

# VRF

## Technical Data Book

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



Model : AG\*\*\*KSVANH/EU



# Nomenclature

Model Name

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

## (1) Classification

AG	Chiller
AM	DVM

## (2) Capacity

kW (3 digits)
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## (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	Standard + General Temp.+ Module
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## (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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- 10 *Hydraulic performance*
- 11 *External contact*

# 1 Specification

## DVM Chiller

Type			DVM Chiller	DVM Chiller	DVM 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
Mode			-	HEAT PUMP	HEAT PUMP
Performance	HP		HP	15	20
	Ton		usRT	12	16
	Capacity (Nominal)	Cooling	kW	42.0	56.0
		Heating	kW	42.0	56.0
Power	Power Input (Nominal)	Cooling	kW	12.35	18.67
		Heating		11.83	17.50
	Current Input (Nominal)	Cooling	A	19.6	29.6
		Heating		18.8	27.8
	MCA		A	32.0	46.0
	MFA		A	40	60
COP	Nominal Cooling		W/W	3.40	3.00
	Nominal Heating		W/W	3.55	3.20
Efficiency	ESEER		W/W	5.7	5.4
Compressor	Type		-	Scroll Inverter	Scroll Inverter
	Output		kW x n	6.76 x 2	6.76 x 2
	Model Name		-	DS-GB070FAVA	DS-GB070FAVA
	Oil	Type	-	PVE	PVE
Fan	Type		-	Propeller	Propeller
	Output x n		W	630 x 2	630 x 2
	Air Flow Rate		CMM	364 (182 x 2)	364 (182 x 2)
	External Static Pressure	Max.	mmAq	8.0	8.0
Water Side Heat Exchanger	Type		-	Brazing Plate	Brazing Plate
	QTy		EA	2	2
	Water Flow Rate (Cooling / Heating)		LPM	120 / 120	160 / 160
	Pressure Drop (Set, Norminal)		kPa	60	100
	Max Operating Pressure		MPa	1.0	1.0
	Connection Type		-	FLANGE	FLANGE
	Pipe connection (Inlet / Outlet)		A	40	40
Field Wiring	Power Source Wire		mm2	-	-
	Transmission Cable		mm2	0.75 ~ 1.5	0.75 ~ 1.5
Refrigerant	Type		-	R410A	R410A
	Factory Charging		kg	18.0	18.0
Sound	Sound Pressure		dB(A)	60.0	62.0
	Sound Power			80.0	83.0
External Dimension	Net Weight		kg	446	446
	Shipping Weight		kg	468	468
	Net Dimensions (WxHxD)		mm	1,795 x 1,695 x 765	1,795 x 1,695 x 765
	Shipping Dimensions (WxHxD)		mm	1,900 x 1,887 x 919	1,900 x 1,887 x 919
Operating Water Temp. Range	Cooling		°C	5 ~ 25	5 ~ 25
	Cooling (If using brine)		°C	-10~25	-10~25
	Heating		°C	25 ~ 55	25 ~ 55
Operating Water flow Range	Water Flow Rate		LPM	60 ~ 240	80 ~ 320
	Minimum water storage in the system		L	294	392
Operating Amb. Temp. Range	Cooling		°C	-15 ~ 48	-15 ~ 48
	Heating		°C	-25 ~ 43	-25 ~ 43

### [NOTE]

\*Specification may be subject to change without prior notice.

1) Specification comply with EN14511.

2) Nominal cooling capacities are based on;  
Chilled water inlet / outlet temperature : 12 / 7 °C, outdoor temperature : 35 °C DB, 24 °C WB.

3) Nominal heating capacities are based on;  
Heating water inlet / outlet temperature : 40 / 45 °C, outdoor temperature : 7 °C DB, 6 °C WB.

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

## 2 Modulation guide

HP	kW	Standard				High Efficiency		
		AG042	AG056	AG070	Recommended pipe size [A]	AG042	AG056	Recommended pipe size [A]
15	42	1			40			40
20	56		1		40			40
25	70			1	50			50
30	84	2			50			50
40	112		2		65			65
45	126	3			65			65
50	140			2	80			80
60	168		3		80	4		80
75	210			3	80	5		80
80	224		4		100			100
90	252	6			100			100
100	280			4	100		5	100
105	294	7			100			100
120	336		6		100	8		100
125	350			5	100			100
135	378	9			100			100
140	392		7		100			100
150	420	10		6	100			100
160	448		8		125			125
165	462	11			125			125
175	490			7	125			125
180	504		9		125	12		125
195	546	13			125			125
200	560			8	125		10	125
210	588	14			125			125
220	616		11		125			125
225	630	15		9	125			125
240	672		12		125	16		125
250	700			10	125			125
260	728		13		125			125
275	770			11	150			150
280	784		14		150			150
300	840			12	150		15	150
320	896		16		150			150
325	910			13	150			150
350	980			14	150			150
375	1050			15	150			150
400	1120			16	150			150

Total capacity of modulated units =  $\Sigma$  capacity of each chiller unit

Total power input of modulated units =  $\Sigma$  power input of each chiller unit







# 4 Capacity correction

## 1) Correction factor by % glycol

Anti-freeze	Ethylene glycol				Propylene glycol			
%wt	Freezing point	Correction factor			Freezing point	Correction factor		
		Capacity	Power Input	Pressure drop		Capacity	Power Input	Pressure drop
0%	0	1.000	1.000	1.000	0	1.000	1.000	1.000
10%	-4	0.989	1.000	1.010	-3	0.988	1.000	1.029
20%	-9	0.975	1.000	1.023	-7	0.973	1.000	1.061
30%	-16	0.960	1.000	1.041	-13	0.955	1.000	1.098
40%	-23	0.943	1.000	1.064	-22	0.933	1.000	1.142
50%	-37	0.924	1.000	1.082	-35	0.910	1.000	1.193

## 2) 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.

# 4 Capacity correction

## 3) Correction factor by water flow rate

Correction	% of normal 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
$\Delta T$	10.0	8.3	7.1	6.3	5.6	5.0	4.2	3.3	2.5

## 4) 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

# 5 Dimensional drawing

## DVM Chiller

AG042/056/070KSVANH/EU

Units : mm / inches

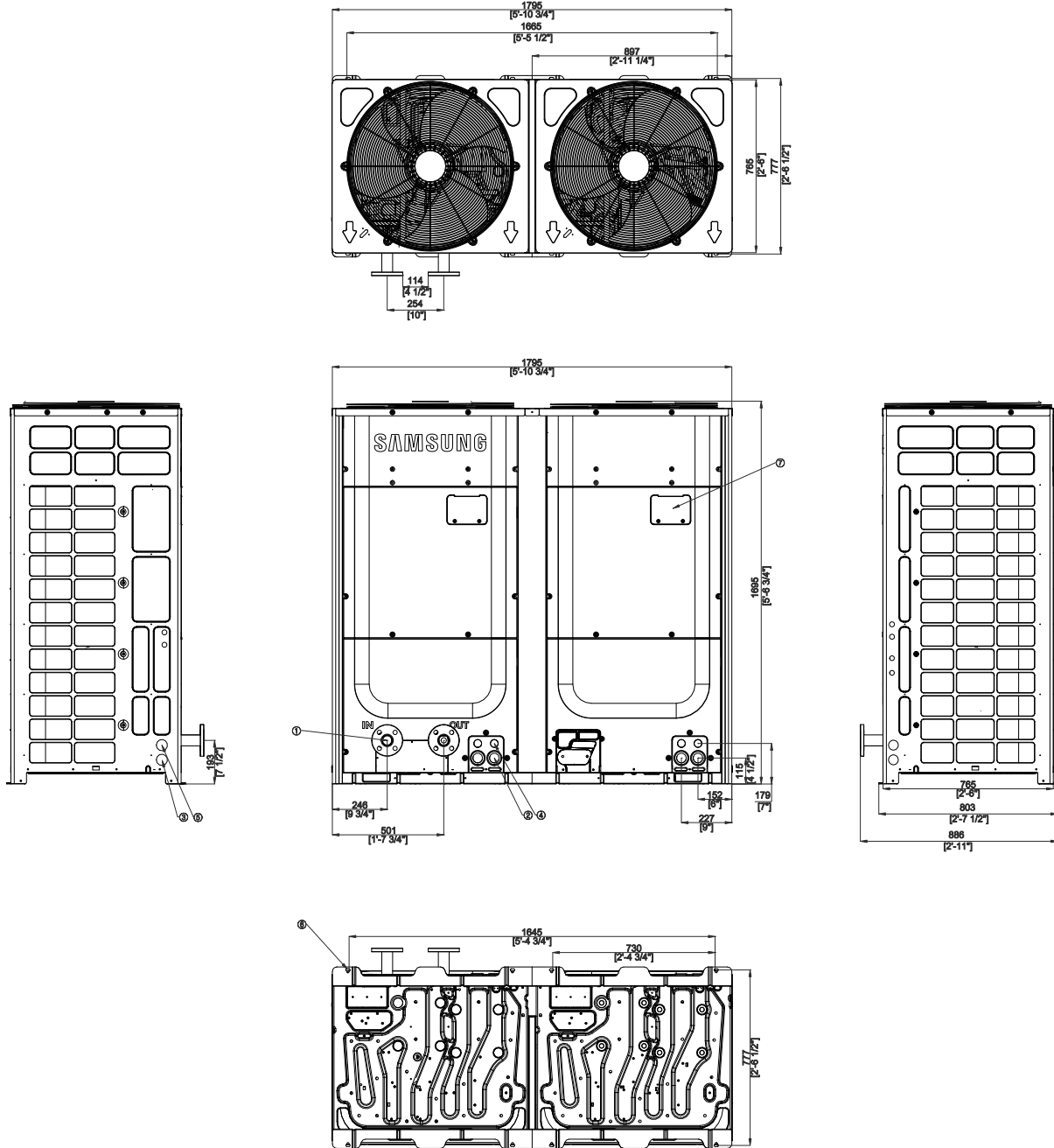
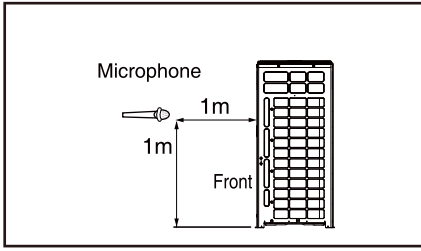


Table of descriptions

1	Water Connections	7	Monitoring Window
2	Power wiring conduit(front)	8	
3	Power wiring conduit(side)	9	
4	Communication wiring conduit(front)	10	
5	Communication wiring conduit(side)	11	
6	Anchor Bolt Hole	12	

# 6 Sound level

## 1) Sound pressure level



Unit: dB(A)

Model	Pressure
AG042KSVANH/EU	60
AG056KSVANH/EU	62
AG070KSVANH/EU	63

### Note

\* Specifications may be subject to change without prior notice

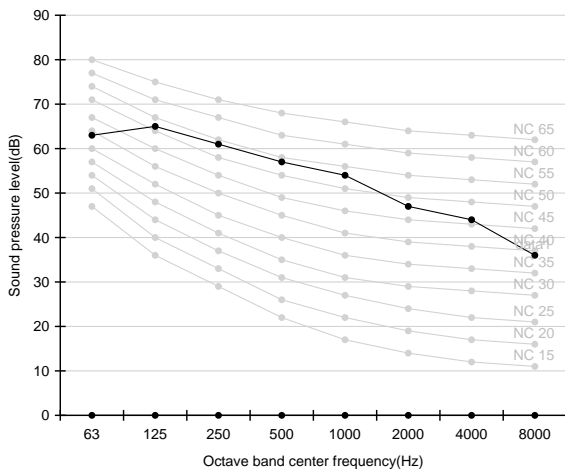
- 1) These operation values were obtained in an anechoic room.
- 2) Sound pressure level will vary depending on a range of factors such as the construction of the particular room.
- 3) Operation sound level may differ depending on operation and ambient conditions.

## 2) Quiet function

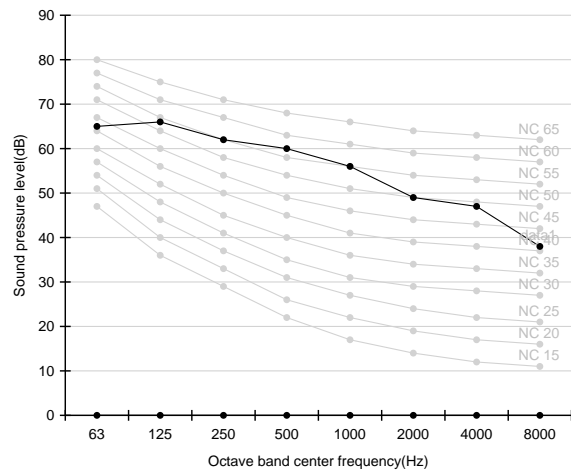
Model	Sound pressure level for quiet function [dB(A)]		
	Level 1	Level 2	Level 3
AG012	57	54	51
AG016	59	56	53
AG020	60	57	54

## 3) NC curves

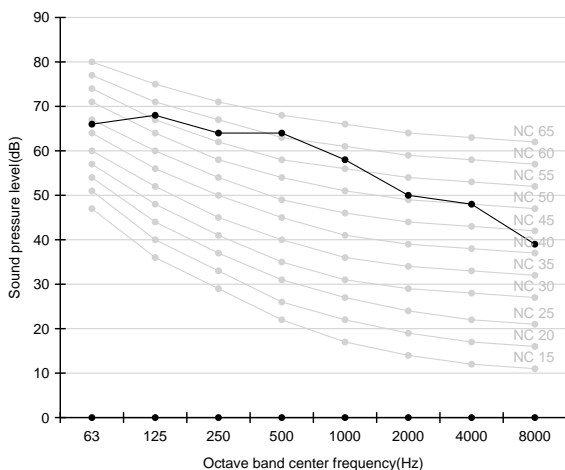
a. AG042KSVANH/EU



b. AG056KSVANH/EU



c. AG070KSVANH/EU



# 6 Sound level

## 4) Sound power level

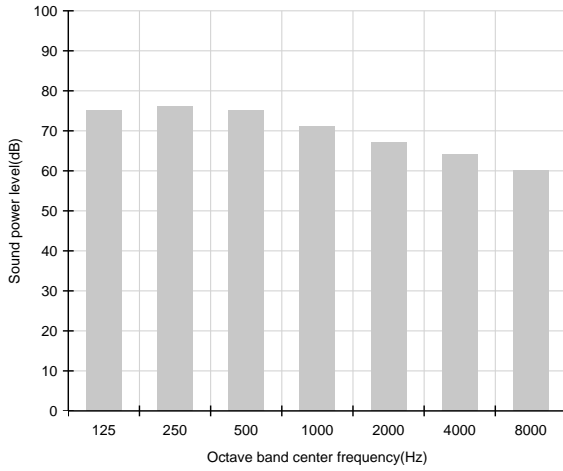
### Note

- \* Specifications may be subject to change
- 1) dBA = A-weighted sound power level.
- 2) Reference power : 1pW.
- 3) Measured according to ISO 3741.

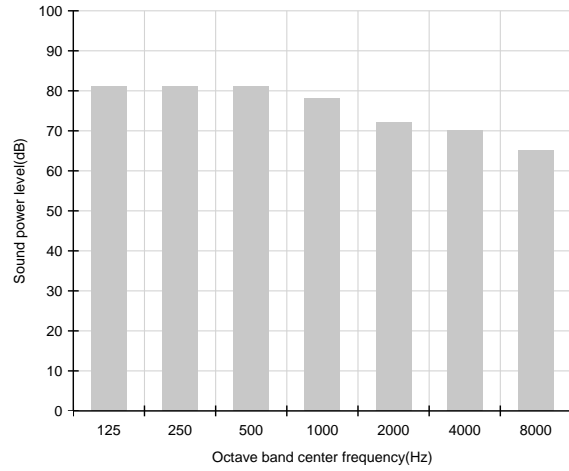
Unit: dB(A)

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

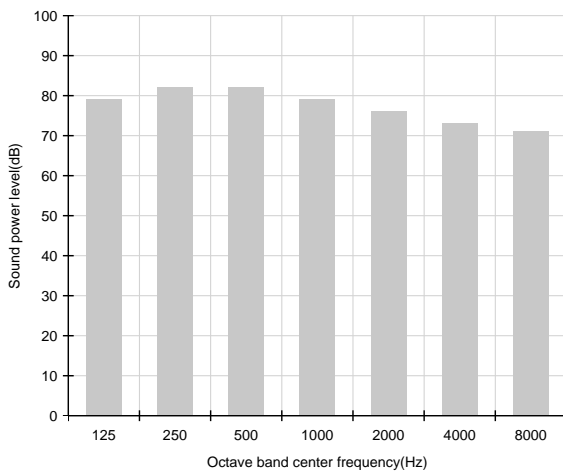
### a. AG042KSVANH/EU



### b. AG056KSVANH/EU



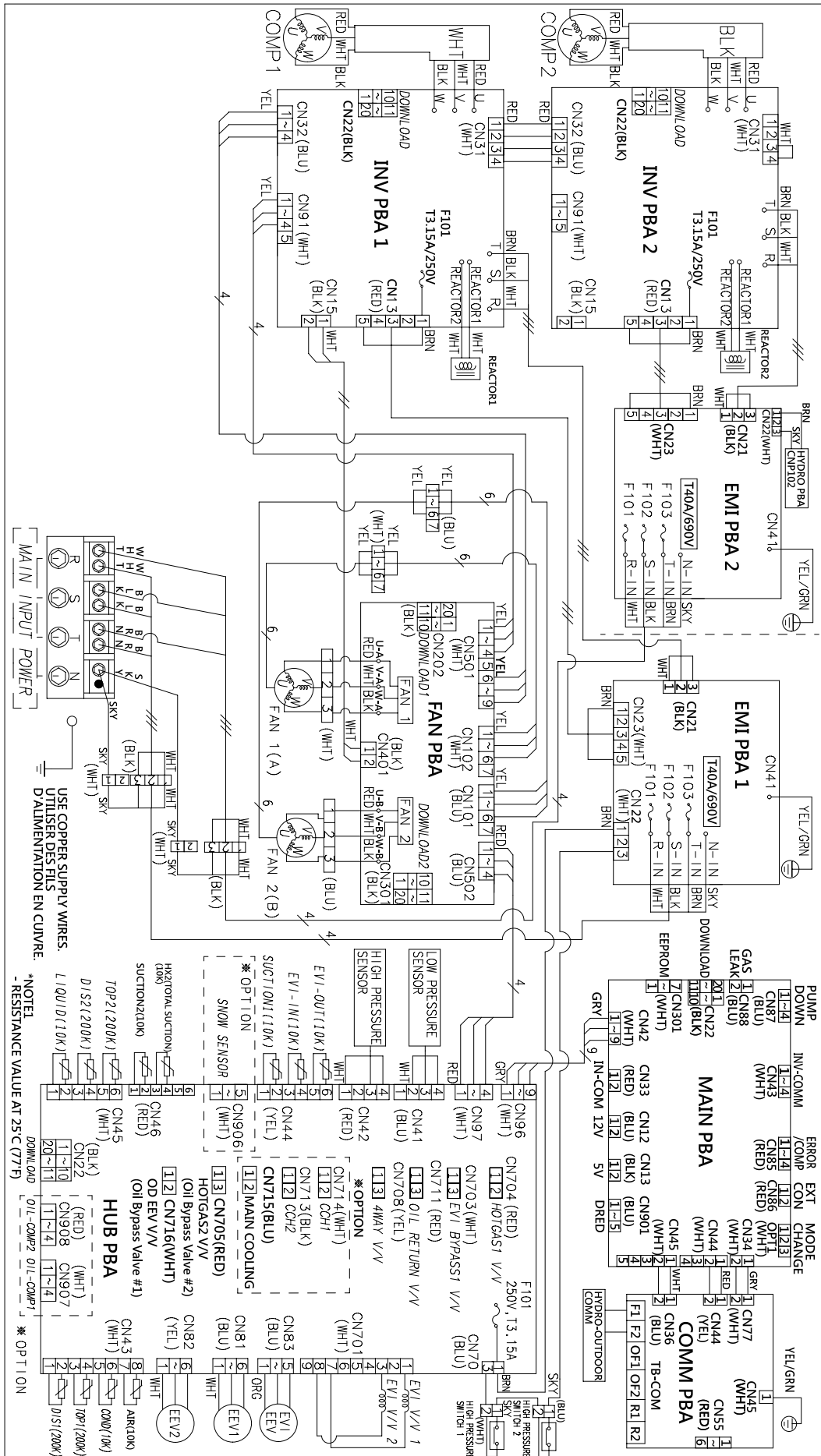
### c. AG070KSVANH/EU



# 7 Electrical wiring diagram

## 1) Inverter controller

AG042/056KSVANH/EU





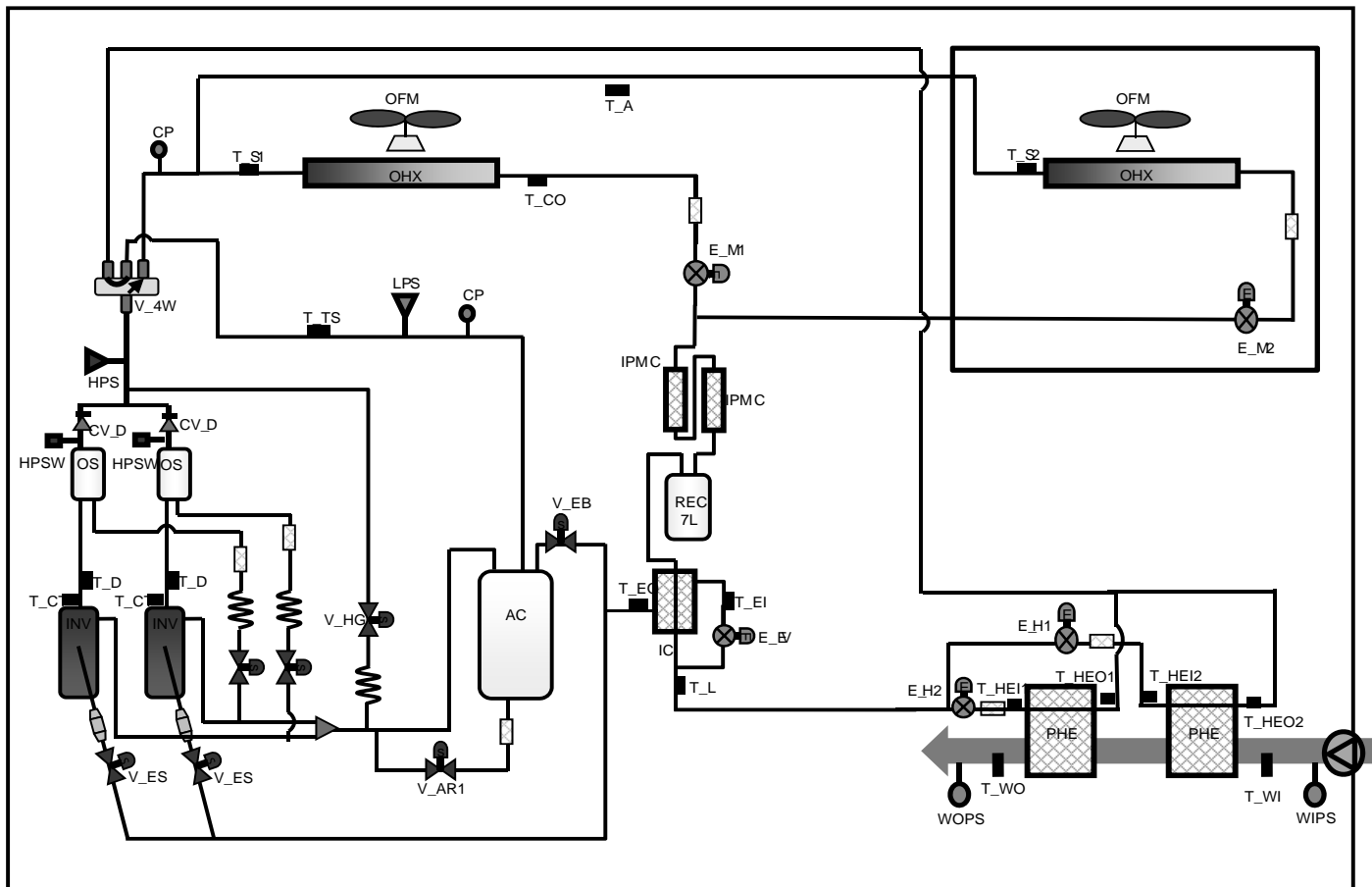




# 8 Cycle diagram

## DVM Chiller

AG042/056/070KSVANH/EU

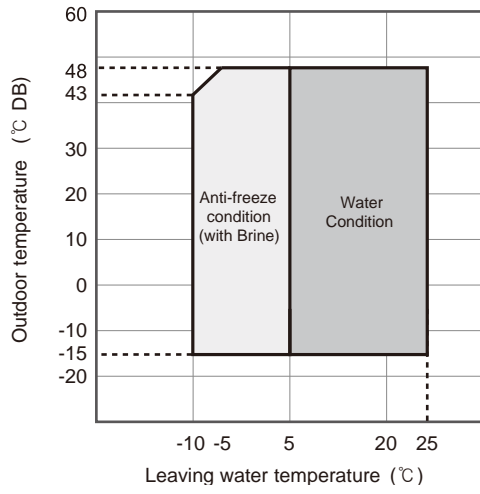


Classification	Description
INV	Inverter Compressor
OFM	Outdoor Fan Motor
OHX	Outdoor Heat Exchanger
AC	Accumulator
OS	Oil Separator
IC	Intercooler
IPMC	IPM Cooler
HPS	High Pressure Sensor
LPS	Low Pressure Sensor
WIPS	Water In Pressure Sensor
WOPS	Water Out Pressure Sensor
HPSW	High Pressure Switch
E_M1	Main EEV1
E_M2	Main EEV2
E_H1	Hydro EEV1
E_H2	Hydro EEV2
E_EV	EVI EEV
V_ES	EVI Solenoid Valve
V_EB	EVI Bypass Valve
PHE	Plate Heat Exchanger
REC	Receiver

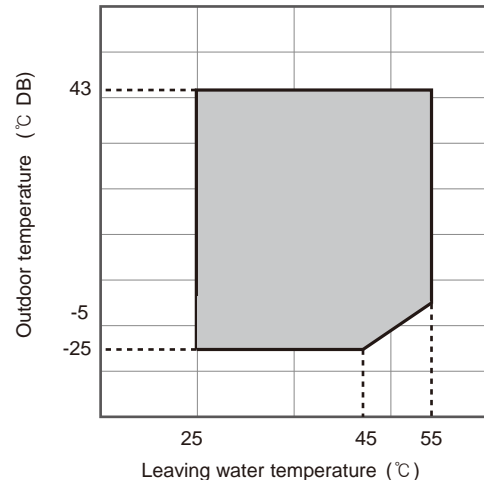
Classification	Description
CP	Charging Port
V_HG	Hot Gas Bypass Valve
V_4W	4way Valve
V_AR	Accumulator Oil Return Valve
CV_D	Discharge Check Valve
T_D	Discharge Temperature Sensor
T_TS	Total Suction Temperature Sensor
T_S1	Suction1 Temperature Sensor
T_S2	Suction2 Temperature Sensor
T_CO	Condenser Out Temperature Sensor
T_EI	EVI In Temperature Sensor
T_EO	EVI Out Temperature Sensor
T_L	Liquid Tube Temperature Sensor
T_CT	Compressor Top Temperature Sensor
T_A	Ambient Temperature Sensor
T_HEI1	Hydro EVA In1 Temperature Sensor
T_HEI2	Hydro EVA In2 Temperature Sensor
T_HEO1	Hydro EVA Out1 Temperature Sensor
T_HEO2	Hydro EVA Out2 Temperature Sensor
T_WI	Water In Temperature Sensor
T_WO	Water Out Temperature Sensor

# 9 Operation limit

## 1) Cooling

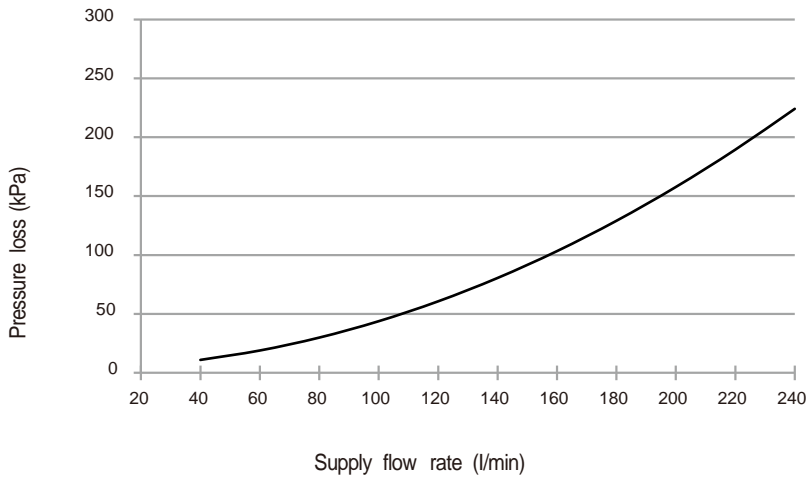


## 2) Heating

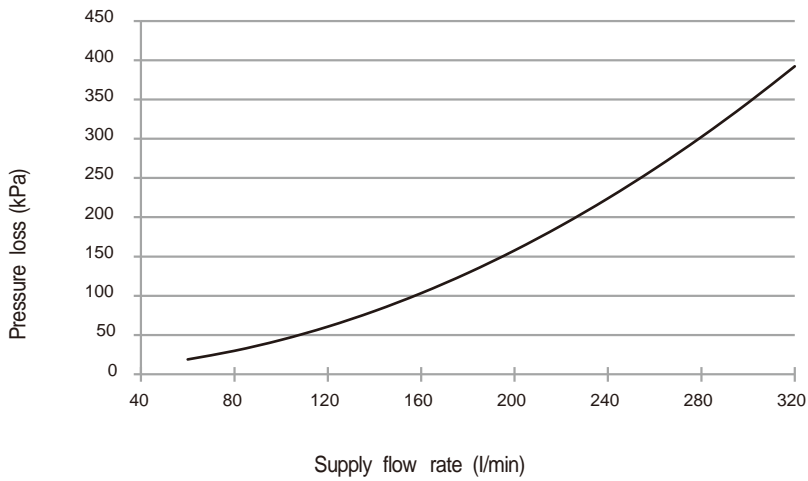


# 10 Hydraulic performance

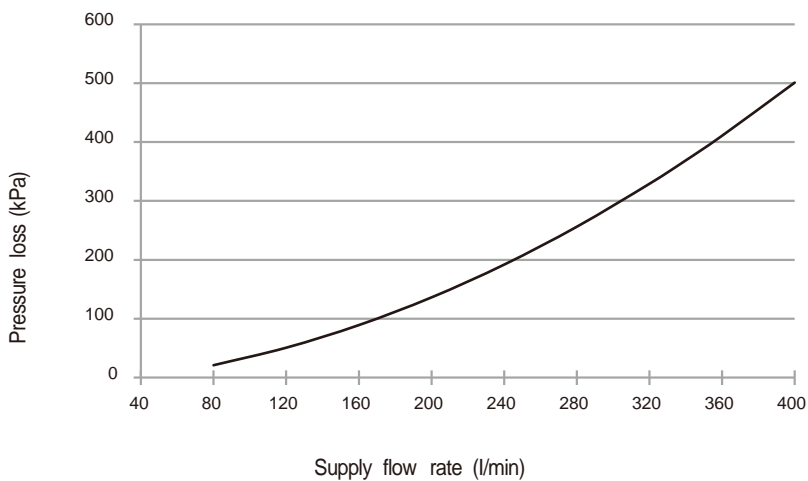
## 1) AG042KSVANH/EU



## 2) AG056KSVANH/EU



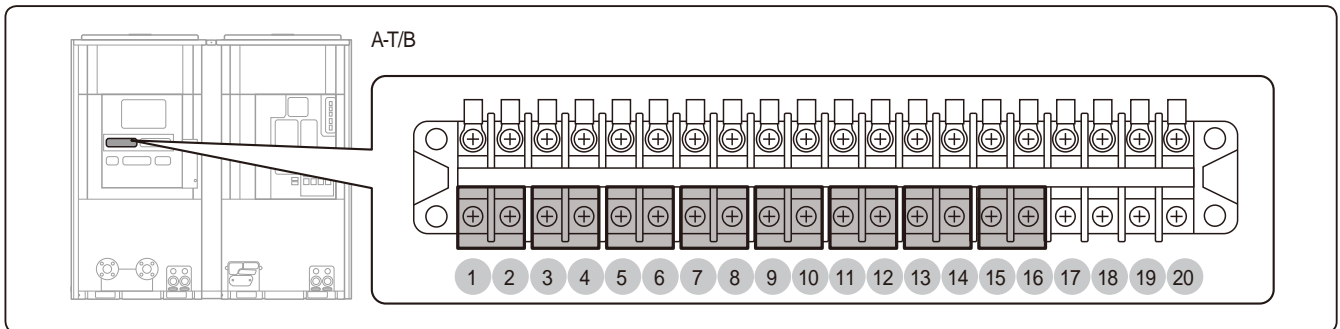
## 3) AG070KSVANH/EU



# 11 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	Defrost 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		Disuse	-	-
19-20	Disuse	-	-	-	

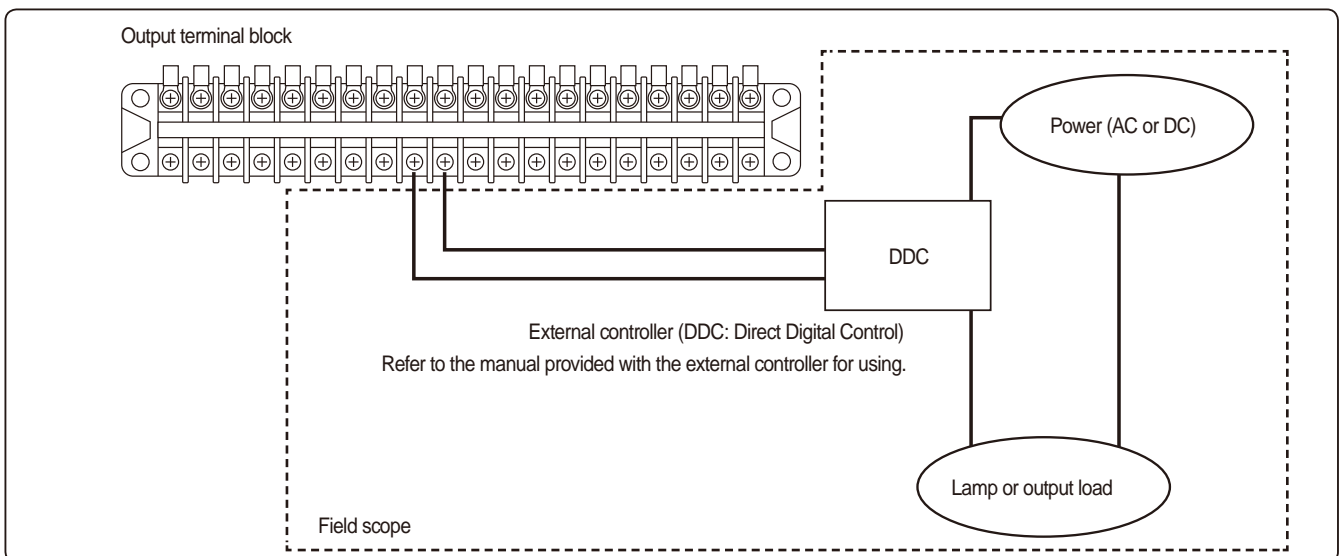
- Output written above is information about individual unit.

### ⚠ CAUTION

- You must turn off the power before working on external contact wiring.
- Output contact can be connected neutral contact and Open/Short only.

Terminal block	Tightening torque	
20P T/B	M3	0.5 ~ 0.75

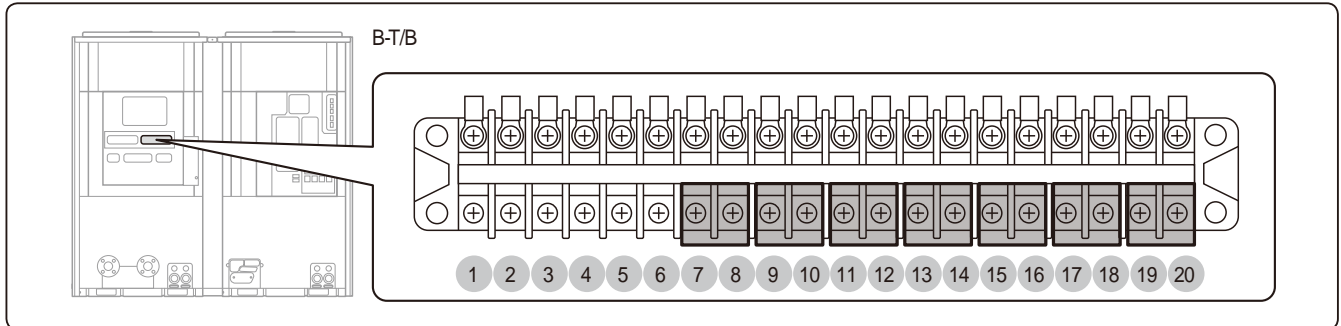
[ Example of output contact installation ]



# 11 External contact

## Wiring work

### 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	Zero voltage contact	Signal about pump operation • Pump interlock error (E918) occurs if ON is not input when operating pump	Pump ON	Pump OFF	Usual input	Each unit
	9-10	Operation ON/OFF		Controlling operation ON/OFF <sup>Note1)</sup>	<sup>Note3)</sup>		Usual/instant input	Main unit of group <sup>Note4)</sup>
	11-12							
	13-14	Operation mode		Selecting cool/heat mode <sup>Note2)</sup>	Heat	Cool	Usual input	Main unit of group <sup>Note4)</sup>
	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 <sup>Note4)</sup>
	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 <sup>Note4)</sup>
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 <sup>Note4)</sup>	

• 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

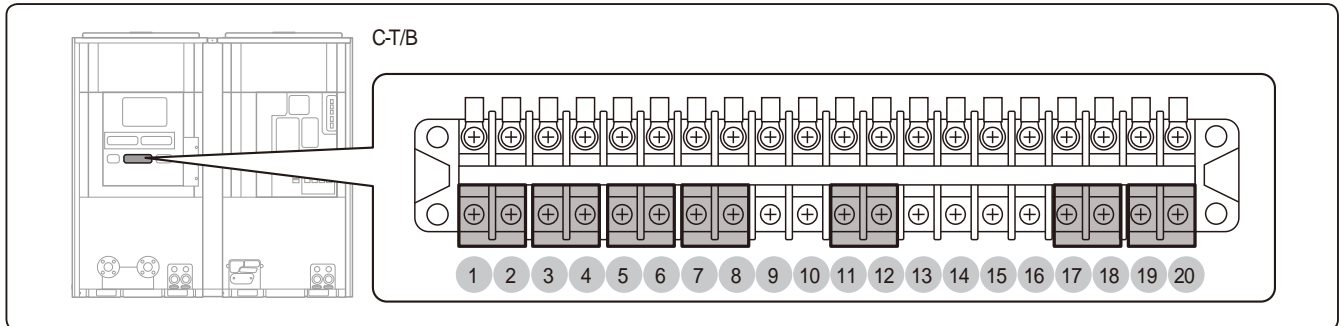
- When set as usual input (0): Operation ON when 9-10 is ON; OFF when 9-10 is OFF

- 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

# 11 External contact

## Wiring work



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 <sup>Note4)</sup>	Quiet function	-	Usual input	Main unit of group <sup>Note8)</sup>
	3-4		Operate demand function (current limet control) in level set by main opeton or module control <sup>Note5)</sup>	Demand function	-	Usual input	Main unit of group <sup>Note8)</sup>
	5-6		Operate forced fan function <sup>Note6)</sup>	Forced fan function	-	Usual input	Main unit of group <sup>Note8)</sup>
	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 <sup>Note7)</sup>	Water law control	Water outlet set temperature control	Usual input	Main unit of group <sup>Note8)</sup>
	13-14	-	No use (N/A)	-	-	-	-
	15-16	-	No use (N/A)	-	-	-	-
	17-18	Analog current	Recognize water outlet set temperature by external input (4 ~ 20 mA) <sup>Note1)</sup> Recognize value of room temperature sensor (4 ~ 20 mA) when standard for water law is room temperautre <sup>Note2)</sup>	-	-	Current input	Main unit of group <sup>Note8)</sup>
19-20	Recognize external water outlet temperature by external temperature sensor (4 ~ 20 mA) <sup>Note3)</sup>		-	-	Current input	Main unit of group <sup>Note8)</sup>	

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

# 11 External contact

## Wiring work

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

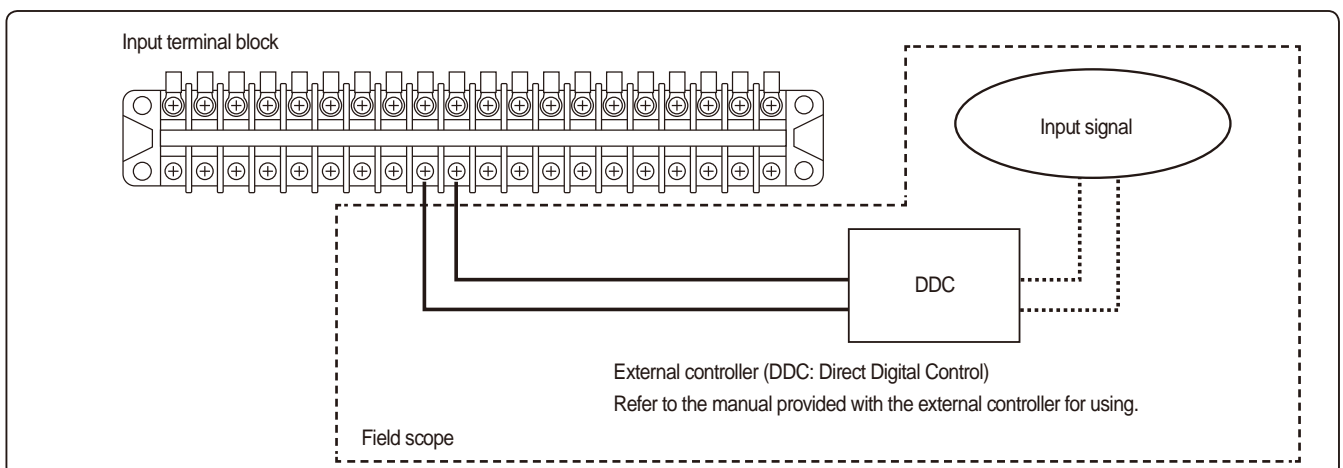
Note7) Operates when input method for water law function is set as external contact

Note8) Main unit of module when group is not available

### 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 : 4~20mA (4mA : -50°C, 20mA : 50°C)
  - External water outlet temperature sensor : 4~20mA (4mA : -30°C, 20mA : 70°C)

[ Example of input contact installation ]



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