

SAMSUNG

CHILLER

Technical

Data Book

DVM CHILLER for Europe
(R410A, 50/60Hz, HP)



Model : AG042/056/070KSV*NH/EU

History

Version	Modification	Date	Remark
Ver.1.0	Release DVM Chiller(pump integrated) TDB for Europe	'16. 05. 03.	
Ver.1.1	1) Add Min. LWT to correction factor by % glycol 2) Add correction factor by altitude	'16. 05. 31.	
Ver.1.2	1) Add maximum external static pressure at cooling nominal water flow rate for AG070KSVGNH/EU model in '1. Specification'. 2) Modification for external static pressure graphs.	'16. 07. 06.	
Ver2.0	Update all contents	'16. 08. 24.	
Ver2.1	Add tCO _{2e} data (Specifications)	'16. 12. 09	
Ver2.2	Add number to Note (P32~37)	'17. 02. 24	
Ver2.3	Modified the Heating Capacity Table (33,34p)	'17. 09. 14	

Nomenclature

Model Name

AG	070	K	S	V	A	N	H	/	EU
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		Buyer

1 Classification

AG	Chiller
AM	DVM

2 Capacity

kW (3 digits)

3 Version

F	2013
H	2014
J	2015
K	2016

4 Product Type

S	Set
X	Outdoor Unit
N	Indoor Unit

5 Feature1

V	Inverter
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6 Feature2

A	Non-pump
G	Pump Integrated

7 Rating Voltage

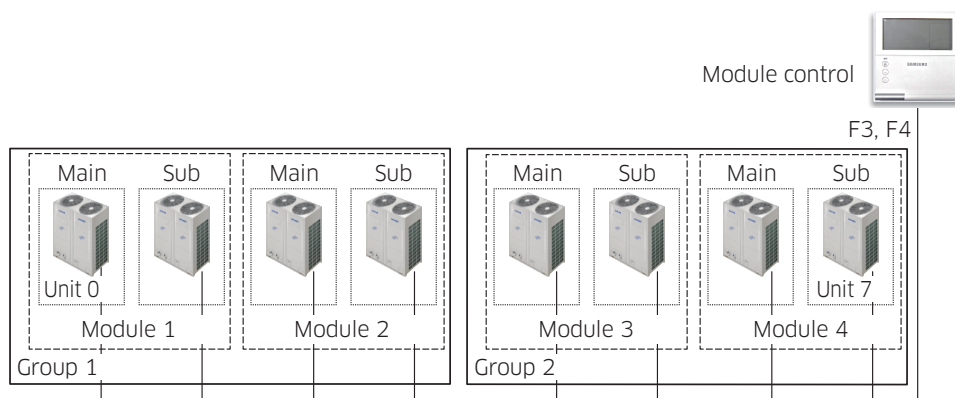
N	3Ø, 380~415V, 50/60Hz
G	3Ø, 380~415V, 50Hz
E	1Ø, 220~240V, 50Hz

8 Mode

H	Heat Pump
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Features & Benefits

Module/group operation of DVM Chiller is to combine multiple units in modules or groups of a single water pipe system and to operate them depending on the working condition.



With combination of 16 single units of 10, 15 tons, maximum 240 tons can be covered. In this case, compared to conventional water chillers, 49% of installation space can be saved.



Samsung DVM Chiller enables users to reduce annual utility costs compared to traditional chillers, while the operational modes can be adjusted to allow for seasonal requirements.



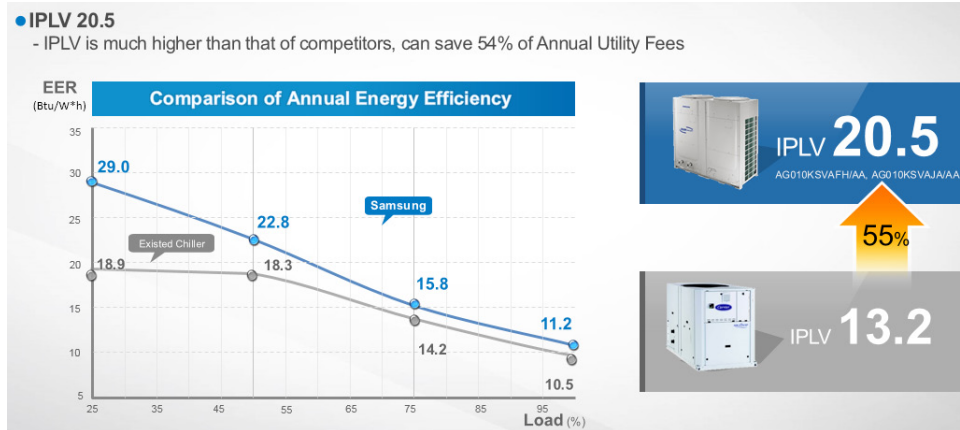
World-class Energy Efficiency

- Secure Reliability and Energy Efficiency with Samsung inverter scroll compressor



Features & Benefits

- IPLV 20.5
 - IPLV is much higher than that of competitors, can save 54% of Annual Utility Fees



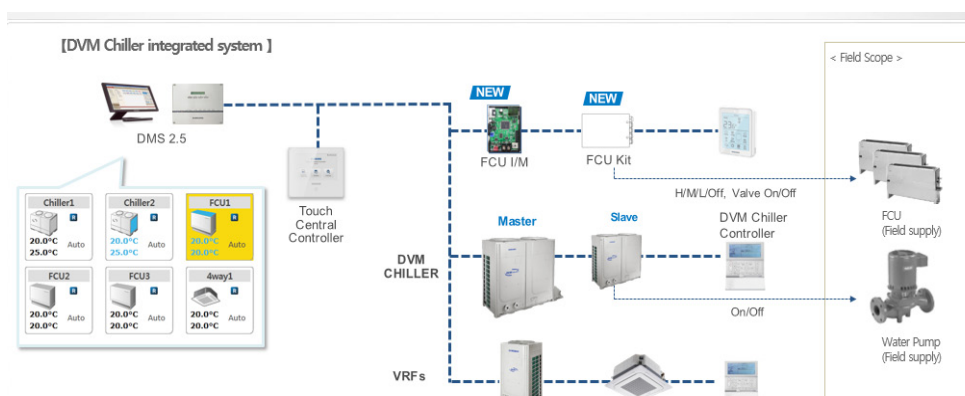
Easy Installation & Small Space

- Flexible Combination and Expansion of System Capacity



Integrated Control

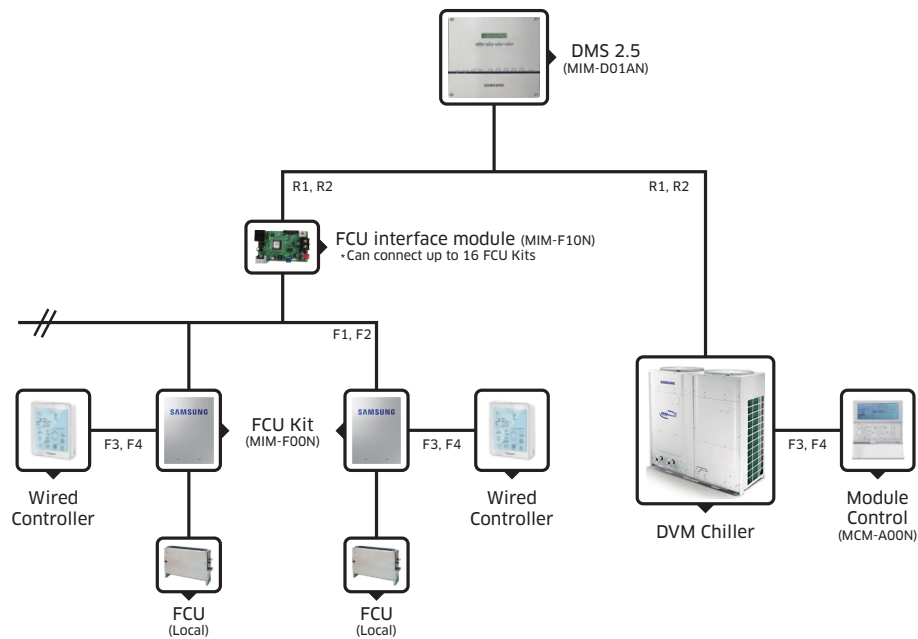
- DVM Chiller provides the integrated control system same as the VRF



Features & Benefits

Control structure_Case 1

- DMS control - DVM Chiller & FCU kit (Samsung)
 - FCU kit : It needs to connect FCU interface module.
 - DVM Chiller : It can connect to DMS directly (R1R2)

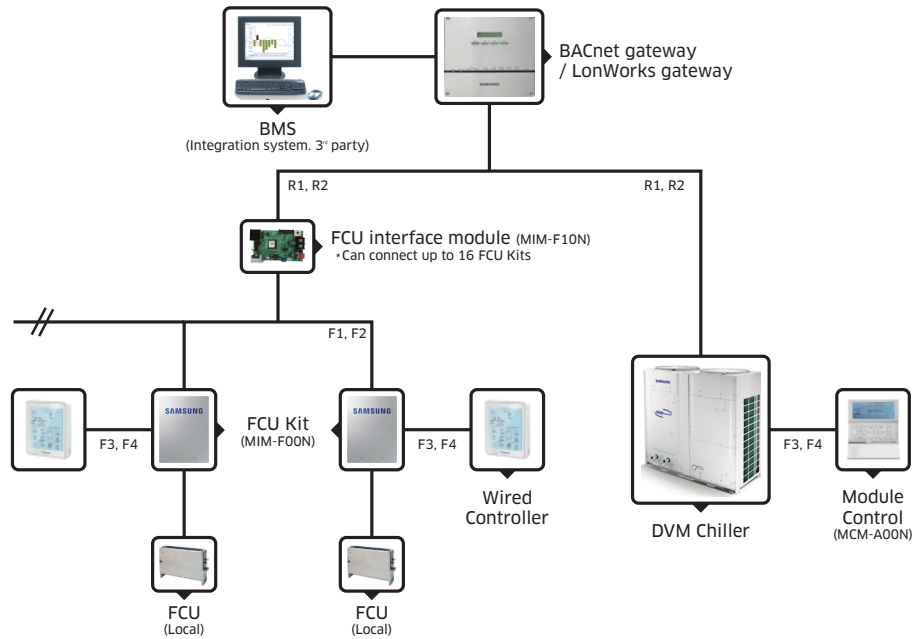


- DMS control & monitoring
 - FCU :On/OFF, Setting temperature, Fan speed
 - Chiller: On/OFF, Setting water temperature, Schedule
 - FCU On/Off & Chiller On/Off Interlock → Control logic setting is required.

Features & Benefits

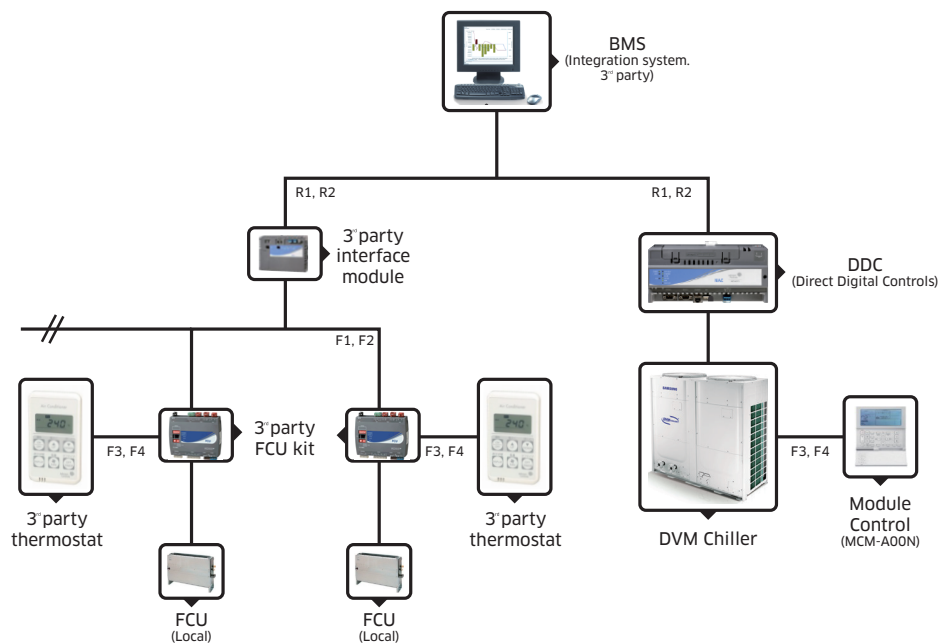
Control structure_Case 2

- 3rd party BMS control (1) - Using Samsung control system
 - Use BACnet (MIM-B17BN), LonWorks gateway (MIM-B18BN)



Control structure_Case 3

- 3rd party BMS control (2) - Not using Samsung control system
 - 3rd party DDC can control and monitor DVM Chiller using the external input/output of DVM Chiller.



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1. Line-up

External appearance

Capacity (kW)	42	56	65
Model (Image)			
Non-pump model	AG042KSVANH/EU	AG056KSVANH/EU	AG070KSVANH/EU
Pump integrated model	AG042KSVGNH/EU	AG056KSVGNH/EU	AG070KSVGNH/EU

- By combining modules, each product enables high capacity. You can combine modules up to 16.

1. Line-up

Modulation guide

Modulated Units		Capacity of Single Unit (kW)			Recommended pipe size [A]	Modulated Units		Capacity of Single Unit (kW)			Recommended pipe size [A]
Capa (kW)	No. of modules	42	56	65		Capa (kW)	No. of modules	42	56	65	
		AG042	AG056	AG070				AG042	AG056	AG070	
42	1	1			40	455	7			7	125
56	1		1		40	462	11	11			125
65	1			1	50	504	9		9		125
84	2	2			50	504 (Higher Efficiency)	12	12			125
112	2		2		65	520	8			8	125
126	3	3			65	546	13	13			125
130	2			2	80	560	10		10		125
168	3		3		80	585	9			9	125
168 (Higher Efficiency)	4	4			80	588	14	14			125
195	3			3	80	616	11		11		125
210	5	5			80	630	15	15			125
224	4		4		100	650	10			10	125
252	6	6			100	672	12		12		125
260	4			4	100	672 (Higher Efficiency)	16	16			125
280	5		5		100	715	11			11	125
294	7	7			100	728	13		13		125
325	5			5	100	780	12			12	150
336	6		6		100	784	14		14		150
336 (Higher Efficiency)	8	8			100	840	15		15		150
378	9	9			100	845	13			13	150
390	6			6	100	896	16		16		150
392	7		7		100	910	14			14	150
420	10	10			100	975	15			15	150
448	8		8		125	1040	16			16	150

NOTE

- The total capacity of modulated units is the sum of each individual unit's capacity.
- The total power input of modulated units is the sum of each individual unit's power input.
- Do not combine with other capacities than the table above. If so, it may be a problem of flow distribution.

2. Specification

Non-pump model

Type				Module Chiller	Module Chiller	Module Chiller
Model Name				AG042KSVANH/EU	AG056KSVANH/EU	AG070KSVANH/EU
Power Supply			Φ, #, V, Hz	3,4,380-415,50/60	3,4,380-415,50/60	3,4,380-415,50/60
Mode			-	HEAT PUMP	HEAT PUMP	HEAT PUMP
Performance	HP		HP	15	20	25
	Ton		usRT	12	16	18.5
	Capacity (Nominal)	Cooling	kW	42.0	56.0	65.0
		Heating	kW	42.0	56.0	69.5
Power	Power Input (Nominal) ^{2)*}	Cooling	kW	12.35	18.67	26.00
		Heating		11.83	17.50	24.39
	Current Input (Nominal) ^{2)*}	Cooling	A	19.6	29.6	41.2
		Heating		18.8	27.8	38.7
	Current	Minimum Ssc Value	MVA	7.094	7.094	13.983
		MCA	A	32.0	46.0	58.0
		MFA	A	40.0	60.0	75.0
	COP	Nominal Cooling (Pump input is not included)		W/W	3.40	3.00
Nominal Cooling (Pump input is included based on EN 14511) ^{1)*}		W/W	3.15	2.78	2.30	
Nominal Heating (Pump input is not included)		W/W	3.55	3.20	2.85	
Nominal Heating (Pump input is included based on EN 14511) ^{1)*}		W/W	3.43	3.09	2.74	
ESEER (Pump input is not included)		W/W	5.7	5.4	5	
ESEER (Pump input is included based on EN 14511) ^{1)*}		W/W	4.75	4.5	4.1	
Casing	Material	Cabinet	-	EGI steel plate	EGI steel plate	EGI steel plate
		Base	-	EGI steel plate	EGI steel plate	EGI steel plate
Compressor	Type		-	Inverter Scroll	Inverter Scroll	Inverter Scroll
	Output		kW × n	6.76 x 2	6.76 x 2	6.76 x 2
	Model Name		-	DS-GB070FAVA	DS-GB070FAVA	DS-GB070FAVA
	Oil	Type	-	PVE	PVE	PVE
		Initial Charge	cc	3400	3400	3400
Fan	Type		-	Propeller	Propeller	Propeller
	Quantity		ea	2	2	2
	Air Flow Rate		CMM	364 (182 x 2)	364 (182 x 2)	392 (196 x 2)
			l/s	6067	6067	6535
	External Static Pressure	Max.	mmAq	8.0	8.0	8.0
			Pa	78.5	78.5	78.5
Fan Motor	Type		-	BLDC Motor	BLDC Motor	BLDC Motor
	Output x n		W	630 x 2	630 x 2	630 x 2
Water Side Heat Exchanger	Type		-	Brazing Plate	Brazing Plate	Brazing Plate
	Water Flow Rate (Cooling/Heating)		LPM	120 / 120	160 / 160	186 / 200
	Pressure Drop (Set. Nominal)		kPa	60	100	120
	Max Operating Pressure		MPa	1.0	1.0	1.0
	Connection Type		-	FLANGE	FLANGE	FLANGE
	Pipe connection (Inlet/Outlet)		Φ, mm	40	40	50
			Φ, inch	1 1/2"	1 1/2"	2"
	Quantity		EA	2	2	2

2. Specification

Pump	Type		-	-	-	-
	Input x n		kW	-	-	-
	Output x n		W	-	-	-
	Nominal Water Flow Rate		LPM	-	-	-
			l/s	-	-	-
	External Static Pressure(Set)	Max.	mAq	-	-	-
			kPa	-	-	-
Wiring connections	Communication	Min.	mm ²	0.75	0.75	0.75
		Remark		F1, F2	F1, F2	F1, F2
Refrigerant	Type		-	R410A	R410A	R410A
	Factory Charging		kg/tCO ₂ e	18/37.58	18/37.58	18/37.58
Sound	Sound Pressure	Cooling	dB(A)	60	62	63
		Heating		57	59	64
	Sound Power			80	83	85
External Dimension	Net Weight		kg	446	446	465
	Shipping Weight		kg	468	468	487
	Net Dimensions (WxHxD)		mm	1,795x1,695x765	1,795x1,695x765	1,795x1,695x765
	Shipping Dimensions (WxHxD)		mm	1,900x1,887x919	1,900x1,887x919	1,900x1,887x919
Operating Water Temp. Range	Cooling		°C	5 ~ 25	5 ~ 25	5 ~ 25
	Cooling (If using brine)		°C	-10 ~ 25	-10 ~ 25	-10 ~ 25
	Heating		°C	25 ~ 55	25 ~ 55	25 ~ 55
Operating water flow Range	Water Flow Rate		LPM	60 ~ 240	80 ~ 320	93 ~ 400
	Minimum water storage in the system		L	294	392	490
Operating Amb. Temp. Range	Cooling		°C	-15 ~ 48	-15 ~ 48	-15 ~ 48
	Heating		°C	-25 ~ 43	-25 ~ 43	-25 ~ 43

NOTE

- Specification may be subject to change without prior notice.
- Specification comply with EN14511.
- Nominal Cooling capacities are based on;
Chilled water inlet / outlet temperature : 12 / 7 °C, outdoor temperature : 35 °C DB, 24 °C WB.
- Nominal Heating capacities are based on;
Heating water inlet / outlet temperature : 40 / 45 °C, outdoor temperature : 7 °C DB, 6 °C WB.
- Sound power level is an absolute value that a sound source generates.
Sound pressure level is a relative value, depending on the distance and acoustic environment.
Sound values are obtained in an anechoic room.
- 1)* EER/COP(Pump input is included) and ESEER(Pump input is included) values are calculated based on EUROVENT condition.
- 2)* Pump input is not included.
- These products contain R410A(GWP=2,088) which is fluorinated greenhouse gas.

2. Specification

Pump integrated model

Type				Module Chiller	Module Chiller	Module Chiller
Model Name				AG042KSVGNH/EU	AG056KSVGNH/EU	AG070KSVGNH/EU
Power Supply			Φ, #, V, Hz	3,4,380-415,50/60	3,4,380-415,50/60	3,4,380-415,50/60
Mode			-	HEAT PUMP	HEAT PUMP	HEAT PUMP
Performance	HP		HP	15	20	25
	Ton		usRT	12	16	18.5
	Capacity (Nominal)	Cooling	kW	42.0	56.0	65
		Heating	kW	42.0	56.0	69.5
Power	Power Input	Cooling	kW	13.59	20.14	28.26
		Heating		12.77	18.48	25.84
	Current Input	Cooling	A	24.2	34.2	45.8
		Heating		23.4	32.4	43.3
	Current	Minimum Ssc Value	MVA	8.078	11.172	15.081
		MCA	A	39	53	65
		MFA	A	50	60	75
COP	Nominal Cooling		W/W	3.09	2.78	2.30
	Nominal Heating		W/W	3.29	3.03	2.69
	ESEER (Pump input is included based on EN 14511)		W/W	4.75	4.5	4.10
Casing	Material	Cabinet	-	EGI steel plate	EGI steel plate	EGI steel plate
		Base	-	EGI steel plate	EGI steel plate	EGI steel plate
Compressor	Type		-	Inverter Scroll	Inverter Scroll	Inverter Scroll
	Output		kW × n	6.76x2	6.76x2	6.76x2
	Model Name		-	DS-GB070FAVA	DS-GB070FAVA	DS-GB070FAVA
	Oil	Type	-	PVE	PVE	PVE
		Initial Charge	cc	3400	3400	3400
Fan	Type		-	Propeller	Propeller	Propeller
	Quantity		ea	2	2	2
	Air Flow Rate		CMM	364 (182 x 2)	364 (182 x 2)	392 (196 x 2)
			l/s	6067	6067	6535
	External Static Pressure	Max.	mmAq	8.0	8.0	8.0
			Pa	78.5	78.5	78.5
Fan Motor	Type		-	BLDC Motor	BLDC Motor	BLDC Motor
	Output x n		W	630 x 2	630 x 2	(630 x 2)
Water Side Heat Exchanger	Type		-	Brazing Plate	Brazing Plate	Brazing Plate
	Water Flow (Cooling/Heating)		LPM	120 / 120	160 / 160	186 / 200
	Pressure Drop		kPa	60	100	120
	Max Operating Pressure		MPa	1	1	1
	Connection Type		-	FLANGE	FLANGE	FLANGE
	Pipe connection (Inlet/Outlet)		Φ, mm	40	40	50
			Φ, inch	1 1/2"	1 1/2"	2"
	Quantity		EA	2	2	2

2. Specification

Pump	Type	-	End-Suction	End-Suction	End-Suction
	Input x n	kW	1.68	1.68	1.68
	Output x n	W	1.45	1.45	1.45
	Nominal Water Flow Rate (Cooling/Heating)	LPM	120 / 120	160 / 160	186 / 200
		l/s	2.0 / 2.0	2.7 / 2.7	3.1 / 3.3
	External Static Pressure(Set) (Cooling/Heating)	Max. mAq	22.4 / 22.4	15.3 / 15.3	10.2 / 10.2
		kPa	220 / 220	150 / 150	131 / 100
Wiring connections	Communication	Min.	mm ²	0.75	0.75
		Remark		F1, F2	F1, F2
Refrigerant	Type	-	R410A	R410A	R410A
	Factory Charging	kg/tCO ₂ e	18/37.58	18/37.58	18/37.58
Sound	Sound Pressure	Cooling	60	62	63
		Heating	57	59	64
	Sound Power		80	84	88
External Dimension	Net Weight	kg	472	472	493
	Shipping Weight	kg	494	494	515
	Net Dimensions (WxHxD)	mm	1,795x1,695x765	1,795x1,695x765	1,795x1,695x765
	Shipping Dimensions (WxHxD)	mm	1,900x1,887x919	1,900x1,887x919	1,900x1,887x919
Operating Water Temp. Range	Cooling	°C	5 ~ 25	5 ~ 25	5 ~ 25
	Cooling (If using brine)	°C	-10 ~ 25	-10 ~ 25	-10 ~ 25
	Heating	°C	25 ~ 55	25 ~ 55	25 ~ 55
Operating water flow Range	Water Flow Rate	LPM	60 ~ 240	80 ~ 320	93 ~ 400
	Minimum water storage in the system	L	294	392	490
Operating Amb. Temp. Range	Cooling	°C	-15 ~ 48	-15 ~ 48	-15 ~ 48
	Heating	°C	-25 ~ 43	-25 ~ 43	-25 ~ 43

NOTE

- Specification may be subject to change without prior notice.
- Specification comply with EN14511.
- Nominal Cooling capacities are based on;
Chilled water inlet / outlet temperature : 12 / 7 °C, outdoor temperature : 35 °C DB, 24 °C WB.
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Heating water inlet / outlet temperature : 40 / 45 °C, outdoor temperature : 7 °C DB, 6 °C WB.
- Sound power level is an absolute value that a sound source generates.
Sound pressure level is a relative value, depending on the distance and acoustic environment.
Sound values are obtained in an anechoic room.
- ESEER (Pump input is included) is calculated based on EUROVENT condition.
- These products contain R410A(GWP=2,088) which is fluorinated greenhouse gas.

3. Electric Characteristics

Classification	Capacity		Model	Power Supply		Voltage Range		Nominal Running Current [A]		Current [A]		ODU Fan Motor [kW]
	HP	kW		Hz	Voltage	Min. (-10%)	Max. (+10%)	Cooling	Heating	MCA	MFA	
Non-pump models	15	42	AG042KSVANH/EU	50/60	380~415	342	456	19.6	18.8	32	40	0.630 x 2
	20	56	AG056KSVANH/EU	50/60	380~415	342	456	29.6	27.8	46	60	0.630 x 2
	25	65	AG070KSVANH/EU	50/60	380~415	342	456	41.2	38.7	58	75	0.630 x 2
Pump integrated models	15	42	AG042KSVG NH/EU	50/60	380~415	342	456	24.2	23.4	39	50	0.630 x 2
	20	56	AG056KSVG NH/EU	50/60	380~415	342	456	34.2	32.4	53	60	0.630 x 2
	25	65	AG070KSVG NH/EU	50/60	380~415	342	456	45.8	43.3	65	75	0.630 x 2

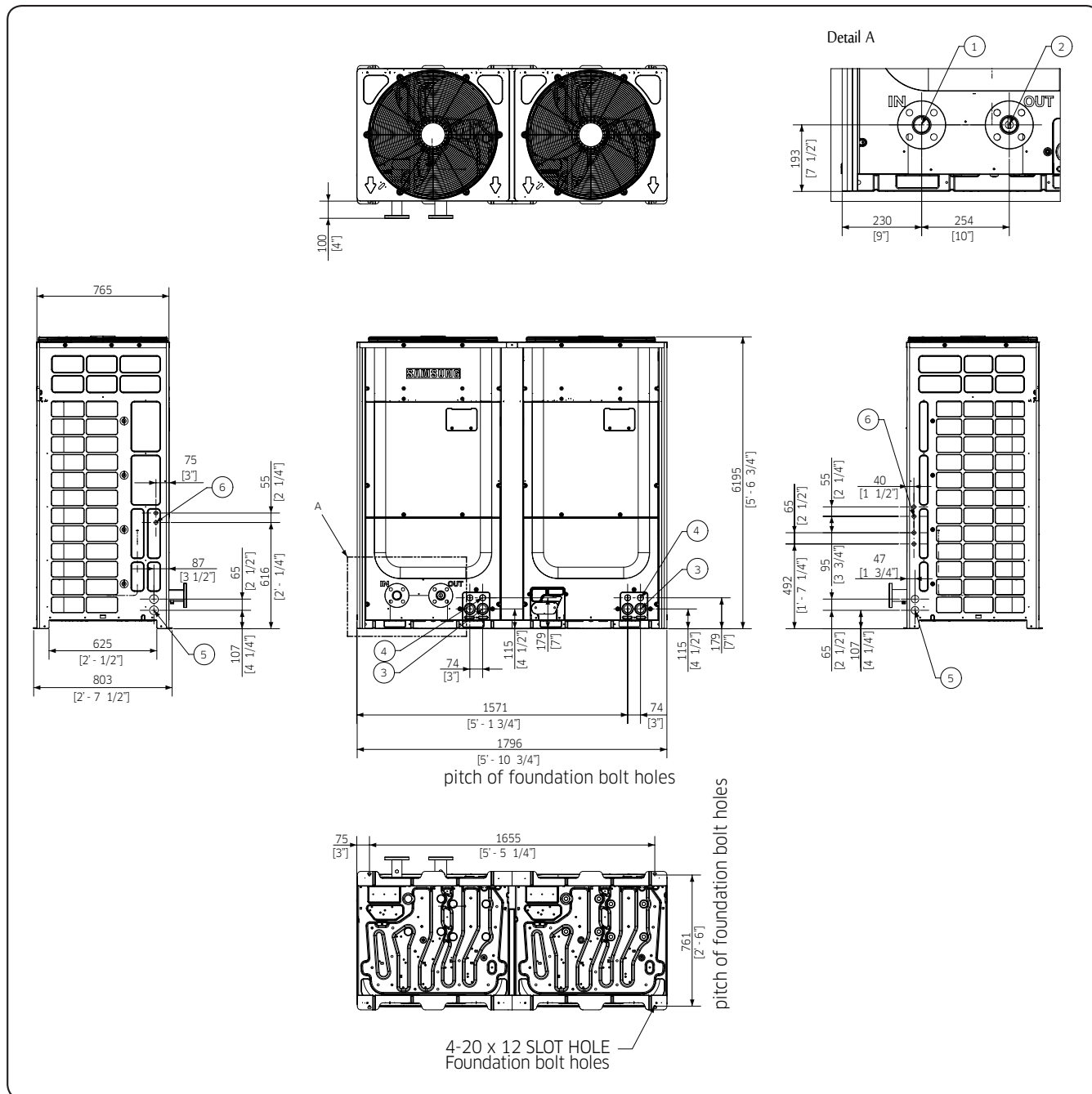
NOTE

- MCA : Minimum circuit amperes
- MFA : Maximum fuse amperes
- Select wire size based on the value of MCA

4. Dimensional Drawing

- AG042/056/070KSV*NH/EU

Units : mm [inches]

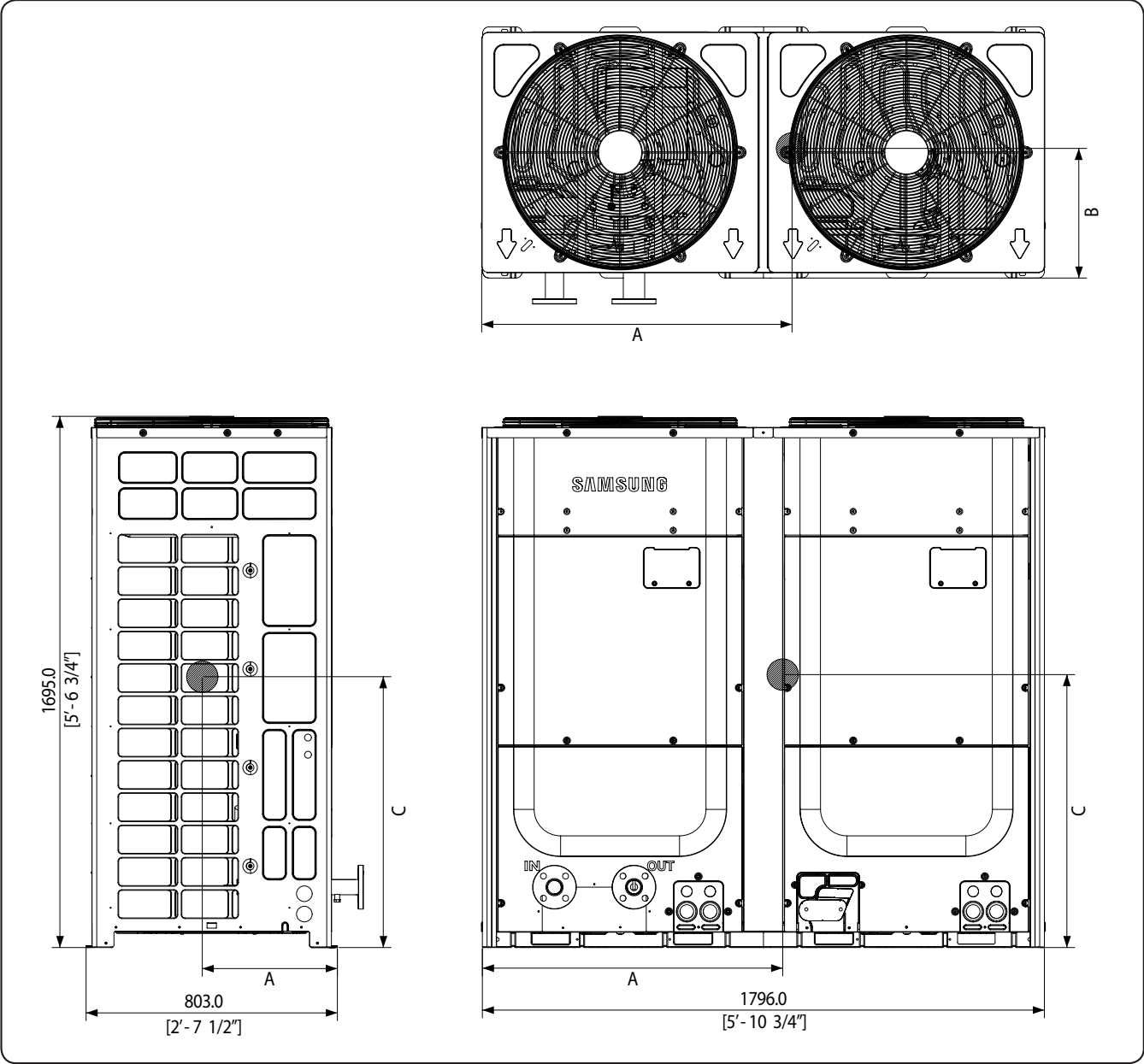


NO	ITEM	SPEC
1	INLET WATER FLANGE	15/20 HP 40A DIN FLANGE, 25HP : 50A DIN FLANGE
2	OUTLET WATER FLANGE	15/20 HP 40A DIN FLANGE, 25HP : 50A DIN FLANGE
3	POWER WIRING CONDUIT	KNOCK OUT HOLE (FRONT)
4	COMMUNICATION WIRING CONDUIT	KNOCK OUT HOLE (FRONT)
5	POWER WIRING CONDUIT	KNOCK OUT HOLE (SIDE)
6	COMMUNICATION WIRING CONDUIT	KNOCK OUT HOLE (SIDE)

5. Centre of Gravity

- AG042/056/070KSV*NH/EU

Units : mm [inches]

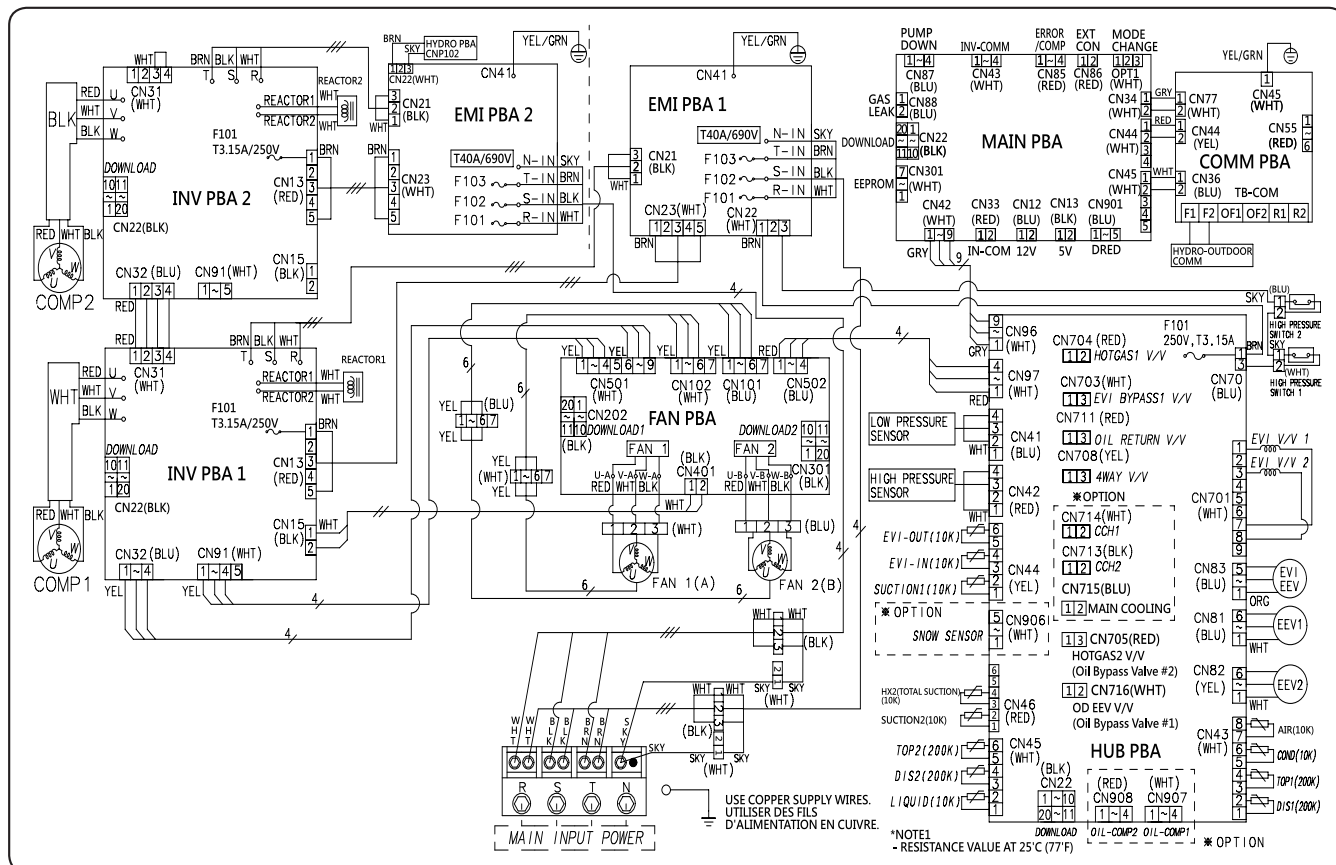


Model	A	B	C
AG0**KSVANH	1020 [3'-4 1/4"]	380 [1'-3"]	590 [1'-11 1/4"]
AG0**KSVGNH	950 [3'-1 1/2"]	370 [1'-2 1/2"]	550 [1'-9 3/4"]
AG01*KSVA*H	1020 [3'-4 1/4"]	380 [1'-3"]	590 [1'-11 1/4"]

6. Electrical Wiring Diagram

Inverter controller

- AGO42/056KSVANH/EU (Non-pump model)



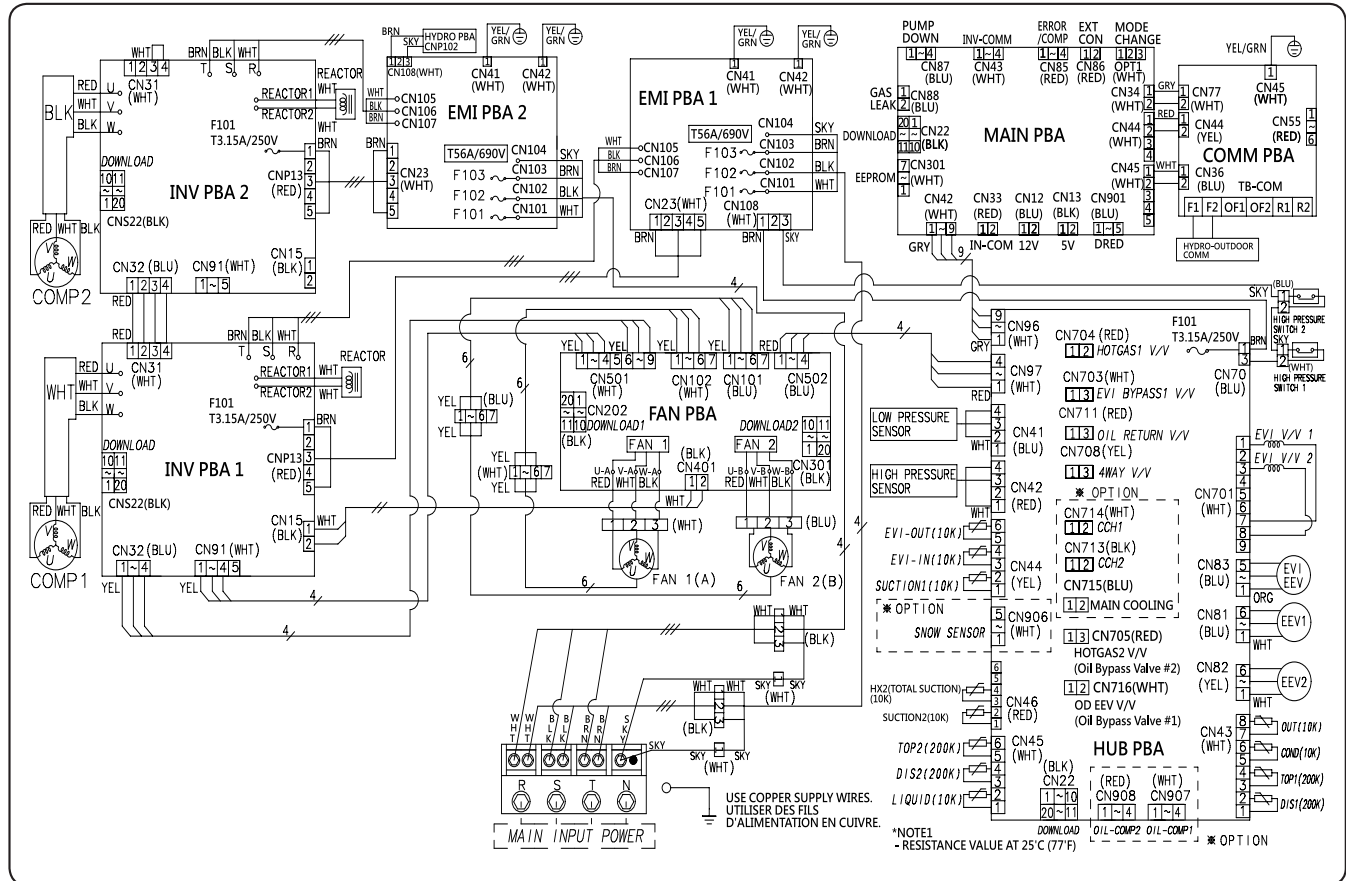
INV PBA1	Printed circuit board (inverter1)	EEV1	Electronic expansion valve 1	HOTGAS1 V/V	Solenode valve (HOTGAS1)
INV PBA2	Printed circuit board (inverter2)	EEV2	Electronic expansion valve 2	EVI BYPASS V/V	Solenode valve (EVI BYPASS)
EMI PBA1	Printed circuit board (emi1)	EVI-OUT(10K)	Thermistor (Enhanced Vapor Injection_out)	RETURN V/V	Solenode valve (RETURN)
EMI PBA2	Printed circuit board (emi2)	EVI-IN(10K)	Thermistor (Enhanced Vapor Injection_in)	4WAY V/V	Solenode valve (4WAY)
FAN PBA	Printed circuit board (fan motor)	SUCTION1(10K)	Thermistor (SUCTION1)	CCH1	Crank Case Heater (Compressor1)
MAIN PBA	Printed circuit board (main)	SUCTION2(10K)	Thermistor (SUCTION2)	CCH2	Crank Case Heater (Compressor2)
HUB PBA	Printed circuit board (hub)	SNOW SENSOR	SNOW SENSOR	MAIN COOLING	Solenode valve (Main cooling)
COMM PBA	Printed circuit board (communication)	OIL-COMP1	Oil-Sensor (Compressor1)	HOTGAS2 V/V	Solenode valve (HOTGAS2)
COMP1	Motor (compressor1)	OIL-COMP2	Oil-Sensor (Compressor2)	OD EEV V/V	Solenode valve (OD EEV)
COMP2	Motor (compressor2)	OUT(10K)	Thermistor (Air)	F101	FUSE (Inverter PBA)
FAN1	Motor (fan1)	COND(10K)	Thermistor (COND.)	690V/T40A	FUSE (EMI PBA)
FAN2	Motor (fan2)	TOP2(200K)	Thermistor (Compressor2 TOP)	MODE CHANGE	Connector (remote switching cool/heat selector)
EVI V/V 1	Solenode valve (Enhanced Vapor Injection_1)	DIS1(200K)	Thermistor DIS1 (200K)	EXT CON	Connector (Output EXT CON)
EVI V/V 2	Solenode valve (Enhanced Vapor Injection_2)	DIS2(200K)	Thermistor DIS2 (200K)	ERROR/COMP EXT	Connector (Output ERROR/COMP EXT CON)
EVI EEV	Electronic expansion valve (EVI)	LIQUID(10K)	Thermistor LIQUID(10K)		

NOTE

- This wiring diagram applies only to the outdoor unit.
- Colors blk: black, red: red, blu: blue, wht: white, yel: yellow, brn: brown, sky: skyblue
- When operating, don't shortcircuit the protection device (High Pressure switch)
- For connection wiring indoor-outdoor transmission F1-F2, outdoor_outdoor transmission OF1-OF2, refer to the installation manual.
- Protective earth(screw), : connector, : The wire quantity

6. Electrical Wiring Diagram

- AG070KSVANH/EU (Non-pump model)



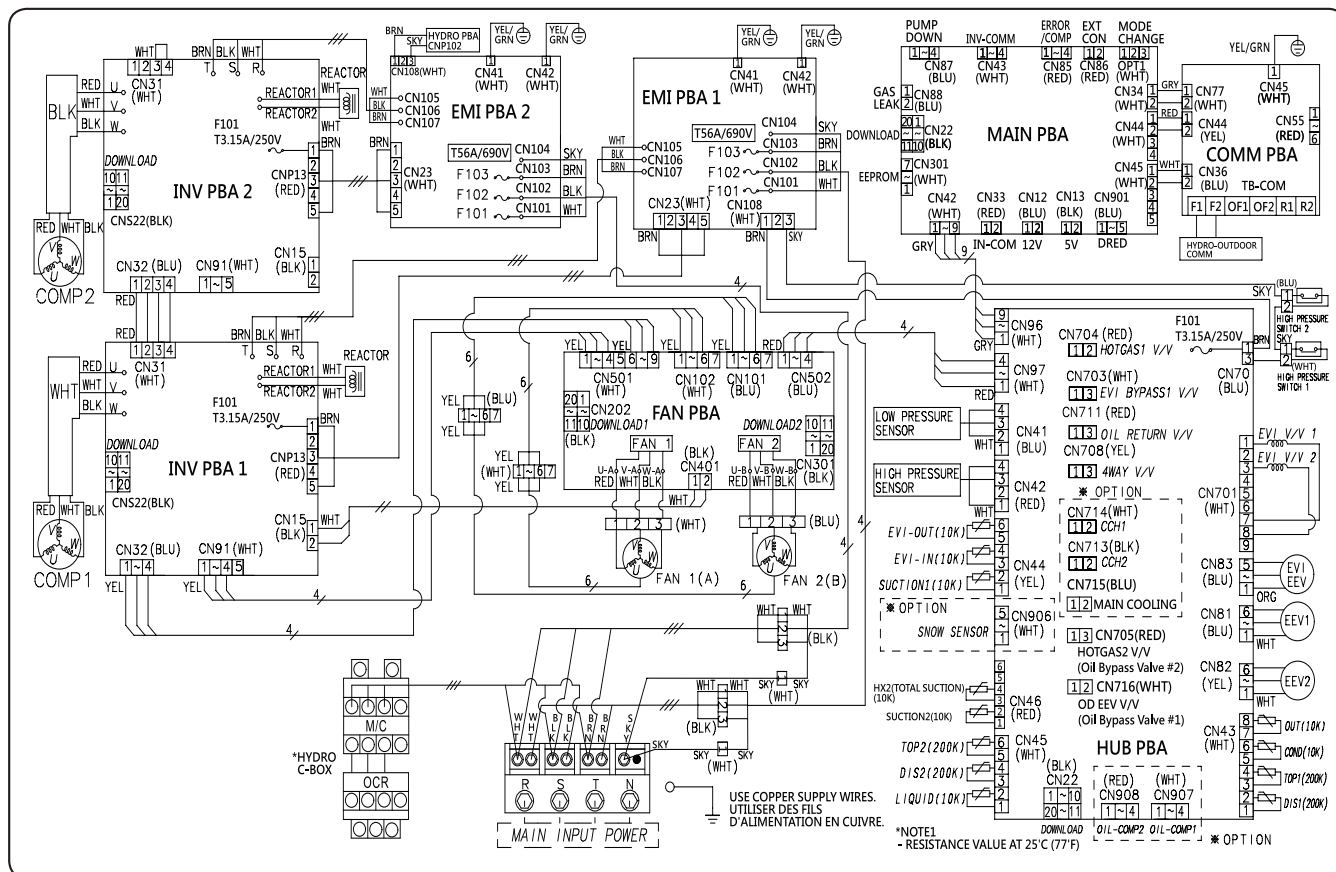
INV PBA1	Printed circuit board (inverter1)	EEV1	Electronic expansion valve 1	HOTGAS1 V/V	Solenoid valve (HOTGAS1)
INV PBA2	Printed circuit board (inverter2)	EEV2	Electronic expansion valve 2	EVI BYPASS V/V	Solenoid valve (EVI BYPASS)
EMI PBA1	Printed circuit board (emi1)	EVI-OUT(10K)	Thermistor (Enhanced Vapor Injection_out)	RETURN V/V	Solenoid valve (RETURN)
EMI PBA2	Printed circuit board (emi2)	EVI-IN(10K)	Thermistor (Enhanced Vapor Injection_in)	4WAY V/V	Solenoid valve (4WAY)
FAN PBA	Printed circuit board (fan motor)	SUCTION1(10K)	Thermistor (SUCTION1)	CCH1	Crank Case Heater (Compressor1)
MAIN PBA	Printed circuit board (main)	SUCTION2(10K)	Thermistor (SUCTION2)	CCH2	Crank Case Heater (Compressor2)
HUB PBA	Printed circuit board (hub)	SNOW SENSOR	SNOW SENSOR	MAIN COOLING	Solenoid valve (Main cooling)
COMM PBA	Printed circuit board (communication)	OIL-COMP1	Oil-Sensor (Compressor1)	HOTGAS2 V/V	Solenoid valve (HOTGAS2)
COMP1	Motor (compressor1)	OIL-COMP2	Oil-Sensor (Compressor2)	OD EEV V/V	Solenoid valve (OD EEV)
COMP2	Motor (compressor2)	OUT(10K)	Thermistor (Air)	F101	FUSE (Inverter PBA)
FAN1	Motor (fan1)	COND(10K)	Thermistor (COND.)	690V/T40A	FUSE (EMI PBA)
FAN2	Motor (fan2)	TOP2(200K)	Thermistor (Compressor2 TOP)	MODE CHANGE	Connector (remote switching cool/heat selector)
EVI V/V 1	Solenoid valve (Enhanced Vapor Injection_1)	DIS1(200K)	Thermistor DIS1 (200K)	EXT CON	Connector (Output EXT CON)
EVI V/V 2	Solenoid valve (Enhanced Vapor Injection_2)	DIS2(200K)	Thermistor DIS2 (200K)	ERROR/COMP EXT	Connector (Output ERROR/COMP EXT CON)
EVI EEV	Electronic expansion valve (EVI)	LIQUID(10K)	Thermistor LIQUID(10K)		

NOTE

- This wiring diagram applies only to the outdoor unit.
- Colors blk: black, red: red, blu: blue, wht: white, yel: yellow, brn: brown, sky: skyblue
- When operating, don't shortcircuit the protection device (High Pressure switch)
- For connection wiring indoor-outdoor transmission F1-F2, outdoor_outdoor transmission OF1-OF2, refer to the installation manual.
- ⊕ Protective earth(screw), □ : connector, ∇ : The wire quantity

6. Electrical Wiring Diagram

- AG042/056KSVGNH/EU (Pump integrated model)



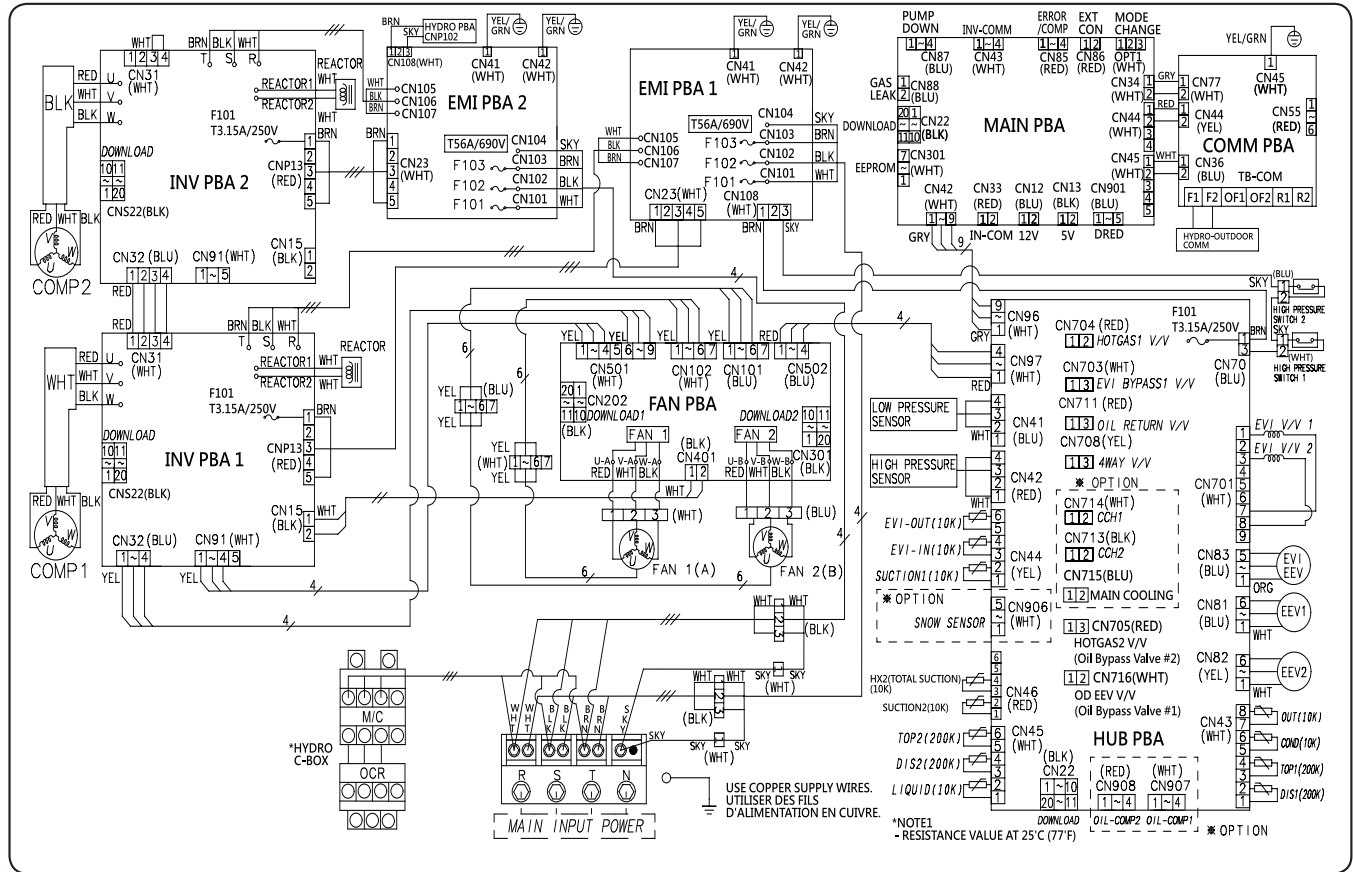
INV PBA1	Printed circuit board (inverter1)	EEV1	Electronic expansion valve 1	HOTGAS1 V/V	Solenode valve (HOTGAS1)
INV PBA2	Printed circuit board (inverter2)	EEV2	Electronic expansion valve 2	EVI BYPASS V/V	Solenode valve (EVI BYPASS)
EMI PBA1	Printed circuit board (emi1)	EVI-OUT(10K)	Thermistor (Enhanced Vapor Injection_out)	RETURN V/V	Solenode valve (RETURN)
EMI PBA2	Printed circuit board (emi2)	EVI-IN(10K)	Thermistor (Enhanced Vapor Injection_in)	4WAY V/V	Solenode valve (4WAY)
FAN PBA	Printed circuit board (fan motor)	SUCTION1(10K)	Thermistor (SUCTION1)	CCH1	Crank Case Heater (Compressor1)
MAIN PBA	Printed circuit board (main)	SUCTION2(10K)	Thermistor (SUCTION2)	CCH2	Crank Case Heater (Compressor2)
HUB PBA	Printed circuit board (hub)	SNOW SENSOR	SNOW SENSOR	MAIN COOLING	Solenode valve (Main cooling)
COMM PBA	Printed circuit board (communication)	OIL-COMP1	Oil-Sensor (Compressor1)	HOTGAS2 V/V	Solenode valve (HOTGAS2)
COMP1	Motor (compressor1)	OIL-COMP2	Oil-Sensor (Compressor2)	OD EEV V/V	Solenode valve (OD EEV)
COMP2	Motor (compressor2)	OUT(10K)	Thermistor (Air)	F101	FUSE (Inverter PBA)
FAN1	Motor (fan1)	COND(10K)	Thermistor (COND.)	690V/T40A	FUSE (EMI PBA)
FAN2	Motor (fan2)	TOP2(200K)	Thermistor (Compressor2 TOP)	MODE CHANGE	Connector (remote switching cool/heat selector)
EVI V/V 1	Solenode valve (Enhanced Vapor Injection_1)	DIS1(200K)	Thermistor DIS1 (200K)	EXT CON	Connector (Output EXT CON)
EVI V/V 2	Solenode valve (Enhanced Vapor Injection_2)	DIS2(200K)	Thermistor DIS2 (200K)	ERROR/COMP EXT	Connector (Output ERROR/COMP EXT CON)
EVI EEV	Electronic expansion valve (EVI)	LIQUID(10K)	Thermistor LIQUID(10K)		
OCR	Over Current Relay for protect chiller system	M/C	Magnetic Contactor		

NOTE

- This wiring diagram applies only to the outdoor unit.
- Colors blk: black, red: red, blu: blue, wht: white, yel: yellow, brn: brown, sky: skyblue
- When operating, don't shortcircuit the protection device (High Pressure switch)
- For connection wiring indoor-outdoor transmission F1-F2, outdoor_outdoor transmission OF1-OF2, refer to the installation manual.
- : Protective earth(screw), : connector, : The wire quantity

6. Electrical Wiring Diagram

- AG070KSVGNH/EU (Pump integrated model)



INV PBA1	Printed circuit board (inverter1)	EEV1	Electronic expansion valve 1	HOTGAS1 V/V	Solenode valve (HOTGAS1)
INV PBA2	Printed circuit board (inverter2)	EEV2	Electronic expansion valve 2	EVI BYPASS V/V	Solenode valve EVI BYPASS
EMI PBA1	Printed circuit board (emi1)	EVI-OUT(10K)	Thermistor (Enhanced Vapor Injection_out)	RETURN V/V	Solenode valve (RETURN)
EMI PBA2	Printed circuit board (emi2)	EVI-IN(10K)	Thermistor (Enhanced Vapor Injection_in)	4WAY V/V	Solenode valve (4WAY)
FAN PBA	Printed circuit board (fan motor)	SUCTION1(10K)	Thermistor (SUCTION1)	CCH1	Crank Case Heater (Compressor1)
MAIN PBA	Printed circuit board (main)	SUCTION2(10K)	Thermistor (SUCTION2)	CCH2	Crank Case Heater (Compressor2)
HUB PBA	Printed circuit board (hub)	SNOW SENSOR	SNOW SENSOR	MAIN COOLING	Solenode valve (Main cooling)
COMM PBA	Printed circuit board (communication)	OIL-COMP1	Oil-Sensor (Compressor1)	HOTGAS2 V/V	Solenode valve (HOTGAS2)
COMP1	Motor (compressor1)	OIL-COMP2	Oil-Sensor (Compressor2)	OD EEV V/V	Solenode valve (OD EEV)
COMP2	Motor (compressor2)	OUT(10K)	Thermistor (Air)	F101	FUSE (Inverter PBA)
FAN1	Motor (fan1)	COND(10K)	Thermistor (COND.)	690V/T40A	FUSE (EMI PBA)
FAN2	Motor (fan2)	TOP2(200K)	Thermistor (Compressor2 TOP)	MODE CHANGE	Connector (remote switching cool/heat selector)
EVI V/V 1	Solenode valve (Enhanced Vapor Injection_1)	DIS1(200K)	Thermistor DIS1 (200K)	EXT CON	Connector (Output EXT CON)
EVI V/V 2	Solenode valve (Enhanced Vapor Injection_2)	DIS2(200K)	Thermistor DIS2 (200K)	ERROR/COMP EXT	Connector (Output ERROR/COMP EXT CON)
EVI EEV	Electronic expansion valve (EVI)	LIQUID(10K)	Thermistor LIQUID(10K)		
OCR	Over Current Relay for protect chiller system	M/C	Magnetic Contactor		

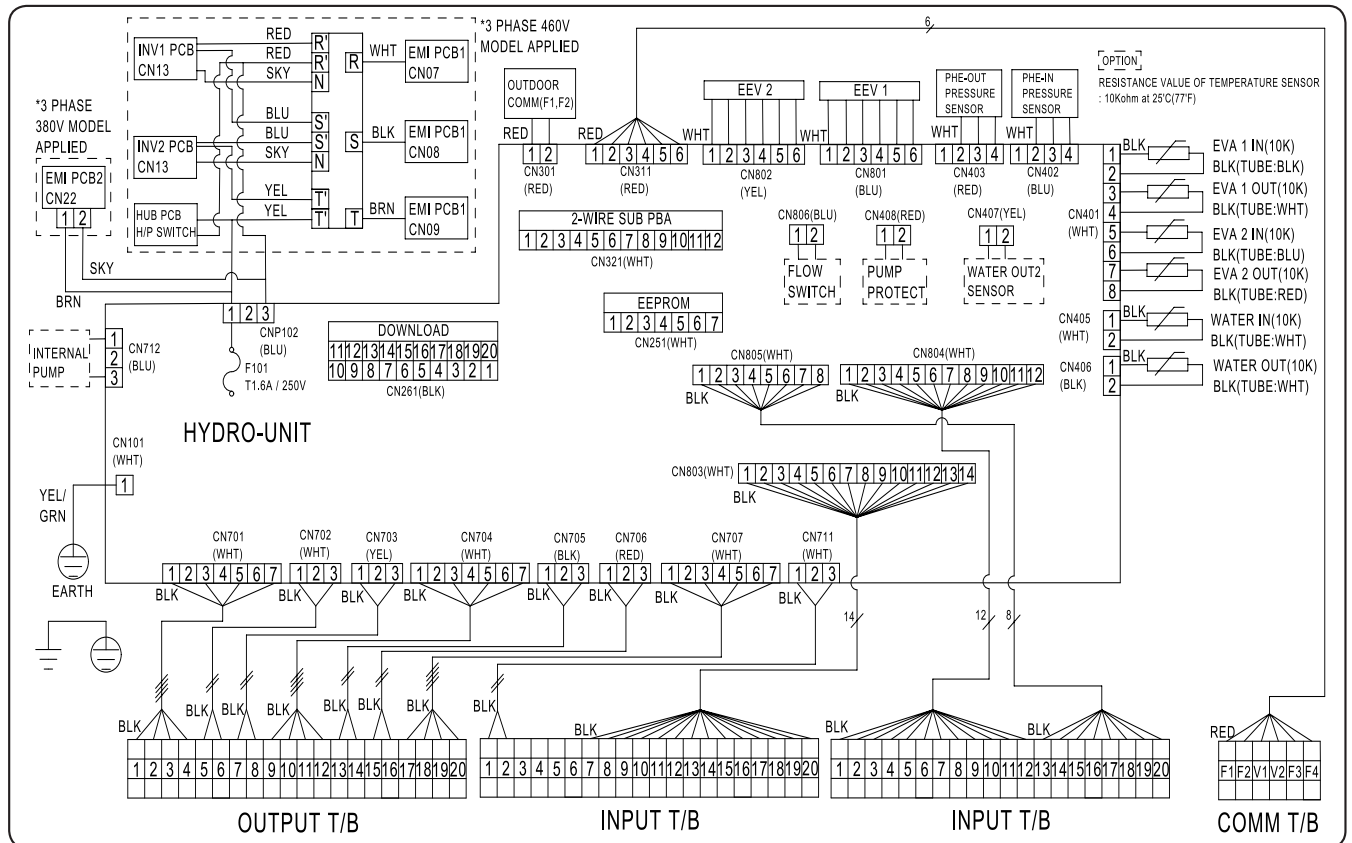
NOTE

- This wiring diagram applies only to the outdoor unit.
- Colors blk: black, red: red, blu: blue, wht: white, yel: yellow, brn: brown, sky: skyblue
- When operating, don't shortcircuit the protection device (High Pressure switch)
- For connection wiring indoor-outdoor transmission F1-F2, outdoor_outdoor transmission OF1-OF2, refer to the installation manual.
- ⊕ Protective earth(screw), □□□□ : connector, $\frac{N}{\text{---}}$: The wire quantity

6. Electrical Wiring Diagram

Hydro controller

- AG042/056/070KSVANH/EU (Non-pump model)



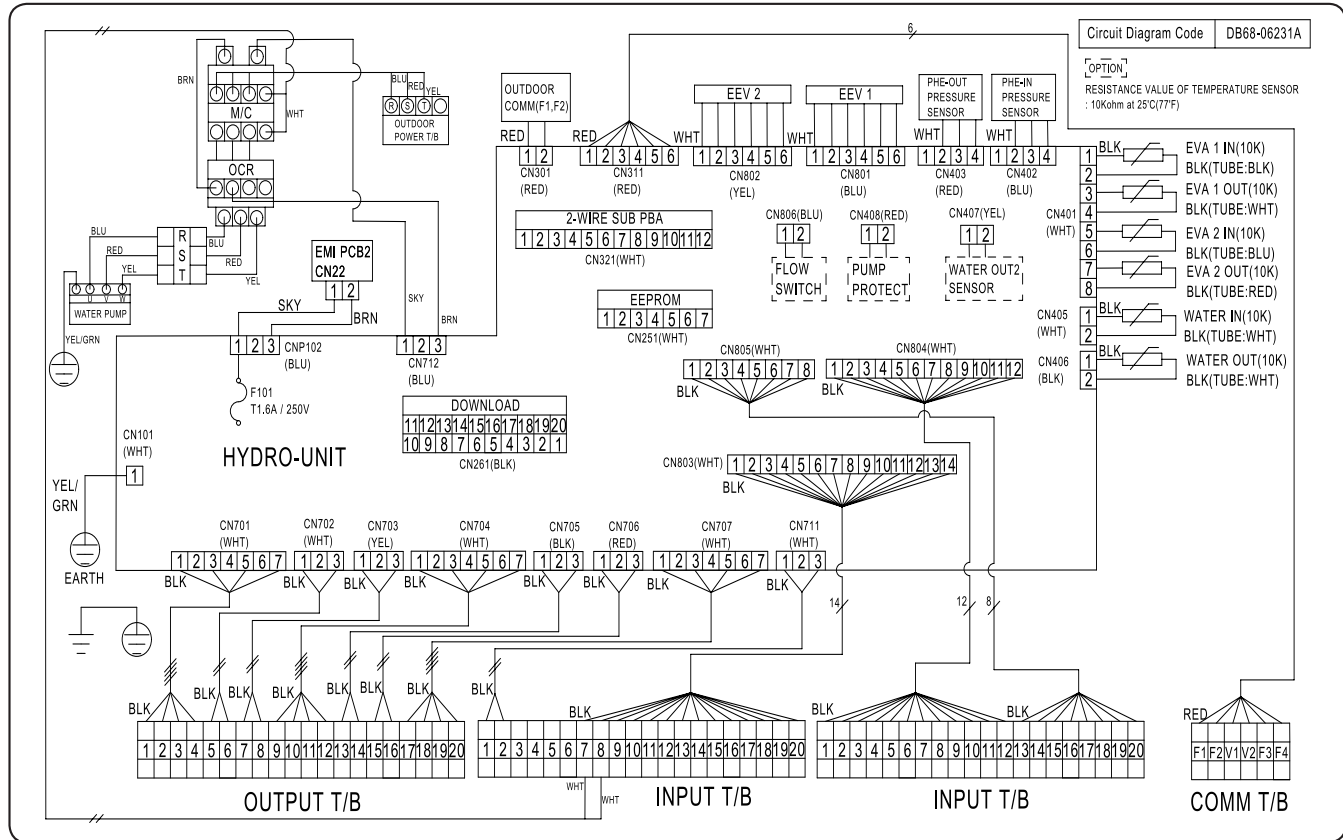
OCR	Over Current Relay for protect chiller system
M/C	Magnetic Contactor
EMI PCB1	Printed Circuit Board(EMI1 PBA)
EMI PCB2	Printed Circuit Board(EMI2 PBA)
INV1 PCB	Printed Circuit Board(Inerter1 PBA)
INV2 PCB	Printed Circuit Board(Inerter2 PBA)
OUTDOOR COMM(F1, F2)	Communication Wire F1, F2
OUTDOOR POWER T/B	Terminal Block(3Phase AC Power)
RST	3Phase AC Power
EEV 1	Electronic expansion valve1
EEV 2	Electronic expansion valve2
EEV1 IN(10K)	Thermistor(Electronic expansion valve inlet 1_10kohm)
EEV1 OUT(10K)	Thermistor(Electronic expansion valve outlet 1_10kohm)
EEV2 IN(10K)	Thermistor(Electronic expansion valve inlet 2_10kohm)
EEV2 OUT(10K)	Thermistor(Electronic expansion valve outlet 2_10kohm)
WATER IN(10K)	Thermistor(Water pipe inlet_10kohm)
WATER OUT(10K)	Thermistor(Water pipe outlet_10kohm)
INPUT T/B	Terminal Block for Input signal
OUTPUT T/B	Terminal Block for Output signal
COMM T/B	Terminal Block for Communication
PHE-IN PRESSURE SENSOR	Pressure Range 0~1.0 Mpa
PHE-OUT PRESSURE SENSOR	Pressure Range 0~1.0 Mpa
WATER OUT2 SENSOR	Thermistor(Water pipe2 outlet_10kohm)
2-WIRE SUB PBA	Printed Circuit Board(NSA communication PBA)
F101	FUSE(Hydro PBA)

NOTE

- This wiring diagram applies only to hydro unit.
- Colors BLK: black, RED: red, BLU: blue, WHT: white, YEL: yellow, BRN: brown, SKY: skyblue and GRN: green.
- When operating, don't shortcircuit the protection device(FLOW switch, Pump protect, PHE-In pressure sensor, PHE-out pressure sensor).
- For connection wiring transmission F1/F2, F3/F4 refer to the installation manual.
- Protective earth(screw), : connector, : The wire quantity

6. Electrical Wiring Diagram

- AG042/056/070KSVGNH/EU (Pump integrated model)



OCR	Over Current Relay for protect chiller system
M/C	Magnetic Contactor
EMI PCB2	Printed Circuit Board(EMI2 PBA)
OUTDOOR COMM(F1, F2)	Communication Wire F1, F2
OUTDOOR POWER T/B	Terminal Block(3Phase AC Power)
RST	3Phase AC Power
EEV 1	Electronic expansion valve1
EEV 2	Electronic expansion valve2
EEV1 IN(10K)	Thermistor(Electronic expansion valve inlet 1_10kohm)
EEV1 OUT(10K)	Thermistor(Electronic expansion valve outlet 1_10kohm)
EEV2 IN(10K)	Thermistor(Electronic expansion valve inlet 2_10kohm)
EEV2 OUT(10K)	Thermistor(Electronic expansion valve outlet 2_10kohm)
WATER IN(10K)	Thermistor(Water pipe inlet_10kohm)
WATER OUT(10K)	Thermistor(Water pipe outlet_10kohm)
INPUT T/B	Terminal Block for Input signal
OUTPUT T/B	Terminal Block for Output signal
COMM T/B	Terminal Block for Communication
PHE-IN PRESSURE SENSOR	Pressure Range 0~1.0 Mpa
PHE-OUT PRESSURE SENSOR	Pressure Range 0~1.0 Mpa
WATER OUT2 SENSOR	Thermistor(Water pipe2 outlet_10kohm)
2-WIRE SUB PBA	Printed Circuit Board(NSA communication PBA)
F101	FUSE(Hydro PBA)

NOTE

- This wiring diagram applies only to hydro unit.
- Colors BLK: black, RED: red, BLU: blue, WHT: white, YEL: yellow, BRN: brown, SKY: skyblue and GRN: green.
- When operating, don't shortcircuit the protection device(FLOW switch, Pump protect, PHE-In pressure sensor, PHE-out pressure sensor).
- For connection wiring transmission F1/F2, F3/F4 refer to the installation manual.
- Protective earth(screw), : connector, : The wire quantity

7. Sound Data

Summary

Classification	Capacity		Model	Sound Pressure (dBA)		Sound Power (dBA)
	HP	KW		Cooling	Heating	
Non-pump Models	15	42	AG042KSVANH/EU	60	57	80
	20	56	AG056KSVANH/EU	62	59	83
	25	65	AG070KSVANH/EU	63	64	85
Pump integrated models	15	42	AG042KSVGNH/EU	60	57	80
	20	56	AG056KSVGNH/EU	62	59	84
	25	65	AG070KSVGNH/EU	63	64	88

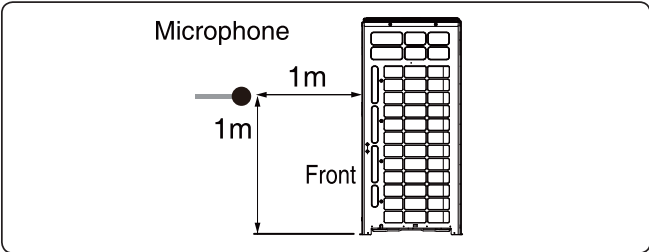
NOTE

- Sound Pressure Level
 - 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
- Sound Power Level
 - Sound power level is an absolute value that a sound source generates.
 - dBA = A-weighted sound power level.
 - Reference power : 1pW.
 - Measured according to ISO 3741.

7. Sound Data

Sound Pressure level

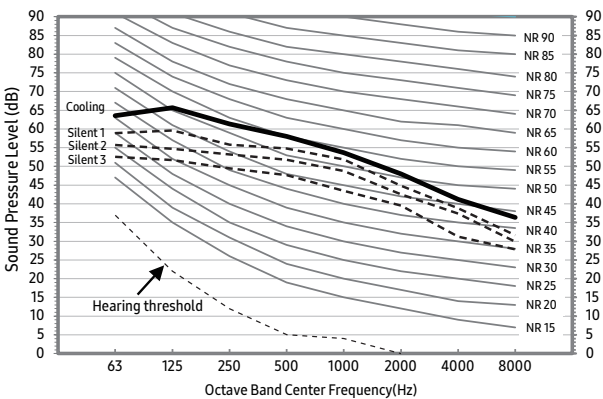
Unit: dB(A)



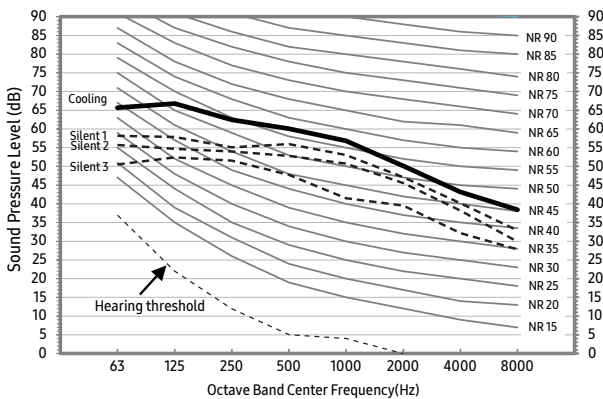
Model	Cooling	Silent1	Silent2	Silent3
AG042KSVANH/EU	60	57	54	51
AG056KSVANH/EU	62	59	56	53
AG070KSVANH/EU	63	60	57	54

• NR Curve

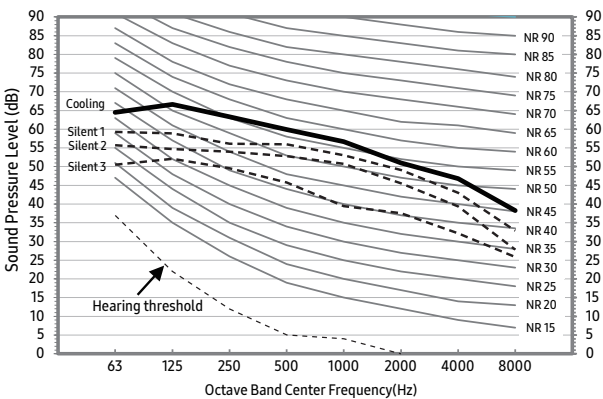
1) AG042KSVANH/EU



2) AG056KSVANH/EU



3) AG070KSVANH/EU



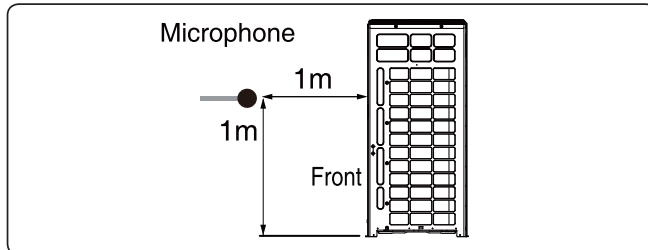
NOTE

- 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

7. Sound Data

Sound Pressure level

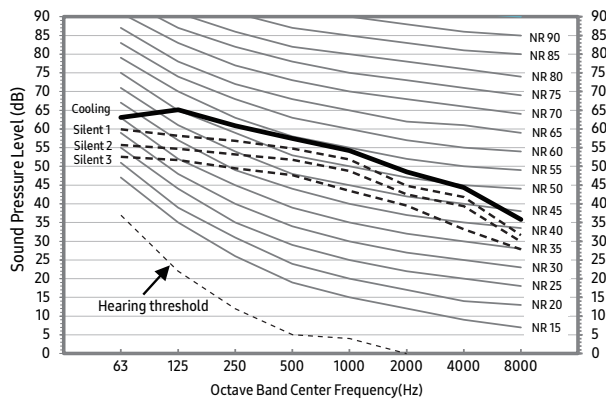
Unit: dB(A)



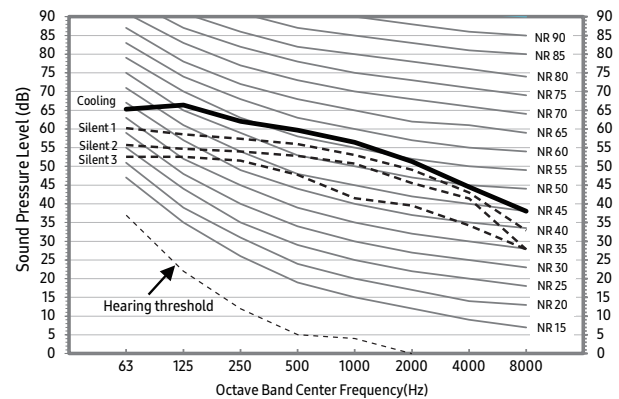
Model	Cooling	Silent1	Silent2	Silent3
AG042KSVGNH/EU	60	57	54	51
AG056KSVGNH/EU	62	59	56	53
AG070KSVGNH/EU	63	60	57	54

• NR Curve

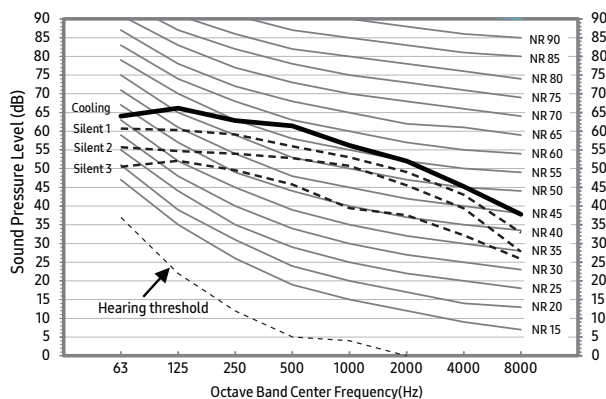
1) AG042KSVGNH/EU



2) AG056KSVGNH/EU



3) AG070KSVGNH/EU



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

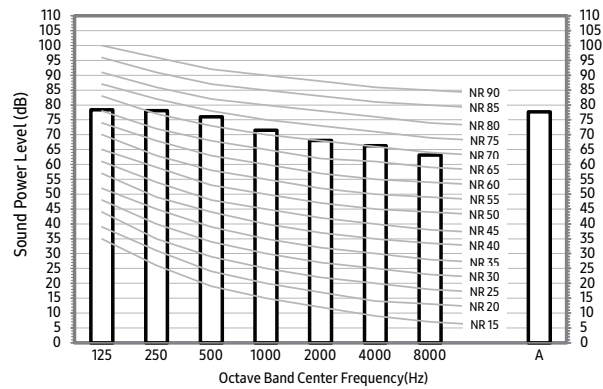
7. Sound Data

Sound Power level

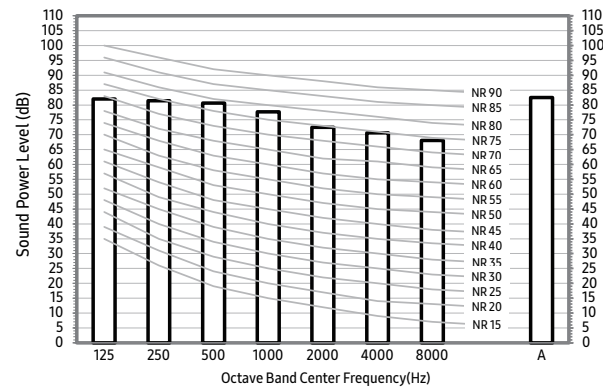
Unit: dB(A)

Model	Power
AG042KSVANH/EU	80
AG056KSVANH/EU	83
AG070KSVANH/EU	85

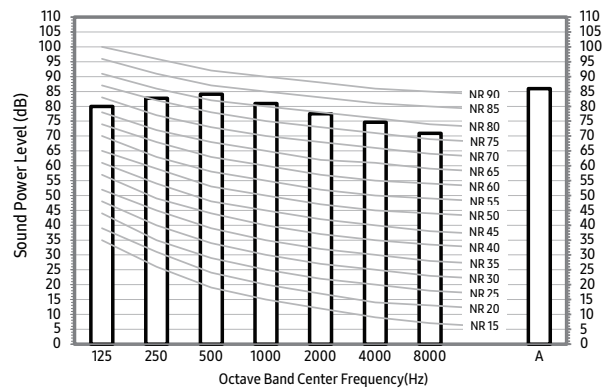
1) AG042KSVANH/EU



2) AG056KSVANH/EU



3) AG070KSVANH/EU



NOTE

- Specifications may be subject to change without prior notice.
- Sound power level is an absolute value that a sound source generates.
- dBA = A-weighted sound power level.
- Reference power : 1pW.
- Measured according to ISO 3741.

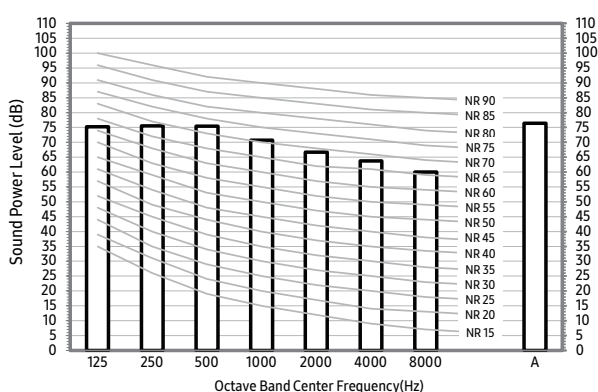
7. Sound Data

Sound Power level

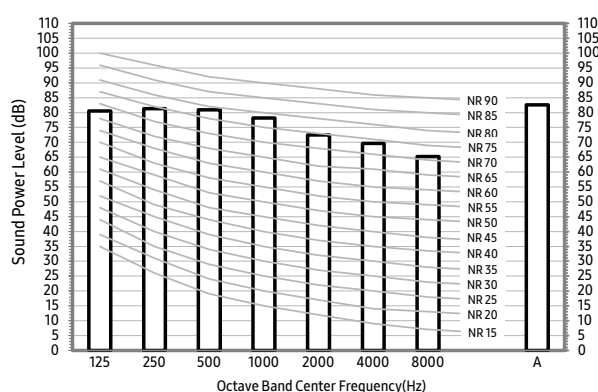
Unit: dB(A)

Model	Power
AG042KSVGNH/EU	80
AG056KSVGNH/EU	84
AG070KSVGNH/EU	88

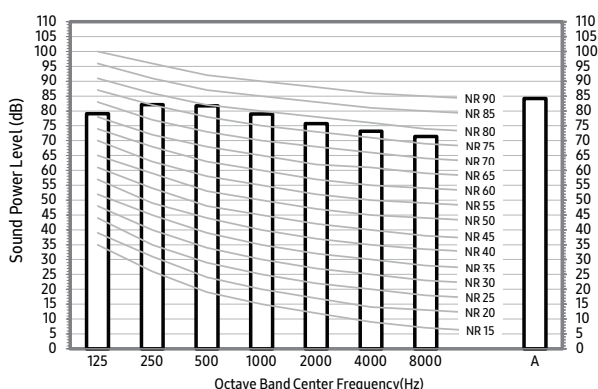
1) AG042KSVGNH/EU



2) AG056KSVGNH/EU



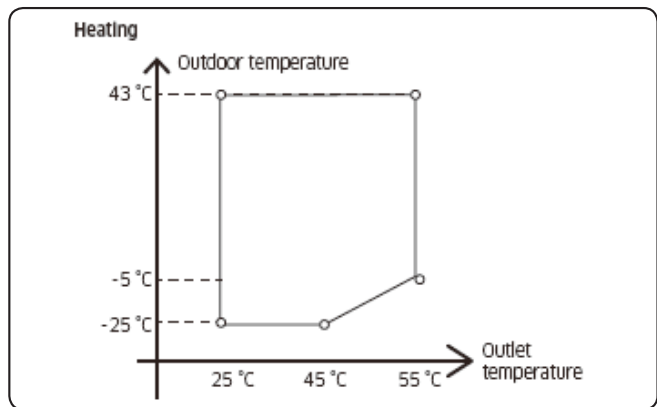
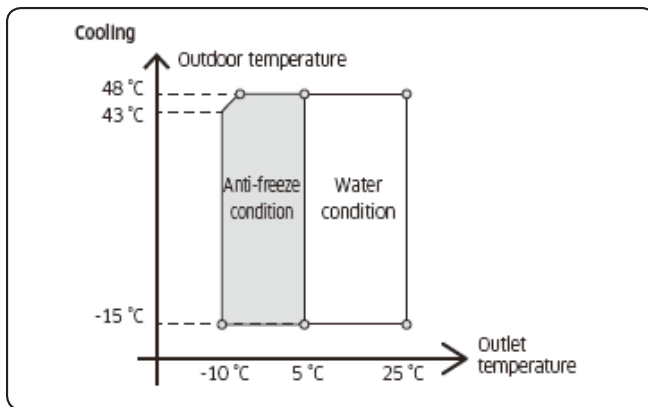
3) AG070KSVGNH/EU



NOTE

- Specifications may be subject to change without prior notice.
- Sound power level is an absolute value that a sound source generates.
- dBA = A-weighted sound power level.
- Reference power : 1pW.
- Measured according to ISO 3741.

8. Operation Range



- 1 The operating range is shown in these figures
- 2 Operate the product within the following range. For product protection, compressor operation may be limited.

Classification	Rated condition (inlet/ outlet)	Range (water outlet)	
		Water	Brine
Cooling	12/7 °C	5 °C ~ 25 °C	-10 °C ~ 25 °C
Heating	40/45 °C	25 °C ~ 55 °C	

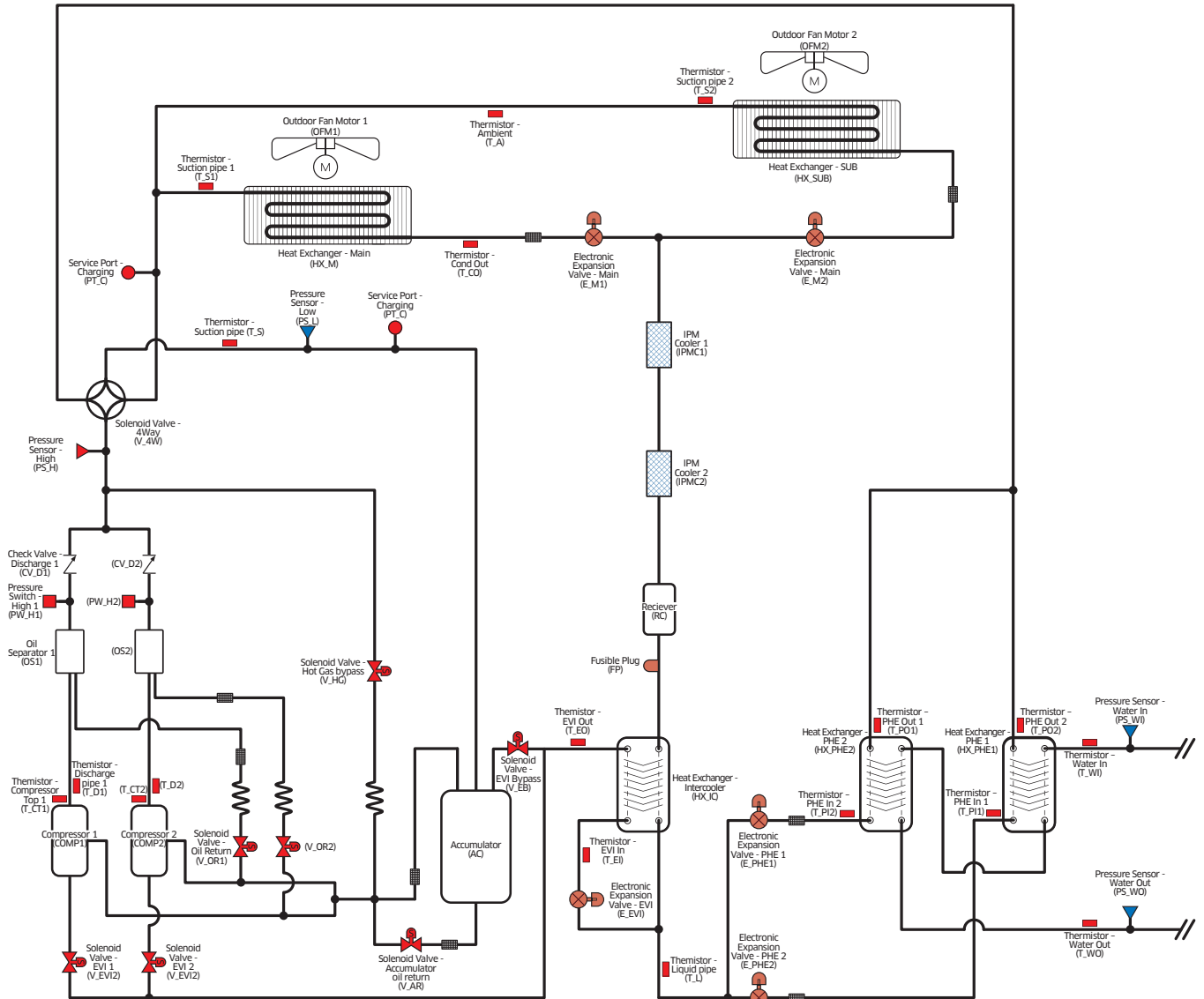
- When using in brine condition in cooling mode, maintain concentration of brine properly. Also, the product should be set in low temperature usage.
- Apply freeze prevention (such as pump operation, inserting brine, using brine, etc.) to use water that is not brine when outdoor temperature is below zero.
- To use low temperature function, hydro controller option and Seg23 "E" should be all set.
- Anti-freeze standard data
 - Make sure if brine is charged enough in water system.

Water outlet temperature, °C	- 10 ~ - 5	- 5 ~ 0	0 ~ 2	2 ~ 5	5 ~ 20
Ethylene glycol, %	40	30	20	10	0
Propylene glycol, %	40	35	25	15	0
Minimum water outlet temperature, °C	-10	-5	0	2	5

- 3 When outdoor temperature is low or in winter time, water in pump and water pipe may freeze and may cause damage to the product and the pipe. Insulate the pump and pipe to prevent freezing. If there are possibility of freezing, operate the pump while the product is off and drain water inside the pump and water pipe.

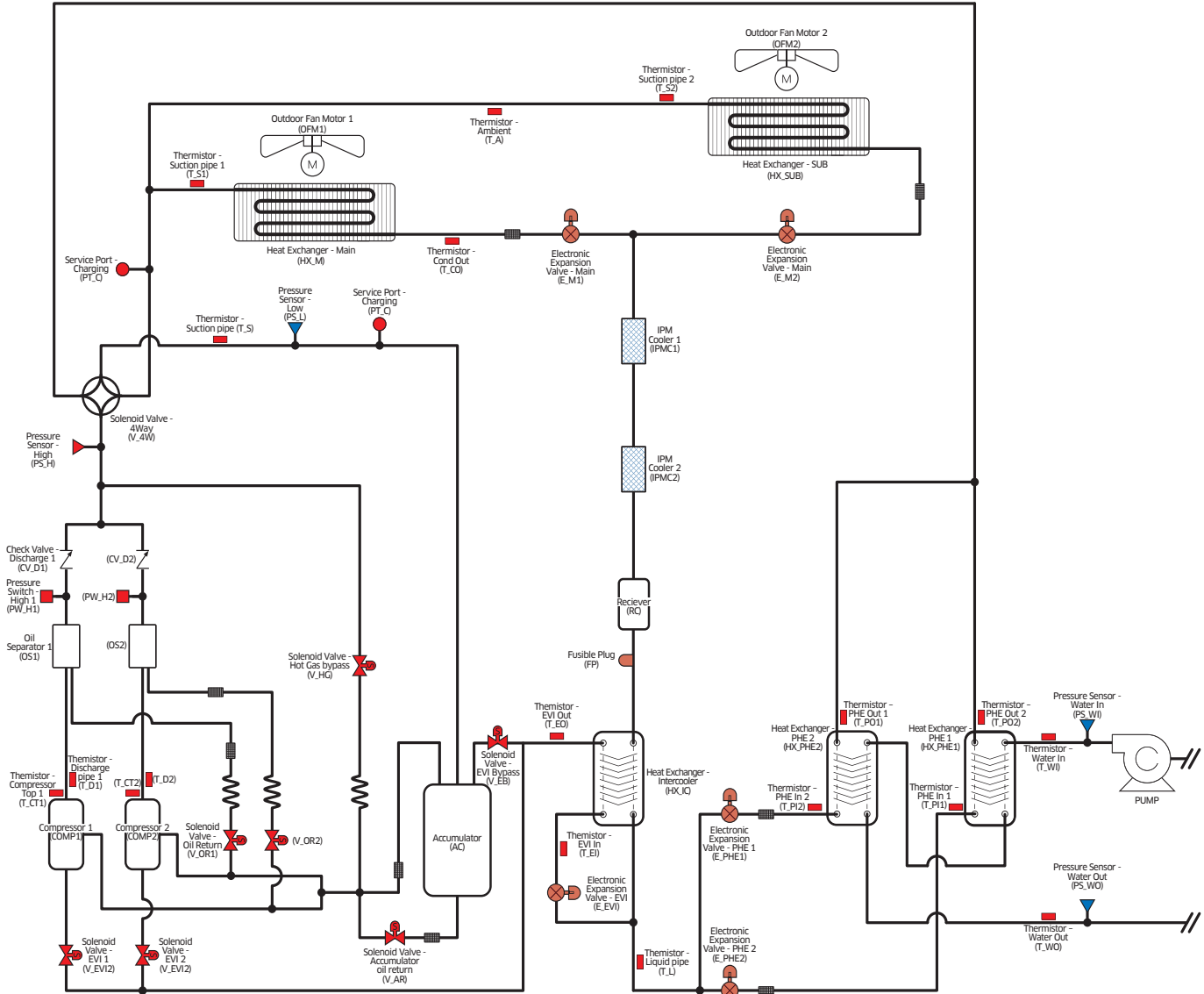
9. Piping Diagram

AG042/056/070KSVANH/EU (Non-pump model)



9. Piping Diagram

AG042/056/070KSVGNH/EU (Pump integrated model)



10. Capacity Table

Non-pump model

Cooling ($\Delta T = 5^{\circ}\text{C}$)

Model	LWE	Outdoor Air Temperature ($^{\circ}\text{C}$, DB)																	
		20			25			30			35			40			45		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVANH/EU	-10 ²	32.05	8.65	91.56	29.62	9.26	84.64	27.20	10.00	77.72	24.78	10.87	70.80	22.48	11.93	64.23	15.54	14.13	60.00 ³
	-5 ²	41.16	9.02	117.60	40.32	9.76	115.20	38.64	10.50	110.40	36.96	11.49	105.60	33.12	12.54	94.63	24.61	15.47	70.30
	0 ²	41.58	9.39	118.80	40.74	10.13	116.40	39.06	10.87	111.60	37.38	11.86	106.80	33.46	12.99	95.61	26.37	15.87	75.35
	5	45.36	9.63	129.60	44.52	10.37	127.20	42.84	11.24	122.40	40.74	12.23	116.40	36.71	13.35	104.88	28.14	16.27	80.40
	7	46.62	9.76	133.20	45.78	10.50	130.80	44.10	11.36	126.00	42.00	12.35	120.00	37.72	13.49	107.76	28.98	16.34	82.80
	9	49.56	9.88	141.60	48.30	10.62	138.00	47.04	11.49	134.40	44.52	12.47	127.20	39.98	13.62	114.24	30.66	16.79	87.60
	11	51.66	10.00	147.60	50.40	10.74	144.00	48.72	11.61	139.20	46.62	12.60	133.20	41.75	13.76	119.28	32.34	17.25	92.40
	13	53.76	10.13	153.60	52.50	10.87	150.00	50.82	11.73	145.20	48.30	12.72	138.00	43.47	13.91	124.20	33.60	17.47	96.00
	15	55.86	10.25	159.60	54.60	10.99	156.00	52.92	11.86	151.20	50.40	12.84	144.00	45.15	14.08	129.00	34.86	17.68	99.60
	18	58.80	10.37	168.00	57.54	11.12	164.40	55.44	12.10	158.40	52.92	13.09	151.20	47.42	14.35	135.48	36.54	17.88	104.40
	25	63.00	10.62	180.00	61.74	11.36	176.40	59.64	12.35	170.40	56.70	13.34	162.00	50.95	14.57	145.56	39.06	17.91	111.60
AG056KSVANH/EU	-10 ²	42.73	13.07	122.08	39.50	14.00	112.85	36.27	15.12	103.63	33.04	16.43	94.40	29.22	16.82	83.50	18.13	15.81	80.00 ³
	-5 ²	54.88	13.63	156.80	53.76	14.75	153.60	51.52	15.87	147.20	49.28	17.36	140.80	43.06	17.67	123.02	28.71	17.84	82.02
	0 ²	55.44	14.19	158.40	54.32	15.31	155.20	52.08	16.43	148.80	49.84	17.92	142.40	43.50	18.30	124.29	30.77	18.30	87.91
	5	60.48	14.56	172.80	59.36	15.68	169.60	57.12	16.99	163.20	54.32	18.48	155.20	47.72	18.82	136.34	32.83	18.76	93.80
	7	62.16	14.75	177.60	61.04	15.87	174.40	58.80	17.18	168.00	56.00	18.67	160.00	49.03	19.01	140.09	33.81	18.85	96.60
	9	66.08	14.94	188.80	64.40	16.06	184.00	62.72	17.36	179.20	59.36	18.86	169.60	51.98	19.20	148.51	35.77	19.36	102.20
	11	68.88	15.12	196.80	67.20	16.24	192.00	64.96	17.55	185.60	62.16	19.04	177.60	54.27	19.39	155.06	37.73	19.90	107.80
	13	71.68	15.31	204.80	70.00	16.43	200.00	67.76	17.74	193.60	64.40	19.23	184.00	56.51	19.60	161.46	39.20	20.15	112.00
	15	74.48	15.50	212.80	72.80	16.62	208.00	70.56	17.92	201.60	67.20	19.42	192.00	58.70	19.84	167.70	40.67	20.40	116.20
	18	78.40	15.68	224.00	76.72	16.80	219.20	73.92	18.30	211.20	70.56	19.79	201.60	61.64	20.23	176.12	42.63	20.62	121.80
	25	84.00	16.06	240.00	82.32	17.18	235.20	79.52	18.67	227.20	75.60	20.16	216.00	66.23	20.54	189.23	45.57	20.66	130.20
AG070KSVANH/EU	-10 ²	49.59	18.20	141.70	45.85	19.50	130.99	42.10	21.06	120.28	38.35	22.88	109.57	33.56	22.49	95.88	19.80	17.98	92.90 ³
	-5 ²	63.70	18.98	182.00	62.40	20.54	178.29	59.80	22.10	170.86	57.20	24.18	163.43	49.44	23.62	141.27	31.34	20.44	92.90 ³
	0 ²	64.35	19.76	183.86	63.05	21.32	180.14	60.45	22.88	172.71	57.85	24.96	165.29	49.95	24.47	142.73	33.59	21.13	95.98
	5	70.20	20.28	200.57	68.90	21.84	196.86	66.30	23.66	189.43	63.05	25.74	180.14	54.80	25.15	156.57	35.85	21.66	102.41
	7	72.15	20.54	206.14	70.85	22.10	202.43	68.25	23.92	195.00	65.00	26.00	185.71	56.30	25.41	160.87	36.92	21.76	105.47
	9	76.70	20.80	219.14	74.75	22.36	213.57	72.80	24.18	208.00	68.90	26.26	196.86	59.69	25.67	170.54	39.06	22.35	111.59
	11	79.95	21.06	228.43	78.00	22.62	222.86	75.40	24.44	215.43	72.15	26.52	206.14	62.32	25.92	178.07	41.20	22.97	117.70
	13	83.20	21.32	237.71	81.25	22.88	232.14	78.65	24.70	224.71	74.75	26.78	213.57	64.89	26.20	185.41	42.80	23.26	122.29
	15	86.45	21.58	247.00	84.50	23.14	241.43	81.90	24.96	234.00	78.00	27.04	222.86	67.40	26.53	192.58	44.41	23.55	126.87
	18	91.00	21.84	260.00	89.05	23.40	254.43	85.80	25.48	245.14	81.90	27.56	234.00	70.79	27.04	202.25	46.55	23.81	132.99
	25	97.50	22.36	278.57	95.55	23.92	273.00	92.30	26.00	263.71	87.75	28.08	250.71	76.06	27.46	217.30	49.76	23.85	142.16

NOTE

- Capacity table may be subject to change without prior notice.
- 1) ΔT = Leaving water temperature - Entering water temperature
- 2) When using brine, refer to the capacity correction factors by brine %wt. (This capacity data is based on Ethylene glycol 50%wt.)
- 3) ΔT is comply with the condition of minimum flow-rate.
- 4) LWT : Leaving water temperature, TC : Total Capacity, PI : Power Input

10. Capacity Table

Cooling ($\Delta T = 7^{\circ}\text{C}$)

Model	LWE	Outdoor Air Temperature ($^{\circ}\text{C}$, DB)																	
		20			25			30			35			40			45		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		KW	KW	LPM	KW	KW	LPM	KW	KW	LPM	KW	KW	LPM	KW	KW	LPM	KW	KW	LPM
AG042KSVANH/EU	-10 ²⁾	32.05	8.12	65.40	29.62	8.70	60.46	27.20	9.25	60.00 ³⁾	24.78	9.85	60.00 ³⁾	22.48	10.59	60.00 ³⁾	15.54	12.25	60.00 ³⁾
	-5 ²⁾	41.16	8.91	84.00	40.32	9.67	82.29	38.64	10.36	78.86	36.96	11.36	75.43	33.12	12.40	67.59	24.61	14.71	60.00 ³⁾
	0 ²⁾	41.58	9.28	84.86	40.74	9.99	83.14	39.06	10.72	79.71	37.38	11.72	76.29	33.46	12.84	68.29	26.37	15.34	60.00 ³⁾
	5	45.36	9.05	92.57	44.52	9.75	90.86	42.84	10.56	87.43	40.74	11.49	83.14	36.71	12.54	74.91	28.14	15.15	60.00 ³⁾
	7	46.62	9.67	95.14	45.78	10.40	93.43	44.10	11.23	90.00	42.00	12.21	85.71	37.72	13.36	76.97	28.98	16.15	60.00 ³⁾
	9	49.56	9.75	101.14	48.30	10.48	98.57	47.04	11.38	96.00	44.52	12.31	90.86	39.98	13.47	81.60	30.66	16.56	62.57
	11	51.66	9.91	105.43	50.40	10.65	102.86	48.72	11.48	99.43	46.62	12.46	95.14	41.75	13.63	85.20	32.34	17.09	66.00
	13	53.76	9.99	109.71	52.50	10.77	107.14	50.82	11.60	103.71	48.30	12.58	98.57	43.47	13.78	88.71	33.60	17.24	68.57
	15	55.86	10.14	114.00	54.60	10.87	111.43	52.92	11.72	108.00	50.40	12.73	102.86	45.15	13.89	92.14	34.86	17.45	71.14
	18	58.80	10.26	120.00	57.54	10.97	117.43	55.44	11.99	113.14	52.92	12.94	108.00	47.42	14.16	96.77	36.54	17.68	74.57
AG056KSVANH/EU	-10 ²⁾	42.73	12.28	87.20	39.50	13.15	80.61	36.27	13.98	80.00 ³⁾	33.04	14.90	80.00 ³⁾	29.22	14.85	80.00 ³⁾	18.13	13.65	80.00 ³⁾
	-5 ²⁾	54.88	13.50	112.00	53.76	14.56	109.71	51.52	15.69	105.14	49.28	17.13	100.57	43.06	17.47	87.87	28.71	16.54	80.00 ³⁾
	0 ²⁾	55.44	14.03	113.14	54.32	15.17	110.86	52.08	16.25	106.29	49.84	17.69	101.71	43.50	18.14	88.78	30.77	17.17	80.00 ³⁾
	5	60.48	13.68	123.43	59.36	14.73	121.14	57.12	15.96	116.57	54.32	17.36	110.86	47.72	17.68	97.39	32.83	16.99	80.00 ³⁾
	7	62.16	14.61	126.86	61.04	15.72	124.57	58.80	17.02	120.00	56.00	18.42	114.29	49.03	18.76	100.06	33.81	18.08	80.00 ³⁾
	9	66.08	14.77	134.86	64.40	15.84	131.43	62.72	17.13	128.00	59.36	18.61	121.14	51.98	19.02	106.08	35.77	18.79	80.00 ³⁾
	11	68.88	14.98	140.57	67.20	16.03	137.14	64.96	17.32	132.57	62.16	18.83	126.86	54.27	19.17	110.76	37.73	19.56	80.00 ³⁾
	13	71.68	15.14	146.29	70.00	16.28	142.86	67.76	17.57	138.29	64.40	18.98	131.43	56.51	19.34	115.33	39.20	19.93	80.00
	15	74.48	15.35	152.00	72.80	16.43	148.57	70.56	17.76	144.00	67.20	19.20	137.14	58.70	19.62	119.79	40.67	20.21	83.00
	18	78.40	15.54	160.00	76.72	16.58	156.57	73.92	18.09	150.86	70.56	19.53	144.00	61.64	20.04	125.80	42.63	20.39	87.00
AG070KSVANH/EU	-10 ²⁾	49.59	17.10	101.21	45.85	18.32	93.56	42.10	19.47	92.90 ³⁾	38.35	20.74	92.90 ³⁾	33.56	19.80	92.90 ³⁾	19.80	15.50	92.90 ³⁾
	-5 ²⁾	63.70	18.73	130.00	62.40	20.31	127.35	59.80	21.85	122.04	57.20	23.91	116.73	49.44	23.36	100.91	31.34	18.75	92.90 ³⁾
	0 ²⁾	64.35	19.54	131.33	63.05	21.08	128.67	60.45	22.67	123.37	57.85	24.68	118.06	49.95	24.15	101.95	33.59	19.62	92.90 ³⁾
	5	70.20	19.05	143.27	68.90	20.52	140.61	66.30	22.23	135.31	63.05	24.18	128.67	54.80	23.63	111.84	35.85	19.35	92.90 ³⁾
	7	72.15	20.35	147.24	70.85	21.90	144.59	68.25	23.61	139.29	65.00	25.66	132.65	56.30	25.13	114.91	36.92	20.56	92.90 ³⁾
	9	76.70	20.61	156.53	74.75	22.11	152.55	72.80	23.86	148.57	68.90	25.97	140.61	59.69	25.33	121.82	39.06	21.37	92.90 ³⁾
	11	79.95	20.78	163.16	78.00	22.32	159.18	75.40	24.17	153.88	72.15	26.17	147.24	62.32	25.58	127.19	41.20	22.30	92.90 ³⁾
	13	83.20	21.08	169.80	81.25	22.67	165.82	78.65	24.37	160.51	74.75	26.48	152.55	64.89	25.96	132.44	42.80	22.67	92.90 ³⁾
	15	86.45	21.34	176.43	84.50	22.84	172.45	81.90	24.73	167.14	78.00	26.68	159.18	67.40	26.28	137.56	44.41	23.17	92.90 ³⁾
	18	91.00	21.64	185.71	89.05	23.18	181.73	85.80	25.14	175.10	81.90	27.20	167.14	70.79	26.68	144.47	46.55	23.49	94.99
AG070KSVANH/EU	25	97.50	22.07	198.98	95.55	23.70	195.00	92.30	25.71	188.37	87.75	27.77	179.08	76.06	27.10	155.21	49.76	23.53	101.54

NOTE

- Capacity table may be subject to change without prior notice.
- 1) ΔT = Leaving water temperature - Entering water temperature
- 2) When using brine, refer to the capacity correction factors by brine %wt. (This capacity data is based on Ethylene glycol 50%wt.)
- 3) ΔT is comply with the condition of minimum flow-rate.
- 4) LWT : Leaving water temperature, TC : Total Capacity, PI : Power Input

10. Capacity Table

Heating ($\Delta T = 5^{\circ}\text{C}$)

Model	LWE	Outdoor Air temperature ($^{\circ}\text{C}$, DB)																	
		-25			-20			-15			-10			-7			-2		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVANH/EU	30	31.49	17.05	90.87	35.14	16.53	100.40	36.81	14.86	105.17	38.90	13.76	111.14	40.36	13.28	115.31	43.13	12.73	123.23
	35	30.09	17.28	86.81	33.57	16.76	95.91	35.16	15.07	100.46	37.16	13.96	106.17	38.55	13.47	110.14	41.20	12.91	117.71
	40	28.49	18.31	82.21	31.79	17.76	90.83	33.29	15.97	95.11	35.18	14.79	100.51	36.50	14.28	104.29	39.01	13.68	111.46
	45	20.33	14.98	60.00	30.00	18.75	85.71	31.42	16.86	89.77	33.20	15.61	94.86	34.45	15.07	98.43	36.82	14.44	105.20
	50	-	-	-	-	-	-	22.81	16.65	65.17	24.10	15.41	68.86	25.01	14.88	71.46	26.73	14.26	76.37
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.39	14.11	75.40
AG056KSVANH/EU	30	41.99	27.74	121.16	46.85	26.90	133.87	49.08	23.08	140.23	51.87	20.36	148.19	53.81	19.64	153.75	57.51	18.83	164.30
	35	40.12	28.12	115.74	44.76	27.27	127.89	46.88	23.41	133.94	49.55	20.65	141.56	51.40	19.93	146.86	54.93	19.10	156.95
	40	37.99	29.80	109.61	42.39	28.90	121.10	44.39	24.81	126.82	46.91	21.88	134.02	48.67	21.12	139.05	52.01	20.24	148.61
	45	27.11	24.38	80.00 ³⁾	40.00	30.51	114.29	41.89	26.19	119.70	44.27	23.09	126.48	45.93	22.29	131.24	49.09	21.36	140.27
	50	-	-	-	-	-	-	30.41	25.86	86.90	32.13	22.80	91.81	33.35	22.01	95.28	35.64	21.09	101.83
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.19	20.87	100.53
AG070KSVANH/EU	30	52.12	38.66	150.36	58.15	37.49	166.14	60.91	32.17	174.03	64.37	28.37	183.91	66.79	27.38	190.82	71.37	26.25	203.91
	35	49.79	39.19	143.65	55.55	38.01	158.72	58.18	32.62	166.23	61.49	28.78	175.69	63.79	27.77	182.26	68.18	26.62	194.79
	40	47.15	41.53	136.03	52.60	40.28	150.30	55.09	34.57	157.39	58.21	30.49	166.33	60.40	29.44	172.57	64.55	28.20	184.44
	45	33.65	30.25	99.30 ³⁾	49.64	42.52	141.84	51.99	36.50	148.55	54.94	32.18	156.97	57.01	31.07	162.88	60.93	29.77	174.08
	50	-	-	-	-	-	-	37.75	36.04	107.84	39.88	31.77	113.94	41.39	30.68	118.24	44.23	29.40	126.38
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43.67	29.09	124.77

Model	LWE	Outdoor Air temperature ($^{\circ}\text{C}$, DB)														
		2			7			15			20			24		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVANH/EU	30	45.66	11.64	130.46	49.20	10.40	140.57	55.75	10.51	159.29	60.40	8.82	172.57	60.40	8.63	172.57
	35	46.22	11.81	132.06	47.00	10.55	134.29	53.26	10.67	152.17	57.70	10.01	164.86	57.70	9.80	164.86
	40	41.30	12.52	118.00	44.50	11.18	127.14	50.42	11.30	144.06	54.63	11.20	156.09	54.63	10.96	156.09
	45	38.98	13.21	111.37	42.00	11.83	120.00	47.59	11.93	135.97	51.56	11.82	147.31	51.56	11.56	147.31
	50	28.30	13.04	80.86	30.49	11.65	87.11	34.55	11.78	98.71	37.43	11.67	106.94	37.43	11.41	106.94
	55	27.93	12.91	79.80	30.10	11.53	86.00	34.11	11.66	97.46	36.95	11.40	105.57	36.95	11.15	105.57
AG056KSVANH/EU	30	60.88	17.22	173.94	65.60	15.38	187.43	74.33	15.55	212.38	80.53	13.05	230.10	80.53	12.77	230.10
	35	61.63	17.47	176.08	62.67	15.61	179.05	71.01	15.78	202.90	76.93	14.81	219.81	76.93	14.50	219.81
	40	55.07	18.52	157.33	59.33	16.54	169.52	67.23	16.72	192.08	72.84	16.57	208.11	72.84	16.21	208.11
	45	51.97	19.54	148.50	56.00	17.50	160.00	63.45	17.65	181.30	68.75	17.49	196.42	68.75	17.10	196.42
	50	37.73	19.29	107.81	40.65	17.23	116.15	46.07	17.43	131.62	49.91	17.26	142.59	49.91	16.89	142.59
	55	37.24	19.10	106.40	40.13	17.06	114.67	45.48	17.25	129.94	49.27	16.86	140.76	49.27	16.49	140.76
AG070KSVANH/EU	30	75.56	24.00	215.88	81.41	21.44	232.61	92.25	21.67	263.58	99.95	18.18	285.56	99.95	17.80	285.56
	35	76.48	24.35	218.52	77.77	21.75	222.21	88.13	22.00	251.81	95.48	20.64	272.80	95.48	20.20	272.80
	40	68.34	25.81	195.26	73.64	23.05	210.39	83.43	23.30	238.38	90.40	23.09	258.28	90.40	22.59	258.28
	45	64.50	27.24	184.29	69.50	24.39	200.00	78.75	24.60	225.00	85.32	24.37	243.77	85.32	23.84	243.77
	50	46.83	26.88	133.80	50.45	24.02	144.15	57.17	24.29	163.35	61.94	24.06	176.96	61.94	23.53	176.96
	55	46.22	26.62	132.05	49.81	23.77	142.31	56.44	24.04	161.27	61.14	23.50	174.70	61.14	22.99	174.70

10. Capacity Table

Heating ($\Delta T = 7^{\circ}\text{C}$)

Model	LWE	Outdoor Air temperature ($^{\circ}\text{C}$, DB)																	
		-25			-20			-15			-10			-7			-2		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVANH/EU	30	31.49	16.91	64.91	35.14	16.38	71.71	36.81	14.66	75.12	38.90	13.63	79.39	40.36	13.11	82.37	43.13	12.61	88.02
	35	30.09	17.11	62.01	33.57	16.57	68.51	35.16	14.93	71.76	37.16	13.78	75.84	38.55	13.29	78.67	41.20	12.77	84.08
	40	28.49	18.10	60.00 ³⁾	31.79	17.53	64.88	33.29	15.82	67.94	35.18	14.60	71.80	36.50	14.09	74.49	39.01	13.50	79.61
	45	20.33	14.00	60.00 ³⁾	30.00	18.54	61.22	31.42	16.70	64.12	33.20	15.40	67.76	34.45	14.90	70.31	36.82	14.28	75.14
	50	-	-	-	-	-	-	22.81	15.58	60.00 ³⁾	24.10	14.59	60.00 ³⁾	25.01	14.26	60.00 ³⁾	26.73	13.83	60.00 ³⁾
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.39	12.97	60.00 ³⁾
AG056KSVANH/EU	30	41.99	27.46	86.54	46.85	26.65	95.62	49.08	22.82	100.16	51.87	20.17	105.85	53.81	19.46	109.82	57.51	18.66	117.36
	35	40.12	27.84	82.67	44.76	27.02	91.35	46.88	23.15	95.67	49.55	20.42	101.12	51.40	19.66	104.90	54.93	18.92	112.11
	40	37.99	29.50	80.00 ³⁾	42.39	28.63	86.50	44.39	24.53	90.59	46.91	21.68	95.73	48.67	20.89	99.32	52.01	20.05	106.15
	45	27.11	22.78	80.00 ³⁾	40.00	30.23	81.63	41.89	25.89	85.50	44.27	22.83	90.34	45.93	22.09	93.74	49.09	21.08	100.19
	50	-	-	-	-	-	-	30.41	24.29	80.00 ³⁾	32.13	21.67	80.00 ³⁾	33.35	21.05	80.00 ³⁾	35.64	20.50	80.00 ³⁾
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35.19	19.18	80.00 ³⁾
AG070KSVANH/EU	30	52.12	38.35	107.40	58.15	37.14	118.67	60.91	31.81	124.31	64.37	28.11	131.37	66.79	27.07	136.30	71.37	26.00	145.65
	35	49.79	38.81	102.60	55.55	37.58	113.37	58.18	32.26	118.74	61.49	28.52	125.49	63.79	27.46	130.19	68.18	26.37	139.14
	40	47.15	41.12	99.30 ³⁾	52.60	39.83	107.36	55.09	34.25	112.42	58.21	30.15	118.81	60.40	29.17	123.26	64.55	27.94	131.74
	45	33.65	28.28	99.30 ³⁾	49.64	42.05	101.31	51.99	36.09	106.11	54.94	31.76	112.12	57.01	30.72	116.34	60.93	29.50	124.34
	50	-	-	-	-	-	-	37.75	33.85	99.30 ³⁾	39.88	30.08	99.30 ³⁾	41.39	29.40	99.30 ³⁾	44.23	28.51	99.30 ³⁾
	55	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43.67	26.73	99.30 ³⁾

Model	LWE	Outdoor Air temperature ($^{\circ}\text{C}$, DB)														
		2			7			15			20			24		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVANH/EU	30	45.66	11.49	93.18	49.20	10.26	100.41	55.75	10.41	113.78	60.40	8.72	123.27	60.40	8.54	123.27
	35	46.22	11.65	94.33	47.00	10.41	95.92	53.26	10.55	108.69	57.70	9.92	117.76	57.70	9.67	117.76
	40	41.30	12.38	84.29	44.50	11.08	90.82	50.42	11.15	102.90	54.63	11.10	111.49	54.63	10.83	111.49
	45	38.98	13.09	79.55	42.00	11.72	85.71	47.59	11.77	97.12	51.56	11.66	105.22	51.56	11.43	105.22
	50	28.30	12.82	60.00 ³⁾	30.49	11.50	62.22	34.55	11.65	70.51	37.43	11.56	76.39	37.43	11.29	76.39
	55	27.93	12.00	60.00 ³⁾	30.10	10.83	61.43	34.11	10.95	69.61	36.95	10.71	75.41	36.95	10.47	75.41
AG056KSVANH/EU	30	60.88	17.03	124.24	65.60	15.24	133.88	74.33	15.34	151.70	80.53	12.88	164.35	80.53	12.60	164.35
	35	61.63	17.24	125.77	62.67	15.46	127.89	71.01	15.61	144.93	76.93	14.67	157.01	76.93	14.30	157.01
	40	55.07	18.31	112.38	59.33	16.32	121.09	67.23	16.53	137.20	72.84	16.38	148.65	72.84	16.03	148.65
	45	51.97	19.32	106.07	56.00	17.27	114.29	63.45	17.45	129.50	68.75	17.32	140.30	68.75	16.91	140.30
	50	37.73	18.97	80.00 ³⁾	40.65	17.04	82.97	46.07	17.27	94.01	49.91	17.07	101.85	49.91	16.66	101.85
	55	37.24	17.75	80.00 ³⁾	40.13	16.02	81.90	45.48	16.20	92.82	49.27	15.84	100.54	49.27	15.49	100.54
AG070KSVANH/EU	30	75.56	23.68	154.20	81.41	21.16	166.15	92.25	21.47	188.27	99.95	17.98	203.97	99.95	17.56	203.97
	35	76.48	24.08	156.09	77.77	21.55	158.72	88.13	21.75	179.86	95.48	20.45	194.86	95.48	20.02	194.86
	40	68.34	25.52	139.47	73.64	22.84	150.28	83.43	22.99	170.27	90.40	22.79	184.49	90.40	22.38	184.49
	45	64.50	26.88	131.64	69.50	24.07	141.84	78.75	24.32	160.71	85.32	24.10	174.12	85.32	23.57	174.12
	50	46.83	26.38	99.30 ³⁾	50.45	23.80	102.97	57.17	23.97	116.68	61.94	23.84	126.40	61.94	23.32	126.40
	55	46.22	24.74	99.30 ³⁾	49.81	22.33	101.65	56.44	22.58	115.19	61.14	22.08	124.78	61.14	21.59	124.78

10. Capacity Table

Pump integrated model

Cooling ($\Delta T = 5^{\circ}\text{C}$)

Model	LWE	Outdoor Air Temperature ($^{\circ}\text{C}$, DB)																	
		20			25			30			35			40			45		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVGNH/EU	-10 ²⁾	32.05	9.74	91.56	29.62	10.34	84.64	27.20	11.05	77.72	24.78	11.89	70.80	22.48	12.93	64.23	15.54	15.13	60.00 ³⁾
	-5 ²⁾	41.16	10.21	117.60	40.32	10.95	115.20	38.64	11.69	110.40	36.96	12.67	105.60	33.12	13.68	94.63	24.61	16.53	70.30
	0 ²⁾	41.58	10.59	118.80	40.74	11.33	116.40	39.06	12.06	111.60	37.38	13.04	106.80	33.46	14.14	95.61	26.37	16.96	75.35
	5	45.36	10.87	129.60	44.52	11.61	127.20	42.84	12.47	122.40	40.74	13.45	116.40	36.71	14.55	104.88	28.14	17.39	80.40
	7	46.62	11.01	133.20	45.78	11.75	130.80	44.10	12.61	126.00	42.00	13.59	120.00	37.72	14.69	107.76	28.98	17.48	82.80
	9	49.56	11.15	141.60	48.30	11.89	138.00	47.04	12.76	134.40	44.52	13.73	127.20	39.98	14.85	114.24	30.66	17.94	87.60
	11	51.66	11.29	147.60	50.40	12.03	144.00	48.72	12.89	139.20	46.62	13.88	133.20	41.75	15.01	119.28	32.34	18.43	92.40
	13	53.76	11.43	153.60	52.50	12.17	150.00	50.82	13.03	145.20	48.30	14.01	138.00	43.47	15.17	124.20	33.60	18.67	96.00
	15	55.86	11.57	159.60	54.60	12.31	156.00	52.92	13.17	151.20	50.40	14.15	144.00	45.15	15.36	129.00	34.86	18.90	99.60
	18	58.80	11.70	168.00	57.54	12.45	164.40	55.44	13.43	158.40	52.92	14.42	151.20	47.42	15.65	135.48	36.54	19.11	104.40
AG056KSVGNH/EU	-10 ²⁾	42.73	14.37	122.08	39.50	15.28	112.85	36.27	16.39	103.63	33.04	17.67	94.40	29.22	18.02	83.50	18.13	16.98	80.00 ³⁾
	-5 ²⁾	54.88	15.02	156.80	53.76	16.15	153.60	51.52	17.27	147.20	49.28	18.77	140.80	43.06	19.03	123.02	28.71	19.05	82.02
	0 ²⁾	55.44	15.59	158.40	54.32	16.72	155.20	52.08	17.84	148.80	49.84	19.34	142.40	43.50	19.68	124.29	30.77	19.54	87.91
	5	60.48	15.99	172.80	59.36	17.12	169.60	57.12	18.44	163.20	54.32	19.94	155.20	47.72	20.23	136.34	32.83	20.03	93.80
	7	62.16	16.19	177.60	61.04	17.32	174.40	58.80	18.63	168.00	56.00	20.14	160.00	49.03	20.43	140.09	33.81	20.14	96.60
	9	66.08	16.39	188.80	64.40	17.52	184.00	62.72	18.84	179.20	59.36	20.34	169.60	51.98	20.65	148.51	35.77	20.68	102.20
	11	68.88	16.58	196.80	67.20	17.71	192.00	64.96	19.03	185.60	62.16	20.54	177.60	54.27	20.86	155.06	37.73	21.24	107.80
	13	71.68	16.77	204.80	70.00	17.91	200.00	67.76	19.23	193.60	64.40	20.73	184.00	56.51	21.08	161.46	39.20	21.51	112.00
	15	74.48	16.96	212.80	72.80	18.10	208.00	70.56	19.42	201.60	67.20	20.93	192.00	58.70	21.34	167.70	40.67	21.77	116.20
	18	78.40	17.14	224.00	76.72	18.28	219.20	73.92	19.80	211.20	70.56	21.31	201.60	61.64	21.73	176.12	42.63	22.02	121.80
AG070KSVGNH/EU	-10 ²⁾	49.59	20.09	141.70	45.85	21.41	130.99	42.10	23.00	120.28	38.35	24.85	109.57	33.56	24.39	95.88	19.80	19.70	92.90 ³⁾
	-5 ²⁾	63.70	20.97	182.00	62.40	22.59	178.29	59.80	24.19	170.86	57.20	26.34	163.43	49.44	25.71	141.27	31.34	22.26	92.90 ³⁾
	0 ²⁾	64.35	21.78	183.86	63.05	23.40	180.14	60.45	25.01	172.71	57.85	27.15	165.29	49.95	26.60	142.73	33.59	22.98	95.98
	5	70.20	22.33	200.57	68.90	23.95	196.86	66.30	25.83	189.43	63.05	27.98	180.14	54.80	27.34	156.57	35.85	23.56	102.41
	7	72.15	22.60	206.14	70.85	24.22	202.43	68.25	26.11	195.00	65.00	28.26	185.71	56.30	27.61	160.87	36.92	23.68	105.47
	9	76.70	22.87	219.14	74.75	24.49	213.57	72.80	26.38	208.00	68.90	28.53	196.86	59.69	27.89	170.54	39.06	24.31	111.59
	11	79.95	23.13	228.43	78.00	24.75	222.86	75.40	26.65	215.43	72.15	28.81	206.14	62.32	28.17	178.07	41.20	24.97	117.70
	13	83.20	23.39	237.71	81.25	25.02	232.14	78.65	26.91	224.71	74.75	29.07	213.57	64.89	28.47	185.41	42.80	25.29	122.29
	15	86.45	23.65	247.00	84.50	25.28	241.43	81.90	27.17	234.00	78.00	29.34	222.86	67.40	28.81	192.58	44.41	25.60	126.87
	18	91.00	23.90	260.00	89.05	25.53	254.43	85.80	27.70	245.14	81.90	29.87	234.00	70.79	29.34	202.25	46.55	25.89	132.99
AG070KSVGNH/EU	25	97.50	24.40	278.57	95.55	26.03	273.00	92.30	28.21	263.71	87.75	30.39	250.71	76.06	29.78	217.30	49.76	25.95	142.16

NOTE

- Capacity table may be subject to change without prior notice.
- 1) ΔT = Leaving water temperature - Entering water temperature
- 2) When using brine, refer to the capacity correction factors by brine %wt.
(This capacity data is based on Ethylene glycol 50%wt.)
- 3) ΔT is comply with the condition of minimum flow-rate.
- 4) LWT : Leaving water temperature, TC : Total Capacity, PI : Power Input

10. Capacity Table

Cooling ($\Delta T = 7^{\circ}\text{C}$)

Model	LWE	Outdoor Air Temperature ($^{\circ}\text{C}$, DB)																	
		20			25			30			35			40			45		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVGNH/EU	-10 ²⁾	32.05	9.09	65.40	29.62	9.65	60.46	27.20	10.20	60.00 ³⁾	24.78	10.81	60.00 ³⁾	22.48	11.56	60.00 ³⁾	15.54	13.23	60.00 ³⁾
	-5 ²⁾	41.16	9.98	84.00	40.32	10.73	82.29	38.64	11.42	78.86	36.96	12.41	75.43	33.12	13.42	67.59	24.61	15.71	60.00 ³⁾
	0 ²⁾	41.58	10.35	84.86	40.74	11.07	83.14	39.06	11.79	79.71	37.38	12.78	76.29	33.46	13.87	68.29	26.37	16.35	60.00 ³⁾
	5	45.36	10.15	92.57	44.52	10.85	90.86	42.84	11.65	87.43	40.74	12.57	83.14	36.71	13.60	74.91	28.14	16.15	60.00 ³⁾
	7	46.62	10.79	95.14	45.78	11.52	93.43	44.10	12.35	90.00	42.00	13.32	85.71	37.72	14.44	76.97	28.98	17.16	60.00 ³⁾
	9	49.56	10.90	101.14	48.30	11.62	98.57	47.04	12.52	96.00	44.52	13.44	90.86	39.98	14.57	81.60	30.66	17.60	62.57
	11	51.66	11.08	105.43	50.40	11.81	102.86	48.72	12.64	99.43	46.62	13.60	95.14	41.75	14.75	85.20	32.34	18.15	66.00
	13	53.76	11.17	109.71	52.50	11.95	107.14	50.82	12.78	103.71	48.30	13.74	98.57	43.47	14.91	88.71	33.60	18.31	68.57
	15	55.86	11.33	114.00	54.60	12.06	111.43	52.92	12.91	108.00	50.40	13.91	102.86	45.15	15.04	92.14	34.86	18.54	71.14
	18	58.80	11.48	120.00	57.54	12.18	117.43	55.44	13.20	113.14	52.92	14.15	108.00	47.42	15.33	96.77	36.54	18.78	74.57
	25	63.00	11.75	128.57	61.74	12.50	126.00	59.64	13.45	121.71	56.70	14.39	115.71	50.95	15.64	103.97	39.06	18.80	79.71
AG056KSVGNH/EU	-10 ²⁾	42.73	13.44	87.20	39.50	14.29	80.61	36.27	15.13	80.00 ³⁾	33.04	16.06	80.00 ³⁾	29.22	16.01	80.00 ³⁾	18.13	14.79	80.00 ³⁾
	-5 ²⁾	54.88	14.78	112.00	53.76	15.83	109.71	51.52	16.97	105.14	49.28	18.41	100.57	43.06	18.70	87.87	28.71	17.73	80.00 ³⁾
	0 ²⁾	55.44	15.31	113.14	54.32	16.46	110.86	52.08	17.53	106.29	49.84	18.98	101.71	43.50	19.38	88.78	30.77	18.36	80.00 ³⁾
	5	60.48	14.99	123.43	59.36	16.05	121.14	57.12	17.28	116.57	54.32	18.68	110.86	47.72	18.95	97.39	32.83	18.18	80.00 ³⁾
	7	62.16	15.95	126.86	61.04	17.07	124.57	58.80	18.36	120.00	56.00	19.77	114.29	49.03	20.05	100.06	33.81	19.28	80.00 ³⁾
	9	66.08	16.13	134.86	64.40	17.21	131.43	62.72	18.51	128.00	59.36	19.98	121.14	51.98	20.35	106.08	35.77	20.00	80.00 ³⁾
	11	68.88	16.36	140.57	67.20	17.41	137.14	64.96	18.70	132.57	62.16	20.22	126.86	54.27	20.52	110.76	37.73	20.78	80.00 ³⁾
	13	71.68	16.53	146.29	70.00	17.68	142.86	67.76	18.98	138.29	64.40	20.38	131.43	56.51	20.70	115.33	39.20	21.15	80.00
	15	74.48	16.76	152.00	72.80	17.84	148.57	70.56	19.18	144.00	67.20	20.62	137.14	58.70	21.00	119.79	40.67	21.45	83.00
	18	78.40	16.96	160.00	76.72	18.01	156.57	73.92	19.53	150.86	70.56	20.97	144.00	61.64	21.44	125.80	42.63	21.66	87.00
	25	84.00	17.35	171.43	82.32	18.47	168.00	79.52	19.93	162.29	75.60	21.37	154.29	66.23	21.78	135.16	45.57	21.76	93.00
AG070KSVGNH/EU	-10 ²⁾	49.59	18.82	101.21	45.85	20.05	93.56	42.10	21.25	92.90 ³⁾	38.35	22.57	92.90 ³⁾	33.56	21.59	92.90 ³⁾	19.80	17.13	92.90 ³⁾
	-5 ²⁾	63.70	20.61	130.00	62.40	22.24	127.35	59.80	23.83	122.04	57.20	25.94	116.73	49.44	25.31	100.91	31.34	20.50	92.90 ³⁾
	0 ²⁾	64.35	21.45	131.33	63.05	23.05	128.67	60.45	24.68	123.37	57.85	26.75	118.06	49.95	26.14	101.95	33.59	21.41	92.90 ³⁾
	5	70.20	20.98	143.27	68.90	22.49	140.61	66.30	24.25	135.31	63.05	26.26	128.67	54.80	25.64	111.84	35.85	21.12	92.90 ³⁾
	7	72.15	22.34	147.24	70.85	23.93	144.59	68.25	25.69	139.29	65.00	27.81	132.65	56.30	27.20	114.91	36.92	22.38	92.90 ³⁾
	9	76.70	22.62	156.53	74.75	24.17	152.55	72.80	25.98	148.57	68.90	28.15	140.61	59.69	27.43	121.82	39.06	23.22	92.90 ³⁾
	11	79.95	22.82	163.16	78.00	24.41	159.18	75.40	26.31	153.88	72.15	28.38	147.24	62.32	27.71	127.19	41.20	24.18	92.90 ³⁾
	13	83.20	23.14	169.80	81.25	24.78	165.82	78.65	26.54	160.51	74.75	28.71	152.55	64.89	28.12	132.44	42.80	24.57	92.90 ³⁾
	15	86.45	23.41	176.43	84.50	24.96	172.45	81.90	26.92	167.14	78.00	28.93	159.18	67.40	28.47	137.56	44.41	25.08	92.90 ³⁾
	18	91.00	23.73	185.71	89.05	25.33	181.73	85.80	27.36	175.10	81.90	29.48	167.14	70.79	28.90	144.47	46.55	25.43	94.99
	25	97.50	24.18	198.98	95.55	25.88	195.00	92.30	27.96	188.37	87.75	30.08	179.08	76.06	29.35	155.21	49.76	25.50	101.54

NOTE

- Capacity table may be subject to change without prior notice.
- 1) ΔT = Leaving water temperature - Entering water temperature
- 2) When using brine, refer to the capacity correction factors by brine %wt.
(This capacity data is based on Ethylene glycol 50%wt.)
- 3) ΔT is comply with the condition of minimum flow-rate.
- 4) LWT : Leaving water temperature, TC : Total Capacity, PI : Power Input

10. Capacity Table

Heating ($\Delta T = 5^{\circ}\text{C}$)

Model	LWE	Outdoor Air temperature ($^{\circ}\text{C}$, DB)																	
		-25			-20			-15			-10			-7			-2		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVGNH/EU	30	31.49	17.81	90.87	35.14	17.34	100.40	36.81	15.71	105.17	38.90	14.64	111.14	40.36	14.18	115.31	43.13	13.67	123.23
	35	30.09	18.03	86.81	33.57	17.55	95.91	35.16	15.90	100.46	37.16	14.82	106.17	38.55	14.35	110.14	41.20	13.83	117.71
	40	28.49	19.02	82.21	31.79	18.51	90.83	33.29	16.77	95.11	35.18	15.62	100.51	36.50	15.13	104.29	39.01	14.57	111.46
	45	20.33	15.63	60.00	30.00	19.47	85.71	31.42	17.62	89.77	33.20	16.41	94.86	34.45	15.89	98.43	36.82	15.29	105.20
	50	14.56	14.27	60.00 ³⁾	21.78	19.12	62.23	22.81	17.30	65.17	24.10	16.10	68.86	25.01	15.58	71.46	26.73	15.00	76.37
	55	8.32	8.89	60.00 ³⁾	21.50	18.93	61.43	22.52	17.12	64.34	23.80	15.93	68.00	24.69	15.43	70.54	26.39	14.84	75.40
AG056KSVGNH/EU	30	41.99	28.49	121.16	46.85	27.70	133.87	49.08	23.95	140.23	51.87	21.27	148.19	53.81	20.58	153.75	57.51	19.80	164.30
	35	40.12	28.86	115.74	44.76	28.05	127.89	46.88	24.25	133.94	49.55	21.55	141.56	51.40	20.85	146.86	54.93	20.05	156.95
	40	37.99	30.49	109.61	42.39	29.64	121.10	44.39	25.62	126.82	46.91	22.74	134.02	48.67	22.01	139.05	52.01	21.16	148.61
	45	27.11	25.02	80.00 ³⁾	40.00	31.21	114.29	41.89	26.96	119.70	44.27	23.92	126.48	45.93	23.15	131.24	49.09	22.25	140.27
	50	19.41	18.86	80.00 ³⁾	29.04	30.70	82.97	30.41	26.52	86.90	32.13	23.51	91.81	33.35	22.75	95.28	35.64	21.87	101.83
	55	11.09	11.68	80.00 ³⁾	28.67	30.39	81.90	30.03	26.23	85.79	31.73	23.27	90.67	32.92	22.52	94.06	35.19	21.64	100.53
AG070KSVGNH/EU	30	52.12	40.17	150.36	58.15	39.02	166.14	60.91	33.67	174.03	64.37	29.85	183.91	66.79	28.85	190.82	71.37	27.72	203.91
	35	49.79	40.70	143.65	55.55	39.53	158.72	58.18	34.12	166.23	61.49	30.25	175.69	63.79	29.24	182.26	68.18	28.09	194.79
	40	47.15	43.04	136.03	52.60	41.80	150.30	55.09	36.07	157.39	58.21	31.97	166.33	60.40	30.92	172.57	64.55	29.68	184.44
	45	33.65	31.55	99.30 ³⁾	49.64	44.05	141.84	51.99	37.99	148.55	54.94	33.66	156.97	57.01	32.54	162.88	60.93	31.25	174.08
	50	24.09	23.74	99.30 ³⁾	36.04	43.38	102.97	37.75	37.41	107.84	39.88	33.13	113.94	41.39	32.04	118.24	44.23	30.78	126.38
	55	13.77	14.65	99.30 ³⁾	35.58	42.94	101.65	37.27	37.02	106.47	39.38	32.79	112.52	40.86	31.72	116.73	43.67	30.46	124.77

Model	LWE	Outdoor Air temperature ($^{\circ}\text{C}$, DB)														
		2			7			15			20			24		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVGNH/EU	30	45.66	12.61	130.46	49.20	11.41	140.57	55.75	11.56	159.29	60.40	9.91	172.57	60.40	9.73	172.57
	35	46.22	12.78	132.06	47.00	11.55	134.29	53.26	11.70	152.17	57.70	11.08	164.86	57.70	10.87	164.86
	40	41.30	13.44	118.00	44.50	12.15	127.14	50.42	12.31	144.06	54.63	12.24	156.09	54.63	11.99	156.09
	45	38.98	14.10	111.37	42.00	12.77	120.00	47.59	12.91	135.97	51.56	12.83	147.31	51.56	12.58	147.31
	50	28.30	13.81	80.86	30.49	12.47	87.11	34.55	12.64	98.71	37.43	12.57	106.94	37.43	12.31	106.94
	55	27.93	13.68	79.80	30.10	12.35	86.00	34.11	12.52	97.46	36.95	12.29	105.57	36.95	12.05	105.57
AG056KSVGNH/EU	30	60.88	18.22	173.94	65.60	16.42	187.43	74.33	16.59	212.38	80.53	14.11	230.10	80.53	13.83	230.10
	35	61.63	18.47	176.08	62.67	16.63	179.05	71.01	16.82	202.90	76.93	15.85	219.81	76.93	15.54	219.81
	40	55.07	19.48	157.33	59.33	17.54	169.52	67.23	17.74	192.08	72.84	17.59	208.11	72.84	17.24	208.11
	45	51.97	20.47	148.50	56.00	18.48	160.00	63.45	18.65	181.30	68.75	18.50	196.42	68.75	18.12	196.42
	50	37.73	20.11	107.81	40.65	18.10	116.15	46.07	18.34	131.62	49.91	18.21	142.59	49.91	17.83	142.59
	55	37.24	19.91	106.40	40.13	17.92	114.67	45.48	18.16	129.94	49.27	17.81	140.76	49.27	17.44	140.76
AG070KSVGNH/EU	30	75.56	25.45	215.88	81.41	22.86	232.61	92.25	23.04	263.58	99.95	19.48	285.56	99.95	19.09	285.56
	35	76.48	25.80	218.52	77.77	23.18	222.21	88.13	23.40	251.81	95.48	21.99	272.80	95.48	21.55	272.80
	40	68.34	27.28	195.26	73.64	24.49	210.39	83.43	24.73	238.38	90.40	24.49	258.28	90.40	23.98	258.28
	45	64.50	28.70	184.29	69.50	25.84	200.00	78.75	26.05	225.00	85.32	25.80	243.77	85.32	25.27	243.77
	50	46.83	28.26	133.80	50.45	25.40	144.15	57.17	25.71	163.35	61.94	25.50	176.96	61.94	24.97	176.96
	55	46.22	27.99	132.05	49.81	25.14	142.31	56.44	25.45	161.27	61.14	24.93	174.70	61.14	24.41	174.70

10. Capacity Table

Heating ($\Delta T = 7^{\circ}\text{C}$)

Model	LWE	Outdoor Air temperature ($^{\circ}\text{C}$, DB)																	
		-25			-20			-15			-10			-7			-2		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVGNH/EU	30	31.49	17.56	64.91	35.14	17.06	71.71	36.81	15.39	75.12	38.90	14.39	79.39	40.36	13.88	82.37	43.13	13.42	88.02
	35	30.09	17.74	62.01	33.57	17.24	68.51	35.16	15.64	71.76	37.16	14.52	75.84	38.55	14.05	78.67	41.20	13.56	84.08
	40	28.49	18.71	60.00 ³⁾	31.79	18.16	64.88	33.29	16.50	67.94	35.18	15.31	71.80	36.50	14.82	74.49	39.01	14.26	79.61
	45	20.33	14.66	60.00 ³⁾	30.00	19.15	61.22	31.42	17.35	64.12	33.20	16.08	67.76	34.45	15.60	70.31	36.82	15.01	75.14
	50	14.56	14.14	60.00 ³⁾	21.78	17.79	60.00 ³⁾	22.81	16.21	60.00 ³⁾	24.10	15.24	60.00 ³⁾	25.01	14.91	60.00 ³⁾	26.73	14.49	60.00 ³⁾
	55	8.32	8.81	60.00 ³⁾	21.50	16.73	60.00 ³⁾	22.52	15.28	60.00 ³⁾	23.80	14.37	60.00 ³⁾	24.69	14.01	60.00 ³⁾	26.39	13.64	60.00 ³⁾
AG056KSVGNH/EU	30	41.99	28.09	86.54	46.85	27.33	95.62	49.08	23.57	100.16	51.87	20.97	105.85	53.81	20.29	109.82	57.51	19.51	117.36
	35	40.12	28.45	82.67	44.76	27.68	91.35	46.88	23.87	95.67	49.55	21.20	101.12	51.40	20.46	104.90	54.93	19.76	112.11
	40	37.99	30.08	80.00 ³⁾	42.39	29.25	86.50	44.39	25.21	90.59	46.91	22.42	95.73	48.67	21.65	99.32	52.01	20.85	106.15
	45	27.11	23.44	80.00 ³⁾	40.00	30.81	81.63	41.89	26.54	85.50	44.27	23.54	90.34	45.93	22.82	93.74	49.09	21.85	100.19
	50	19.41	18.69	80.00 ³⁾	29.04	28.54	80.00 ³⁾	30.41	24.93	80.00 ³⁾	32.13	22.35	80.00 ³⁾	33.35	21.73	80.00 ³⁾	35.64	21.19	80.00 ³⁾
	55	11.09	11.58	80.00 ³⁾	28.67	26.82	80.00 ³⁾	30.03	23.38	80.00 ³⁾	31.73	20.97	80.00 ³⁾	32.92	20.44	80.00 ³⁾	35.19	19.88	80.00 ³⁾
AG070KSVGNH/EU	30	52.12	39.74	107.40	58.15	38.56	118.67	60.91	33.20	124.31	64.37	29.49	131.37	66.79	28.46	136.30	71.37	27.40	145.65
	35	49.79	40.18	102.60	55.55	38.99	113.37	58.18	33.64	118.74	61.49	29.88	125.49	63.79	28.83	130.19	68.18	27.76	139.14
	40	47.15	42.50	99.30 ³⁾	52.60	41.23	107.36	55.09	35.63	112.42	58.21	31.51	118.81	60.40	30.54	123.26	64.55	29.32	131.74
	45	33.65	29.55	99.30 ³⁾	49.64	43.44	101.31	51.99	37.45	106.11	54.94	33.11	112.12	57.01	32.08	116.34	60.93	30.87	124.34
	50	24.09	23.53	99.30 ³⁾	36.04	40.23	99.30 ³⁾	37.75	35.17	99.30 ³⁾	39.88	31.37	99.30 ³⁾	41.39	30.68	99.30 ³⁾	44.23	29.79	99.30 ³⁾
	55	13.77	14.52	99.30 ³⁾	35.58	37.86	99.30 ³⁾	37.27	32.96	99.30 ³⁾	39.38	29.54	99.30 ³⁾	40.86	28.78	99.30 ³⁾	43.67	27.99	99.30 ³⁾

Model	LWE	Outdoor Air temperature ($^{\circ}\text{C}$, DB)														
		2			7			15			20			24		
		TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow	TC	PI	Water flow
		kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM	kW	kW	LPM
AG042KSVGNH/EU	30	45.66	12.33	93.18	49.20	11.15	100.41	55.75	11.35	113.78	60.40	9.71	123.27	60.40	9.53	123.27
	35	46.22	12.50	94.33	47.00	11.28	95.92	53.26	11.47	108.69	57.70	10.87	117.76	57.70	10.63	117.76
	40	41.30	13.18	84.29	44.50	11.92	90.82	50.42	12.04	102.90	54.63	12.02	111.49	54.63	11.76	111.49
	45	38.98	13.85	79.55	42.00	12.53	85.71	47.59	12.63	97.12	51.56	12.55	105.22	51.56	12.33	105.22
	50	28.30	13.50	60.00 ³⁾	30.49	12.20	62.22	34.55	12.39	70.51	37.43	12.33	76.39	37.43	12.06	76.39
	55	27.93	12.69	60.00 ³⁾	30.10	11.54	61.43	34.11	11.70	69.61	36.95	11.49	75.41	36.95	11.26	75.41
AG056KSVGNH/EU	30	60.88	17.92	124.24	65.60	16.19	133.88	74.33	16.33	151.70	80.53	13.91	164.35	80.53	13.64	164.35
	35	61.63	18.14	125.77	62.67	16.39	127.89	71.01	16.58	144.93	76.93	15.68	157.01	76.93	15.31	157.01
	40	55.07	19.16	112.38	59.33	17.22	121.09	67.23	17.47	137.20	72.84	17.35	148.65	72.84	17.00	148.65
	45	51.97	20.13	106.07	56.00	18.13	114.29	63.45	18.36	129.50	68.75	18.26	140.30	68.75	17.85	140.30
	50	37.73	19.67	80.00 ³⁾	40.65	17.79	82.97	46.07	18.05	94.01	49.91	17.89	101.85	49.91	17.49	101.85
	55	37.24	18.48	80.00 ³⁾	40.13	16.77	81.90	45.48	17.00	92.82	49.27	16.67	100.54	49.27	16.33	100.54
AG070KSVGNH/EU	30	75.56	25.08	154.20	81.41	22.56	166.15	92.25	22.89	188.27	99.95	19.38	203.97	99.95	18.96	203.97
	35	76.48	25.48	156.09	77.77	22.94	158.72	88.13	23.17	179.86	95.48	21.87	194.86	95.48	21.43	194.86
	40	68.34	26.90	139.47	73.64	24.22	150.28	83.43	24.41	170.27	90.40	24.22	184.49	90.40	23.81	184.49
	45	64.50	28.25	131.64	69.50	25.44	141.84	78.75	25.74	160.71	85.32	25.53	174.12	85.32	25.00	174.12
	50	46.83	27.64	99.30 ³⁾	50.45	25.05	102.97	57.17	25.27	116.68	61.94	25.17	126.40	61.94	24.64	126.40
	55	46.22	25.99	99.30 ³⁾	49.81	23.57	101.65	56.44	23.87	115.19	61.14	23.39	124.78	61.14	22.90	124.78

11. Capacity Correction

Correction factor by % glycol

Anti-freeze	Ethylene glycol					Propylene glycol				
%wt	Freezing point	Min. LWT (°C)	Correction factor			Freezing point	Min. LWT (°C)	Correction factor		
			Capacity	Power Input	Pressure drop			Capacity	Power Input	Pressure drop
0%	0	5	1.000	1.000	1.000	0	5	1.000	1.000	1.000
10%	-4	1	0.989	0.995	1.010	-3	2	0.988	0.994	1.029
20%	-9	-4	0.975	0.990	1.023	-7	-2	0.973	0.988	1.061
30%	-16	-10	0.960	0.985	1.041	-13	-8	0.955	0.982	1.098
40%	-23	-10	0.943	0.980	1.064	-22	-10	0.933	0.976	1.142
50%	-37	-10	0.924	0.975	1.082	-35	-10	0.910	0.970	1.193

Defrosting correction factor (Capacity coefficient)

Model	Outdoor Air Temperature (°C, DB)								
	-10	-8	-6	-4	-2	0	2	5	7
AG042	0.99	0.99	0.99	0.98	0.94	0.91	0.89	0.94	1.00
AG056	0.99	0.99	0.98	0.97	0.92	0.90	0.88	0.93	1.00
AG070	0.99	0.98	0.96	0.95	0.91	0.88	0.86	0.91	1.00

- Corrected heating capacity = Heating Capacity x Capacity coefficient
- 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 aircooled chiller unit, defrost operation is carried out periodically. During defrost operation, capacity of aircooled chiller unit may decrease.
- The decrement is not considered to the individual capacity tables.

Correction factor by water flow rate

Correction	% of Nominal water flow rate								
	50	60	70	80	90	100	120	150	200
Power input	0.976	0.980	0.985	0.990	0.995	1.000	1.010	1.025	1.048
ΔT	10.0	8.3	7.1	6.3	5.6	5.0	4.2	3.3	2.5

11. Capacity Correction

Quiet function correction factor

Cooling

Quiet function	Outdoor Air Temperature (°C, DB)							
	0		20		35		45	
	Capacity	Power Input	Capacity	Power Input	Capacity	Power Input	Capacity	Power Input
Level 1	1.00	1.00	1.00	1.00	1.00	1.27	0.52	1.08
Level 2	1.00	1.00	1.00	1.00	1.00	1.36	0.51	1.07
Level 3	1.00	1.00	0.90	0.86	0.70	0.90	0.40	0.96

Heating

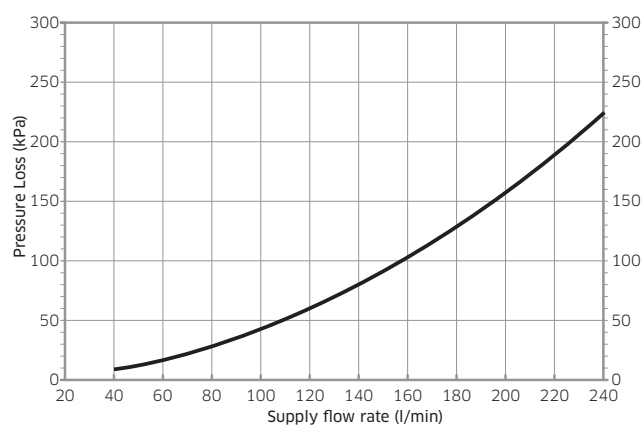
Quiet function	Outdoor Air Temperature (°C, DB)							
	-15		2		7		15	
	Capacity	Power Input	Capacity	Power Input	Capacity	Power Input	Capacity	Power Input
Level 1	0.47	1.08	0.88	1.21	1.00	1.24	1.00	1.00
Level 2	0.46	1.06	0.88	1.27	1.00	1.33	1.00	1.00
Level 3	0.34	0.96	0.60	0.92	0.67	0.91	1.00	1.00

Correction factor by altitude

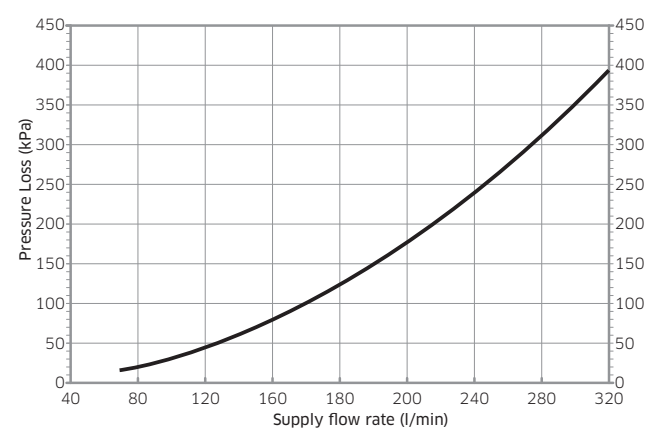
Altitude (m)	0	300	600	900	1200	1500	1800	2100	2400	2700	3000
Power input	1.0000	1.0090	1.0182	1.0277	1.0374	1.0473	1.0575	1.0680	1.0787	1.0897	1.1010

12. Hydraulic Performance

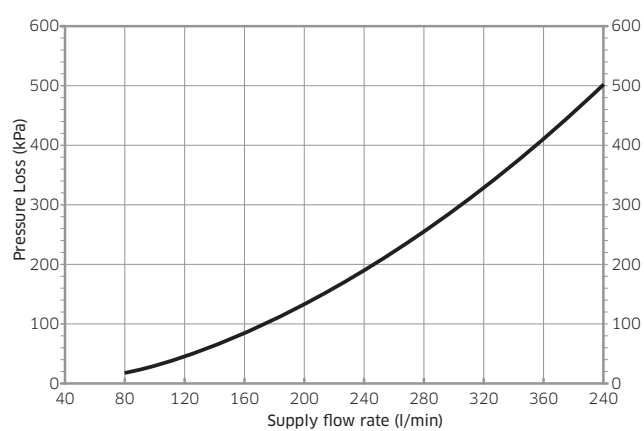
AG042KSV***NH/EU**



AG056KSV***NH/EU**



AG070KSV***NH/EU**



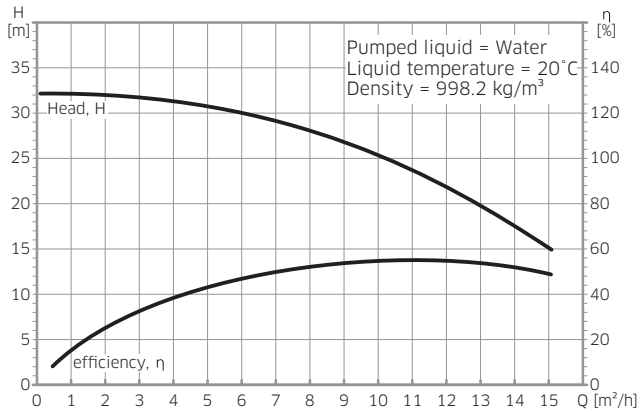
NOTE

- Range : 50 ~ 200 % of rated flow rate
- Frequency : 50Hz

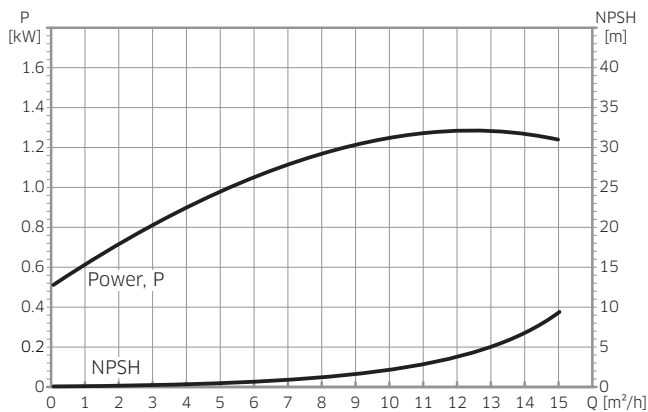
13. Pump Performance Chart

Pump integrated model

- AG***KSVGNH/EU
 - Head, Efficiency curve



- Power, NPSH curve



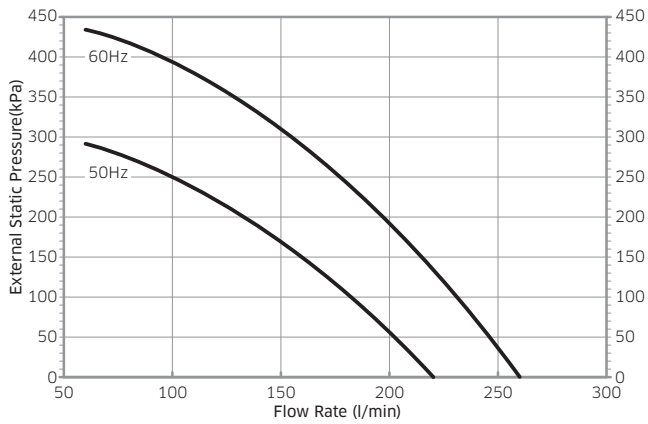
NOTE

- NPSH = Net Positive Suction Head
- NPSH is the requirement to keep enough pressure on the system to prevent cavitation.
- Cavitation : flashing the moving fluid into a gas
- Frequency : 50Hz

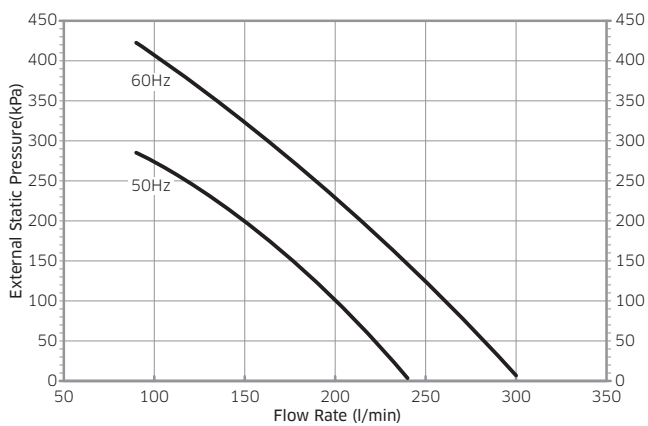
14. External Static Pressure

Pump integrated model

- AG042KSVGNH/EU, AG056KSVGNH/EU



- AG070KSVGNH/EU



NOTE

- Be sure to determine the flow rate by referencing the P-Q curve.
- If the determined flow rate is any value that deviates from the P-Q curve, it may cause failures or malfunction.

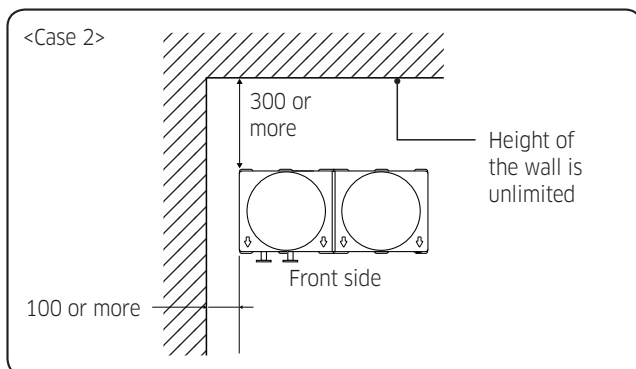
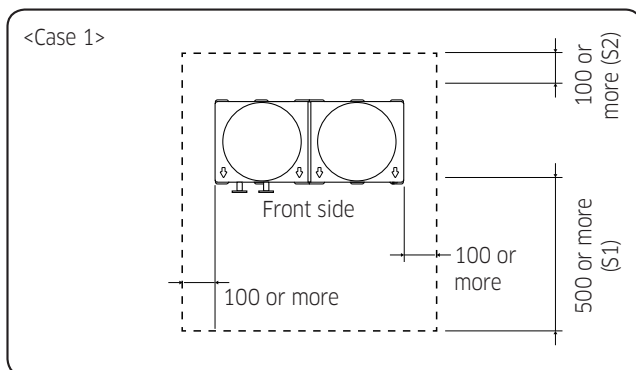
15. Installation

Required space for installation

- Space requirement was decided based on the following conditions; Cooling mode, outdoor temperature of 35 °C. Larger space is required if the outdoor temperature is higher than 35 °C or if the place is heated easily by quantity of solar radiation.
- When you secure installation space, consider path for people and the direction of the wind.
- Secure installation space as shown in the figure, considering ventilation and the service space.
- If the installation space is narrow, installer or other worker may get injured during work and may also cause a problem with the product.
- If you install multiple number of DVM CHILLERS in one space, make sure to secure enough ventilation space if there's any walls around the product that may disturb the air flow. If enough ventilation space is not secured, the product may malfunction.
- You could install the DVM CHILLERS with 100 mm of space between each unit, but performance may decrease depending on the installation environment.

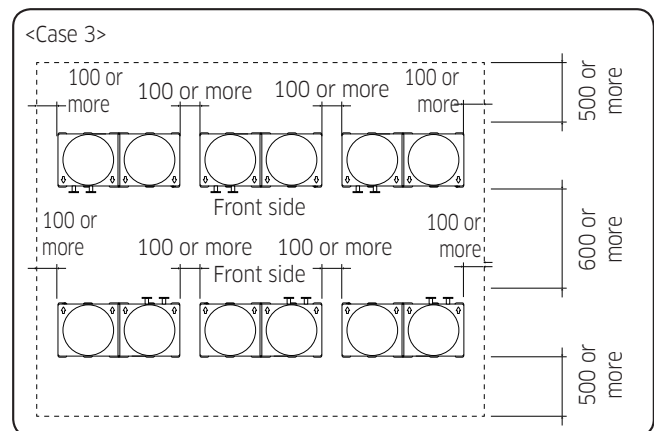
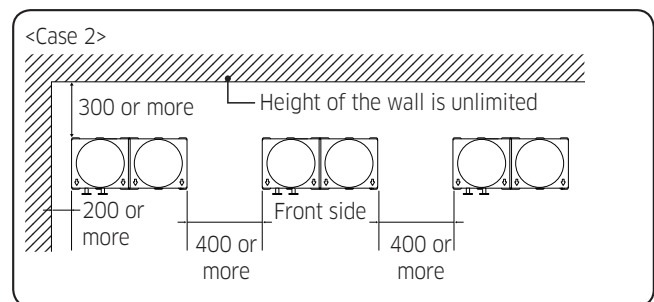
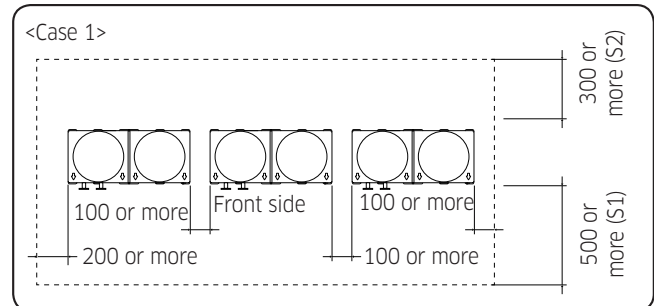
1 Single installation

Unit: mm



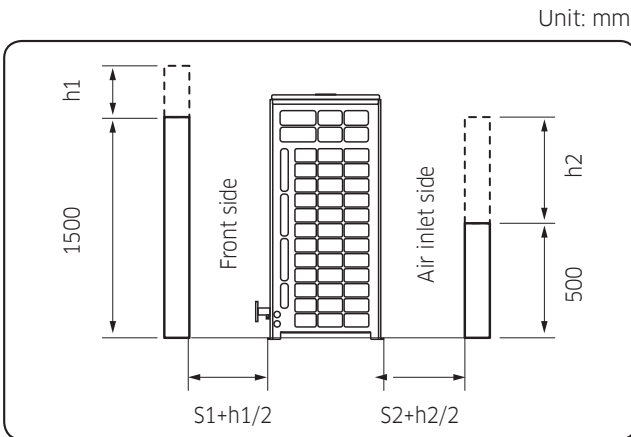
2 Module installation

Unit: mm



- Installing by <Case 1> or <Case 3>
 - Height of the wall on the front side should not be higher than 1500 mm.
 - Height of the wall on the air inlet side should not be higher than 500 mm.
 - Height of the wall on the side is not limited.
 - If the height of the wall exceeds by certain value (h_1 , h_2), additional clearance $[(h_1)/2, (h_2)/2 : \text{Half of the exceeded distance}]$ should be added to the service space (S1, S2).

15. Installation



Base construction and installation

⚠ WARNING

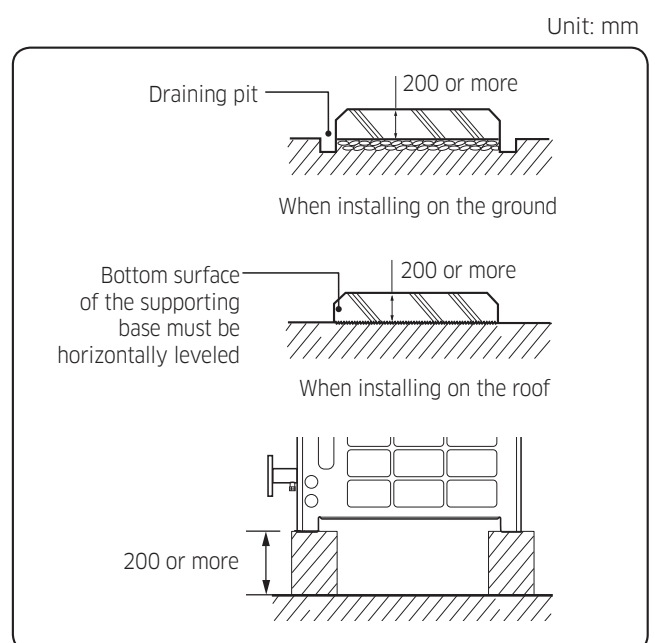
- Make sure to remove the wooden pallet before installing the DVM CHILLER. If you do not remove the wooden pallet, there is risk of fire during welding the pipes. If the DVM CHILLER is installed with wooden pallet on, and it was used for long period time, wooden palette may break and cause electrical hazard or high pressure may damage the pipes.
- Fix DVM CHILLER firmly on the base ground with anchor bolts.

⚠ CAUTION

- Manufacturer is not responsible for the damage occurred by not following the installation standards.
- 1 Make sure that the height of the base ground is 200 mm or higher to protect the product from rain water or other external conditions. Also, install a drainage hole around the supporting base and connect the drain pipe to the drainage pit.
 - 2 Considering the vibration and weight of the product, strength of the base ground must be strong to prevent noise and the top surface of it should be flat.
 - 3 Area of the base ground should be 1.5 times larger than the bottom of the product.
 - 4 Product must be fixed firmly so that it can withstand the wind speed of 30 m/s. If you cannot fix the DVM CHILLER on the supporting base, fix it by side or use extra structure.

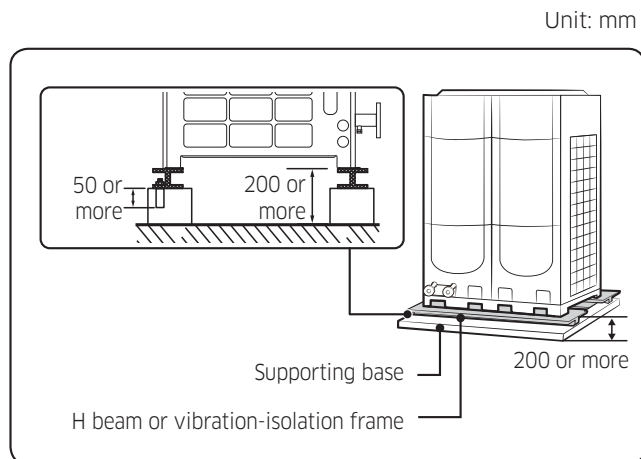
- 5 In heating operation, defrost water may form so you must really care about the drainage and waterproofing the floor. To prevent defrost water from stagnating or freezing, construct a drainage pit with over 1/50 slant. (Ice may form on the floor in the winter time.)
- 6 It is necessary to add wire mesh or steel bar during concrete construction for the base ground to prevent damage or cracks.
- 7 When installing multiple DVM CHILLERS at the same place, construct an H beam or a vibration-isolation frame on the base ground to install the product.
- 8 After installing an H beam or a vibration-isolation frame, apply corrosion protection and other necessary coating.
- 9 When concrete construction for product installation is complete, install an isolation pad (t = 20 mm or more) or a vibration-isolation frame to prevent vibration of the product from transferring to the supporting base.
- 10 Place the product on an H beam or a vibration isolation frame and fix it with the anchor bolt, nut and washer. (The bearing capacity of the anchor bolt has to be over 3.5 kN)

Supporting base construction

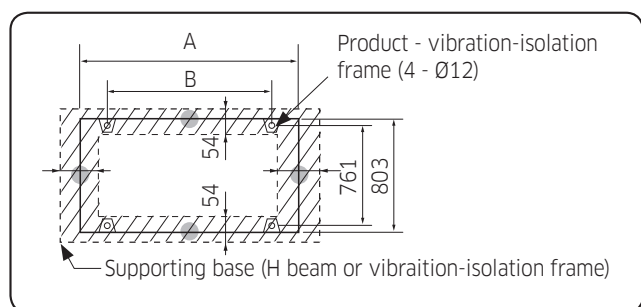


15. Installation

Product installation



Base mount and anchor bolt position



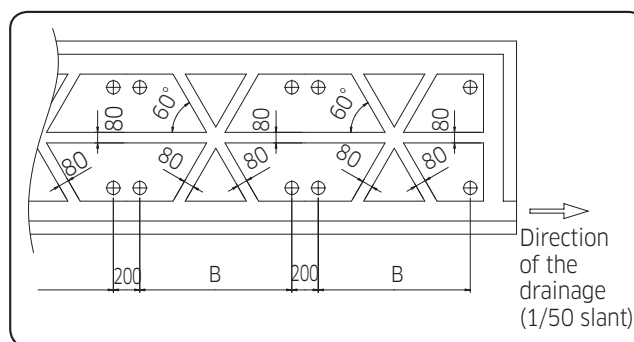
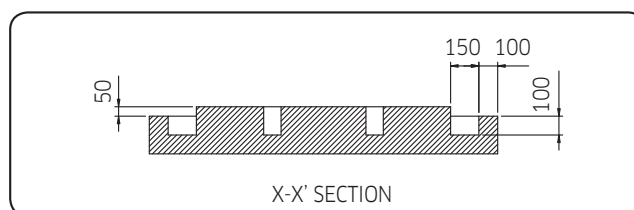
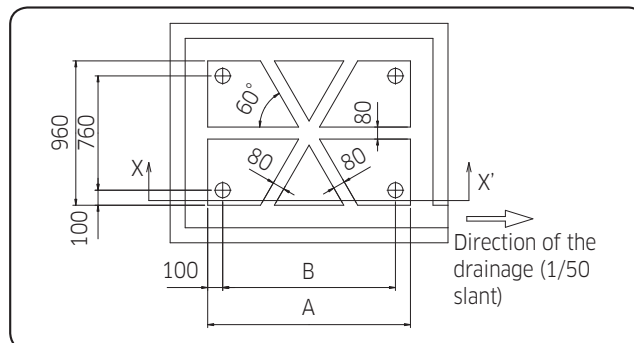
Applied model	Net dimension	
	A	B
AG042/056/070**	1,795	1,655

- When applying vibration-isolation frame additionally on supporting base, specification of fixed holes with the base should be referred to specification of the frame.

Examples of draining work

- Use concrete or steel bar for draining work to prevent any damage or cracks.
- For smooth draining of defrost water, make sure to apply 1/50 slant.
- Construct a drainage around the product to prevent the defrost water (from the product) from stagnating, overflowing or freezing near the installation space.
- When the product is installed on the roof, check the strength and waterproof status of the roof.

Unit: mm



Applied model	Net dimension	
	A	B
AG042/045/070**	1.855	1.655

Installation precautions

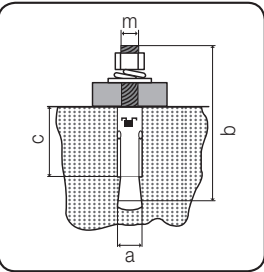
Connecting the anchor bolt



- Tighten the rubber washer to prevent the bolt connection part of the DVM CHILLER from corroding.

15. Installation

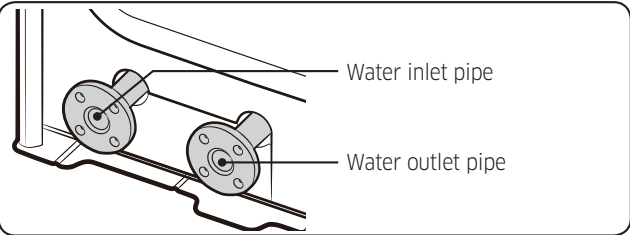
Anchor specification



- Use the anchor bolts and nuts that is zinc plated or made of STS material. Regular anchor bolts or nuts may get damaged by corrosion.

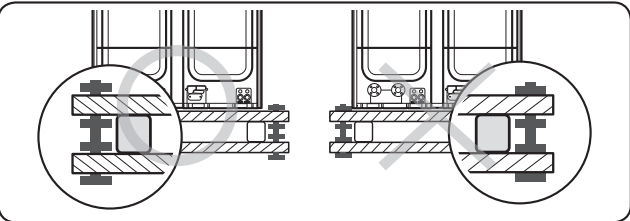
Size	Diameter of drill bit (a)	Anchor length (b)	Sleeve length (c)	Insertion depth	Fastening torque
ø10	14 mm	75 mm	40 mm	50 mm	30 N·m

Connecting the pipe



- If you install the DVM CHILLER on the rooftop, check the strength and make sure to waterproof the rooftop.
- Construct draining pit around the supporting base and pay attention to the drainage around the product. (Condensation or defrost water may form during product operation.)
- If there's any possibility of small animals entering into the product through pipe outlet, block the outlet.

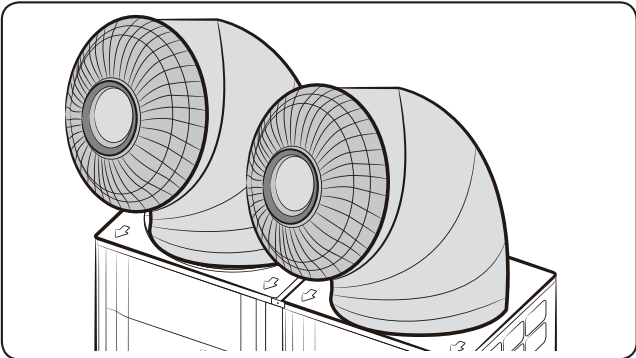
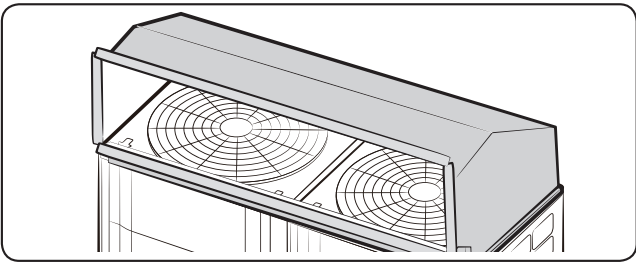
Installing vibration-isolation frame



- During installation, make sure there is no gap between the supporting base and the extra structures such as vibration-isolation frame or H beam.

- Supporting base must be constructed strongly to support the bottom part of the vibration-isolation mount.
- After installing the vibration-isolation frame, unscrew the fixing part on the top and bottom part of the frame.

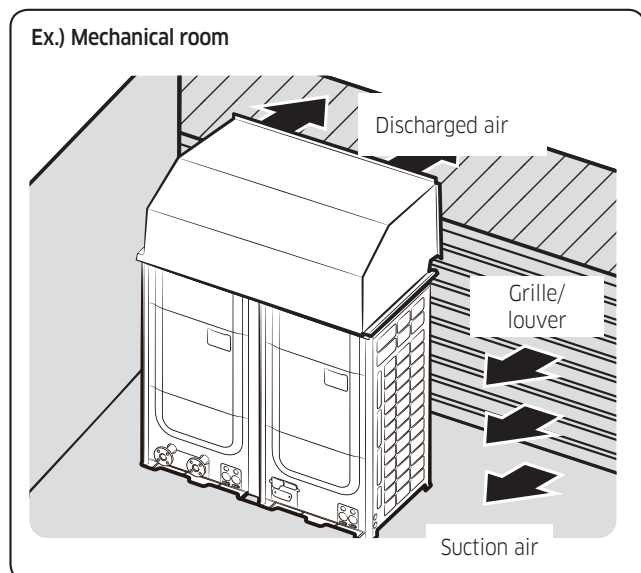
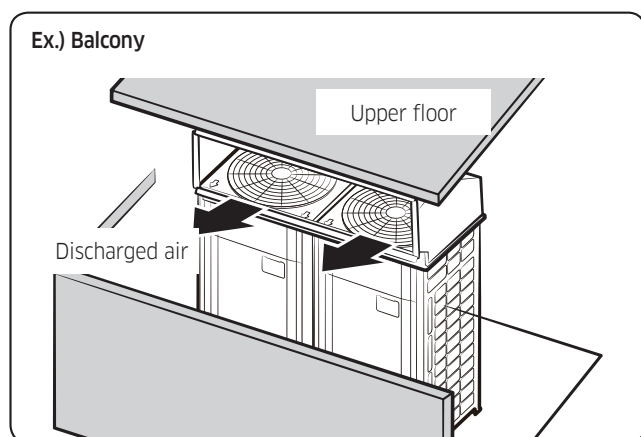
Installing discharge duct



- Static pressure of the discharge duct should be within the standard specification (80 Pa) when installing the duct.
- If you remove the fan guard to install the discharge duct, make sure to install a safety net on the duct outlet. Foreign substance may enter into the product and there could be a risk of personal injury.
- Wear protection equipment at all times when making galvanized sheet metal duct, since the worker may get injured by the sharp parts.
- When installing the product under the tree or near forest, leafs may get into the product and cause problems on the product. Therefore, install a discharge duct to prevent foreign substance infiltration. Installing the discharge duct around the obstacles

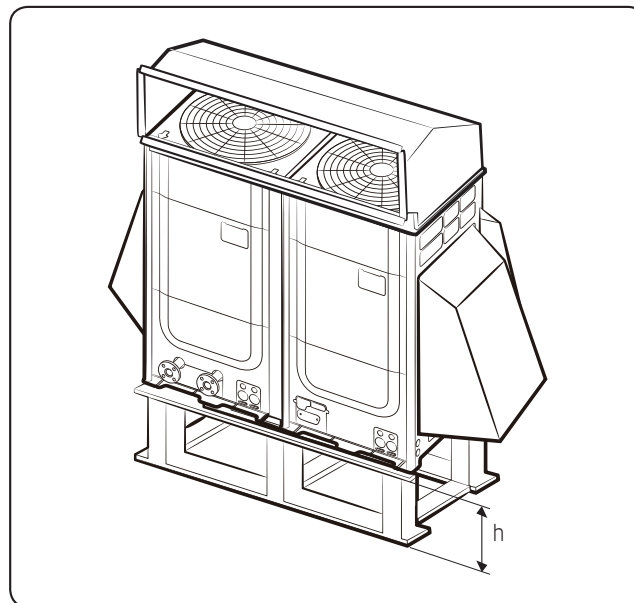
15. Installation

Installing the wind/snow prevention duct



- It is necessary to install a wind/snow prevention duct (field supply) to direct exhaust from the fan horizontally, when it is difficult to provide a minimum space of 2 m between the air outlet and a nearby obstacle.

Installing the discharge duct in cold regions



- In cold regions with lots of snowfall, install a snow prevention duct, as a sufficient countermeasure, to prevent snow from accumulating on the product. When the snow prevention duct is not installed properly, frost may accumulate on the heat exchanger and heating operation may not work normally.
- Air outlet of the duct should not be directed to the enclosed space.

CAUTION

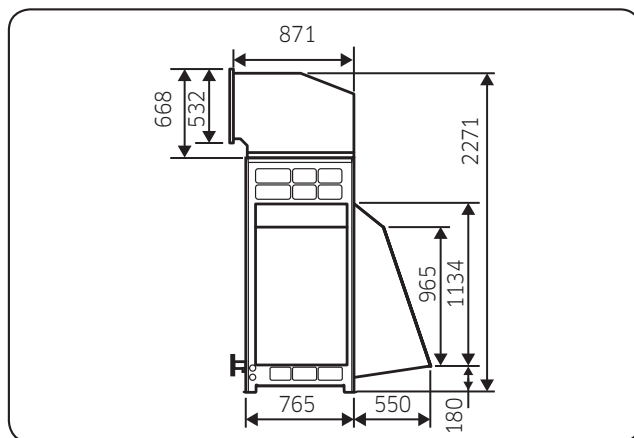
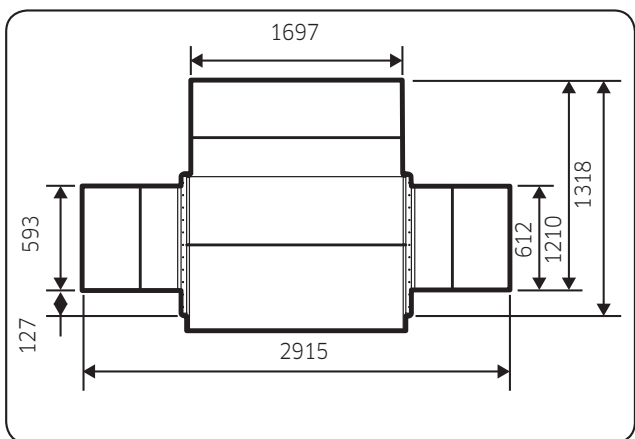
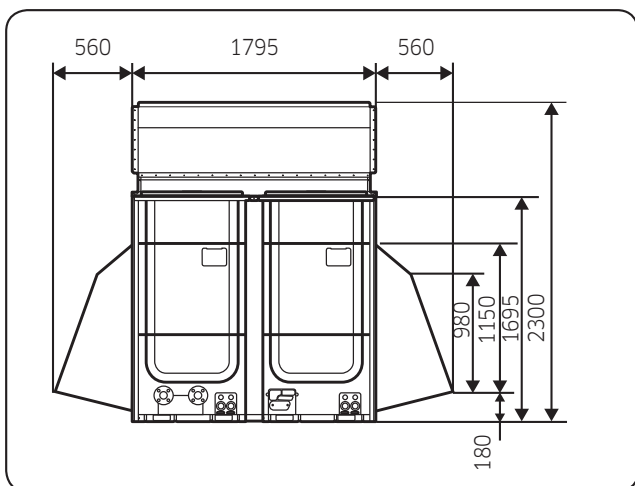
Cautions regarding on installing the frame and selecting the base ground

- Height (h) of the frame and the base ground should be higher than the "heaviest expected snowfall".
- Area of the frame and the supporting base should not be larger than the area of the product. Snow may accumulate if the area of the frame or the base ground is larger.

15. Installation

Installing the discharge duct in regions with strong wind

- In windy regions such as near sea shores, protection wall or wind protection duct must be installed for normal operation of the product. (Refer to the illustration of the snow prevention duct, for installing the wind protection duct.)
- Install the wind prevention duct with the consideration of major wind direction. If the direction of the discharge part is same as major direction of the wind, it could cause product's performance decrease.



⚠ CAUTION

Cautions regarding on installing the frame and selecting the base ground

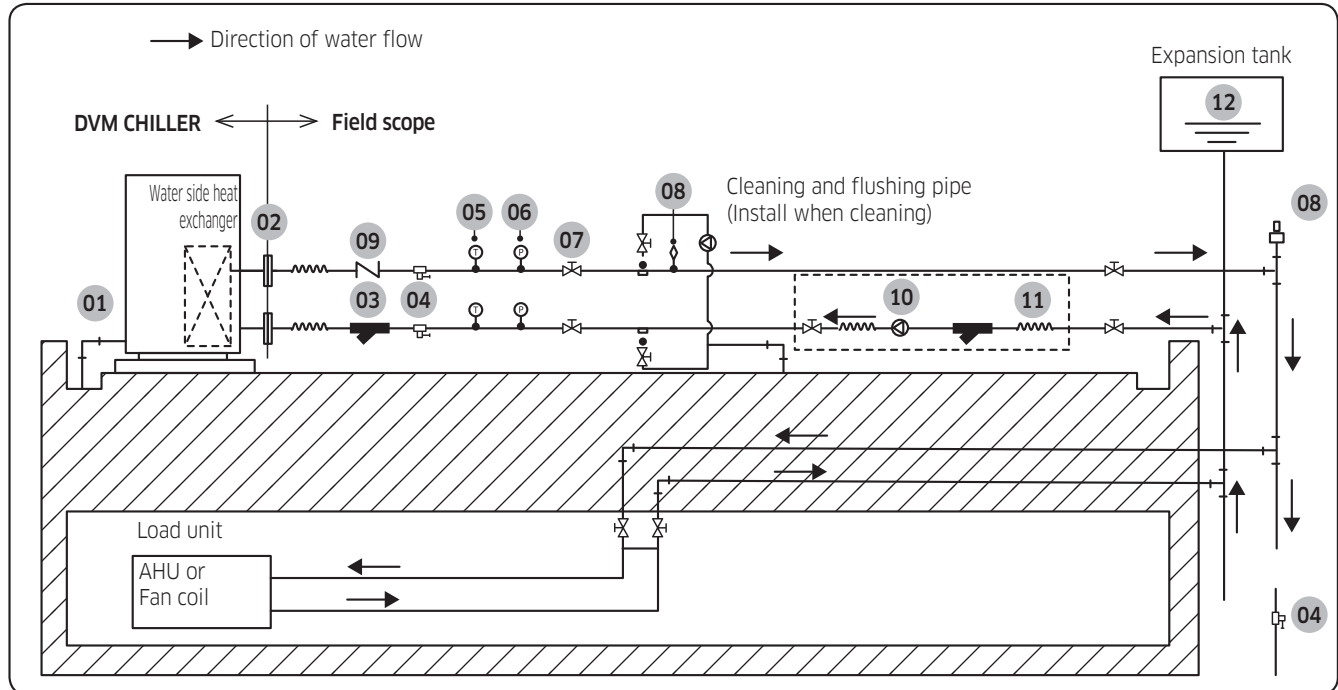
- The base ground must be solid and the product must be fixed with anchor bolts.
- Make sure to install the product in a place strong enough to withstand its weight. If the place cannot withstand the weight of the product, product may fall and cause personal injury.
- When installing on a rooftop subject to strong wind, countermeasures must be taken to prevent the product from falling down.
- Use a frame that is resistant to corrosion.

15. Installation

Water pipe installation

Water pipe diagram

Install the water system according to the diagram.



NOTE

- The part shown in the dotted line is an installation example of AG***KSA series (non-pump models).

No.	Name	Remarks
01	Drain plug	Make 1/100 ~ 1/200 for drain to flow by height difference. To prevent freezing in winter time, make slope steep and distance of level side short as possible. Take appropriate countermeasures such as drain heater to prevent freezing in cold region.
02	Flange	Install flange to allow unit exchange.
03	Strainer	Install strainer at the nearest place of the product to prevent foreign materials flow into water side heat exchanger. (50 Mesh)
04	Drain valve	Install drain valve to drain water for service.
05	Temperature gauge	It is recommended for checking ability and operation.
06	Pressure gauge	It is recommended for checking operation status.

No.	Name	Remarks
07	Valve	Install valves for services such as flowmeter exchange and cleaning.
08	Air vent valve	Install air vent valve where there is a risk of air remaining. (Auto air valve usable)
09	Check valve	Install check valve to prevent water flowing backward when pump is stopped.
10	Pump	Install pump which holds amount for keeping the head loss and delivering enough water amount to the product. (Refer to water flow rate range on page 54.)
11	Flexible joint	It is recommended to prevent noise and vibration of pump.
12	Expansion tank	Install expansion tank to release expanded water or water supply.

15. Installation

⚠ WARNING

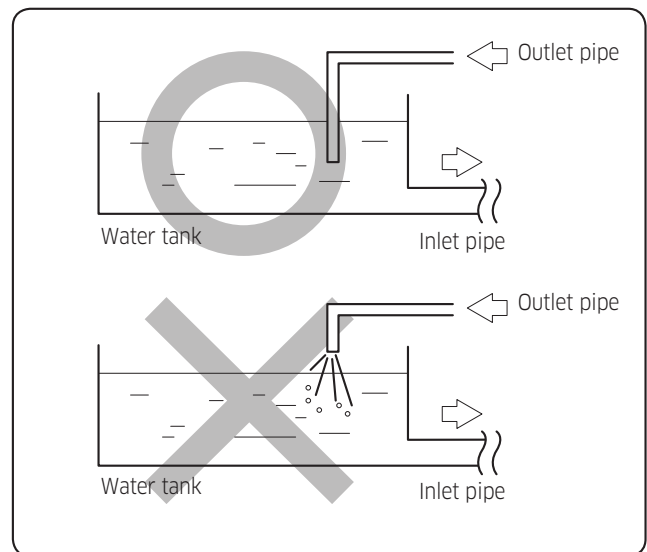
- The maximum operation water pressure of the product is 1.0 MPa.
- The water strainer is not included in the product. You must install 50 Mesh stainless strainer (field supply). If the strainer is not installed, it may cause breakdown of the product.
- The strainer needs periodical maintenance. Work on pipes considering space for maintenance.
- Companion flange (field supply) should be made of SUS304, DIN PN10 standardized product.

Water pipe installation

Installation precautions

- Heat source water with high level of foreign substances can cause corrosion or creation of water scale on plate type heat exchanger and pipe, so select installation place where the heat source water is qualified according to water maintenance standard for air conditioning equipment.
- Install strainer (field supply) on heat source water inlet.
- If sand, dust, corroded particles flow into water system, heat exchanger may get damaged because of sedimentation of metallic particles and blocking the heat exchanger.
- Be careful not to change inlet/outlet of chilled/heating water.
- For normal operation, supply chilled/heating water regularly to keep operation conditions stable.
- Install valves at inlet/outlet of water pipes for services.
- Install temperature gauge and pressure gauge at inlet/outlet of water pipes to check operation status.
- Insulate pipes to prevent thermal loss of water pipes and freezing of pipe surface.

- When insulation is not done thoroughly, you will waste energy caused by thermal loss and may get property damage during cold seasons when water pipe freezes. If the product is stopped at night or not operated for long time during winter time, solution for water pipe freezing may be necessary. Freezing may cause product damage, so take appropriate countermeasures such as pump operation, water drainage, or heating by heater depending on the situation.
- Install flexible joints at water pipes to prevent vibrations.
- Support water pipes with holders so that too much weight is not loaded on pipes.
- Install valves to drain water when the product is not used for a long time or outdoor temperature is below freezing point. Use drain valve to drain water left in plate type heat exchanger and inside the product.



- Install pipe returning to the pump inside the water to prevent bubbles when thermal storage or tank is installed. If dissolved oxygen is increased, corrosion on water side heat exchanger and pipe can be faster.

15. Installation

Installing strainer

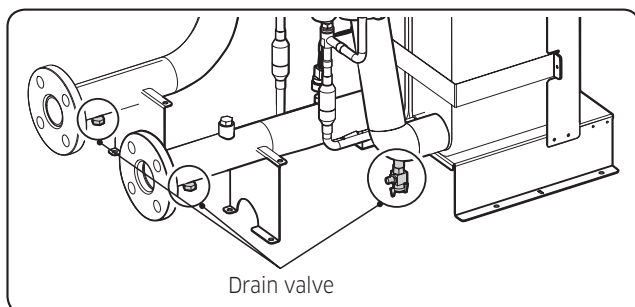
- Install strainer (Field scope: 50 Mesh) that cleaning is possible at the inlet of DVM CHILLER to prevent foreign substances such as bolt and stones from flowing into water side heat exchanger.
 - If strainer is not installed or the mesh is too wide, foreign substances may flow into the system and cause damage by freezing.
- Install drain valves at inlet/outlet pipes to drain water from water side heat exchanger for services.
- Install extra strainer that cleaning is possible near inlet pipe of the water pump.

Maintaining circulating water amount

- If the product is operated below minimum amount of circulating water (more than 50 % of rated flow rate), plate type heat exchanger may freeze and get damage. Use the product within circulating water amount.
- Maintain for water level since it may decrease by blocked strainer, remaining air, malfunction of circulating pump.

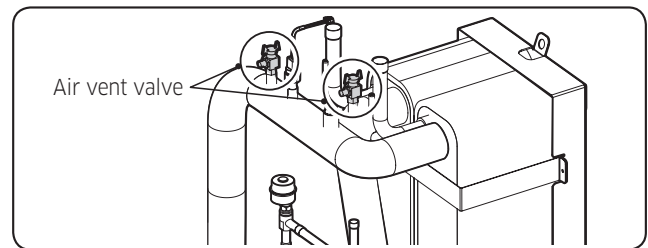
Drainage during winter time

- When DVM CHILLER is not operated during winter time, drain all water by opening drain valves in CHILLER shown in figure.



Air venting

- Vent air by opening two air vent valves on inlet and middle of the pipe of water side heat exchanger. If air venting is not done properly, it is difficult to maintain rated flow rate, and pipe corrosion or noise by remaining oxygen may occur.



- When venting air, be aware to prevent water get in to the box.

Solution for freeze protection device

When freeze protection device is activated, plate heat exchanger may freeze. Operate the product after taking care of the cause. If you operate the product before the problem has been taken care of, plate type heat exchanger will be frozen and damaged, causing refrigerant leakage or water may enter into the refrigerant cycle.

Solution for pump vibration noise

Install flexible joints at inlet/outlet and use vibration proof rubber on the pump since noise may occur when pump vibration is transferred to pipes.

15. Installation

Maintaining contamination

Foreign substances included in chilled/heating water by small particles pass strainers, and they may be stuck or stacked inside plate type heat exchanger. Some parts of water pipes inside the plate type heat exchanger, and the performance may decrease or it may freeze and get damage. Therefore, clean the plate type heat exchanger periodically.

Turbidity is a standard for water pollution level, and standard water pollution set by Corrosion Prevention Association is under turbidity 4. If the turbidity is high or foreign substance is flew in too much, clean the plate type heat exchanger periodically and maintain the turbidity under 4. If it is over 4, clean the product in about 1 year period since the first operation of the product.

Solution for water level decrease

When tank or thermal storage is installed open, select pump which can acquire required water amount concerning head loss other than pipe resistance.

CAUTION

- The product should be operated for 3 minute after it is stopped to protect water side heat exchanger (plate type heat exchanger) from freezing.

NOTE

- Expansion tank is to buffer expanded water and also to purge air in water pipes. The capacity of expansion tank should be 2 ~ 2.5 times larger than amount of water expansion or 4 ~ 5 % of total amount of circulating water.

Freeze protection operation

Forced pump operation may be operated periodically to protect water side heat exchanger (plate type heat exchanger) from freezing in winter time or night time when the pump is stopped. Be careful not to be injured.

Water flow rate range

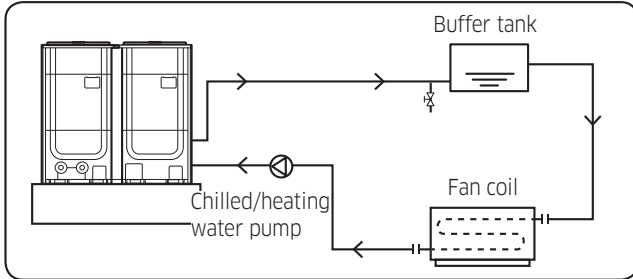
Refer to the table to maintain minimum amount of circulating water. If circulating amount is not enough, the product will not only operate in best performance but also affect the life of the product. Keep the amount above the minimum level.

Model name	Flow rate range (LPM)	
	Min.	Max.
AG042KSV Series	60	240
AG056KSV Series	80	320
AG070KSV Series	93	400

15. Installation

Securing water storage

Minimum water storage



- If the length of water pipe is too short, water storage within the system becomes lower and ON/OFF operation of the compressor occurs more often. For stable operation, maintain certain water storage by applying header or Buffer tank.

CAUTION

- When installing tank, inlet pipe of the tank must be installed under the water level.
- If total water storage becomes under the minimum storage, install another tank to retain more water storage.
 - In case of variable flow system, retain certain amount of water by bypass pipe system.

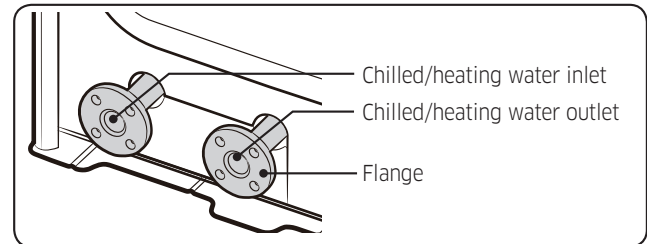
Model name	Minimum water storage (L)
AG042KSV Series	294
AG056KSV Series	392
AG070KSV Series	490

NOTE

- Total water storage in the system = water storage within the water pipe + water storage in DVM CHILLER + water storage in AHU (or fan coil)
- Minimum capacity of buffer tank = Minimum water storage - water storage within the water pipe system
- Select the capacity of buffer tank according to system installation condition of the field.

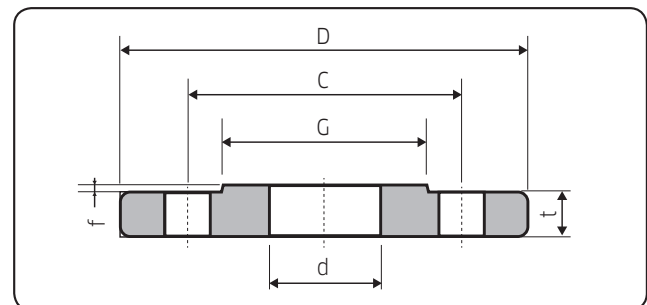
Water pipe installation

Connecting water pipe



- Companion flange is not supplied. Use field supplied one in DIN standardized product.
- When connecting the water pipe, use companion flange and bolt made of SUS304, DIN PN10 standardized product.
- Maintain the tightening torque for flange as the table.

Water pipe size	Allowable torque for flange (N·m)	Material of gasket
40 A	6.8	EPDM
50 A	12.7	EPDM



	Size	D	t		
			W.N.	Slip-On	Blind
DIN PN10	40	150	16	16	16
	50	165	18	18	18

	G	f	d	Bolting		
				C	Diameter of holes	Bolt size
DIN PN10	88	3	44.5	110	18	4-M16
	102	3	57	125	18	4-M16

15. Installation

Using the pump

NOTE

- The description below applies to AG***KSVG series models only.

Startup

CAUTION

- Do not start the pump until it has been filled with liquid.

WARNING

- Pay attention to the direction of the vent hole, and make sure that the escaping hot or cold liquid does not cause injury to persons or damage to the equipment.

Checking the direction of rotation

NOTE

- The description below applies to three-phase motors only.

The motor fan cover has an installation indicator. See fig. 1. Based on the motor cooling air, it indicates the direction of rotation of the motor.

Before the motor is started for the first time or if the position of the indicator has been changed, the indicator function should be checked, for instance by moving the indicator field with a finger.

To determine whether the direction of rotation is correct or wrong, compare the indication with the table below.

Indicator field	Direction of rotation
Black	Correct
White/reflecting	Wrong*
* To reverse the direction of rotation, switch off the power supply and interchange any two of the incoming supply wires.	

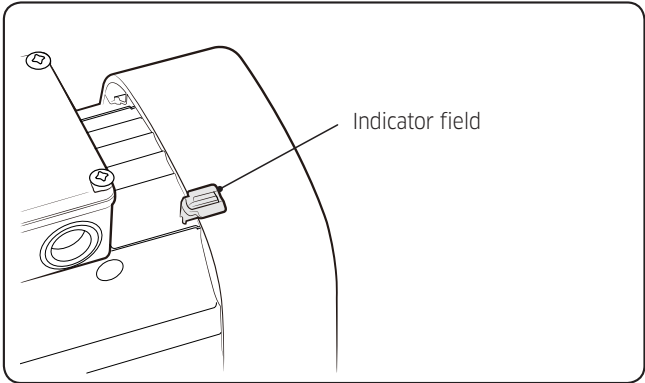


Fig. 1 Installation indicator

You can place the indicator in various positions on the motor, but do not place it between the cooling fins close to the screws that hold the fan cover. The correct direction of rotation is also shown by arrows on the motor fan cover.

Maintenance

WARNING

- Before starting work on the pump, switch off the power supply. Make sure that the power supply cannot be accidentally switched on.
- Make sure that the escaping water does not cause injury to persons or damage to the equipment.

The internal pump parts are maintenance-free. You must keep the motor clean in order to ensure adequate cooling of the motor. If the pump is installed in dusty environments, clean and check the pump regularly. Take the enclosure class of the motor into account when cleaning.

The motor has maintenance-free, greased-for-life bearings.

15. Installation

Frost protection

Pumps which are not being used during periods of frost must be drained to avoid damage.

Remove the filling and drain plugs from the pump.

Do not refit the plugs until the pump is taken into operation again.

CAUTION

- Before startup after a period of inactivity, the pump and the suction pipe must be completely filled with liquid. See Start up (page 56).

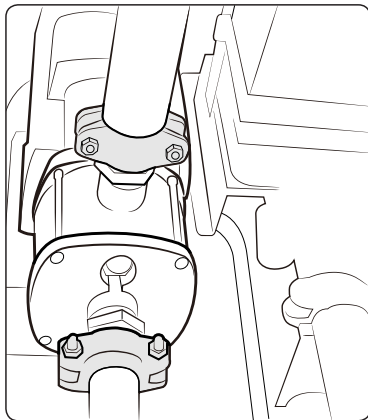
Cleaning

Prior to a long period of inactivity, flush the pump with clean water to prevent corrosion and deposits in the pump.

Use acetic acid to remove possible lime deposits from the pump.

Repairing the pump and connecting the pipe

We recommend that you fit isolating valves on either side of the pump. It is thus not necessary to drain the system if the pump needs service. The pump must not be stressed by the pipework.



Coupling bolt

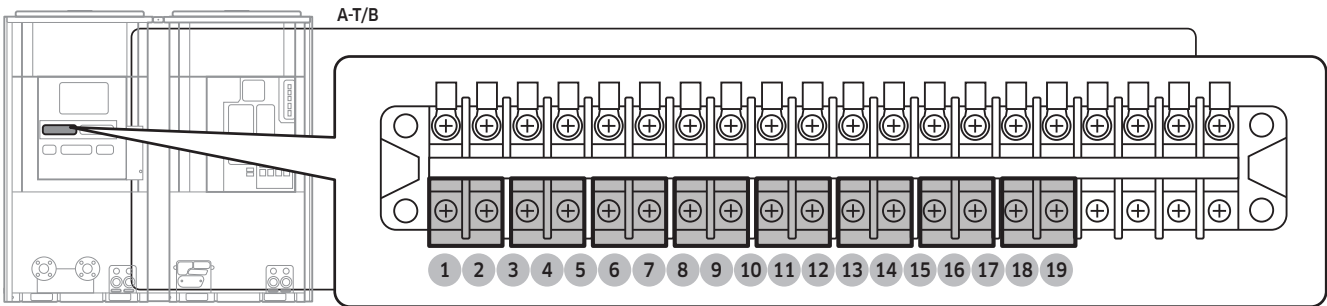
torque: $200 \pm 10\%$ kgfcm

The torque must not be exceeded.

15. Installation

External contact wiring work

Output contact



No.	Name	Signal	Function	Contact Short	Contact Open
A-T/B	1-2	Zero voltage contact	Display when operates in heating mode	Heat	Cool
	3-4		Display when operates	Operate	Stop
	5-6		Display when error occurs	Error occurred	No error
	7-8		Display when defrosting	Deforst ON	Defrost OFF
	9-10		Display when pump operates	Pump ON	Pump OFF
	11-12		Display when compressor operates	Compressor ON	Compressor OFF
	13-14		Signal of pump operation	Pump signal ON	Pump signal OFF
	15-16		Display when freeze protection operates	Pump ON for freeze protection	Others
	17-18	-	-	-	-
	19-20	-	-	-	-

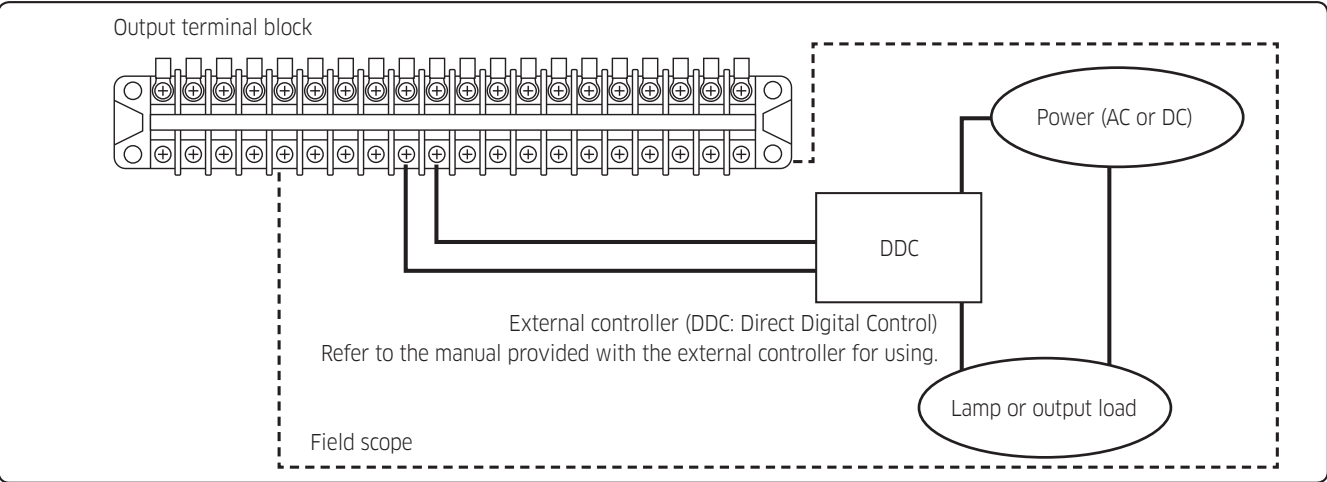
- Output written above is information about individual unit.

CAUTION

- You must turn off the power before working on external contact wiring.
- Output contact can be connected neutral contact and Open/Short only.
- Be sure to install a buzzer (alarm) on terminals 15 and 16 in order that the operator can check the system when the freeze protection function starts.

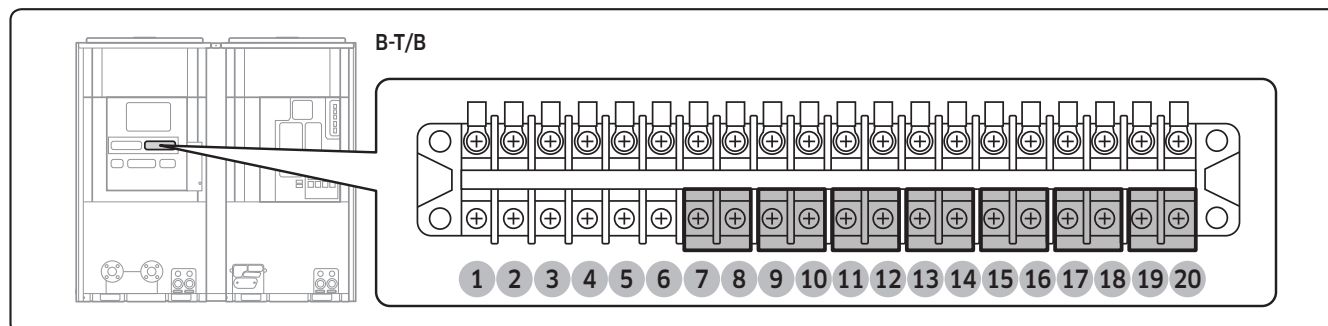
Terminal block	Tightening torque (N·m)	
20P T/B	M3	0.5 ~ 0.75

- Example of output contact installation



15. Installation

Input contact



No.	Name	Signal	Function	Contact Short	Contact Open	Signal recognition	Setting unit
B-T/B	1-2	Disuse	-	-	-	-	-
	3-4	Disuse	-	-	-	-	-
	5-6	Disuse	-	-	-	-	-
	7-8	Pump interlock	Signal about pump operation • Pump interlock error (E918) occurs if ON is not input when operating pump ^{Note5)}	Pump ON	Pump OFF	Usual input	Each unit
	9-10	Operation ON/OFF	Controlling operation ON/OFF ^{Note1)}	Note3)		Usual/instant input	Main unit of group ^{NOTE4)}
	11-12						
	13-14	Operation mode	Selecting cool/heat mode ^{Note2)}	Heat	Cool	Usual input	Main unit of group ^{NOTE4)}
	15-16	Hot water (Cool storage) mode	Entering hot water (cool storage) mode by external control • Cool + ON: Cool storage • Heat + ON: Hot water	Cool storage/Hot water	Cool/Heat	Usual input	Main unit of group ^{NOTE4)}
	17-18	Hot water (Cool storage) control standard	Control depending on set temperature when ON Control depending on external hot water (cool storage) thermostat when OFF	Control by set temperature	Control by thermostat	Usual input	Main unit of group ^{NOTE4)}
	19-20	Hot water (Cool storage) thermostat signal	When thermostat is set as standard for hot water (cool storage) mode • Thermo ON when ON (Not over range of water outlet temperature) • Thermo OFF when OFF	Thermo ON	Thermo OFF	Usual input	Main unit of group ^{NOTE4)}

15. Installation

- To use hot water (cool storage) mode, the function should be activated by Module Controller.
- Usual input: Operate by current status of contact
Instant input: Operate when contact signal changes from OFF to ON / from ON to OFF.

Note1) Operates when input method of Operation On/Off is set as external contact

Note2) Operates when input method of operation mode is set as external contact

Note3) Operation depending on external contact operation ON/OFF input method

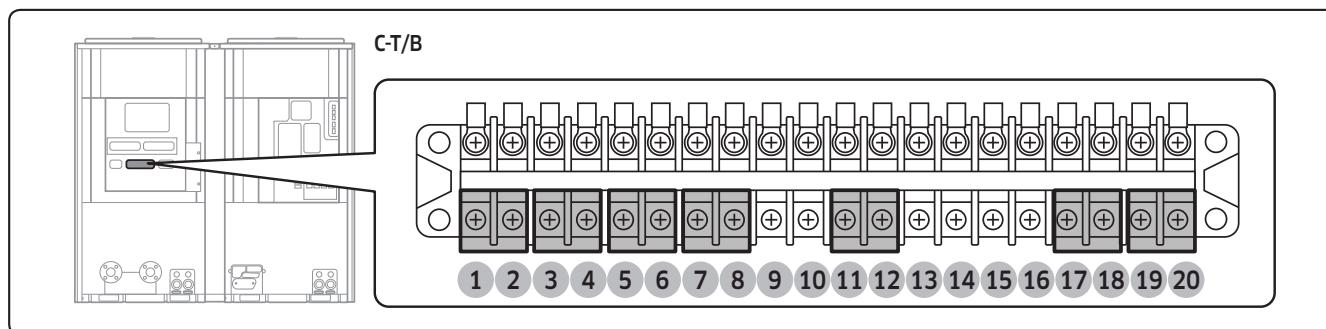
- When set as usual input (0): Operation ON when **9-10** is ON; OFF when **9-10** is OFF
- When set as instant input (1): Operation ON when **9-10** is ON more than 0.1 second; OFF when **11-12** is ON more than 0.1 second

Note4) Main unit of module when group is not available

Note5) Pump models do not need to connect pump interlock contacts (7-8).

NOTE

- Refer to page page 62 for example of installation.



No.	Name	Signal	Function	Contact Short	Contact Open	Signal recognition	Setting unit
C-T/B	1-2	Zero voltage contact	Operate quiet function in level set by main option or module control ^{Note4)}	Quiet function	-	Usual input	Main unit of group ^{Note8)}
	3-4		Operate demand function (current limit control) in level set by main option or module control ^{Note5)}	Demand function	-	Usual input	Main unit of group ^{Note8)}
	5-6		Operate forced fan function ^{Note6)}	Forced fan function	-	Usual input	Main unit of group ^{Note8)}
	7-8		Reset on error occurred status • Operates only when remote error reset input function is set to use	Reset error	-	Instant input	Main unit of module
	9-10	-	No use (N/A)	-	-	-	-
	11-12	Zero voltage contact	Operate water law ^{Note7)}	Water law control	Water outlet set temperature control	Usual input	Main unit of group ^{Note8)}
	13-14	-	No use (N/A)	-	-	-	-
	15-16	-	No use (N/A)	-	-	-	-

15. Installation

No.	Name	Signal	Function	Contact Short	Contact Open	Signal recognition	Setting unit
C-T/B	17-18	Set temperature/ room temperature sensor	Recognize water outlet set temperature by external input (4 ~ 20 mA) ^{Note1)} Recognize value of room temperature sensor (4 ~ 20 mA) when standard for water law is room temperature ^{Note2)}	-	-	Current input	Main unit of group ^{Note8)}
	19-20	External water outlet temperature	Recognize external water outlet temperature by external temperature sensor (4 ~ 20 mA) ^{Note3)}	-	-	Current input	Main unit of group ^{Note8)}

- Usual input: Operate by current status of contact
Instant input: Operate when contact signal changes from OFF to ON / from ON to OFF

^{Note1)} Value of water outlet set temperature = $5.625 \times \text{Current} - 32.5$
Heat (Hot water) mode recognizes minimum 25 °C and maximum 55 °C
Cool (Cool storage) mode recognizes minimum 5 °C and maximum 25 °C (Minimum -10 °C when using low temperature function)

Current (mA)	4	6	8	10	12	14	16	18	20
Temperature (°C)	-10.00	1.25	12.50	23.75	35.00	46.25	57.50	68.75	80.00

^{Note2)} Room temperature = $6.25 \times \text{Current} - 75$

Current (mA)	4	6	8	10	12	14	16	18	20
Temperature (°C)	-50.00	-37.50	-25.00	-12.50	0.00	12.50	25.00	37.50	50.00

^{Note3)} If operation pattern is not standard control, control standard temperature depends on external water outlet temperature sensor. External water outlet temperature sensor should be installed where can represent the temperature of water pipe system.

Water outlet temperature = $6.25 \times \text{current} - 55$

Current (mA)	4	6	8	10	12	14	16	18	20
Temperature (°C)	-30.00	-17.50	-5.00	7.50	20.00	32.50	45.00	57.50	70.00

^{Note4)} Operates when input method for quiet function is set as external contact

- If the contact is short, quiet function operates in Cool/Heat mode.
- Quiet function by Module Controller operates in Cool mode and night time.

^{Note5)} Operates when input method for demand function is set as external contact

^{Note6)} Operates when input method for forced fan function is set as external contact

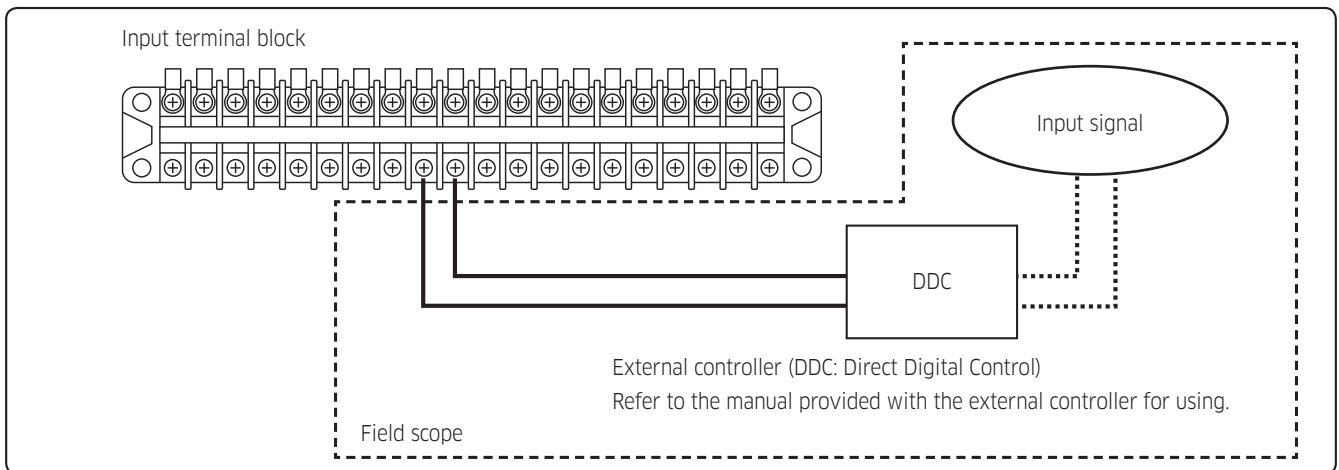
^{Note7)} Operates when input method for water law function is set as external contact

^{Note8)} Main unit of module when group is not available

15. Installation

NOTE

- Room temperature sensor and external water outlet temperature sensor is not supplied. Purchase and install the appropriate sensor according to the usage.
 - Room temperature sensor: 4 ~ 20 mA (4 mA : -50 °C, 20 mA : 50 °C)
 - External water outlet temperature sensor: 4 ~ 20 mA (4 mA : -30 °C, 20 mA : 70 °C)
- Example of input contact installation

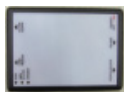


15. Installation

Function description

No.	Description
1	Select operation On/Off input method of module/group
2	Select temperature setting input method of module/group
3	Select operation mode (Cool/Heat, Hot water/Cool storage) input method of module/group
4	Select demand control input method of module/group
5	Select demand level Current will be limited below the set level when "Perform" command is transmitted.
6	Select quiet function input method of module
7	Select forced fan function input method of module - Forced fan: Removes accumulated snow by operating the fan of stopped unit in low frequency - Snow accumulation prevention, which operates occasionally when outdoor temperature is below zero, is basic function.
8	Select water law input method of module/group
9	Select pump operation status when thermo OFF
10	Select to use error clear function by external contact
11	Setting CHILLER unit address: identical with channel address used by DMS
12	Select quiet function level - Quiet function will start in set level when "Perform" command is transmitted. - Level comparison: Level3 > Level2 > Level1
13	Confirm delay for unsecured flow rate when operating: Delay for inspecting no input for pump interlock and unsecured flow rate Compressor will not operate until water flow is detected.
14	Set when controlling water outlet temperature by installing extra water temperature gauge on water pipe header or tank - External water outlet temperature sensor should be installed on main unit of group (or module when group is not available). - Standard for water outlet temperature depends on external water outlet temperature sensor except when operation pattern is standard control.
15	Setting water law standard - To set room temperature as standard, external room temperature sensor should be installed. - Room temperature sensor should be installed on main unit of group (or module when group is not available).
16 ~ 27	Water law control constant: Refer to water law operation graph.
28	Recognition of external control operation ON/OFF 0 (recognizing usual signal): Constantly inspects ON/OFF status of contact and set operation ON/OFF 1 (recognizing instant signal): Set operation ON/OFF when contact ON/OFF signal is input (when external contact is consisted of button click)
34	Select to use low temperature function - The function will operate when set simultaneously with product option of module control (Seg23 of installation option 02 = 'E') - Low temperature function: Expands water outlet usage range in Cool/Cool storage mode (5 ~ 25 °C → -10 ~ 25 °C) - When using low temperature function, use brine and maintain the concentration under freezing point.

16. Accessory

Classification	Product	Image	Model	Remark
Integrated Management System	DMS 2.5		MIM-D01AN	
	Zensys 2.0		AST-Z**P	
Centralized Control System	Touch controller		MCM-A300N	
Building Management System	BACnet Gateway		MIM-B17BN	
	Lonworks Gateway		MIM-B18BN	
DVM Chiller Control System	FCU KIT		MIM-F00N	
	FCU Interface module		MIM-F10N	
Power Distribution System	PIM		MIM-16N	
Individual Control System	Module controller		MCM-A00N	
	Simplified wired remote controller		MWR-SH10N	for FCU kit
Others	S-Converter		MIM-C02N	

16. Accessory



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Ver.2.3

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