

AIRSTAGE™ J-III L

DESIGN & TECHNICAL MANUAL



FUJITSU GENERAL LIMITED



1. GENERAL INFORMATION

1. MODEL LINE UP

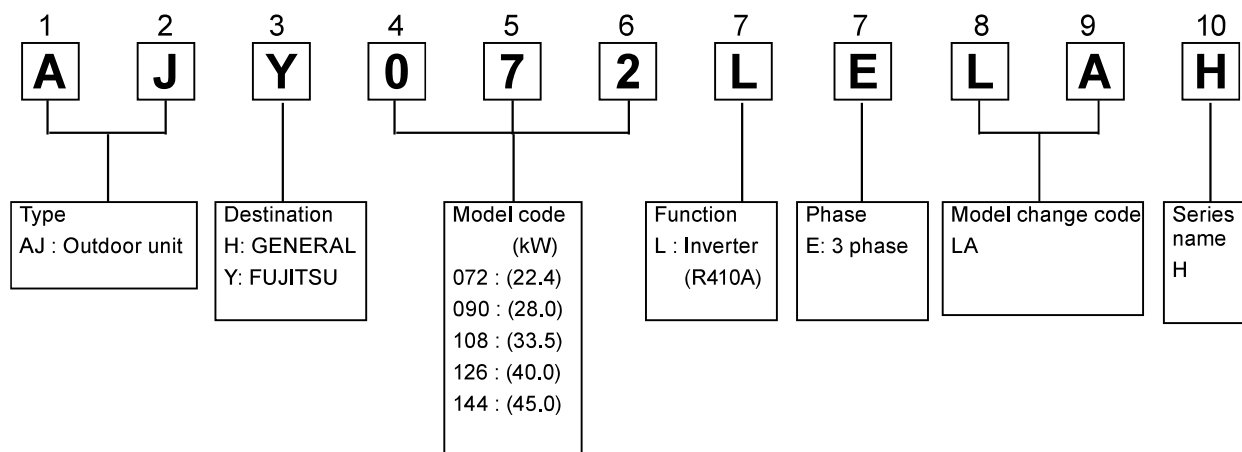
1-1. OUTDOOR UNIT

- Line up from 8HP to 16HP in 2HP increments.

■ LINE UP (SINGLE)

HP	Capacity (kW)	Model name	Chassis	Connectable indoor unit
8	22.4	AJ*072LELAH		1 to 20
10	28.0	AJ*090LELAH		1 to 25
12	33.5	AJ*108LELAH		1 to 30
14	40.0	AJ*126LELAH		1 to 36
16	45.0	AJ*144LELAH		1 to 40

■ MODEL DESIGNATION

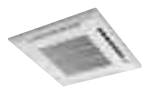


1-2. INDOOR UNIT

■ LINE UP (1/3)

Various combinations of types and capacity, ranging from 1.1kW to 28.0kW.

Capacity		Compact Cassette	Circular Flow Cassette		Cassette		Mini Duct	Slim Duct/ Slim Concealed Floor	Medium Static Pressure Duct
kW	Model code		XM	XK	XD	XA			
1.1	04	●					●		
2.2	07	●					●	●	
2.8	09	●					●	●	
3.6	12	●					●	●	
4.0 / 4.5	14	●					●	●	
5.6	18	●	●	●	●		●	●	
7.1	24	●	●	●	●		●	●	●
9.0	30		●	●		●			●
10.0	34			●		●			
11.2	36			●		●			●
12.5	45			●		●			●
14.0	54			●		●			
18.0	60								
22.4	72								
25.0	90								
28.0	96								

Compact Cassette	Circular Flow Cassette	Cassette
AUXB04GBLH AUXB07GALH AUXB09GALH AUXB12GALH AUXB14GALH AUXB18GALH AUXB24GALH  Grid type grille; UTG-UF*E-W  Standard type grille; UTG-UF*C-W	AUXM018GLAH AUXM024GLAH AUXM030GLAH AUXK018GLAH AUXK024GLAH AUXK030GLAH AUXK034GLAH AUXK036GLAH AUXK045GLAH AUXK054GLAH 	AUXD18GALH AUXD24GALH AUXA30GALH AUXA34GALH AUXA36GALH AUXA45GALH AUXA54GALH 

Mini Duct	Slim Duct/Slim Concealed Floor	Medium Static Pressure Duct
ARXK04GCLH ARXK07GCLH ARXK09GCLH ARXK12GCLH ARXK14GCLH   ARXK18GCLH  ARXK24GCLH	ARXD07GALH ARXD09GALH ARXD12GALH ARXD14GALH   ARXD18GALH  ARXD24GALH 	ARXA24GBLH ARXA30GBLH ARXA36GBLH ARXA45GBLH 

■ LINE UP (2/3)

Various combinations of types and capacity, ranging from 1.1kW to 28.0kW.

Capacity		High Static Pressure Duct	Large Airflow Duct	Compact Floor	Compact Floor (EEV external)	Floor / Ceiling	Ceiling
kW	Model code						
1.1	04			●	●		
2.2	07			●	●		
2.8	09			●	●		
3.6	12			●	●	●	
4.0 / 4.5	14			●	●	●	
5.6	18		●			●	
7.1	24		●			●	
9.0	30		●				●
10.0	34						
11.2	36	●					●
12.5	45	●					●
14.0	54						●
18.0	60	●					
22.4	72	●					
25.0	90	●					
28.0	96	●					

High Static Pressure Duct	Large Airflow Duct
ARXC36GBTH ARXC45GATH ARXC60GATH ARXC72GBTH ARXC90GBTH ARXC96GATH	ARXN018GLBH ARXN024GTBH ARXN030GTBH

Compact Floor	Compact Floor (EEV external)
AG*A004GCAH AG*A007GCAH AG*A009GCAH AG*A012GCAH AG*A014GCAH	AG*E004GCAH AG*E007GCAH AG*E009GCAH AG*E012GCAH AG*E014GCAH EV kit

Floor / Ceiling	Ceiling
AB*A12GATH AB*A14GATH AB*A18GATH AB*A24GATH	AB*A30GATH AB*A36GATH AB*A45GATH AB*A54GATH

■ LINE UP (3/3)

Various combinations of types and capacity, ranging from 1.1kW to 28.0kW.

Capacity		Wall Mounted	Wall Mounted (EEV external)
kW	Model code		
1.1	04	●	●
2.2	07	●	●
2.8	09	●	●
3.6	12	●	●
4.0 / 4.5	14	●	●
5.6	18	●	
7.1	24	●	
9.0	30	●	
10.0	34	●	
11.2	36		
12.5	45		
14.0	54		
18.0	60		
22.4	72		
25.0	90		
28.0	96		

Wall Mounted		Wall Mounted (EEV external)	
AS*A004GTAH AS*A007GTAH AS*A009GTAH		AS*E004GTAH AS*E007GTAH AS*E009GTAH	
AS*A012GCAH AS*A014GCAH		AS*E012GCAH AS*E014GCAH	
AS*A12GACH AS*A14GACH		AS*E12GACH AS*E14GACH	
AS*A18GBCH AS*A24GBCH		EV kit 	
AS*A030GTAH AS*A034GTAH			



2. MODEL SELECTION

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2. MODEL SELECTION

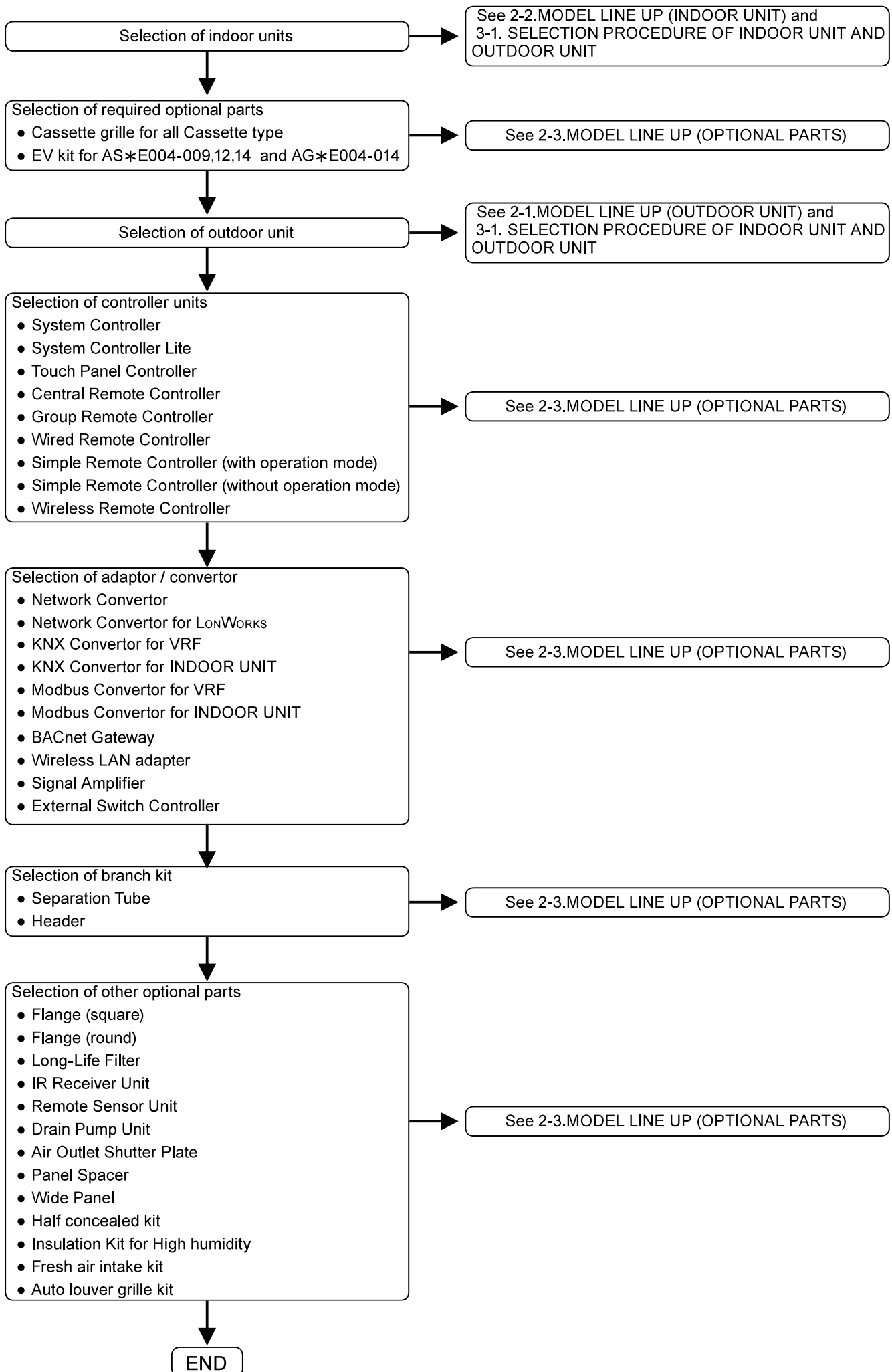
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1. MODEL SELECTION PROCEDURE



2. MODEL LINE UP

2-1. OUTDOOR UNIT

■ LINE UP

HP	Capacity (kW)		Model name	Connectable indoor unit	Indoor unit connectable cooling capacity (kW)
	Cooling	Heating			
8	22.4	22.4	AJ*072LELAH	1 to 20	11.2 to 33.6
10	28.0	28.0	AJ*090LELAH	1 to 25	14.0 to 42.0
12	33.5	33.5	AJ*108LELAH	1 to 30	16.8 to 50.2
14	40.0	40.0	AJ*126LELAH	1 to 36	20.0 to 60.0
16	45.0	45.0	AJ*144LELAH	1 to 40	22.5 to 67.5

2-2. INDOOR UNIT

■ LINE UP

Type	Rated capacity (kW)		Model name	Dimensions H x W x D (mm)	Remarks
	Cooling	Heating			
Compact Cassette	1.1	1.3	AUXB04GBLH	245 x 570 x 570	UTG-UFYE-W (FUJITSU) UTG-UFGE-W (GENERAL) UTG-UFYC-W (FUJITSU) UTG-UFGC-W (GENERAL)
	2.2	2.8	AUXB07GALH		
	2.8	3.2	AUXB09GALH		
	3.6	4.1	AUXB12GALH		
	4.5	5.0	AUXB14GALH		
	5.6	6.3	AUXB18GALH		
	7.1	8.0	AUXB24GALH		
Circular Flow Cassette	5.6	6.3	AUXM018GLAH	246 x 840 x 840	UTG-UKYC-W(FUJITSU) UTG-UKGC-W(GENERAL) UTG-UKYA-B(FUJITSU) UTG-UKGA-B(GENERAL)
	7.1	8.0	AUXM024GLAH		
	9.0	10.0	AUXM030GLAH		
	5.6	6.3	AUXK018GLAH	288 x 840 x 840	
	7.1	8.0	AUXK024GLAH		
	9.0	10.0	AUXK030GLAH		
	10.0	11.2	AUXK034GLAH		
	11.2	12.5	AUXK036GLAH		
	12.5	14.0	AUXK045GLAH		
14.0	16.0	AUXK054GLAH			
Cassette	5.6	6.3	AUXD18GALH	246 x 840 x 840	UTG-UGYA-W (FUJITSU) UTG-UGGA-W (GENERAL)
	7.1	8.0	AUXD24GALH		
	9.0	10.0	AUXA30GALH		
	10.0	11.2	AUXA34GALH	288 x 840 x 840	
	11.2	12.5	AUXA36GALH		
	12.5	14.0	AUXA45GALH		
	14.0	16.0	AUXA54GALH		
Mini duct	1.1	1.3	ARXK04GCLH	198 x 700 x 450	
	2.2	2.8	ARXK07GCLH		
	2.8	3.2	ARXK09GCLH		
	3.6	4.0	ARXK12GCLH		
	4.5	5.0	ARXK14GCLH		
	5.6	6.3	ARXK18GCLH	198 x 900 x 450	
	7.1	8.0	ARXK24GCLH	198 x1,100 x 450	
Slim Duct / Slim Concealed Floor	2.2	2.8	ARXD07GALH	198 x 700 x 620	
	2.8	3.2	ARXD09GALH		
	3.6	4.0	ARXD12GALH		
	4.5	5.0	ARXD14GALH		
	5.6	6.3	ARXD18GALH	198 x 900 x 620	
	7.1	8.0	ARXD24GALH	198 x 1,100 x 620	
Medium Static Pressure Duct	7.1	8.0	ARXA24GBLH	270 x 1,135 x 700	
	9.0	10.0	ARXA30GBLH		
	11.2	12.5	ARXA36GBLH		
	12.5	14.0	ARXA45GBLH		
High Static Pressure Duct	11.2	12.5	ARXC36GBTH	400 x 1,050 x 500	
	12.5	14.0	ARXC45GATH		
	18.0	20.0	ARXC60GATH		
	22.4	25.0	ARXC72GBTH	450 x 1,587 x 700	
	25.0	28.0	ARXC90GBTH		
	28.0	31.5	ARXC96GATH		550 x 1,587 x 700
Large Airflow Duct	5.6	6.3	ARXN018GLBH	270 x 1,135 x 700	
	7.1	8.0	ARXN024GTBH	300 x 1,400 x 700	
	9.0	10.0	ARXN030GTBH		

■ LINE UP

Type	Rated capacity (kW)		Model name	Dimensions H x W x D (mm)	Remarks	
	Cooling	Heating				
Floor / Ceiling	3.6	4.0	AB*A12GATH	199 x 990 x 655		
	4.5	5.0	AB*A14GATH			
	5.6	6.3	AB*A18GATH			
	7.1	8.0	AB*A24GATH			
Ceiling	9.0	10.0	AB*A30GATH	240 x 1,660 x 700		
	11.2	12.5	AB*A36GATH			
	12.5	14.0	AB*A45GATH			
	14.0	16.0	AB*A54GATH			
Compact floor	1.1	1.3	AG*A004GCAH	600 x 740 x 200		
	2.2	2.8	AG*A007GCAH			
	2.8	3.2	AG*A009GCAH			
	3.6	4.0	AG*A012GCAH			
	4.0	4.5	AG*A014GCAH			
Compact floor (EEV external model)	1.1	1.3	AG*E004GCAH		UTR-EV09XB	
	2.2	2.8	AG*E007GCAH			
	2.8	3.2	AG*E009GCAH			
	3.6	4.0	AG*E012GCAH		UTR-EV14XB	
	4.0	4.5	AG*E014GCAH			
Wall mounted	1.1	1.3	AS*A004GTAH	262 x 820 x 206		
	2.2	2.8	AS*A007GTAH			
	2.8	3.2	AS*A009GTAH			
	3.6	4.0	AS*A012GCAH	268 x 840 x 203		
	4.0	4.5	AS*A014GCAH			
	3.6	4.1	AS*A12GACH	275 x 790 x 215		
	4.5	5.0	AS*A14GACH			
	5.6	6.3	AS*A18GBCH	320 x 998 x 238		
	7.1	8.0	AS*A24GBCH			
	9.0	10.0	AS*A030GTAH	340 x 1,150 x 280		
	10.0	11.2	AS*A034GTAH			
Wall mounted (EEV external model)	1.1	1.3	AS*E004GTAH	262 x 820 x 206	UTR-EV09XB	
	2.2	2.8	AS*E007GTAH			
	2.8	3.2	AS*E009GTAH			
	3.6	4.0	AS*E012GCAH	268 x 840 x 203	UTR-EV14XB	
	4.0	4.5	AS*E014GCAH			
	3.6	4.1	AS*E12GACH	275 x 790 x 215		
	4.5	5.0	AS*E14GACH			

2-3. OPTIONAL PARTS

■ CONTROLLER

Items	Model name	Remarks
System Controller	UTY-APGXZ1	Option: UTY-PEGX1, UTY-PPGXP2
System Controller Lite	UTY-ALGXZ1	Option: UTY-PLGXA2, UTY-PLGXR2, UTY-PLGXE2, UTY-PLGXP2, UTY-PLGXX2
Touch Panel Controller	UTY-DTG*Z1	Option: UTY-PTGXA
Central Remote Controller	UTY-DCG*	
Group Remote Controller	UTY-CGG*	
Wired Remote Controller (Touch panel)	UTY-RNR*Z2	2-wire type
Wired Remote Controller	UTY-RLR*	
Wired Remote Controller	UTY-RNK*	3-wire type
Simple Remote Controller (With operation mode)	UTY-RSR*	2-wire type
Simple Remote Controller (Without operation mode)	UTY-RHR*	
Simple Remote Controller (With operation mode)	UTY-RSK*	3-wire type
Simple Remote Controller (Without operation mode)	UTY-RHK*	
Wireless Remote Controller	UTY-LNH*	

■ ADAPTOR / CONVERTOR / MAINTENANCE TOOL

Items	Model name	Remarks
Network Convertor	UTY-VTGX	
Network Convertor (AC power supply)	UTY-VTGXV	
KNX Convertor for VRF	UTY-VKGX	
KNX Convertor for Indoor Unit	UTY-VKSX	
Modbus Convertor for VRF	UTY-VMGX	
Modbus Convertor for Indoor Unit	UTY-VMSX	
Network Convertor	UTY-VGGXZ1	
Network Convertor for LonWorks	UTY-VLGX	
BACnet Gateway (Hardware)	UTY-VBGX	
BACnet Gateway (Software)	UTY-ABGXZ1	
Signal Amplifier	UTY-VSGXZ1	
External Switch Controller	UTY-TERX UTY-TEKX	
Service Tool	UTY-ASGXZ1	
Web Monitoring Tool	UTY-AMGXZ1	
Wireless LAN Adapter	UTY-TFSXZ1	

■ BRANCH KIT

Items	Model name	Total cooling capacity of indoor units (kW) *1
Separation Tube	UTP-AX054A	19.6 or less
	UTP-AX090A	28.0 or less
	UTP-AX180A	28.1 to 56.0
Header	UTR-H0906L	28.0 or less
	UTR-H1806L	28.1 to 56.0
	UTR-H0908L	28.0 or less
	UTR-H1808L	28.1 to 56.0

*1 : Total cooling capacity of indoor units means the total value of indoor unit cooling capacity connected downstream.

■ EV KIT

Items	Model name	Applicable indoor unit
EV Kit	UTR-EV09XB	AG*E004GCAH, AG*E007GCAH, AG*E009GCAH AS*E004GTAH, AS*E007GTAH, AS*E009GTAH
	UTR-EV14XB	AG*E012GCAH, AG*E014GCAH AS*E12GACH, AS*E14GACH AS*E012GCAH, AS*E014GCAH

■ CASSETTE GRILLE

Items	Model name	Remarks
Cassette grille	UTG-UF*E-W	For Compact Cassette type
	UTG-UF*C-W	
	UTG-UG*A-W	For Cassette type
	UTG-UK*C-W	For Circular Flow Cassette type
	UTG-UK*A-B	

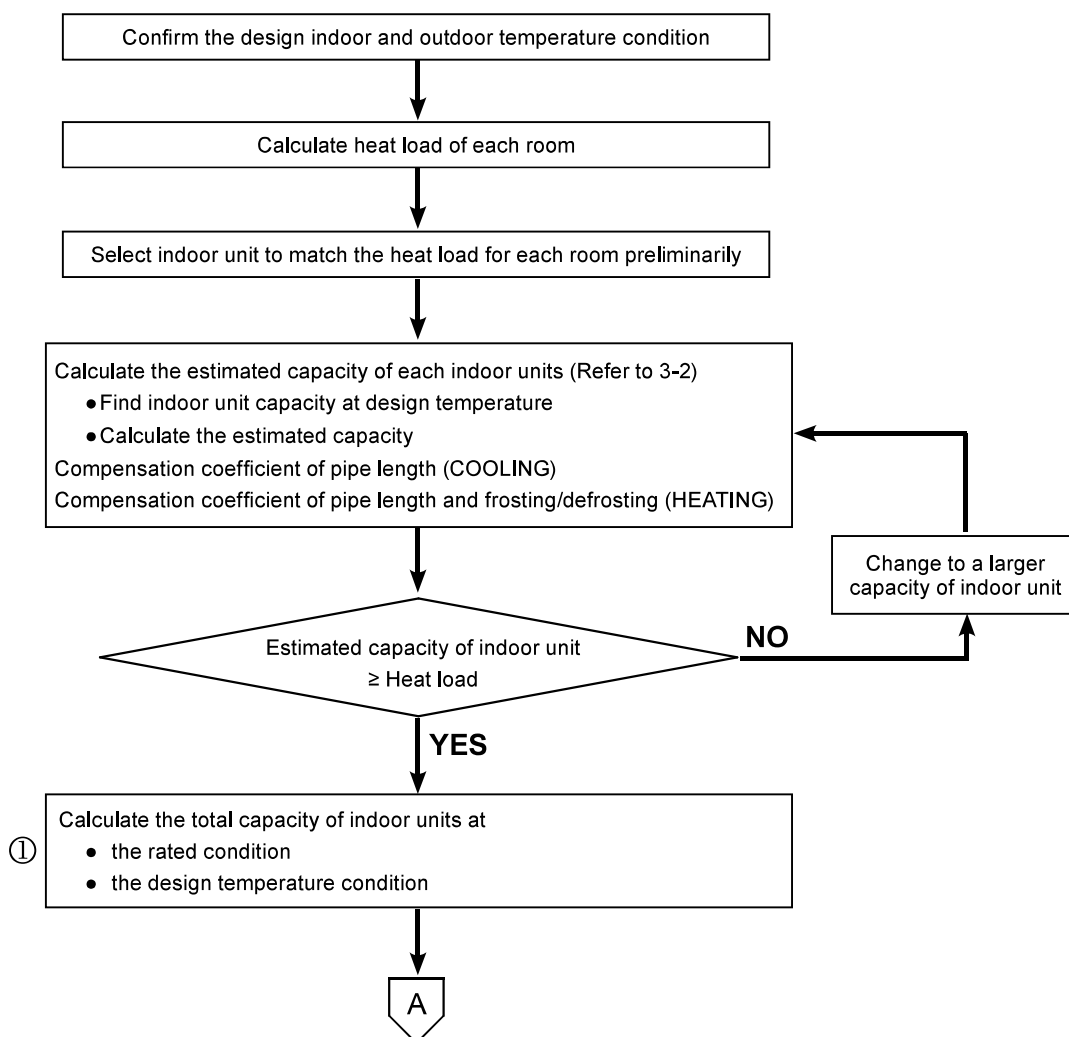
■ OTHERS

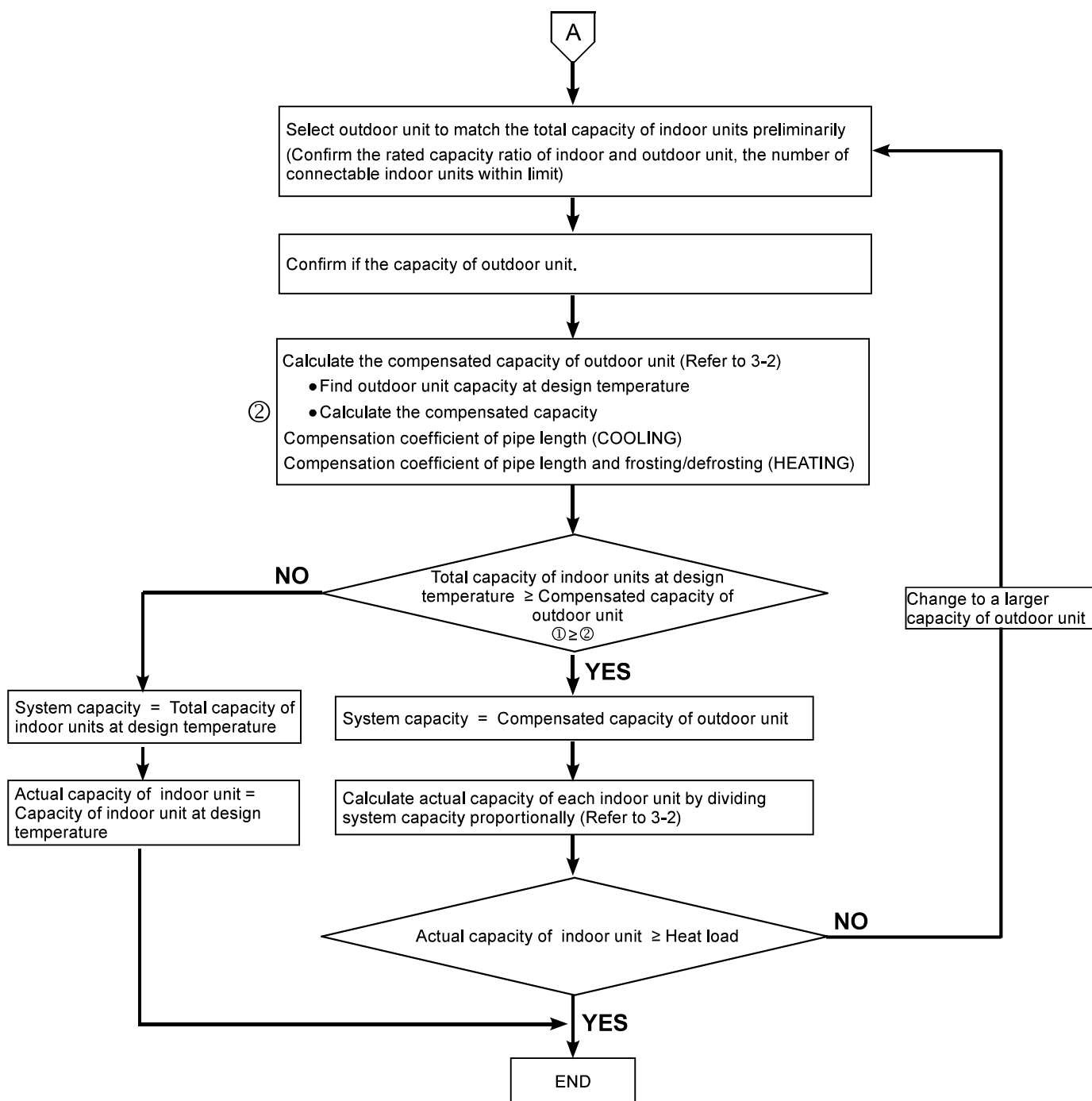
Items	Model name	Remarks
Flange (Square)	UTD-SF045T	For Medium Static Pressure Duct type
Flange (Round)	UTD-RF204	For Medium Static Pressure Duct type
Long-Life Filter	UTD-LF25NA	For Medium Static Pressure Duct type
	UTD-LF60KA	For High Static Pressure Duct type
Drain Pump Unit	UTZ-PX1NBA	For Medium Static Pressure Duct type
	UTR-DPB24T	For Ceiling type
Air Outlet Shutter Plate	UTR-YDZB	For Compact Cassette type
	UTR-YDZK	For Cassette type Circular Flow Cassette type
Panel Spacer	UTG-BKXA-W	For Cassette type Circular Flow Cassette type
Wide Panel	UTG-AKXA-W	For Cassette type Circular Flow Cassette type
Half concealed kit	UTR-STA	For Compact Floor type
IR Receiver Unit	UTB-YWC	For all Duct type
	UTY-LRH*B1	For Cassette type
	UTY-LBHXD	For Circular Flow Cassette type
Human Sensor Kit	UTY-SHZXC	
Remote Sensor Unit	UTY-XSZX	For all Duct type
Insulation Kit for High Humidity	UTZ-KXRA	For Cassette type Circular Flow Cassette type
	UTZ-KXGC	For Compact Cassette type
Fresh air intake kit	UTZ-VXAA	For Compact Cassette type
	UTZ-VXRA	For Cassette type Circular Flow Cassette type
Auto louver grille kit	UTD-GXSA-W	For Slim Duct type
	UTD-GXSB-W	
	UTD-GXSC-W	
	UTD-GXTA-W	For Mini Duct type, Slim Duct type
	UTD-GXTB-W	
	UTD-GXTC-W	
External connect kit	UTY-XWZXZ6	For Outdoor unit
	UTY-XWZXZ7	For Indoor unit / Central remote controller
	UTY-XWZXZ8	For Central remote controller
	UTY-XWZXZ9	For Outdoor unit
	UTY-XWZXZA	For Touch panel controller / Central remote controller
	UTY-XWZXZB	For Indoor unit
	UTY-XWZXZC	
	UTY-XWZXZD	
	UTY-XWZXZE	
	UTY-XWZXZF	For Outdoor unit

3. MODEL SELECTION AND CAPACITY CALCULATION

3-1. SELECTION PROCEDURE OF INDOOR UNIT AND OUTDOOR UNIT

Please select indoor units and outdoor unit and make the capacity of each indoor unit be larger than cooling and heating load.





3-2. METHOD OF CAPACITY CALCULATION

The capacity calculation method which takes the effects of air temperature, pipe length and frosting/defrosting into consideration is shown below.

1. Calculate the estimated capacity of each indoor unit.

(1) Find capacity of indoor unit at rated condition (TCin)r and at design temperature (TCin)d [from 7. CAPACITY TABLE COOLING (INDOOR UNIT) or 8. CAPACITY TABLE HEATING (INDOOR UNIT)]

(2) Find the following compensation coefficient [From 6. CAPACITY COMPENSATION COEFFICIENT].

- Compensation coefficient of pipe length
- Compensation coefficient of frosting/defrosting (Heating calculation only)

(3) Calculate the estimated capacity of indoor unit (TCin)e.

COOLING:

Estimated capacity of indoor unit (TCin)e
 = Capacity of indoor unit at design temperature (TCin)d
 x Compensation coefficient of pipe length

HEATING:

Estimated capacity of indoor unit (TCin)e
 = Capacity of indoor unit at design temperature (TCin)d
 x Compensation coefficient of pipe length
 x Compensation coefficient of frosting/defrosting

2. Calculate the compensated capacity of outdoor unit.

(4) Find capacity of outdoor unit at rated condition (TCout)r [From 2. MODEL LINE UP].

(5) Calculate total rated capacity of indoor units : $\sum(TCin)r$
 and ratio to the rated capacity of outdoor unit : $\sum(TCin)r / (TCout)r$.

(6) Find capacity of outdoor unit at design temperature (TCout)d
 [using result of (5) and 4. CAPACITY TABLE (OUTDOOR UNIT)].

(7) Calculate the compensated capacity of outdoor unit (TCout)c.

COOLING:

Compensated capacity of outdoor unit (TCout)c
 = Capacity of outdoor unit at design temperature (TCout)d
 x Compensation coefficient of pipe length

HEATING:

Compensated capacity of outdoor unit (TCout)c
 = Capacity of outdoor unit at design temperature (TCout)d
 x Compensation coefficient of pipe length
 x Compensation coefficient of frosting/defrosting

3. Decide system capacity.

(8) Calculate total capacity of indoor units at design temperature $\sum(TCin)d$.

(9) System capacity = the smaller one of (TCout)c and $\sum(TCin)d$ (7) or (8)

4. Calculate actual capacity of each indoor unit.

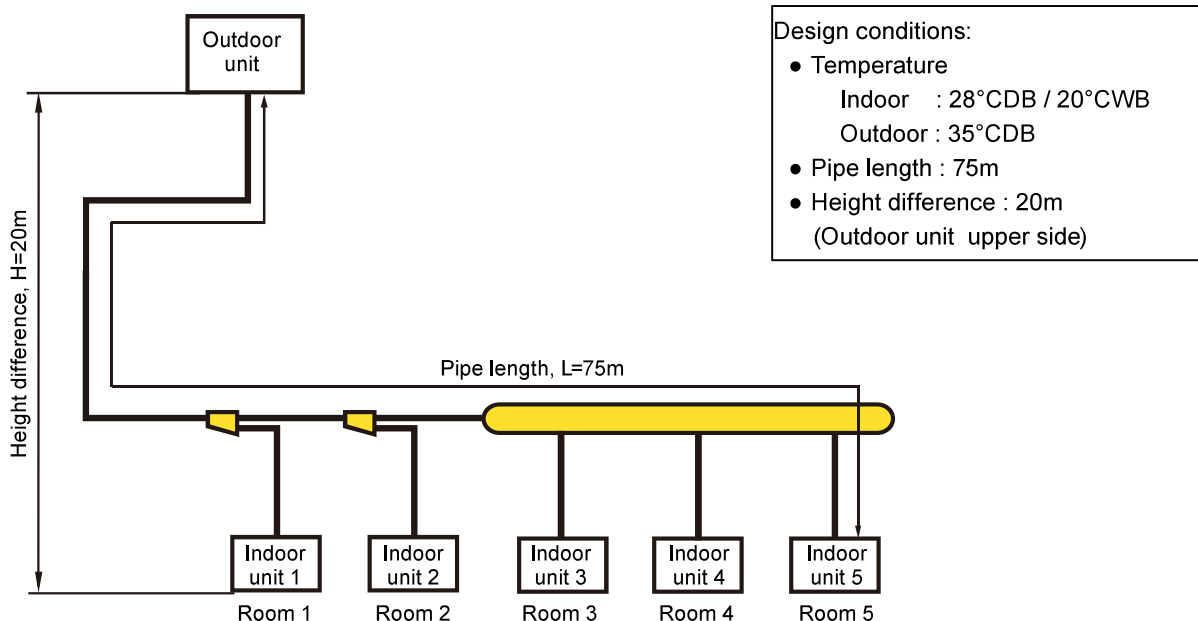
(10) Calculate actual capacity of each indoor unit by dividing system capacity proportionally.

Actual capacity of indoor unit = (System capacity) x (Rated capacity of indoor unit) / (Total rated capacity of indoor unit)
 = (System capacity) x (TCin)r / $\sum(TCin)r$ (9) x (1) / (5)

3-3. THE EXAMPLE OF CALCULATION

■ EXAMPLE 1

Fig.1 Outline of the system



● Selection of indoor unit

			Room 1	Room 2	Room 3	Room 4	Room 5	Remark
A-1	Cooling heat load	kW	6.0	6.0	6.0	2.0	1.5	
A-2	Indoor unit models		AUXK24	AUXK24	AUXK24	AUXB09	AUXB07	
A-3	Rated capacity $(TC_{in})_r$	kW	7.1	7.1	7.1	2.8	2.2	See 7
A-4	Capacity at design temperature $(TC_{in})_d$	kW	7.7	7.7	7.7	3.0	2.4	See 7
A-5	Compensation coefficient of pipe length		0.90					See 6
A-6	Estimated capacity of indoor unit $(TC_{in})_e$	kW	6.9	6.9	6.9	2.7	2.2	(A-4) x (A-5)
A-7	Total rated capacity $\sum(TC_{in})_r$	kW	26.3					Sum of A-3
A-8	Total capacity at design temperature $\sum(TC_{in})_d$	kW	28.5					Sum of A-4

● Preliminary selection of outdoor unit

				Remark
B-1	Outdoor unit model		8HP : AJ*072LELAH	
B-2	Rated capacity $(TC_{out})_r$	kW	22.4	See 2
B-3	Total rated capacity of indoor unit / Rated capacity of outdoor unit $\sum(TC_{in})_r / (TC_{out})_r$	%	117.4	(A-4) / (B-2)
B-4	Capacity at design temperature $(TC_{out})_d$	kW	25.8	See Fig.2 2)
B-5	Compensation coefficient of pipe length		0.90	See 6
B-6	Compensated capacity of outdoor unit $(TC_{out})_c$	kW	23.2	(B-4) x (B-5)

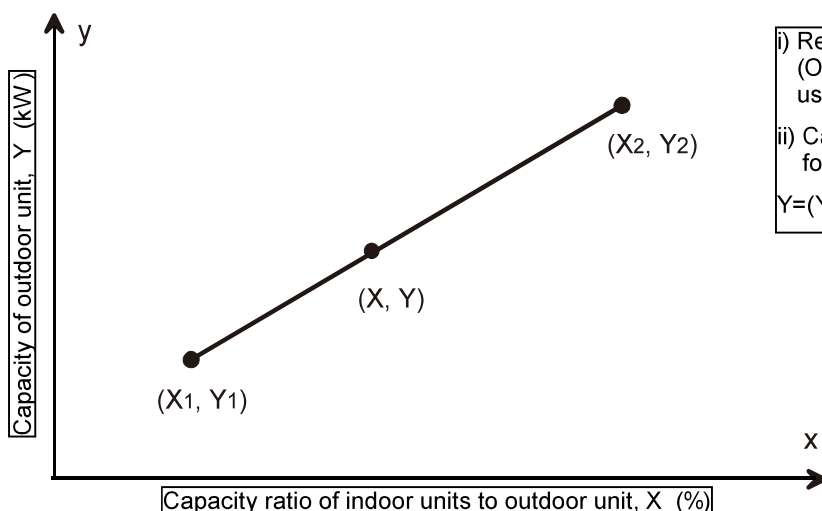
● Decide system capacity

				Remark
C-1	System capacity	kW	23.2	Smaller one of (A-8) and (B-6)

● Calculate actual capacity of each indoor unit

		Room 1	Room 2	Room 3	Room 4	Room 5	Remark
Actual capacity of each indoor unit	kW	6.3	6.3	6.3	2.5	1.9	(C-1) x (A-3) / (A-7)

1) Equation for capacity calculation of outdoor unit.



- i) Refer to 4. CAPACITY TABLE (OUTDOOR UNIT) to find Y_1 and Y_2 using X_1 and X_2 .
- ii) Calculate capacity of outdoor unit using following equation:
- $$Y = (Y_2 - Y_1) / (X_2 - X_1) \times (X - X_1) + Y_1$$

2) Cooling capacity table of 8HP outdoor units: AJ*072LELAH

Total rated cooling capacity of indoor unit	Outdoor temperature (°CDB)	Indoor temperature									
		18°CDB / 14 °CWB		27°CDB / 19 °CWB		28°CDB / 20 °CWB		30°CDB / 22 °CWB		32°CDB / 23 °CWB	
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
26.8 (120%) X ₂	-15	15.5	2.65	26.9	4.52	29.2	4.89	31.8	5.15	32.5	5.13
	35	15.5	3.93	25.4	7.67	25.9	7.73	27.0	7.86	27.6	7.93
	46	15.5	5.94	18.4	6.67	Y ₂	6.67	19.5	6.67	19.9	6.67
24.6 (110%) X ₁	-15	14.2	2.44	24.6	4.15	26.7	4.49	30.9	5.17	31.6	5.15
	35	14.2	3.61	24.6	7.48	25.4	7.67	26.4	7.79	27.0	7.86
	46	14.2	5.22	18.2	6.72	Y ₁	6.72	19.3	6.72	19.7	6.72

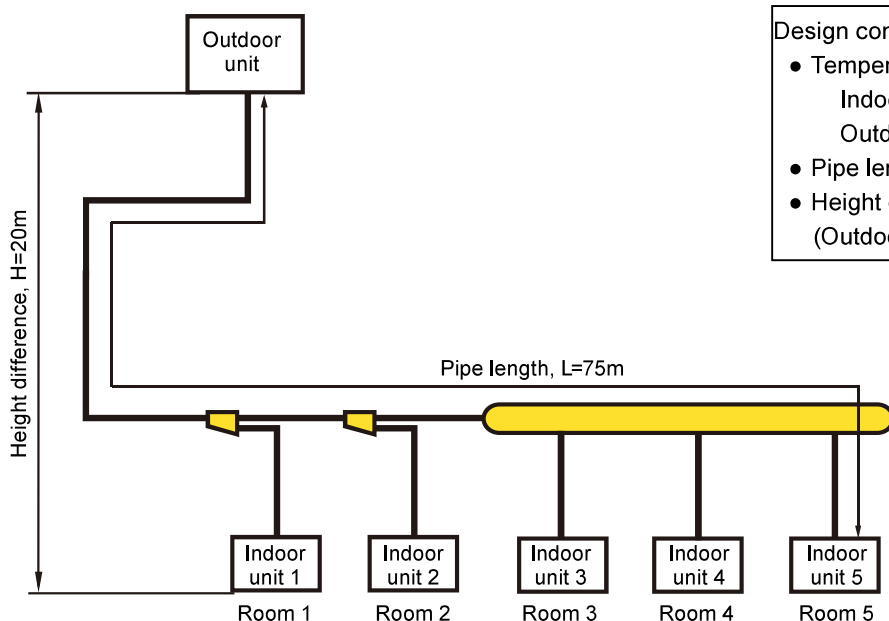
Capacity ratio of indoor units to outdoor unit	$X_1 = 110 \%$	$X = 117.4 \%$	$X_2 = 120 \%$
Capacity of outdoor units (kW)	$Y_1 = 25.4$	Y	$Y_2 = 25.9$

$$Y = (25.9 - 25.4) / (120 - 110) \times (117.4 - 110) + 25.4 = \mathbf{25.8 \text{ (kW)}}$$

Fig.2 Method for calculation of capacity of outdoor unit from capacity tables

EXAMPLE 2

Fig.1 Outline of the system



Design conditions:

- Temperature
Indoor : $28^{\circ}\text{CDB} / 20^{\circ}\text{CWB}$
Outdoor : 35°CDB
- Pipe length : 75m
- Height difference : 20m
(Outdoor unit upper side)

● Selection of indoor unit

			Room 1	Room 2	Room 3	Room 4	Room 5	Remark
A-1	Cooling heat load	kW	7.5	7.5	7.5	0.8	0.8	
A-2	Indoor unit models		AUXK30	AUXK30	AUXK30	AUXB04	AUXB04	
A-3	Rated capacity $(\text{TC}_{\text{in}})_r$	kW	9.0	9.0	9.0	1.1	1.1	See 7
A-4	Capacity at design temperature $(\text{TC}_{\text{in}})_d$	kW	9.7	9.7	9.7	1.2	1.2	See 7
A-5	Compensation coefficient of pipe length		0.90					See 6
A-6	Estimated capacity of indoor unit $(\text{TC}_{\text{in}})_e$	kW	8.7	8.7	8.7	1.1	1.1	$(\text{A-4}) \times (\text{A-5})$
A-7	Total rated capacity $\sum(\text{TC}_{\text{in}})_r$	kW	29.2					Sum of A-3
A-8	Total capacity at design temperature $\sum(\text{TC}_{\text{in}})_d$	kW	31.5					Sum of A-4

● Preliminary selection of outdoor unit

				Remark
B-1	Outdoor unit model		10HP : AJ*090LELAH	
B-2	Rated capacity $(\text{TC}_{\text{out}})_r$	kW	28.0	See 2
B-3	Total rated capacity of indoor unit / Rated capacity of outdoor unit $\sum(\text{TC}_{\text{in}})_r / (\text{TC}_{\text{out}})_r$	%	104.3	$(\text{A-4}) / (\text{B-2})$
B-4	Capacity at design temperature $(\text{TC}_{\text{out}})_d$	kW	28.9	See Fig.2 2)
B-5	Compensation coefficient of pipe length		0.90	See 6
B-6	Compensated capacity of outdoor unit $(\text{TC}_{\text{out}})_c$	kW	26.0	$(\text{B-4}) \times (\text{B-5})$

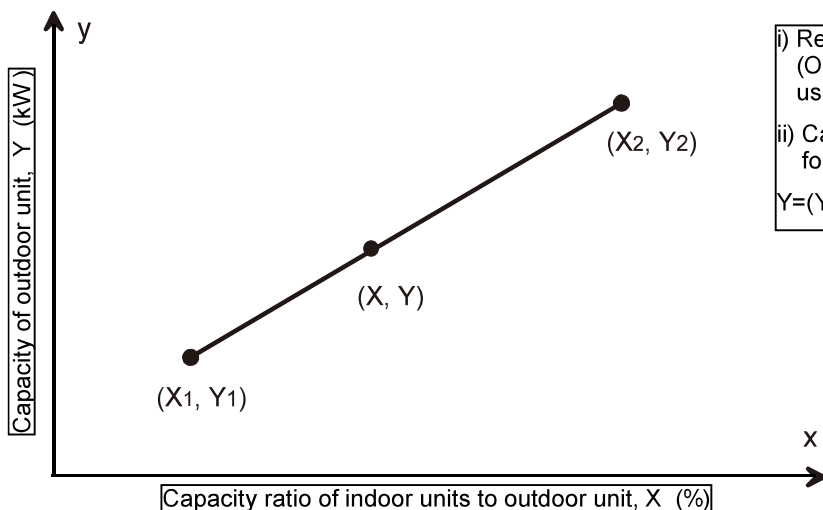
● Decide system capacity

				Remark
C-1	System capacity	kW	26.0	Smaller one of (A-8) and (B-6)

● Calculate actual capacity of each indoor unit

		Room 1	Room 2	Room 3	Room 4	Room 5	Remark
	Actual capacity of each indoor unit	kW	8.0	8.0	8.0	1.0	$(\text{C-1}) \times (\text{A-3}) / (\text{A-7})$

1) Equation for capacity calculation of outdoor unit.



- i) Refer to 4. CAPACITY TABLE (OUTDOOR UNIT) to find Y₁ and Y₂ using X₁ and X₂.
- ii) Calculate capacity of outdoor unit using following equation:
- $$Y = (Y_2 - Y_1) / (X_2 - X_1) \times (X - X_1) + Y_1$$

2) Cooling capacity table of 10HP outdoor units: AJ*090LELAH

Total rated cooling capacity of indoor unit	Outdoor temperature (°CDB)	Indoor temperature									
		18°CDB / 14°CWB		27°CDB / 19°CWB		28°CDB / 20°CWB		30°CDB / 22°CWB		32°CDB / 23°CWB	
		TC	IP	TC	IP	TC	IP	TC	IP	TC	IP
30.8 (110%) X ₂	-15	17.7	3.88	30.8	6.62	33.4	7.17	35.1	7.17	35.9	7.16
	35	17.7	5.07	28.7	8.63	29.3	8.67	30.6	8.74	31.3	8.78
	46	17.7	6.67	20.0	6.70	Y ₂	6.70	21.4	6.70	21.8	6.70
28.0 (100%) X ₁	-15	16.1	3.54	28.0	6.03	30.4	6.53	34.0	7.18	34.8	7.17
	35	16.1	4.63	28.0	8.59	28.6	8.63	29.9	8.70	30.5	8.73
	46	16.1	5.92	19.7	6.73	Y ₁	6.73	21.1	6.73	21.5	6.73

Capacity ratio of indoor units to outdoor unit	X ₁ = 100 %	X = 104.3 %	X ₂ = 110 %
Capacity of outdoor units (kW)	Y ₁ = 28.6	Y	Y ₂ = 29.3

$$Y = (29.3 - 28.6) / (110 - 100) \times (104.3 - 100) + 28.6 = \underline{\underline{28.9 \text{ (kW)}}}$$

Fig.2 Method for calculation of capacity of outdoor unit from capacity tables



3. OUTDOOR UNITS

CONTENTS

3. OUTDOOR UNITS

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1. SPECIFICATIONS

Nominal system capacity			HP	8	10	12
Model name				AJ*072LELAH	AJ*090LELAH	AJ*0108LELAH
Power source				3N ~ 400 V, 50 Hz		
Available voltage range				342 to 456 V		
Capacity	Cooling		kW	22.4	28.0	33.5
	Nominal Heating			22.4	28.0	33.5
	Max Heating			25.0	31.5	37.5
Input power	Cooling		kW	6.30	8.59	10.42
	Nominal Heating			4.65	6.61	8.18
	Max Heating			5.45	8.29	10.25
EER	Cooling			3.56	3.26	3.22
COP	Nominal Heating		kW / kW	4.82	4.24	4.10
	Max Heating			4.56	3.80	3.66
Fan	Type × Quantity			Propeller Fan×2		
	Airflow rate	High	m³ / h	8,400	9,000	11,000
	External static pressure (Max)		Pa	20	30	30
	Motor	Type × Quantity		DC motor×2		
		Output	W	111 x 2		200 x 2
Sound power level	Cooling		dB(A)	66	69	73
	Heating			-	-	-
Sound pressure level	Cooling		dB(A)	52	54	59
	Heating			54	57	61
Heat exchanger	Length		mm	1,293		
	Fin pitch			1.45		
	Rows × Stages			2 x 66	2.6 x 66	
	Pipe type (Material)			Grooved H-pin (Copper)		
	Fin	Type (Material)		Corrugate (Aluminium)		
		Surface treatment		Corrosion Resistance (Blue Fin)		
Compressor	Type × Quantity			Scroll(inv)×1		
	Motor output		kW	4.70		
	Crankcase heater		W	35		
Refrigerant	Type			R410A		
	Charge		kg	7.0	7.5	7.5
Refrigerant oil	Type			FVC68D		
	Oil charge unt		cm³	2300		
Enclosure	Material			Painted galvanized steel		
	Colour			Beige (10YR 7.5/1.0NN)		
Dimensions (H × W × D)	Net		mm	1428 × 1080 × 480		
	Gross			1557 × 1174 × 600		
Weight	Net		kg	170	177	178
	Gross			186	194	197
Connection pipe	Pipe diameter	Liquid	mm	9.52		12.70
		Gas		19.05	22.20	28.58
	Method	Liquid		Brazing		
		Gas		Brazing		
	Connection pipe	Max. length		m	120	
Max. height difference		50 / 40 (Outdoor unit : Upper / Lower)				
Operation temper- ature range	Cooling		°CDB	-15* to 46		
	Heating			-20 to 21		
Defrost method				Reversed Cycle		
Compressor capacity control (Steps / Range)				106 steps / 12.5 to 100%		
Connectable indoor units			Number	See CHAPTER01, 1. MODEL LINE UP		

*: When the outdoor unit is lower than the indoor unit, the temperature range is -5°C.

Note : Specifications are based on the following conditions.

Cooling : Indoor temperature of 27°CDB / 19°CWB, and outdoor temperature of 35°CDB / 24°CWB.

Heating : Indoor temperature of 20°CDB / 15°CWB, and outdoor temperature of 7°CDB / 6°CWB.

Pipe length : 7.5 m; Height difference between outdoor unit and indoor unit : 0 m.

The protective function might work when using it outside the operation range.

Nominal system capacity			HP	14	16
Model name				AJ*126LELAH	AJ*144LELAH
Power source				3 phase, ~400V, 50Hz	
Available voltage range				342 to 456 V	
Capacity	Cooling		kW	40.0	45.0
	Nominal Heating			40.0	45.0
	Max Heating			45.0	50.0
Input power	Cooling		kW	12.12	14.96
	Nominal Heating			9.71	11.81
	Max Heating			11.81	14.29
EER	Cooling		kW / kW	3.30	3.01
COP	Nominal Heating			4.12	3.81
	Max Heating			3.81	3.50
Fan	Type × Quantity			Propeller Fan×2	
	Airflow rate	High	m³ / h	13000	14000
	External static pressure (Max)		Pa	60	60
	Motor	Type × Quantity		DC motor×2	
		Output	W	375 x 2	
Sound power level	Cooling		dB(A)	75	77
	Heating			-	-
Sound pressure level	Cooling		dB(A)	62	64
	Heating			63	65
Heat exchanger	Length		mm	1285	
	Fin pitch			1.45	
	Rows × Stages			3 x 76	
	Pipe type (Material)			Grooved H-pin (Copper)	
	Fin	Type (Material)		Corrugate (Aluminium)	
		Surface treatment		Corrosion Resistance (Blue Fin)	
Compressor	Type × Quantity			Scroll(inv)×1	
	Motor output		kW	6.2	
	Crankcase heater		W	35 x 2	
Refrigerant	Type			R410A	
	Charge		kg	11.0	11.0
Refrigerant oil	Type			FVC68D	
	Oil charge unt		cm³	2000	
Enclosure	Material			Painted galvanized steel	
	Colour			Beige (10YR 7.5/1.0NN)	
Dimensions (H × W × D)	Net		mm	1638 x 1080 x 480	
	Gross			1767 x 1174 x 600	
Weight	Net		kg	213	
	Gross			233	
Connection pipe	Pipe diameter	Liquid	mm	12.70	
		Gas		28.58	
	Method	Liquid	Brazing		
		Gas	Brazing		
	Max. length		m	120	
	Max. height difference			50/40 (Outdoor unit: Upper/Lower)	
Operation temper- ature range	Cooling		°CDB	-5*1 to 46*2	
	Heating			-20 to 21	
Defrost method				Reversed Cycle	
Compressor capacity control (Steps / Range)				106 steps / 12.5 to 100	
Connectable indoor units			Number	See CHAPTER01, 1. MODEL LINE UP	

*1: When the outdoor unit is lower than the indoor unit, the temperature range is -5°C.

*2: The cooling operation range of -15 to 46°C is allowed only when all of the indoor units connected to the system are higher than capacity of 5.6kW.

Note : Specifications are based on the following conditions.

Cooling : Indoor temperature of 27°CDB / 19°CWB, and outdoor temperature of 35°CDB / 24°CWB.

Heating : Indoor temperature of 20°CDB / 15°CWB, and outdoor temperature of 7°CDB / 6°CWB.

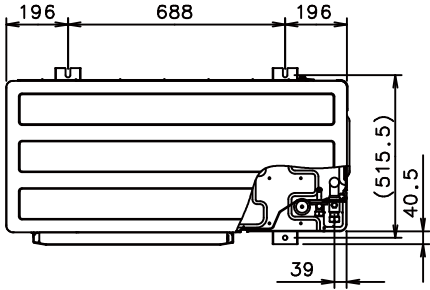
Pipe length : 7.5 m; Height difference between outdoor unit and indoor unit : 0 m.

The protective function might work when using it outside the operation range.

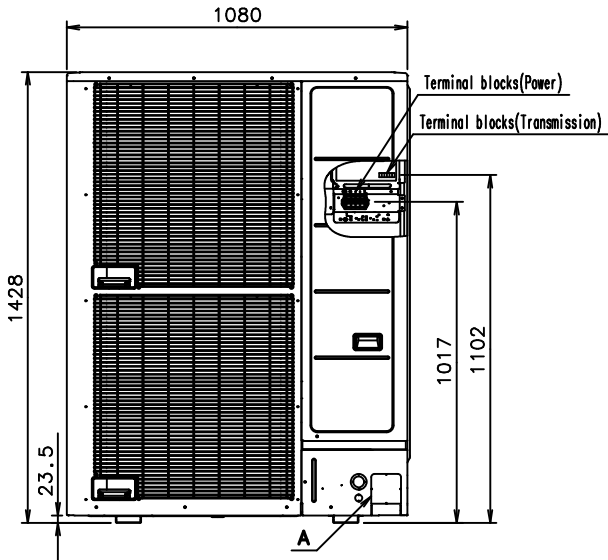
2. DIMENSIONS

■ MODELS: AJ*072LELAH, AJ*090LELAH, AJ*108LELAH

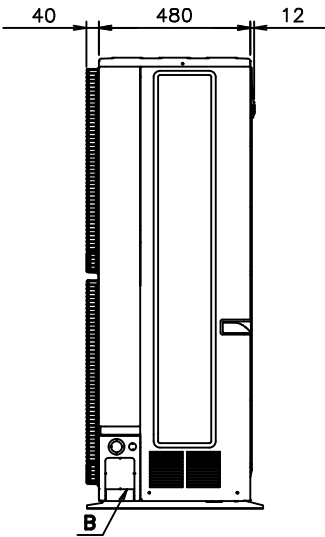
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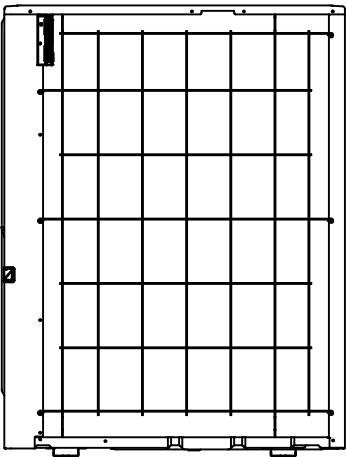
Top view



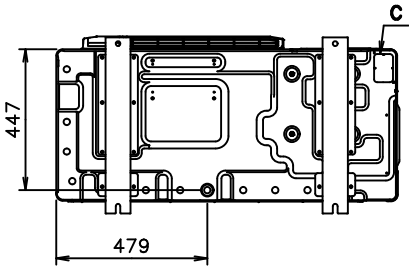
Front view



Side view

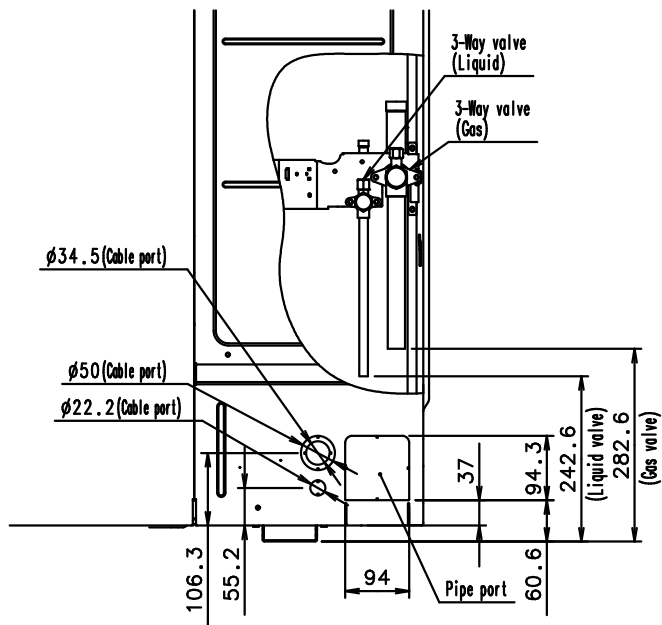


Rear view

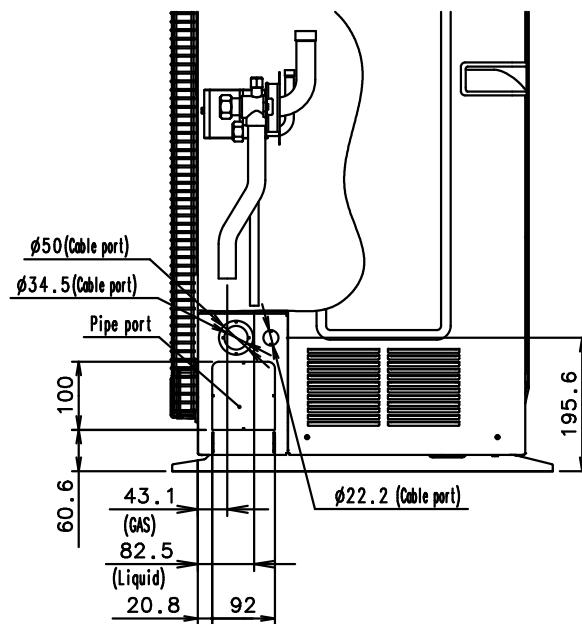


Bottom view

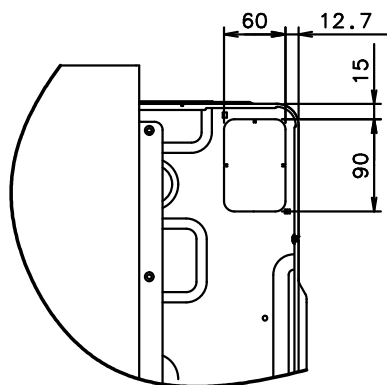
(Unit : mm)



Detail A



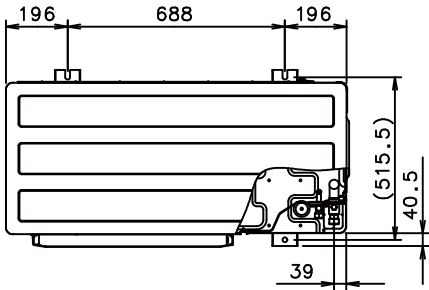
Detail B



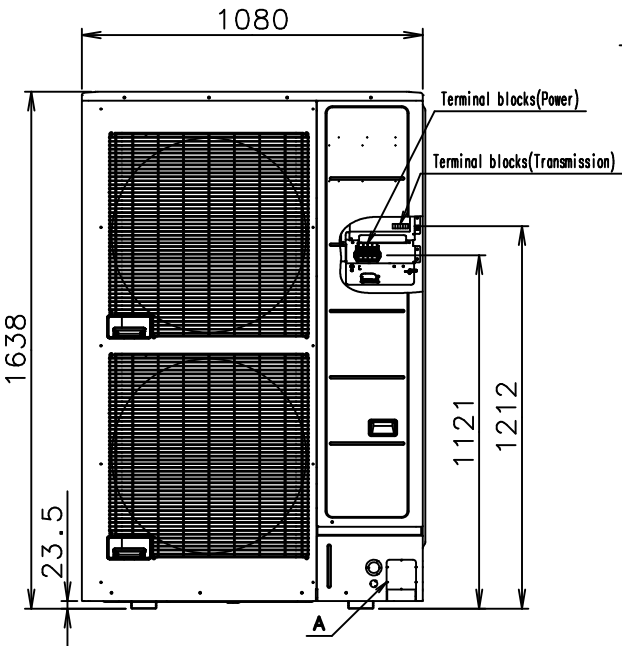
Detail C

■ MODELS: AJ*126LELAH, AJ*144LELAH

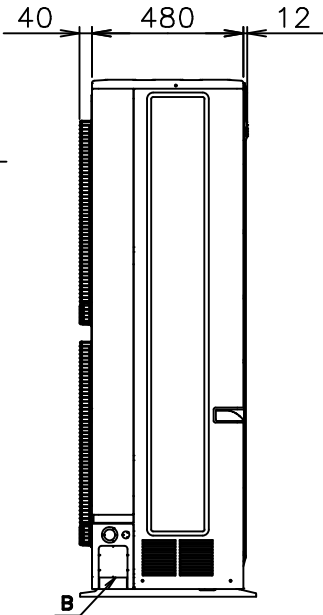
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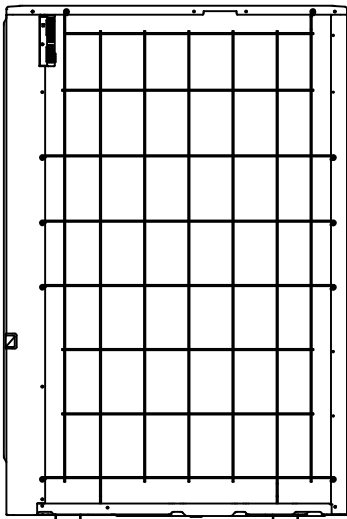
Top view



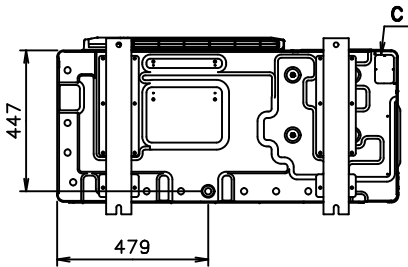
Front view



Side view

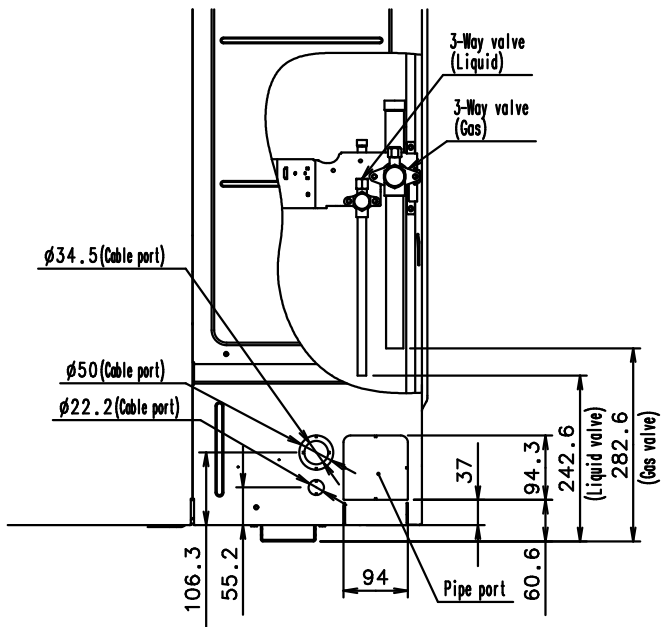


Rear view

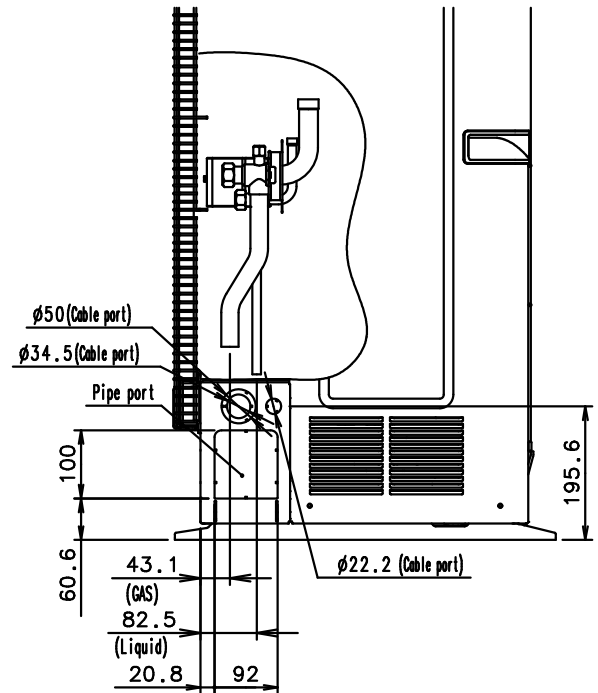


Bottom view

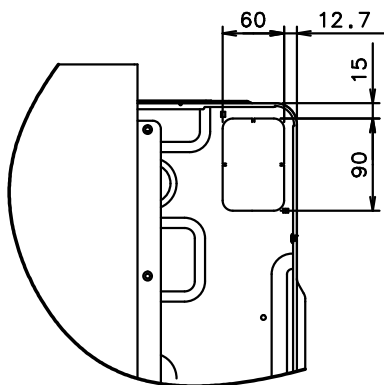
(Unit : mm)



Detail A



Detail B

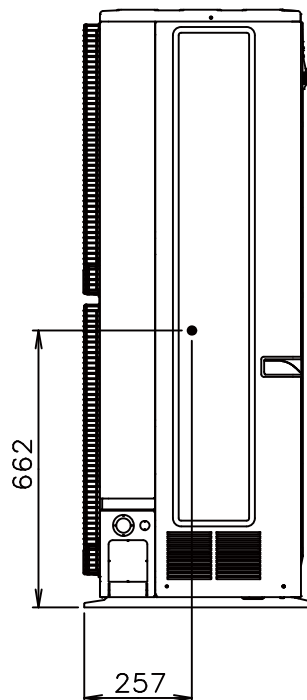
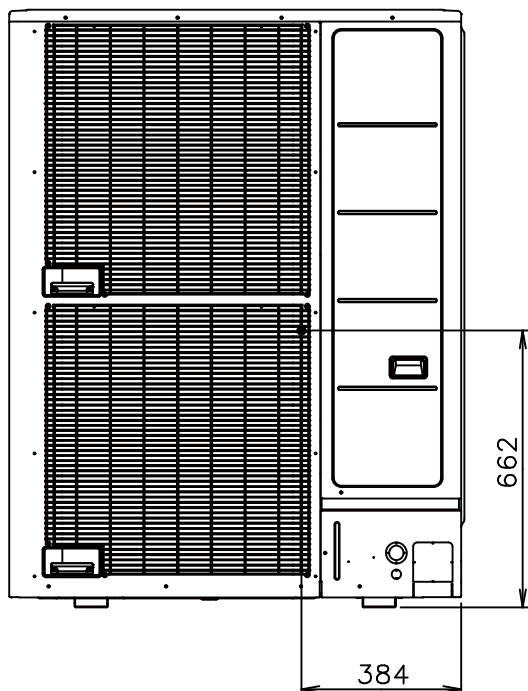


Detail C

■ CENTER OF GRAVITY POSITION

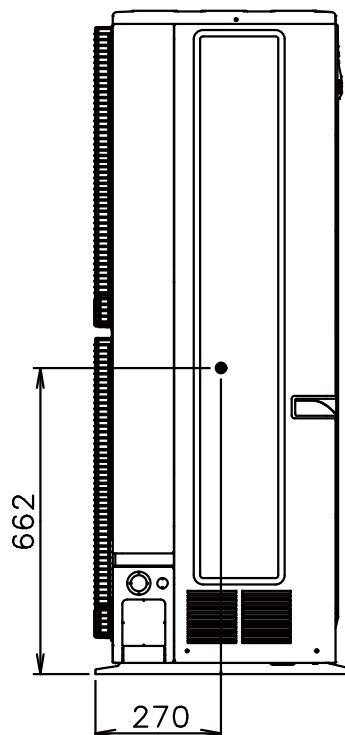
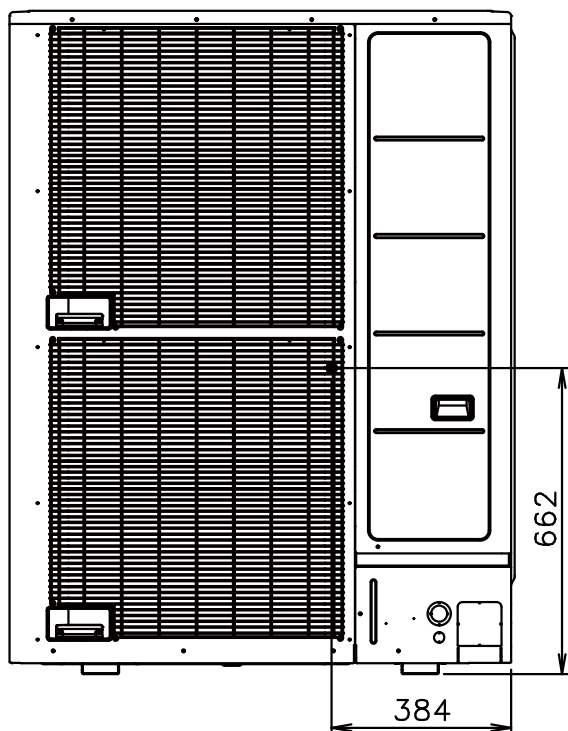
● Model: AJ*072LELAH

(Unit : mm)



● : Center of gravity

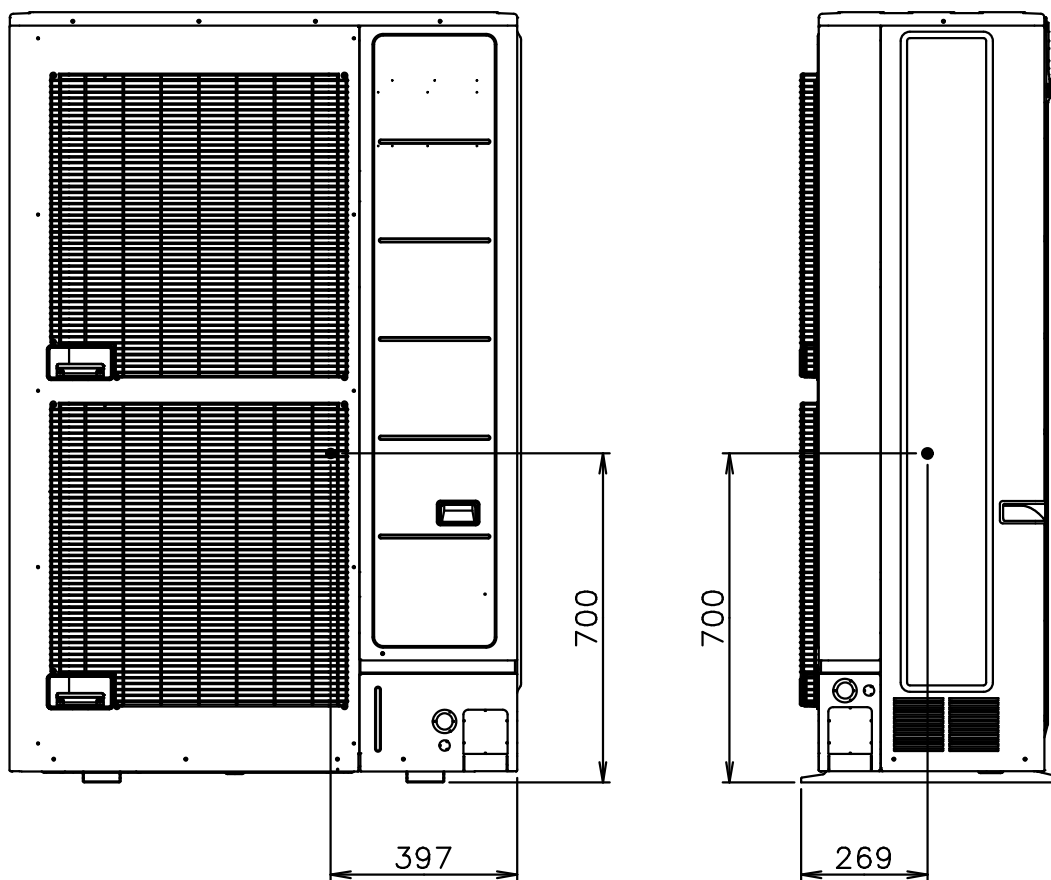
● Models: AJ*090LELAH, AJ*108LELAH



● : Center of gravity

● Models: AJ*126LELAH, AJ*144LELAH

(Unit : mm)



● : Center of gravity

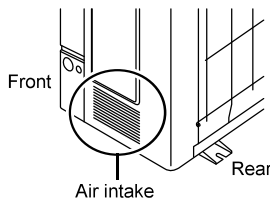
OUTDOOR
UNITS

OUTDOOR
UNITS

3. INSTALLATION SPACE

⚠ Caution

- The installation space shown in the following examples is based on an ambient temperature under cooling operation of 35 °C DB at the air intake of the outdoor unit.
Provide more space around the air intake than shown in the examples if the ambient temperature exceeds 35 °C DB or if the thermal load of all of the outdoor units exceeds the capacity.
- Consider the transportation route, installation space, maintenance space, and access, and install the unit in a location with sufficient space for the refrigerant piping.
- Observe the installation space specifications that are shown in the figures.
Provide the same space for the air intake at the rear of the outdoor unit.
If the installation is not performed according to the specifications, it could cause a short circuit and result in a lack of operating performance.
As a result, the outdoor unit might easily be stopped by high-pressure protection.
- When there is a wall at the right side of the unit, provide a space of 100mm or more.



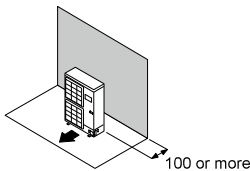
- Installation methods not shown in the following examples are not recommended.
Performance may drop significantly.

3-1. SINGLE OUTDOOR UNIT INSTALLATION

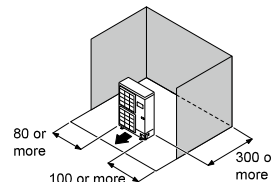
■ WHEN THE UPWARD AREA IS OPEN

Unit : mm

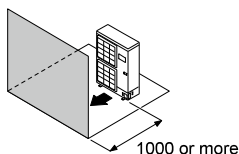
● Obstacles at rear only



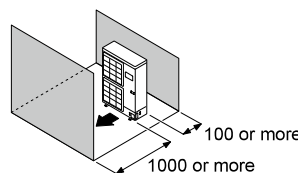
● Obstacles at rear and sides only*



● Obstacles at front only

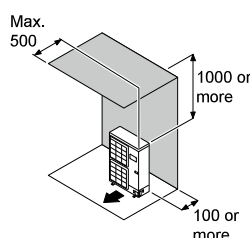


● Obstacles at front and rear only

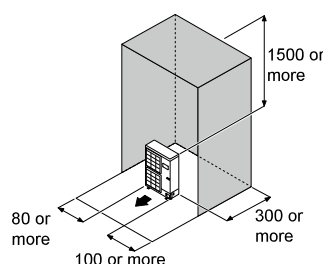


■ WHEN AN OBSTRUCTION IS PRESENT ALSO IN THE UPWARD AREA

● Obstacles at rear and above only



● Obstacles at rear, sides, and above only*



*: When side walls are protruding frontward, refer to "3-4. DUCT INSTALLATION".

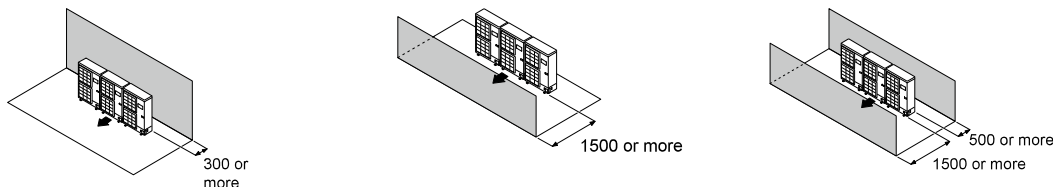
3-2. MULTIPLE OUTDOOR UNIT INSTALLATION

- Provide at least 100mm of space between the outdoor units if multiple units are installed.
- When routing the piping from the side of an outdoor unit, provide space for the piping.
- No more than 3 units must be installed side by side.

When 3 units or more are arranged in a line, provide the space as shown in the following example when an obstruction is present also in the upward area.

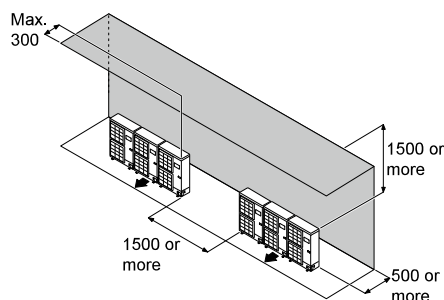
■ WHEN THE UPWARD AREA IS OPEN

- Obstacles at rear only
- Obstacles at front only
- Obstacles at front and rear only



■ WHEN AN OBSTRUCTION IS PRESENT ALSO IN THE UPWARD AREA

- Obstacles at rear and above only



3-3. OUTDOOR UNITS INSTALLATION IN MULTI ROW

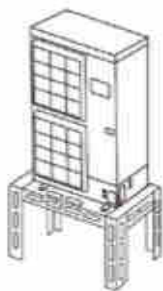
- The following settings are not recommended in case of cooling by a low outside temperature.

- Single parallel unit arrangement
- Multiple parallel unit arrangement



⚠ Caution

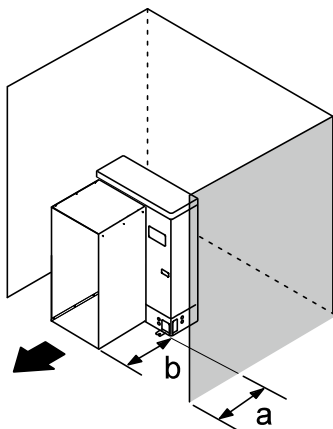
- When the outdoor temperature is 0 °C or less, do not use the accessory drain pipe and drain cap. If the drain pipe and drain cap are used, the drain water in the pipe may freeze in extremely cold climate. (For reverse cycle model only.)
- In area with heavy snowfall, if the inlet and outlet of the outdoor unit is blocked with snow, it might become difficult to get warm, and it is likely to cause product malfunction. Construct a canopy and a pedestal, or place the unit on a high stand that is locally installed.



3-4. DUCT INSTALLATION

When there are obstacles at rear, and the side walls are protruding frontward, install a duct as shown in the figure below.

Installation of the unit without duct may lead capacity degradation caused by a short circuit, operation stop by high pressure protection, or other malfunction.



a: Protruding distance of side walls

b: Length of the duct

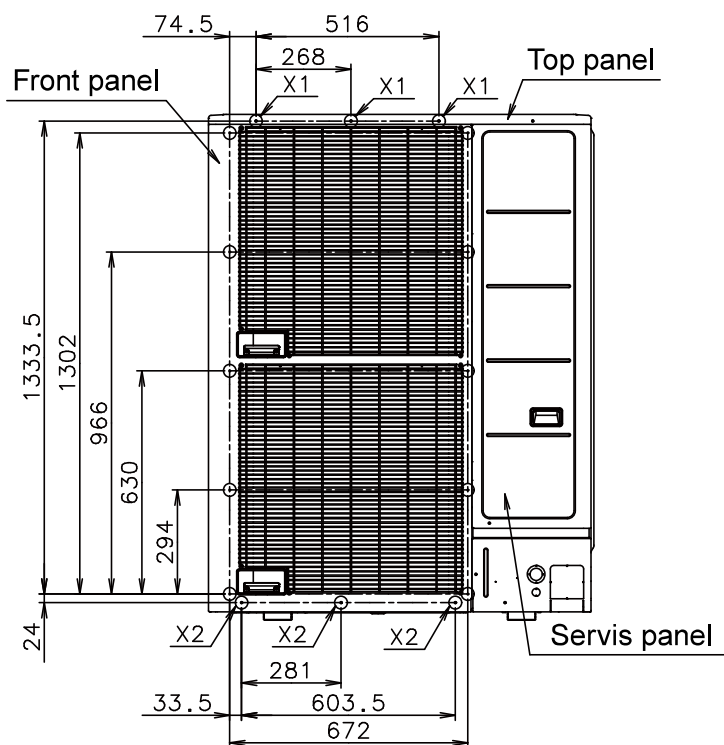
$$a \leq b$$

■ ABOUT THE DUCT

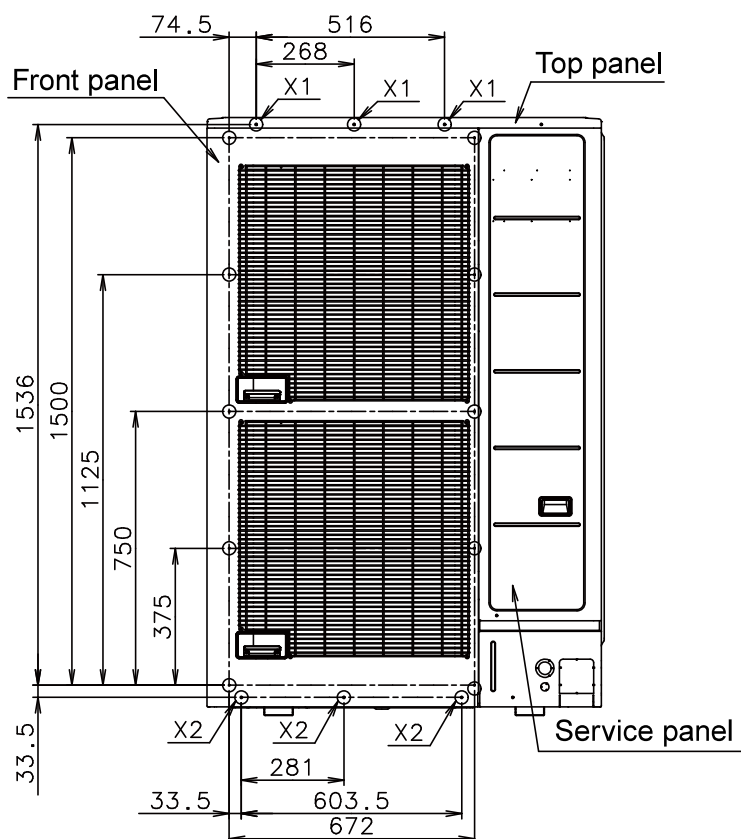
The duct needs to be purchased locally. When installing the duct, be careful of the followings;

- Do not cover the service panel. If covered, the panel cannot be opened for servicing.
- Screw holes for installing the duct are placed on the front panel. Fix the duct by using a $\varnothing 5$ tapping screw. (See the following diagram for the location.)

● Models: AJ*072LELAH, AJ*090LELAH, AJ*108LELAH



● Models: AJ*126LELAH, AJ*144LELAH

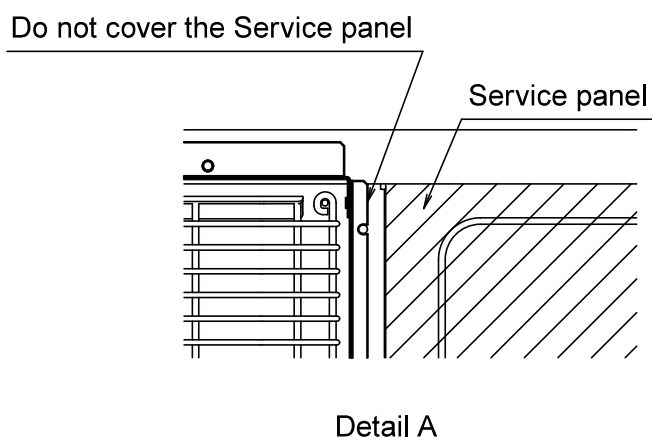
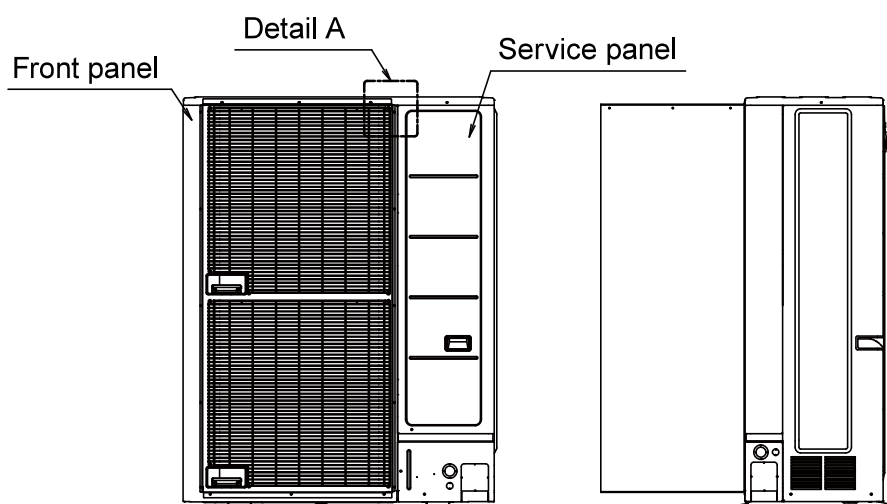


X1: Remove the screw securing the top panel, and reuse it for fixing the duct.

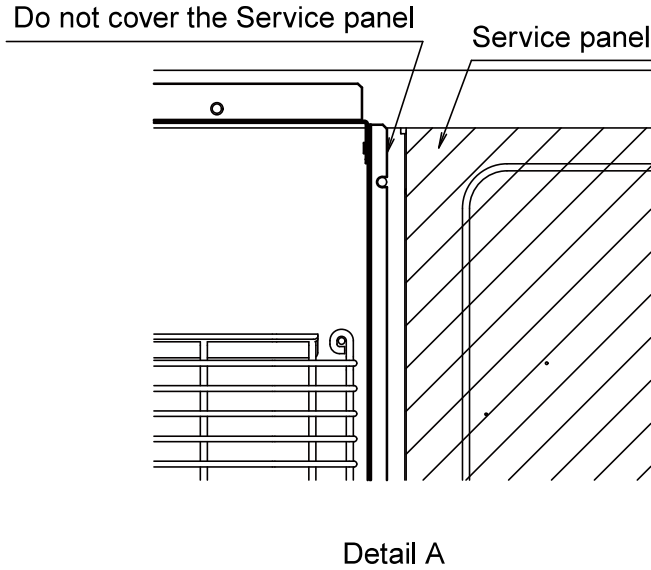
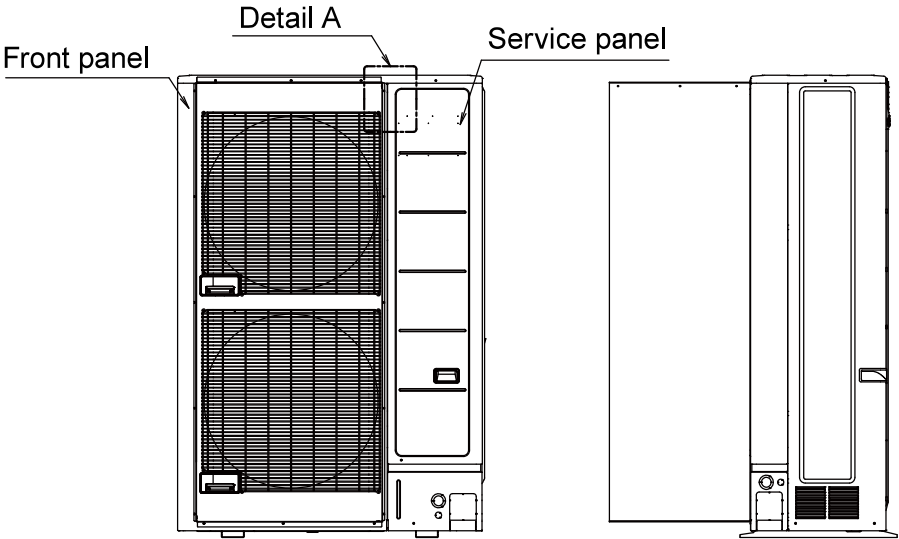
X2: Remove the screw securing the front panel, and reuse it for fixing the duct.

■ DUCT INSTALLATION EXAMPLE

- Models: AJ*072LELAH, AJ*090LELAH, AJ*108LELAH

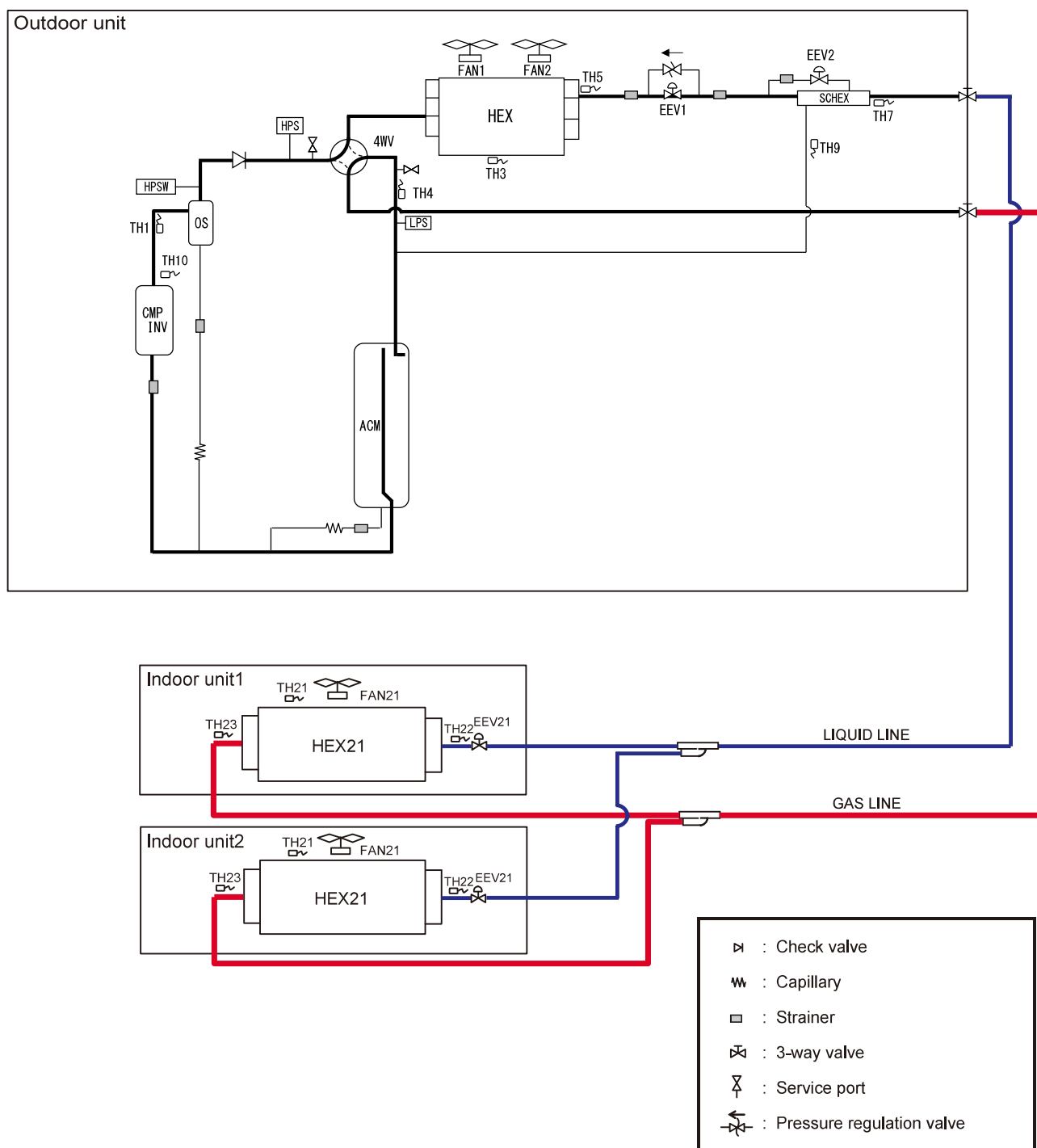


● Models: AJ*126LELAH, AJ*144LELAH

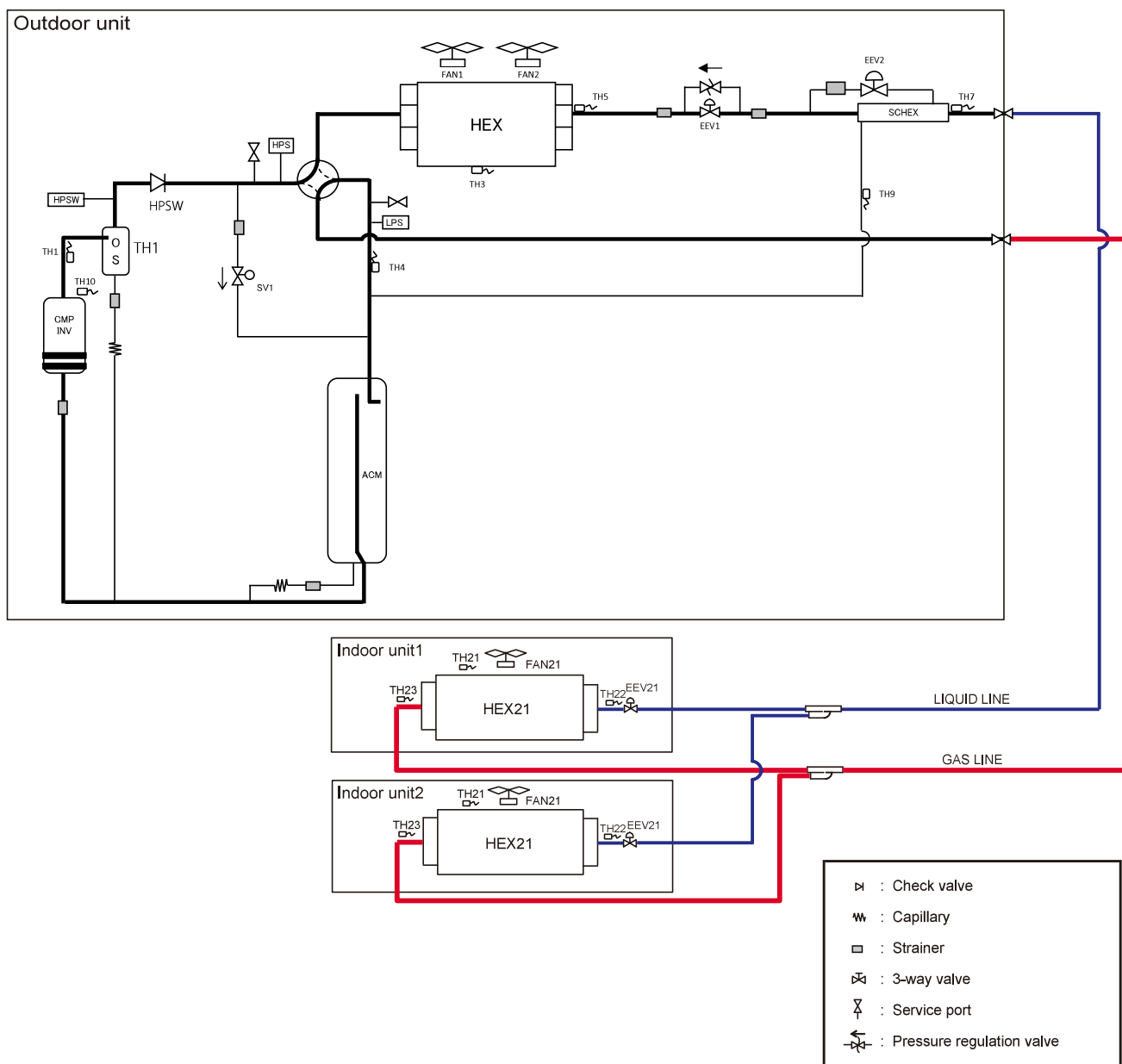


4. REFRIGERANT CIRCUIT

■ MODELS: AJ*072LELAH, AJ*090LELAH, AJ*108LELAH



MODELS: AJ*126LELAH, AJ*144LELAH



■ SYMBOL DESCRIPTION

● Outdoor unit

MARK	DESCRIPTION
CMP	Compressor (Inverter type)
HEX	Heat exchanger
FAN 1	Fan 1
FAN 2	Fan 2
ACM	Accumulator
OS	Oil separator
SCHEX	Sub-cool heat exchanger
HPS	High pressure sensor
LPS	Low pressure sensor
HPSW	High pressure sensor switch
4WV	4-way valve
SV 1	Solenoid valve 1
EEV 1	Electric expansion valve 1
EEV 2	Electric expansion valve 2
TH 1	Discharge temperature thermistor
TH 3	Outdoor temperature thermistor
TH 4	Suction temperature thermistor
TH 5	Heat exchanger (outlet) thermistor
TH 7	Liquid temperature thermistor
TH 9	Sub-cool heat exchanger (outlet) thermistor
TH 10	Compressor temperature thermistor

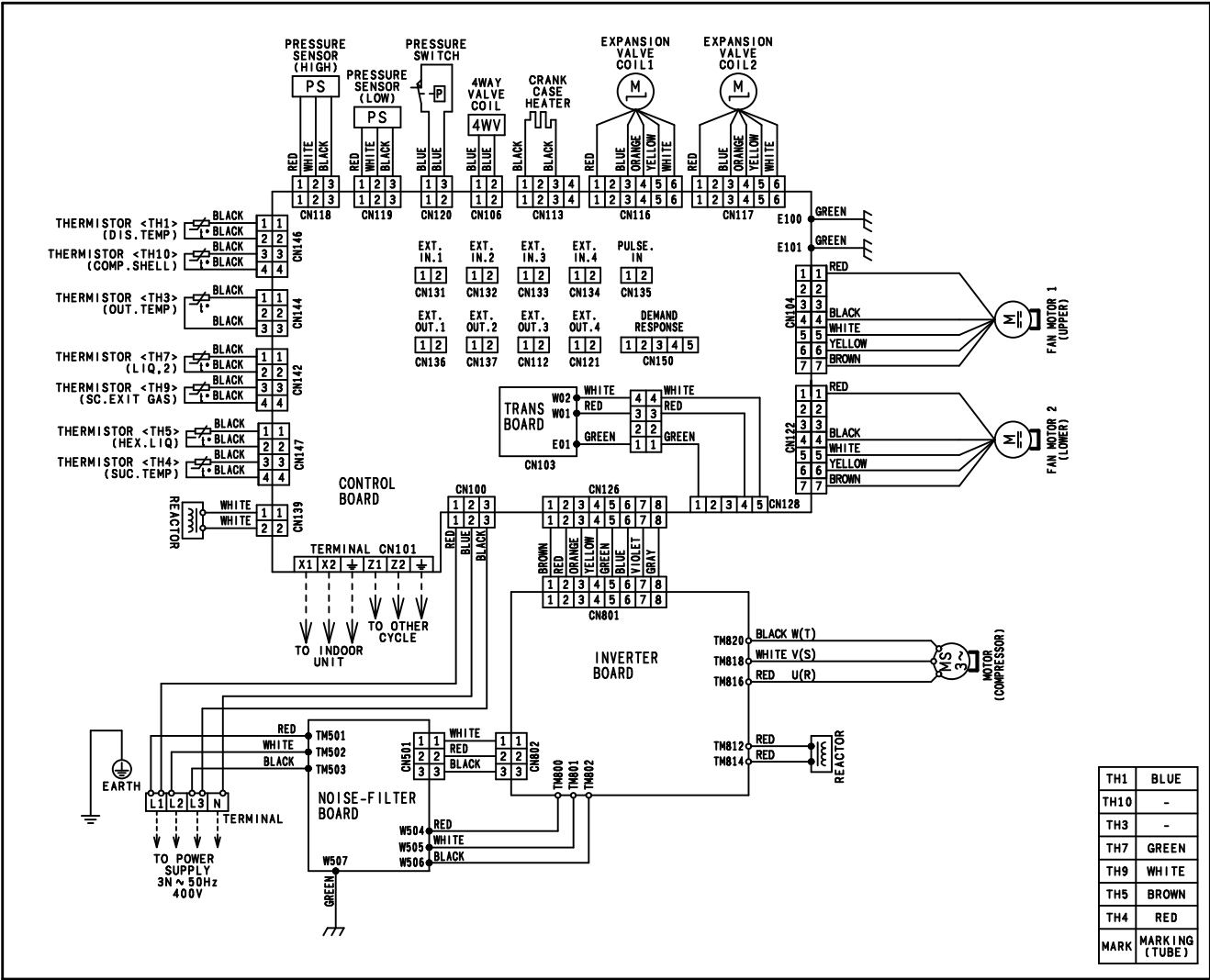
Marking (Tube)
Blue
—
Red
Brown
Green
White
—

● Indoor unit

MARK	DESCRIPTION
HEX 21	Heat exchanger
FAN 21	Fan
EEV 21	Electric expansion valve
TH 21	Room temperature thermistor
TH 22	Heat exchanger (inlet) thermistor
TH 23	Heat exchanger (outlet) thermistor

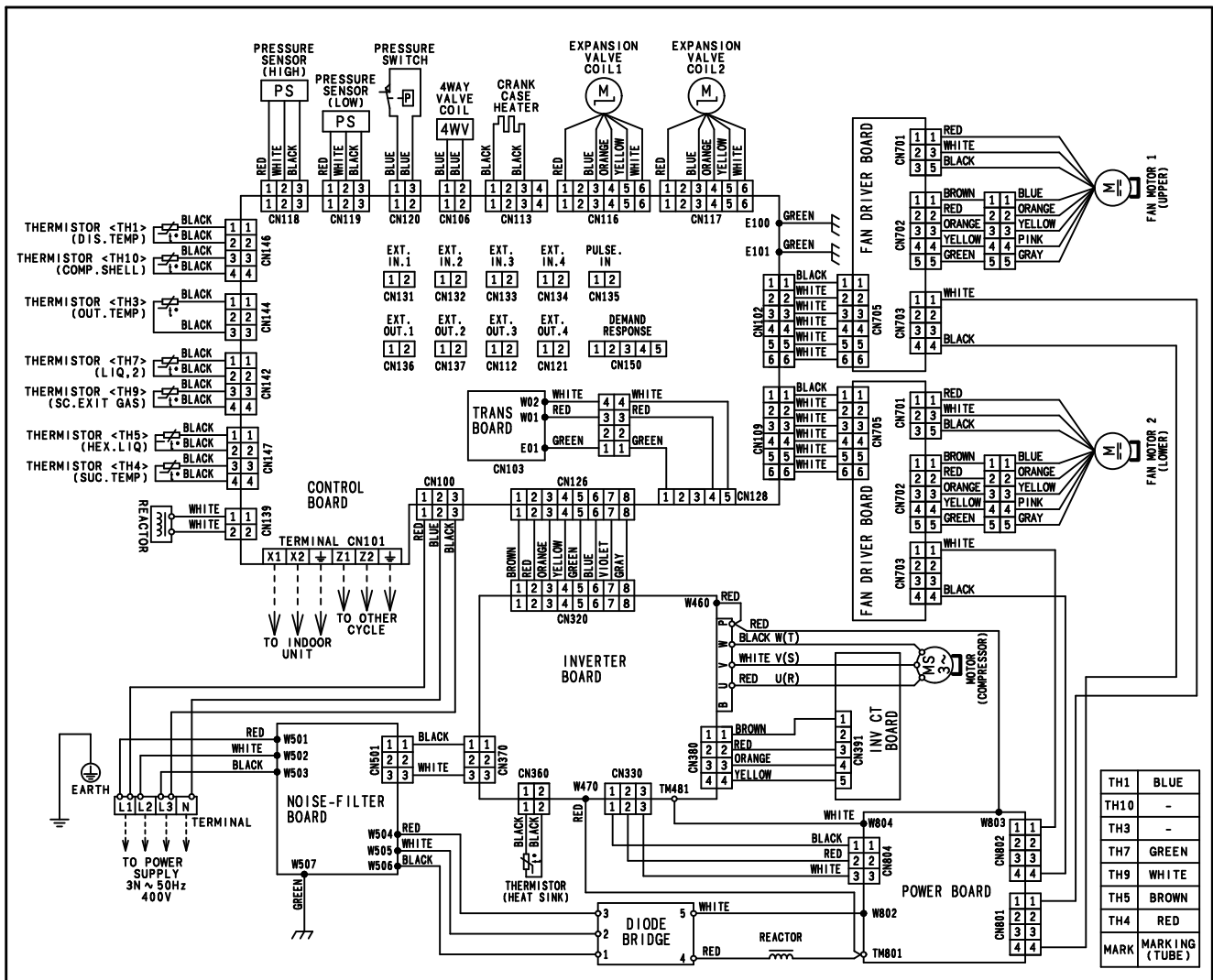
5. WIRING DIAGRAM

■ MODELS: AJ*072LELAH, AJ*090LELAH



MODEL: AJ*108LELAH

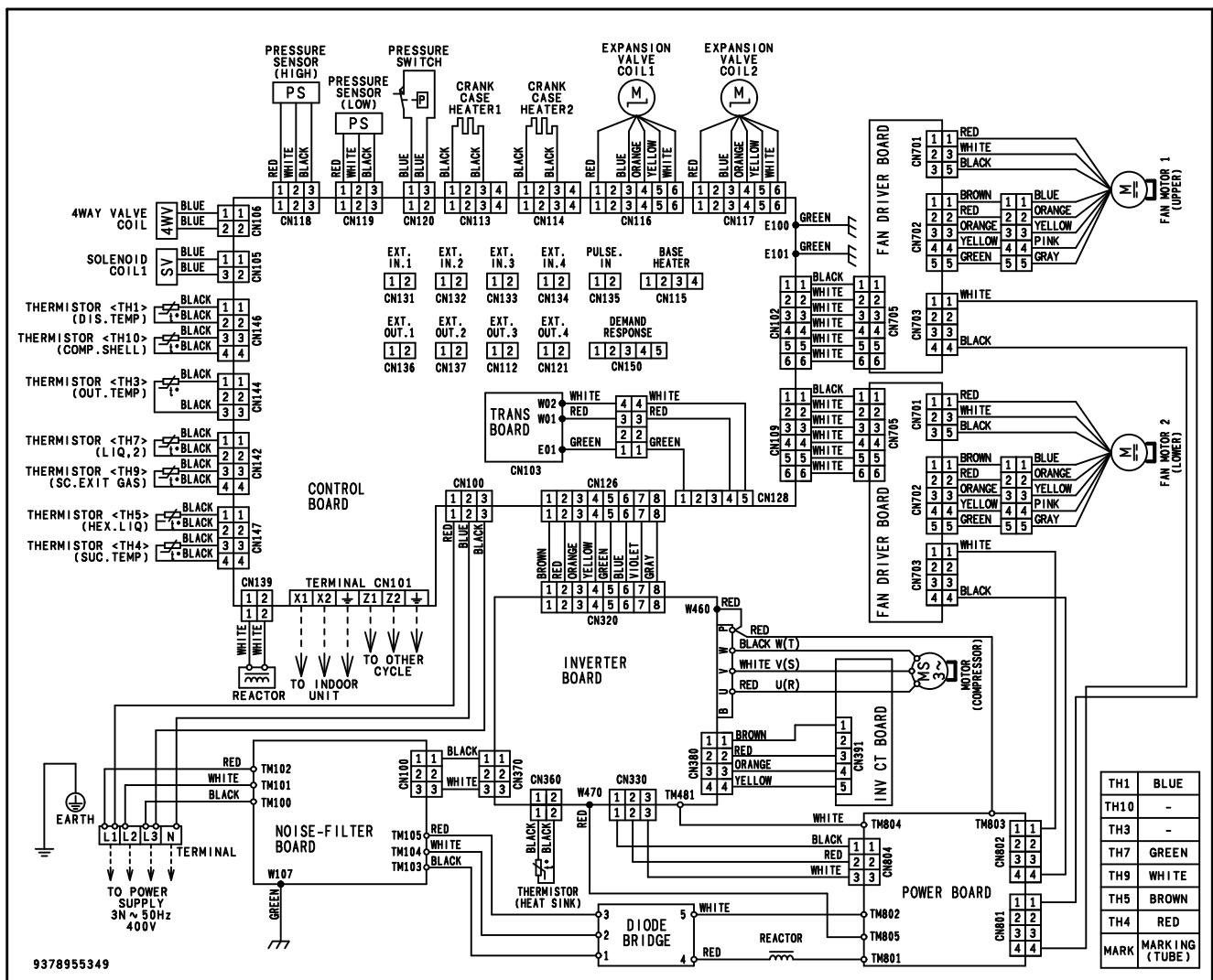
OUTDOOR
UNITS



OUTDOOR
UNITS

MODELS: AJ*126LELAH, AJ*144LELAH

OUTDOOR
UNITS



OUTDOOR
UNITS

6. OPERATION RANGE

Operation mode	Operation range		
	Indoor unit	Outdoor unit (8/10/12HP)	Outdoor unit (14/16HP)
Cooling / Dry	18 to 32°C DB R.H. 80% or less	-15 to 46°C DB *1	-5 to 46°C DB *1 *2
Heating	10 to 30°C DB	-20 to 21°C DB	

R.H. : Relative Humidity.

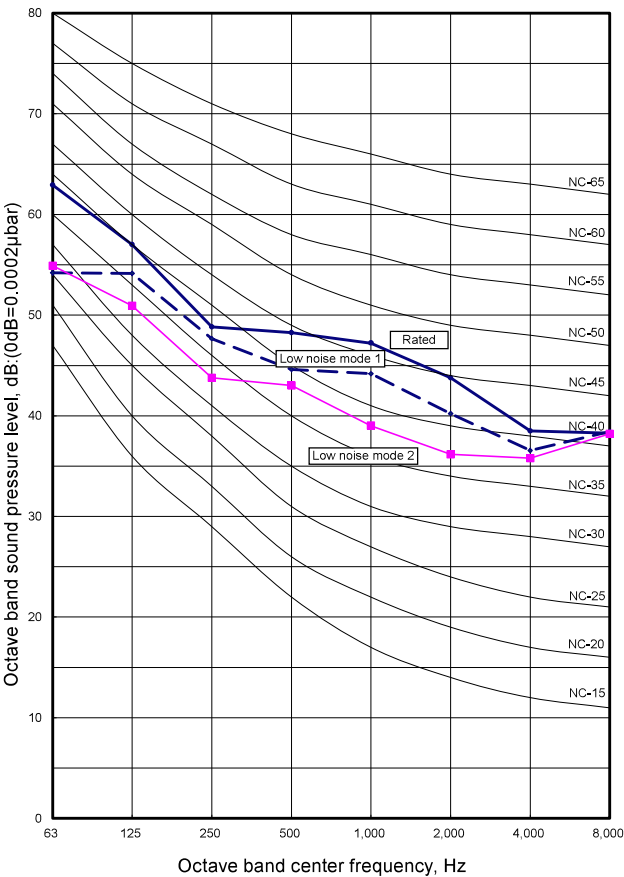
*1: When the outdoor unit is lower than the indoor unit, the temperature range is -5°C.

*2: The cooling operation range of -15 to 46°C is allowed only when all of the indoor units connected to the system are higher than capacity of 5.6kW.

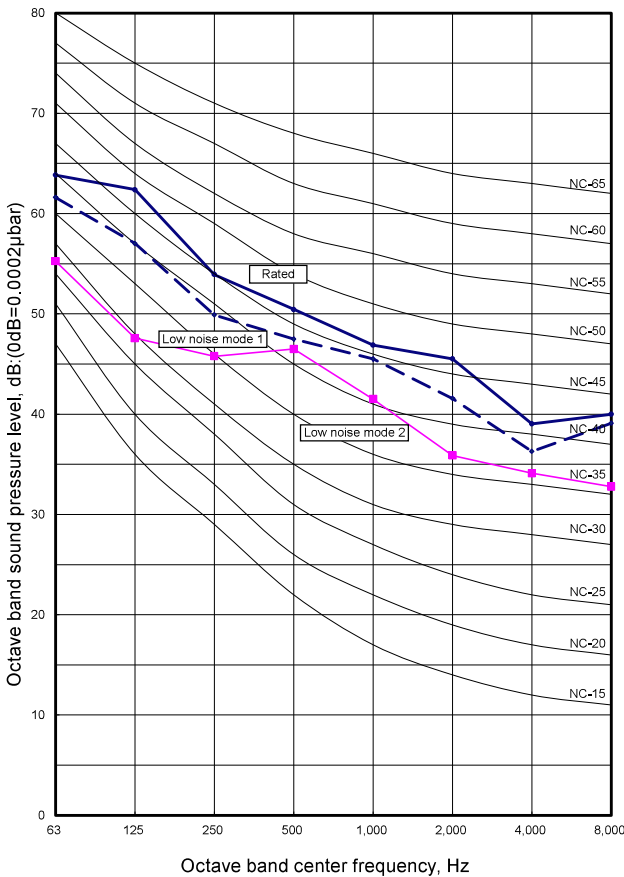
7. NOISE LEVEL CURVE

■ MODEL: AJ*072LELAH

● Cooling

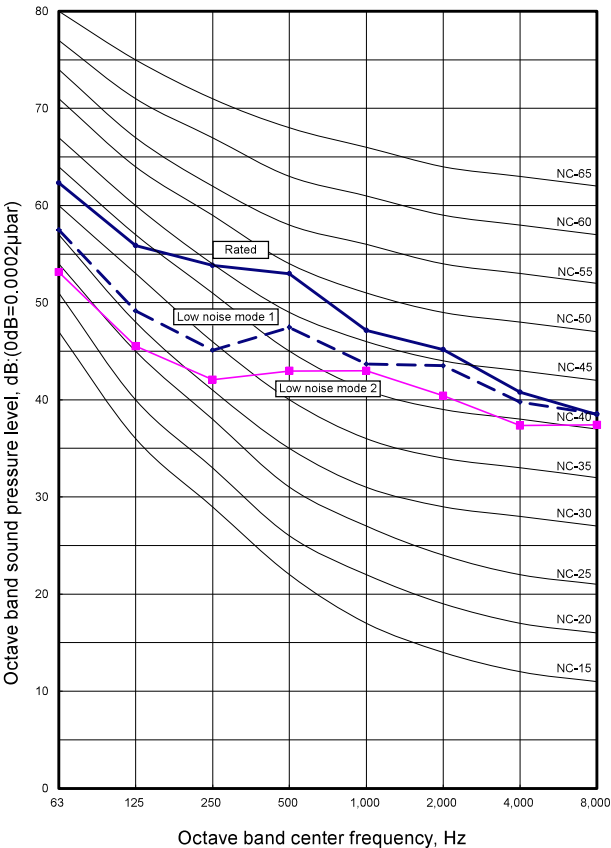


● Heating

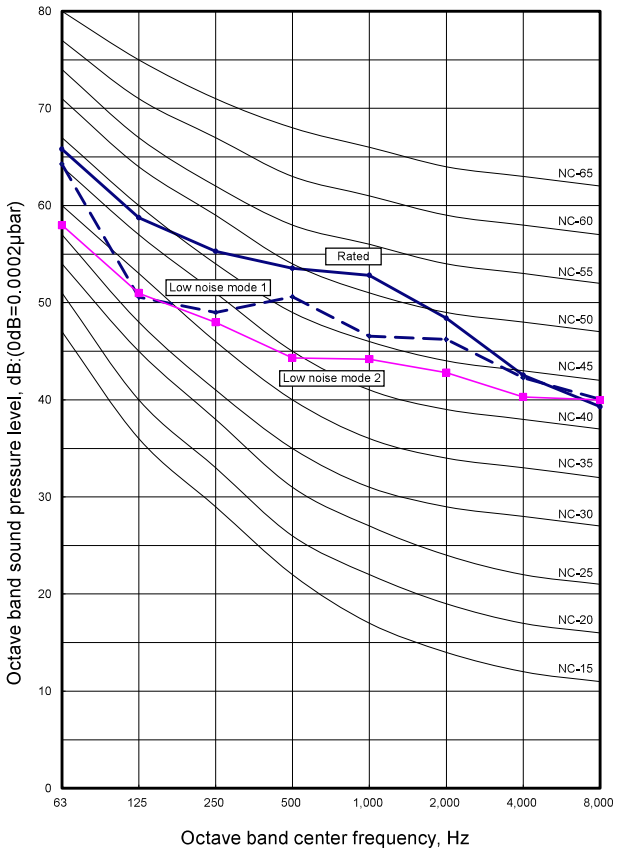


■ MODEL: AJ*090LELAH

● Cooling

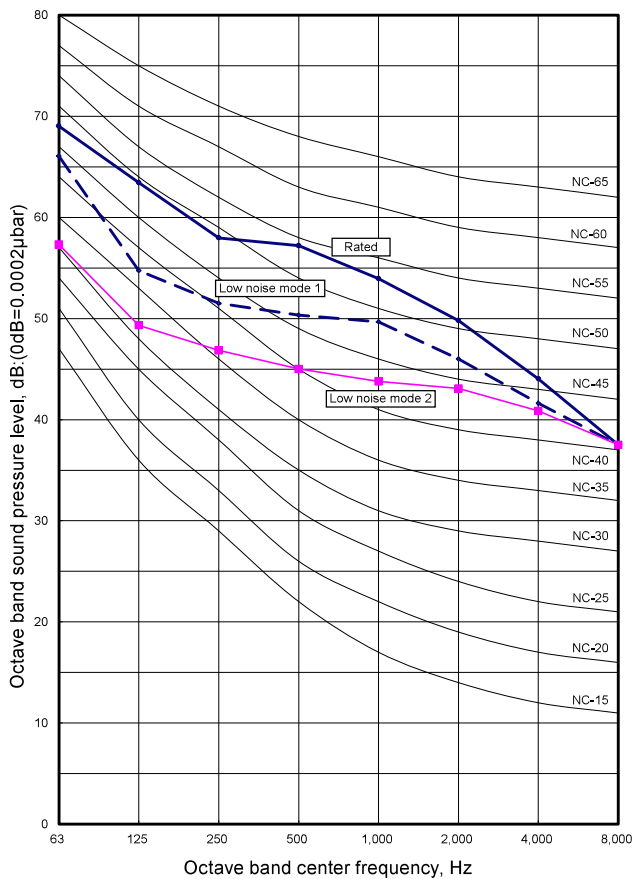


● Heating

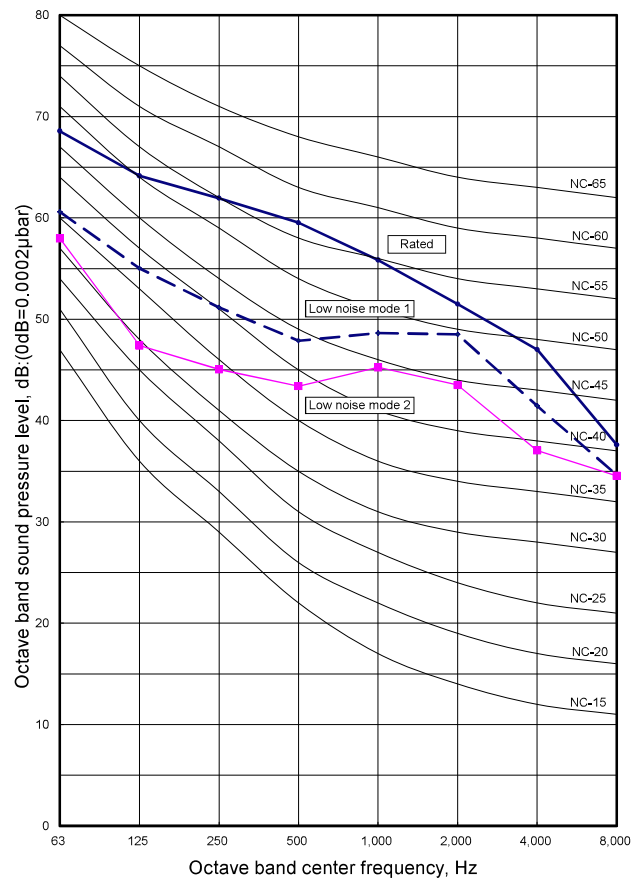


■ **MODEL: AJ*108LELAH**

● **Cooling**

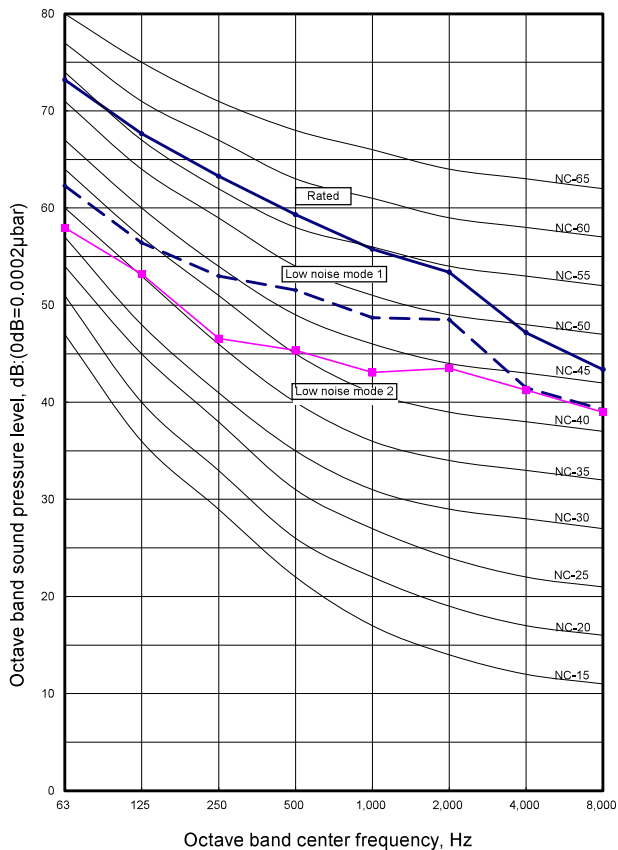


● **Heating**

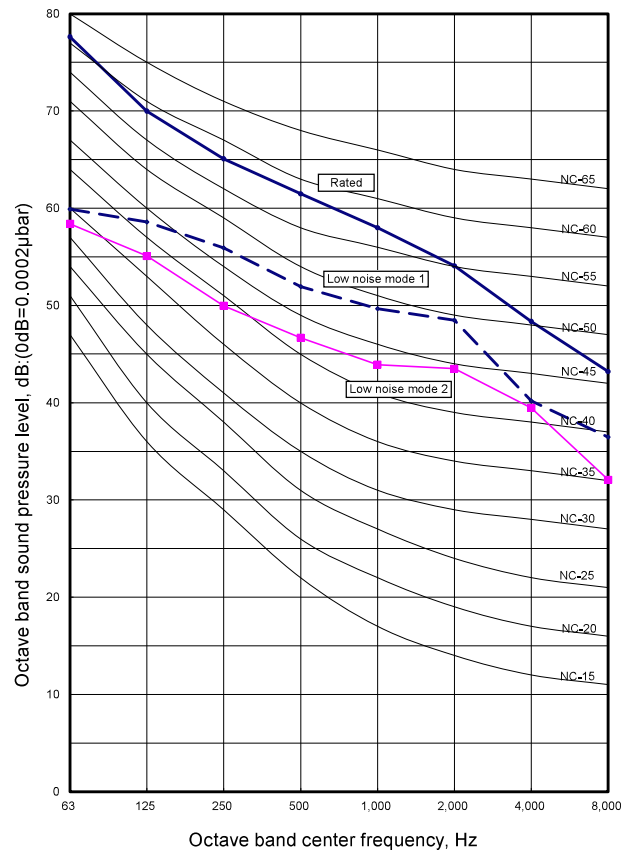


■ **MODEL: AJ*126LELAH**

● **Cooling**

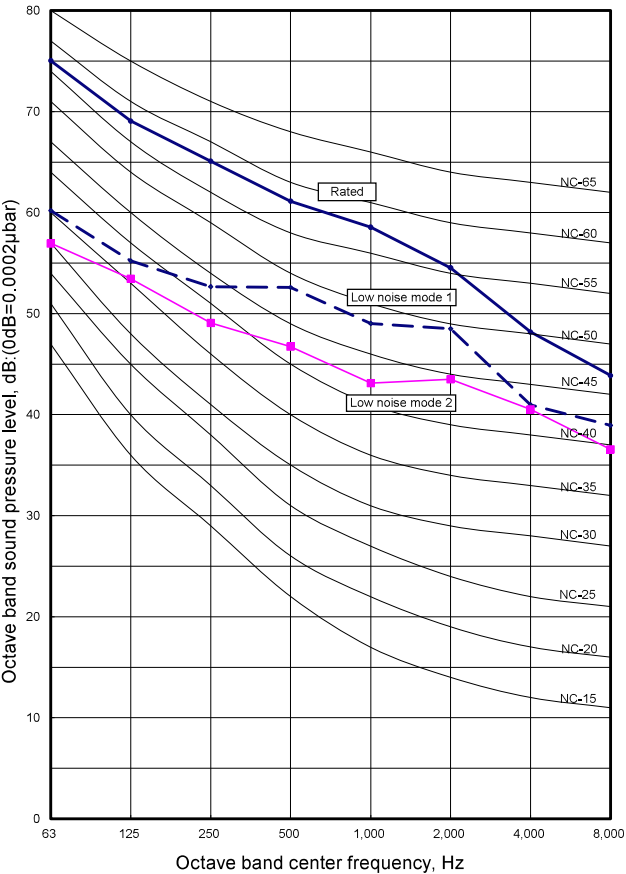


● **Heating**

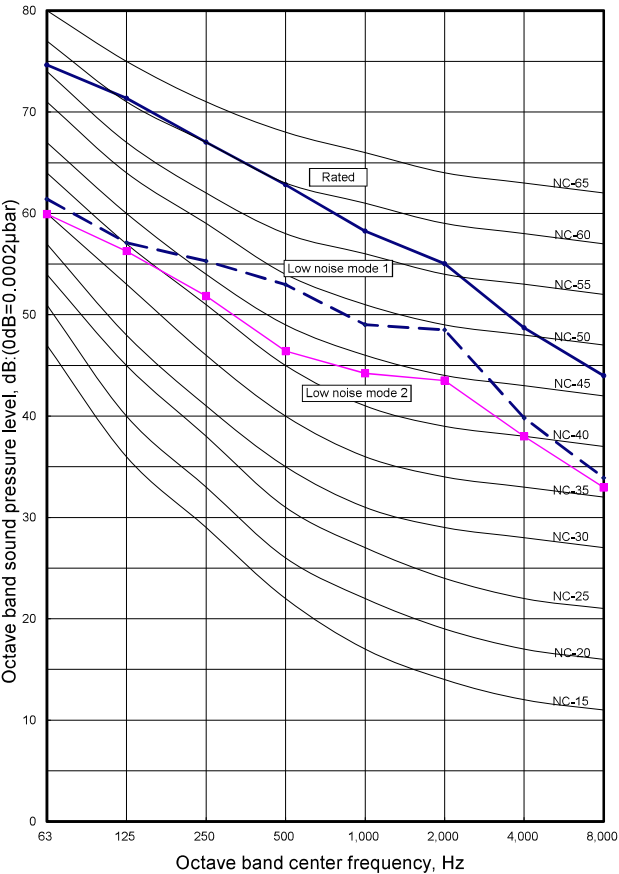


■ **MODEL: AJ*144LELAH**

● **Cooling**



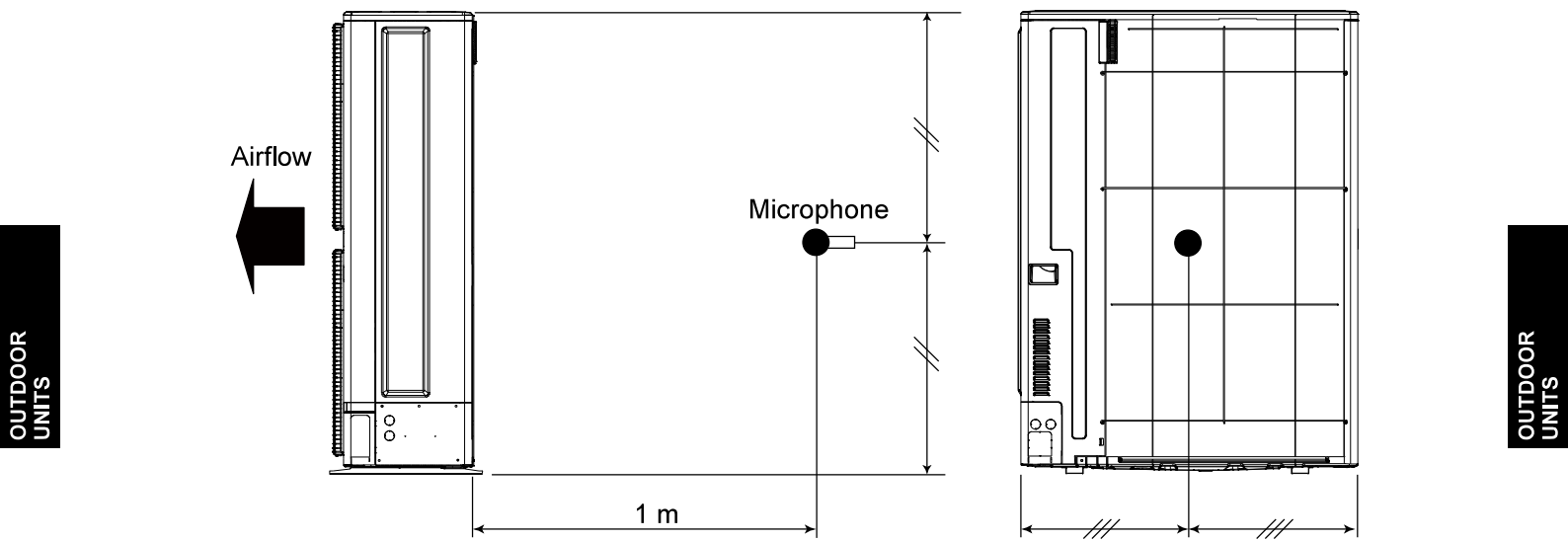
● **Heating**



OUTDOOR
UNITS

OUTDOOR
UNITS

■ SOUND LEVEL CHECK POINT



8. ELECTRIC CHARACTERISTICS

		Rated Value		Electric Characteristics									
		Power Supply		Full Load Characteristics			Wiring Specifications *1				Compressor	Outdoor Fan Motor	
HP	Model name	Hz	Voltage (V)	MCA (A)	TOCA (A)	MSC (A)	MFA (A)	Power Cable (mm ²)	Earth Cable (mm ²)	Limited Wiring Length (m) *2	RLA (A)	Output (W)	FLA (A)
8	AJ*072LELAH	50	400	18.9	15.8	17.3	20	6	6	62	17.8	111	0.47
10	AJ*090LELAH	50	400	18.9	15.8	17.3	20	6	6	62	17.8	111	0.47
12	AJ*108LELAH	50	400	22.5	18.7	20.2	25	6	6	62	17.8	200	0.43
14	AJ*126LELAH	50	400	34.2	28.5	32.1	40	10	10	64	25.3	375	0.80
16	AJ*144LELAH	50	400	34.2	28.5	32.1	40	10	10	64	25.3	375	0.80

- Select the breaker based on MCA of the table above.
- Select the wire diameter based on the larger value of MCA or TOCA of the table above and select a wire diameter which withstands the breaker capacity.

*1 Wiring Spec : These values are recommended data. Please select the wiring spec in accordance with the regional cable standard.

*2 Limited Wiring Length : This wiring length is in case voltage drop less than 2%. When wiring length extend longer, select the wiring size of larger diameter.

RLA : Rated Load Amp of compressor under the standard condition.

MCA : Min Circuit Amp = Max Operating Current (Full Load)

MSC : Max Starting Current

TOCA : Total Value of Each Over Current Set

MFA : Main Fuse (Circuit Breaker) Current

9. SAFETY DEVICES

Safety device	AJ*072LELAH	AJ*090LELAH	AJ*108LELAH	AJ*126LELAH	AJ*144LELAH
Fuse (Main)	AC 250V 10A				
Protector (INV)	AC 500V 45A			AC 500V 80A	
Protector (Fan Motor)	-		DC 750V 10A	DC 750V 10A	
Compressor Protector	"Overcurrent protection - Discharge Pipe Temperature protection Off : 120°C On : 85°C Compressor Temperature protection Off : 130°C On : 90°C"				
High Pressure Protection	Off : 4.2 MPa On : 3.2 MPa				
Low Pressure Protection	Off : 0.05 MPa				
Fuse (Varistor)	-			AC 250V 3.15A	



4. INDOOR UNITS