MRV W

Heat Pump System Full DC Inverter Water Cooled

MRV-W - FEATURES

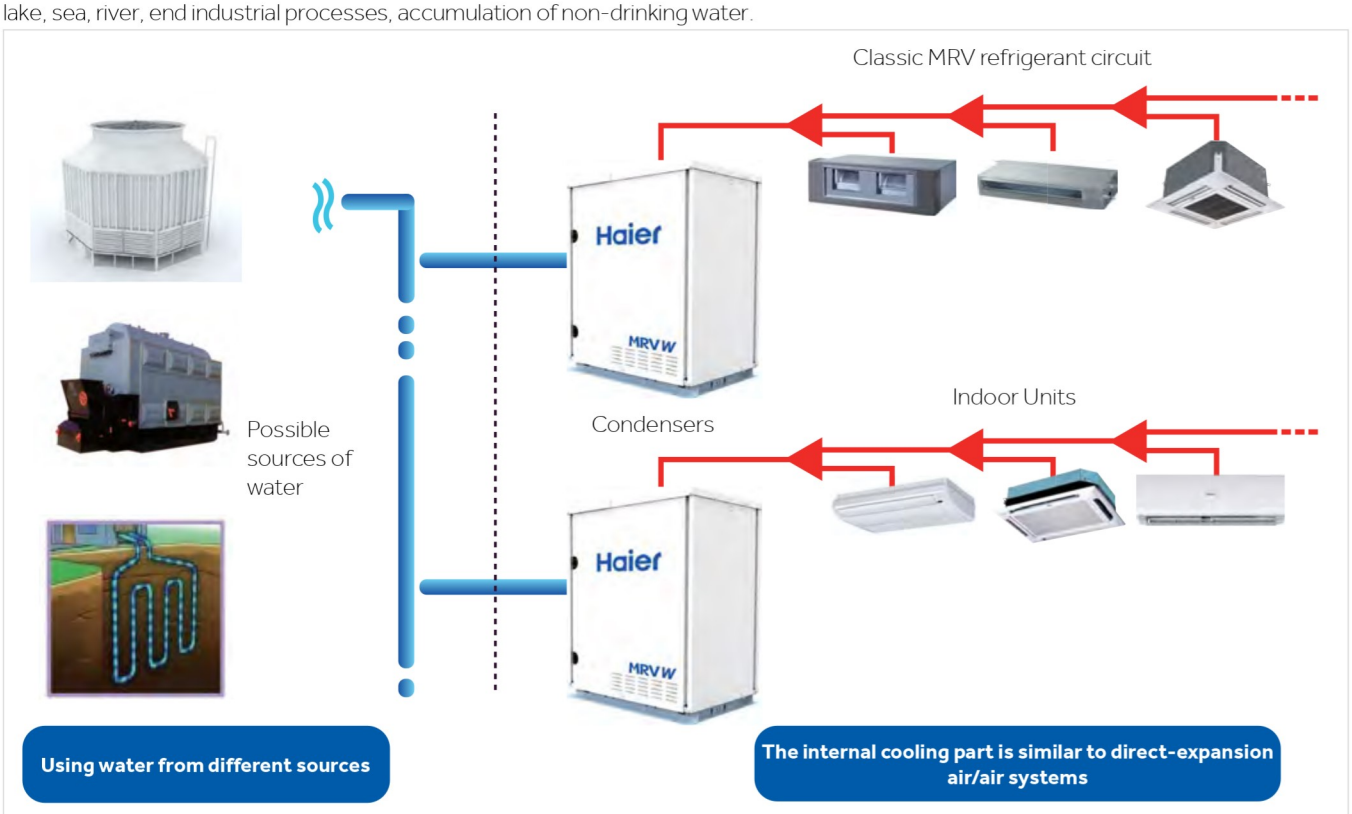
OPERATING PRINCIPLE

MRV-W are MRV/VRF systems with direct refrigerant expansion and inverter compressors that use the same indoor units as the classic MRV systems, controls and joints.

The design and implementation of the internal circuit follows the same rules as a normal MRV/VRF system, the only difference is that they use water and not air to condense or evaporate on the outdoor unit. MRV-W therefore does not have fans and large air/refrigerant exchangers but uses special water/refrigerant exchangers. This allows to significantly reduce the size of the product compared to a classic MRV of equal cooling capacity.

Thanks to its small footprint, of only W 775 x D 545 x H 995, the installation of the MRV-W takes place inside technical rooms, basements, garages and corridors as it does not need to exchange energy with the outdoor air.

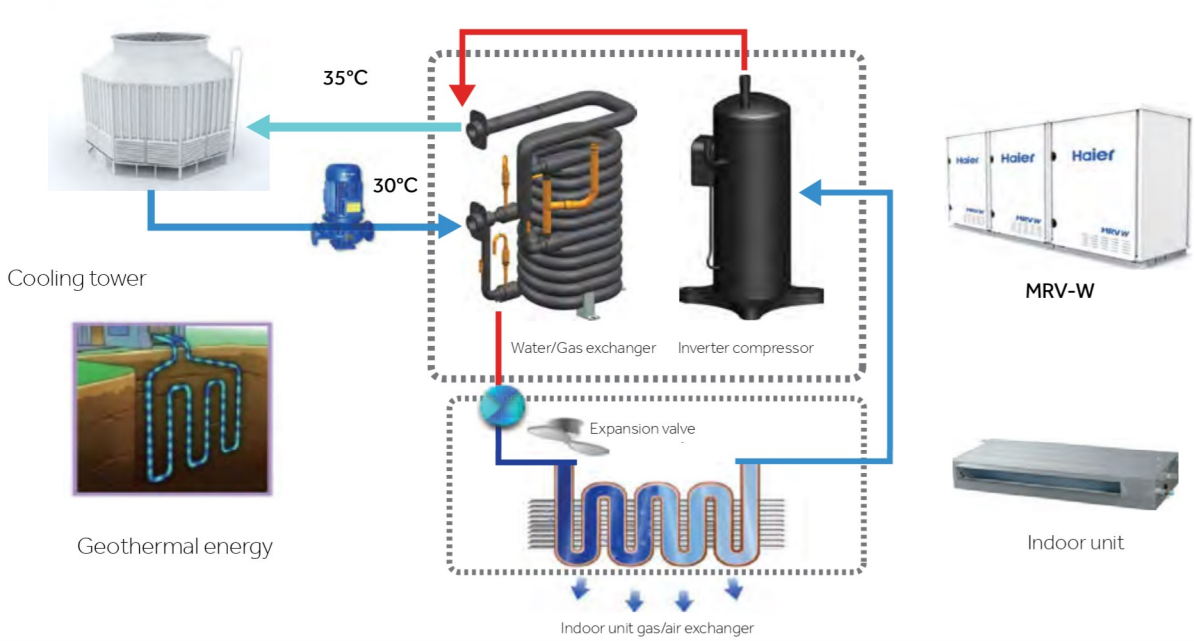
The water needed for operation reaches the units through small diameter pipes. Water can have different origins such as ground water, lake, sea, river, end industrial processes, accumulation of non-drinking water.



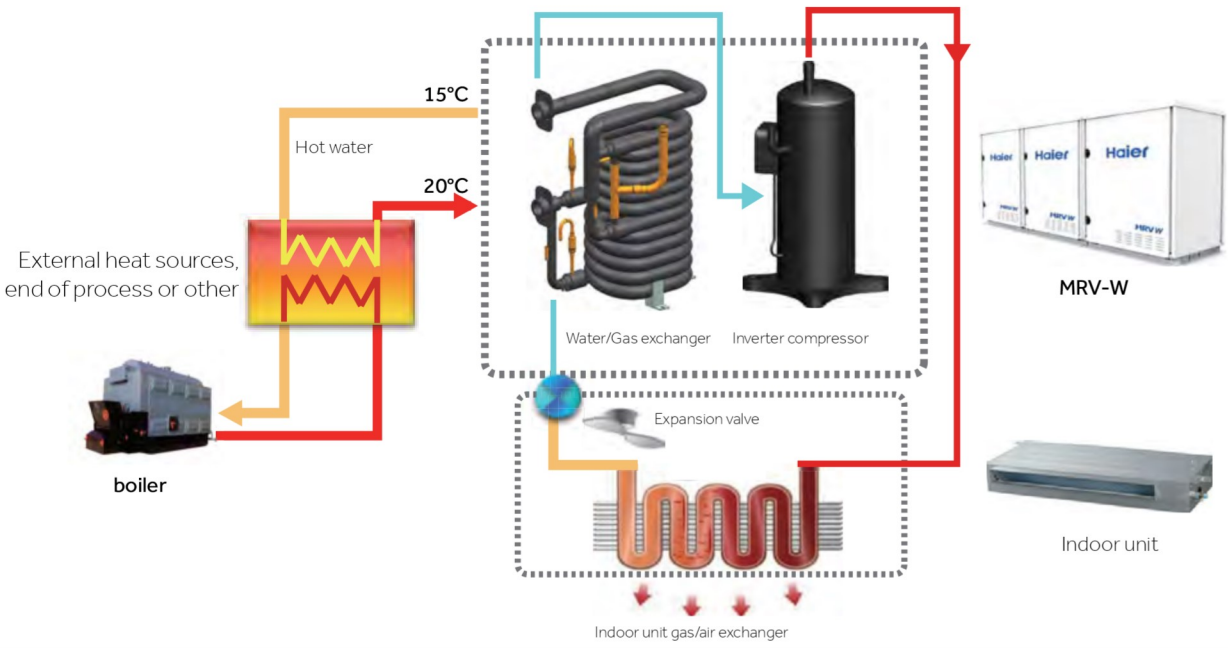
CONFIGURATION

MRW-W is a direct expansion system that combines the efficiency of the VRF technology with the use of water from a variety of sources.

EXAMPLE OF COOLING OPERATION



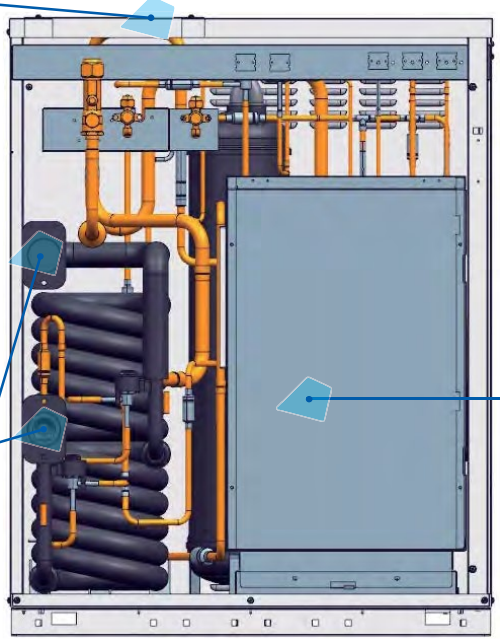
EXAMPLE OF HEATING OPERATION



MRV-W - FEATURES

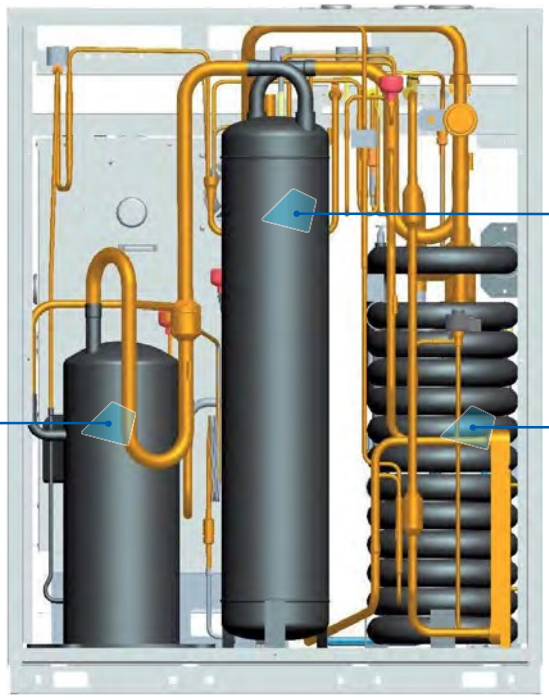
MRV-W INTERNAL STRUCTURE

Refrigerant connections
to indoor units



Water entry and exit to
the gas/water exchanger

Electrical, compact and easily removable
panel to access the compressor



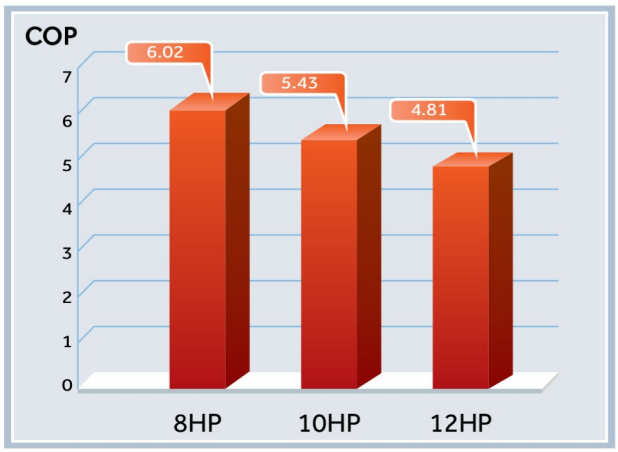
Generous gas separator and liquid
refrigerant side.

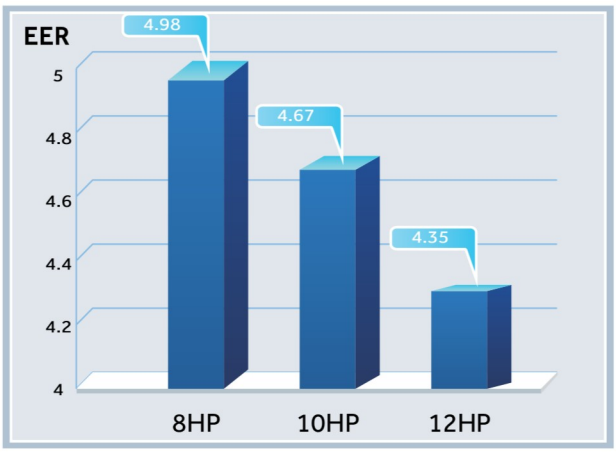
Double-wrapped "pipe in pipe" gas water
exchanger in counter flow, great efficiency
and uniformity of exchange.

DC Inverter Compressor

HIGH EFFICIENCY

Using a constant source, the COP can also reach values of 6.02, much higher than an air/air system. As a result, EER values are also increased in equal proportion.





HIGH-EFFICIENCY COMPRESSOR

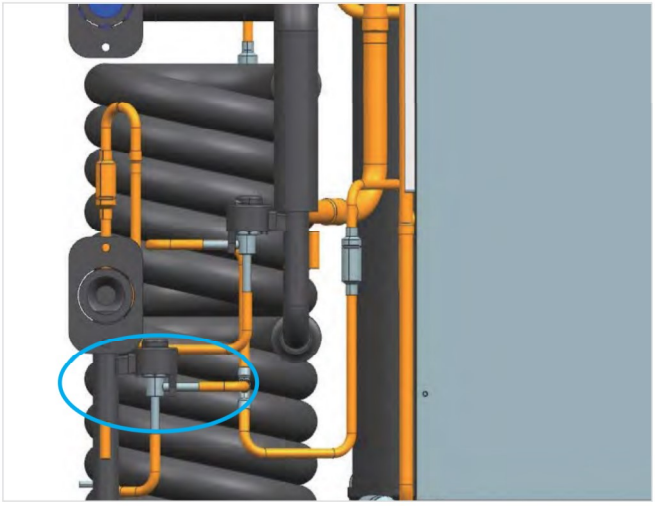
DC Inverter Scroll

COUNTER CURRENT "PIPE IN PIPE" EXCHANGER

Water circulates inside and refrigerant circulates outside. The internal star-section and spiral tube offers a greater exchange surface than a classic circular section, for the benefit of efficiency.

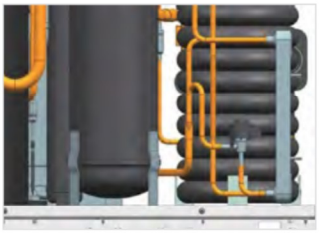
DUAL ELECTRONIC EXPANSION VALVE

To modulate the surface of the active exchanger according to the thermal demand.



2-SIDED SUB-COOLING SYSTEM

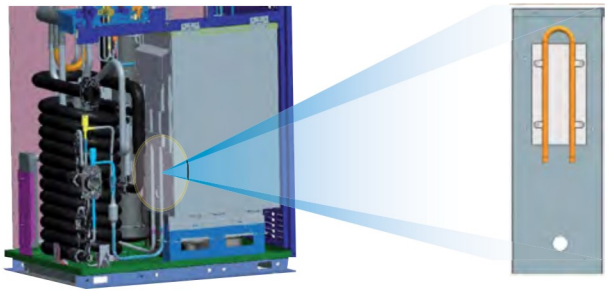
- The first stage acts on the condenser
- The second stage acts independently
- The independent or joint activity of the two stages allows to increase the exchange of refrigerant by 46% and to reduce the loss of load through the pipes by 55%, leading to an increase in overall efficiency of 9% compared to single circuits "Under cooling"



MRV-W - FEATURES

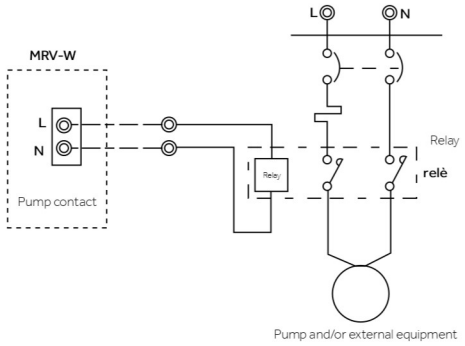
COOLING ELECTRONIC CIRCUITS

The circuits are cooled by special static exchangers where the refrigerant gas circulates inside. This allows you to cool and keep the temperature of the electric panel and power modules constant, avoiding cumbersome sinks and especially the use of noisy electric fans.

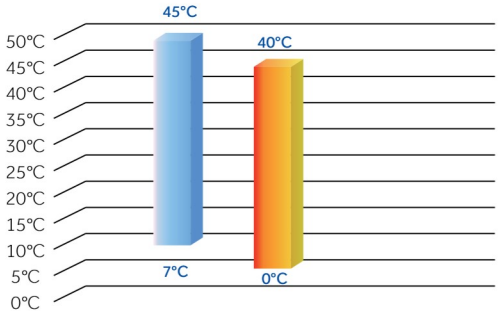


RELIABILITY

The management of the external pump or electro-valves to power the flow of water to the MRV-W systems, is controlled by the unit itself according to the activity of the compressor and the real need for water. Avoiding unnecessary waste of energy.



TEMPERATURE RANGE



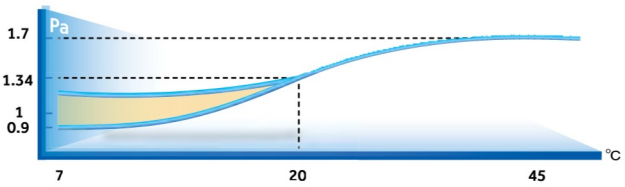
Water input temperature 7 to 45°C

Ambient temperatures where to install MRV-W 0~40°C

The water flow at the exchanger can range from 50 to 150 L/min (nominal 96 L/min)

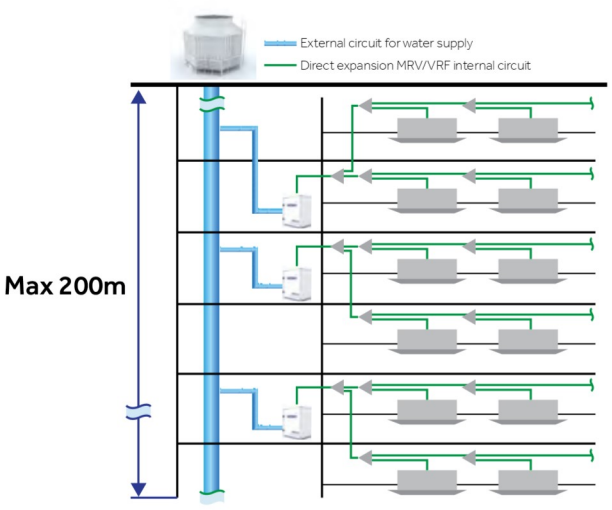
CONSTANT PRESSURE

Accurate system to maintain the pressure adequate to the compressor according to the operating temperature of the refrigerant in order to maintain a more stable output capacity and for the reliability over time of the component itself.



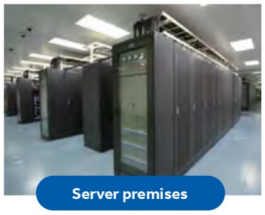
FLEXIBLE INSTALLATION

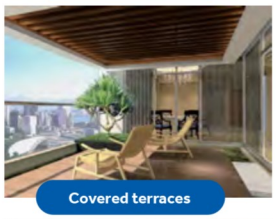
Using water as a condenser, you can air-condition very tall buildings, where you can reach up to 200 meters in height with a pressure of 1.6 MPa.



POSSIBLE ENVIRONMENTS WHERE MRV-W CAN BE INSTALLED INDOOR


Basements of villas


Server premises


Covered terraces


Corridors/storage

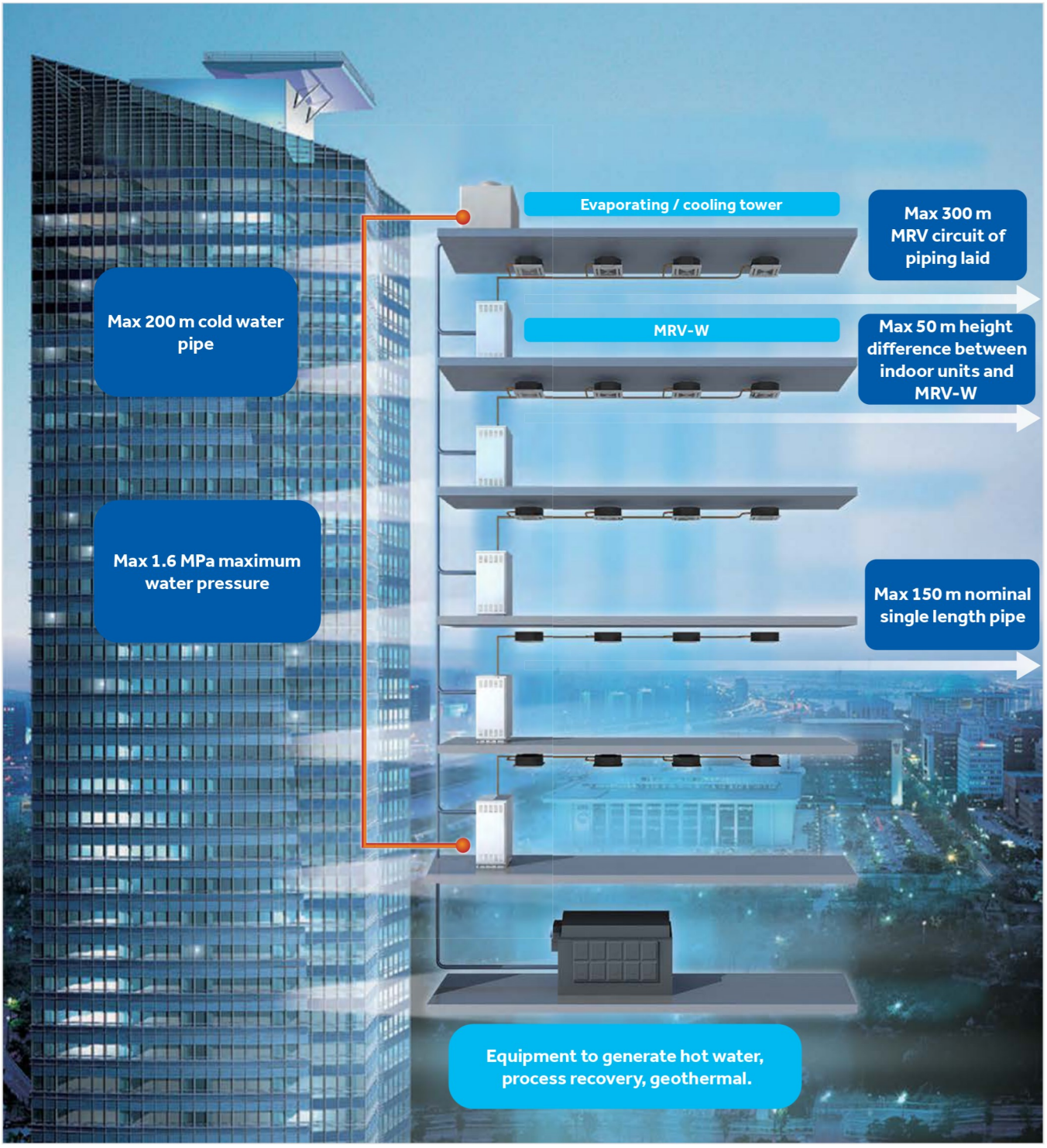

Engineering


Garages / warehouses

MRV-W - FEATURES

EXAMPLES OF PIPING LENGTHS

Ability to achieve large elevations and lengths within each floor served by an MRV-W.



Haier

Outdoor Units
MRV-W

8-12HP

AV08IMWEWA
AV10IMWEWA
AV12IMWEWA

Model		AV08IMWEWA	AV10IMWEWA	AV12IMWEWA
Capacity				
Power Class	HP	8	10	12
Cooling	kW	22,40	28,00	33,50
Heating	kW	25,00	31,50	37,50
Electrical Parameters				
Power supply	Ph-V/Hz	3/380-400/50/60 (5 wires L1+L2+L3+N+T)	3/380-400/50/60 (5 wires L1+L2+L3+N+T)	3/380-400/50/60 (5 wires L1+L2+L3+N+T)
Absorbed power - Cooling	kW	4,50	6,00	7,70
Max absorbed power - Cooling	kW	13,00	15,00	17,00
Absorbed current in cooling.	A	7,20	9,60	12,32
Max absorbed current - Cooling	A	20,79	23,99	27,19
Absorbed power – Heating	kW	4,15	5,80	7,80
Max absorbed power – Heating	kW	13,00	15,00	17,00
Absorbed current in heating	A	6,64	9,28	12,47
Max absorbed current – Heating	A	20,79	23,99	27,19
EER energy class	W/W	4,98	4,67	4,35
COP energy class	W/W	6,02	5,43	4,81
SEER energy class	W/W	5,87	5,76	5,69
SCOP energy class	W/W	6,13	6,01	5,96
Performance				
Water flow (High)	m^3/h	4,80	6,00	7,20
Sound pressure level (High)	dB(A)	50	51	53
Sound power level (High)	dB(A)	61	62	64
Installation - Dimensions - Components				
Unit Dimensions WxDxH	mm	775x545x995		
Packaged unit dimensions WxDxH	mm	875x655x1128		
Net weight / Gross weight	Kg	172/183	172/183	172/183
Compressor type		DC Inverter Scroll	DC Inverter Scroll	DC Inverter Scroll
Quantity and type of the compressor	No.	1 INV	1 INV	1 INV
Refrigerant type		R410A	R410A	R410A
Pre-charged refrigerant qty.	Kg	2	2	2
Ø Liquid side refrigerant pipe	mm (inch)	9,52 (3/8)	9,52 (3/8)	12,7 (1/2)
Ø Gas side refrigerant pipe	mm (inch)	19,05 (3/4)	22,22 (7/8)	25,40 (1)
Ø OU Oil Equalisation Pipe	mm (inch)	9,52 (3/8)	9,52 (3/8)	9,52 (3/8)
Maximum piping length	m	300	300	300
Max linear piping length (Equivalent/Real)	m	150/120	150/120	150/120
Max height difference between IU and OU (*)	m	50/40	50/40	50/40
Water/gas exchanger				
Type		Double - tube in tube	Double - tube in tube	Double - tube in tube
Material		Copper/steel	Copper/steel	Copper/steel
Water input connection		DN32	DN32	DN32
Water output connection		DN32	DN32	DN32
Exchanger pressure drop	Kpa	35	50	70
Connection type		Internal thread	Internal thread	Internal thread
Max water input pressure	Mpa	1.6	1.6	1.6
Water input temperature range (Cooling/ Heating)	°C	7~45	7~45	7~45
Connectable Indoor Capacity Ratio				
Indoor / Outdoor Capacity Ratio	%	50-130	50-130	50-130
Maximum number of connectable IUs	No.	13	16	19

(*1) 50 m when the outdoor unit is above the indoor unit / 40 m when it is below
The specifications indicated are obtained with the following test conditions: in Cooling mode, Indoor temperature of 27°C WB / 19°C DB and Outdoor temperature of 35°C WB / 24°C DB. In Heating mode, Indoor temperature of 20°C WB and Outdoor temperature of 7°C WB / 6°C DB

Outdoor Units
MRV-W

16-24HP

AV08IMWEWA
AV10IMWEWA
AV12IMWEWA

Model		AV16IMWEWA AV08IMWEWA AV08IMWEWA	AV18IMWEWA AV08IMWEWA AV10IMWEWA	AV20IMWEWA AV10IMWEWA AV10IMWEWA	AV22IMWEWA AV10IMWEWA AV12IMWEWA	AV24IMWEWA AV12IMWEWA AV12IMWEWA
Capacity						
Power Class	HP	16	18	20	22	24
Cooling	kW	44,80	50,40	56,00	61,50	67,00
Heating	kW	50,00	56,50	63,00	69,00	75,00
Electrical Parameters						
Power supply	Ph-V/Hz	3/380-400/50/60 (5 wires L1+L2+L3+N+T)	3/380-400/50/60 (5 wires L1+L2+L3+N+T)	3/380-400/50/60 (5 wires L1+L2+L3+N+T)	3/380-400/50/60 (5 wires L1+L2+L3+N+T)	3/380-400/50/60 (5 wires L1+L2+L3+N+T)
Absorbed power - Cooling	kW	9,00	10,50	12,00	13,70	15,40
Max absorbed power - Cooling	kW	26,00	28,00	30,00	32,00	34,00
Absorbed current in cooling.	A	14,39	16,79	19,19	21,91	24,63
Max absorbed current - Cooling	A	41,58	44,78	47,98	51,18	54,38
Absorbed power – Heating	kW	8,30	9,95	11,60	13,60	15,60
Max absorbed power – Heating	kW	26,00	28,00	30,00	32,00	34,00
Absorbed current in heating	A	13,27	15,91	18,55	21,75	24,95
Max absorbed current – Heating	A	41,58	44,78	47,98	51,18	54,38
EER energy class	W/W	4,98	4,8	4,67	4,49	4,35
COP energy class	W/W	6,02	5,68	5,43	5,07	4,81
SEER energy class	W/W	5,87	5,82	5,76	5,73	5,69
SCOP energy class	W/W	6,13	6,10	6,01	5,98	5,96
Performance						
Water flow (High)	m^3/h	9,60	10,80	12,00	13,20	14,40
Sound pressure level (High)	dB(A)	53	54	54	55	56
Sound power level (High)	dB(A)	64	65	65	66	67
Installation - Dimensions - Components						
Unit Dimensions WxDxH	mm	775x545x995+775x545x995				
Packaged unit dimensions WxDxH	mm	875x655x1128+875x655x1128				
Net weight / Gross weight	Kg	344/366	344/366	344/366	344/366	344/366
Compressor type		DC Inverter Scroll	DC Inverter Scroll	DC Inverter Scroll	DC Inverter Scroll	DC Inverter Scroll
Quantity and type of the compressor	No.	2 INV	2 INV	2 INV	2 INV	2 INV
Refrigerant type		R410A	R410A	R410A	R410A	R410A
Pre-charged refrigerant qty.	Kg	4	4	4	4	4
Ø Liquid side refrigerant pipe	mm (inch)	12,7 (1/2)	15,88 (5/8)	15,88 (5/8)	15,88 (5/8)	15,88 (5/8)
Ø Gas side refrigerant pipe	mm (inch)	28,58 (1 - 1/8)	28,58 (1 - 1/8)	28,58 (1 - 1/8)	28,58 (1 - 1/8)	28,58 (1 - 1/8)
Ø OU Oil Equalisation Pipe	mm (inch)	99,52 (3/8)	9,52 (3/8)	9,52 (3/8)	9,52 (3/8)	9,52 (3/8)
Maximum piping length	m	300	300	300	300	300
Max linear piping length (Equivalent/Real)	m	150/120	150/120	150/120	150/120	150/120
Max height difference between IU and OU (*)	m	50/40	50/40	50/40	50/40	50/40
Water/gas exchanger						
Type		Double - tube in tube	Double - tube in tube	Double - tube in tube	Double - tube in tube	Double - tube in tube
Material		Copper/steel	Copper/steel	Copper/steel	Copper/steel	Copper/steel
Water input connection		DN32	DN32	DN32	DN32	DN32
Water output connection		DN32	DN32	DN32	DN32	DN32
Exchanger pressure drop	Kpa	35+35	35+50	50+50	50+70	70+70
Connection type		Internal thread	Internal thread	Internal thread	Internal thread	Internal thread
Max water input pressure	Mpa	1,6	1,6	1,6	1,6	1,6
Water input temperature range (Cooling/ Heating)	°C	7~45	7~45	7~45	7~45	7~45
Connectable Indoor Capacity Ratio						
Indoor / Outdoor Capacity Ratio	%	50-130	50-130	50-130	50-130	50-130
Maximum number of connectable IUs	No.	23	29	33	36	39

(*1) 50 m when the outdoor unit is above the indoor unit / 40 m when it is below
The specifications indicated are obtained with the following test conditions: in Cooling mode, Indoor temperature of 27°C WB / 19°C DB and Outdoor temperature of 35°C WB / 24°C DB. In Heating mode, Indoor temperature of 20°C WB and Outdoor temperature of 7°C WB / 6°C DB

Haier

Outdoor Units
MRV-W

26-30HP
AV08IMWEWA
AV10IMWEWA
AV12IMWEWA

Model		AV26IMWEWA AV08IMWEWA AV08IMWEWA AV10IMWEWA	AV28IMWEWA AV08IMWEWA AV10IMWEWA AV10IMWEWA	AV30IMWEWA AV10IMWEWA AV10IMWEWA AV10IMWEWA
Capacity				
Power Class	HP	26	28	30
Cooling	kW	72,80	78,40	84,00
Heating	kW	81,50	88,00	94,50
Electrical Parameters				
Power supply	Ph-V/Hz	3/380-400/50/60 (5 wires L1+L2+L3+N+T)	3/380-400/50/60 (5 wires L1+L2+L3+N+T)	3/380-400/50/60 (5 wires L1+L2+L3+N+T)
Absorbed power - Cooling	kW	15,00	16,50	18,00
Max absorbed power - Cooling	kW	41.00	43,00	45,00
Absorbed current in cooling.	A	23,99	26,39	28,79
Max absorbed current - Cooling	A	65,57	68,77	71,97
Absorbed power – Heating	kW	14,10	15,75	17,40
Max absorbed power – Heating	kW	41,00	43,00	45,00
Absorbed current in heating	A	22,55	25,19	27,83
Max absorbed current – Heating	A	65,57	68,77	71,97
EER energy class	W/W	4,85	4,75	4,67
COP energy class	W/W	5,78	5,59	5,43
SEER energy class	W/W	5,84	5,8	5,76
SCOP energy class	W/W	6,11	6,1	6,01
Performance				
Water flow (High)	m^3/h	15,60	16,80	18,00
Sound pressure level (High)	dB(A)	55	55	56
Sound power level (High)	dB(A)	66	66	67
Installation - Dimensions - Components				
Unit Dimensions WxDxH	mm	775x545x995+775x545x995+775x545x995		
Packaged unit dimensions WxDxH	mm	875x655x1128+875x655x1128+875x655x1128		
Net weight / Gross weight	Kg	516/549	516/549	516/549
Compressor type		DC Inverter Scroll	DC Inverter Scroll	DC Inverter Scroll
Quantity and type of the compressor	No.	3 INV	3 INV	3 INV
Refrigerant type		R410A	R410A	R410A
Pre-charged refrigerant qty.	Kg	6	6	6
Ø Liquid side refrigerant pipe	mm (inch)	19,05 (3/4)	19,05 (3/4)	19,05 (3/4)
Ø Gas side refrigerant pipe	mm (inch)	31,80 (1-1/4)	31,80 (1-1/4)	31,80 (1-1/4)
Ø OU Oil Equalisation Pipe	mm (inch)	9,52 (3/8)	9,52 (3/8)	9,52 (3/8)
Maximum piping length	m	300	300	300
Max linear piping length (Equivalent/Real)	m	150/120	150/120	150/120
Max height difference between IU and OU (*)	m	50/40	50/40	50/40
Water/gas exchanger				
Type		Double - tube in tube	Double - tube in tube	Double - tube in tube
Material		Copper/steel	Copper/steel	Copper/steel
Water input connection		DN32	DN32	DN32
Water output connection		DN32	DN32	DN32
Exchanger pressure drop	Kpa	35+35+50	35+50+50	50+50+50
Connection type		Internal thread	Internal thread	Internal thread
Max water input pressure	Mpa	1,6	1,6	1,6
Water input temperature range (Cooling/ Heating)	°C	7~45	7~45	7~45
Connectable Indoor Capacity Ratio				
Indoor / Outdoor Capacity Ratio	%	50-130	50-130	50-130
Maximum number of connectable IUs	No.	43	46	50

(*1) 50 m when the outdoor unit is above the indoor unit / 40 m when it is below
The specifications indicated are obtained with the following test conditions: in Cooling mode, Indoor temperature of 27°C WB / 19°C DB and Outdoor temperature of 35°C WB / 24°C DB. In Heating mode, Indoor temperature of 20°C WB and Outdoor temperature of 7°C WB / 6°C DB

Outdoor Units
MRV-W

32-36HP

AV08IMWEWA
AV10IMWEWA
AV12IMWEWA

Model		AV32IMWEWA AV10IMWEWA AV10IMWEWA AV12IMWEWA	AV34IMWEWA AV10IMWEWA AV12IMWEWA AV12IMWEWA	AV36IMWEWA AV12IMWEWA AV12IMWEWA AV12IMWEWA
Capacity				
Power Class	HP	32	34	36
Cooling	kW	89,50	95,00	100,50
Heating	kW	100,50	106,50	112,50
Electrical Parameters				
Power supply	Ph-V/Hz	3/380-400/50/60 (5 wires L1+L2+L3+N+T)	3/380-400/50/60 (5 wires L1+L2+L3+N+T)	3/380-400/50/60 (5 wires L1+L2+L3+N+T)
Absorbed power - Cooling	kW	19,70	21,40	23,10
Max absorbed power - Cooling	kW	47,00	49,00	51,00
Absorbed current in cooling.	A	31,51	34,23	36,95
Max absorbed current - Cooling	A	75,17	78,37	81,57
Absorbed power – Heating	kW	19,40	21,40	23,40
Max absorbed power – Heating	kW	47,00	49,00	51,00
Absorbed current in heating	A	31,03	34,23	37,42
Max absorbed current – Heating	A	75,17	78,37	81,57
EER energy class	W/W	4,54	4,44	4,35
COP energy class	W/W	5,18	4,98	4,81
SEER energy class	W/W	5,74	5,72	5,69
SCOP energy class	W/W	5,99	5,97	5,96
Performance				
Water flow (High)	m^3/h	19,20	20,40	21,60
Sound pressure level (High)	dB(A)	57	57	58
Sound power level (High)	dB(A)	68	68	69
Installation - Dimensions - Components				
Unit Dimensions WxDxH	mm	775x545x995+775x545x995+775x545x995		
Packaged unit dimensions WxDxH	mm	875x655x1128+875x655x1128+875x655x1128		
Net weight / Gross weight	Kg	516/549	516/549	516/549
Compressor type		DC Inverter Scroll	DC Inverter Scroll	DC Inverter Scroll
Quantity and type of the compressor	No.	3 INV	3 INV	3 INV
Refrigerant type		R410A	R410A	R410A
Pre-charged refrigerant qty.	Kg	6	6	6
Ø Liquid side refrigerant pipe	mm (inch)	19,05 (3/4)	19,05 (3/4)	19,05 (3/4)
Ø Gas side refrigerant pipe	mm (inch)	31,80 (1-1/4)	31,80 (1-1/4)	31,80 (1-1/2)
Ø OU Oil Equalisation Pipe	mm (inch)	9,52 (3/8)	9,52 (3/8)	9,52 (3/8)
Maximum piping length	m	300	300	300
Max linear piping length (Equivalent/Real)	m	150/120	150/120	150/120
Max height difference between IU and OU (*)	m	50/40	50/40	50/40
Water/gas exchanger				
Type		Double - tube in tube	Double - tube in tube	Double - tube in tube
Material		Copper/steel	Copper/steel	Copper/steel
Water input connection		DN32	DN32	DN32
Water output connection		DN32	DN32	DN32
Exchanger pressure drop	Kpa	50+50+70	50+70+70	70+70+70
Connection type		Internal thread	Internal thread	Internal thread
Max water input pressure	Mpa	1,6	1,6	1,6
Water input temperature range (Cooling/ Heating)	°C	7~45	7~45	7~45
Connectable Indoor Capacity Ratio				
Indoor / Outdoor Capacity Ratio	%	50-130	50-130	50-130
Maximum number of connectable IUs	No.	53	56	59

(*1) 50 m when the outdoor unit is above the indoor unit / 40 m when it is below
The specifications indicated are obtained with the following test conditions: in Cooling mode, Indoor temperature of 27°C WB / 19°C DB and Outdoor temperature of 35°C WB / 24°C DB. In Heating mode, Indoor temperature of 20°C WB and Outdoor temperature of 7°C WB / 6°C DB