



R32

Commercial Air Conditioners

Engineering Data

M thermal A Series Split



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CONTENTS

Part 1

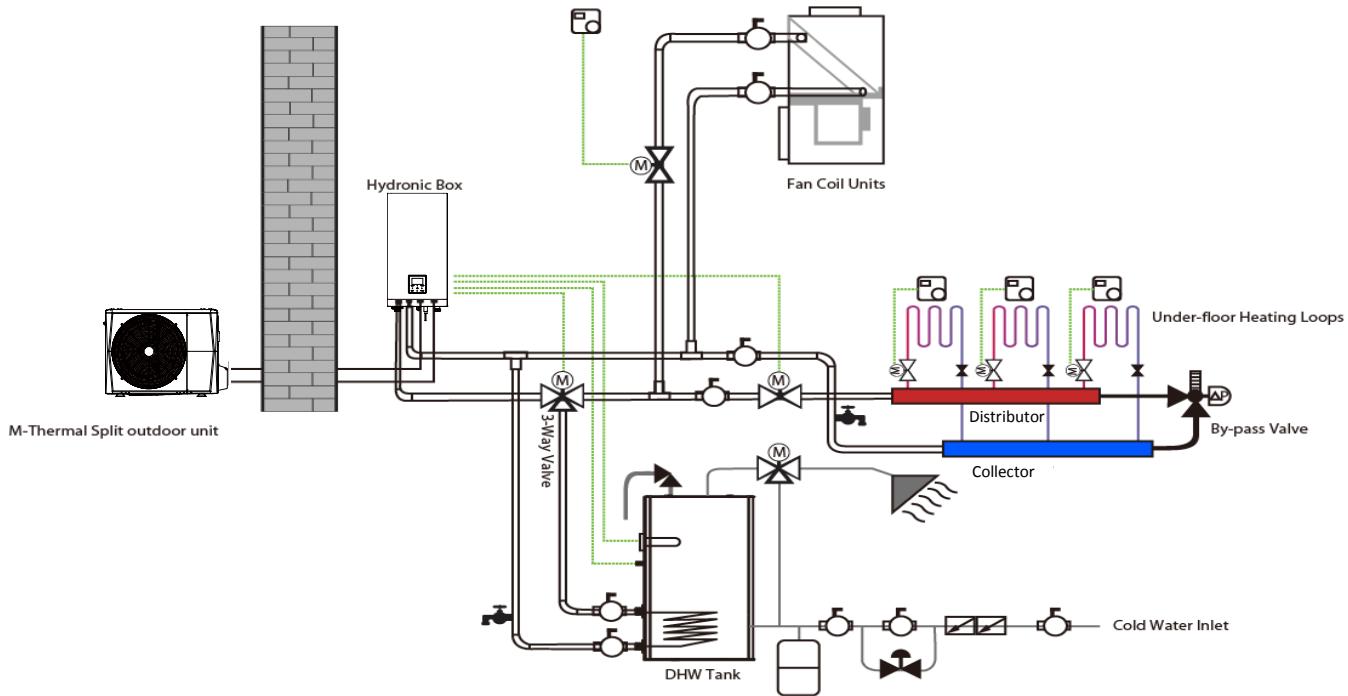
General Information

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1 M thermal Split System

1.1 System Schematic

Figure 1-1.1: System schematic



M thermal is an integrated air-to-water heat pump system which is one-stop solution for space heating, space cooling and domestic hot water. The outdoor heat pump system extracts heat from the outdoor air and transfers this heat through refrigerant piping to the plate heat exchanger in the hydronic box. The heated water in the hydronic box circulates to low temperature heat emitters (under-floor heating loops or low temperature radiators) to provide space heating, and to the domestic hot water tank to provide domestic hot water. The 4-way valve in the outdoor unit can reverse the refrigerant cycle so that the hydronic box can provide chilled water for cooling using fan coil units.

The heating capacity of heat pumps decreases with ambient temperature dropping. Backup electric heater is customized to provide additional heating capacity for use during extremely cold weather when the heat pump capacity is insufficient.

1.2 System Configurations

M thermal Split can be configured to run with the electric heater either enabled or disabled and can also be used in conjunction with an auxiliary heat source such as a boiler.

The chosen configuration affects the size of heat pump that is required. Three typical configurations are described below. Refer to Figure 1-1.2.

Configuration 1: Heat pump only

- The heat pump covers the required capacity and no extra heating capacity is necessary.
- Requires selection of larger capacity heat pump and implies higher initial investment.
- Ideal for new construction in projects where energy efficiency is paramount.

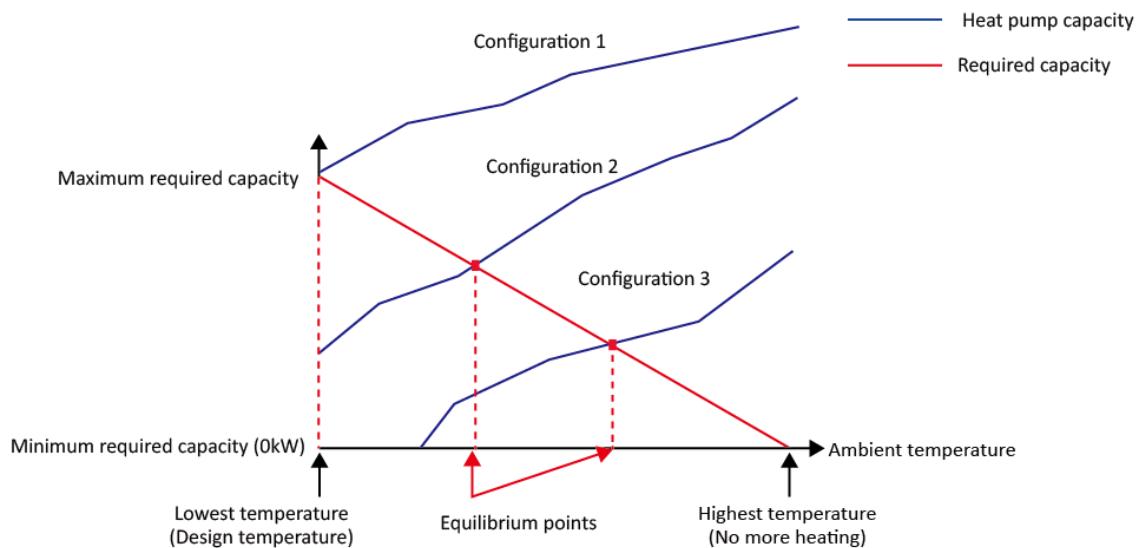
Configuration 2: Heat pump and backup electric heater

- Heat pump covers the required capacity until the ambient temperature drops below the point at which the heat pump is able to provide sufficient capacity. When the ambient temperature is below this equilibrium point (as shown in Figure 1-1.2, the backup electric heater supplies the required additional heating capacity.
- Best balance between initial investment and running costs, results in lowest lifecycle cost.
- Ideal for new construction.

Configuration 3: Heat pump conjunction with auxiliary heat source

- Heat pump covers the required capacity until the ambient temperature drops below the point at which the heat pump is able to provide sufficient capacity. When the ambient temperature is below this equilibrium point (as shown in Figure 1-1.2, depending on the system settings, either the auxiliary heat source supplies the required additional heating capacity or the heat pump does not run and the auxiliary heat source covers the required capacity.
- Enables selection of lower capacity heat pump.
- Ideal for refurbishments and upgrades.

Figure 1-1.2: System configurations



2 Unit Capacities

2.1 Outdoor unit

Table 1-2.1: Outdoor unit

Capacity	4kW	6kW
MHA-	V4W/D2N8-B	V6W/D2N8-B
Power Supply (V/Ph/Hz)	220-240/1 /50	220-240/1 /50
Appearance		

Capacity	8kW	10kW	12kW		14kW		16kW	
Model MHA-	V8W/D2N8-B	V10W/D2N8-B	V12W/D2N8-B	V12W/D2RN8-B	V14W/D2N8-B	V14W/D2RN8-B	V16W/D2N8-B	V16W/D2RN8-B
Power Supply (V/Ph/Hz)	220-240/1/50	220-240/1/50	220-240/1/50	380-415/3/50	220-240/1/50	380-415/3/50	220-240/1/50	380-415/3/50
Appearance								

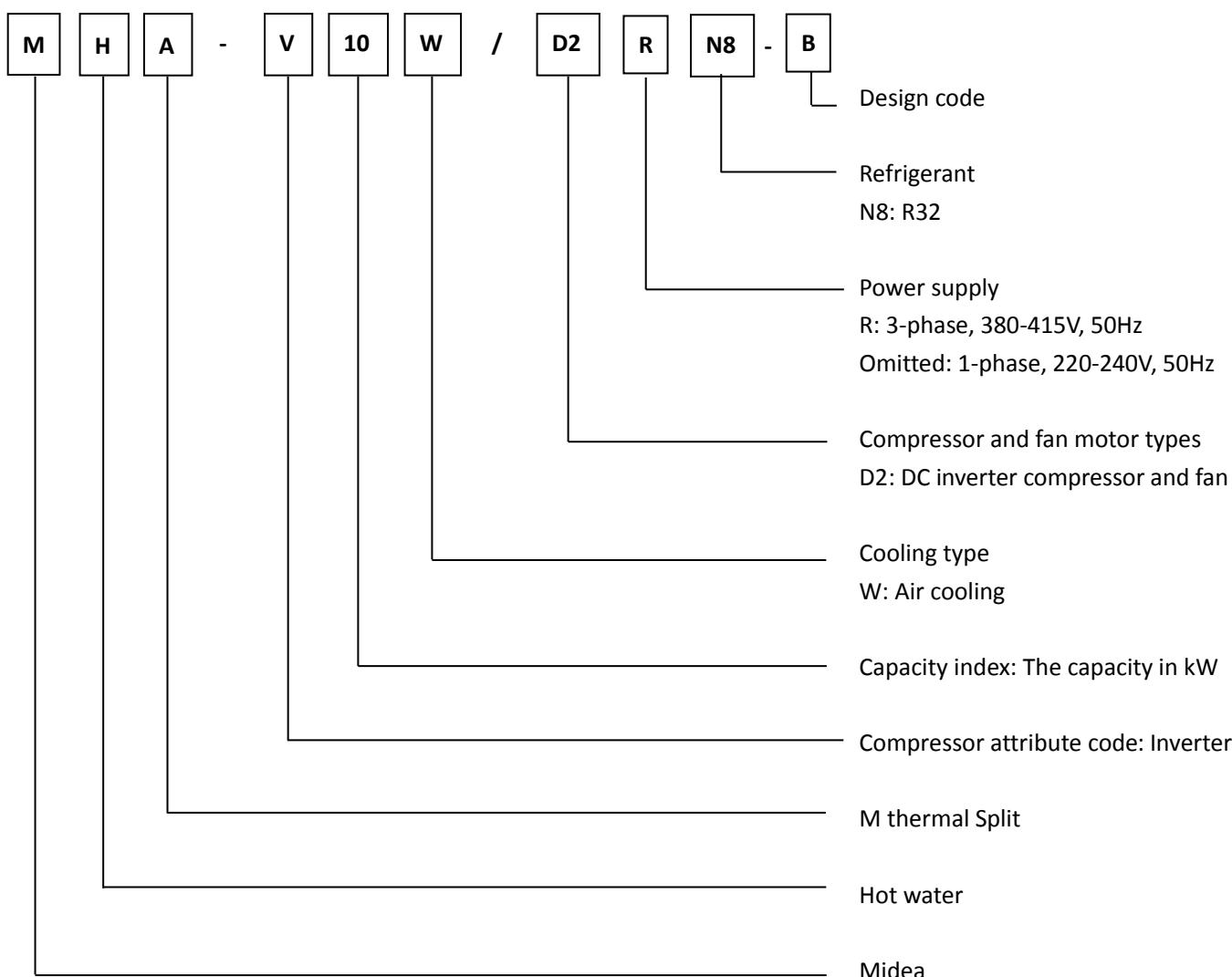
2.2 Hydronic box

Table 1-2.2: Hydronic box

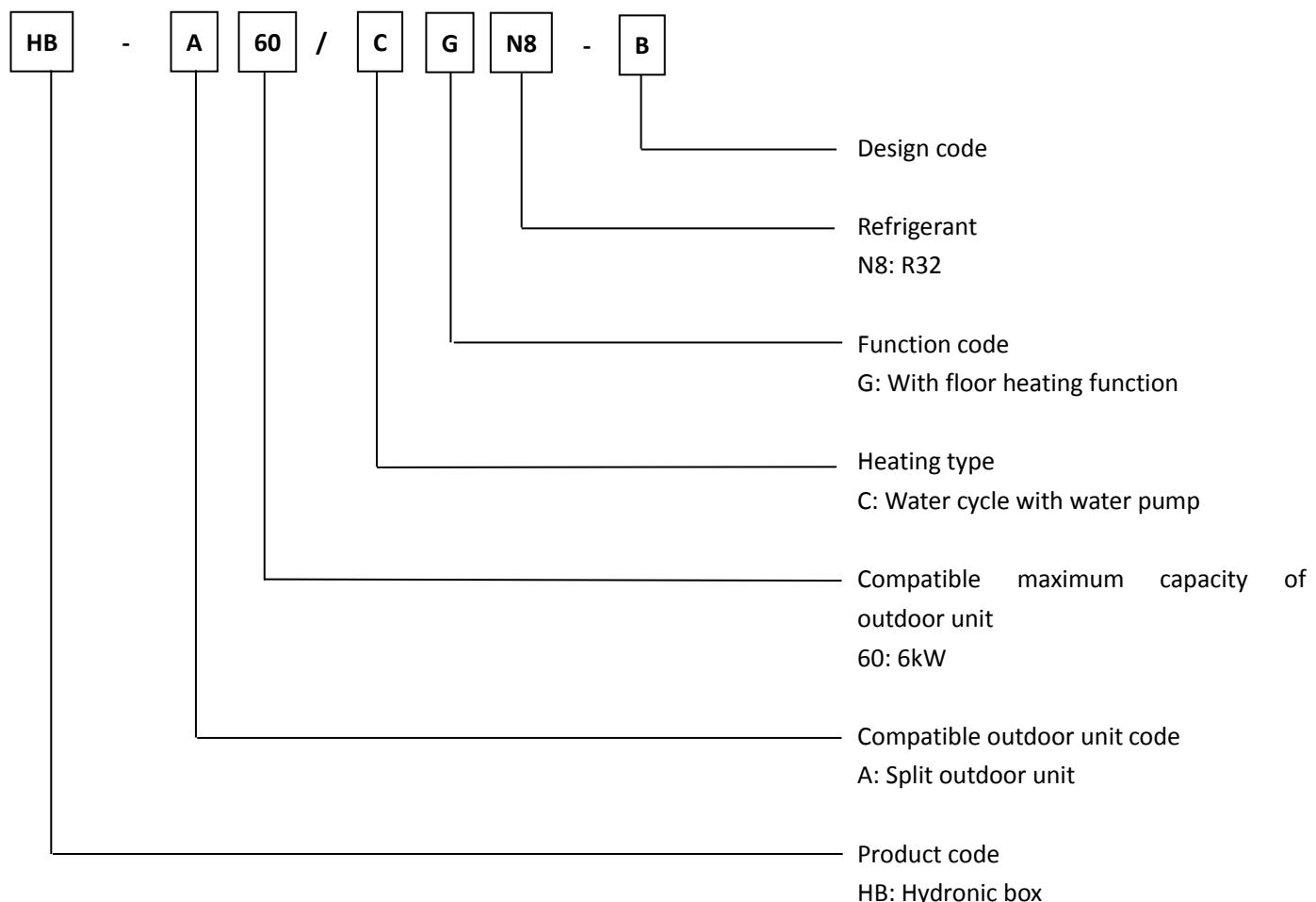
Model	HB-A60/CGN8-B	HB-A100/CGN8-B	HB-A160/CGN8-B
Power Supply (V/Ph/Hz)	220-240/1 /50	220-240/1 /50	220-240/1 /50
Compatible outdoor unit model MHA-	V4W/D2N8-B	V8W/D2N8-B	V12W/D2N8-B
	V6W/D2N8-B	V10W/D2N8-B	V14W/D2N8-B
Appearance			

3 Nomenclature

3.1 Outdoor unit



3.2 Hydronic box



4 System Design and Unit Selection

4.1 Selection procedure

Step 1: Total heat load calculation

Calculate conditioned surface area
Select the heat emitters (type, quantity, water temperature and heat load)

Step 2: System configuration

Decide whether to include AHS and set AHS's switching temperature
Decide whether backup electric heater is enabled or disabled

Step 3: Selection of outdoor units

Determine required total heat load on outdoor units
Set capacity safety factor
Select power supply

Provisionally select M thermal Split unit capacity based on nominal capacity

Correct capacity of the outdoor units for the following items:
Outdoor air temperature / Outdoor humidity / Water outlet temperature¹ / Altitude / Anti-freeze fluid

Is corrected M thermal Split unit capacity ≥ Required total heat load on outdoor units²

Yes

M thermal Split system selection is complete

No

Select a larger model or enable backup electric heater operation

Notes:

1. If the required water temperatures of the heat emitters are not all the same, the M thermal Split's outlet water temperature setting should be set at the highest of the heat emitter required water temperatures. If the water outlet design temperature falls between two temperatures listed in the outdoor unit's capacity table, calculate the corrected capacity by interpolation.
2. If the outdoor unit selection is to be based on total heating load and total cooling load, select Split units which satisfy both total heating and cooling load requirements.

4.2 M thermal Leaving Water Temperature (LWT) Selection

The recommended design LTW ranges for different types of heat emitter are:

- For floor heating: 30 to 35°C
- For fan coil units: 30 to 45°C
- For low temperature radiators: 40 to 50°C

4.3 Optimizing System Design

To get the most comfort with the lowest energy consumption with M thermal, it is important to take account of the following considerations:

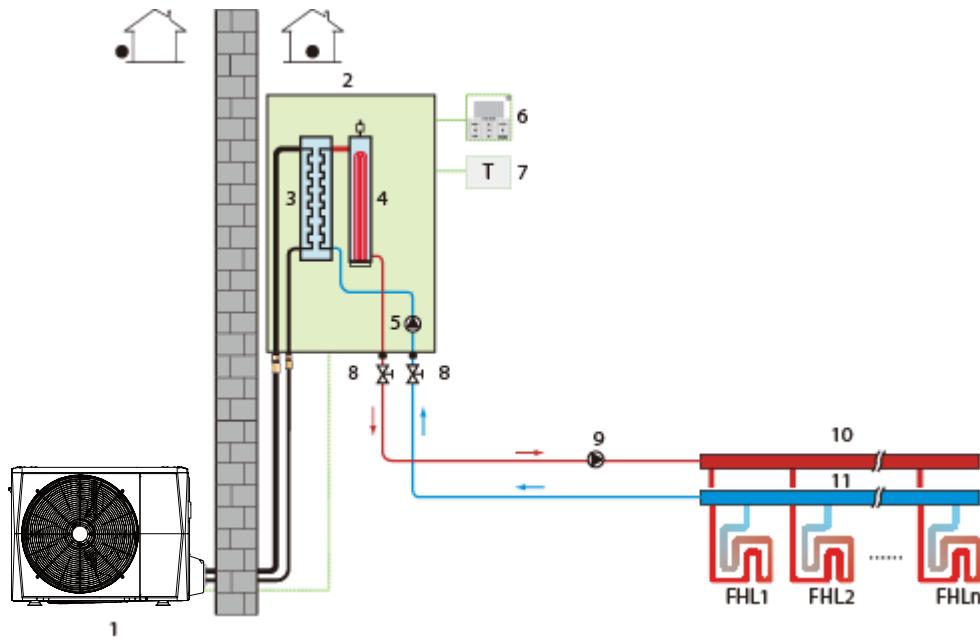
- Choose heat emitters that allow the heat pump system to operate at as low a hot water temperature as possible whilst still providing sufficient heating.
- Make sure the correct weather dependency curve is selected to match the installation environment (building structure, climate) as well as ender user's demands.
- Connecting room thermostats (field supplied) to the hydronic system helps prevent excessive space heating by stopping the outdoor unit and circulator pump when the room temperature is above the thermostat set point.

5 Typical Applications

5.1 Space Heating Only

The room thermostat is used as a switch. When there is a heating request from the room thermostat, the unit operates to achieve the target water temperature set on the user interface. When the room temperature reaches the thermostat's set temperature, the unit stops.

Figure 1-5.1: Space heating

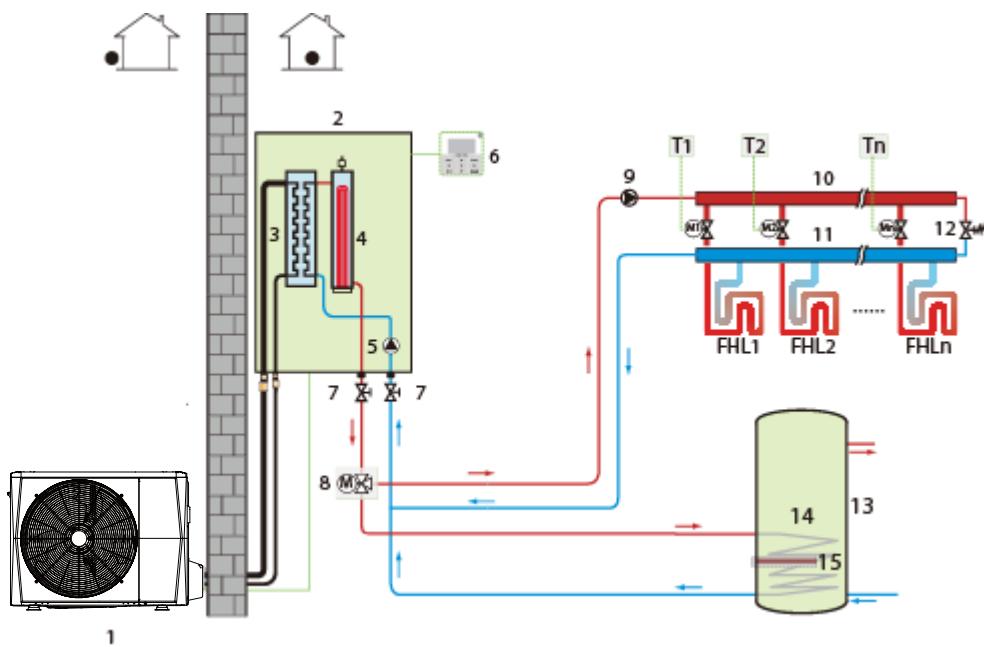


Legend			
1	Outdoor unit	7	Room thermostat (field supplied)
2	Hydronic box	8	Stop valve (field supplied)
3	Plate heat exchanger	9	External circulator pump (field supplied)
4	Backup electric heater(optional)	10	Distributor (field supplied)
5	Internal circulator pump	11	Collector (field supplied)
6	User interface	FHL 1...n	Floor heating loops (field supplied)

5.2 Space Heating and Domestic Hot Water

The room thermostats are not connected to the hydronic box but to a motorized valve. Each room's temperature is regulated by the motorized valve on its water circuit. Domestic hot water is supplied from the domestic hot water tank connected to the hydronic box. A bypass valve is required.

Figure 1-5.2: Space heating and domestic hot water

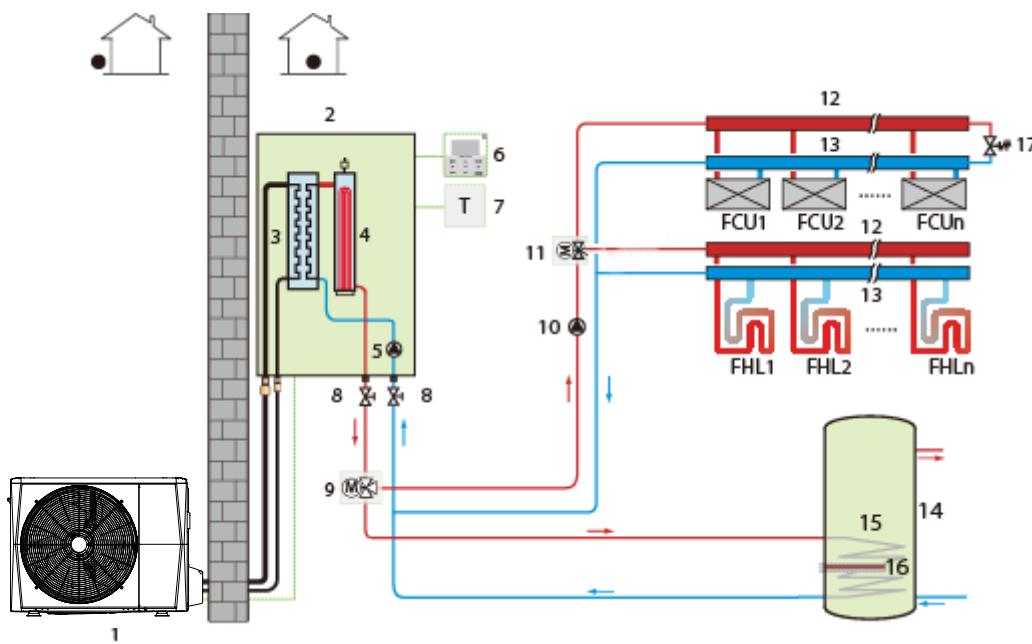


Legend			
1	Outdoor unit	10	Distributor (field supplied)
2	Hydronic box	11	Collector (field supplied)
3	Plate heat exchanger	12	Bypass valve (field supplied)
4	Backup electric heater(optional)	13	Domestic hot water tank (field supplied)
5	Internal circulator pump	14	Heat exchanger coil
6	User interface	15	Immersion heater
7	Stop valve (field supplied)	FHL 1...n	Floor heating loops (field supplied)
8	Motorized 3-way valve (field supplied)	M1...n	Motorized valves (field supplied)
9	External circulator pump (field supplied)	T1...n	Room thermostats (field supplied)

5.3 Space Heating, Space Cooling and Domestic Hot Water

Floor heating loops and fan coil units are used for space heating and fan coil units are used for space cooling. Domestic hot water is supplied from the domestic hot water tank connected to the hydronic box. The unit switches to heating or cooling mode according to the temperature detected by the room thermostat. In space cooling mode, the 2-way valve is closed to prevent cold water entering the floor heating loops.

Figure 1-5.3: Space heating, space cooling and domestic hot water

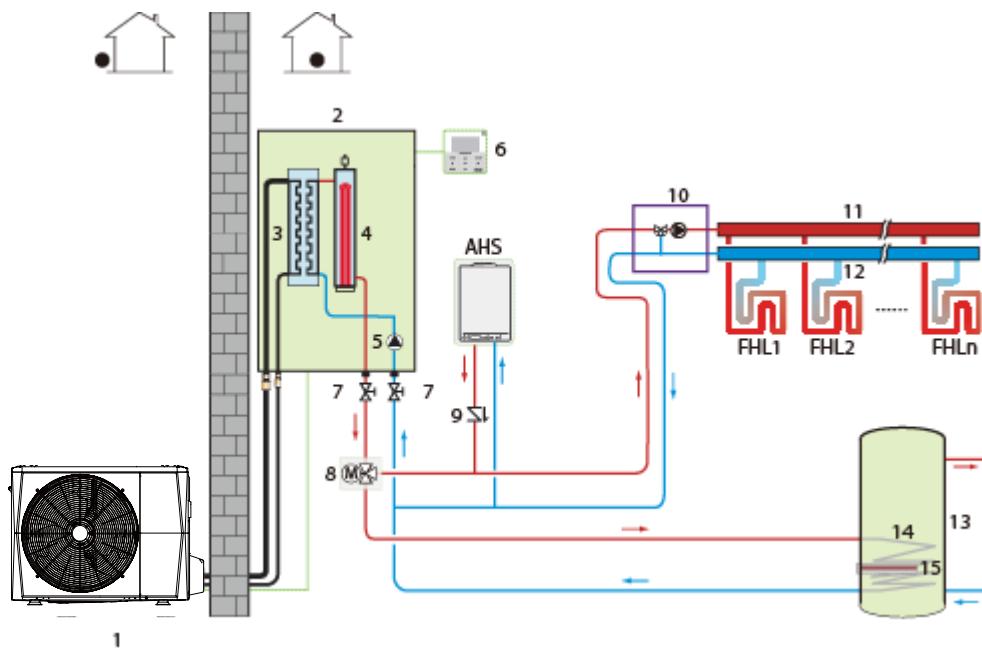


Legend			
1	Outdoor unit	11	3-way valve (field supplied)
2	Hydronic box	12	Distributor (field supplied)
3	Plate heat exchanger	13	Collector (field supplied)
4	Backup electric heater(optional)	14	Domestic hot water tank (field supplied)
5	Internal circulator pump	15	Heat exchanger coil
6	User interface	16	Immersion heater
7	Room thermostat (field supplied)	17	Bypass valve (field supplied)
8	Stop valve (field supplied)	FHL 1...n	Floor heating loops (field supplied)
9	Motorized 3-way valve (field supplied)	FCU 1...n	Fan coil units (field supplied)
10	External circulator pump (field supplied)		

5.4 Space Heating and Domestic Hot Water (Bivalent)

5.4.1 Auxiliary heat source provides space heating only

Figure 1-5.4: Space heating and domestic hot water with auxiliary heat source providing space heating only

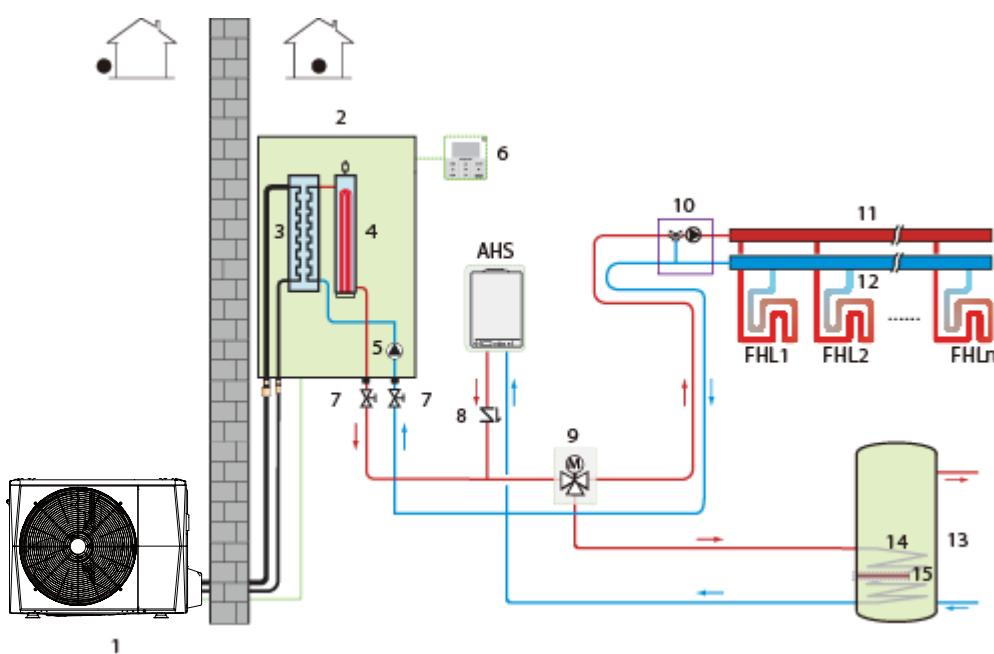


Legend

1	Outdoor unit	10	Mixing station (field supplied)
2	Hydronic box	11	Distributor (field supplied)
3	Plate heat exchanger	12	Collector (field supplied)
4	Backup electric heater(optional)	13	Domestic hot water tank (field supplied)
5	Internal circulator pump	14	Heat exchanger coil
6	User interface	15	Immersion heater
7	Stop valve (field supplied)	FHL 1...n	Floor heating loops (field supplied)
8	Motorized 3-way valve (field supplied)	AHS	Auxiliary heating source (field supplied)
9	Non-return valve (field supplied)		

5.4.2 Auxiliary heat source provides space heating and domestic hot water

Figure 1-5-5: Space heating and domestic hot water with auxiliary heat source providing space heating and domestic hot water

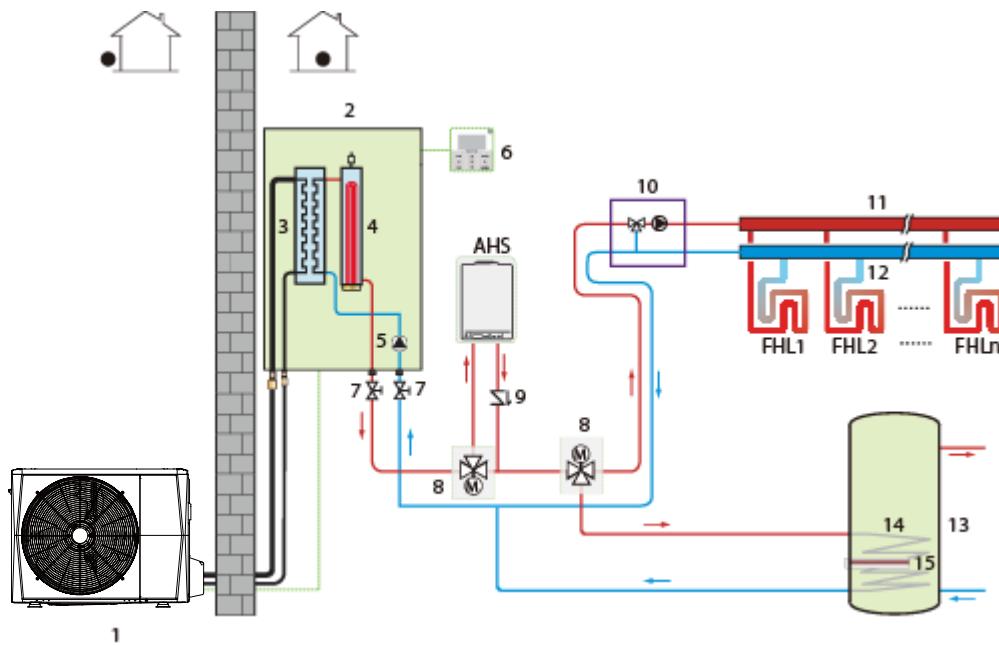


Legend	
1	Outdoor unit
2	Hydronic box
3	Plate heat exchanger
4	Backup electric heater(optional)
5	Internal circulator pump
6	User interface
7	Stop valve (field supplied)
8	Non-return valve (field supplied)
9	Motorized 3-way valve (field supplied)
10	Mixing station (field supplied)
11	Distributor (field supplied)
12	Collector (field supplied)
13	Domestic hot water tank (field supplied)
14	Heat exchanger coil
15	Immersion heater
FHL 1...n	Floor heating loops (field supplied)
AHS	Auxiliary heating source (field supplied)

5.4.3 Auxiliary heat source provides additional heating

If the unit's outlet temperature is too low, the auxiliary heat source provides additional heating to raise the water temperature to the set temperature. An additional 3-way valve is required. When the unit's outlet temperature is too low, the 3-way valve is open and the water flows through the auxiliary heat source. When the unit's outlet temperature is high enough, the 3-way valve is closed.

Figure 1-5.6: Space heating and domestic hot water with auxiliary heat source providing additional heating

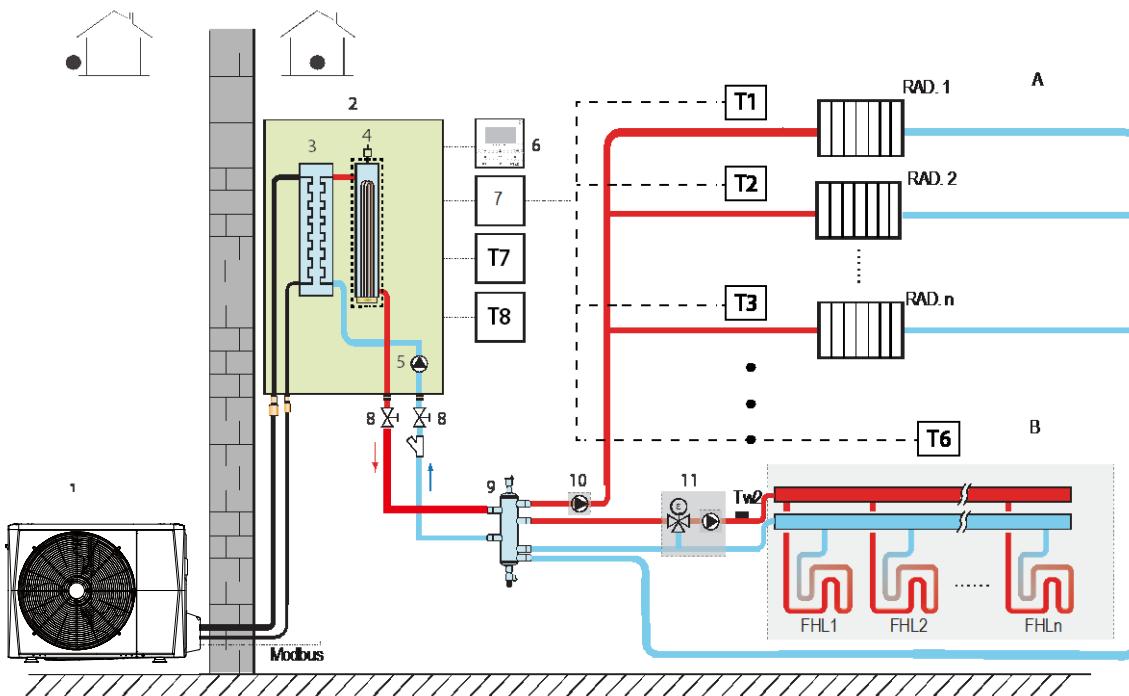


Legend			
1	Outdoor unit	10	Mixing station (field supplied)
2	Hydronic box	11	Distributor (field supplied)
3	Plate heat exchanger	12	Collector (field supplied)
4	Backup electric heater(optional)	13	Domestic hot water tank (field supplied)
5	Internal circulator pump	14	Heat exchanger coil
6	User interface	15	Immersion heater
7	Stop valve (field supplied)	FHL 1...n	Floor heating loops (field supplied)
8	Motorized 3-way valve (field supplied)	AHS	Auxiliary heating source (field supplied)
9	Non-return valve (field supplied)		

5.5 Space Heating Through Floor Heating Loops and Radiators

The floor heating loops and radiators require different operating water temperatures. To achieve these two set points, a mixing station is required. Room thermostats for each zone are optional. With the help of hydronic adapter board(optional), maximum 8 thermostats for 8 rooms are available to control heat pump, which greatly improves the operation convenience.

Figure 1-5.7: Space heating through floor heating loops and radiators



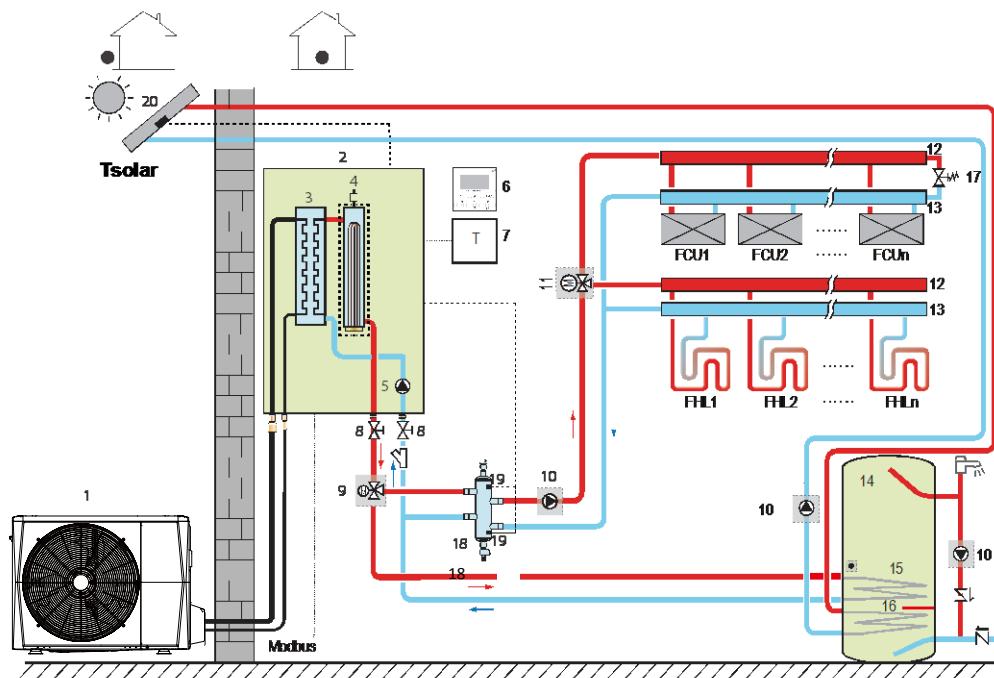
Legend

1	Outdoor unit	10	External circulator pump (field supplied)
2	Hydronic box	11	Mixing station (field supplied)
3	Plate heat exchanger	12	Room thermostat (field supplied)
4	Backup electric heater(optional)	13	Bypass valve (field supplied)
5	Internal circulator pump	FHL 1...n	Floor heating loops (field supplied)
6	User interface(Integrated in hydronic box)	RAD 1...n	Radiators (field supplied)
7	Hydronic adapter board (Optional)	11	Mixing station (field supplied)
8	Stop valve (field supplied)	T1...8	Room thermostats (field supplied)
9	Balance tank (field supplied)		

5.6 Space Heating, Space Cooling and Domestic Hot Water Compatible with Solar Water Heater

Floor heating loops and fan coil units are used for space heating and fan coil units are used for space cooling. Domestic hot water is supplied from the domestic hot water tank connected to both the hydronic box and solar water heater. Solar water pump is controlled by Tsolar temperature sensor. Balance tank temperature sensor is used to control on/off of heat pump. Once the heat pump stops, internal pump stops to save energy and then balance tank provides hot water for space heating. In addition, balance tank temperature control can meet both space heating and domestic hot water needs at the same time.

Figure 1-5.8: Space heating, space cooling and domestic hot water compatible with solar water heater



Legend			
1	Outdoor unit	12	Distributor (field supplied)
2	Hydronic box	13	Collector (field supplied)
3	Plate heat exchanger	14	Domestic hot water tank (field supplied)
4	Backup electric heater(optional)	15	Heat exchanger coil
5	Internal circulator pump	16	Immersion heater
6	User interface(Integrated in hydronic box)	17	Bypass valve (field supplied)
7	Room thermostat	18	Balance tank (field supplied)*
8	Stop valve (field supplied)	19	Balance tank temperature sensor (optional)
9	Motorized 3-way valve (field supplied)	FHL 1...n	Floor heating loops (field supplied)
10	External circulator pump (field supplied)	FCU 1...n	Fan coil units (field supplied)
11	Motorized 3-way valve (field supplied)		

Note:

1. Balance tank volume requirement
For HB-A60/CGN8-B, balance tank volume $\geq 25L$
For HB-A100/CGN8-B, balance tank volume $\geq 25L$
For HB-A160/CGN8-B, balance tank volume $\geq 40L$

Part 2

Engineering Data

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1 Specifications

1.1 Outdoor Unit

Table 2-1.1: MHA-V4(6, 8, 10)W/D2N8-B specifications¹

Model name MHA-		V4W/D2N8-B	V6W/D2N8-B	V8W/D2N8-B	V10W/D2N8-B
Compatible hydronic box HB-		A60/CGN8-B		A100/CGN8-B	
Power supply		V/Ph/Hz			220-240/1/50
Heating ²	Capacity	kW	4.25	6.20	8.30
	Rated input	kW	0.82	1.24	1.60
	COP		5.20	5.00	5.20
Heating ³	Capacity	kW	4.35	6.35	8.20
	Rated input	kW	1.14	1.69	2.08
	COP		3.80	3.75	3.95
Heating ⁴	Capacity	kW	4.40	6.00	7.50
	Rated input	kW	1.49	2.00	2.36
	COP		2.95	3.00	3.18
Cooling ⁵	Capacity	kW	4.50	6.55	8.40
	Rated input	kW	0.81	1.34	1.66
	EER		5.55	4.90	5.05
Cooling ⁶	Capacity	kW	4.70	7.00	7.40
	Rated input	kW	1.36	2.33	2.19
	EER		3.45	3.00	3.38
Seasonal space heating energy efficiency class ⁷	LWT at 35°C		A+++	A+++	A+++
	LWT at 55°C		A++	A++	A++
SCOP ⁷	LWT at 35°C		4.85	4.95	5.21
	LWT at 55°C		3.31	3.52	3.36
SEER	LWT at 7°C		4.99	5.34	5.83
	LWT at 18°C		7.77	8.21	8.95
MOP(Maximum overcurrent protection)		A	18	18	19
MCA(Minimum circuit amps)		A	12	14	16
Compressor	Type		Twin rotary DC inverter		Twin rotary DC inverter
Outdoor fan	Motor type		Brushless DC motor		Brushless DC motor
	Number of fans		1	1	1
Air side heat exchanger	Type		Finned tube		Finned tube
Refrigerant(R32)	Factory charge	kg	1.50	1.50	1.65
Throttle type			Electronic expansion valve		Electronic expansion valve
Piping connections	Type		Flare	Flare	Flare
	Liquid Dia.(OD)	mm	Φ6.35	Φ6.35	Φ9.52
	Gas Dia.(OD)	mm	Φ15.9	Φ15.9	Φ15.9
	Min. pipe length	m	2	2	2
	Max. pipe length	m	30	30	30
Installation height difference	Outdoor unit above	m	20	20	20
	Outdoor unit below	m	20	20	20
Sound power level ⁸		dB	56	58	59
Sound pressure level ⁹		dB	44	45	46
Net dimensions (W×H×D)		mm	1008×712×426	1008×712×426	1118×865×523
Packed dimensions (W×H×D)		mm	1065×800×485	1065×800×485	1180×890×560
Net/Gross weight		kg	58/64	58/64	77/88
Operating temperature range	Cooling	°C	-5 to 43		
	Heating	°C	-25 to 35		
	DHW	°C	-25 to 43		

Table 2-1.1: MHA-V12(14, 16)W/D2N8-B specifications¹

Model name MHA-		V12W/D2N8-B	V14W/D2N8-B	V16W/D2N8-B
Compatible hydronic box HB-		A160/CGN8-B		
Power supply		220-240/1/50		
Heating ²	Capacity	kW	12.1	14.5
	Rated input	kW	2.44	3.09
	COP		4.95	4.70
Heating ³	Capacity	kW	12.3	14.2
	Rated input	kW	3.24	3.89
	COP		3.80	3.65
Heating ⁴	Capacity	kW	12.0	13.8
	Rated input	kW	3.87	4.60
	COP		3.10	3.00
Cooling ⁵	Capacity	kW	12.00	13.50
	Rated input	kW	3.00	3.75
	EER		4.00	3.60
Cooling ⁶	Capacity	kW	11.6	12.7
	Rated input	kW	4.22	4.98
	EER		2.75	2.55
Seasonal space heating energy efficiency class ⁷	LWT at 35°C		A+++	A+++
	LWT at 55°C		A++	A++
SCOP ⁷	LWT at 35°C		4.81	4.72
	LWT at 55°C		3.45	3.47
SEER	LWT at 7°C		4.89	4.86
	LWT at 18°C		7.1	6.9
MOP(Maximum overcurrent protection)	A	30	30	30
MCA(Minimum circuit amps)	A	25	26	27
Compressor	Type	Twin rotary DC inverter		
Outdoor fan	Motor type	Brushless DC motor		
	Number of fans	1	1	1
Air side heat exchanger	Type	Finned tube		
Refrigerant(R32)	Factory charge	kg	1.84	1.84
Throttle type	Electronic expansion valve			
Piping connections	Type	Flare	Flare	Flare
	Liquid Dia.(OD)	mm	Φ9.52	Φ9.52
	Gas Dia.(OD)	mm	Φ15.9	Φ15.9
	Min. / Max. pipe length	m	2/30	2/30
Installation height difference	Outdoor unit above	m	20	20
	Outdoor unit below	m	20	20
Sound power level ⁸	dB	64	65	68
Sound pressure level ⁹	dB	50	51	54
Net dimensions (W×H×D)	mm	1118×865×523	1118×865×523	1118×865×523
Packed dimensions (W×H×D)	mm	1180×890×560	1180×890×560	1180×890×560
Net/Gross weight	kg	96/110	96/110	96/110
Operating temperature range	Cooling	°C	-5 to 43	
	Heating	°C	-25 to 35	
	DHW	°C	-25 to 43	

M thermal Split

Table 2-1.1: MHA-V12(14, 16)W/D2RN8-B specifications¹

Model name MHA-			V12W/D2RN8-B	V14W/D2RN8-B	V16W/D2RN8-B
Compatible hydronic box HB-			A160/CGN8-B		
Power supply		V/Ph/H	380-415/3/50		
Heating ²	Capacity	kW	12.1	14.5	16.0
	Rated input	kW	2.44	3.09	3.56
	COP		4.95	4.70	4.50
Heating ³	Capacity	kW	12.3	14.2	16.0
	Rated input	kW	3.24	3.89	4.44
	COP		3.80	3.65	3.60
Heating ⁴	Capacity	kW	12.0	13.8	16.0
	Rated input	kW	3.87	4.60	5.52
	COP		3.10	3.00	2.90
Cooling ⁵	Capacity	kW	12.00	13.50	14.90
	Rated input	kW	3.00	3.75	4.38
	EER		4.00	3.60	3.40
Cooling ⁶	Capacity	kW	11.6	12.7	14.0
	Rated input	kW	4.22	4.98	5.71
	EER		2.75	2.55	2.45
Seasonal space heating energy efficiency class ⁷	LWT at 35°C		A+++	A+++	A+++
	LWT at 55°C		A++	A++	A++
SCOP ⁷	LWT at 35°C		4.81	4.72	4.62
	LWT at 55°C		3.45	3.47	3.41
SEER	LWT at 7°C		4.86	4.83	4.67
	LWT at 18°C		7.04	6.85	6.71
MOP(Maximum overcurrent protection)	A		14	14	14
MCA(Minimum circuit amps)	A		10	11	12
Compressor	Type		Twin rotary DC inverter		
Outdoor fan	Motor type		Brushless DC motor		
	Number of fans		1	1	1
Air side heat exchanger	Type		Finned tube		
Refrigerant(R32)	Factory charge	kg	1.84	1.84	1.84
Throttle type			Electronic expansion valve		
Piping connections	Type		Flare	Flare	Flare
	Liquid/ Gas Dia.(OD)	mm	Φ9.52/15.9	Φ9.52/15.9	Φ9.52/15.9
	Min. /Max. pipe length	m	2/30	2/30	2/30
Installation height difference	Outdoor unit above/below	m	20	20	20
Sound power level ⁸	dB		64	65	68
Sound pressure level(1m) ⁹	dB		50	51	55
Net dimensions (W×H×D)	mm		1118×865×523	1118×865×523	1118×865×523
Packed dimensions (W×H×D)	mm		1180×890×560	1180×890×560	1180×890×560
Net/Gross weight	kg		112/125	112/125	112/125
Operating temperature range	Cooling	°C	-5 to 43		
	Heating	°C	-25 to 35		
	DHW	°C	-25 to 43		

Note: 1. Relevant EU standards and legislation: EN14511; EN14825; EN50564; EN12102; (EU) No 811:2013; (EU) No 813:2013; OJ 2014/C 207/02:2014.

2. Outdoor air temperature 7°C DB, 85% R.H.; EWT 30°C, LWT 35°C.

3. Outdoor air temperature 7°C DB, 85% R.H.; EWT 40°C, LWT 45°C.

4. Outdoor air temperature 7°C DB, 85% R.H.; EWT 47°C, LWT 55°C.

5. Outdoor air temperature 35°C DB; EWT 23°C, LWT 18°C.

6. Outdoor air temperature 35°C DB; EWT 12°C, LWT 7°C.

7. Seasonal space heating energy efficiency class tested in average climate conditions.

8. Test standard: EN12102-1

9. Sound pressure level is the maximum value tested under the two conditions of Notes2 and Notes5.

1.2 Hydronic Box

Table 2-1.2: HB-A60(100,160)/ CGN8-B specifications

Model name HB-			A60/CGN8-B	A100/CGN8-B	A160/CGN8-B
Compatible Outdoor unit model MHA-			V4(6)W/D2N8-B	V8(10)W/D2N8-B	V12(14,16)W/D2(R)N8-B
Function			Heating and cooling		
Setting water temperature range	Cooling	°C	5~25		
	Heating	°C	25~65		
	DHW (tank)	°C	30~60		
Power supply		V/Ph/ Hz	220-240/1/50	220-240/1/50	220-240/1/50
Sound power level ¹		dB	38	42	43
Sound pressure level(1m) ²		dB	28	30	32
Dimension (W×H×D)		mm	420×790×270	420×790×270	420×790×270
Packing (W×H×D)		mm	525×1050×360	525×1050×360	525×1050×360
Net/gross weight		kg	37/43	37/43	39/45
Water circuit	Piping connections		inch	R1"	R1"
	Safety valve set pressure		MPa	0.3	0.3
	Drainage pipe connection		mm	Φ25	Φ25
	Expansion tank	Volume	L	8.0	8.0
		Max. water pressure	MPa	0.3	0.3
		Pre-pressure	MPa	0.1	0.1
	Water side	Type	Plate type		Plate type
Refrigerant circuit	Water pump head		m	9	9
	Liquid Dia. (OD)		mm	Φ6.35	Φ9.52
	Gas Dia. (OD)		mm	Φ15.9	Φ15.9

Note: 1. Test standard: EN12102-1
 2. Sound pressure level is the maximum value tested under the two conditions of Note3 and Note4 for different combination between outdoor unit and hydronic box.

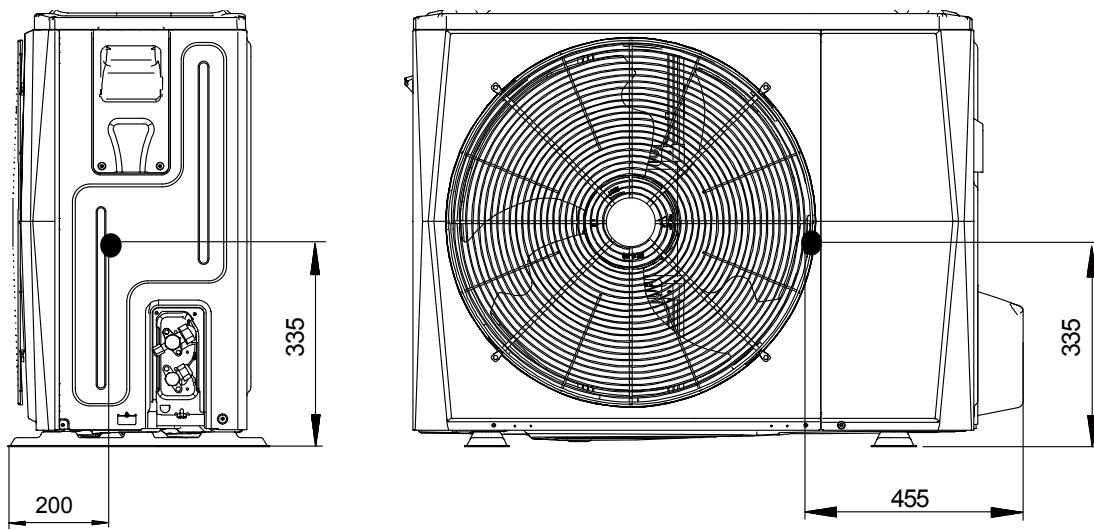
3. Outdoor air temperature 7°C DB, 85% R.H.; EWT 30°C, LWT 35°C.
4. Outdoor air temperature 35°C DB; EWT 23°C, LWT 18°C.

2 Dimensions and Center of Gravity

2.1 Outdoor Unit

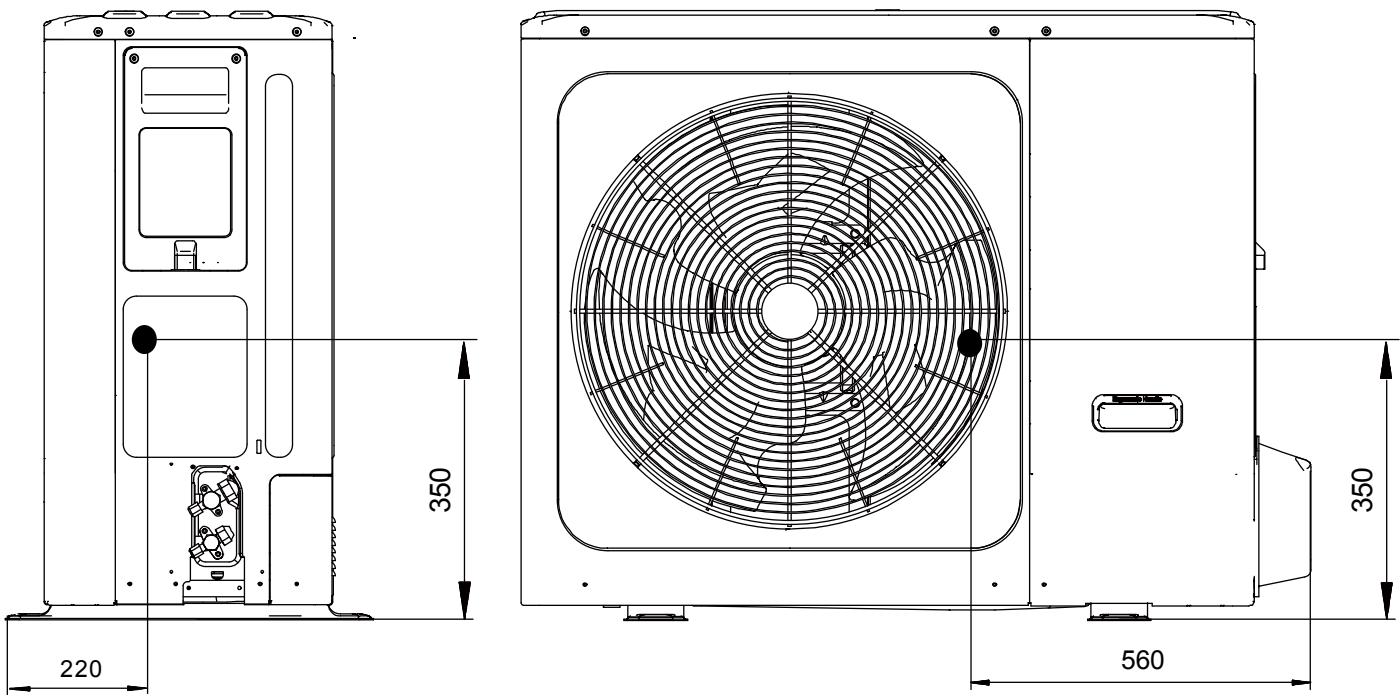
MHA-V4(6)W/D2N8-B

Figure 2-2.1: MHA-V4(6)W/D2N8-B dimensions and center of gravity (unit: mm)



MHA-V8(10)W/D2N8-B

Figure 2-2.2: MHA-V8(10)W/D2N8-B dimensions and center of gravity (unit: mm)



MHA-V12(14,16)W/D2N8-B

Figure 2-2.2: MHA-V12(14,16)W/D2N8-B dimensions and center of gravity (unit: mm)

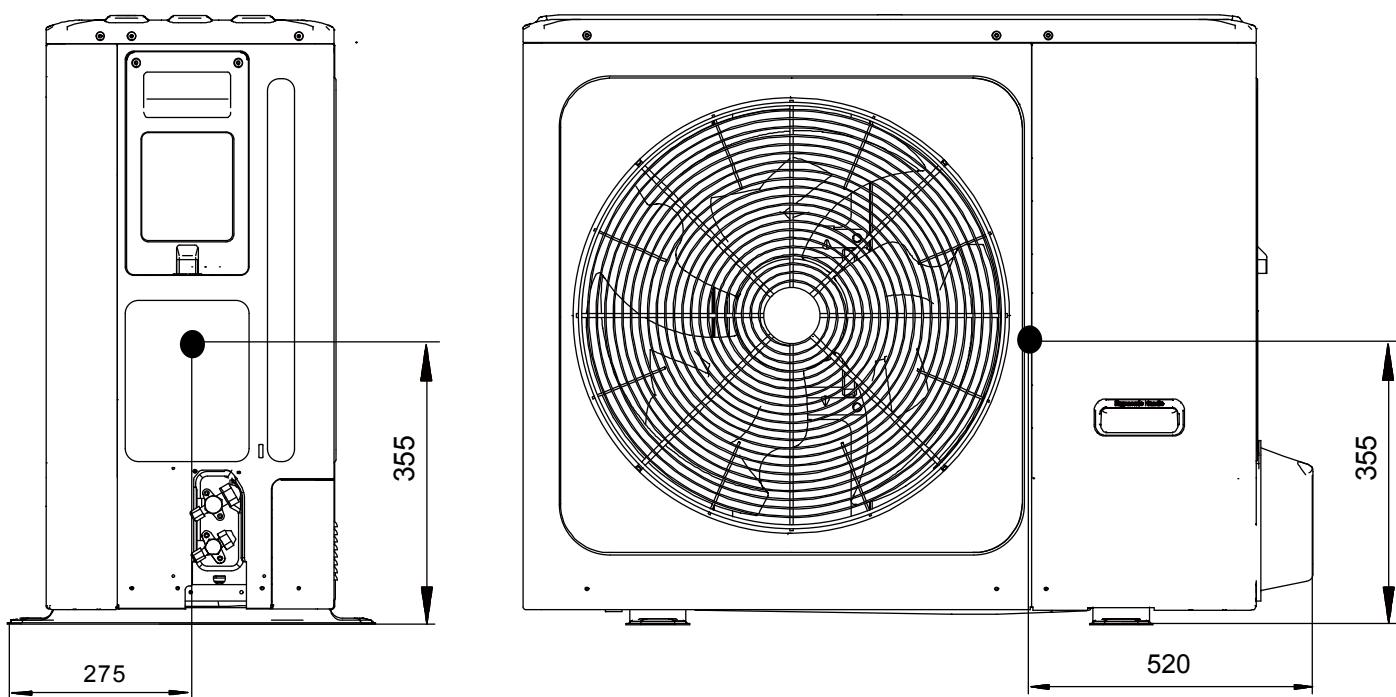
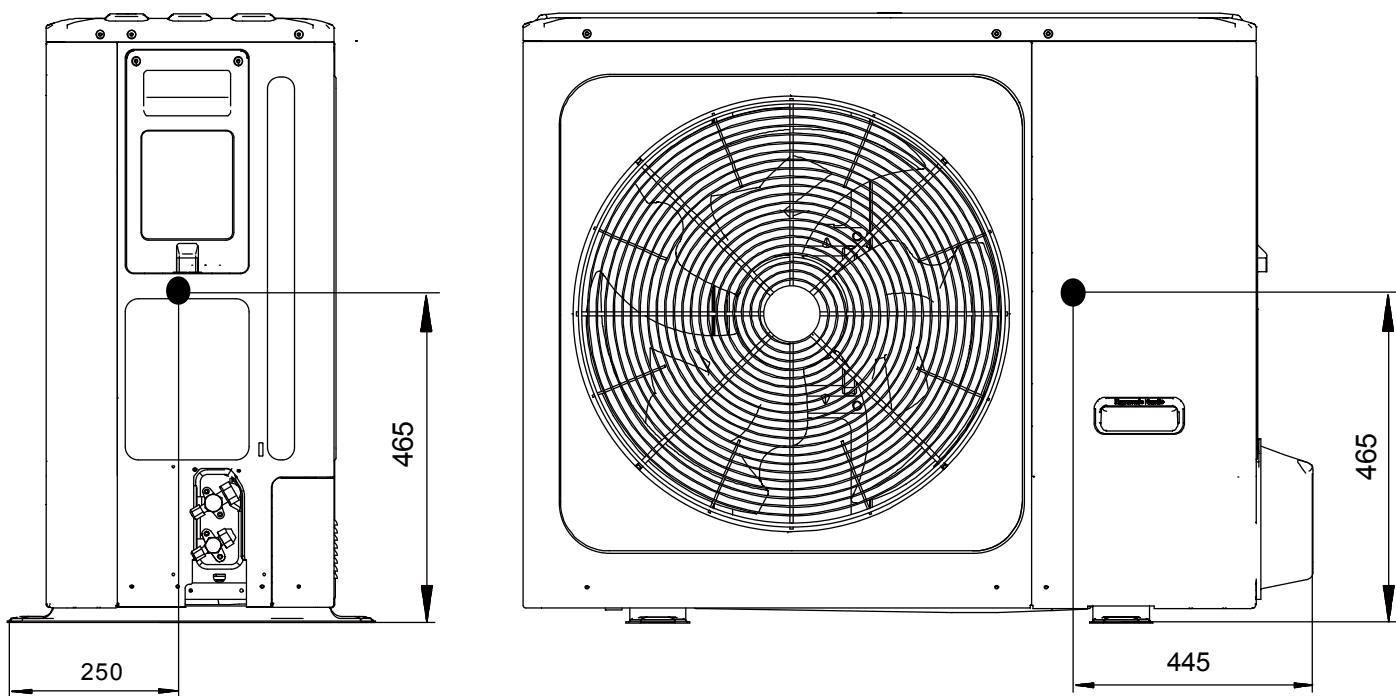
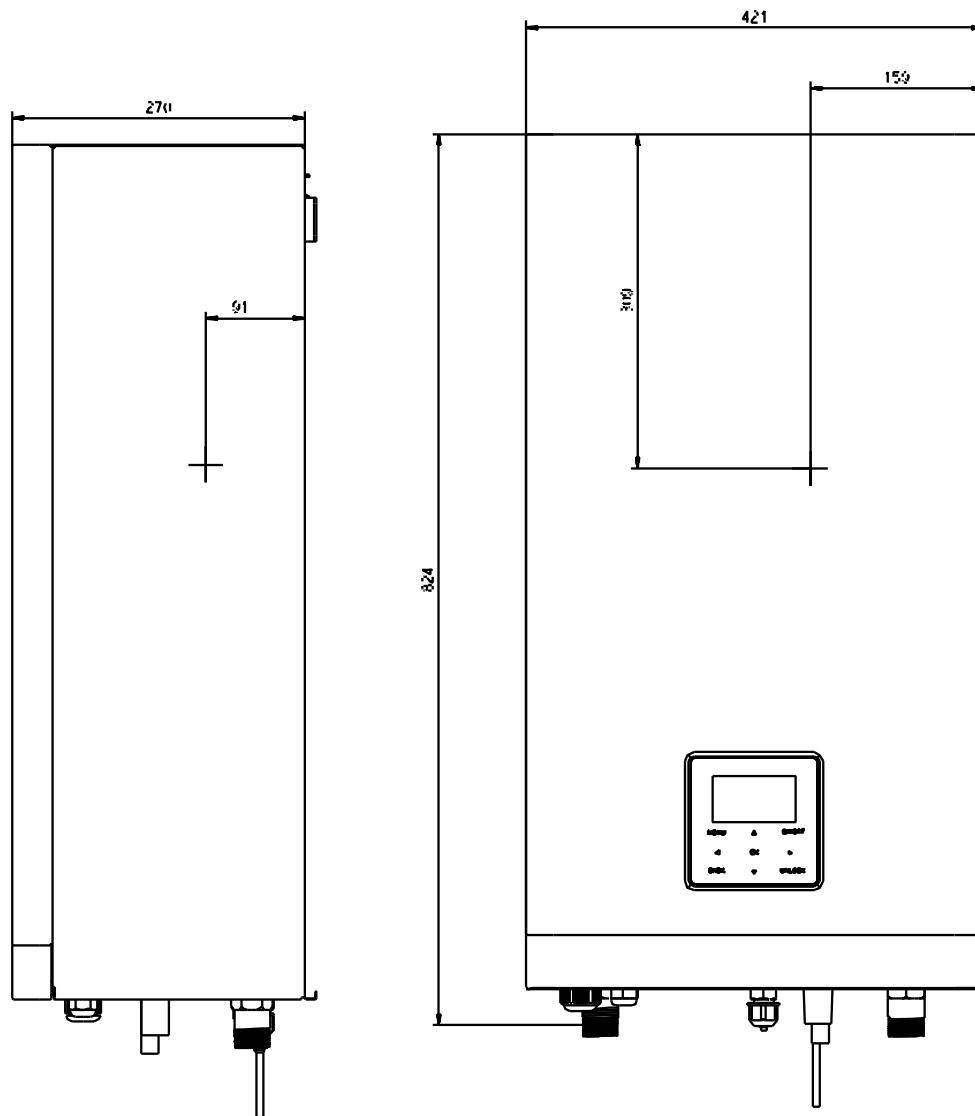
**MHA-V12(14,16)W/D2RN8-B**

Figure 2-2.2: MHA-V12(14,16)W/D2RN8-B dimensions and center of gravity (unit: mm)



2.2 Hydronic Box

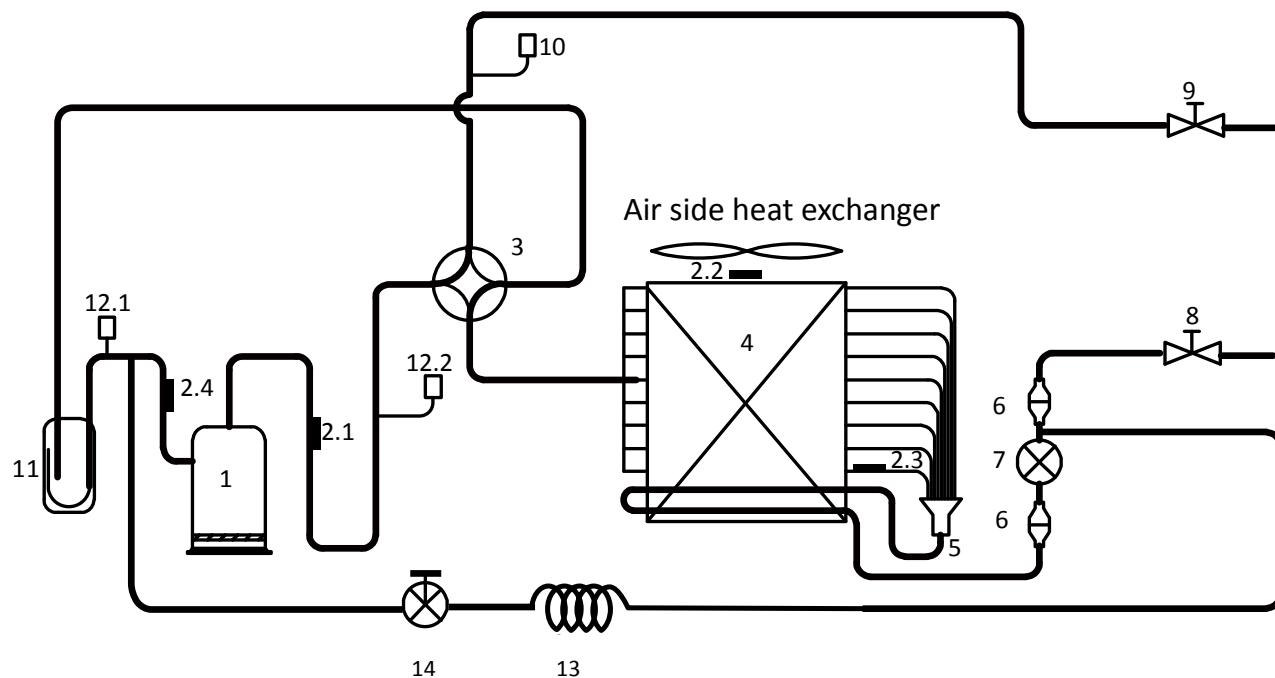
Figure 2-2.3: Hydronic box dimensions and center of gravity (unit: mm)



3 Piping Diagrams

3.1 Outdoor Unit

Figure 2-3-1: Outdoor unit piping diagram

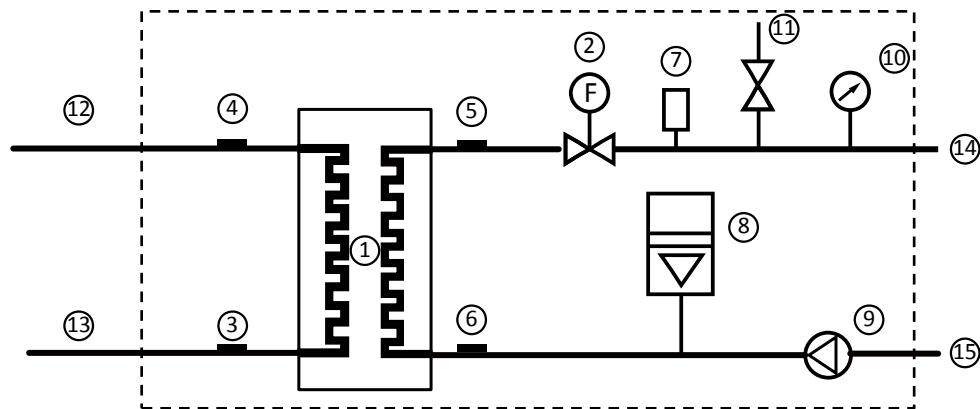


Legend

1	Compressor	7	Electronic expansion valve
2.1	Discharge pipe temperature sensor	8	Stop valve (liquid side)
2.2	Outdoor ambient temperature sensor	9	Stop valve (gas side)
2.3	Air side heat exchanger refrigerant outlet temperature sensor	10	Pressure sensor
2.4	Suction pipe temperature sensor	11	Separator
3	4-way valve	12.1	Low pressure switch
4	Air side heat exchanger	12.2	High pressure switch
5	Distributor	13	Capillary
6	Filter	14	Solenoid valve

3.2 Hydronic Box

Figure 2-3.2:Hydronic box piping diagram



Legend			
1	Water side heat exchanger	9	Water pump
2	Water flow switch	10	Manometer
3	Refrigerant liquid line temperature sensor	11	Safety valve
4	Refrigerant gas line temperature sensor	12	Refrigerant gas side
5	Water outlet temperature sensor	13	Refrigerant liquid side
6	Water inlet temperature sensor	14	Water outlet
7	Air purge valve	15	Water inlet
8	Expansion vessel		

4 Wiring Diagrams

4.1 Outdoor Unit

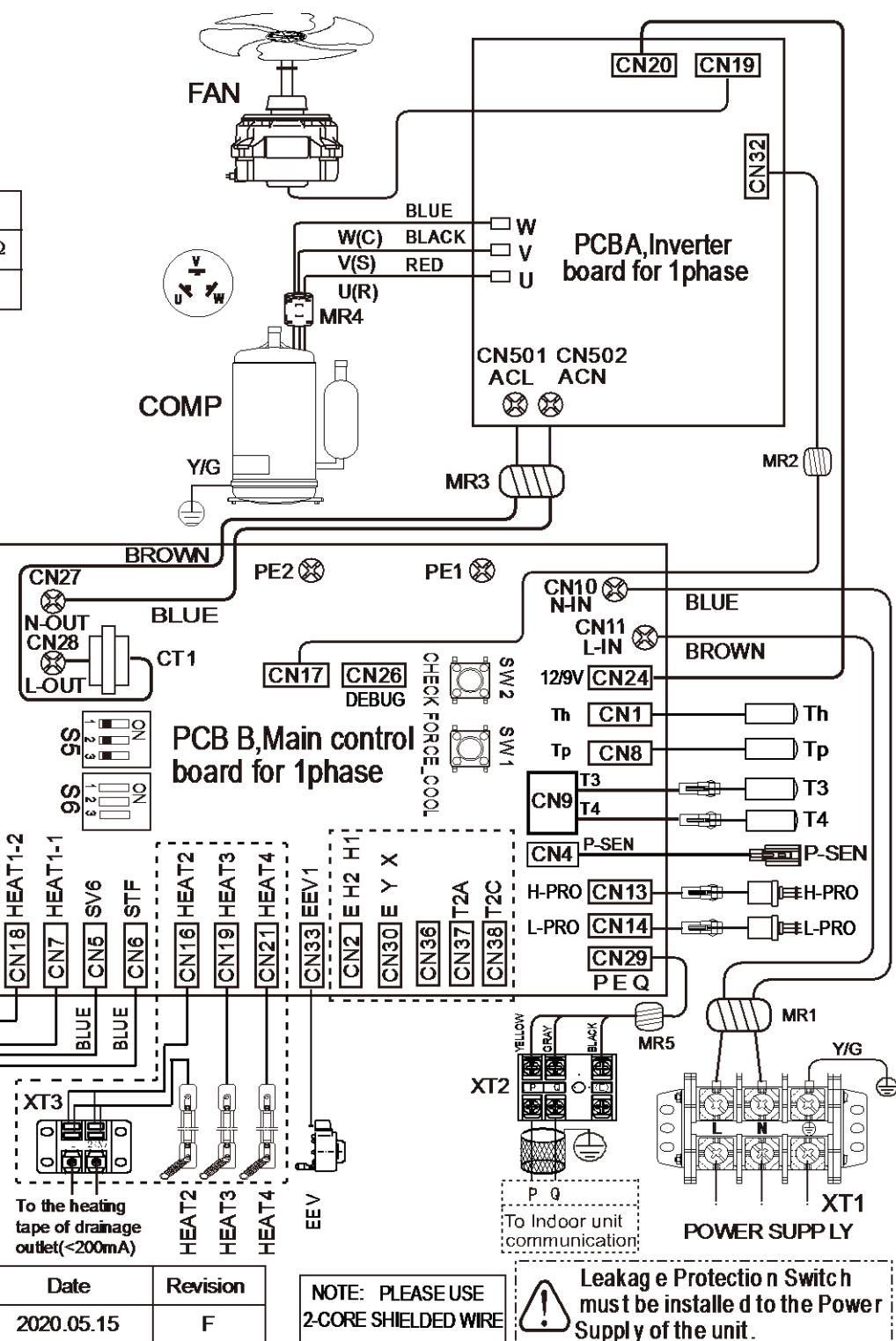
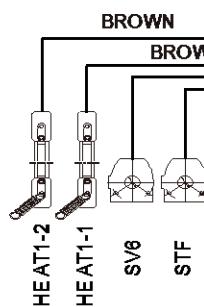
MHA-V4(6,8,10)W/D2N8-B

Figure 2-4.1: MHA-V4(6, 8, 10)W/D2N8-B wiring diagram

Temp. Sensor code	Property values
T3/T4/Th	$B_{250} = 4100K$, $R_{25C} = 10k\Omega$
Tp	$B_{250} = 3950K$, $R_{25C} = 5k\Omega$

CODE	Part name
4-WAY	4-WAY valve
COMP.	Compressor
CT1	AC current detector
EEV	Electric expensive valve
FAN	Outdoor fan motor
HEAT1-1	Comp. electrical heating tape1
HEAT1-2	Comp. electrical heating tape2
HEAT2	Chassis electrical heating tape
H-PRO	High pressure switch
L-PRO	Low pressure switch
MR1-MR5	Magnetic ring
P-SEN.	Pressure sensor
T3	Condenser temp.sensor
T4	Outdoor ambient temp.sensor
TF	Radiator temp.sensor
Th	Suction temp.sensor
Tp	COMP. discharge temp.sensor
XT1-3	Terminal blocks

The wiring picture shown is for reference only, actual product may vary.



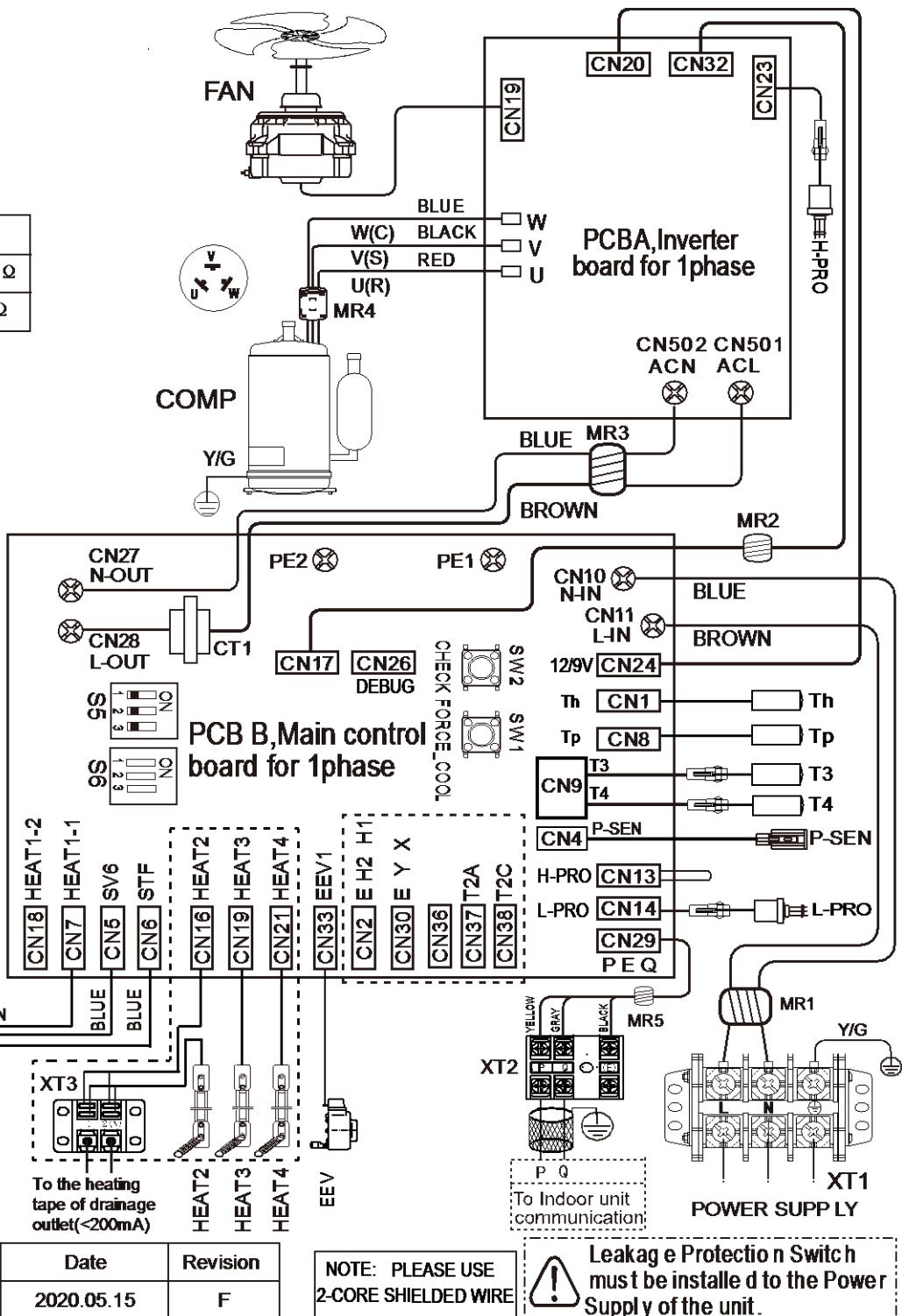
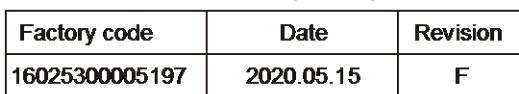
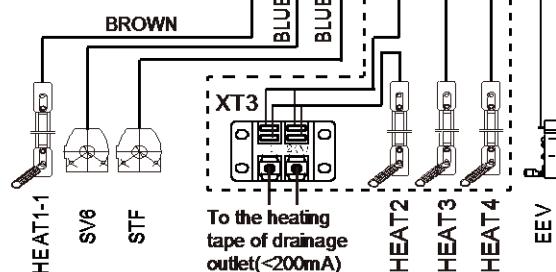
Factory code	Date	Revision
16025300005154	2020.05.15	F

Figure 2-4.1: MHA-V12(14,16)W/D2N8-B wiring diagram

Temp. Sensor code	Property values
T3/T4/Th	$B_{250} = 4100\text{K}$, $R_{25^\circ\text{C}} = 10\text{k}\Omega$
Tp	$B_{250} = 3950\text{K}$, $R_{90^\circ\text{C}} = 5\text{k}\Omega$

CODE	Part name
4-WAY	4-WAY valve
COMP.	Compressor
CT1	AC current detector
EEV	Electric expensive valve
FAN	Outdoor fan motor
HEAT1-1	Comp. electrical heating tape1
HEAT1-2	Comp. electrical heating tape2
HEAT2	Chassis electrical heating tape
H-PRO	High pressure switch
L-PRO	Low pressure switch
MR1-MR5	Magnetic ring
P-SEN.	Pressure sensor
T3	Condenser temp.sensor
T4	Outdoor ambient temp.sensor
TF	Radiator temp.sensor
Th	Suction temp.sensor
Tp	COMP. discharge temp.sensor
XT1-3	Terminal blocks

**The wiring picture shown
is for reference only, actual
product may vary.**

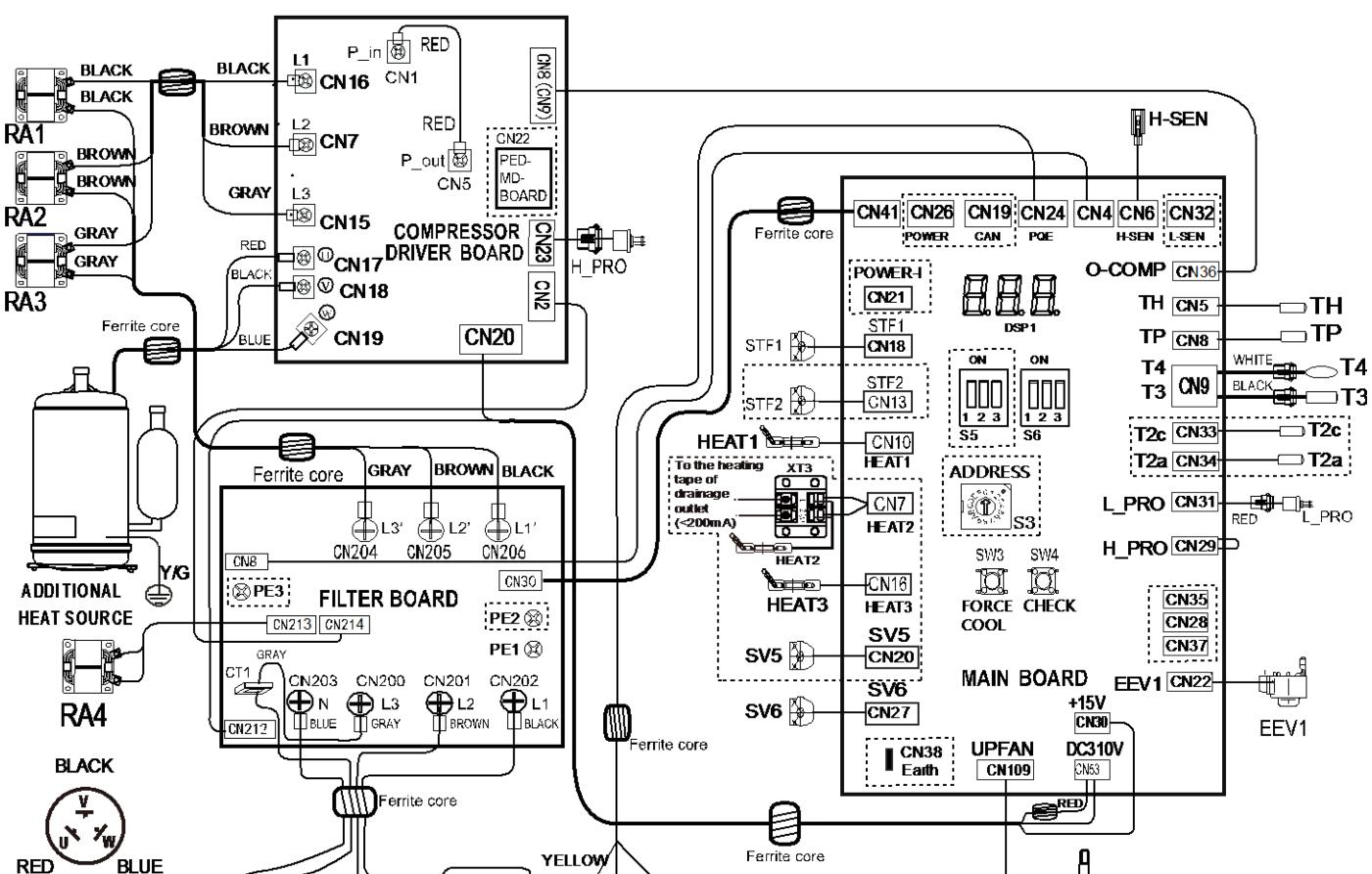


**NOTE: PLEASE USE
2-CORE SHIELDED WIRE**

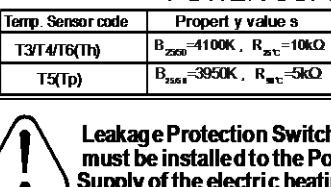
Leakage Protection Switch must be installed to the Power Supply of the unit.

MHA-V12(14,16)W/D2RN8-B

Figure 2-4.1: MHA-V12(14,16)W/D2RN8-B wiring diagram



It will be at least ten minutes before the power goes back on



Equipment must be grounded.

The wiring picture shown is for reference only, actual product may vary.

Factory code	Date	Revision
16025300005134	2020.05.07	H

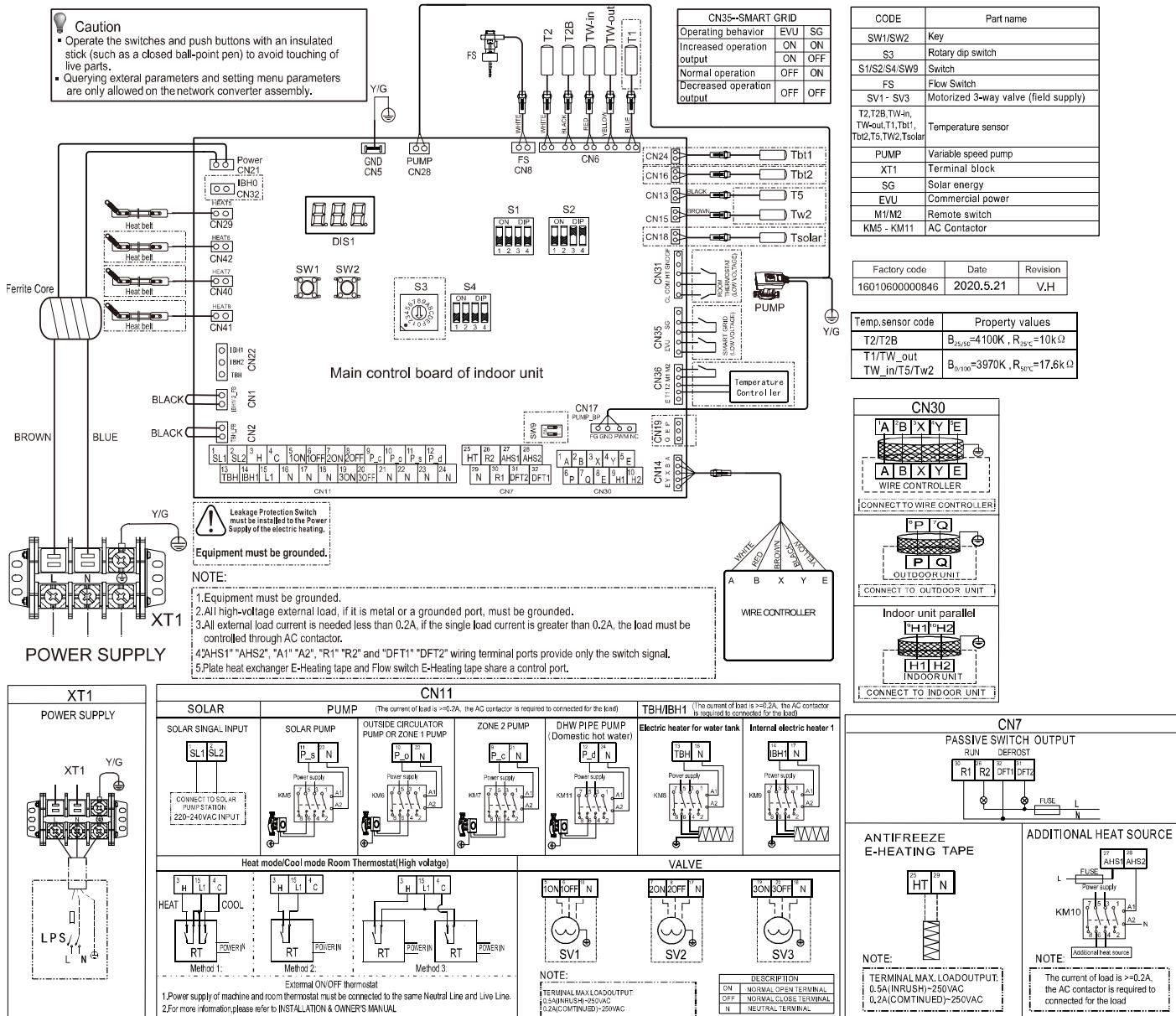
CODE	NAME
COMP	Inverter compressor
EEV1/2	Electric expansion valve
FAN_UP/DOWN	DC fan motor
HEAT1/HEAT2	Crankcase heating
H_PRO/L_PRO	High/Low pressure switch
H-SEN	High pressure sensor
XT1	Big 4-phase terminal
CT1	AC current transformer
RA	Reactor
STF1/STF2	4-way valve
SV5/SV6	Solenoid valve
T3/T3A	Piping temperature sensor
T4	Outdoor ambient temperature sensor
T5	Inverter compressor discharge temperature sensor
TP	Compressor exhaust temperature sensor
TH	Compressor return temperature sensor

M thermal Split

4.2 Hydronic Box

HB-A60(100,160)/CGN8-B

Figure 2-4.2 HB-A60(100,160)/CGN8-B wiring diagram



5 Capacity Tables

5.1 Heating Capacity Tables (Test standard: EN14511)

Table 2-5.1: Heating capacity for MHA-V4W/D2N8-B

DB	Maximum																											
	25				30				35				40				45				50				55			
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	
-25	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
-20	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC			
-15	3.60	1.19	3.03	3.41	1.22	2.78	3.25	1.36	2.39	2.93	1.49	1.97	2.50	1.60	1.56	2.20	1.68	1.31	1.84	1.56	1.18	1.73	1.68	1.03	/	/		
-10	4.17	1.22	3.40	4.49	1.38	3.25	4.34	1.52	2.85	4.02	1.65	2.43	3.59	1.77	2.02	3.28	1.81	1.81	2.63	1.68	1.56	2.81	1.80	1.56	/	/		
-7	4.92	1.33	3.69	5.14	1.46	3.52	4.99	1.60	3.11	4.67	1.73	2.70	4.54	1.98	2.29	4.41	2.12	2.08	4.28	2.34	1.83	3.56	1.94	1.84	/	/		
-5	4.99	1.24	4.03	5.18	1.39	3.72	5.02	1.53	3.27	4.74	1.68	2.82	4.63	1.89	2.45	4.56	2.02	2.26	4.41	2.26	1.95	3.83	2.00	1.92	/	/		
0	5.41	1.07	5.06	5.27	1.21	4.34	5.10	1.36	3.74	4.92	1.55	3.18	5.04	1.74	2.89	5.02	2.03	2.48	5.13	2.16	2.37	4.40	2.10	2.09	/	/		
5	5.99	1.03	5.83	5.75	1.18	4.85	5.68	1.31	4.33	5.59	1.48	3.77	5.60	1.71	3.27	5.50	1.98	2.78	5.54	2.07	2.68	4.90	2.09	2.35	4.04	2.16	1.87	
7	6.58	0.99	6.67	6.22	1.15	5.40	6.26	1.26	4.96	6.26	1.42	4.41	5.96	1.63	3.67	5.69	1.76	3.23	5.74	1.90	3.03	5.41	2.08	2.61	4.27	2.09	2.04	
10	6.37	0.95	6.68	6.03	1.17	5.16	6.07	1.26	4.82	6.31	1.36	4.63	6.05	1.57	3.86	5.80	1.80	3.23	5.70	1.80	3.16	5.27	1.96	2.69	4.49	2.02	2.22	
15	6.03	0.90	6.71	5.72	1.20	4.78	5.75	1.25	4.59	6.40	1.27	5.04	6.20	1.47	4.21	5.47	1.50	3.65	5.63	1.65	3.41	5.04	1.76	2.87	4.87	1.90	2.56	
20	5.86	0.81	7.24	5.74	1.00	5.75	5.67	1.11	5.13	6.16	1.12	5.48	6.12	1.31	4.66	5.61	1.40	3.99	5.52	1.50	3.68	4.77	1.56	3.06	/	/		
25	5.70	0.72	7.91	5.77	0.80	7.21	5.60	0.96	5.85	5.91	0.98	6.06	6.05	1.15	5.25	5.75	1.31	4.39	5.42	1.35	4.02	4.50	1.36	3.30	/	/		
30	5.78	0.69	8.41	5.84	0.78	7.48	5.78	0.89	6.51	5.89	0.92	6.39	6.02	1.07	5.62	5.67	1.22	4.63	5.51	1.28	4.31	4.61	1.32	3.51	/	/		
35	5.85	0.65	8.96	5.90	0.76	7.77	5.97	0.82	7.27	5.86	0.87	6.77	5.99	0.99	6.05	5.59	1.14	4.90	5.61	1.22	4.62	/	/	/	/	/		
40	6.30	0.58	10.8	6.38	0.67	9.51	6.36	0.74	8.57	6.33	0.80	7.88	6.38	0.93	6.86	6.00	1.15	5.20	/	/	/	/	/	/	/	/		
43	6.57	0.54	12.2	6.67	0.62	10.8	6.59	0.69	9.50	6.62	0.77	8.63	6.61	0.89	7.39	6.25	1.16	5.38	/	/	/	/	/	/	/	/		

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°

C) HC: Total heating capacity (kW)

PI: Power input (kW)

Table 2-5.2: Heating capacity for MHA-V6W/D2N8-B

DB	Maximum																															
	LWT								HC								PI								COP							
	25		30		35		40		45		50		55		60		65		HC		PI		COP		HC		PI		COP			
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP		
-25	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
-20	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC		
-15	4.43	1.49	2.97	4.19	1.53	2.73	4.00	1.71	2.34	3.61	1.87	1.93	3.08	2.01	1.53	2.70	2.02	1.34	2.26	1.88	1.20	2.13	2.02	1.05	/	/	/	/	/	/	/	
-10	5.75	1.69	3.41	5.50	1.84	2.99	5.11	1.99	2.57	4.83	2.18	2.22	4.64	2.24	2.07	4.13	2.41	1.72	3.80	2.24	1.69	3.32	2.30	1.44	/	/	/	/	/	/	/	
-7	6.55	1.77	3.71	6.30	1.92	3.28	6.21	2.17	2.86	5.79	2.32	2.50	5.57	2.38	2.35	5.29	2.63	2.01	5.22	2.66	1.96	4.57	2.61	1.75	/	/	/	/	/	/	/	
-5	6.54	1.64	3.98	6.32	1.79	3.52	6.14	1.99	3.09	5.97	2.18	2.74	5.84	2.30	2.54	5.44	2.44	2.23	5.31	2.64	2.01	4.73	2.59	1.83	/	/	/	/	/	/	/	
0	6.49	1.34	4.85	6.37	1.48	4.31	6.35	1.68	3.79	6.80	1.99	3.42	6.85	2.25	3.04	5.88	2.37	2.48	5.42	2.59	2.09	5.06	2.54	1.99	/	/	/	/	/	/	/	
5	7.04	1.31	5.37	6.71	1.50	4.48	6.88	1.62	4.25	6.96	1.89	3.69	6.99	2.12	3.29	6.37	2.27	2.81	6.11	2.46	2.48	5.74	2.53	2.27	4.92	2.68	1.84	/	/	/	/	
7	7.58	1.28	5.90	7.06	1.47	4.81	7.41	1.56	4.76	7.13	1.79	3.99	7.13	2.00	3.58	6.87	2.16	3.17	6.90	2.37	2.91	6.42	2.52	2.55	5.25	2.60	2.02	/	/	/	/	
10	7.43	1.21	6.12	7.11	1.36	5.24	7.35	1.46	5.02	7.37	1.75	4.21	7.32	1.93	3.78	7.01	2.09	3.35	6.93	2.28	3.04	6.27	2.41	2.60	5.57	2.52	2.21	/	/	/	/	
15	7.17	1.13	6.35	7.20	1.24	5.82	7.26	1.38	5.28	7.78	1.69	4.61	7.63	1.83	4.16	7.24	1.97	3.67	6.98	2.12	3.30	6.01	2.23	2.70	6.10	2.39	2.56	/	/	/	/	
20	6.93	0.97	7.15	6.97	1.11	6.28	6.98	1.18	5.91	7.21	1.54	4.70	7.42	1.68	4.42	7.28	1.81	4.02	6.81	1.89	3.60	5.98	1.95	3.06	/	/	/	/	/	/	/	
25	6.69	0.80	8.32	6.74	0.94	7.16	6.70	1.06	6.31	6.65	1.30	5.11	7.21	1.52	4.74	7.33	1.66	4.43	6.63	1.66	4.00	5.94	1.67	3.55	/	/	/	/	/	/	/	
30	6.74	0.71	9.53	6.83	0.85	8.02	6.83	0.94	7.27	6.56	1.09	6.01	7.05	1.40	5.05	6.91	1.40	4.92	6.60	1.57	4.21	6.01	1.57	3.83	/	/	/	/	/	/	/	
35	6.79	0.66	10.3	6.93	0.73	9.43	6.96	0.85	8.17	6.47	0.94	6.87	6.89	1.27	5.42	6.49	1.24	5.21	6.57	1.48	4.45	/	/	/	/	/	/	/	/	/		
40	7.26	0.64	11.4	7.37	0.73	10.2	7.28	0.81	9.02	7.12	0.97	7.34	7.34	1.20	6.12	6.93	1.22	5.68	/	/	/	/	/	/	/	/	/	/	/			
43	7.54	0.63	12.0	7.64	0.70	10.9	7.48	0.76	9.87	7.51	0.91	8.27	7.61	1.08	7.02	7.19	1.21	5.96	/	/	/	/	/	/	/	/	/	/	/			

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

HC: Total heating capacity (kW)

PI: Power input (kW)

Table 2-5.3: Heating capacity for MHA-V8W/D2N8-B

DB	Maximum																										
	25			30			35			40			45			50			55			60			65		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-25	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
-20	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC		
-15	6.90	2.07	3.34	6.44	2.24	2.87	6.11	2.51	2.43	5.57	2.47	2.26	5.29	2.65	2.00	4.67	2.70	1.73	4.94	2.92	1.69	3.99	2.84	1.41	/	/	
-10	7.45	2.02	3.68	7.28	2.18	3.33	7.08	2.25	3.15	6.87	2.63	2.62	6.77	2.74	2.47	6.32	2.88	2.20	6.07	3.05	1.99	5.19	2.86	1.81	/	/	
-7	7.64	2.03	3.76	7.47	2.20	3.40	7.27	2.26	3.21	7.05	2.64	2.67	6.94	2.76	2.52	6.48	2.89	2.24	6.22	3.07	2.03	5.32	2.88	1.85	/	/	
-5	8.05	2.00	4.02	7.97	2.16	3.69	7.69	2.39	3.22	7.45	2.57	2.90	7.44	2.77	2.69	7.35	2.99	2.46	6.45	2.94	2.19	6.04	3.00	2.02	/	/	
0	8.24	1.73	4.77	8.55	2.02	4.23	8.49	2.25	3.77	8.40	2.53	3.32	8.09	2.75	2.94	8.11	2.95	2.75	7.10	2.99	2.38	6.85	3.16	2.17	/	/	
5	8.86	1.49	5.95	8.95	1.81	4.94	9.03	1.98	4.56	8.78	2.29	3.84	8.69	2.57	3.38	8.30	2.76	3.00	7.56	2.74	2.76	7.11	2.89	2.46	3.89	3.27	
7	9.51	1.45	6.54	9.20	1.73	5.32	9.11	1.80	5.07	8.85	2.12	4.18	8.98	2.35	3.82	8.43	2.66	3.17	7.80	2.50	3.12	7.24	2.66	2.72	4.08	3.00	
10	10.1	1.35	7.44	9.28	1.59	5.84	8.94	1.65	5.42	8.70	2.02	4.30	8.74	2.24	3.90	8.28	2.42	3.42	8.20	2.48	3.31	7.50	2.72	2.76	5.59	2.65	
15	9.86	1.12	8.79	9.39	1.33	7.09	9.09	1.51	6.04	9.07	1.77	5.12	8.91	2.03	4.38	8.41	2.23	3.77	8.32	2.34	3.55	7.68	2.49	3.09	5.71	2.39	
20	9.65	0.95	10.1	9.51	1.14	8.33	9.33	1.32	7.09	9.45	1.59	5.93	9.08	1.81	5.02	8.53	2.02	4.22	8.43	2.12	3.97	7.86	2.27	3.46	/	/	
25	9.42	0.90	10.4	9.00	1.03	8.75	8.75	1.15	7.64	9.15	1.44	6.34	9.01	1.55	5.80	8.61	1.87	4.61	8.09	1.90	4.25	7.46	2.01	3.72	/	/	
30	9.18	0.83	11.0	8.49	0.93	9.16	8.17	1.05	7.78	8.85	1.29	6.84	8.93	1.43	6.23	8.68	1.74	4.99	7.84	1.73	4.53	7.07	1.78	3.98	/	/	
35	9.55	0.84	11.3	8.83	0.93	9.45	8.50	1.06	8.05	9.20	1.31	7.05	9.29	1.46	6.34	9.03	1.73	5.21	8.16	1.80	4.72	/	/	/	/	/	
40	10.0	0.87	11.6	9.27	0.93	10.0	8.92	1.05	8.49	9.66	1.32	7.31	9.75	1.51	6.46	9.48	1.74	5.46	/	/	/	/	/	/	/	/	
43	10.3	0.84	12.3	9.55	0.85	11.3	9.19	1.01	9.11	9.95	1.27	7.86	10.0	1.47	6.83	9.77	1.61	6.08	/	/	/	/	/	/	/	/	

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

HC: Total heating capacity (kW)

PI: Power input (kW)

Table 2-5.4: Heating capacity for MHA-V10W/D2N8-B

DB	Maximum																																				
	25								30								35								40								LWT				
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP				
-25	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/			
-20	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	/	/	/	/	/	/	/				
-15	7.26	2.15	3.37	6.78	2.34	2.90	6.43	2.62	2.46	5.86	2.57	2.28	5.57	2.76	2.02	4.91	2.82	1.74	5.20	3.04	1.71	4.20	2.96	1.42	/	/	/	/	/	/	/	/	/	/			
-10	8.37	2.33	3.60	8.14	2.53	3.22	7.89	2.65	2.98	7.64	2.86	2.67	7.38	3.10	2.38	7.03	3.31	2.13	6.67	3.58	1.86	5.38	3.15	1.71	/	/	/	/	/	/	/	/	/	/			
-7	8.72	2.29	3.81	8.48	2.49	3.41	8.31	2.61	3.11	7.96	2.81	2.83	7.68	3.05	2.52	7.33	3.26	2.25	7.05	3.53	1.97	5.61	3.10	1.81	/	/	/	/	/	/	/	/	/	/			
-5	8.80	2.14	4.12	8.86	2.47	3.60	8.80	2.64	3.33	8.46	2.94	2.88	8.18	3.09	2.65	8.04	3.27	2.46	7.53	3.32	2.27	6.13	3.10	1.98	/	/	/	/	/	/	/	/	/	/			
0	9.03	1.83	4.94	9.36	2.31	4.05	9.56	2.55	3.76	9.25	2.93	3.16	8.89	3.10	2.87	8.82	3.27	2.70	8.18	3.31	2.47	6.99	3.30	2.12	/	/	/	/	/	/	/	/	/	/			
5	9.94	1.73	5.75	9.97	2.07	4.81	10.1	2.25	4.51	10.1	2.64	3.83	9.79	2.88	3.40	9.45	3.14	3.01	9.08	3.27	2.78	7.85	3.20	2.45	4.52	3.30	1.37										
7	10.5	1.77	5.94	10.3	1.97	5.21	10.3	2.09	4.93	10.5	2.50	4.18	10.3	2.73	3.77	9.83	3.05	3.22	9.72	3.20	3.04	8.23	2.96	2.78	4.85	3.11	1.56										
10	11.2	1.59	7.04	10.4	1.85	5.64	10.0	1.96	5.13	9.94	2.38	4.17	9.87	2.69	3.67	9.59	2.91	3.30	9.57	3.11	3.08	8.27	3.04	2.72	6.44	3.05	2.11										
15	11.4	1.41	8.10	10.6	1.64	6.49	10.2	1.73	5.90	10.1	2.11	4.80	10.1	2.39	4.22	9.78	2.58	3.80	9.76	2.76	3.54	8.43	2.70	3.13	6.56	2.71	2.43										
20	10.8	1.19	9.05	10.8	1.35	7.96	10.7	1.59	6.72	10.7	1.89	5.66	10.3	2.12	4.86	10.0	2.38	4.21	9.85	2.54	3.88	8.90	2.56	3.48	/	/	/										
25	9.94	1.04	9.59	9.90	1.17	8.44	9.82	1.38	7.12	9.82	1.64	6.00	9.46	1.84	5.15	9.22	2.07	4.46	9.06	2.20	4.11	8.18	2.22	3.69	/	/	/										
30	9.77	0.96	10.2	9.07	1.10	8.79	8.90	1.12	7.95	8.85	1.32	6.72	9.92	1.61	6.15	9.31	1.88	4.96	9.04	1.88	4.80	7.49	1.96	3.83	/	/	/										
35	10.2	0.95	10.7	9.44	1.03	9.15	9.25	1.11	8.30	9.21	1.32	6.97	10.3	1.61	6.40	9.69	1.87	5.17	9.42	1.90	4.96	/	/	/	/	/	/										
40	10.7	0.93	11.5	9.91	1.01	9.81	9.71	1.15	8.47	9.67	1.32	7.34	10.8	1.60	6.79	10.2	1.84	5.53	/	/	/	/	/	/	/	/	/	/	/								
43	11.0	0.91	12.0	10.2	0.96	10.6	10.0	1.08	9.25	9.96	1.23	8.07	11.2	1.47	7.58	10.5	1.68	6.25	/	/	/	/	/	/	/	/	/	/	/								

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

HC: Total heating capacity (kW)

PI: Power input (kW)

Table 2-5.5: Heating capacity for MHA-V12W/D2(R)N8-B

DB	Maximum																													
	25			30			35			40			45			50			55			60			65					
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP			
-25	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/		
-20	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC		
-15	8.90	3.12	2.85	8.86	3.34	2.65	8.86	3.62	2.45	7.93	3.62	2.19	7.39	3.95	1.87	6.71	3.97	1.69	6.33	4.31	1.47	5.87	4.69	1.25	/	/	/	/	/	
-10	11.0	3.47	3.17	10.1	3.68	2.74	10.0	3.95	2.54	9.69	4.34	2.23	9.32	4.54	2.05	8.96	4.62	1.94	8.60	4.79	1.79	6.70	5.13	1.30	/	/	/	/	/	
-7	12.3	3.52	3.49	10.9	3.62	3.02	11.0	3.89	2.83	10.4	4.27	2.44	10.4	4.50	2.31	10.6	4.74	2.24	10.6	5.25	2.02	8.05	5.06	1.59	/	/	/	/	/	
-5	12.4	3.33	3.71	11.2	3.55	3.15	11.3	3.87	2.92	10.9	4.26	2.57	10.9	4.61	2.37	10.8	4.75	2.27	10.6	5.14	2.05	8.21	5.14	1.60	/	/	/	/	/	
0	12.5	2.87	4.35	11.9	3.13	3.80	12.0	3.44	3.48	12.3	4.04	3.04	12.3	4.37	2.81	11.1	4.61	2.41	10.8	4.74	2.27	8.52	5.03	1.69	/	/	/	/	/	
5	14.6	2.66	5.49	13.5	2.97	4.55	13.6	3.28	4.15	13.8	3.70	3.73	13.6	4.18	3.26	12.8	4.46	2.88	12.8	4.70	2.73	11.6	5.06	2.29	9.92	5.16	1.92			
7	15.5	2.57	6.00	14.3	2.83	5.04	14.6	3.11	4.69	14.8	3.57	4.14	14.5	4.00	3.63	13.9	4.43	3.14	13.9	4.66	2.97	13.0	5.07	2.56	11.5	5.17	2.23			
10	15.0	2.40	6.22	14.4	2.62	5.49	14.3	2.83	5.06	14.6	3.34	4.37	14.3	3.89	3.69	13.5	4.11	3.30	13.1	4.38	2.99	12.7	4.79	2.65	11.7	4.89	2.39			
15	15.1	1.97	7.67	14.7	2.21	6.65	14.4	2.65	5.43	15.0	3.17	4.72	14.6	3.53	4.14	13.4	3.73	3.60	12.1	3.97	3.03	12.3	4.32	2.85	11.7	4.42	2.65			
20	14.6	1.66	8.76	14.3	1.88	7.60	14.2	2.20	6.47	14.8	2.75	5.39	14.8	3.15	4.69	13.7	3.37	4.06	12.0	3.55	3.39	10.8	3.71	2.90	/	/	/			
25	14.4	1.55	9.31	14.3	1.73	8.23	14.2	1.93	7.35	14.7	2.35	6.26	14.7	2.73	5.39	13.9	3.00	4.63	12.0	3.12	3.84	10.0	3.36	2.99	/	/	/			
30	14.6	1.45	10.1	14.2	1.62	8.75	14.4	1.85	7.76	14.7	2.22	6.63	14.7	2.63	5.59	14.0	2.82	4.95	12.6	2.94	4.30	10.3	3.40	3.04	/	/	/			
35	15.2	1.39	10.9	14.9	1.60	9.29	14.7	1.80	8.16	15.1	2.17	6.95	14.6	2.50	5.83	14.2	2.72	5.24	12.9	2.79	4.62	/	/	/	/	/	/			
40	15.7	1.41	11.1	15.6	1.59	9.82	15.4	1.79	8.65	16.0	2.17	7.36	15.3	2.44	6.29	14.5	2.69	5.40	/	/	/	/	/	/	/	/	/			
43	16.2	1.35	12.0	16.0	1.50	10.6	15.9	1.73	9.18	16.5	2.11	7.82	16.0	2.35	6.81	14.8	2.57	5.75	/	/	/	/	/	/	/	/	/			

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

HC: Total heating capacity (kW)

PI: Power input (kW)

Table 2-5.6: Heating capacity for MHA-V14W/D2(R)N8-B

DB	Maximum																															
	25				30				35				40				45				50				55				60			
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP		
-25	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	
-20	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	/	/	/	/	/	/		
-15	9.61	3.40	2.82	9.57	3.65	2.62	9.57	3.94	2.43	8.57	3.95	2.17	7.63	4.12	1.85	7.01	4.32	1.62	6.46	4.58	1.41	6.01	5.05	1.19	/	/	/	/	/	/		
-10	11.9	3.81	3.12	11.4	4.18	2.73	11.0	4.44	2.47	10.6	4.70	2.26	9.64	4.73	2.04	9.07	5.01	1.81	8.72	5.21	1.67	6.73	5.30	1.27	/	/	/	/	/	/		
-7	13.7	4.02	3.41	12.9	4.28	3.02	12.7	4.55	2.79	12.3	4.94	2.49	11.9	5.17	2.31	11.0	5.33	2.07	11.3	5.46	2.01	8.02	5.31	1.51	/	/	/	/	/	/		
-5	13.9	3.78	3.68	13.2	3.87	3.41	12.5	4.16	2.99	12.6	4.61	2.73	12.1	4.99	2.42	11.2	5.24	2.13	11.1	5.32	2.09	8.25	5.06	1.63	/	/	/	/	/	/		
0	14.3	3.40	4.21	13.7	3.54	3.87	12.4	3.82	3.26	13.0	4.32	3.01	12.7	4.85	2.62	11.9	4.99	2.38	11.8	5.19	2.27	9.34	5.48	1.70	/	/	/	/	/	/		
5	15.4	2.93	5.25	14.9	3.30	4.51	14.3	3.63	3.94	14.3	3.95	3.61	14.2	4.59	3.11	13.8	4.98	2.77	13.8	5.18	2.66	11.7	5.38	2.17	9.76	5.33	1.83					
7	16.3	2.81	5.80	15.6	3.15	4.94	15.5	3.37	4.59	15.6	3.86	4.04	15.7	4.35	3.60	15.0	4.81	3.11	14.5	4.92	2.95	13.2	5.20	2.54	10.4	4.95	2.10					
10	15.5	2.28	6.81	15.5	2.89	5.36	14.9	3.10	4.79	15.3	3.60	4.24	15.0	4.08	3.67	15.3	4.62	3.31	14.2	4.60	3.08	13.2	4.91	2.69	11.2	4.98	2.26					
15	15.3	2.01	7.62	15.2	2.62	5.79	15.2	2.94	5.16	15.8	3.56	4.45	15.5	3.98	3.89	15.3	4.37	3.51	13.0	4.02	3.24	12.7	4.48	2.84	11.9	4.97	2.41					
20	14.9	1.78	8.35	14.8	2.20	6.74	14.6	2.59	5.65	15.2	3.04	5.01	15.1	3.42	4.42	15.0	3.84	3.90	12.7	3.62	3.52	11.0	3.77	2.92	/	/	/					
25	14.9	1.64	9.08	14.7	1.92	7.69	14.6	2.38	6.15	14.9	2.68	5.57	14.7	2.98	4.95	14.7	3.43	4.30	12.5	3.28	3.80	10.2	3.40	2.99	/	/	/					
30	15.3	1.55	9.82	14.8	1.80	8.21	14.9	2.10	7.09	15.1	2.42	6.22	15.0	2.80	5.36	14.6	3.14	4.65	12.8	2.93	4.37	10.3	3.40	3.04	/	/	/					
35	16.0	1.45	11.1	15.4	1.70	9.04	15.0	1.87	8.02	15.5	2.26	6.86	15.3	2.65	5.77	14.8	2.95	5.00	13.0	2.77	4.69	/	/	/	/	/	/					
40	16.2	1.40	11.6	16.4	1.59	10.3	16.2	1.89	8.57	16.0	2.20	7.26	15.8	2.59	6.08	15.0	2.78	5.38	/	/	/	/	/	/	/	/	/	/				
43	16.5	1.36	12.2	16.7	1.54	10.8	16.5	1.88	8.81	16.3	2.12	7.69	16.1	2.56	6.27	15.2	2.73	5.54	/	/	/	/	/	/	/	/	/	/				

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

HC: Total heating capacity (kW)

PI: Power input (kW)

Table 2-5.7: Heating capacity for MHA-V16W/D2(R)N8-B

DB	Maximum																							
	25			30			35			40			45			50			55			60		
	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP	HC	PI	COP
-25	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	/	/	/	/	/	/	/	/	/	/	/	/
-20	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC	TBC
-15	11.8	4.37	2.71	11.3	4.60	2.45	10.7	4.93	2.17	10.1	5.24	1.92	9.03	5.38	1.68	7.53	5.32	1.42	6.82	5.29	1.29	6.42	5.59	1.15
-10	13.4	4.51	2.97	13.0	4.78	2.72	12.7	5.09	2.49	12.4	5.43	2.28	11.1	5.61	1.96	9.49	5.56	1.70	8.92	5.88	1.51	7.04	5.59	1.26
-7	14.3	4.59	3.13	14.1	4.89	2.88	13.9	5.19	2.67	13.8	5.55	2.50	13.1	6.02	2.18	12.9	6.22	2.07	12.6	6.29	2.00	8.25	6.18	1.33
-5	14.6	4.27	3.47	14.3	4.61	3.13	14.0	4.93	2.86	13.8	5.33	2.61	13.4	5.88	2.28	13.0	5.82	2.22	12.6	5.92	2.13	8.62	5.97	1.45
0	15.1	3.49	4.33	14.7	3.91	3.75	14.3	4.27	3.34	13.9	4.80	2.88	14.1	5.33	2.64	13.4	5.14	2.61	12.8	5.42	2.37	9.56	5.54	1.72
5	16.8	3.25	5.19	14.6	3.61	4.06	16.1	4.00	4.04	15.6	4.57	3.43	15.9	4.96	3.20	15.3	5.05	3.02	14.5	5.21	2.77	12.7	5.36	2.37
7	17.5	3.16	5.53	15.7	3.12	4.68	16.8	3.79	4.43	16.4	4.25	3.85	16.6	4.71	3.53	16.2	5.05	3.17	16.2	5.53	2.89	14.1	5.34	2.63
10	18.0	3.01	6.02	16.4	3.34	4.96	17.6	3.73	4.74	17.1	4.33	3.96	17.3	4.72	3.67	16.7	5.12	3.26	16.1	5.16	3.11	14.3	5.15	2.79
15	18.9	2.76	6.84	19.3	3.08	6.26	18.9	3.48	5.43	18.3	4.08	4.48	18.5	4.53	4.09	17.8	4.79	3.72	17.5	5.11	3.42	14.7	4.83	3.06
20	16.7	2.08	8.03	16.9	2.38	7.10	16.7	2.69	6.21	17.4	3.40	5.12	16.1	3.77	4.28	14.6	4.06	3.60	15.0	4.32	3.46	13.1	4.39	3.00
25	16.2	1.83	8.86	16.2	2.23	7.26	16.0	2.31	6.94	16.6	2.87	5.81	15.7	3.23	4.87	14.5	3.46	4.20	14.1	3.68	3.82	12.4	4.05	3.07
30	15.6	1.55	10.1	15.5	1.88	8.21	15.4	2.00	7.68	15.9	2.45	6.49	15.3	2.81	5.46	14.4	3.01	4.79	13.2	3.15	4.18	12.7	4.11	3.10
35	16.3	1.50	10.8	16.6	1.84	9.01	16.3	1.94	8.42	16.6	2.42	6.87	15.9	2.79	5.68	15.0	3.00	5.01	13.4	3.07	4.35	/	/	/
40	16.9	1.47	11.5	17.6	1.75	10.1	17.2	1.88	9.15	17.4	2.40	7.24	16.4	2.78	5.91	15.6	2.98	5.22	/	/	/	/	/	/
43	17.2	1.46	11.8	18.0	1.71	10.5	17.6	1.88	9.37	17.7	2.39	7.41	16.7	2.70	6.20	15.9	2.94	5.41	/	/	/	/	/	/

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°

C) HC: Total heating capacity (kW)

PI: Power input (kW)

5.2 Cooling Capacity Tables (Test standard: EN14511)

Table 2-5.8: MHA-V4W/D2N8-B cooling capacity

DB	Maximum														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	4.76	0.46	10.30	5.47	0.55	10.01	6.09	0.48	12.66
0	/	/	/	/	/	/	4.54	0.57	8.03	5.25	0.65	8.08	5.87	0.55	10.70
5	/	/	/	/	/	/	4.04	0.67	6.07	4.75	0.75	6.34	5.37	0.65	8.28
10	/	/	/	/	/	/	6.06	1.06	5.71	6.44	1.01	6.40	7.11	0.85	8.37
15	/	/	/	5.05	0.86	5.91	8.09	1.46	5.55	8.14	1.26	6.44	8.85	1.05	8.43
20	4.72	1.04	4.53	6.01	1.35	4.47	8.16	1.49	5.47	8.33	1.30	6.42	8.98	1.10	8.15
25	5.87	1.30	4.51	6.97	1.84	3.80	8.23	1.53	5.39	8.52	1.33	6.40	9.12	1.15	7.90
30	5.84	1.55	3.78	6.80	1.85	3.67	7.77	1.65	4.72	8.19	1.46	5.63	8.77	1.30	6.75
35	5.80	1.79	3.24	6.64	1.87	3.55	7.31	1.76	4.15	7.87	1.58	4.98	8.43	1.44	5.84
40	3.80	1.51	2.52	5.08	1.81	2.81	5.91	1.73	3.41	6.63	1.68	3.95	7.88	1.64	4.80
43	2.58	1.15	2.24	3.80	1.52	2.51	5.08	1.56	3.26	5.88	1.57	3.74	7.55	1.59	4.73
Normal															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	3.83	0.33	11.74	4.45	0.37	11.92	4.95	0.35	14.10
0	/	/	/	/	/	/	3.66	0.39	9.35	4.28	0.44	9.81	4.78	0.36	13.31
5	/	/	/	/	/	/	3.23	0.48	6.68	3.81	0.52	7.29	4.36	0.45	9.77
10	/	/	/	/	/	/	4.87	0.77	6.29	5.19	0.70	7.37	5.79	0.59	9.89
15	/	/	/	3.79	0.61	6.25	6.79	1.15	5.89	7.00	0.99	7.06	7.44	0.80	9.29
20	3.68	0.77	4.76	4.86	1.01	4.80	6.80	1.16	5.88	7.17	1.03	6.94	7.82	0.87	8.98
25	4.65	0.97	4.78	5.72	1.40	4.09	6.96	1.21	5.74	7.44	1.07	6.98	8.05	0.91	8.85
30	4.69	1.17	4.02	5.67	1.45	3.92	6.67	1.32	5.06	7.25	1.20	6.05	7.85	1.06	7.44
35	4.51	1.32	3.40	5.45	1.43	3.82	6.02	1.35	4.47	6.87	1.28	5.36	7.69	1.20	6.39
40	3.10	1.15	2.70	4.30	1.42	3.03	5.15	1.40	3.68	5.95	1.37	4.34	7.15	1.32	5.41
43	2.12	0.91	2.33	2.99	1.15	2.59	4.04	1.18	3.43	5.04	1.25	4.04	5.97	1.15	5.18
Minimum															
DB	LWT (°C)														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	2.48	0.20	12.60	2.87	0.23	12.38	3.21	0.20	15.83
0	/	/	/	/	/	/	2.37	0.24	9.92	2.77	0.27	10.09	3.11	0.23	13.40
5	/	/	/	/	/	/	1.74	0.24	7.35	2.06	0.27	7.76	2.35	0.23	10.17
10	/	/	/	/	/	/	2.70	0.39	6.99	2.90	0.37	7.91	3.21	0.31	10.39
15	/	/	/	2.32	0.35	6.64	3.64	0.58	6.29	3.50	0.45	7.80	4.25	0.41	10.32
20	1.86	0.38	4.95	2.13	0.43	5.00	3.38	0.54	6.23	3.95	0.54	7.32	4.44	0.47	9.50
25	2.23	0.46	4.89	2.37	0.55	4.29	3.29	0.54	6.04	3.92	0.53	7.33	4.38	0.47	9.28
30	2.23	0.54	4.10	2.33	0.57	4.11	3.12	0.59	5.30	3.79	0.59	6.38	4.23	0.55	7.72
35	2.05	0.59	3.50	2.53	0.63	4.00	3.01	0.63	4.79	3.66	0.63	5.81	4.23	0.62	6.84
40	1.40	0.52	2.69	2.01	0.64	3.12	2.52	0.66	3.82	3.18	0.71	4.50	4.07	0.74	5.51
43	0.73	0.31	2.38	1.43	0.53	2.68	2.11	0.59	3.57	2.57	0.62	4.17	3.80	0.71	5.38

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

CC: Total cooling capacity (kW)

PI: Power input (kW)

Table 2-5.9: MHA-V6W/D2N8-B cooling capacity

DB	Maximum														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	5.27	0.59	8.93	6.38	0.55	11.53	6.77	0.64	10.62
0	/	/	/	/	/	/	5.05	0.69	7.28	6.16	0.66	9.39	6.55	0.74	8.85
5	/	/	/	/	/	/	4.55	0.79	5.74	5.66	0.76	7.48	6.05	0.84	7.20
10	/	/	/	/	/	/	6.32	1.13	5.61	6.90	1.01	6.83	7.45	0.95	7.88
15	/	/	/	5.89	1.10	5.33	8.09	1.46	5.55	8.14	1.26	6.44	8.85	1.05	8.43
20	5.41	1.38	3.93	6.63	1.43	4.62	8.16	1.49	5.47	8.33	1.30	6.42	8.98	1.10	8.15
25	7.16	1.80	3.98	7.37	1.77	4.17	8.23	1.53	5.39	8.52	1.33	6.40	9.12	1.15	7.90
30	6.50	1.85	3.51	7.29	1.90	3.84	7.77	1.65	4.72	8.19	1.46	5.63	8.77	1.30	6.75
35	5.84	1.90	3.07	7.22	2.03	3.55	7.31	1.76	4.15	7.87	1.58	4.98	8.43	1.44	5.84
40	3.80	1.51	2.52	5.08	1.81	2.81	5.91	1.73	3.41	6.63	1.68	3.95	7.88	1.64	4.80
43	2.58	1.15	2.24	3.80	1.52	2.51	5.08	1.56	3.26	5.88	1.57	3.74	7.55	1.59	4.73
Normal															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	4.24	0.42	10.18	5.19	0.38	13.72	5.50	0.42	12.96
0	/	/	/	/	/	/	4.07	0.48	8.48	5.02	0.44	11.39	5.33	0.48	11.01
5	/	/	/	/	/	/	3.64	0.58	6.31	4.54	0.53	8.61	4.91	0.58	8.49
10	/	/	/	/	/	/	5.08	0.82	6.18	5.55	0.71	7.86	6.06	0.65	9.31
15	/	/	/	4.42	0.78	5.65	6.79	1.15	5.89	7.00	0.99	7.06	7.44	0.80	9.29
20	4.22	1.02	4.14	5.36	1.08	4.96	6.80	1.16	5.88	7.17	1.03	6.94	7.82	0.87	8.98
25	5.67	1.35	4.21	6.05	1.35	4.49	6.96	1.21	5.74	7.44	1.07	6.98	8.05	0.91	8.85
30	5.23	1.40	3.74	6.08	1.48	4.10	6.67	1.32	5.06	7.25	1.20	6.05	7.85	1.06	7.44
35	4.54	1.41	3.22	5.93	1.55	3.83	6.02	1.35	4.47	6.87	1.28	5.36	7.69	1.20	6.39
40	3.10	1.15	2.70	4.30	1.42	3.03	5.15	1.40	3.68	5.95	1.37	4.34	7.15	1.32	5.41
43	2.12	0.91	2.33	2.99	1.15	2.59	4.04	1.18	3.43	5.04	1.25	4.04	5.97	1.15	5.18
Minimum															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	2.75	0.25	10.92	3.35	0.23	14.26	3.57	0.27	13.17
0	/	/	/	/	/	/	2.64	0.29	9.00	3.25	0.28	11.72	3.47	0.31	11.08
5	/	/	/	/	/	/	1.96	0.28	6.95	2.46	0.27	9.16	2.64	0.30	8.84
10	/	/	/	/	/	/	2.81	0.41	6.87	3.10	0.37	8.44	3.36	0.34	9.78
15	/	/	/	2.71	0.45	5.99	3.64	0.58	6.29	3.50	0.45	7.80	4.25	0.41	10.32
20	2.13	0.50	4.30	2.35	0.45	5.17	3.38	0.54	6.23	3.95	0.54	7.32	4.44	0.47	9.50
25	2.72	0.63	4.31	2.50	0.53	4.72	3.29	0.54	6.04	3.92	0.53	7.33	4.38	0.47	9.28
30	2.48	0.65	3.81	2.49	0.58	4.30	3.12	0.59	5.30	3.79	0.59	6.38	4.23	0.55	7.72
35	2.07	0.62	3.31	2.75	0.69	4.00	3.01	0.63	4.79	3.66	0.63	5.81	4.23	0.62	6.84
40	1.40	0.52	2.69	2.01	0.64	3.12	2.52	0.66	3.82	3.18	0.71	4.50	4.07	0.74	5.51
43	0.73	0.31	2.38	1.43	0.53	2.68	2.11	0.59	3.57	2.57	0.62	4.17	3.80	0.71	5.38

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

CC: Total cooling capacity (kW)

PI: Power input (kW)

Table 2-5.10: MHA-V8W/D2N8-B cooling capacity

DB	Maximum														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	6.39	0.63	10.07	8.21	0.76	10.82	8.74	0.71	12.31
0	/	/	/	/	/	/	6.17	0.71	8.69	7.26	0.74	9.76	7.76	0.70	11.05
5	/	/	/	/	/	/	5.96	0.82	7.30	6.30	0.72	8.69	6.78	0.69	9.78
10	/	/	/	/	/	/	6.29	0.74	8.54	7.91	0.84	9.45	8.30	0.79	10.53
15	/	/	/	5.97	0.87	6.84	7.33	0.99	7.38	9.11	1.15	7.94	9.73	1.12	8.67
20	5.68	1.15	4.96	7.06	1.29	5.46	8.38	1.35	6.22	10.31	1.60	6.43	11.15	1.64	6.81
25	6.47	1.48	4.36	7.82	1.63	4.81	9.26	1.68	5.52	11.25	1.90	5.92	12.76	2.02	6.33
30	7.27	1.89	3.85	8.57	2.01	4.25	10.15	2.06	4.93	12.20	2.20	5.54	14.36	2.40	6.00
35	7.39	2.25	3.28	8.77	2.31	3.80	10.21	2.31	4.43	11.74	2.40	4.89	13.59	2.50	5.42
40	6.61	2.52	2.62	7.42	2.37	3.14	8.88	2.53	3.51	10.23	2.51	4.07	12.27	2.83	4.34
43	5.09	2.28	2.23	5.64	2.19	2.58	6.73	2.13	3.16	8.15	2.17	3.75	10.04	2.49	4.03
Normal															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	5.14	0.45	11.38	6.68	0.53	12.50	7.10	0.51	14.03
0	/	/	/	/	/	/	4.98	0.50	9.94	5.91	0.52	11.31	6.31	0.49	12.86
5	/	/	/	/	/	/	4.77	0.60	7.96	5.05	0.52	9.69	5.50	0.51	10.76
10	/	/	/	/	/	/	5.05	0.54	9.32	6.37	0.60	10.55	6.75	0.58	11.60
15	/	/	/	4.48	0.62	7.24	6.16	0.79	7.83	7.83	0.90	8.70	8.17	0.86	9.55
20	4.43	0.85	5.21	5.71	0.97	5.86	6.99	1.04	6.69	8.87	1.28	6.95	9.71	1.29	7.50
25	5.13	1.11	4.61	6.42	1.24	5.17	7.84	1.33	5.87	9.82	1.52	6.46	11.26	1.59	7.09
30	5.84	1.42	4.10	7.14	1.57	4.54	8.71	1.65	5.28	10.80	1.82	5.94	12.86	1.95	6.61
35	5.75	1.67	3.45	7.20	1.76	4.09	8.42	1.76	4.77	10.25	1.95	5.26	12.39	2.09	5.94
40	5.40	1.92	2.81	6.27	1.86	3.38	7.73	2.04	3.79	9.18	2.06	4.47	11.14	2.28	4.89
43	4.18	1.80	2.32	4.44	1.66	2.67	5.36	1.61	3.32	6.98	1.72	4.06	7.94	1.80	4.41
Minimum															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	3.33	0.28	11.86	4.31	0.33	12.89	4.60	0.31	14.71
0	/	/	/	/	/	/	3.23	0.31	10.38	3.83	0.32	11.79	4.11	0.31	13.34
5	/	/	/	/	/	/	2.57	0.30	8.55	2.74	0.27	10.29	2.96	0.26	11.57
10	/	/	/	/	/	/	2.80	0.28	10.11	3.56	0.31	11.31	3.75	0.30	12.59
15	/	/	/	2.75	0.36	7.69	3.30	0.39	8.37	3.92	0.41	9.62	4.67	0.44	10.61
20	2.24	0.41	5.42	2.50	0.41	6.12	3.47	0.49	7.09	4.88	0.67	7.33	5.51	0.69	7.93
25	2.46	0.52	4.73	2.66	0.49	5.43	3.71	0.60	6.18	5.18	0.76	6.78	6.12	0.82	7.44
30	2.78	0.66	4.19	2.93	0.62	4.76	4.08	0.74	5.53	5.64	0.90	6.28	6.92	1.01	6.86
35	2.62	0.74	3.54	3.34	0.78	4.28	4.21	0.82	5.12	5.46	0.96	5.70	6.82	1.07	6.36
40	2.44	0.87	2.80	2.94	0.84	3.48	3.79	0.97	3.93	4.91	1.06	4.64	6.34	1.28	4.97
43	1.43	0.60	2.37	2.12	0.77	2.76	2.80	0.81	3.46	3.55	0.85	4.18	5.06	1.11	4.58

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

CC: Total cooling capacity (kW)

PI: Power input (kW)

Table 2-5.11: MHA-V10W/D2N8-B cooling capacity

DB	Maximum														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	6.83	0.69	9.92	8.79	0.82	10.66	9.35	0.77	12.13
0	/	/	/	/	/	/	6.61	0.77	8.56	7.76	0.81	9.61	8.30	0.76	10.88
5	/	/	/	/	/	/	6.38	0.89	7.19	6.74	0.79	8.56	7.25	0.75	9.63
10	/	/	/	/	/	/	6.55	0.75	8.73	8.17	0.80	10.18	8.80	0.86	10.22
15	/	/	/	6.30	1.07	5.89	7.61	1.03	7.35	9.48	1.13	8.38	10.64	1.20	8.84
20	6.20	1.28	4.86	7.19	1.39	5.17	8.67	1.45	5.97	10.79	1.64	6.57	12.49	1.68	7.45
25	7.13	1.68	4.24	8.26	1.81	4.56	9.87	1.88	5.24	12.00	2.07	5.79	13.93	2.17	6.42
30	8.06	2.17	3.71	9.34	2.31	4.05	11.08	2.40	4.62	13.21	2.57	5.14	15.37	2.79	5.51
35	8.13	2.48	3.12	9.48	2.43	3.72	11.03	2.62	4.21	12.70	2.68	4.73	14.51	2.87	5.06
40	6.61	2.52	2.62	7.42	2.37	3.14	8.88	2.53	3.51	10.23	2.51	4.07	12.27	2.83	4.34
43	5.09	2.28	2.23	5.64	2.19	2.58	6.73	2.13	3.16	8.15	2.17	3.75	10.04	2.49	4.03
Normal															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	5.50	0.49	11.21	7.15	0.58	12.31	7.59	0.55	13.82
0	/	/	/	/	/	/	5.33	0.54	9.79	6.33	0.57	11.14	6.75	0.53	12.66
5	/	/	/	/	/	/	5.11	0.65	7.84	5.41	0.57	9.54	5.88	0.56	10.60
10	/	/	/	/	/	/	5.26	0.55	9.53	6.58	0.58	11.37	7.16	0.64	11.26
15	/	/	/	4.73	0.76	6.24	6.39	0.82	7.80	8.15	0.89	9.18	8.94	0.92	9.74
20	4.83	0.95	5.11	5.82	1.05	5.55	7.23	1.13	6.42	9.29	1.31	7.10	10.87	1.32	8.21
25	5.65	1.26	4.49	6.78	1.38	4.91	8.35	1.50	5.58	10.47	1.66	6.32	12.30	1.71	7.18
30	6.48	1.64	3.95	7.78	1.80	4.32	9.51	1.92	4.95	11.69	2.12	5.51	13.76	2.26	6.08
35	6.31	1.93	3.28	7.78	1.94	4.01	9.09	2.01	4.53	11.08	2.18	5.09	13.23	2.39	5.54
40	5.40	1.92	2.81	6.27	1.86	3.38	7.73	2.04	3.79	9.18	2.06	4.47	11.14	2.28	4.89
43	4.18	1.80	2.32	4.44	1.66	2.67	5.36	1.61	3.32	6.98	1.72	4.06	7.94	1.80	4.41
Minimum															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	3.56	0.30	11.68	4.61	0.36	12.69	4.93	0.34	14.49
0	/	/	/	/	/	/	3.46	0.34	10.23	4.09	0.35	11.61	4.39	0.33	13.14
5	/	/	/	/	/	/	2.75	0.33	8.42	2.93	0.29	10.13	3.17	0.28	11.40
10	/	/	/	/	/	/	2.92	0.28	10.33	3.67	0.30	12.18	3.97	0.33	12.22
15	/	/	/	2.90	0.44	6.62	3.42	0.41	8.33	4.08	0.40	10.14	5.11	0.47	10.81
20	2.44	0.46	5.31	2.55	0.44	5.79	3.59	0.53	6.81	5.11	0.68	7.49	6.17	0.71	8.68
25	2.71	0.59	4.60	2.81	0.55	5.15	3.95	0.67	5.88	5.52	0.83	6.64	6.69	0.89	7.54
30	3.08	0.76	4.03	3.19	0.70	4.53	4.45	0.86	5.19	6.10	1.05	5.82	7.41	1.18	6.30
35	2.88	0.85	3.37	3.61	0.86	4.19	4.55	0.94	4.86	5.90	1.07	5.52	7.28	1.23	5.93
40	2.44	0.87	2.80	2.94	0.84	3.48	3.79	0.97	3.93	4.91	1.06	4.64	6.34	1.28	4.97
43	1.43	0.60	2.37	2.12	0.77	2.76	2.80	0.81	3.46	3.55	0.85	4.18	5.06	1.11	4.58

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

CC: Total cooling capacity (kW)

PI: Power input (kW)

Table 2-5.12: MHA-V12W/D2(R)N8-B cooling capacity

DB	Maximum														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	9.55	1.27	7.50	10.39	1.41	7.37	11.39	1.36	8.35
0	/	/	/	/	/	/	9.33	1.57	5.93	10.90	1.49	7.32	11.89	1.50	7.92
5	/	/	/	/	/	/	9.12	1.71	5.32	11.41	1.57	7.27	12.38	1.64	7.57
10	/	/	/	/	/	/	10.81	2.05	5.27	13.14	1.92	6.85	14.18	1.94	7.32
15	/	/	/	10.51	2.32	4.53	12.50	2.33	5.36	14.87	2.27	6.56	15.98	2.24	7.14
20	7.78	2.03	3.83	12.15	2.96	4.10	14.16	3.12	4.54	15.93	3.14	5.08	16.53	2.84	5.82
25	10.10	3.00	3.37	13.80	3.61	3.82	15.82	3.91	4.04	17.00	4.01	4.24	17.07	3.44	4.96
30	9.99	3.58	2.79	13.43	4.13	3.25	15.18	4.17	3.64	16.17	4.15	3.90	16.11	3.74	4.31
35	9.89	4.52	2.19	13.07	4.90	2.67	14.53	4.56	3.19	15.34	4.38	3.51	15.26	4.00	3.81
40	8.11	4.53	1.79	9.87	4.33	2.28	10.67	3.92	2.72	12.19	4.05	3.01	13.23	3.77	3.51
43	5.20	3.72	1.40	6.11	3.26	1.87	7.33	3.02	2.43	8.53	3.19	2.67	10.68	3.26	3.27
Normal															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	7.69	0.91	8.47	8.46	0.99	8.51	9.25	0.97	9.52
0	/	/	/	/	/	/	7.53	1.11	6.78	8.89	1.05	8.48	9.67	1.05	9.22
5	/	/	/	/	/	/	7.30	1.26	5.80	9.16	1.13	8.10	10.05	1.21	8.32
10	/	/	/	/	/	/	8.68	1.51	5.75	10.57	1.38	7.65	11.54	1.43	8.07
15	/	/	/	7.88	1.62	4.86	10.50	1.80	5.82	12.78	1.74	7.36	13.43	1.67	8.05
20	6.07	1.51	4.02	9.83	2.20	4.46	11.81	2.36	4.99	13.71	2.44	5.61	14.39	2.19	6.56
25	8.00	2.24	3.56	11.33	2.71	4.17	13.39	3.04	4.41	14.84	3.14	4.73	15.07	2.65	5.68
30	8.04	2.71	2.97	11.19	3.18	3.52	13.03	3.27	3.99	14.31	3.34	4.28	14.43	2.97	4.86
35	7.68	3.34	2.30	10.73	3.69	2.91	11.97	3.41	3.51	13.39	3.47	3.86	13.91	3.26	4.27
40	6.62	3.45	1.92	8.35	3.35	2.49	9.28	3.09	3.00	10.94	3.24	3.38	12.00	2.97	4.05
43	4.27	2.93	1.45	4.80	2.44	1.97	5.83	2.23	2.61	7.30	2.47	2.96	8.44	2.30	3.66
Minimum															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	4.98	0.56	8.83	5.46	0.62	8.78	6.00	0.60	9.98
0	/	/	/	/	/	/	4.88	0.69	7.09	5.75	0.65	8.84	6.29	0.66	9.56
5	/	/	/	/	/	/	3.93	0.63	6.23	4.96	0.58	8.61	5.41	0.60	8.95
10	/	/	/	/	/	/	4.81	0.77	6.24	5.91	0.72	8.20	6.40	0.73	8.75
15	/	/	/	4.83	0.94	5.16	5.63	0.91	6.22	6.39	0.79	8.11	7.67	0.86	8.92
20	3.07	0.73	4.18	4.30	0.92	4.65	5.86	1.11	5.29	7.55	1.28	5.92	8.16	1.18	6.93
25	3.84	1.05	3.65	4.69	1.07	4.38	6.33	1.36	4.64	7.82	1.58	4.96	8.19	1.38	5.95
30	3.82	1.26	3.03	4.59	1.25	3.68	6.10	1.46	4.17	7.47	1.65	4.51	7.77	1.54	5.04
35	3.50	1.48	2.36	4.98	1.64	3.04	5.99	1.59	3.76	7.13	1.71	4.18	7.66	1.68	4.56
40	2.99	1.56	1.91	3.91	1.53	2.56	4.55	1.46	3.11	5.85	1.67	3.50	6.83	1.66	4.12
43	1.46	0.98	1.48	2.30	1.13	2.03	3.05	1.12	2.72	3.72	1.22	3.04	5.38	1.42	3.80

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

CC: Total cooling capacity (kW)

PI: Power input (kW)

Table 2-5.13: MHA-V14W/D2(R)N8-B cooling capacity

DB	Maximum														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	10.0	1.32	7.57	10.9	1.47	7.44	12.0	1.42	8.43
0	/	/	/	/	/	/	9.80	1.67	5.87	11.4	1.58	7.24	12.5	1.59	7.84
5	/	/	/	/	/	/	9.57	1.76	5.44	12.0	1.61	7.43	13.0	1.68	7.73
10	/	/	/	/	/	/	11.3	2.18	5.21	13.1	1.92	6.85	14.2	1.94	7.32
15	/	/	/	11.0	2.32	4.60	13.1	2.32	5.45	15.5	2.32	6.67	16.4	2.32	7.26
20	8.17	2.17	3.77	12.8	3.16	4.04	14.9	3.33	4.47	15.9	3.14	5.08	16.5	2.84	5.82
25	10.6	3.19	3.32	14.5	3.84	3.77	16.6	4.16	3.99	17.0	4.01	4.24	17.1	3.44	4.96
30	10.5	3.96	2.65	14.1	4.53	3.11	15.9	4.56	3.49	16.2	4.18	3.87	16.1	3.74	4.31
35	10.4	4.81	2.16	13.7	5.32	2.58	15.3	4.88	3.13	15.3	4.44	3.45	15.3	4.12	3.71
40	8.11	4.53	1.79	9.87	4.33	2.28	10.7	3.92	2.72	12.2	4.05	3.01	13.2	3.77	3.51
43	5.20	3.72	1.40	6.11	3.26	1.87	7.33	3.02	2.43	8.53	3.19	2.67	10.7	3.26	3.27
Normal															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	8.07	0.94	8.56	8.88	1.03	8.60	9.72	1.01	9.61
0	/	/	/	/	/	/	7.90	1.18	6.71	9.33	1.11	8.39	10.2	1.11	9.13
5	/	/	/	/	/	/	7.67	1.29	5.93	9.61	1.16	8.28	10.6	1.24	8.50
10	/	/	/	/	/	/	9.12	1.60	5.69	10.6	1.38	7.65	11.5	1.43	8.07
15	/	/	/	8.24	1.67	4.94	11.0	1.85	5.92	13.4	1.79	7.48	13.8	1.68	8.19
20	6.37	1.61	3.96	10.3	2.35	4.40	12.4	2.52	4.92	13.7	2.44	5.61	14.4	2.19	6.56
25	8.40	2.39	3.52	11.9	2.89	4.12	14.1	3.23	4.35	14.8	3.14	4.73	15.1	2.65	5.68
30	8.44	2.99	2.82	11.8	3.49	3.37	13.7	3.57	3.83	14.3	3.37	4.25	14.4	2.97	4.86
35	8.07	3.56	2.27	11.3	4.00	2.81	12.6	3.65	3.45	13.4	3.52	3.80	13.9	3.35	4.15
40	6.62	3.45	1.92	8.35	3.35	2.49	9.28	3.09	3.00	10.9	3.24	3.38	12.0	2.97	4.05
43	4.27	2.93	1.45	4.80	2.44	1.97	5.83	2.23	2.61	7.30	2.47	2.96	8.44	2.30	3.66
Minimum															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	5.22	0.59	8.92	5.73	0.65	8.86	6.30	0.63	10.08
0	/	/	/	/	/	/	5.13	0.73	7.01	6.04	0.69	8.75	6.61	0.70	9.47
5	/	/	/	/	/	/	4.12	0.65	6.37	5.21	0.59	8.80	5.68	0.62	9.15
10	/	/	/	/	/	/	5.06	0.82	6.16	5.91	0.72	8.20	6.40	0.73	8.75
15	/	/	/	5.05	0.96	5.24	5.88	0.93	6.32	6.68	0.81	8.25	7.86	0.87	9.07
20	3.22	0.78	4.12	4.52	0.99	4.58	6.16	1.18	5.21	7.55	1.28	5.92	8.16	1.18	6.93
25	4.03	1.12	3.60	4.93	1.14	4.32	6.65	1.45	4.58	7.82	1.58	4.96	8.19	1.38	5.95
30	4.01	1.39	2.88	4.82	1.37	3.53	6.41	1.60	4.01	7.47	1.67	4.48	7.77	1.54	5.04
35	3.67	1.58	2.33	5.23	1.78	2.94	6.29	1.70	3.69	7.13	1.73	4.11	7.66	1.73	4.44
40	2.99	1.56	1.91	3.91	1.53	2.56	4.55	1.46	3.11	5.85	1.67	3.50	6.83	1.66	4.12
43	1.46	0.98	1.48	2.30	1.13	2.03	3.05	1.12	2.72	3.72	1.22	3.04	5.38	1.42	3.80

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

CC: Total cooling capacity (kW)

PI: Power input (kW)

Table 2-5.14: MHA-V16W/D2(R)N8-B cooling capacity

DB	Maximum														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	10.0	1.32	7.57	10.9	1.47	7.44	12.0	1.42	8.43
0	/	/	/	/	/	/	9.80	1.67	5.87	11.4	1.58	7.24	12.5	1.59	7.84
5	/	/	/	/	/	/	9.57	1.76	5.44	12.0	1.61	7.43	13.0	1.68	7.73
10	/	/	/	/	/	/	11.3	2.18	5.21	13.1	1.92	6.85	14.2	1.94	7.32
15	/	/	/	11.4	2.43	4.67	13.5	2.44	5.53	16.1	2.37	6.77	17.0	2.30	7.37
20	8.99	2.43	3.70	14.0	3.55	3.96	15.8	3.56	4.42	16.9	3.36	5.03	17.5	3.04	5.76
25	11.7	3.59	3.25	15.9	4.32	3.69	17.4	4.47	3.90	17.9	4.31	4.14	17.9	3.70	4.84
30	11.5	4.46	2.59	15.5	5.11	3.04	17.2	5.05	3.41	17.1	4.66	3.68	16.9	4.02	4.21
35	11.4	5.42	2.11	15.1	6.00	2.52	16.5	5.60	2.94	16.3	4.96	3.27	16.2	4.47	3.62
40	8.92	5.11	1.75	10.9	4.89	2.22	11.7	4.42	2.65	13.4	4.69	2.86	14.6	4.36	3.34
43	5.98	4.50	1.33	7.33	4.12	1.78	9.01	3.91	2.31	10.5	4.13	2.54	12.0	3.85	3.11
Normal															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	8.07	0.94	8.56	8.88	1.03	8.60	9.72	1.01	9.61
0	/	/	/	/	/	/	7.90	1.18	6.71	9.33	1.11	8.39	10.2	1.11	9.13
5	/	/	/	/	/	/	7.67	1.29	5.93	9.61	1.16	8.28	10.6	1.24	8.50
10	/	/	/	/	/	/	9.12	1.60	5.69	10.6	1.38	7.65	11.5	1.43	8.07
15	/	/	/	8.52	1.70	5.02	11.4	1.89	6.01	13.8	1.82	7.59	14.2	1.71	8.31
20	7.01	1.80	3.88	11.4	2.63	4.31	13.1	2.70	4.87	14.5	2.62	5.56	15.3	2.35	6.49
25	9.24	2.69	3.43	13.1	3.25	4.02	14.8	3.47	4.25	15.6	3.37	4.62	15.8	2.85	5.55
30	9.28	3.37	2.75	12.9	3.93	3.29	14.8	3.95	3.74	15.2	3.75	4.04	15.1	3.19	4.75
35	8.87	4.01	2.21	12.4	4.51	2.75	13.6	4.19	3.24	14.2	3.94	3.60	14.7	3.64	4.05
40	7.28	3.89	1.87	9.18	3.78	2.43	10.2	3.49	2.93	12.0	3.75	3.21	13.2	3.43	3.84
43	4.91	3.55	1.38	5.76	3.08	1.87	7.17	2.89	2.48	8.98	3.20	2.81	9.46	2.72	3.48
Minimum															
DB	LWT														
	5			10			15			20			25		
	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER	CC	PI	EER
-5	/	/	/	/	/	/	5.22	0.59	8.92	5.73	0.65	8.86	6.30	0.63	10.08
0	/	/	/	/	/	/	5.13	0.73	7.01	6.04	0.69	8.75	6.61	0.70	9.47
5	/	/	/	/	/	/	4.12	0.65	6.37	5.21	0.59	8.80	5.68	0.62	9.15
10	/	/	/	/	/	/	5.06	0.82	6.16	5.91	0.72	8.20	6.40	0.73	8.75
15	/	/	/	5.23	0.98	5.32	6.08	0.95	6.41	6.91	0.83	8.37	8.14	0.88	9.21
20	3.54	0.88	4.04	4.97	1.11	4.49	6.53	1.27	5.15	8.01	1.37	5.86	8.65	1.26	6.86
25	4.43	1.26	3.52	5.42	1.28	4.22	6.98	1.56	4.47	8.21	1.69	4.85	8.60	1.48	5.81
30	4.41	1.57	2.81	5.31	1.54	3.44	6.92	1.77	3.91	7.92	1.86	4.26	8.15	1.66	4.92
35	4.04	1.78	2.27	5.75	2.00	2.87	6.79	1.96	3.47	7.56	1.94	3.90	8.12	1.87	4.33
40	3.29	1.76	1.86	4.30	1.72	2.50	5.01	1.65	3.03	6.43	1.93	3.33	7.52	1.92	3.91
43	1.68	1.19	1.41	2.76	1.43	1.93	3.75	1.45	2.58	4.57	1.58	2.89	6.03	1.67	3.61

Abbreviations:

LWT: Leaving water temperature (°C)

DB: Dry-bulb temperature for Outdoor air temperature (°C)

CC: Total cooling capacity (kW)

PI: Power input (kW)

6 Operating Limits

Figure 2-6.1: Heating operating limits¹

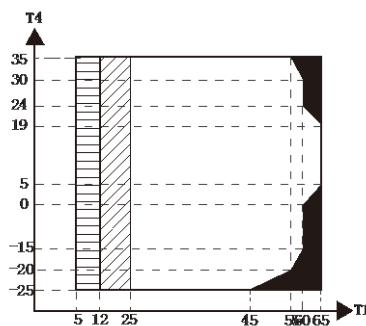


Figure 2-6.2: Cooling operating limits

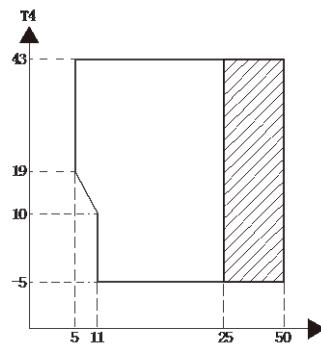
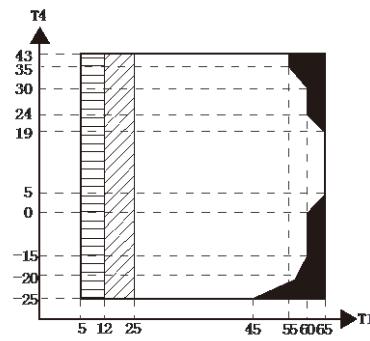


Figure 2-6.3: Domestic hot water operating limits¹



Abbreviations:

T4: Outdoor temperature (°C)
T1: Leaving water temperature (°C)

Notes:

1. If IBH/AHS setting is valid, only IBH/AHS turns on; If IBH/AHS setting is invalid, only heat pump turns on
2. Water flow temperature drop or rise interval
3. IBH/AHS only

7 Hydronic Performance

Figure 2-7.1: HB-A60(100)/CGN8-B hydronic performance

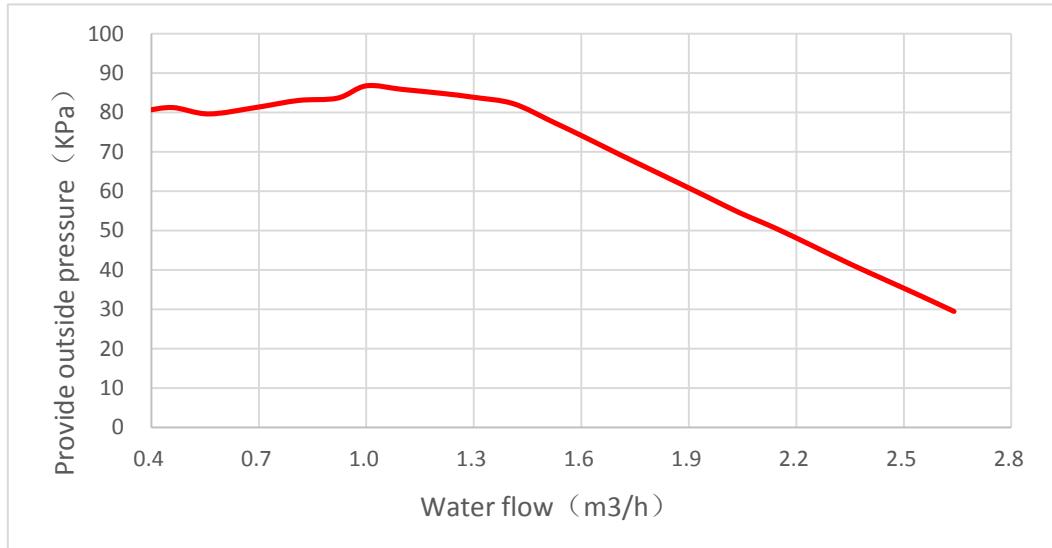
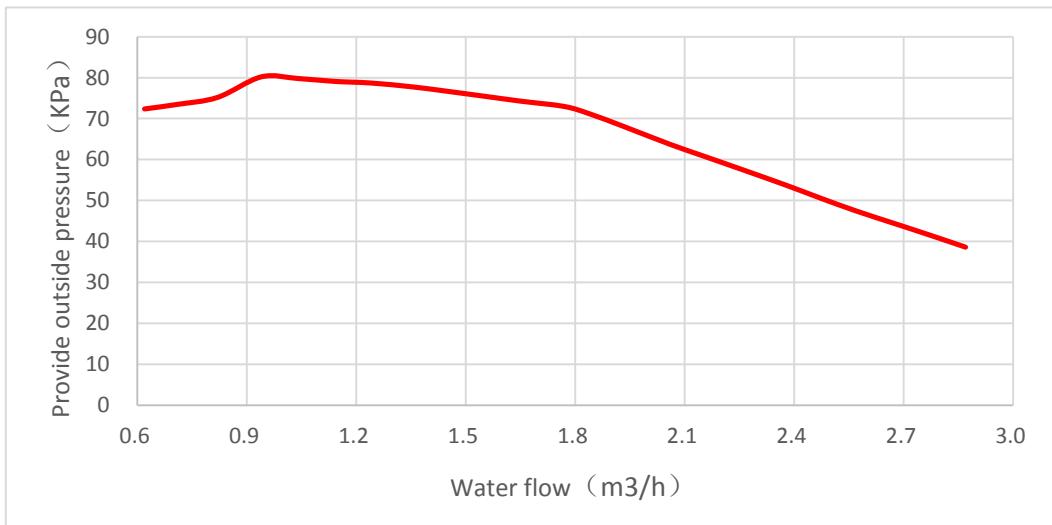


Figure 2-7.2: HB-A160/CGN8-B hydronic performance



8 Sound Levels

8.1 Overall

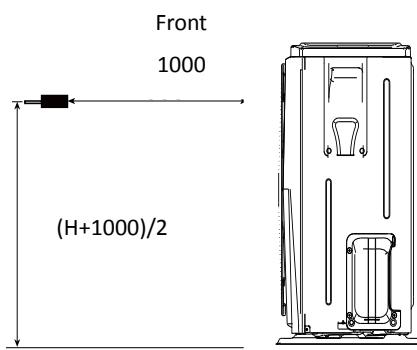
Table 2-8.1: Sound pressure levels¹

Model name	dB
MHA-V4W/D2N8-B	44
MHA-V6W/D2N8-B	45
MHA-V8W/D2N8-B	46
MHA-V10W/D2N8-B	49
MHA-V12W/D2RN8-B	50
MHA-V14W/D2RN8-B	51
MHA-V16W/D2RN8-B	55
MHA-V12W/D2RN8-B	50
MHA-V14W/D2RN8-B	51
MHA-V16W/D2RN8-B	55

Notes:

1. Sound pressure level is measured at a position 1m in front of the unit and $(1+H)/2$ m (where H is the height of the unit) above the floor in a semi-anechoic chamber. During in-situ operation, sound pressure levels may be higher as a result of ambient noise. Sound pressure level is the maximum value tested under the two conditions of Notes2 and Notes3. For 16kW model, the value is calculated and it is for reference only

Figure 2-8.1: Sound pressure level measurement (unit: mm)



2. Outdoor air temperature 7°C DB, 85% R.H.; EWT 30°C, LWT 35°C.
3. Outdoor air temperature 35°C DB; EWT 23°C, LWT 18°C..

M thermal Split

8.2 Octave Band Levels

Figure 2-8.2: MHA-V4/D2N8-B octave band levels

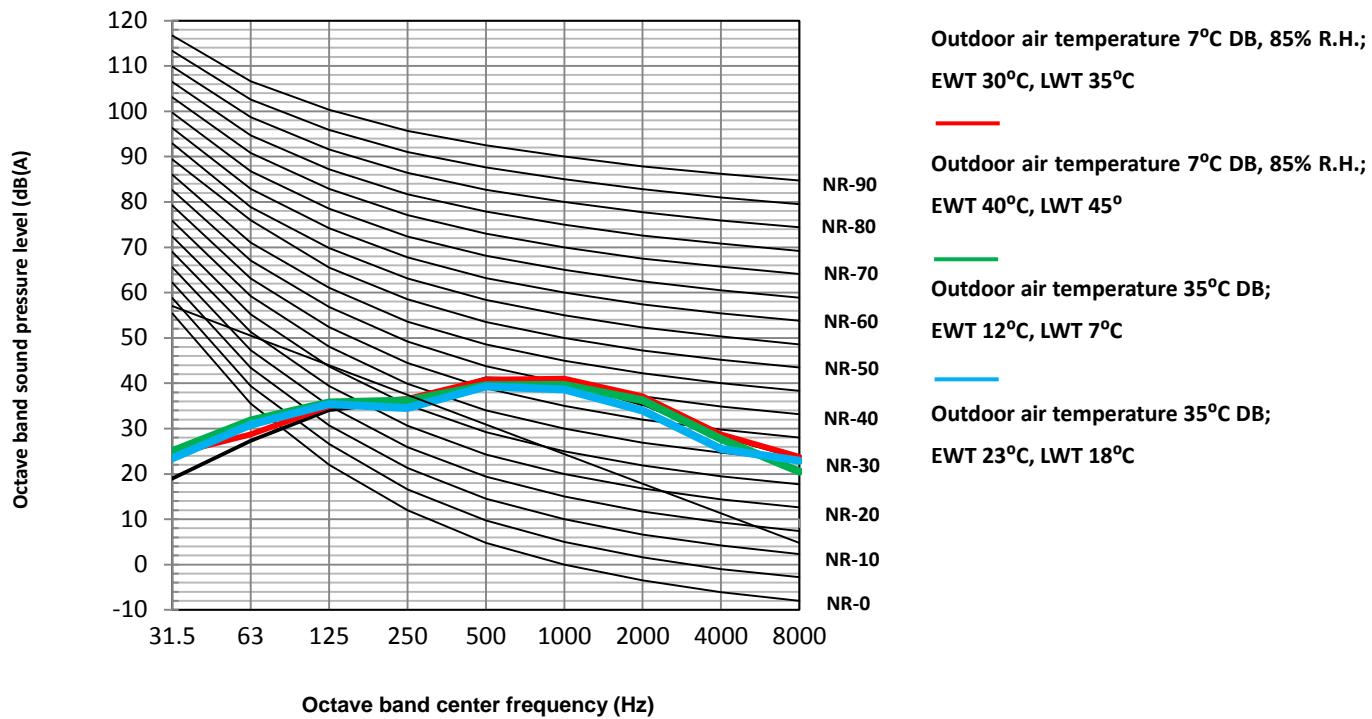


Figure 2-8.3: MHA-V6/D2N8-B octave band levels

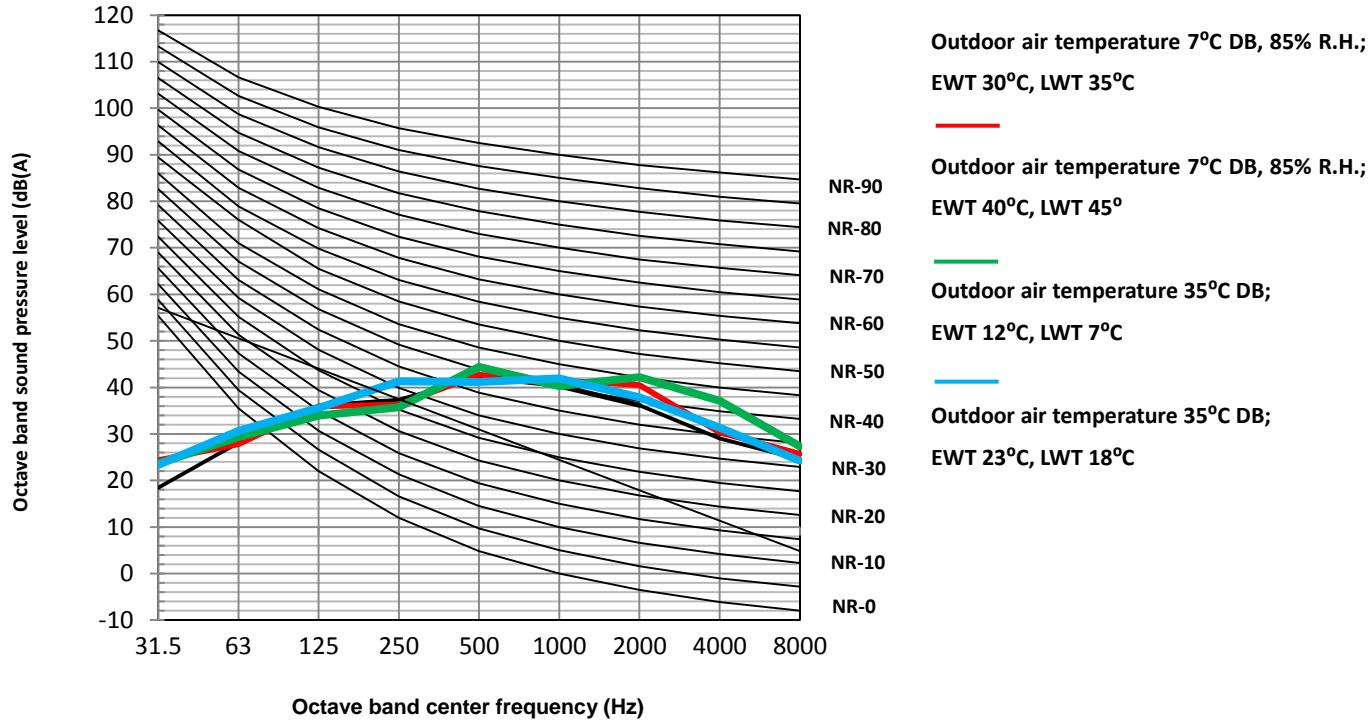


Figure 2-8.4: MHA-V8/D2N8-B octave band levels

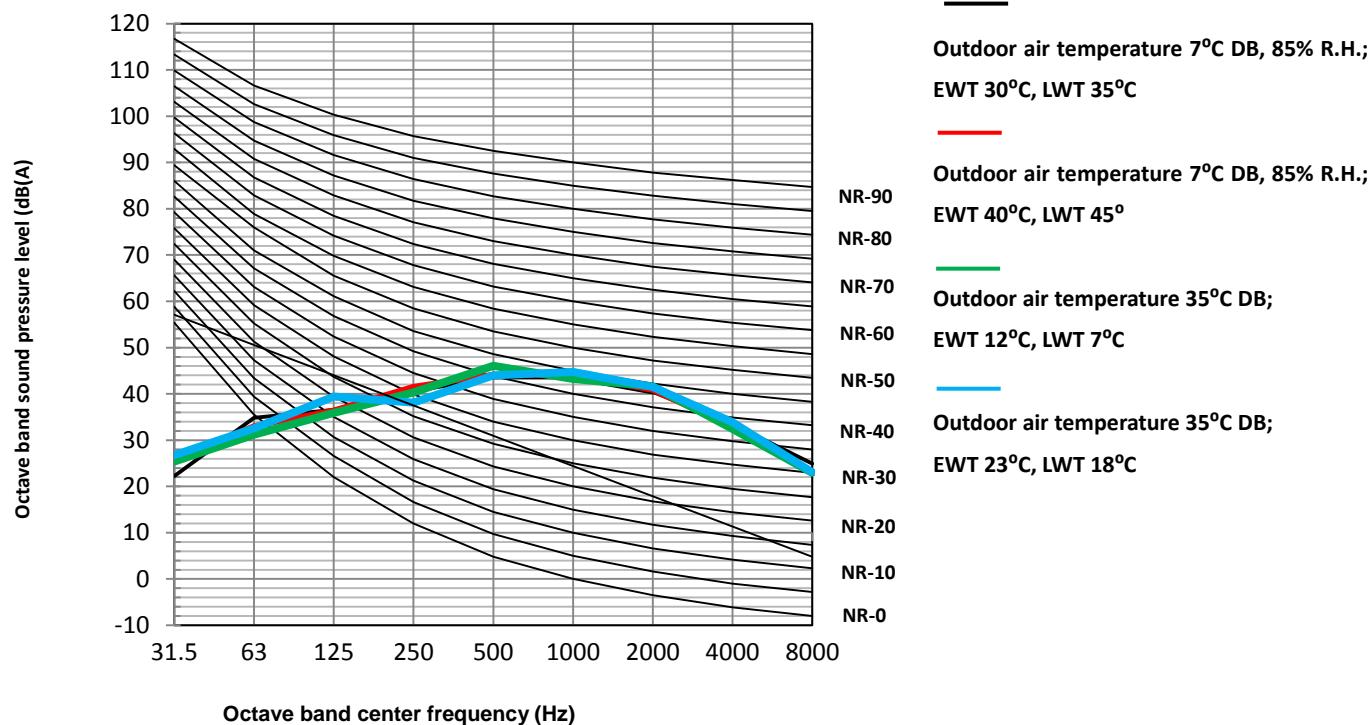
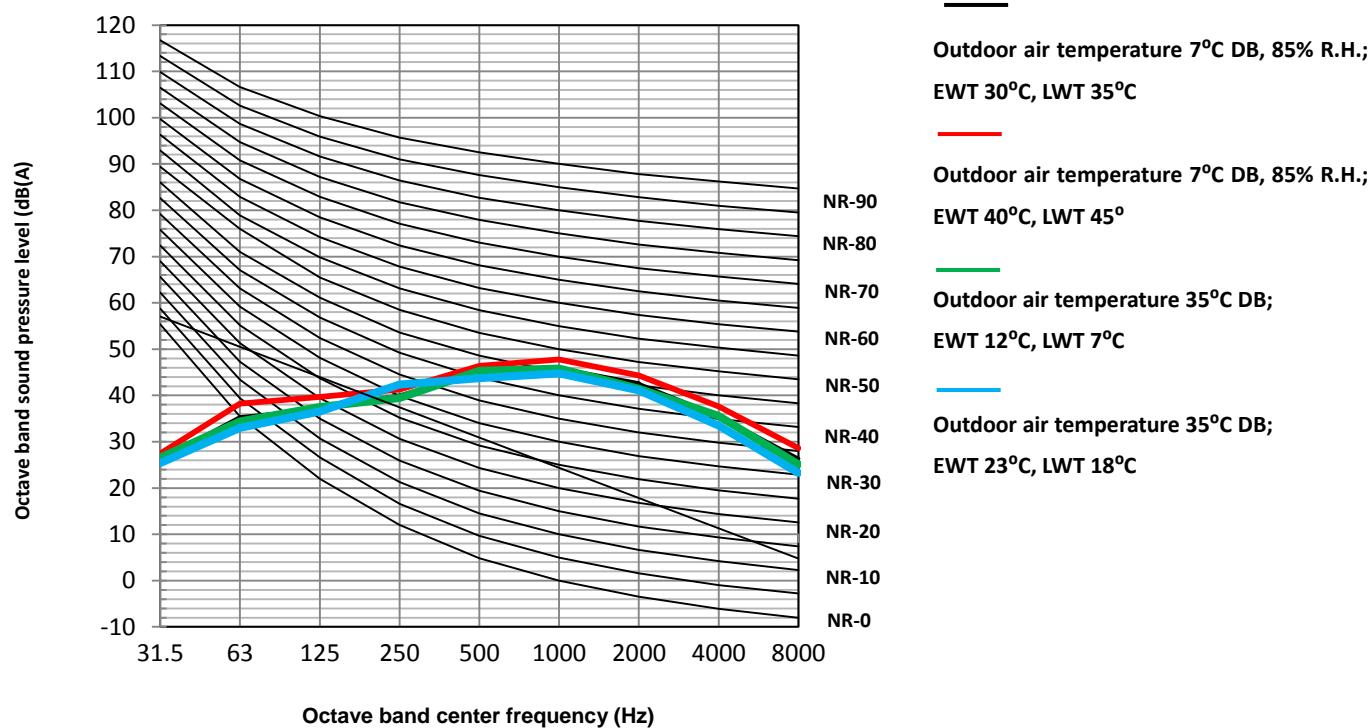


Figure 2-8.5: MHA-V10/D2N8-B octave band levels



M thermal Split

Figure 2-8.5: MHA-V12/D2N8-B octave band levels

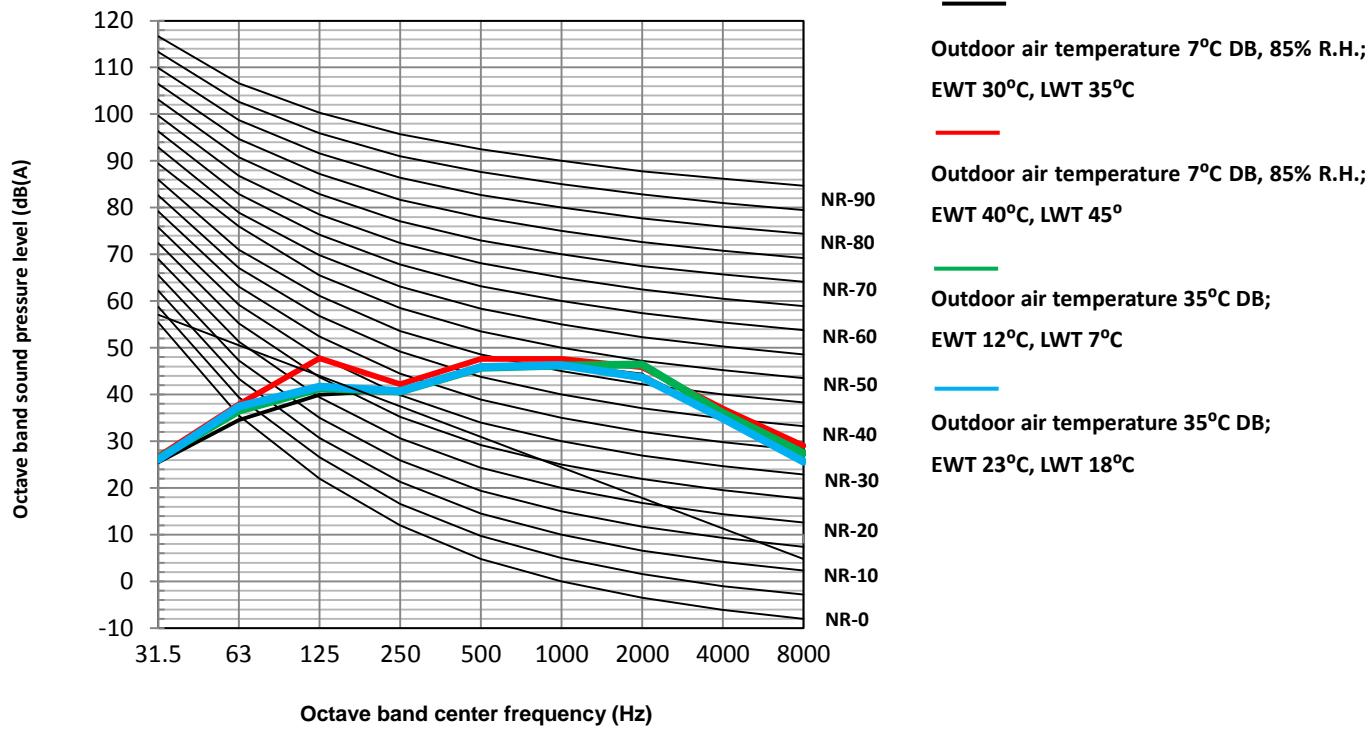


Figure 2-8.5: MHA-V14/D2N8-B octave band levels

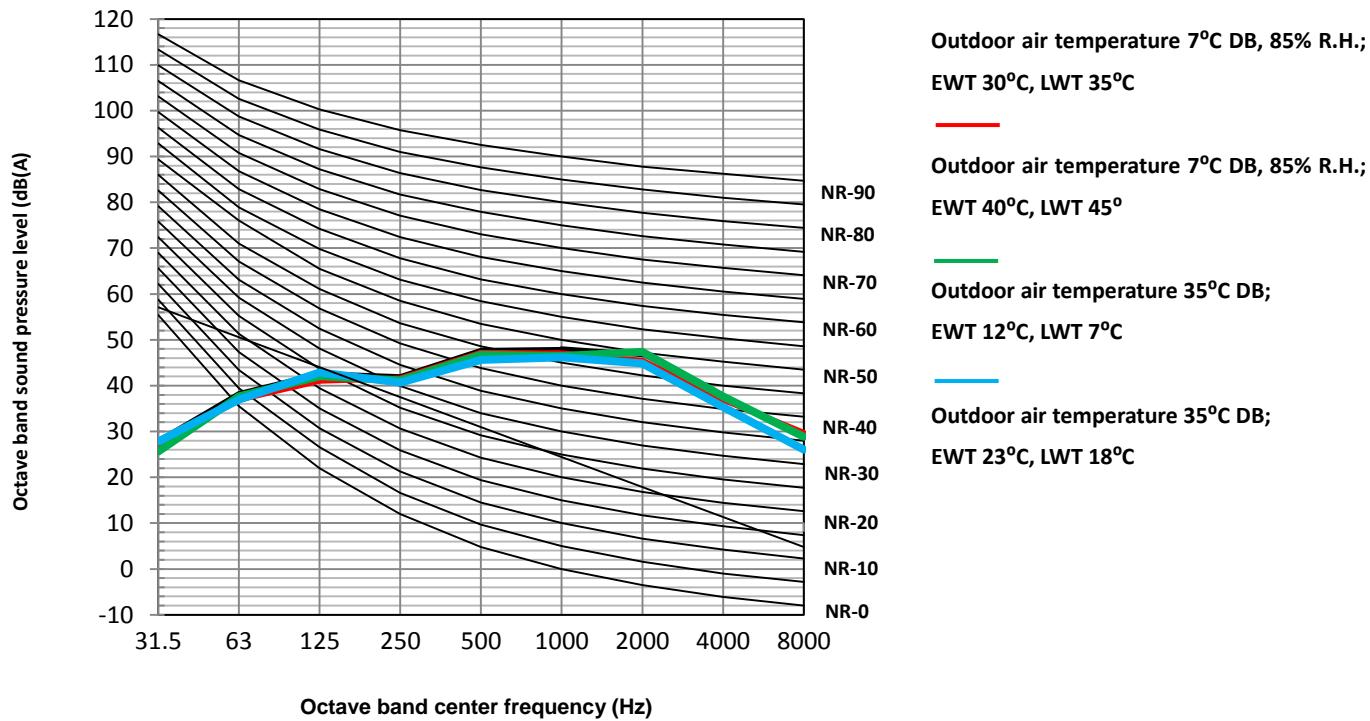


Figure 2-8.5: MHA-V12/D2RN8-B octave band levels

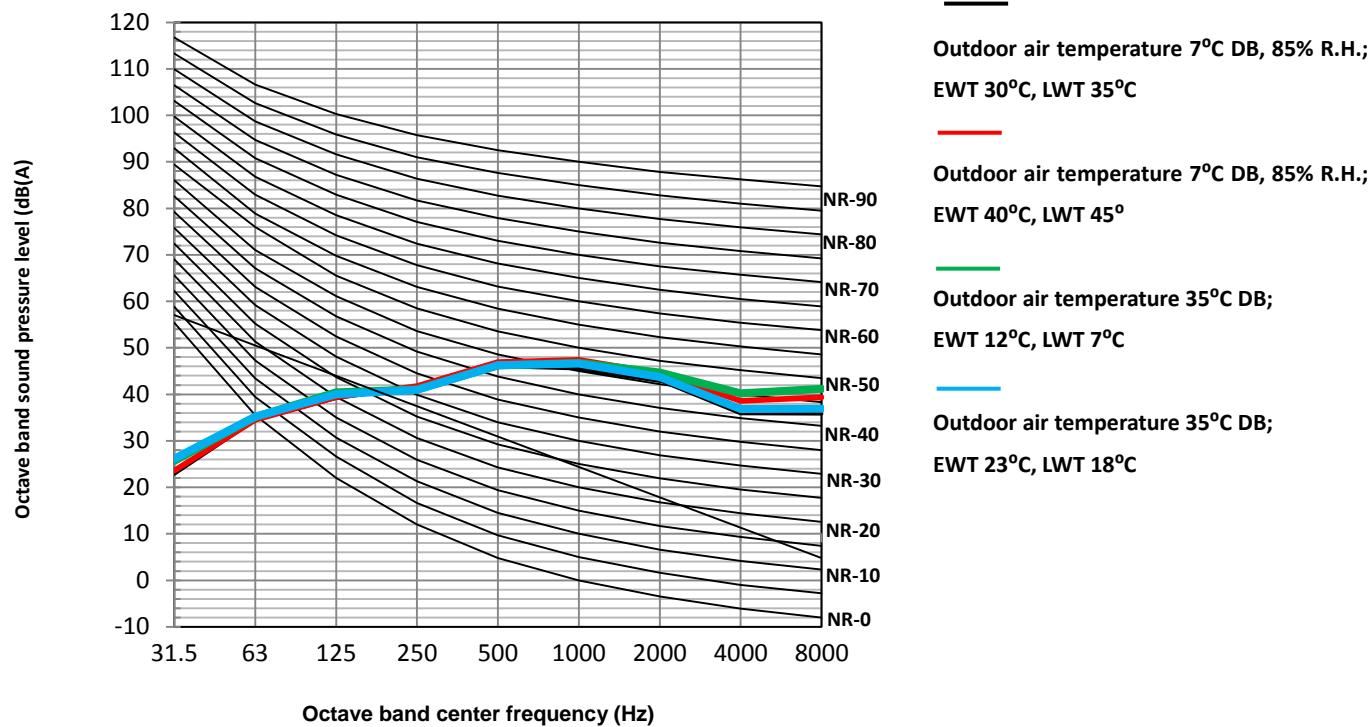
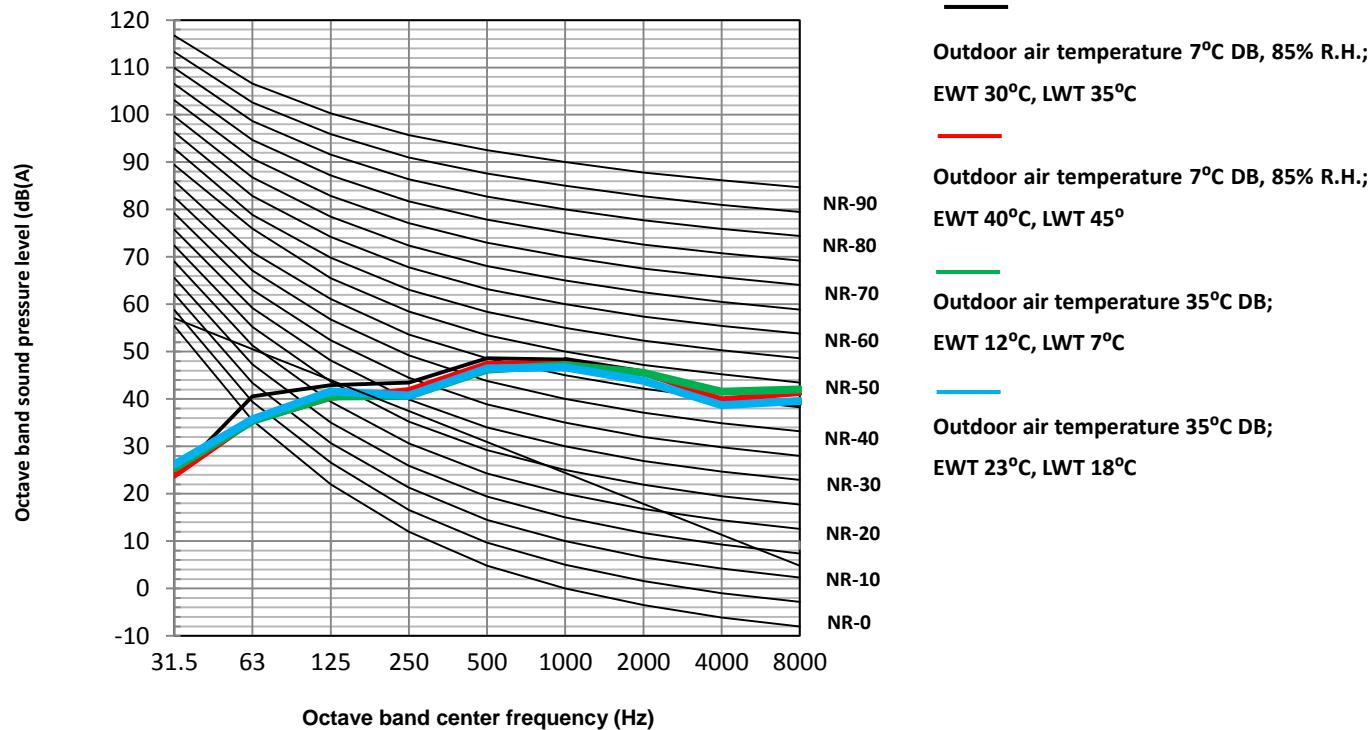
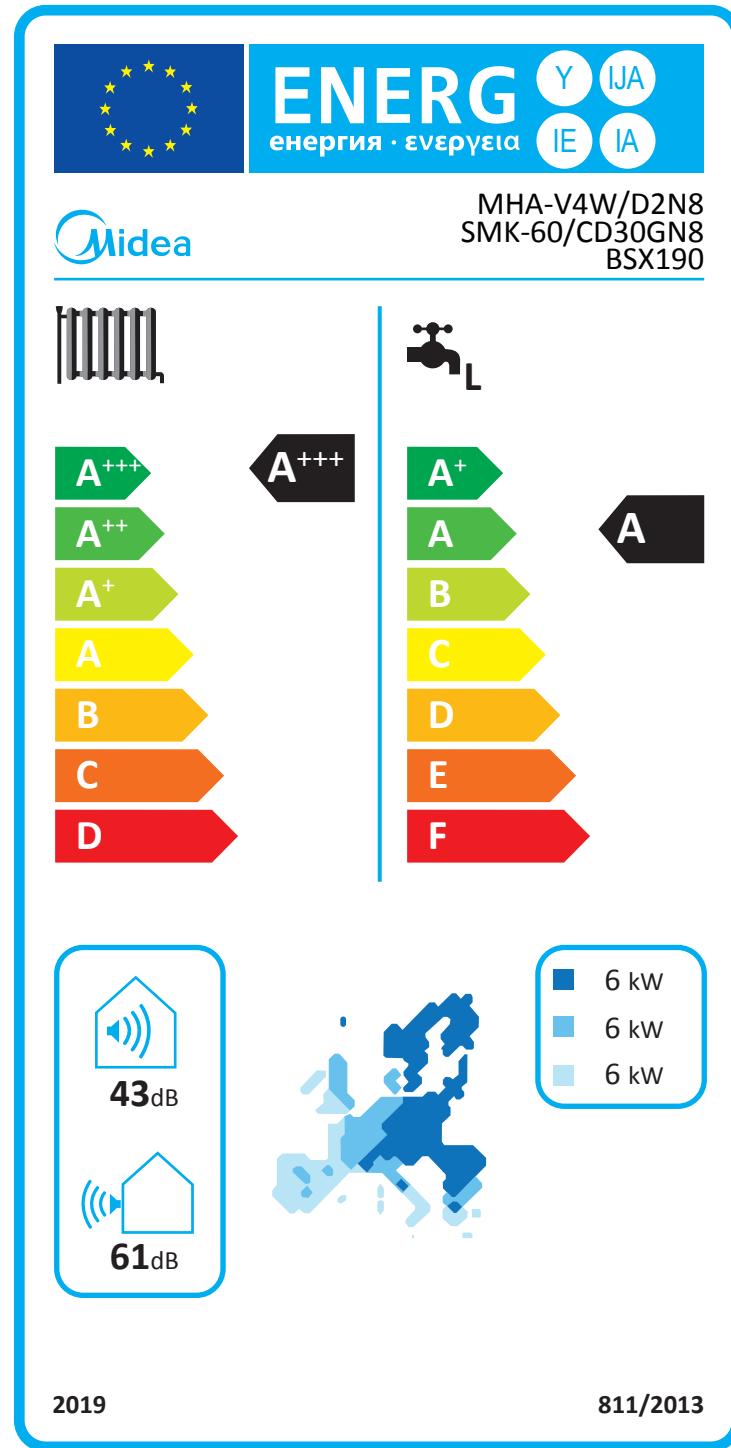


Figure 2-8.5: MHA-V14/D2RN8-B octave band levels





Product Fiche

Manufacture: GD Midea Heating & Ventilating Equipment Co.,Ltd.

Address: Penglai Industry Road, Beijiao, Shunde, Foshan, Guangdong, 528311, P.R. China

Importer: Frigicoll SA C/ BLASCO DE GARAY Nº4 08960 SANT JUST DESVERN BARCELONA Spain

Models		Climate condition	Sound power level(indoor/outdoor), $L_{WA}[\text{dB}]$	Medium - temperature application				Low - temperature application			
Outdoor unit	Indoor unit			Rated heat output [kW]	Energy efficiency	Annual energy consumption [kWh]	Energy efficiency classes	Rated heat output [kW]	Energy efficiency	Annual energy consumption [kWh]	Energy efficiency classes
MHA-V4W/D2N8	SMK-60/CGN8	Average	43 / 61	6	130.6%	3712	A++	6	187.5%	2692	A+++
		Colder	/	5	108.0%	4524	/	6	159.5%	3572	/
		Warmer	/	6	167.3%	1888	/	6	252.5%	1167	/
MHA-V6W/D2N8	SMK-60/CGN8	Average	43/ 62	6	130.6%	3712	A++	6	187.5%	2692	A+++
		Colder	/	5	108.0%	4524	/	5	159.5%	3572	/
		Warmer	/	6	167.3%	1888	/	6	252.5%	1167	/
MHA-V8W/D2N8	SMK-80/CGN8	Average	43 / 63	8	128.0%	4995	A++	9	188.4%	3834	A+++
		Colder	/	7	103.5%	6467	/	8	157.4%	4825	/
		Warmer	/	8	167.8%	2626	/	8	262.9%	1603	/
MHA-V10W/D2N8	SMK-80/CGN8	Average	43 / 65	8	128.0%	4995	A++	9	188.4%	3834	A+++
		Colder	/	7	103.5%	6467	/	8	157.4%	4825	/
		Warmer	/	8	167.8%	2626	/	8	262.9%	1603	/

English

Model: Indoor
 Model: Outdoor
 Climate condition
 Sound power level (Indoor/Outdoor)
 Medium - temperature application
 Low-temperature application
 Rated heat output
 Energy efficiency
 Annual energy consumption
 Energy efficiency classes

Español

Modelo: Interior
 Modelo: Exterior
 Condición climática
 Nivel de potencia acústica
 Aplicación a temperatura media
 Aplicación a baja temperatura
 Salida de calor nominal
 Eficiencia energética
 Consumo anual de energía
 Clases de eficiencia energética

Française

Modèle: Intérieur
 Modèle: Extérieur
 Condition climatique
 Niveau de puissance acoustique
 Application à moyenne température
 Application à basse température
 Puissance thermique nominale
 Efficacité énergétique
 Consommation d'énergie annuelle
 Classes d'efficacité énergétique



Technical parameters								
Model(s):	Outdoor unit: MHA-V4W/D2N8 Indoor unit: SMK-60/CGN8							
Air-to-water heat pump:	YES							
Water-to-water heat pump:	NO							
Brine-to-water heat pump:	NO							
Low-temperature heat pump:	NO							
Equipped with a supplementary heater:	NO							
Heat pump combination heater:	NO							
Declared climate condition:	AVERAGE							
Parameters are declared for medium-temperature application.								
Item	Symbol	Value	Unit					
Rated heat output (*)	P _{rated}	6.0	kW					
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature T _j								
T _j = -7 °C	P _d	5.31	kW					
T _j = 2 °C	P _d	3.38	kW					
T _j = 7 °C	P _d	2.31	kW					
T _j = 12 °C	P _d	1.34	kW					
T _j = bivalent temperature	P _d	5.31	kW					
T _j = operating limit	P _d	4.62	kW					
For air-to-water heat pumps: T _j = -15 °C	P _d	-	kW					
Bivalent temperature	T _{biv}	-7	°C					
Cycling interval capacity for heating	P _{cyc}	-	kW					
Degradation co-efficient (**)	C _d	0.9	--					
Power consumption in modes other than active mode								
Off mode	P _{off}	0.029	kW					
Standby mode	P _{sb}	0.015	kW					
Thermostat-off mode	P _{to}	0.015	kW					
Crankcase heater mode	P _{ck}	0.000	kW					
Other items								
Capacity control	variable							
Sound power level, indoors/outdoors	L _{WA}	43/61	dB					
Annual energy consumption	Q _{HE}	3712	kWh					
For heat pump combination heater:								
Declared load profile	-		Water heating energy efficiency	n _{wh}				
Daily electricity consumption	Q _{elec}	-	kWh	-				
Annual electricity consumption	AEC	-	kWh	%				
Daily fuel consumption	Q _{fuel}	-	kWh					
Annual fuel consumption	AFC	-	GJ					
Contact details	GD Midea Heating & Ventilating Equipment Co. Ltd (Penglai industry road, Beijiao, Shunde, Foshan, Guangdong, P.R China)							
(*) For heat pump space heaters and heat pump combination heaters, the rated heat output Prated is equal to the design load for heating P _{designh} , and the rated heat output of a supplementary heater Psup is equal to the supplementary capacity for heating sup(T _j).								
(**) If Cd _h is not determined by measurement then the default degradation coefficient is Cd _h = 0,9.								

Technical parameters								
Model(s):	Outdoor unit: MHA-V4W/D2N8 Indoor unit: SMK-60/CGN8							
Air-to-water heat pump:	YES							
Water-to-water heat pump:	NO							
Brine-to-water heat pump:	NO							
Low-temperature heat pump:	NO							
Equipped with a supplementary heater:	NO							
Heat pump combination heater:	NO							
Declared climate condition:	COLDER							
Parameters are declared for medium-temperature application.								
Item	Symbol	Value	Unit					
Rated heat output (*)	P _{rated}	5.1	kW					
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature T _j								
T _j = -7 °C	P _d	3.24	kW					
T _j = 2 °C	P _d	1.99	kW					
T _j = 7 °C	P _d	1.51	kW					
T _j = 12 °C	P _d	1.40	kW					
T _j = bivalent temperature	P _d	4.16	kW					
T _j = operating limit	P _d	2.89	kW					
For air-to-water heat pumps: T _j = -15 °C	P _d	4.16	kW					
Bivalent temperature	T _{biv}	-15	°C					
Cycling interval capacity for heating	P _{cyc}	-	kW					
Degradation co-efficient (**)	C _d	0.9	--					
Power consumption in modes other than active mode								
Off mode	P _{off}	0.029	kW					
Standby mode	P _{sb}	0.015	kW					
Thermostat-off mode	P _{to}	0.015	kW					
Crankcase heater mode	P _{ck}	0.000	kW					
Other items								
Capacity control	variable							
Sound power level, indoors/outdoors	L _{WA}	-	dB					
Annual energy consumption	Q _{HE}	4524	kWh					
For heat pump combination heater:								
Declared load profile	-		Water heating energy efficiency	n _{wh}				
Daily electricity consumption	Q _{elec}	-	kWh	-				
Annual electricity consumption	AEC	-	kWh	%				
Daily fuel consumption	Q _{fuel}	-	kWh					
Annual fuel consumption	AFC	-	GJ					
Contact details	GD Midea Heating & Ventilating Equipment Co. Ltd (Penglai industry road, Beijiao, Shunde, Foshan, Guangdong, P.R China)							
(*) For heat pump space heaters and heat pump combination heaters, the rated heat output Prated is equal to the design load for heating P _{designh} , and the rated heat output of a supplementary heater Psup is equal to the supplementary capacity for heating sup(T _j).								
(**) If C _d is not determined by measurement then the default degradation coefficient is C _d = 0,9.								

Technical parameters								
Model(s):	Outdoor unit: MHA-V4W/D2N8 Indoor unit: SMK-60/CGN8							
Air-to-water heat pump:	YES							
Water-to-water heat pump:	NO							
Brine-to-water heat pump:	NO							
Low-temperature heat pump:	NO							
Equipped with a supplementary heater:	NO							
Heat pump combination heater:	NO							
Declared climate condition:	WARMER							
Parameters are declared for medium-temperature application.								
Item	Symbol	Value	Unit					
Rated heat output (*)	P _{rated}	6.0	kW					
Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature T _j								
T _j = -7 °C	P _d	-	kW					
T _j = 2 °C	P _d	5.85	kW					
T _j = 7 °C	P _d	3.87	kW					
T _j = 12 °C	P _d	1.82	kW					
T _j = bivalent temperature	P _d	3.87	kW					
T _j = operating limit	P _d	5.85	kW					
For air-to-water heat pumps: T _j = -15 °C	P _d	-	kW					
Bivalent temperature	T _{biv}	7	°C					
Cycling interval capacity for heating	P _{cyc}	-	kW					
Degradation co-efficient (**)	C _d	0.9	--					
Power consumption in modes other than active mode								
Off mode	P _{off}	0.029	kW					
Standby mode	P _{sb}	0.015	kW					
Thermostat-off mode	P _{to}	0.015	kW					
Crankcase heater mode	P _{ck}	0.000	kW					
Other items								
Capacity control	variable							
Sound power level, indoors/outdoors	L _{WA}	-	dB					
Annual energy consumption	Q _{HE}	1888	kWh					
For heat pump combination heater:								
Declared load profile	-		Water heating energy efficiency	n _{wh}				
Daily electricity consumption	Q _{elec}	-	kWh	-				
Annual electricity consumption	AEC	-	kWh	%				
Daily fuel consumption	Q _{fuel}	-	kWh					
Annual fuel consumption	AFC	-	GJ					
Contact details	GD Midea Heating & Ventilating Equipment Co. Ltd (Penglai industry road, Beijiao, Shunde, Foshan, Guangdong, P.R China)							
(*) For heat pump space heaters and heat pump combination heaters, the rated heat output Prated is equal to the design load for heating Pdesignh, and the rated heat output of a supplementary heater Psup is equal to the supplementary capacity for heating sup(Tj).								
(**) If Cd is not determined by measurement then the default degradation coefficient is Cd = 0,9.								

Information requirements for comfort chillers

Model(s):		Outdoor unit: MHA-V4W/D2N8		Indoor unit: SMK-60/CGN8			
Outdoor side heat exchanger of chiller:		Air to water					
Indoor side heat exchanger chiller:		Water					
Type:		Compressor driven vapour compression					
Driver of compressor:		Electric motor					
Item	Symbol	Value	Unit	Item	Symbol		
Rated cooling capacity	P _{rated,c}	4.2	kW	Seasonal space cooling energy efficiency	η _{s,c}		
Declared cooling capacity for part load at given outdoor temperature T _j				Declared energy efficiency ratio for part load at given outdoor temperature T _j			
T _j =+35°C	P _{dc}	4.17	kW	T _j =+35°C	EER _d		
T _j =+30°C	P _{dc}	3.23	kW	T _j =+30°C	EER _d		
T _j =+25°C	P _{dc}	2.04	kW	T _j =+25°C	EER _d		
T _j =+20°C	P _{dc}	1.04	kW	T _j =+20°C	EER _d		
Degradation co-efficient for chillers (*)	C _{dc}	0.9	-				
Power consumption in modes other than "active mode"							
Off mode	P _{OFF}	0.015	kW	Crankcase heater mode	P _{CK}	0.000	kW
Thermosat-off mode	P _{TO}	0.009	kW	Standby mode	P _{SB}	0.015	kW
Other items							
Capacity control	variable			For air-to-water comfort chillers: air flow rate, outdoor measured	-	3250	m ³ /h
Sound power level, indoors / outdoors	L _{WA}	43/62	dB	For water / brine-to-water chillers: Rated brine or water flow rate, outdoor side heat exchanger	-	-	m ³ /h
Emissions of nitrogen oxides (if applicable)	NO _x (**)	-	mg/kWh input GCV				
GWP of the refrigerant	-	675	kg CO ₂ eq (100years)				
Standard rating conditions used		Low temperature application					
Contact details		GD Midea Heating & Ventilating Equipment Co., Ltd. Penglai industry Road, Beijiao, Shunde, Foshan, Guangdong, 528311 P.R. China					

Information requirements for comfort chillers

Model(s):		Outdoor unit: MHA-V4W/D2N8		Indoor unit: SMK-60/CGN8			
Outdoor side heat exchanger of chiller:		Air to water					
Indoor side heat exchanger chiller:		Water					
Type:		Compressor driven vapour compression					
Driver of compressor:		Electric motor					
Item	Symbol	Value	Unit	Item	Symbol		
Rated cooling capacity	P _{rated,c}	4.3	kW	Seasonal space cooling energy efficiency	η _{s,c}		
Declared cooling capacity for part load at given outdoor temperature T _j				Declared energy efficiency ratio for part load at given outdoor temperature T _j			
T _j =+35°C	P _{dc}	4.33	kW	T _j =+35°C	EER _d		
T _j =+30°C	P _{dc}	3.28	kW	T _j =+30°C	EER _d		
T _j =+25°C	P _{dc}	2.16	kW	T _j =+25°C	EER _d		
T _j =+20°C	P _{dc}	1.42	kW	T _j =+20°C	EER _d		
Degradation co-efficient for chillers (*)	C _{dc}	0.9	-				
Power consumption in modes other than "active mode"							
Off mode	P _{OFF}	0.015	kW	Crankcase heater mode	P _{CK}	0.000	kW
Thermosat-off mode	P _{TO}	0.009	kW	Standby mode	P _{SB}	0.015	kW
 Other items							
Capacity control	variable			For air-to-water comfort chillers: air flow rate, outdoor measured	-	3250	m ³ /h
Sound power level, indoors / outdoors	L _{WA}	43/58	dB	For water / brine-to-water chillers: Rated brine or water flow rate, outdoor side heat exchanger	-	-	m ³ /h
Emissions of nitrogen oxides (if applicable)	NO _x (**)	-	mg/kWh input GCV				
GWP of the refrigerant	-	675	kg CO ₂ eq (100years)				
Standard rating conditions used		Medium temperature application					
Contact details		GD Midea Heating & Ventilating Equipment Co., Ltd. Penglai industry Road, Beijiao, Shunde, Foshan, Guangdong, 528311 P.R. China					

Condition (°C)	Outdoor unit Model	Indoor unit Model	Capacity (kW)	Power input (kW)	EER/COP (/)
Ambient Temperature: 35 Water temperature: 7	MHA-V4W/D2N8	SMK-60/CGN8	4.50	1.36	3.32
	MHA-V6W/D2N8	SMK-60/CGN8	6.50	2.20	2.95
	MHA-V8W/D2N8	SMK-80/CGN8	7.38	2.44	3.02
	MHA-V10W/D2N8	SMK-80/CGN8	8.15	2.76	2.95
Ambient Temperature: 35 Water temperature: 18	MHA-V4W/D2N8	SMK-60/CGN8	4.30	0.77	5.60
	MHA-V6W/D2N8	SMK-60/CGN8	6.45	1.32	4.88
	MHA-V8W/D2N8	SMK-80/CGN8	8.35	1.79	4.67
	MHA-V10W/D2N8	SMK-80/CGN8	10.2	2.40	4.25
Ambient Temperature: 7 Water temperature: 35	MHA-V4W/D2N8	SMK-60/CGN8	4.20	0.82	5.15
	MHA-V6W/D2N8	SMK-60/CGN8	6.50	1.34	4.85
	MHA-V8W/D2N8	SMK-80/CGN8	8.40	1.73	4.85
	MHA-V10W/D2N8	SMK-80/CGN8	10.0	2.15	4.65
Ambient Temperature: 2 Water temperature: 35	MHA-V4W/D2N8	SMK-60/CGN8	4.25	1.09	3.90
	MHA-V6W/D2N8	SMK-60/CGN8	5.58	1.44	3.88
	MHA-V8W/D2N8	SMK-80/CGN8	7.10	1.83	3.88
	MHA-V10W/D2N8	SMK-80/CGN8	8.25	2.29	3.60
Ambient Temperature: -7 Water temperature: 35	MHA-V4W/D2N8	SMK-60/CGN8	4.80	1.60	3.00
	MHA-V6W/D2N8	SMK-60/CGN8	6.00	2.04	2.94
	MHA-V8W/D2N8	SMK-80/CGN8	7.05	2.32	3.04
	MHA-V10W/D2N8	SMK-80/CGN8	8.20	2.78	2.95
Ambient Temperature: 7 Water temperature: 45	MHA-V4W/D2N8	SMK-60/CGN8	4.20	1.15	3.65
	MHA-V6W/D2N8	SMK-60/CGN8	6.35	1.74	3.64
	MHA-V8W/D2N8	SMK-80/CGN8	8.05	2.16	3.73
	MHA-V10W/D2N8	SMK-80/CGN8	9.85	2.72	3.62
Ambient Temperature: 2 Water temperature: 45	MHA-V4W/D2N8	SMK-60/CGN8	4.30	1.41	3.05
	MHA-V6W/D2N8	SMK-60/CGN8	5.65	1.87	3.02
	MHA-V8W/D2N8	SMK-80/CGN8	7.50	2.38	3.15
	MHA-V10W/D2N8	SMK-80/CGN8	7.95	2.62	3.04
Ambient Temperature: -7 Water temperature: 45	MHA-V4W/D2N8	SMK-60/CGN8	4.15	1.74	2.39
	MHA-V6W/D2N8	SMK-60/CGN8	5.50	2.27	2.42
	MHA-V8W/D2N8	SMK-80/CGN8	6.65	2.71	2.45
	MHA-V10W/D2N8	SMK-80/CGN8	7.80	3.24	2.41
Ambient Temperature: 7 Water temperature: 55	MHA-V4W/D2N8	SMK-60/CGN8	4.10	1.44	2.85
	MHA-V6W/D2N8	SMK-60/CGN8	5.75	1.98	2.90
	MHA-V8W/D2N8	SMK-80/CGN8	7.50	2.49	3.01
	MHA-V10W/D2N8	SMK-80/CGN8	9.30	3.25	2.86
Ambient Temperature: 2 Water temperature: 55	MHA-V4W/D2N8	SMK-60/CGN8	4.20	1.79	2.35
	MHA-V6W/D2N8	SMK-60/CGN8	5.55	2.27	2.44
	MHA-V8W/D2N8	SMK-80/CGN8	6.90	2.80	2.46
	MHA-V10W/D2N8	SMK-80/CGN8	7.90	3.22	2.45
Ambient Temperature: -7 Water temperature: 55	MHA-V4W/D2N8	SMK-60/CGN8	3.85	2.04	1.89
	MHA-V6W/D2N8	SMK-60/CGN8	5.10	2.62	1.95
	MHA-V8W/D2N8	SMK-80/CGN8	6.60	3.38	1.95
	MHA-V10W/D2N8	SMK-80/CGN8	6.90	3.79	1.82