

# Specifications

## Hydro Unit

- Production of low temperature hot water and chilled water.
- Hot water production to a maximum temperature of 50 °C.
- Two-way control: leaving water temperature and room temperature control.
- Connection to low temperature radiators and AHU water coils.
- Hot water production for sanitary use.
- Connectable to Heat Recovery DVM S systems.



Model (HE)		AM160FNBDEH/EU		AM320FNBDEH/EU		AM500FNBDEH/EU	
Power Supply		Ø, #, V, Hz		1Ø, 2, 220-240 V, 50 Hz		1Ø, 2, 220-240 V, 50 Hz	
Performance	Capacity (Nominal)	Cooling	kW	14.0	28.0	44.8	
		Heating		16.0	31.5	50.4	
Power	Power Input (Nominal)	Cooling	W	10	10	10	
		Heating		10	10	10	
	Current Input (Nominal)	Cooling	A	0.05	0.05	0.05	
		Heating		0.05	0.05	0.05	
	MCA (Including External Contact)				2.2	2.2	2.2
	MFA			A	2.75	2.75	2.75
Heat Exchanger	Type		-	PHE	PHE	PHE	
	Quantity		-	1	1	1	
	Pipe Size	Ø, inch		PT1 (25A)	PT1 (25A)	PT11/4 (32A)	
	Water Flow Rate	l/min		48	92	150	
	Flow Switch	l/min		20	30	50	
Piping Connections	Liquid Pipe	Ø, mm		9.52	9.52	12.70	
		Ø, inch		3/8	3/8	1/2	
	Gas Pipe	Ø, mm		15.88	22.20	28.58	
		Ø, inch		5/8	7/8	1 1/8	
Field Wiring	Power Source Wire (L<10 m, Single Installation)	mm <sup>2</sup>		2.5	2.5	2.5	
	Transmission Cable	mm <sup>2</sup>		0.75-1.50	0.75-1.50	0.75-1.50	
Refrigerant	Type		-	R410A(Fluorinated greenhouse gas, GWP=2,088)			
	Control Method		-	EEV	EEV	EEV	
Sound <sup>2</sup>	Sound Pressure	dB(A)		27	28	31	
Dimensions	Net Weight	kg		29.0	33.0	40.0	
	Net Dimensions (W × H × D)	mm		518 x 627 x 330	518 x 627 x 330	518 x 627 x 330	
Operating Temperature Range	Ambient	Cooling	°C	-5.0-48.0	-5.0-48.0	-5.0-48.0	
		Heating	°C	-20.0-35.0	-20.0-35.0	-20.0-35.0	
		Hot Water (Main Cooling, HR)	°C	-20.0-35.0 (43.0)	-20.0-35.0 (43.0)	-20.0-35.0 (43.0)	
	Leaving Water	Cooling	°C	5.0-30.0	5.0-30.0	5.0-30.0	
		Heating	°C	20.0-50.0	20.0-50.0	20.0-50.0	

### Accessories



Wired  
Remote Controller

MWR-WW00N



Wired  
Remote Controller

MWR-WG00\*N

# Hydro Unit HE

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# 1 Specifications

## Hydro Unit HE

### 1) Technical specifications

Model			AM160FNBDEH***	AM320FNBDEH***	AM500FNBDEH***	
Power Supply			Ø, #, V, Hz	1, 2, 220-240, 50	1, 2, 220-240, 50	
Mode			-	HP/HR	HP/HR	
Performance	Capacity (Nominal)	Cooling *1)	kW	14.0	28.0	
			Btu/h	47,800	95,600	
		Heating *2)	kW	16.0	31.5	
			Btu/h	54,600	107,500	
Power	Power Input (Nominal)	Cooling *1)	W	10.00	10.00	
		Heating *2)		10.00	10.00	
	Current Input (Nominal)	Cooling *1)	A	0.05	0.05	
		Heating *2)		0.05	0.05	
	MCA (Including External Contact)		A	2.2	2.2	
	MFA			2.75	2.75	
Compressor	Type		-	-	-	
	Output		kW x n	-	-	
	Model Name		-	-	-	
	Oil	Type	-	-	-	
Initial Charge		cc	-	-		
Heat Exchanger	Type		-	PHE	PHE	
	Quantity		-	1	1	
	Pipe Size		Ø, inch	PT 1 (25A)	PT 1 (25A)	
	Water Flow Rate		LPM	48	92	
	Flow Switch		LPM	20	30	
Option Code			-	01004C-105000-208C8C-332200	01004C-105000-231C1C-332200	
Piping Connections	Liquid Pipe		Ø, mm	9.52	9.52	
			Ø, inch	3/8"	3/8"	
	Gas Pipe			Ø, mm	15.88	22.2
				Ø, inch	5/8"	7/8"
Drain Pipe		Ø,mm	-	-		
FieldWiring	Power Source Wire (L<10m, Single Installation)		mm2	2.5	2.5	
	Transmission Cable		mm2	0.75 ~ 1.5	0.75 ~ 1.5	
Refrigerant	Type		-	-	-	
	Control Method		-	EEV	EEV	
Sound	Sound Pressure *3)		dB(A)	27	28	
	Sound Power			-	-	
Dimensions	Net Weight		kg	29.00	33.00	
	Shipping Weight		kg	31.00	35.00	
	Net Dimensions (W×H×D)		mm	518 x 627 x 330	518 x 627 x 330	
	Shipping Dimensions (W×H×D)		mm	652 x 700 x 426	652 x 700 x 426	
Operating Temp. Range	Ambient	Cooling	°C	-5.0 ~ 48.0	-5.0 ~ 48.0	
		Heating	°C	-20 ~ 35	-20 ~ 35	
		Hot Water (Main Cooling, HR)	°C	-20.0 ~ 35(43)	-20.0 ~ 35(43)	
	Leaving Water	Cooling	°C	5.0 ~ 30.0	5.0 ~ 30.0	
		Heating	°C	20.0 ~ 50.0	20.0 ~ 50.0	
			°C	20.0 ~ 50.0	20.0 ~ 50.0	

\* Specifications may be subject to change without prior notice for product improvement.

\*1) Nominal cooling capacities are based on;  
 - Water temperature : 23°C inlet, 18°C outlet  
 - Indoor temperature : 27°C DB, 19°C WB  
 - Outdoor temperature : 35°C DB, 24°C WB

\*2) Nominal heating capacities are based on;  
 - Water temperature : 30°C inlet, 35°C outlet  
 - Indoor temperature : 20°C DB  
 - Outdoor temperature : 7°C DB, 6°C WB

\*3) Sound pressure was acquired in an anechoic room. Thus actual noise level may be different depending on the installation conditions.

\*4) These products contain R410A which is fluorinated greenhouse gas.

\* Heat Exchanger type : Plate Heat Exchanger (STS)

# 2 Capacity table

## Hydro Unit HE

### 1) Cooling

Capacity (kW)	Outdoor temp.(°C)		Water inlet temp.(°C)				
	DB	10	15	20	23	25	30
14	-5	11.2	12.6	14.5	15.3	15.8	16.6
	-3	11.2	12.6	14.5	15.3	15.8	16.6
	-1	11.2	12.6	14.5	15.3	15.8	16.6
	0	11.2	12.6	14.5	15.3	15.8	16.6
	2	11.2	12.6	14.5	15.3	15.8	16.6
	4	11.2	12.6	14.5	15.3	15.8	16.6
	6	11.2	12.6	14.5	15.3	15.8	16.6
	8	11.2	12.6	14.5	15.3	15.8	16.6
	10	11.2	12.6	14.5	15.3	15.8	16.6
	12	11.2	12.6	14.5	15.3	15.8	16.6
	14	11.2	12.6	14.5	15.3	15.8	16.6
	16	11.2	12.6	14.5	15.3	15.8	16.6
	18	11.2	12.6	14.5	15.3	15.8	16.6
	20	11.2	12.6	14.5	15.3	15.8	16.6
	22	11.2	12.6	14.5	15.3	15.8	16.4
	24	11.2	12.6	14.3	15.1	15.6	16.2
	26	11.2	12.4	14.1	14.9	15.4	16.0
	28	10.8	12.2	14.0	14.7	15.1	15.8
	30	10.4	12.0	13.8	14.5	14.9	15.6
	28	32	10.1	11.8	13.6	14.3	14.7
34		9.7	11.6	13.4	14.1	14.5	15.3
35		9.5	11.5	13.4	14.0	14.4	15.2
36		9.3	11.4	13.3	13.9	14.3	15.1
38		8.9	11.2	13.1	13.7	14.1	14.9
40		8.6	11.0	13.0	13.5	13.8	14.7
-5		22.4	28.0	30.9	32.8	34.0	35.3
-3		22.4	28.0	30.9	32.8	34.0	35.3
-1		22.4	28.0	30.9	32.8	34.0	35.3
0		22.4	28.0	30.9	32.8	34.0	35.3
2		22.4	28.0	30.9	32.8	34.0	35.3
4		22.4	28.0	30.9	32.8	34.0	35.3
6		22.4	28.0	30.9	32.8	34.0	35.3
8		22.4	28.0	30.9	32.8	34.0	35.3
10		22.4	28.0	30.9	32.8	34.0	35.3
12		22.4	28.0	30.9	32.8	34.0	35.3
14		22.4	28.0	30.9	32.8	34.0	35.3
16		22.4	28.0	30.9	32.8	34.0	35.3
18		22.4	28.0	30.9	32.8	34.0	35.3
20		22.4	28.0	30.9	32.8	34.0	35.3
22	22.4	28.0	30.9	32.8	34.0	35.3	
24	22.4	28.0	30.3	32.0	33.2	34.0	
26	22.4	27.2	29.7	31.3	32.4	33.3	
28	21.6	26.5	29.0	30.5	31.5	32.5	
30	20.9	25.7	28.4	29.8	30.7	31.8	
32	20.1	24.9	27.8	29.1	29.9	31.1	
34	19.4	24.2	27.2	28.3	29.1	30.4	
35	19.0	23.8	26.9	28.0	28.7	30.1	
36	18.6	23.4	26.6	27.6	28.3	29.7	
38	17.9	22.7	26.0	26.8	27.4	28.9	
40	17.2	21.9	25.4	26.1	26.5	28.2	
44.8	-5	35.8	40.3	46.3	48.8	50.5	53.1
	-3	35.8	40.3	46.3	48.8	50.5	53.1
	-1	35.8	40.3	46.3	48.8	50.5	53.1
	0	35.8	40.3	46.3	48.8	50.5	53.1
	2	35.8	40.3	46.3	48.8	50.5	53.1
	4	35.8	40.3	46.3	48.8	50.5	53.1
	6	35.8	40.3	46.3	48.8	50.5	53.1
	8	35.8	40.3	46.3	48.8	50.5	53.1
	10	35.8	40.3	46.3	48.8	50.5	53.1
	12	35.8	40.3	46.3	48.8	50.5	53.1
	14	35.8	40.3	46.3	48.8	50.5	53.1
	16	35.8	40.3	46.3	48.8	50.5	53.1
	18	35.8	40.3	46.3	48.8	50.5	53.1
	20	35.8	40.3	46.3	48.8	50.5	53.1
	22	35.8	40.3	46.3	48.8	50.5	52.4
	24	35.8	40.3	45.8	48.2	49.8	51.8
	26	35.8	39.7	45.3	47.6	49.2	51.3
	28	34.6	39.0	44.7	47.0	48.5	50.7
	30	33.4	38.4	44.2	46.4	47.8	50.1
	32	32.2	37.7	43.7	45.7	47.1	49.5
34	31.0	37.1	43.1	45.1	46.4	48.9	
35	30.4	36.8	42.9	44.8	46.1	48.6	
36	29.8	36.4	42.6	44.5	45.7	48.3	
38	28.6	35.8	42.0	43.8	45.0	47.7	
40	27.4	35.1	41.4	43.1	44.3	47.1	

# 2 Capacity table

## Hydro Unit HE

### 2) Heating

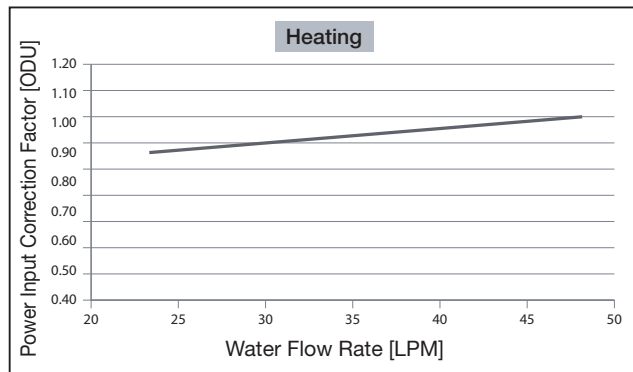
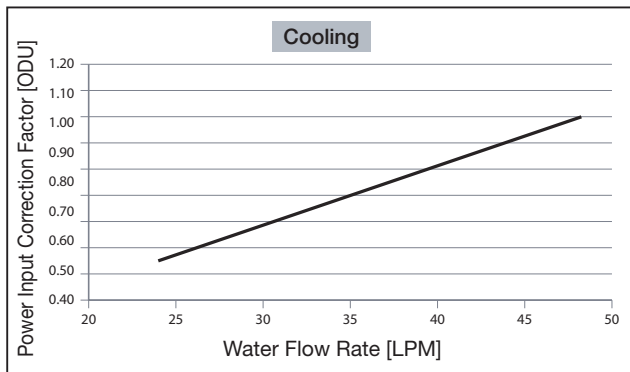
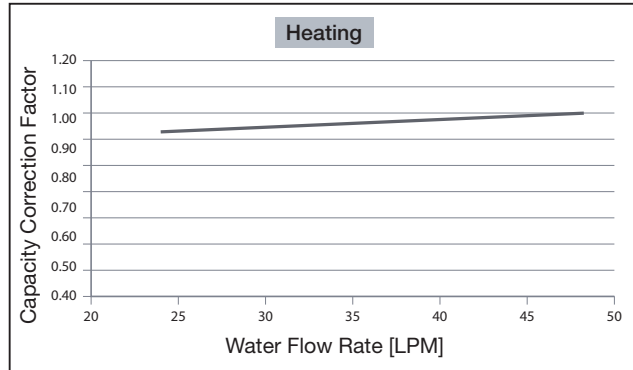
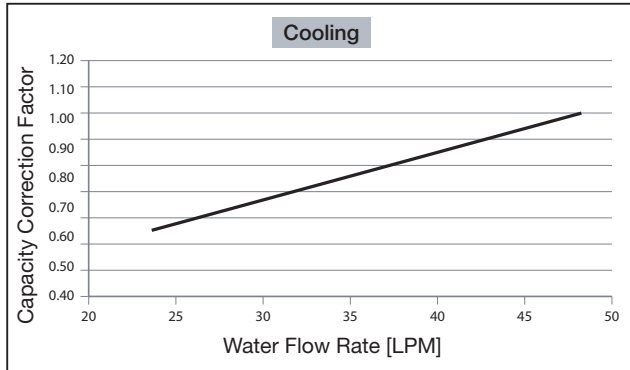
Capacity (kW)	Outdoor temp.(°C)		Water inlet temp.(°C)			
	DB	WB	20	30	40	45
16	-20.0	-20.2	12.4	11.7	7.2	4.7
	-17.5	-17.8	12.9	12.1	8.1	5.8
	-15.0	-15.3	13.4	12.5	8.9	6.8
	-12.5	-13.0	13.9	12.9	9.8	7.7
	-10.0	-10.5	14.3	13.3	10.6	8.6
	-7.5	-8.1	14.8	13.7	11.5	9.1
	-5.0	-5.6	15.3	14.1	12.3	9.6
	-2.5	-3.3	15.8	14.5	12.6	9.6
	0.0	-0.7	16.3	14.9	12.8	9.6
	2.5	1.7	16.8	15.3	12.8	9.6
	5.0	4.1	17.2	15.7	12.8	9.6
	7.0	6.0	17.6	16.0	12.8	9.6
	10.0	8.9	17.6	16.0	12.8	9.6
	12.5	11.3	17.6	16.0	12.8	9.6
	15.0	13.7	17.6	16.0	12.8	9.6
	20.0	15.0	17.6	16.0	12.8	9.6
25.0	18.3	17.6	16.0	12.8	9.6	
30.0	21.3	17.6	16.0	12.8	9.6	
35.0	24.0	17.6	16.0	12.8	9.6	
31.5	-20.0	-20.2	24.4	23.1	14.2	7.9
	-17.5	-17.8	26.0	24.5	16.3	10.0
	-15.0	-15.3	27.5	25.8	18.4	12.0
	-12.5	-13.0	29.0	27.2	20.6	14.1
	-10.0	-10.5	30.5	28.6	22.7	16.2
	-7.5	-8.1	32.1	30.0	24.9	17.6
	-5.0	-5.6	33.6	31.4	27.0	18.9
	-2.5	-3.3	33.7	31.5	27.7	18.9
	0.0	-0.7	33.8	31.5	28.4	18.9
	2.5	1.7	33.9	31.5	28.4	18.9
	5.0	4.1	33.9	31.5	28.4	18.9
	7.0	6.0	34.1	31.5	28.4	18.9
	10.0	8.9	34.1	31.5	28.4	18.9
	12.5	11.3	34.1	31.5	28.4	18.9
	15.0	13.7	34.1	31.5	28.4	18.9
	20.0	15.0	34.1	31.5	28.4	18.9
25.0	18.3	34.1	31.5	28.4	18.9	
30.0	21.3	34.1	31.5	28.4	18.9	
35.0	24.0	34.1	31.5	28.4	18.9	
50.4	-20.0	-20.2	39.1	36.9	22.7	15.2
	-17.5	-17.8	40.6	38.2	25.4	18.3
	-15.0	-15.3	42.1	39.4	28.1	21.3
	-12.5	-13.0	43.7	40.7	30.7	24.3
	-10.0	-10.5	45.2	42.0	33.3	27.2
	-7.5	-8.1	46.7	43.3	36.0	28.7
	-5.0	-5.6	48.2	44.5	38.6	30.2
	-2.5	-3.3	49.7	45.8	39.5	30.2
	0.0	-0.7	51.2	47.1	40.3	30.2
	2.5	1.7	52.7	48.4	40.3	30.2
	5.0	4.1	54.2	49.6	40.3	30.2
	7.0	6.0	55.4	50.4	40.3	30.2
	10.0	8.9	55.4	50.4	40.3	30.2
	12.5	11.3	55.4	50.4	40.3	30.2
	15.0	13.7	55.4	50.4	40.3	30.2
	20.0	15.0	55.4	50.4	40.3	30.2
25.0	18.3	55.4	50.4	40.3	30.2	
30.0	21.3	55.4	50.4	40.3	30.2	
35.0	24.0	55.4	50.4	40.3	30.2	

# 3 Capacity & Power input correction

## Hydro Unit HE

### 1) By water flow rate

(1) AM160FNBDEH\*\*\*



### Cooling

Water flow Rate (LPM)	24.0	36.0	48.0
Capacity Correction Factor	0.66	0.83	1.00
Power Input Correction Factor [ODU]	0.55	0.78	1.00

### Heating

Water flow Rate (LPM)	24.0	36.0	48.0
Capacity Correction Factor	0.92	0.96	1.00
Power Input Correction Factor [ODU]	0.87	0.94	1.00

### ◆ Flow rate by $\Delta T$

Flow Rate [LPM]	5HP	10HP	16HP
$\Delta T=10^{\circ}\text{C}$	24.0	46.0	75.0
$\Delta T=5^{\circ}\text{C}$	48.0	92.0	150.0

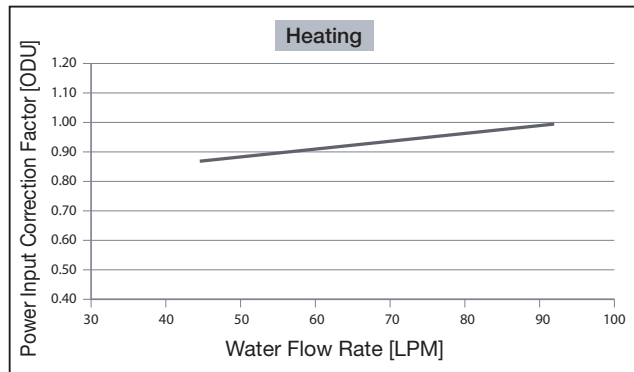
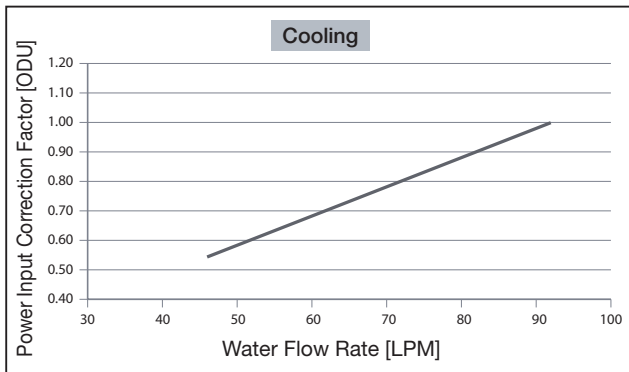
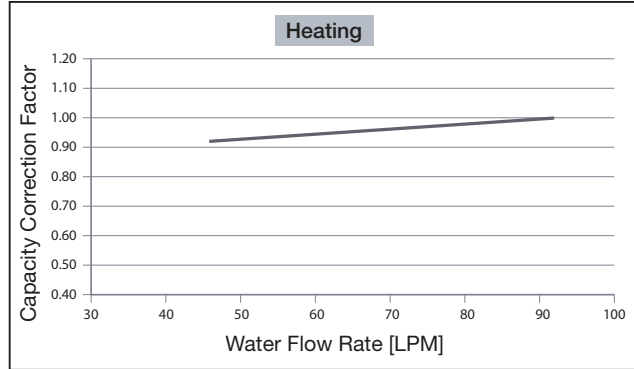
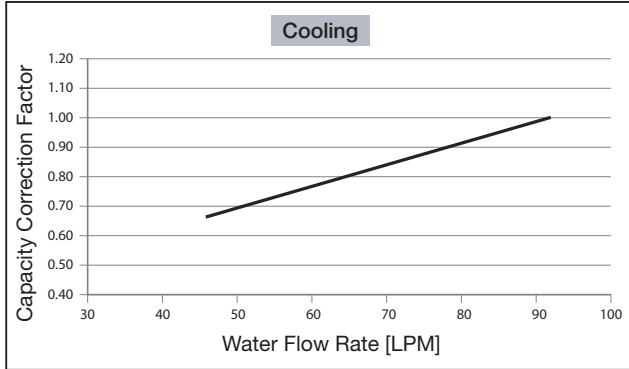
\* Minimum flow rate of the Hydro unit is 50% of rated flow rate.

# 3 Capacity & Power input correction

## Hydro Unit HE

1) By water flow rate

(2) AM320FNBDEH\*\*\*



### Cooling

Water flow Rate (LPM)	46.0	69.0	92.0
Capacity Correction Factor	0.66	0.83	1.00
Power Input Correction Factor [ODU]	0.55	0.78	1.00

### Heating

Water flow Rate (LPM)	46.0	69.0	92.0
Capacity Correction Factor	0.92	0.96	1.00
Power Input Correction Factor [ODU]	0.87	0.94	1.00

#### ◆ Flow rate by $\Delta T$

Flow Rate [LPM]	5HP	10HP	16HP
$\Delta T=10^{\circ}\text{C}$	24.0	46.0	75.0
$\Delta T=5^{\circ}\text{C}$	48.0	92.0	150.0

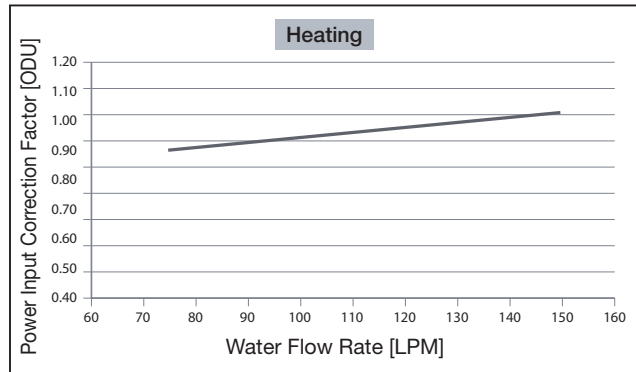
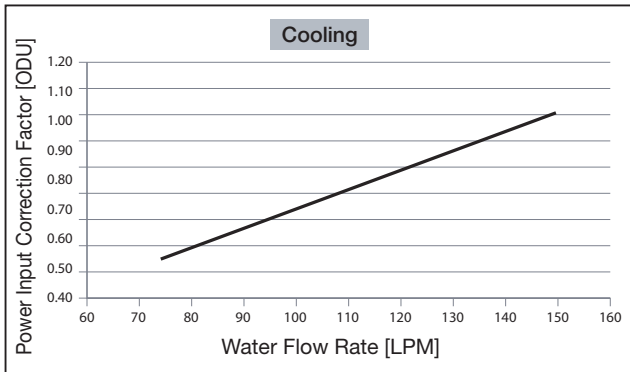
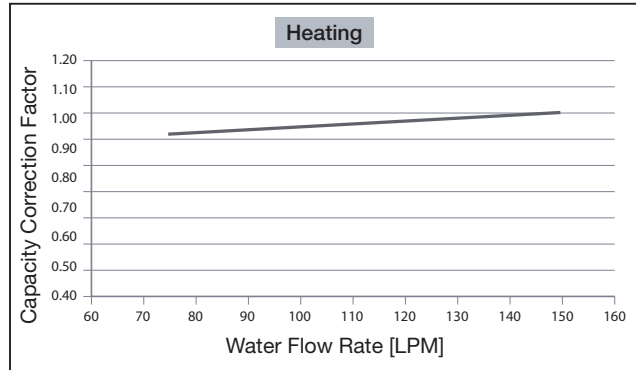
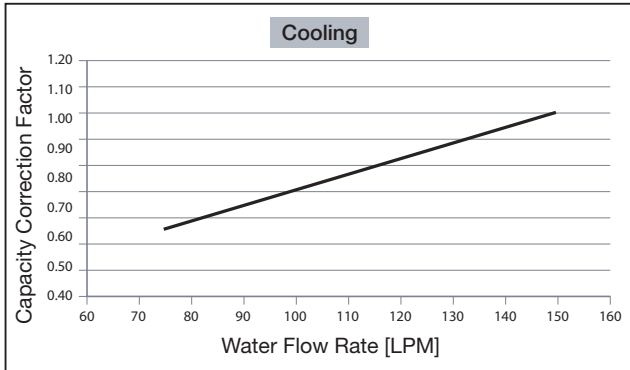
\* Minimum flow rate of the Hydro unit is 50% of rated flow rate.

# 3 Capacity & Power input correction

## Hydro Unit HE

### 1) By water flow rate

### (3) AM500FNBDEH\*\*\*



## Cooling

Water flow Rate (LPM)	75.0	112.5	150.0
Capacity Correction Factor	0.66	0.83	1.00
Power Input Correction Factor [ODU]	0.55	0.78	1.00

## Heating

Water flow Rate (LPM)	75.0	112.5	150.0
Capacity Correction Factor	0.92	0.96	1.00
Power Input Correction Factor [ODU]	0.87	0.94	1.00

### ◆ Flow rate by $\Delta T$

Flow Rate [LPM]	5HP	10HP	16HP
$\Delta T=10^{\circ}\text{C}$	24.0	46.0	75.0
$\Delta T=5^{\circ}\text{C}$	48.0	92.0	150.0

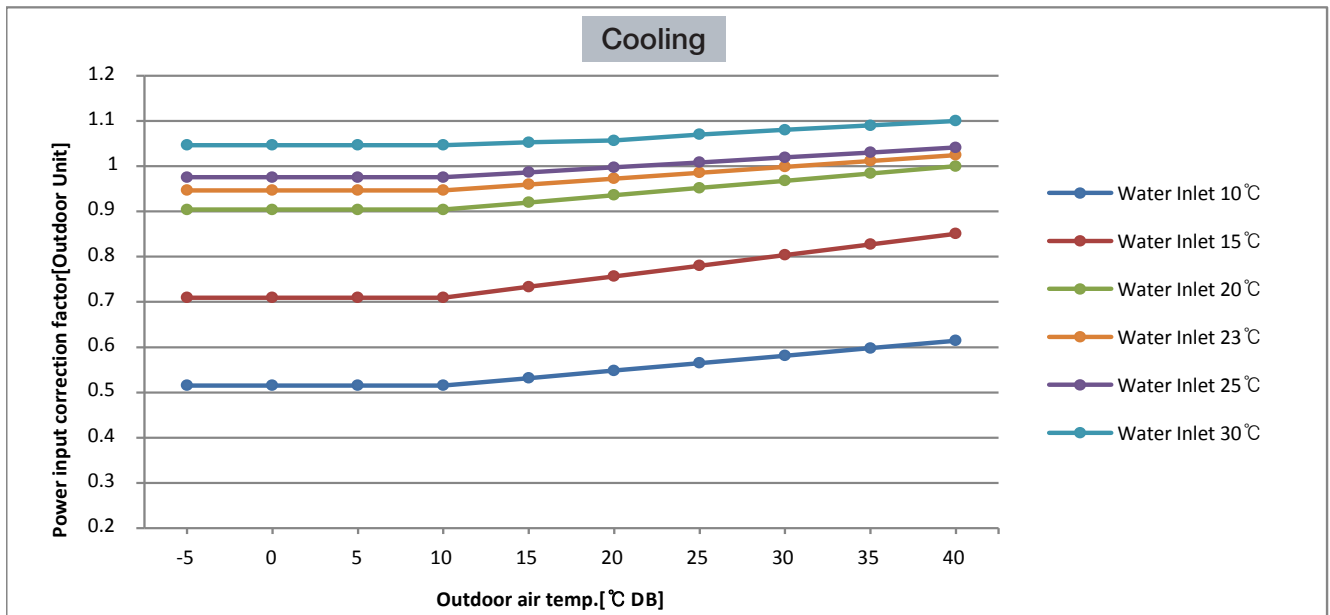
\* Minimum flow rate of the Hydro unit is 50% of rated flow rate.



### 3 Capacity & Power input correction

Hydro Unit HE

2) By outdoor air temperature



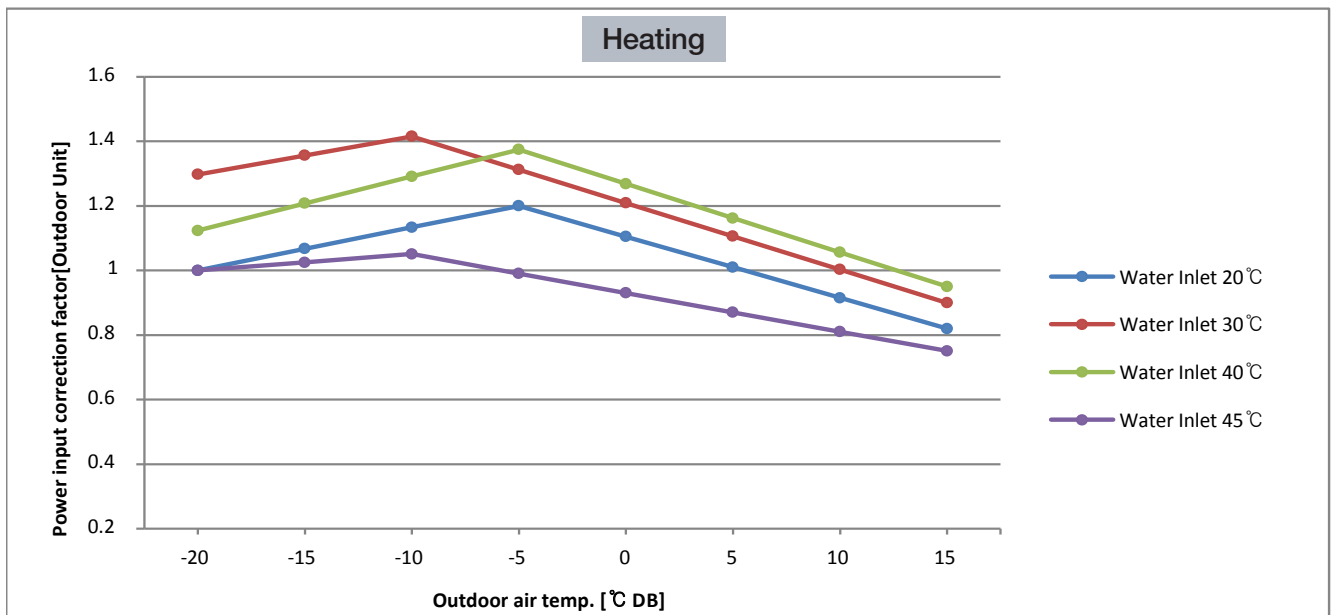
Power input correction factor (Cooling)

Outdoor air temp. (DB, °C)	Water inlet temp. (°C)					
	10	15	20	23	25	30
-5	0.52	0.71	0.90	0.95	0.98	1.05
0	0.52	0.71	0.90	0.95	0.98	1.05
5	0.52	0.71	0.90	0.95	0.98	1.05
10	0.52	0.71	0.90	0.95	0.98	1.05
15	0.53	0.73	0.92	0.96	0.99	1.05
20	0.55	0.76	0.94	0.97	1.00	1.06
25	0.56	0.78	0.95	0.99	1.01	1.07
30	0.58	0.80	0.97	1.00	1.02	1.08
35	0.60	0.83	0.98	1.01	1.03	1.09
40	0.61	0.85	1.00	1.02	1.04	1.10

### 3 Capacity & Power input correction

Hydro Unit HE

2) By outdoor air temperature



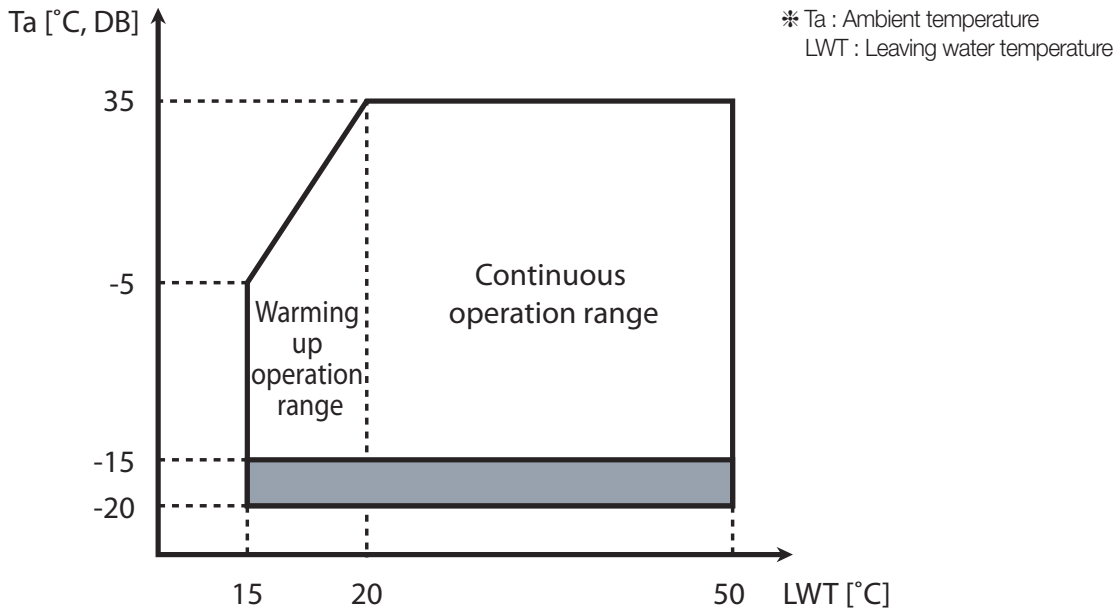
Power input correction factor (Heating)

Outdoor air temp. (°C)		Water inlet temp. (°C)			
DB	WB	20	30	40	45
-20	-20.2	1.00	1.30	1.12	1.00
-15	-15.3	1.07	1.36	1.21	1.03
-10	-10.5	1.13	1.42	1.29	1.05
-5	-5.6	1.20	1.31	1.37	0.99
0	-0.7	1.11	1.21	1.27	0.93
5	4.1	1.01	1.11	1.16	0.87
7	6	0.97	1.06	1.14	0.85
10	8.9	0.92	1.00	1.11	0.81
15	13.7	0.82	0.90	0.95	0.75
20	15	0.81	0.89	0.94	0.75
25	18.3	0.81	0.89	0.94	0.74
30	21.3	0.81	0.88	0.93	0.74
35	24	0.80	0.88	0.93	0.73

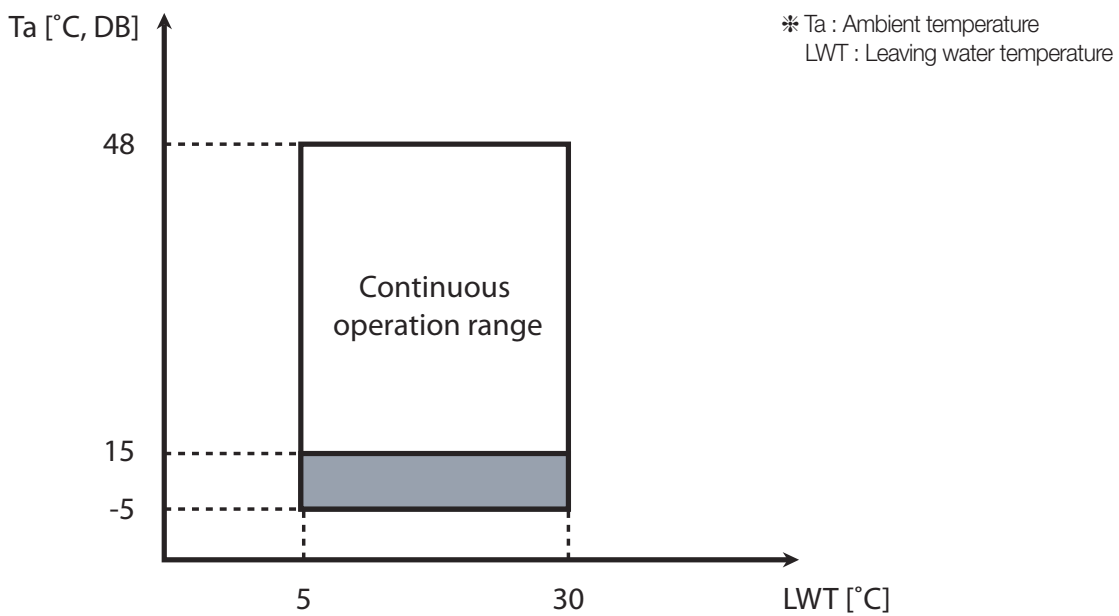
# 4 Operation range


## Hydro Unit HE

### 1) Heating



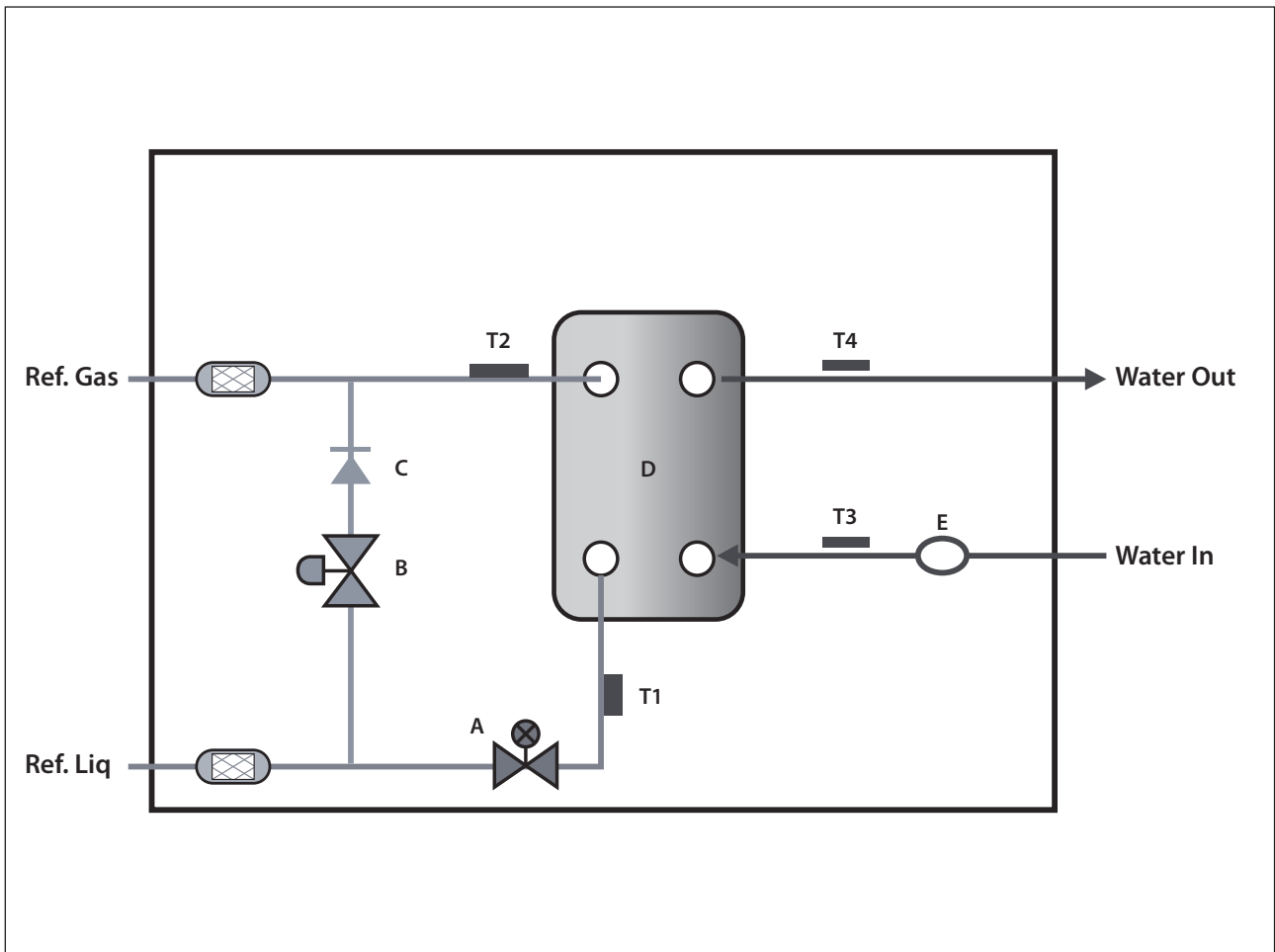
### 2) Cooling



\*  : Operation of outdoor unit possible, but no guarantee of capacity in this condition.

# 5 Piping diagram

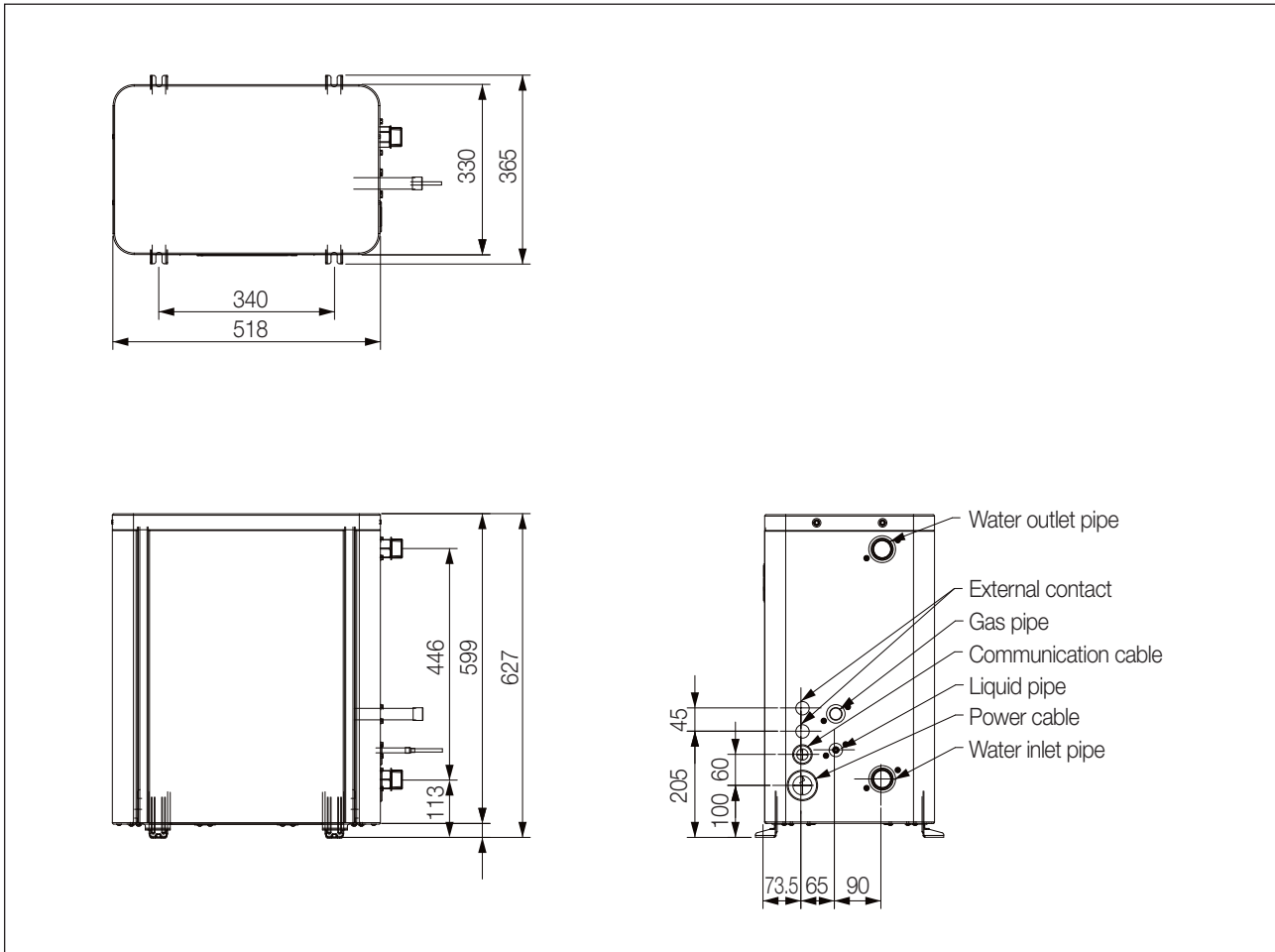
## Hydro Unit HE



Symbol	Name
A	EEV
B	Bypass Valve for Defrost
C	Check Valve
D	Heat Exchanger
E	Flow Switch
T1	Eva. Inlet Temp. Sensor
T2	Eva. Outlet Temp. Sensor
T3	Water Inlet Temp. Sensor
T4	Water Outlet Temp. Sensor

# 6 Dimensional drawing

## Hydro Unit HE

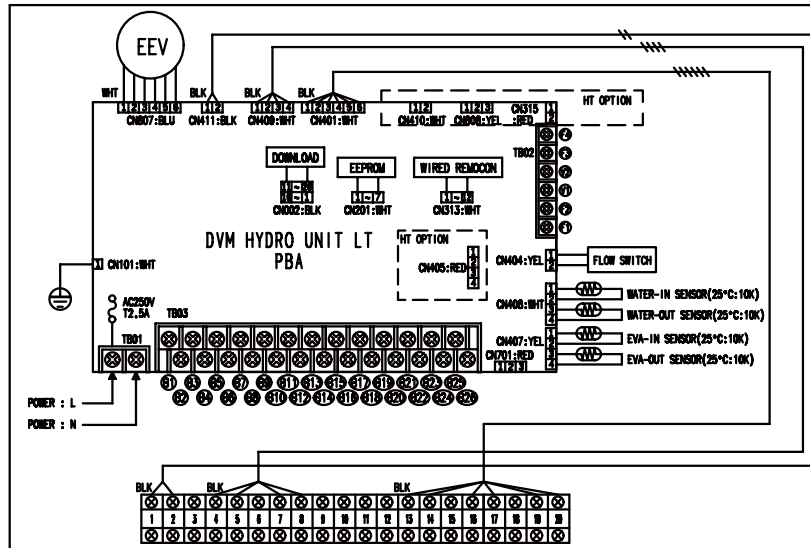


Model name of DVM Hydro unit		AM160FNBDEH***	AM320FNBDEH***	AM500FNBDEH***
Refrigerant side	Liquid pipe	3/8" (ø9.52)	3/8" (ø9.52)	1/2" (ø12.7)
	Gas pipe	5/8" (ø15.88)	7/8" (ø22.23)	1-1/8" (ø28.58)
Water side	Water inlet/outlet pipe	PT 1 (25 A)	PT 1 (25 A)	PT 1-1/4 (32 A)

# 7 Electrical Wiring Diagram

## Hydro Unit HE

AM160/320/500FNBDEH/EU



Display	Explanation
E101	Communication error between DVM Hydro unit and outdoor unit (When DVM Hydro unit is having trouble with receiving data from outdoor unit)
E102	Communication error on outdoor unit
E121	Error on room temperature sensor of DVM Hydro unit (Short or Open)
E122	Error on EVA IN sensor of DVM Hydro unit (Short or Open)
E123	Error on EVA OUT sensor of DVM Hydro unit (Short or Open)
E128	EVA IN sensor of DVM Hydro unit is detached
E129	EVA OUT sensor of DVM Hydro unit is detached
E130	EVA IN and EVA OUT sensor of DVM Hydro unit is detached
E151	Error due to opened EEV of DVM Hydro unit (2nd detection)
E152	Error due to closed EEV of DVM Hydro unit (2nd detection)
E161	Mixed operation mode error
E162	EEPROM error
E163	EEPROM option setting error
E177	Emergency error : water pipe check
E185	Cross wiring error (When power line is connected to communication line of DVM Hydro unit)
E198	Error due to disconnected Thermal Fuse (When the temperature of terminal block is increases)
E901	Error on the sensor of water inlet pipe (Short or Open)
E902	Error on the sensor of water outlet pipe (Short or Open)
E907	Error due to pipe rupture protection
E908 E909	Error due to freeze prevention
E910	Water temperature sensor on water outlet pipe is detached
E911 E913	Error due to turned off Flow switch off flow switch (when switch turns off within 10 seconds after pump starts to operate)
E914	Error due to incorrect thermostat connection

Terminal No.	External contact	Operation status/inspection checklist	Remarks
B1 - B2	OPERATION CHECK	Check on/off status for operation temp of the control panel on the site	Optional
B3 - B4	ALARM	Check on/off status for alarm temp of the panel on the site	Optional
B5 - B6	MAIN PUMP	Check the status of the pump operation signal and on/off status of operation at the control panel on the site	Mandatory
B7 - B8	HEATER	Check the status of the heater operation signal input at the control panel on the site	Optional
B9 - B10 - B11	3WAY 1 V/V	Check the status of signal output and on/off status of valve operation (Direction switch of the indoor hot water tank)	Optional
B12 - B13 - B14	3WAY 2 V/V	Check the status of signal output and on/off status of valve operation (Interlocked with water energy pump signal)	Optional
B15 - B16 - B17	2WAY V/V	Check the status of signal output or operation status of the valve	Optional
B19 - B20	AC230, THERMOSTAT 1	Check the connection status of the thermostat and operation status of the product (cooling)	Optional
B21 - B22	AC230, THERMOSTAT 2	Check the connection status of the thermostat and operation status of the product (heating)	Optional
B23 - B24	AC24, THERMOSTAT 1	Check the connection status of the thermostat and operation status of the product (cooling)	Optional
B25 - B26	AC24, THERMOSTAT 2	Check the connection status of the thermostat and operation status of the product (heating)	Optional
1 - 2	ROOM TEMP	Check the temperature display on the wired remote controller after separately installing the indoor temperature sensor (Refer to option setting of the wired remote controller)	Optional
7 - 8	WATER TANK TEMP	Check the temperature display on the wired remote controller after installing the 4-20mA temperature sensor	Mandatory (not order supply)
13 - 14	SOLAR PUMP	Check the solar pump contact signal input and status of the operation	Optional
16 - 17	EXT. CONTROL	Check the contact signal input and status of the operation	Optional
19 - 20	SMART GRID	Check the Smart Grid contact input and the signal	Optional

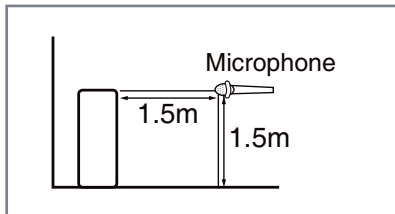
### NOTE

1. This wiring diagram applies only to the indoor unit.
2. Symbols show as follow;  
BLK : black, RED : red, BLU : blue, WHT:white, YEL : yellow, BRN : brown, SKY : sky-blue, GRN : green
3. For connection wiring indoor-outdoor transmission F1-F2, indoor-wired remotecontroller transmission F3-F4.
4. : Protective earth(screw), : Connector,   n   : The wire quantity

# 8 Sound pressure level

## Hydro Unit HE

### 1) Operation sound level



Unit : dB(A)

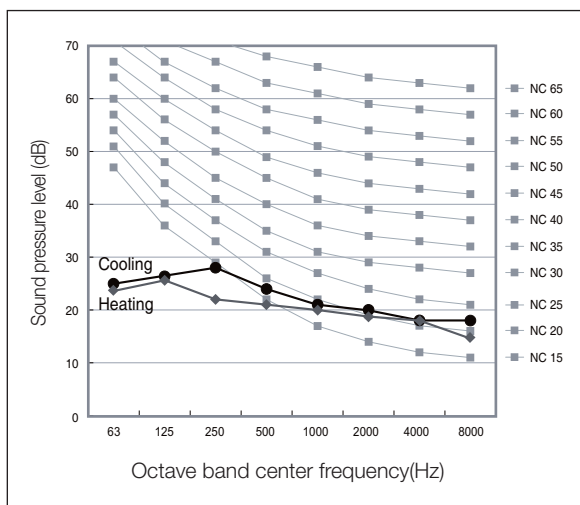
Model	Cooling	Heating
AM160FNBDEH***	27	26
AM320FNBDEH***	28	27
AM500FNBDEH***	30	31

**Note**

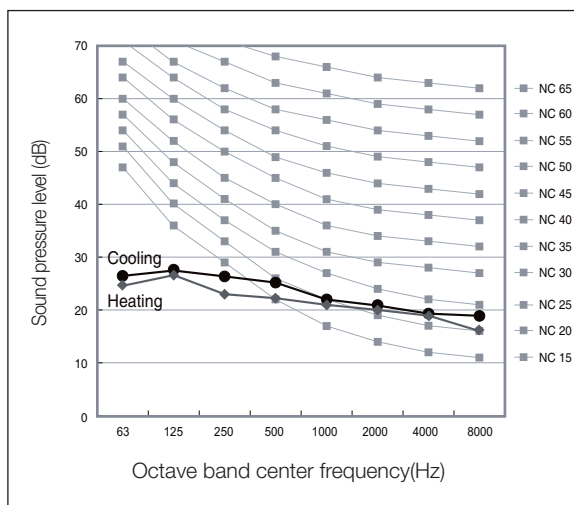
Specifications may be subject to change without prior notice.  
 Sound pressure level is obtained in an anechoic room.  
 Sound pressure level is a relative value, depending on the distance and acoustic environment.  
 Sound pressure level may differ depending on operation condition.  
 dBA = A-weighted sound pressure level  
 Reference acoustic pressure 0 dB= 20 uPa

### 2) NC curves

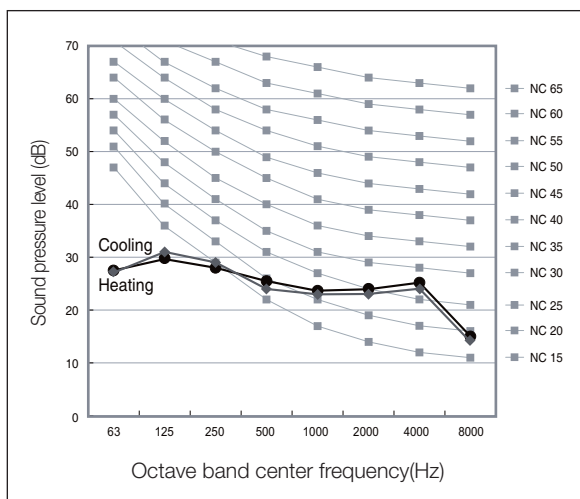
#### (1) AM160FNBDEH \*\*\*



#### (2) AM320FNBDEH \*\*\*



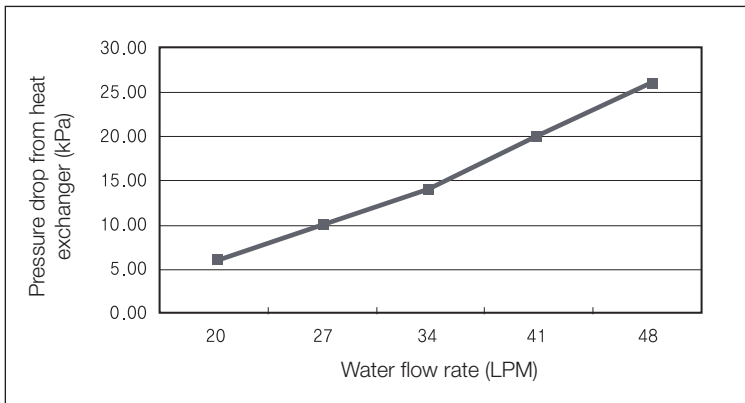
#### (3) AM500FNBDEH \*\*\*



# 9 Hydraulic performance

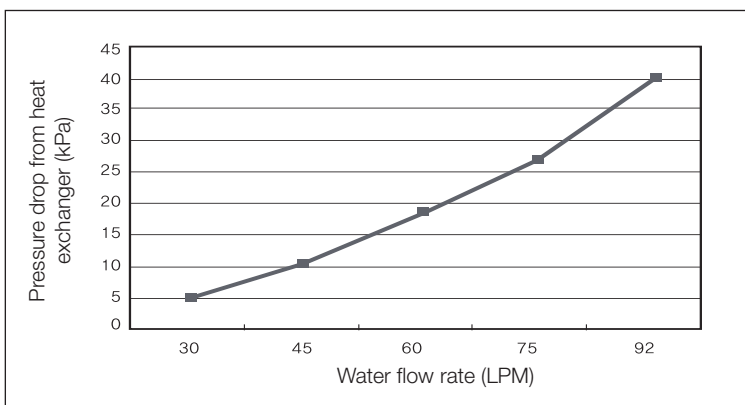
## Hydro Unit HE

### 1) AM160FNBDEH\*\*\*



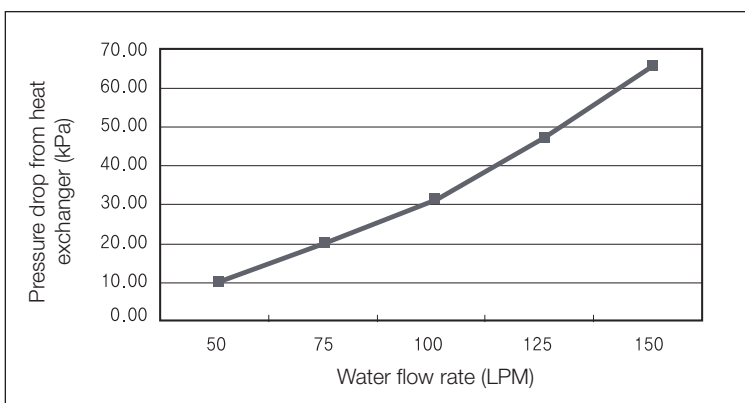
Water flow rate (LPM)	Pressure drop from heat exchanger (kPa)
20	6
27	10
34	14
41	20
48	26

### 2) AM320FNBDEH\*\*\*



Water flow rate (LPM)	Pressure drop from heat exchanger (kPa)
30	5
45	11
60	19
75	27
92	40

### 3) AM500FNBDEH\*\*\*



Water flow rate (LPM)	Pressure drop from heat exchanger (kPa)
50	10
75	20
100	32
125	46
150	65



# Hydro Unit HT

- 1 *Specifications*
- 2 *Capacity Table*
- 3 *Piping Diagram*
- 4 *Dimensional Drawing*
- 5 *Electrical Wiring Diagram*
- 6 *Sound Pressure Level*
- 7 *Hydraulic Performance*

# 1 Specifications

## Hydro Unit HT

### 1) Technical specifications

Model				AM160FNBFB***	AM160FNBFBG***	AM250FNBFB***	AM250FNBFBG***
Power Supply			Ø, #, V, Hz	1, 2, 220-240, 50	3, 4, 380-415, 50	1, 2, 220-240, 50	3, 4, 380-415, 50
Mode			-	HP/HR	HP/HR	HP/HR	HP/HR
Performance	Capacity (Nominal)	Cooling *1)	kW	-	-	-	-
			Btu/h	-	-	-	-
		Heating *2)	kW	16.0	16.0	25.0	25.0
			Btu/h	54,600	54,600	85,300	85,300
Power	Power Input (Nominal)	Cooling *1)	W	-	-	-	-
		Heating *2)	W	3,100	3,100	5,000	5,000
	Current Input (Nominal)	Cooling *1)	A	-	-	-	-
		Heating *2)	A	14.3	4.85	23.1	7.85
	MCA (Including External Contact)				24.15	12.88	32.15
MFA			A	30.19	16.1	40.19	16.1
Compressor	Type		-	Rotary	Rotary	Rotary	Rotary
	Output		kW × n	-	-	-	-
	Model Name		-	UX5T250FNBEX	UX5T250FNBEX	UX5T250FNBEX	UX5T250FNBEX
	Oil	Type	-	POE	POE	POE	POE
Initial Charge		cc	1,700	1,700	1,700	1,700	
Heat Exchanger	Type		-	PHE	PHE	PHE	PHE
	Quantity		-	2	2	2	2
	Pipe Size		Ø, inch	PT 1 (25A)	PT 1 (25A)	PT 1 (25A)	PT 1 (25A)
	Water Flow Rate		LPM	23	23	36	36
	Flow Switch		LPM	12	12	12	12
Option Code			-	01104C-105000-20A0A0-332200	01104C-105000-20A0A0-332200	01104C-105000-20FAFA-332100	01104C-105000-20FAFA-332100
Piping Connections	Liquid Pipe		Ø, mm	9.52	9.52	9.52	9.52
			Ø, inch	3/8"	3/8"	3/8"	3/8"
	Gas Pipe		Ø, mm	15.88	15.88	15.88	15.88
			Ø, inch	5/8"	5/8"	5/8"	5/8"
Drain Pipe		Ø, mm	-	-	-	-	
Field Wiring	Power Source Wire (L<10m, Single Installation)		mm2	4.0	2.5	4.0	2.5
	Transmission Cable		mm2	0.75 ~ 1.5	0.75 ~ 1.5	0.75 ~ 1.5	0.75 ~ 1.5
Refrigerant	Type		-	R-134a	R-134a	R-134a	R-134a
	Control Method		-	EEV	EEV	EEV	EEV
	Factory Charging		kg / tCO2e	2.15 / 3.07	2.15 / 3.07	2.15 / 3.07	2.15 / 3.07
Sound	Sound Pressure *3)		dB(A)	42	42	42	42
	Sound Power			-	-	-	-
Dimensions	Net Weight		kg	104.00	104.00	104.00	104.00
	Shipping Weight		kg	107	107	107	107
	Net Dimensions (W×H×D)		mm	518 x 1,210 x 330	518 x 1,210 x 330	518 x 1,210 x 330	518 x 1,210 x 330
	Shipping Dimensions (W×H×D)		mm	652 x 1,289 x 426	652 x 1,289 x 426	652 x 1,289 x 426	652 x 1,289 x 426
Operating Temp. Range	Ambient	Cooling	°C	-	-	-	-
		Heating	°C	-20 ~ 35	-20 ~ 35	-20 ~ 35	-20 ~ 35
		Hot Water (Main Cooling, HR)	°C	-20.0 ~ 35(43)	-20.0 ~ 35(43)	-20.0 ~ 35(43)	-20.0 ~ 35(43)
	Leaving Water	Cooling	°C	-	-	-	-
		Heating	°C	25.0 ~ 80.0	25.0 ~ 80.0	25.0 ~ 80.0	25.0 ~ 80.0

\* \* Specifications may be subject to change without prior notice for product improvement.

- \*1) Nominal cooling capacities are based on;  
 - Water temperature : 23°C inlet, 18°C outlet  
 - Indoor temperature : 27°C DB, 19°C WB  
 - Outdoor temperature : 35°C DB, 24°C WB

- \*2) Nominal heating capacities are based on;  
 - Water temperature : 55°C inlet, 65°C outlet  
 - Indoor temperature : 20°C DB  
 - Outdoor temperature : 7°C DB, 6°C WB

- \*3) Sound pressure was acquired in an anechoic room. Thus actual noise level may be different depending on the installation conditions.

- \*4) These products contain R410A which is fluorinated greenhouse gas.

\* Heat Exchanger type : Plate Heat Exchanger (STS)

- \*5) These products contain R134a(GWP=1,430) which is fluorinated greenhouse gas.

# 2 Capacity table

## Hydro Unit HT

### 1) Heating

HC : Heating Capacity(W), PI : Power Input(W)  
LW : Leaving Water temperature, EW : Entering Water temperature

Model	Ta [°C DB]	LW[°C]		LW[°C]		LW[°C]		LW[°C]	
		45		55		65		75	
		HC	PI	HC	PI	HC	PI	HC	PI
160	-20	15,000	2,062	15,000	2,017	15,000	2,523	14,000	3,193
	-17	15,000	2,083	15,000	1,952	15,000	2,357	14,500	3,063
	-15	15,500	2,313	15,500	2,007	15,500	2,435	15,000	2,895
	-7	15,500	2,305	16,000	2,185	16,000	2,598	15,500	2,956
	-3	16,000	2,352	16,000	2,380	16,000	2,560	16,000	3,087
	1	16,000	2,146	16,000	2,363	16,000	2,501	16,000	3,052
	3	16,000	2,041	16,000	2,314	16,000	2,453	16,000	2,963
	7	16,000	1,868	16,000	2,281	16,000	2,419	16,000	2,828
	11	16,000	1,850	16,000	2,279	16,000	2,428	16,000	2,763
	15	16,000	1,806	16,000	2,259	16,000	2,474	16,000	2,734
	20	16,000	1,784	16,000	2,232	16,000	2,444	16,000	2,701
	25	16,000	1,763	16,000	2,205	16,000	2,415	16,000	2,668
	30	16,000	1,741	16,000	2,178	16,000	2,385	16,000	2,636
	35	16,000	1,719	16,000	2,151	16,000	2,355	16,000	2,603
250	-20	23,000	4,460	23,000	4,734	22,000	5,017	21,500	5,424
	-17	23,500	4,333	23,500	4,563	23,500	4,802	22,500	5,159
	-15	24,000	4,287	24,500	4,456	24,500	4,670	23,500	4,996
	-7	24,500	3,878	25,000	4,084	25,000	4,235	24,000	4,442
	-3	25,000	3,736	25,000	3,933	25,000	4,073	24,500	4,226
	1	25,000	3,616	25,000	3,803	25,000	3,948	25,000	4,051
	3	25,000	3,565	25,000	3,747	25,000	3,900	25,000	3,979
	7	25,000	3,443	25,000	3,652	25,000	3,831	25,000	3,865
	11	25,000	3,417	25,000	3,580	25,000	3,799	25,000	3,791
	15	25,000	3,400	25,000	3,530	25,000	3,798	25,000	3,758
	20	25,000	3,359	25,000	3,488	25,000	3,752	25,000	3,713
	25	25,000	3,318	25,000	3,445	25,000	3,707	25,000	3,668
	30	25,000	3,278	25,000	3,403	25,000	3,661	25,000	3,623
	35	25,000	3,237	25,000	3,360	25,000	3,616	25,000	3,578

EW = 40°C  
ΔT = 5°C

EW = 45°C  
ΔT = 10°C

EW = 55°C  
ΔT = 10°C

EW = 65°C  
ΔT = 10°C

### Conditions

- ΔT = Leaving Water temperature - Entering Water temperature
- No pump power input is included.
- Equivalent piping length = 7.5m
- Ta < 0 °C : RH=75%, Ta > 0 °C : RH=85%

# 2 Capacity table

## Hydro Unit HT

### 2) Capacity calculation method

How to calculate heating capacity and power input : Combination of outdoor unit and hydro unit HT

- Heating capacity and power input of hydro unit HT : refer to the indoor unit capacity table.
- Power input of outdoor unit : refer to the outdoor unit capacity table (indoor 20°C DB).

Example

- Standard condition: Outdoor 7°C DB/6°C WB, Indoor 20°C DB
- Water condition: EW 55°C, LW 65°C

### 8HP DVM S TDB Heat Capacity Table

combination, % (Capacity index)	Outdoor Temperature(°C)		Indoor Temperature (°C,DB)	
			20.0 °C	
	DB	WB	TC kW	PI kW
100%	-20	-21	19.8	7.80
	-17	-18	20.9	7.96
	-15	-16	22.0	8.04
	-12	-13	22.9	7.92
	-10	-11	23.9	7.68
	-7	-8	24.4	7.21
	-5	-6	25.2	6.84
	-3	-4	25.2	6.21
	0	-1	25.2	5.84
	3	2	25.2	5.52
	5	4	25.2	5.23
	7	6	25.2	5.10
	9	8	25.2	4.85
	11	10	25.2	4.63
	13	12	25.2	4.42
15	14	25.2	4.27	

Combination 1 (Outdoor Unit 8HP + Indoor Unit 8HP)

Indoor Heat Capa.[kW]	25	= HT Capacity Table
PI Indoor Unit(8HP)[kW]	3.831	= HT Capacity Table
PI Outdoor Unit(8HP)[kW]	5.10	----- Outdoor Unit Capacity Table
PI System[kW]	8.93	=Indoor Unit PI + Outdoor Unit PI

## 2 Capacity table

### Hydro Unit HT

#### 10HP DVM S TDB Heat Capacity Table

combination, % (Capacity index)	Outdoor Temperature(°C)		Indoor Temperature (°C,DB)	
			20.0 °C	
	DB	WB	TC kW	PI kW
100%	-20	-21	26.5	10.24
	-17	-18	28.1	10.45
	-15	-16	29.1	10.67
	-12	-13	29.7	10.62
	-10	-11	30.7	10.40
	-7	-8	31.2	9.57
	-5	-6	31.5	8.99
	-3	-4	31.5	8.15
	0	-1	31.5	7.68
	3	2	31.5	7.25
	5	4	31.5	6.88
	7	6	31.5	6.70
	9	8	31.5	6.38
	11	10	31.5	6.08
	13	12	31.5	5.81
15	14	31.5	5.61	

Combination 1 ( Outdoor Unit 10HP + Indoor Unit 5HP x 2ea)

Indoor Heat Capa.[kW]	16	= HT Capacity Table
Indoor Heat Capa.[kW]	32	= 2 x 5HP
PI Indoor Unit(5HP)[kW]	2.419	= HT Capacity Table
PI Total Indoor Unit[kW]	4.838	= 2 x 5HP
PI Outdoor Unit(10HP)[kW]	6.70	----- Outdoor Unit Capacity Table
PI System[kW]	11.54	= Total Indoor Unit PI + Outdoor Unit PI

#### Flowrate Information

Flowrate[l/min]	**160**	**250**
ΔT = 15°C	15.4	24.1
ΔT = 10°C	23.0	36.0
ΔT = 5°C	46.0	72.0

## 2 Capacity table

### Hydro Unit HT

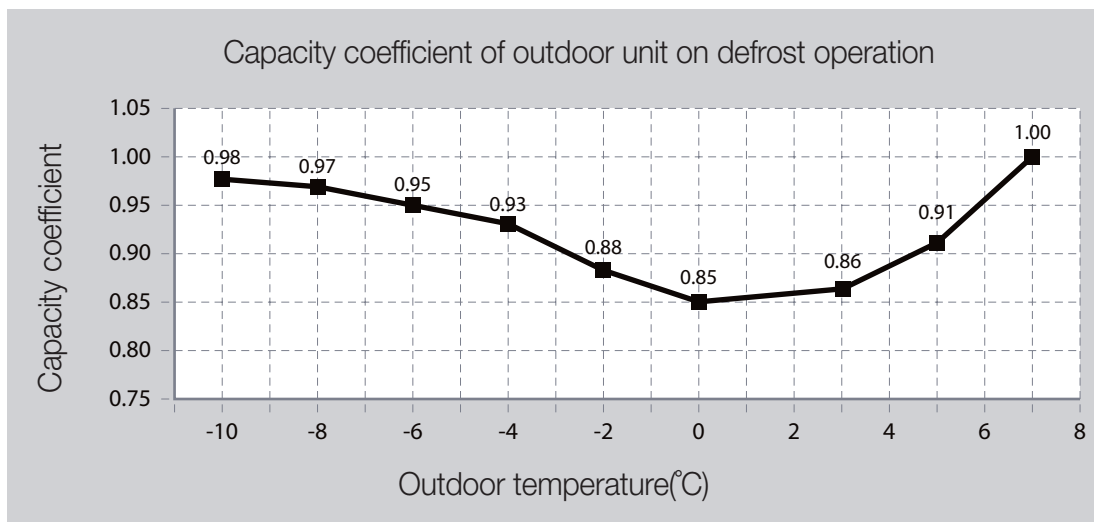
How to calculate heating capacity and power input : Integrated value

#### 1. Defrosting correction factor (Outdoor unit)

- On heating operation, frost can be formed on heat exchanger according to outdoor temperature. (Frost on heat exchanger results in decreasing the performance.)  
To remove frost on heat exchanger of outdoor unit, defrost operation is carried out periodically.  
During defrost operation, capacity of outdoor unit may decrease.  
The decrement is not considered to the individual capacity tables.

Outdoor temperature (°C, DB)	-10	-8	-6	-4	-2	0	3	5	7
Capacity coefficient	0.98	0.97	0.95	0.93	0.88	0.85	0.86	0.91	1

**Corrected Heating Capacity = heating capacity x Capacity coefficient**



#### 2. Power input of hydro unit HT during defrost operation

	Power Input (W)
HT 5HP	1050
HT 8HP	1500

#### 3. Capacity correction factor of hydro unit HT during defrost operation

	HT Capa Correction Factor
HT 5HP	0.3
HT 8HP	

# 2 Capacity table

## Hydro Unit HT

Example) Combination: 10HP DVM S + 5HP HT X 2ea, Outdoor 5°C DB, EW/LW=55°C/65°C

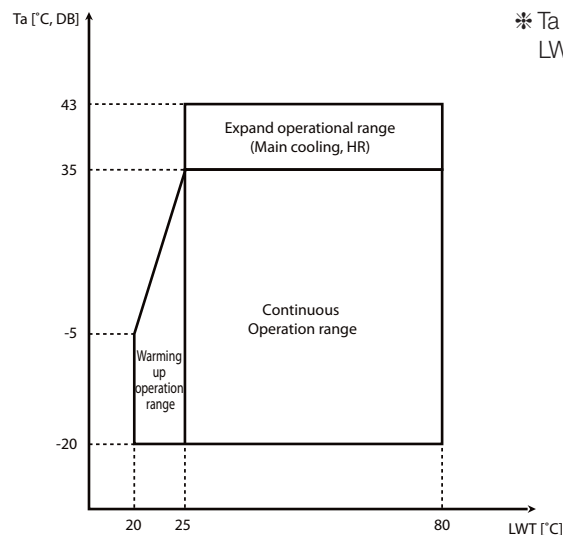
- 1) Defrosting correction factor (Outdoor unit, 5°C) = 0.91
- 2) Capacity correction factor (Hydro unit HT) = 0.3
- 3) Integrated capacity correction factor =  $0.91 - (1 - 0.91) \times 0.3 = 0.883$
- 4) HC =  $0.883 \times 16,000W \times 2ea = 28.3kW$
- 5) Power input (Outdoor unit) = 6.88kW
- 6) Power input (Hydro unit HT) =  $\{ 0.91 \times (2,453W + 2,419W) / 2 + (1 - 0.91) \times 1,050W \} \times 2 = 4.62kW$
- 7) Total PI =  $6.88 + 4.62 = 11.5kW$

## 10HP DVM S TDB Heat Capacity Table

combination, % (Capacity index)	Outdoor Temperature(°C)		Indoor Temperature (°C,DB)	
			20.0 °C	
	DB	WB	TC kW	PI kW
100%	-20	-21	26.5	10.24
	-17	-18	28.1	10.45
	-15	-16	29.1	10.67
	-12	-13	29.7	10.62
	-10	-11	30.7	10.40
	-7	-8	31.2	9.57
	-5	-6	31.5	8.99
	-3	-4	31.5	8.15
	0	-1	31.5	7.68
	3	2	31.5	7.25
	5	4	31.5	6.88
	7	6	31.5	6.70
	9	8	31.5	6.38
	11	10	31.5	6.08
13	12	31.5	5.81	
15	14	31.5	5.61	

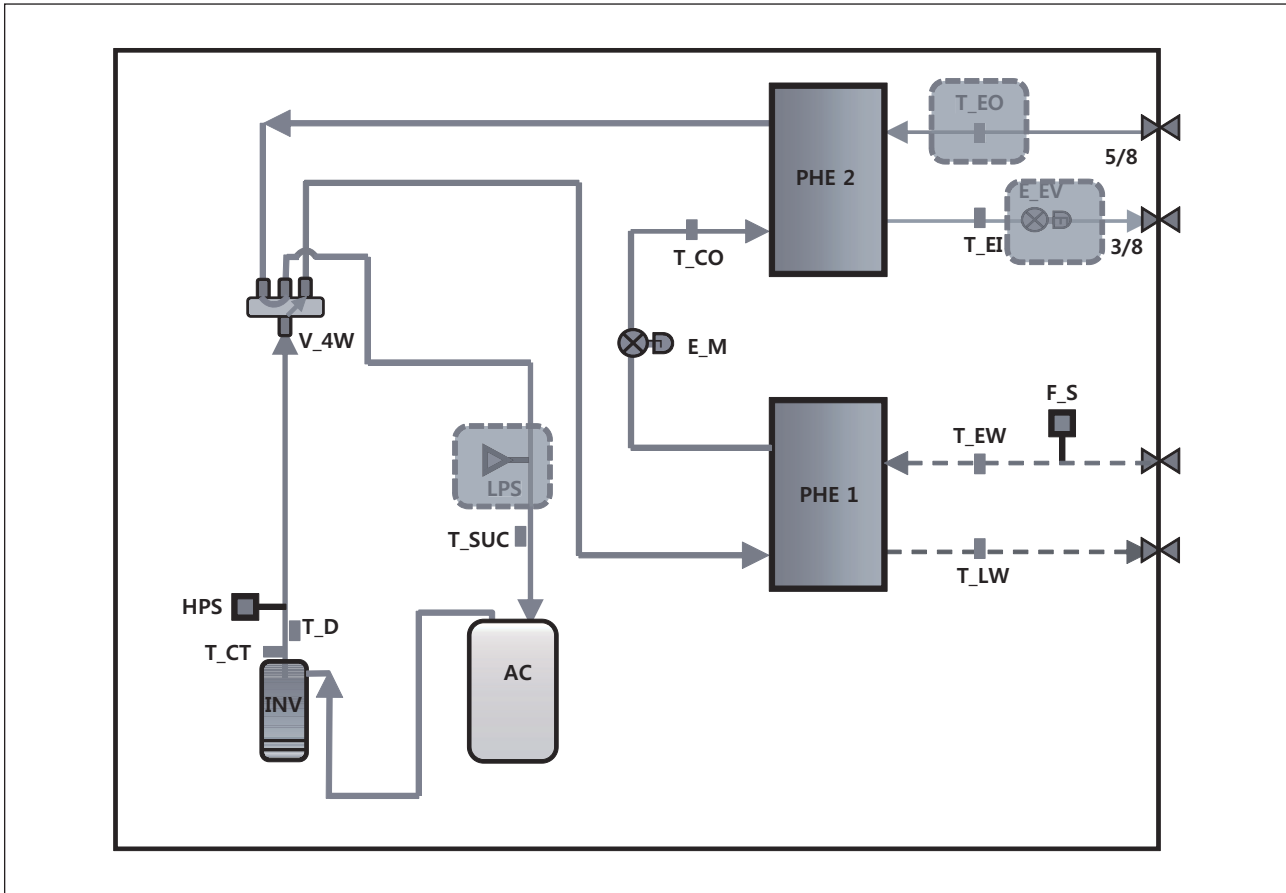
## 2-3. Operation range

### 1) Heating



### 3 Piping diagram

Hydro Unit HT

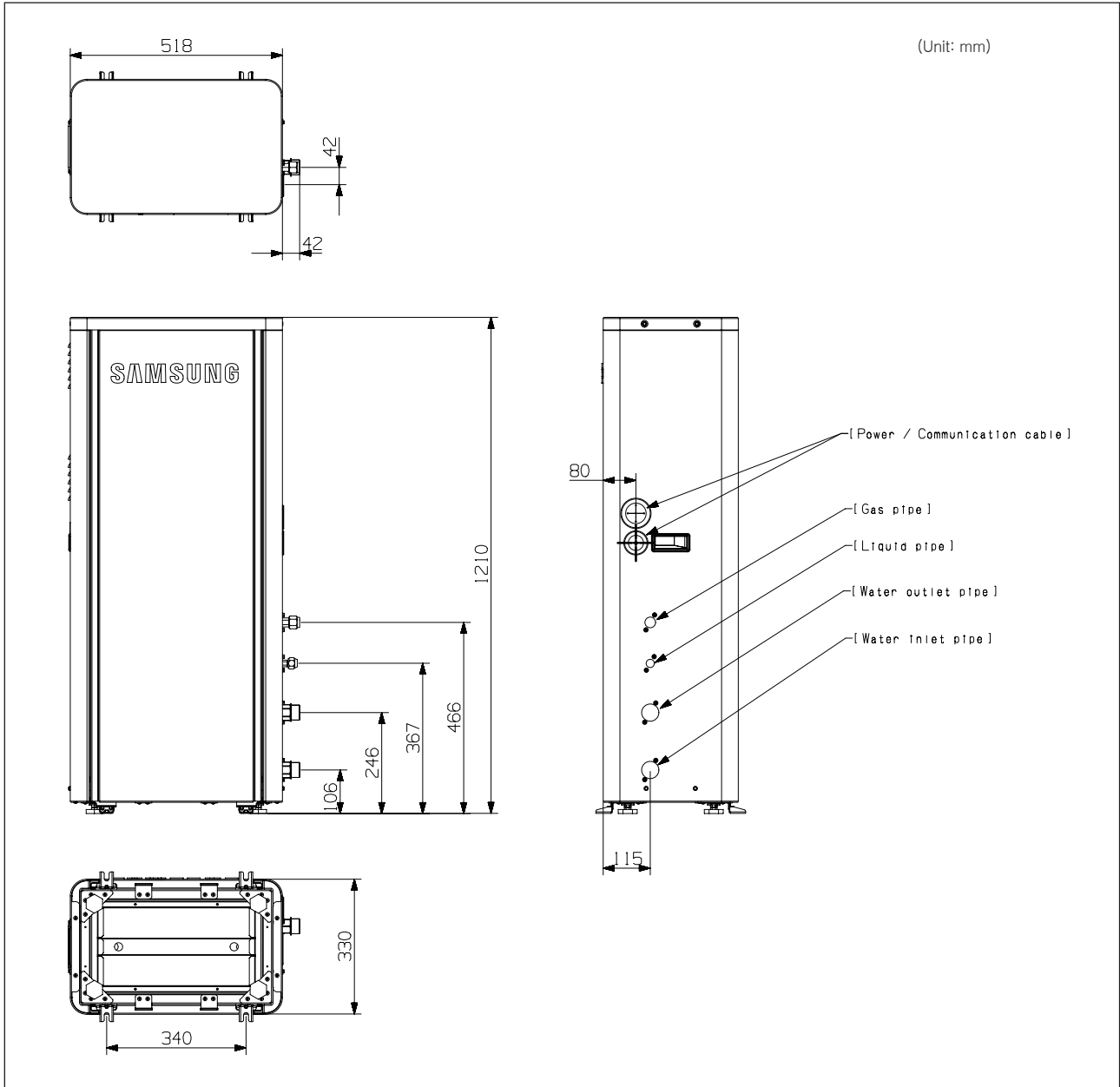


Symbol	Name
INV	Inverter Compressor
PHE1	Plate Heat Exchanger(R134a/water)
PHE2	Plate Heat Exchanger(R134a/R410a)
AC	Accumulator
HPS	High Pressure Sensor
LPS	Low Pressure Sensor
E_M	Main EEV (R134a)
E_EV	EVI EEV (R410a)
V_4W	4Way Valve
T_D	Discharge Temp. Sensor
T_CO	Cond Out Temp. Sensor
T_EI	EVI In Temp. Sensor (R410a)
T_EO	EVI Out Temp. Sensor (R410a)
T_CT	Comp. Top Temp. Sensor
T_SUC	Suction Temp. Sensor
T_EW	Entering Water Temp. Sensor
T_LW	Leaving Water Temp. Sensor
F_S	Flow Switch



# 4 Dimensional drawing

## Hydro Unit HT



Model of the Hydro unit		AM***FNBF*B
Refrigerant side	Liquid side connection part	3/8" (ø9.52)
	Gas side connection part	5/8" (ø15.88)
Water side connection part		PT 1(25A)

# 5 Electrical Wiring Diagram

## Hydro Unit HT

AM160/250FNBFE/BU

에러코드 Error No	PBA - 에러 설명 Error Description	에러 원인 Faulted part	동작 상태/점검 사항 Operation status/Inspection checklist	비고 Remarks
E 1 1 0	Control Kit PBA - MAIN PBA 간 통신 단절 에러 (Control Kit와 PBA 간) Communication error between the control kit and main	DB - B2 통신 케이블 COMMUNICATION CABLE	통신 케이블의 연결 상태를 점검하십시오. Check the connection status of the communication cable on the site.	선택 사항 Optional
E 1 2 1	Room 센서의 Short 또는 Open Room sensor error (Short/Open)	DB - B4 방열기 HEATER	방열기 작동 상태를 점검하십시오. Check the status of the heater operation signal on the site.	선택 사항 Optional
E 1 2 2	Line in 센서의 Short 또는 Open Line in sensor error (Short/Open)	DB - B6 라인 인 센서 LINE IN PMP	라인 인 센서의 작동 상태를 점검하십시오. Check the status of the line in sensor signal and on/off status of operation at the control panel on the site.	선택 사항 Optional
E 1 2 3	Line out 센서의 Short 또는 Open Line out sensor error (Short/Open)	DB - B8 보일러 센서 HEATER	보일러 센서의 작동 상태를 점검하십시오. Check the status of the boiler operation signal output at the control panel on the site.	선택 사항 Optional
E 1 9 8	Thermal fuse cut off error 화재 차단 센서 - 열점기 차단 에러 (화재 차단 센서 / 열점기 차단) Communication error (The mismatched number of hydro unit)	DB - B08 - B11 SW1 1 VV SW1 2 VV	SW1 1 VV 및 SW1 2 VV의 작동 상태를 점검하십시오. Check the status of signal output and on/off status of valve operation (Direction of flow of the indoor hot water loop).	선택 사항 Optional
E 2 0 1	화재 차단 센서 - 열점기 차단 에러 (화재 차단 센서 / 열점기 차단) Communication error between the outdoor and hydro unit	DB1 - B31 - B34 SW1 1 VV SW1 2 VV	SW1 1 VV 및 SW1 2 VV의 작동 상태를 점검하십시오. Check the status of signal output and on/off status of valve operation (Water locked in the outdoor pump signal).	선택 사항 Optional
E 2 0 2	화재 차단 센서 - 열점기 차단 에러 (화재 차단 센서 / 열점기 차단) Hydro unit communication error between main micron and in, micron	DB5 - B16 - B17 SW1 1 VV SW1 2 VV	SW1 1 VV 및 SW1 2 VV의 작동 상태를 점검하십시오. Check the status of signal output and operation status of the valve.	선택 사항 Optional
E 2 2 1	실외기 온도 센서 Short 또는 Open Outdoor air temperature sensor error (Short/Open)	DB9 - B20 AC20, AC20-2, AC20, HEATSENS1	실외기 온도 센서의 연결 상태를 점검하십시오. Check the connection status of the outdoor air temperature sensor (Heating).	선택 사항 Optional
E 2 3 1	Cond Out 센서의 Short 또는 Open Condenser outlet sensor error (Short/Open)			선택 사항 Optional
E 2 5 1	Compressor discharge 온도 센서 Short 또는 Open Compressor discharge temperature sensor error (Short/Open)			선택 사항 Optional
E 2 9 1	고압 센서 Short 또는 Open High pressure sensor error (Short or Open)			선택 사항 Optional
E 2 9 6	저압 센서 Short 또는 Open Low pressure sensor error (Short or Open)			선택 사항 Optional
E 3 0 8	Section 센서의 Short 또는 Open (H/W에서는 - 검출 불가능) Section temperature sensor error (Short/Open)			선택 사항 Optional
E 3 2 0	실외기 온도 센서 Short 또는 Open Outdoor air temperature sensor error (Short/Open)			선택 사항 Optional
E 4 0 7	고압 과부하 에러 High pressure error (Overload)			선택 사항 Optional
E 4 1 0	Compressor operation stop due to low pressure protection control or refrigerant leakage Compressor operation stop due to low pressure protection control or refrigerant leakage			선택 사항 Optional
E 4 1 6	Discharge over temperature error when compressor stop Discharge over temperature error when compressor stop			선택 사항 Optional
E 4 2 8	Compressor operation stop due to abnormal compression ratio Compressor operation stop due to abnormal compression ratio			선택 사항 Optional
E 4 3 9	실외기 누설 에러 Error due to the refrigerant leakage			선택 사항 Optional
E 4 4 0	실외기 온도 범위 초과 에러 (H/W에서는 - 검출 불가능) Out of operation temperature range in heating (Heating)			선택 사항 Optional
E 4 4 3	실외기 온도 범위 초과 에러 Out of operation temperature range in heating (Heating)			선택 사항 Optional
E 4 6 1	Compressor relation alerting error Compressor relation alerting error			선택 사항 Optional
E 4 6 2	Total input current overload error Total input current overload error			선택 사항 Optional
E 4 6 3	실외기 과전류(L/L) 에러 L/L over current(L/L) error			선택 사항 Optional
E 4 6 4	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 6 5	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 6 6	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 6 7	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 6 8	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 6 9	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 7 0	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 7 1	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 7 2	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 7 3	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 7 4	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 8 4	실외기 과부하 에러 Overload error			선택 사항 Optional
E 4 8 5	실외기 과부하 에러 Overload error			선택 사항 Optional
E 5 0 0	실외기 과부하 에러 Overload error			선택 사항 Optional
E 9 0 1	Water inlet (PIE) Temperature sensor error (Short/Open)			선택 사항 Optional
E 9 0 2	Water outlet (PIE) Temperature sensor error (Short/Open)			선택 사항 Optional
E 9 0 4	Water tank water level sensor error (Short/Open)			선택 사항 Optional
E 9 0 7	Error due to pipe rupture protection			선택 사항 Optional
E 9 0 8	동결방지 에러 Error due to freeze prevention (no-operation is possible)			선택 사항 Optional
E 9 0 9	동결방지 중 Com off 동작 에러 (동결 방지 불가능) Error due to freeze prevention (no-operation is possible)			선택 사항 Optional
E 9 1 0	Water temperature sensor on water outlet pipe is detached			선택 사항 Optional
E 9 1 1	Film Switch Open Error			선택 사항 Optional
E 9 1 2	Film Switch Close Error			선택 사항 Optional
E 9 1 3	Film Switch Error (6번 검사 제외) 에러 Six times detection for Film Switch Error			선택 사항 Optional
E 9 1 4	Thermalist 오작동 에러 Error due to incorrect thermalist connection			선택 사항 Optional
E 9 1 5	DC Fan Motor feed back error			선택 사항 Optional

**하이드로유닛 전기회로도**  
Wiring Diagram Hydro unit  
DB68-04030A

**에러 코드**  
E 9 0 8 동결방지 에러  
E 9 0 9 동결방지 중 Com off 동작 에러 (동결 방지 불가능)  
E 9 1 0 Water temperature sensor on water outlet pipe is detached  
E 9 1 1 Film Switch Open Error  
E 9 1 2 Film Switch Close Error  
E 9 1 3 Film Switch Error (6번 검사 제외) 에러  
E 9 1 4 Thermalist 오작동 에러  
E 9 1 5 DC Fan Motor feed back error

### NOTE

- This wiring diagram applies only to the indoor unit.
- Symbols show as follow;  
BLK : black, RED : red, BLU : blue, WHT:white, YEL : yellow, BRN : brown, SKY : sky-blue, GRN : green
- For connection wiring indoor-outdoor transmission F1-F2, indoor-wired remotecontroller transmission F3-F4.
- ⊕: Protective earth(screw), □: Connector, n: The wire quantity

# 5 Electrical Wiring Diagram

## Hydro Unit HT

AM160/250FNBFGB/EU

에러코드 Error No	PBA - 에러 설명 Error Description	에러 번호 Terminal No.	에러 원인 External cause	동작 상태 확인/점검 사항 Operation status/inspection checklist	비고 Remarks
E 1 1 0	Control kit PBA - 메인 릴레이 PBA 간 통신 단절시 에러 (Control kit와 PBA 간)	B1 - B2	통신 케이블	동작 상태 확인/점검 사항 Operation status/inspection checklist	비고 Remarks
E 1 2 1	Room sensor error (Open/Short)	B3 - B4	방온 센서	방온 센서 연결 상태 확인	옵션 Optional
E 1 2 2	Live in sensor error (Open/Short)	B5 - B6	실온 센서	실온 센서 연결 상태 확인	옵션 Optional
E 1 2 3	Live Out sensor error (Open/Short)	B7 - B8	실외 온 센서	실외 온 센서 연결 상태 확인	옵션 Optional
E 1 9 8	Thermostat use cut off error	B9 - B10	온도 조절기	온도 조절기 사용 여부 확인	옵션 Optional
E 2 0 1	Communication error (The mismatched number of hydro unit)	B11 - B12	수압 센서	수압 센서 연결 상태 확인	옵션 Optional
E 2 0 2	Communication error between the outdoor and hydro unit	B13 - B14	수압 센서	수압 센서 연결 상태 확인	옵션 Optional
E 2 0 3	Communication error between the outdoor and ter. unit	B15 - B16	수압 센서	수압 센서 연결 상태 확인	옵션 Optional
E 2 2 1	Indoor air temperature sensor error (Short/Open)	B17 - B18	실내 온도 센서	실내 온도 센서 연결 상태 확인	옵션 Optional
E 2 3 1	Condenser outlet sensor error (Open/Short)	B19 - B20	응축기 출구 온도 센서	응축기 출구 온도 센서 연결 상태 확인	옵션 Optional
E 2 5 1	Compressor discharge temperature sensor error (Open/Short)	B21 - B22	압축기 배기구 온도 센서	압축기 배기구 온도 센서 연결 상태 확인	옵션 Optional
E 2 9 1	Refrigerant leakage or error on high pressure sensor (Short or Open)	B23 - B24	고압 센서	고압 센서 연결 상태 확인	옵션 Optional
E 2 9 6	Refrigerant leakage or error on low pressure sensor (Short or Open)	B25 - B26	저압 센서	저압 센서 연결 상태 확인	옵션 Optional
E 3 0 8	Section sensor error (Open/Short)	B27 - B28	단절 센서	단절 센서 연결 상태 확인	옵션 Optional
E 3 2 0	Top of compressor temperature sensor error (Short/Open)	B29 - B30	압축기 상부 온도 센서	압축기 상부 온도 센서 연결 상태 확인	옵션 Optional
E 4 1 0	Compressor operation stop due to low pressure protection control or refrigerant leakage	B31 - B32	압축기 정지	압축기 정지 원인 확인	옵션 Optional
E 4 1 6	Discharge over temperature error when compressor stop	B33 - B34	배기구 과열	배기구 과열 원인 확인	옵션 Optional
E 4 2 8	Compressor stop due to abnormal compression ratio	B35 - B36	압축기 정지	압축기 정지 원인 확인	옵션 Optional
E 4 3 9	Error due to refrigerant leakage	B37 - B38	냉매 누출	냉매 누출 확인	옵션 Optional
E 4 4 3	Operation prohibition due to low pressure	B39 - B40	저압 차단	저압 차단 확인	옵션 Optional
E 4 6 1	Comp relation starting error	B41 - B42	압축기 작동	압축기 작동 확인	옵션 Optional
E 4 6 2	Total input current overload error	B43 - B44	전력 과부하	전력 과부하 확인	옵션 Optional
E 4 6 3	Top of compressor temperature over heat	B45 - B46	압축기 상부 과열	압축기 상부 과열 확인	옵션 Optional
E 4 6 4	PIV over current error	B47 - B48	PIV 과전류	PIV 과전류 확인	옵션 Optional
E 4 6 6	COMP over load error	B49 - B50	압축기 과부하	압축기 과부하 확인	옵션 Optional
E 4 6 7	DC Link voltage under/over error	B51 - B52	DC 링크 전압	DC 링크 전압 확인	옵션 Optional
E 4 6 8	Current sensor error	B53 - B54	전류 센서	전류 센서 연결 상태 확인	옵션 Optional
E 4 6 9	DC Link voltage sensor error	B55 - B56	DC 링크 전압 센서	DC 링크 전압 센서 연결 상태 확인	옵션 Optional
E 4 7 0	EEPROM read/write error	B57 - B58	EEPROM	EEPROM 연결 상태 확인	옵션 Optional
E 4 7 1	EEPROM error	B59 - B60	EEPROM	EEPROM 연결 상태 확인	옵션 Optional
E 4 7 2	Zero crossing error	B61 - B62	제로 크로스	제로 크로스 확인	옵션 Optional
E 4 7 3	Comp locking error	B63 - B64	압축기 잠금	압축기 잠금 확인	옵션 Optional
E 4 7 4	Reactor sensor error (Short/Open)	B65 - B66	리액터 센서	리액터 센서 연결 상태 확인	옵션 Optional
E 4 8 4	PIV over load error	B67 - B68	PIV 과부하	PIV 과부하 확인	옵션 Optional
E 4 8 5	Input current sensor error	B69 - B70	입력 전류 센서	입력 전류 센서 연결 상태 확인	옵션 Optional
E 5 0 0	Reactor over heat error	B71 - B72	리액터 과열	리액터 과열 확인	옵션 Optional
E 9 0 1	Water inlet (PIE) temperature sensor error (Short/Open)	B73 - B74	수온 센서	수온 센서 연결 상태 확인	옵션 Optional
E 9 0 2	Water outlet (PIE) temperature sensor error (Short/Open)	B75 - B76	수온 센서	수온 센서 연결 상태 확인	옵션 Optional
E 9 0 4	Water unit Water leak sensor error (Short/Open)	B77 - B78	수온 센서	수온 센서 연결 상태 확인	옵션 Optional
E 9 0 7	Error due to pipe rupture protection	B79 - B80	수온 센서	수온 센서 연결 상태 확인	옵션 Optional
E 9 0 8	Error due to freeze prevention-operation is impossible	B81 - B82	동결 방지	동결 방지 확인	옵션 Optional
E 9 0 9	Error due to freeze prevention-operation is impossible	B83 - B84	동결 방지	동결 방지 확인	옵션 Optional
E 9 1 0	Water temperature sensor on water outlet pipe is detached	B85 - B86	수온 센서	수온 센서 연결 상태 확인	옵션 Optional
E 9 1 1	Film Switch Open	B87 - B88	필름 스위치	필름 스위치 연결 상태 확인	옵션 Optional
E 9 1 2	Film Switch Close	B89 - B90	필름 스위치	필름 스위치 연결 상태 확인	옵션 Optional
E 9 1 3	Film Switch Error (Six times detection for Film Switch Error)	B91 - B92	필름 스위치	필름 스위치 연결 상태 확인	옵션 Optional
E 9 1 4	Thermostat disconnection	B93 - B94	온도 조절기	온도 조절기 연결 상태 확인	옵션 Optional
E 9 1 5	DC FAN Motor feed back error	B95 - B96	DC 팬 모터	DC 팬 모터 연결 상태 확인	옵션 Optional

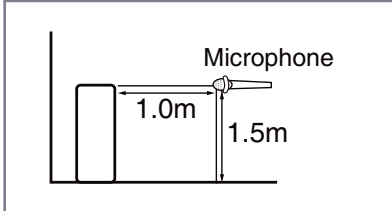
### NOTE

- This wiring diagram applies only to the indoor unit.
- Symbols show as follow;  
BLK : black, RED : red, BLU : blue, WHT : white, YEL : yellow, BRN : brown, SKY : sky-blue, GRN : green
- For connection wiring indoor-outdoor transmission F1-F2, indoor-wired remotecontroller transmission F3-F4.
- ⊕ : Protective earth(screw), □ : Connector, n : The wire quantity

# 6 Sound pressure level

## Hydro Unit HT

### 1) Operation Sound Level



Unit : dB(A)

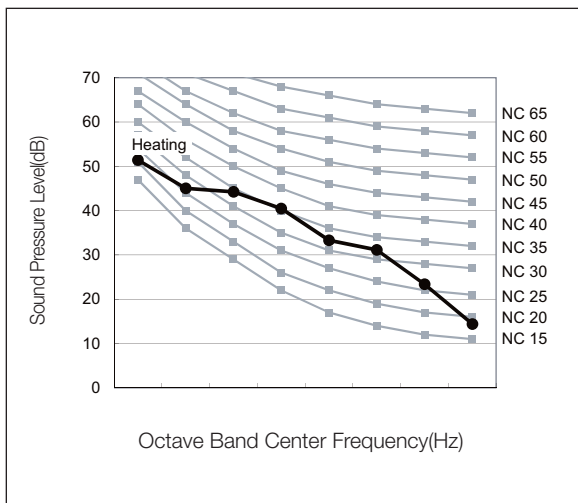
Model	Heating
AM160FNBFBFEB***	42
AM160FNBFBFG***	42
AM250FNBFBFEB***	42
AM250FNBFBFG***	42

#### ✓ Note

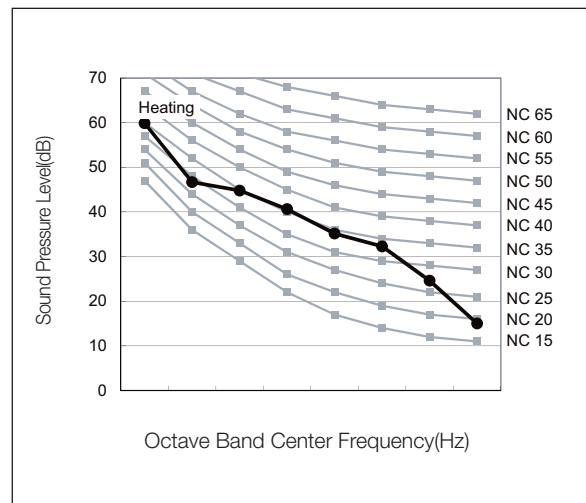
Specifications may be subject to change without prior notice.  
 Sound pressure level is obtained in an anechoic room.  
 Sound pressure level is a relative value, depending on the distance and acoustic environment.  
 Sound pressure level may differ depending on operation condition.  
 dBA = A-weighted sound pressure level  
 Reference acoustic pressure 0 dB= 20 uPa

### 2) NC curves

#### (1) AM160FNBFBFEB\*\*\*



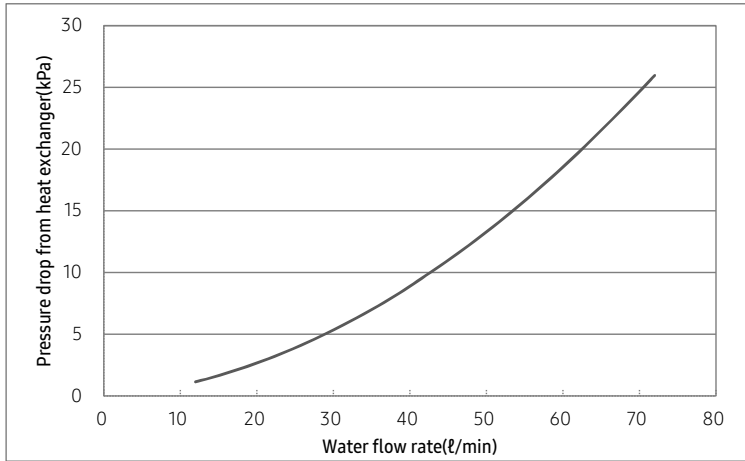
#### (2) AM250FNBFBFEB\*\*\*



# 7 Hydraulic performance

## Hydro Unit HT

### 1) AM\*\*\*FNBF\*\*



Water flow rate (LPM)	Pressure drop from heat exchanger (kPa)
12	1.1
15	1.6
20	2.7
25	3.9
30	5.3
35	7.0
40	8.9
50	13.3
60	18.5
70	24.6
72	26.0