



aqua**nex**  
**Heat Pump Water Heaters**  
Technical Data

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MWH 2000 - Space Heating / Boiler Replacement model

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Heating Capacity  
14kW – 220kW



# Heat Pump Water Heaters for Space Heating

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*Overview brochure available*

Other relevant documents:

- Application Manual
- Specification Sheets (model specific)
- Installation & Maintenance
- Aquanex Controls Application User Guide
- R32 Refrigerant Handling: Water Heating Units



# Heat Pump Water Heater for Space Heating

## Overview

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Heat pump water heaters by Temperzone utilise the highest efficiency technologies to minimise energy consumption. The MWH Series is specifically designed to deliver heated water to space heating applications. They reduce dependence on combustion of fossil fuels by using clean energy sources. Durability and reliability are also key features.





# Heat Pump Water Heater for Space Heating

## MWH 2000

## Applications

These units have been specifically developed to deliver heated water for space heating HVAC applications, specifically air conditioning of light commercial and residential premises, e.g. schools, offices, hotels, retirement villages.

Suitable for supply air temperature control applications using full or high proportions of fresh air

## Features

### Introduction

Hot water heat pumps by Temperzone provide ideal heating solutions as we move to a sustainable future using cleaner energy sources.

Temperzone heat pumps utilise the highest efficiency technologies to minimise energy consumption and are not dependent on combustion of fossil fuels. They can deliver up to 3.5 times the heating energy output for every unit of electrical energy consumed.

The Thermoshell® is designed to operate direct in-line with flow pumps, and a minimum temperature difference of 5K across the heat exchanger.

MWH Series heat pumps incorporate the Temperzone proprietary UC8 unit control module with sophisticated software installed specific to the application of space heating.

### Lower GWP

MWH models utilise R32 refrigerant, which has significantly less Global Warming Potential (GWP 675 vs 2088) when compared to R410A units or fuel burning alternatives.

### Energy Efficient

Each MWH system is comprised of a refrigeration system with highly efficient Thermoshell® heat exchangers to extract 'free' heat from the ambient air and

transfer it directly to water, and from there to your space heating heat exchanger, eg fan coil unit.

Four high efficiency inverter compressors provide reduced power consumption at part load. Heat exchange coils use inner grooved (rifled) tube for better heat transfer. The standard unit includes a high efficiency electronically commutated (EC) water pump.

### Performance

The variable capacity inverter compressor technology can provide close comfort control of the room temperature. Each MWH unit has an extra capacity\* available for faster response when well away from set point at start-up, and an energy saving low capacity turn-down.

An optional multi-speed EC water pump (0-10V DC control) enables fine tuning of the unit to match the supply water temperature required.

The system also includes a temperature sensing head pressure control which enables the system to compensate for outdoor ambient temperatures above 15°C on heating cycle.

An EVI version is available that enables improved performance in low ambient conditions (down to -10°C).

\* Available when using Design LWT 45°C or less.

### Typical Applications

- Space heating - with or without zone controls (zone controls supplied by others)
- Boiler replacement. The units will supply heated water at up to 55 °C (settable during commissioning), for a range of heating applications such as radiator panels, AHU coils
- Fresh air tempering coils
- Reheat coils as part of humidity control
- Pre-heat coils, for full fresh air systems during low ambient conditions
- AHU heating coils
- Electric heater bank replacement
- Pool heating from a primary circuit
- Retirement homes
- Hotels and resorts

Note: Not suitable for direct heating of chlorinated pool/spa water or any corrosive fluids (refer Temperzone for suitable models)

### Refer 'MWH Applications Manual' for more detailed information.

It is essential that this Application Manual be understood prior to the design of the water heating system to ensure the system operates both correctly and efficiently. This manual is available at [www.temperzone.com](http://www.temperzone.com) (search MWH 2000) and will be updated as more applications are developed and supported.



# Heat Pump Water Heater for Space Heating

## MWH 2000

### Features

#### Cost Effective

The MWH range eliminates the need for an intermediate buffer tank<sup>1</sup>, improving both the efficiency and cost effectiveness of the installed system. High temperature differential, low variable water flows and low pressure drop contribute to reduced installation cost.

#### Thermoshell® Technology

The unit includes a compact long-life highly efficient water heat exchanger design. It has a low pressure drop compared to plate heat exchangers.

#### Soft Starting

Inverter compressors are soft starting therefore have none of the problems associated with high in-rush current.

#### Durable

Heat exchange coils comprise aluminium corrugated plate fins on mechanically expanded rifled copper tube. Coil fins are epoxy coated for extra protection in corrosive environments, e.g. salt laden sea air. Each MWH unit's cabinet is constructed from high grade galvanised steel - polyester powder coated (grey) for all weather protection and is rated IP44/IPX4<sup>2</sup>. External fasteners are SKT® coated – marine grade.

#### Insulation

Units are insulated to prevent external condensation forming on the cabinet exterior. The insulation is foil faced and meets fire test standards AS 1530.3 (1989) and BS 476 parts 6 & 7. Internal piping is also insulated to minimise any heat loss.

#### Control

Each MWH 2000 includes a UC8 Controller for each of the four compressors. These look after refrigeration system protection and manages the LWT using variable compressor and pump speeds. An Advanced Programmed Logic Controller (PLC) manages application specific parameters, eg timer scheduling, compressor staging, de-ice operation, external pumps, water valves.

BMS control options are available, eg Modbus using UC8, or BACnet/IP using the Advanced PLC.

#### Quiet

The unit's coil design permits low fan speeds and hence low noise levels. The compressor is isolated in a built-in, insulated compartment to minimise noise.

#### Wiring

A control panel, located in each MWH unit, is fully wired ready to accept the main power supply. The electrical supply required is: 3 phase 400 V a.c. 50 Hz, plus neutral and earth.

Each system complies with the requirements of the Regulatory Compliance Mark (RCM) for appliance safety (AS/NZS 60335.1 & 60335.2.40) and EMC (AS/NZS CISPR.14 residential or light commercial or IEC 61000.6.8 commercial and industrial).

#### Unit Protection

1. HP/LP for loss of water flow or refrigerant.
2. Anti-rapid cycle timer and internal overload for compressors
3. Circuit breaker control circuits.
4. Time-and-temperature controlled electronic de-ice switch minimises icing-up of the outdoor coil during heating cycle at low ambients.
5. Sensor fault indication.
6. Compressor minimum run time to ensure oil return.

#### Self Diagnostics

Each Unit Controller (UC8) has a LED display to indicate faults and running conditions. A non-specific fault indicator is included for interface to external systems via the optional relay board.

#### Peace of Mind

Temperzone operates a quality management system that conforms to AS/NZS ISO 9001:2015. The company's products have been selected, against worldwide competition, for use in some of the most exclusive projects – chosen because of their proven efficiency, durability, performance, reliability and value.

#### Accessory

Condensate drain connection kit (25mm OD) – supplied.

#### Options

1. Electronic Vapour Injection (EVI)  
- for enhanced low ambient performance
2. Water pump (external)  
- supplied by others.

*Note: If installing in a Plant Room sufficient allowance must be made to prevent recirculation of air on to the coil (refer Application Manual)*

<sup>1</sup> System requires a minimum volume, which may necessitate a make-up volume tank fitted; refer Specifications table (p.10).

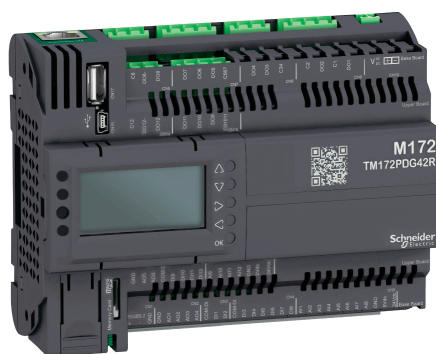
<sup>2</sup> Outdoor fan clearance <100mm (ref. IEC 60529)



# Heat Pump Water Heater for Space Heating

## Controls

### Advanced Controller (M172)



### Features

- Reduces energy consumption and helps improve system efficiency
- Comes pre-programmed and pre-installed to manage refrigerant circuit, compressor staging, defrost cycles
- Turnkey control for: single load, LAT & RAT applications
- LWT or RWT control
- Fresh Air Tempering/space heating control; LAT or RAT control
- Temperature setting range from 35°C – 55°C (default 45°C)
- LED to indicate status of the unit [Power On/Off], inverter fault and compressor lockout
- Water & set temperature display
- Real time clock
- Time schedule for stand-alone operations
- Auto-Restart after power failure by built-in schedule if used
- Remote start/stop
- Backlit screen for ease of reading;
- Soft touch tab keys
- Web browser access with password protection
- Integrated Modbus option via Modbus TCP or Modbus RTU (serial)
- 24V control cable
- Micro SD & USB slots for software updates
- Low level hard wired control (option)
- High level BMS control via BACnet/IP over Ethernet (option)



# Heat Pump Water Heater MWH 2000

## Performance Data

### Heating Capacity (kW)

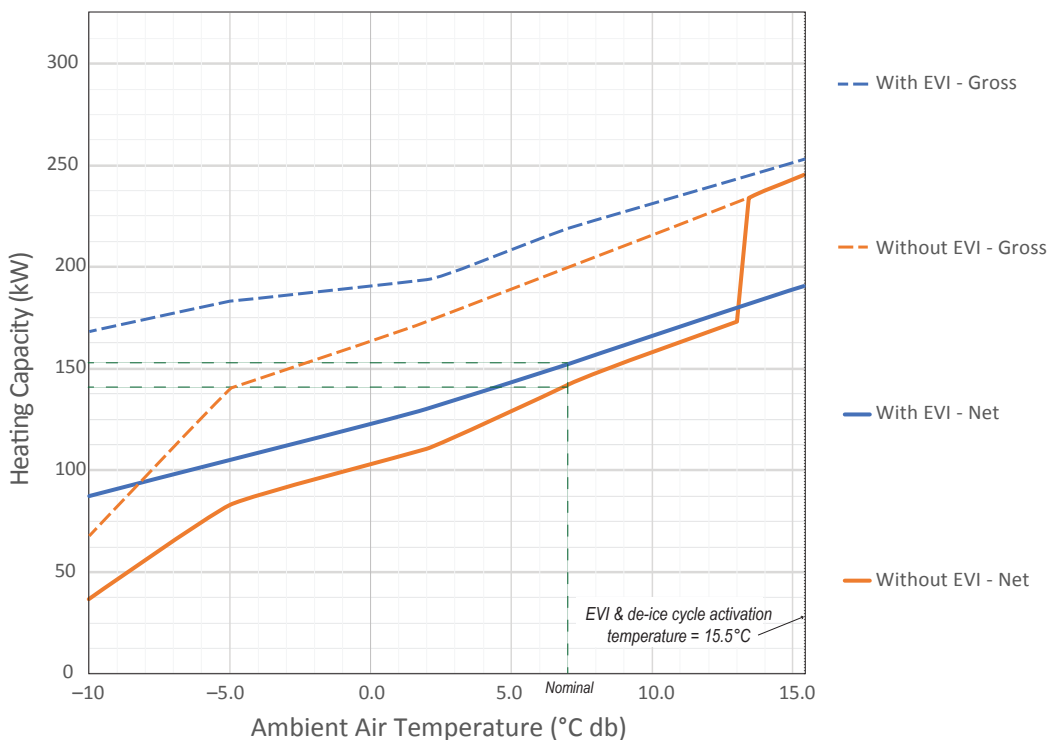
- FL = Water Flow Rate (l/min)
- G = Gross Heating Capacity (kW)
- N = Net Heating Capacity allowing for average defrost (kW)
- PI = Power Input (kW)
- LWT = Leaving Water Temperature (°C)
- = Nominal/Maximum Capacity at rating condition (kW)
- EVI = Electronic Vapour Injection

Ambient Air Temperature °C db

LWT °C	- 10				- 5				2				7				19						
	FL	G	N	PI	FL	G	N	PI	FL	G	N	PI	FL	G	N	PI	FL	G	N	PI			
<b>MWH 2000 with EVI, 15K Δt</b>																							
35	154.1	161.0	79.3	53.9	167.7	175.2	99.0	53.9	186.0	194.3	132.3	54.9	202.9	212.1	148.8	53.9	242.3	253.2	253.2	54.0			
45	162.0	169.3	82.9	64.9	177.1	185.1	104.5	65.8	184.8	193.1	131.5	66.9	210.4	219.9	154.3	66.9	262.3	274.1	274.1	67.1			
55	123.4	129.0	65.2	51.9	134.6	140.7	81.1	51.9	148.3	154.9	100.2	50.6	157.7	164.8	112.8	53.5	185.6	194.0	194.0	50.5			
<b>MWH 2000 without EVI, 15K Δt</b>																							
35	141.8	148.1	73.6	48.7	157.3	164.4	93.6	49.6	180.9	189.1	123.3	50.8	199.1	208.0	144.8	51.4	242.3	253.2	253.2	54.0			
45	62.6	65.5	37.2	21.9	133.7	139.7	80.6	46.2	163.0	170.4	111.1	65.3	192.5	201.2	140.0	65.3	262.3	274.1	274.1	67.1			
55	max. LWT < 55°C								120.4	125.8	62.5	44.2	144.4	150.9	103.8	55.2	185.6	194.0	194.0	50.5			

Note: Changes in the design Δt (±5K) will not greatly affect capacity, but will affect the load on the pump and therefore change energy efficiency.

Heating Capacity at 15K Δt, LWT 45°C





# Heat Pump Water Heater MWH 2000

## Performance Data

### Sound Levels

**Test Conditions:** EN 12102-1:2017.  
Diffuse field method in a reverberant room.  
Measured in decibels re 1 picowatt.

#### Sound Power Levels (SWL) – Radiated

Octave Band Frequency Hz

125	250	500	1K	2K	4K
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Fan Speed	SWL dB(A)	Sound Power Levels (SWL) dB					
HIGH (8V)	86	71	75	80	81	80	74

Note: Outdoor fans running at nominal speed

#### Sound Pressure Levels (SPL)

Fan Speed	SPL @ 3 m dB(A)	Sound Pressure Levels (SPL) dB					
HIGH (8V)	70	55	59	64	65	64	58

Sound Pressure Level (SPL) in decibels re 20 µPa



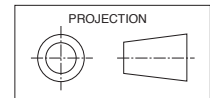


# Heat Pump Water Heater MWH 2000

Dimensions (mm)

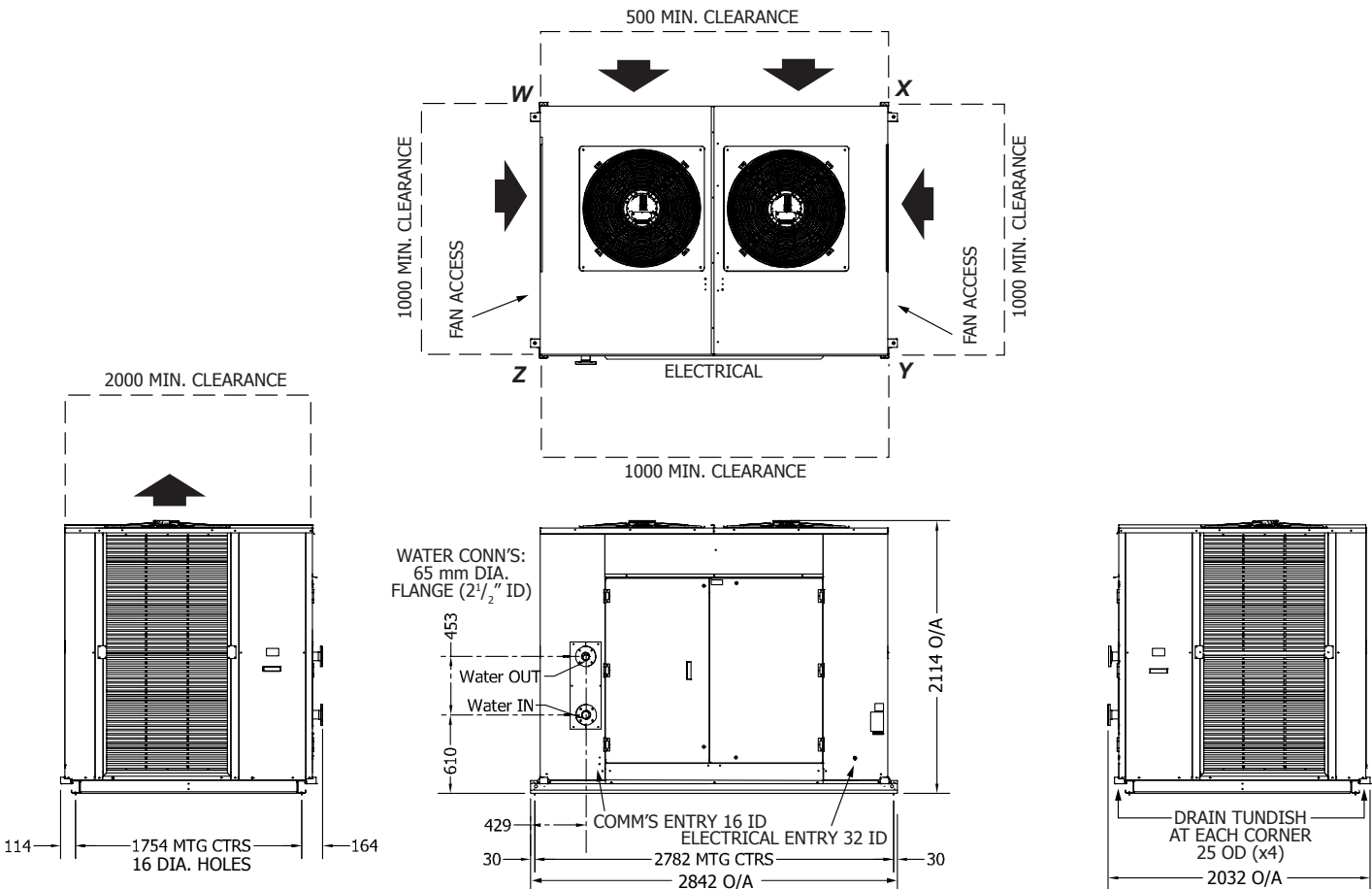
## MWH 2000LTM

POINT LOADS (kg)				
W	X	Y	Z	
223	363	387	573	



Not to Scale

Multiple units side-by-side:  
Allow a minimum of 1m between  
coil faces.



Materials and specifications are subject to change without notice due to the manufacturer's ongoing research and development programme.



# Heat Pump Water Heater for Space Heating

## Specifications

aquanex  
nex gen R32 inverter

Model	MWH 2000LTM-CE (without EVI)	MWH 2000LTM-CEV (with EVI)
Nominal Heating Capacity (net) kW <sup>1</sup>	140	154
Heating Capacity Range (gross) kW <sup>2</sup>	14 ~ 201	14 ~ 220
COP <sup>1</sup>	3.09	3.32
Unit Controllers	Schneider M172 + UC8 (x4)	
Design HEX differential °C	15	
Min./Nominal Water Flow rate l/min <sup>1</sup>	20 / 200	20 / 217
Min./Max. Inlet Water temp. °C	20 / 50	
Min. Operating Ambient Air temp. °C	-10 / 45	
Design Water Temperature (EWT/LWT) °C	30 / 45	
Entering Water Pressure Drop kPa <sup>3</sup>	16	21
Min. Water Volume in sys. for Space Htg litres	150	
Min. Water Volume in sys. for 100% F/A litres	300	
Heat Exchanger	Thermoshell® (x4)	
Electronic Expansion Valves	8 (2/sys.)	12 (3/sys.)
Refrigerant	R32 (Class A2L)	
Compressor type	inverter scroll (x4)	
Fan type	EC Axial (x2)	
Ext'l static press. available of fans Pa	125	
Pump type required	external, BDLC	
Communication Options	BMS / Modbus / BACnet	
Power Source <sup>4</sup>	3 phase 400 V a.c. 50 Hz + N + E	
Running current A/ph..	103	
Max. Running Amps A/ph..	121	
RCD type recommendation	type B, 30 mA, 3 pole	
Protection Rating	IP44 / IPX4 <sup>5</sup>	
Finish	grey polyester powder coat	
Net Weight kg	1533	1546
Net Weight incl. water kg	1583	1596

### Notes:

- <sup>1</sup> Rating conditions: EWT 30°C, LWT 45°C, Outdoor Ambient Temperature 7°C D.B., 6°C W.B.  
Net capacity allows for average defrost. Refer page 7 for rating at other conditions.
- <sup>2</sup> Ranges at rating conditions: Min. speed [1 comp.] ~ max. 100% [4 comp.]
- <sup>3</sup> Pressure drop at Water Flow rate and rating conditions above
- <sup>4</sup> Voltage range: 380–440 V
- <sup>5</sup> Outdoor fan-guard clearance <100 mm (ref. IEC 60529)

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# Heat Pump Water Heater for Space Heating

Notes

[www.temperzone.biz](http://www.temperzone.biz)

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