

THE NIGHTSTOR 100/60 ELECTRIC CENTRAL HEATING SYSTEM USER INSTRUCTIONS

Your Installer is:

HYNDBURN ENGINEERING SERVICES LTD.
7 WATER STREET
CLAYTON-le-MOORS
LANCASHIRE, BB5 5SH.
TEL: 01254 829833
www.hes.co.uk
sales@hes.co.uk

Repairs

If the Nightstor boiler was not installed by your local Electricity Board and your installer has difficulties for any reason, contact the makers.

Important

Use a barely damp cloth when cleaning the control box. Water must not get inside or it may damage the electronic components.

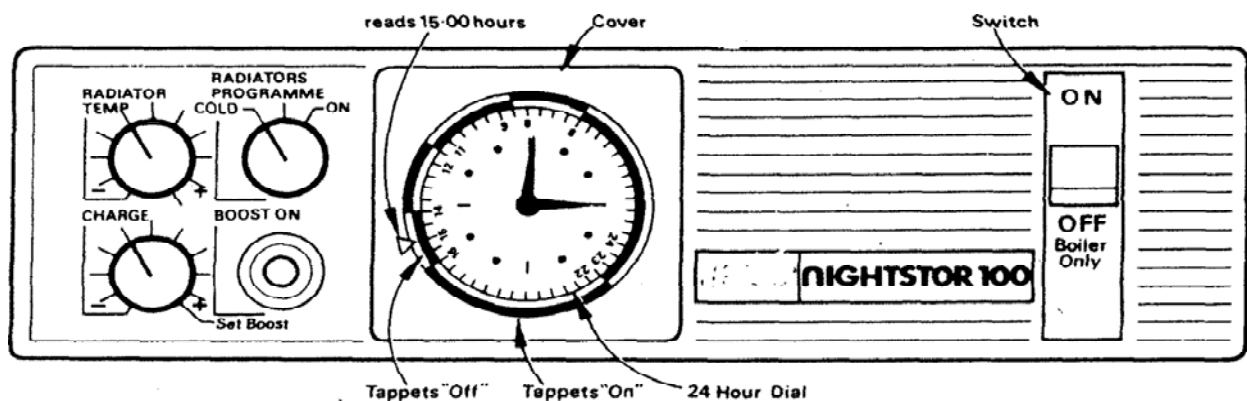
BASIC OPERATION

Your new 'electric boiler' is a night storage unit. Each night it will consume low cost electricity to charge a brick core with heat for the following day. You will soon get used to adjusting this heat storage system. Otherwise the boiler is controlled by a room thermostat and a programmer in the same way as a gas or oil fired unit.

The complete central heating system

should have been commissioned and left in working order. Make sure that this has been done before switching on. Ensure that the system has been filled with water, the radiators have been vented, and all the radiator on/off valves are open.

All the controls are on the Nightstor control box except for the room temperature thermostat.



NIGHTSTOR 100/60 CONTROL PANEL

Switching on for the First Time

If the boiler is new or cold at the start of a heating season, switch on in the evening for the first overnight charge. The main switch* is on the right hand side of the panel. Turn the "charge" knob fully clockwise to the +, 'set boost' position. Turn the 'radiators programme' knob to the 'on' position and set the room thermostat as required. The central heating pump will start and the 'boost on' indicator will light.

After about one hour a fan inside the boiler unit will start and the radiators will warm up. They will not be very efficient on this first evening because the boiler is too cold.

*The main switch says 'OFF *Boiler Only*' because there is another switch inside the control box, for use by the service engineer, which isolates the control electronics.

Setting the Programmer

Set the clock to the correct time by removing the protective cover and turning the hands. As you turn the hands, the '24 hour dial' also turns and it is necessary to get both the dial and the hands indicating correctly e.g. at 3 o'clock in the afternoon the hands read 3 o'clock and the dial reads 15.00 hours. Now set the tappets to give the central heating programme you desire. Each tappet controls a period of $\frac{1}{2}$ hour; if the tappet is 'out' the heating will be on, if it is 'in' the heating will be off for that $\frac{1}{2}$ hour.

Before you go to bed set the 'radiator temp.' knob to the middle of its range between - and + and set the radiators programme knob to the 'programme' position.

Normal Operation

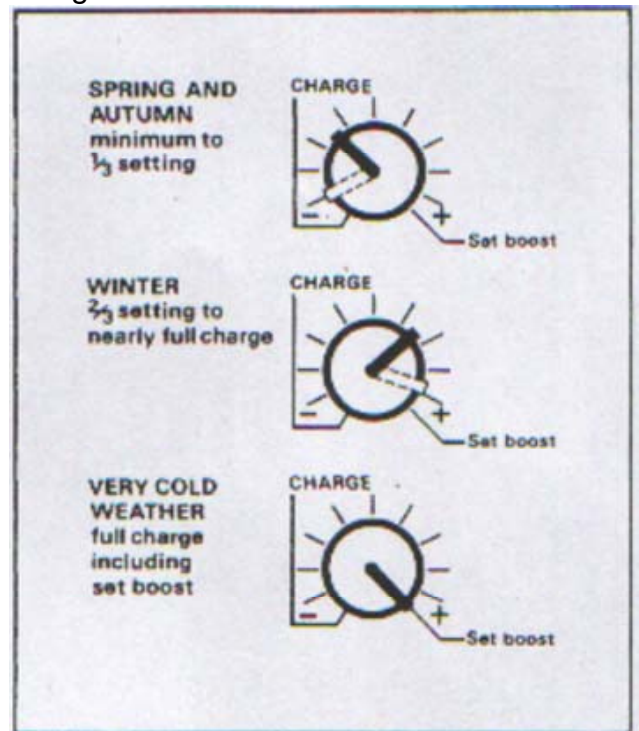
In the morning the pump and fan will start at the programmed time and the radiators will warm up. When the radiators reach the set temperature the fan will switch off and on to just maintain that temperature. You can of course adjust the radiator temperature as you require.

You can leave the boiler as set and it will work automatically whilst you adjust the radiator temperature and switch the radiators programme knob to 'off' and 'on' or let the programmer control them. Each night the boiler will use low cost electricity to fully charge the core. Under normal circumstances the stored heat will be more than sufficient for your purposes.

However, on very cold days, you may use up all the stored heat and the boost light will come on, probably towards evening indicating that normal cost electricity is being used. If you do not want to use normal cost electricity like this, turn back the charge knob just a little so that the boost light goes out. There is some useful heat left in the boiler but the radiators will gradually get cold as this heat is exhausted. Eventually the fan will stop for the remainder of that day. (Unless you turn the boost back on!).

If you leave the charge knob at or near the maximum setting the boiler unit will be quite hot in the morning when it is fully charged. It will warm the kitchen or utility room nicely in the winter but it may be hotter than necessary in the spring or autumn. To avoid this and to operate the boiler efficiently, it is better to make a habit of assessing the weather and setting the charge control each night accordingly, as shown in the diagram alongside.

These are general guidelines only, and the best setting will vary according to the size of your house, how well insulated it is, and how warm you like to be. You will soon learn how to adjust the boiler to suit your requirements. There will be long periods when you do not need to change the charge setting, but try to anticipate very cold days so that the boiler is fully charged and ready for them. If in doubt, it is better to overcharge than undercharge.



Central Heating Programmes

The programme you use will be the same as you would use with a boiler fired by oil or gas. Typical programmes are shown below and programme A is shown set on the panel diagram.

To take maximum advantage of the Economy 7 tariff, you should note that low cost electricity is available from 12.30am to 7.30am in the winter (1.30am to 8.30am in the summer i.e. always 00.30 hours to 07.30 hours Greenwich Mean Time). To allow the core to charge fully, it is best if you can

leave the radiators off for the first 5/2 hours of this period. Then, in winter, the radiators can be switched on at 6 am to warm the house before you wake up, still using low rate electricity and without depleting the store of heat.

You need not change the programme for Summer Time because you will not then need to use full charge. Just change the clock.

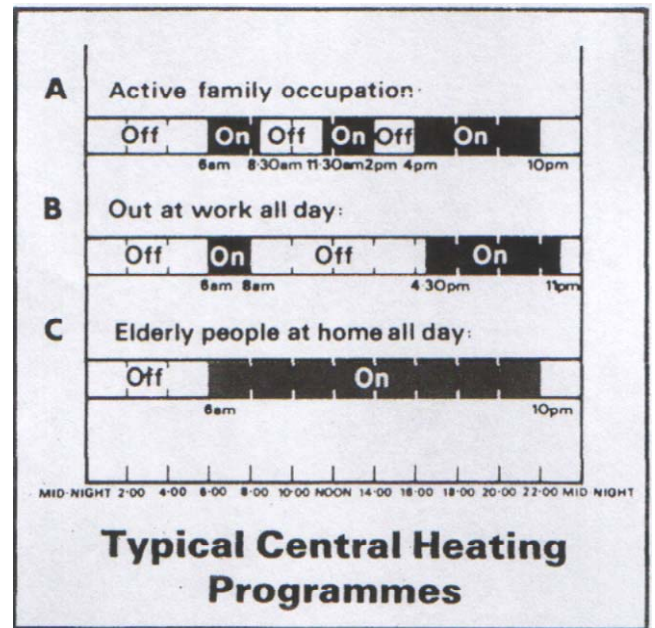
Holidays

You should not normally switch the boiler off at the main switch until the end of the heating season unless you leave the house empty for a long period. If you do switch off at the main switch, remember to turn the radiators programme knob to 'off 30 seconds beforehand.

When you go away for a short period switch the radiators programme knob to 'off and turn the charge knob anti-clockwise to its minimum (-) setting. The boiler will then be ready for you to use immediately on your return, with a useful charge of heat. If the weather is very cold or you know that you will be returning early in the day you might decide to leave the charge knob at Vs or 1/2 setting. To prevent freezing you can of course leave the radiators on with the radiator temperature set at minimum.

For a longer period of absence, if you fully charge the boiler the night before and then switch off in the morning of your departure, there will be enough heat left for the evening of your return up to a week later. The slow escape of heat while you are away will keep the house aired.

If you are away for ten days or more the boiler will be cold and you should proceed as if you are switching on for the first time. If you want heat on the first evening of your return you must use boost and this uses normal cost electricity. Remember to set a charge level appropriate to the weather before you go to bed.



In General

For economical operation keep the charge setting as low as possible providing you are not running out of stored heat in the evening so as to need boost on. If you do run out of heat use boost and when you go to bed turn the charge control down, but leave it set higher than the day before.

Leave the room thermostat as low as possible, say 20°C if it is in the Lounge and 15°C if it is in the Hall. Keep the radiator temperature as low as possible. However, do be comfortably warm. You have a very efficient boiler and your heating bills should be surprisingly low. As with other types of boiler, you must not turn off all the radiators. Leave at least four on. If you have (or contemplate fitting) any thermostatic radiator valves, remember that these will turn off automatically!

Core and Elements

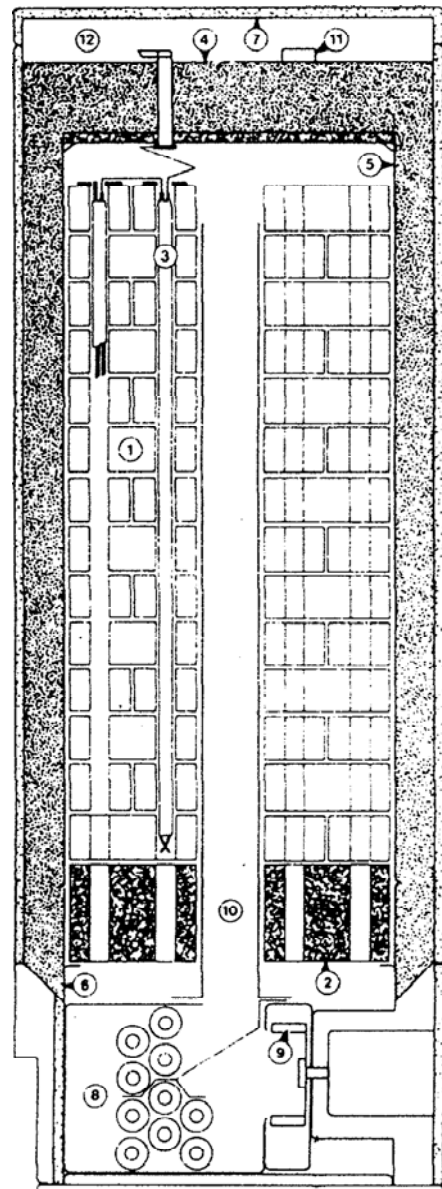
Interlocking Feolite refractory bricks are built up on an 'insulating block' to make the core. There are 24 vertical holes formed through the core to accept the 'heating elements' in two banks of twelve in series. Each element consists of two lengths of Nichrome furnace heating strip contained in ceramic insulators and hanging from ceramic insulating discs at the top of the core. Each bank of elements is connected to the supply by nickel alloy posts passing through the top 'primary insulation'.

Thermal Insulation

A thin nickel alloy 'core box' surrounds the core and separates it from the primary insulation which consists of two layers of Microtherm insulating panels. The core box and Microtherm panels are assembled into an insulation box for delivery as a unit which slides down over the partially assembled core and locates on the 'plenum'. The 'secondary insulation' is bonded to the outer casing which is assembled round the completed core plus primary insulation.

Heat Extraction

The plenum is a mild steel box which supports the core and contains a heat exchanger, a fan, and a central heating water pump. To extract heat from the core; the fan and pump are switched on by the control unit. Air flows in a closed circuit from the top of the core down a 'hot draught tube' and through the heat exchanger to the fan inlet. The fan exhausts into the plenum and the air then flows up the element holes and between the bricks to the top of the core.



- 1 Core
- 2 Insulating block
- 3 Heating elements
- 4 Primary insulation
- 5 Core box
- 6 Plenum
- 7 Secondary insulation
- 8 Heat exchanger
- 9 Fan
- 10 Hot draught tube
- 11 Thermal links
- 12 Connection void

Control System

The control unit contains heavy duty relays controlling power to the element banks, and a printed circuit board carrying temperature sensing and control electronics.

The control inputs are the room thermostat, a water temperature sensor, four core temperature thermocouples and a 'night signal' from the Economy 7 meter system.

When the night signal is on both element banks are connected and the core temperature rises to the charge setting. If the programmer and room thermostat demand heat the fan and pump are switched on and the central heating water temperature rises.

When the night signal is off the heating elements cannot be energised unless the core is discharged to a fixed low temperature - the 'boost' level. If then the core temperature control is set at maximum, a 'boost' light comes on. Alternate element banks are switched in a timed sequence to maintain heat output, albeit using normal rate electricity. On very cold days up to 20% of the electricity used could be at the normal rate. However, the normal rate usage over a full heating season should not exceed 3% of the total. If the user prevents the 'boost' from operating by turning down the core temperature control setting, the fan is finally stopped at a very low core temperature, to prevent unnecessary operation.

Performance

The boiler models will meet the following needs:

Nightstor 100 - 10kW house

Nightstor 60 - 6.5kW house

For example, for the Nightstor 100 the boiler will meet the needs of a house where the calculated heat losses, including air changes, add up to 10kW when the outside temperature is -1°C. Such a house will accept more than 10kW warming up from a cold

condition. However it needs less on average over a winter day. The maximum continuous output rates are:

Core fully charged

- 19kW (60 and 100)

Core at boost level

- 8kW (100), 6kW (60)

Note that the room thermostat and the water temperature controller will reduce these heating rates to whatever the house requires by switching the central heating on and off.

Safety Devices

If the core temperature control system fails and the core overheats, non-resettable 'thermal links' break the heavy current connections to the element banks, (if the pump fails a resettable water over-temperature trip operates to switch off the fan and protect the heat exchanger. A pressure relief valve is incorporated in the water piping and the fan motor is fitted with automatically resetting thermal links. These devices should only be repaired or reset by a competent engineer.

Maintenance

The boiler does not require routine maintenance. However it is recommended that the boiler and control unit be inspected by a competent service engineer once a year to ensure that the heavy current electrical connections are tight and the fan cooling air duct is free from debris. Consult your local Electricity Board or installer.

Please note also that your installer should have added a corrosion inhibitor to the central heating water. If the system is drained for any reason make sure that the correct amount of inhibitor is added when the system is refilled. One suitable inhibitor is:

SENTINEL X100

This is obtainable from plumbers and builders merchants and should be used in accordance with the manufacturer's instructions.