



Aqu@Scop Star DCI

Air-to-Water DC **Inverter** Heat Pumps

Models MQHD 06 to 18



6.0 to 17.5 kW



DCINVERTER



AIRWELL
WESPER
ELECTRA
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Strength Points

By introducing the variable speed in our packaged heat pump range, we are in perfect adequacy with the user expectations while preserving the advantages which made the success of our previous models, that is to say : Quality of manufacture, performances, life span, low noise level and control system dedicated to the heating.

Use of DC inverter technology :

- In both compressor and outdoor fan motor to adapt the unit capacity to the building heat demand.

Energy savings :

- By avoiding compressor start-up and shutdown phases DC inverter enables unit to run continuously while modulating the compressor output in relation to the set temperature on part load.

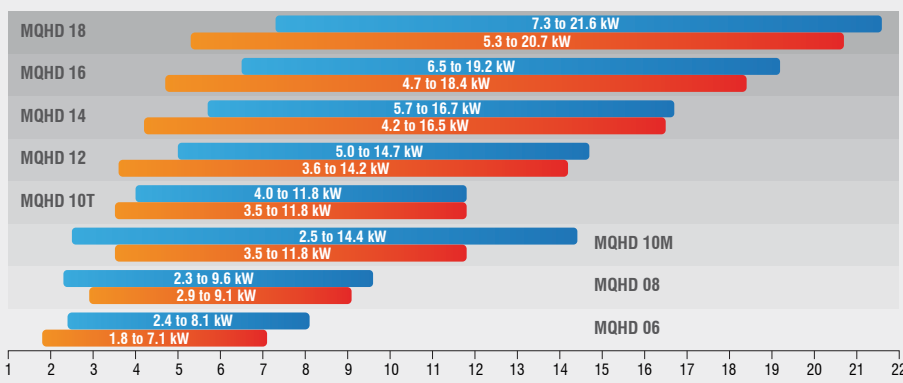
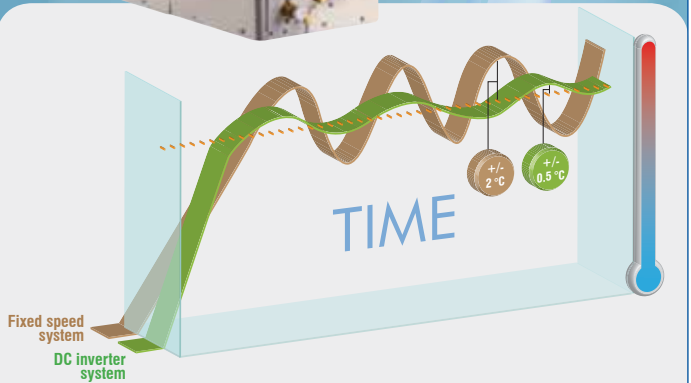
Silent running :

- Most of the time, unit is running at reduced speed.

Quick reach of set temperature :

- DC inverter starts with maximum speed to reach set temperature as quick as possible. Once the temperature setpoint is reached, the inverter will reduce and adapt speed according to the capacity needed only.
- Great accuracy in maintaining the desired water temperature setpoint. Unit optimized in heating mode for radiator, fan coil and floor applications.
- LWT up to +55 °C in heating mode, outdoor temperature down to -15 °C.

- Single-phase or 3-phase power voltage.
- Adapted to the markets of new housing and renovation.
- Single circuit with DC inverter compressor.
- Blue fins coil as standard.
- Bi-flow electronic expansion valve as standard on whole range.
- Stainless steel plate heat exchanger with antifreeze protection.
- Variable speed fan controller as standard.
- Pump as standard.



- Fixed speed system, traditional technology : compressor runs at fixed speed, and cycles on and off to adjust to cooling/heating demand.
- Inverter system : set point is reached fast and the compressor continuously adjusts its capacity to match the exact cooling/heating demand.



Specifications

General description

The new family **MQHD R410A** single or three phase, covers a capacity range from **6 to 17.5 kW**, developed in **8 different sizes**.

This new heat pump has been optimized in heating mode in order to reach high level of COP in both fan coil and floor heating application.

Inverter technology "**DC sinewave**" can provide a continuous variable capacity depending on building load. This can be easily translated in higher seasonal efficiency, reduced CO₂ emission and lower yearly operating cost.

Compact design and "all in one" concept keep installation easy and quick. In fact all hydraulic main components are fitted inside the unit : pump, manometer, expansion vessel, filter (not mounted but standard with the unit), drain valve.

Also an easy maintenance and serviceability are guaranteed thanks to easy accessibility of all components, just removing main sheet metal panel.

Applications

The following applications have been taken into consideration during unit development, for both heating and cooling operating modes :

- Fan coil application,
- Floor application,
- Domestic hot water application.

Unit components

Brazed plate heat exchanger

Brazed plated heat exchanger, thermally insulated with flexible closed cell material. Electric heater to prevent freezing fixed on the plates. Heat exchanger inlet and outlet water connections are threaded type. Inlet and outlet water pipes include two water temperature sensors.

Finned coil

The finned coil is seamless copper tube, arranged in staggered rows, mechanically expanded into a corrugated aluminium fins.

Blue fin treatment as standard to improve water drainage and defrost cycle.

Fan motor

Fan motor is DC brushless type.

Compressor

The hermetic compressors are rotary, twin rotary and scroll types depending on sizes. The compressor is equipped with motor thermal protection overload. The compressor is mounted on rubber anti vibration pads. Here below table that shows compressor type by size :

Sizes	Compressor type
06	Rotary
08	Twin rotary
10M	Twin rotary
10T to 18	Scroll

Control features

This system control can manage following feature :

- Day & night mode.
- Auto-test function.
- Remote ON/OFF switch.
- Remote alarm output, dry contact.
- Remote heating / cooling selection mode.
- Fan motor variable speed control.
- Compressor motor variable speed control (DC inverter technology based).

- Electronic expansion valve control.
- Water pump motor on/off control.
- Brazed heat exchanger antifreeze protection.
- Floor system mode.
- Modbus protocol RS 485.
- Room thermostat control.
- Domestic hot water management.
- 0-10Vdc remote signal for cool or heat setpoint, or for compressor speed signal.
- Minimum HMI (Human Interface) with 7-segments and 4 key switches. To show main status and sensor value.
- Auxiliary electrical heater management.

Control board

The unit is controlled by 2 main boards : ODU board and HYDI board.

ODU board

ODU board is the main board able to manage following components :

- Compressor.
- Fan motor.
- 4-way valve.
- EEV valve.
- Coil sensor.
- Heat sink sensor.
- Compressor discharge sensor.
- Outdoor air sensor.



HYDI board

HYDI board is a board able to manage following components :

- Pump.
- Water sensor.
- Electrical heater kit.
- Room thermostat.
- Domestic hot water request.



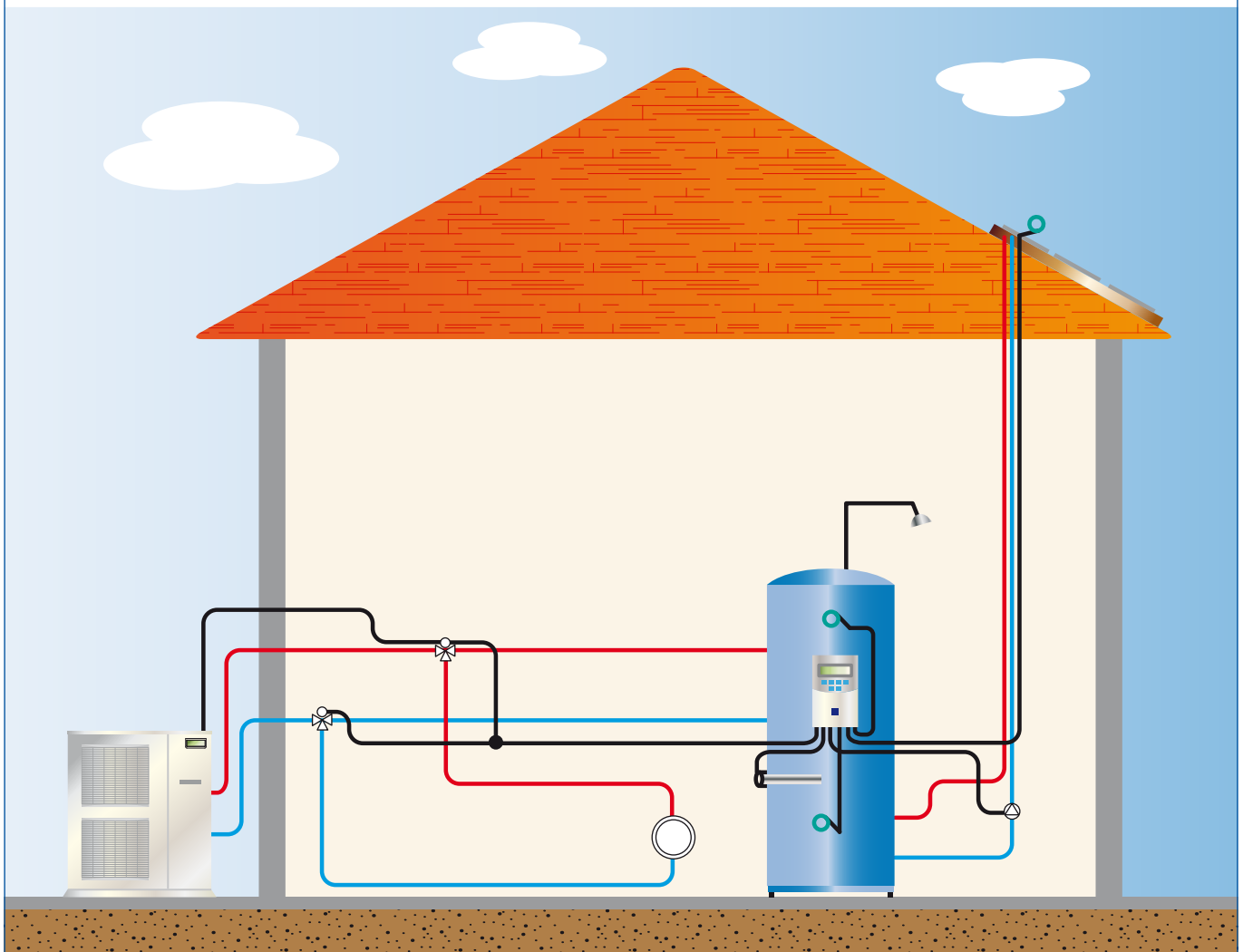
Standard equipment

- Water pressure differential switch.
- Water pressure safety valve.
- Blue fin treatment.
- Coil guards.
- AVM rubber pad (supplied loose).
- Water filter (supplied loose).
- Main switch (10 kW and above).
- ModBus protocol RS485.
- Fan speed control.
- Antifreeze electric heater kit.

Accessories

- Room thermostat.
- Electric heater kit 2-4-6 kW.

Example of application - Unit with domestic hot water tank



The DHW mode must be configured with the HMI through a parameter called "nod".

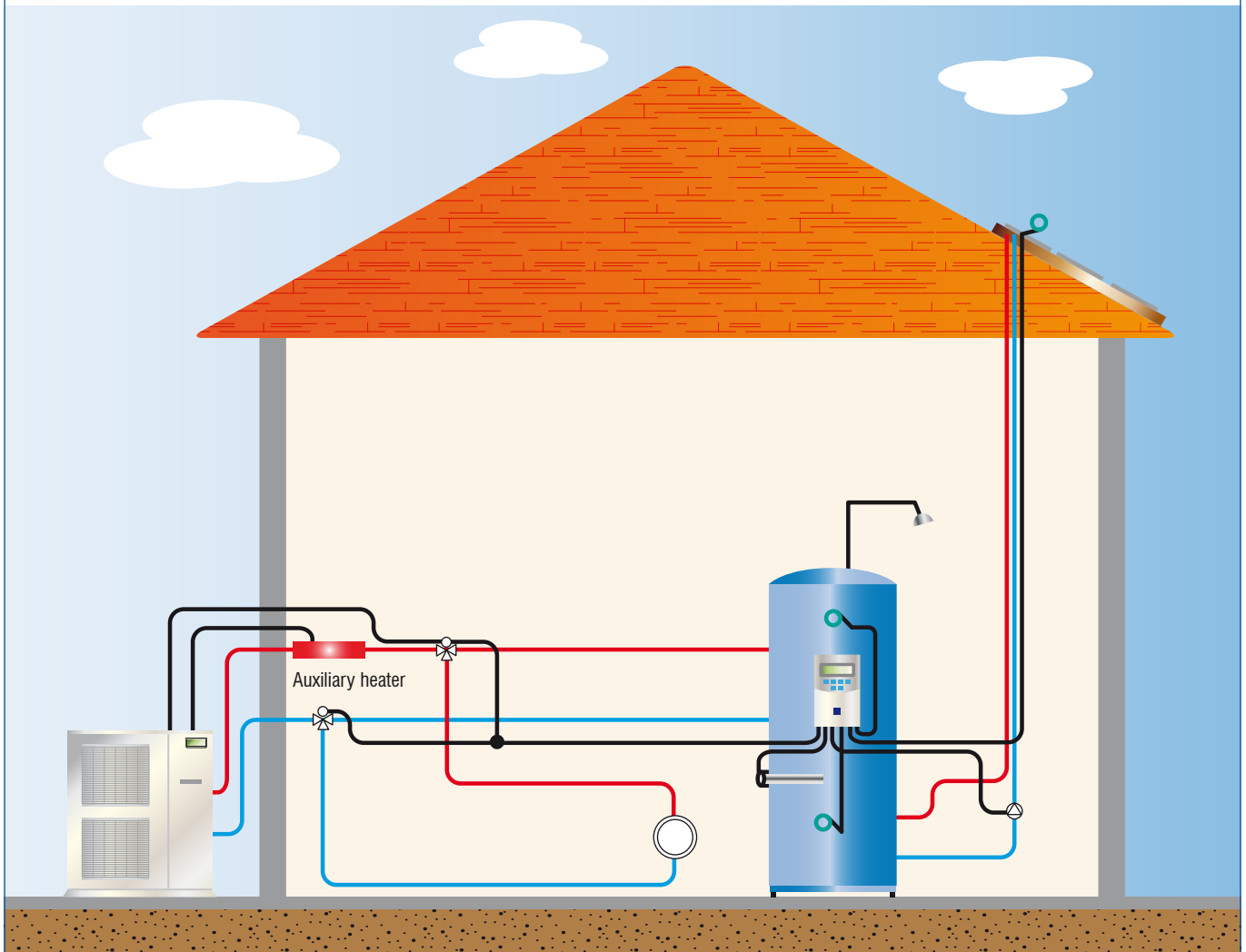
When the temperature of domestic hot water is less or equal to desired setpoint, the water thermostat sends a request to the heat pump in the DHW input (placed on HYDI board).

The heat pump will work in heating mode with set point 55 °C until the request is present.

When the temperature of domestic hot water in the tank is equal to DHW set point, the water thermostat releases the request to the heat pump, the heat pump can return to work with the setpoint selected by the HMI and the status according to what has been selected by HMI (or by the input Forced Mode and Forced SB).

When the heat pump switches from "DHW" mode in "space heating" mode the pump will be always on.

Example of application - Unit with electric heater kit and domestic hot water tank



The heating integration must be configured with the HMI with a parameter called "AUH"; for the DHW there is the same parameter used in the application "Unit with DHW tank".

The heating integration doesn't work when there is a DHW request.

The DHW request works like application "Unit with DHW tank".

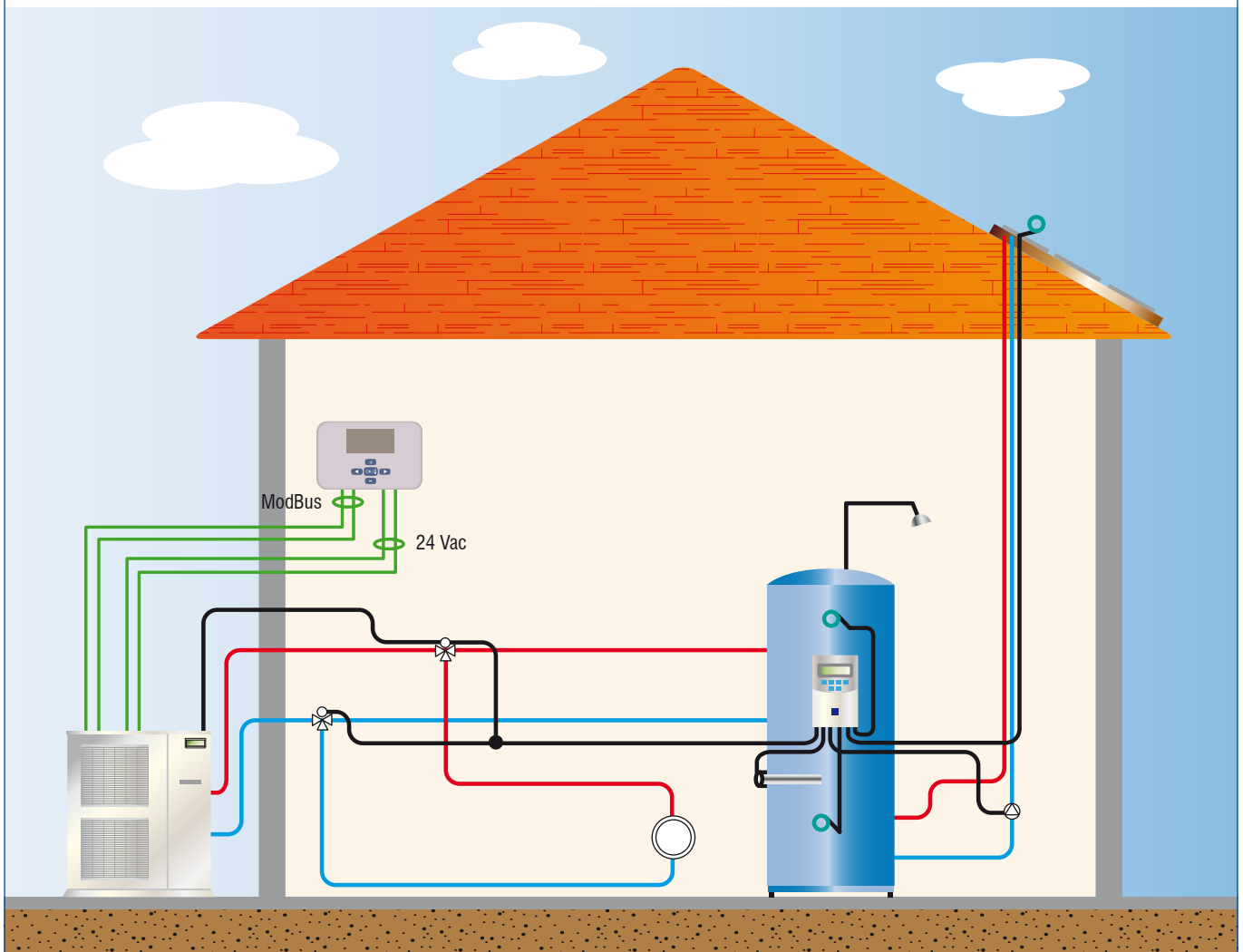
With the heat pump in heat mode, without DHW request, if the NLoad parameter value is at max value, and the LWT sensor is less or equal to (Set Heating - 2 °C) for CTotalOnTime min the HYDI out "Aux Heater" goes on. The Aux Heater signal goes off if the leaving temperature is greater than Set Heating + 1.

CTotalOnTime parameter can be set from 0 to 60 min.

The auxiliary heater goes on also when the LWT sensor measure a temperature less or equal 15 °C in Heating mode; in this case the heat pump is in standby mode but the pump stays on.

When the temperature reaches 20 °C the auxiliary heater goes off and the heat pump goes on.

Example of application - Unit with room thermostat and domestic hot water tank

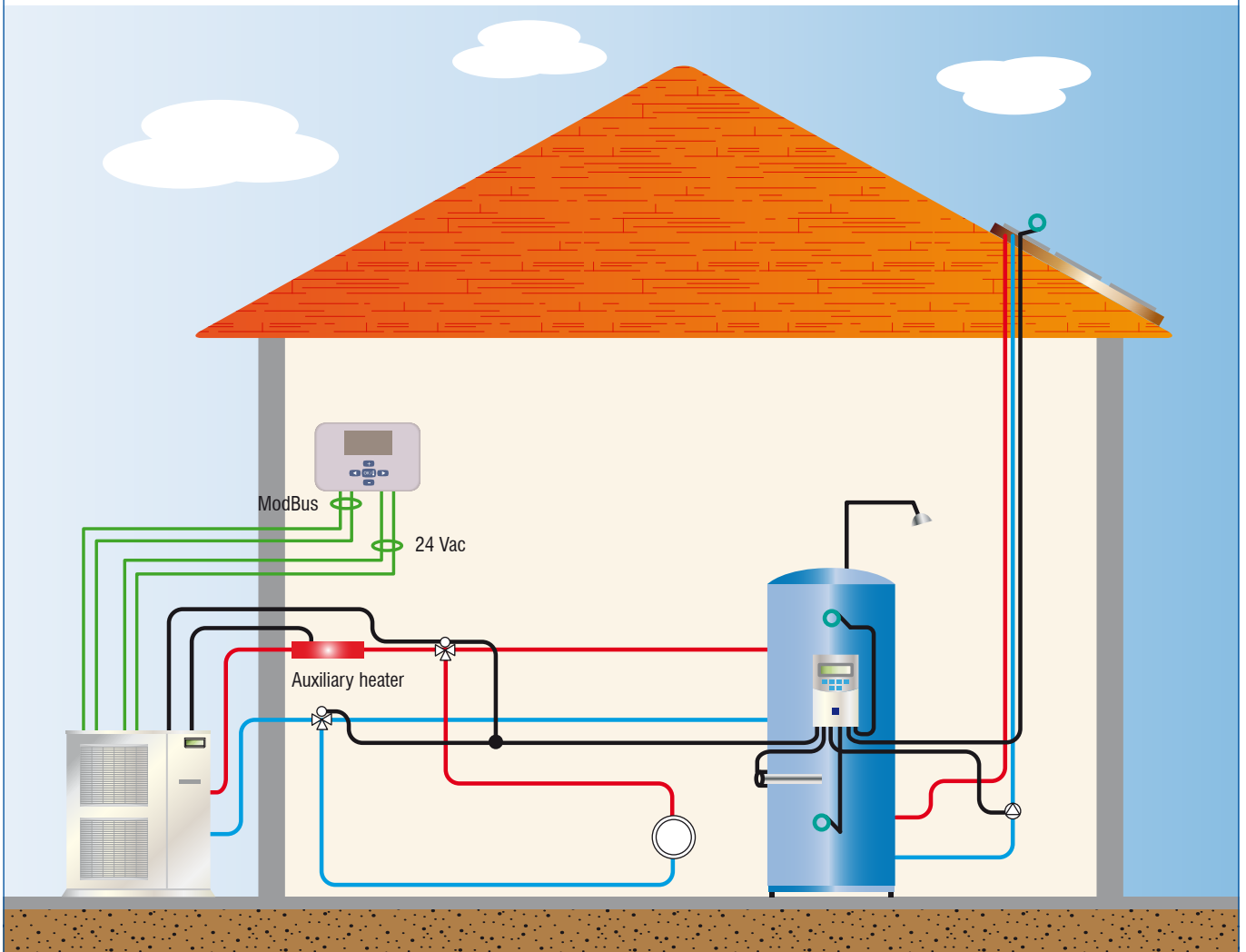


The DHW mode must be configured through dipswitch placed on the HYDI board.

The DHW request works like application "Unit with DHW tank".

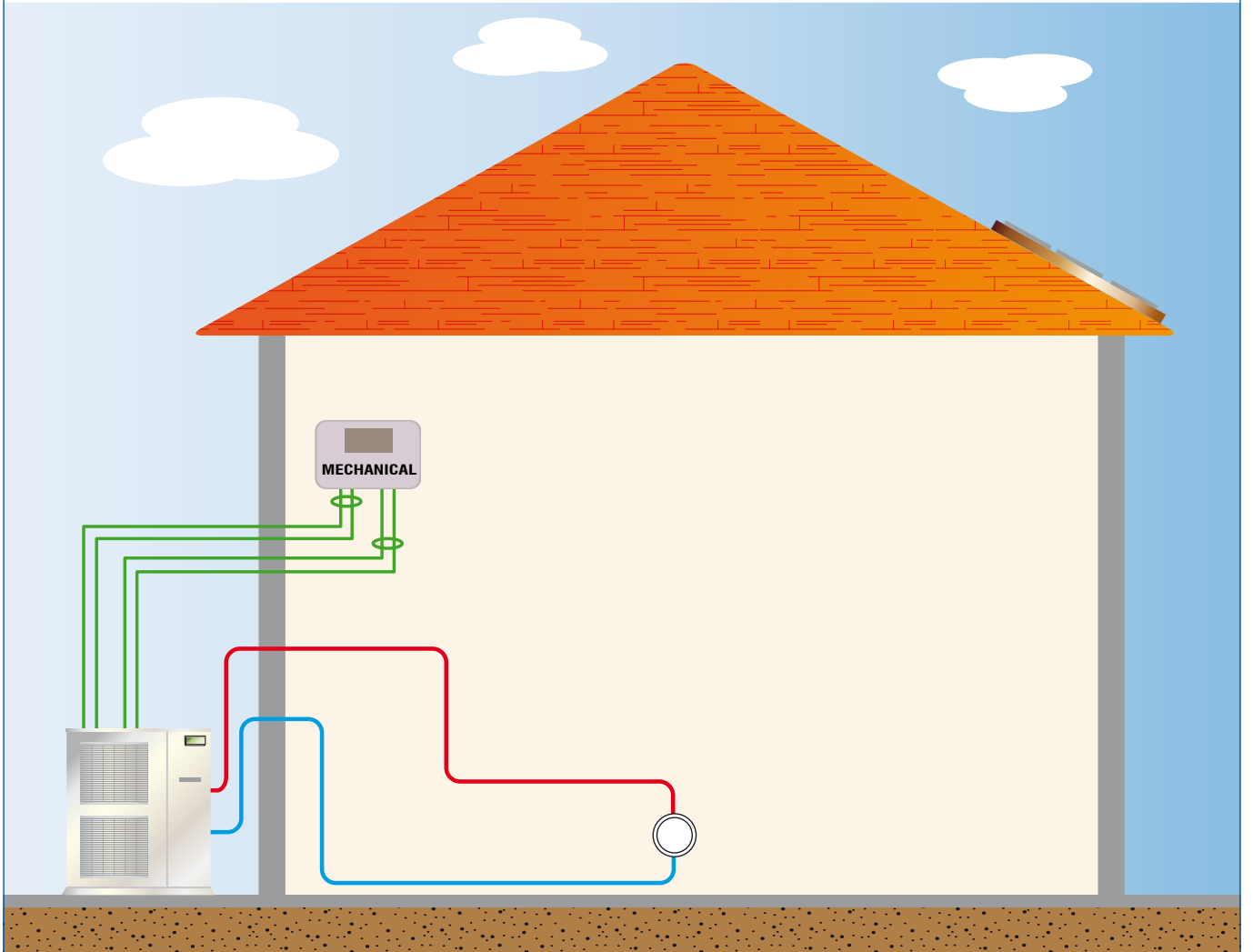
The user can select, on the remote controller, the set point, for the heating and cooling mode, the mode, heating, cooling or DHW only.

Example of application - Unit with room thermostat, electric heater kit and domestic hot water tank



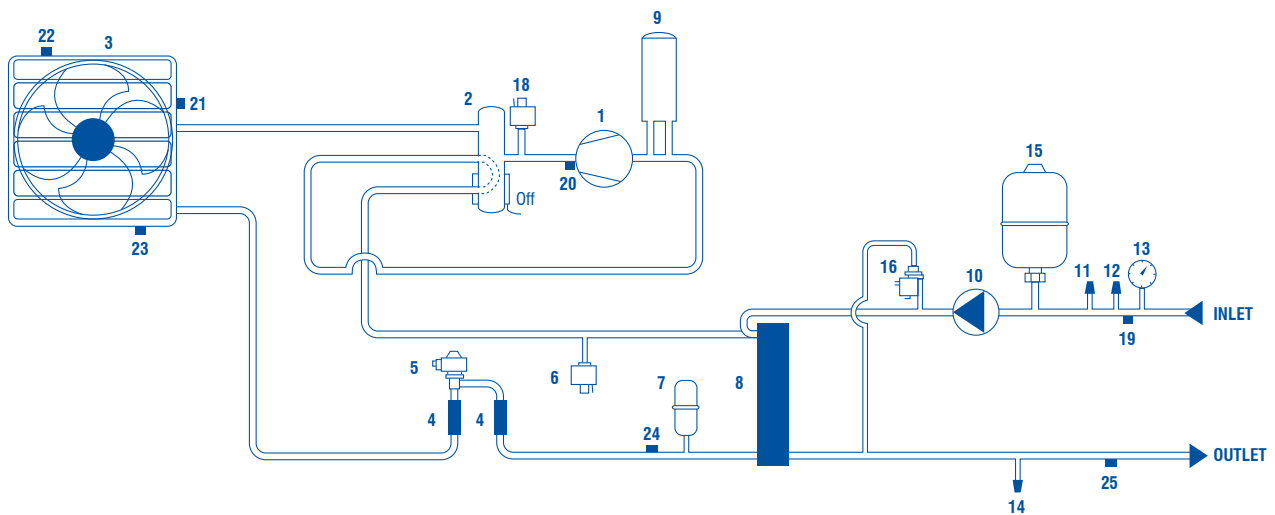
The heating integration must be configured with the HMI; for the DHW there is the same parameter used in the application "Unit with DHW tank".

Example of application - Unit with mechanical room thermostat



Refrigerant flow diagrams - MQHD 06 & 08

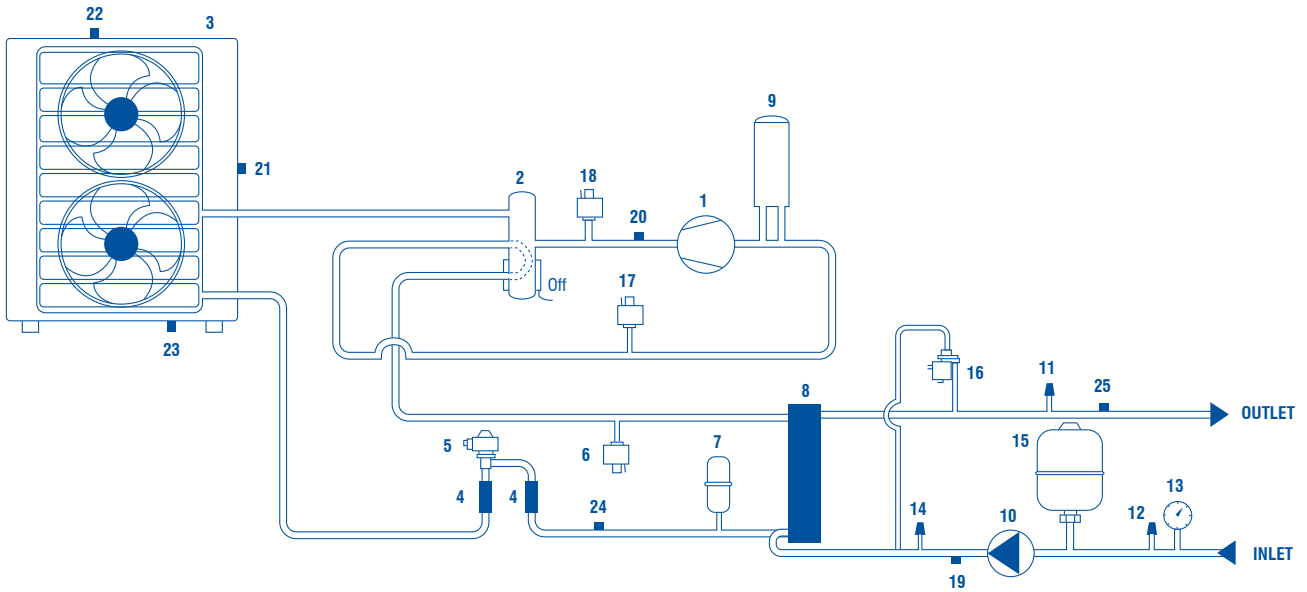
Unit schematic single fan chassis (6-8 kW)



REFRIGERANT CIRCUIT		HYDRAULIC CIRCUIT		PROBES	
1	Compressor	10	Pump	19	ET : entering water temperature
2	4-way valve	11	Air vent	20	CTT : discharge temperature
3	Coil + Fan	12	Safety valve	21	OT : gas temperature (coil)
4	Filter	13	Water manometer	22	OAT : outdoor ambient temperature
5	EEV (Electronic Expansion Valve)	14	Drain valve	23	OCT : evaporating temperature (coil)
6	High pressure sensor	15	Expansion tank	24	IRT : liquid temperature
7	Liquid receiver	16	Differential pressure switch	25	LT : leaving water temperature
8	Heat exchanger				
9	Accumulator				
18	High pressure switch				

Refrigerant flow diagrams - MQHD 10M/10T/12/14/16/18

Unit schematic double fan chassis (10 to 18 kW)



REFRIGERANT CIRCUIT		HYDRAULIC CIRCUIT		PROBES	
1	Compressor	10	Pump	19	ET : entering water temperature
2	4-way valve	11	Air vent	20	CTT : discharge temperature
3	Coil + Fan	12	Safety valve	21	OT : gas temperature (coil)
4	Filter	13	Water manometer	22	OAT : outdoor ambient temperature
5	EEV (Electronic Expansion Valve)	14	Drain valve	23	OCT : evaporating temperature (coil)
6	High pressure sensor	15	Expansion tank	24	IRT : liquid temperature
7	Liquid receiver	16	Differential pressure switch	25	LT : leaving water temperature
8	Heat exchanger				
9	Accumulator				
17	Low pressure switch				
18	High pressure switch				

Technical data - Single phase units

Units		MQHD 06	MQHD 08	MQHD 10M
Power Supply	V-ph-Hz	230/1/50	230/1/50	230/1/50
Nominal Cooling Capacity - A35W23	kW	6.00	8.00	9.80
Nominal Power Input	kW	1.40	2.13	2.45
EER		4.30	3.75	4.00
Energy Efficiency Class		A	A	A
Rated current (Cooling)	A	6.3	9.6	11.0
Nominal Cooling Capacity - A35W7	kW	5.80	6.80	9.00
Nominal Power Input	kW	2.00	2.43	3.10
EER		2.90	2.80	2.90
Nominal Heating Capacity - A7W35	kW	6.00	7.70	10.00
Nominal Power Input	kW	1.52	1.975	2.50
Max Power Input	kW	2.50	3.00	3.50
C.O.P.		3.95	3.90	4.00
Energy Efficiency Class		A	A	B
Rated current (CO/HP)	A	6.9	8.9	11.2
Nominal Heating Capacity - A7W45	kW	5.60	7.00	9.50
Nominal Power Input	kW	1.80	2.26	2.97
C.O.P.		3.1	3.1	3.2
Full load ampere	A	15	15	15
Circuit breaker rating	A	20	20	20
Condenser type & quantity			Coil x 1	
Fan type & quantity		Propeller x 1	Propeller x 1	Propeller x 2
Fan speeds (High)	rpm	650	650	800
Air flow	m ³ /h	2910	2910	6780
Evaporator type & quantity			Plate heat exchanger x 1	
Water flow	m ³ /h	1.03	1.38	1.72
Hydraulic Connection (Inlet Water)	inch	Rc 3/4	Rc 3/4	Rc 3/4
Hydraulic Connection (Outlet Water)	inch	Rc 3/4	Rc 3/4	Rc 3/4
Water Pressure Difference (BPHE)	kPa	13	20	18
Available Water Pressure	kPa	57	49	103
Refrigerant control			EEV	
Standard charge (R410a)	kg	1.55	1.76	2.7
COMPRESSOR				
Type		Single rotary	Twin rotary	Twin rotary
Nom. comp frequency - Sound power level	dB(A)	63	64	69
Nom. comp frequency - Sound Pressure level at 10 meters	dB(A)	35	36	41
Max comp frequency - Sound power level	dB(A)	65	66	72
Max comp frequency - Sound Pressure level at 10 meters	dB(A)	37	38	43
DIMENSIONS				
Length x Width x Height	mm	977 x 413 x 870	977 x 413 x 870	1241 x 401 x 1382
Package Dimensions (Length x Width x Height)	mm	1110 x 480 x 1045	1110 x 480 x 1045	1260 x 481 x 1435
WEIGHT				
Weight	kg	81.8	86.8	155
Package weight	kg	103	108	167
OPERATING RANGE				
Cooling (Outlet Water)	°C		+5 to +20	
Cooling (Air)	°C		+10 to +46	
Heating (Outlet Water)	°C		+24 to +55	
Heating (Air)	°C		-15 to +35	

(1) The sound pressure level refers to a distance of 10 meters from the unit in a free field, Q=2 according to EN 3744 standard.
Rating conditions according to EN 14511 (2004)

(2) All data are according to Eurovent standard

Conditions :

Nominal cooling capacity : Inlet/Outlet water temperature : 23/18 °C and Outdoor air : 35/24 °C

Nominal heating capacity : Inlet/Outlet water temperature : 30/35 °C and Outdoor air : 7/6 °C

"A" : Outdoor air temperature.

"W" : Water temperature.

Technical data - Three phase units

Units		MQHD 10T	MQHD 12	MQHD 14	MQHD 16	MQHD 18
Power Supply	V-ph-Hz	400/3/50	400/3/50	400/3/50	400/3/50	400/3/50
Nominal Cooling Capacity - A35W18	kW	9.86	12.25	13.94	16.00	18.00
Nominal Power Input	kW	2.14	2.85	3.48	4.15	4.68
EER		4.61	4.30	4.00	3.86	3.85
Energy Efficiency Class		A	A	A	A	A
Rated current (Cooling)	A	4.0	4.9	5.8	6.8	7.3
Nominal Cooling Capacity - A35W7	kW	9.90	11.44	13.40	14.50	15.50
Nominal Power Input	kW	3.37	4.02	5.14	5.37	5.96
EER		2.94	2.85	2.61	2.70	2.60
Nominal Heating Capacity - A7W35	kW	10.00	12.01	13.96	15.50	17.50
Nominal Power Input	kW	2.27	2.79	3.33	3.88	4.40
Max Power Input	kW	6.50	6.50	6.50	6.50	6.50
C.O.P.		4.41	4.31	4.19	4.00	3.98
ENERGY EFFICIENCY CLASS		A	A	A	B	B
Rated current (CO/HP)	A	3.9	4.8	5.4	6.3	6.9
Nominal Heating Capacity - A7W45	kW	9.92	11.75	13.76	15.30	16.80
Nominal Power Input	kW	2.92	3.55	4.47	4.77	5.80
C.O.P.		3.40	3.31	3.08	3.21	2.90
Full load ampere	A	15	15	15	15	15
Circuit breaker rating	A	20	20	20	20	20
Condenser type & quantity		Coil x 1				
Fan type & quantity		Propeller x 2				
Fan speeds (High)	rpm	650	650	650	650	750
Air flow	m ³ /h	6780	6780	6780	6780	7770
Evaporator type & quantity		Plate heat exchanger x 1				
Water flow	m ³ /h	1.72	2.06	2.41	2.75	3.10
Hydraulic Connection (Inlet Water)	inch	Rc 3/4	Rc 3/4	Rc 1	Rc 1	Rc 1
Hydraulic Connection (Outlet Water)	inch	Rc 3/4	Rc 3/4	Rc 1	Rc 1	Rc 1
Water Pressure Difference (BPHE)	kPa	18	26	15	18	22
Available Water Pressure	kPa	170	151	158	134	118
Refrigerant control		EEV				
Standard charge (R410a)	kg	2.7	2.7	3.2	3.2	4.1
COMPRESSOR						
Type		Scroll				
Nom. comp frequency - Sound power level	dBA	67	68	68	69	71
Nom. comp frequency - Sound Pressure level at 10 meters	dBA	39	40	40	41	43
Max comp frequency - Sound power level	dBA	69	70	70	71	72
Max comp frequency - Sound Pressure level at 10 meters	dBA	41	42	42	43	44
DIMENSIONS						
Length x Width x Height	mm	1241 x 401 x 1382				
Package Dimensions (Length x Width x Height)	mm	1260 x 481 x 1435				
WEIGHT						
Weight	kg	185	185	190	190	207
Package weight	kg	197	197	202	202	219
OPERATING RANGE						
Cooling (Outlet Water)	°C	+5 to +20				
Cooling (Air)	°C	+10 to +46				
Heating (Outlet Water)	°C	+24 to +55				
Heating (Air)	°C	-15 to +35				

(1) The sound pressure level refers to a distance of 10 meters from the unit in a free field, Q=2 according to EN 3744 standard.
Rating conditions according to EN 14511 (2004)

(2) All data are according to Eurovent standard

Conditions :

Nominal cooling capacity : Inlet/Outlet water temperature : 23/18 °C and Outdoor air : 35/24 °C

Nominal heating capacity : Inlet/Outlet water temperature : 30/35 °C and Outdoor air : 7/6 °C

"A" : Outdoor air temperature.

"W" : Water temperature.

Electrical Data

Single-phase units

Units		MQHD 06	MQHD 08	MQHD 10M
Rated voltage	V/ph/Hz	230/1/50		
Max. power input	kW	2.5	3.0	3.5
Rated current (Cooling/Heating)	A	6.3/6.9	9.6/8.9	11.0/11.2
Full load current (FLA)	A	15	15	15
Circuit breaker rating	A	20	20	20

3-phase units

Units		MQHD 10T	MQHD 12	MQHD 14	MQHD 16	MQHD 18
Rated voltage	V/ph/Hz	400/3/50				
Max. power input	kW	6.5	6.5	6.5	6.5	6.5
Rated current (Cooling/Heating)	A	4.0/3.9	4.9/4.8	5.8/5.4	6.8/6.3	7.3/6.9
Full load current (FLA)	A	15	15	15	15	15
Circuit breaker rating	A	20	20	20	20	20

Performance Data

Units			MQHD 06	MQHD 08	MQHD 10M
Outdoor air temperature : 7 °C Water temperature : 35 °C	Nominal heating capacity	kW	6.0	7.7	10.0
	Nominal COP		3.95	3.90	4.00
	Total power input	kW	1.52	1.98	2.50
	Capacity range Min.- Max.	kW	1.80 - 7.13	2.87 - 9.13	3.50 - 11.80
Outdoor air temperature : 2 °C Water temperature : 35 °C *	Heating capacity	kW	5.74	8.18	8.55
	COP		3.74	3.42	3.11
Outdoor air temperature : 7 °C Water temperature : 45 °C	Heating capacity	kW	5.60	7.00	9.50
	COP		3.10	3.10	3.20
Outdoor air temperature : 35 °C Water temperature : 18 °C	Nominal cooling capacity	kW	6.00	8.00	9.80
	Nominal EER		4.30	3.75	4.00
	Total power input	kW	1.40	2.13	2.45
	Capacity range Min.- Max.	kW	2.44 - 8.10	2.30 - 9.61	2.45 - 14.44
Outdoor air temperature : 35 °C Water temperature : 7 °C	Cooling capacity	kW	5.80	6.80	9.00
	EER		2.90	2.80	2.90

Note : All data measured according to EN 14511

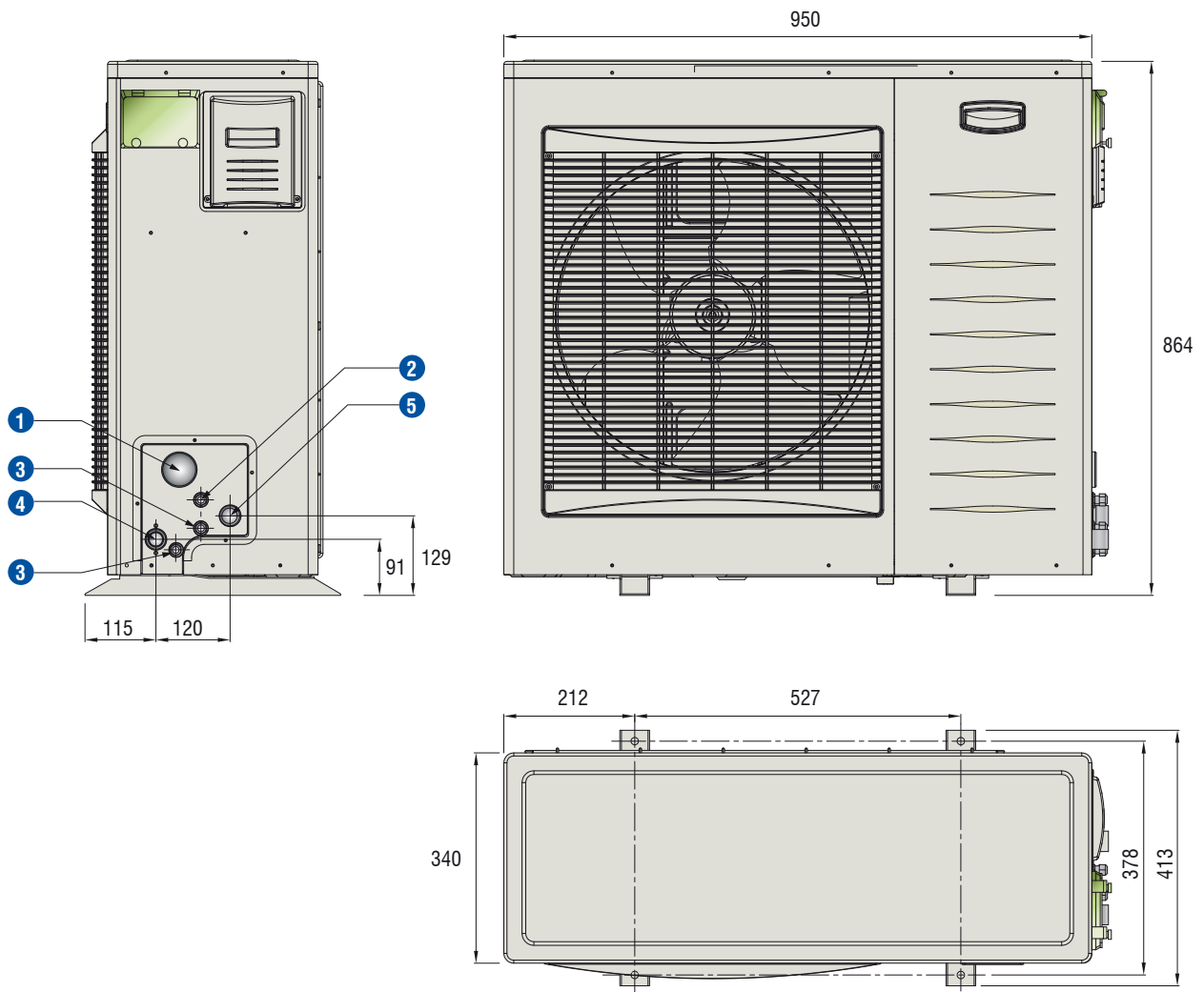
* With deicing

Units			MQHD 10T	MQHD 12	MQHD 14	MQHD 16	MQHD 18
Outdoor air temperature : 7 °C Water temperature : 35 °C	Nominal heating capacity	kW	10.00	12.01	13.96	15.50	17.50
	Nominal COP		4.41	4.31	4.19	4.00	3.98
	Total power input	kW	2.27	2.79	3.33	3.88	4.40
	Capacity range Min.- Max.	kW	3.5 - 11.8	3.6 - 14.2	4.2 - 16.5	4.7 - 18.4	5.3 - 20.7
Outdoor air temperature : 2 °C Water temperature : 35 °C *	Heating capacity	kW	10.12	10.41	10.66	11.2	14.8
	COP		3.42	3.4	3.42	3.34	2.96
Outdoor air temperature : 7 °C Water temperature : 45 °C	Heating capacity	kW	9.92	11.75	13.76	15.30	16.80
	COP		3.40	3.31	3.08	3.21	2.90
Outdoor air temperature : 35 °C Water temperature : 18 °C	Nominal cooling capacity	kW	9.86	12.25	13.94	16.00	18.00
	Nominal EER		4.61	4.30	4.00	3.86	3.85
	Total power input	kW	2.14	2.85	3.48	4.15	4.68
	Capacity range Min.- Max.	kW	4.0 - 11.8	5.0 - 14.7	5.7 - 16.7	6.5 - 19.2	7.3 - 21.6
Outdoor air temperature : 35 °C Water temperature : 7 °C	Cooling capacity	kW	9.90	11.44	13.40	14.50	15.50
	EER		2.94	2.85	2.61	2.70	2.60

Note : All data measured according to EN 14511

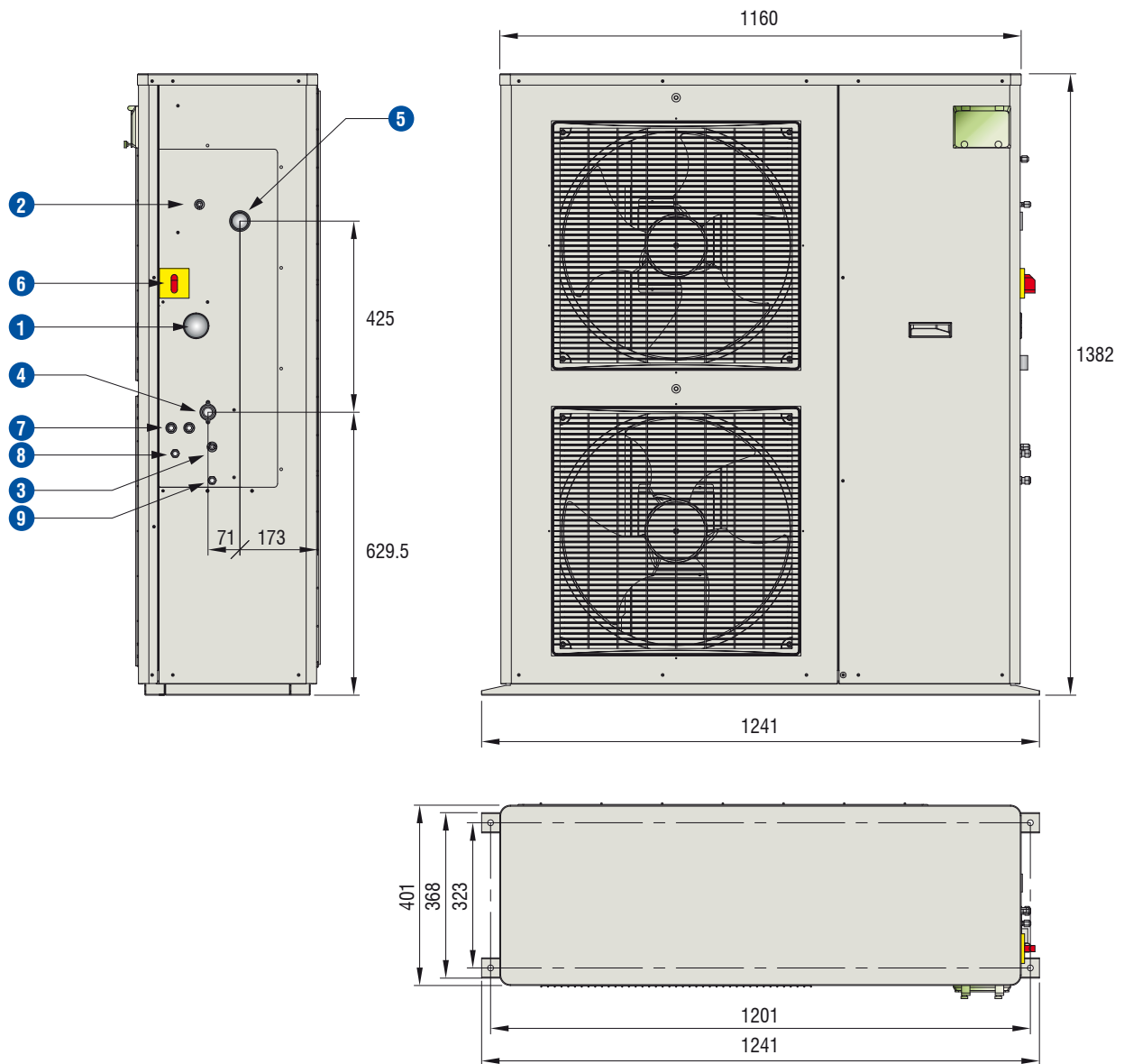
* With deicing

Dimensions (mm) - MQHD 06 to 08 - Single Phase Units



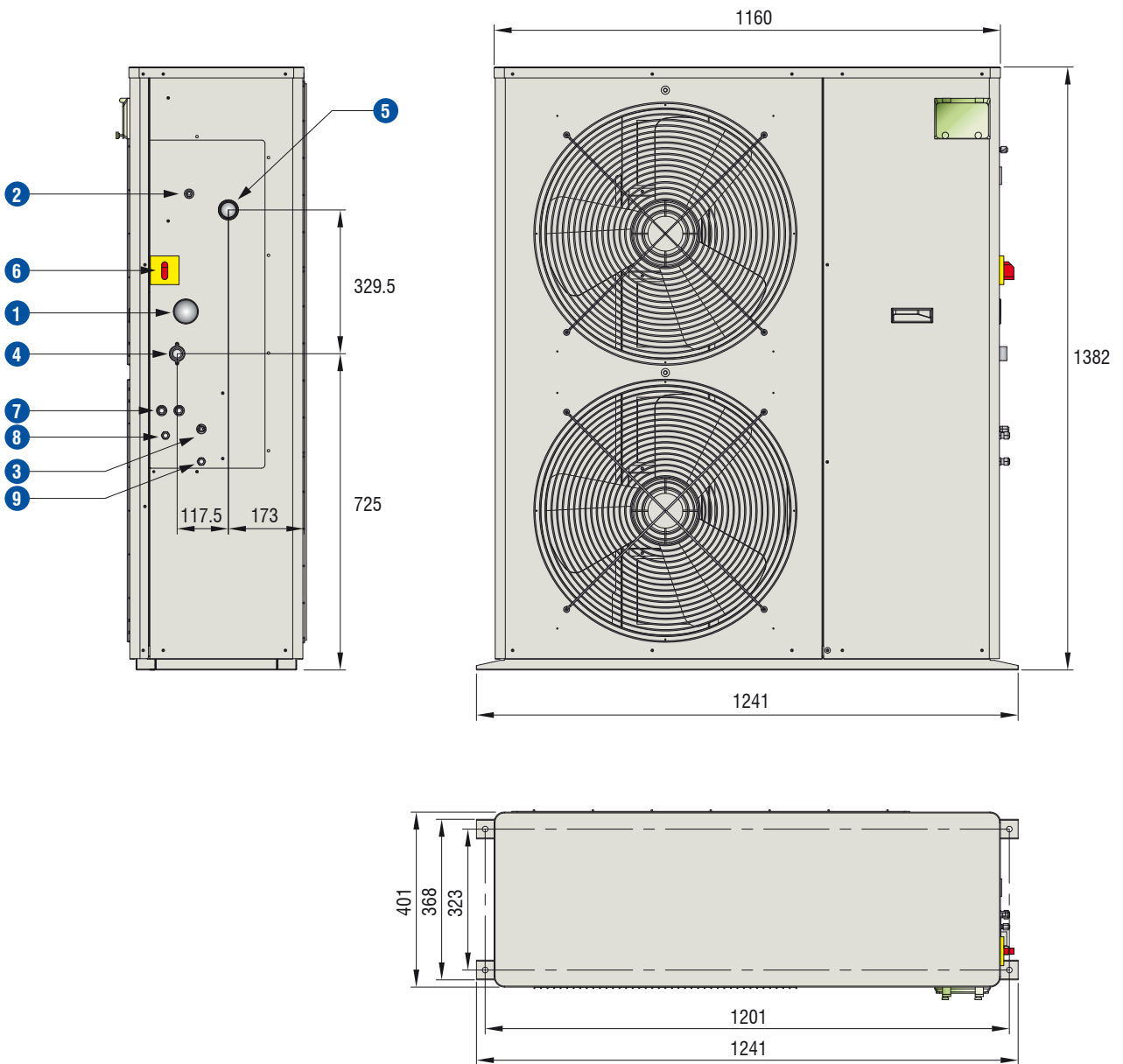
1	Water pressure gauge
2	Air vent valve
3	Water drain valve
4	Water inlet 3/4" gas female
5	Water outlet 3/4" gas female

Dimensions (mm) - MQHD 10M - Single Phase Units



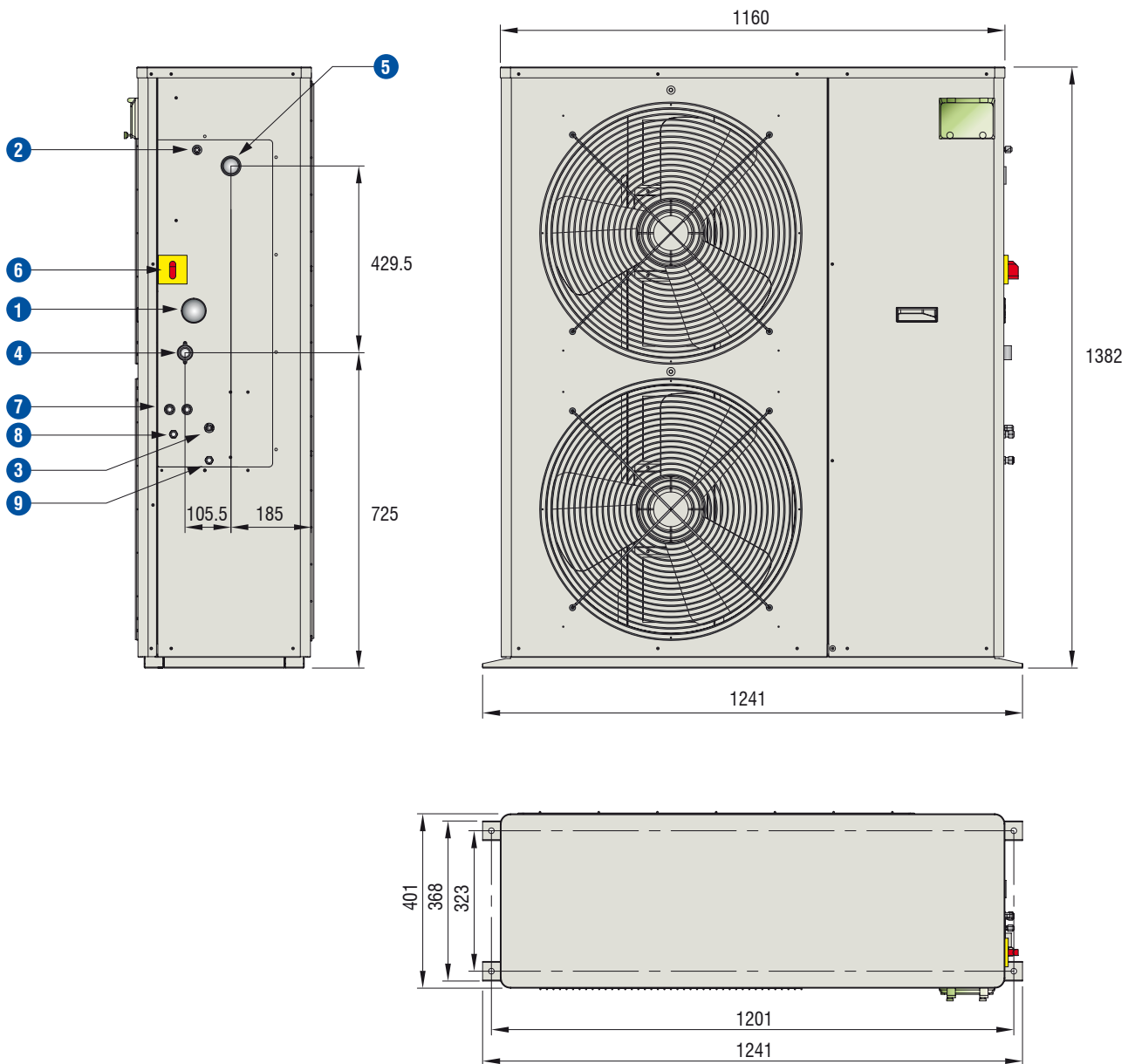
1	Water pressure gauge
2	Air vent valve
3	Water drain valve
4	Water inlet 3/4" gas female
5	Water outlet 3/4" gas female
6	Main switch
7	Electrical power supply
8	HP service valve
9	LP service valve

Dimensions (mm) - MQHD 10T & 12 - Three Phase Units



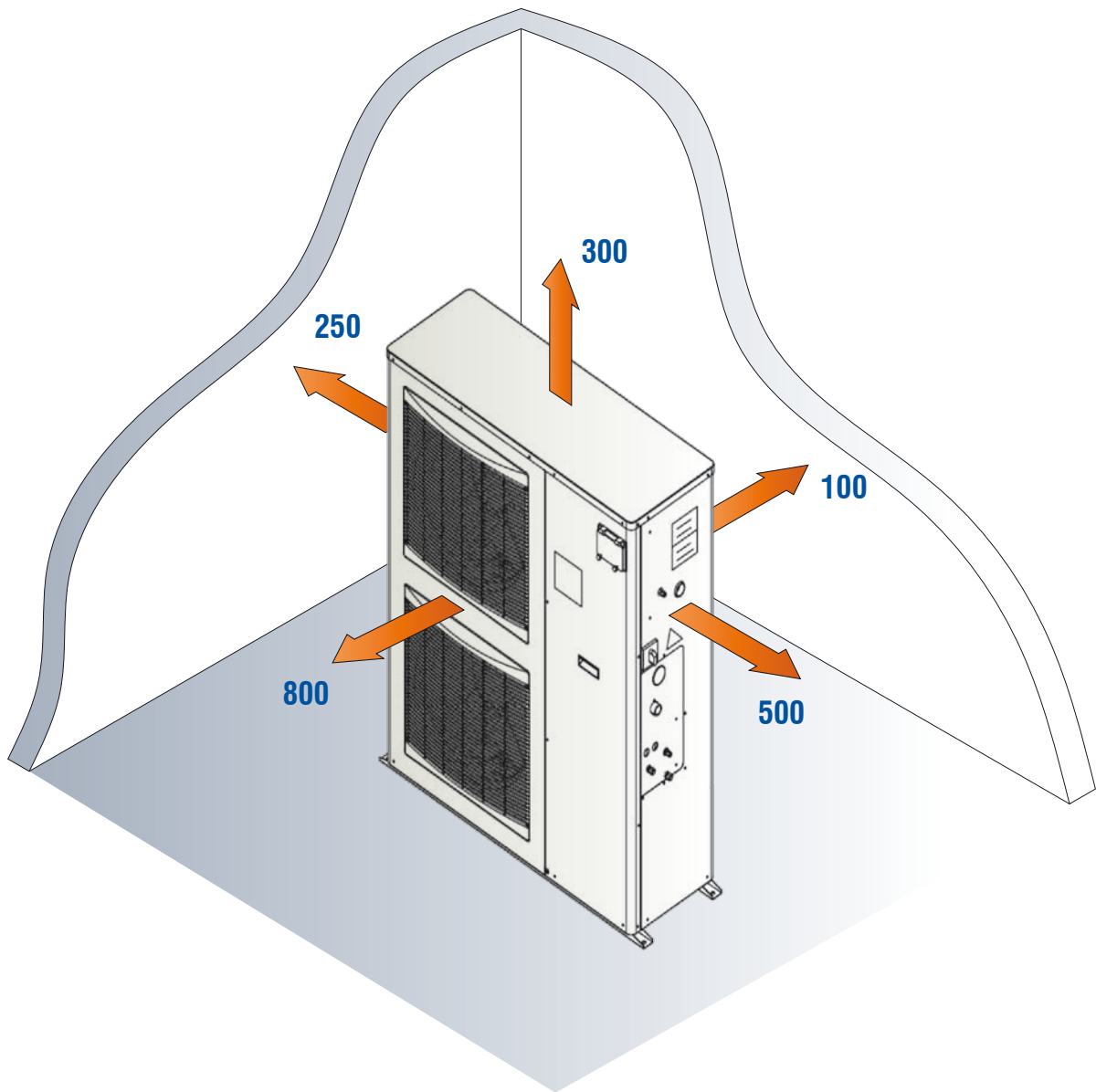
1	Water pressure gauge
2	Air vent valve
3	Water drain valve
4	Water inlet 3/4" gas female
5	Water outlet 3/4" gas female
6	Main switch
7	Electrical power supply
8	HP service valve
9	LP service valve

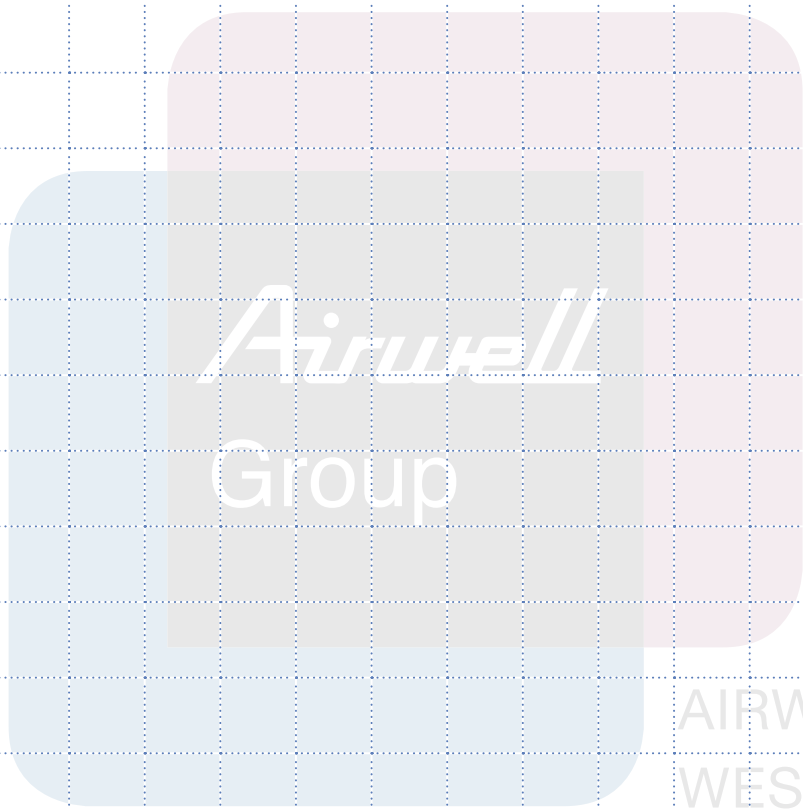
Dimensions (mm) - MQHD 14-16-18 - Three Phase Units



1	Water pressure gauge
2	Air vent valve
3	Water drain valve
4	Water inlet 1" gas female
5	Water outlet 1" gas female
6	Main switch
7	Electrical power supply
8	HP service valve
9	LP service valve

Minimum Clearances (mm)





AIRWELL
WESPER
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Ref. : EDM MQHD-A.2GB/02.12 - Supersedes : EDM MQHD-A.1GB/08.11

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