

VHEC-VHTCHydro Units | **R-410A** | 60Hz

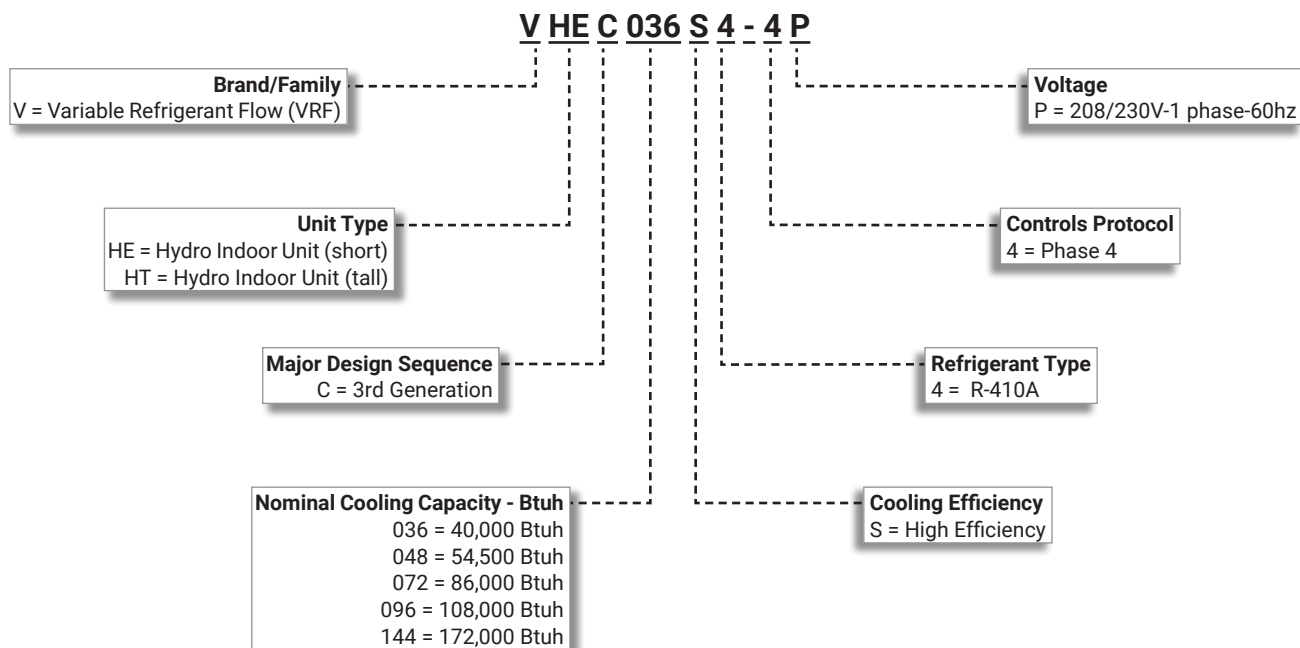
40,000 to 172,000 Btuh

**COMMERCIAL
PRODUCT SPECIFICATIONS (EHB)**

VHEC036-144



VHTC054-072

MODEL NUMBER IDENTIFICATION

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Line up

Hydro Unit VHEC

Capacity(Heating)	40 kBtu/h	54.5 kBtu/h	108 kBtu/h	172 kBtu/h
Image				
Model	VHEC036S4-4P	VHEC048S4-4P	VHEC096S4-4P	VHEC144S4-4P

Hydro Unit VHTC

Capacity(Heating)	54.5 kBtu/h	86 kBtu/h
Image		
Model	VHTC048S4-4P	VHTC072S4-4P

Specification

Hydro Unit VHEC

Model CODE				VHEC036S4-4P	VHEC048S4-4P
Power Supply			Φ, #, V, Hz	1,2,208-230,60	1,2,208-230,60
Mode			-	HEAT PUMP	HEAT PUMP
Performance	Capacity (Nominal)	Cooling	Btu/h	-	-
		Heating	Btu/h	40,000	54,500
Power	Power Input (Nominal)	Cooling	W	-	-
		Heating		10	10
	Current Input (Nominal)	Cooling	A	-	-
		Heating		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
	Sound Power	Heating		-	-
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	Operating Temp. Range	Cooling	°F	-	-
		Heating	°F	-4~95	-4~95
	Operating Water Temp. Range		°F	68~122	68~122

NOTE

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

* 1) Nominal cooling capacities are based on;

- Watertemperature: 73.4°F(23°C) inlet, 64.4°F(18°C) outlet
- Indoortemperature: 80.6°F(27°C) DB, 66.2°F(19°C) WB
- Outdoortemperature: 95°F(35°C) DB, 75.2°F(24°C) WB

* 2) 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

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

* 4) The VRF system contains R410A (GWP=2,088) which is fluorinated greenhouse gas.

* Heat Exchanger type : Plate Heat Exchanger (STS)

Specification

Hydro Unit VHEC

Model CODE				VHEC096S4-4P	VHEC144S4-4P	
Power Supply			Φ, #, V, Hz	1,2,208-230,60	1,2,208-230,60	
Mode			-	HEAT PUMP	HEAT PUMP	
Performance	Capacity (Nominal)	Cooling	Btu/h	-	-	
		Heating	Btu/h	108,000	172,000	
Power	Power Input (Nominal)	Cooling	W	-	-	
		Heating		10	10	
	Current Input (Nominal)	Cooling	A	-	-	
		Heating		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	11/8	
	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	
	Sound Power	Heating		-	-	
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	Operating Temp. Range	Cooling	°F	-	-	
		Heating	°F	-4~95	-4~95	
	Operating Water Temp. Range		°F	68~122	68~122	

NOTE

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

* 1) Nominal cooling capacities are based on:

- Watertemperature: 73.4°F(23°C) inlet, 64.4°F(18°C) outlet
- Indoortemperature: 80.6°F(27°C) DB, 66.2°F(19°C) WB
- Outdoortemperature: 95°F(35°C) DB, 75.2°F(24°C) WB

* 2) 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

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

* 4) The VRF system contains R410A (GWP=2,088) which is fluorinated greenhouse gas.

* Heat Exchanger type : Plate Heat Exchanger (STS)

Specification

Hydro Unit VHTC

Model CODE				VHTC048S4-4P	VHTC072S4-4P
Power Supply			Φ, #, V, Hz	1,2,208-230,60	1,2,208-230,60
Mode			-	HEAT PUMP	HEAT PUMP
Performance	Capacity (Nominal)	Cooling	Btu/h	-	-
		Heating	Btu/h	54,500	86,000
Power	Power Input (Nominal)	Cooling	W	-	-
		Heating		3100	5000
	Current Input (Nominal)	Cooling	A	-	-
		Heating		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	NPT 1	NPT 1
	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
	Sound Power	Heating		-	-
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	Operating Temp. Range	Cooling	°F	-	-
		Heating	°F	-4~109.4	-4~109.4
	Operating Water Temp. Range			°F	77~176

NOTE

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

- * 1) Nominal cooling capacities are based on;
 - Water temperature: 73.4°F(23°C) inlet, 64.4°F(18°C) outlet
 - Indoor temperature: 80.6°F(27°C) DB, 66.2°F(19°C) WB
 - Outdoor temperature: 95°F(35°C) DB, 75.2°F(24°C) WB

- * 2) 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

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

* 4) The VRF system contains R410A (GWP=2,088) which is fluorinated greenhouse gas.

* Heat Exchanger type : Plate Heat Exchanger (STS)

Summary Table

Electrical characteristics

Hydro Unit VHEC

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	VHEC036S4-4P	1	2	60	208-230	187	253	0.05	2.2	15.0
16.0	VHEC048S4-4P									
31.5	VHEC096S4-4P									
50.4	VHEC144S4-4P									

Hydro Unit VHTC

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	VHTC048S4-4P	1	2	60	208-230	187	253	14.3	18.0	25.0
25.0	VHTC072S4-4P							23.1	30.0	40.0

NOTE

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

Capacity Table

Hydro Unit VHEC

1) Heating

Model	Outdoor Temp.(°F)		Water Inlet Temp.(°F)			
	DB	WB	68	86	104	113
VHEC036S4-4P	-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
VHEC048S4-4P	-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

Capacity Table

Hydro Unit VHEC

1) Heating

Model	Outdoor Temp.(°F)		Water Inlet Temp.(°F)			
	DB	WB	68	86	104	113
VHEC096S4-4P	-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
VHEC144S4-4P	-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

Capacity Table

Hydro Unit VHTC

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
VHTC048S4-4P	-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
VHTC072S4-4P	-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		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

ΔT=9°F

ΔT=18°F

ΔT=18°F

ΔT=18°F

Conditions

- ΔT = 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%

Capacity Table

Hydro Unit VHTC

2) Capacity calculation method

How to calculate heating capacity power input : Combination of outdoor unit and Hydro Unit VHTC

- Heating capacity and power input of Hydro Unit VHTC : 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
PI Indoor Unit(6TON)[kW]	3.831
PI Outdoor Unit(6TON)[kW]	5.10
PI System[kW]	8.93

= HT Capacity Table
 = HT Capacity Table (Ref. P.17)

 =Indoor Unit PI + Outdoor Unit PI

Outdoor Unit Capacity Table

Capacity Table

Hydro Unit VHTC

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	
PI System[kW]	11.54	= Total Indoor Unit PI + Outdoor Unit PI

Outdoor Unit Capacity Table

Flowrate Information

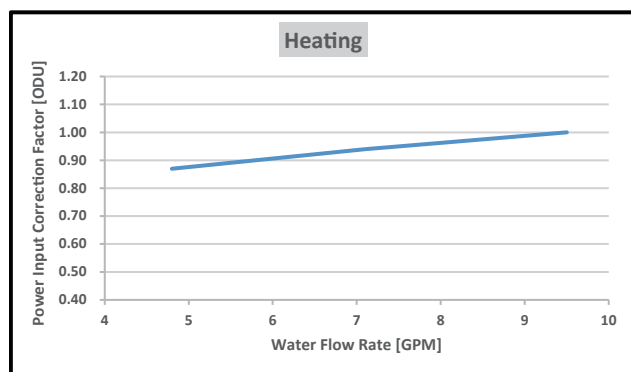
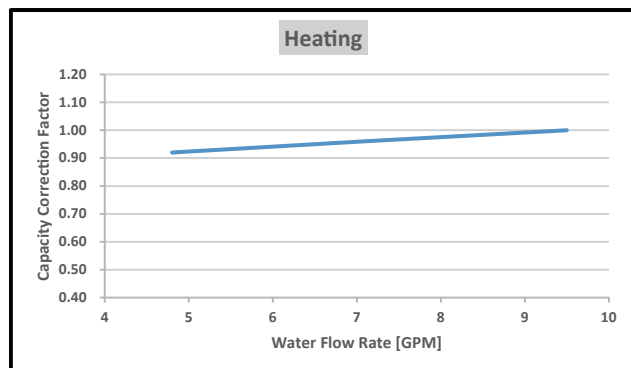
Flowrate[gpm]	**048**	**072**
ΔT = 27°F	4.1	6.4
ΔT = 18°F	6.1	9.5
ΔT = 9°F	12.2	19.0

Capacity correction

Hydro Unit VHEC

1) Capacity based on flow rate

(1) VHEC036S4-4P



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
$\Delta T=18^{\circ}\text{F}$	4.8	6.3	12.2	19.8
$\Delta T=9^{\circ}\text{F}$	9.5	12.7	24.3	39.6

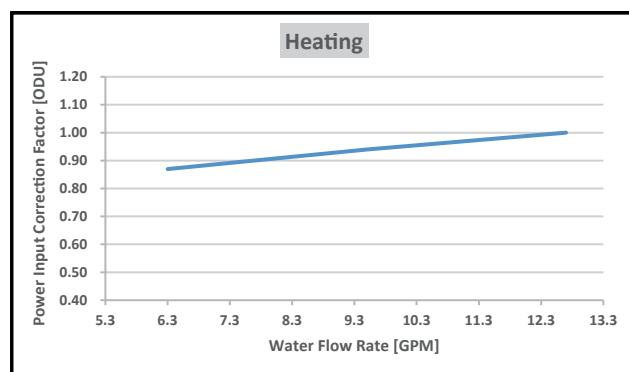
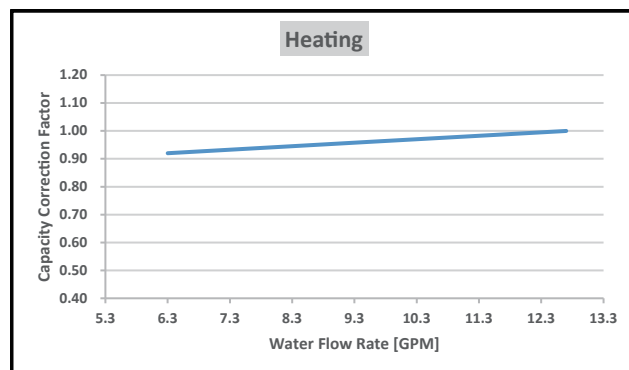
* Minimum flow rate of the Hydro unit is 50% of rated flow rate.

Capacity correction

Hydro Unit VHEC

1) Capacity based on flow rate

(2) VHEC048S4-4P



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
$\Delta T=18^{\circ}\text{F}$	4.8	6.3	12.2	19.8
$\Delta T=9^{\circ}\text{F}$	9.5	12.7	24.3	39.6

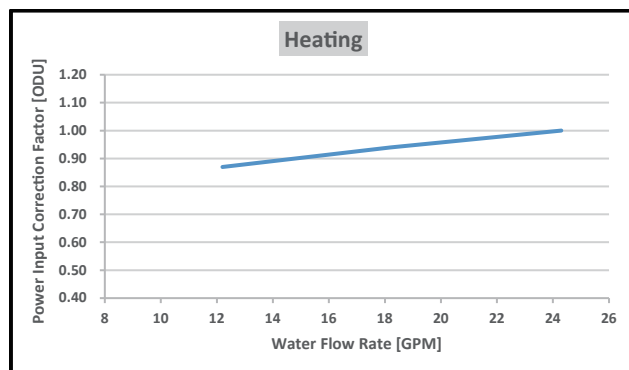
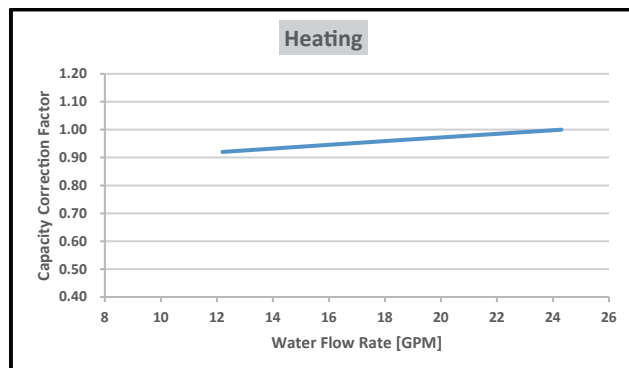
* Minimum flow rate of the Hydro unit is 50% of rated flow rate.

Capacity correction

Hydro Unit VHEC

1) Capacity based on flow rate

(3) VHEC096S4-4P



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
$\Delta T=18^{\circ}\text{F}$	4.8	6.3	12.2	19.8
$\Delta T=9^{\circ}\text{F}$	9.5	12.7	24.3	39.6

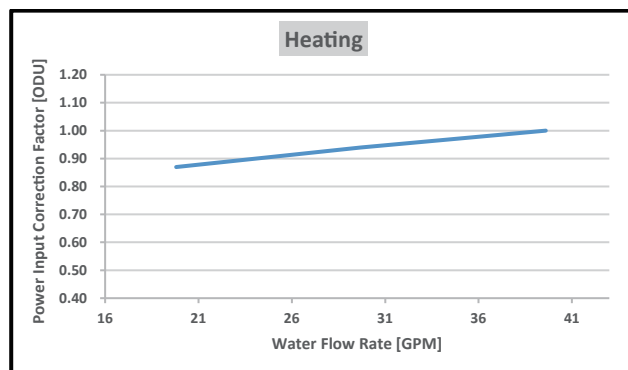
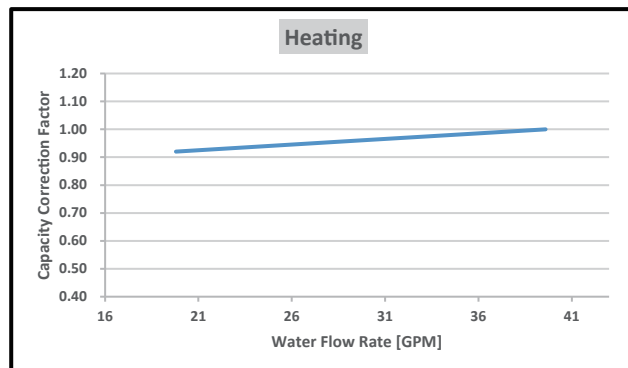
* Minimum flow rate of the Hydro unit is 50% of rated flow rate.

Capacity correction

Hydro Unit VHEC

1) Capacity based on flow rate

(4) VHEC144S4-4P



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

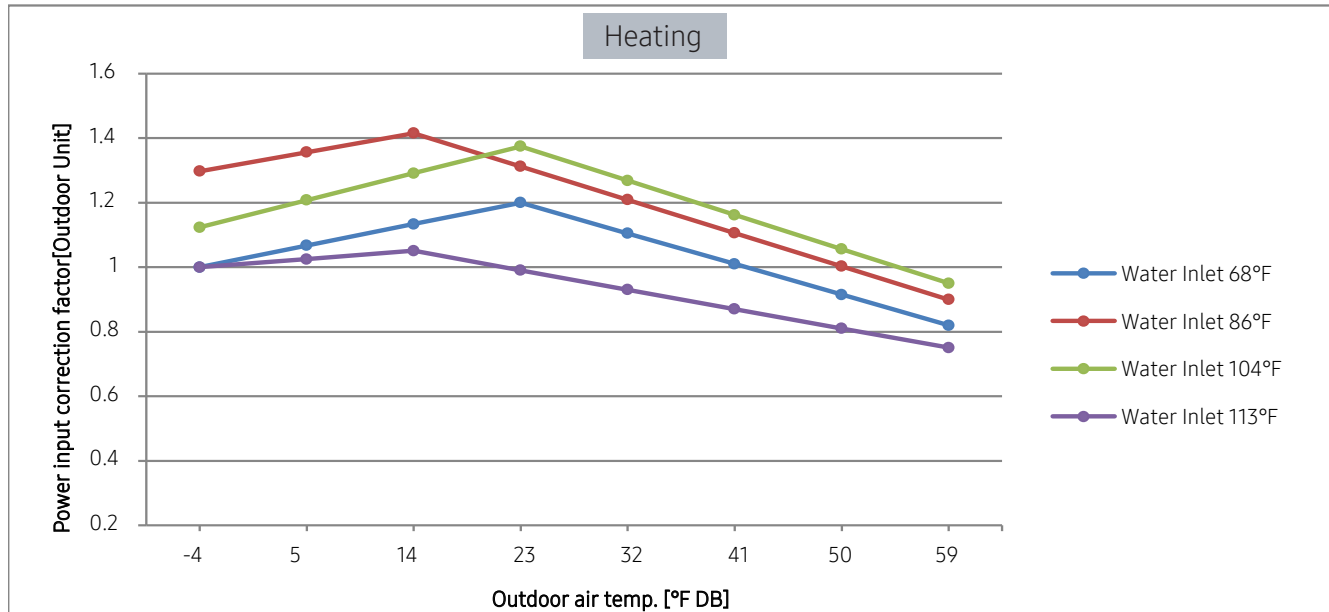
Flow Rate [GPM]	3TON	4TON	8TON	12TON
$\Delta T=18^{\circ}\text{F}$	4.8	6.3	12.2	19.8
$\Delta T=9^{\circ}\text{F}$	9.5	12.7	24.3	39.6

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

Capacity correction

Hydro Unit VHEC

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

Capacity correction

Hydro Unit VHTC

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.)

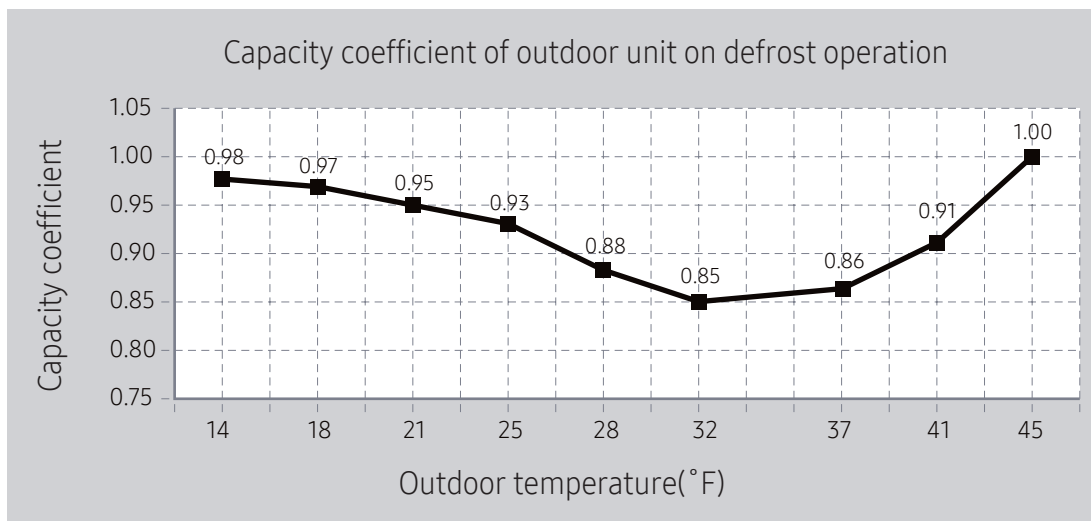
To remove frost on heat exchanger of outdoor unit, defrost operation is carried out periodically.

During defrost operation, capacity of outdoor unit may decrease.

The decrement is not considered to the individual capacity tables.

Outdoor temperature (°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 VHTC during defrost operation

	Power Input (W)
HT 4TON	1050
HT 6TON	1500

3. Capacity correction factor of Hydro Unit VHTC 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

Capacity correction

Hydro Unit VHTC

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 VHTC) = 0.3

3) Integrated capacity correction factor = $0.91 - (1 - 0.91) \times 0.3 = 0.883$

4) HC = $0.883 \times 54,500 \text{ Btu/h} \times 2\text{ea} = 109,000 \text{ Btu/h}$

5) Power input (Outdoor unit) = 6.88kW

6) Power input (Hydro Unit VHTC) = $\{ 0.91 \times (2,453\text{W} + 2,419\text{W}) / 2 + (1 - 0.91) \times 1,050\text{W} \} \times 2 = 4.62\text{kW}$

7) Total PI = $6.88 + 4.62 = 11.5\text{kW}$

Correction Factor : Ref.P15, Hydro Unit Capacity Table : Ref.P.10

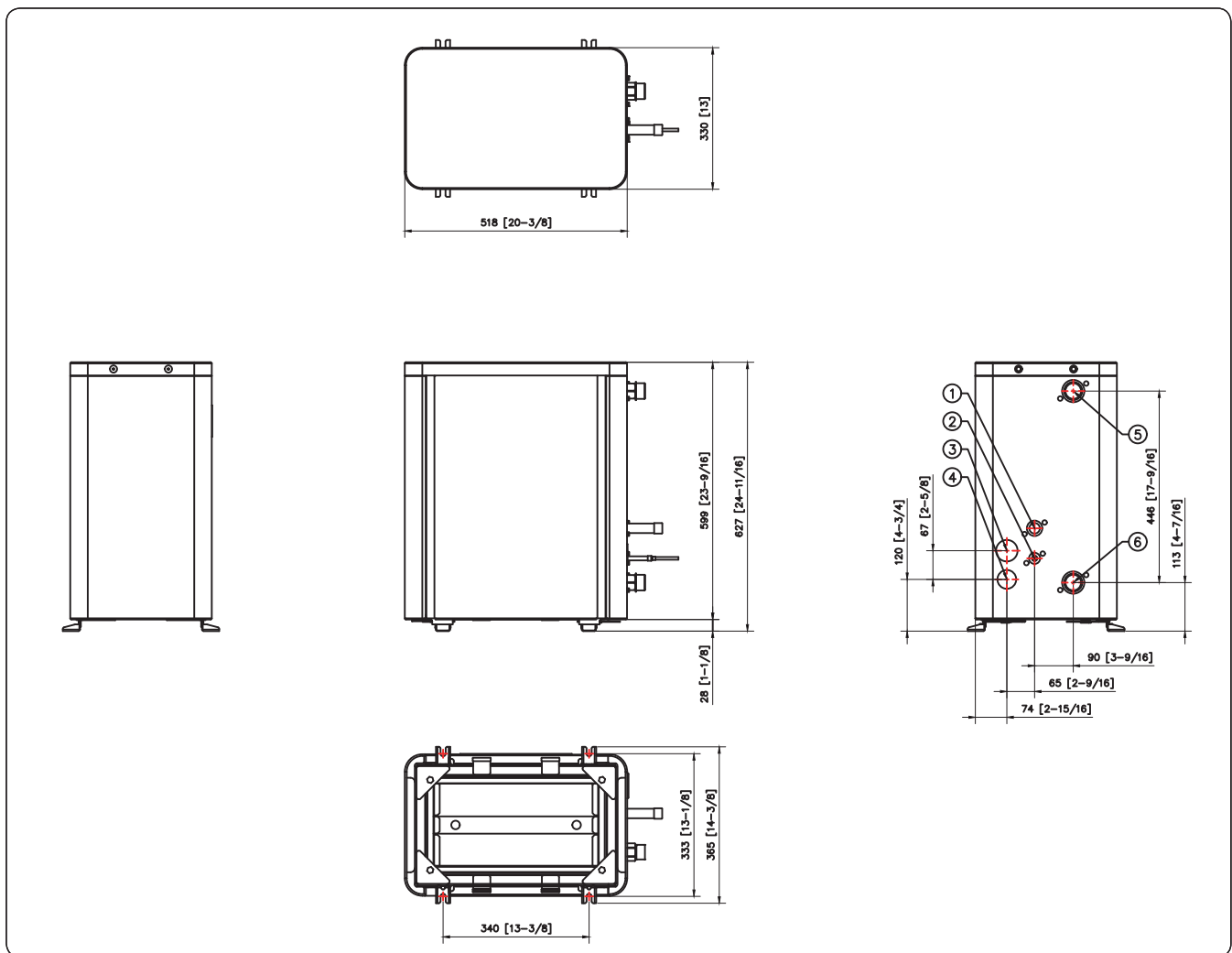
8TON DVM S TDB Heat Capacity Table

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

Dimensional Drawing

Hydro Unit VHEC

Unit: mm [inch]

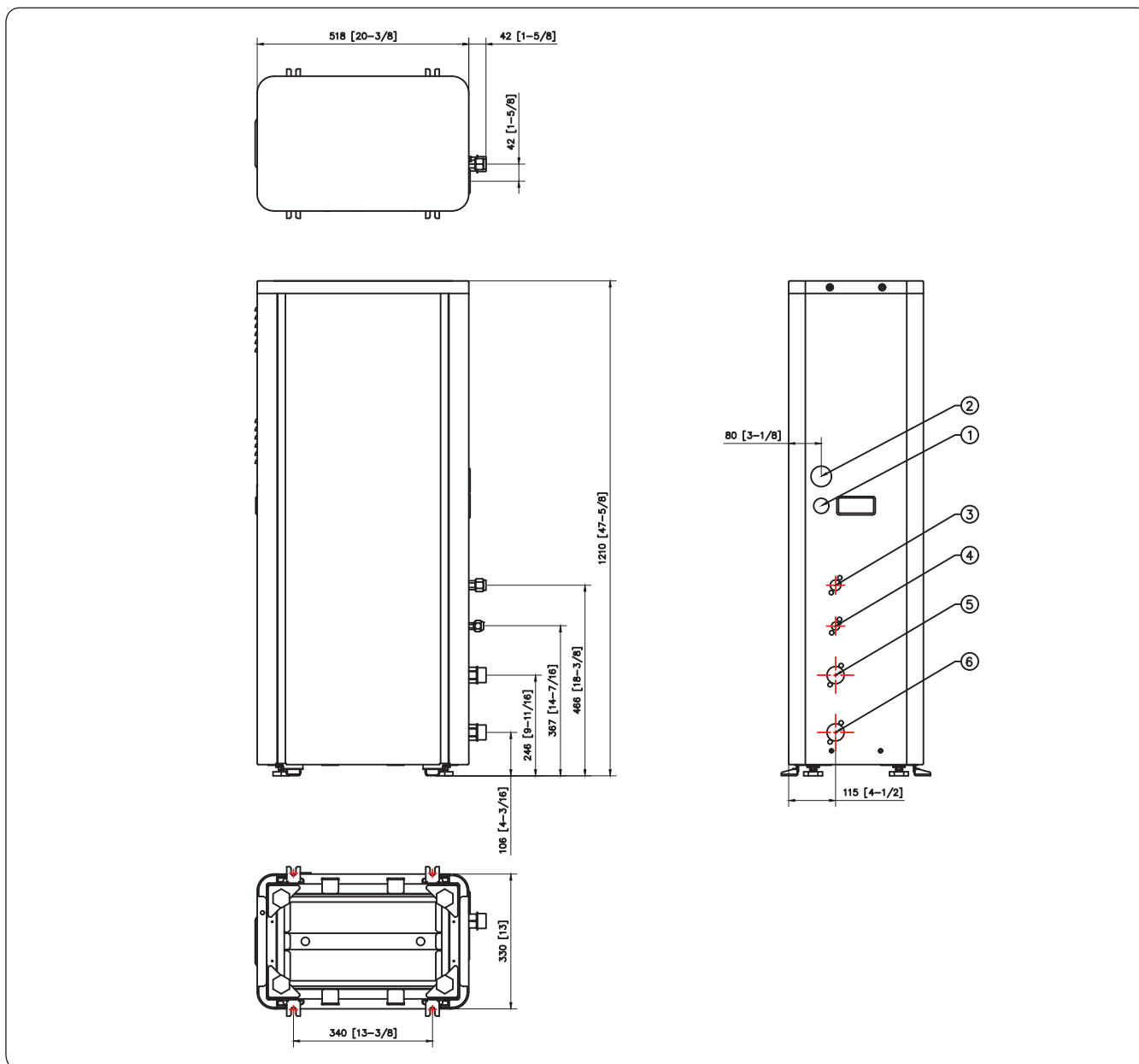


No.	Name	Description			
		VHEC036S4-4P	VHEC048S4-4P	VHEC096S4-4P	VHEC144S4-4P
1	Gas Pipe Connection	Φ15.88[5/8]	Φ22.22[7/8]	Φ28.58[1 1/8]	
2	Liquid Pipe Connection	Φ9.52[3/8]	Φ9.52[3/8]	Φ12.70[1/2]	
3	Communication Wiring Conduits	-	-	-	
4	Power supply conduit	-	-	-	
5	Water outlet pipe	-	-	-	
6	Water inlet pipe	-	-	-	

Dimensional Drawing

Hydro Unit VHTC

Unit: mm [inch]

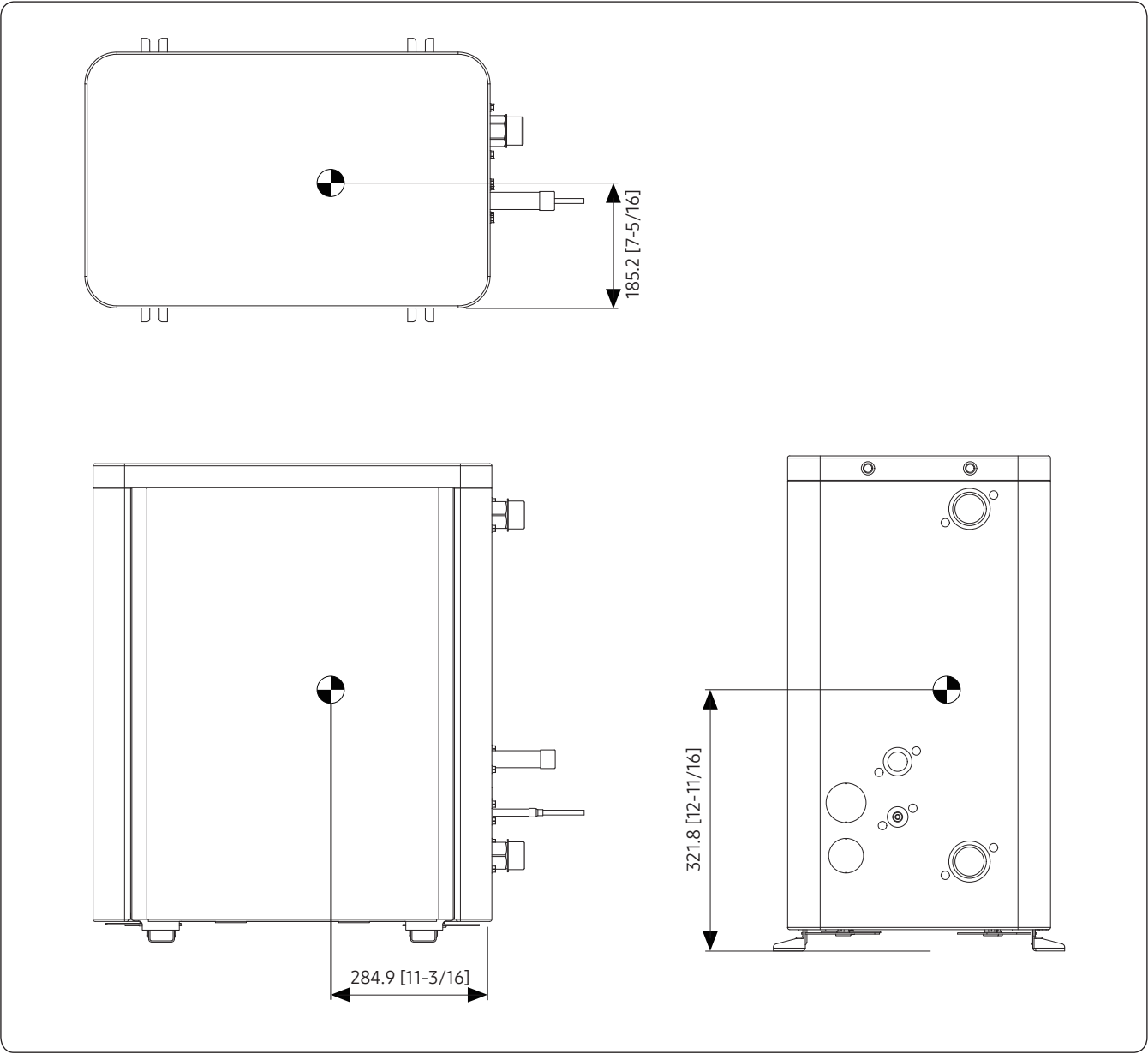


No.	Name	Description
1	Power supply conduit	-
2	Communication Wiring Conduits	-
3	Gas pipe connection	15.88 [5/8]
4	Liquid pipe connection	9.52 [3/8]
5	Water outlet pipe	-
6	Water inlet pipe	-

Center of Gravity

Hydro Unit VHEC

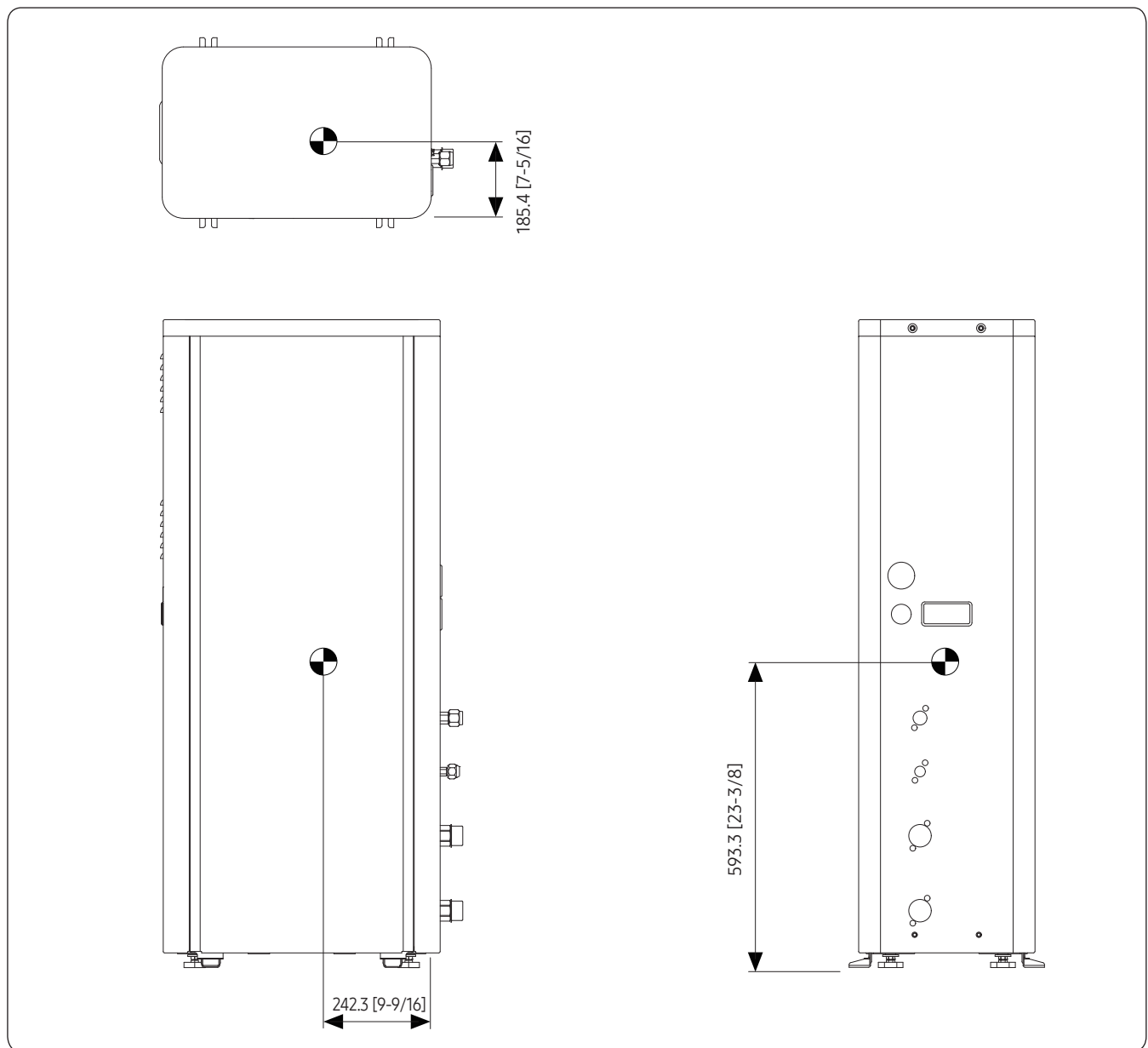
Unit: mm [inch]



Center of Gravity

Hydro Unit VHTC

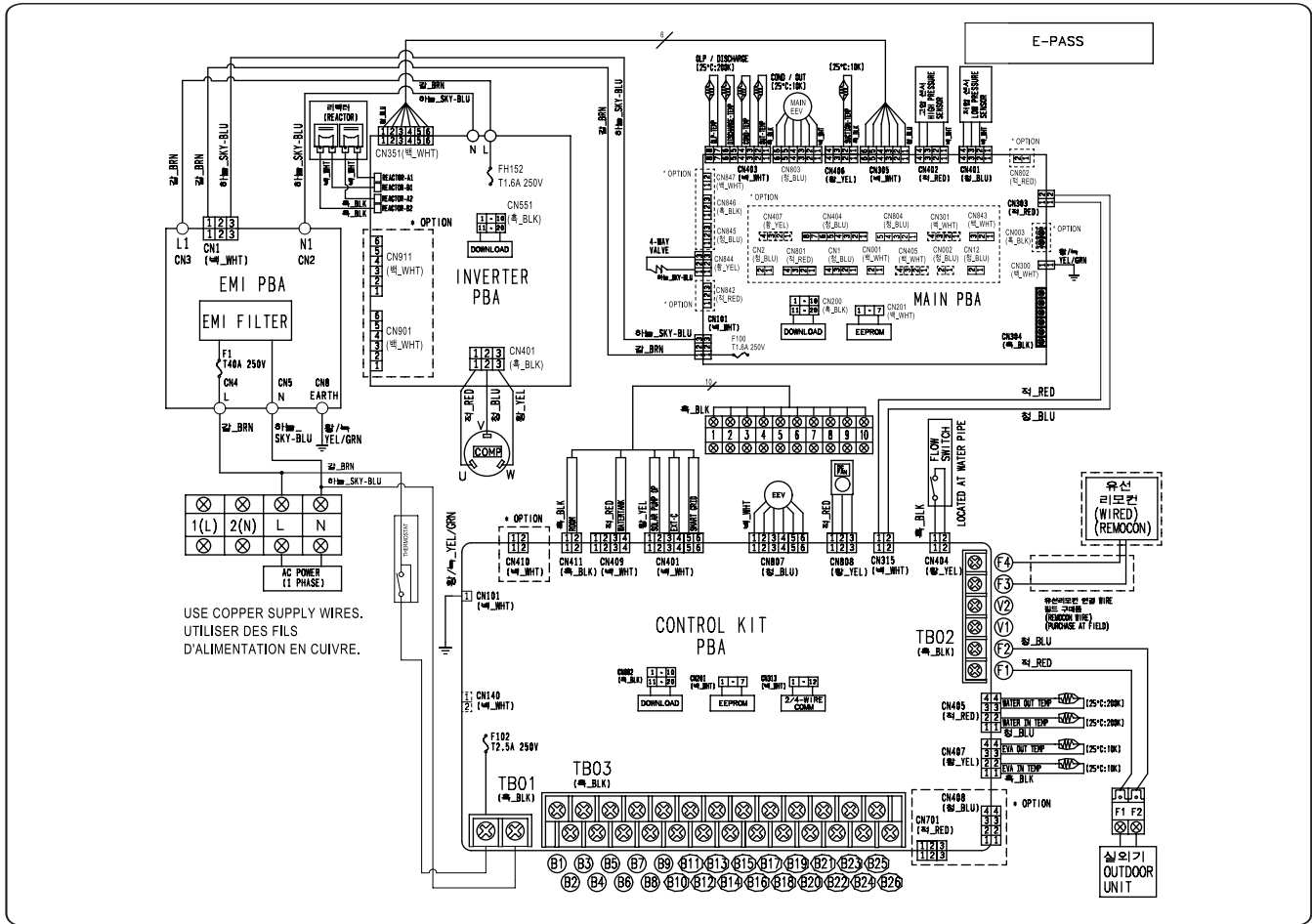
Unit: mm [inch]



Electrical wiring diagram

Hydro Unit VHTC

VHTC048S4-4P, VHTC072S4-4P



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 (CONTROL)	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

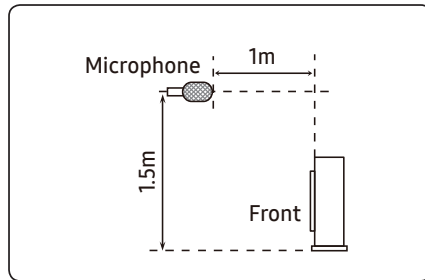
- This wiring diagram applies only to the Indoor unit.
- Symbols show as follow :
BLK: black, RED: red, BLU: blue, WHT: white, YEL: yellow, BRN: brown, SKY: skyblue: GRN: green
- For connection wiring indoor-outdoor transmission F1-F2, indoor-wired remote controller transmission F3-F4.
- ⊕ Protective earth(screw), □ : connector, $\frac{1}{2}$: The wire quantity

Sound Data

Hydro Unit VHEC

Sound pressure level

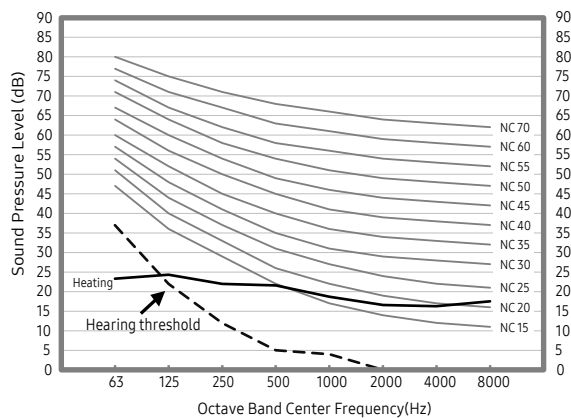
Unit: dB(A)



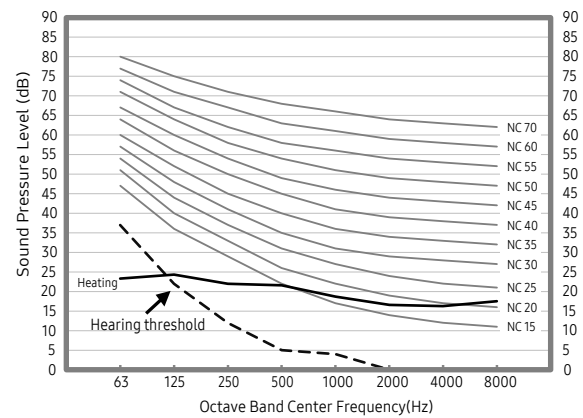
Model	Heating
VHEC036S4-4P	26
VHEC048S4-4P	26
VHEC096S4-4P	27
VHEC144S4-4P	31

• NC Curve

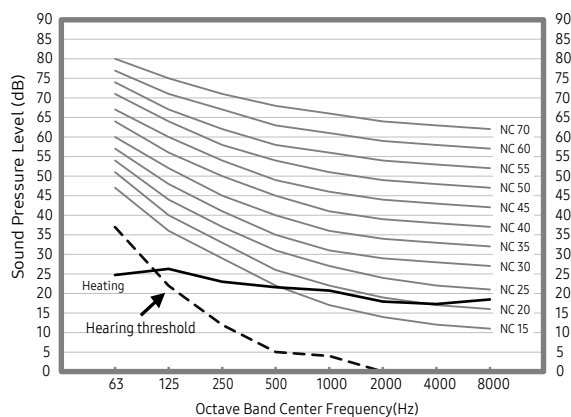
1) VHEC036S4-4P



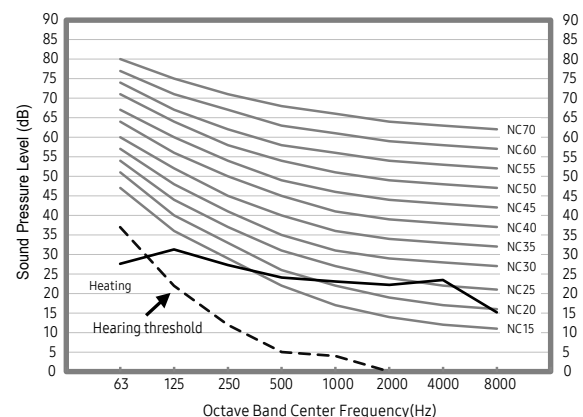
2) VHEC048S4-4P



3) VHEC096S4-4P



4) VHEC144S4-4P



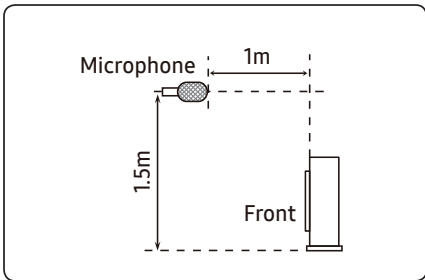
NOTE

- 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.
 - dB(A) = A weighted sound pressure level
 - Reference acoustic pressure 0 dB = 20μPa

Sound Data

Hydro Unit VHTC

Sound pressure level

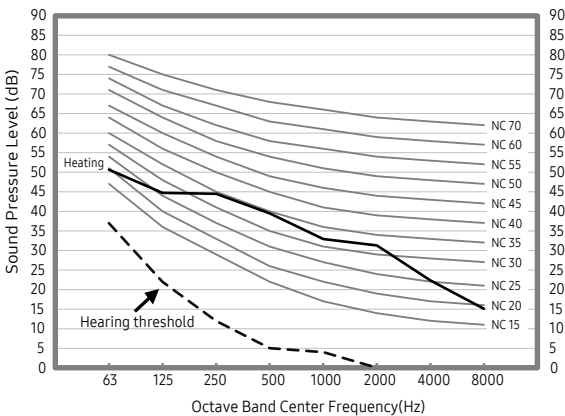


Unit: dB(A)

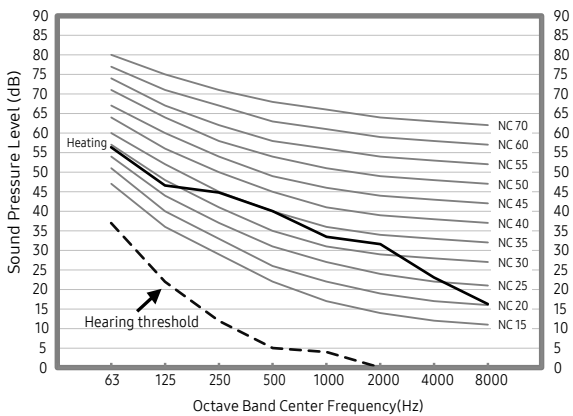
Model	Heating
VHTC048S4-4P	42
VHTC072S4-4P	42

- NC Curve

1) VHTC048S4-4P



2) VHTC072S4-4P



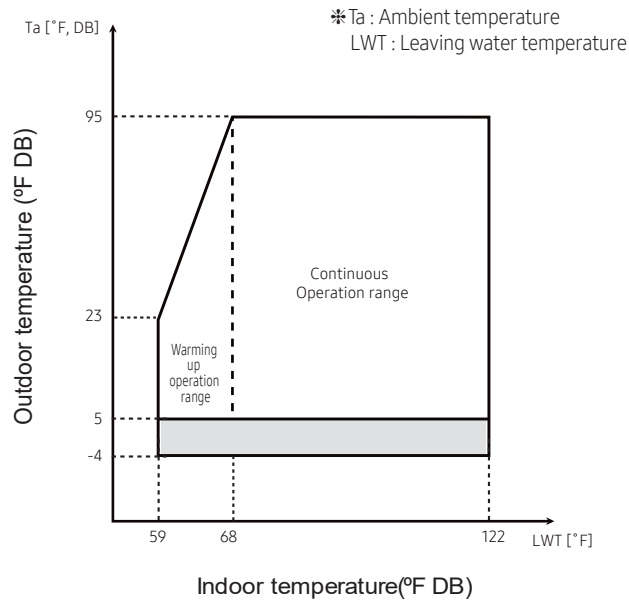
NOTE

- 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

Operation range

Hydro Unit VHEC

1) Heating

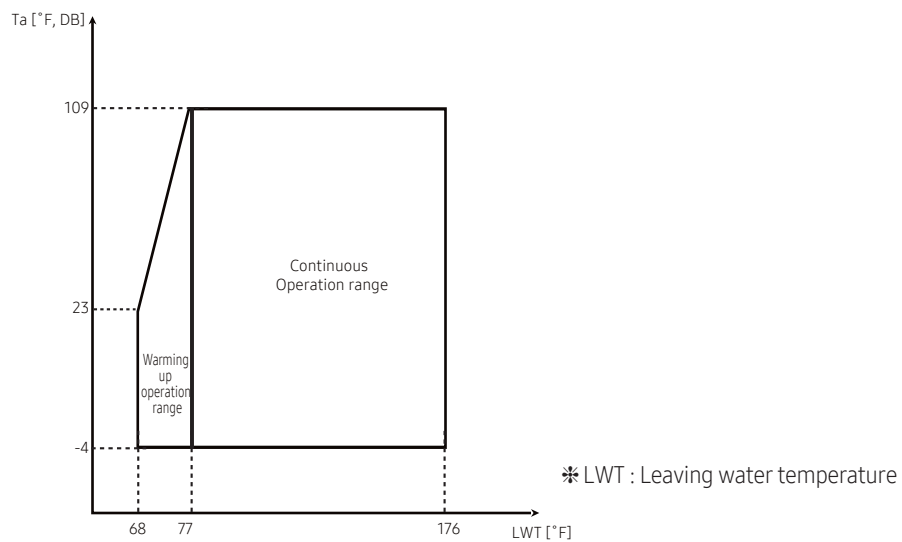


* : Operation of outdoor unit possible, but no guarantee of capacity in this condition.

Hydro Unit VHTC

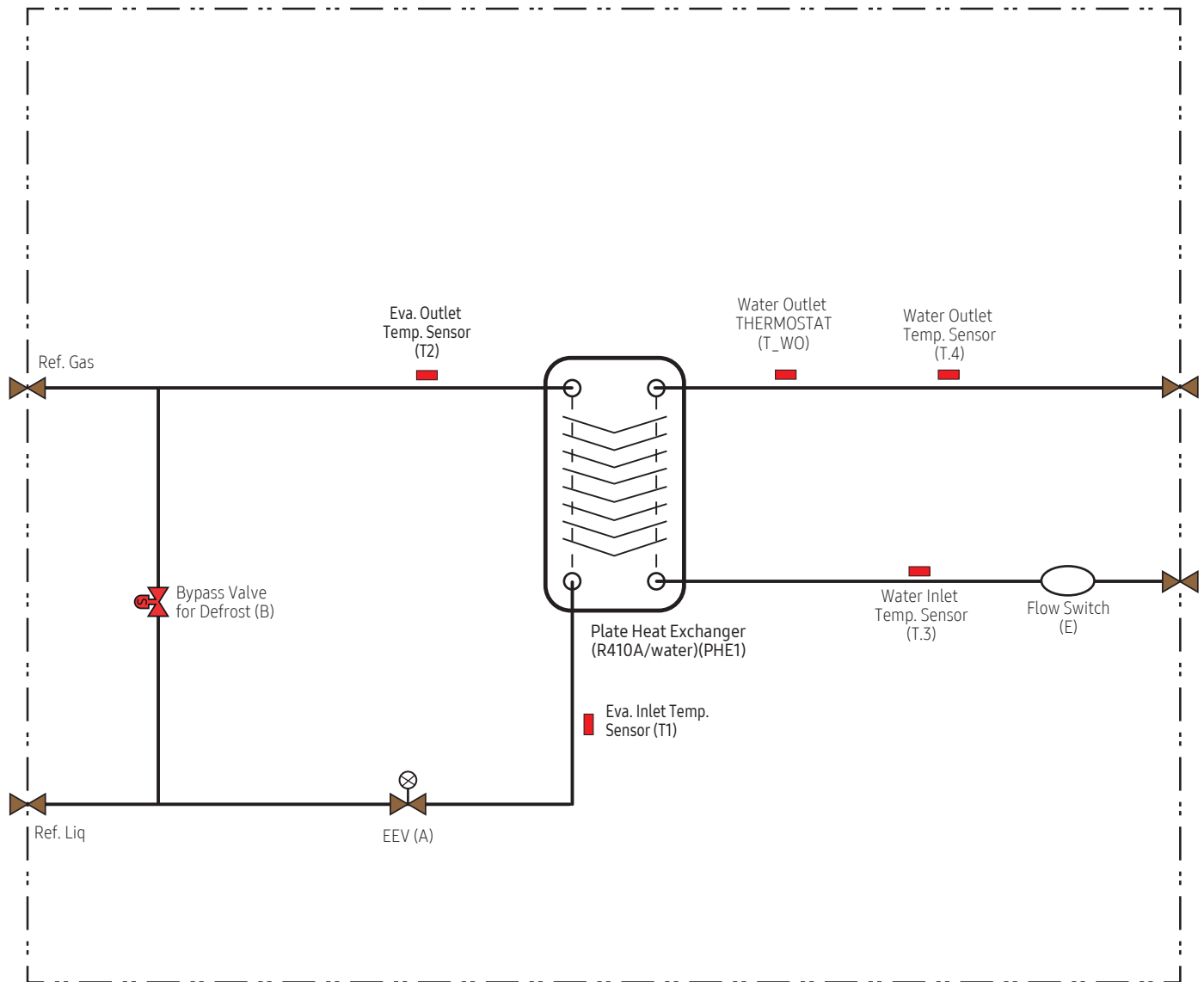
1) Heating

*Ta : Ambient temperature



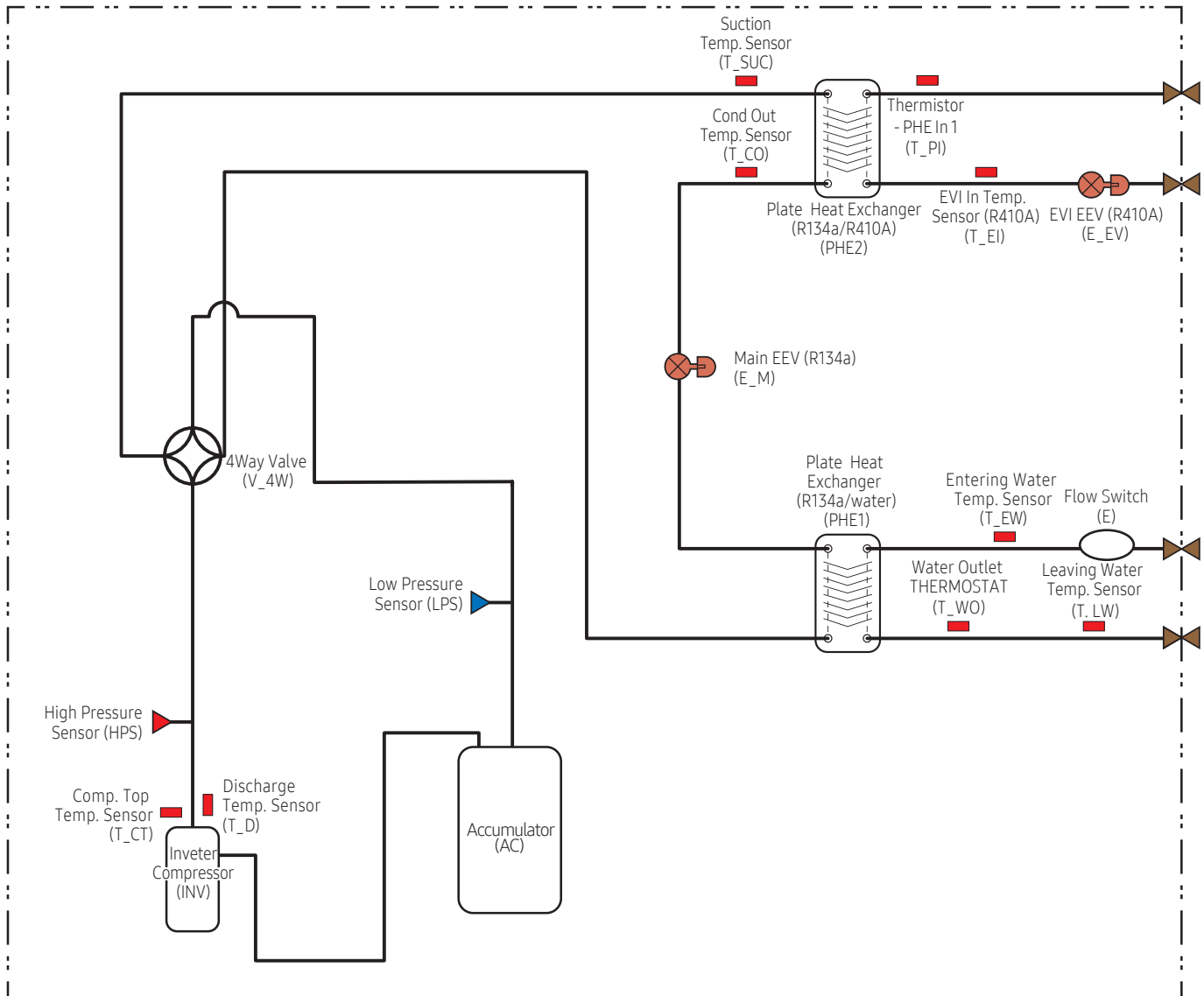
Piping Diagram

Hydro Unit VHEC



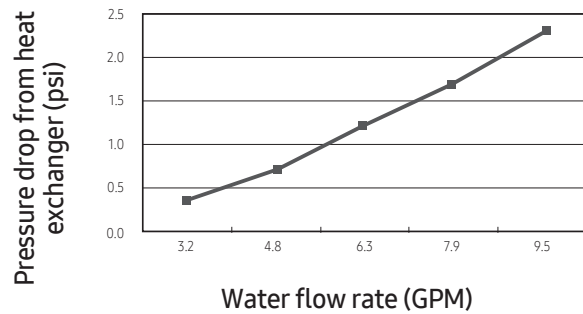
Piping Diagram

Hydro Unit VHTC

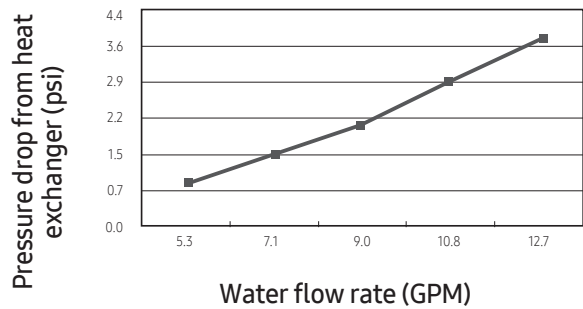


Hydraulic performance

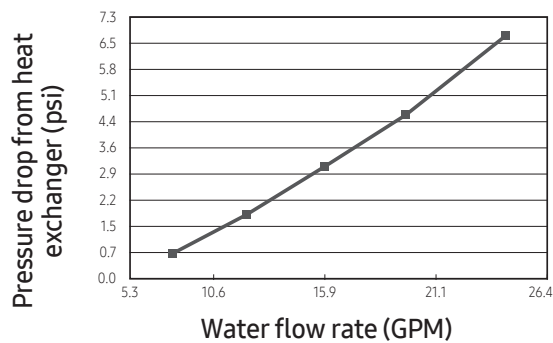
Hydro Unit VHEC



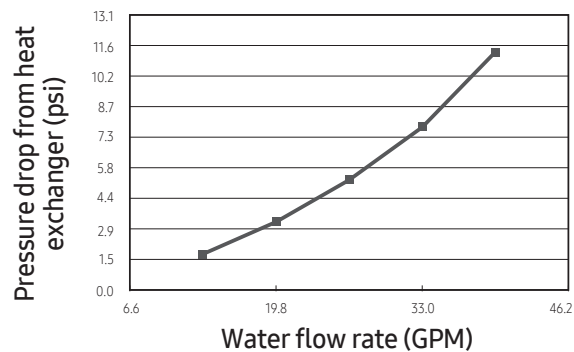
VHEC036S4-4P	
Water flow rate (GPM)	Pressure drop from heat exchanger (psi)
3.2	0.4
4.8	0.7
6.3	1.2
7.9	1.7
9.5	2.3



VHEC048S4-4P	
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



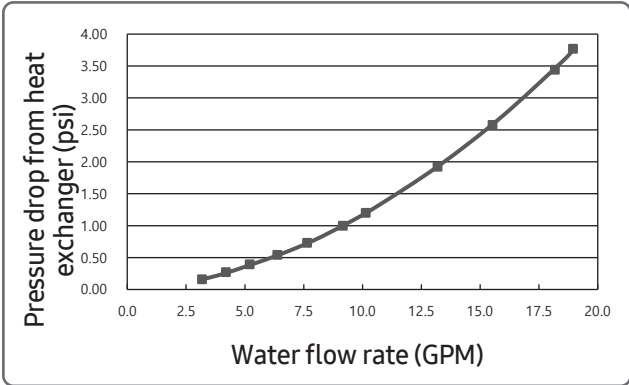
VHEC096S4-4P	
Water flow rate (GPM)	Pressure drop from heat exchanger (psi)
7.9	0.7
11.9	1.7
15.9	3
19.8	4.5
24.3	6.7



VHEC144S4-4P	
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

Hydraulic performance

Hydro Unit VHTC



VHTC048S4-4P, VHTC072S4-4P	
Water flow rate (GPM)	Pressure drop from heat exchanger (psi)
3.2	0.2
4.0	0.2
5.3	0.4
6.6	0.6
7.9	0.8
9.2	1.0
10.6	1.3
13.2	1.9
15.9	2.7
18.5	3.6
19.0	3.8

Installation Clearances

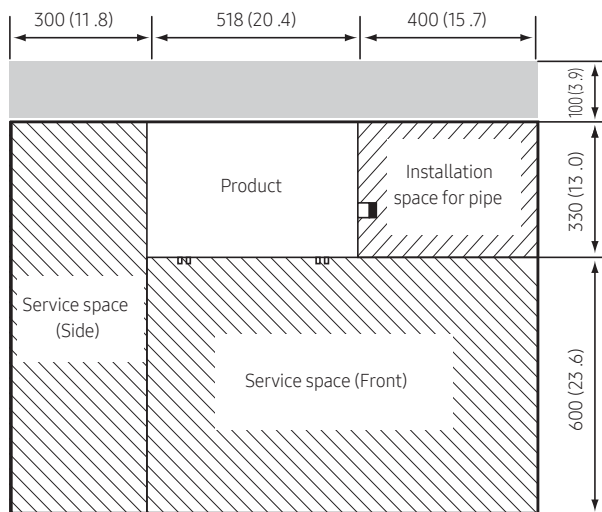
Selecting installation location

- ▶ 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 VHTC: 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 VHTC .
- ▶ 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 VHTC 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 VHTC 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 space on the water pipe side .

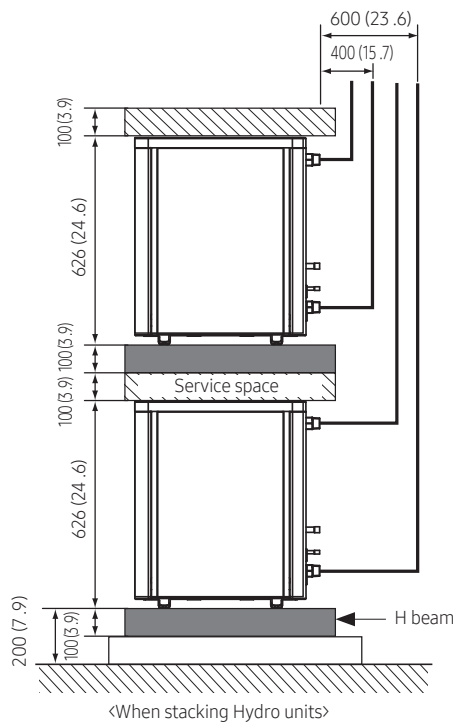
Unit: mm (inch)



Installation Clearances

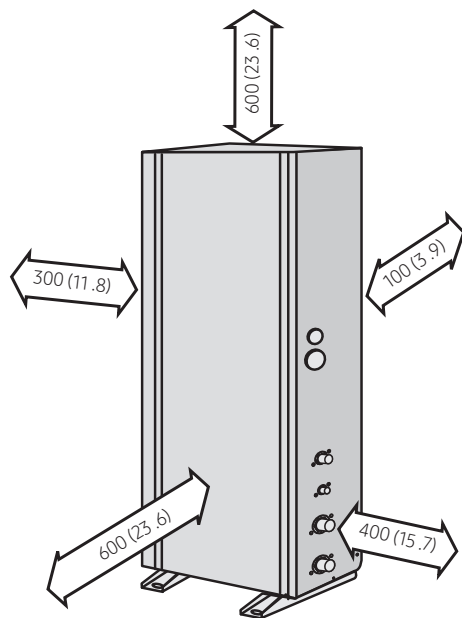
Hydro Unit VHEC

Unit: mm (inch)



Hydro Unit VHTC

Unit: mm (inch)



CAUTION

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



Visit us at www.lennox.com

For the latest technical information, www.lennoxcommercial.com

Contact us at 1-800-4-LENNOX

NOTE - Due to Lennox' ongoing commitment to quality, Specifications, Ratings and Dimensions subject to change without notice and without incurring liability.
Improper installation, adjustment, alteration, service or maintenance can cause property damage or personal injury.
Installation and service must be performed by a qualified installer and servicing agency.

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