

# Underfloor Heat Pump Water Heaters

**MAGNUS**<sup>®</sup>  
powerhouse water heaters





NEW ZEALAND  
DESIGNED AND  
MANUFACTURED

**Over 60 years  
of innovation**



# MAGNUS In-line design, revolutionary heat pump water heater design.

Adopting an integrated system design ethos, MAGNUS solutions deliver comfort and convenience that is more cost effective, efficient and extremely reliable.

## Designed for Cost Effectiveness

MAGNUS In-line systems are designed to significantly reduce the installed system cost compared with traditional systems. In-line design delivers leaving water at the right temperature required for the application and has lower water flow rates. This can eliminate the traditional requirement for water storage tanks, larger pumps and larger piping.

## Designed for Better Performance

MAGNUS In-line system technology allows for substantial efficiency gains over traditional installations. This is achieved through a precise control of heated water supply for optimised heat absorption by the underfloor. As the heating load of the application is met the MAGNUS heat pump water heater reduces energy input and increases in efficiency.

## Designed to Operate Reliably, Longer

MAGNUS In-line systems are low maintenance, with low service requirements. Its ThermoShell® heat exchanger, unlike traditional heat exchangers, are fouling resistant. Also, the advanced unit controller combined with application specific design uniquely enables the compressor to constantly operate within its design limits improving unit life.



MWU - Underfloor Heat Pumps

03



## MAGNUS<sup>®</sup>

powerhouse water heaters



1

### IN-LINE SINGLE PASS

In-line design directly delivers water at the required temperature so removes the requirement for a water storage tank



2

### HIGH EFFICIENCY INVERTER COMPRESSORS

For superior part load performance and increased efficiency



3

### THERMOSHELL

ThermoShell<sup>®</sup> heat exchanger non-fouling design for long life performance.



4

### INTELLIGENT UNIT CONTROLLER

Ensures the unit runs at its optimum efficiency and provides system operation data.



5

### MULTI SPEED FANS

Multi speed condenser fans for better efficiency and control.



6

### ELECTRONIC EXPANSION VALVES

Electronic expansion valves for greater control and efficiency.



7

### MARINE GRADE POWDER COATING

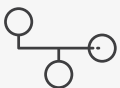
Polyester powder coated with highly corrosion resistant pre-coating for long life durability.



8

### EPOXY COATED COILS

Corrosion resistant epoxy coated coils for long life coil protection.



9

### LOCAL OR 3RD PARTY CONTROL

Operates with Temperzone local or 3rd party controllers.



10

### LOW AMBIENT TEMPERATURE OPERATION

Performs down to -10°C ambient.



11

### EASY SERVICE ACCESS

Easy access panels to internal components.



12

### BMS INTEGRATION

Modbus via RS485 (or TCP/IP option)

# Heat Pump Underfloor Heating

- ✓ **Whole of house heating**, control temperatures for individual zones
- ✓ **Even heat distribution**, no cold spots and uncomfortable airflow
- ✓ **Silent** with no noise generated in the heated indoor space
- ✓ **Enhanced aesthetics**, no unsightly diffusers or bulky fixed heaters
- ✓ **Environmentally friendly** heating option with lowest CO<sub>2</sub> emissions
- ✓ Heat pumps are the most **cost effective & efficient** heating technology
- ✓ **MAGNUS** is the most cost effective and efficient underfloor system

## Heat pump water heater efficiency

A heat pump water heater is the most efficient form of heating as it is able to turn one unit of input power into four units of output power making it 400% efficient under typical operating conditions. Gas is typically only 70-80% efficient while electricity is only 100% efficient, so even though the initial cost may be higher for a heat pump system the very low cost of operation means the system is the most cost effective option.



Comparative energy input and output for various heating technologies\*.

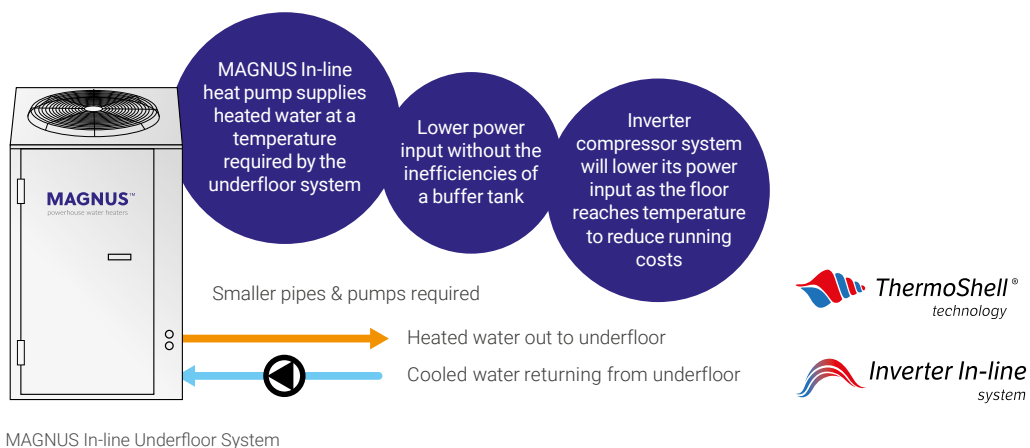


\* conditions: 7/6°C db/wb outdoor ambient; EWT 25°C; LWT 35°C

# MAGNUS In-line Advantage

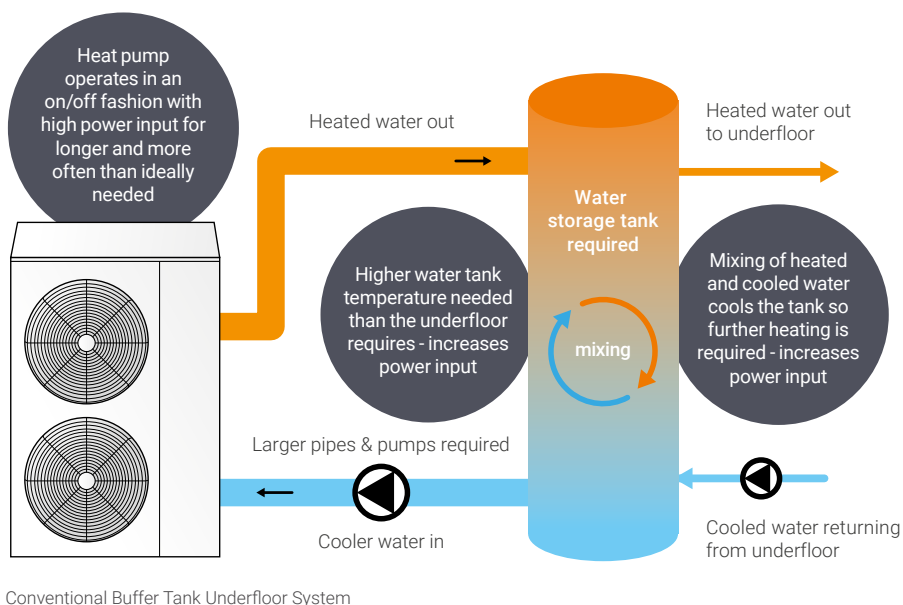
## Efficient MAGNUS In-line system design

MAGNUS In-line systems are designed to directly provide water at the right temperature required by the underfloor system; conventional heat pumps are not able to do this. Unlike conventional underfloor heat pumps, MAGNUS In-line underfloor heat pumps are specifically designed for underfloor heating to maximise efficiency and cost effectiveness.



## Inefficient conventional heat pump system design

Conventional underfloor heat pump system design is inefficient. Situated between the heat pump and underfloor network is a water storage tank or secondary heat exchanger which must be heated so water can be supplied to the underfloor tubing. Because returning cooled water mixes with the heated water the tank must be heated to a higher temperature than the underfloor requires. This continual mixing and the need for a higher water tank temperature makes the system inefficient as the heat pump must operate for longer and at a higher power input than ideally required.





# Low Carbon Emissions

## MAGNUS Underfloor Heat Pumps

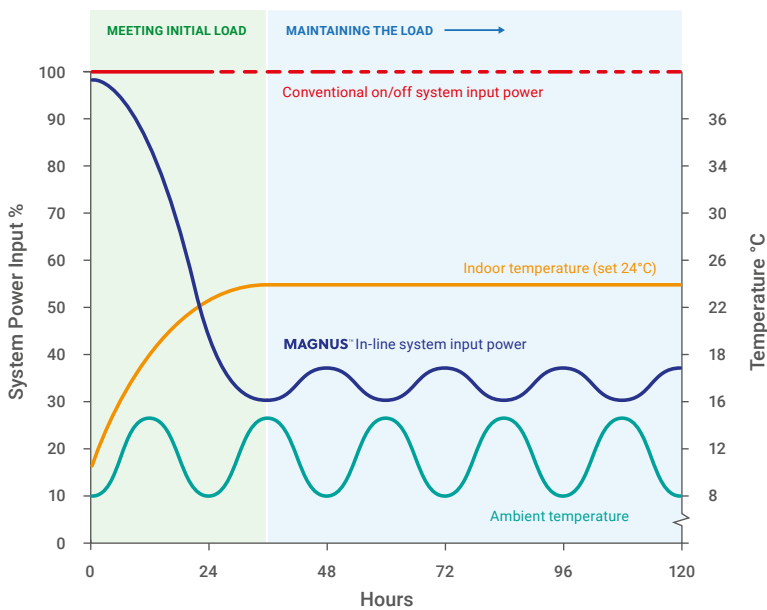
Utilising heat pump water heater technology leads to substantially reduced carbon emissions when compared to conventional water heating systems. Using renewable energy, individual units have nearly no carbon emissions and have the lowest overall carbon footprint. Carbon emissions can be reduced by as much as 70% when compared to gas boiler heating systems.



# MAGNUS Superior Efficiency

## MAGNUS inverter In-line, the lowest running cost underfloor heat pump system

Achieving at least 30% energy savings over conventional buffer tank systems, the MAGNUS In-line system fully utilises its inverter compressor technology by reducing its power input as the floor warms up to the set temperature. Conventional fixed speed (and inverter) buffer tank systems are less efficient as they must operate longer and with higher energy input than ideally required.



System Power Input Comparison

MAGNUS in-line inverter systems achieve at least 30% reductions in total system power input

## Intelligent De-ice Performance

In very cold ambient conditions ice will form on the evaporator coil during operation. Our coil design has been optimised for the local humid marine climate to more effectively remove ice build-up while maintaining unit efficiency. Combined with our intelligent de-ice system, these are the most effective cold climate heat-pump water heating units on the market.

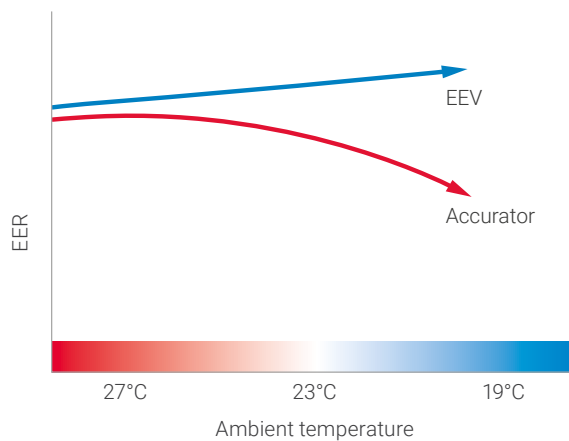


- ✓ No costly water storage tank
- ✓ Takes up less installed space
- ✓ Better outdoor aesthetics
- ✓ Designed specifically for underfloor heating
- ✓ More reliable long life system
- ✓ Most energy efficient system
- ✓ Easier installation
- ✓ Lower servicing requirements



## Electronic Expansion Valves

A unique electronic expansion valve control system ensures reliable performance under a wide range of ambient temperatures. They also facilitate maximised energy savings in shoulder seasons – periods in which systems often run at part-load. Pressure transducers allow for precision pressure monitoring and control.



## Operates Down to -10°C Ambient

Designed for the harshest conditions, MAGNUS Underfloor heat pumps feature electronic expansion valves (EEV) which enable these units to operate in ambient temperatures down to -10°C and ensure efficient heating, whatever the weather.

# MAGNUS Reliability & Durability

- ✓ ThermoShell technology®
- ✓ Inverter compressor
- ✓ Advanced integrated controls
- ✓ Commercial construction
- ✓ Corrosion resistant epoxy coated coils
- ✓ Corrosion resistant advanced powder coating
- ✓ Full safety design integration
- ✓ Compact system design

## Superior Durable Construction

Temperzone's has a long established reputation for quality and durability focusing on long life commercial grade systems.

- Durable powder coated galvanised steel cabinet
- Leak-free access door construction
- Easy service and maintenance access using panels and doors
- Free draining base, prevents water and ice accumulation inside unit
- Highly durable closed cell foam insulation
- Meets fire test standards AS 1530.3 (1989) and BS 476 parts 6 and 7
- Maintenance free non-fouling, long life ThermoShell® heat-exchanger
- Separated compressor compartment from fan chamber so unit can be serviced whilst operating.

## Highly Corrosion Resistant Design

- Highly corrosion resistant polyester powder coating treatment
- Highly corrosion resistant pre-treatment beneath powder coating - achieves AS/NZ 4506 Atmospheric Classification D High Marine/ Industrial - salt spray resistance test: 1000hrs with undercut <2mm
- Highly corrosion resistant epoxy coated coils. Superior epoxy coated fins to suit harsh climatic conditions.



# MAGNUS Long Life Technology

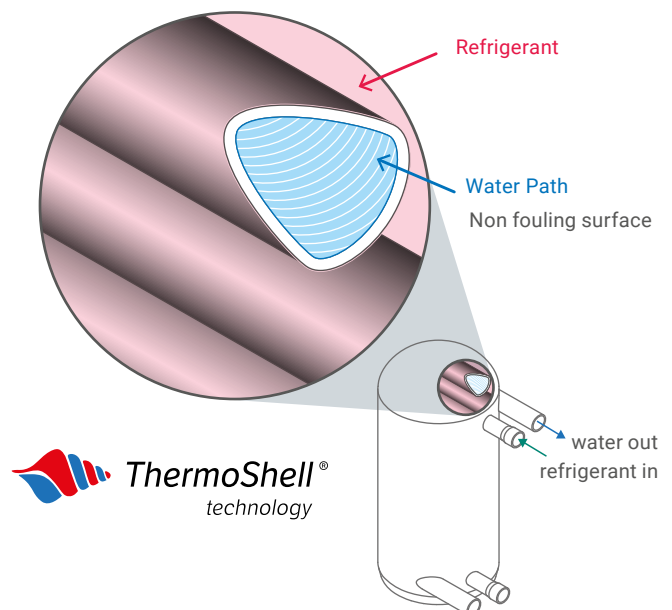
MAGNUS In-line technology underpins its superior efficiency, reliability and durability.

## Non-fouling ThermoShell® technology

Heat pump water heaters have at their core a refrigerant to water heat exchanger and its performance is critical to the overall performance of the system. Conventional heat exchanger designs are highly prone to fouling over time which reduces performance and greatly shortens the life of the system. MAGNUS In-line units feature highly efficient innovative ThermoShell® heat exchangers which are fouling resistant, delivering the same performance year after year.

## Smart efficient variable speed pumps

MAGNUS In-line underfloor systems only require a single small highly efficient variable speed pump. These Class A pumps feature an EC motor which reduces energy use by around 50%. Conventional systems have high water flow rates so require two large costly pumps to run the system.

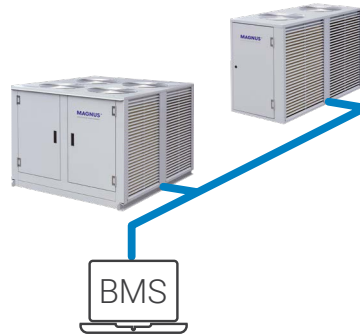


ThermoShell® Heat Exchanger



# Superior Control

Temperzone offers superior refrigeration control to enable reliable and efficient performance of MAGNUS heat pumps.



## Intelligent UC8 Controller

Temperzone's proprietary UC8 electronic unit controller intelligently monitors the refrigerant conditions, ambient air and returning water temperature to deliver precise leaving water temperature while optimising system efficiency under all conditions.

- Display for system error / fault reporting
- Control inputs via pluggable screw terminal blocks
- Operates with 12Vdc or 24Vac thermostats
- Accepts Modbus BMS connection
- Remote start/stop input
- DRED Compatible
- Advanced refrigeration safety system
- High and low pressure safeties

## BMS Control Integration

Providing for centralised management control, the UC8 controller is BMS compatible via digital and analogue signals or via Modbus.



## Local or 3rd Party Control

Choose either Temperzone's TZT-100 advanced thermostat controller, or utilise 3rd-party control integration with 12VAC or 24VDC control

## WiFi Service Utility Tool

WiFi Service Utility (WSU) is a portable control interface that plugs directly into the UC8 board on a Temperzone MAGNUS Unit.

It allows you to monitor a wide range of operational parameters, view fault logs and even take control of the unit. It has its own WiFi network built in and the control and diagnostics are done wirelessly from a smartphone, tablet or notebook PC.





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# MAGNUS Underfloor

Specifically designed underfloor heating technology utilising variable speed inverter compressor and pump technology for delivering a fixed leaving water temperature under all conditions to achieve precise comfort conditions and leading energy efficiency.

- Inverter compressor in-line technology, for optimal efficiency and heating service
- Does not require water storage tanks
- BLDC variable speed pump technology
- Highly efficient de-ice control down to -10°C ambient
- Maintenance free non-fouling, long life ThermoShell® heat-exchanger
- Highly efficient design achieving very high COP's
- Durable galvanised steel construction entirely finished with advanced polyester powder coat. Highly corrosion resistant pre-treatment beneath powder coating - achieves AS/NZ 4506 Atmospheric Classification D High Marine/ Industrial - salt spray resistance test: 1000hrs with undercut <2mm
- Superior epoxy-coated fins and advanced rifle bore copper tubes to suit harsh climatic conditions
- Durable polyester powder coated drain base
- Leak-free access door construction
- Easy service and maintenance access panels
- Highly durable closed cell foam insulation.
- Meets fire test standards AS 1530.3 (1989) and BS 476 parts 6 and 7
- AS1530.3 compliant insulation
- Advanced UC8 controller logic for wide range of operating conditions
- Single and three phase options
- Compact design
- Quiet operation design
- Simplified BMS control integration
- Local or 3rd Party control integration
- Electronic Expansion Valves
- Multi-speed condenser fans
- Low carbon emission technology

# MAGNUS

## MWU Specifications

**MAGNUS**<sup>®</sup>  
powerhouse water heaters



Model	MWU 180	MWU 250	MWU 450	MWU 900
Nominal Heating Capacity (kW) *	16.1	20.4	37.5	74
Heating Capacity Range kW	3.7 ~ 20.0	4.6 ~ 25.5	8.5 ~ 46.5	9.0 ~ 86
Input Power (kW) *	3.9	5.0	9.3	17.9
COP *	4.11	4.08	4.04	4.00
Water Flow Rate l/min.	23	29	54	106
LWT Range °C	----- 25 ~ 45 (factory setting 35) -----			
Design HEX Differential °C	10	10	10	10
Min./Max. EWT °C (Heating)	10 / 35	10 / 35	10 / 35	10 / 35
Entering Pressure Drop * kPa	34 (5 psi)	55 (8 psi)	21 (3 psi)	55 (8 psi)
Heat Exchanger	ThermoShell	ThermoShell	ThermoShell (x3)	ThermoShell (x6)
Sound Power (SWL) dB(A) **	72	73	75	78
Sound Pressure @ 3m (SPL) dB(A)	56	57	59	62
Power Source	1ph. 230V ac 50Hz	3ph. 400V ac 50Hz	3ph. 400V ac 50Hz	3ph. 400V ac 50Hz
Running Amps - A/sys.	18	8.5 / 9.5 / 8.5	16 / 18 / 16	16 / 18 / 16 (x2)
Max. Running Amps - A/sys.	29	16 / 18 / 16	30 / 33 / 30	30 / 33 / 30 (x2)
Refrigerant	R410A	R410A	R410A	R410A
Min. Ambient Operating temp.	-10°C	-10°C	-10°C	-10°C
Unit Controller	UC8	UC8	UC8	UC8 (x2)
Electronic Expansion Valves	1	1	2	4
Compressor	Inverter scroll	Inverter scroll	Inverter scroll	Inverter scroll
Fans	3 spd Axial 500mm	3 spd Axial 500mm	3 spd Axial 500mm (x2)	3 spd Axial 500mm (x4)
Pump	Integrated BLDC	Integrated BLDC	Integrated BLDC	Integrated BLDC
Water Connections	1" BSP male (x2)	1" BSP male (x2)	1 1/4" BSP male (x2)	1 1/4" BSP male (x2)
Unit Dimensions (W x D x H) (mm)	978 x 804 x 1199	978 x 804 x 1199	1814 x 803 x 1199	1863 x 1477 x 1259
Net Weight	169	178	322	545
Communications Options	----- TZT-100 / Modbus / 3rd Party controls -----			
Unit Finish	----- zinc galvanised steel / grey polyester powder coat -----			

\* Rating conditions: 7/6°C db/wb outdoor ambient; EWT 25°C; LWT 35°C. \*\* Radiated. BS 848.2 : 2004. Direct method of measurement (reverberant room).  
The manufacturer reserves the right to make changes in specifications at any time without notice or obligation.



# MAGNUS

## Tailored Solutions



Our leading expertise coupled with an offering of application specific MAGNUS heat pump water heaters can help realise significant energy savings and reductions in carbon emissions across your projects.

### **MAGNUS Pool Heating - MWP**

Designed for residential and commercial pools, these highly efficient multi-pass systems incorporate titanium heat-exchangers making them suitable for direct use with chlorinated and salt water pools. A highly corrosion resistant design ensures durable long life operation.

### **MAGNUS Potable Water Heating - MWS**

These MAGNUS systems heat water directly to 62°C in a single pass. Single-Pass technology is ideal for commercial markets where meeting the load at peak demand for hot water is the key driver of system capital cost. As it functions in a similar way to an instantaneous hot water system, a greatly reduced storage volume is required to meet the peak demand load usage period. This substantially reduces the installed cost of the hot water system and significantly reduces the running cost.

### **MAGNUS Space Heating - MWH**

These innovative boiler/electric heater bank replacement systems combine variable capacity inverter compressor and BLDC pump technologies to efficiently maintain a constant supply water temperature under the widest possible range of ambient conditions. As integrated in-line heating systems, they do away with conventional primary/secondary heating loops.

### **MAGNUS Space Heating/Cooling - MWR**

An innovative solution to combining space heating and cooling into a single, In-line system. Designed for use with a range of wall and floor mounted fan coil/fan assisted radiator systems. With variable capacity inverter compressor and BLDC pump technologies they efficiently maintain a constant supply water temperature in heating or cooling while delivered capacity is controlled at each zone to meet the real time demand for stable room temperature control.

### **MAGNUS Chillers - MWC**

These innovative in-line chiller systems combine variable capacity inverter compressor and BLDC pump technologies to efficiently maintain a constant supply water temperature under the widest possible range of ambient conditions. As integrated in-line chiller systems, they do away with conventional primary/secondary loops.



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