



# Gemini EC

1000 - 12000

'All-in-One' Renewable Energy Climate Control

- Integral Aerothermal fresh air source heat pump boiler
- Integral dual function dehumidifying and expelled room air heat pump
- 'Direct-Contact' heat pump technology
- 'Blue-EC' ultra efficient digital inverter fan system
- 'Auto fan' intelligent air recirculation fan management
- Active heat recycling into room air and pool water via dehumidifier
- Room air and pool water integral support heating provision
- Central ventilation with room air recirculation
- Fully compliant with 'Eco-Design' Directive (ERP) 2015

**Heatstar**  
Energy Technology Systems



Engineered with Excellence, Specified with Confidence.

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'All-in-One' Renewable Energy Climate Control

**Renewable Energy from the Aerothermal heat pump, combined with low energy digital fan technology, the Gemini offers optimum energy efficiency for all indoor pools – all from a single, easily installed unit.**

## The Gemini concept – the convenient 'all-in-one' solution

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

The Gemini is offered 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 provides all the usual energy efficiencies associated with a modern indoor pool environmental control unit, being 'twined' with a second dehumidifying heat pump with active heat recycling.

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. The Gemini targets the particular characteristics of an indoor pool and achieves an optimum balance between energy efficiency and effective temperature control.

## 'Direct-Contact' superior Aerothermal heat pump efficiency

The Gemini's integral Aerothermal 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 super-heated hot refrigerant of the heat pump.

Therefore, higher operating efficiencies and SCOP's are achievable when compared to separate external heat pump boilers, which can only provide in-direct heating via pumped 'hot water' central heating pipe circuits and water storage tanks.

The air flow required through the Gemini's Aerothermal 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.

## Optimum 'all year round' renewable energy source

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

It is therefore easy to appreciate that, during much of the year, the average temperature of the fresh air will be significantly warmer than the subsurface ground temperature, upon which an alternative ground source heat pump boiler may depend. Therefore, an Aerothermal heat pump offers an excellent renewable energy solution for the all year round characteristics of an indoor pool. Additionally, an Aerothermal heat pump boiler can also extract and utilise latent energy from the humidity contained within the fresh air.

## Pool room air quality – powered fresh air facility

To maintain optimum pool room air quality, the Gemini is equipped with a fresh air dilution facility, using a power regulated exhaust air fan and a fresh air induction aperture regulated by a damper. The exhaust air fan also ensures a negative pool room air pressure, to prevent the pool room air from migrating into other adjoining rooms.

## 'Blue EC' Ultra-efficient digital inverter fan system

Against the consideration that the permanent operation of an air fan motor may represent the largest consumer of energy within an indoor pool, 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 impeller, which features a DC motor coupled to an AC inverter.

## 'Intelligent' Auto-Fan – Why run the fan at full power when you don't need to?

The Gemini features 'auto-fan' technology, whereby the speed and power of the air recirculation fan is managed automatically to enable significant energy savings whenever there is low demand for dehumidification or air 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 can also be reduced.

## Fully adjustable air re-circulation air flow

The air flow rate provided by the fan system can be adjusted on-site to precisely match the exact requirement of the pool room.

## Illuminated fan window

Another unique feature is the blue LED illuminated Perspex window, enabling the special energy saving EC fan, and its managed speed of rotation, to be observed at will within the plant room.

## Dual function dehumidifying and expelled room air heat pump

The pool room air is re-circulated through the Gemini by the integral fan. Inside the unit the humid room air is passed through the cold refrigerated coil matrix of the dehumidifying heat pump where, upon contact, the excess humidity condenses to cold water.

The dehumidified and de-energised air is then returned back to the room and/or expelled through the separate Aerothermal heat pump to outside. This arrangement also reduces the requirement for the Aerothermal heat pump to enter efficiency-limiting de-icing cycles during cold weather.

The warm, moisture laden pool room air is rich in energy and the heat pumps are able to absorb both 'Sensible' (dry heat) and 'Latent' (steam-like energy present within the airborne water vapour). This absorbed heat, together with ALL the electrical energy used to operate the heat pumps, is then recycled back into either the pool room air OR the pool water. Active energy recycling efficiencies of up to 380% are possible through this process.

Control over where the heat recycled by the dehumidifying heat pump is placed is completely automatic, with the system giving priority to establishing the optimum pool room air temperature prior to transferring the available heat into the pool water.

This ideal method of heat recycling control is possible as the Gemini features full capacity heat recycling coils both for the air and the pool water. Therefore, 100% control is achieved over where the heat is placed, ensuring maximum energy efficiency and preventing unnecessary overheating.



## Integral Optimised Support Heating provision

The Gemini also encompasses integrated optimised support heating provision using dedicated heat emitters. Therefore, if using a natural gas fuel boiler as a support heat source, the fuel boiler may enable superior economy and less CO<sub>2</sub> emission than the Aerothermal heat pump during colder weather and the Gemini's control system is able to be adapted to optimise this benefit.

Support heating is also optimised to improve energy efficiency by ensuring a quick initial warm up of the pool water and, importantly, a swift return to the higher pool room air temperature setting after an 'air temperature set back' period.

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

## 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.

## Pre-Packaged for easy installation

To reduce installation work and complexity to a minimum, the Gemini is offered as a completely pre-assembled package, incorporating all heat emitters, 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.

## 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.

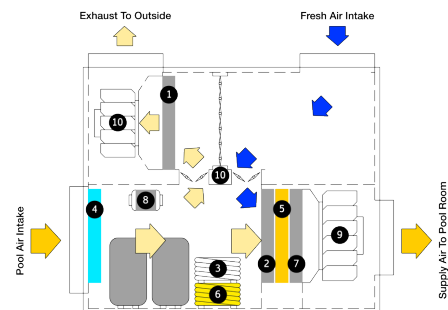
Therefore, whether the pool room is a large conservatory or a small basement, the Gemini will always be the perfect uncompromised approach.

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.

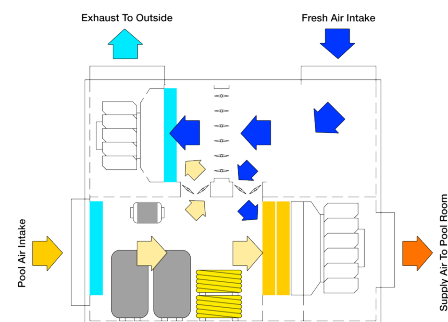


## Gemini EC modes of operation

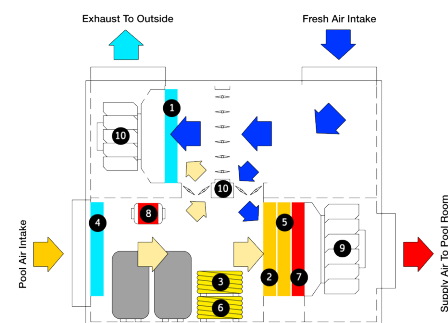
### Dehumidification Heat Pump Active



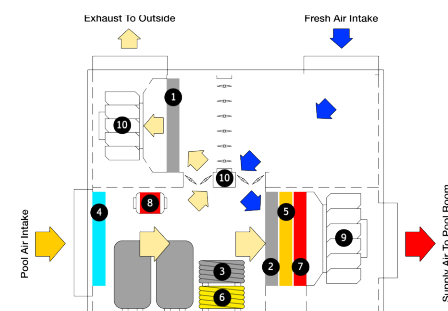
### Aerothermal Heat Pump Active



### Support Heating Active



### Cold Weather Mode (mains gas only)



Key:

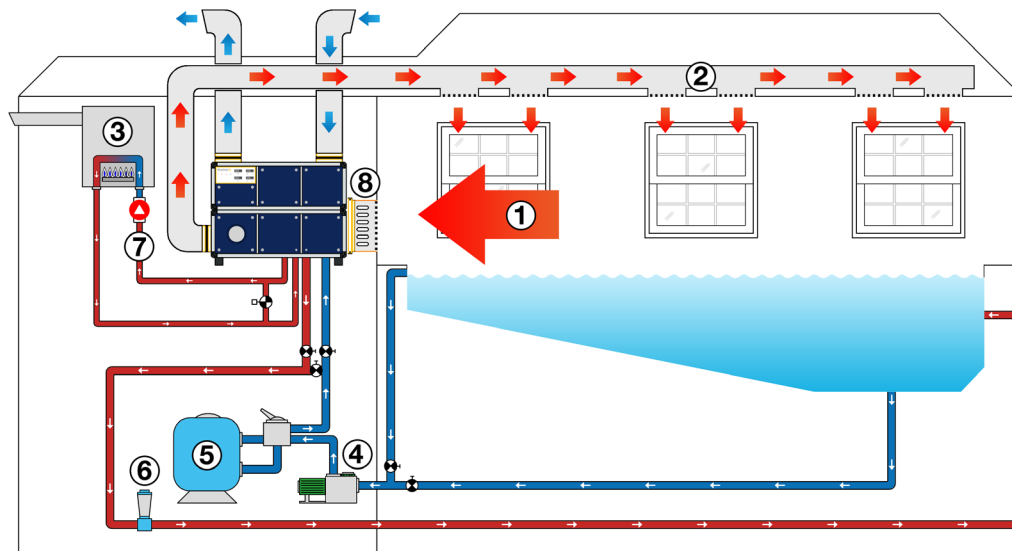
- 1\_Fresh Air Heat Pump 'cooling' evaporator
- 2\_Fresh Air Heat Pump 'heating' air condenser
- 3\_Fresh Air Heat Pump 'heating' pool water condenser
- 4\_Dehumidifying Heat Pump 'cooling' evaporator
- 5\_Dehumidifying Heat Pump 'heating' air condenser
- 6\_Dehumidifying Heat Pump 'heating' pool water condenser
- 7\_Support room air heat emitter
- 8\_Support pool water heat emitter
- 9\_Room air re-circulation digital fan
- 10\_Fresh air heat pump/exhaust room air digital fan
- 11\_Automated control dampers



## Gemini EC installation

### Key:

- 1: Pool air intake
- 2: Supply air duct to pool hall (overhead or underfloor)
- 3: Fuel or heat pump boiler
- 4: Pool water pump
- 5: Pool water filter
- 6: Chemical introduction
- 7: Boiler water pump
- 8: Attenuator



## Gemini EC standard performance specifications

Type		1000		2000		3000		4000		6000		8000		12000	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
<b>Air recirculation fan duty</b>	M <sup>3</sup> /Hr.	1500	3500	1800	3500	2000	3500	2500	7000	3500	7000	5000	14000	7000	14000
Maximum external resistance	Pa	150		150		150		250		250		250		250	
Variable speed control range	%	0	100	0	100	0	100	0	100	0	100	0	100	0	100
<b>Expelled / fresh air fan duty</b>	M <sup>3</sup> /Hr.	150	350	180	350	200	350	250	700	350	700	500	1400	700	1400
Maximum external resistance	Pa	50		50		50		100		100		100		100	
Variable speed control range	%	0	100	0	100	0	100	0	100	0	100	0	100	0	100
<b>Aerothermal heat pump fan duty</b>	M <sup>3</sup> /Hr.	2000		2700		3400		4700		6700		9400		13400	
Maximum external resistance	Pa	50		50		50		100		100		100		100	
Variable speed control range	%	0	100	0	100	0	100	0	100	0	100	0	100	0	100
<b>Fan type</b>		'Blue EC' backward curved, direct drive, electronically commutated, brushless DC motor													
<b>Dehumidification</b>															
Dehumidifying heat pump	L/Hr.	4.5		6.3		7.6		9.3		15.3		18.6		30.6	
Fresh air induction: Summer	L/Hr.	0.9	2.2	1.1	2.2	1.2	2.2	1.5	4.3	2.2	4.3	3.1	8.7	4.3	8.7
Fresh air induction: Winter	L/Hr.	1.5	3.6	1.8	3.6	2.0	3.6	2.6	7.2	3.6	7.2	5.1	14.3	7.2	14.3
<b>Room air heating potential</b>															
Fresh air heat pump heat output	kW	5.2		6.7		8.0		9.4		13.5		18.8		27.0	
Dehum heat pump recycled heat	kW	6.6		9.2		11.1		13.6		22.4		27.2		44.8	
LTHW coil	kW	9.8	22.9	11.8	22.9	13.1	22.9	16.3	45.7	22.9	45.7	32.7	91.4	45.7	91.4
<b>Pool water heating potential</b>															
Fresh air heat pump heat output	kW	5.2		6.7		8.0		9.4		13.5		18.8		27.0	
Dehum heat pump recycled heat	kW	6.6		9.2		11.1		13.6		22.4		27.2		44.8	
LTHW coil	kW	13.2	46.2	13.2	46.2	13.2	46.2	26.4	68.6	26.4	68.6	68.6	137.9	68.6	137.9

Rated conditions

Pool air: 30°C/60% R.H. Pool water: 28°C

Ambient: 7°C/100 R.H. Winter: 28°C/45% R.H. summer

LTHW: 70°C Flow/50°C return

*Due to continuous development the right to alter specifications without notice is reserved. E&OE.*

### Central Ventilation - perfect air distribution and air curtain effects

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

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.

### Highest quality construction

The Gemini is designed and constructed within the UK 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 a 50mm thick 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 eco refrigerant and is completely hermetically sealed to guard against leakage.

### High efficiency orbital scroll compressor

The refrigeration compressor which drives the heat pump uses a special 'orbital scroll' design, manufactured in the UK by Copeland, offering the best possible operating efficiency.

### Energy Related Product Directive compliance (ERP)

The European Union Directive for 'Energy Related Products' is now in force and encompasses sweeping legislation which impacts upon ventilation product engineering, efficiency and performance rating.

The Gemini is so energy efficient that, not only does it comply with the new directive, but it actually even exceeds the more stringent regulations proposed for the future.

### 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.

### Free commissioning

All Gemini units are commissioned free of charge within the UK by experienced Heatstar technicians to ensure correct installation and optimal performance.

### Factory supported warranty and maintenance

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

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 chose Heatstar?

Heatstar is a specialist British manufacturer and the renowned leading authority for the application of environmental control technology for indoor swimming pools. Heatstar have pioneered the innovation, design and development of modern, highly energy efficient, systems and are specified with confidence by the UK's leading pool building experts.

A flag-bearer for energy-efficiency for over three decades, Heatstar continue to play a huge part in making swimming pools role models for energy savings and reduced carbon emissions.

Heatstar have 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 10,000 Heatstar systems have been supplied within the UK and also exported to numerous Countries.

When investing in equipment of this nature, confidence and assurance in the brand are important considerations. 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 us

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

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