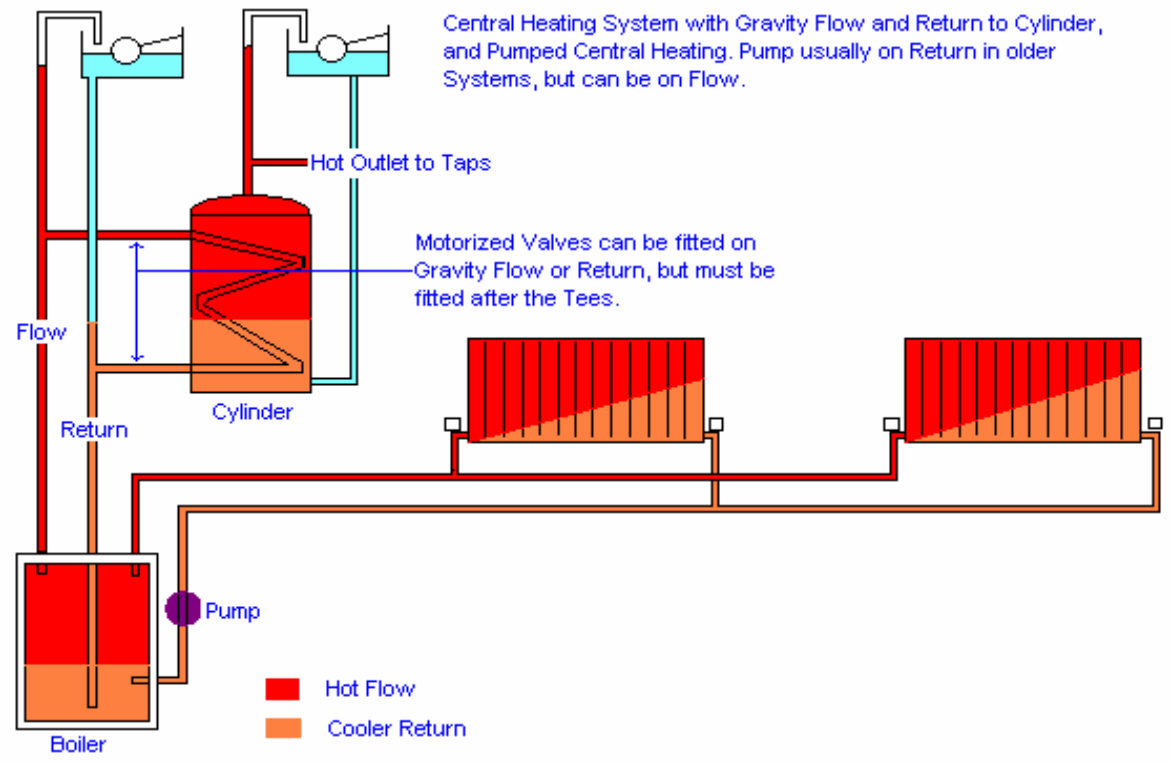
This is an older type of system, which can be identified as follows; apart from the gas supply there will normally be four pipes coming from the boiler.

Two 28mm pipes, which are the Gravity Flow and Return that heats the hot water in the Cylinder and two 22mm pipes which are for the Central Heating.

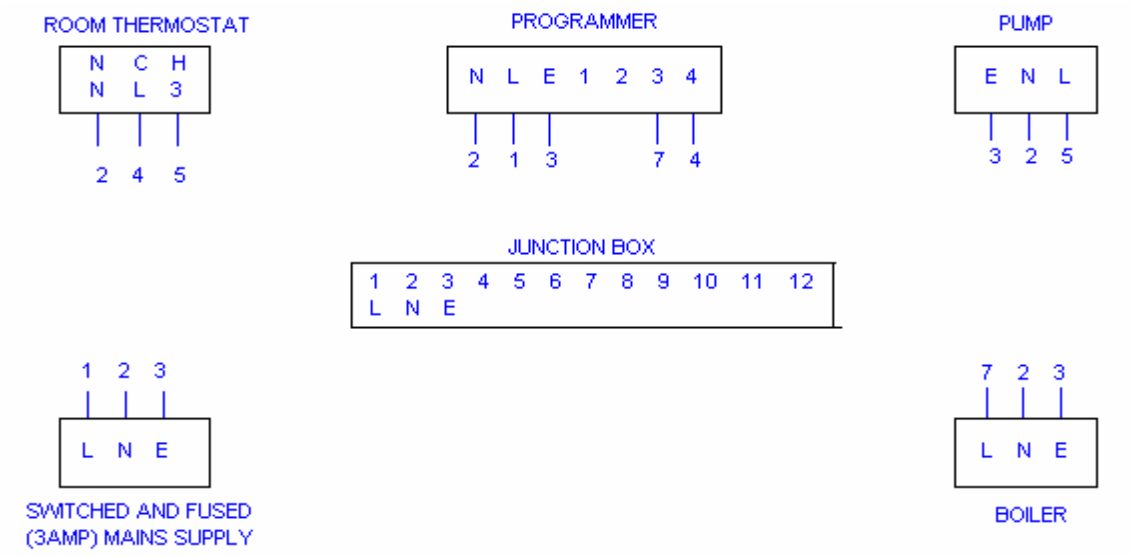
In some cases there will only be three connections to the boiler, there will still be four pipes, but the two returns will be connected together at what is called an injector tee.

There is not much control with this type of system as the hot water gravity flow and returns are always working when the central heating boiler is on, even if the cylinder is boiling hot.

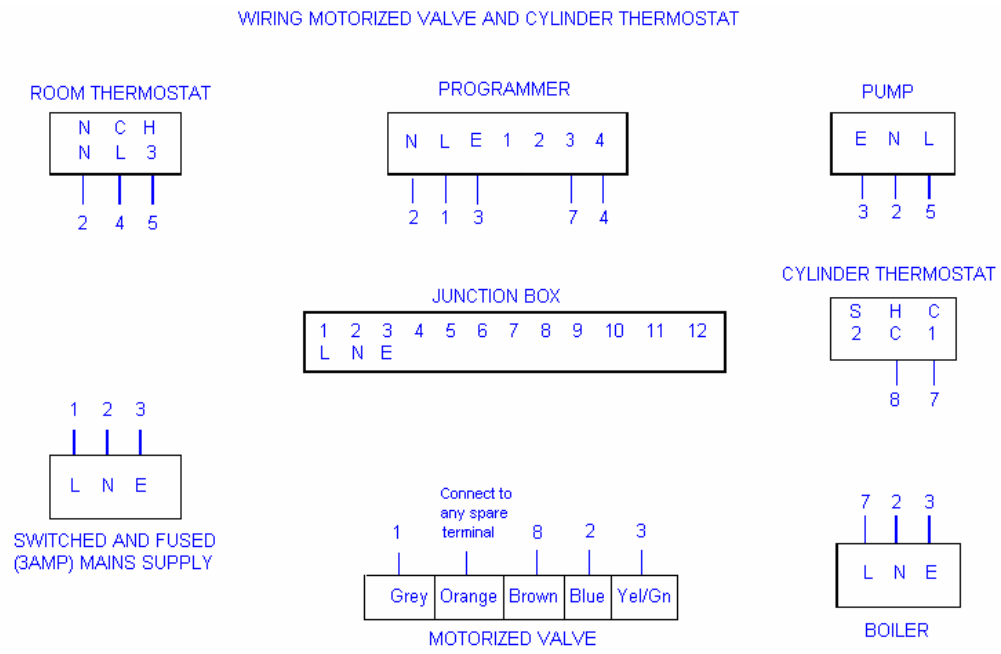
In a very few cases, there will be a motorized valve combined with a cylinder thermostat.



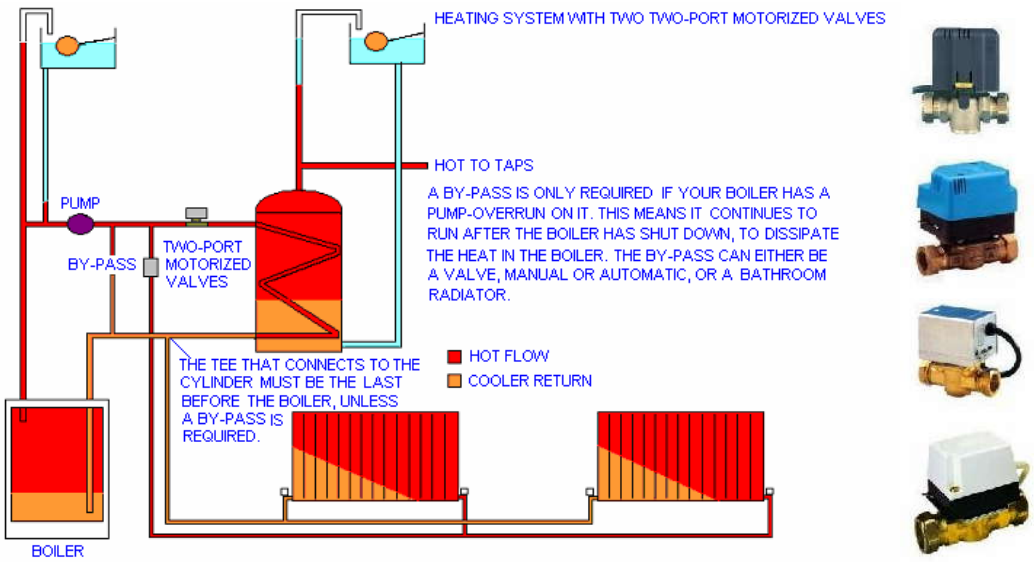
Whilst this type of system is not very efficient, it is very reliable because it has only a simple boiler and a pump to go wrong. It can be made a lot more efficient with the addition of a Motorized Valve on the Gravity Flow or Return and a room thermostat if you don't have one.



How to fit a Motorized Valve is covered on our main Website, but the wiring diagram is below.



FULLY PUMPED SYSTEM WITH TWO TWO-PORT MOTORIZED VALVES



Two-Port Motorized Valves

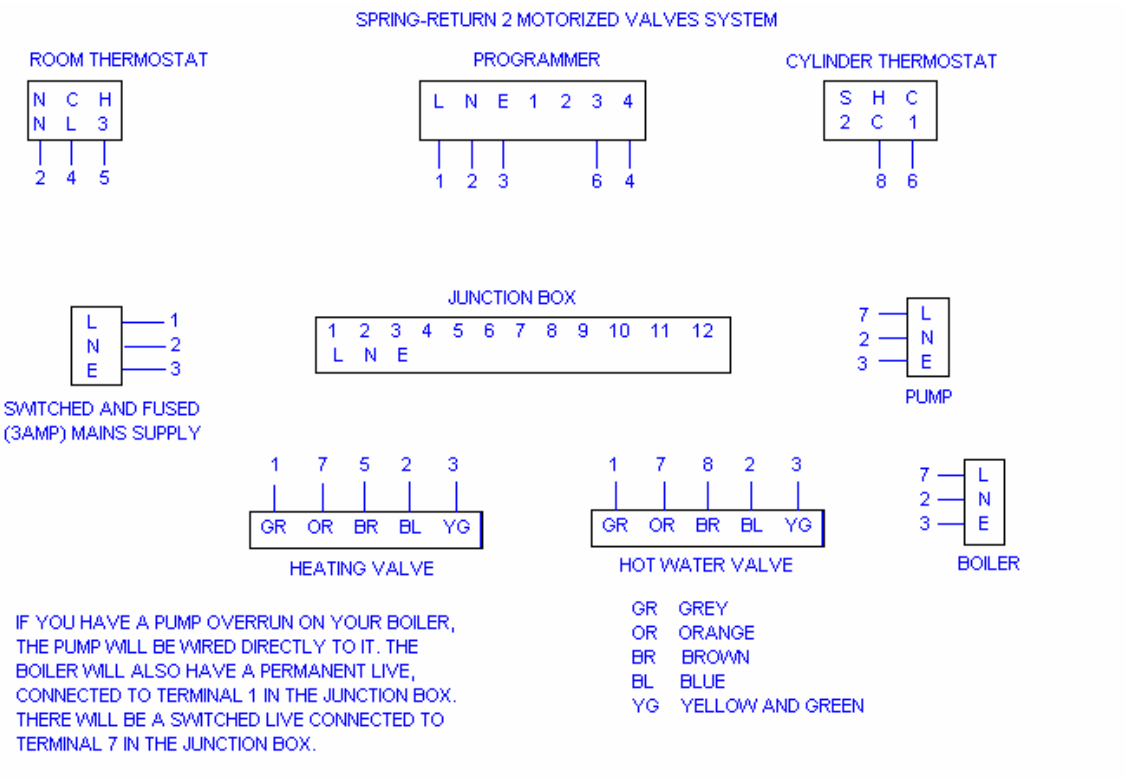
This is one of the two most common systems. It can be used with any type of boiler, including System Boilers, that are fed directly from the mains. Most modern boilers have a pump overrun and in that case, you have to have a by-pass as pictured above.

Apart from the gas, there should be only two pipes coming off the Boiler, the Flow and Return.

The Pump and Motorized Valves are usually located in the Cylinder Cupboard, although this is not always the case.

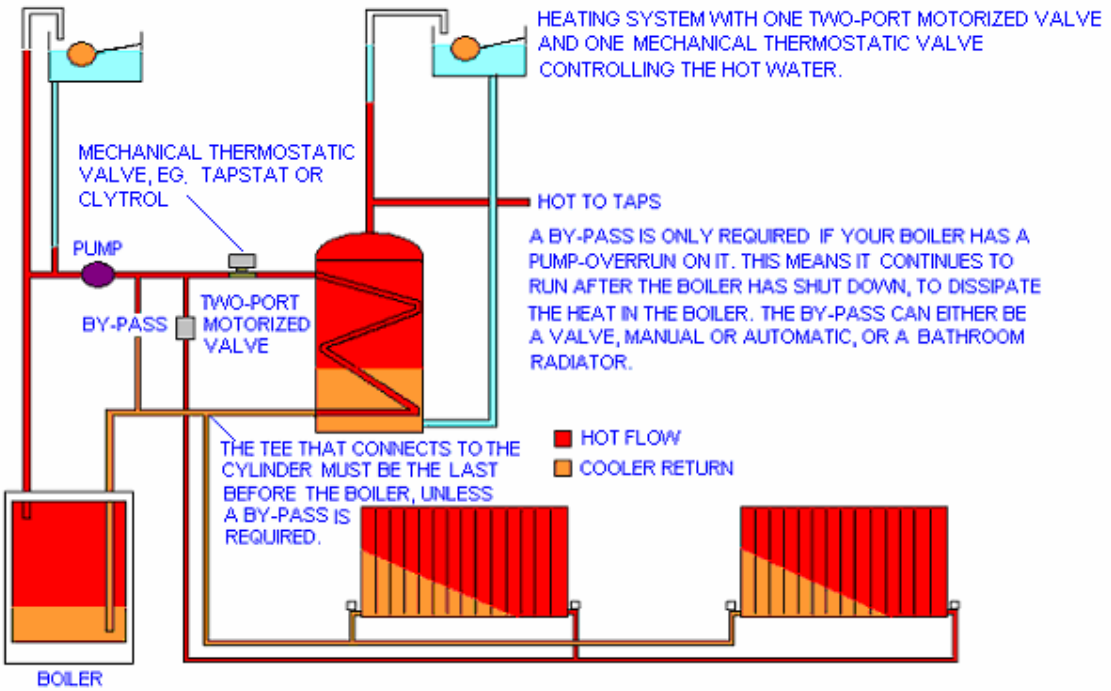
If you have a System Boiler, this is a Boiler that doesn't have a Feed and Expansion Tank as above, but is filled from the Cold Main, the Pump and Valves are sometimes enclosed within the Boiler Casing.

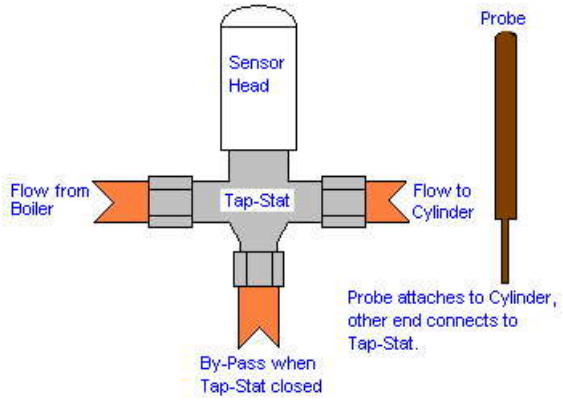
We can only show you how the system should be wired, how to check for faults and replace components is on our main website. If you are unfortunate enough to have a system that was installed by Servowarm, with no automatic controls, you can convert it as above. How to do it is covered on our main Website.



FULLY PUMPED SYSTEM WITH ONE TWO-PORT VALVE ON CENTRAL HEATING AND HOT WATER CONTROLLED BY MECHANICAL THERMOSTATIC VALVE EG. TAP-STAT; OR WITH NO CONTROL.

Description





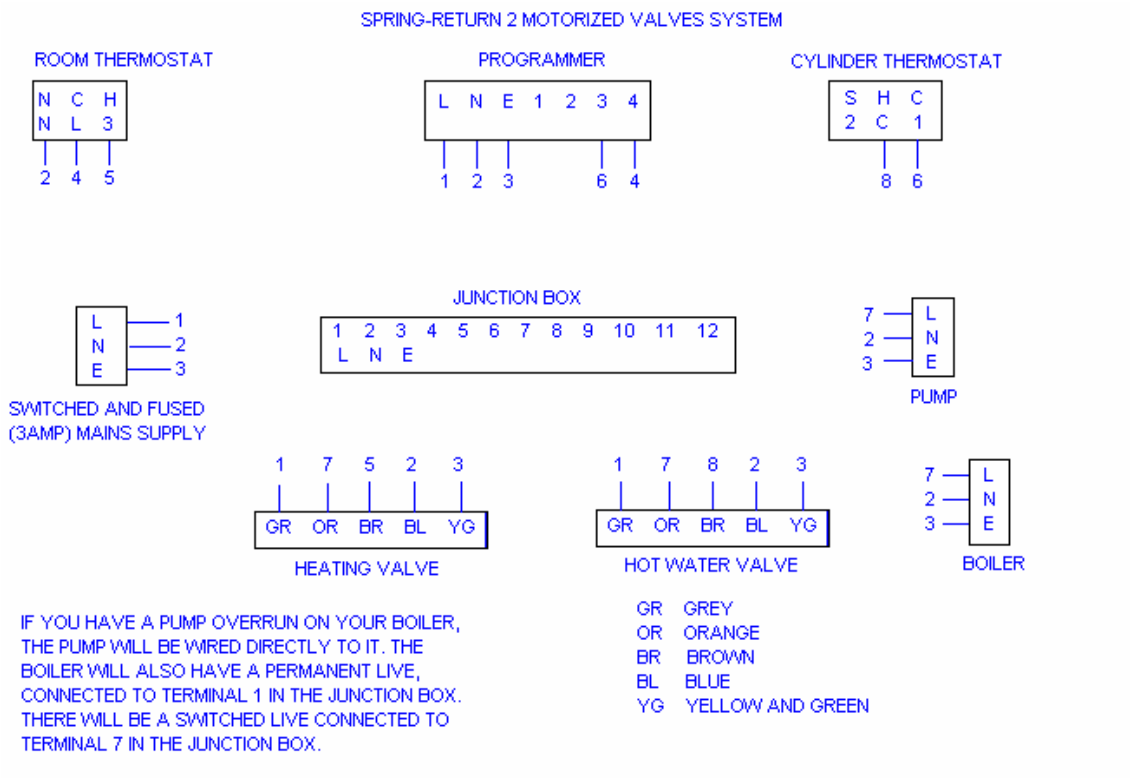


This Fully Pumped System is not very good as the Mechanical Valves (if fitted) usually fail after a short period and you then have no control of the hot water and there is no way of telling if they are shutting off or not.

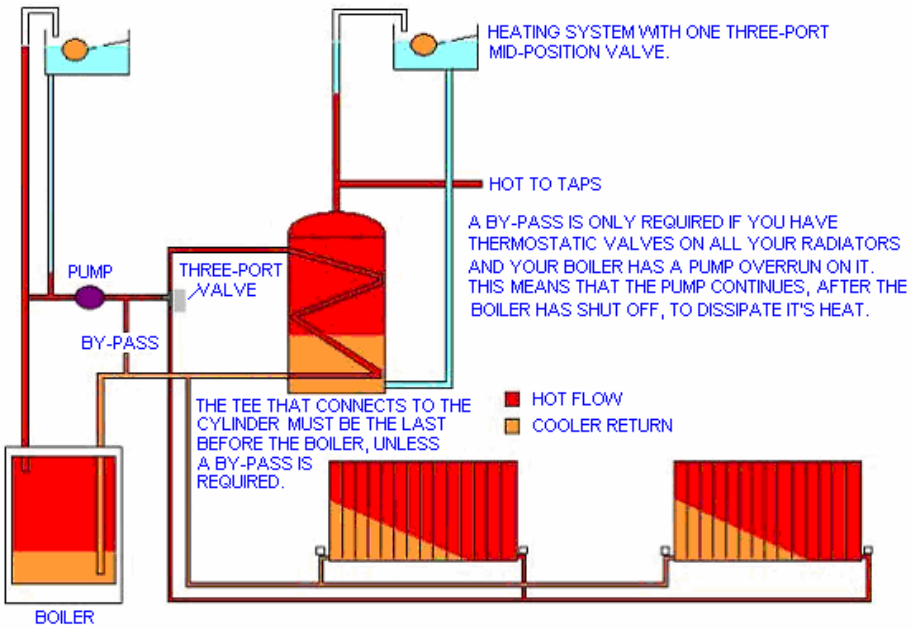
There is no way of stopping the Boiler from operating when the Programmer is on for Hot Water, the Boiler just keeps Cycling on and off, even if the Mechanical Thermostatic Valve has closed because the Cylinder water is hot; it wastes a huge amount of gas.

The System is very wasteful of gas; if you have this type of System, register as Fully Pumped System with Two Two-Port Valves and we will show you how to convert it so that you make huge savings on your Gas bills.

We can only show you how the system should be wired, how to check for faults and replace components is on our main website. How to convert your system is covered on our main Website.



Fully pumped system with one three port mid-position valve





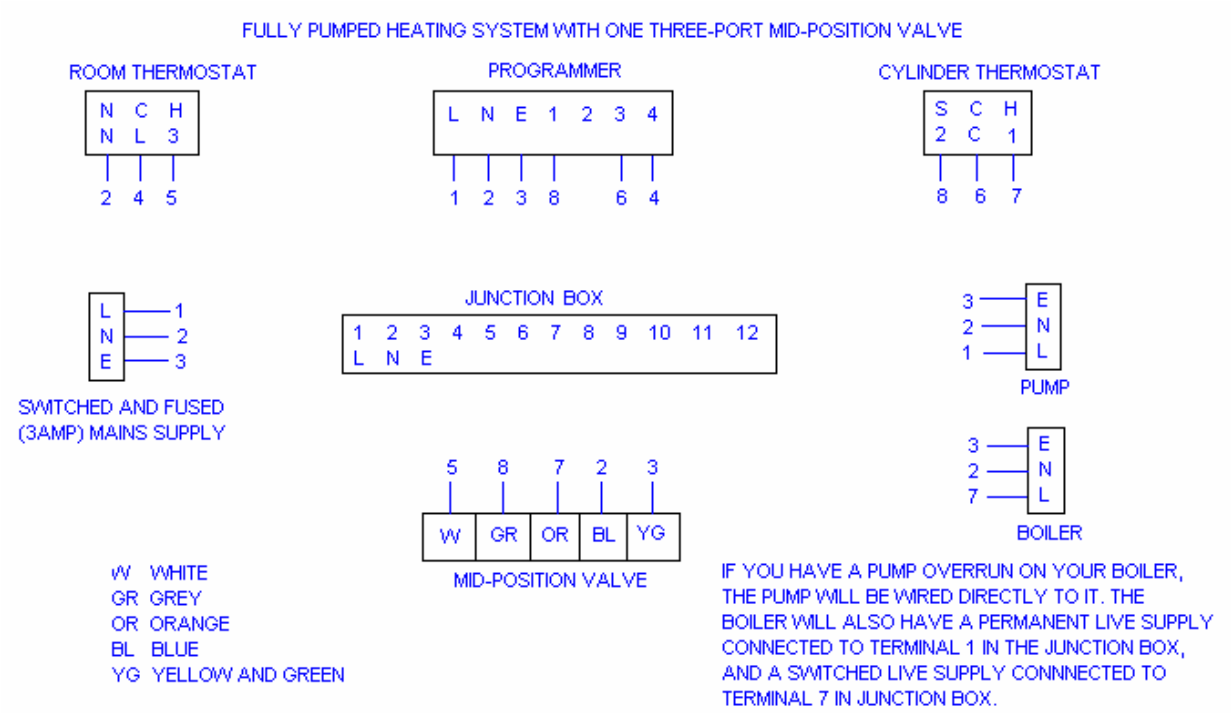
Three-Port Mid -Position Valves

This is one of the two most common heating systems, it is usually referred to as Y Plan.

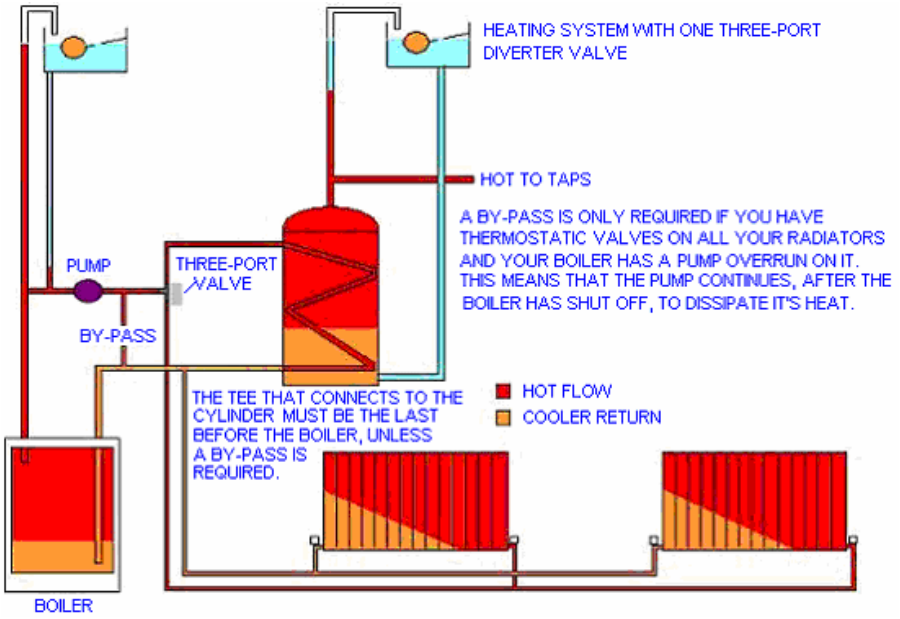
It can be used with any boiler, including system boilers, which are fed directly from the mains.

The mid-position valve allows you to have both heating and hot water ports open at the same time and doesn't give priority to either, in other words they both heat up at the same time. With a mid-position valve there is no need for a bypass as one port is always open; the only exception being when there are Thermostatic Valves on every Radiator.

We can only show you how the system should be wired, how to fault find and change components is covered on our main Website. If you are unfortunate enough to have a heating system installed by Servowarm, with no automatic controls, you can see how to convert it on our main Website.



Fully pumped system with Three-Port Diverter Valve description





Three-Port Diverter Valves

This system looks the same as the three-port mid-position valve system.

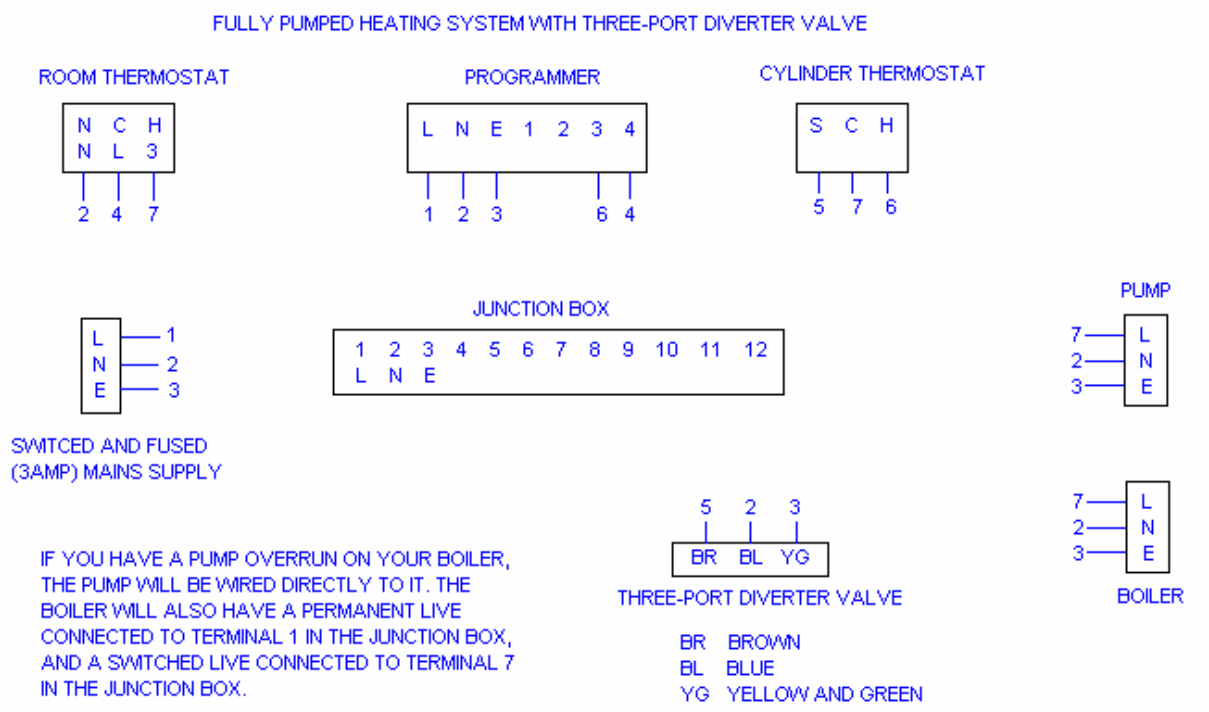
It differs in that only one port is open at a time and is usually wired to give priority to hot water, meaning that if you have a demand for hot water there is no central heating until the demand for hot water is satisfied.

This is not very satisfactory if you have a lot of demand.

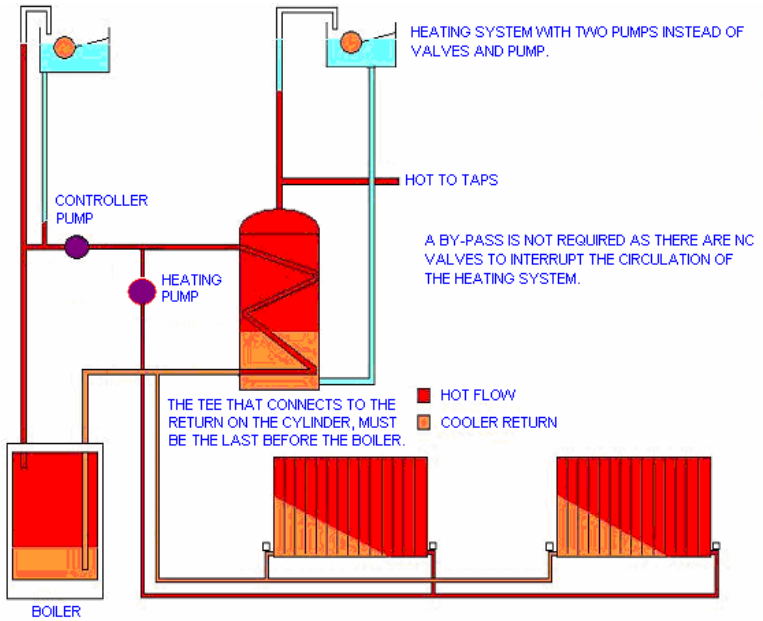
There is no need for a bypass on this system, except in the odd case where there is not a long enough run of pipe between the boiler and cylinder, as one port is always open.

It also requires a By-Pass if you have Thermostatic Valves on every Radiator and your Boiler has a Pump Overrun on it. The mid-position system is far better and you should consider changing if your Diverter Valve needs changing.

To see how to change the system and to check for faults and change components, you will have to visit our main Website.



Fully Pumped System Using Two Pumps





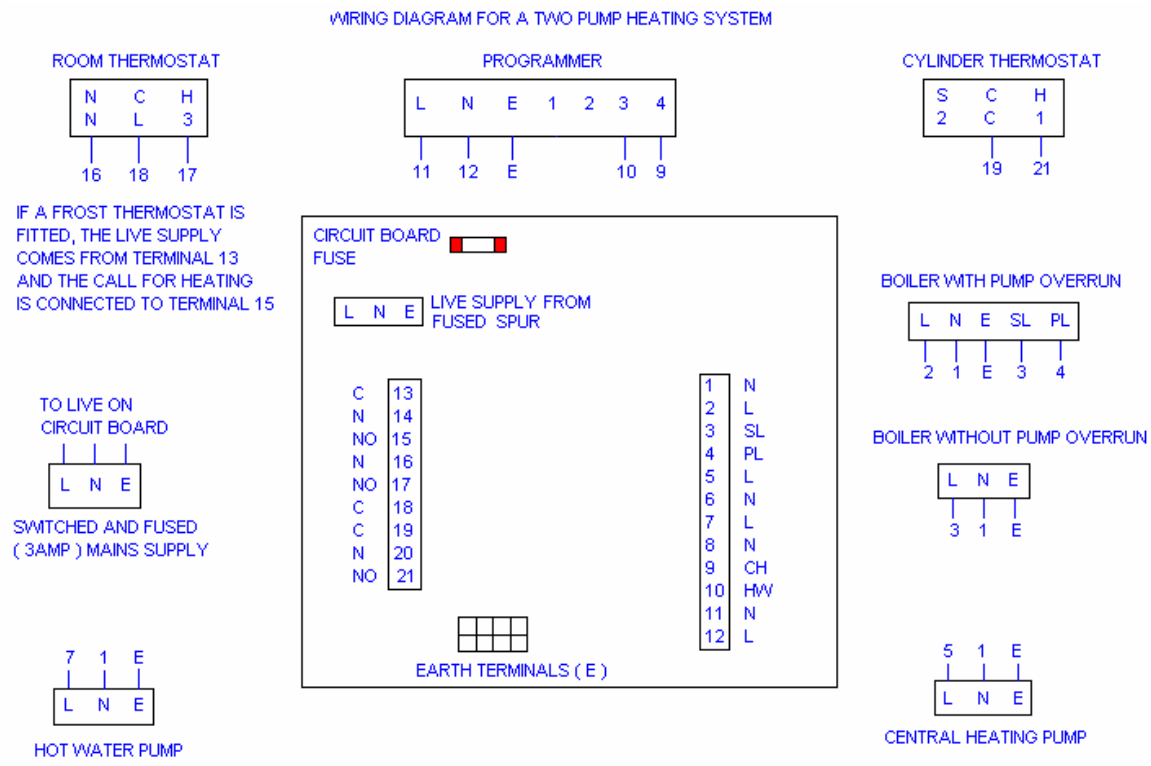
Two individual Pumps

This is a diagram of a Fully Pumped Two Pump System.

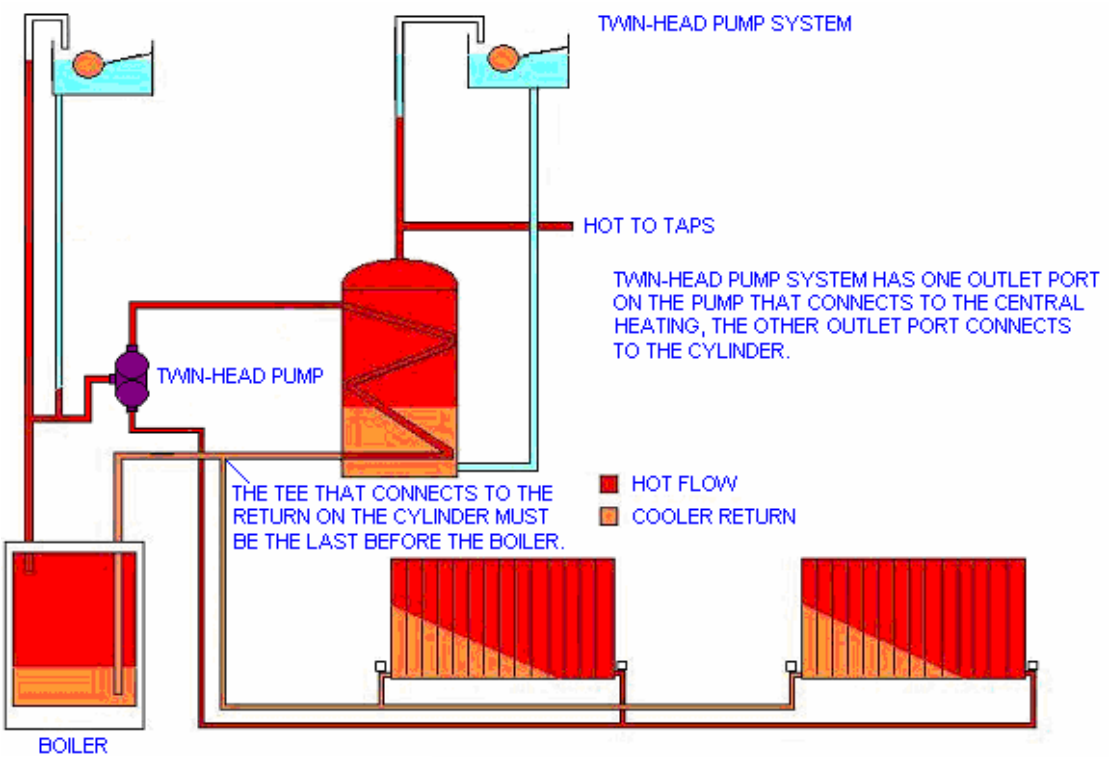
The Pump shown as the Controller Pump provides the hot water via the Cylinder, if you have a Pump Overrun on your Boiler it is this Pump which will continue to run until the heat is dissipated.

The Heating Pump provides Central Heating via the Radiators. Room and Cylinder Thermostats and a Programmer, which turns on the individual Pumps, control the System.

We can only show you how the system should be wired, how to fault find and change components is covered on our main Website.



Fully Pumped System Using Twin-Head Pump



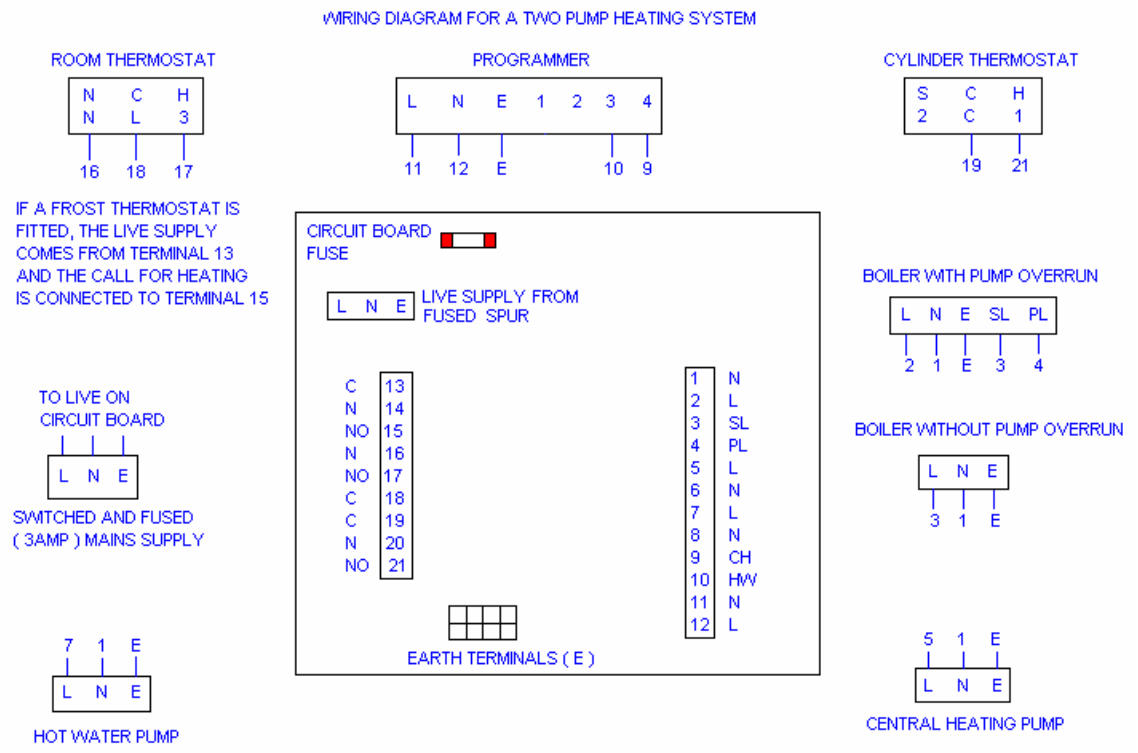


Twin- Head Pump

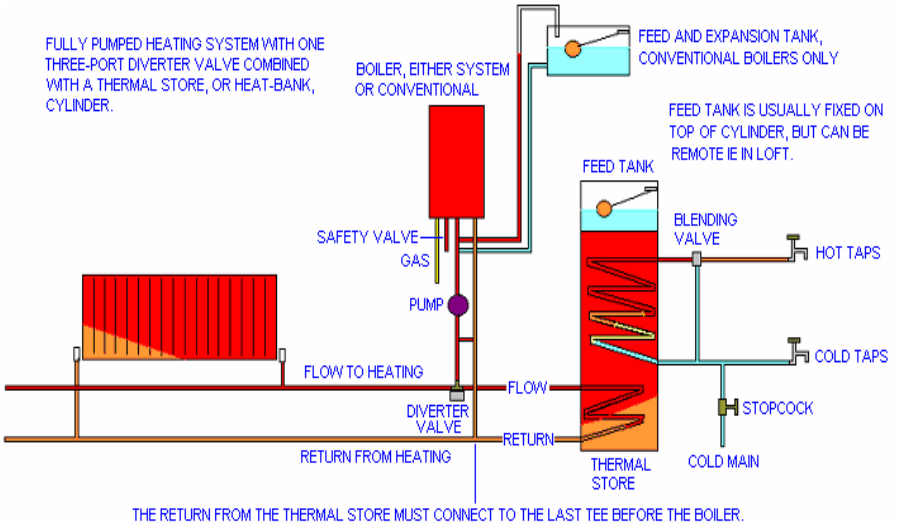
This is a diagram of a Twin-Head Pump system which has a Flow Port from the Boiler and two Outlet Ports, one for Central Heating and one for Hot Water.

The two individual Pump Heads are controlled by Room and Cylinder Thermostats, in conjunction with a Programmer. The whole System is wired to a Circuit Board.

We can only show you how the system should be wired, how to fault find and change components is covered on our main Website.



FULLY PUMPED SYSTEM WITH THREE-PORT DIVERTER VALVE COMBINED WITH A THERMAL STORE CYLINDER





This System gives Mains Pressure hot water without the need for an Un-vented Cylinder.

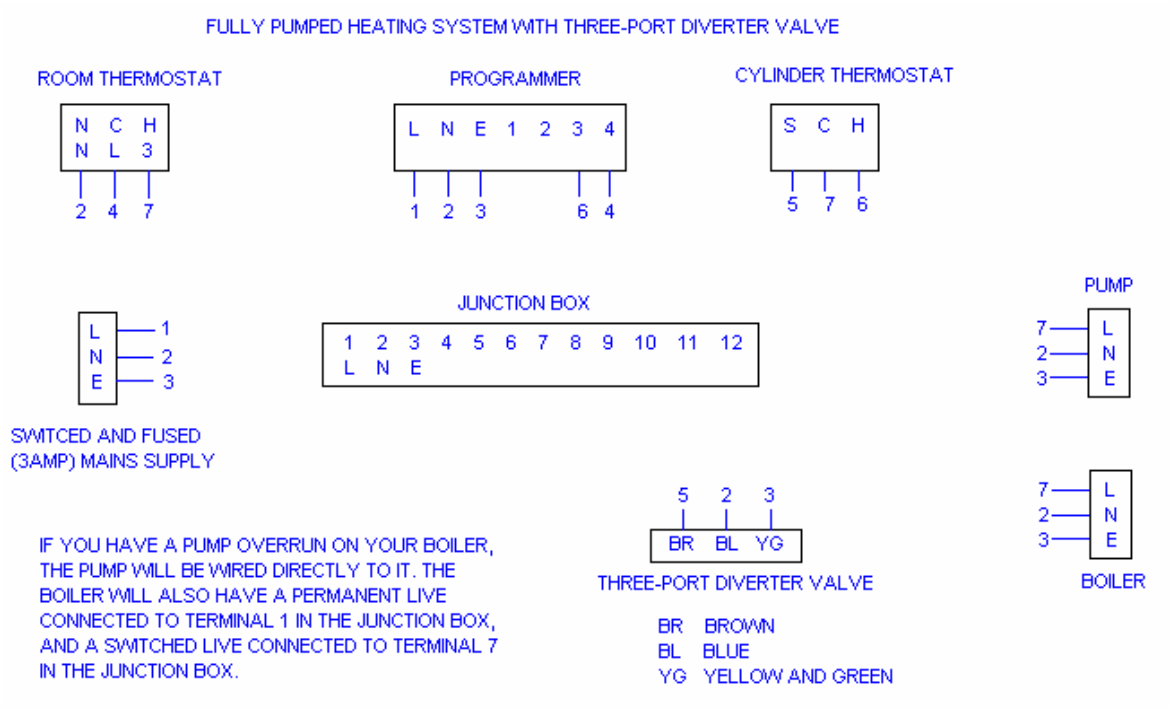
The heat-bank system above, heats the cylinder in the traditional way via the heating coil.

The Diverter Valve gives priority to the Hot Water, which can be a drawback if you use a lot of Hot Water.

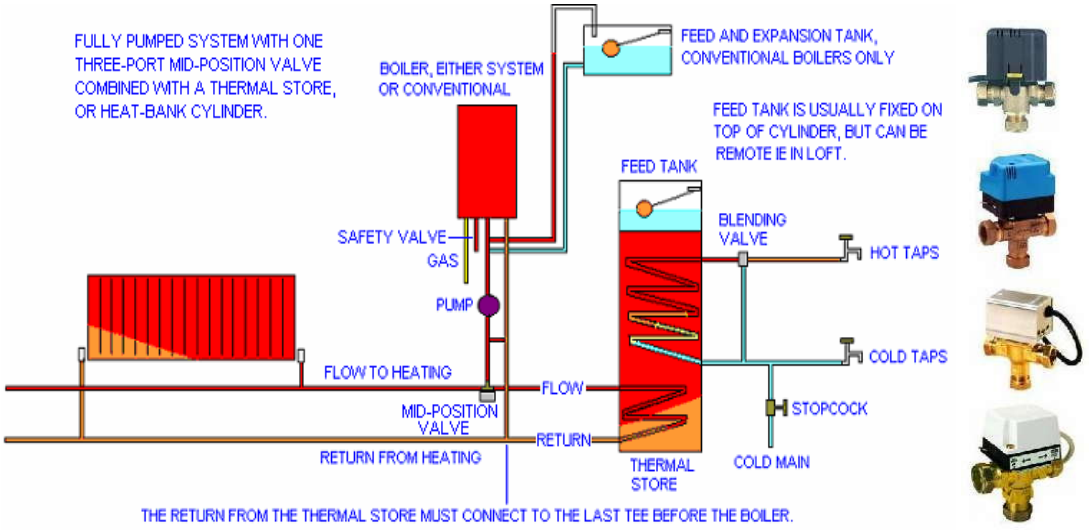
It can be used with any boiler, but a system boiler is usually used so that there are no tanks in the loft.

Your particular Thermal Store can have a tank attached, as above, or it can be in the loft etc. The System is controlled by Room and Cylinder Thermostats in conjunction with a Programmer.

We can only show you how the system should be wired, how to fault find and change components is covered on our main Website.



FULLY PUMPED SYSTEM WITH THREE-PORT MID-POSITION VALVE COMBINED WITH A THERMAL STORE CYLINDER

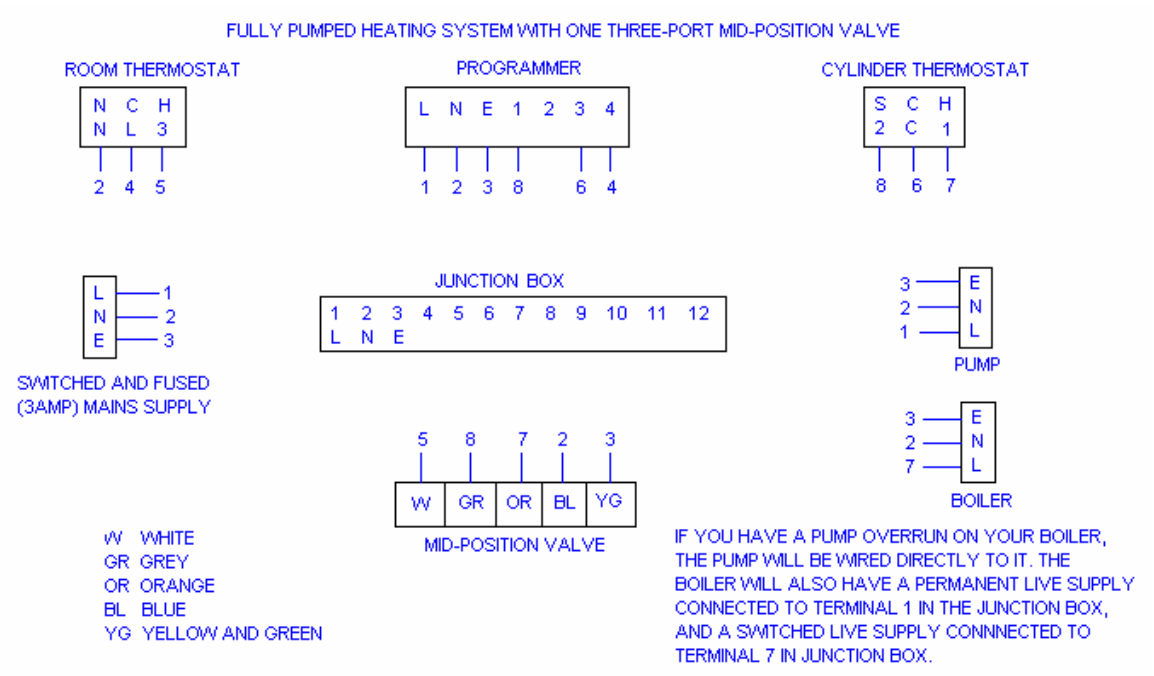


This System gives Mains Pressure hot water without the need for an Un-vented Cylinder.

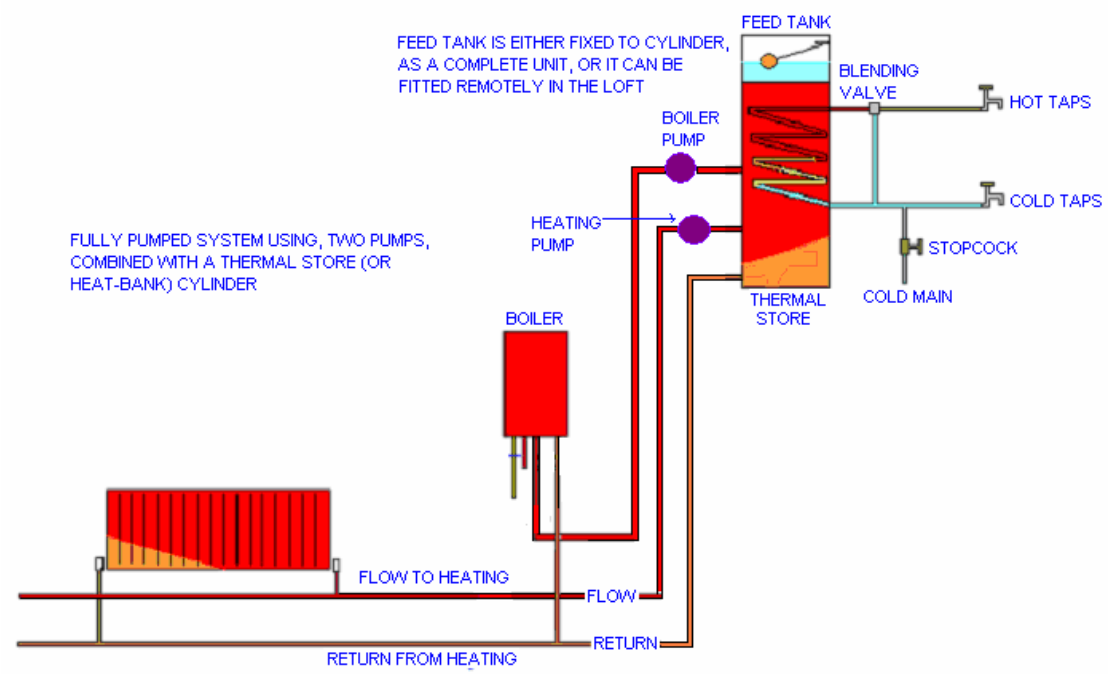
The heat-bank system above, heats the cylinder in the traditional way via the heating coil. The Mid-Position Diverter Valve gives equal priority to Central Heating and Hot Water.

It can be used with any boiler, but a system boiler is usually used so that there are no tanks in the loft. The System is fully controlled by Room and Cylinder Thermostats in conjunction with a Programmer.

We can only show you how the system should be wired, how to fault find and change components is covered on our main Website.



FULLY PUMPED SYSTEM WITH TWO PUMPS COMBINED WITH A THERMAL STORE CYLINDER





This System gives Mains Pressure hot water without the need for an Un-vented Cylinder.

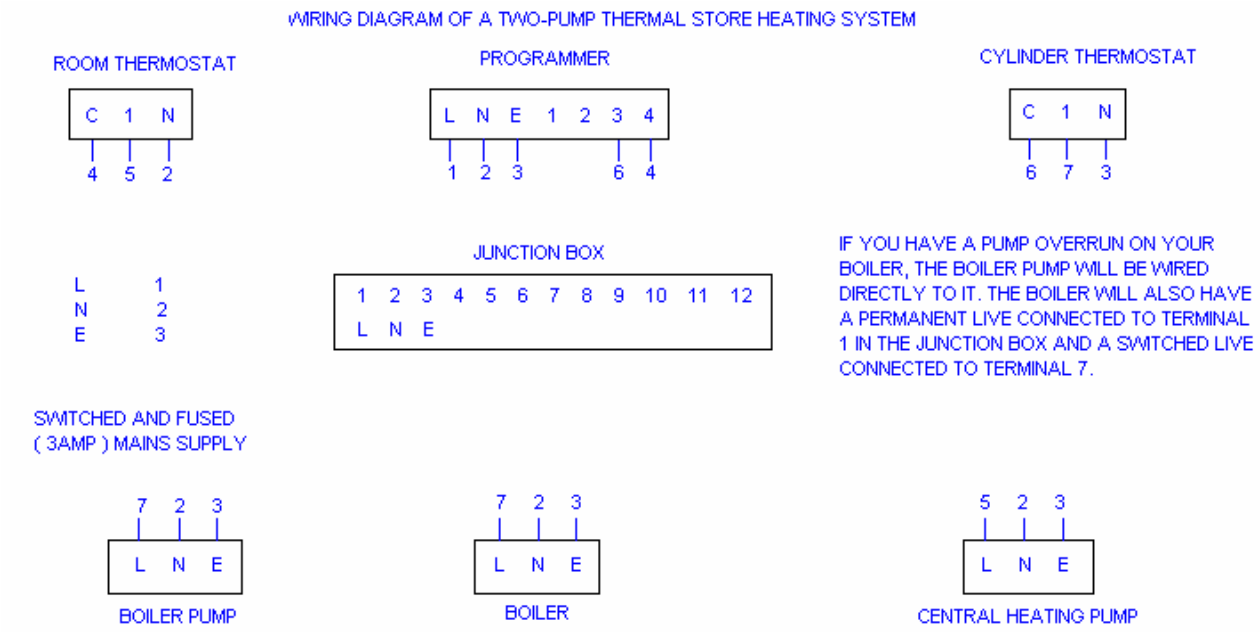
This Heat-Bank system heats the cylinder directly from the boiler, using the Boiler Pump, and the central heating is then taken from the Heat-Bank via the Heating Pump.

The mains water is fed through the heat-bank, via an internal coil, from which it picks up heat to give you mains pressure hot water.

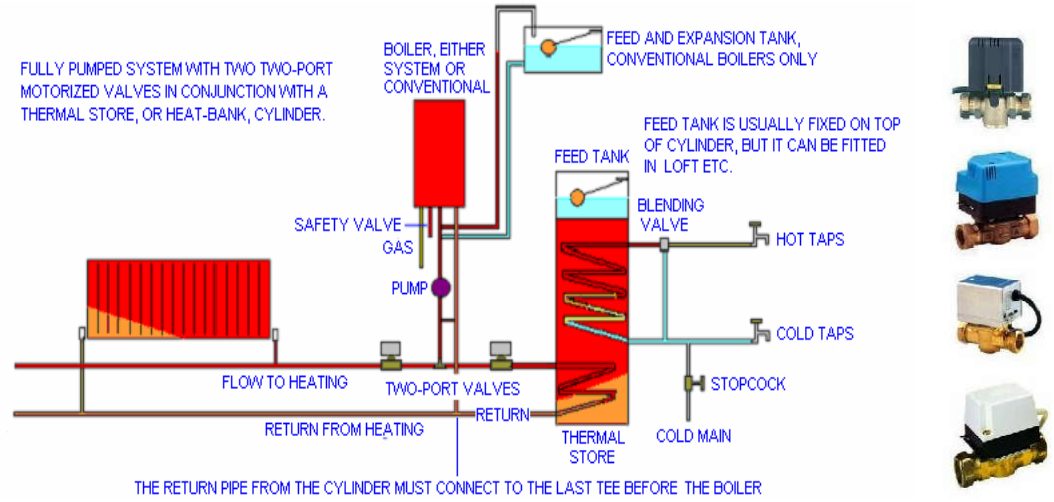
This system can use any Conventional Boiler, and the feed is usually combined with the Thermal Store Cylinder, as it does away with the need for tanks in the loft; you can have a separate feed and expansion tank, usually located in the loft.

The System is controlled by Room and Cylinder Thermostats in conjunction with a Programmer.

We can only show you how the system should be wired, how to fault find and change components is covered on our main Website



FULLY PUMPED SYSTEM WITH TWO TWO-PORT MOTORIZED VALVES COMBINED WITH A THERMAL STORE CYLINDER



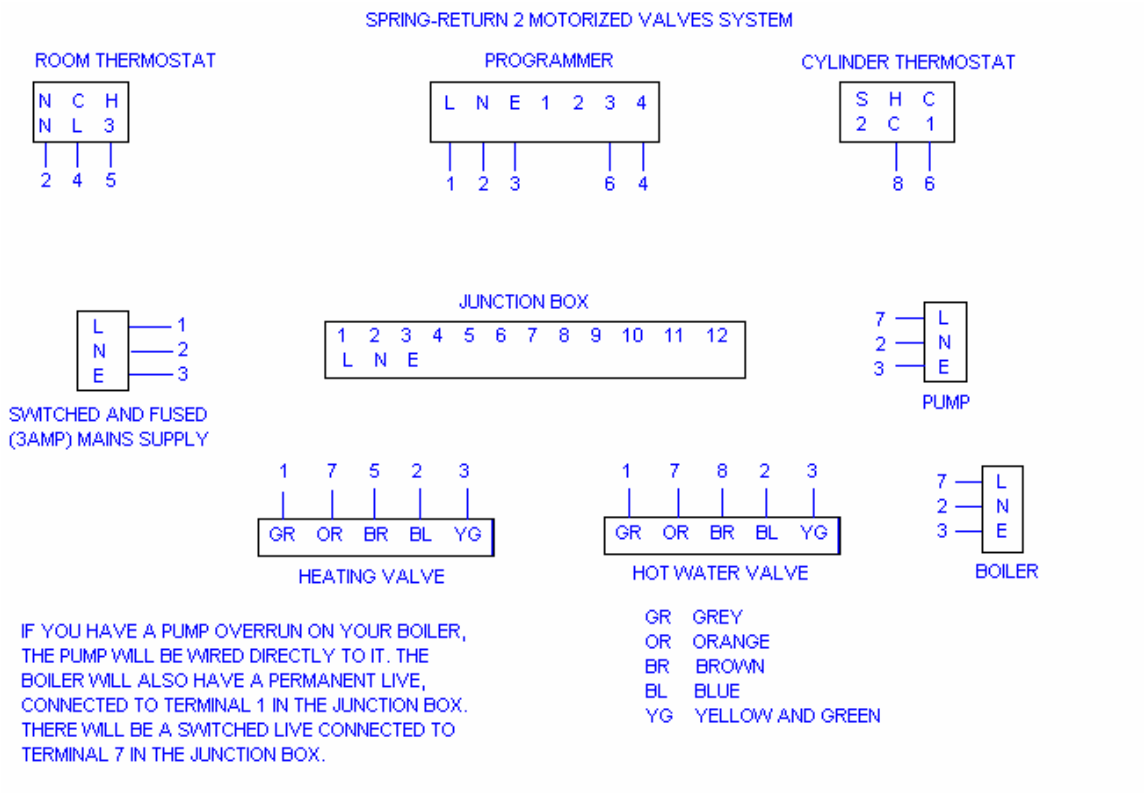
This System gives Mains Pressure hot water without the need for an Un-vented Cylinder.

The Thermal Store system above heats the cylinder the traditional way via the heating coil in the cylinder.

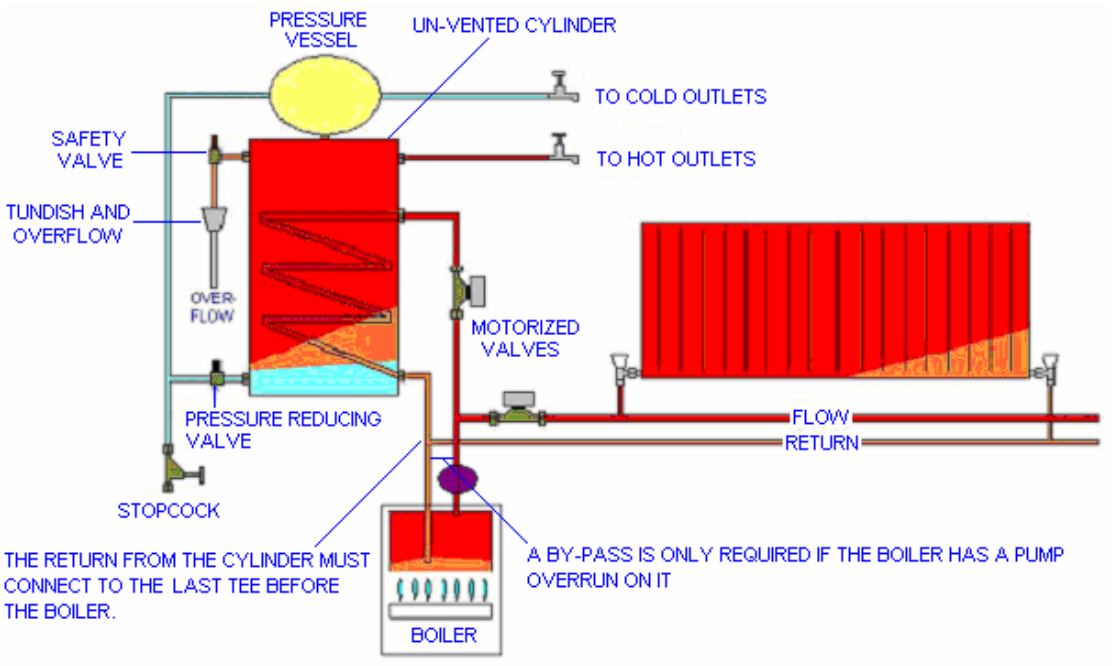
The mains pressure hot water is heated by a separate coil in the cylinder. You can use any conventional boiler, but a system boiler is usually used to eliminate tanks in the loft.

The System is controlled by Room and Cylinder Thermostats in conjunction with a Programmer.

We can only show you how the system should be wired, how to fault find and change components is covered on our main Website



FULLY PUMPED SYSTEM WITH TWO TWO-PORT MOTORIZED VALVES COMBINED WITH AN UN-VENTED CYLINDER







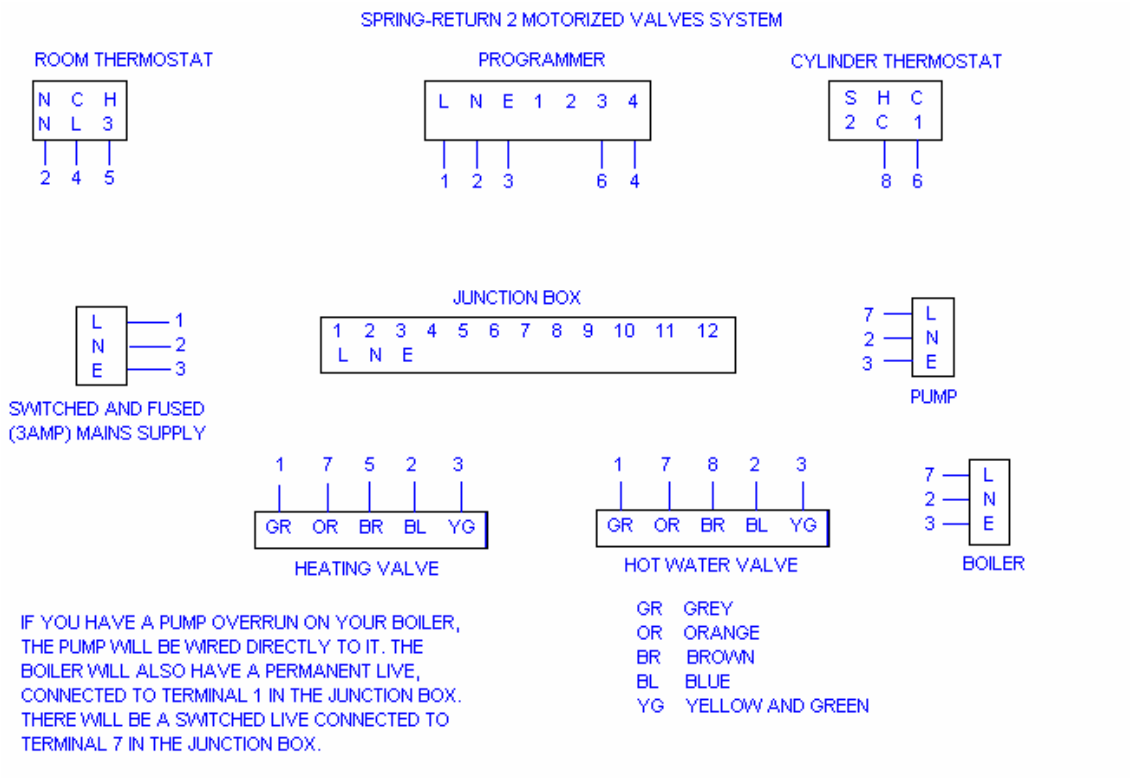
The Un-Vented Cylinder is heated in the normal way, via a Coil in the Cylinder.

The Cylinder is Pressurized by the Cold Main to 3bar, and when a tap is opened, the Main pushes the hot water out of the Cylinder and through the supply pipe.

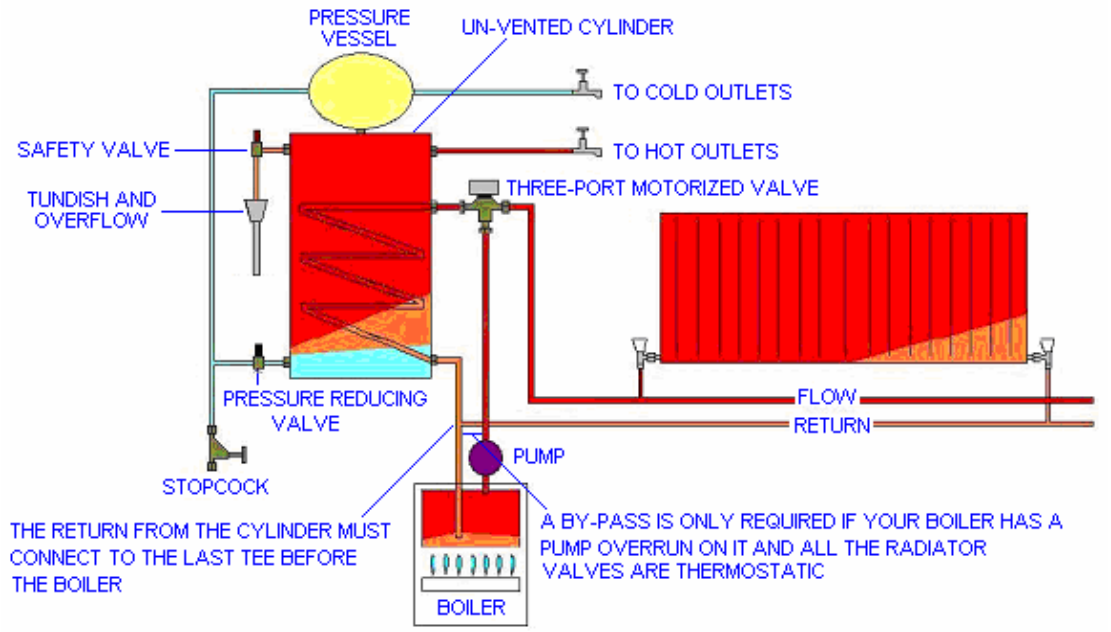
The only difference between this and a conventional Cylinder is the means of pressure, one is from the tank in the loft and the other is from the Main.

The System is controlled by Room and Cylinder Thermostats in conjunction with a Programmer.

We can only show you how the system should be wired, how to fault find and change components is covered on our main Website.



FULLY PUMPED SYSTEM WITH THREE-PORT MID-POSITION MOTORIZED VALVE COMBINED WITH AN UN-VENTED CYLINDER





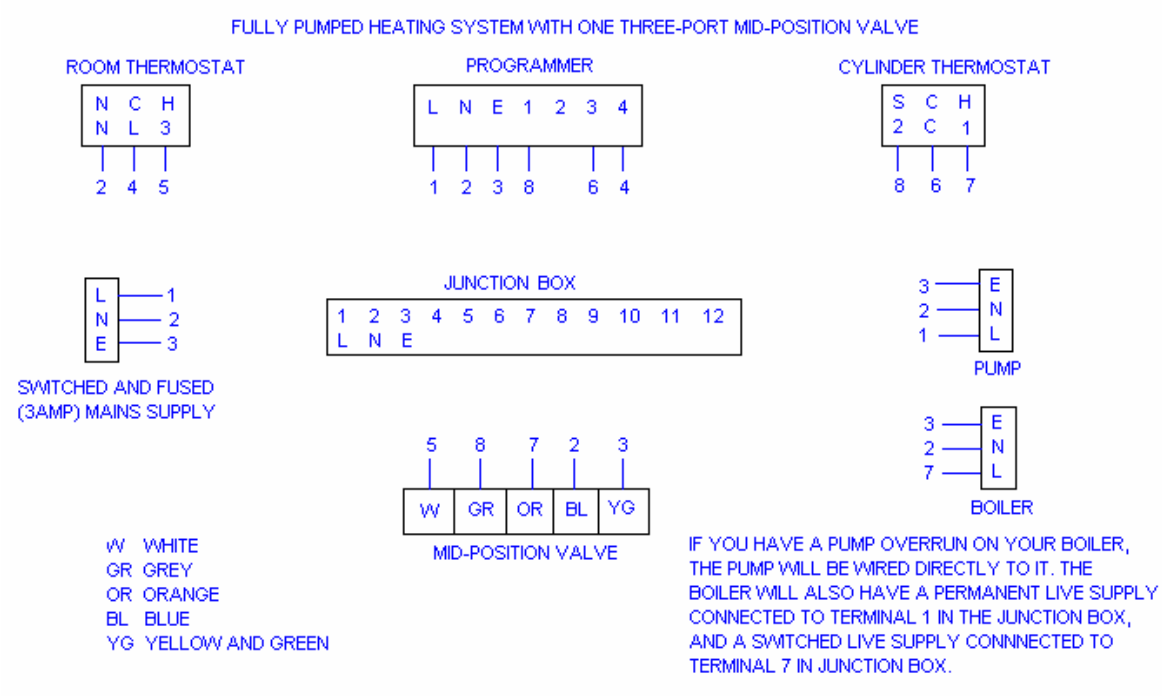


The Un-Vented Cylinder is heated in the normal way, via a Coil in the Cylinder.

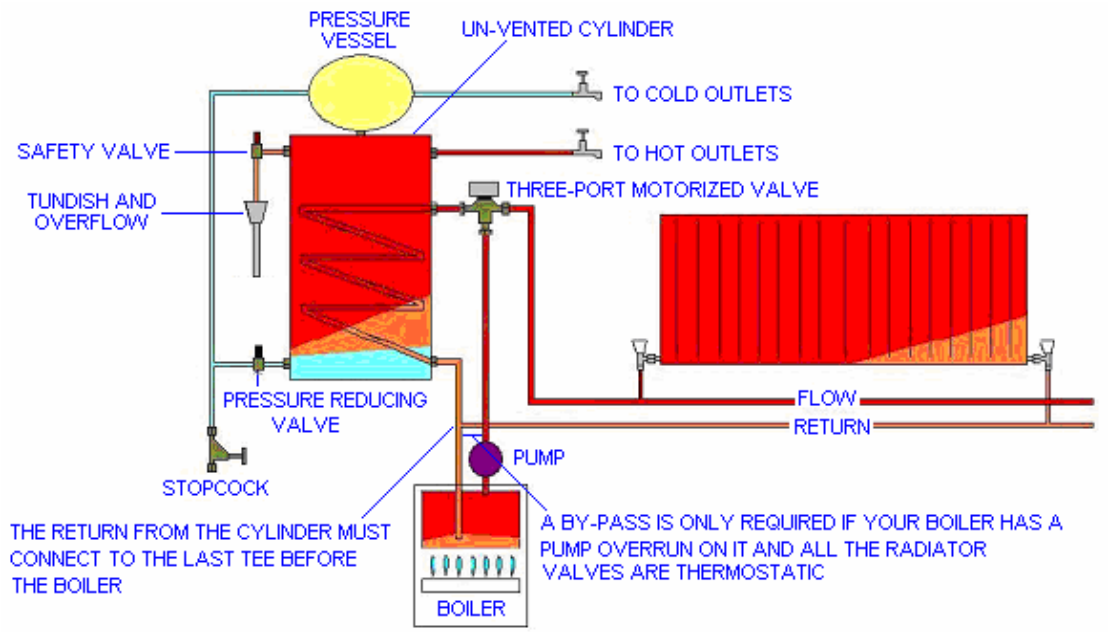
The Cylinder is Pressurized by the Cold Main to 3bar, and when a tap is opened, the Main pushes the hot water out of the Cylinder and through the supply pipe; the only difference between this and a conventional Cylinder is the means of pressure, one is from the tank in the loft and the other is from the Main.

The System is controlled by Room and Cylinder Thermostats in conjunction with a Programmer

We can only show you how the system should be wired, how to fault find and change components is covered on our main Website.



FULLY PUMPED SYSTEM WITH THREE-PORT DIVERTER VALVE COMBINED WITH AN UN-VENTED CYLINDER







The Un-Vented Cylinder is heated in the normal way, via a Coil in the Cylinder.

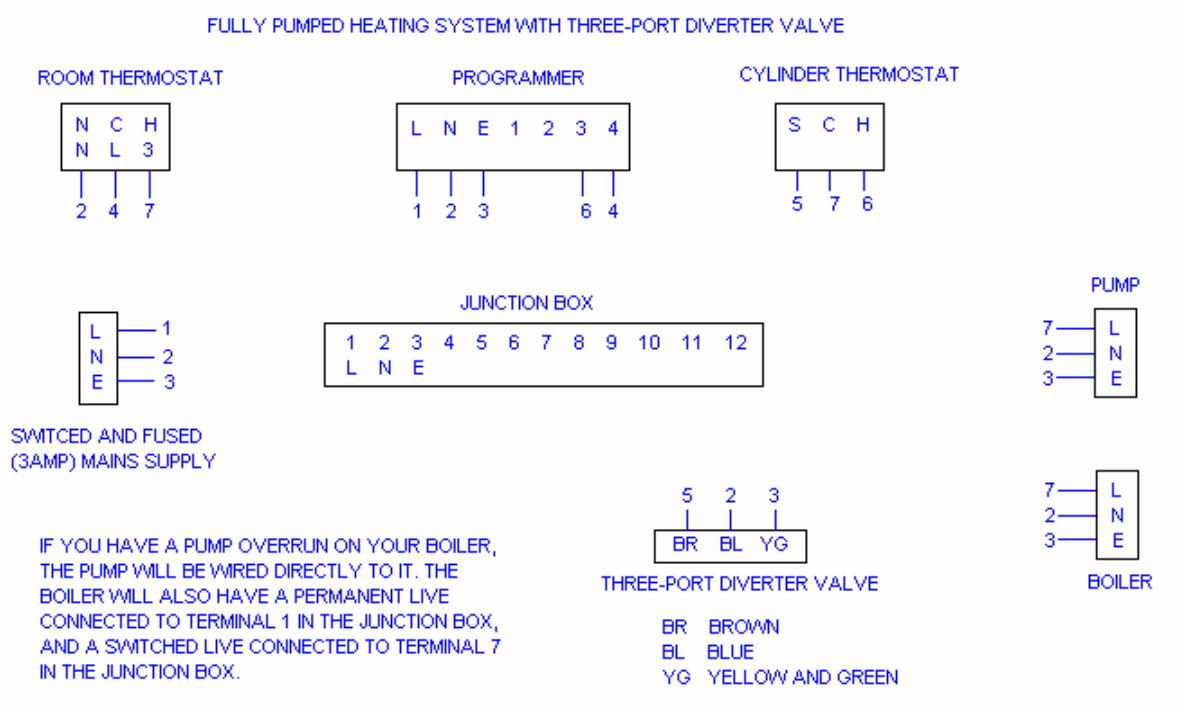
The Cylinder is Pressurized by the Cold Main to 3bar, and when a tap is opened, the Main pushes the hot water out of the Cylinder and through the supply pipe.

The only difference between this and a conventional Cylinder is the means of pressure, one is from the tank in the loft and the other is from the Main.

This System gives priority to the Cylinder, so if you use a lot of hot water the Heating suffers.

The System is controlled by Room and Cylinder Thermostats, in conjunction with a Programmer.

We can only show you how the system should be wired, how to fault find and change components is covered on our main Website



OUR MAIN WEBSITE ADDRESS IS

www.heating-and-plumbing-solutions.com