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# The Zeroth Energy System

An ambient loop communal heat pump system providing heating and hot water to apartments in residential developments

## Applications



Large Residential Developments



Mixed-use Residential Projects



Affordable Apartment Buildings



Retrofit Apartment Buildings



The Zeroth Energy System combines a central ambient loop with compact in-apartment heat pumps and is an energy efficient and flexible way to deliver space heating and domestic hot water to residential apartments.

It utilises an ambient loop that is maintained at 25°C by a central plant, often a renewable source, or via a district heating network (DHN) connection. The central ambient loop is connected to in-apartment units that comprise a Zeroth water-water heat pump and hot water cylinder.

The Zeroth Energy System works with various heating emitters such as radiators and underfloor heating. The system's design can be customised to fit specific project needs, including managing overheating to comply with Part O regulations.

The Zeroth Energy System, with its ambient loop design, significantly boosts system efficiency while offering numerous advantages. It helps reduce the risk of overheating thanks to lower distribution losses compared to traditional high-temperature heat networks. Ambient loop systems also require less insulation, saving costs and often allowing for a smaller plant room. Additionally, they seamlessly integrate with low-carbon heating technologies, connect to district heating networks and even recover "low-grade" heat from industrial processes. This innovative approach reduces carbon emissions, minimises local air pollution, and improves energy efficiency, making it an ideal whole-building solution for modern residential apartments.

# Features and benefits



## Design

- **Streamlined installation:** Each Zeroth unit is pre-wired and pre-plumbed, drastically cutting installation time. For ultimate convenience, the units can be fully integrated within a prefabricated service cupboard, enabling rapid deployment on-site.
- **No F-Gas specialist required:** The system eliminates the need for specialist F-Gas installers, simplifying project logistics and reducing costs.
- **Compact footprint:** The Zeroth unit, comprising a water-to-water heat pump and a hot water cylinder, has a space-efficient footprint of just 550mm x 560mm. Its compact design makes it ideal for seamless integration into standard utility or kitchen cupboards, maximising usable living space.
- **Reliable backup:** A built-in and independently wired 2 kW immersion heater within the hot water cylinder provides emergency backup, ensuring a continuous supply of hot water even during maintenance or repairs.
- **Whisper-quiet operation:** Advanced materials and meticulous design minimise acoustic output, allowing the Zeroth unit to deliver hot water, and heating quietly, ensuring it won't disturb residents.
- **Durable, low-maintenance design:** The stainless-steel hot water cylinder is engineered for longevity and does not require a sacrificial anode, reducing maintenance requirements and maximising service life.



## Technical

- **Space-saving plant rooms:** The central plant supplies energy at relatively low levels to the ambient loop, which often allows for smaller plant rooms. This design reduces costs and frees up valuable space for other uses within the building.
- **Lower heat distribution temperatures help reduce the risk of overheating in corridors.**
- **Flexible central plant options:** The system supports a wide range of technologies, including connections to district heating networks. These options enable significant carbon emission reductions while adapting to diverse project needs.
- **Customisable emitters:** With compatibility for various emitters such as radiators, underfloor heating, and fan coil units, designers have the flexibility to create tailored solutions that balance functionality and aesthetic appeal.
- **Improved thermal efficiency:** Lower distribution losses compared to high-temperature alternatives help maintain cooler corridor temperatures and reduce the risk of overheating. This improves overall system performance and occupant comfort.
- **Enhanced system efficiency:** By minimising heat loss during warm water distribution through the ambient loop, the system delivers higher overall energy efficiency, saving resources and cutting operational costs.
- **Reduced insulation requirements:** The low operating temperature of the ambient loop reduces the need for extensive pipework insulation, lowering capital costs while maintaining system efficiency.
- **Compatibility with low-carbon technologies:** Fully compatible with air source heat pumps (ASHPs) and other low-carbon solutions, the system can integrate with central temperature networks to further reduce emissions and improve energy efficiency.

# Features and benefits



## Control

- Onboard controls on the Zeroth heat pump and integration with in-apartment control options ensure the resident can easily optimise both the hot water and space heating to suit their thermal comfort.
- The Zeroth Energy System has MODBUS connectivity, giving the specifier and the client full flexibility of design and control.
- The Zeroth Energy System can be integrated with smart controls of individual zone temperatures and schedules, boost modes for temperature and control over multiple emitter technologies to optimise system performance and thermal comfort for the residents.



## Application

- Suitable for use in residential apartments, mixed use developments and for deep retrofits of suitable apartment buildings.
- The design and energy saving features of the Zeroth Energy System mean it has a CoP of up to 9.3.
- Two-year manufacturers guarantee that can be extended to five years with a maintenance and servicing agreement for added peace of mind.



## Technical details - Zeroth Energy System

For heating and hot water only, the Zeroth Energy System is available in two output versions:

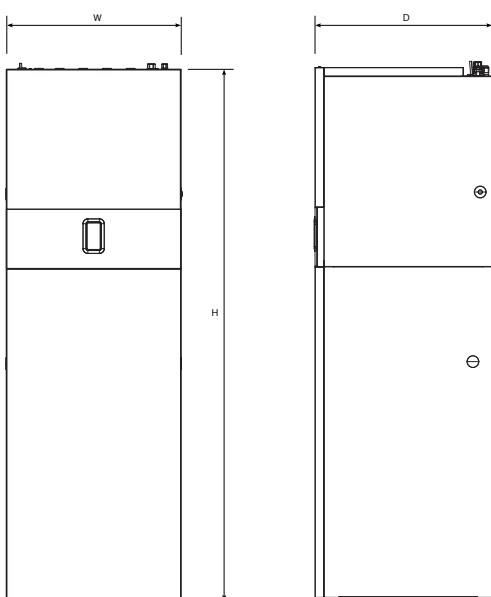
- **Zeroth Heat Pump:** 4 and 6kW heating and hot water

The integrated cylinder is made from stainless steel with a heat pump mounted underneath, in a removable module, which includes an inbuilt heating system circulation pump and an inbuilt PIC valve for the energy loop.

The outer casing is made from painted white steel formed around a rigid frame, with adjustable feet. The end user controls are mounted flush on the front and all pipework and cable entries are on the top of the unit, except for a drain hose (connected at the back) and the discharge which can be piped left or right, through the knockout.

## Overview of dimensions, output, COP and sound performance

	ZHP4H-180	ZHP6H-180
Services	Heating and hot water	Heating and hot water
Dimensions (W x D x H) mm	550 × 560 × 2000	550 × 560 × 2000
Output kW @ flowrate S25 / W35	4.0	6.4
COP	9.3	8.4
Sound performance dB(A)	34	36



# Full technical data for Zeroth unit 4kW and 6kW heating and hot water

## ZHP4H-180 & ZHP6H-180

		ZHP4H-180	ZHP6H-180
<b>Operating limits</b>			
Heating water temperature (min / max)	°C	20 / 55	20 / 55
Energy loop temperature	°C	25	25
<b>Performance data / flow rates</b>			
Heating output / COP @ S25 / W35	kW / COP	4.0 / 9.3	6.4 / 8.4
Heating output / COP @ S25 / W55	kW / COP	4.6 / 4.3	6.0 / 4.1
Heating output / COP @ S20 / W35	kW / COP	4.2 / 8.0	6.2 / 7.2
Heating output / COP @ S20 / W55	kW / COP	4.2 / 3.9	6.0 / 3.8
Heating output / COP @ S15 / W35	kW / COP	4.1 / 6.5	6.2 / 6.0
Heating output / COP @ S15 / W55	kW / COP	4.1 / 3.5	6.1 / 3.5
Minimum heating water flow rate (5K ΔT)	l / s	0.19	0.29
Required buffer volume	l	25	25
Available pump head @ nominal flow rate	kPa	54	35.5
<b>Source data / flow rates</b>			
Required capacity from loop @ S25 / W35	kW	3.6	5.6
Minimum flow rate from loop (5K ΔT)	l / s	0.17	0.25
Maximum static pressure rating	Bar	10	10
<b>Dimensions, weights and filling quantities</b>			
Dimensions (W x D x H)	mm	550 × 560 × 2000	
Filled weight / weight without packaging (empty)	kg	353 / 178	
Loop / heating connections	mm	22 copper stub	
Drain discharge (19mm clear hose)	mm	1.5m length supplied loose	
Discharge (G3 T&P valve)	mm	½" F BSP	
CWM inlet / DHW outlet connections	mm	22 copper stub	
IP rating		IPX4	
Expansion vessel (heating)	l	8	8
Refrigerant	Type / kg	R410A / 1.05	R410A / 1.05
Sound power level @ stand. rating condition	dB(A)	34	36
Noise rating	NR	35	35
<b>Electrical connections</b>			
Nominal voltage / phase / frequency	V / P / Hz	230 / 1 / 50	230 / 1 / 50
Nominal power consumption @ S25 / W35	kW	0.43	0.76
Maximum power consumption @ S25 / W55	kW	1.06	1.46
Power factor @ S25 / W35	PF	0.98	0.98
Fuse protection (HP module)	Rating	C 16A	
Immersion rating (cylinder)	kW	2.0	
Fuse protection (immersion)	Rating	B 10A	
Number of electrical supplies		2	
<b>Hot water cylinder</b>			
Type		Unvented	
Material / insulation		Stainless steel / EPS foam	
T&P valve rating		7 Bar or 90°C	
Maximum water inlet pressure	bar	6	
Storage volume	l	172	
Mixed water at 40°C V40	l	709	
Declared ErP load profile		XXL	
Integrated electric immersion rating	kW	2.0	
Maximum temperature with immersion	°C	60	
Water regulations		G3 KIWA approval to EN12897	
T&P valve		Factory fitted	
Standing heat loss EN12897-2016 (KIWA)	kWh / 24	1.97	
Standing heat loss EN15332-2007 (SAP)	kWh / 24	1.63	
Cylinder heat up time (from 10 to 60°C)	hrs	2.75	2.0
Accessories supplied loose		Tundish, discharge pipework, 1.5m hose, adjustable feet	



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