SAMSUNG

VRF

Technical Data Book

Hydro Unit for America

Model :AM***CNB*C*/AA

History

Version	Modification	Date	Remark
Ver. 1.0	Release the VRF Hydro Unit for America	23.06.14	-
Ver. 1.1	Updated some data	23.08.01	-
Ver. 1.2	Updated some data	23.09.22	-

Nomenclature

Indoor Units

Model Name

AM	036	C	N	B	D	C	H	/	AA
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		Buyer

(1) Classification

AM	DVM

(2) Capacity

X 1/10 kW (3 digits)

(3) Version

C	2023

(4) Product Type

X	Outdoor Unit
N	Indoor Unit

(5) Product Notation

B	Hydro Unit

(6) Feature

D	STANDRAD
F	CASCADE

(7) Rating Voltage

C	208~230V, 60Hz, 1Φ

(8) Mode

H	Heat Pump(R410A)
B	Heat Pump(R134a)

Contents

1. Line up

Hydro Unit HE

Capacity(Heating)	40 kBtu/h	54.5 kBtu/h	108 kBtu/h	172 kBtu/h
Image				
Model	AM036CNBDCH/AA	AM048CNBDCH/AA	AM096CNBDCH/AA	AM144CNBDCH/AA

Hydro Unit HT

Capacity(Heating)	54.5 kBtu/h	86 kBtu/h
Image		
Model	AM048CNBFCB/AA	AM072CNBFCB/AA

2. Specification

Hydro Unit HE

Model CODE				AM036CNBDCH/AA	AM048CNBDCH/AA
Power Supply			Φ, #, V, Hz	1,2,208-230,60	1,2,208-230,60
Mode			-	HEAT PUMP	HEAT PUMP
Performance	Capacity (Nominal)	Heating	Btu/h	40,000	54,500
Power	Power Input (Nominal)	Heating	W	10	10
	Current Input (Nominal)	Heating	A	0.05	0.05
Heat Exchanger	Type		-	PHE	PHE
	Quantity		-	1	1
	Pipe Size		Φ, inch	NPT1	NPT1
	Water Flow Rate		LPM	36	48
			GPM	9.5	12.7
	Flow Switch		LPM	12	20
			GPM	3.2	5.3
Option Code			-	01004C-105000 206464-332200	01004C-105000 208C8C-332200
Piping Connections	Liquid Pipe		Φ, inch	3/8	3/8
	Gas Pipe		Φ, inch	5/8	5/8
	Drain Pipe		Φ, inch	3/4	3/4
Field Wiring	Power Source Wire	Min.	AWG	10	10
	Transmission Cable		AWG	18	18
Refrigerant	Type		-	R410A	R410A
	Control Method		-	EEV INCLUDED	EEV INCLUDED
Sound	Sound Pressure	Heating	dB(A)	27	27
Dimensions	Net Weight		lbs	64.4	64.4
	Shipping Weight		lbs	69.0	69.0
	Net Dimensions (W×H×D)		inch	20.4x24.7x13.0	20.4x24.7x13.0
	Shipping Dimensions (W×H×D)		inch	25.7x27.6x16.8	25.7x27.6x16.8
Temp	Max. Outdoor Ambient Operating Temp.	Heating	°F	95	95
	Operating Water Temp. Range		°F	68~122	68~122

NOTE

* Specifications may be subject to change without prior notice for product improvement.
* 1) Nominal heating capacities are based on;

  Water temperature: 86°F(30°C) inlet, 95°F(35°C) outlet
  Indoor temperature : 68°F(20°C) DB
  Outdoor temperature :44.6°F(7°C) DB, 42.8°F(6°C) WB
* 2) Sound pressure was acquired in an anechoic room. Thus actual noise level may be different depending on the installation conditions.
* 3) The VRF system contains R410A (GWP=2,088) which is fluorinated greenhouse gas.
* Heat Exchanger type : Plate Heat Exchanger (STS)

2. Specification

Hydro Unit HE

Model CODE				AM096CNBDCH/AA	AM144CNBDCH/AA
Power Supply			Φ, #, V, Hz	1,2,208-230,60	1,2,208-230,60
Mode			-	HEAT PUMP	HEAT PUMP
Performance	Capacity (Nominal)	Heating	Btu/h	108,000	172,000
Power	Power Input (Nominal)	Heating	W	10	10
	Current Input (Nominal)	Heating	A	0.05	0.05
Heat Exchanger	Type		-	PHE	PHE
	Quantity		-	1	1
	Pipe Size		Φ, inch	NPT1	NPT1-1/4
	Water Flow Rate		LPM	92	150
			GPM	24.3	39.6
	Flow Switch		LPM	30	50
			GPM	7.9	13.2
Option Code			-	01004C-105000 231C1C-332200	01004C-105000 232D2D-332200
Piping Connections	Liquid Pipe		Φ, inch	3/8	1/2
	Gas Pipe		Φ, inch	7/8	1 1/8
	Drain Pipe		Φ, inch	3/4	3/4
Field Wiring	Power Source Wire	Min.	AWG	10	10
	Transmission Cable		AWG	18	18
Refrigerant	Type		-	R410A	R410A
	Control Method		-	EEV INCLUDED	EEV INCLUDED
Sound	Sound Pressure	Heating	dB(A)	28	31
Dimensions	Net Weight		lbs	75.4	95.2
	Shipping Weight		lbs	80.0	99.9
	Net Dimensions (W×H×D)		inch	20.4x24.7x13.0	20.4x24.7x13.0
	Shipping Dimensions (W×H×D)		inch	25.7x27.6x16.8	25.7x27.6x16.8
Temp	Max. Outdoor Ambient Operating Temp.	Heating	°F	95	95
	Operating Water Temp. Range		°F	68~122	68~122

NOTE

* Specifications may be subject to change without prior notice for product improvement.
* 1) Nominal heating capacities are based on;
  Water temperature: 86°F(30°C) inlet, 95°F(35°C) outlet
  Indoor temperature : 68°F(20°C) DB
  Outdoor temperature :44.6°F(7°C) DB, 42.8°F(6°C) WB
* 2) Sound pressure was acquired in an anechoic room. Thus actual noise level may be different depending on the installation conditions.
* 3) The VRF system contains R410A (GWP=2,088) which is fluorinated greenhouse gas.
* Heat Exchanger type : Plate Heat Exchanger (STS)

2. Specification

Hydro Unit HT

Model CODE					AM048CNBFCB/AA	AM072CNBFCB/AA
Power Supply				Φ, #, V, Hz	1,2,208-230,60	1,2,208-230,60
Mode				-	HEAT PUMP	HEAT PUMP
Performance	Capacity (Nominal)	Heating		Btu/h	54,500	86,000
Power	Power Input (Nominal)	Heating		W	3100	5000
	Current Input (Nominal)	Heating		A	14.3	23.1
Compressor	Type			-	Rotary	Rotary
	Output			kW x n	-	-
	Model Name			-	UX5T250FNBEX	UX5T250FNBEX
	Oil	Type		-	POE	POE
		Initial Charge		cc	1,700	1,700
Heat Exchanger	Type			-	PHE	PHE
	Quantity			-	2	2
	Pipe Size			Φ, inch	NPT1	NPT1
	Water Flow Rate			LPM	23	36
				GPM	6.1	9.5
	Flow Switch			LPM	12	12
				GPM	3.2	3.2
Option Code				-	01104C-105000 20A0A0-332200	01104C-105000 20FAFA-332100
Piping Connections	Liquid Pipe			Φ, inch	3/8	3/8
	Gas Pipe			Φ, inch	5/8	5/8
	Drain Pipe			Φ, inch	3/4	3/4
Field Wiring	Power Source Wire		Min.	AWG	6	6
	Transmission Cable			AWG	18	18
Refrigerant	Type			-	R410A / R134a	R410A / R134a
	Control Method			-	EEV INCLUDED	EEV INCLUDED
Sound	Sound Pressure	Heating		dB(A)	42	42
Dimensions	Net Weight			lbs	233.7	233.7
	Shipping Weight			lbs	250.2	250.2
	Net Dimensions (W×H×D)			inch	20.4x47.6x13.0	20.4x47.6x13.0
	Shipping Dimensions (W×H×D)			inch	25.7x54.1x16.8	25.7x54.1x16.8
Temp	Max. Outdoor Ambient Operating Temp.	Heating		°F	109.4	109.4
	Operating Water Temp. Range			°F	77~176	77~176

NOTE

* Specifications may be subject to change without prior notice for product improvement.
* 1) Nominal heating capacities are based on;
  Water temperature: 131°F(55°C) inlet, 149°F(65°C) outlet
  Indoor temperature : 68°F(20°C) DB
  Outdoor temperature :44.6°F(7°C) DB, 42.8°F(6°C) WB
* 2) Sound pressure was acquired in an anechoic room. Thus actual noise level may be different depending on the installation conditions.
* 3) The VRF system contains R410A (GWP=2,088) which is fluorinated greenhouse gas.
* Heat Exchanger type : Plate Heat Exchanger (STS)

3. Summary Table

Electrical characteristics

Hydro Unit HE

Capacity [kW]	Model	Power Supply				Voltage Range [V]		Rated Current [A]	Current [A]	
		Φ	#	Hz	Voltage	Min. (-10%)	Max. (+10%)	Heating	MCA	MOP
11.7	AM036CNBDCH/AA	1	2	60	208-230	187	253	0.05	2.2	15.0
16.0	AM048CNBDCH/AA									
31.5	AM096CNBDCH/AA									
50.4	AM144CNBDCH/AA									

Hydro Unit HT

Capacity [kW]	Model	Power Supply				Voltage Range [V]		Rated Current [A]	Current [A]	
		Φ	#	Hz	Voltage	Min. (-10%)	Max. (+10%)	Heating	MCA	MOP
16.0	AM048CNBFCB/AA	1	2	60	208-230	187	253	14.3	18.0	25.0
25.0	AM072CNBFCB/AA							23.1	30.0	40.0

NOTE

- FLA : Full Load Ampere
- MCA : Minimum Circuit Ampere (A)
- MOP : Maximum Overcurrent Protective Device (A)

4. Capacity Table

Hydro Unit HE

1) Heating

Model	Outdoor Temp.(°F)		Water Inlet Temp.(°F)			
	DB	WB	68	86	104	113
AM036CNBDCH***	-4	-4.36	31,014	29,263	18,008	11,755
	0.5	-0.04	32,264	30,263	20,259	14,506
	5	4.46	33,515	31,264	22,260	17,007
	9.5	8.6	34,765	32,264	24,511	19,258
	14	13.1	35,766	33,265	26,512	21,509
	18.5	17.42	37,016	34,265	28,763	22,760
	23	21.92	38,267	35,265	30,764	24,011
	27.5	26.06	39,517	36,266	31,514	24,011
	32	30.74	40,768	37,266	32,014	24,011
	36.5	35.06	42,018	38,267	32,014	24,011
	41	39.38	43,019	39,267	32,014	24,011
	44.6	42.8	44,019	40,018	32,014	24,011
	50	48.02	44,019	40,018	32,014	24,011
	54.5	52.34	44,019	40,018	32,014	24,011
	59	56.66	44,019	40,018	32,014	24,011
	68	59	44,019	40,018	32,014	24,011
	77	64.94	44,019	40,018	32,014	24,011
	86	70.34	44,019	40,018	32,014	24,011
	95	75.2	44,019	40,018	32,014	24,011
AM048CNBDCH***	-4	-4.36	42,311	39,922	24,567	16,037
	0.5	-0.04	44,017	41,287	27,638	19,790
	5	4.46	45,723	42,652	30,368	23,203
	9.5	8.6	47,429	44,017	33,439	26,273
	14	13.1	48,794	45,381	36,169	29,344
	18.5	17.42	50,500	46,746	39,240	31,050
	23	21.92	52,206	48,111	41,969	32,757
	27.5	26.06	53,912	49,476	42,993	32,757
	32	30.74	55,618	50,841	43,675	32,757
	36.5	35.06	57,324	52,206	43,675	32,757
	41	39.38	58,689	53,571	43,675	32,757
	44.6	42.8	60,054	54,594	43,675	32,757
	50	48.02	60,054	54,594	43,675	32,757
	54.5	52.34	60,054	54,594	43,675	32,757
	59	56.66	60,054	54,594	43,675	32,757
	68	59	60,054	54,594	43,675	32,757
	77	64.94	60,054	54,594	43,675	32,757
	86	70.34	60,054	54,594	43,675	32,757
	95	75.2	60,054	54,594	43,675	32,757

4. Capacity Table

Hydro Unit HE

1) Heating

Model	Outdoor Temp.(°F)		Water Inlet Temp.(°F)			
	DB	WB	68	86	104	113
AM096CNBDCH***	-4	-4.36	83,256	78,820	48,452	26,956
	0.5	-0.04	88,716	83,597	55,618	34,121
	5	4.46	93,834	88,033	62,783	40,946
	9.5	8.6	98,952	92,810	70,290	48,111
	14	13.1	104,070	97,587	77,456	55,277
	18.5	17.42	109,530	102,364	84,962	60,054
	23	21.92	114,648	107,141	92,128	64,489
	27.5	26.06	114,989	107,482	94,516	64,489
	32	30.74	115,330	107,482	96,905	64,489
	36.5	35.06	115,672	107,482	96,905	64,489
	41	39.38	115,672	107,482	96,905	64,489
	44.6	42.8	116,354	107,482	96,905	64,489
	50	48.02	116,354	107,482	96,905	64,489
	54.5	52.34	116,354	107,482	96,905	64,489
	59	56.66	116,354	107,482	96,905	64,489
	68	59	116,354	107,482	96,905	64,489
	77	64.94	116,354	107,482	96,905	64,489
	86	70.34	116,354	107,482	96,905	64,489
	95	75.2	116,354	107,482	96,905	64,489
AM144CNBDCH***	-4	-4.36	133,415	125,908	77,456	51,865
	0.5	-0.04	138,533	130,344	86,668	62,442
	5	4.46	143,651	134,438	95,881	72,679
	9.5	8.6	149,111	138,874	104,753	82,915
	14	13.1	154,229	143,310	113,624	92,810
	18.5	17.42	159,347	147,746	122,837	97,928
	23	21.92	164,465	151,840	131,709	103,047
	27.5	26.06	169,583	156,276	134,780	103,047
	32	30.74	174,702	160,712	137,509	103,047
	36.5	35.06	179,820	165,148	137,509	103,047
	41	39.38	184,938	169,242	137,509	103,047
	44.6	42.8	189,033	171,972	137,509	103,047
	50	48.02	189,033	171,972	137,509	103,047
	54.5	52.34	189,033	171,972	137,509	103,047
	59	56.66	189,033	171,972	137,509	103,047
	68	59	189,033	171,972	137,509	103,047
	77	64.94	189,033	171,972	137,509	103,047
	86	70.34	189,033	171,972	137,509	103,047
	95	75.2	189,033	171,972	137,509	103,047

4. Capacity Table

Hydro Unit HT

1) Heating

Ta : Ambient temperature, HC : Heating Capacity(Btu/h), PI : Power Input(W)
LW : Leaving Water temperature, EW : Entering Water temperature

Model	Ta	LW[°F]		LW[°F]		LW[°F]		LW[°F]	
		113		131		149		167	
	[°F DB]	HC	PI	HC	PI	HC	PI	HC	PI
AM048CNBFCB***	-4	51,182	2,062	51,182	2,017	51,182	2,523	47,770	3,193
	1	51,182	2,083	51,182	1,952	51,182	2,357	49,476	3,063
	5	52,888	2,313	52,888	2,007	52,888	2,435	51,182	2,895
	19	52,888	2,305	54,594	2,185	54,594	2,598	52,888	2,956
	27	54,594	2,352	54,594	2,380	54,594	2,560	54,594	3,087
	34	54,594	2,146	54,594	2,363	54,594	2,501	54,594	3,052
	37	54,594	2,041	54,594	2,314	54,594	2,453	54,594	2,963
	45	54,594	1,868	54,594	2,281	54,594	2,419	54,594	2,828
	52	54,594	1,850	54,594	2,279	54,594	2,428	54,594	2,763
	59	54,594	1,806	54,594	2,259	54,594	2,474	54,594	2,734
	68	54,594	1,784	54,594	2,232	54,594	2,444	54,594	2,701
	77	54,594	1,763	54,594	2,205	54,594	2,415	54,594	2,668
	86	54,594	1,741	54,594	2,178	54,594	2,385	54,594	2,636
	95	54,594	1,719	54,594	2,151	54,594	2,355	54,594	2,603
AM072CNBFCB***	-4	78,479	4,460	78,479	4,734	75,067	5,017	73,361	5,424
	1	80,185	4,333	80,185	4,563	80,185	4,802	76,773	5,159
	5	81,891	4,287	83,597	4,456	83,597	4,670	80,185	4,996
	19	83,597	3,878	85,304	4,084	85,304	4,235	81,891	4,442
	27	85,304	3,736	85,304	3,933	85,304	4,073	83,597	4,226
	34	85,304	3,616	85,304	3,803	85,304	3,948	85,304	4,051
	37	85,304	3,565	85,304	3,747	85,304	3,900	85,304	3,979
	45	85,304	3,443	85,304	3,652	85,304	3,831	85,304	3,865
	52	85,304	3,417	85,304	3,580	85,304	3,799	85,304	3,791
	59	85,304	3,400	85,304	3,530	85,304	3,798	85,304	3,758
	68	85,304	3,359	85,304	3,488	85,304	3,752	85,304	3,713
	77	85,304	3,318	85,304	3,445	85,304	3,707	85,304	3,668
	86	85,304	3,278	85,304	3,403	85,304	3,661	85,304	3,623
	95	85,304	3,237	85,304	3,360	85,304	3,616	85,304	3,578

EW : Entering Water temperature	EW = 104°F	EW = 113°F	EW = 131°F	EW = 149°F
Leaving Water temperature - Entering Water temperature	△T=9°F	△T=18°F	△T=18°F	△T=18°F

Conditions

- △T = Leaving Water temperature - Entering Water temperature
- No pump power input is included.
- Equivalent piping length = 7.5m
- Ta < 32°F : RH=75%, Ta > 32°F : RH=85%

4. Capacity Table

Hydro Unit HT

2) Capacity calculation method

How to calculate heating capacity 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 68°F DB).

Example

- Standard condition : Outdoor 44.6°F DB/42.8°F WB, Indoor 68°F DB
- Water condition : EW 55°F, LW 65°F

6TON DVM S TDB Heat Capacity Table

Combination,% (Capacity index)	Outdoor Temperature(°F)		Indoor Temperature(°F,DB)	
			68°F	
			TC	PI
	DB	WB	Btu/h	kW
100%	-4	-6	67,560	7.8
	1	0	71,314	7.96
	5	3	75,067	8.04
	10	9	78,138	7.92
	14	12	81,550	7.68
	19	18	83,256	7.21
	23	21	85,986	6.84
	27	25	85,986	6.21
	32	30	85,986	5.84
	37	36	85,986	5.52
	41	39	85,986	5.23
	45	43	85,986	5.1
	48	46	85,986	4.85
	52	50	85,986	4.63
	55	54	85,986	4.42
	59	57	85,986	4.27

Combination 1 (Outdoor Unit 6TON + Indoor Unit 6TON)

Indoor Heat Capa.[Btu/h]	86,000	= HT Capacity Table
PI Indoor Unit(6TON)[kW]	3.831	= HT Capacity Table (Ref. P.17)
PI Outdoor Unit(6TON)[kW]	5.10	Outdoor Unit Capacity Table
PI System[kW]	8.93	=Indoor Unit PI + Outdoor Unit PI

4. Capacity Table

Hydro Unit HT

8TON DVM S TDB Heat Capacity Table

Combination,% (Capacity index)	Outdoor Temperature(°F)		Indoor Temperature(°F,DB)	
			68°F	
			TC	PI
	DB	WB	Btu/h	kW
100%	-4	-6	90,422	10.24
	1	0	95,881	10.45
	5	3	99,293	10.67
	10	9	101,341	10.62
	14	12	104,753	10.4
	19	18	106,459	9.57
	23	21	107,482	8.99
	27	25	107,482	8.15
	32	30	107,482	7.68
	37	36	107,482	7.25
	41	39	107,482	6.88
	45	43	107,482	6.7
	48	46	107,482	6.38
	52	50	107,482	6.08
	55	54	107,482	5.81
	59	57	107,482	5.61

Combination 1 (Outdoor Unit 8TON + Indoor Unit 4TON x 2ea)

Indoor Heat Capa.[kW]	54,500	= HT Capacity Table (Ref. P.17)
Indoor Heat Capa.[kW]	109,000	= 2 x 5HP
PI Indoor Unit(4TON)[kW]	2.419	= HT Capacity Table (Ref. P.17)
PI Total Indoor Unit[kW]	4.838	= 2 x 5HP
PI Outdoor Unit(8TON)[kW]	6.70	Outdoor Unit Capacity Table
PI System[kW]	11.54	= Total Indoor Unit PI + Outdoor Unit PI

Flowrate Information

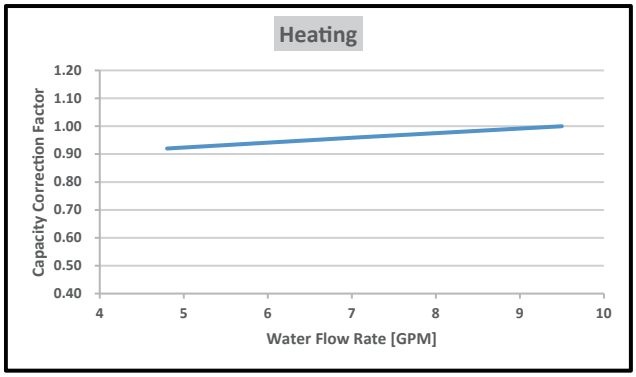
Flowrate[gpm]	**048**	**072**
ΔT = 27°F	4.1	6.4
ΔT = 18°F	6.1	9.5
ΔT = 9°F	12.2	19.0

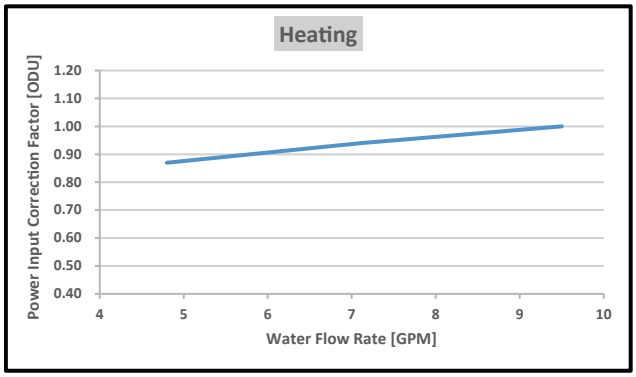
5. Capacity correction

Hydro Unit HE

1) Capacity based on flow rate

(1) AM036CNBDCH***





Heating

Water flow Rate (GPM)	4.8	7.1	9.5
Capacity Correction Factor	0.92	0.96	1.00
Power Input Correction Factor [ODU]	0.87	0.94	1.00

Flow rate by ΔT

Flow Rate [GPM]	3TON	4TON	8TON	12TON
ΔT=18°F	4.8	6.3	12.2	19.8
ΔT=9°F	9.5	12.7	24.3	39.6

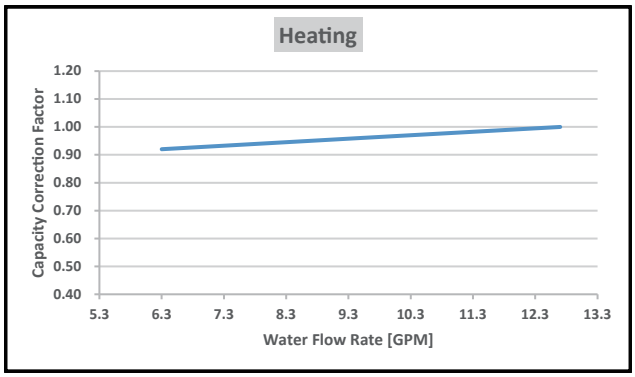
* Minimum flow rate of the Hydro unit is 50% of rated flow rate.

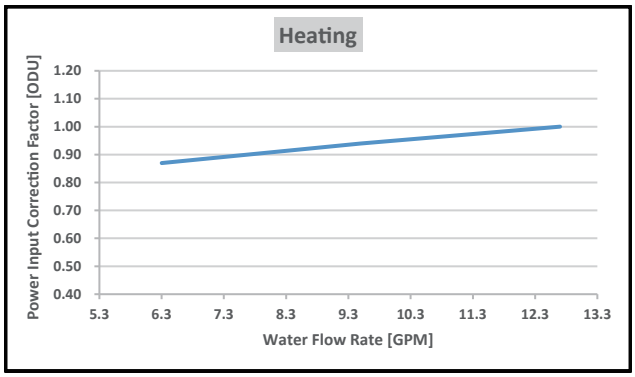
5. Capacity correction

Hydro Unit HE

1) Capacity based on flow rate

(2) AM048CNBDCH***





Heating

Water flow Rate (GPM)	6.3	9.5	12.7
Capacity Correction Factor	0.92	0.96	1.00
Power Input Correction Factor [ODU]	0.87	0.94	1.00

Flow rate by ΔT

Flow Rate [GPM]	3TON	4TON	8TON	12TON
ΔT=18°F	4.8	6.3	12.2	19.8
ΔT=9°F	9.5	12.7	24.3	39.6

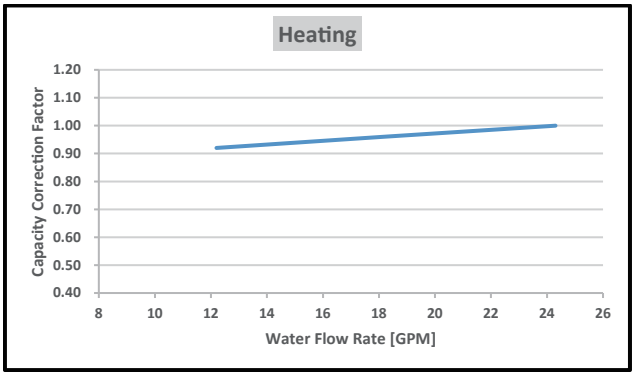
* Minimum flow rate of the Hydro unit is 50% of rated flow rate.

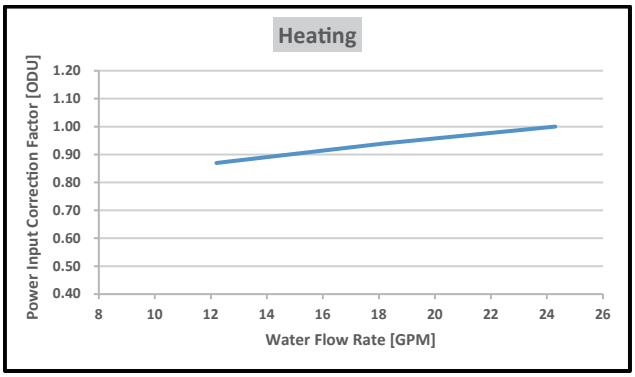
5. Capacity correction

Hydro Unit HE

1) Capacity based on flow rate

(3) AM096CNBDCH***





Heating

Water flow Rate (GPM)	12.2	18.2	24.3
Capacity Correction Factor	0.92	0.96	1.00
Power Input Correction Factor [ODU]	0.87	0.94	1.00

Flow rate by ΔT

Flow Rate [GPM]	3TON	4TON	8TON	12TON
ΔT=18°F	4.8	6.3	12.2	19.8
ΔT=9°F	9.5	12.7	24.3	39.6

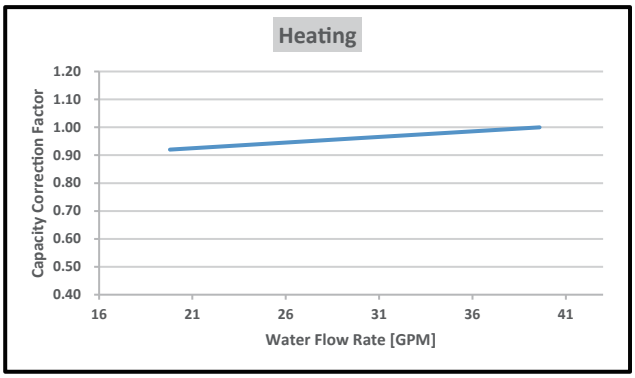
* Minimum flow rate of the Hydro unit is 50% of rated flow rate.

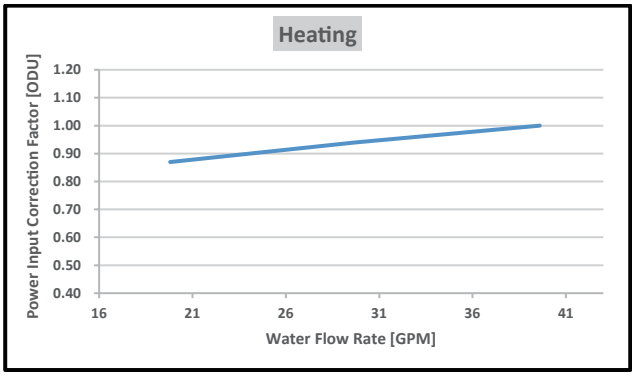
5. Capacity correction

Hydro Unit HE

1) Capacity based on flow rate

(4) AM144CNBDCH***





Heating

Water flow Rate (GPM)	19.8	29.7	39.6
Capacity Correction Factor	0.92	0.96	1.00
Power Input Correction Factor [ODU]	0.87	0.94	1.00

Flow rate by ΔT

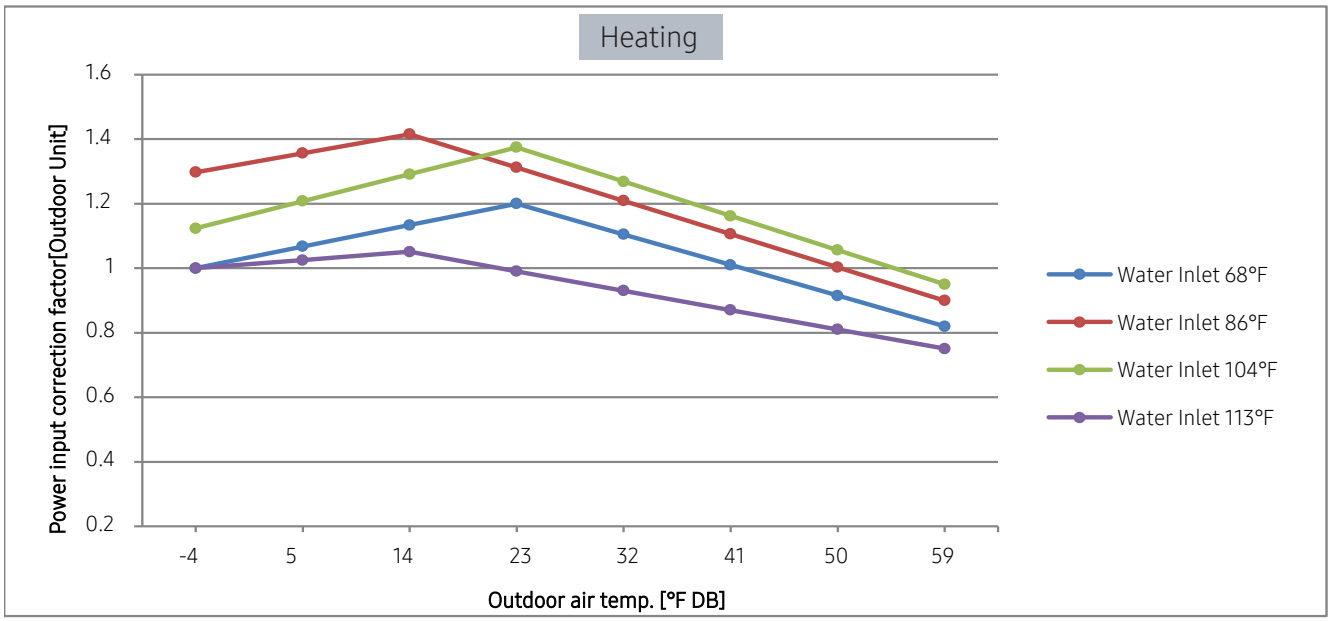
Flow Rate [GPM]	3TON	4TON	8TON	12TON
ΔT=18°F	4.8	6.3	12.2	19.8
ΔT=9°F	9.5	12.7	24.3	39.6

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

5. Capacity correction

Hydro Unit HE

2) Capacity based on outdoor temperature



Power input correction factor (Heating)

Outdoor air temp. (°F)		Water inlet temp. (°F)			
DB	WB	68	86	104	113
-4	-4.4	1.00	1.30	1.12	1.00
5	-4.5	1.07	1.36	1.21	1.03
14	13.1	1.13	1.42	1.29	1.05
23	21.9	1.20	1.31	1.37	0.99
32	30.7	1.11	1.21	1.27	0.93
41	24.6	1.01	1.11	1.16	0.87
45	42.8	0.97	1.06	1.14	0.85
50	48.0	0.92	1.00	1.11	0.81
59	56.7	0.82	0.90	0.95	0.75
68	59.0	0.81	0.89	0.94	0.75
77	64.9	0.81	0.89	0.94	0.74
86	70.3	0.81	0.88	0.93	0.74
95	75.2	0.80	0.88	0.93	0.73

5. Capacity correction

Hydro Unit HT

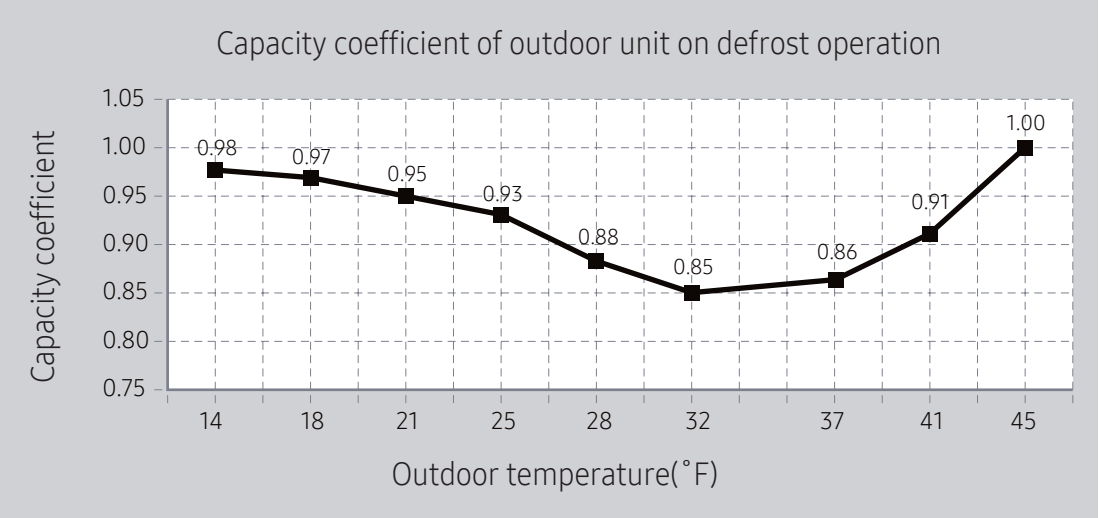
How to calculate heating capacity and power input : Integrated value

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 decreacse.
The decrement is not considered to the individual capacity tables.

Outdoor temperature (°F, DB)	14	18	21	25	28	32	37	41	45
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 4TON	1050
HT 6TON	1500

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

	HT Capacity Correction Factor
HT 4TON	0.3
HT 6TON	

※ In case of the defrosting interval, it discharges the heat as much as (rated capacity x correction factor). [Water temp. Drop]
ex) HT 4TON HT 4TON defrosting capacity = -54,500Btu/h * 0.3 = -16,350Btu/h

5. Capacity correction

Hydro Unit HT

Example) Combination: 8TON DVM S + 4TON HT X 2ea, Outdoor 41˚F DB, EW/LW=131˚F/149˚F

1) Defrosting correction factor (Outdoor unit, 41˚F) = 0.91
2) Capacity correction factor (Hydro unit HT) = 0.3
3) Integrated capacity correction factor = 0.91 - (1 - 0.91) x 0.3 = 0.883
4) HC = 0.883 x 54,500Btu/h x 2ea = 109,000Btu/h
5) Power input (Outdoor unit) = 6.88kW
6) Power input (Hydro unit HT) = { 0.91 x (2,453W + 2,419W) / 2 + (1 - 0.91) x 1,050W } x 2 = 4.62kW
7) Total PI = 6.88 + 4.62 = 11.5kW

Correction Factor : Ref.P16, Hydro Unit Capacity Table : Ref.P.12

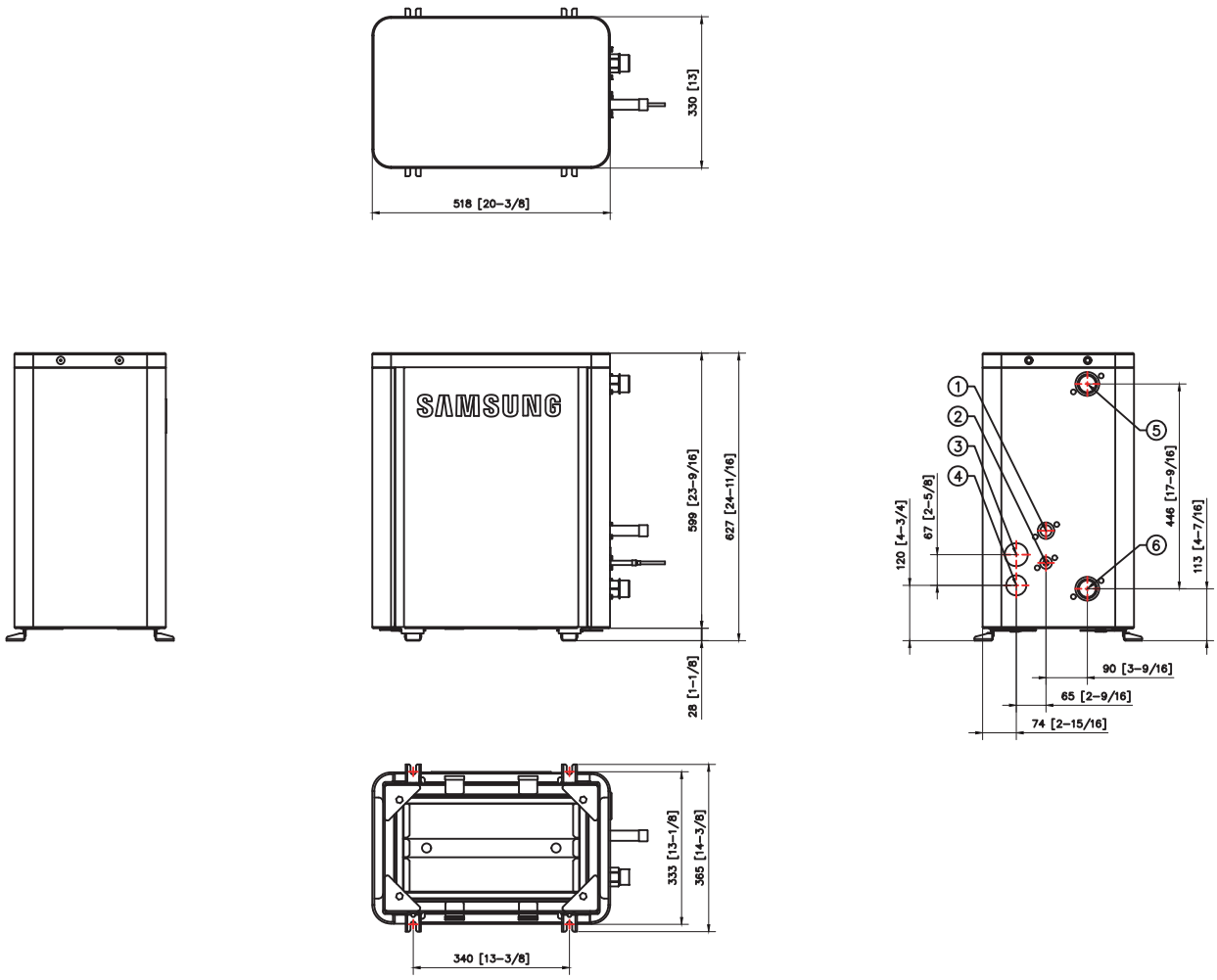
8TON DVM S TDB Heat Capacity Table

Combination,% (Capacity index)	Outdoor Temperature(°F)		Indoor Temperature(°F,DB)	
			68°F	
			TC	PI
	DB	WB	Btu/h	kW
100%	68	-6	90,422	10.24
	1	0	95,881	10.45
	5	3	99,293	10.67
	10	9	101,341	10.62
	14	12	104,753	10.4
	19	18	106,459	9.57
	23	21	107,482	8.99
	27	25	107,482	8.15
	32	30	107,482	7.68
	37	36	107,482	7.25
	41	39	107,482	6.88
	45	43	107,482	6.70
	48	46	107,482	6.38
	52	50	107,482	6.08
	55	54	107,482	5.81
	59	57	107,482	5.61

6. Dimensional Drawing

Hydro Unit HE

Unit: mm [inch]

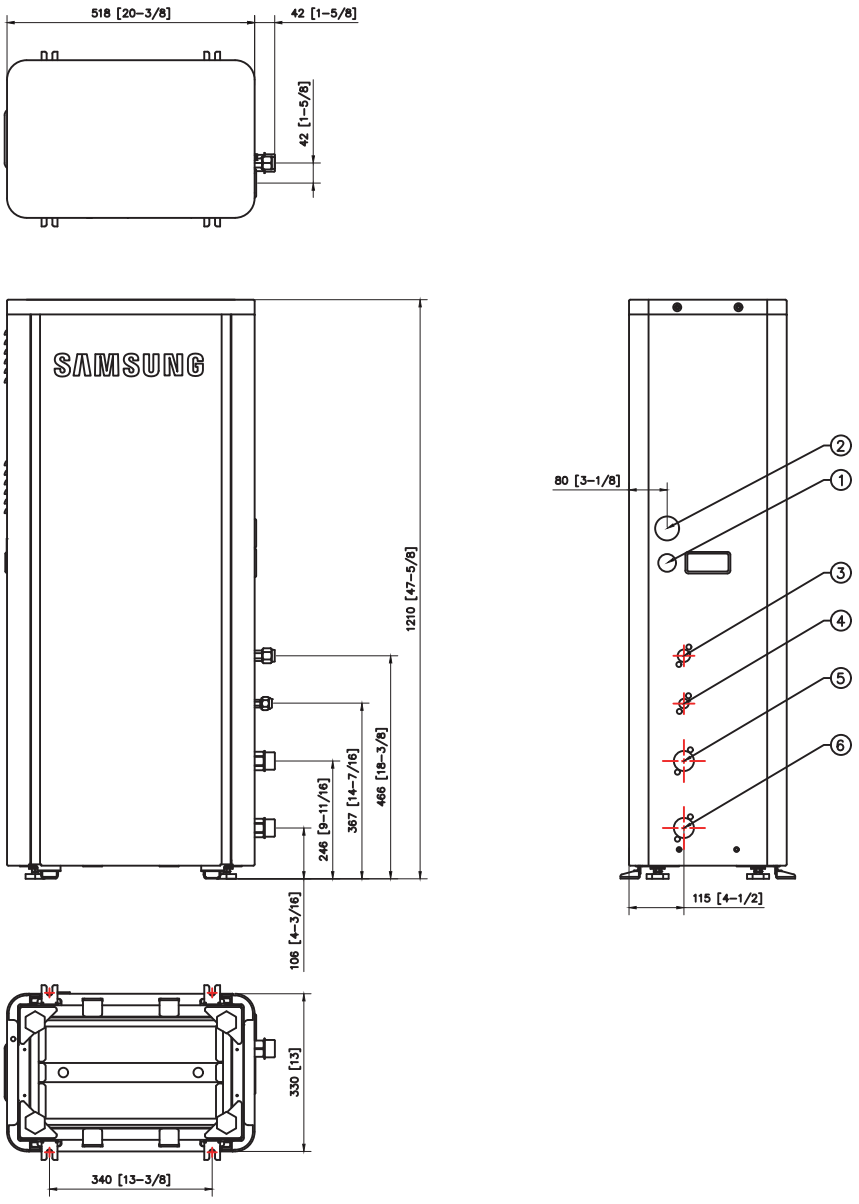


No.	Name	Description		
		AM036CNBDCH/AA, AM048CNBDCH/AA	AM096CNBDCH/AA	AM144CNBDCH/AA
1	Gas Pipe Connection	Φ15.88[5/8]	Φ22.22[7/8]	Φ28.58[1 1/8]
2	Liquid Pipe Connection	Φ9.52[3/8]	Φ9.52[3/8]	Φ12.70[1/2]
3	Communication Wiring Conduits	-	-	-
4	Power supply conduit	-	-	-
5	Water outlet pipe	-	-	-
6	Water inlet pipe	-	-	-

6. Dimensional Drawing

Hydro Unit HT

Unit: mm [inch]

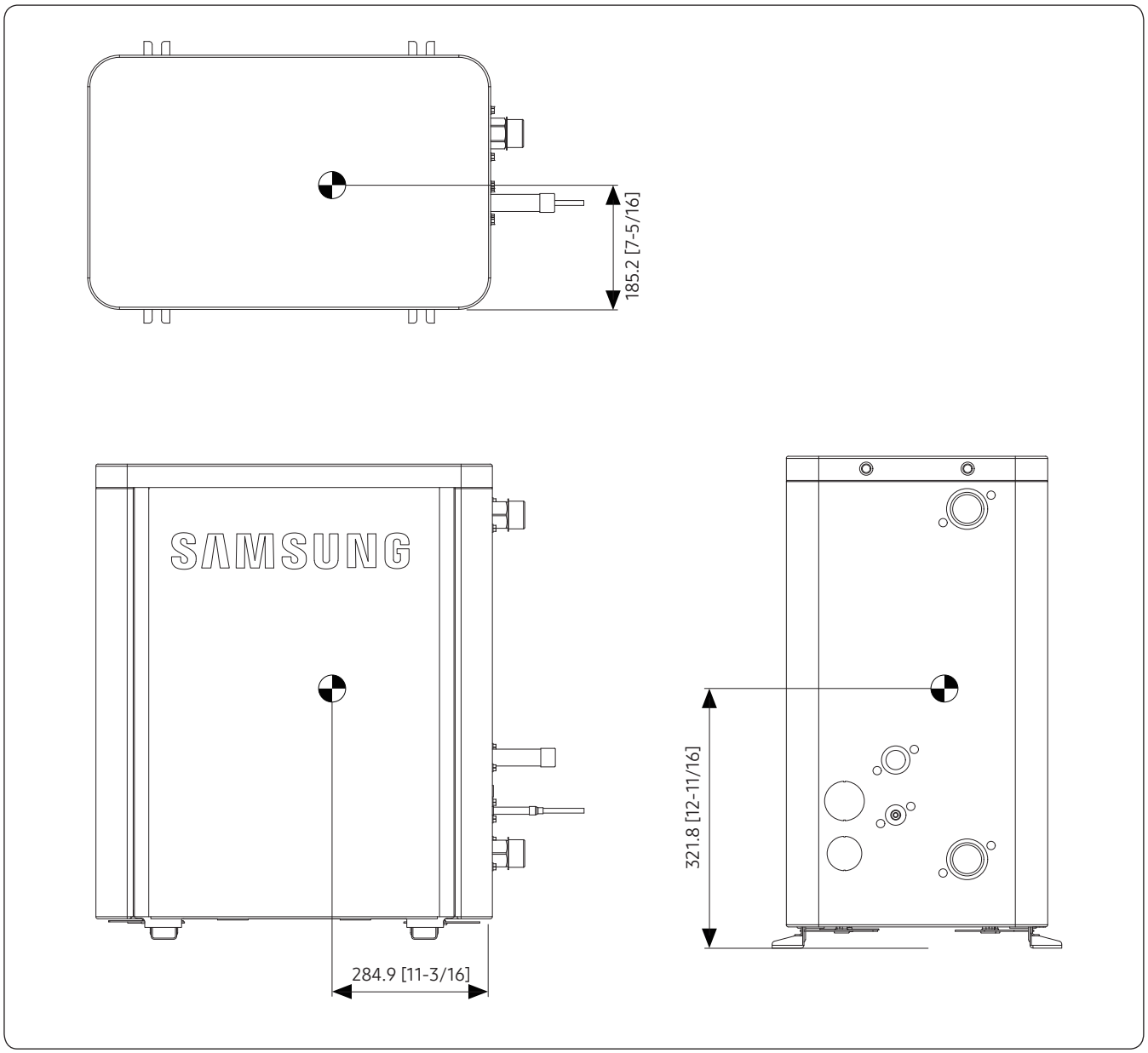


No.	Name	Description
1	Power supply conduit	-
2	Communication Wiring Conduits	-
3	Gas pipe connection	15.88 [5/8]
4	Liquid pipe connection	9.52 [3/8]
5	Water outlet pipe	-
6	Water inlet pipe	-

7. Center of Gravity

Hydro Unit HE

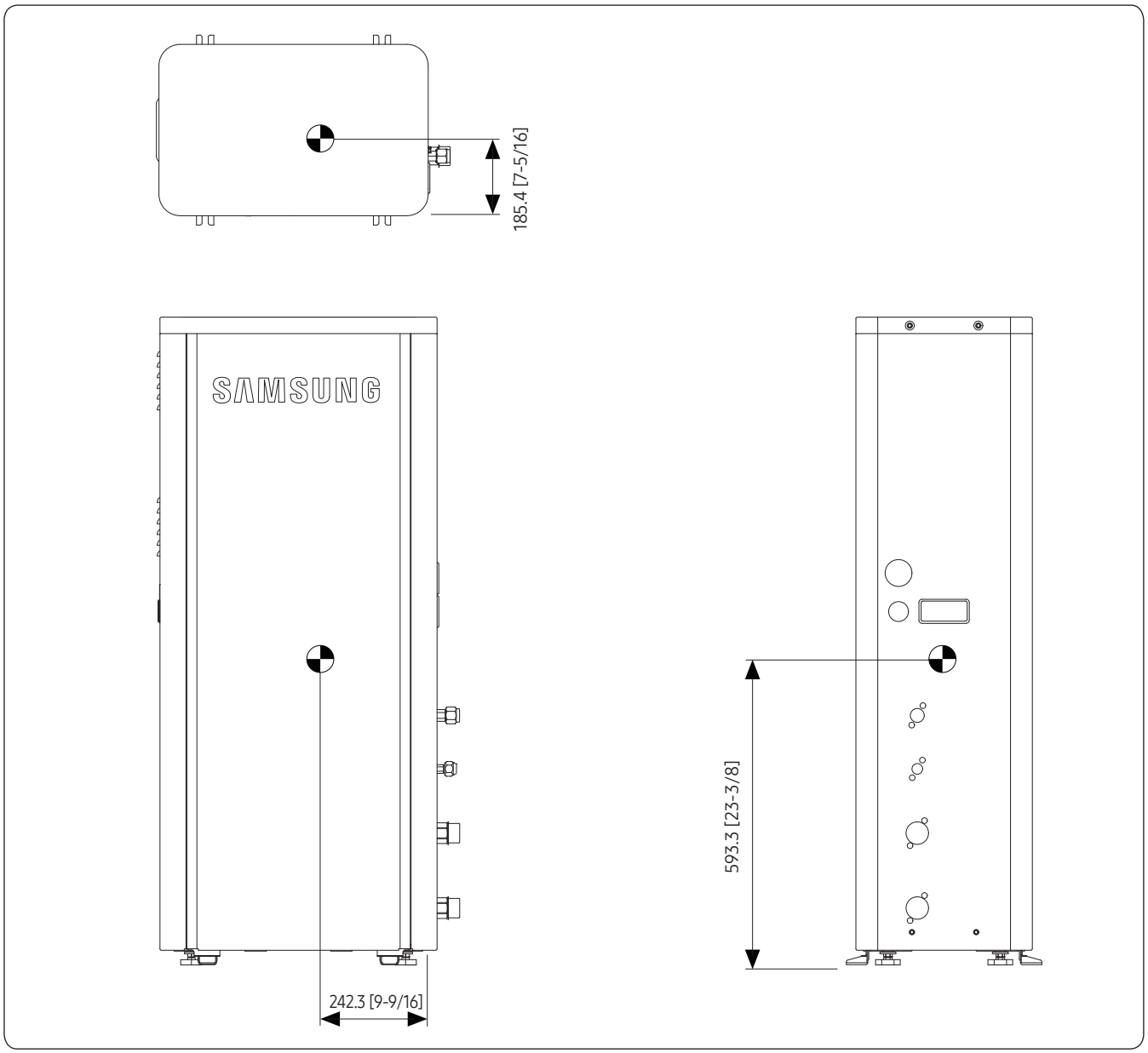
Unit: mm [inch]



7. Center of Gravity

Hydro Unit HT

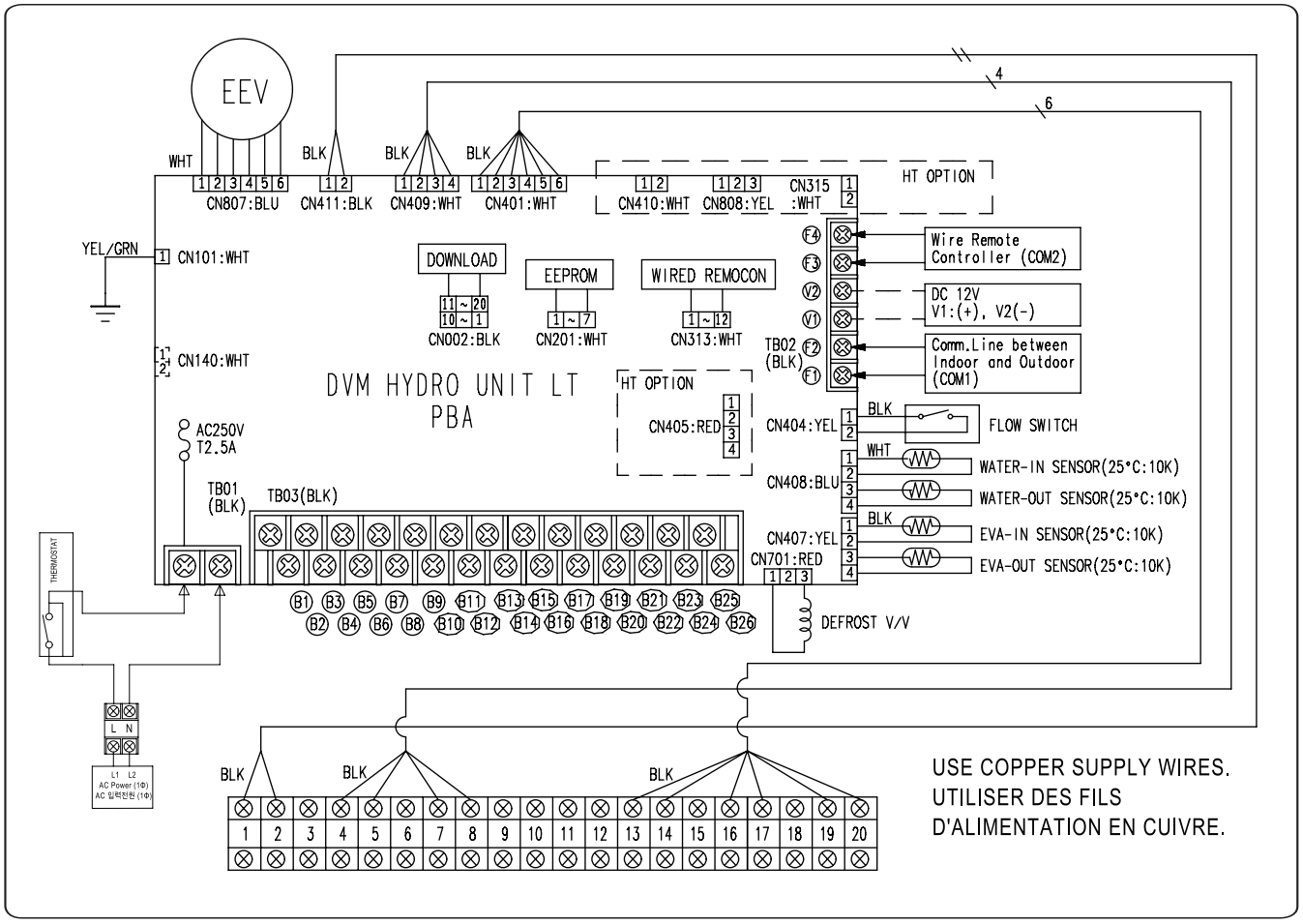
Unit: mm [inch]



8. Electrical wiring diagram

Hydro Unit HE

AM036CNBDCH/AA, AM048CNBDCH/AA, AM096CNBDCH/AA, AM144CNBDCH/AA



DVM HYDRO UNIT LT PBA	Printed circuit board
WATER IN TEMP	Thermistor (WATER IN_10Kohm)
WATER OUT TEMP	Thermistor (WATER OUT_10Kohm)
EVA IN TEMP	Thermistor (EVA IN_10Kohm)
EVA OUT TEMP	Thermistor (EVA OUT_10Kohm)
EEV TEMP	Electronic expansion valve

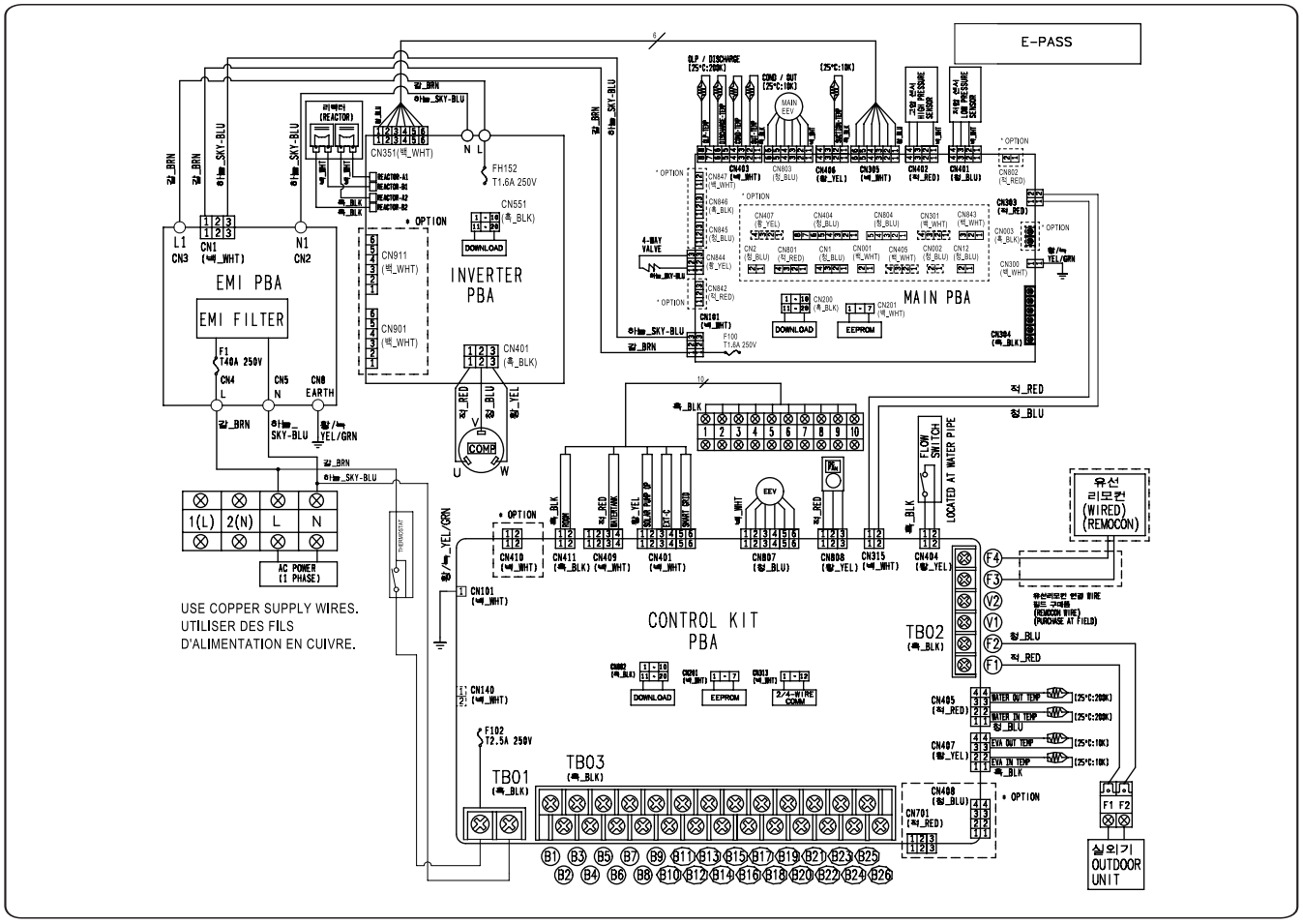
NOTE

- 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: skyblue: GRN: green
- For connection wiring indoor-outdoor transmission F1-F2, indoor-wired remote controller transmission F3-F4.
- ⏚ Protective earth(screw), ▭▭▭ : connector, N : The wire quantity

8. Electrical wiring diagram

Hydro Unit HT

AM048CNBFCB/AA, AM072CNBFCB/AA



MAIN PBA	Printed circuit board (MAIN)	EEV TEMP	Electronic expansion valve
INVERTER PBA	Printed circuit board (INVERTER)	OLP TEMP	Thermistor (OLP_200kohm)
EMI PBA	Printed circuit board (EMI)	DISCHARGE TEMP	Thermistor (DISCHARGE_200Kohm)
CONTROL KIT PBA	Printed circuit board(CONTORL)	COND TEMP	Thermistor (COND_200Kohm)
COMP	Motor (compressor)	OUT TEMP	Thermistor (OUT_200Kohm)
WATER IN TEMP	Thermistor (WATER IN_10Kohm)	4-WAY VALVE	Solenoid valve (4 Way valve)
WATER OUT TEMP	Thermistor (WATER OUT_10Kohm)	FH152	FUSE (INV PCB)
EVA IN TEMP	Thermistor (EVA IN_10Kohm)	250V/40A	FUSE (EMI PCB)
EVA OUT TEMP	Thermistor (EVA OUT_10Kohm)		

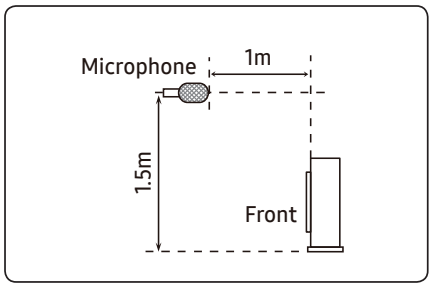
NOTE

- 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: skyblue: GRN: green
- For connection wiring indoor-outdoor transmission F1-F2, indoor-wired remote controller transmission F3-F4.
- ⏚ Protective earth(screw), ▭▭▭ : connector, N : The wire quantity

9. Sound Data

Hydro Unit HE

Sound pressure level

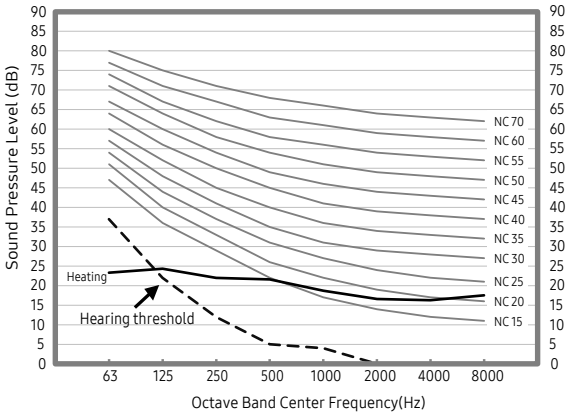


Unit: dB(A)

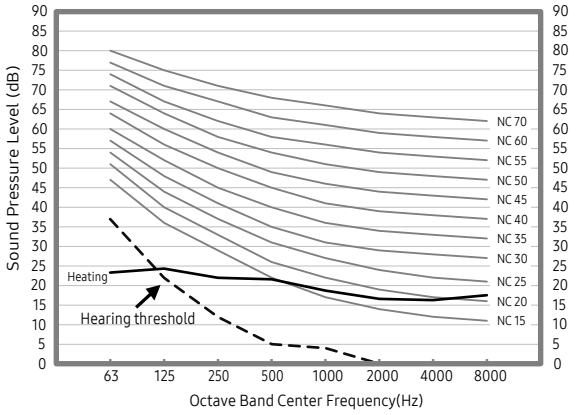
Model	Heating
AM036CNBDCH/AA	26
AM048CNBDCH/AA	26
AM096CNBDCH/AA	27
AM144CNBDCH/AA	31

- NC Curve

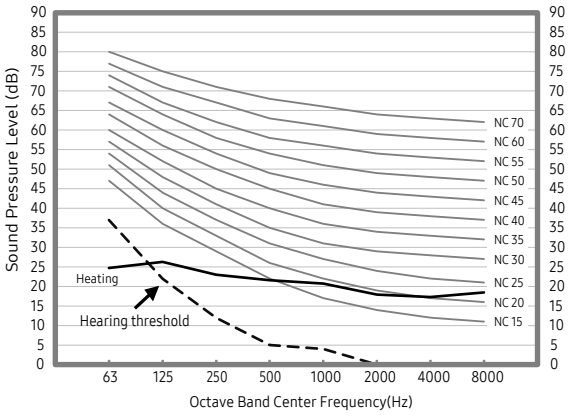
1) AM036CNBDCH/AA



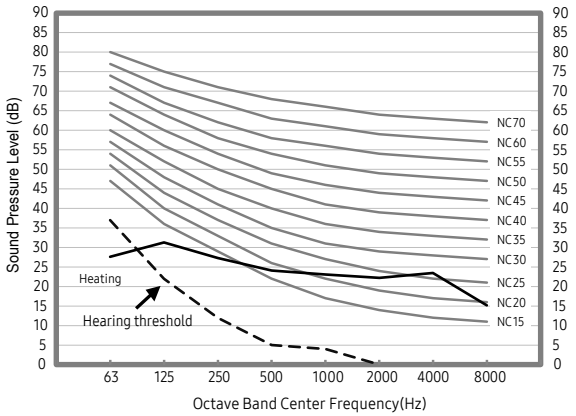
2) AM048CNBDCH/AA



3) AM096CNBDCH/AA



4) AM144CNBDCH/AA



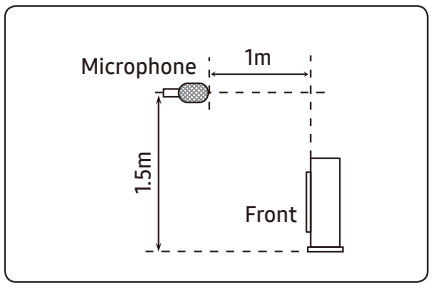
NOTE

- 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 = 20μPa

9. Sound Data

Hydro Unit HT

Sound pressure level

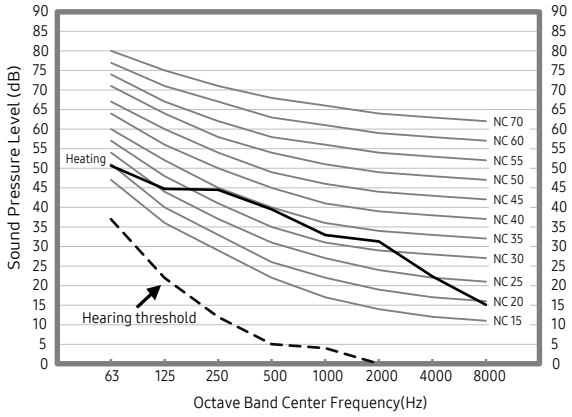


Unit: dB(A)

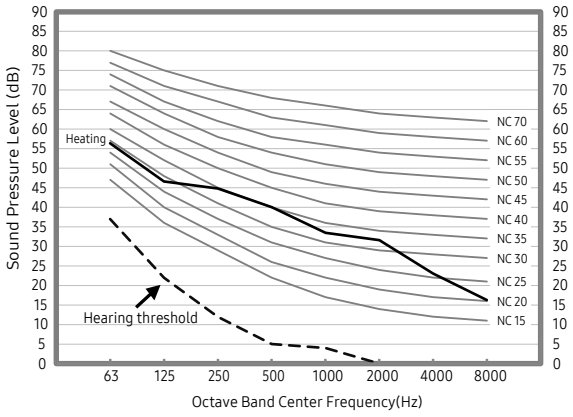
Model	Heating
AM048CNBFCB/AA	42
AM072CNBFCB/AA	42

- NC Curve

1) AM048CNBFCB/AA



2) AM072CNBFCB/AA



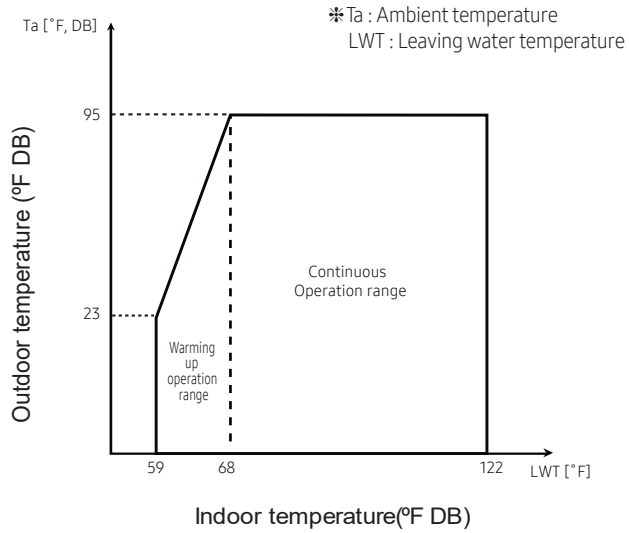
NOTE

- 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 = 20μPa

10. Operation range

Hydro Unit HE

1) Heating

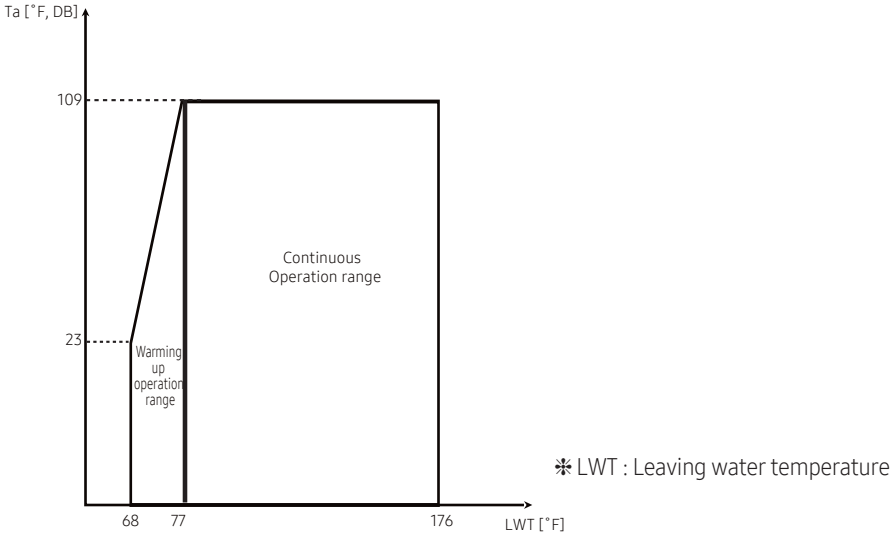


※ Note: Hydro unit operation range varies according to the outdoor unit model. Refer to outdoor unit technical data book for outdoor unit operating range.

Hydro Unit HT

1) Heating

❉Ta : Ambient temperature

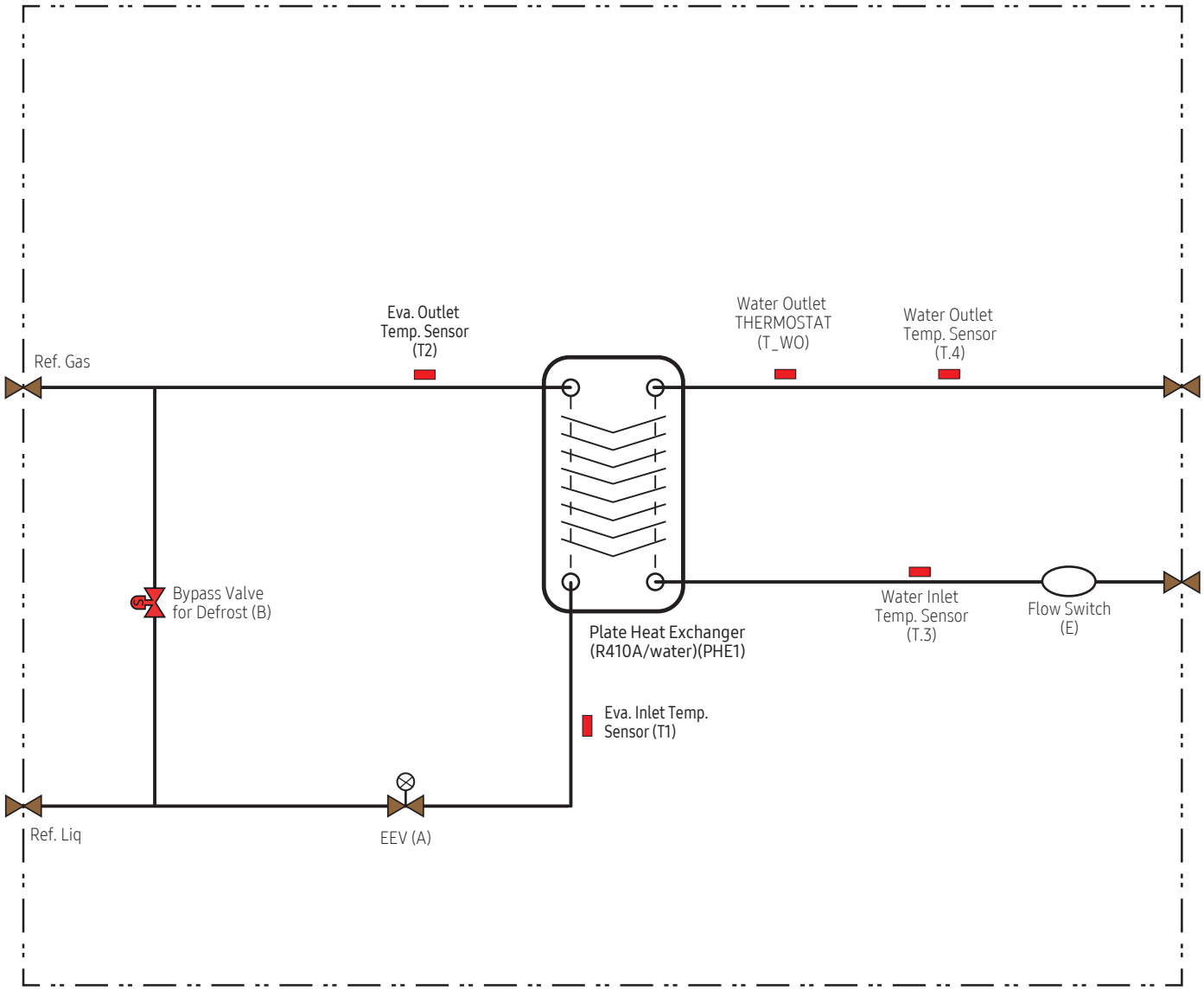


❉LWT : Leaving water temperature

※ Note: Hydro unit operation range varies according to the outdoor unit model. Refer to outdoor unit technical data book for outdoor unit operating range.

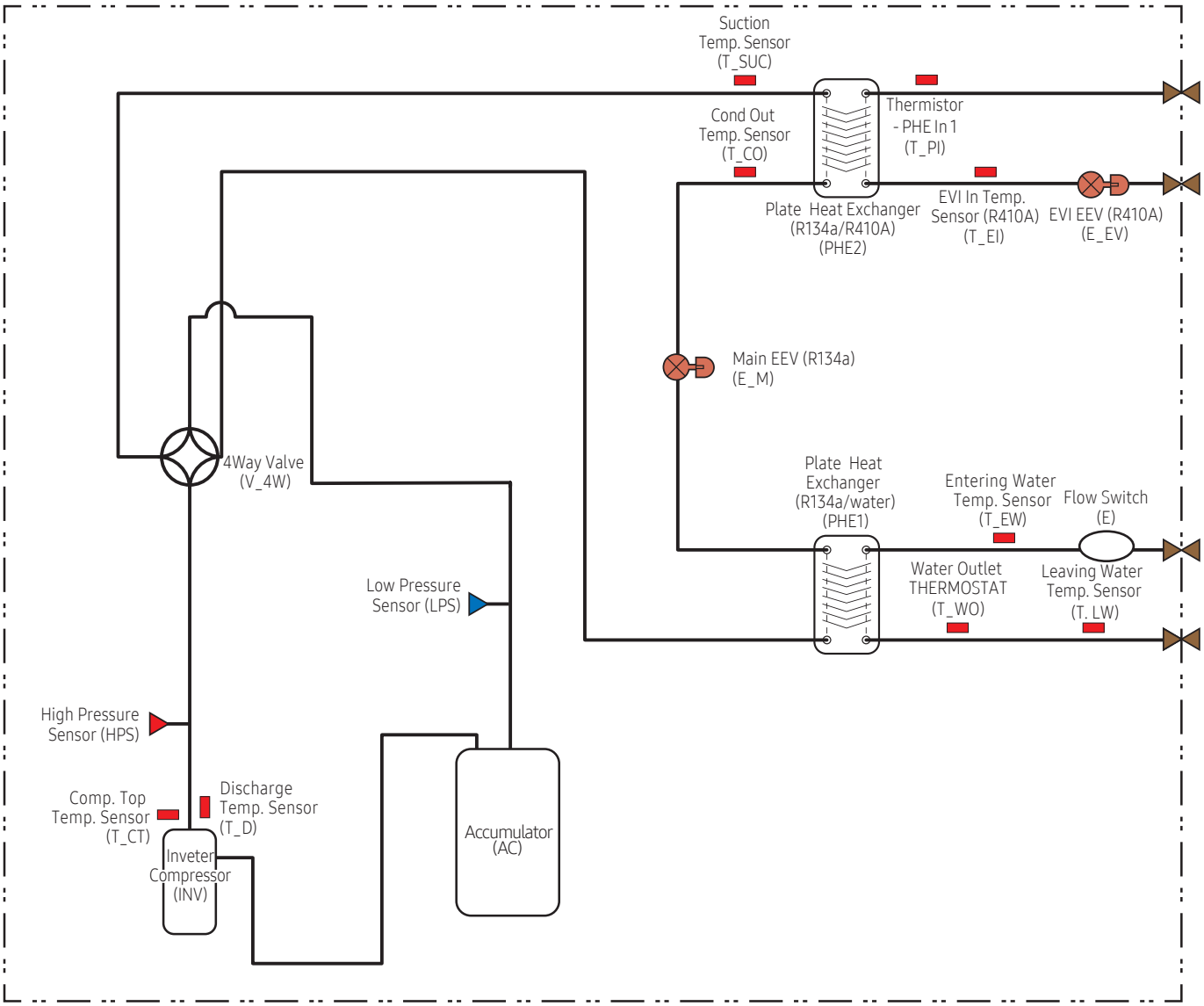
11. Piping Diagram

Hydro Unit HE



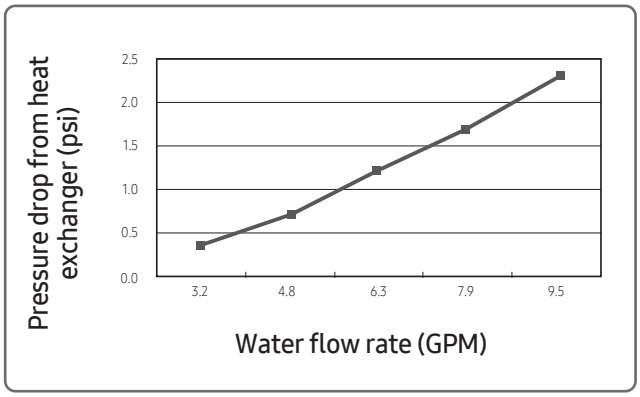
11. Piping Diagram

Hydro Unit HT

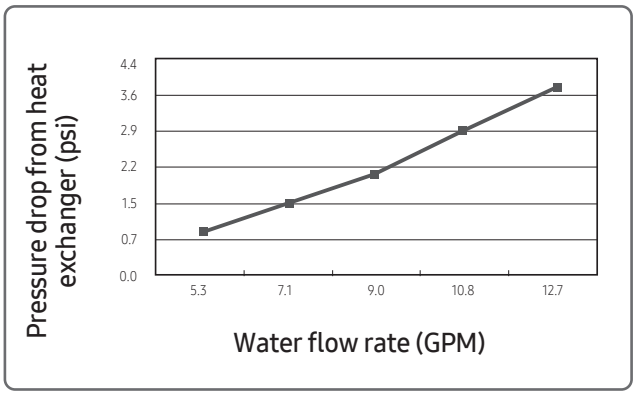


12. Hydraulic performance

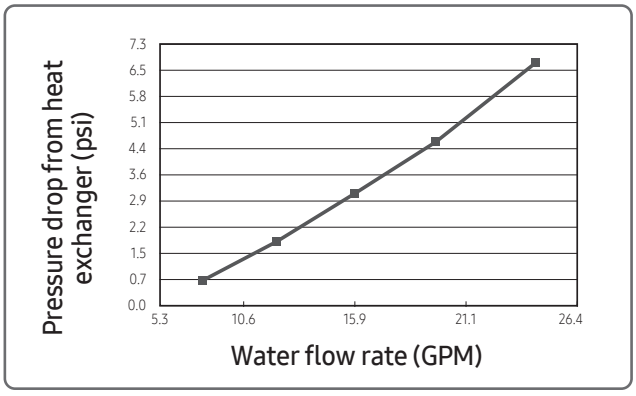
Hydro Unit HE



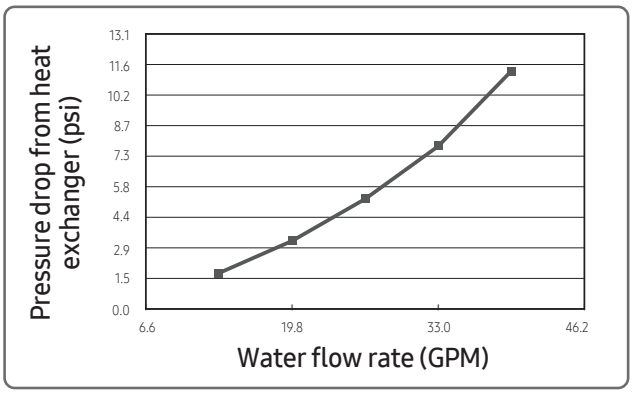
AM036CNBDCH/AA	
Water flow rate (GPM)	Pressure drop from heat exchanger (psi)
3.2	0.4
4.8	0.7
6.3	1.2
7.9	1.7
9.5	2.3



AM048CNBDCH/AA	
Water flow rate (GPM)	Pressure drop from heat exchanger (psi)
5.3	0.9
7.1	1.5
9	2
10.8	2.9
12.7	3.8



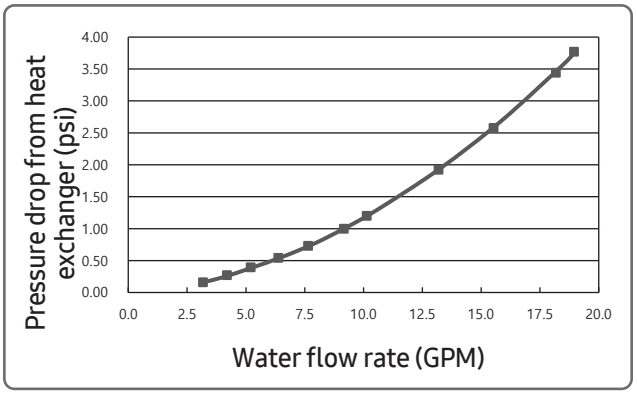
AM096CNBDCH/AA	
Water flow rate (GPM)	Pressure drop from heat exchanger (psi)
7.9	0.7
11.9	1.7
15.9	3
19.8	4.5
24.3	6.7



AM144CNBDCH/AA	
Water flow rate (GPM)	Pressure drop from heat exchanger (psi)
13.2	1.6
19.8	3.2
26.4	5.2
33	7.8
39.6	11.3

12. Hydraulic performance

Hydro Unit HT



AM048CNBFCB/AA, AM072CNBFCB/AA	
Water flow rate (GPM)	Pressure drop from heat exchanger (psi)
3.2	0.2
4.0	0.2
5.3	0.4
6.1	0.5
6.6	0.6
7.9	0.8
9.2	1.0
9.5	1.1
10.6	1.3
13.2	1.9
15.9	2.7
18.5	3.6
19.0	3.8

13. Installation

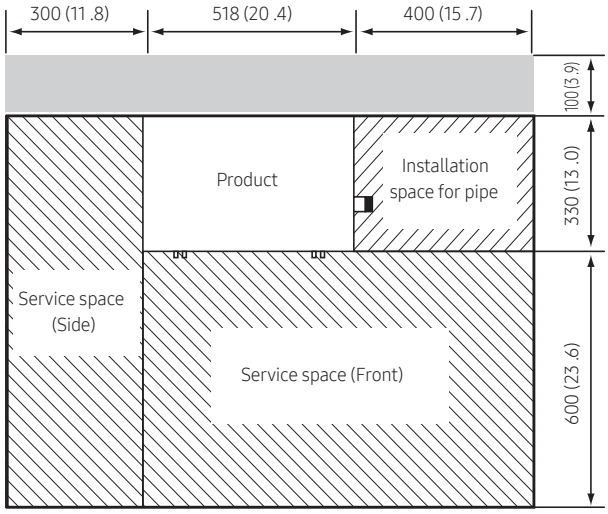
Selecting installation location

- Choose a location with ventilation ducts or openings to remove the heat generated from the product and maintain the surrounding temperature within: Hydro unit: 5 ~ 40 °C (41 ~ 104 °F), humidity 80 % Hydro unit HT: 5 ~ 35 °C (41 ~ 95 °F), humidity 80 % .
- Choose a place where the structure can bear the weight and vibration of the DVM Hydro unit / Hydro unit HT .
- Choose a flat place that rainwater does not settle or leak .
- Choose a well ventilated place with sufficient space for repair and other services .
- Choose a place where you can easily connect the refrigerant pipes between the DVM Hydro unit / Hydro unit HT and outdoor unit within allowable distance .
- Do not install this product in a place where it may corrode .
- Install the DVM Hydro unit / Hydro unit HT power and communication cables to the outdoor unit at least 1 m (3 .28 feet) away from electric appliances such as TVs . In some cases interference may occur even if there's more than 1 m (3 .28 feet) gap from the electric appliances .

Space requirement

- When installing the product, make sure to secure minimum clearance with obstacles as shown below .
- When you install one product on top of the other one, secure at least 600 mm (23 .6 inch) of spaœ on the water pipe side .

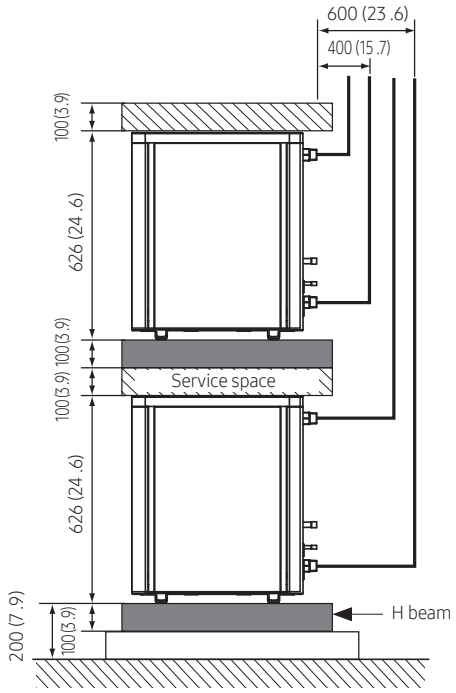
Unit: mm (inch)



13. Installation

Hydro unit HE

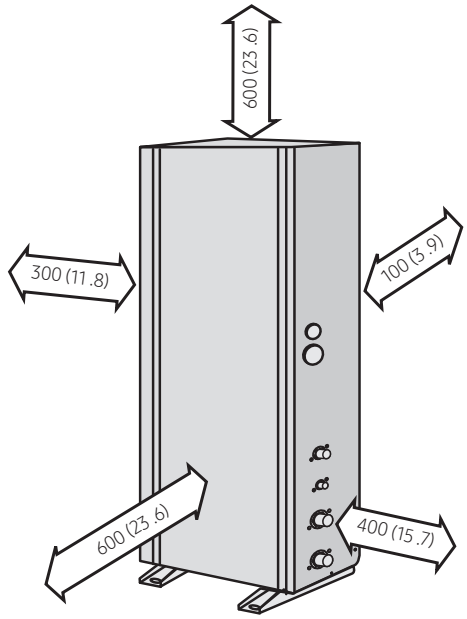
Unit: mm (inch)



<When stacking Hydro units>

Hydro unit HT

Unit: mm (inch)



CAUTION

- If the Hydro unit / Hydro unit HT must be installed close to a wall, prevent unit vibration from transmitting to nearby walls with cushioning materials etc.

13. Installation

Base construction and installation of the DVM Hydro unit / Hydro unit HT

WARNING • If this product is installed in residential area, apply vibration isolation to prevent the vibration from transferring to the building .

▶ Manufacturer is not responsible for the damage occurred by not following the installation standards .

1 . Considering the vibration and weight of the DVM Hydro unit / Hydro unit HT, strength of the base ground must be strong enough to prevent noise and the top part of the base ground has to be flat .

2 . Base ground should be 1 .5 times larger than the bottom of the Hydro unit .

3 . It is necessary to add wire mesh or steel bar during concrete construction for the base ground to prevent damages or cracks .

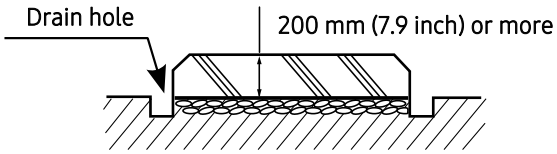
4 . Place the DVM Hydro unit / Hydro unit HT on the base construction and completely fix it with the bolt, nut and washer . [The bearing force has to be over 3 .5 kN (786 .8 lbf)]

5 . Fix the DVM Hydro unit / Hydro unit HT firmly with 4 foundation bolts .

6 . When concrete construction for DVM Hydro unit / Hydro unit HT installation is completed, install an anti-vibration pad(t=20 mm or more) or an anti-vibration frame(vibration transmissibility=5 % and below) to prevent vibration of the outdoor unit from transferring to the base ground .

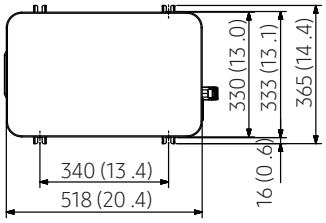
7 . When constructing base ground, DVM Hydro unit / Hydro unit HT must be supported within the range of following dimensions .

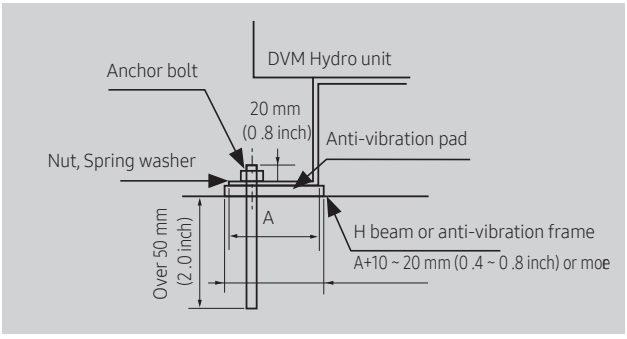
Base ground construction

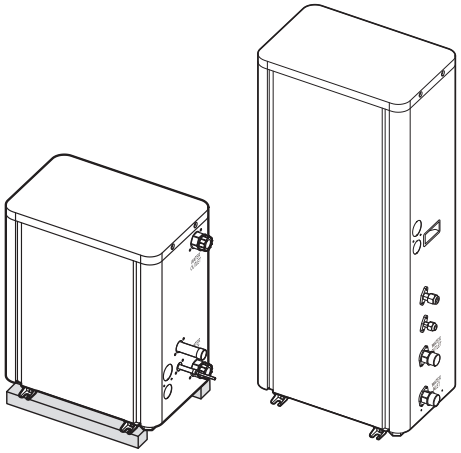


DVM Hydro unit installation

Unit: mm (inch)



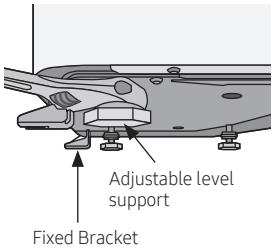




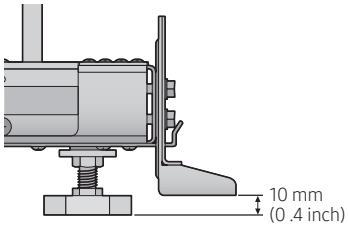
13. Installation

DVM Hydro unit HT installation

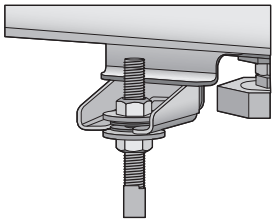
Considering the weight and vibration of the DVM Hydro unit HT, the strength of the base ground must be strong enough to support the unit and prevent noise. The base must be flat and level.



Adjust the level support keeping at least 10 mm (0.4 inch) from the bottom of the level support to the bottom of the fixed bracket.



Place the DVM Hydro unit HT on the base and fix it with a bolt or threaded rod (M10, 3/8"), nut and washer.
The recommended length of the bolt or threaded rod is over 20 mm (0.78 inch) from the base.

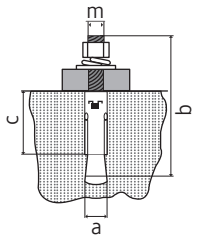


‹ A method of fixing the bracket ›

13. Installation

Base construction and installation of the DVM Hydro unit HT

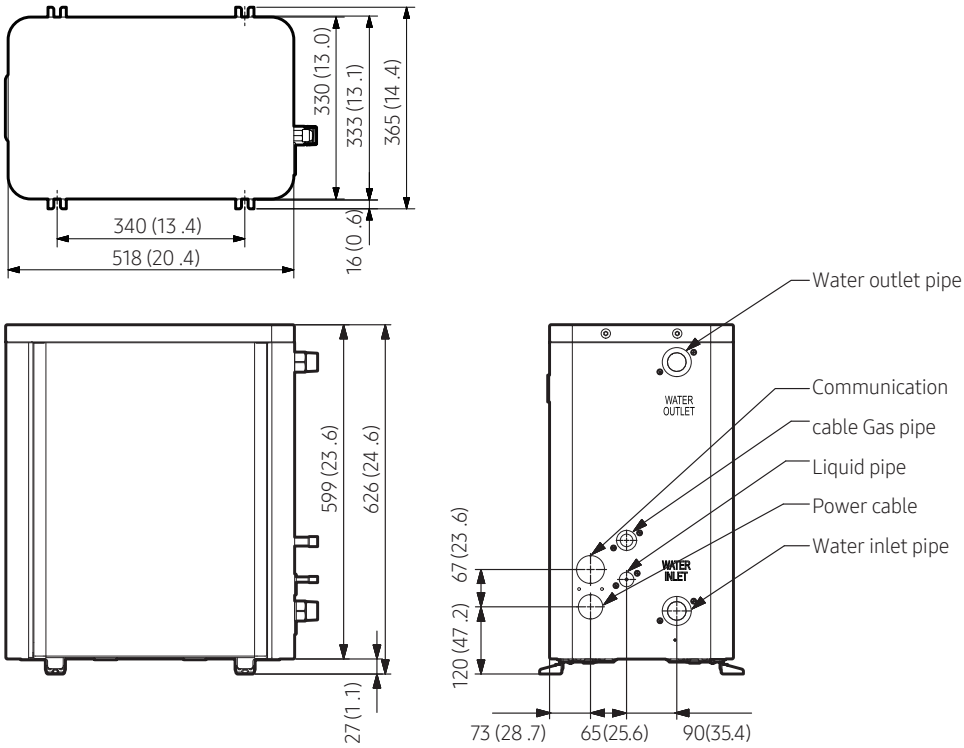
Anchor specification



Size	Diameter of drill bit (a)	Anchor length (b)	Sleeve length (c)	Insert depth	Fastening torque
M10 (3/8")	14 mm (0.6 inch)	75 mm (3.0 inch)	40 mm (1.6 inch)	50 mm (2.0 inch)	30 N·m (22.1 lbf·ft)

Dimension of the Hydro unit HE

Unit: mm (inch)

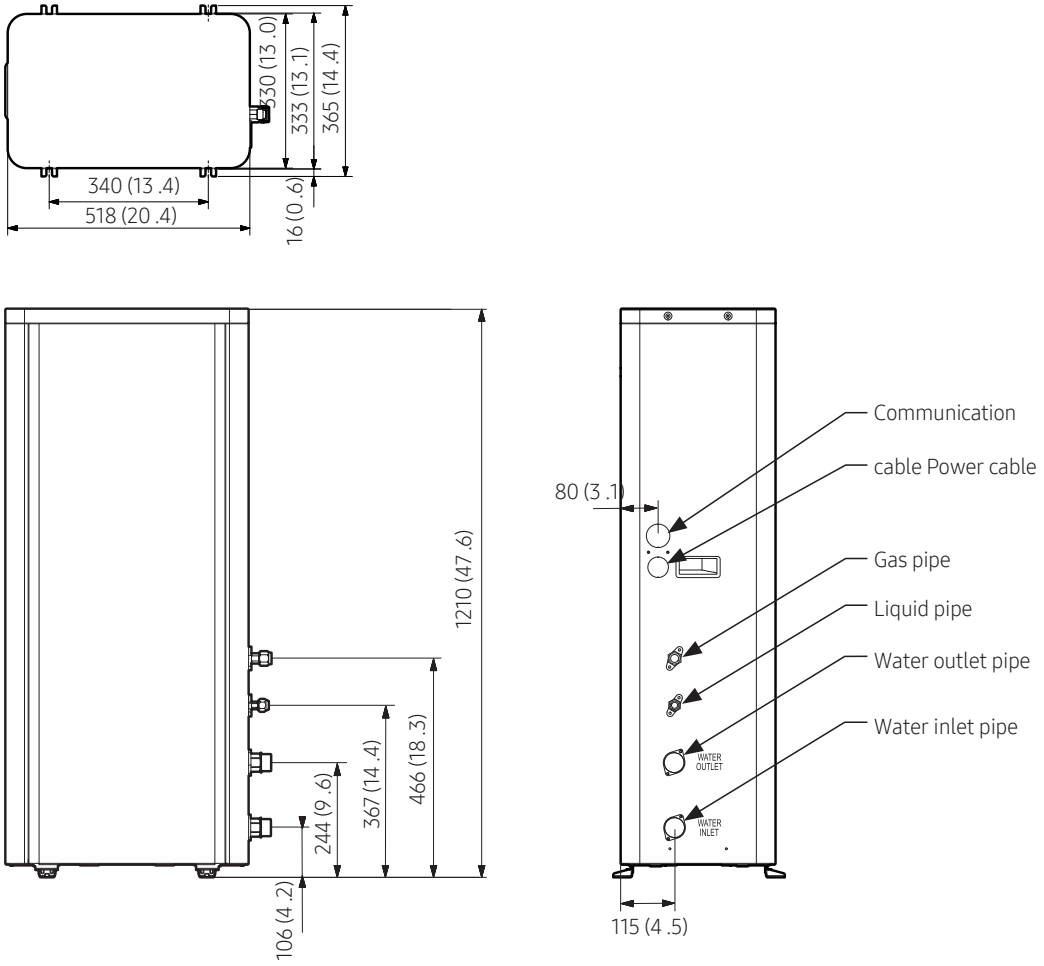


Model of the DVM Hydro unit		AM036CNBD✶✶ AM048CNBD✶✶	AM096CNBD✶✶	AM144CNBD✶✶
Refrigerant side	Liquid side connection part	3/8" (ø9.52)	3/8" (ø9.52)	1/2" (ø12.7)
	Gas side connection part	5/8" (ø15.88)	7/8" (ø22.23)	1-1/8" (ø28.58)
Water side connection part		NPT 1" (25A)	NPT 1" (25A)	NPT 1-1/4" (32A)

13. Installation

Dimension of the Hydro unit HT

Unit: mm (inch)



Model of the Hydro unit		AM✳✳✳CNBF✳✳
Refrigerant side	Liquid side connection part	3/8” (ø9.52)
	Gas side connection part	5/8” (ø15.88)
Water side connection part		NPT 1"(25A)

13. Installation

Refrigerant pipe installation

Refrigerant pipe work

- Use exclusive tools and accessories for R-410A to respond to pressure of the R-410A and prevent foreign substances from entering into the pipes.
- The length of refrigerant pipe should be as short as possible and the height difference between the DVM Hydro unit / Hydro unit HT and outdoor unit should be minimized.
- Piping work must be done within allowable piping length, height difference, and the allowable length after branching.
- The pressure of the R-410A is high. Use only certified refrigerant pipe and follow the installation method.
- Use clean refrigerant pipe and there shouldn't be any harmful ion, oxide, dust, iron content or moisture inside pipe.
- Pipe work must be done aside from the product.
- After completing the pipe installation, calculate the additional amount of refrigerant according to method of each indoor units and make sure to use R-410A refrigerant when charging. (Color of the R-410A refrigerant container is painted in pink.)

Model name of DVM Hydro unit	AM036CNBDCH AM048CNBDCH AM048CNBFCB AM072CNBFCB	AM096CNBDCH	AM144CNBDCH
Amount of additional refrigerant	0.6 kg (1.3 lb)	0.7 kg (1.5 lb)	1.2 kg (2.6 lb)

- Do not use Flux when brazing the refrigerant pipes .

CAUTION

- The maximum number of the Hydro Unit HT connectable to one system(module) is 3 units .
- In case the capacity combination of the Hydro Unit HT/HE exceeds 50 % among the total indoor unit, please don't put the additional refrigerant .
- If you need to perform cooling refrigerant charging mode with R-410A outdoor unit, the Hydro unit HT will not operate if the water temperature is below 33 ºC (91 .4 ºF) . Make sure to raise the water temperature above 33 ºC (91 .4 ºF) before conducting cooling refrigerant charging mode .
  Alternatively, you can proceed with heating refrigerant charging mode .
- If you need to perform pump down operation, the Hydro unit HT will not operate if the water temperature is below 33 ºC (91.4 ºF). Make sure to raise the water temperature above 33 ºC (91 .4 ºF) before conducting pump down operation .
- All other indoor units should perform the heating or stop, when R-134a refrigerant collecting operation .

13. Installation

Tools used for refrigerant pipe installation

Product using R-410A/R-134a refrigerant requires exclusive tools . Check the conventional tools for compatibility before installation .

Tool	Work	Compatibility with conventional tool	
Pipe cutter	Refrigerant pipe work	Pipe cutting	Compatible
Flaring tool		Pipe flaring	
Refrigerating machine oil		Apply refrigerant oil on flared part	Use exclusive ether oil, ester oil, alkali benzene oil or mixture of these oils
Torque wrench		Connect flare nut with pipe	Compatible
Pipe bender		Pipe bending	
Nitrogen gas	Air tightness test	Inhibition of oxidation	
Welder		Pipe welding	
Manifold gauge	Air tightness test ~ additional refrigerant charging	Vacuuming, charging and checking operation	Need exclusive one to prevent mixture of R-22 refrigerant oil use and also the measurement is not available due to the high pressure .
Refrigerant charging hose			Need exclusive one due to the refrigerant leakage or inflow of impurities .
Vacuum pump	Vacuum drying	Compatible (Use products which contains the check valve to prevent the oil from flowing backward into the outdoor unit .) Use the one that can be vacuumed up to 100 .7 kPa (14 .6 psi, 5Torr) .	
Scale for refrigerant charging		Compatible	
Gas leak detector		Gas leak test	Need exclusive one (Ones used for R-134a is compatible)
Flare nut	Must use the flare nut equipped with the product . Refrigerant leakage may occur when the conventional flare nut for R-22 is used .		

Selecting refrigerant pipe

- Install the refrigerant pipe according to main pipe size for each capacities of DVM Hydro unit / Hydro unit HT .

Model name of DVM Hydro unit		AM036CNBDCH AM048CNBDCH AM048CNBFCB AM072CNBFCB	AM096CNBDCH	AM144CNBDCH
Refrigerant side	Liquid side	3/8” (ø9 .52)	3/8” (ø9 .52)	1/2” (ø12 .7)
	Gas side	5/8” (ø15 .88)	7/8” (ø22 .23)	1-1/8” (ø28 .58)

13. Installation

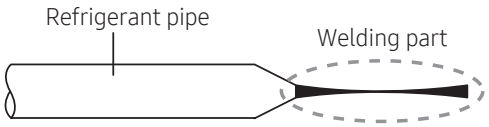
Keeping refrigerant pipe

- To prevent foreign materials or water from entering the pipe, storing method and sealing method (especially during installation) is very important . Apply correct sealing method depending on the environment .
- Be especially careful when you penetrate the pipe through the hole in a wall or when the end of the pipe is exposed to outdoor during installation .
- Use the flare nut supplied with the product . If other flare nuts are used, it can cause refrigerant leakage .

Exposure place	Exposure time	Sealing type
Outdoor	Longer than one month	Pipe pinch
	Shorter than one month	Taping
Indoor	-	Taping

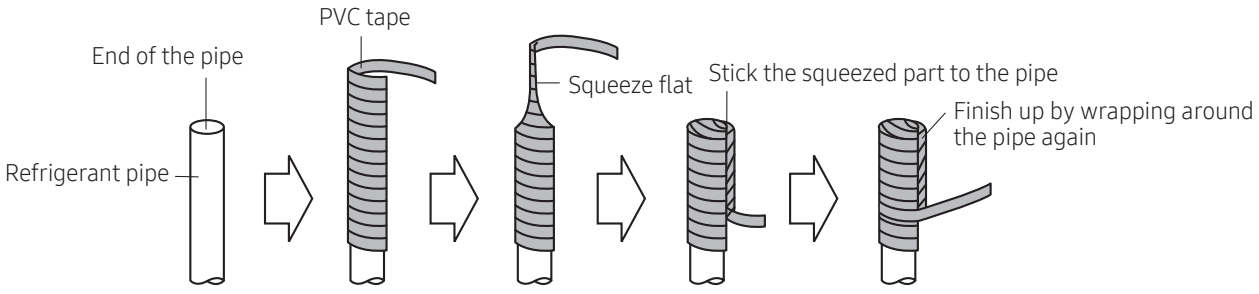
Pinching the refrigerant pipe

- Compress the end of the refrigerant pipe and weld the compressed part .



Taping the refrigerant pipe

- Seal the end of the refrigerant pipe with a PVC vinyl tape .



13. Installation

Refrigerant pipe welding and safety information Important

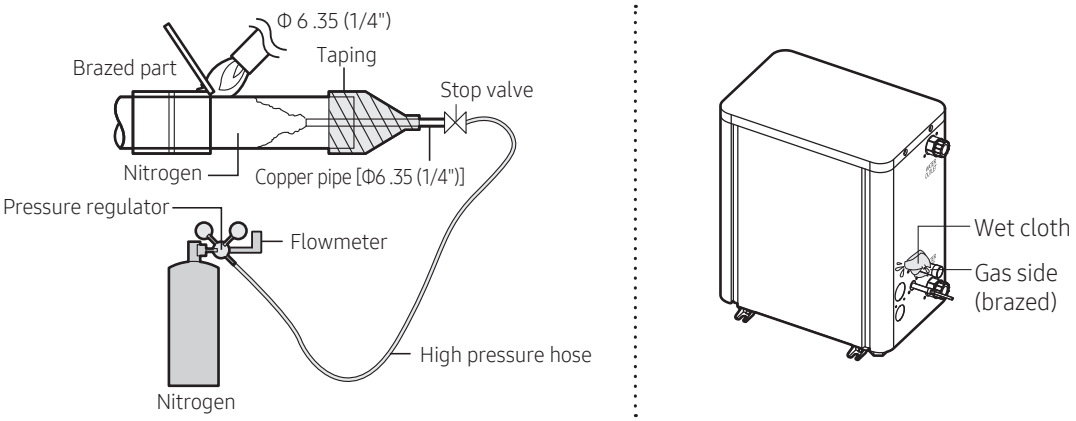
information for refrigerant pipe work

- Make sure there is no moisture inside the pipe.
- Make sure there are no foreign substances and impurities in the pipe.
- Make sure there is no leakage.
- Make sure to follow the instruction when welding or storing the pipe.

Nitrogen flushing while brazing (DVM Hydro unit)

- When brazing the refrigerant pipes, flush them with nitrogen gas as shown in the picture.
- If you do not perform nitrogen flushing when brazing the pipes, oxide may form inside the pipe and can cause damage to the important parts such as compressor and valves etc.

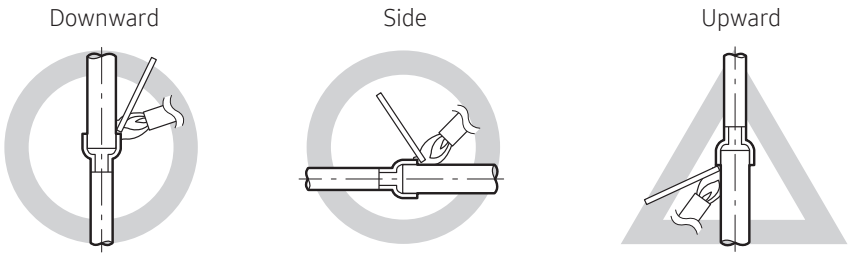
- Adjust the flow rate of the nitrogen flushing with a pressure regulator to maintain 0.05 m^3/h (1.77 ft^3/h) or less.
- When brazing the pipes on the connection port, cover the valve with wet cloth before brazing (to protect the parts within the valve)



Direction of the pipe when brazing

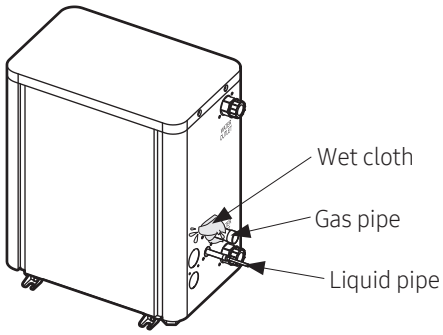
- Direction of the pipe should be headed downward or sideways when brazing.

- Avoid brazing the pipe with pipe direction heading upward.



13. Installation

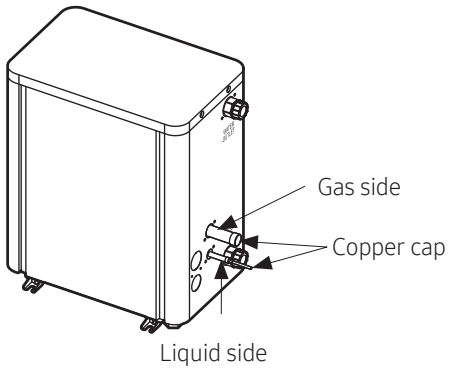
Refrigerant pipe work on DVM Hydro unit



CAUTION

- Caution for brazing the pipe to a DVM Hydro unit
  - When brazing the pipe to the product, the unit may get damaged by the heat and flame from brazing . Use a flame proofing cloth to protect the unit from a brazing fire or flame .
  - Wrap the pipe with a wet cloth and braze it as shown in the illustration . Also, water dripping from the wet cloth may interrupt the brazing so make sure the water does not drip from the wet cloth .
  - Make sure that connected pipes of DVM Hydro unit and the outdoor unit do not interrupt each other or make contact with the product . (Vibration may cause damage to the pipes .)
  - When removing the sealed pipe on the bottom side of the service valve, cut it with a pipe cutter first and then start the brazing .When the sealed pipe is brazed without cutting, you may get injured by the refrigerant within the pipe .

1 . Remove the copper cap of the refrigerant pipe and eliminate the sludge or foreign substances on the brazed part and then braze the connecting pipe on each port .
   - Since nitrogen gas is sealed within the pipe, you must discharge the nitrogen gas from the liquid pipe .Then remove the copper cap and check for existence of the nitrogen gas .
   - Check the pressure of the nitrogen gas before brazing . If the nitrogen gas is not being purged, product is not normal so do not install it .



2 . Cover the refrigerant pipe well with insulation .
   - It prevents the water, on the outer surface of the pipe, from dripping and increase the efficiency of the DVM Hydro unit .
3 . Cut off the leftover insulator .
4 . Check for cracks on the bent part of the pipes .
5 . When the DVM Hydro unit is installed in a hot and humid place, water may form on the outer surface of the insulation so it would be necessary to double the insulation thickness [10 mm (0 .4 inch) or more] .

13. Installation

Refrigerant pipe work on DVM Hydro unit HT

DVM Hydro unit HT has refrigerant pipes of two different types .

- ▶ Liquid side pipe
- ▶ Gas side pipe
- ▶ Make sure there are no foreign substances and impurities in the pipe .

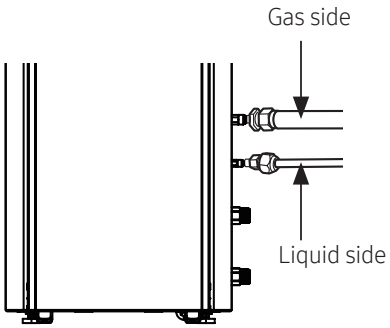
CAUTION

- There is no nitrogen gas inside of connected pipes of Hydro unit HT and the outdoor unit .
- DVM Hydro unit HT is using refrigerant R-134a in the integral circuit .The connected pipes of Hydro unit HT and the outdoor unit are using R-410A
- If impurities (moisture, micro-substances) are introduced into the refrigerant pipes, the product performance and reliability may be seriously affected .
- The design pressure is 4 .1 MPa (594 .7 psi), and make sure to consider selecting the refrigerant pipes which meet the standard(material, thickness)
- Make sure to use liquid refrigerant when charging the refrigerant, because the used refrigerant is a blended refrigerant .

❋ DVM Hydro unit HT uses a plate type heat exchanger, and make sure to consider installation location to connecting water pipes .

1 . Remove the safety cap of the refrigerant pipe and fasten the nuts after connecting refrigerant pipes to each port of the Hydro unit HT .

▶ Make sure to hand tighten the nut first, after that use tools like torque wrench and spanner .



2 . Wrap the refrigerant pipes with insulation .

3 . Cut the rest of insulation .

4 . Make sure to check any defects on the bent parts of the pipes .

5 . The standard temperature and humidity condition is 30 °C (86 °F) with humidity below 85 % . If the condition is in high humidity, use one grade thicker . [Over 10 mm (0 .4 inch)]

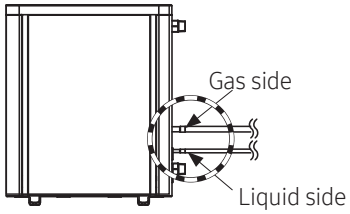
13. Installation

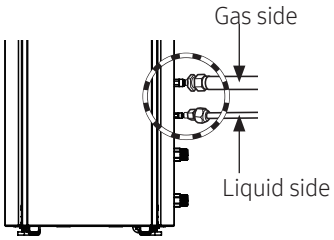
Performing leak test and insulation

Before completing the installation (insulating hose and pipes), you must check for gas leakage and when there is no leakage, you may insulate the pipes and hoses .

Leak test

Use a gas detector to check the connection part of the pipes for gas leakage .





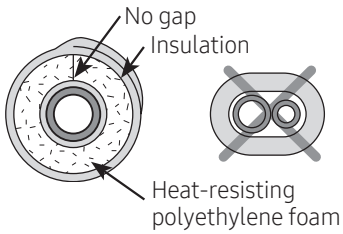
Insulation

Selecting the insulator of refrigerant pipe

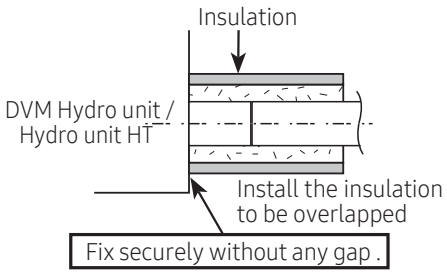
- Insulate the gas pipe and liquid pipe by referring to the thickness of insulation for each pipe size .
- The standard temperature and humidity condition is 30 °C (86 °F) with humidity below 85 % . If the condition is in high humidity, use one grade thicker .

Pipe	Outer diameter		Insulator				Remarks
			General [30 °C (86 °F), 85 %]		High humidity [30 °C (86 °F), over 85 %]		
			EPDM, NBR				
	mm	inch	mm	inch	mm	inch	
Liquid pipe	6 .35 ~ 9 .52	1/4 ~ 3/8	9	3/8	9	3/8	Heating resisting temperature over 120 °C (248 °F)
	12 .7 ~ 50 .8	1/2 ~ 2	13	1/2	13	1/2	
Gas pipe	6 .35	1/4	13	1/2	19	3/4	
	9 .52 ~ 25 .4	3/8 ~ 1	19	3/4	25	1	
	28 .58 ~ 44 .45	1 1/8 ~ 1 3/4	19	3/4	32	1 1/4	
	50 .8	2	25	1	38	1 1/2	

1 . To avoid condensation problems, wrap each pipes with heat-resisting polyethylene foam .
- Make sure that the opening part of the insulation to face up .



2 . Wrap the refrigerant pipes and drain pipes with insulation .

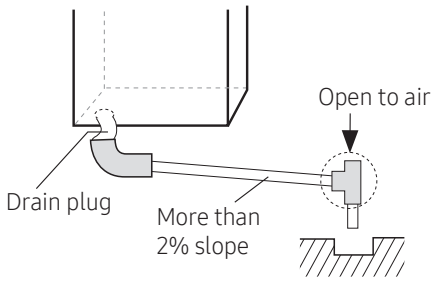


13. Installation

Installing the drain pipe

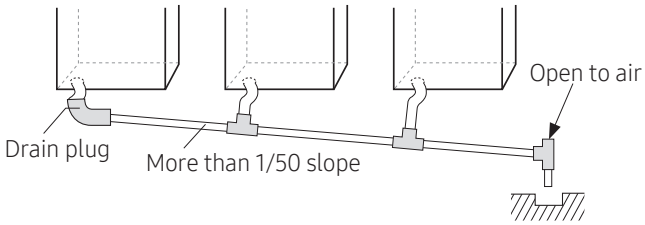
Installing the drain pipe

- Use a level to make sure that product is horizontally leveled.
- Choose one of the 2 drain holes on the bottom of the product and insert the provided drain plug, then connect the drain pipe.
- From the 2 drain holes, block the unused hole with the provided rubber plug.
- Install the drain pipe at the rear side of the unit to get a sufficient space for repairs and service on the front side.
- Do not install a trap on the pipe and install the drain pipe horizontally with a slope of 2% or more to prevent water from flowing backwards.
- For smooth drainage, install an air vent that is open to air.
- Insulate the drain pipe and drain plug with insulation over 10 mm (0.4 inch).
- Install the safety equipment for a heating appliance.



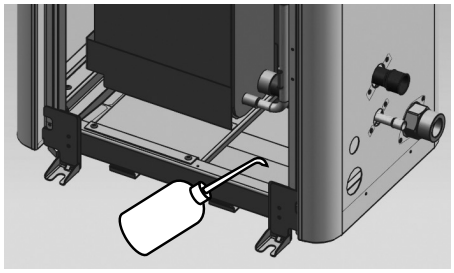
When concentrated drainage is installed

- Install a common drain pipe with an air vent that is open to air.

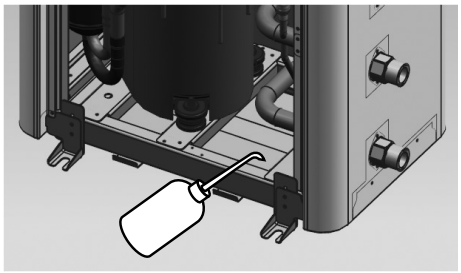


Verify water drainage

Prepare about 2 liters of water and pour water into the drain pan of the DVM Hydro unit / Hydro unit HT as shown in the illustration.



‹DVM hydro unit›



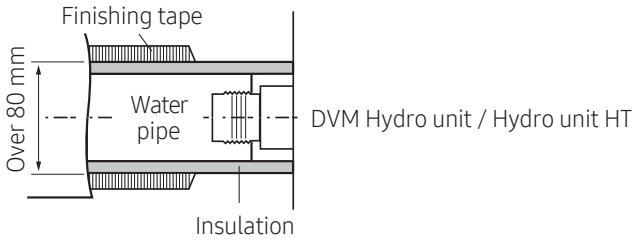
‹DVM hydro unit HT›

13. Installation

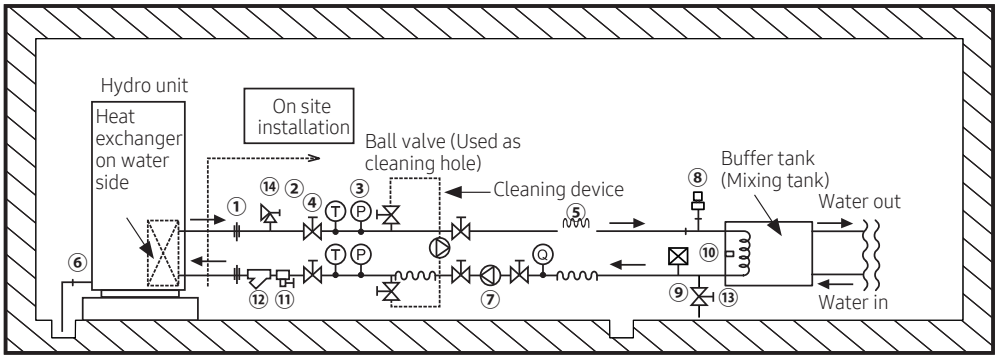
Water pipe installation

1. Use closed type water pipe and closed type expansion tank when constructing water piping system.
2. Water pipe installation system
   1) Install the water pipe as shown in the below illustration. All the parts, other than DVM Hydro unit / Hydro unit HT, must follow on site installation specification.

<Water pipe connection part>

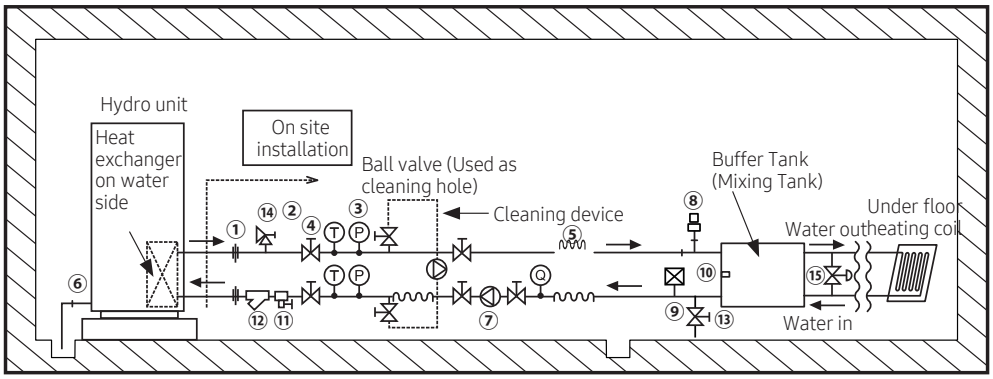


▶ Installing hot water supply



①	Water pipe joint (union, flange)	⑤	Flexible joint	⑨	Expansion tank
②	Thermometer	⑥	Drain (within the product)	⑩	Temperature sensor for hot water tank
③	Manometer	⑦	Pump	⑪	Drain valve
④	Ball valve	⑧	Air vent	⑫	Strainer
⑬	Water Valve	⑭	Pressure relief valve (Pressure safety valve)		

▶ Installing under floor heating



13. Installation

①	Water pipe joint (union, flange)	⑤	Flexible joint	⑨	Expansion tank
②	Thermometer	⑥	Drain (within the product)	⑩	Temperature sensor for thermal storage tank
③	Manometer	⑦	Pump	⑪	Drain valve
④	Ball valve	⑧	Air vent	⑫	Strainer
⑬	Water Valve	⑭	Pressure relief valve (Pressure safety valve)	⑮	Differential Pressure bypass Valve

When more than two water pipes are used for heating (e.g. Floor + Fan Coil Unit), Buffer Tank (Mixing Tank) or bypass valve should be used to maintain the water flow rate.

► On site installation specification

Model name	Strainer	Flow meter	Thermometer	Manometer	Air vent	Pump	Ball valve	Drain valve
AM048CNBFCB	#50 NPT	0~50 ℓ/min (0 ~ 13 .2 gal/min)	0~100 °C (0~212 °F)	0 ~ 1 Mpa (0 ~ 145 psi)	0 .6 m3/h (158 .5gal/h) [Condition: 0 .15MPa (21 .8psi)]	23 ℓ/min (6 .1 gal/min)	NPT 1"	15 A
AM072CNBFCB		0 ~ 100 ℓ/min (0 ~ 26 .4 gal/min)				36 ℓ/min (9 .5 gal/min)		
AM036CNBDCH		0 ~ 50 ℓ/min (0 ~ 13 .2 gal/min)				36 ℓ/min (9 .5 gal/min)		
AM048CNBDCH						48 ℓ/min (12 .7 gal/min)		
AM096CNBDCH		0 ~ 100 ℓ/min (0 ~ 26 .4 gal/min)				92 ℓ/min (24 .3 gal/min) (Refer to pressure drop graph)		
AM144CNBDCH	#50 NPT	0 ~ 150 ℓ/min (0 ~ 39 .6 gal/min)	0 ~ 100 °C (0 ~ 212 °F)	0 ~ 1 Mpa (0 ~ 145 psi)	0 .6 m3/h (158 .5 gal/h)[Condition: 0 .15 MPa (21 .8 psi)]	150 ℓ/min (39 .6 gal/min) (Refer to pressure drop graph)	NPT 1-1/4"	15 A

2) Do not exceed the torque value stated in the below table. If you apply more torque, it may cause damage to the product.

Diameter of water pipe (Outer diameter, mm)		Tightening torque	
mm	inch	N·m	lbf·ft
10 ~ 20	0.39 ~ 0.79	25	18.4
21 ~ 30	0.83 ~ 1.18	50	36.9
31 ~ 50	1.22 ~ 1.97	100	73.8
51 ~ 80	2.0 ~ 3.15	220	162.3
81 ~ 115	3.19 ~ 4.53	600	442.5

13. Installation

3) Use certified parts for water pipe system and the water pressure of the water pipe system connected to outdoor unit must remain under 1.0 MPa (145.0 psi). Use copper or stainless pipe water pipe.
4) Water pipes must be equipped with valves and other instrumentations as shown in the diagram. Strainer must be installed within 1 ~ 2 m (3.3 ~ 6.6 ft) from the entrance pipe of the DVM Hydro unit / Hydro unit HT.
   a) When strainer is not installed, sand, dust or rust debris may cause product breakage.
   b) Make sure that the strainer mesh is made of stainless steel.
5) Water inlet pipe is located at the bottom part of the heat exchanger and the water outlet pipe is at the top part of the heat exchanger.
6) DVM Hydro unit / Hydro unit HT must be installed indoor at room temperature and the water inlet and outlet must be insulated as shown in the 'Water pipe installation system' diagram.
7) Insulation work must be done properly and thoroughly to prevent condensation from forming on the surface of the product and drain pipes of indoor/outdoor units. When the necessary work is not done thoroughly, you will waste energy caused by thermal loss. In cold applications pipes may freeze and burst causing property damage.
8) If you stop the product for long time or in night time, water pipe circuit may freeze naturally when the temperature around the DVM Hydro unit / Hydro unit HT is under 0 °C (32 °F). When water pipe circuit freezes, it will cause damage to the plate type heat exchanger and therefore preventive measure must be taken according to the situation.
   a) Drain remaining water in the water pipe
   b) Install self-regulating heat cable on the water pipes
   c) If the product is installed in a place where surround temperature drops below 0 °C (32 °F), use anti-freeze accordingly for freezing point depression.
9) Install number of auto air discharge valve at a point where air may remain within the pipe (such as vertical water pipe). If the air within the pipe is not discharged, it may cause performance decrease or corrosion on the product or pipes.
10) Following is the operation range of water.

Section		Outlet water temperature		Flow rate					
		AM✱✱✱CNBD✱✱	AM✱✱✱CNBF✱✱	AM036CNBDCH	AM048CNBDCH	AM096CNBDCH	AM144CNBDCH	AM048CNBFCB	AM072CNBFCB
Standard condition	Heating	35 °C (95 °F)	65 °C (149 °F)	36 l/min (9 .5 GPM)	48 l/min (12 .7 GPM)	92 l/min (24 .3 GPM)	150 l/min (39 .6 GPM)	-	-
								23 l/min (6 .1 GPM)	36 l/min (9 .5 GPM)
Operation range	Heating	20 ~ 50 °C (68 ~ 122 °F)	25 ~ 80 °C (77 ~ 176 °F)	18~36 l/min (4 .8~9 .5 GPM)	24~48 l/min (6 .3~12 .7 GPM)	46 ~ 92 l/min (12 .2 ~ 24 .3 GPM)	75 ~ 150 l/min (19 .8 ~ 39 .6 GPM)	-	-
								14 ~ 46 l/min (3 .7 ~ 12 .2 GPM)	14 ~ 72 l/min (3 .7 ~ 19 .0 GPM)

▶ When the amount of cooling water is out of the operation range, stop the DVM Hydro unit / Hydro unit HT and take care of the cause before re-start the operation.
▶ Temperature of discharged water is very high so be careful not to come in contact with the body. Also, cover the external water pipe with appropriate insulator for insulation and preventing burns.

11) Water scale may occur on the plate type heat exchanger depending on the water quality and the type of plate heat exchanger so regular chemical cleaning is necessary. When installing water pipes, install a heat source water shut-off valve and also install the flushing pipe with a ball valves (for chemical cleaning) on the pipe installed between the shut-off valve and the outdoor unit.
12) Before trial operation, connect the cleaning pipes installed on inlet and outlet as shown in above illustration. Then, take appropriate measures (such as blind flange etc) to stop the circulation water from entering the outdoor unit plate type heat exchanger, and use circulating pump to remove foreign substance within the water pipes and clean the strainer. If you do not clean the strainer, foreign substances may accumulates on plate type heat exchanger and may break the heat exchanger or cause problem to it.
13) Make sure that water quality within the water pipe meets the standard of cooling water quality for refrigerating and air conditioning equipment.
    - Water containing high level of foreign substances can cause water heat exchanger and pipe corrosion or creation of water scale. (Use the appropriate heat source water according to the below table)
    - If the make-up water is provided from any other source than local water supply, make sure to check the quality of water.
    - Strainer (which needs to be purchased separately) must be installed to the 'Water IN' pipes of the water pipe. If sand, dust or rust debris enters to water system, it may cause corrosion on metallic materials or blockage of the water heat exchanger and damage the heat exchanger.
    - If the existing thermal storage tank or pipes are used, foreign substances may block the plate type heat exchanger of the DVM Hydro unit / Hydro unit HT so, water quality and foreign substances must be managed.
14) Check that the total water volume in the installation, excluding the internal water volume of DVM Hydro unit / Hydro unit HT, is 20 L (5.3 gal) minimum.

13. Installation

Classification	Item	Closed type system		Effects		Recommended number for water quality inspection
		Circulating water	Supplemented water	Corrosion	Scale	
Standard value	pH [25 °C (77 °F)]	7 .0 ~ 8 .0	7 .0 ~ 8 .0	O	O	Once a year
	Electric conductivity [25 °C (77 °F)] (mS/m)	30 or below	30 or below	O	O	
	Chloride ion (mg Cl-/L)	50 or below	50 or below	O		
	Sulfate ion (mg SO_4^{2-}/L)	50 or below	50 or below	O	O	
	M alkali level [pH 4 .8] (mg $CaCo_3$/L)	50 or below	50 or below		O	
	Total hardness (mg $CaCo_3$/L)	70 or below	70 or below		O	
	Calcium hardness (mg $CaCo_3$/L)	50 or below	50 or below		O	
	Ionized silica (mg SiO_2/L)	30 or below	30 or below		O	
Reference	Iron (mg Fe/L)	1 .0 or below	0 .3 or below	O	O	
	Copper (mg Cu/L)	1 .0 or below	1 .0 or below	O		
	Sulfate ion (mg S^{2-}/L)	Not to be detected	Not to be detected	O		
	Ammonium ion (mg NH_4+/L)	0 .3 or below	0 .1 or below	O		
	Residual chlorine (mg Cl/L)	0 .25 or below	0 .3 or below	O		
	Free carbon dioxide (mg CO_2/L)	0 .4 or below	0 .4 or below	O		
	Stability index	-	-	O	O	

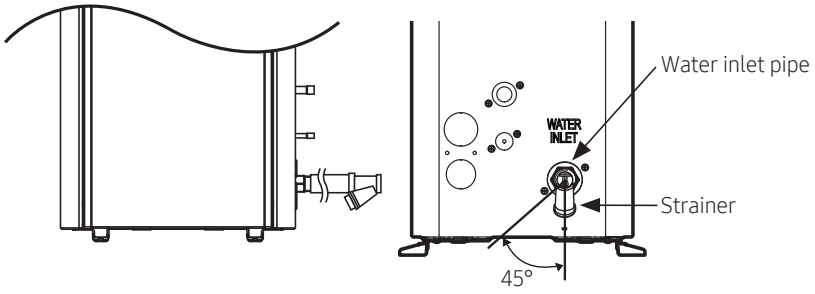
NOTE

- Circle (O) marks in the chart show the factor relevant to corrosion or water scale.
- When the water temperature is over 40 ˚C (104 ˚F), steels without protective coating may corrode when exposed to water. Applying corrosion prevention material or degassing can be effective measure to prevent corrosion.
- For the cooling water and the make-up water, used under closed circuit water system with closed circuit cooling tower, should satisfy the standard shown in above table.
- Supplied water or make-up water should be tap water, industrial water. Purified water, neutralized water and softened water should not be supplied.
- 15 items in the above table is a typical factor for corrosion and/or water scale.
- When water pipe circuit freezes, it will cause breakage on the plate type heat exchanger. Therefore appropriate preventive measure must be taken according to the situation.
  - Drain remaining water in the water pipe
  - Constantly operate the water pump to circulate the water within the water pipe
  - Install a self-regulating heat cable on the water pipe
- Open the valve of the water pipe connected to the outdoor unit after flushing (cleaning foreign substances in water pipe) is completed.
- Check that air is vented from the water pipe and circulation amount is secured before opening the service valve on the refrigerant side of the outdoor unit.
- If water flow stops during outdoor unit operation, it may cause breakage on plate type heat exchanger.

13. Installation

Connecting strainer

- ▶ Use a strainer with 50 mesh (Diameter of each hole must be under 0.4 mm (0.016 inch), excluding punching plate)
- ▶ Connect the strainer after checking the direction of the strainer on the water inlet hole as shown in the illustration.
- ▶ Wind the Teflon tape more than 15 times on the thread of the water pipe before connecting it.
- ▶ Service port must face downward and angle should be within 45° on the left and the right side.
- ▶ After installing the strainer, makes sure that there is no water leakage on the connection part.
- ▶ For normal operation of the product, clean the strainer regularly (more than once a year).



<Front view> <Side view>

Connecting power and communication cable

Specification of electric wires

Indoor unit	Power supply	MCCB	ELB	Power cable	Earth cable	Communication cable
DVM Hydro unit	208~230V/60 Hz Max: 253 V Min: 187 V	20 A	25 A, 30 mA, 0 .1 sec↓	10 AWG ↑ (Single Installation)	10 AWG	20 AWG~14 AWG
DVM Hydro unit HT (AM048CNBFCB)	208~230V/60 Hz Max: 253 V Min: 187 V	30 A	30 A, 30 mA, 0.1 sec ↓	6 AWG ↑ (Single Installation)		
DVM Hydro unit HT (AM072CNBFCB)		50 A	50 A, 30 mA, 0.1 sec ↓			

∗ Table for current (Single installation)

Indoor unit	Model	Rated current (A)	MCA (A)	MOP (Min. ELCB, MCCB, A)
DVM Hydro unit	AM✶✶✶CNBD✶✶	0.05	2.2	15.0
DVM Hydro unit HT	AM048CNBF✶✶	14.3	18.0	25.0
	AM072CNBF✶✶	23.1	30.0	40.0

13. Installation

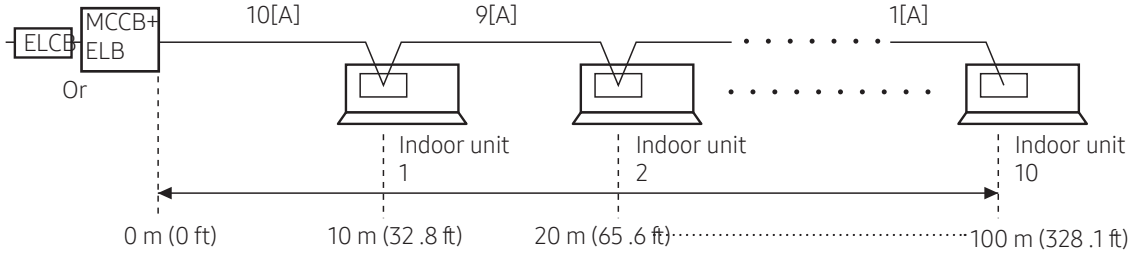
▶ Decide the power cable specification and maximum length within 10 % power drop among indoor units.

$$\sum_{k=1}^{n}\left(\frac{Coef\times 35.6\times Lk\times ik}{1000\times Ak}\right) < 10\ \%\ \text{of input voltage[V]}$$

- coef : 1.55
  Lk : Distance among each indoor unit [m (inch)], Ak: Power cable specification[mm^2 ($inch^2$)]
  ik : Running current of each unit [A]

Example of Installation

▶ Total power cable length L = 100 m (328.1 ft), Running current of each units 1[A]
▶ Total 10 indoor units were installed

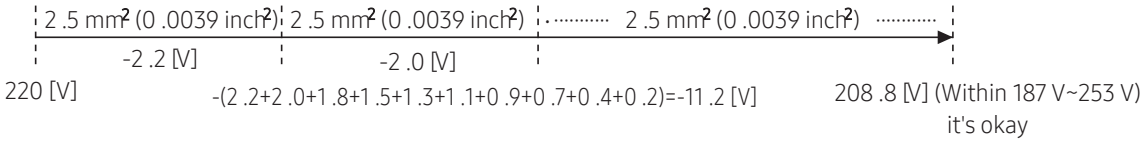


▶ Apply following equation

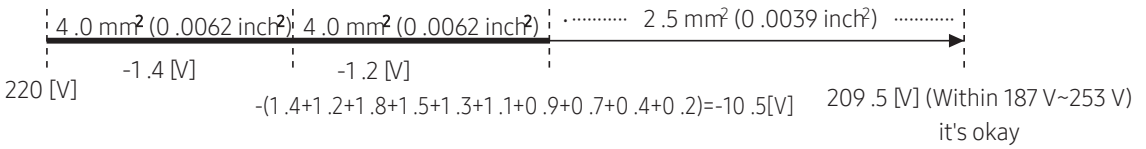
$$\sum_{k=1}^{n}\left(\frac{Coef\times 35\ .6\times Lk\times ik}{1000\times Ak}\right) <\ 10\ \%\ \text{of input voltage[V]}$$

✻ Calculation

- Installing 1 type of wire .



- Installing with 2 different sort wire .

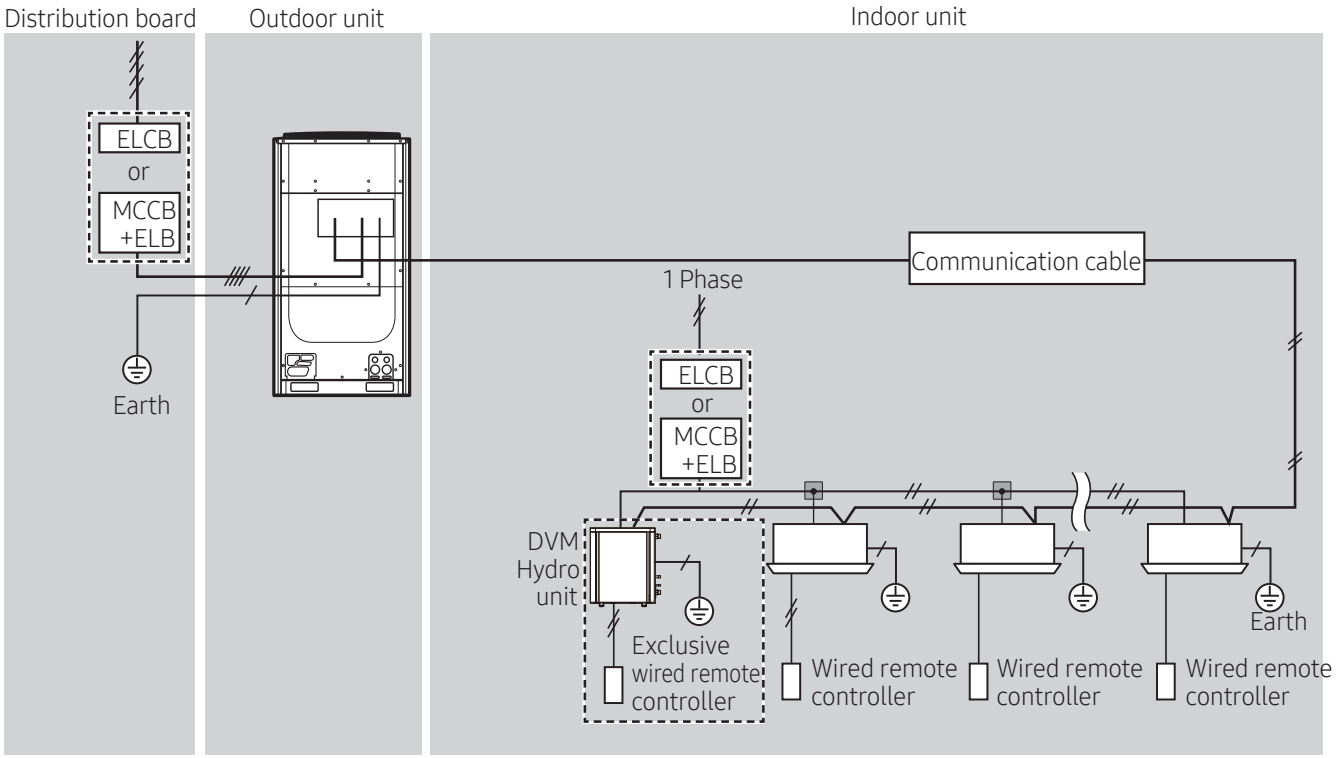


13. Installation

Overall system configuration

DVM Hydro unit / Hydro unit HT use 208~230 V

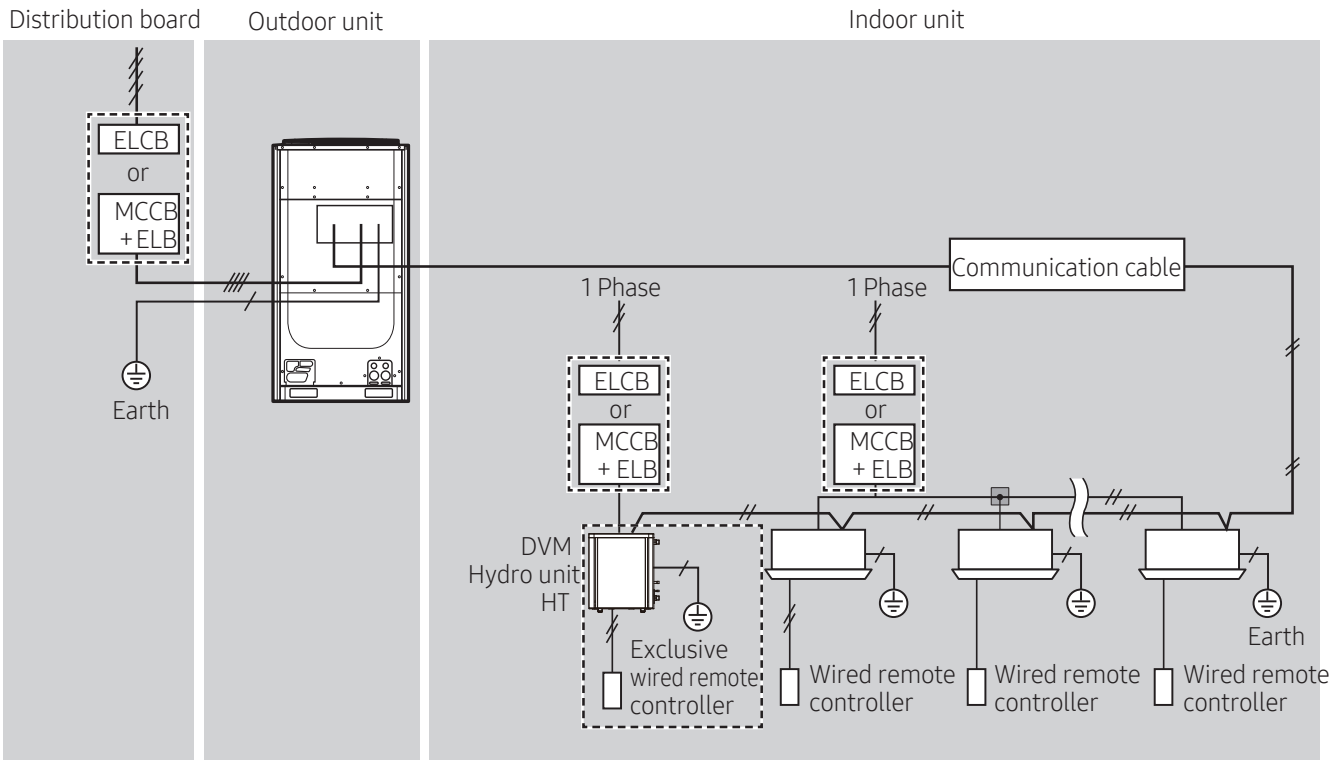
DVM Hydro unit



13. Installation

Overall system configuration

DVM Hydro unit HT



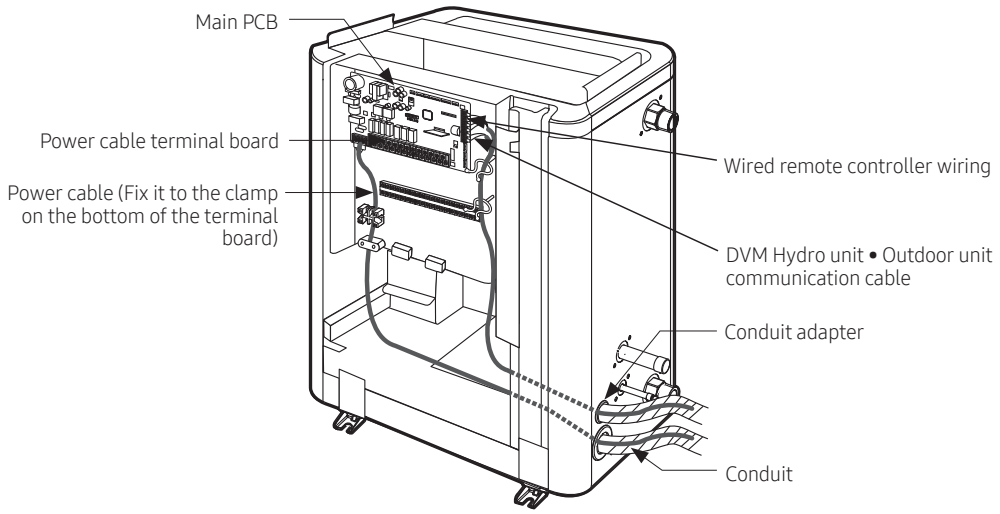
CAUTION

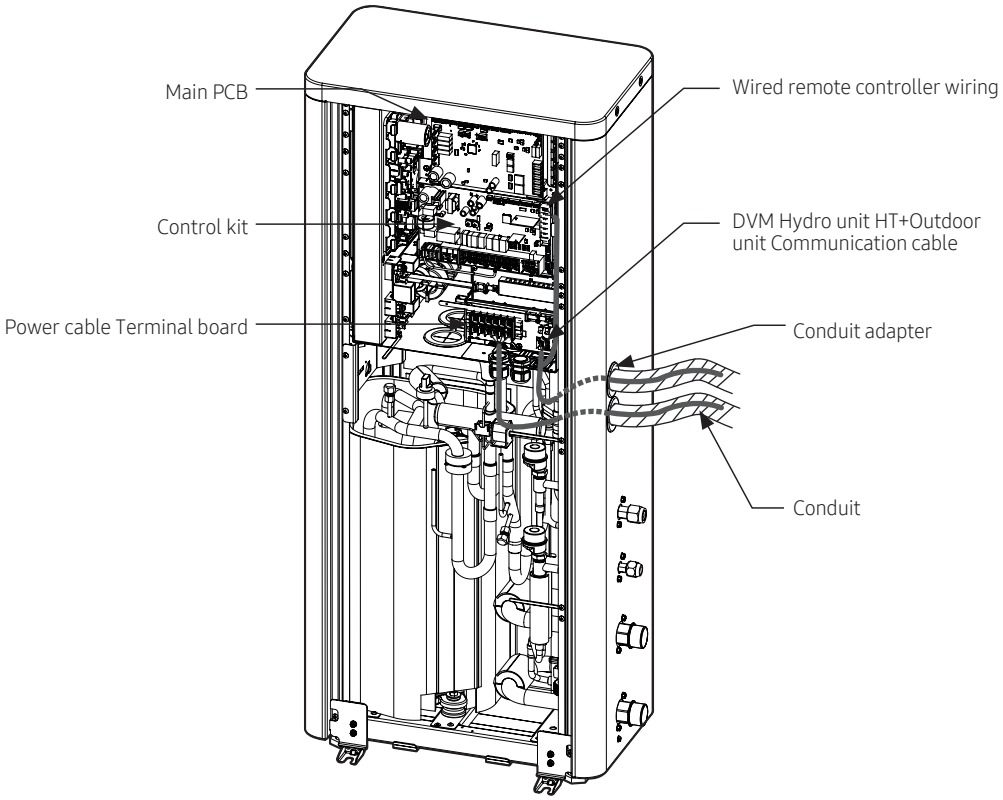
- Do not divide communication cable multiple times from one indoor/DVM Hydro unit / Hydro unit HT to another . It may cause communication error .
- Do not divide power cable multiple times from one Hydro unit HT to another . DVM Hydro unit HT can get a damage .
- Power supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord . (Code designation IEC:60245 IEC 57 / CENELEC: H05RN-F) (AM✶✶✶CNBD✶✶ Model)
- Power supply cords of parts of appliances for outdoor use shall not be lighter than polychloroprene sheathed flexible cord . (Code designation IEC:60245 IEC 66 / CENELEC: H07RN-F) (AM✶✶✶CNBF✶✶ Model)

13. Installation

Power supply and communication cable configuration

- ▶ Withdraw a main power cable and a grounding cable through the cable outlet on the right side of the DVM Hydro unit / Hydro unit HT.
- ▶ When connecting external contact signal wire, connect them to the PCB terminal board through the cable outlets in the right side of the outdoor unit.
- ▶ Wires must be installed after putting them in separate conduit tubes.
- ▶ Fix the conduit at the cable outlet using a conduit adapter.



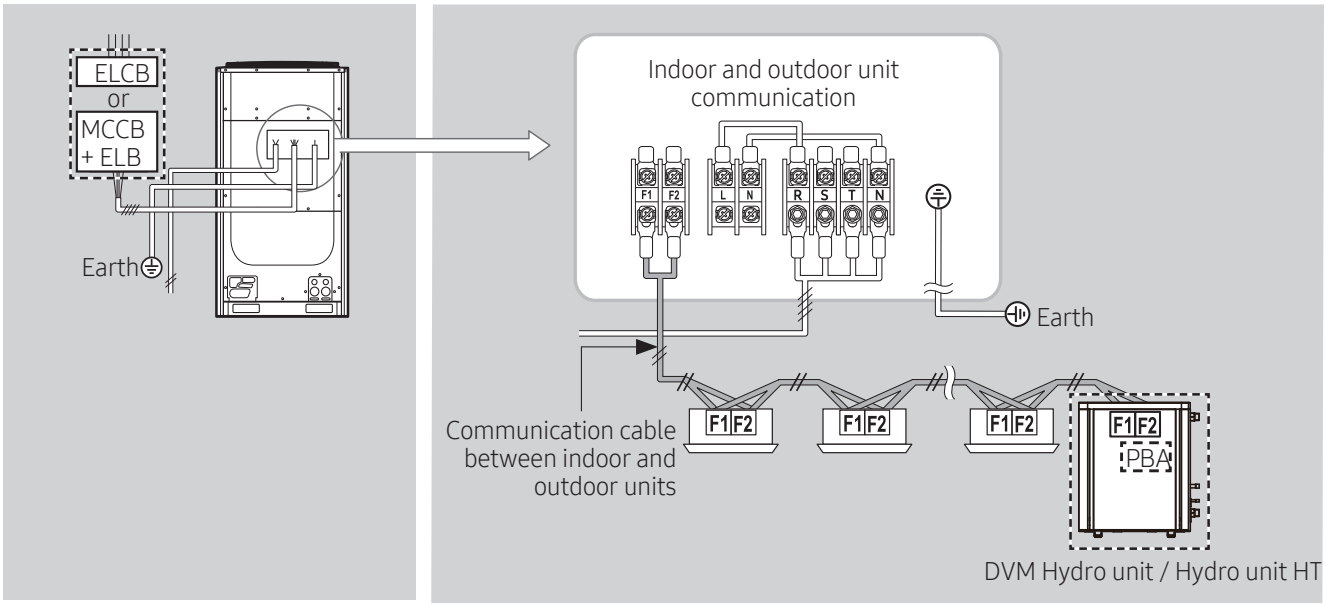


13. Installation

Specifications of the cable protection tube

Name	Material	Applicable conditions
Flexible PVC conduit	PVC	When the cable tube is installed indoor and not exposed to outside, because it is embedded in concrete structure
Class 1 flexible conduit	Galvanized steel sheet	When the cable tube is installed indoor but exposed to outside so there are risk of damage to the cable tube
Class 1 PVC coated flexible conduit	Galvanized steel sheet and Soft PVC compound	When the cable tube is installed outdoor and exposed to outside so there are risk of damage to the cable tube and extra waterproof is needed

Power and communication wiring diagram

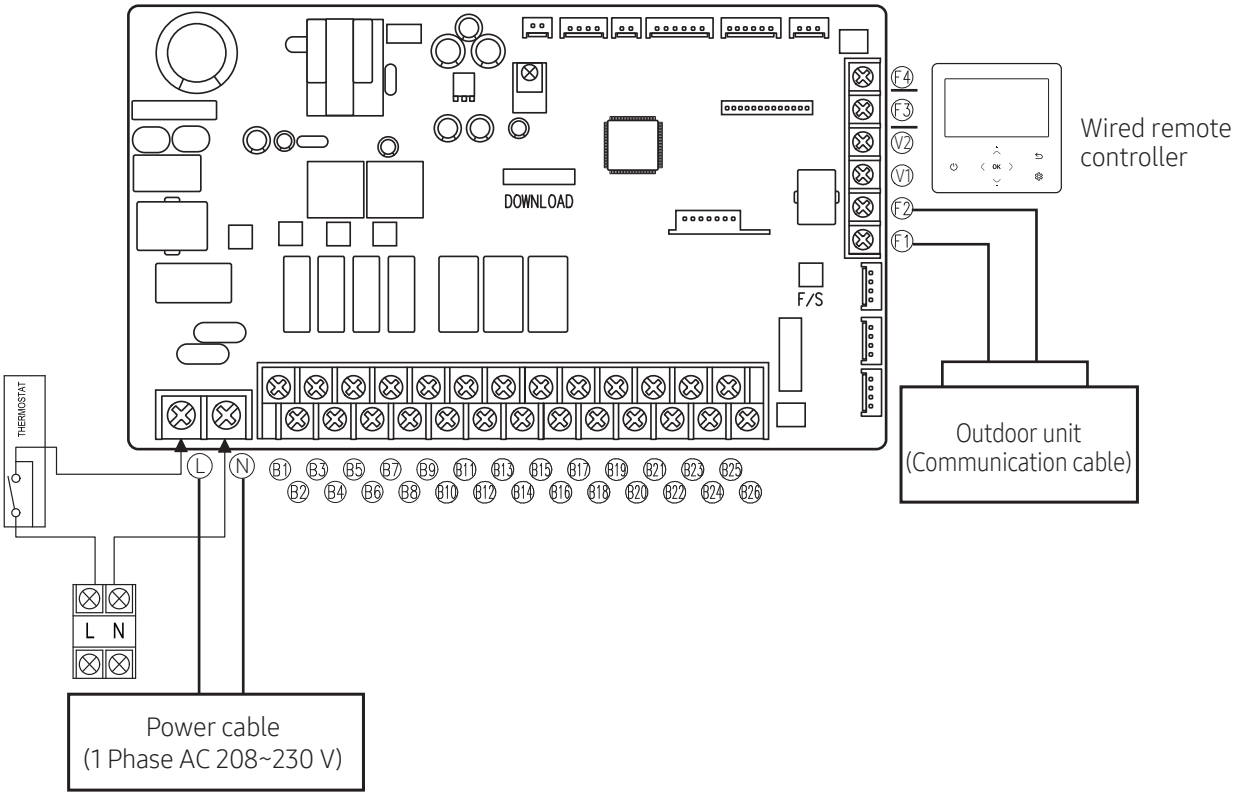


- The communication cable between indoor and outdoor units has no polarity.
- Arrange the cables using a clamp attached on the left side of the terminal board.
- When you connect the power cable, you must apply rated tightening torque to connect the screws for the terminal board.

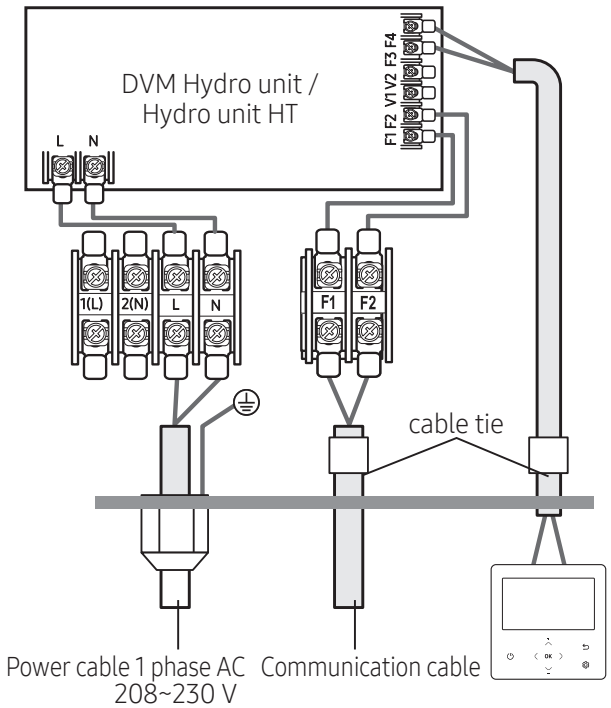
13. Installation

PBA connection diagram

- AM✶✶✶CNBD✶✶



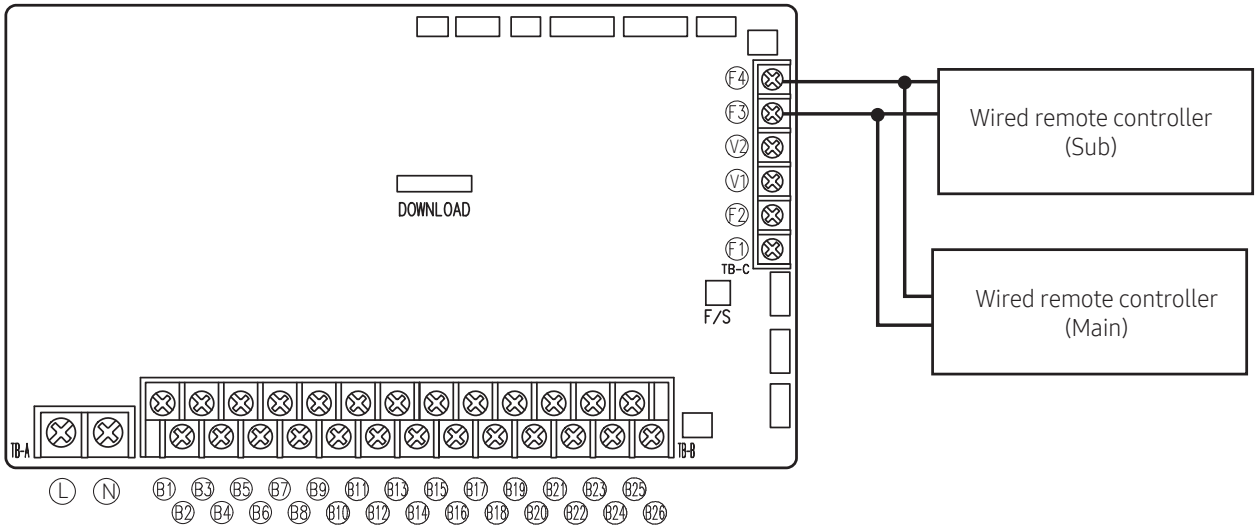
- AM✶✶✶CNBF✶✶



13. Installation

Wiring diagram for connecting 2 wired remote controllers

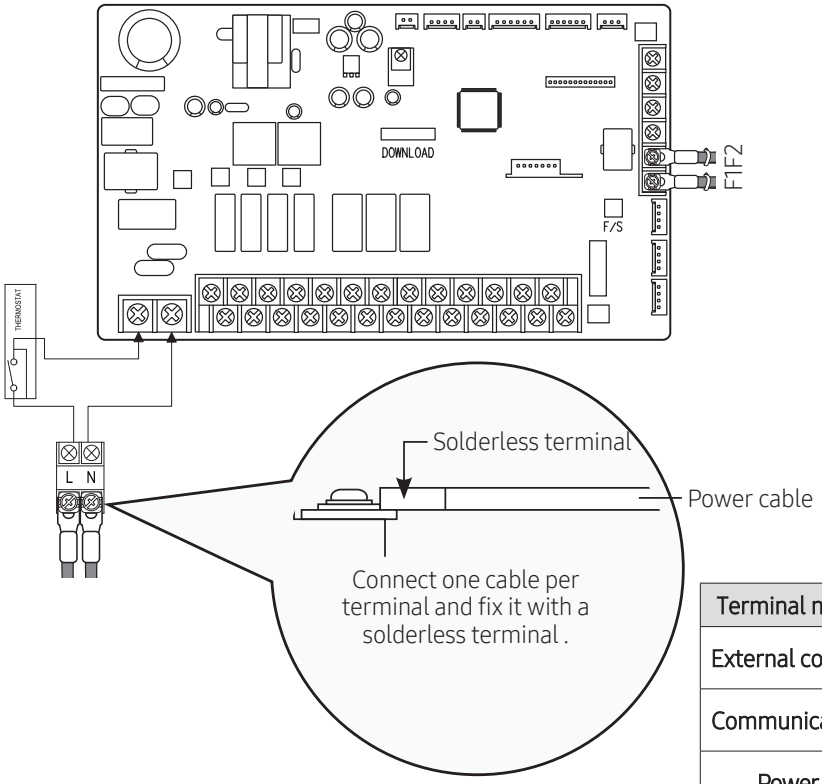
- AM✶✶✶CNBD✶✶ / AM✶✶✶CNBF✶✶



13. Installation

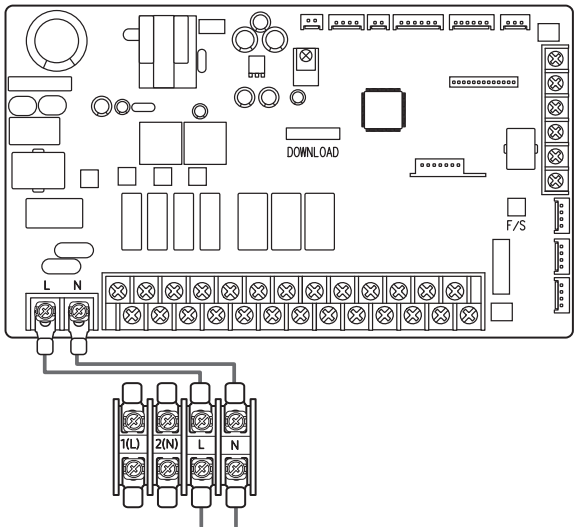
Connecting the power terminal

- Connect the cables to the terminal board using a solderless ring terminal.
- Properly connect the cables by using certified and rated cables and make sure to fix them properly so that external force is not applied to the terminal.
- Use a driver and wrench that can apply the rated torque when tightening the screws on the terminal board.
- Tighten the terminal screws by applying rated torque value. If the terminal is loose, arc heat may occur and cause fire and if the terminal is connected too firmly, terminal may get damaged.



Terminal name	Tightening Torque	
External contact	M3	0 .5 ~ 0 .75 N·m (0 .37 ~ 0 .55 lbf·f)
Communication	M3 .5	0 .8 ~ 1 .2 N·m (0 .59 ~ 0 .89 lbf·f)
Power	M4	1 .2 ~ 1 .8 N·m (0 .89 ~ 1 .33 lbf·f)

‹DVM Hydro unit ›

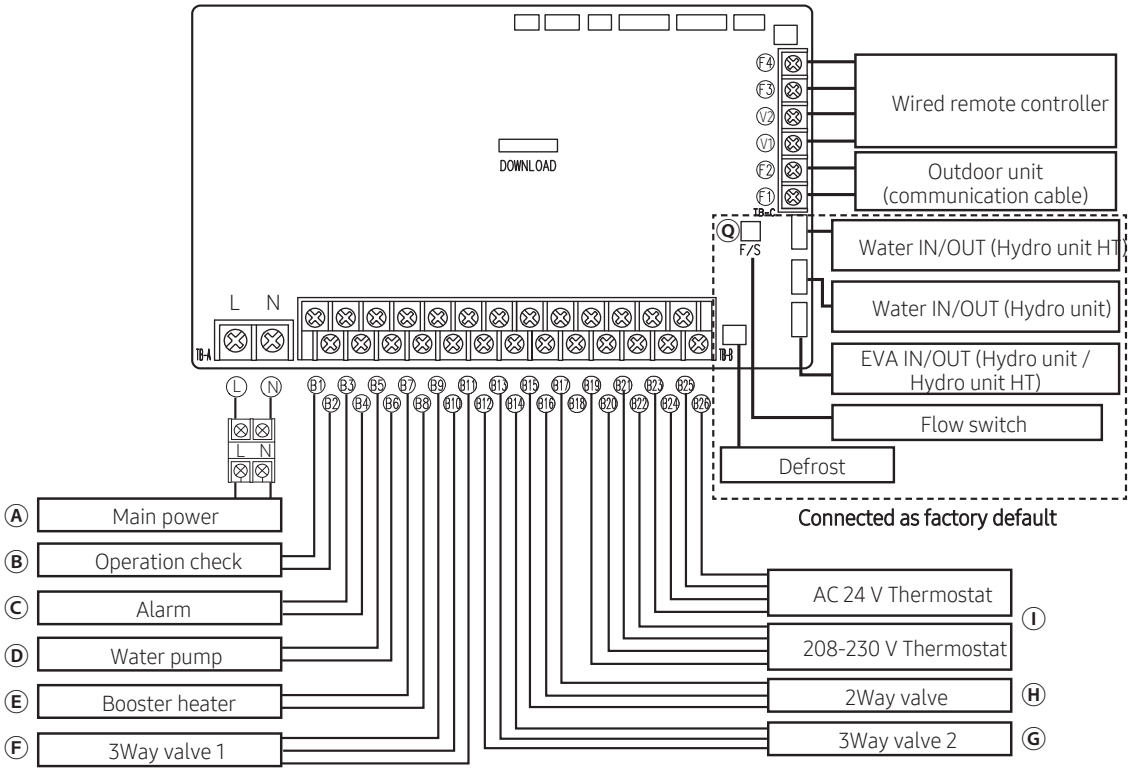


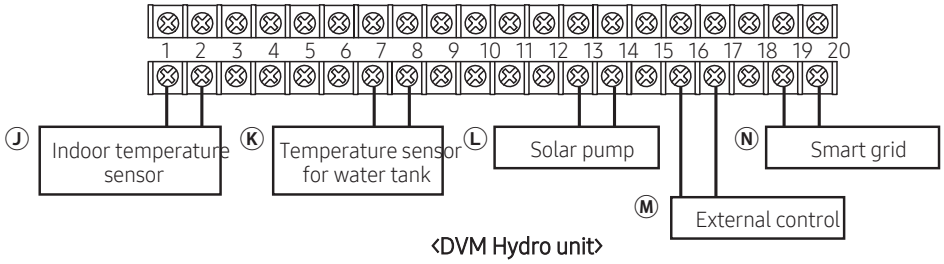
‹DVM Hydro unit HT›

13. Installation

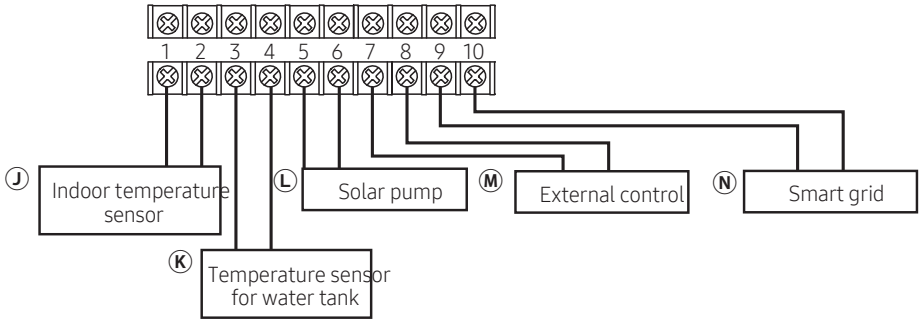
Connecting external contact

External contact connection diagram





<DVM Hydro unit>



<DVM Hydro unit HT>

13. Installation

Explanation		Terminal No.	Input / Output	AC/DC	Maximum allowable current
A	Power	L, N	Input	AC	2 .5 A
B	Operation check	B1, B2	Contact output	-	0 .5 A
C	Alarm	B3, B4	Contact output	-	0 .5 A
D	Water pump	B5, B6	Contact output	-	0 .5 A
E	Booster heater	B7, B8	Contact output	-	0 .5 A
F	3Way valve 1	B9 ~ B11	Output	AC	0 .5 A
G	3Way valve 2	B12 ~ B14	Output	AC	0 .5 A
H	2Way valve	B15 ~ B17	Output	AC	0 .5 A
I	AC 208-230, AC 24 V Thermostat	B19 ~ B26	Input	AC	10 mA
J	Separately installed indoor temperature sensor (MRW-TA)	1,2(1,2)	Input	DC	1 mA
K	Temperature sensor for water tank	7,8(3,4)	Input	DC	20 mA
L	Solar pump	13,14(5,6)	Contact input	-	10 mA
M	External control	16,17(7,8)	Contact input	-	1 mA
N	Smart grid	19,20(9,10)	Input	DC	1 mA
O	Communication cable (RS485)	F1, F2	Input , Output	DC	10 mA
P	Wired remote controller	V1	Output	DC	210 mA (per each controller)
		V2	Grounding	-	-
		F3, F4	Input, Output	DC	10 mA
Q	Flow switch	F/S	Input	DC	1 mA

❋ ( ) : Hydro unit HT

❋ For instruction regarding on wiring power, communication and wired remote controller, refer to "Connecting power and communication cable" chapter .

❋ External control: Operation On or Off by external contact signal

❋ Smart grid: Set by remote controller FSV
FSV#5041 : Default is 0 (Disable)
FSV#5042 : 0 (default) While the external contact is maintained as High, disable all heat source (heater) .
1 Use Booster Heater only

13. Installation

▶ Refer to the below table for the terminal numbers for connecting external contact.

Terminal No.	External contact	Function	Remarks
B1, B2	Operation check	Output operation status	Optional
B3, B4	Alarm	Output alarm status	Optional
B5, B6	Water pump	Output operation signal for a water pump	Mandatory
B7, B8	Booster heater	Output operation signal for booster heater of DHW tank	Optional
B9~B11	3Way valve 1	Output 3 way valve direction signal for indoor heating / DHW selection	Optional
B12~B14	3Way valve 2	Output for solar pump interconnection/defrost signal interconnection	Optional
B15~B17	2Way valve	Output 2 way valve switching signal for blocking cold water fall in floor cooling	Optional
B19, B20	AC 208-230, Thermostat 1	Input thermostat signal for cooling (AC 208-230 V)	Optional
B21, B22	AC 208-230, Thermostat 2	Input thermostat signal for heating (AC 208-230 V)	Optional
B23, B24	AC24, Thermostat 1	Input thermostat signal for cooling (AC 24V)	Optional
B25, B26	AC24, Thermostat 2	Input thermostat signal for heating (AC 24V)	Optional
1, 2 (1, 2)	Indoor temperature sensor	Connect indoor temperature sensor (Connection status can be checked on the wired remote controller .)	Optional
7, 8 (3, 4)	Temperature sensor for water tank	Connect temperature sensor of DHW tank (Connection status can be checked on the wired remote controller .)	hot water supply operation
13, 14 (5, 6)	Solar pump	Input contact signal for solar heat pump operation	Optional
16, 17 (7, 8)	External control	Input external contact control signal (Refer to seg 14 of 02 series remote controller installation option .)	Optional
19, 20 (9, 10)	Smart grid	Input contact signal for smart grid	Optional

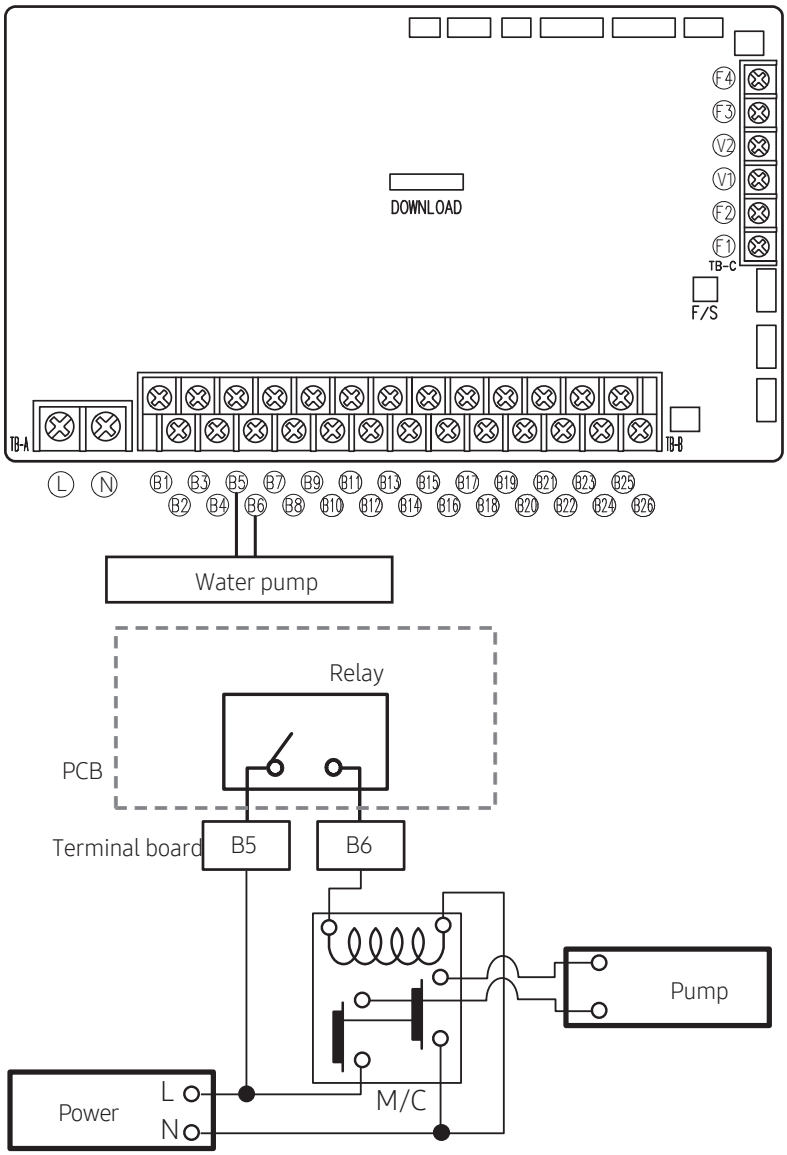
✻ ( ) : Hydro unit HT

✻ You may need to set different field specifications for the wired remote controller depending on the function .

13. Installation

Water pump connection

▶ Connect a water pump to B5, B6 of the PBA terminal block.



CAUTION

- Terminal of this product is for water pump and the maximum allowable current is 0 .5 A

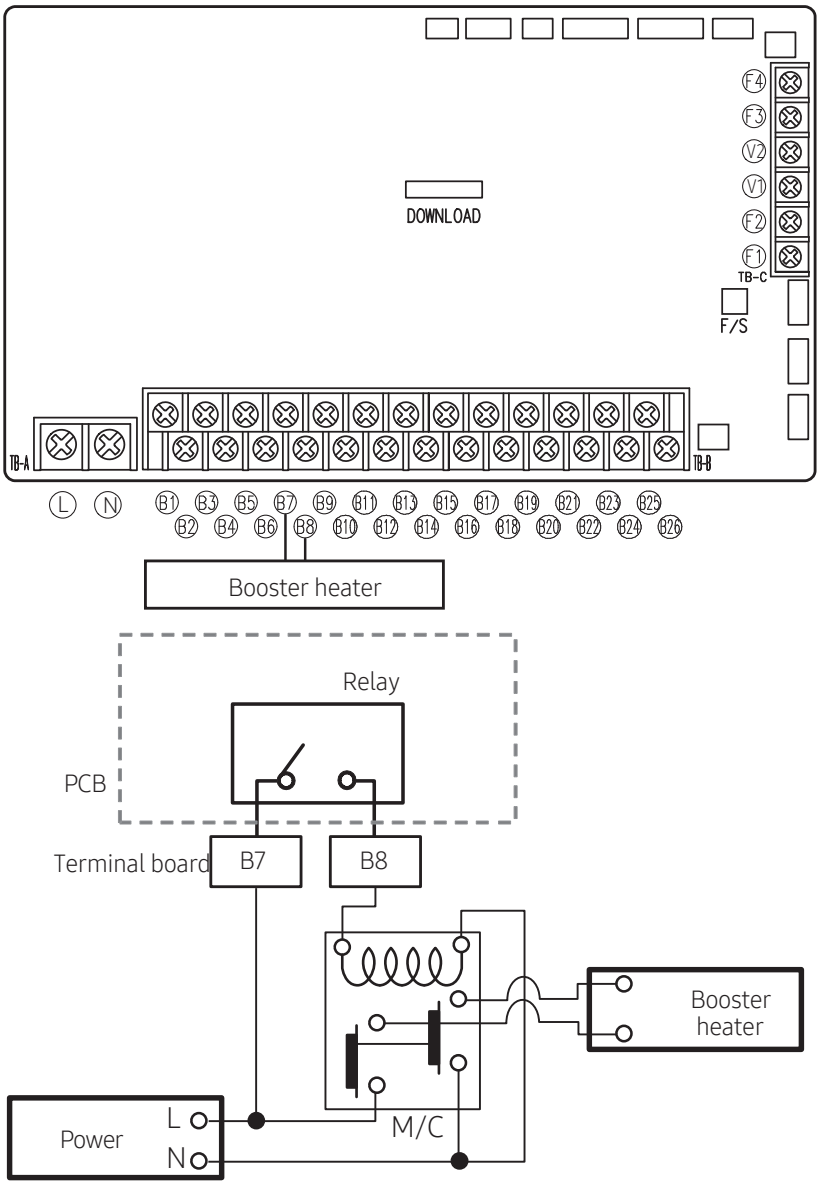
Specification table

Part	Specification
Terminal block (Output)	B5, B6
Connection type	Water pump (No-voltage contact)

13. Installation

Booster heater connection

▶ Connect a booster heater to B7, B8 of the PBA terminal block .



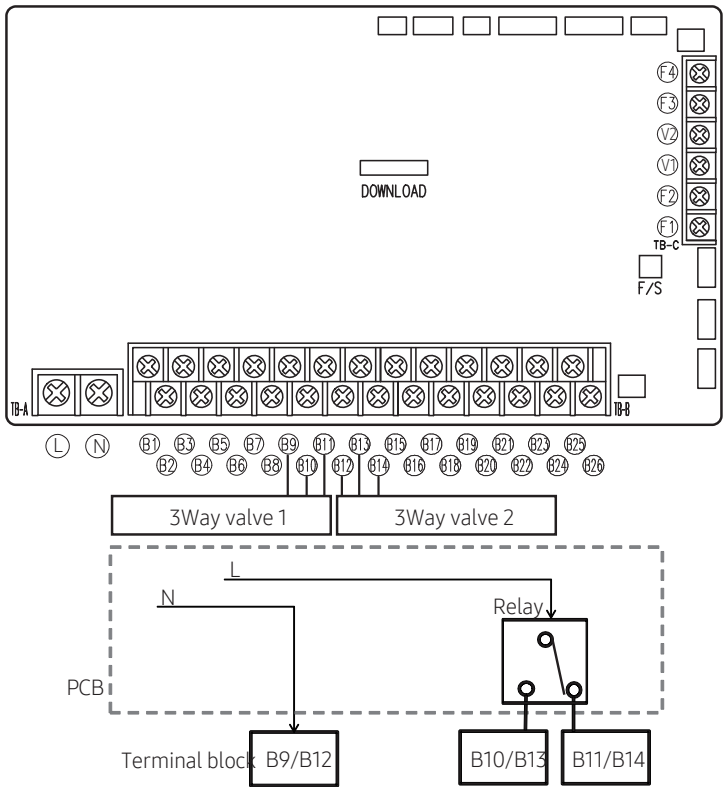
Specification table

Part	Specification
Terminal block (Output)	B7, B8
Connection type	Booster heater (No-voltage contact)

13. Installation

3Way valve connection

- ▶ Check the type of 3Way valve and connect it to the terminal board as shown in the illustration.
- ▶ Use a rated wire and connect it as shown in the illustration.
- ▶ 3 Way valve 1: When the valve is connected to B9 and B11, its direction should be indoor side.
- ▶ 3 Way valve 2: When the valve is connected to B12 and B14, its direction should be tank side.



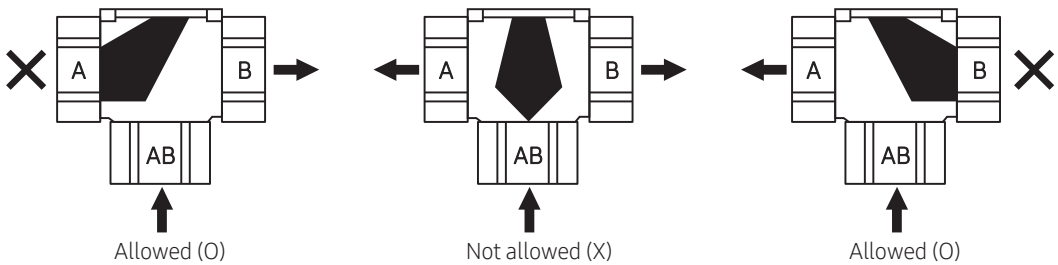
* Initially, relay is connected between L and B11/B14 of the terminal block.

CAUTION

- Before completing installation of 3Way valve, check the opening direction of the port.

Part	Specification
Output (B9 ~ B11, B12 ~ B14)	AC 208-230 V (Max 0 .5A / 120W)

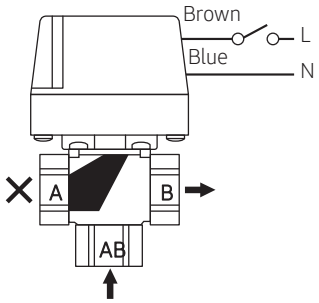
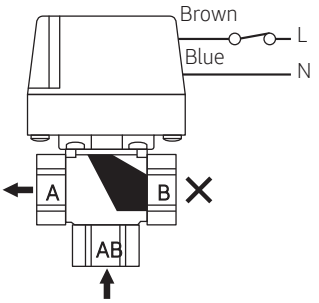
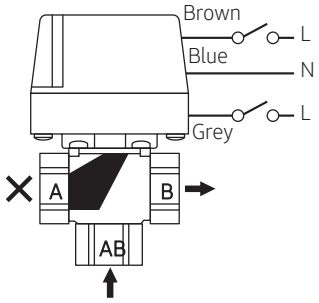
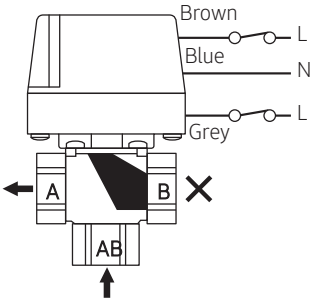
Allowed connection



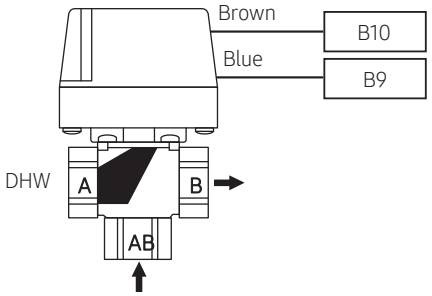
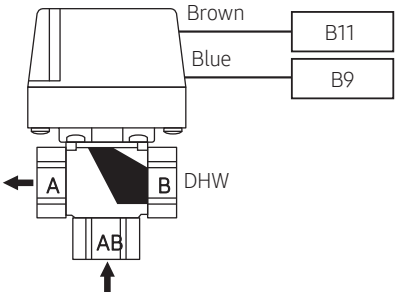
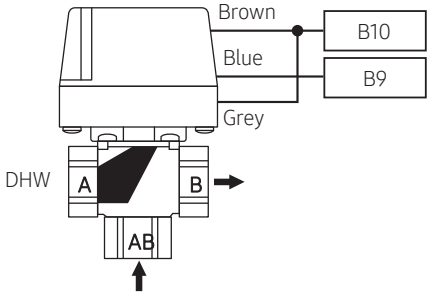
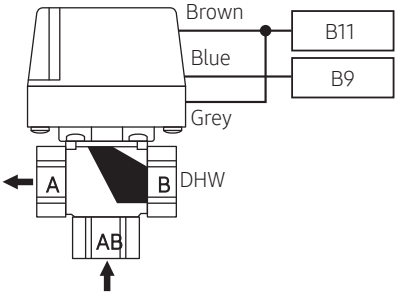
13. Installation

Example of installation (Danfoss H-series valve)

▶ Connecting the valve

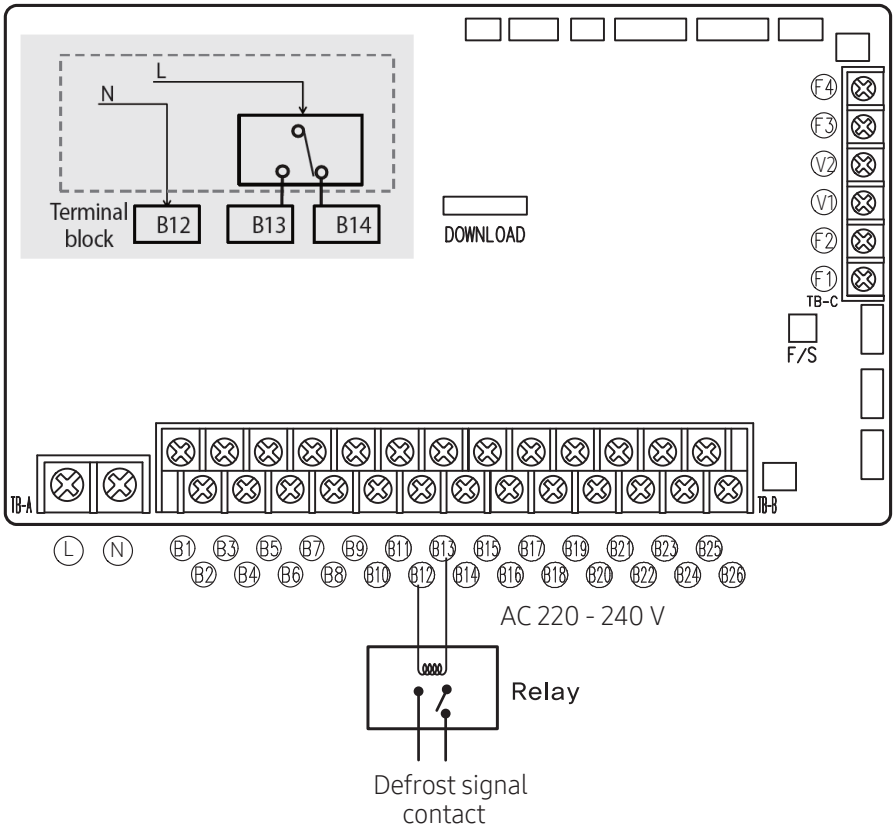
3-port diverter valves		
3-port mid-position valves		

▶ Example of wiring

3-port diverter valves		
3-port mid-position valves		

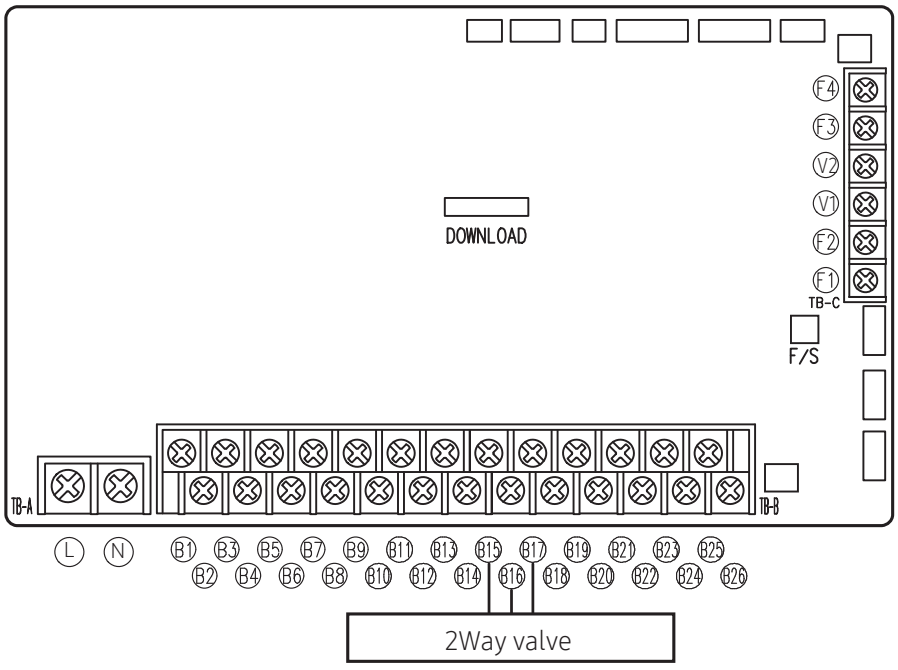
13. Installation

✻ Connect B12/B13 (3 Way valve 2) of the terminal block to use the defrost mode contact output .



Connecting 2Way valve

- ▶ Connect a 2Way valve to B15, B16 and B17 of the PBA terminal block .
- ▶ 2Way valve is interlocked with 3Way valve 1.



✻ Initially, relay is connected between L and B17 of the terminal block .

13. Installation

CAUTION

- Terminal of this product is for 2Way valve and the maximum allowable current is 0.5 A

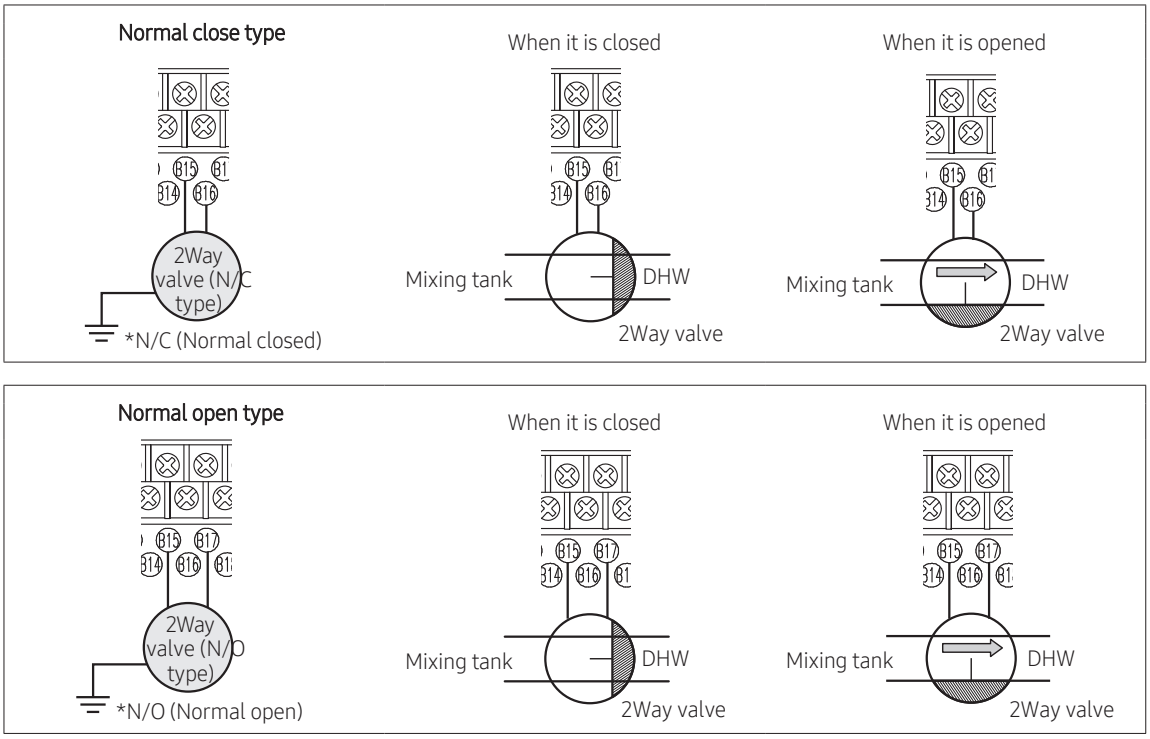
Specification table

Part	Specification
Terminal block (Output)	B15: Output power N B16: Output power L (switch type) B17: Output power L (switch type)
Connection type	Directly connect 2Way valve (below 0 .5 A)
Output (B15~B17)	AC 208 ~ 230 V (Max 0.5 A / 120 W)

Wiring 2Way valve

When floor cooling and fan coil unit cooling operate at the same time, 2 way valve prevent temperature drop of the floor.

▶ Use a rated wire to connect it as shown in the illustration and fix it with a cable tie.
▶ Initial setting of the valve is 'closed (no flow)'.



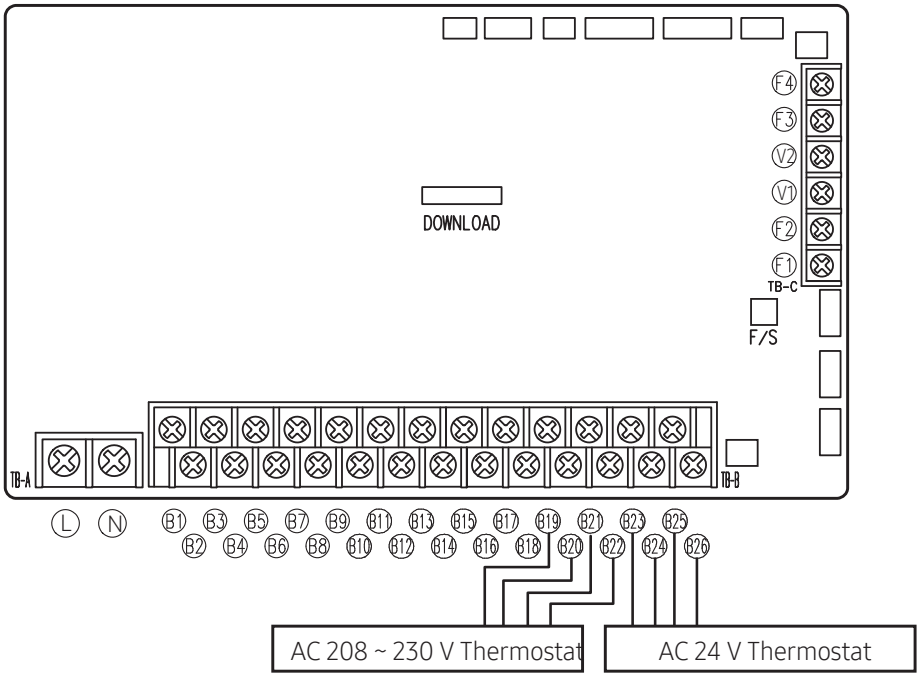
CAUTION

- Wiring is different for a N/C (Normal closed) valve and N/O (Normal open) valve.

13. Installation

AC 208 ~ 230 V or AC 24V thermostat

- ▶ Connect the indoor thermostat to B19~B26 of the PBA terminal block.
- ▶ Connect a thermostat to the designated terminal as stated in the rated table.
- ▶ Only 1 type of thermostat can be connected. (B19~B22 or B23~B26)
- ▶ Product will not operate when signal for cooling and heating mode is inputted at the same time.



CAUTION

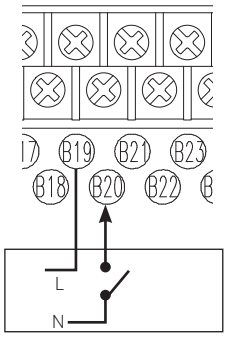
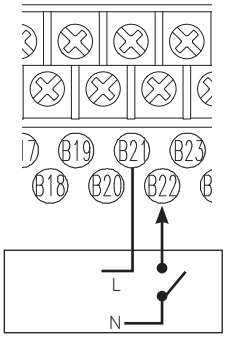
- Maximum allowable current of each terminal is below 10mA

Specification table

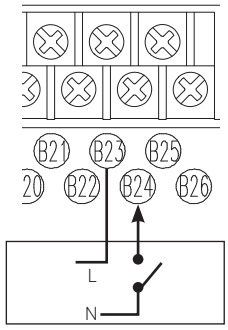
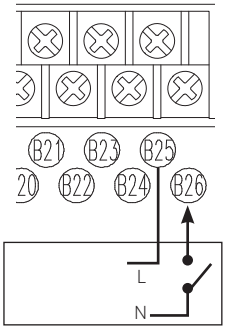
Part	Specification
Terminal block (AC 208 ~ 230 V)	B19: Output power L (for cooling mode) B20: Input power N (for cooling mode) B21: Output power L (for heating mode) B22: Input power N (for heating mode)
Terminal block (AC 24V)	B23: Output power L (for cooling mode) B24: Input power N (for cooling mode) B25: Output power L (for heating mode) B26: Input power N (for heating mode)
Connection type	Connect to indoor power controller
Input (B19~B22)	AC 208 ~ 230 V (Maximum 10 mA)
Input (B23~B26)	AC 24 V (Maximum 10 mA)
Condition for operation	When B20 or B24 is detected -> cooing mode When B22 or B26 is detected -> heating mode

13. Installation

AC 208 ~ 230 V thermostat

Cooling mode(Not use)	Heating mode
 Thermostat	 Thermostat

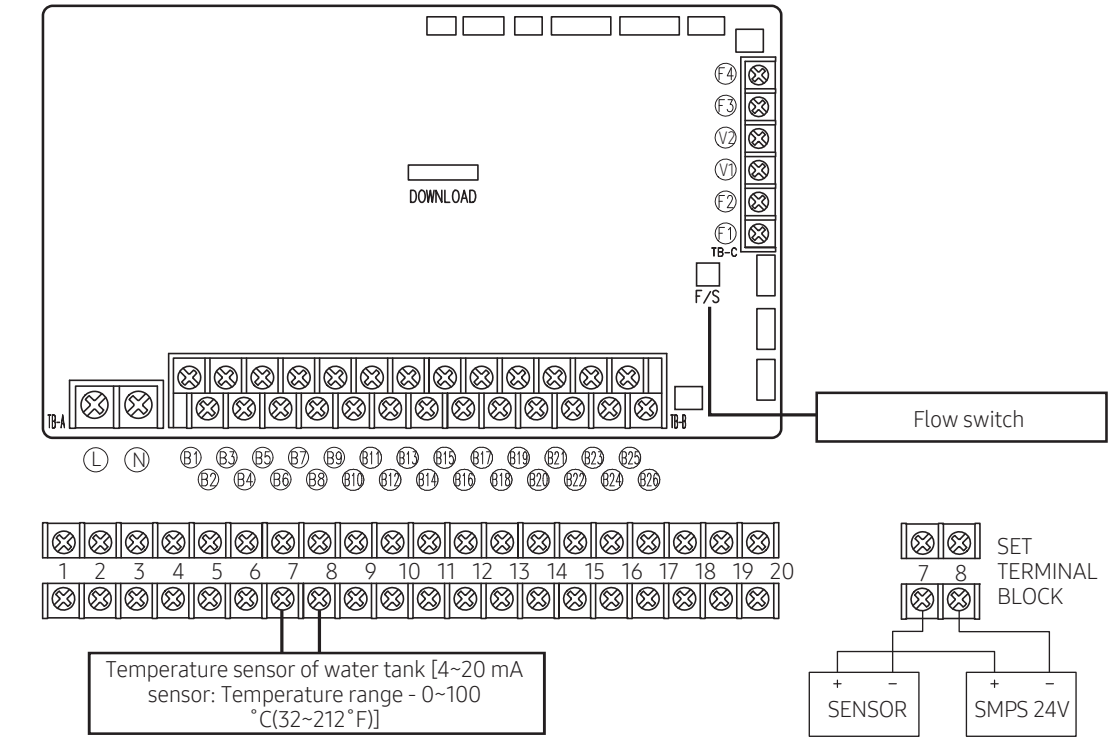
AC 24 V thermostat

Cooling mode(Not use)	Heating mode
 Thermostat	 Thermostat

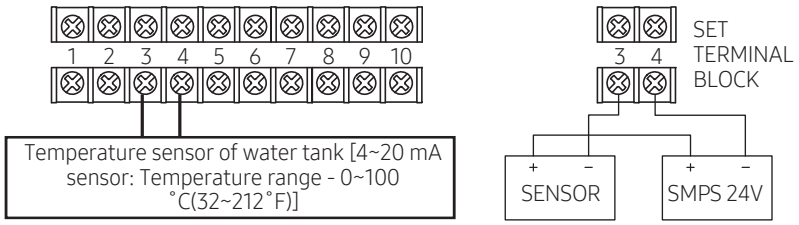
13. Installation

Connecting temperature sensor of water tank and flow switch

- Connect the temperature sensor of water tank to number 7 and 8 of the terminal block located on the bottom side.
- Connect 4~20 mA temperature sensor for water tank. When there is more than one unit, at least one of them should be connected directly to the temperature sensor.



<DVM Hydro unit>

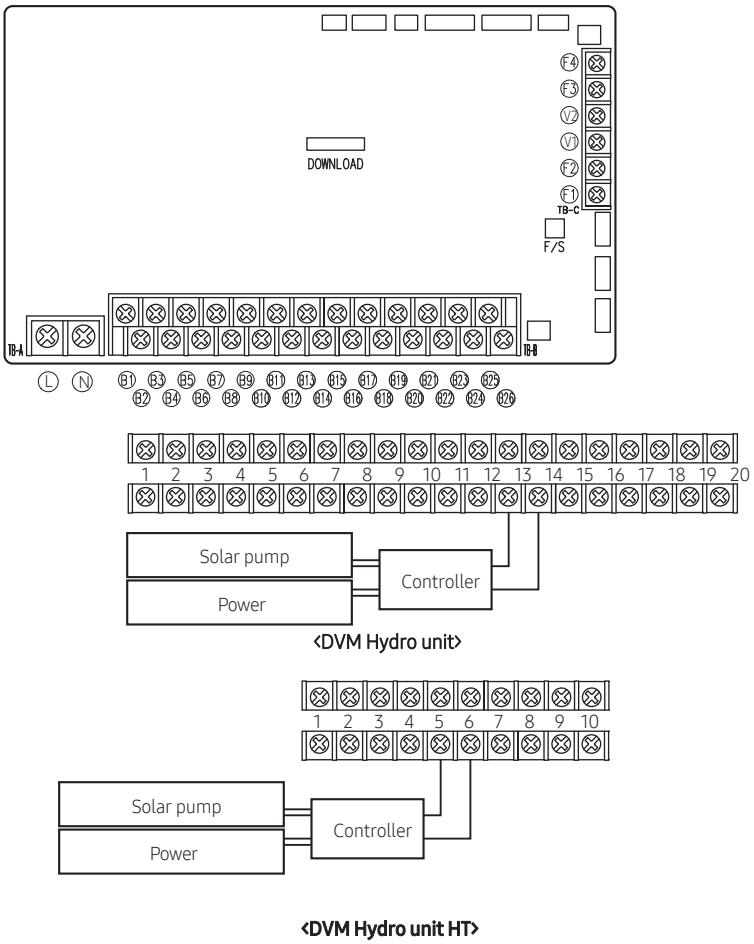


<DVM Hydro unit HT>

13. Installation

Connecting solar pump

▶ Connect the signal wire for solar pump to number 13 and 14 (HT: 5. 6) of the terminal block located on the bottom side.



<DVM Hydro unit>

<DVM Hydro unit HT>

CAUTION

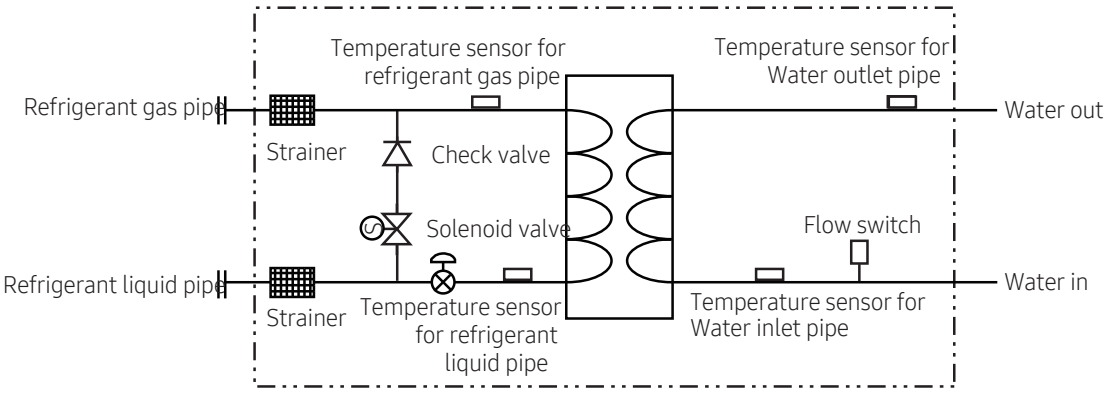
- Maximum allowable current of each terminal is below 10 mA .
- Ports number 13 and 14 (HT: 5. 6) is for input port for detection and they do not supply power to a solar pump.

Specification table

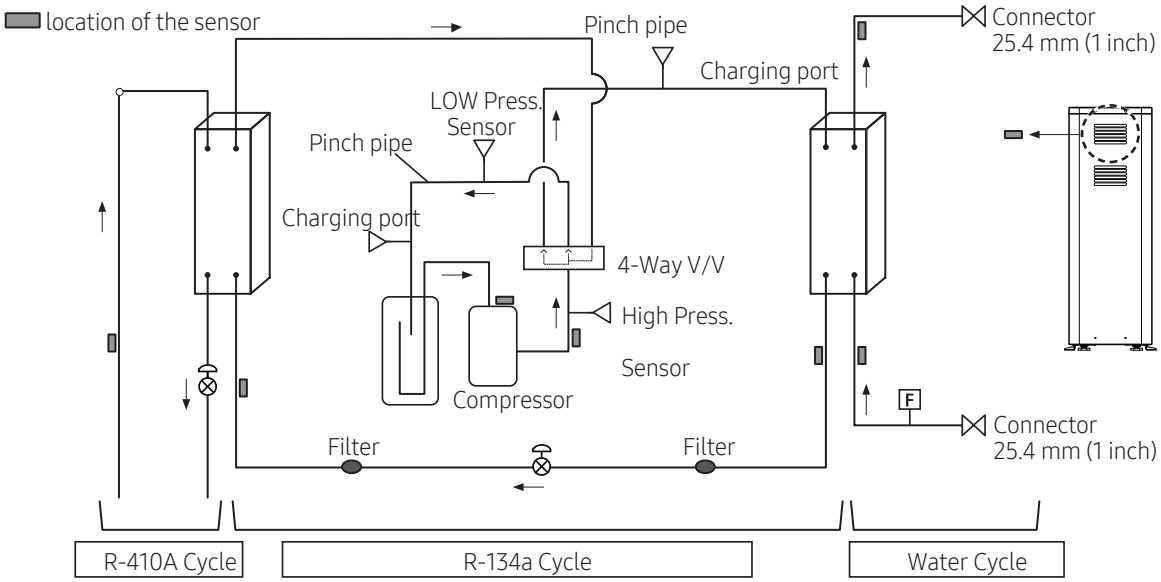
Part	Specification
Terminal block (Input)	13 and 14 (HT: 5. 6): No-voltage contact
Connection type	Connect to solar pump controller (contact signal)

13. Installation

System diagram for DVM Hydro unit / Hydro unit HT



<DVM Hydro unit>



<DVM Hydro unit HT>

2023. 08
Ver. 1.1

Samsung Electronics Co., LTD.
Head Office (Suwon Korea) 129, Samsung-Ro, Yeongtong-Gu, Suwon City, Gyeonggi-Do, Korea 16677
Website : www.samsung.com, https://partnerhub.samsung.com Email : airconditioner@samsung.com