Storage Heaters – a technical guide

1 Background and power supply

Storage heaters (commonly known as night storage heaters) utilise electrical power to heat elements that are set inside clay bricks. The bricks store the heat and release it slowly.

The electricity companies have two tariffs that are used where storage heaters are fitted in a household:

- Economy 7. This provides lower cost electricity overnight, typically from midnight to 7am and this is used to run the heaters
- Economy 10. This provides lower costs electricity over night and in the afternoon for a 'boost'.

In older electrical installations the storage heaters (and usually the lower element in an immersion heater) are powered from a separate fuse board or consumer unit, fitted with 15A fuses or 16A MCBs. In modern installations there may be only a single consumer unit.

Where there is a separate fuse board or consumer unit there will also be an electricity company time switch, which allows power to be provided to the storage heater fuse board or consumer unit only at specified times.

The typical lifetime of a storage heater is 10 to 15 years. Parts can fail sooner.

Some storage heaters have two supplies to them:

- The economy 7 or 10 supply
- A second supply to run an auxiliary fan (or fan heater) in the base of the heater to provide additional heat when required during the day (peak charge) period. This second supply will be from the main fuse board or consumer unit.

A storage heater will typically be rated at between 1KW and 3KW (KW = 1000 watts).

2 Older versus modern storage heaters

All storage heaters have:

- An input control (electrical) which governs the amount of heat stored
- An output control (mechanical which allows some control over the rate of heat release)
- Insulation.

More modern storage heaters have improved input controls including a thermostat, which senses the room temperature and reduces the heat if the room is naturally warm. Newer models also have improved insulation, which in turn improves storage and allows greater output control.

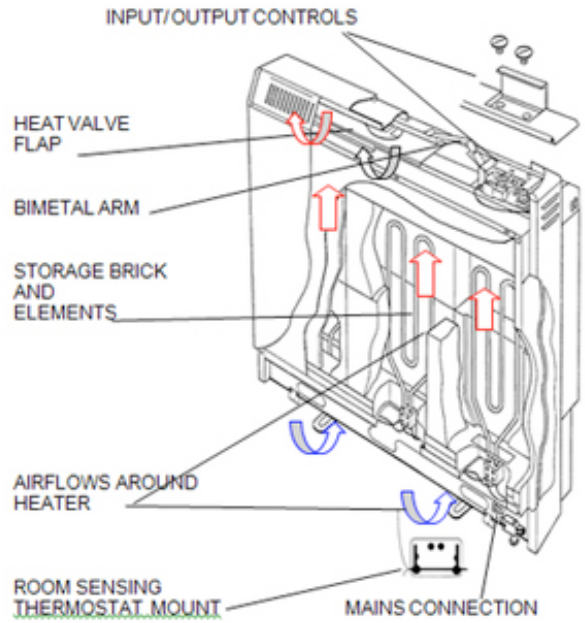
3 What's in a storage heater

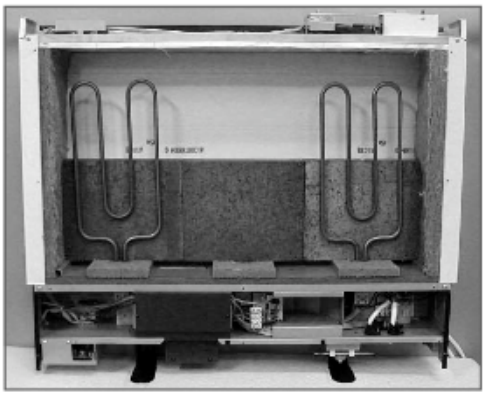
A typical storage consists of:

- A thermal fuse (on older heaters) or input cutout. These are designed to deal with the potential problem of a heater being covered.
- An input charge control thermostat
- A charge limiter (in some models)
- The heating element(s), which for multiple elements are in parallel
- The cabling, terminal blocks and mechanical parts.

An overview of a typical heater is shown in Figure 1.

Figure 1 - Typical storage heater





The photograph shows a storage heater with the front cover, bricks and one element removed.

Storage heaters with the bricks in are very heavy. New heaters are supplied with the bricks packed separately.

The diagram for a simple heater is shown in Figure 2 and for a more complex model in Figure 3. Both figures are sourced from Creda.

Figure 2 - typical storage heater circuit diagram

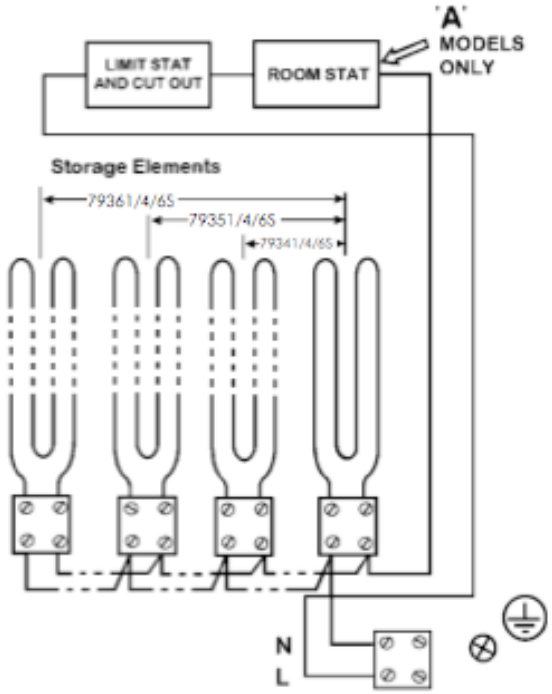
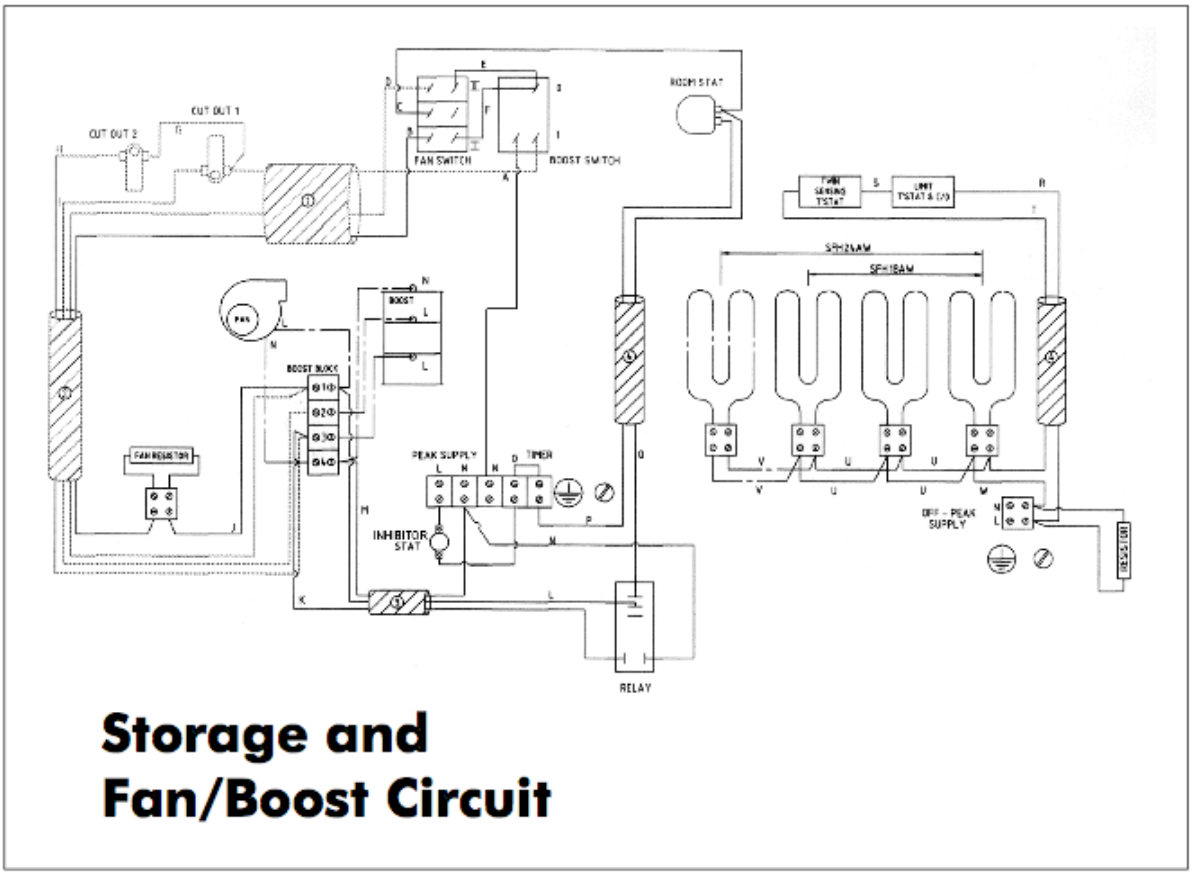


Figure 3 - storage heater with fan heater built in (source Creda)



4 Common problems

There are three sets of common problems with storage heaters:

(i) Input cutout tripped or thermal fuse-link blown due to overheating, usually caused by something being placed over the heater. Typically these can be reset. Usually the front panel and top need to be removed. The cutout will be adjacent to or integrated with the controls. Look for a small round device about the size of a penny with a red or white dot in the centre, which can pop up. With the power off push this down, you should hear a click. Re-assemble the heater and it should work on the next charge period. See paragraph 5 below for how to double check.

(ii) Input charge control thermostat faulty. This can in some circumstances, be caused by a build up of dust. If there is a large build up of dust a good clean (with the power off) is required. If it's still faulty replacement thermostats can often be obtained.

(iii) An element is open circuit. This can be ascertained by measurement with a test meter.

5 Testing and fault finding

Normally one is fault finding a storage heater when the supply to it is not available during the day. Do double check and remember if it's an economy 10 installation the power may come on – so isolate the heater in all circumstances. Most have an isolating switch on the wall. Also remember that if there is an integrated fan or fan heater then this will have a second supply, which also needs isolating.

It is possible to see if a storage heater will call for power when electricity is available by measuring the 'Ohms' between the live and neutral at the input. Ensure when doing this that the live and neutral are disconnected from the supply; otherwise one is measuring all the heaters and quite possibly an immersion element all via the fuse box or consumer unit.

A 3KW heater should have an input impedance in the region of 19 Ohms, a 1KW heater in the region of 57 Ohms. These figures are only guides. Use Ohms law (in the 50plus Electrical guide) to see how to calculate them.

One can also meter out any input cutouts and thermostats simply by measuring from the main live input through each component in turn to check for continuity.

A note of warning; older heaters can deteriorate (due to constant heating) to the extent that cable insulation and connections literally fall apart when touched. If the heater you are working on is in this condition then it should be replaced.

If you are planning to fault find a working or partially working heater ask a customer to ensure it is turned off the day before. Otherwise it could be too hot to work on.

Finally and as last resort it is possible to connect a storage heater temporarily to a 13 Amp power point. This will allow live testing but be aware of the current the heater will take and the fact that it will not heat up quickly.

6 Replacing a storage heater

There are a number of points to consider when replacing a storage heater:

- Removal of the original heater. It's usually easier to remove the bricks before trying to lift a heater. Do this before unscrewing it from the wall. Most heaters need a trolley or sack truck to move. There will also be a good deal of dust and old insulation tends to break down. Storage heaters made from 1974 onwards have been asbestos free. There are few heaters of this age in circulation.
- Disposal will need to be via a Hippo Bag or similar with the bricks taken to the bag separately.
- The new heater will be delivered on a pallet, adjacent to the kerb only and with the bricks packed separately.

7 Moving a storage heater

If you are considering moving a storage heater within a property or to another property then bear in mind the points in paragraph 6 and that:

(i) You will have to remove the bricks

(ii) The heater needs to be in reasonable condition to tolerate the move

(iii) A power supply in a new location has to be wired back the storage heater distribution fuse box or consumer unit. You should not connect a storage heater to a ring main or spur from a ring main.

8 Use of storage heaters

As seen in this guide most storage heaters are very simple. Many end users do struggle with how to use them. The simple rules are:

- Set the input to about 4-5 – this ensures the heater will charge
- Set the output to 0 until heat is required. Setting the output to a low level prevents a heater running out of stored heat too soon.
- Remember a fan-assisted heater may not have a mechanical flap but could utilise an electric fan to dispel the heat into the room.

For further information contact 50plus.

Tel: 0845 22 50 495 or 01494 784 448

Web www.the50plus.co.uk.