



# Thermaltricity® Air Source Heat Pumps

## Models KS015R & KS02R

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### Introduction

A Thermaltricity Air Source Heat Pump uses the same mechanical technology as a refrigerator and air conditioner but for the generation of hot water.

The real selling point is the fact that it uses 1 unit of electricity to generate approximately 3 units of heat. In comparison, a standard immersion heater uses 3 units of electricity to provide 3 units of heat.

The introduction of Air Source Heat Pumps to the domestic household and small business user has become financially possible because of technical advances in planet friendly refrigerants and new compressor technology. With low running costs, they are a cost effective option in new house builds, energy efficient refurbishments or retrofits and will help to mitigate the effects of increasing gas and oil prices.

### Features

- Effective efficiency = 250% to 400%
- Simple installation
- Designed to heat water continuously
- For a 4 person household the annual electricity use is up to 75% less than heating a conventional hot water tank
- Work well in humid climates
- Use CFC-free Refrigerant R417a



- Heat pumps in various forms have been around for many years and are used worldwide for both domestic and commercial applications
- Life expectancy of 15 years
- Can be integrated with a solar thermal collector through a Powertech Thermal Store for greater hot water production
- Ideal for use with warm water underfloor heating

The two models introduced into the UK in 2006 are 4.7kW and 6.5kW nominal rated units – specifications are shown below:

Model KS015R		Model KS02R	
Power output	<b>4.7kW</b>	Power output	<b>6.5kW</b>
Outlet water rated temp	<b>55°C</b>	Outlet water rated temp	<b>55°C</b>
Rated power input	<b>1.25kW</b>	Rated power input	<b>1.7kW</b>
Water output litre/hour	<b>110</b>	Water output litre/hour	<b>150</b>
Ambient air range	<b>-5°C to 40°C</b>	Ambient air range	<b>-5°C to 40°C</b>
Weight	<b>95kg</b>	Weight	<b>130kg</b>
Size (mm)	<b>523(h) x 550(d) x 680(w)</b>	Size (mm)	<b>626(h) x 600(d) x 780(w)</b>

## Applications

Thermaltricity Air Source Heat Pumps are ideal for installation in commercial kitchens or laundries where there is a simultaneous need for cooler air and hot water. They are perfectly suited for providing domestic hot water and space heating when using a thermal store in houses, hotels, nursing homes, purpose-built apartments and in fact anywhere where there is a need for domestic hot water / space heating. In 2007 Thermaltricity will be expanding its range of Air Source Heat Pumps.



Fig. 1 - An ASHP in a commercial kitchen reclaiming heat from a food prep. area. The heat extracted is then used to preheat the washing up water. Further, it also cools the area & enhances the efficiency of the freezers.

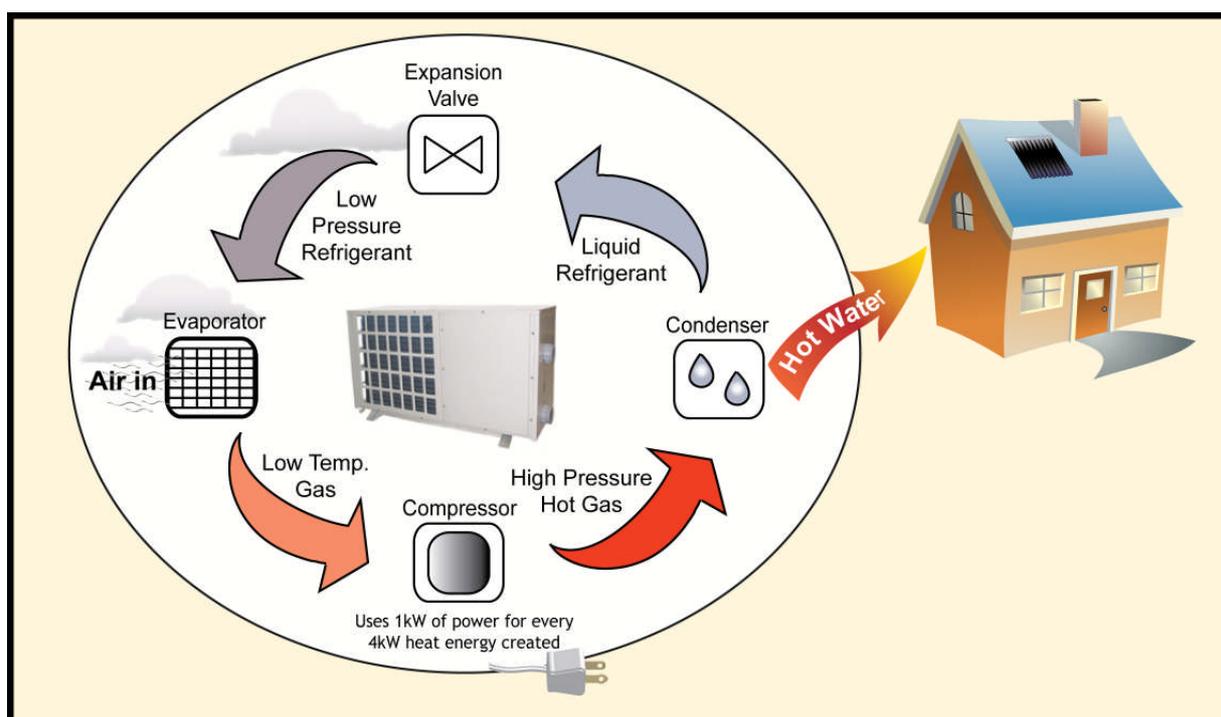


Fig. 2 - An external heat pump providing hot water for showers in Slovakia.



## How They Work

An Air Source Heat Pump works by transferring heat - not by converting electrical energy into heat. It removes energy from a low temperature source (ambient air) and moves it into a hot water tank or directly into a central heating system (ideal for underfloor heating). The stages of the process are illustrated below:



First it takes ambient air from the surrounding area and uses its low grade heat (as low as  $-5^{\circ}\text{C}$ ) to heat low pressure liquid refrigerant passing through the evaporator, thus turning it into a gas.

The refrigerant then passes through the compressor which raises the refrigerant pressure and thus the temperature as well.

The hot refrigerant gas passes through the heat pump condenser, where it gives off gained heat via a heat exchanger (to provide domestic hot water) and condenses back into a liquid state.

The liquid refrigerant is now passed through an expansion valve where the pressure is reduced and the cycle starts all over again.

The only electricity cost is the operation of the compressor and the fan to collect free heat from the air and through the use of a standard circulating pump positioned on the outside of the heat pump unit. This pump is plumbed in between the hot water tank/space heating loop and the other side of the heat exchanger.



## Heat Comparison Tables

Heating 1,000kg of water from 20°C to 55°C requires 35,000Kcal.

Heat Values	Co-efficient of Performance (COP)
Coal fired back boiler 2750 Kcal/kWh	0.55
Oil fuel boiler 6630 Kcal/kWh	0.65
Gas boiler 16900 Kcal/kWh	0.65
Electric Immersion Heater 826Kcal/kWh	0.96
Heat Pump Water Heater 3268 Kcal/kWh	3.8

## Why Air Source Over Ground Source

- The Thermaltricity range of heat pumps is designed for internal use. (Powertech also have a range of Air Source Heat Pumps which can be sited externally and work at sub-zero temperatures). This means that Air Source Heat Pumps have greater flexibility over ground source.
- In summer months when hot water is still needed, ambient air temperatures are significantly higher than ground temperatures. Air source heat pumps, therefore, have the potential to outperform GSHP during these periods.
- Ground source heat pumps require large trenches or boreholes to be dug requiring an area of land. There are a large number of instances where the ground needed is not available.
- Air Source Heat Pumps, are simple to install making them substantially lower in cost than ground source.
- Air Source Heat Pumps are also ideal for swimming pool heating.

## Further Information

If you are looking to cut your fuel bills, please feel free to talk to any of our technical team on **01202 890234** to find out how your home or business can benefit from a Thermaltricity Air Source Heat Pump.

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