



Geothermal Heating at
Chy An Gweal Estate Ludgvan

Operating Instructions

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Geothermal Central Heating Systems

Chy An Gweal Estate Ludgvan

User Instructions

Introduction

The central heating system installed in your home looks very similar to those heated by gas or oil fired boilers, but it differs in several important respects. The information which follows is intended to give an overview of how the system works and the use of its controls. However, if you are in any doubt about any aspect of its use please contact Penwith Housing Association on 01736 – 334953 to obtain further help.

The heat pump

The heat pump for your home is located in an external enclosure outside the property – a key for accessing the heat pump will have been supplied to you by the installer. The heat pump is connected to a loop of pipework installed in a borehole near the bungalow. When the heat pump is working it extracts energy from this loop and increases its temperature to a level suitable for heating your home. The energy extracted from the ground is mainly warmth it has gained from sunlight. The temperature of the ground below the surface is stable throughout the year, so your system will work equally well in summer and winter. The heat pump and the water circulating pumps used in the system are driven by mains electricity and the cost of this will appear on your normal electricity bill. It is expected that the cost of this electricity will be less than you are likely to have spent in the past on solid fuel for the old system, but it will of course depend on how much heating you use. If you are in any doubt about this Penwith Housing Association can provide help and advise on reading your electricity meter and energy bills. You are probably aware that you are now free to chose the supplier that you buy your electricity from, and it may be worthwhile for you to compare prices to ensure that you are obtaining the best price available to you.

The heat pump is not like a conventional boiler which delivers water at a high temperature for short periods of time. The heat pump works better at lower output temperatures - it is better to run the heat pump for longer periods of time at moderate temperatures than for short periods of time at high temperature.



Powergen Heatplant Heat pump with front panel removed



Heat pump as fitted at Chy An Gweal. The heat pump is on the left. The box on the right is the ground loop pump and control box.

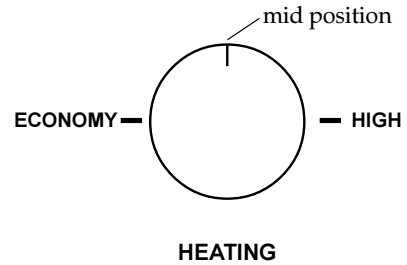
The heat pump fitted to your home has one user control knob which can be found behind the front panel (the panel is a push on fit and can be removed easily). The control should usually be set to the mid position between “Economy” and “High”. When winter sets in if the weather becomes very cold it may be necessary to turn the temperature up above this setting to “High,” but to maximise economy remember to turn it back down when the weather becomes milder. The heat pump front panel also has two fault lights - if either of these is lit you will need to contact Penwith Housing Association to arrange for the unit to be checked.



Fault Lights Control Knob

Close up of heat pump front panel showing control knob and fault lights

The heat pump has two operating modes, one of which is designed to heat the hot water tank and the other for the radiator system. It can only operate in one of these modes at any one time. The installer will have set your programmer (described below) when the system was installed. If the programmer settings input by the installer become unsuitable for you Penwith Housing Association can arrange for them to be changed.



Close up of heat pump control knob.

The radiator system

The radiator system installed in your home uses the same types of fitting used in traditional central heating systems, but it operates at a safer lower surface temperature. This is not a disadvantage – the system has been designed to produce enough heat to keep your home warm – but it needs to deliver a moderate amount of heat for extended periods to work at its best. For this reason it is best not to switch the system on and off many times during the day, but rather to allow it to run automatically to maintain continuous warmth.



Thermostatic radiator valves.

These are attached to the radiators in the main bedroom and kitchen (where the kitchen has a radiator) They enable the temperature of those rooms to be varied. Each unit contains a temperature sensitive valve which switches off the flow of hot water to the radiator when the desired temperature is achieved. Because of the need to maintain background warmth these valves are only fitted in the rooms where individual room temperature control is most needed.



Thermostatic Radiator Valve

The Room Thermostat

This is normally positioned on the hall or living room wall. It reacts to the temperature of the air around it. When the temperature set is achieved the room thermostat sends a signal back to the heat pump causing it to switch off. It is recommended that the thermostat should be set between 18°C and 22°C. For energy efficiency the thermostat should be set at as low a level as possible to achieve satisfactory comfort levels.



Room Thermostat

The Programmer

The programmer is a digital clock which operates your heating system. Heating and hot water are controlled independently and can be switched on and off automatically up to 3 times a day. The table on the right shows a typical programme. If you wish to change the settings the important points to remember are:

- Avoid running the hot water system and radiator system at the same time. If they are switched on at the same time the radiators will turn off while the hot water tank is heating up.
- Programme the radiator system to run for a reasonable length of time – at least an hour at a time and preferably more. The heat pump is least efficient (more expensive to run) when switched on and off for short periods of time.



Programmer

The programmer's internal clock can be left on GMT (winter time setting) and need not be changed when British Summer Time begins and ends, although you can change this if you wish. If you need help with setting your programmer please ask your support worker or contact Penwith Housing Association for assistance. As an alternative to using the programmer to switch the radiator system on and off you can use the "ON" mode to make heating constantly available and then use the room thermostat to control the temperature throughout the day and night. Alternatively use the "ALLDAY" setting to start heating at the first setting on the programmer and to switch off at the last.

Table showing typical programmer settings

	Heating	Hot Water
On		5.00 a.m.
Off		7.00 am
On	7.00 am	
Off		
On		2.00 p.m.
Off		3.00 p.m.
On		
Off	10.30 p.m	
On		
Off		

Immersion Heater

Your hot water cylinder is fitted with an immersion heater for emergency use. This is controlled by a switch in the cylinder cupboard. As your heating system provides hot water you should not normally use it. Heating water with the immersion heater is more expensive than the heating system. Switching the immersion heater on while the heating system is on will prevent the heat pump from working correctly.

Performance Data

Data calculated for the Chy An Gweal Site by Powergen November 2004

Renewable heat acquisition and overall operating efficiency

Each ground source heat pump will “collect” around 6000 kWh of renewable thermal energy from the ground every year, at an average operating efficiency of around 325%.

Comparison of GSHP system fuel costs with fossil fuel systems (£ / year)

	GSHP	Oil	Smokeless solid fuel
Lighting & power	£ 205	£ 240	£ 240
Space & water heating	£ 210	£ 370	£ 740
Totals	£ 415	£ 610	£ 980

CO2 Emissions (tonnes /year)

	GSHP	Oil	Smokeless solid fuel
Lighting & power	1.1	1.1	1.1
Space & water heating	1.2	3.8	7.2
Totals	2.3	4.9	8.3
