

Solid Fuel Association Guide to Central Heating Link-Up



Combining solid fuel with other central heating technologies using various methods ranging from a simple link-up to a fully integrated thermal store system

www.solidfuel.co.uk

Introduction

Modern integrated or linked-up systems allow customers to utilise a solid fuel boiler alongside other heating technologies such as gas, oil, heat pumps or solar thus providing maximum flexibility.

Note: The information in this booklet specifically applies to open vented systems. With a very few exceptions, it is not recommended that solid fuel appliances be connected to a sealed system so it is very difficult to link up with a combination boiler or other sealed system boiler.

Building Regulations

The installation of any heating appliance in the UK is subject to Building Regulations. There are separate regulations for Scotland, Northern Ireland and England & Wales. All place constraints on the type of appliance which can be installed particularly in relation to minimum efficiencies. In designing a link-up system, full regard needs to be given to the Building Regulations as they cover all aspects of the installation including electrical work.

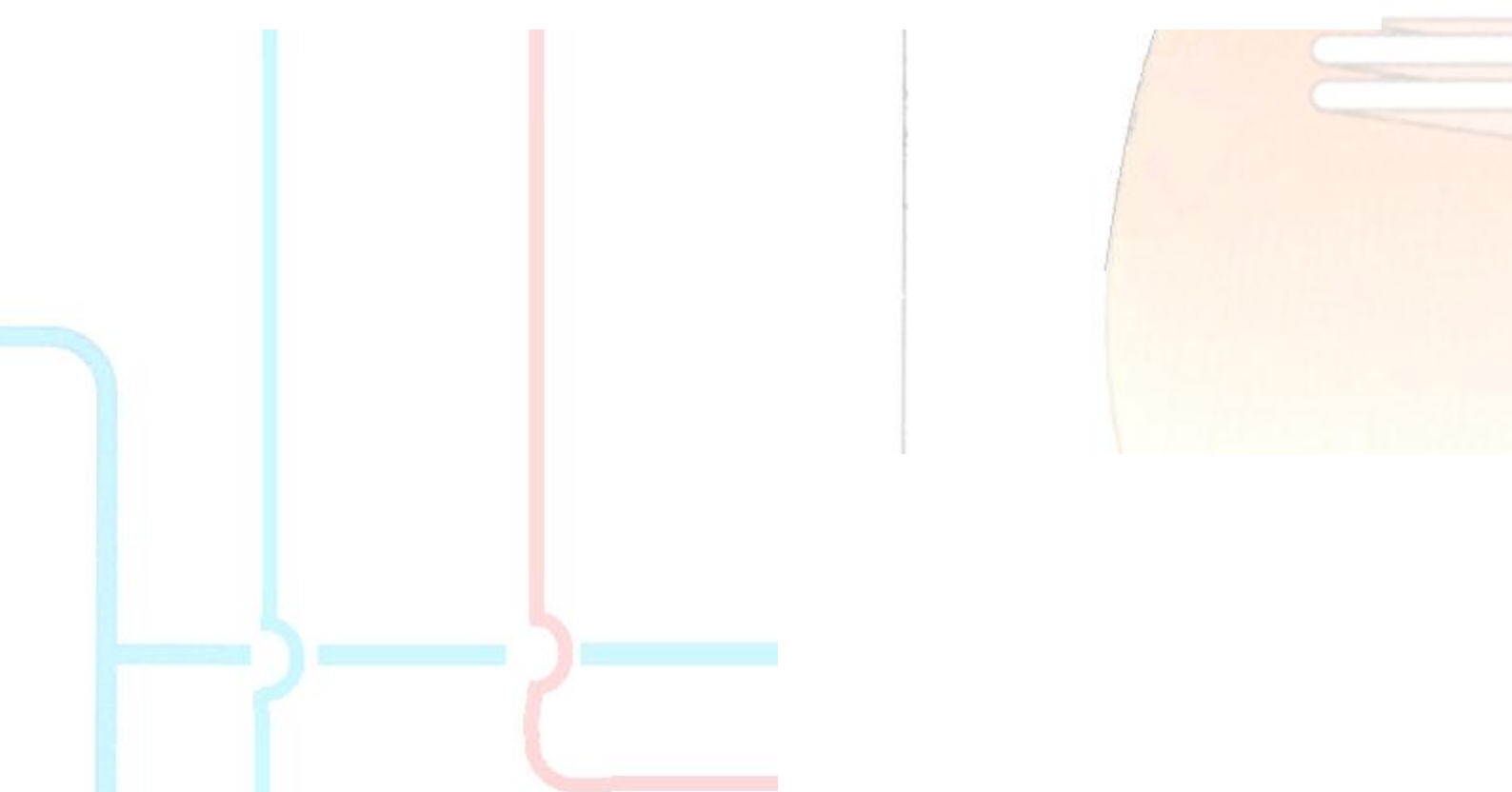
Benefits of link-up - Flexible heating

The real advantage of link-up is its flexibility. The consumer can enjoy the cosy comfort of a solid fuel fire or stove and at the same time, derive a wider heating contribution from it. When the fire is not lit, the primary central heating operates as normal.

Interlinking appliances can be achieved in a number of different ways and the method chosen will depend on the existing system if applicable and the output of the appliances being linked.

Whichever method is chosen, it is essential to ensure that in every case, the solid fuel appliance has an unrestricted open vent and separate cold feed. To further increase safety and reduce the possibility of boiling in the event of a power or pump failure, any motorised valves fitted to the solid fuel circuit should be of the normally open, powered closed type.

It is possible to design a custom link-up system to suit almost any combination of technologies but the design must take into account the specific requirements and hydraulic characteristics of the different appliances and the type of system controls that are to be employed.



Section 1 - Simple Link-up

How a Simple link-up works

General Features of a simple link-up system:-

- In its simplest form, an open fire, room heater or stove fitted with a back-boiler can be linked to an existing or new central heating system.
- The existing or primary boiler continues to service the system as and when required.
- The hot water and radiators can be supplied by either or both appliances depending on the heat required.
- Link-up can apply to either hot water only or both hot water and radiators.
- Solar panels can be integrated to maximise efficiency by providing 'free' hot water from the sun when it is available.

Link-up can be very simple and inexpensive if only a limited additional benefit is required. In many cases a simple link-up is most cost effective when an open fire or stove is added to an existing central heating system. By using a boiler flue-set with domestic hot water back-boiler or a boiler stove, it is possible to improve the efficiency of a fireplace and generate additional hot water.

Simple direct link-up

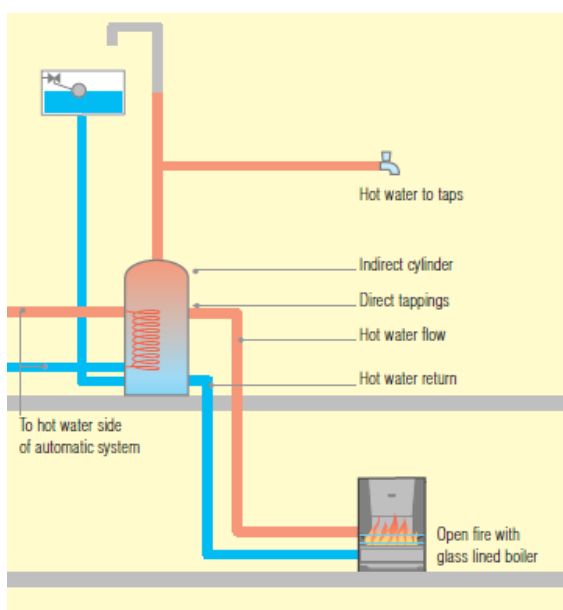


Fig.1 Simple direct link-up

Where a glass lined or similarly rust-proofed boiler is fitted to an open fire or stove, the boiler can be connected directly to the domestic hot water cylinder. This type of system was originally used years ago for the production of hot water from open fires but is still valid today.

It can be seen from fig.1 that the solid fuel appliance uses the domestic hot water feed and vent and heats the water in the cylinder directly by passing it through the boiler.

Simple indirect link-up

In this instance, a standard boiler is used and the water in the cylinder is heated indirectly via a coil. It requires the fitting of an additional cold feed and expansion tank to service the new system and allows the use of a standard boiler. In the strictest sense of the word, this is not a link-up as the two appliances have a separate system and heat the same cylinder via separate coils.

In a house fitted with solar panels, the heat generated can be used to indirectly supply a twin coil hot water cylinder. In this way, hot water can be obtained all year round using the power of the sun backed up by your solid fuel boiler during the cooler months.

Simple link-up will only provide hot water and will not assist with heating the radiators.

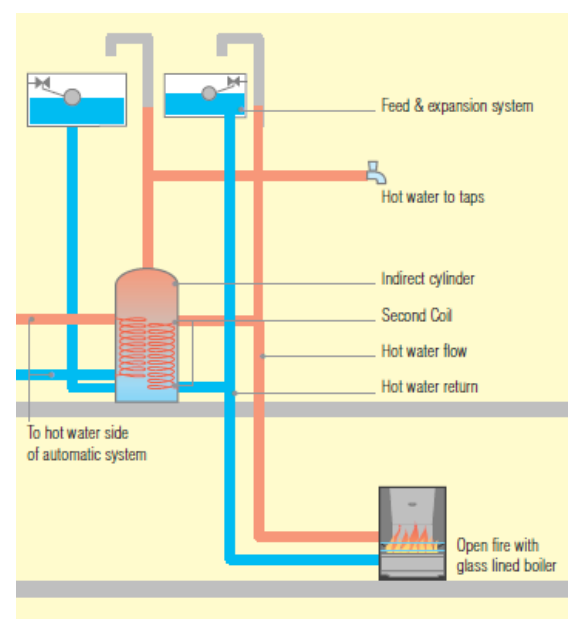


Fig.2 Simple indirect link-up

Section 2 - Full Link-Up

A fully linked up or integrated system enables more than one appliance to contribute to the central heating system as well as the domestic hot water.

In the past there have been problems associated with linking two dissimilar heating appliances into the same heating system, especially when the appliances are located remotely from each other.

These problems have included loss of heat through the unlit appliance, loss of stored hot water when the heating is on, inefficient use of the heat generated when both appliances are in operation and excessive heat produced when both appliances are operating.

There are now specialised products on the market which enable link-up to be carried out successfully between any two appliances and can give different levels of control and automation to meet the customer's requirements.

Electronically controlled link-up

Heating Innovations Ltd have produced a control system called H2 which operates in conjunction with any solid fuel appliance with a boiler together with an existing open vented automatic central heating system. This system can also be incorporated as part of a new system to enable Link-Up to take place. Installation of the H2 unit has been made as straightforward as possible by having the electrics pre-wired leaving only external connections to be made.

More details at www.h2panel.co.uk

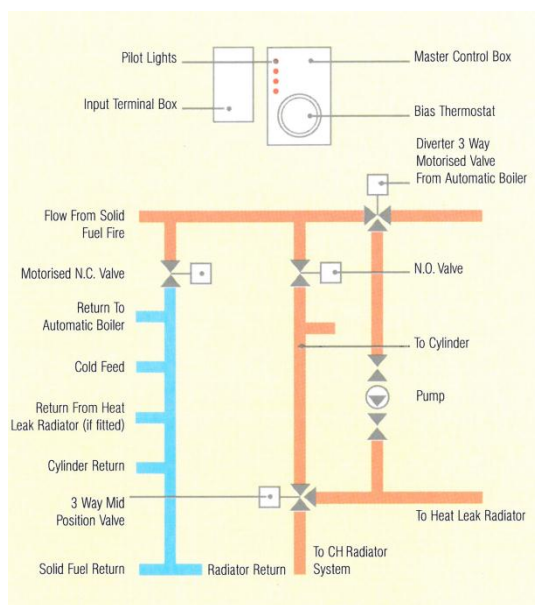


Fig.3 H2 Panel

Neutral point vessel link-up- neutraliser, centraliser

The use of a neutral point manifold or vessel offers a neat solution to the problems of linking appliances. This fixes the neutral point location within the system. The cold feed and open vent are both connected to the system at the neutralising chamber.

Benefits of a neutral point vessel

Because both appliances are only connected through the vessel which has a comparatively large volume, pumped and gravity circuits are hydraulically de-coupled so will not affect each other.

In other words, the pumped circuit from a gas or oil boiler will not induce or hinder the flow through a solid fuel boiler via its gravity circuit. A system incorporating a neutralising vessel can connect several different appliances together without them interfering with each other hydraulically.

Location

- In converting an existing system to accommodate a neutral point vessel, most of the work takes place in the airing cupboard thus avoiding general disruption within the home.
- Where the solid fuel appliances are on the same floor level as the vessel, elevation of the vessel and hot water cylinder is recommended. This elevation is to achieve gravity circulation and efficient venting of the system.

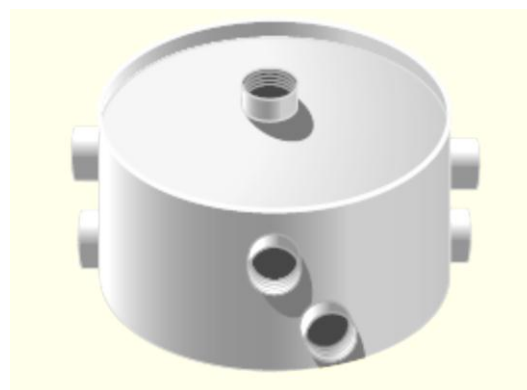


Fig.4 Dunsley Neutralizer

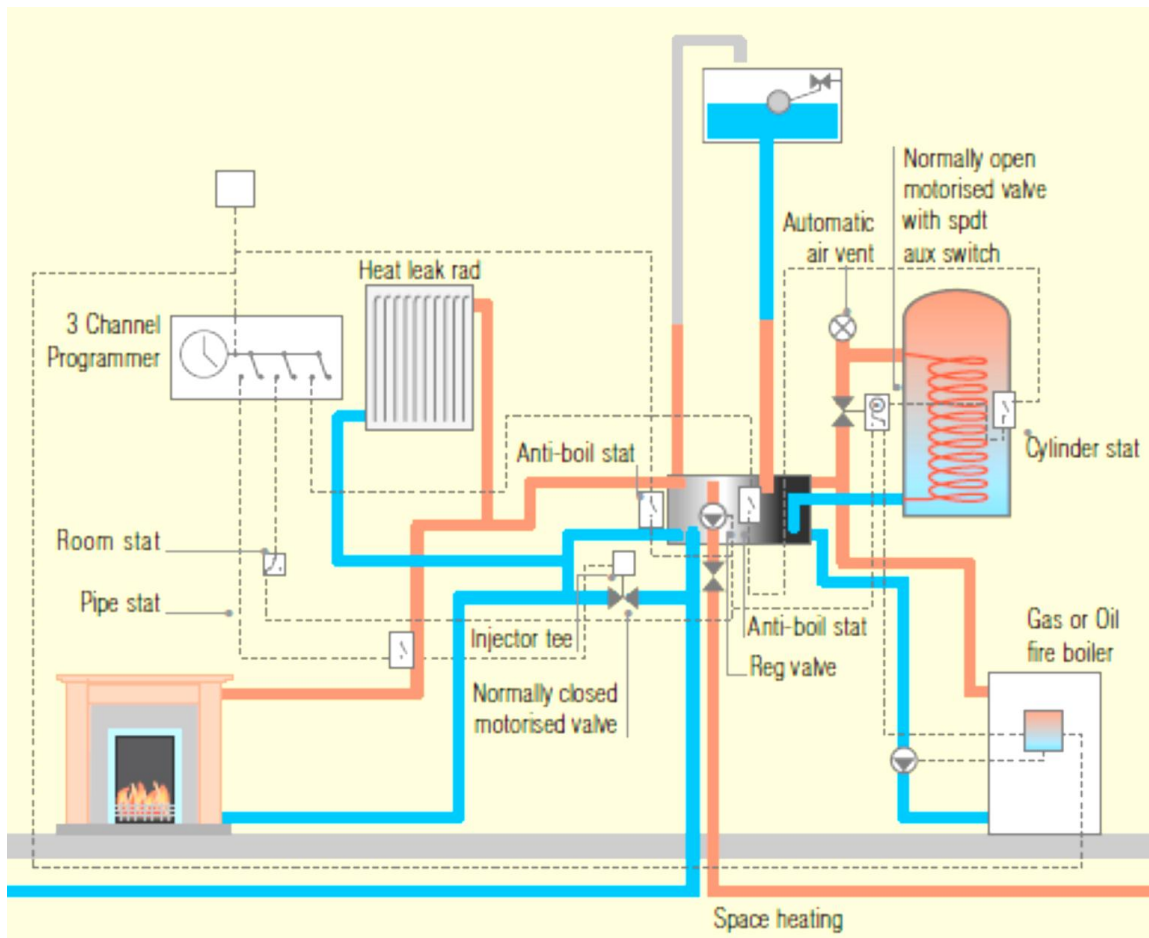


Fig.5 Dunsley Neutralizer Typical Layout - more details at www.dunsleyheat.co.uk

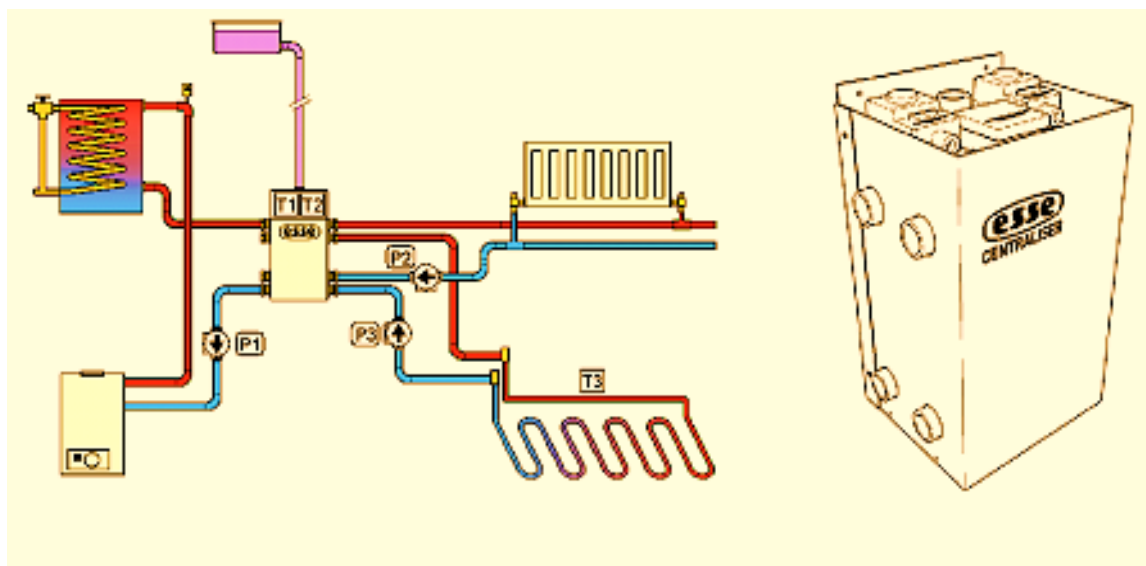


Fig.6 Esse Centraliser Typical Pipework Layout - more details at www.esse.com

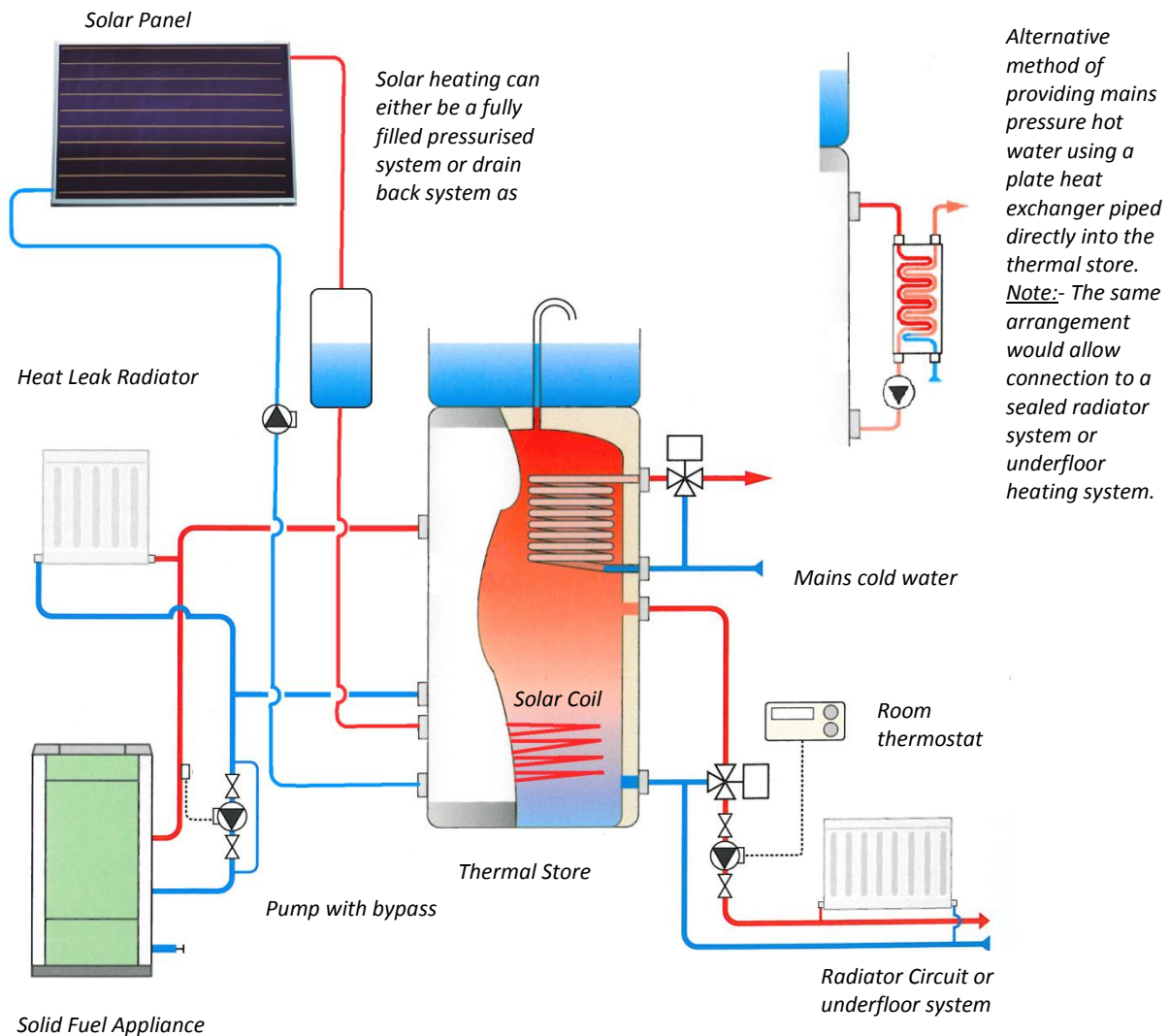
Section 3 – Thermal Store Link-Up

The thermal store system takes the principle of the neutralising vessel one step further by providing considerable heat storage as well as neutralisation of water circulation.

A thermal store is a large tank (typically 200-300 litres) very much like a hot water cylinder but instead of containing domestic hot water, it is filled with primary or system water. Both the appliances and heating circuits are connected directly rather than via a coil.

Direct connection means that the store holds primary water. In other words it is the same water that is circulating around the stove or the gas boiler. The thermal store acts as the neutral point of the system and also stores some or all of the heat produced for later use. Domestic hot water can be supplied at mains pressure via a secondary coil inside the store or through a separate plate heat exchanger. Many different sources of heat can be integrated into the same system.

Fig.7 Typical thermal store system



Pipework Design

The output from a solid fuel stove can be turned down but not turned off. Therefore, there are two essential rules to be observed when designing the system.

1. The system must have an unrestricted open vent to atmosphere.
2. There must be scope for the dissipation of heat from the appliance in the event of a pump or power failure. A heat leak radiator should be provided sized to the turn-down output of the appliance (usually 25% of maximum output).

The stove primary pipework should always be designed so that in the event of a pump failure, heat can circulate by gravity (thermosiphon) to the store or to the heat leak radiator.

Where the primaries are pumped, a bypass should be fitted to the pump to facilitate an unrestricted cold feed to the appliance (10mm diameter).

Important note: A stove should never be connected to an unvented cylinder unless two tiers of safety can be provided in accordance with Part G of the Building Regulations. Guidance should be sought from the manufacturer of the system.

Accumulators and buffer tanks

Accumulators and buffer tanks are both thermal stores, the difference between the two is the way they are used.

A buffer store retains heat for later use. The buffer can supplement the output of the appliance when demand is high and store heat when demand is less. This can be particularly useful in the case of a stove which

will work more efficiently and cleanly when burning at a higher rate. Stored heat can be immediately accessed without having to wait for the appliance to heat up to working temperature. A buffer will help to maintain a more consistent output from sources that may work slightly intermittently such as solar or heat pumps.

An accumulator takes this a step further by storing all the heat produced by an appliance during an extended period working at full rate. This heat is then gradually used up over the course of the day. This is an ideal way to use the heat from batch log burning appliances etc. Because accumulators store more heat they are usually bigger than buffer tanks.

Benefits of using a thermal store

The water in a thermal store is usually stored at around 80°C.

This water is then circulated to the heat emitters via thermostatic mixing valves. For a radiator circuit, the water would typically be mixed down to 60°C whilst for underfloor systems, this could be as low as 35°C.

By storing water at a higher temperature, the charge of heat lasts longer.

Additional overhear protection for thermal stores

A secondary coil connected to the cold water main and controlled by an overheat valve can be fitted as shown overleaf. In the event of an overheat situation, the store can be cooled down by the coil and the heated water goes to domestic waste via a tundish.

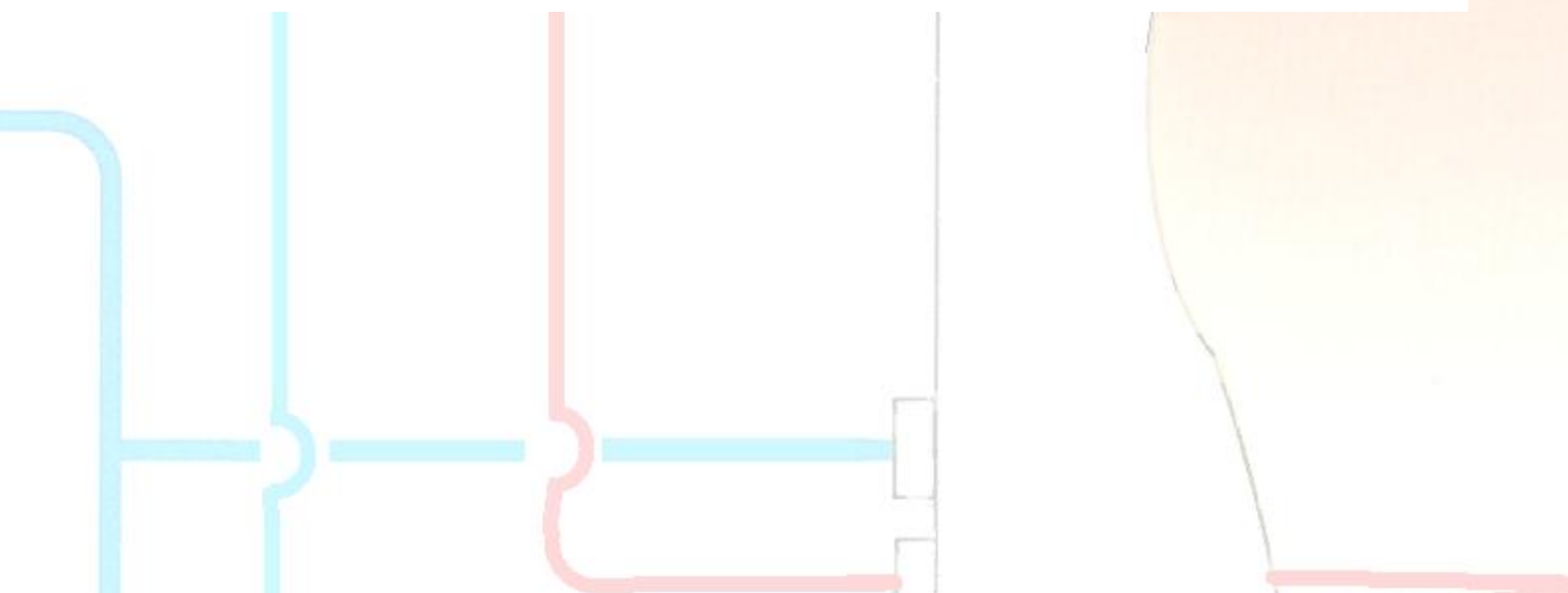
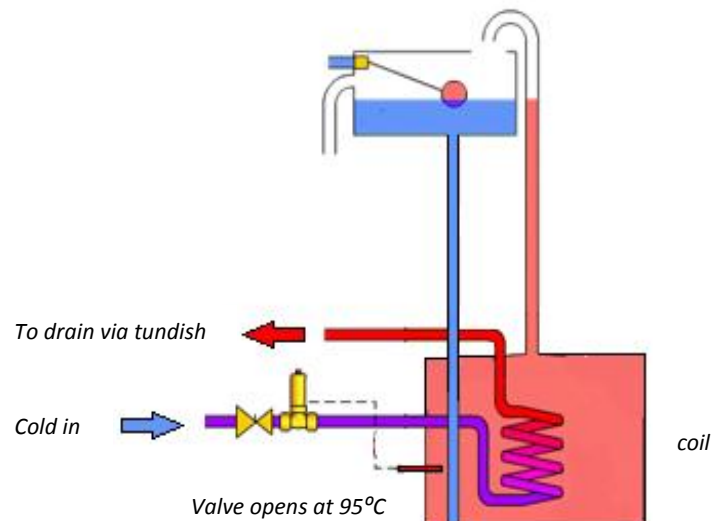


Fig.8 Additional overheat protection



Additional notes:-

To ensure a satisfactory link-up the following factors must be taken into account.

1. The priority of any design must be safety. There must be no possible danger to persons or property arising from the way a householder may use the system, even if this is unorthodox, unreasonable or ill advised.
2. Ensure separate and suitable flues exist for each appliance in use.
3. All components of the linked system must conform to all relevant Water Bye-Laws, Building Regulations, British/ European Standards and Approved Codes of Practice.
4. Since much of the pipework of an existing system will be concealed, it must all be located and correctly identified by whoever carries out the installation.
5. Any solid fuel appliance must always have a separate cold feed and vent which must be permanently open and unobstructed at all times without valves. Many modern gas and oil boilers operate with sealed and pressurised systems which are not suitable for linking to an open vented system.
6. The float valve in the feed and expansion cistern and the overflow pipes must be made of copper.

The Solid Fuel Association is the UK's foremost authority on all aspects of domestic solid fuel heating. We are happy to offer expert guidance to both professionals and consumers alike.

To find out more about solid fuel, visit our website at www.solidfuel.co.uk

Or call us on 01773 835400

