

Renewable Energy Climate Control



Renewable Energy from the Fresh Air Source heat pump, combined with low energy digital fan technology - the Gemini offers optimum energy efficiency for all indoor pools.

**Engineered with Excellence,
Specified with Confidence.**

Renewable Energy Climate Control :

- Integral fresh air source heat pump boiler
- Integral heat pump dehumidifier
- Special Digital low energy air fan.
- Auto fan - automatic fan power
- Active Heat reclaim into air and pool water
- Central ventilation
- Air and pool water support heating provision

The concept – the ‘all-in-one’ solution :

Put simply, the Gemini is an indoor pool climate control unit which generates it's own heat using an integral fresh air source heat pump boiler. The fresh air source heat pump is used as the main method of heating, extracting free 'renewable' energy from the outside air and directly heating both the pool water and the pool room air.

The Gemini is launched as a direct response to ever increasing fuel prices and the escalating focus and demand for the use and inclusion of renewable energy sources.

The Gemini still provides all the usual energy efficiencies associated with a modern indoor pool climate control unit, being equipped with a second dehumidification heat pump with active heat reclaim.

The Gemini therefore provides an easy and convenient 'all-in-one' solution to the desire to accommodate renewable energy technology, whilst avoiding the complexity, cost and limitation of alternative approaches

Superior heat pump efficiency :

The Gemini's integral air source heat pump heats the pool room air and water 'directly', i.e. the comparatively cool pool water and room air is in actual contact with the hot refrigerant in the heat pump.

Therefore, higher operating efficiencies and C.O.P's are achievable when compared to separate external heat pump boilers, which can only provide in-direct heating via a pumped central heating pipe circuit, heat exchangers and water storage tank. The air flow required through the Gemini's fresh air heat pump is already, in part, required for the normal ventilation requirements of the pool room, so the energy consumed by the heat pump fan is effectively subsidised.

'All year round' renewable energy source :

In contrast to dwellings, an indoor pool will require heat literally every single day of the year.

It is therefore obvious to appreciate that, during much of the year, the average temperature of the fresh air will be significantly warmer than the subterranean ground temperature. Therefore, a fresh air source heat pump offers an excellent renewable energy solution for the characteristics of an indoor pool.

Additionally, a fresh air heat pump boiler can also extract and utilise latent energy from the humidity contained within the fresh air.

Pre-Packaged for Easy Installation

To reduce installation work and expense to a minimum, the Gemini is offered as a completely pre-assembled package, incorporating all heating coils, controls and motorised heating valves, providing dehumidification, heat recovery, air heating, pool water heating and fresh air dilution, all from a single, easily installed unit.

Therefore, the Gemini would usually only require an electricity supply and simple pipe connections to a boiler, pool water filtration circuit and waste water drain.

Ultra High Efficiency Digital Air Fan

The special type of fan used in the Gemini is very important to the overall energy efficiency.

For a domestic indoor pool, it may be surprising to learn that, generally, it is the permanent operation of the air fan which results in the highest energy consumption. Therefore, the Gemini employs a very special type of digital fan, to offer the best possible energy efficiency and, so, the lowest operating cost of any such system.

The digital fan uses a directly driven, backward curved, centrifugal impellor, which features a DC motor coupled to an AC inverter.

Auto-fan : automated fan power – low energy mode

To further reduce operating costs, the Gemini features 'auto-fan' technology, whereby the speed and power of the fan reduces automatically to an energy saving 'tick-over' whenever there is low demand for dehumidification or heating.

For a domestic pool equipped with a surface cover, there will typically be long durations of low demand and the energy saved by 'auto-fan' would be very considerable.

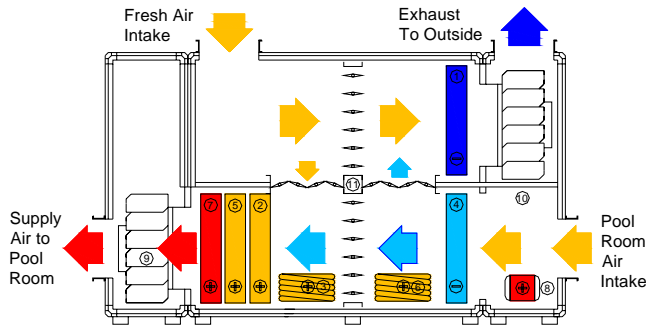
Additionally, when the fan is operating on low power, ventilation air noise in the pool room is also reduced.

Heat Pump Dehumidifier

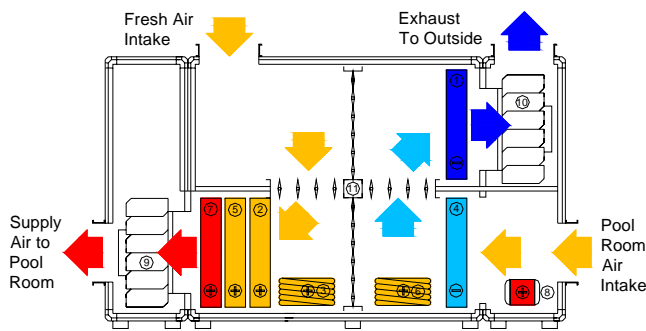
The humid pool room air is re-circulated through the Gemini by the integral fan. Inside the Gemini, the humid air is brought in contact with the cold refrigerated surface of the dehumidification heat pump where, upon contact, the excess humidity condenses to water, thus the pool room air is dehumidified.

The high quantity of 'sensible' and 'latent' energy contained within the warm, humid pool room air is then fully absorbed into the heat pump and used to provide Active Heat Recovery. This heat, together with ALL the energy used to operate the heat pump, is then used to help heat the pool room air OR the pool water.

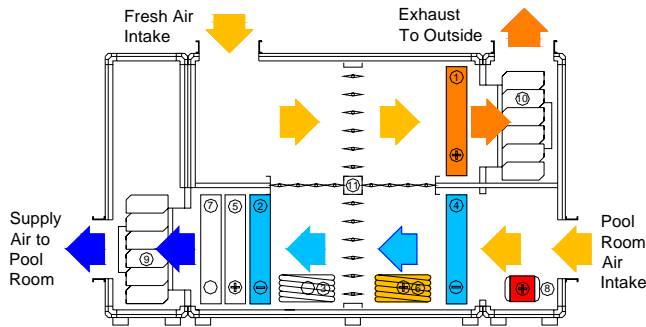
Air Re-circulation Mode



Full Ventilation Mode



Air Conditioning Mode



- 1) Fresh Air Heat Pump Evaporator Coil
- 2) Fresh Air Heat Pump Air Condenser Coil
- 3) Fresh Air Heat Pump Pool Water Condenser Coil
- 4) Dehumidification Heat Pump Evaporator Coil
- 5) Dehumidification Heat Pump Air Condenser Coil
- 6) Dehumidification Heat Pump Pool Water Condenser Coil
- 7) Support Air Heating Coil
- 8) Support Pool Water Heating Coil
- 9) Supply Air Digital Fan
- 10) Exhaust Air Digital Fan
- 11) Four-way air damper system

Integral Support Heating Provision

To ensure that the optimum pool room air and pool water temperatures are always achieved, during periods when the heating requirements exceed the heat generated from the heat pumps, supplementary heating coils can be incorporated within the Gemini.

These coils transfer heat piped from a separate heat source, typically a fuel or heat pump boiler, into the pool room air or pool water.

For installations where a separate heat pump boiler is also used, special up-rated heating coils are used to compensate for the lower heating circuit temperature.

The high capacity pool water heating coil ensures a swift initial warm-up period for the pool from cold.

For salt water pools, titanium heating coils are available.

The Gemini features a 'heat' demand signal which can be used to activate the heat source and which also incorporates a pool water overheat protection facility.

Digital Control Panel

All functions of the Gemini are completely automatic. Once the desired pool water and pool room air temperatures are entered on the intuitive and easy-to-set control panel, the integral sensors and processors accurately self-govern the various modes of operation.

The controls feature the latest digital technology and are able to clearly display and monitor the actual temperatures and system status.

The pool room temperature can also automatically be reduced to a 'set back' to save energy when the pool is not in use, via a link to the pool surface cover or other switch facility.

Central Ventilation

Positioned out of sight within the pool equipment room, the Gemini is able to be connected to an air duct channel, enabling central ventilation around the pool room for optimum control.

The duct channel would feature air outlet grilles, positioned at strategic points around the pool hall, to provide coverage to all areas and to discharge air directly over surfaces prone to condensation, such as glazing, creating an air curtain effect. The duct channel can be located either overhead or concealed under floor.

In addition, ducts would also be required to take fresh air to the Gemini and to exhaust the pool room air to outside.

The air duct connection spigots on the Gemini all feature integral anti-vibration connections.

Although the duct work would normally be designed and installed by a specialist ducting contractor, Heatstar are pleased to advise on this aspect as necessary.

Fresh Air Induction with Heat Pump Heat Recovery

To maintain optimum pool room air quality, the Gemini is equipped with a fresh air dilution facility, using a speed regulated exhaust air fan and a fresh air induction connection regulated with a motorised damper.

To ensure that energy efficiency is maintained and to limit the heat lost by introducing colder fresh air, the exhausted pool room air is subjected to a 'dual' process of heat reclaim : the warm pool room air is first passed through the dehumidification heat pump to enable active heat recovery and then through the heat collection coil of the fresh air heat pump, where further heat within the air is reclaimed and utilised. This process also reduces the requirement for the fresh air heat pump to de-frost during cold weather.

If a rise in pool room humidity continues beyond the immediate control of the dehumidification heat pump, the Gemini automatically increases the rate of introduction of dryer fresh air.

The exhaust air fan also ensures a negative pool room air pressure, to prevent the pool room air from migrating into other rooms. The Gemini features a 'quad air damper' system, to enable the pool room air pressure differential to be finely adjusted to help limit the deflection of stretched plastic ceilings.

Air Conditioning cooling mode :

The Gemini fresh air source heat pump additionally can be specified to operate in a 'reverse cycle mode', whereby the pool room air is cooled as it is re-circulated through the unit and the fresh air coil is used in the same way as a remote condenser unit, dissipating heat into the fresh air, which is then exhausted back to atmosphere.

Highest Quality Construction

The Gemini is designed and constructed to the highest possible standard and all components have been especially selected for use within corrosive swimming pool environments.

For maximum strength and durability, the units are constructed from an anodised aluminium skeleton frame.

All exterior access panels are formed from galvanised steel, with a tough PVC coating to prevent corrosion, fixed via chrome latches.

All air heat exchange coils feature gold epoxy coating to protect against chemical corrosion.

The heat pump utilises zero ozone depletion refrigerant and is completely hermetically sealed to guard against leakage.

Total Flexibility of Configuration

Each Gemini unit is tailored to the precise individual requirements of the application, obviating the need to under or oversize performance aspects or tolerate inappropriate equipment room layout.

Dehumidification rates, air flows and heating duties are all selected individually to give a completely balanced, highly effective system, operating at ideal efficiency.

Therefore, whether the pool room is a large conservatory or a small basement, the Gemini will always be the perfect uncompromised approach.

The unit can be configured so that the position of the control panel, pipes, air duct spigots and maintenance access can also all be orientated during manufacture to accommodate the ideal equipment room layout.

Rigorous Testing Procedures

Prior to every new Gemini unit leaving the Heatstar factory, it is first subjected to a thorough procedure of testing and appraisal within Heatstar's own climatic chamber to ensure that all aspects meet the required quality and performance standards. Individual certificates of testing are provided.

Factory Supported Warranty & Maintenance

The Gemini comes with the assurance and peace of mind of a comprehensive, on-site warranty.

Also available are extended warranty options and the benefit and assurance of future routine servicing by Heatstar's own technicians to ensure minimal maintenance costs, a very long operating life and that the Gemini is always able to obtain optimum efficiency.

Free System Design Service

Heatstar offer a free, computer-aided system design facility providing accurate and precise equipment selections, installation schemes and economic assessments. Heatstar's highly experienced team of experts are available for consultation on all related aspects, without charge or obligation.

Why Heatstar ?

Heatstar have produced heat recovery systems for swimming pools since 1978 and were amongst the first to become involved in this specialist field.

Heatstar have also been producing pre-packaged climate control units like the Gemini longer than any other company and this experience is evident throughout the product range.

Through the years, over 7000 systems have been manufactured and supplied, not only to the UK, but also extensively abroad.

Needless to say, the performance, quality and, very importantly, the long-term reliability and durability of Heatstar and their products systems have been demonstrated beyond question.

Contact Heatstar for detailed specifications and a full analysis of your heating and environmental control requirements.

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Designed and manufactured by Heatstar in the UK