



Internal Use Only

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# ***MULTI V*<sup>™</sup> sync<sup>II</sup> System**

## **Air Conditioner**

### **SERVICE MANUAL R410A**

### **(Exploded View)**

**MODEL : ARUB Series**

#### **CAUTION**

Before Servicing the unit, read the safety precautions in General SVC manual.  
Only for authorized service personnel.

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# Safety Precautions

To prevent injury to the user or other people and property damage, the following instructions must be followed.

■ Incorrect operation due to ignoring instruction will cause harm or damage. The seriousness is classified by the following indications.

**⚠ WARNING** This symbol indicates the possibility of death or serious injury.

**⚠ CAUTION** This symbol indicates the possibility of injury or damage to properties only.

■ Meanings of symbols used in this manual are as shown below.

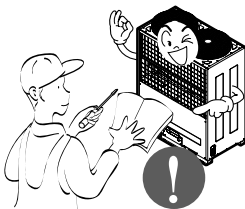
	<b>Be sure not to do.</b>
	<b>Be sure to follow the instruction.</b>

## ⚠ WARNING

### ■ Installation

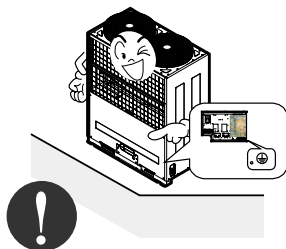
Have all electric work done by a licensed electrician according to "Electric Facility Engineering Standard" and "Interior Wire Regulations" and the instructions given in this manual and always use a special circuit.

- If the power source capacity is inadequate or electric work is performed improperly, electric shock or fire may result.



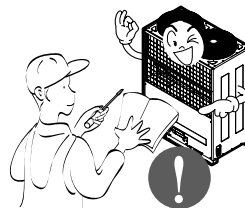
**Always ground the product.**

- There is risk of fire or electric shock.



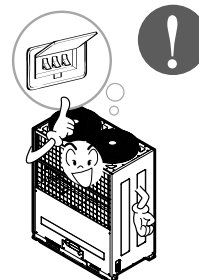
Ask the dealer or an authorized technician to install the air conditioner.

- Improper installation by the user may result in water leakage, electric shock, or fire.



**Always install a dedicated circuit and breaker.**

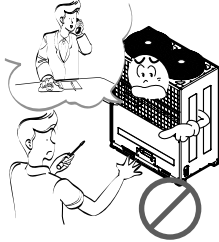
- Improper wiring or installation may cause fire or electric shock.



## Safety Precautions

**For re-installation of the installed product, always contact a dealer or an Authorized Service Center.**

- There is risk of fire, electric shock, explosion, or injury.



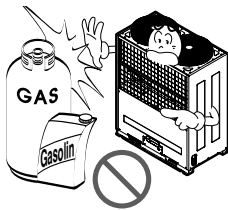
**Do not install, remove, or re-install the unit by yourself (customer).**

- There is risk of fire, electric shock, explosion, or injury.



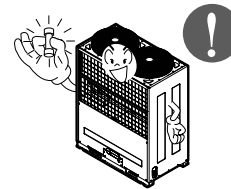
**Do not store or use flammable gas or combustibles near the air conditioner.**

- There is risk of fire or failure of product.



**Use the correctly rated breaker or fuse.**

- There is risk of fire or electric shock.



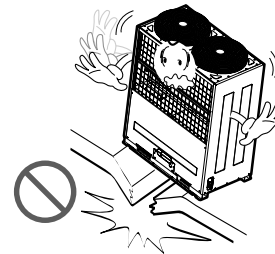
**Prepare for strong wind or earthquake and install the unit at the specified place.**

- Improper installation may cause the unit to topple and result in injury.



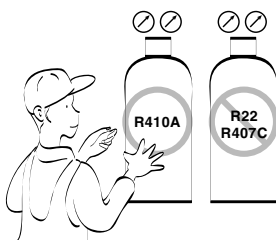
**Do not install the product on a defective installation stand.**

- It may cause injury, accident, or damage to the product.



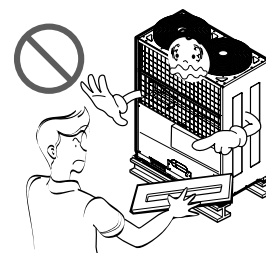
**When installing and moving the air conditioner to another site, do not charge it with a different refrigerant from the refrigerant specified on the unit.**

- If a different refrigerant or air is mixed with the original refrigerant, the refrigerant cycle may malfunction and the unit may be damaged.



**Do not reconstruct to change the settings of the protection devices.**

- If the pressure switch, thermal switch, or other protection device is shorted and operated forcibly, or parts other than those specified by LGE are used, fire or explosion may result.



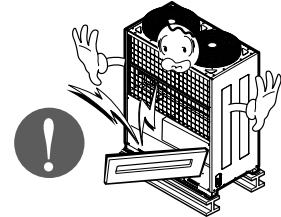
**Ventilate before operating air conditioner when gas leaked out.**

- It may cause explosion, fire, and burn.



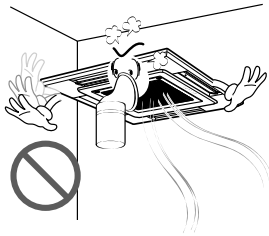
**Securely install the cover of control box and the panel.**

- If the cover and panel are not installed securely, dust or water may enter the outdoor unit and fire or electric shock may result.



**If the air conditioner is installed in a small room, measures must be taken to prevent the refrigerant concentration from exceeding the safety limit when the refrigerant leaks.**

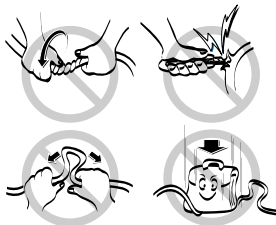
- Consult the dealer regarding the appropriate measures to prevent the safety limit from being exceeded. Should the refrigerant leak and cause the safety limit to be exceeded, hazards due to lack of oxygen in the room could result.



**■ Operation**

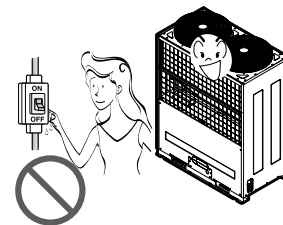
**Do not damage or use an unspecified power cord.**

- There is risk of fire, electric shock, explosion, or injury.



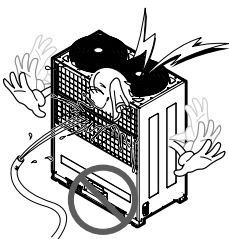
**Use a exclusive outlet for this appliance.**

- There is risk of fire or electrical shock.



**Be cautious that water could not enter the product.**

- There is risk of fire, electric shock, or product damage.



**Do not touch the power switch with wet hands.**

- There is risk of fire, electric shock, explosion, or injury.



## Safety Precautions

**When the product is soaked (flooded or submerged), contact an Authorized Service Center.**

- There is risk of fire or electric shock.



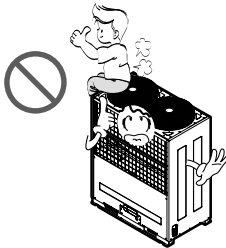
**Be cautious not to touch the sharp edges when installing.**

- It may cause injury.



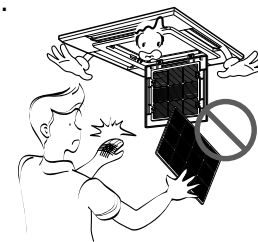
**Take care to ensure that nobody could step on or fall onto the outdoor unit.**

- This could result in personal injury and product damage.



**Do not open the inlet grille of the product during operation. (Do not touch the electrostatic filter, if the unit is so equipped.)**

- There is risk of physical injury, electric shock, or product failure.

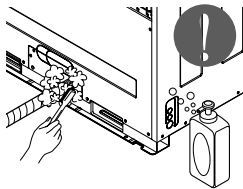


## CAUTION

### Installation

**Always check for gas (refrigerant) leakage after installation or repair of product.**

- Low refrigerant levels may cause failure of product.



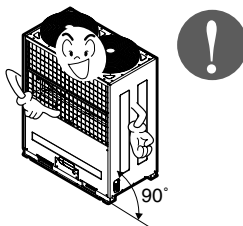
**Do not install the product where the noise or hot air from the outdoor unit could damage the neighborhoods.**

- It may cause a problem for your neighbors.



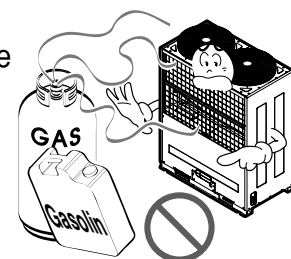
**Keep level even when installing the product.**

- To avoid vibration or water leakage.



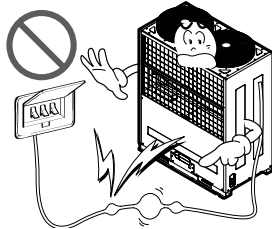
**Do not install the unit where combustible gas may leak.**

- If the gas leaks and accumulates around the unit, an explosion may result.



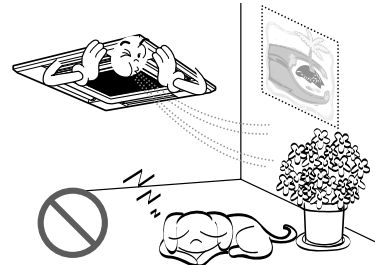
**Use power cables of sufficient current carrying capacity and rating.**

- Cables that are too small may leak, generate heat, and cause a fire.



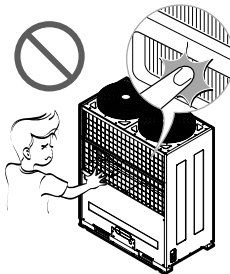
**Do not use the product for special purposes, such as preserving foods, works of art, etc. It is a consumer air conditioner, not a precision refrigeration system.**

- There is risk of damage or loss of property.



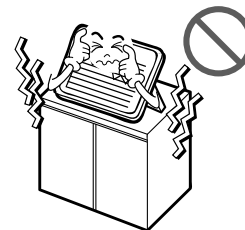
**Keep the unit away from children. The heat exchanger is very sharp.**

- It can cause the injury, such as cutting the finger. Also the damaged fin may result in degradation of capacity.



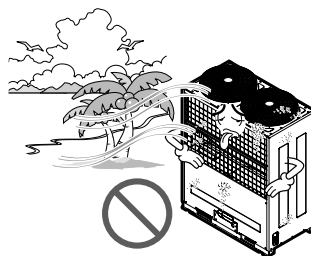
**When installing the unit in a hospital, communication station, or similar place, provide sufficient protection against noise.**

- The inverter equipment, private power generator, high-frequency medical equipment, or radio communication equipment may cause the air conditioner to operate erroneously, or fail to operate. On the other hand, the air conditioner may affect such equipment by creating noise that disturbs medical treatment or image broadcasting.



**Do not install the product where it is exposed to sea wind (salt spray) directly.**

- It may cause corrosion on the product. Corrosion, particularly on the condenser and evaporator fins, could cause product malfunction or inefficient operation.

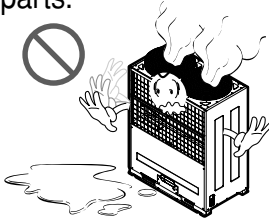


## Safety Precautions

### ■ Operation

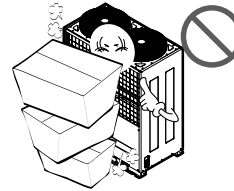
#### Do not use the air conditioner in special environments.

- Oil, steam, sulfuric smoke, etc. can significantly reduce the performance of the air conditioner or damage its parts.



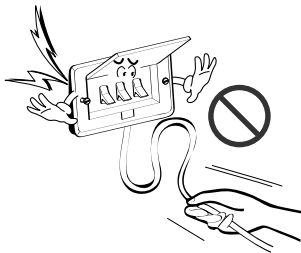
#### Do not block the inlet or outlet.

- It may cause failure of appliance or accident.



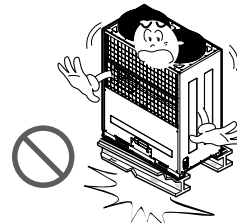
#### Make the connections securely so that the outside force of the cable may not be applied to the terminals.

- Inadequate connection and fastening may generate heat and cause a fire.



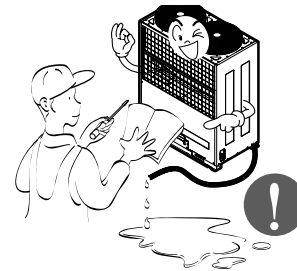
#### Be sure the installation area does not deteriorate with age.

- If the base collapses, the air conditioner could fall with it, causing property damage, product failure, or personal injury.



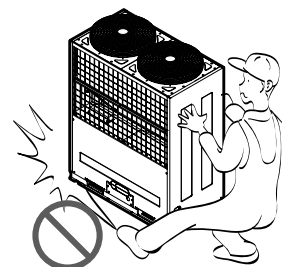
#### Install and insulate the drain hose to ensure that water is drained away properly based on the installation manual.

- A bad connection may cause water leakage.



#### Be very careful about product transportation.

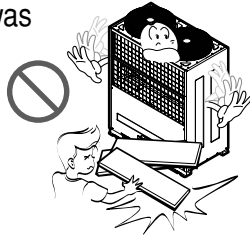
- Only one person should not carry the product if it weighs more than 20 kg.
- Some products use PP bands for packaging. Do not use any PP bands for a means of transportation. It is dangerous.
- Do not touch the heat exchanger fins. Doing so may cut your fingers.
- When transporting the outdoor unit, suspending it at the specified positions on the unit base. Also support the outdoor unit at four points so that it cannot slip sideways.





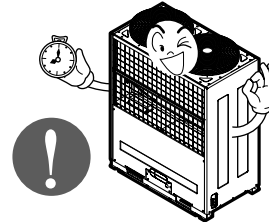
**Safely dispose of the packing materials.**

- Packing materials, such as nails and other metal or wooden parts, may cause stabs or other injuries.
- Tear apart and throw away plastic packaging bags so that children may not play with them. If children play with a plastic bag which was not torn apart, they face the risk of suffocation.



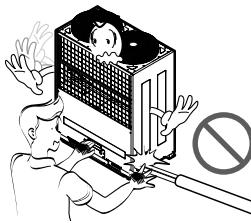
**Turn on the power at least 6 hours before starting operation.**

- Starting operation immediately after turning on the main power switch can result in severe damage to internal parts. Keep the power switch turned on during the operational season.



**Do not touch any of the refrigerant piping during and after operation.**

- It can cause a burn or frostbite.



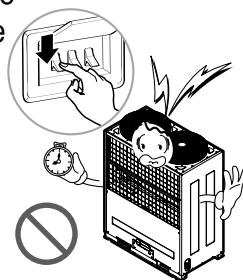
**Do not operate the air conditioner with the panels or guards removed.**

- Rotating, hot, or high-voltage parts can cause injuries.

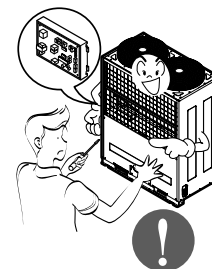


**Do not directly turn off the main power switch after stopping operation.**

- Wait at least 5 minutes before turning off the main power switch. Otherwise it may result in water leakage or other problems.

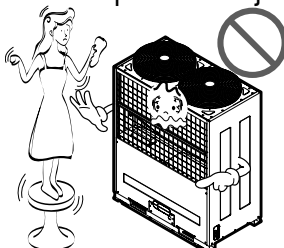


**Auto-addressing should be done in condition of connecting the power of all indoor and outdoor units. Auto-addressing should also be done in case of changing the indoor unit PCB.**



**Use a firm stool or ladder when cleaning or maintaining the air conditioner.**

- Be careful and avoid personal injury.



**Do not insert hands or other objects through the air inlet or outlet while the air conditioner is plugged in.**

- There are sharp and moving parts that could cause personal injury.

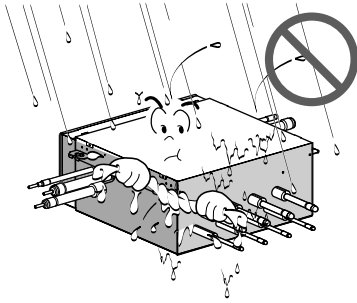


## Safety Precautions

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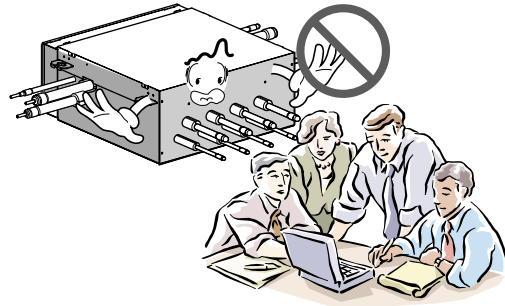
**Avoid a place where rain may enter since the HR unit is for indoor**

- There is risk of property damage, failure of product, or electric shock.



**Install the HR unit at a place in which it is not affected by operation mode changing noise.**

- Installation within cell such as meeting room etc, may disturb business due to noise.



# Part 1

## General Information

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# 1. Model Names

## 1.1 Indoor Unit

Category	Chassis Name	Capacity(Btu/h(kW))									
		7k (2.2)	9k (2.8)	12k (3.6)	18k (5.6)	24k (7.1)	28k (8.2)	36k (10.6)	42k (12.3)	48k (14.1)	
Wall Mounted (General)	SE	ARNU07GSE*1	ARNU09GSE*1	ARNU12GSE*1							
	S5				ARNU18GS5*1	ARNU24GS5*1					
ART COOL	Mirror	SE	ARNU07GSE*1	ARNU09GSE*1	ARNU12GSE*1						
		S3				ARNU18GS3*1	ARNU24GS3*1				
	ART COOL	SP	ARNU07GSP*1	ARNU09GSP*1	ARNU12GSP*1						
	ART COOL Wide	SV				ARNU18GSV*1					
Ceiling Cassette	1 Way	TJ	ARNU07GTJ*1	ARNU09GTJ*1	ARNU12GTJ*1						
	2 Way	TL				ARNU18GTL*1	ARNU24GTL*1				
	4 Way	TE		ARNU09GTE*1	ARNU12GTE*1	ARNU18GTE*1					
		TH					ARNU24GTH*1	ARNU28GTH*1			
		TD							ARNU36GTD*1	ARNU42GTD*1	ARNU48GTD*1
Ceiling Concealed Duct	High Static	BH				ARNU18GBHA1	ARNU24GBHA1				
		BG						ARNU28GBGA1	ARNU36GBGA1	ARNU42GBGA1	
		BR									ARNU48GBRA1
	Low Static	B1	ARNU07GB1G1	ARNU09GB1G1	ARNU12GB1G1						
		B2				ARNU18GB2G1	ARNU24GB2G1				
	Built-in	B3	ARNU07GB3G1 PBSGB10 PBSC10	ARNU09GB3G1 PBSGB10 PBSC10	ARNU12GB3G1 PBSGB10 PBSC10						
		B4				ARNU18GB4G1 PBSGB20 PBSC20	ARNU24GB4G1 PBSGB20 PBSC20				
Ceiling & Floor	VE		ARNU09GVEA1	ARNU12GVEA1							
Ceiling Suspended	VJ				ARNU18GVJA1	ARNU24GVJA1					
Floor Standing	With Case	CE	ARNU07GCEA1	ARNU09GCEA1	ARNU12GCEA1						
		CF				ARNU18GCF A1	ARNU24GCF A1				
	Without Case	CE	ARNU07GCEU1	ARNU09GCEU1	ARNU12GCEU1						
		CF				ARNU18GCFU1	ARNU24GCFU1				

※ \* ART COOL- Color, Ceiling Cassette- A:Basic C:Plasma, Wall Mounted- A:Basic L:Plasma













## 1.2 Outdoor Unit

Power Supply	8HP	10HP	12HP	14HP	16HP	18HP	20HP	22HP	
3Ø, 380 ~ 415V, 50Hz	808T1	1008T1	1208T1	1408T1	1608T1	1808T1	2008T1	2208T1	
Power Supply	24HP	26HP	28HP	30HP	32HP	34HP	36HP	38HP	40HP
3Ø, 380 ~ 415V, 50Hz	2408T1	2608T1	2808T1	3008T1	3208T1	3408T1	3608T1	3808T1	4008T1
Heat Recovery	ARUB								

Power supply	2 rooms	3 rooms	4 rooms
1Ø, 220~240V, 50/60 Hz	PRHR020	PRHR030	PRHR040




## 2. External Appearance

### 2.1 Indoor Units

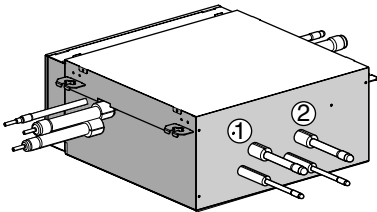
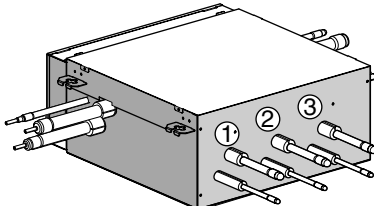
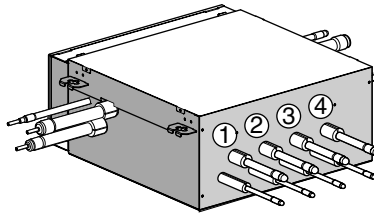
<p><b>Ceiling Cassette- 1Way</b></p> <p>ARNU07GTJA1 ARNU09GTJA1 ARNU12GTJA1</p> 	<p><b>Ceiling Cassette -2Way</b></p> <p>ARNU18GTLA1 ARNU24GTLA1</p> 
<p><b>Ceiling Cassette- 4Way</b></p> <p>ARNU09GTEA1 ARNU12GTEA1 ARNU18GTEA1 ARNU24GTHA1 ARNU28GTHA1 ARNU36GTDA1 ARNU42GTDA1 ARNU48GTDA1</p> 	<p><b>Ceiling Concealed Duct - High Static</b></p> <p>ARNU18GBHA1 ARNU24GBHA1 ARNU28GBGA1 ARNU36GBGA1 ARNU42GBGA1 ARNU48GBRA1</p> 
<p><b>Ceiling Concealed Duct - Low Static</b></p> <p>ARNU07GB1G1 ARNU09GB1G1 ARNU12GB1G1 ARNU18GB2G1 ARNU24GB2G1</p> 	<p><b>Wall Mounted</b></p> <p>ARNU07GSEA1 ARNU09GSEA1 ARNU12GSEA1 ARNU18GS5A1 ARNU24GS5A1</p> 
<p><b>ART COOL Mirror</b></p> <p>ARNU07GSE*1 S3:* B : Blue SE:* R:Mirror ARNU09GSE*1 M : Metal V:Silver ARNU12GSE*1 D : Wood B : Blue ARNU18GS3*1 R : Mirror ARNU24GS3*1 C : Cherry W : White</p> 	<p><b>ART COOL</b></p> <p>ARNU07GSP*1 ARNU09GSP*1 ARNU12GSP*1</p> <p>* B : Blue M : Metal D : Wood W : White</p> 
<p><b>ART COOL Wide</b></p> <p>ARNU18GSV*1</p> <p>* B : Blue M : Metal D : Wood W : White</p> 	<p><b>Ceiling Concealed Duct-Built in</b></p> <p>ARNU07GB1G1+PBSGB10(Acc'y), PBSC10(Acc'y) ARNU09GB1G1+PBSGB10(Acc'y), PBSC10(Acc'y) ARNU12GB1G1+PBSGB10(Acc'y), PBSC10(Acc'y) ARNU18GB2G1+PBSGB20(Acc'y), PBSC20(Acc'y) ARNU24GB2G1+PBSGB20(Acc'y), PBSC20(Acc'y)</p> 
<p><b>Ceiling &amp; Floor</b></p> <p>ARNU09GVEA1 ARNU12GVEA1</p> <p><b>Ceiling Suspended</b></p> <p>ARNU18GVJA1 ARNU24GVJA1</p> 	<p><b>Floor Standing</b></p> <p><b>With case</b></p> <p>ARNU07GCEA1 ARNU09GCEA1 ARNU12GCEA1 ARNU18GCFA1 ARNU24GCFA1</p> <p><b>Without case</b></p> <p>ARNU07GCEU1 ARNU09GCEU1 ARNU12GCEU1 ARNU18GCFU1 ARNU24GCFU1</p> 

※ These are model names of the basic function.

## 2.2 Outdoor Units

<p>ARUB808T1 ARUB1008T1 ARUB1208T1 ARUB1408T1</p>  <p>8, 10, 12, 14HP</p>	<p>ARUB1608T1 ARUB1808T1 ARUB2008T1 ARUB2208T1 ARUB2408T1</p>  <p>16, 18, 20, 22, 24HP</p>
<p>ARUB2608T1 ARUB2808T1 ARUB3008T1 ARUB3208T1 ARUB3408T1 ARUB3608T1 ARUB3808T1 ARUB4008T1</p>  <p>26, 28, 30, 32, 34, 36, 38, 40HP</p>	

## 2.3 HR Unit

PRHR020	PRHR030	PRHR040
 <p>(For 2 rooms)</p>	 <p>(For 3 rooms)</p>	 <p>(For 4 rooms)</p>

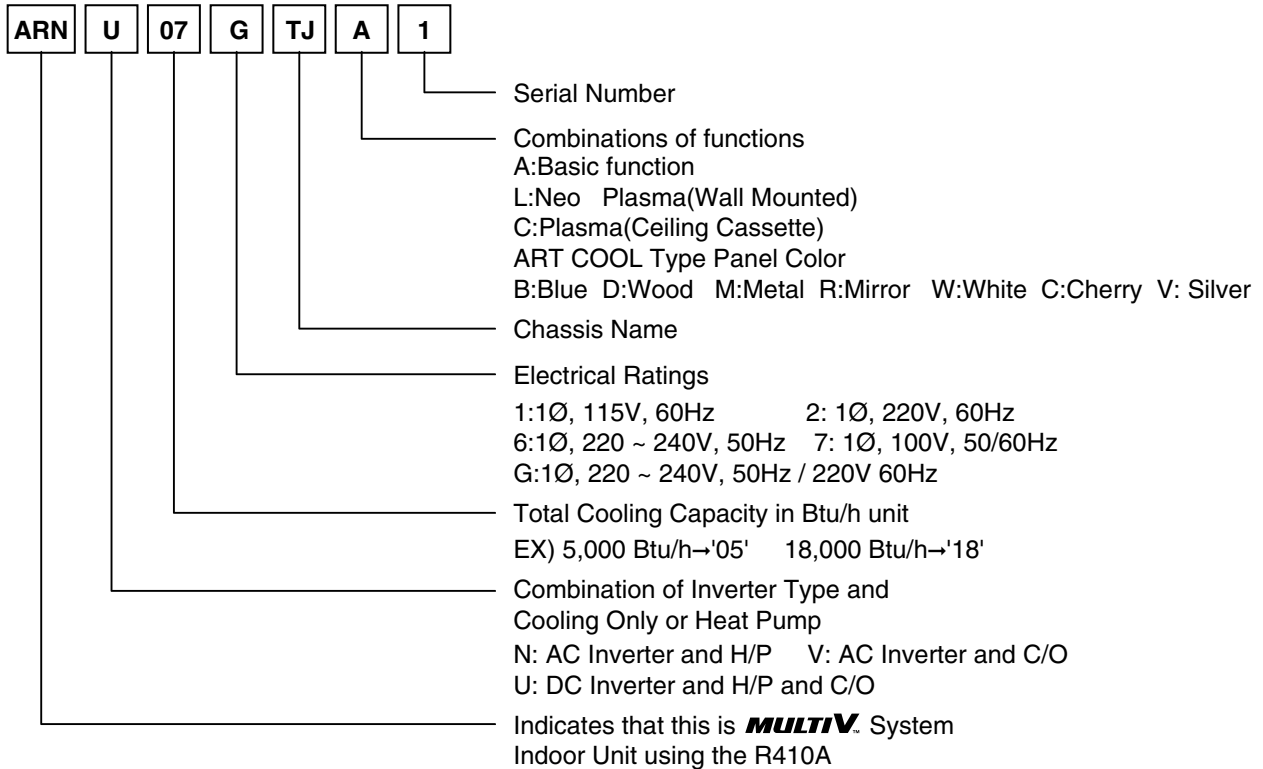
### 3. Combination of Outdoor Units

System Capacity	Number of Units 50Hz	Module			
		8	10	12	14
8HP	1	1			
10HP	1		1		
12HP	1			1	
14HP	1				1
16HP	2	2			
18HP	2	1	1		
20HP	2		2		
22HP	2		1	1	
24HP	2			2	
26HP	3	2	1		
28HP	3	1	2		
30HP	3		3		
32HP	3		2	1	
34HP	3		1	2	
36HP	3			3	
38HP	3			2	1
40HP	3			1	2

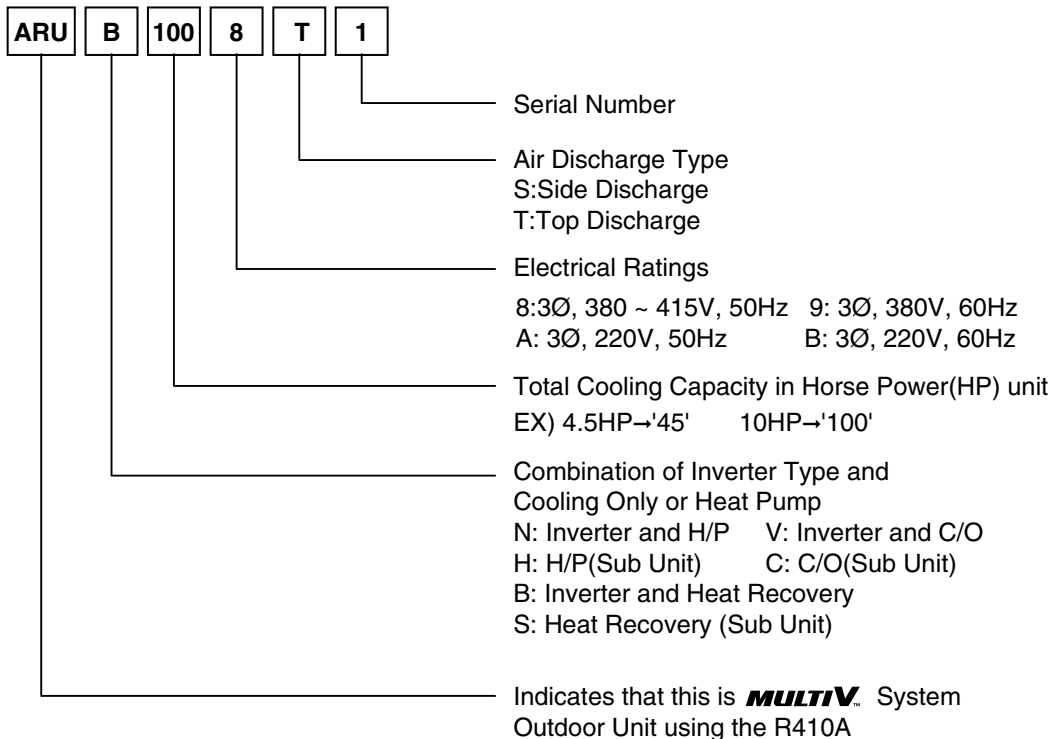
- Up to a maximum 40HP are realized by combining 8, 10, 12 and 14HP

# 4. Nomenclature

## 4.1 Indoor Unit

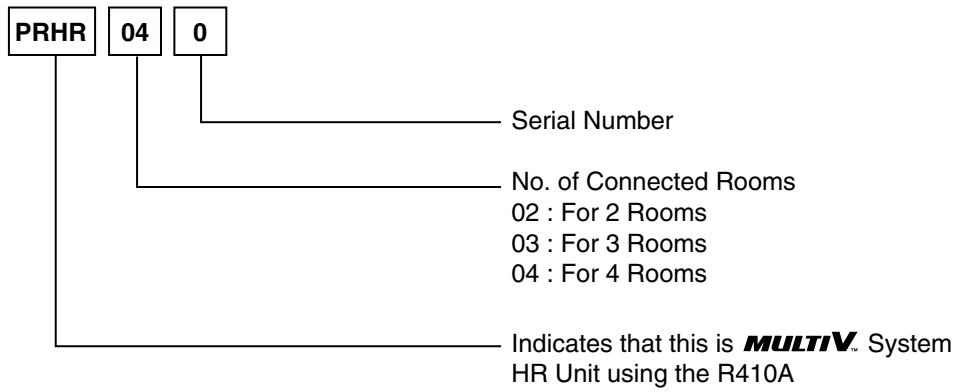


## 4.2 Outdoor Unit





### 4.3 HR Unit



## 5. Outdoor Units Information

**CAUTION:** A ratio of the connectable Indoor Units with Outdoor Units : within 50~130%  
Over 130% combination ratio to be reduced the capacity in defrost.

**Power Supply: Outdoor Unit (3Ø, 380 ~ 415V, 50Hz)**

### ■ Heat Recovery System

Unit		1 outdoor unit			
System(HP)		8	10	12	14
Model		ARUB808T1	ARUB1008T1	ARUB1208T1	ARUB1408T1
Refrigerant	Charge(kg/Oz)	8/282.2	8/282.2	8/282.2	8/282.2
	Type	R410a	R410a	R410a	R410a
	CF(Correction Factor)	-1	0	1	2
Max. Connectable No. of Indoor Units		13	16	20	20
Net Weight	kg	300	300	300	300
	lbs	661.4	661.4	661.4	661.4
Dimensions (W*H*D)	mm	1280 * 1607 * 730	1280 * 1607 * 730	1280 * 1607 * 730	1280 * 1607 * 730
	inch	50.4 * 63.3 * 28.7	50.4 * 63.3 * 28.7	50.4 * 63.3 * 28.7	50.4 * 63.3 * 28.7
Connecting Pipes	Liquid Pipes[mm(inch)]	Ø9.52(3/8)	Ø9.52(3/8)	Ø12.7(1/2)	Ø12.7(1/2)
	Low Pressure Pipes[mm(inch)]	Ø19.05(3/4)	Ø22.2(7/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)
	High Pressure Gas Pipes[mm(inch)]	Ø15.88(5/8)	Ø19.05(3/4)	Ø19.05(3/4)	Ø22.2(7/8)

Unit		2 outdoor units					3 outdoor units
System(HP)		16	18	20	22	24	26
Model		ARUB1608T1	ARUB1808T1	ARUB2008T1	ARUB2208T1	ARUB2408T1	ARUB2608T1
		ARUB808T1	ARUB1008T1	ARUB1008T1	ARUB1208T1	ARUB1208T1	ARUB1008T1
		ARUS808T1	ARUS808T1	ARUS1008T1	ARUS1008T1	ARUS1208T1	ARUS808T1
							ARUS808T1
Refrigerant	Charge(kg/Oz)	16/564.4	16/564.4	16/564.4	16/564.4	16/564.4	24/846.6
	Type	R410a	R410a	R410a	R410a	R410a	R410a
	CF(Correction Factor)	-2	-1	0	1	2	-2
Max. Connectable No. of Indoor Units		20	20	20	22	24	32
Net Weight	kg	300x2	300x2	300x2	300x2	300x2	300x3
	lbs	661.4x2	661.4x2	661.4x2	661.4x2	661.4x2	661.4x3
Dimensions (W*H*D)	mm	1280 * 1607 * 730)x2	1280 * 1607 * 730)x2	1280 * 1607 * 730)x2	1280 * 1607 * 730)x2	1280 * 1607 * 730)x2	1280 * 1607 * 730)x3
	inch	(50.4 * 63.3 * 28.7)x2	(50.4 * 63.3 * 28.7)x2	(50.4 * 63.3 * 28.7)x2	(50.4 * 63.3 * 28.7)x2	(50.4 * 63.3 * 28.7)x2	(50.4 * 63.3 * 28.7)x3
Connecting Pipes	Liquid Pipes[mm(inch)]	Ø12.7(1/2)	Ø15.88(5/8)	Ø15.88(5/8)	Ø15.88(5/8)	Ø15.88(5/8)	Ø19.05(3/4)
	Low Pressure Pipes[mm(inch)]	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø34.9(1 3/8)	Ø34.9(1 3/8)	Ø34.9(1 3/8)
	High Pressure Gas Pipes[mm(inch)]	Ø22.2(7/8)	Ø22.2(7/8)	Ø22.2(7/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)

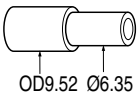
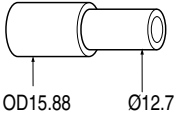
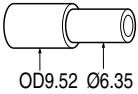
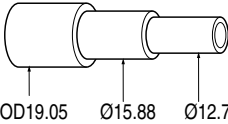
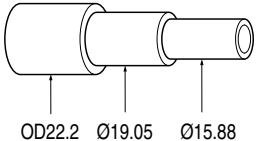
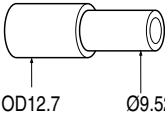
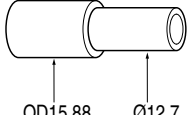
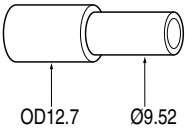
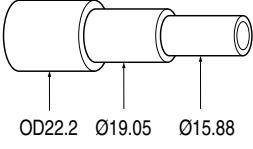
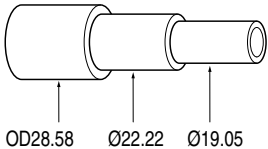
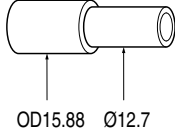
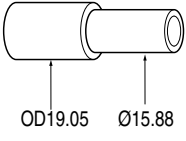
Unit		3 outdoor units						
System(HP)		28	30	32	34	36	38	40
Model		ARUB2808T1	ARUB3008T1	ARUB3208T1	ARUB3408T1	ARUB3608T1	ARUB3808T1	ARUB4008T1
		ARUB1008T1	ARUB1008T1	ARUB1208T1	ARUB1208T1	ARUB1208T1	ARUB1408T1	ARUB1408T1
		ARUS1008T1	ARUS1008T1	ARUS1008T1	ARUS1208T1	ARUS1208T1	ARUS1208T1	ARUS1408T1
		ARUS808T1	ARUS1008T1	ARUS1008T1	ARUS1008T1	ARUS1208T1	ARUS1208T1	ARUS1208T1
Refrigerant	Charge(kg/Oz)	24/846.6	24/846.6	24/846.6	24/846.6	24/846.6	24/846.6	24/846.6
	Type	R410a	R410a	R410a	R410a	R410a	R410a	R410a
	CF(Correction Factor)	-1	0	1	2	3	4	5
Max. Connectable No. of Indoor Units		32	32	32	34	36	38	40
Net Weight	kg	300x3	300x3	300x3	300x3	300x3	300x3	300x3
	lbs	661.4x3	661.4x3	661.4x3	661.4x3	661.4x3	661.4x3	661.4x3
Dimensions (W*H*D)	mm	(1280 * 1607 * 730)x3	(1280 * 1607 * 730)x3	(1280 * 1607 * 730)x3	(1280 * 1607 * 730)x3	(1280 * 1607 * 730)x3	(1280 * 1607 * 730)x3	(1280 * 1607 * 730)x3
	inch	(50.4 * 63.3 * 28.7)x3	(50.4 * 63.3 * 28.7)x3	(50.4 * 63.3 * 28.7)x3	(50.4 * 63.3 * 28.7)x3	(50.4 * 63.3 * 28.7)x3	(50.4 * 63.3 * 28.7)x3	(50.4 * 63.3 * 28.7)x3
Connecting Pipes	Liquid Pipes[mm(inch)]	Ø19.05(3/4)	Ø19.05(3/4)	Ø19.05(3/4)	Ø19.05(3/4)	Ø19.05(3/4)	Ø19.05(3/4)	Ø19.05(3/4)
	Low Pressure Pipes[mm(inch)]	Ø34.9(1 3/8)	Ø34.9(1 3/8)	Ø34.9(1 3/8)	Ø34.9(1 3/8)	Ø41.3(1 5/8)	Ø41.3(1 5/8)	Ø41.3(1 5/8)
	High Pressure Gas Pipes[mm(inch)]	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø34.9(1 3/8)	Ø34.9(1 3/8)

## 6. HR Units Information

### 6.1 HR Units (Power Supply : 1Ø, 220~240V, 50Hz)

Model		PRHR020	PRHR030	PRHR040
Max. Connectable No. of Indoor Units		2	3	4
Net Weight	kg	20	22	24
	lbs	44.1	48.5	52.9
Dimensions (W*H*D)	inch	23.7*10.6*22.1	23.7*10.6*22.1	23.7*10.6*22.1
	mm	601*270*562	601*270*562	601*270*562
Connecting Pipes	Liquid Pipes[mm(inch)]	Ø9.52[3/8]	Ø12.7[1/2]	Ø12.7[1/2]
	Low Pressure Pipes[mm(inch)]	Ø9.52[3/8]	Ø12.7[1/2]	Ø12.7[1/2]
	High Pressure Gas Pipes[mm(inch)]	Ø19.05[3/4]	Ø22.2[7/8]	Ø22.2[7/8]

### 6.2. Reducers for Indoor Units and HR Units

Models	Liquid pipe	Gas pipe	
		High pressure	Low pressure
Indoor unit reducer			
HR unit reducer	PRHR020 		
			
PRHR030 / PRHR040			
			



# Part 2

## Indoor Units

<b>Ceiling Cassette</b>	
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Convertible .....	145
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Floor Standing.....	157



# Ceiling Mounted Cassette Type (1Way)

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# 1. Specifications

\* Model Name  
A:Basic, C:Plasma

Type		1Way Ceiling Cassette			
Model	Unit	ARNU07GTJ*1	ARNU09GTJ*1	ARNU12GTJ*1	
Cooling Capacity	W	2,200	2,800	3,600	
	kcal/h	1,900	2,400	3,100	
	Btu/h	7,500	9,600	12,300	
Heating Capacity	W	2,500	3,200	4,000	
	kcal/h	2,200	2,800	3,400	
	Btu/h	8,500	10,900	13,600	
Casing		Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate	
Dimensions (W*D*H)	Body	mm	860x410x138	860x410x138	860x410x138
		inch	33.8x16.1x5.4	33.8x16.1x5.4	33.8x16.1x5.4
	Front Panel	mm	1070x480x20	1070x480x20	1070x480x20
		inch	42.1x18.9x0.8	42.1x18.9x0.8	42.1x18.9x0.8
Coil	Rows x Columns x FPI	2x9x21	2x9x21	2x9x21	
	Face Area	m <sup>2</sup>	0.13	0.13	0.13
Fan	Type	Cross Flow Fan	Cross Flow Fan	Cross Flow Fan	
	Motor Output x Number	W	45	45	45
	Running Current	A	0.18	0.18	0.18
	Air Flow Rate(H/M/L)	cmm	7.5/6.5/6	7.5/6.5/6	8/7/6
		cfm	265/229/212	265/229/212	283/247/212
	Drive	Direct	Direct	Direct	
Motor type	BLDC	BLDC	BLDC		
Temperature Control		Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material		Foamed polystyrene	Foamed polystyrene	Foamed polystyrene	
Safety Device		Fuse	Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø6.35(1/4)	Ø6.35(1/4)
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø12.7(1/2)	Ø12.7(1/2)
	Drain Pipe(Internal Dia.)	mm	25.0	25.0	25.0
Net Weight	kg(lbs)	15(33.1)	15(33.1)	15(33.1)	
Noise Level(Sound Press, 1.5m, H/M/L)	dBA±3	40/38/37	40/38/37	41/39/37	
Power Supply	Ø / V / Hz	1, 220 ~ 240, 50	1, 220 ~ 240, 50	1, 220 ~ 240, 50	
		1, 220, 60	1, 220, 60	1, 220, 60	
Refrigerant Control		EEV	EEV	EEV	
Power cable		CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	
Panel Color		Morning fog	Morning fog	Morning fog	
Panel Name(Acc'y)		PT-HJ*			

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are Net Capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

5. To be added for more available Models



## 2. Functions

### Indoor Unit

#### Operation ON/OFF by Remote controller

#### Sensing the Room Temperature

- Room temperature sensor. (Thermistor)

#### Room temperature control

- Maintains the room temperature in accordance with the Setting Temperature.

#### Starting Current Control

- Indoor fan is delayed for 5 seconds at the starting.

#### Indoor Fan Speed Control

- Jet, High, Med, Low, Lolow

#### Soft Dry Operation Mode

- Intermittent operation of fan at low speed.

#### Airflow Direction Control

- The louver can be set at swing up and down automatically.

#### Auto Restart

- Although the air-conditioner is turned off by a power failure, it is restarted automatically previous operation mode after power supply.

#### Deice (defrost) control (Heating)

- Both the indoor and outdoor fan stops during defrosting.
- Hot start after defrost ends.

#### Hot-start Control (Heating)

- The indoor fan does not rotate until the evaporator piping temperature will be reached at 25°C.

#### Compact and light design

- To install a unit is very convenient because of smaller size than textile.

#### Low noise

- The most advanced low-noise design.
- The adoption of turbo fan and round type heat exchanger give the quietest operation.

#### Long life filter

- Long life wrinkle(type) and washable and anti-bacteria filter is adopted.

#### High head Drain pump

- Built-in drain pump automatically drains water.
- A standard drain-head height of up to 700mm is possible.

#### High-Ceiling corresponding Function

- According to the height of ceiling, the RPM of indoor fan motor is selected to increase air reaching distance.

#### Central Control(Optional)

- It is operating individually or totally by central control function.

#### Auto Change Over

- It is operating cooling and heating mode automatically according to setting temperature.

# 3. Operation Details

## The functions of main control

### ■ Auto Swing Control

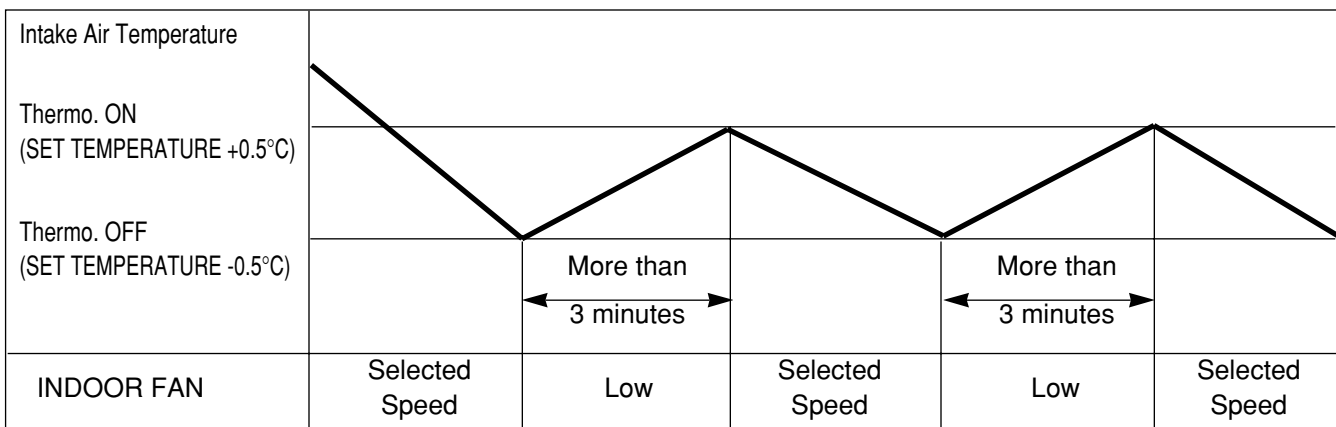
- This function is to swing the louver up and down automatically.

### ■ Soft-Dry Operation

- The indoor fan speed is automatically set to the low, so the shift of the indoor fan speed is impossible because of already being set to the best speed for Dry Operation by microcontroller control.

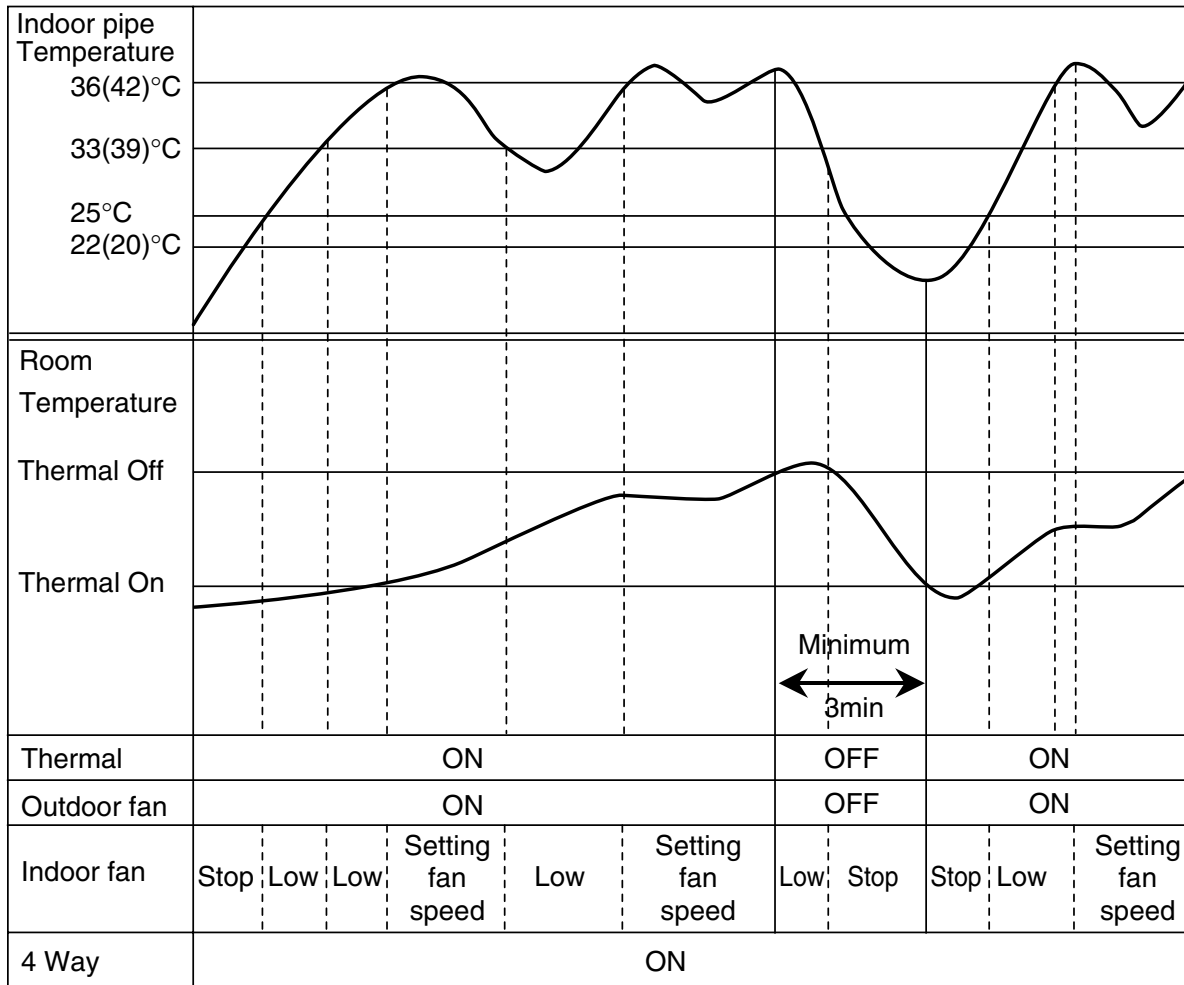
### ■ Cooling Mode Operation

- When selecting the Cooling( \* ) Mode Operation, the unit will operate according to the setting by the remote controller and the operation diagram is as following



## ■ Heating Mode Operation

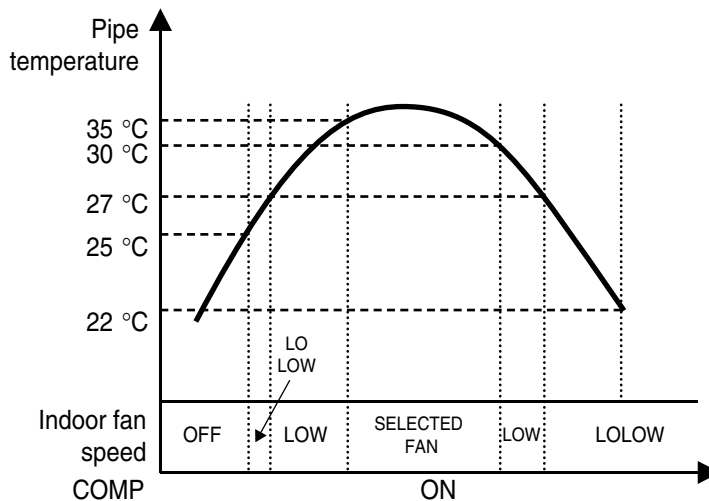
The unit will operate according to the setting by the remote controller and the operation diagram is shown as following.



	Thermal ON	Thermal OFF
Indoor Unit mode	ST+2	ST+4
2TH (Remo.+Indoor)	To be selected lower temperature contrast Indoor Unit and Remo.	To be selected lower temperature contrast Indoor Unit and Remo.
Remo. mode	ST+0	ST+2

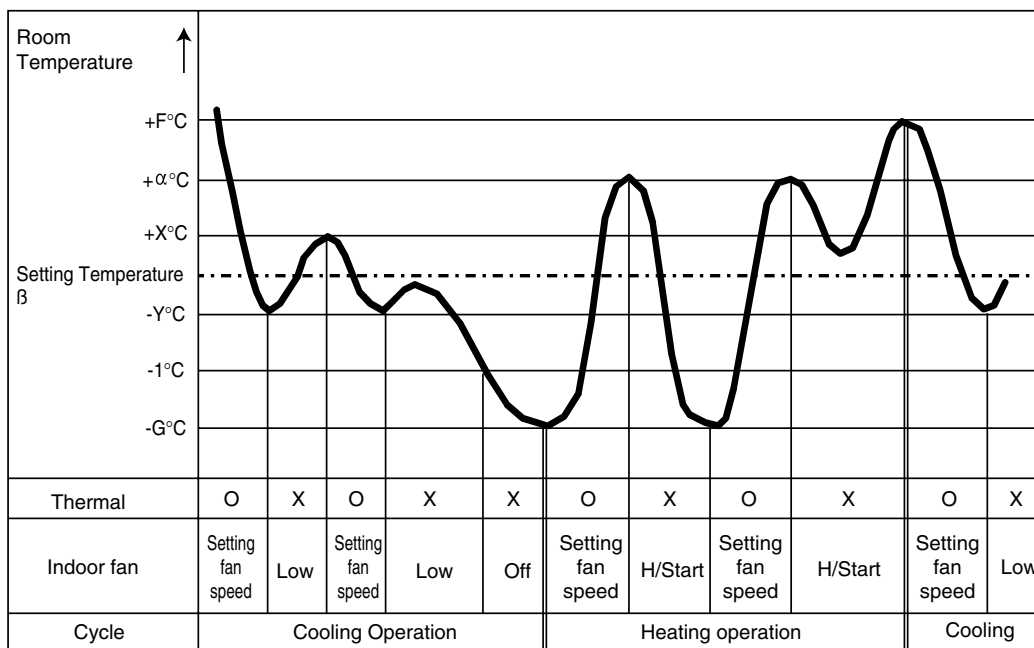
### Hot-start Control

- The indoor fan does not rotate until the evaporator piping temperature will be reached to 25°C.
- The operation diagram is as following.



### Auto Change Over

- In response to user's wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)^\circ\text{C}$	Cooling → Heating
$T_{ai} \geq T_s + F(2)^\circ\text{C}$	Heating → Cooling

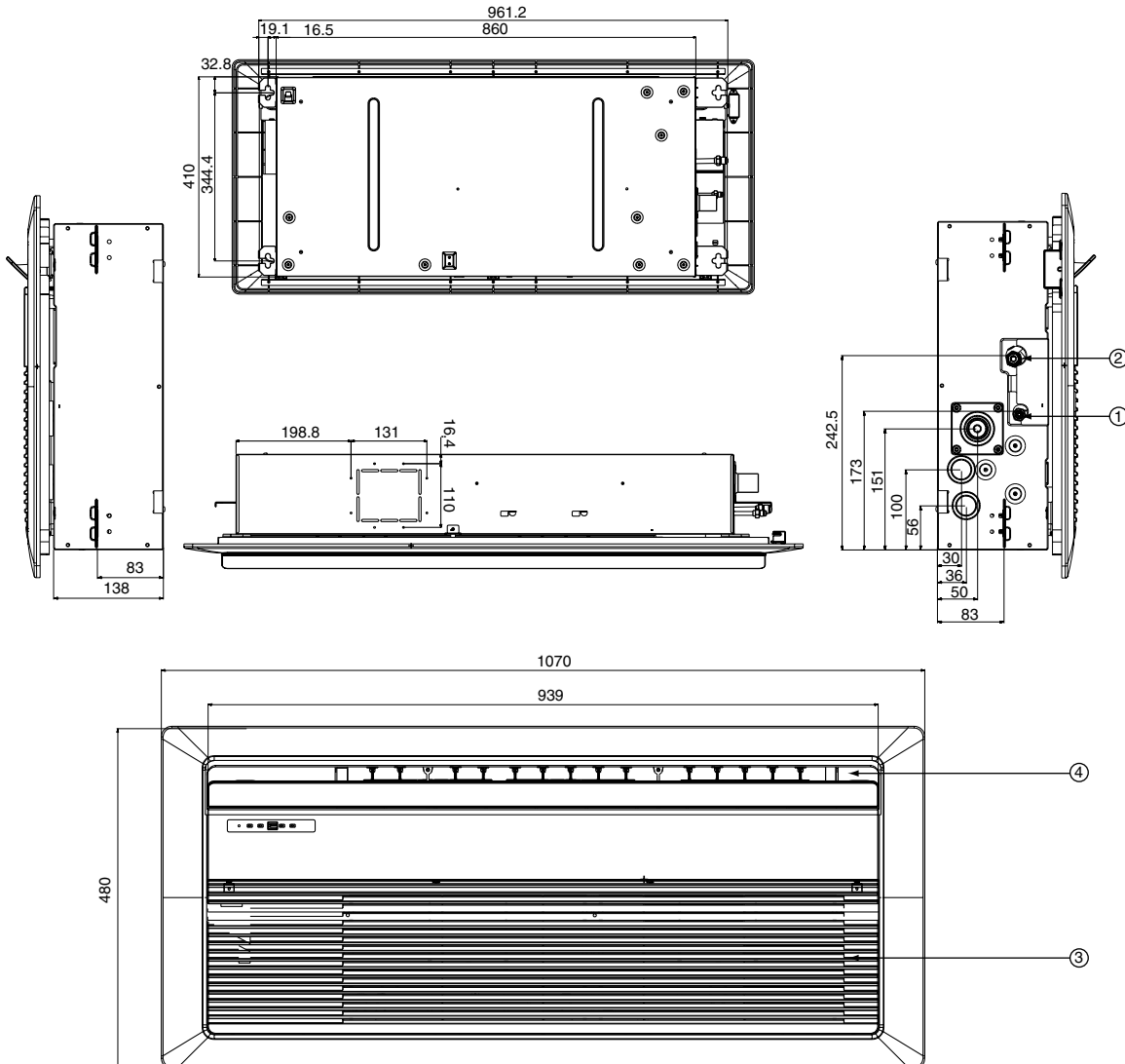
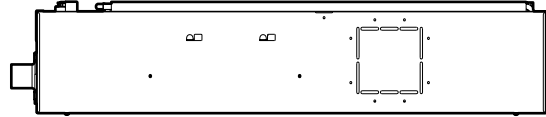
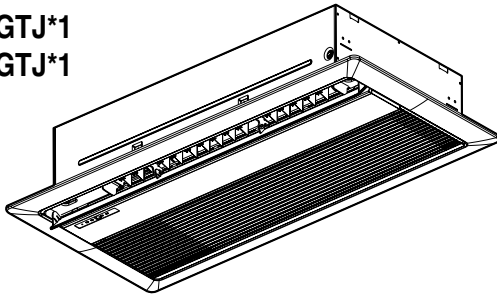
Definition		Default(°C)
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
$\alpha$	Thermal Off Temperature for Heating	1
$\beta$	Thermal On Temperature for Heating	0

\*  $T_{ai}$  : Indoor Temperature

\*  $T_s$  : Setting Temperature

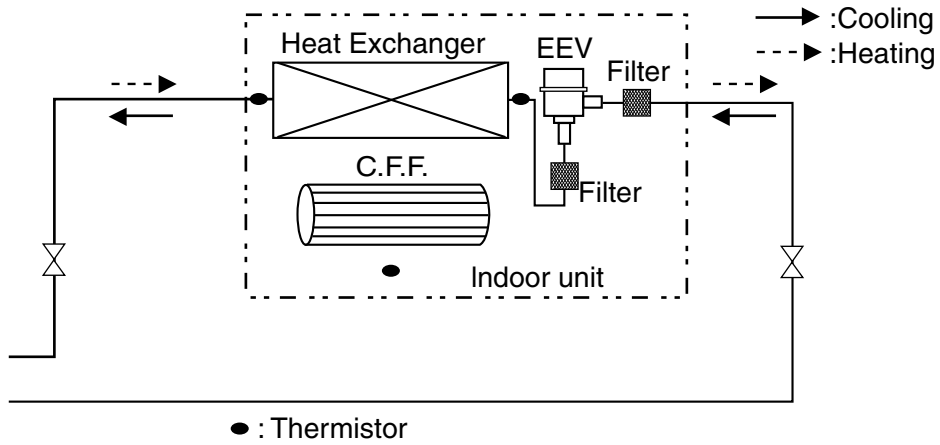
# 4. Dimensions

ARNU07GTJ\*1  
 ARNU09GTJ\*1  
 ARNU12GTJ\*1



Number	Name	Description
1	Liquid pipe connection	ø6.35 flare
2	Gas pipe connection	ø12.7 flare
3	Air suction grill	
4	Air discharge grill	

# 5. Piping Diagrams

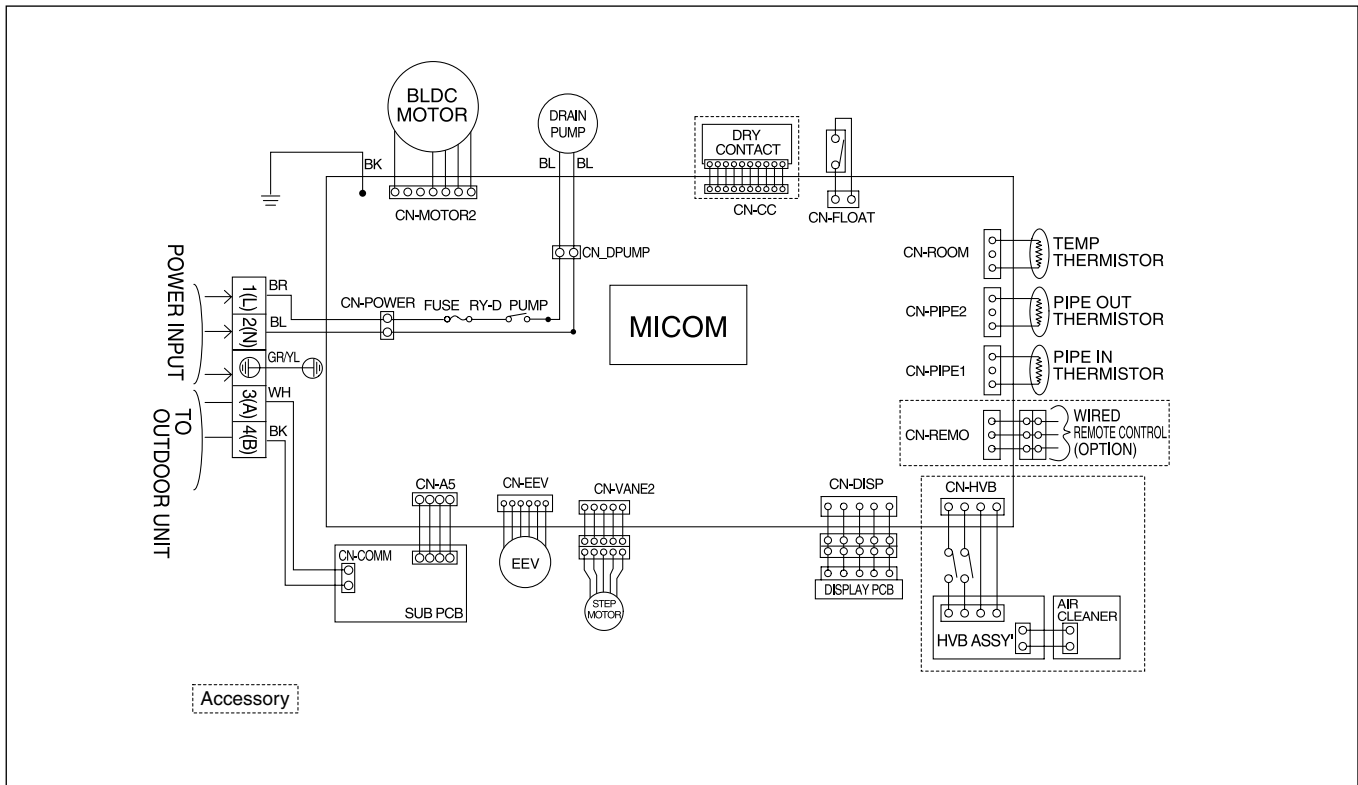


Refrigerant pipe connection port diameter

[unit: mm(inch)]

Model	Gas	Liquid
ARNU07GTJ*1	12.7(1/2)	6.35(1/4)
ARNU09GTJ*1		
ARNU12GTJ*1		

# 6. Wiring Diagrams



CONNECTOR NUMBER	LOCATION POINT	FUNCTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR2	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-COMM	COMMUNICATION	CONNECTION BETWEEN INDOOR AND OUTDOOR
CN-DISP1	DISPLAY	DISPLAY OF INDOOR STATUS
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-STEP/M1	STEP MOTOR	STEP MOTOR OUTPUT
CN-FLOAT	FLOAT SWITCH INPUT	FLOAT SWITCH SENSING
CN-PIPE	PIPE SENSOR	PIPE THERMISTOR
CN-PIPE/O	DISCHARGE PIPE SENSOR	DISCHARGE PIPE THERMISTOR
CN-ROOM	ROOM SENSOR	ROOM THERMISTOR
CN-REMO	REMOTE CONTROLLER	REMOTE CONTROL LINE





## Ceiling Mounted Cassette Type (2Way)

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<b>4. Dimensions .....</b>	<b>40</b>
<b>5. Piping Diagrams .....</b>	<b>41</b>
<b>6. Wiring Diagrams .....</b>	<b>42</b>

# 1. Specifications

\* Model Name  
A:Basic, C:Plasma

Type			2Way Ceiling Cassette
Model		Unit	ARNU18GTL*1
Cooling Capacity		W	5,600
		kcal/h	4,800
		Btu/h	19,100
Heating Capacity		W	6,300
		kcal/h	5,400
		Btu/h	21,500
Casing			Galvanized Steel Plate
Dimensions (W*D*H)	Body	mm	830x550x225
		inch	32.6x21.6x8.9
	Front Panel	mm	1050x640x28.5
		inch	41.3x25.2x1.1
Coil	Rows x Columns x FPI		2x11x20
	Face Area	m <sup>2</sup>	0.13
Fan	Type		Cross Flow Fan
	Motor Output x Number	W	70
	Running Current	A	0.36
	Air Flow Rate(H/M/L)	cmm	13/12/10
		cfm	459/424/353
	Drive	Direct	
Motor type	BLDC		
Temperature Control			Microprocessor, Thermostat for cooling and heating
Sound Absorbing Thermal Insulation Material			Foamed polystyrene
Safety Device			Fuse
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)
	Gas Side	mm(inch)	Ø12.7(1/2)
	Drain Pipe(Internal Dia.)	mm	25.0
Net Weight		kg(lbs)	28(61.7)
Noise Level(Sound Press, 1.5m, H/M/L)		dBA±3	40/35/30
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60
Refrigerant Control			EEV
Power cable			CV2.0 X 3C
Transmission cable			CVV-SB 1.25 X 2C
Panel Color			Morning fog
Panel Name(Acc'y)			PT-HL*

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are Net Capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

5. To be added for more available Models

\* Model Name  
A:Basic, C:Plasma

Type			2Way Ceiling Cassette
Model		Unit	ARNU24GTL*1
Cooling Capacity		W	7,100
		kcal/h	6,100
		Btu/h	24,200
Heating Capacity		W	8,000
		kcal/h	6,900
		Btu/h	27,300
Casing			Galvanized Steel Plate
Dimensions (W*D*H)	Body	mm	830x550x225
		inch	32.6x21.6x8.9
	Front Panel	mm	1050x640x28.5
		inch	41.3x25.2x1.1
Coil	Rows x Columns x FPI		2x11x20
	Face Area	m <sup>2</sup>	0.13
Fan	Type		Cross Flow Fan
	Motor Output x Number	W	70
	Running Current	A	0.36
	Air Flow Rate(H/M/L)	cmm	17/15/13
		cfm	601/530/459
	Drive		Direct
Motor type		BLDC	
Temperature Control			Microprocessor, Thermostat for cooling and heating
Sound Absorbing Thermal Insulation Material			Foamed polystyrene
Safety Device			Fuse
Pipe Connections	Liquid Side	mm(inch)	Ø9.52(3/8)
	Gas Side	mm(inch)	Ø15.88(5/8)
	Drain Pipe(Internal Dia.)	mm	25.0
Net Weight		kg(lbs)	28(61.7)
Noise Level(Sound Press, 1.5m, H/M/L)		dBA±3	42/37/32
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60
Refrigerant Control			EEV
Power cable			CV2.0 X 3C
Transmission cable			CVV-SB 1.25 X 2C
Panel Color			Morning fog
Panel Name(Acc'y)			PT-HL*

**Notes:-**

- Capacities are based on the following conditions:
  - Cooling
    - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
    - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
  - Heating
    - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
    - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
- Capacities are Net Capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve
- To be added for more available Models

## 2. Functions

### Indoor Unit

**Operation ON/OFF by Remote controller**

**Sensing the Room Temperature**

- Room temperature sensor. (Thermistor)

**Room temperature control**

- Maintains the room temperature in accordance with the Setting Temperature.

**Starting Current Control**

- Indoor fan is delayed for 5 seconds at the starting.

**Indoor Fan Speed Control**

- Jet, High, Med, Low, Lolow

**Soft Dry Operation Mode**

- Intermittent operation of fan at low speed.

**Airflow Direction Control**

- The louver can be set at swing up and down automatically.

**Auto Restart**

- Although the air-conditioner is turned off by a power failure, it is restarted automatically previous operation mode after power supply.

**Deice (defrost) control (Heating)**

- Both the indoor and outdoor fan stops during defrosting.
- Hot start after defrost ends.

**Hot-start Control (Heating)**

- The indoor fan does not rotate until the evaporator piping temperature will be reached at 25°C.

**Compact and light design**

- To install a unit is very convenient because of smaller size than textile.

**Low noise**

- The most advanced low-noise design.
- The adoption of turbo fan and round type heat exchanger give the quietest operation.

**Long life filter**

- Long life wrinkle(type) and washable and anti-bacteria filter is adopted.

**High head Drain pump**

- Built-in drain pump automatically drains water.
- A standard drain-head height of up to 700mm is possible.

**High-Ceiling corresponding Function**

- According to the height of ceiling, the RPM of indoor fan motor is selected to increase air reaching distance.

**Central Control(Optional)**

- It is operating individually or totally by central control function.

**Auto Change Over**

- It is operating cooling and heating mode automatically according to setting temperature.

# 3. Operation Details

## The functions of main control

### ■ Auto Swing Control

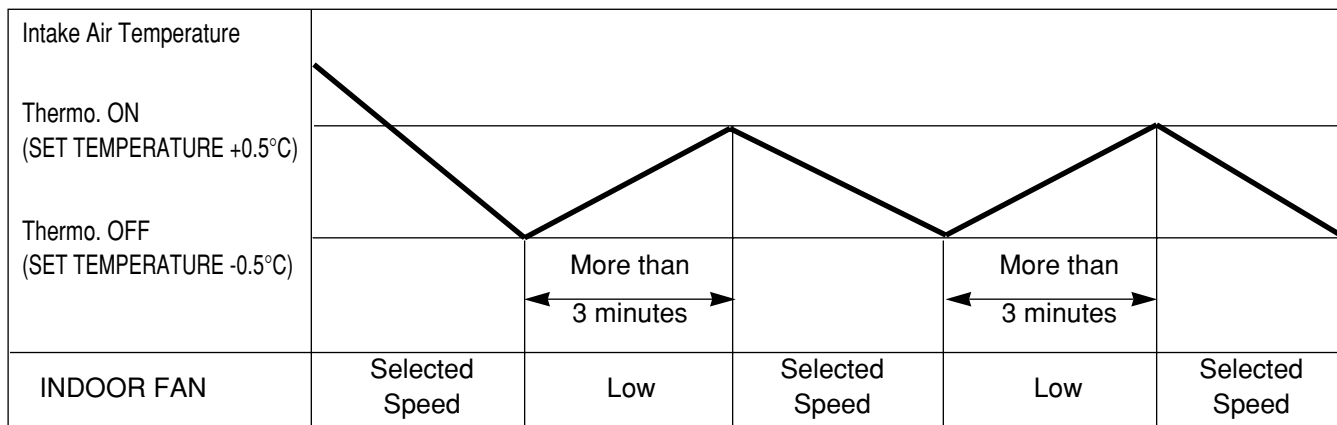
- This function is to swing the louver up and down automatically.

### ■ Soft-Dry Operation

- The indoor fan speed is automatically set to the low, so the shift of the indoor fan speed is impossible because of already being set to the best speed for Dry Operation by microcontroller control.

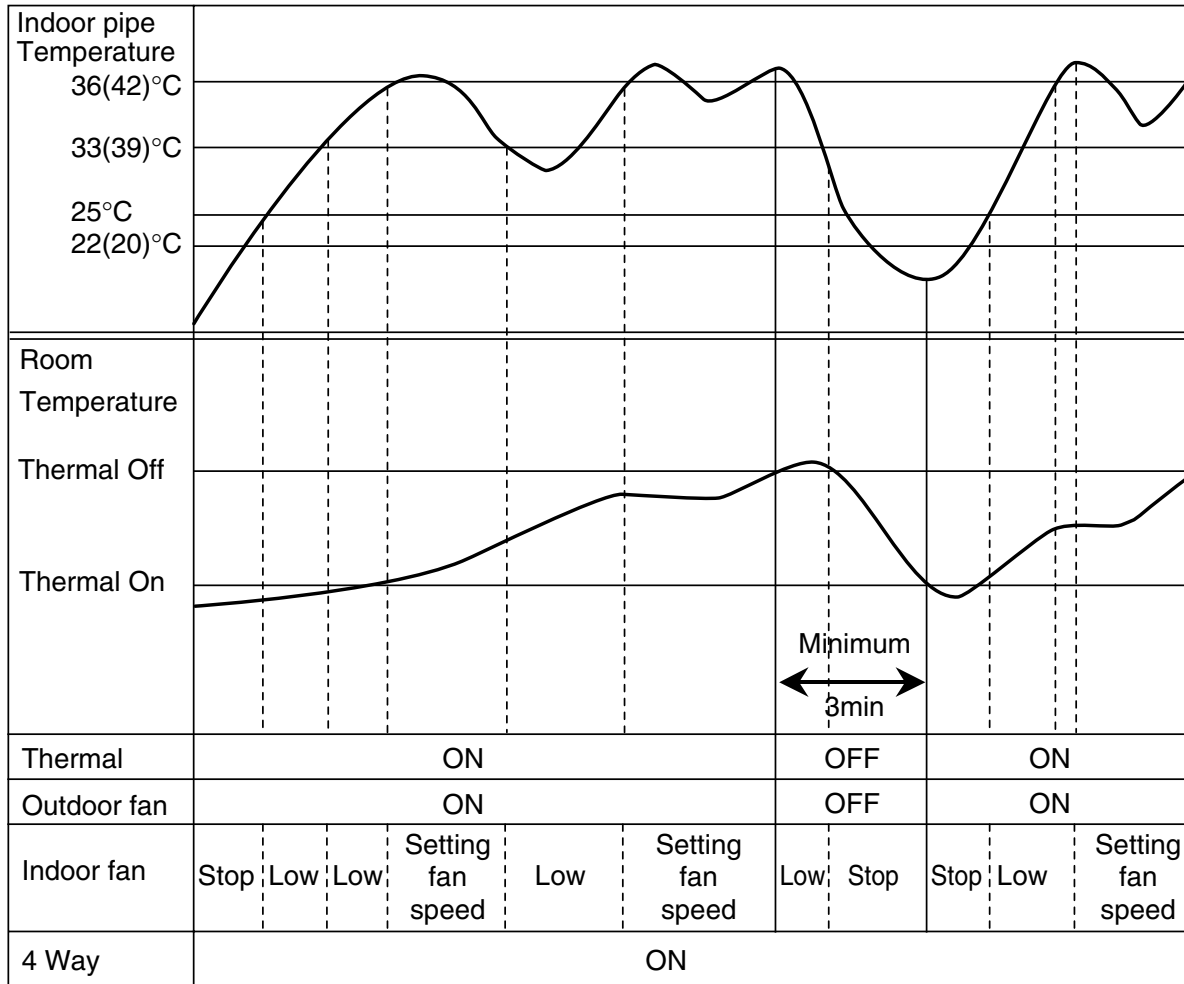
### ■ Cooling Mode Operation

- When selecting the Cooling(※) Mode Operation, the unit will operate according to the setting by the remote controller and the operation diagram is as following



## ■ Heating Mode Operation

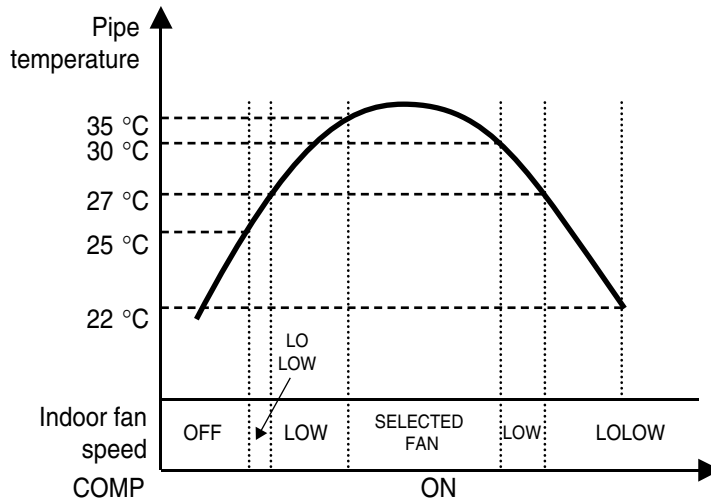
The unit will operate according to the setting by the remote controller and the operation diagram is shown as following.



	Thermal ON	Thermal OFF
Indoor Unit mode	ST+2	ST+4
2TH (Remo.+Indoor)	To be selected lower temperature contrast Indoor Unit and Remo.	To be selected lower temperature contrast Indoor Unit and Remo.
Remo. mode	ST+0	ST+2

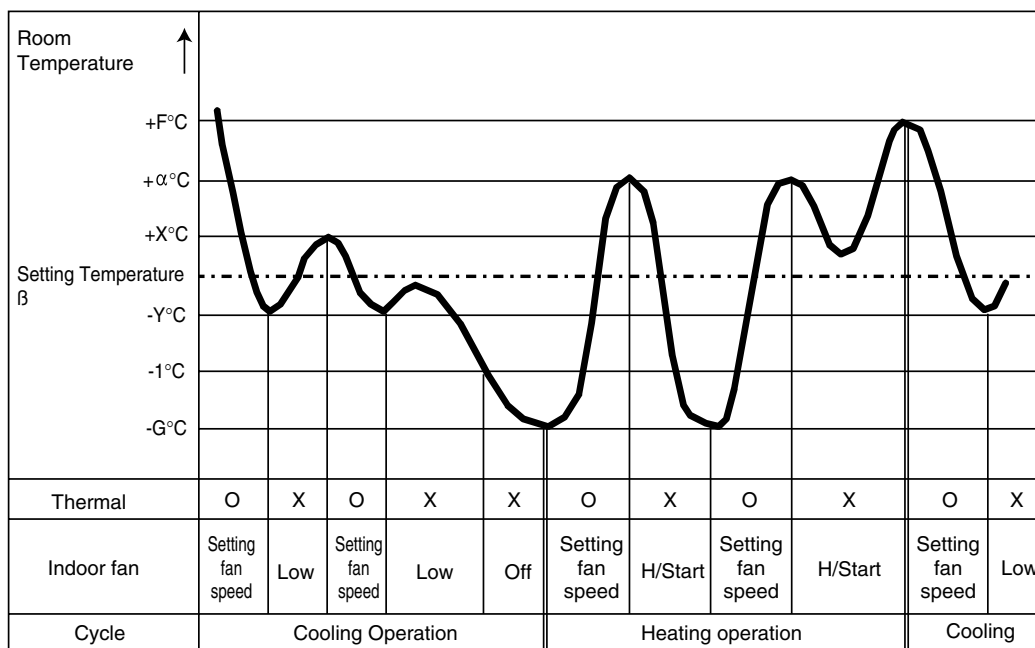
### Hot-start Control

- The indoor fan does not rotate until the evaporator piping temperature will be reached to 25°C.
- The operation diagram is as following.



### Auto Change Over

- In response to user's wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

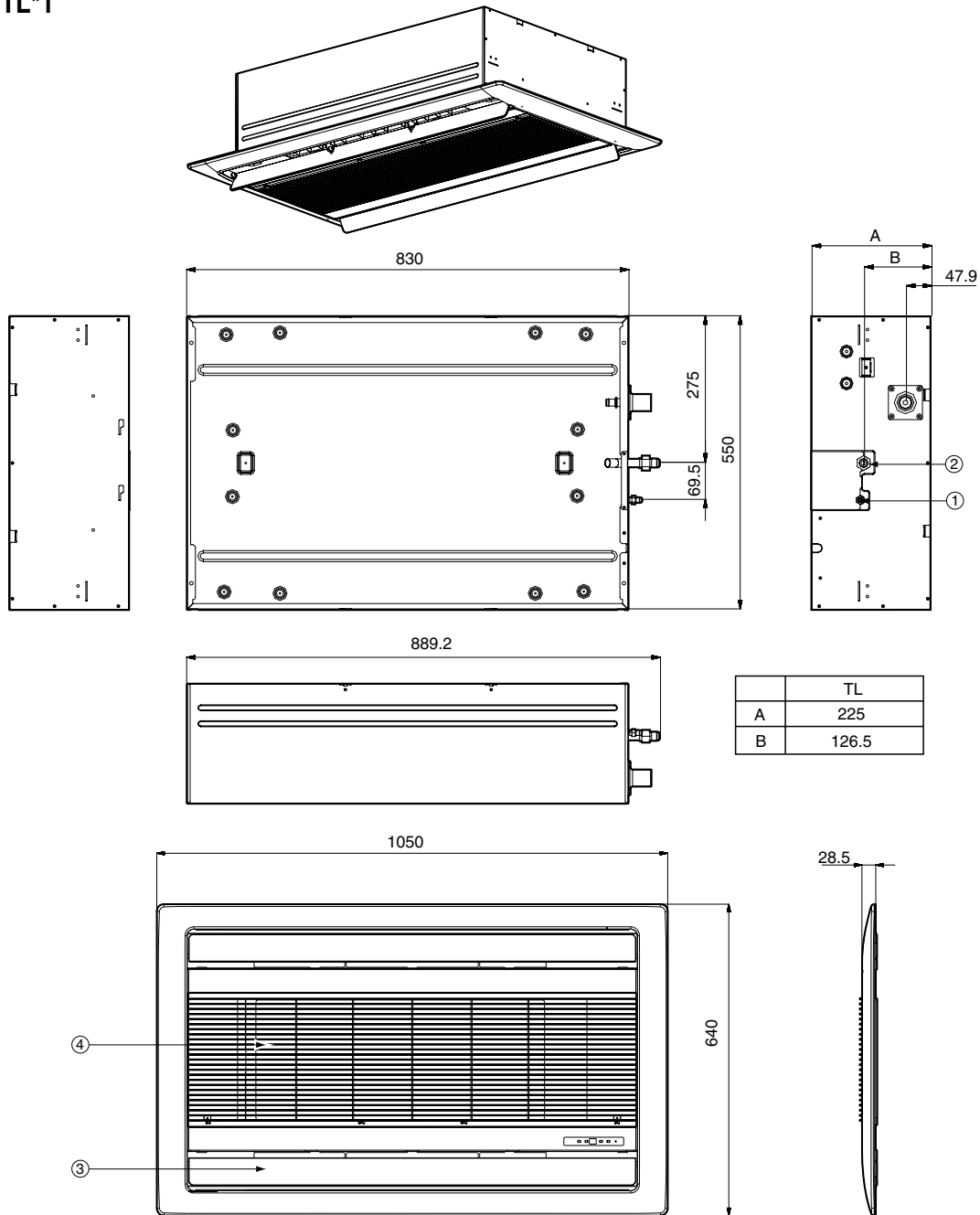
Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)$	Cooling → Heating

- \*  $T_{ai}$  : Indoor Temperature
- \*  $T_s$  : Setting Temperature

	Definition	Default( )
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
α	Thermal Off Temperature for Heating	1

# 4. Dimensions

ARNU18GTL\*1  
ARNU24GTL\*1

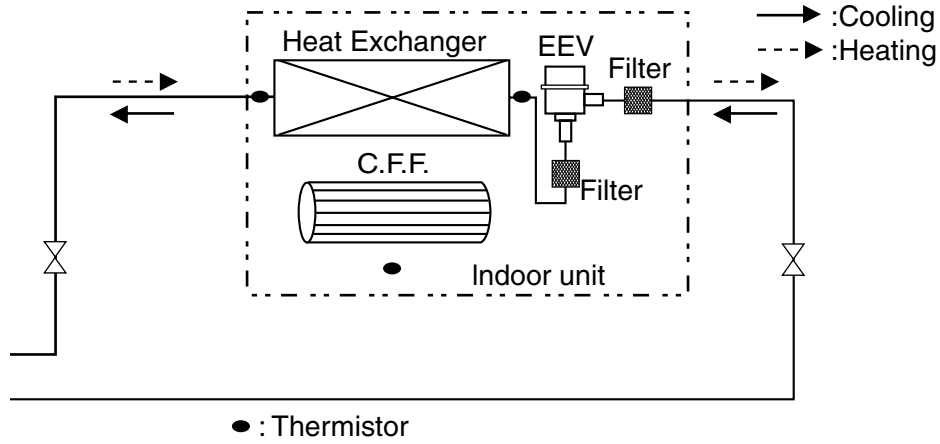


(unit : mm)

Number	Name	Description
1	Liquid pipe connection	(18k) Ø6.35, (24k)Ø9.52
2	Gas pipe connection	(18k) Ø12.7, (24k)Ø15.88
3	Air discharge grill	
4	Air suction grill	



# 5. Piping Diagrams



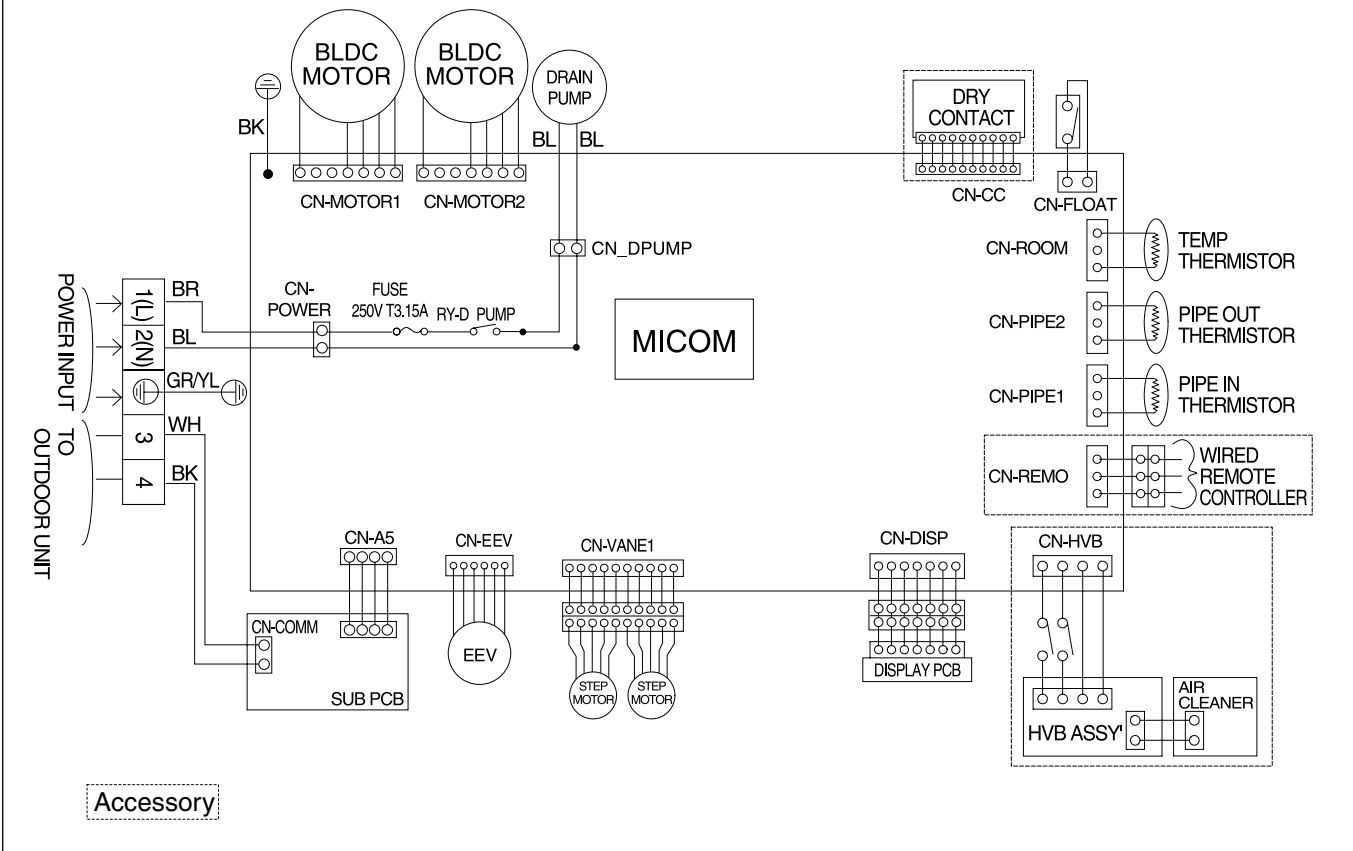
Refrigerant pipe connection port diameter

[unit: mm(inch)]

Model	Gas	Liquid
ARNU18GTL*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU24GTL*1	Ø15.88(5/8)	Ø9.52(3/8)

# 6. Wiring Diagrams

## INDOOR DIAGRAM



CONNECTOR NUMBER	SPEC	DESCRIPTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR2	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-COMM	COMMUNICATION	CONNECTION BETWEEN INDOOR AND OUTDOOR
CN-DISP1	DISPLAY	DISPLAY OF INDOOR STATUS
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-VANE1	STEP MOTOR	STEP MOTOR OUTPUT
CN-FLOAT	FLOAT SWITCH INPUT	FLOAT SWITCH SENSING
CN-PIPE1	PIPE SENSOR	PIPE THERMISTOR
CN-PIPE2	DISCHARGE PIPE SENSOR	DISCHARGE PIPE THERMISTOR
CN-ROOM	ROOM SENSOR	ROOM THERMISTOR
CN-REMO	REMOTE CONTROLLER	REMOTE CONTROL LINE

## Ceiling Mounted Cassette Type (4Way)

<b>1. Specifications .....</b>	<b>44</b>
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<b>4. Dimensions .....</b>	<b>51</b>
<b>5. Piping Diagrams .....</b>	<b>53</b>
<b>6. Wiring Diagrams .....</b>	<b>54</b>

# 1. Specifications

Type		4 Way Ceiling Cassette			
Model	Unit	ARNU09GTE*1	ARNU12GTE*1	ARNU18GTE*1	
Cooling Capacity	W	2,800	3,600	5,600	
	kcal/h	2,400	3,100	4,800	
	Btu/h	9,600	12,300	19,100	
Heating Capacity	W	3,200	4,000	6,300	
	kcal/h	2,800	3,400	5,400	
	Btu/h	10,900	13,600	21,500	
Casing		Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate	
Dimensions (W*D*H)	Body	mm	570x570x269	570x570x269	570x570x269
		inch	22.4x22.4x10.5	22.4x22.4x10.5	22.4x22.4x10.5
	Front Panel	mm	670x670x30	670x670x30	670x670x30
		inch	26.4x26.4x1.2	26.4x26.4x1.2	26.4x26.4x1.2
Coil	Rows x Columns x FPI	2x11x18	2x11x18	2x11x18	
	Face Area	m <sup>2</sup>	0.32	0.32	0.32
Fan	Type	Turbo Fan	Turbo Fan	Turbo Fan	
	Motor Output x Number	W	40	40	40
	Running Current	A	0.18	0.18	0.18
	Air Flow Rate(H/M/L)	cmm	9/8/7	11/10/9	13/12/10
		cfm	318/282/247	389/353/318	459/424/353
	Drive	Direct	Direct	Direct	
Motor type	BLDC	BLDC	BLDC		
Temperature Control		Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material		Foamed polystyrene	Foamed polystyrene	Foamed polystyrene	
Safety Device		Fuse	Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø6.35(1/4)	Ø6.35(1/4)
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø12.7(1/2)	Ø12.7(1/2)
	Drain Pipe(Internal Dia.)	mm	25.0	25.0	25.0
Net Weight	kg(lbs)	19(41.9)	19(41.9)	19(41.9)	
Noise Level(Sound Press, 1.5m, H/M/L)	dBA±3	39/33/30	41/35/32	43/37/35	
Power Supply	Ø / V / Hz	1, 220 ~ 240, 50	1, 220 ~ 240, 50	1, 220 ~ 240, 50	
		1, 220, 60	1, 220, 60	1, 220, 60	
Refrigerant Control		EEV	EEV	EEV	
Power cable	mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable	mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	
Panel Color		Morning fog	Morning fog	Morning fog	

**Notes:-**

- Capacities are based on the following conditions:
  - Cooling
    - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
    - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
  - Heating
    - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
    - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero

- Capacities are net capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve
- To be added for more available Models

\* A : Basic Model  
 B : Plasma Model

Type			4 Way Ceiling Cassette			
Model	Unit		ARNU24GTH*1	ARNU28GTH*1	ARNU36GTD*1	
Cooling Capacity	W		7,100	8,200	10,600	
	kcal/h		6,100	7,100	9,100	
	Btu/h		24,200	28,000	36,200	
Heating Capacity	W		8,000	9,200	11,900	
	kcal/h		6,900	8,000	10,200	
	Btu/h		27,300	31,500	40,600	
Casing			Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate	
Dimensions (W*D*H)	Body	mm	840x840x225	840x840x225	840x840x288	
		inch	33.0x33.0x8.9	33.0x33.0x8.9	33.0x33.0x11.3	
	Front Panel	mm	950x950x30	950x950x30	950x950x30	
		inch	37.4x37.4x1.2	37.4x37.4x1.2	37.4x37.4x1.2	
Coil	Rows x Columns x FPI		2x9x18	2x9x18	2x12x19	
	Face Area	m <sup>2</sup>	0.43	0.43	0.57	
Fan	Type		Turbo Fan	Turbo Fan	Turbo Fan	
	Motor Output x Number	W	33	33	144	
	Running Current	A	0.15	0.15	0.56	
	Air Flow Rate(H/M/L)	cmm		17/15/13	19/16/14	25/21/19
		cfm		600/529/459	671/565/494	883/742/671
	Drive		Direct	Direct	Direct	
Motor type		BLDC	BLDC	BLDC		
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	Foamed polystyrene	
Safety Device			Fuse	Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø9.52(3/8)	Ø9.52(3/8)	Ø9.52(3/8)	
	Gas Side	mm(inch)	Ø15.88(5/8)	Ø15.88(5/8)	Ø15.88(5/8)	
	Drain Pipe(Internal Dia.)	mm	25.0	25.0	25.0	
Net Weight		kg(lbs)	24(52.9)	24(52.9)	32(70.5)	
Noise Level(Sound Press, 1.5m, H/M/L)		dBA±3	38/35/31	39/38/32	43/40/39	
Power Supply	Ø / V / Hz		1, 220 ~ 240, 50	1, 220 ~ 240, 50	1, 220 ~ 240, 50	
			1, 220, 60	1, 220, 60	1, 220, 60	
Refrigerant Control			EEV	EEV	EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	
Panel Color			Morning fog	Morning fog	Morning fog	

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

5. To be added for more available Models

\* A : Basic Model

B : Plasma Model

## Specifications

Type			4 Way Ceiling Cassette		
Model	Unit		ARNU42GTD*1	ARNU48GTD*1	
Cooling Capacity	W		12,300	14,100	
	kcal/h		10,600	12,100	
	Btu/h		42,000	48,100	
Heating Capacity	W		13,800	15,900	
	kcal/h		11,000	13,200	
	Btu/h		43,800	51,200	
Casing			Galvanized Steel Plate	Galvanized Steel Plate	
Dimensions (W*D*H)	Body	mm	840x840x288	840x840x288	
		inch	33.0x33.0x11.3	33.0x33.0x11.3	
	Front Panel	mm	950x950x30	950x950x30	
		inch	37.4x37.4x1.2	37.4x37.4x1.2	
Coil	Rows x Columns x FPI		2x12x19	2x12x19	
	Face Area	m <sup>2</sup>	0.57	0.57	
Fan	Type		Turbo Fan	Turbo Fan	
	Motor Output x Number	W	144	144	
	Running Current	A	0.56	0.56	
	Air Flow Rate(H/M/L)	cmm		30/27/24	31/29/27
		cfm		1059/954/848	1095/1024/954
	Drive		Direct	Direct	
Motor type		BLDC	BLDC		
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	
Safety Device			Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø9.52(3/8)	Ø9.52(3/8)	
	Gas Side	mm(inch)	Ø15.88(5/8)	Ø15.88(5/8)	
	Drain Pipe(Internal Dia.)	mm	25.0	25.0	
Net Weight		kg(lbs)	32(70.5)	32(70.5)	
Noise Level(Sound Press, 1.5m, H/M/L)		dBA±3	44/42/40	45/43/41	
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	
Refrigerant Control			EEV	EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	
Panel Color			Morning fog	Morning fog	

### Notes:-

- Capacities are based on the following conditions:
    - Cooling
      - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
      - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
      - Interconnecting Piping Length 7.5m
      - Level Difference of Zero
    - Heating
      - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
      - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
      - Interconnecting Piping Length 7.5m
      - Level Difference of Zero
  - Capacities are net capacities
  - Due to our policy of innovation some specifications may be changed without notification
  - EEV : Electronic Expansion Valve
  - To be added for more available Models
- \* A : Basic Model  
B : Plasma Model

## 2. Functions

### Indoor Unit

#### Operation ON/OFF by Remote controller

#### Sensing the Room Temperature

- Room temperature sensor. (Thermistor)

#### Room temperature control

- Maintains the room temperature in accordance with the Setting Temperature.

#### Starting Current Control

- Indoor fan is delayed for 5 seconds at the starting.

#### Indoor Fan Speed Control

- Jet, High, Med, Low, Lolow

#### Soft Dry Operation Mode

- Intermittent operation of fan at low speed.

#### Airflow Direction Control

- The louver can be set at swing up and down automatically.

#### Auto Restart

- Although the air-conditioner is turned off by a power failure, it is restarted automatically previous operation mode after power supply.

#### Deice (defrost) control (Heating)

- Both the indoor and outdoor fan stops during defrosting.
- Hot start after defrost ends.

#### Hot-start Control (Heating)

- The indoor fan does not rotate until the evaporator piping temperature will be reached at 25°C.

#### Compact and light design

- To install a unit is very convenient because of smaller size than textile.

#### Low noise

- The most advanced low-noise design.
- The adoption of turbo fan and round type heat exchanger give the quietest operation.

#### Long life filter

- Long life wrinkle(type) and washable and anti-bacteria filter is adopted.

#### High head Drain pump

- Built-in drain pump automatically drains water.
- A standard drain-head height of up to 700mm is possible.

#### High-Ceiling corresponding Function

- According to the height of ceiling, the RPM of indoor fan motor is selected to increase air reaching distance.

#### Central Control(Optional)

- It is operating individually or totally by central control function.

#### Swirl Swing Control

- It is operating swirl swing

#### Auto Change Over

- It is operating cooling and heating mode automatically according to setting temperature.

## 3. Operation Details

### The functions of main control

#### ■ Auto Swing Control

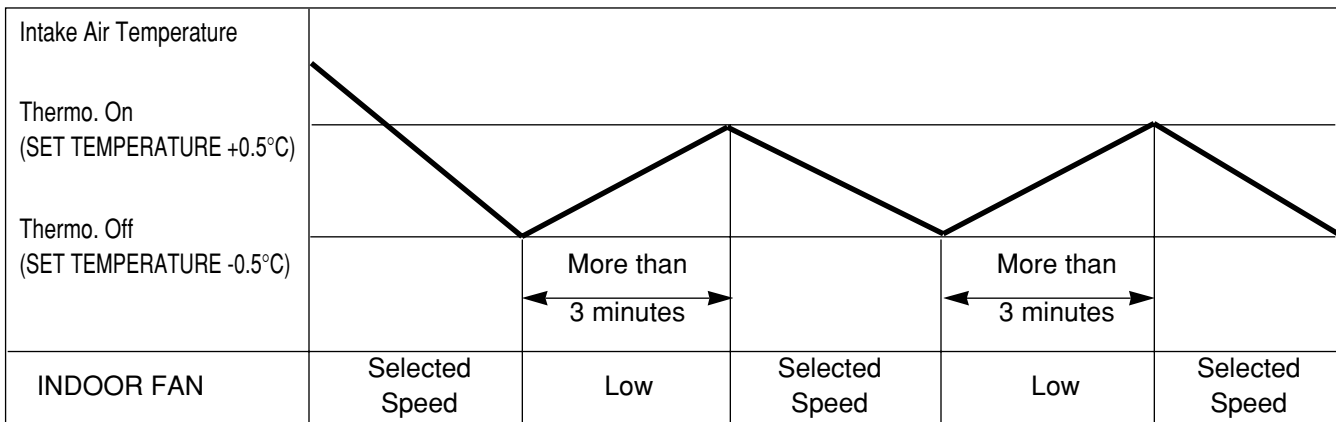
- This function is to swing the louver up and down automatically.

#### ■ Soft-Dry Operation

- The indoor fan speed is automatically set to the low, so the shift of the indoor fan speed is impossible because of already being set to the best speed for Dry Operation by microcontroller control.

#### ■ Cooling Mode Operation

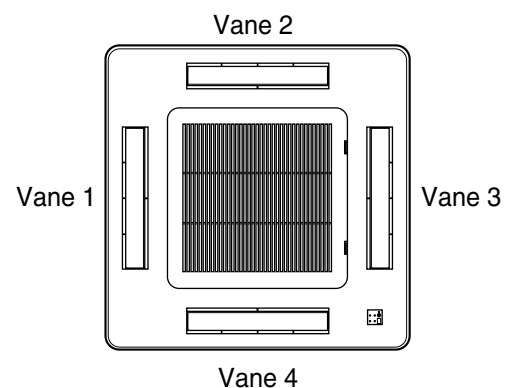
- When selecting the Cooling ( \* ) Mode Operation, the unit will operate according to the setting by the remote controller and the operation diagram is as following



#### ■ Swirl Swing Control

Vane 2, 4 is almost vane closed while vane1, 3 is opened.

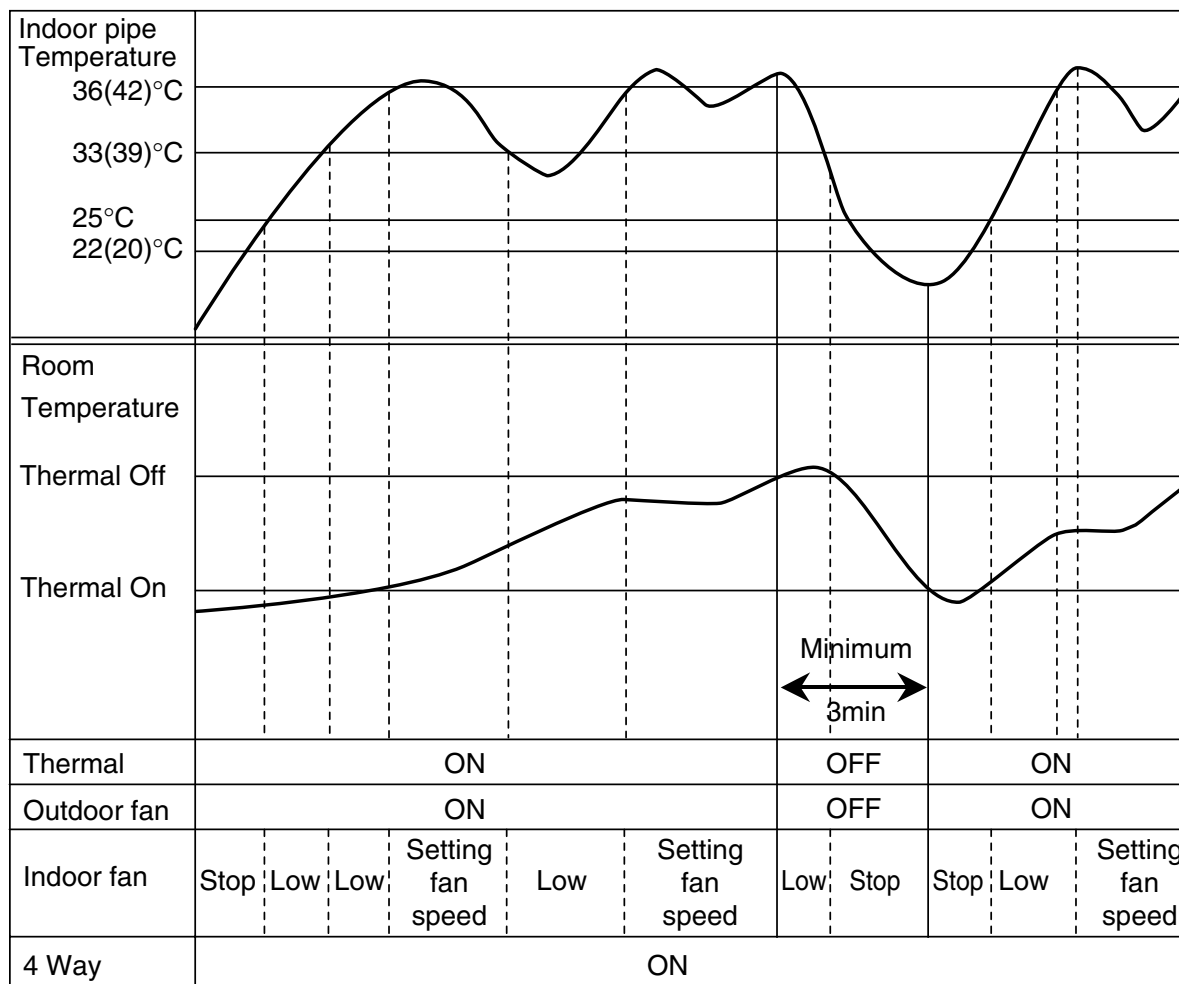
Vane 1, 3 and vane 2,4 turn over minutely





## ■ Heating Mode Operation

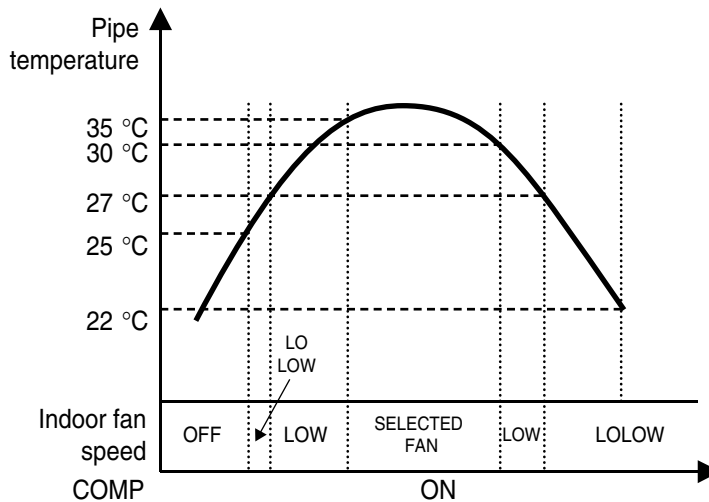
The unit will operate according to the setting by the remote controller and the operation diagram is shown as following.



	Thermal ON	Thermal OFF
Indoor Unit mode	ST+2	ST+4
2TH (Remo.+Indoor)	To be selected lower temperature contrast Indoor Unit and Remo.	To be selected lower temperature contrast Indoor Unit and Remo.
Remo. mode	ST+0	ST+2

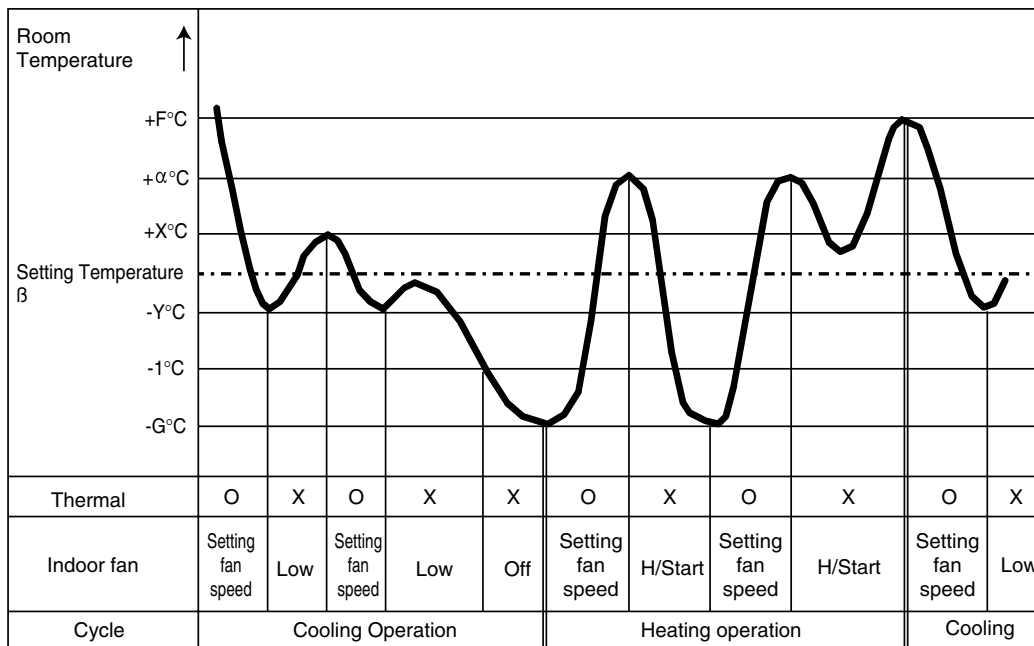
### Hot-start Control

- The indoor fan does not rotate until the evaporator piping temperature will be reached to 25°C.
- The operation diagram is as following.



### Auto Change Over

- In response to user's wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)$	Cooling → Heating

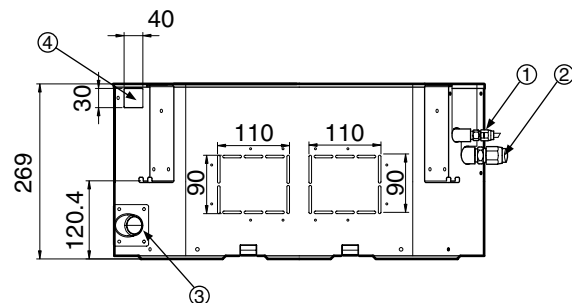
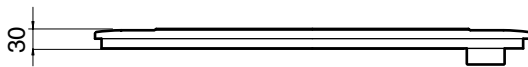
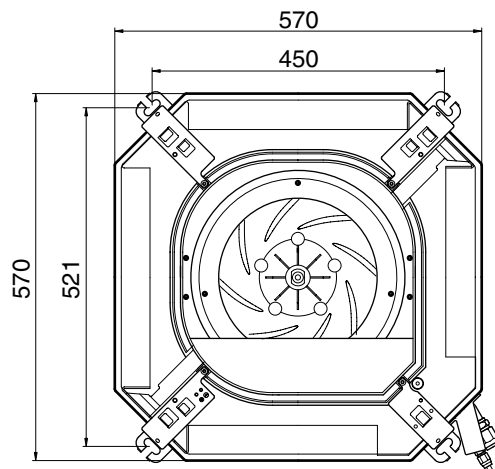
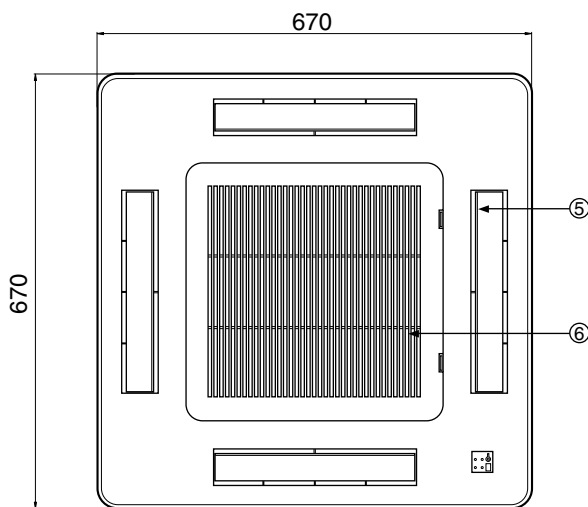
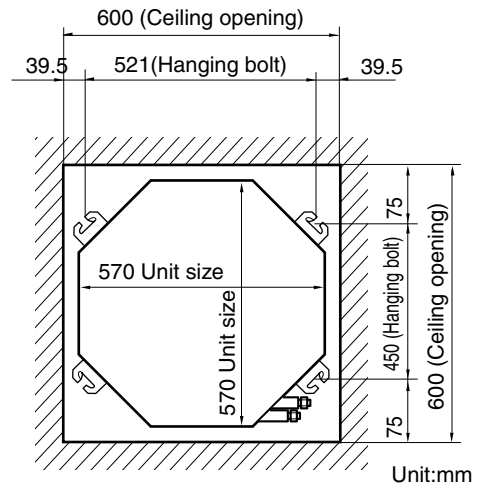
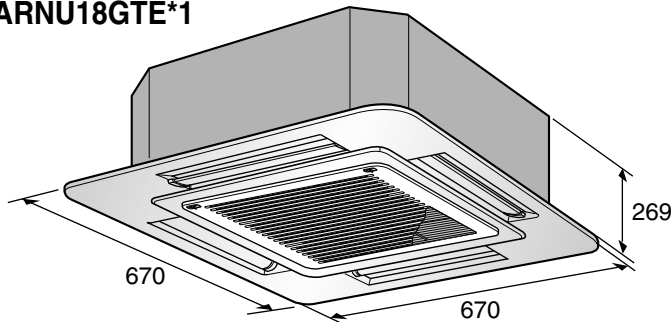
	Definition	Default( )
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
α	Thermal Off Temperature for Heating	1

\*  $T_{ai}$  : Indoor Temperature

\*  $T_s$  : Setting Temperature

# 4. Dimensions

ARNU09GTE\*1  
 ARNU12GTE\*1  
 ARNU18GTE\*1

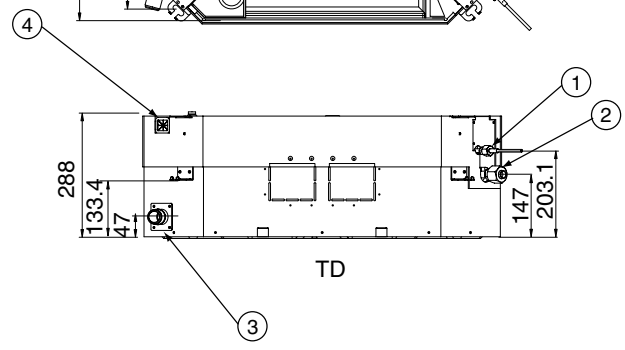
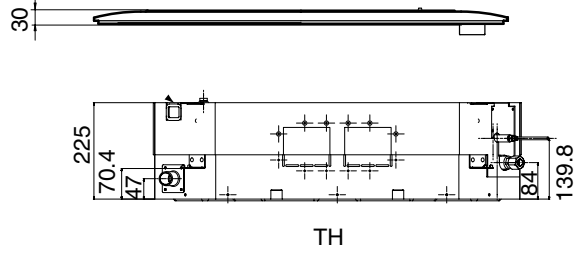
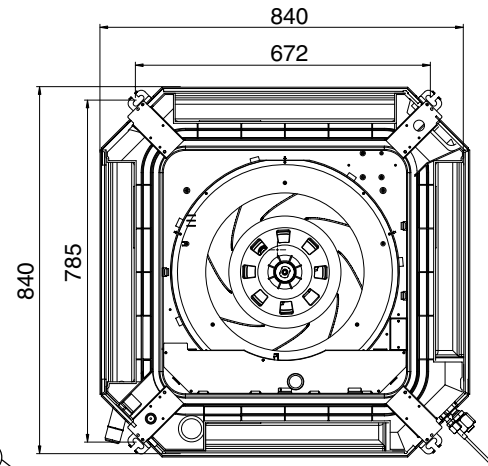
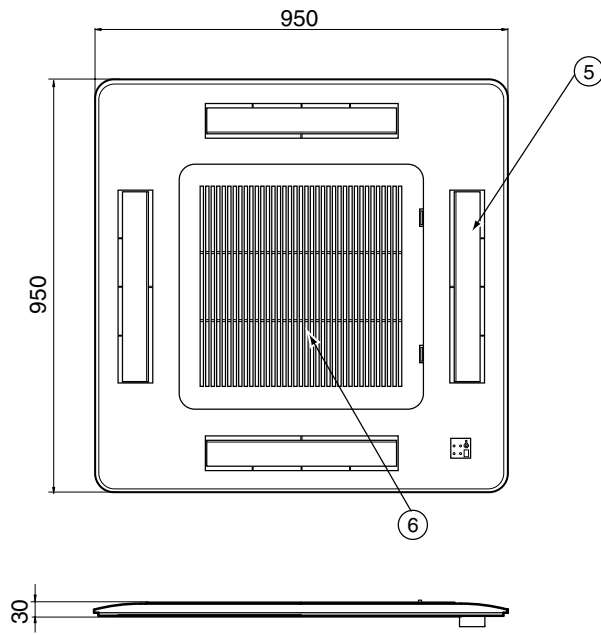
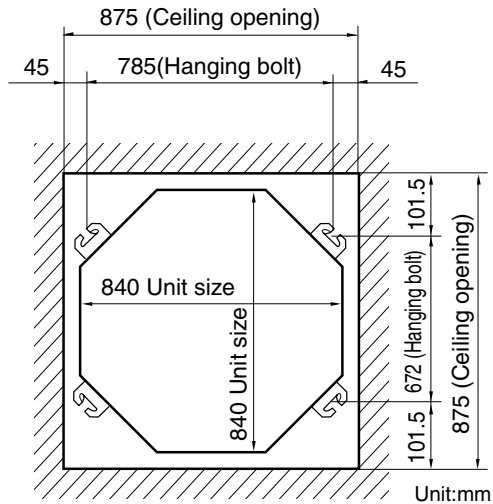
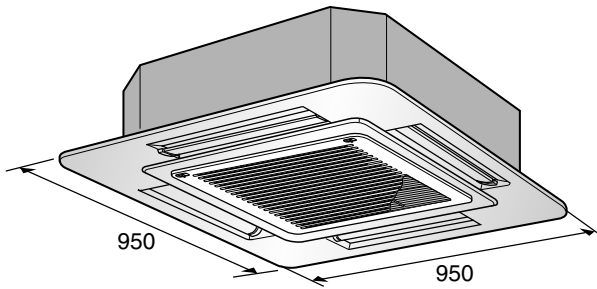


(unit : mm)

Number	Name	Description
1	Liquid pipe connection	Unit size(9k, 12k, 18k):Ø6.35
2	Gas pipe connection	Unit size(9k, 12k, 18k):Ø12.7
3	Drain pipe connection	
4	Power supply connection	
5	Air discharge grill	
6	Air suction grill	

## Dimensions

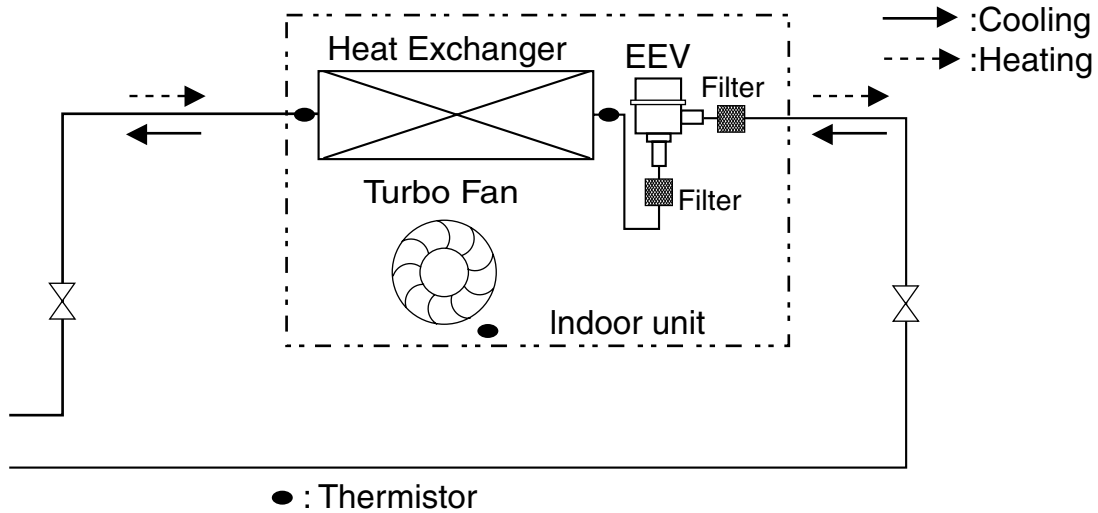
ARNU24GTH\*1  
 ARNU28GTH\*1  
 ARNU36GTD\*1  
 ARNU42GTD\*1  
 ARNU48GTD\*1



(unit : mm)

Number	Name	Description
1	Liquid pipe connection	Unit Size (24k, 28k, 36k, 42k, 48k):Ø9.52
2	Gas pipe connection	Unit Size(24k, 28k, 36k, 42k, 48k):Ø15.88
3	Drain pipe connection	
4	Power supply connection	
5	Air discharge grill	
6	Air suction grill	

# 5. Piping Diagrams

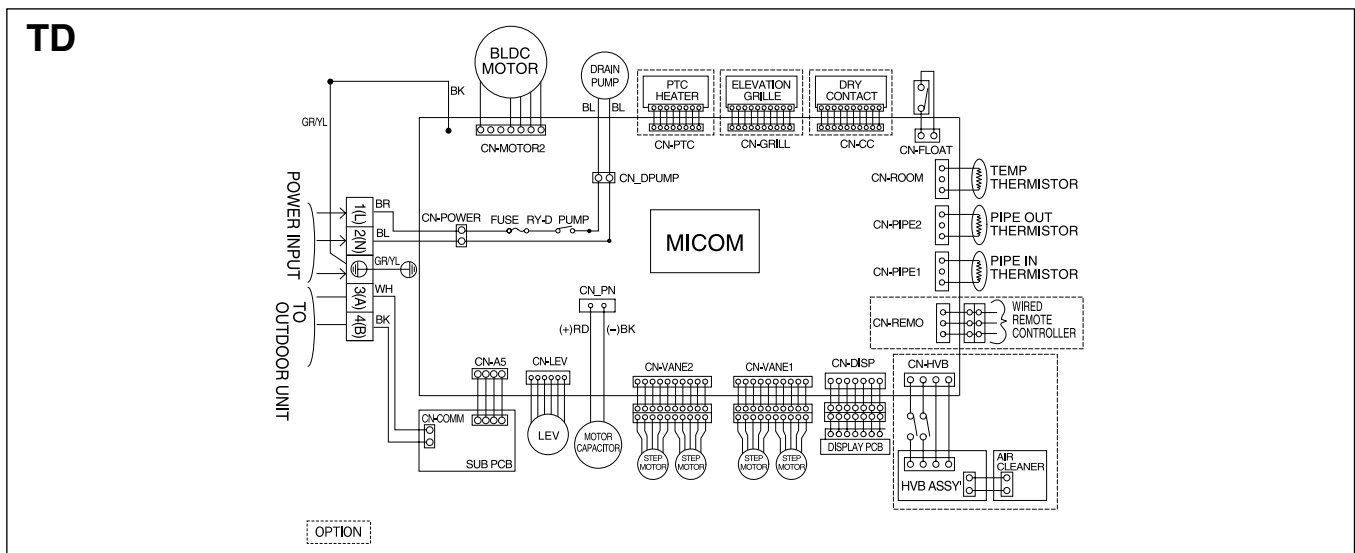
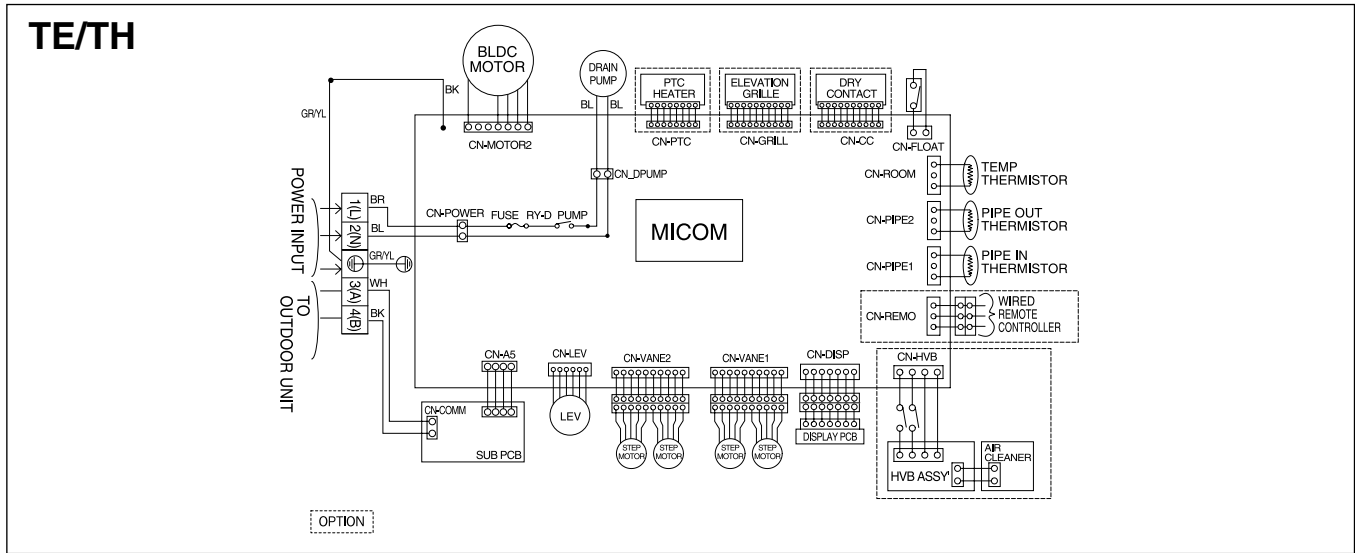


Refrigerant pipe connection port diameter

[unit: mm(inch)]

Model	Gas	Liquid
ARNU09GTE*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU12GTE*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU18GTE*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU24GTH*1	Ø15.88(5/8)	Ø9.52(3/8)
ARNU28GTH*1	Ø15.88(5/8)	Ø9.52(3/8)
ARNU36GTD*1	Ø15.88(5/8)	Ø9.52(3/8)
ARNU42GTD*1	Ø15.88(5/8)	Ø9.52(3/8)
ARNU48GTD*1	Ø15.88(5/8)	Ø9.52(3/8)

# 6. Wiring Diagrams



CONNECTOR NUMBER	LOCATION POINT	FUNCTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR2	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-DPUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-COMM	COMMUNICATION	CONNECTION BETWEEN INDOOR AND OUTDOOR
CN-DISP	DISPLAY	DISPLAY OF INDOOR STATUS
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-VANE1	STEP MOTOR	STEP MOTOR OUTPUT
CN-FLOAT	FLOAT SWITCH INPUT	FLOAT SWITCH SENSING
CN-PIPE1	PIPE SENSOR	PIPE THERMISTOR
CN-PIPE2	DISCHARGE PIPE SENSOR	DISCHARGE PIPE THERMISTOR
CN-ROOM	ROOM SENSOR	ROOM THERMISTOR
CN-REMO	REMOTE CONTROLLER	REMOTE CONTROL LINE

# Art Cool Type

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# 1. Specifications

Type			ARTCOOL			
Model		Unit	ARNU07GSP*1	ARNU09GSP*1	ARNU12GSP*1	
Cooling Capacity	W		2,200	2,800	3,600	
	kcal/h		1,900	2,400	3,100	
	Btu/h		7,500	9,600	12,300	
Heating Capacity	W		2,500	3,200	4,000	
	kcal/h		2,200	2,800	3,400	
	Btu/h		8,500	10,900	13,600	
Dimensions (W*D*H)	Body	mm	570x137x568	570x137x568	570x137x568	
		inch	22.4x5.4x22.3	22.4x5.4x22.3	22.4x5.4x22.3	
Coil	Rows x Columns x FPI		2x20x20	2x20x20	2x20x20	
	Face Area	m <sup>2</sup>	0.16	0.16	0.16	
Fan	Type		Turbo Fan	Turbo Fan	Turbo Fan	
	Motor Output x Number	W	30	30	30	
	Running Current	A	0.14	0.14	0.14	
	Air Flow Rate(H/M/L)	cmm		6/5.5/5	7/ 6.5 /6	8.7/ 8.1 /7.5
		cfm		212/194/177	247/230/212	307/286/265
	Drive		Direct	Direct	Direct	
Motor type		BLDC	BLDC	BLDC		
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	Foamed polystyrene	
Air Filter			Net(Washable)	Net(Washable)	Net(Washable)	
Safety Device			Fuse	Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø6.35(1/4)	Ø6.35(1/4)	
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø12.7(1/2)	Ø12.7(1/2)	
	Drain Pipe(Internal Dia.)	mm	12.2	12.2	12.2	
Net Weight		kg(lbs)	12(26.5)	12(26.5)	12(26.5)	
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	38/34/32	40/36/33	42/38/36	
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	
Refrigerant Control			EEV	EEV	EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	
Front Panel(** Position)			M: Metal, D: Wood, B: Blue, W: White			

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

5. To be added for more available Models



## 2. Functions

### Indoor Unit

#### Operation ON/OFF by Remote controller

#### Sensing the Room Temperature

- Room temperature sensor. (THERMISTOR)

#### Room temperature control

- Maintains the room temperature in accordance with the Setting temperature

#### Starting Current Control

- Indoor fan is delayed for 5 sec at the starting.

#### Indoor Fan Speed Control

- High, Med, Low, CHAOS

#### Operation indication Lamps (LED)

Signal Receptor

Receives the signals from the remote control.(Signal receiving sound: two short beeps or one long beep.)

Operation Indication Lamps

- ① On/Off : Lights up during the system operation.
- ☆ Sleep Mode : Lights up during Sleep Mode Auto operation.
- ⌚ Timer : Lights up during Timer operation.
- \* Defrost Mode : Lights up during Defrost Mode or Hot Start operation.
- BB Temperature : Indicate the setting temperature.

#### Soft Dry Operation Mode

- Intermittent operation of fan at low speed.

#### Sleep Mode Auto Control

- The fan is switched to low(Cooling), med(Heating) speed.
- The unit will be stopped after 1, 2, 3, 4, 5, 6, 7 hours.

#### Natural Air Control by CHAOS Logic

- The fan is switched to intermittent or irregular operation
- The fan speed is automatically switched from high to low speed.

#### Airflow Direction Control

- The louver can be set at the desired position or swing up and down automatically.

#### Defrost(Deice) control (Heating)

- Both the indoor and outdoor fan stops during defrosting.

#### Hot-start Control (Heating)

- The indoor fan does not rotate until the evaporator pipe temperature will be reached at 28°C.

#### Auto Change Over

- It is operating cooling and heating mode automatically according to setting temperature.

## 3. Operation Details

### *The functions of main control*

#### **DISPLAY**

##### **(1) High quality LCD remote controller supplied**

###### **Operation Indicator**

- On while in appliance operation, off while in appliance pause

###### **Timer(on/off) and Sleep timer Indicator**

- On while in timer mode (on/off) and in sleep timer mode, off when timer mode is completed or canceled

###### **Defrost Indicator**

- Off except when hot start during heating mode operation or while in defrost control.

###### **Plasma Indicator**

- On while in plasma mode, off while plasma mode is canceled.

###### **Auto restart**

- In case the power comes on again after a power failure, Auto Restarting Operation is the function to operate procedures automatically to the previous operating conditions.  
If you want to use this operation, press the Auto Restart Button.

###### **Power(Forced Operation)**

- Operation starts, when this button is pressed and stops when you press the button again.

#### **■ Cooling Mode Operation**

- When the intake air temperature reaches 0.5°C below the setting temp, the compressor and the outdoor fan stop.
- When it reaches 0.5°C above the setting temp, they start to operate again.  
Compressor ON Temp=> Setting Temp+0.5°C  
Compressor OFF Temp => Setting Temp-0.5°C
- While in compressor running, operating with the airflow speed set by the remote controller. While in compressor not running, operating with the low airflow speed regardless of the setting.

## ■ Healthy Dehumidification Mode

- When the dehumidification operation input by the remote controller is received, the intake air temperature is detected and the setting temp is automatically set according to the intake air temperature.  
 $26^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow 25^{\circ}\text{C}$   
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} < 26^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} - 1^{\circ}\text{C}$   
 $18^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} - 0.5^{\circ}\text{C}$   
 $\text{Intake Air Temp} < 18^{\circ}\text{C} \Rightarrow 18^{\circ}\text{C}$
- While in compressor off, the indoor fan repeats low airflow speed and pause.
- While the intake air temp is between compressor on temp. and compressor off temp., 10-min dehumidification operation and 4-min compressor off repeat  
 Compressor ON Temp.  $\Rightarrow$  Setting Temp + 0.5°C  
 Compressor OFF Temp.  $\Rightarrow$  Setting Temp - 0.5°C
- In 10-min dehumidification operation, the indoor fan operates with the low airflow speed.

## ■ Heating Mode Operation

- When the intake air temp reaches +3°C above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.  
 Compressor ON Temp.  $\Rightarrow$  Setting Temp. + 2°C  
 Compressor OFF Temp.  $\Rightarrow$  Setting Temp. - 4°C
- While in compressor on, the indoor fan is off when the indoor pipe temp. is below 26°C, when above 28°C, it operates with the low or setting airflow speed (while in sleep mode, with the medium airflow speed).
- While in compressor off, the indoor fan is off when the indoor pipe temp is below 33°C, when above 35°C, it operates with the low airflow speed.
- If overloaded while in heating mode operation, in order to prevent the compressor from OLP operation, the outdoor fan is turned on/off according to the indoor pipe temp.
- While in defrost control, both of the indoor and outdoor fans are turned off.

## ■ Defrost Control

- While in heating mode operation in order to protect the evaporator pipe of outdoor unit from freezing, reversed to cooling cycle to defrost the evaporator pipe of the outdoor unit.
- Defrost control is available 30 minutes later since heating mode operation started, and it will not prolong over 6 minutes.
- Deicing starts only when the outdoor pipe temperature falls below -6°C after 30 minutes passed from starting of heating operating and more than 10 minutes operation of compressor.
- Deicing ends after 6 minutes passed from starting of deice operation or when the outdoor pipe temperature rises over 12°C even if before 6 minutes.

## ■ Fuzzy Operation (Outdoor unit C/O Model)

- According to the temperature set by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.  
 Compressor ON Temp  $\Rightarrow$  Setting Temp + 0.5°C  
 Compressor OFF Temp  $\Rightarrow$  Setting Temp + 0.5°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.

$26^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow 25^{\circ}\text{C}$   
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} < 26^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 1^{\circ}\text{C}$   
 $22^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 0.5^{\circ}\text{C}$   
 $18^{\circ}\text{C} \leq \text{Intake Air Temp} < 22^{\circ}\text{C} \Rightarrow \text{Intake Air Temp}$   
 $\text{Intake Air Temp} < 18^{\circ}\text{C} \Rightarrow 18^{\circ}\text{C}$

- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature

### ■ Fuzzy Operation (Outdoor unit H/P Model)

- When any of operation mode is not selected like the moment of the power on or when 3 hrs has passed since the operation off, the operation mode is selected.
- When determining the operation mode, the compressor, the outdoor fan, and the 4 way valve are off and only the indoor fan is operated for 15 seconds. Then an operation mode is selected according to the intake air temp at that moment as follows.  
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow \text{Fuzzy Operation for Cooling}$   
 $21^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Fuzzy Operation for Dehumidification}$   
 $\text{Intake Air Temp} < 21^{\circ}\text{C} \Rightarrow \text{Fuzzy Operation for Heating}$
- If any of the operation modes among cooling / dehumidification / heating mode operations is carried out for 10 sec or longer before Fuzzy operation, the mode before Fuzzy operation is operated.

#### 1) Fuzzy Operation for Cooling

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is  $0.5^{\circ}\text{C}$  or more below the setting temp, the compressor is turned off. When  $0.5^{\circ}\text{C}$  or more above the setting temp, the compressor is turned on.  
Compressor ON Temp  $\Rightarrow \text{Setting Temp} + 0.5^{\circ}\text{C}$   
Compressor OFF Temp  $\Rightarrow \text{Setting Temp} + 0.5^{\circ}\text{C}$
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
 $26^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow 25^{\circ}\text{C}$   
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} < 26^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 1^{\circ}\text{C}$   
 $22^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 0.5^{\circ}\text{C}$   
 $18^{\circ}\text{C} \leq \text{Intake Air Temp} < 22^{\circ}\text{C} \Rightarrow \text{Intake Air Temp}$   
 $\text{Intake Air Temp} < 18^{\circ}\text{C} \Rightarrow 18^{\circ}\text{C}$
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature.

#### 2) Fuzzy Operation for Dehumidification

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is  $0.5^{\circ}\text{C}$  or more below the setting temp, the compressor is turned off. When  $0.5^{\circ}\text{C}$  or more above the setting temp, the compressor is turned on.  
Compressor ON Temp  $\Rightarrow \text{Setting Temp} + 0.5^{\circ}\text{C}$   
Compressor OFF Temp  $\Rightarrow \text{Setting Temp} + 0.5^{\circ}\text{C}$

- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.

$26^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow 25^{\circ}\text{C}$

$24^{\circ}\text{C} \leq \text{Intake Air Temp} < 26^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 1^{\circ}\text{C}$

$22^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 0.5^{\circ}\text{C}$

$18^{\circ}\text{C} \leq \text{Intake Air Temp} < 22^{\circ}\text{C} \Rightarrow \text{Intake Air Temp}$

$\text{Intake Air Temp} < 18^{\circ}\text{C} \Rightarrow 18^{\circ}\text{C}$

- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan repeats the low airflow speed or pause as in dehumidification operation.

### 3) Fuzzy Operation for Heating

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is  $3^{\circ}\text{C}$  or more above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.

Compressor ON Temp  $\Rightarrow$  Setting Temp.  $+2^{\circ}\text{C}$

Compressor OFF Temp  $\Rightarrow$  Setting Temp.  $+4^{\circ}\text{C}$

- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.

$20^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow \text{Intake Air Temp} + 0.5^{\circ}\text{C}$

$\text{Intake Air Temp} < 20^{\circ}\text{C} \Rightarrow 20^{\circ}\text{C}$

- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is set to the high or the medium according to the intake air temperature and the setting temperature.

#### ■ Airflow Speed Selection

- The airflow speed of the indoor fan is set to high, medium, low, or chaos by the input of the airflow speed selection key on the remote controller.

#### ■ On-Timer Operation

- When the set time is reached after the time is input by the remote controller, the appliance starts to operate.
- The timer LED is on when the on-timer is input. It is off when the time set by the timer is reached.
- If the appliance is operating at the time set by the timer, the operation continues.

#### ■ Off-Timer Operation

- When the set time is reached after the time is input by the remote controller, the appliance stops operating.
- The timer LED is on when the off-timer is input. It is off when the time set by the timer is reached.
- If the appliance is on pause at the time set by the timer, the pause continues.

### ■ Off-Timer <=> On-Timer Operation

- When the set time is reached after the on/off time is input by the remote controller, the on/off-timer operation is carried out according to the set time.

### ■ Sleep Timer Operation

- When the sleep time is reached after <1,2,3,4,5,6,7,0(cancel) hr> is input by the remote controller while in appliance operation, the operation of the appliance stops.
- While the appliance is on pause, the sleep timer mode cannot be input.
- While in cooling mode operation, 30 min later since the start of the sleep timer, the setting temperature increases by 1°C. After another 30 min elapse, it increases by 1°C again.
- When the sleep timer mode is input while in cooling cycle mode, the airflow speed of the indoor fan is set to the low.
- When the sleep timer mode is input while in heating cycle mode, the airflow speed of the indoor fan is set to the medium.

### ■ Chaos Swing Mode

- By the Chaos Swing key input, the vane automatically operates with the Chaos Swing or they are fixed to the desired direction.

### ■ Chaos Natural Wind Mode

- When the Chaos Natural Wind mode is selected and then operated, the high, medium, or low speed of the airflow mode is operated for 2~15 sec randomly by the Chaos Simulation.”

### ■ Jet Cool Mode Operation (Outdoor unit C/O Model)

- If the Jet Cool key is input at any operation mode while in appliance operation, the Jet Cool mode operates.
- In the Jet Cool mode, the indoor fan is operated at super-high speed for 30 min at cooling mode operation.
- In the Jet Cool mode operation, the room temperature is controlled to the setting temperature, 18°C
- When the sleep timer mode is input while in the Jet Cool mode operation, the Jet Cool mode has the priority.
- During the JET COOL function at any moment, the A/C starts to blow the cool air with side louvers closed at extremely high speed for 30 minutes setting the room temp. automatically to 18°C.

### ■ Jet Cool Mode Operation (Outdoor unit H/P Model)

- While in heating mode or Fuzzy operation, the Jet Cool key cannot be input. When it is input while in the other mode operation (cooling, dehumidification, ventilation), the Jet Cool mode is operated.”
- In the Jet Cool mode, the indoor fan is operated at super-high speed for 30 min at cooling mode operation.
- In the Jet Cool mode operation, the room temperature is controlled to the setting temperature, 18°C
- When the sleep timer mode is input while in the Jet Cool mode operation, the Jet Cool mode has the priority.
- During the JET HEAT function at any moment, the A/C starts to blow the hot air with side louvers closed at extremely high speed for 60 minutes setting the room temp. automatically to 30°C.

### ■ Auto Restarting Operation

- When the power is restored after a sudden power failure while in appliance operation, the mode before the power failure is kept on the memory and the appliance automatically operates in the mode on the memory.
- Operation Mode that is kept on the memory
  - State of Operation ON/OFF

- Operation Mode/Setting Temp/Selected Airflow Speed
- Sleep Timer Mode/Remaining Time of Sleep Timer (unit of hour)

### ■ Forced Operation

- Operation procedures when the remote control can't be used.
- The operation will be started if the power button is pressed.
- If you want to stop operation, re-press the button.

	Cooling Model	Heat pump Model		
		Room Temp. $\geq 24^{\circ}\text{C}$	$21^{\circ}\text{C} \leq$ Room Temp. $< 24^{\circ}\text{C}$	Room Temp. $< 21^{\circ}\text{C}$
Operating mode	Cooling	Cooling	Healthy Dehumidification	Heating
Indoor Fan Speed	High	High	High	High
Setting Temperature	22°C	22°C	23°C	24°C

- While in forced operation, the key input by the remote control has no effect and the buzzer sounds 10 times to indicate the forced operation.

### ■ Test operation

- During the TEST OPERATION, the unit operates in cooling mode at high speed fan, regardless of room temperature and resets in  $18 \pm 1$  minutes.
- During test operation, if remote controller signal is received, the unit operates as remote controller sets. If you want to use this operation, Press and hold ON/OFF button 3~5 seconds, then the buzzer sound 1 "beep".
- If you want to stop the operation, re-press the button.

### ■ Protection of the evaporator pipe from frosting

- If the indoor pipe temp is below  $0^{\circ}\text{C}$  in 7 min. after the compressor operates without any pause while in cooling cycle operation mode, the compressor and the outdoor fan are turned off in order to protect the indoor evaporator pipe from frosting.
- When the indoor pipe temp is  $7^{\circ}\text{C}$  or higher after 3 min. pause of the compressor, the compressor and the outdoor fan is turned on according to the condition of the room temperature.

### ■ Buzzer Sounding Operation

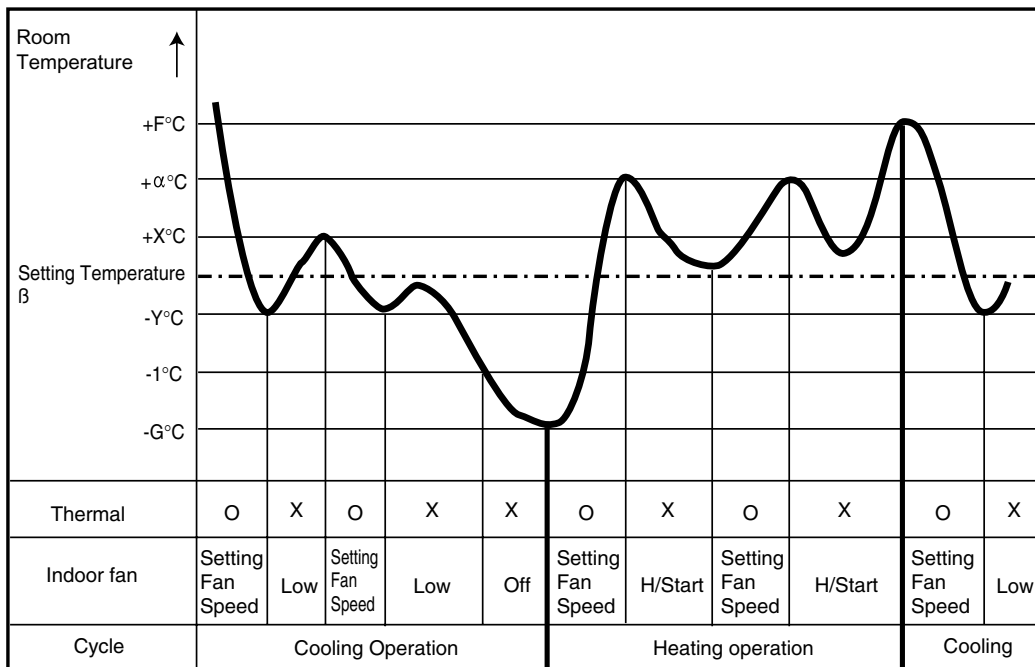
- When the appliance-operation key is input by the remote control, the short "beep-beep-" sounds.
- When the appliance-pause key is input by the remote control, the long "beep—" sounds.
- When a key is input by the remote control while the slide switch on the main unit of the appliance is on the forced operation position, the error sound "beep-beep-beep-beep-beep-" is made 10 times to indicate that the remote control signal cannot be received.

**■ Air Cleaner Operation**

- When an air cleaner function is selected during Air Conditioner operation
  - Plasma air cleaner function will be operated while in any operation mode with selecting the function.
  - The function is to be stopped while it is operating with selecting the function.
- When an air cleaner function is selected during operation off
  - The function will be only operated.
- When inlet grille of air conditioner is opened during plasma operation, High Voltage Generator(H.V.B) is to be stopped. When inlet grille of air conditioner is closed during plasma operation, High Voltage Generator(H.V.B) will be operated again.

**■ Auto Change Over**

- In response to user's wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)$	Cooling → Heating

	Definition	Default( )
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
α	Thermal Off Temperature for Heating	1

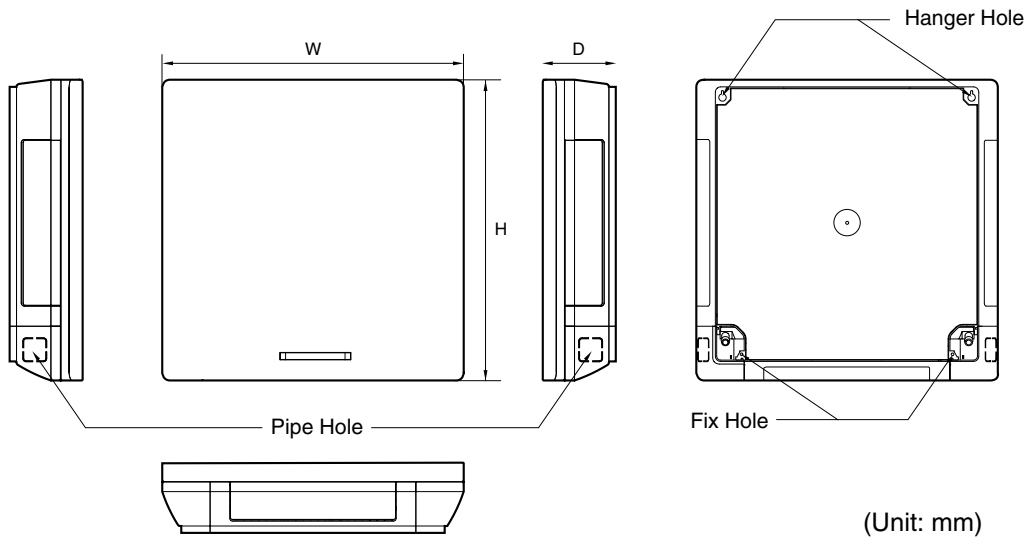
\*  $T_{ai}$  : Indoor Temperature

\*  $T_s$  : Setting Temperature



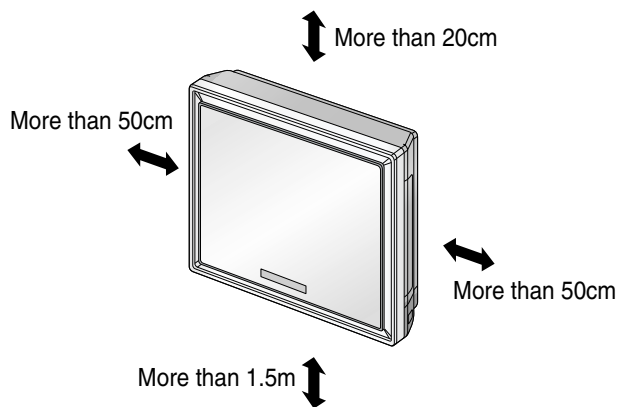
# 4. Dimensions

ARNU07GSP\*1  
 ARNU09GSP\*1  
 ARNU12GSP\*1



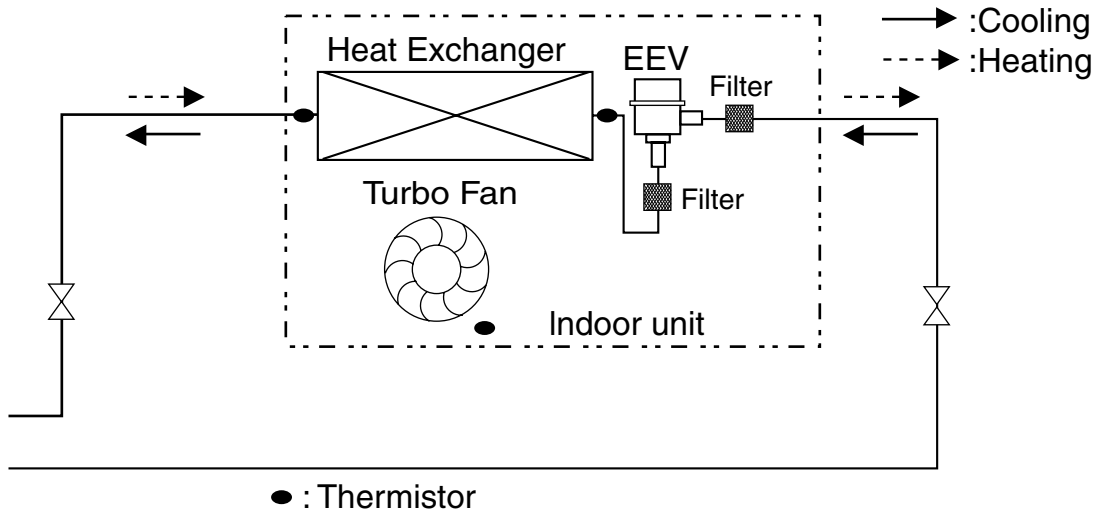
Note:  
 1. Pipe Specification(mm)

Model	Liquid	Gas
7, 9, 12k	Ø6.35	Ø12.7



Model	W	H	D
ARNU07GSP*1 ARNU09GSP*1 ARNU12GSP*1	570	568	137

# 5. Piping Diagrams



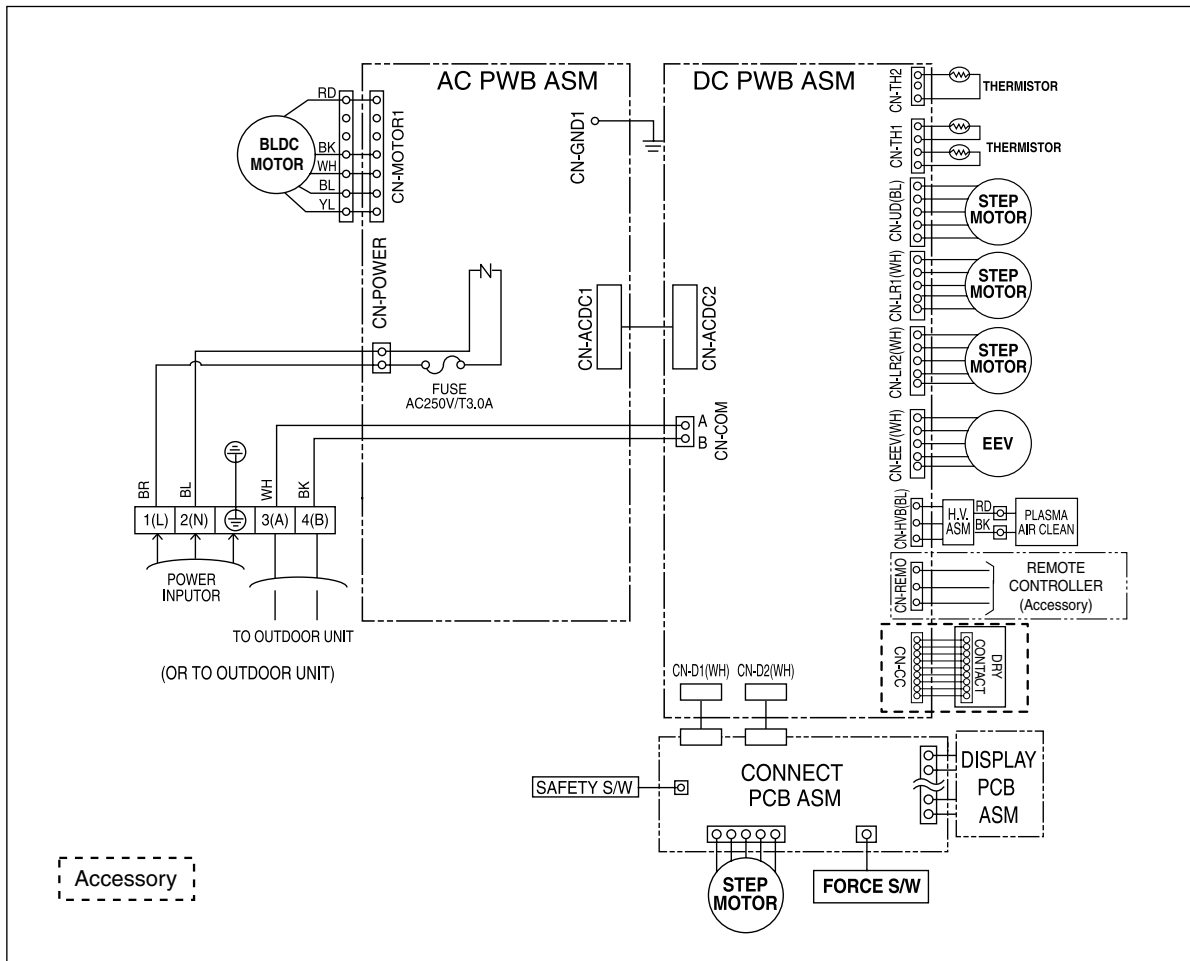
Refrigerant pipe connection port diameter

[unit: mm(inch)]

Model	Gas	Liquid
ARNU07GSP*1 ARNU09GSP*1 ARNU12GSP*1	12.7(1/2)	6.35(1/4)

\*(Color): M(Metal), D(Wood), B(Blue), W(White)

# 6. Wiring Diagrams



CONNECTOR NUMBER	LOCATION POINT	FUNCTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR1	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-COM	COMMUNICATION	COMMUNICATION BETWEEN INDOOR AND OUTDOOR
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-D1	DISPLAY	DISPLAY OF INDOOR STATUS
CN-D2	DISPLAY	DISPLAY OF INDOOR STATUS
CN-LR1	STEP MOTOR	STEP MOTOR OUTPUT FOR LEFT/RIGHT
CN-LR2	STEP MOTOR	STEP MOTOR OUTPUT FOR LEFT/RIGHT
CN-UD	STEP MOTOR	STEP MOTOR OUTPUT
CN-TH1	ROOM/PIPE SENSOR	ROOM AND PIPE THERMISTOR
CN-TH2	DISCHARGE PIPE SENSOR	DISCHARGE PIPE THERMISTOR



# Art Cool Type(Wide)

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# 1. Specifications

Type		ARTCOOL Wide	
Model		ARNU18GSV*1	
Cooling Capacity	W	5,600	
	kcal/h	4,800	
	Btu/h	19,100	
Heating Capacity	W	6,300	
	kcal/h	5,400	
	Btu/h	21,500	
Dimensions (W*D*H)	Body	mm	928x147x522
		inch	36.5x5.8x20.6
Coil	Rows x Columns x FPI		2x16x20
	Face Area	m <sup>2</sup>	0.24
Fan	Type		Turbo Fan
	Motor Output x Number	W	30
	Running Current	A	0.14
	Air Flow Rate(H/M/L)	cmm	13.5/11.4 /10.4
		cfm	477/403/367.5
	Drive		Direct
Motor type		BLDC	
Temperature Control			Microprocessor, Thermostat for cooling and heating
Sound Absorbing Thermal Insulation Material			Foamed polystyrene
Air Filter			Net(Washable)
Safety Device			Fuse
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)
	Gas Side	mm(inch)	Ø12.7(1/2)
	Drain Pipe(Internal Dia.)	mm	12.2
Net Weight		kg(lbs)	15(33)
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	44/39/34
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60
Refrigerant Control			EEV
Power cable		mm <sup>2</sup>	CV2.0 X 3C
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C
Front Panel(** Position)			M: Metal, D: White, B: Blue, W: White

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

5. To be added for more available Models

## 2. Functions

### Indoor Unit

#### Operation ON/OFF by Remote controller

#### Sensing the Room Temperature

- Room temperature sensor. (THERMISTOR)

#### Room temperature control

- Maintains the room temperature in accordance with the Setting Temp.

#### Starting Current Control

- Indoor fan is delayed for 5 sec at the starting.

#### Indoor Fan Speed Control

- High, Med, Low, CHAOS

#### Operation indication Lamps (LED)

Signal Receptor

Receives the signals from the remote control.(Signal receiving sound: two short beeps or one long beep.)

Operation Indication Lamps

- ⓪ On/Off : Lights up during the system operation.
- ☆ Sleep Mode : Lights up during Sleep Mode Auto operation.
- ⌚ Timer : Lights up during Timer operation.
- \* ⓪ Defrost Mode : Lights up during Defrost Mode or Hot Start operation.
- BB Temperature : Indicate the setting temperature.

#### Soft Dry Operation Mode

- Intermittent operation of fan at low speed.

#### Sleep Mode Auto Control

- The fan is switched to low(Cooling), med(Heating) speed.
- The unit will be stopped after 1, 2, 3, 4, 5, 6, 7 hours.

#### Natural Air Control by CHAOS Logic

- The fan is switched to intermittent or irregular operation
- The fan speed is automatically switched from high to low speed.

#### Airflow Direction Control

- The louver can be set at the desired position or swing up and down automatically.

#### Defrost(Deice) control (Heating)

- Both the indoor and outdoor fan stops during defrosting.

#### Hot-start Control (Heating)

- The indoor fan does not rotate until the evaporator pipe temperature will be reached at 28°C.

#### Auto Change Over

It is operating cooling and heating mode automatically according to setting temperature.

## 3. Operation Details

### *The functions of main control*

#### **DISPLAY**

##### **1) High quality LCD remote controller supplied**

###### **Operation Indicator**

- On while in appliance operation, off while in appliance pause

###### **Timer Indicator**

- On while in timer mode (on/off) and in sleep timer mode, off when timer mode is completed or canceled

###### **Defrost Indicator**

- Off except when hot start during heating mode operation or while in defrost control.

###### **Plasma Indicator**

- On while in plasma mode, off while plasma mode is canceled.

###### **Auto restart Indicator**

- On while auto restart mode, off while auto restart mode is canceled.

###### **Auto restart**

- In case the power comes on again after a power failure, Auto Restarting Operation is the function to operate procedures automatically to the previous operating conditions.  
If you want to use this operation, press the Auto Restart Button.

###### **Power(Forced Operation)**

- Operation starts, when this button is pressed and stops when you press the button again.

#### **■ Cooling Mode Operation**

- When the intake air temperature reaches 0.5°C below the setting temp, the compressor and the outdoor fan stop.
- When it reaches 0.5°C above the setting temp, they start to operate again.

Compressor ON Temp=> Setting Temp+0.5°C

Compressor OFF Temp => Setting Temp-0.5°C

- While in compressor running, operating with the airflow speed set by the remote controller. While in compressor not running, operating with the low airflow speed regardless of the setting.



## ■ Healthy Dehumidification Mode

- When the dehumidification operation input by the remote controller is received, the intake air temperature is detected and the setting temp is automatically set according to the intake air temperature.
  - 26°C ≤ Intake Air Temp ⇒ 25°C
  - 24°C ≤ Intake Air Temp < 26°C ⇒ Intake Air Temp-1°C
  - 18°C ≤ Intake Air Temp < 24°C ⇒ Intake Air Temp-0.5°C
  - Intake Air Temp < 18°C ⇒ 18°C
- While in compressor off, the indoor fan repeats low airflow speed and pause.
- While the intake air temp is between compressor on temp. and compressor off temp., 10-min dehumidification operation and 4-min compressor off repeat
  - Compressor ON Temp. ⇒ Setting Temp+0.5°C
  - Compressor OFF Temp. ⇒ Setting Temp-0.5°C
- In 10-min dehumidification operation, the indoor fan operates with the low airflow speed.

## ■ Heating Mode Operation

- When the intake air temp reaches +3°C above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.
  - Compressor ON Temp. ⇒ Setting Temp. +2°C
  - Compressor OFF Temp. ⇒ Setting Temp.+4°C
- While in compressor on, the indoor fan is off when the indoor pipe temp. is below 26°C, when above 28°C, it operates with the low or setting airflow speed (while in sleep mode, with the medium airflow speed).
- While in compressor off, the indoor fan is off when the indoor pipe temp is below 33°C, when above 35°C, it operates with the low airflow speed.
- If overloaded while in heating mode operation, in order to prevent the compressor from OLP operation, the outdoor fan is turned on/off according to the indoor pipe temp.
- While in defrost control, both of the indoor and outdoor fans are turned off.

## ■ Defrost Control

- While in heating mode operation in order to protect the evaporator pipe of outdoor unit from freezing, reversed to cooling cycle to defrost the evaporator pipe of the outdoor unit.
- Defrost control is available 30 minutes later since heating mode operation started, and it will not prolong over 6 minutes.
- Deicing starts only when the outdoor pipe temperature falls below -6°C after 30 minutes passed from starting of heating operating and more than 10 minutes operation of compressor.
- Deicing ends after 6 minutes passed from starting of deice operation or when the outdoor pipe temperature rises over 12°C even if before 6 minutes.

## ■ Fuzzy Operation (Outdoor unit C/O Model)

- According to the temperature set by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.
  - Compressor ON Temp ⇒ Setting Temp+0.5°C
  - Compressor OFF Temp ⇒ Setting Temp+0.5°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.

## Operation Details

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$26^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow 25^{\circ}\text{C}$   
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} < 26^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 1^{\circ}\text{C}$   
 $22^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 0.5^{\circ}\text{C}$   
 $18^{\circ}\text{C} \leq \text{Intake Air Temp} < 22^{\circ}\text{C} \Rightarrow \text{Intake Air Temp}$   
 $\text{Intake Air Temp} < 18^{\circ}\text{C} \Rightarrow 18^{\circ}\text{C}$

- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature

### ■ Fuzzy Operation (Outdoor unit H/P Model)

- When any of operation mode is not selected like the moment of the power on or when 3 hrs has passed since the operation off, the operation mode is selected.
- When determining the operation mode, the compressor, the outdoor fan, and the 4 way valve are off and only the indoor fan is operated for 15 seconds. Then an operation mode is selected according to the intake air temp at that moment as follows.  
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow \text{Fuzzy Operation for Cooling}$   
 $21^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Fuzzy Operation for Dehumidification}$   
 $\text{Intake Air Temp} < 21^{\circ}\text{C} \Rightarrow \text{Fuzzy Operation for Heating}$
- If any of the operation modes among cooling / dehumidification / heating mode operations is carried out for 10 sec or longer before Fuzzy operation, the mode before Fuzzy operation is operated.

#### 1) Fuzzy Operation for Cooling

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is  $0.5^{\circ}\text{C}$  or more below the setting temp, the compressor is turned off. When  $0.5^{\circ}\text{C}$  or more above the setting temp, the compressor is turned on.  
Compressor ON Temp  $\Rightarrow \text{Setting Temp} + 0.5^{\circ}\text{C}$   
Compressor OFF Temp  $\Rightarrow \text{Setting Temp} + 0.5^{\circ}\text{C}$
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
 $26^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow 25^{\circ}\text{C}$   
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} < 26^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 1^{\circ}\text{C}$   
 $22^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 0.5^{\circ}\text{C}$   
 $18^{\circ}\text{C} \leq \text{Intake Air Temp} < 22^{\circ}\text{C} \Rightarrow \text{Intake Air Temp}$   
 $\text{Intake Air Temp} < 18^{\circ}\text{C} \Rightarrow 18^{\circ}\text{C}$
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature.

#### 2) Fuzzy Operation for Dehumidification

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is  $0.5^{\circ}\text{C}$  or more below the setting temp, the compressor is turned off. When  $0.5^{\circ}\text{C}$  or more above the setting temp, the compressor is turned on.  
Compressor ON Temp  $\Rightarrow \text{Setting Temp} + 0.5^{\circ}\text{C}$   
Compressor OFF Temp  $\Rightarrow \text{Setting Temp} + 0.5^{\circ}\text{C}$

- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
 $26^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow 25^{\circ}\text{C}$   
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} < 26^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 1^{\circ}\text{C}$   
 $22^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 0.5^{\circ}\text{C}$   
 $18^{\circ}\text{C} \leq \text{Intake Air Temp} < 22^{\circ}\text{C} \Rightarrow \text{Intake Air Temp}$   
 $\text{Intake Air Temp} < 18^{\circ}\text{C} \Rightarrow 18^{\circ}\text{C}$
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan repeats the low airflow speed or pause as in dehumidification operation.

### 3) Fuzzy Operation for Heating

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is  $3^{\circ}\text{C}$  or more above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.  
 $\text{Compressor ON Temp} \Rightarrow \text{Setting Temp} + 2^{\circ}\text{C}$   
 $\text{Compressor OFF Temp} \Rightarrow \text{Setting Temp} + 4^{\circ}\text{C}$
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
 $20^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow \text{Intake Air Temp} + 0.5^{\circ}\text{C}$   
 $\text{Intake Air Temp} < 20^{\circ}\text{C} \Rightarrow 20^{\circ}\text{C}$
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is set to the high or the medium according to the intake air temperature and the setting temperature.

#### ■ Airflow Speed Selection

- The airflow speed of the indoor fan is set to high, medium, low, or chaos by the input of the airflow speed selection key on the remote controller.

#### ■ On-Timer Operation

- When the set time is reached after the time is input by the remote controller, the appliance starts to operate.
- The timer LED is on when the on-timer is input. It is off when the time set by the timer is reached.
- If the appliance is operating at the time set by the timer, the operation continues.

#### ■ Off-Timer Operation

- When the set time is reached after the time is input by the remote controller, the appliance stops operating.
- The timer LED is on when the off-timer is input. It is off when the time set by the timer is reached.
- If the appliance is on pause at the time set by the timer, the pause continues.

### ■ Off-Timer <=> On-Timer Operation

- When the set time is reached after the on/off time is input by the remote controller, the on/off-timer operation is carried out according to the set time.

### ■ Sleep Timer Operation

- When the sleep time is reached after <1,2,3,4,5,6,7,0(cancel) hr> is input by the remote controller while in appliance operation, the operation of the appliance stops.
- While the appliance is on pause, the sleep timer mode cannot be input.
- While in cooling mode operation, 30 min later since the start of the sleep timer, the setting temperature increases by 1°C. After another 30 min elapse, it increases by 1°C again.
- When the sleep timer mode is input while in cooling cycle mode, the airflow speed of the indoor fan is set to the low.
- When the sleep timer mode is input while in heating cycle mode, the airflow speed of the indoor fan is set to the medium.

### ■ Chaos Swing Mode

- By the Chaos Swing key input, the vane automatically operates with the Chaos Swing or they are fixed to the desired direction.

### ■ Chaos Natural Wind Mode

- When the Chaos Natural Wind mode is selected and then operated, the high, medium, or low speed of the airflow mode is operated for 2~15 sec randomly by the Chaos Simulation.”

### ■ Jet Cool Mode Operation (Outdoor unit C/O Model)

- If the Jet Cool key is input at any operation mode while in appliance operation, the Jet Cool mode operates.
- In the Jet Cool mode, the indoor fan is operated at super-high speed for 30 min at cooling mode operation.
- In the Jet Cool mode operation, the room temperature is controlled to the setting temperature, 18°C
- When the sleep timer mode is input while in the Jet Cool mode operation, the Jet Cool mode has the priority.
- When the Jet Cool key is input, the upper/lower vanes are reset to those of the initial cooling mode and then operated in order that the air outflow could reach further.

### ■ Jet Cool Mode Operation (Outdoor unit H/P Model)

- While in heating mode or Fuzzy operation, the Jet Cool key cannot be input. When it is input while in the other mode operation (cooling, dehumidification, ventilation), the Jet Cool mode is operated.”
- In the Jet Cool mode, the indoor fan is operated at super-high speed for 30 min at cooling mode operation.
- In the Jet Cool mode operation, the room temperature is controlled to the setting temperature, 18°C
- When the sleep timer mode is input while in the Jet Cool mode operation, the Jet Cool mode has the priority.
- When the Jet Cool key is input, the upper/lower vanes are reset to those of the initial cooling mode and then operated in order that the air outflow could reach further.

### ■ Auto Restarting Operation

- When the power is restored after a sudden power failure while in appliance operation, the mode before the power failure is kept on the memory and the appliance automatically operates in the mode on the memory.
- Operation Mode that is kept on the memory

- State of Operation ON/OFF
- Operation Mode/Setting Temp/Selected Airflow Speed
- Sleep Timer Mode/Remaining Time of Sleep Timer (unit of hour)

### ■ Forced Operation (Outdoor unit C/O Model)

- To operate the appliance by force in case that the remote controller is lost, the forced operation button is on the main unit of the appliance to operate the appliance in the standard conditions.
- Press the forced operation button, the forced operation is carried out.
- Press the forced operation button once again to stop operation.
- The forced operation is carried out in cooling mode with the setting temperature 22°C and the high speed of airflow.

### ■ Forced Operation (Outdoor unit H/P Model)

- To operate the appliance by force in case that the remote controller is lost, the forced operation selection switch is on the main unit of the appliance to operate the appliance in the standard conditions.
- Press the forced operation button, the forced operation is carried out.
- Press the forced operation button once again to stop operation.
- In the forced operation mode, the indoor fan is operated at low speed for around 15 sec and then the operation condition is set according to the intake air temperature as follows.
  - 24°C ≤ Intake Air Temp           => Cooling Mode Operation, 22°C, High Speed
  - 21°C ≤ Intake Air Temp < 24°C => Dehumidification Operation, 23°C, High Speed
  - Intake Air Temp < 21°C           => Heating Mode Operation, 24°C, High Speed

### ■ Test Operation Control

- To check the condition of the installation when installing the appliance, the appliance is operated at cooling mode, high speed of airflow, compressor-on for 18 min without controlling the room temperature.
- After supplying power to the main body, keep pressing the forced operation button for about 3 seconds.
- While in test operation, a key can be input by the remote controller.  
When a key (operation start/stop, operation mode selection, airflow speed selection, temperature control, Jet Cool) is input by the remote controller, the test operation is canceled and the appliance is operated according to the setting by the remote controller.

### ■ Protection of the evaporator pipe from frosting

- In the temperature of the indoor pipe is below 0°C after 7 minutes from starting the compressor, the compressor and outdoor fan are stopped, and 3 minutes delay of operating of the compressor, when the temperature of the indoor pipe is over 7°C, the compressor and the outdoor fan are reoperated.
- Outdoor fan motor stops when indoor pipe temperature is below 3°C and restarts at the pipe temperature above 6°C or after 90 seconds, if the pipe temperature does not rise to 6°C, outdoor fan motor runs continuously at even below 3°C.

**■ Buzzer Sounding Operation**

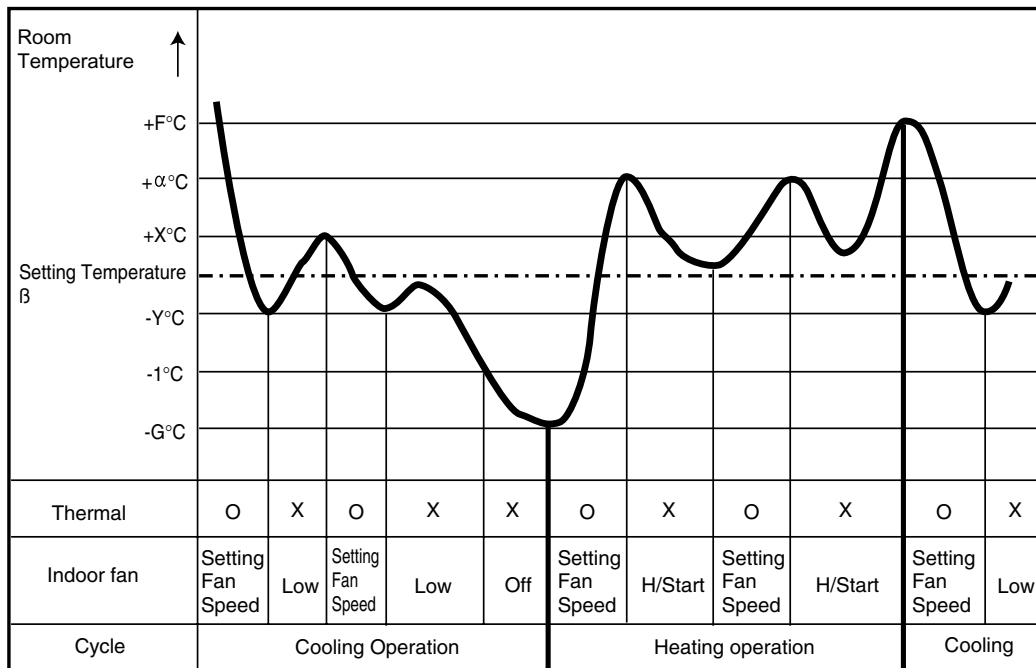
- When the appliance-operation key is input by the remote controller, the short “beep-beep-” sounds.
- When the appliance-pause key is input by the remote controller, the long “beep—” sounds.

**■ Air Cleaner Operation**

- When an air cleaner function is selected during Air Conditioner operation
  - Plasma air cleaner function will be operated while in any operation mode with selecting the function.
  - The function is to be stopped while it is operating with selecting the function.
- When an air cleaner function is selected during operation off
  - The function will be only operated.
- When inlet grille of air conditioner is opened during plasma operation, High Voltage Generator(H.V.B) is to be stopped. When inlet grille of air conditioner is closed during plasma operation, High Voltage Generator(H.V.B) will be operated again.

**■ Auto Change Over**

- In response to user's wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

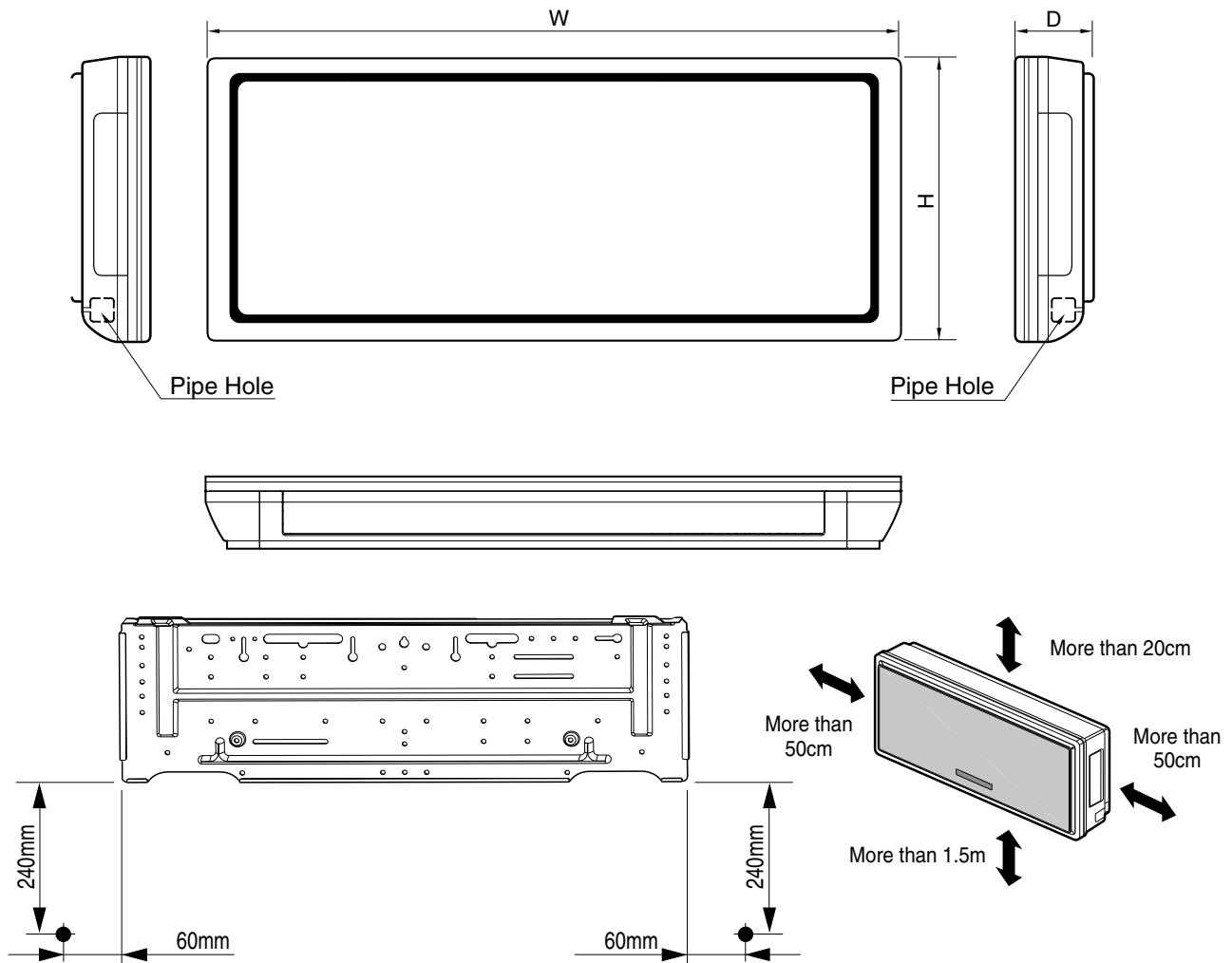
Switching condition	Operation mode switching
Tai ≤ Ts - G(2)	Cooling → Heating

	Definition	Default( )
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
α	Thermal Off Temperature for Heating	1

\* Tai : Indoor Temperature  
 \* Ts : Setting Temperature

# 4. Dimensions

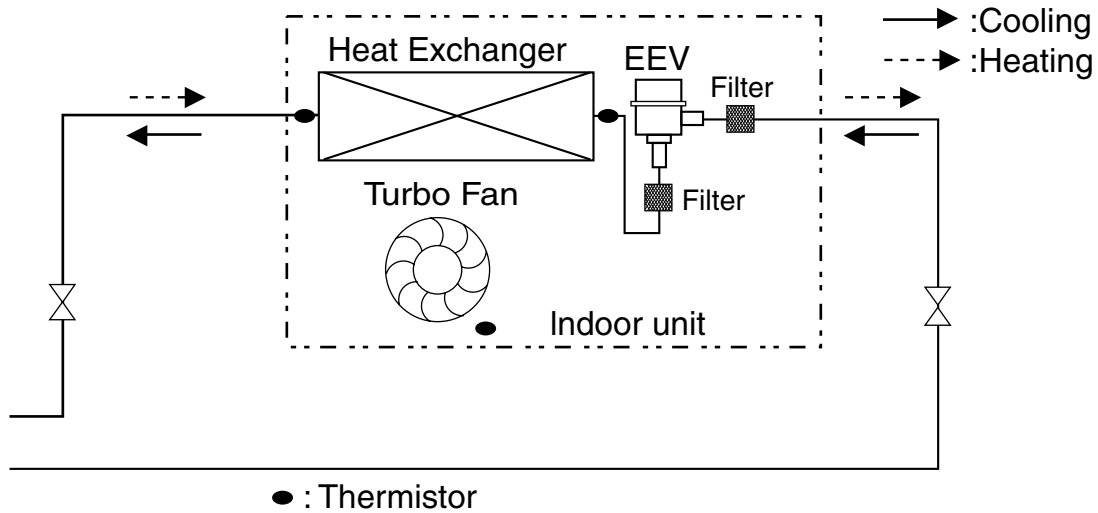
ARNU18GSV\*1



(Unit: mm)

Model	W	H	D
ARNU18GSV*1	928	522	147

# 5. Piping Diagrams



Refrigerant pipe connection port diameter

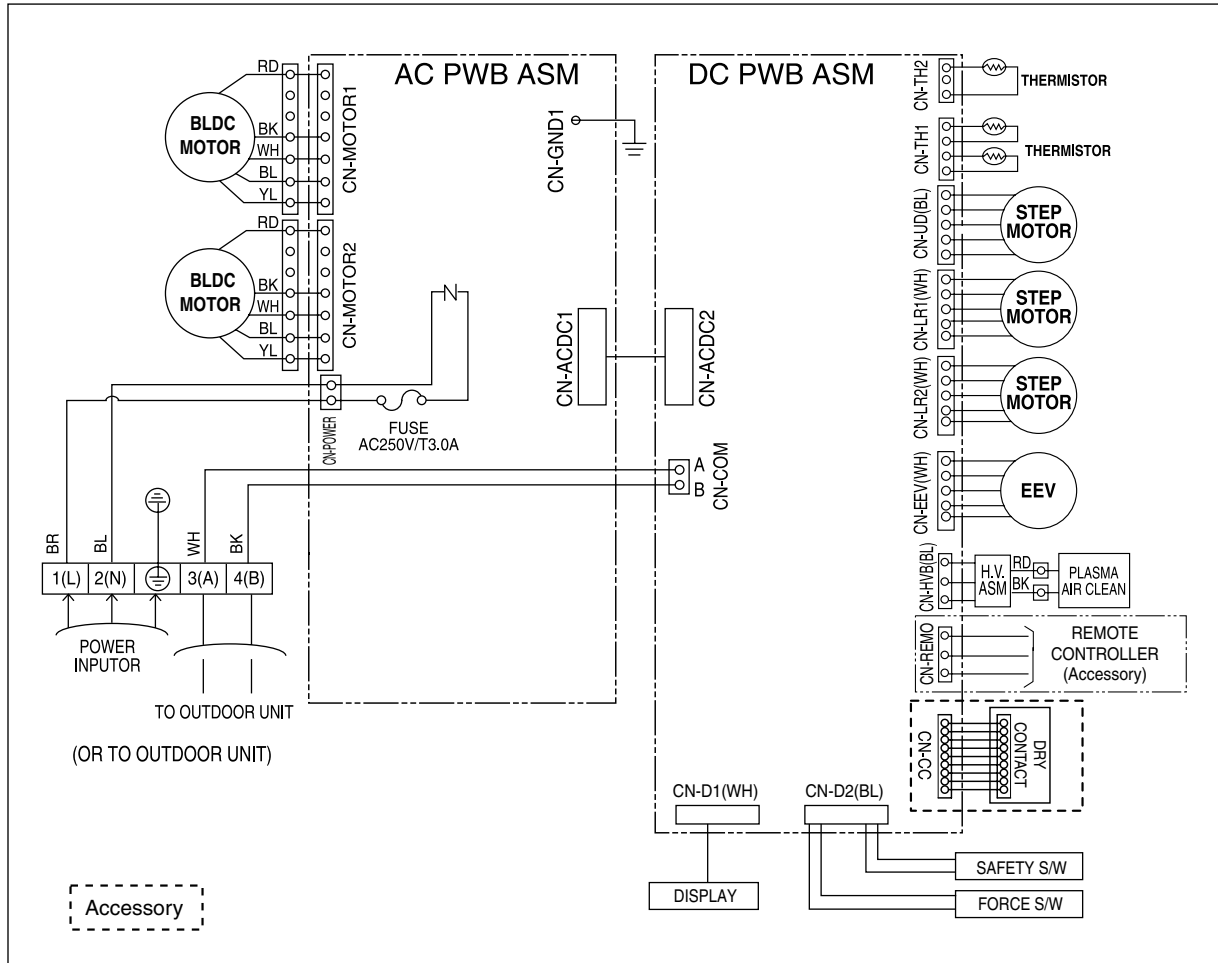
[unit: mm(inch)]

Model	Gas	Liquid
ARNU18GSV*1	Ø12.7(1/2)	Ø6.35(1/4)

\*(Color): M(Metal), D(Wood), B(Blue), W(White)



# 6. Wiring Diagrams



CONNECTOR NUMBER	LOCATION POINT	FUNCTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR1/2	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-COM	COMMUNICATION	COMMUNICATION BETWEEN INDOOR AND OUTDOOR
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-D1	DISPLAY	DISPLAY OF INDOOR STATUS
CN-D2	DISPLAY	DISPLAY OF INDOOR STATUS
CN-LR1	STEP MOTOR	STEP MOTOR OUTPUT FOR LEFT/RIGHT
CN-LR2	STEP MOTOR	STEP MOTOR OUTPUT FOR LEFT/RIGHT
CN-UD	STEP MOTOR	STEP MOTOR OUTPUT
CN-TH1	ROOM/PIPE SENSOR	ROOM AND PIPE THERMISTOR
CN-TH2	DISCHARGE PIPE SENSOR	DISCHARGE PIPE THERMISTOR



# Art Cool Type(Mirror)

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# 1. Specifications

Type		ART COOL Mirror			
Model	Unit	ARNU07GSE*1	ARNU09GSE*1	ARNU12GSE*1	
Cooling Capacity	W	2,200	2,800	3,600	
	kcal/h	1,900	2,400	3,100	
	Btu/h	7,500	9,600	12,300	
Heating Capacity	W	2,500	3,200	4,000	
	kcal/h	2,200	2,800	3,400	
	Btu/h	8,500	10,900	13,600	
Dimensions (W*D*H)	Body	mm	915x169x282	915x169x282	
		inch	36.0x6.5x11.1	36.0x6.5x11.1	
Coil	Rows x Columns x FPI		2x15x20	2x15x20	
	Face Area	m <sup>2</sup>	0.32	0.32	
Fan	Type		Cross Flow Fan	Cross Flow Fan	
	Motor Output x Number	W	40	40	
	Running Current	A	0.2	0.2	
	Air Flow Rate(H/M/L)	cmm	7/6/4	8/7/5	10/8/6
		cfm	247/212/141	282/247/177	353/283/212
	Drive		Direct	Direct	
Motor type		BLDC	BLDC		
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	
Air Filter			Net(Washable)	Net(Washable)	
Safety Device			Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø6.35(1/4)	
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø12.7(1/2)	
	Drain Pipe(Internal Dia.)	mm	16	16	
Net Weight		kg(lbs)	9(19.8)	9(19.8)	
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	37/33/23	39/35/25	
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50	1, 220 ~240, 50	
			1, 220, 60	1, 220, 60	
Refrigerant Control			EEV	EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	
Front Panel(** Position)			R:Mirror V:Silver B:Blue		

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

5. To be added for more available Models

Type			ART COOL Mirror	
Model		Unit	ARNU18GS3*1	ARNU24GS3*1
Cooling Capacity		W	5,600	7,100
		kcal/h	4,800	6,100
		Btu/h	19,100	24,200
Heating Capacity		W	6,300	8,000
		kcal/h	5,400	6,900
		Btu/h	21,500	27,300
Dimensions (W*D*H)	Body	mm	1170x173x315	1170x173x315
		inch	46.1x6.8x12.4	46.1x6.8x12.4
Coil	Rows x Columns x FPI		2x13x20	2x13x20
	Face Area	m <sup>2</sup>	0.15	0.15
Fan	Type		Cross Flow Fan	Cross Flow Fan
	Motor Output x Number	W	40	40
	Running Current	A	0.2	0.2
	Air Flow Rate(H/M/L)	cmm	12.6/11.5/10	15/14/13
		cfm	445/406/353	530/494/459
	Drive		Direct	Direct
Motor type		BLDC	BLDC	
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating
Sound Absorbing Thermal Insulation Material			Foamed polystrene	Foamed polystrene
Air Filter			Net(Washable)	Net(Washable)
Safety Device			Fuse	Fuse
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø9.52(3/8)
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø15.88(5/8)
	Drain Pipe(Internal Dia.)	mm	16	16
Net Weight		kg(lbs)	13(28.6)	13(28.6)
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	42/40/37	44/41/38
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60
Refrigerant Control			EEV	EEV
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C
Front Panel(** Position)			R:Mirror W:White D:Wood B:Blue M:Metal C:Cherry	

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

5. To be added for more available Models

## 2. Functions

### Indoor Unit

#### Operation ON/OFF by Remote controller

#### Sensing the Room Temperature

- Room temperature sensor. (THERMISTOR)

#### Room temperature control

- Maintains the room temperature in accordance with the Setting Temp.

#### Starting Current Control

- Indoor fan is delayed for 5 sec at the starting.

#### Indoor Fan Speed Control

- High, Med, Low, CHAOS

#### Operation indication Lamps (LED)

Signal Receptor

Receives the signals from the remote control.(Signal receiving sound: two short beeps or one long beep.)

Operation Indication Lamps

- ① On/Off : Lights up during the system operation.
- ☆ Sleep Mode : Lights up during Sleep Mode Auto operation.
- ⌚ Timer : Lights up during Timer operation.
- \* ⏸ Defrost Mode : Lights up during Defrost Mode or Hot Start operation.
- BB Temperature : Indicate the setting temperature.

#### Soft Dry Operation Mode

- Intermittent operation of fan at low speed.

#### Sleep Mode Auto Control

- The fan is switched to low(Cooling), med(Heating) speed.
- The unit will be stopped after 1, 2, 3, 4, 5, 6, 7 hours.

#### Natural Air Control by CHAOS Logic

- The fan is switched to intermittent or irregular operation
- The fan speed is automatically switched from high to low speed.

#### Airflow Direction Control

- The louver can be set at the desired position or swing up and down automatically.

#### Defrost(Deice) control (Heating)

- Both the indoor and outdoor fan stops during defrosting.

#### Hot-start Control (Heating)

- The indoor fan does not rotate until the evaporator pipe temperature will be reached at 28°C.

#### Auto Change Over

- It is operating cooling and heating mode automatically according to setting temperature.

## 3. Operation Details

### *The functions of main control*

#### **DISPLAY**

##### **1) High quality LCD remote controller supplied**

###### **Operation Indicator**

- On while in appliance operation, off while in appliance pause

###### **Timer Indicator**

- On while in timer mode (on/off) and in sleep timer mode, off when timer mode is completed or canceled

###### **Defrost Indicator**

- Off except when hot start during heating mode operation or while in defrost control.

###### **Plasma Indicator**

- On while in plasma mode, off while plasma mode is canceled.

###### **Auto restart Indicator**

- On while auto restart mode, off while auto restart mode is canceled.

###### **Auto restart**

- In case the power comes on again after a power failure, Auto Restarting Operation is the function to operate procedures automatically to the previous operating conditions.  
If you want to use this operation, press the Auto Restart Button.

###### **Power(Forced Operation)**

- Operation starts, when this button is pressed and stops when you press the button again.

#### **■ Cooling Mode Operation**

- When the intake air temperature reaches 0.5°C below the setting temp, the compressor and the outdoor fan stop.
- When it reaches 0.5°C above the setting temp, they start to operate again.

Compressor ON Temp=> Setting Temp+0.5°C

Compressor OFF Temp => Setting Temp-0.5°C

- While in compressor running, operating with the airflow speed set by the remote controller. While in compressor not running, operating with the low airflow speed regardless of the setting.

### ■ Healthy Dehumidification Mode

- When the dehumidification operation input by the remote controller is received, the intake air temperature is detected and the setting temp is automatically set according to the intake air temperature.  
26°C ≤ Intake Air Temp ⇒ 25°C  
24°C ≤ Intake Air Temp < 26°C ⇒ Intake Air Temp-1°C  
18°C ≤ Intake Air Temp < 24°C ⇒ Intake Air Temp-0.5°C  
Intake Air Temp < 18°C ⇒ 18°C
- While in compressor off, the indoor fan repeats low airflow speed and pause.
- While the intake air temp is between compressor on temp. and compressor off temp., 10-min dehumidification operation and 4-min compressor off repeat  
Compressor ON Temp. ⇒ Setting Temp+0.5°C  
Compressor OFF Temp. ⇒ Setting Temp-0.5°C
- In 10-min dehumidification operation, the indoor fan operates with the low airflow speed.

### ■ Heating Mode Operation

- When the intake air temp reaches +3°C above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.  
Thermo ON Temp. ⇒ Setting Temp. +2°C  
Thermo OFF Temp. ⇒ Setting Temp.+4°C
- While in compressor on, when above 38°C, it operates with setting airflow speed (while in sleep mode, with the medium airflow speed).
- While in compressor off, the indoor fan is off when the indoor pipe temp is below 33°C, when above 35°C, it operates with the low airflow speed.
- While in defrost control, both of the indoor and outdoor fans are turned off.

### ■ Defrost Control

- While in heating mode operation in order to protect outdoor unit from freezing, reversed to cooling cycle to defrost of the outdoor unit.

### ■ Fuzzy Operation (Outdoor unit C/O Model)

- According to the temperature set by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.  
Compressor ON Temp ⇒ Setting Temp+0.5°C  
Compressor OFF Temp ⇒ Setting Temp+0.5°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
26°C ≤ Intake Air Temp ⇒ 25°C  
24°C ≤ Intake Air Temp < 26°C ⇒ Intake Air Temp+1°C  
22°C ≤ Intake Air Temp < 24°C ⇒ Intake Air Temp+0.5°C  
18°C ≤ Intake Air Temp < 22°C ⇒ Intake Air Temp  
Intake Air Temp < 18°C ⇒ 18°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature



## ■ Fuzzy Operation (Outdoor unit H/P Model)

- When any of operation mode is not selected like the moment of the power on or when 3 hrs has passed since the operation off, the operation mode is selected.
- When determining the operation mode, the compressor, the outdoor fan, and the 4 way valve are off and only the indoor fan is operated for 15 seconds. Then an operation mode is selected according to the intake air temp at that moment as follows.
  - 24°C ≤ Inatake Air Temp       => Fuzzy Operation for Cooling
  - 21°C ≤ Inatake Air Temp < 24°C => Fuzzy Operation for Dehumidification
  - Inatake Air Temp < 21°C       => Fuzzy Operation for Heating
- If any of the operation modes among cooling / dehumidification / heating mode operations is carried out for 10 sec or longer before Fuzzy operation, the mode before Fuzzy operation is operated.

### 1) Fuzzy Operation for Cooling

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.
  - Compressor ON Temp   => Setting Temp+0.5°C
  - Compressor OFF Temp => Setting Temp+0.5°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.
  - 26°C ≤ Intake Air Temp       => 25°C
  - 24°C ≤ Intake Air Temp < 26°C => Intake Air Temp+1°C
  - 22°C ≤ Intake Air Temp < 24°C => Intake Air Temp+0.5°C
  - 18°C ≤ Intake Air Temp < 22°C => Intake Air Temp
  - Intake Air Temp < 18°C       => 18°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature.

### 2) Fuzzy Operation for Dehumidification

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.
  - Compressor ON Temp   => Setting Temp+0.5°C
  - Compressor OFF Temp => Setting Temp+0.5°C

- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
26°C ≤ Intake Air Temp ⇒ 25°C  
24°C ≤ Intake Air Temp < 26°C ⇒ Intake Air Temp + 1°C  
22°C ≤ Intake Air Temp < 24°C ⇒ Intake Air Temp + 0.5°C  
18°C ≤ Intake Air Temp < 22°C ⇒ Intake Air Temp  
Intake Air Temp < 18°C ⇒ 18°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan repeats the low airflow speed or pause as in dehumidification operation.

### 3) Fuzzy Operation for Heating

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is 3°C or more above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.  
Compressor ON Temp ⇒ Setting Temp + 2°C  
Compressor OFF Temp ⇒ Setting Temp + 4°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
20°C ≤ Intake Air Temp ⇒ Intake Air Temp + 0.5°C  
Intake Air Temp < 20°C ⇒ 20°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is set to the high or the medium according to the intake air temperature and the setting temperature.

#### ■ Airflow Speed Selection

- The airflow speed of the indoor fan is set to high, medium, low, or chaos by the input of the airflow speed selection key on the remote controller.

#### ■ On-Timer Operation

- When the set time is reached after the time is input by the remote controller, the appliance starts to operate.
- The timer LED is on when the on-timer is input. It is off when the time set by the timer is reached.
- If the appliance is operating at the time set by the timer, the operation continues.

#### ■ Off-Timer Operation

- When the set time is reached after the time is input by the remote controller, the appliance stops operating.
- The timer LED is on when the off-timer is input. It is off when the time set by the timer is reached.
- If the appliance is on pause at the time set by the timer, the pause continues.

## ■ Off-Timer <=> On-Timer Operation

- When the set time is reached after the on/off time is input by the remote controller, the on/off-timer operation is carried out according to the set time.

## ■ Sleep Timer Operation

- When the sleep time is reached after <1,2,3,4,5,6,7,0(cancel) hr> is input by the remote controller while in appliance operation, the operation of the appliance stops.
- While the appliance is on pause, the sleep timer mode cannot be input.
- While in cooling mode operation, 30 min later since the start of the sleep timer, the setting temperature increases by 1°C. After another 30 min elapse, it increases by 1°C again.
- When the sleep timer mode is input while in cooling cycle mode, the airflow speed of the indoor fan is set to the low.
- When the sleep timer mode is input while in heating cycle mode, the airflow speed of the indoor fan is set to the medium.

## ■ Chaos Swing Mode

- By the Chaos Swing key input, the vane automatically operates with the Chaos Swing or they are fixed to the desired direction.

## ■ Chaos Natural Wind Mode

- When the Chaos Natural Wind mode is selected and then operated, the high, medium, or low speed of the airflow mode is operated for 2~15 sec randomly by the Chaos Simulation.”

## ■ Jet Cool Mode Operation (Outdoor unit C/O Model)

- If the Jet Cool key is input at any operation mode while in appliance operation, the Jet Cool mode operates.
- In the Jet Cool mode, the indoor fan is operated at super-high speed for 30 min at cooling mode operation.
- In the Jet Cool mode operation, the room temperature is controlled to the setting temperature, 18°C
- When the sleep timer mode is input while in the Jet Cool mode operation, the Jet Cool mode has the priority.
- When the Jet Cool key is input, the upper/lower vanes are reset to those of the initial cooling mode and then operated in order that the air outflow could reach further.

## ■ Jet Cool Mode Operation (Outdoor unit H/P Model)

- While in heating mode or Fuzzy operation, the Jet Cool key cannot be input. When it is input while in the other mode operation (cooling, dehumidification, ventilation), the Jet Cool mode is operated.”
- In the Jet Cool mode, the indoor fan is operated at super-high speed for 30 min at cooling mode operation.
- In the Jet Cool mode operation, the room temperature is controlled to the setting temperature, 18°C
- When the sleep timer mode is input while in the Jet Cool mode operation, the Jet Cool mode has the priority.
- When the Jet Cool key is input, the upper/lower vanes are reset to those of the initial cooling mode and then operated in order that the air outflow could reach further.

## ■ Auto Restarting Operation

- When the power is restored after a sudden power failure while in appliance operation, the mode before the power failure is kept on the memory and the appliance automatically operates in the mode on the memory.
- Operation Mode that is kept on the memory

- State of Operation ON/OFF
- Operation Mode/Setting Temp/Selected Airflow Speed
- Sleep Timer Mode/Remaining Time of Sleep Timer (unit of hour)

### ■ Forced Operation (Outdoor unit C/O Model)

- To operate the appliance by force in case that the remote controller is lost, the forced operation button is on the main unit of the appliance to operate the appliance in the standard conditions.
- Press the forced operation button, the forced operation is carried out.
- Press the forced operation button once again to stop operation.
- The forced operation is carried out in cooling mode with the setting temperature 22°C and the high speed of airflow.

### ■ Forced Operation (Outdoor unit H/P Model)

- To operate the appliance by force in case that the remote controller is lost, the forced operation selection switch is on the main unit of the appliance to operate the appliance in the standard conditions.
- Press the forced operation button, the forced operation is carried out.
- Press the forced operation button once again to stop operation.
- In the forced operation mode, the indoor fan is operated at low speed for around 15 sec and then the operation condition is set according to the intake air temperature as follows.

24°C ≤ Intake Air Temp           => Cooling Mode Operation, 22°C, High Speed

21°C ≤ Intake Air Temp < 24°C => Dehumidification Operation, 23°C, High Speed

Intake Air Temp < 21°C           => Heating Mode Operation, 24°C, High Speed

### ■ Test Operation Control

- To check the condition of the installation when installing the appliance, the appliance is operated at cooling mode, high speed of airflow, compressor-on for 18 min without controlling the room temperature.
- After supplying power to the main body, keep pressing the forced operation button for about 3 seconds.
- While in test operation, a key can be input by the remote controller.  
When a key (operation start/stop, operation mode selection, airflow speed selection, temperature control, Jet Cool) is input by the remote controller, the test operation is canceled and the appliance is operated according to the setting by the remote controller.

### ■ Protection of the evaporator pipe from frosting

- In the temperature of the indoor pipe is below 0°C after 7 minutes from starting the compressor, the compressor and outdoor fan are stopped, and 3 minutes delay of operating of the compressor, when the temperature of the indoor pipe is over 7°C, the compressor and the outdoor fan are reoperated.
- Outdoor fan motor stops when indoor pipe temperature is below 3°C and restarts at the pipe temperature above 6°C or after 90 seconds, if the pipe temperature does not rise to 6°C, outdoor fan motor runs continuously at even below 3°C.

### ■ Buzzer Sounding Operation

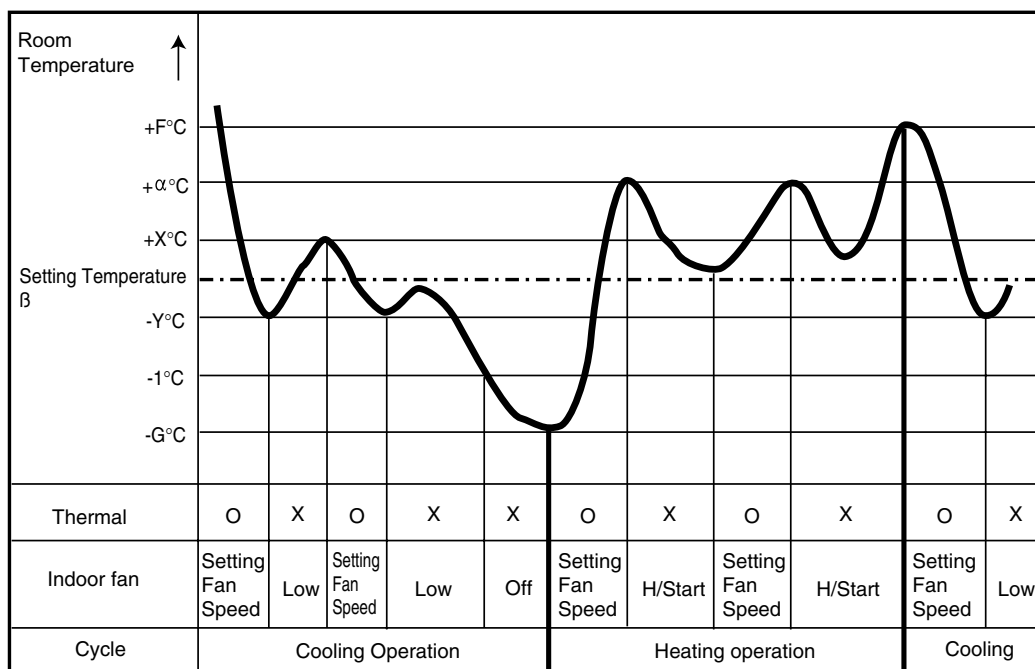
- When the appliance-operation key is input by the remote controller, the short “beep-beep-” sounds.
- When the appliance-pause key is input by the remote controller, the long “beep—” sounds.

### ■ Air Cleaner Operation

- When an air cleaner function is selected during Air Conditioner operation
  - Plasma air cleaner function will be operated while in any operation mode with selecting the function.
  - The function is to be stopped while it is operating with selecting the function.
- When an air cleaner function is selected during operation off
  - The function will be only operated.
- When inlet grille of air conditioner is opened during plasma operation, High Voltage Generator(H.V.B) is to be stopped. When inlet grille of air conditioner is closed during plasma operation, High Voltage Generator(H.V.B) will be operated again.

### ■ Auto Change Over

- In response to user □ wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

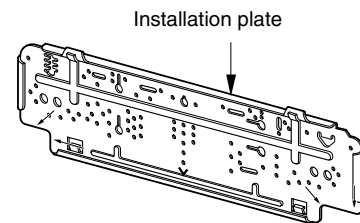
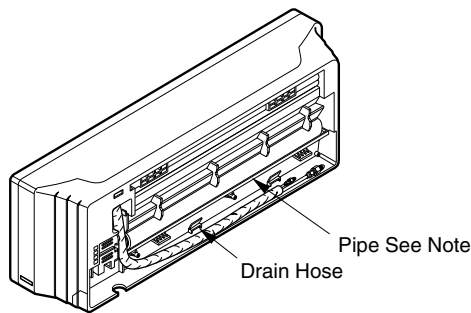
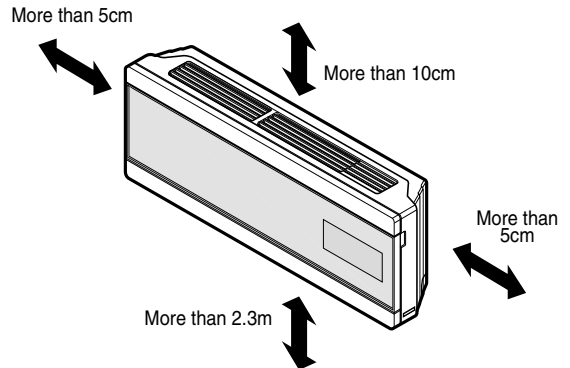
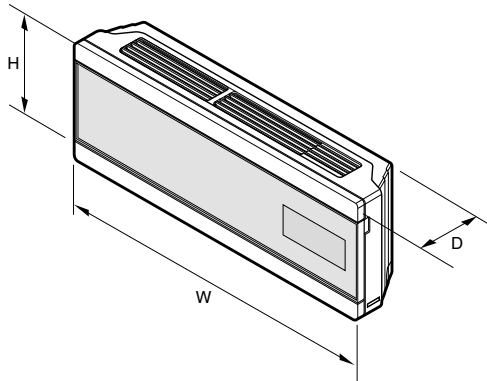
Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)^\circ\text{C}$	Cooling → Heating
$T_{ai} \geq T_s + F(2)^\circ\text{C}$	Heating → Cooling

Definition		Default(°C)
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
α	Thermal Off Temperature for Heating	1
β	Thermal On Temperature for Heating	0

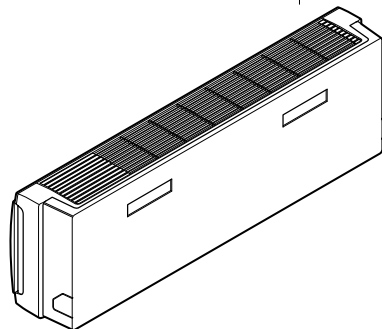
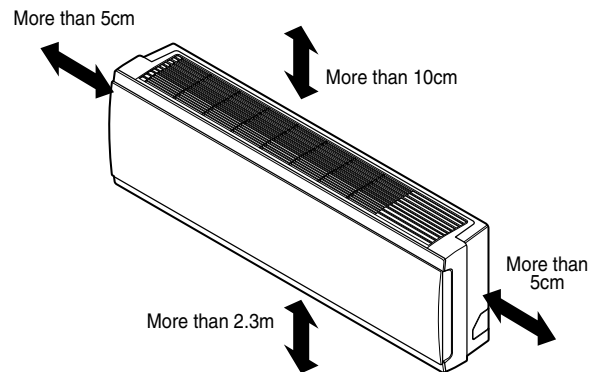
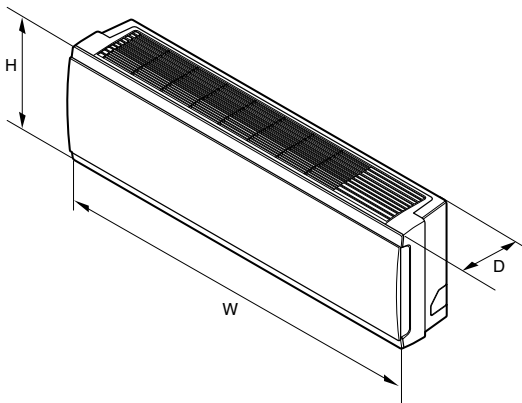
- \*  $T_{ai}$  : Indoor Temperature
- \*  $T_s$  : Setting Temperature

# 4. Dimensions

**ARNU18GS3\*1**  
**ARNU24GS3\*1**



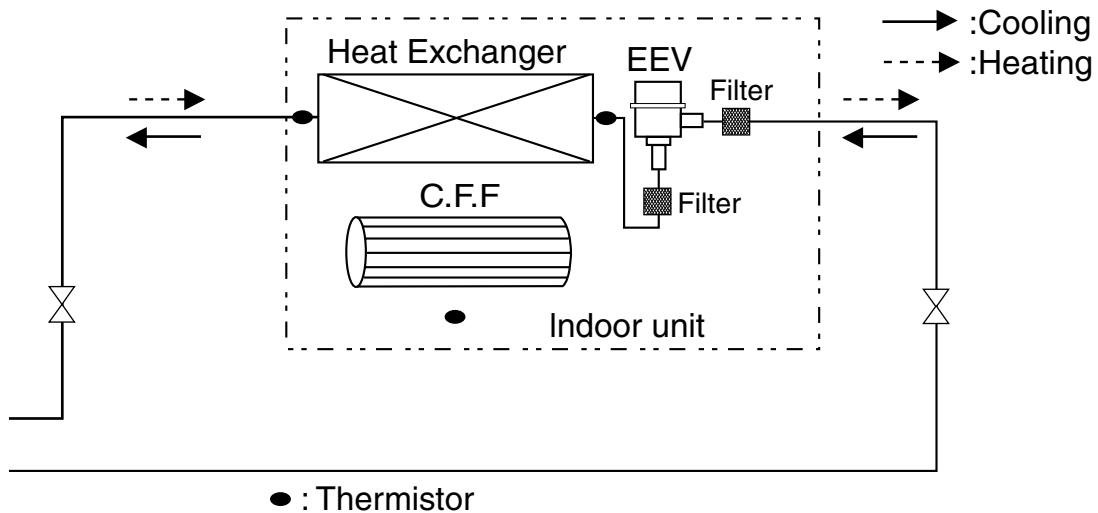
**ARNU07GSE\*1**  
**ARNU09GSE\*1**  
**ARNU12GSE\*1**



(unit : mm)

Model	W	H	D
ARNU07GSE*1	915	282	169
ARNU09GSE*1			
ARNU12GSE*1			
ARNU18GS3*1	1170	315	173
ARNU24GS3*1			

# 5. Piping Diagrams



Refrigerant pipe connection port diameter

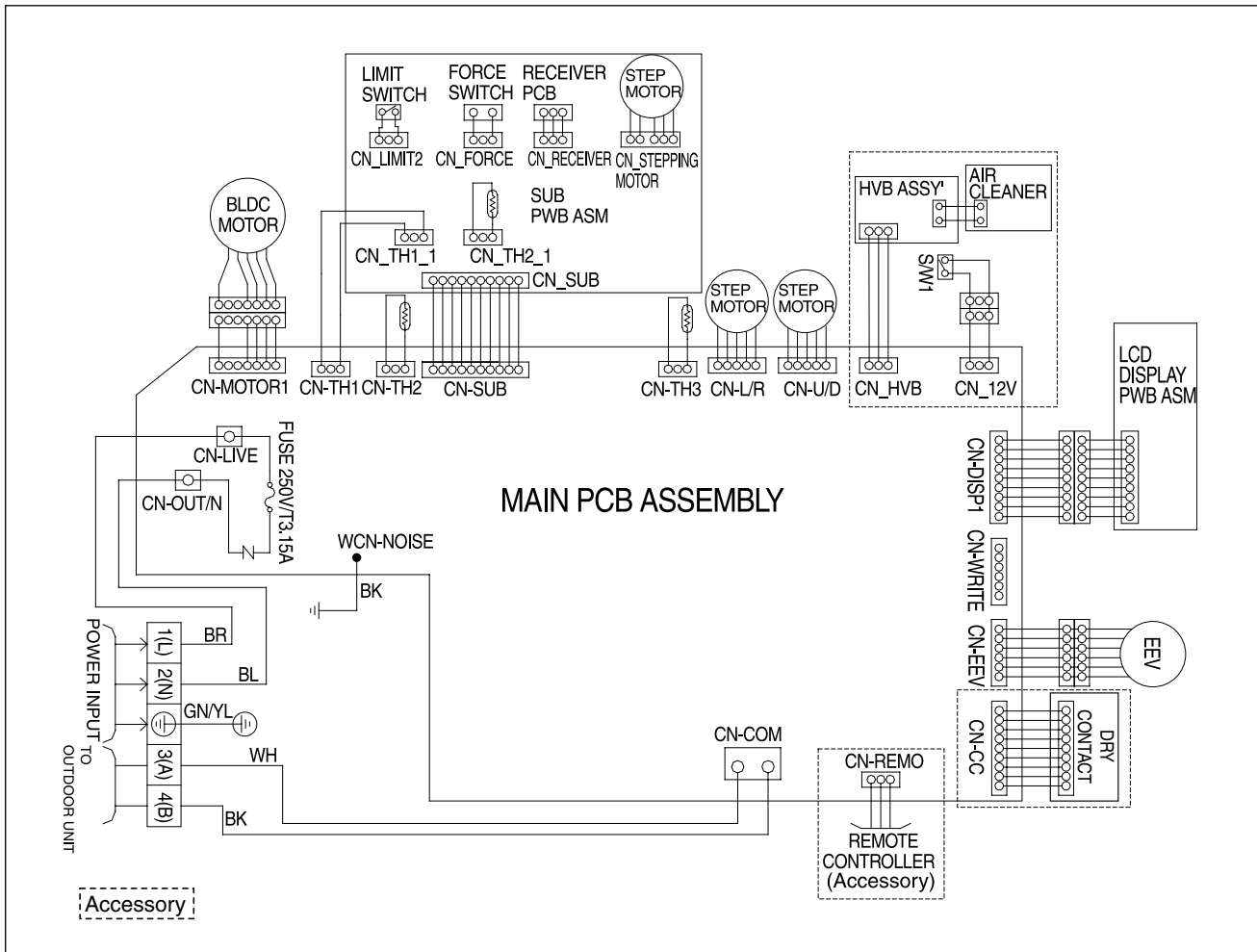
MODEL	[unit: mm(inch)]	
	GAS	LIQUID
ARNU07GSE*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU09GSE*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU12GSE*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU18GS3*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU24GS3*1	Ø15.88(5/8)	Ø9.52(3/8)

\*SE-(Color) : R(Mirror), V(Silver), B(Blue)

S3 -(Color) : R(Mirror), M(Metal), B(Blue), D(Wood), W(White), C(Cherry)

# 6. Wiring Diagrams

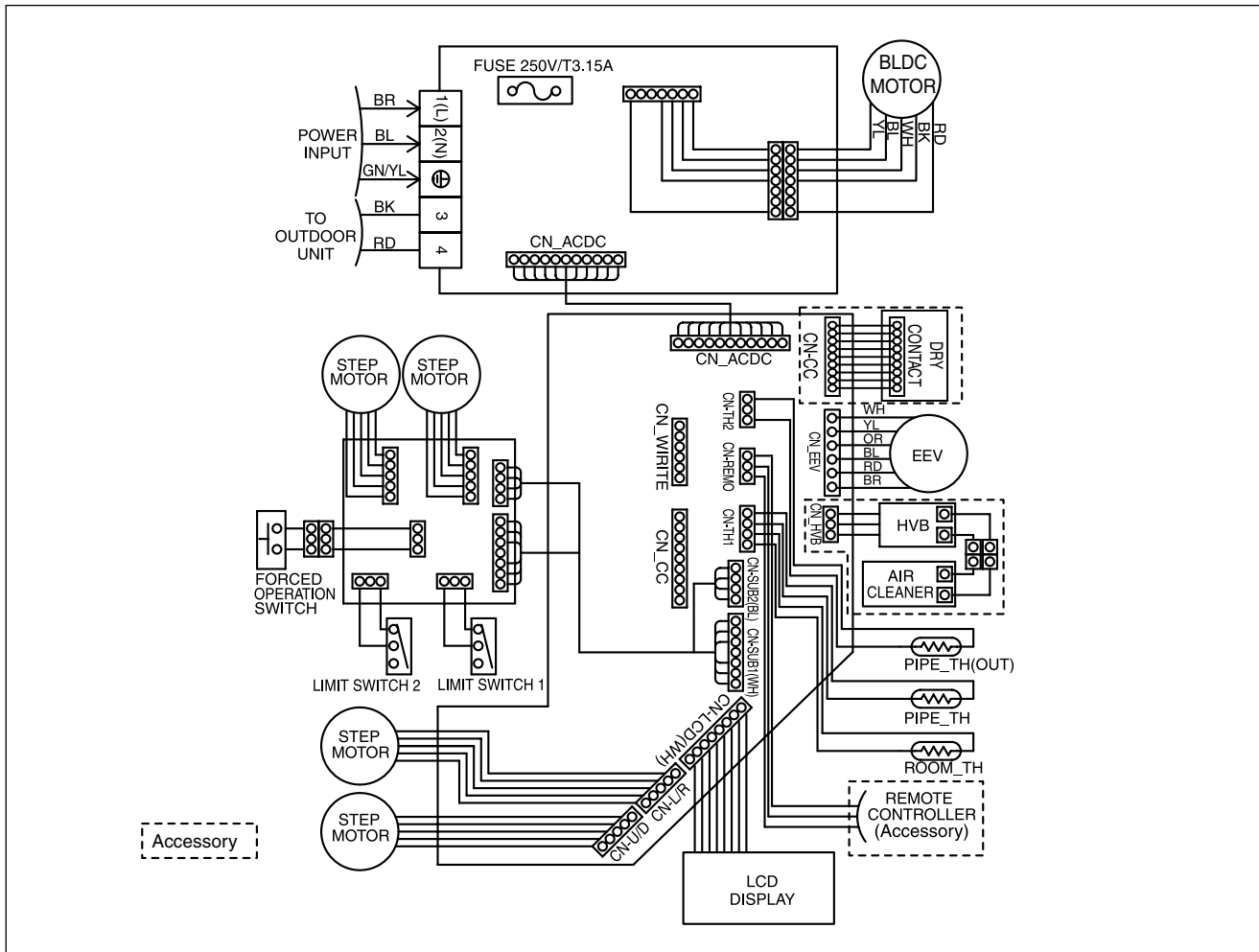
## SE Chassis



CONNECTOR NUMBER	LOCATION POINT	FUNCTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR1	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-COM	COMMUNICATION	COMMUNICATION BETWEEN INDOOR AND OUTDOOR
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-L/R	STEP MOTOR	STEP MOTOR OUTPUT FOR LEFT/RIGHT
CN-U/D	STEP MOTOR	STEP MOTOR OUTPUT
CN-TH1	ROOM/PIPE SENSOR	ROOM & PIPE THERMISTOR
CN-TH2	DISCHARGE PIPE SENSOR	DISCHARGE PIPE THERMISTOR
CN-SUB	STEP MOTOR(FRONT)	FRONT PANEL STEP MOTOR
CN-HVB	AIR PURIFIER	AIR PURIFIER OUTPUT
CN-VFD	DISPLAY	DISPLAY OF INDOOR STATUS
CN-CON	SAFETY CONNECTION	SAFETY OF INDOOR STATUS
CN_AC/DC	AC/DC CONNECTION	CONNECTION BETWEEN AC PCB AND DC PCB



S3 Chassis



CONNECTOR NUMBER	LOCATION POINT	FUNCTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR1	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-COM	COMMUNICATION	COMMUNICATION BETWEEN INDOOR AND OUTDOOR
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-L/R	STEP MOTOR	STEP MOTOR OUTPUT FOR LEFT/RIGHT
CN-U/D	STEP MOTOR	STEP MOTOR OUTPUT
CN-TH1	ROOM/PIPE SENSOR	ROOM & PIPE THERMISTOR
CN-TH2	DISCHARGE PIPE SENSOR	DISCHARGE PIPE THERMISTOR
CN-SUB	STEP MOTOR(FRONT)	FRONT PANEL STEP MOTOR
CN-HVB	AIR PURIFIER	AIR PURIFIER OUTPUT
CN-VFD	DISPLAY	DISPLAY OF INDOOR STATUS
CN-CON	SAFETY CONNECTION	SAFETY OF INDOOR STATUS
CN_AC/DC	AC/DC CONNECTION	CONNECTION BETWEEN AC PCB AND DC PCB



## Ceiling Concealed Duct Type (Low static)

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<b>6. Wiring Diagrams .....</b>	<b>108</b>

# 1. Specifications

Type			Ceiling Concealed Duct (Low Static)			
Model		Unit	ARNU07GB1G1	ARNU09GB1G1	ARNU12GB1G1	
Cooling Capacity		W	2,200	2,800	3,600	
		kcal/h	1,900	2,400	3,100	
		Btu/h	7,500	9,600	12,300	
Heating Capacity		W	2,500	3,200	4,000	
		kcal/h	2,200	2,800	3,400	
		Btu/h	8,500	10,900	13,600	
Casing			Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate	
Dimensions (W*D*H)	Body	mm	820 x 575 x 190	820 x 575 x 190	820 x 575 x 190	
		inch	32.3 x 21.7 x 7.5	32.3 x 21.7 x 7.5	32.3 x 21.7 x 7.5	
Coil	Rows x Columns x FPI		2x11x21	2x11x21	2x11x21	
	Face Area	m <sup>2</sup>	0.16	0.16	0.16	
Fan	Type		Sirocco Fan	Sirocco Fan	Sirocco Fan	
	Motor Output x Number	W	30	30	30	
	Running Current	A	0.1	0.1	0.1	
	Air Flow Rate(H/M/L)	cmm		8.5/7.5/6.5	9.5/8.5/7.5	10.5/9.5/8.5
		cfm		300.2 / 264.9 / 229.6	335.5 / 300.2 / 264.9	370.9 / 335.5 / 300.2
	External Static Pressure	Pa	19.6	19.6	19.6	
	Drive		Direct	Direct	Direct	
Motor type		BLDC	BLDC	BLDC		
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	Foamed polystyrene	
Air Filter			Net(Washable)	Net(Washable)	Net(Washable)	
Safety Device			Fuse	Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø6.35(1/4)	Ø6.35(1/4)	
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø12.7(1/2)	Ø12.7(1/2)	
	Drain Pipe(Inner Dia.)	mm	25.4	25.4	25.4	
Net Weight		kg(lbs)	17(37.5)	17(37.5)	17(37.5)	
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	35/33/31	36/34/32	37/35/33	
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	
Refrigerant Control			EEV	EEV	EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

5. To be added for more available Models

Type			Ceiling Concealed Duct (Low Static)		
Model		Unit	ARNU18GB2G1	ARNU24GB2G1	
Cooling Capacity	W		5,600	7,000	
	kcal/h		4,800	6,100	
	Btu/h		19,100	24,200	
Heating Capacity	W		6,300	8,000	
	kcal/h		5,400	6,900	
	Btu/h		21,500	27,300	
Casing			Galvanized Steel Plate	Galvanized Steel Plate	
Dimensions (W*D*H)	Body	mm	1100 x 575 x 190	1100 x 575 x 190	
		inch	43.3 x 21.7 x 7.5	43.3 x 21.7 x 7.5	
Coil	Rows x Columns x FPI		2x10x19	2x10x19	
	Face Area	m <sup>2</sup>	0.23	0.23	
Fan	Type		Sirocco Fan	Sirocco Fan	
	Motor Output x Number	W	80	80	
	Running Current	A	0.24	0.24	
	Air Flow Rate(H/M/L)	cmm		16 / 14 / 12	17.5 / 15 / 13
		cfm		565 / 494.4 / 423.8	618 / 530 / 459
	External Static Pressure	Pa	19.6	19.6	
	Drive		Direct	Direct	
Motor type		BLDC	BLDC		
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	
Air Filter			Net(Washable)	Net(Washable)	
Safety Device			Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø9.52(3/8)	
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø15.88(5/8)	
	Drain Pipe(Inner Dia.)	mm	25.4	25.4	
Net Weight		kg(lbs)	21(46.3)	21(46.3)	
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	40/37/34	43/40/37	
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	
Refrigerant Control			EEV	EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	

**Notes:-**

- Capacities are based on the following conditions:
  - Cooling
    - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
    - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
  - Heating
    - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
    - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
- Capacities are net capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve
- To be added for more available Models

## 2. Functions

### Indoor Unit

**Operation ON/OFF by Remote controller**

**Sensing the Room Temperature** • Room temperature sensor. (Thermistor)

**Room temperature control** • Maintains the room temperature in accordance with the Setting Temperature.

**Starting Current Control** • Indoor fan is delayed for 5 seconds at the starting.

**Indoor Fan Speed Control** • High, Med, Low

**Soft Dry Operation Mode** • Intermittent operation of fan at low speed.

**Auto Restart** • Although the air-conditioner is turned off by a power failure, it is restarted automatically previous operation mode after power supply.

**Deice (defrost) control (Heating)** • Both the indoor and outdoor fan stops during defrosting.  
• Hot start after defrost ends.

**Hot-start Control (Heating)** • The indoor fan does not rotate until the evaporator piping temperature reaches 25°C.

**High head height Drain pump** • A standard drain-head height of up to 700mm is possible.

**Central Control(Optional)** • It is operating individually or totally by central control function.

**Auto Change Over** • It is operating cooling and heating mode automatically according to setting temperature.

## 3. Operation Details

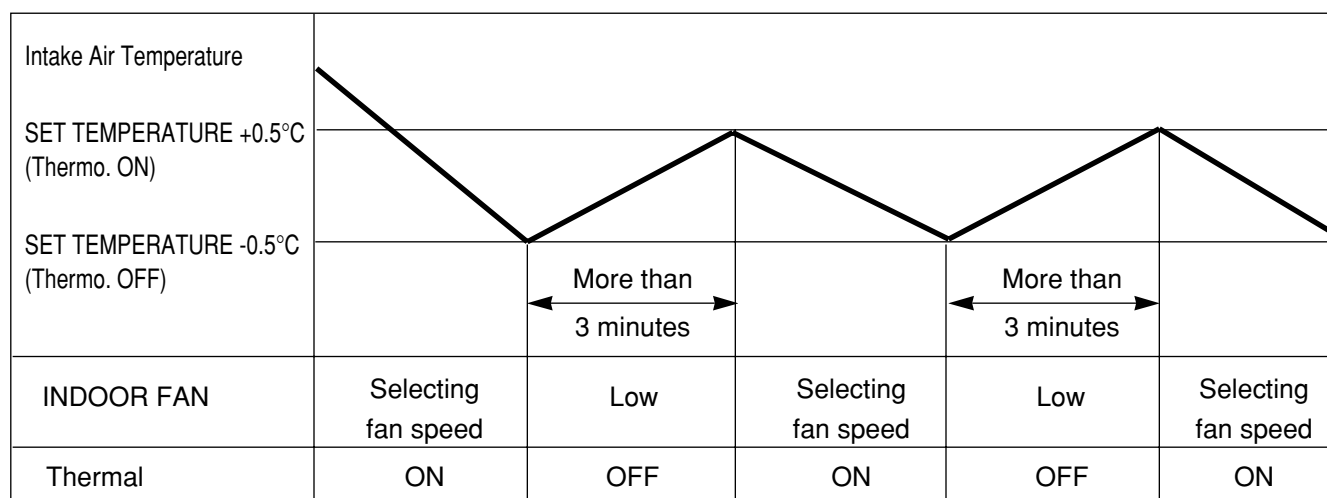
### The functions of main control

#### ■ Soft-Dry Operation

- The indoor fan speed is automatically set to the low, so the shift of the indoor fan speed is impossible because of already being set to the best speed for Dry Operation by microcontroller control.

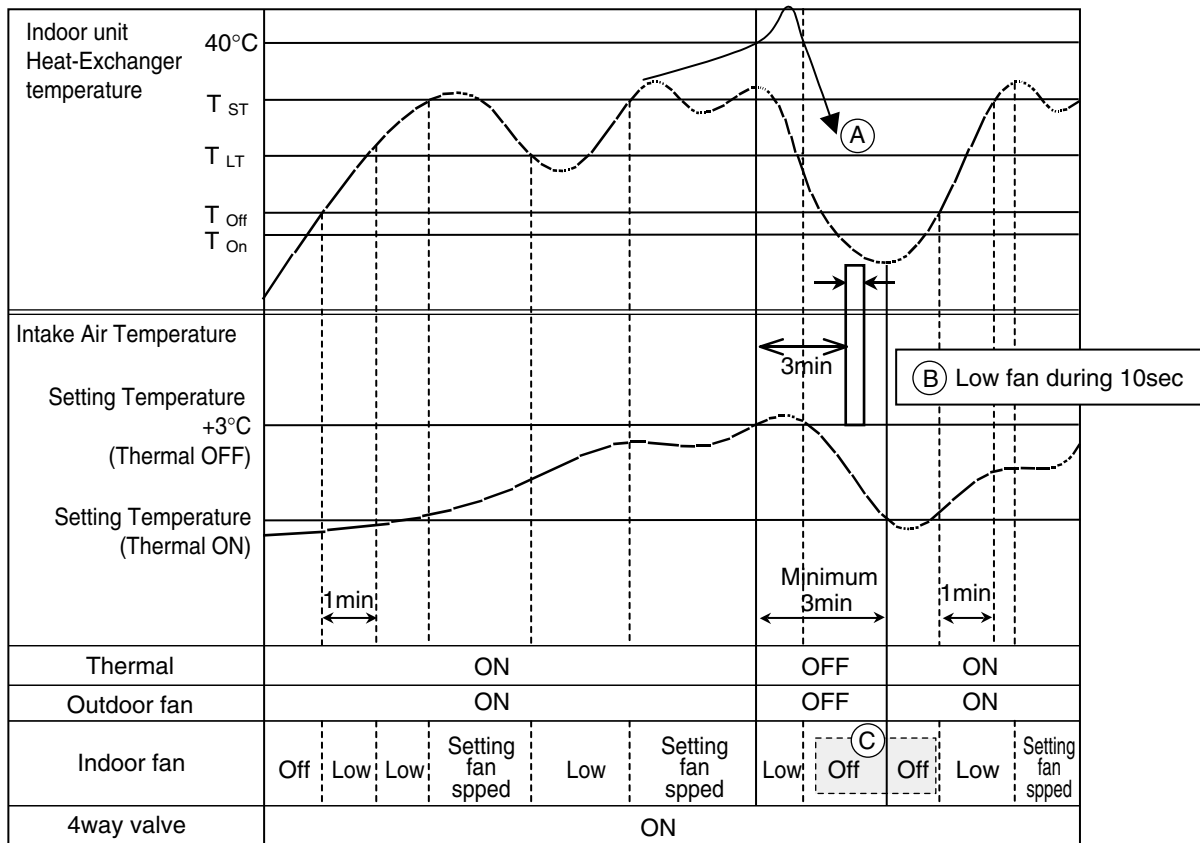
#### ■ Cooling Mode Operation

- When selecting the Cooling(✳) Mode Operation, the unit will operate according to the setting by the remote controller and the operation diagram is as following.



## ■ Heating Mode Operation

The unit will operate according to the setting by the remote controller and the operation diagram is shown as following.



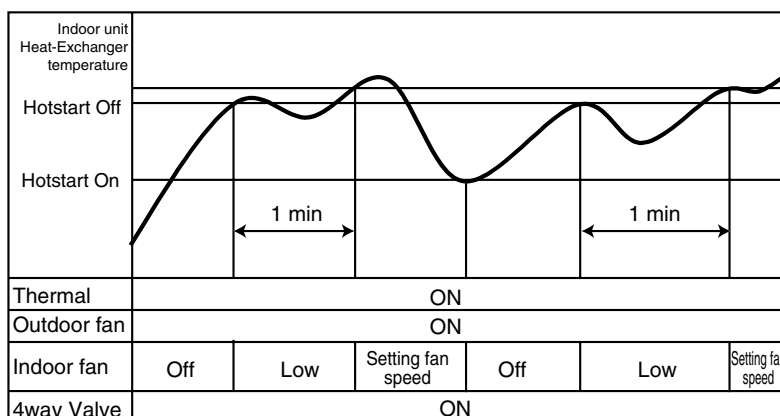
- **Compressor-off interval** : - (A) While the indoor Heat-Exchanger temperature is higher than 40°C, fan operates at low speed, when it becomes lower than 40°C fan stops.
- (B) For eliminating latent heat-loss, fan operates at low speed for 10 seconds periodically.
- (C) To be operated "Low" except initial Hotstart operation

	High Static			Low Static				Convertible	
Chassis	BH	BG	BR	B1	B2	CE	CF	VE	VJ
Hotstart On $T_{On}$	19°C	19°C	19°C	19°C	19°C	19°C	19°C	26°C	26°C
Hotstart Off $T_{Off}$	22°C	22°C	22°C	22°C	22°C	22°C	22°C	27°C	27°C
Low temperature $T_{LT}$	25°C	25°C	25°C	25°C	25°C	25°C	25°C	28°C	28°C
Setting Temperature $T_{ST}$	27°C	27°C	27°C	27°C	27°C	27°C	27°C	30°C	30°C



## Hot-Start Control

- The indoor fan does not rotate until the indoor unit Hex-Exchanger temperature reaches 30°C.
- The operation diagram is as following.

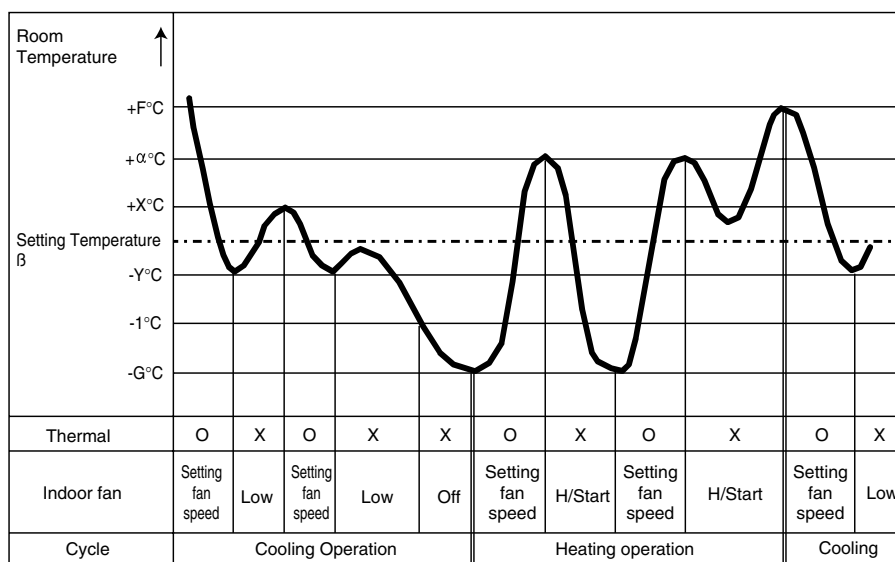


- Initial Hotstart On state

- ① Power Off ➡ On
- ② Operation Off ➡ On
- ③ Cooling operation ➡ Heating operation
- ④ Defrost operation

## Auto Change Over

- In response to user wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

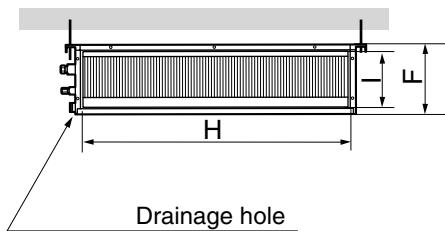
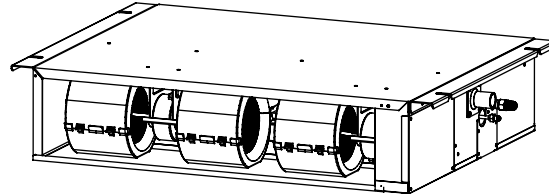
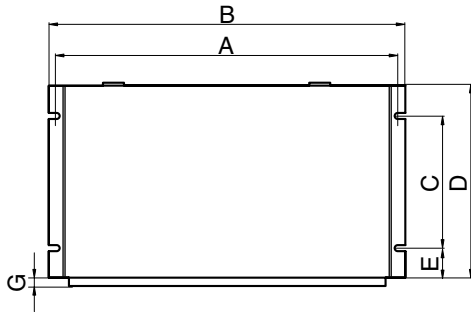
Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)^\circ\text{C}$	Cooling → Heating
$T_{ai} \geq T_s + F(2)^\circ\text{C}$	Heating → Cooling

- \*  $T_{ai}$  : Indoor Temperature
- \*  $T_s$  : Setting Temperature

Definition		Default(°C)
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
α	Thermal Off Temperature for Heating	1
β	Thermal On Temperature for Heating	0

# 4. Dimensions

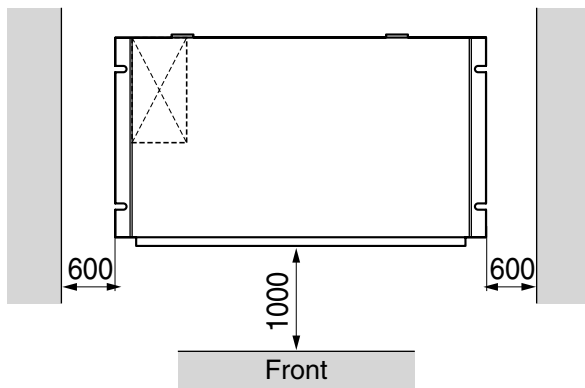
ARNU07GB1G1/ARNU09GB1G1/ ARNU12GB1G1  
 ARNU18GB2G1/ARNU24GB2G1



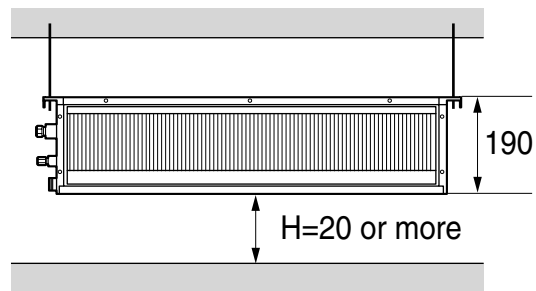
Dimension Capacity	A	B	C	D	E	F	G	H	I
7/9/12k BTU/h	850	900	383	570	93.5	190	20.6	795	163
18/24k BTU/h	1130	1180	383	570	93.5	190	20.6	1065	163

(unit: mm)

**Top view**  
(unit: mm)

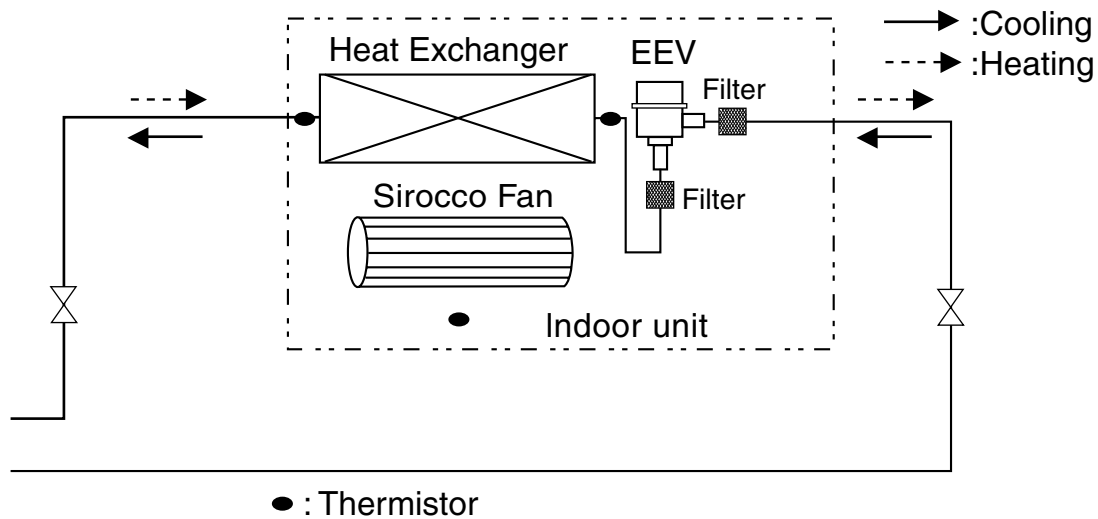


**Front view**



\* Suitable dimension "H" is necessary to get a slope to drain as figure

# 5. Piping Diagrams

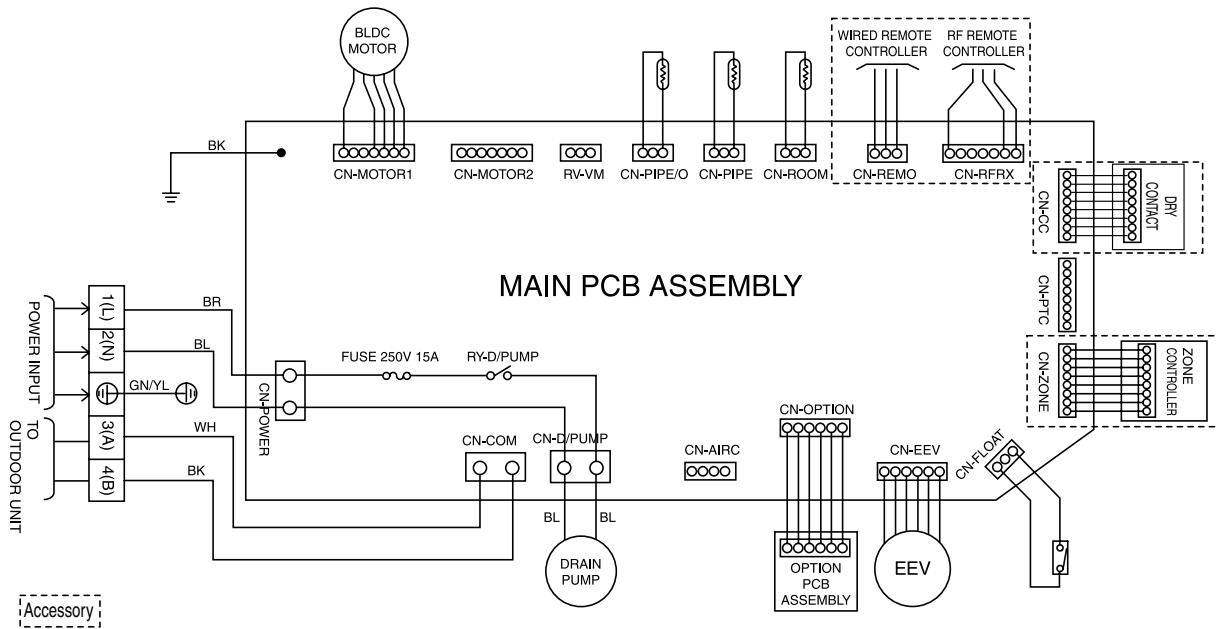


Refrigerant pipe connection port diameter

[unit: mm(inch)]

MODEL	GAS	LIQUID
ARNU07GB1G1 / ARNU09GB1G1 ARNU12GB1G1 / ARNU18GB2G1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU24GB2G1	Ø15.88(5/8)	Ø9.52(3/8)

# 6. Wiring Diagrams



CONNECTOR NUMBER	SPEC.	DESCRIPTION
CN-MOTOR1	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-MOTOR2	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-PIPE/O	DISCHARGE PIPE THERMISTOR	DISCHARGE PIPE THERMISTOR
CN-PIPE	PIPE SENSOR	PIPE THERMISTOR
CN-ROOM	ROOM SENSOR	ROOM THERMISTOR
CN-REMO	REMOTE CONTROLLER	REMOTE CONTROL LINE
CN-FLOAT	FLOAT SWITCH INPUT	FLOAT SWITCH SENSING
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-OPTION	OPTION PWB.	COMMUNICATION BETWEEN MAIN AND OPTION
CN-COM	COMMUNICATION	COMMUNICATION BETWEEN INDOOR AND OUTDOOR
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER

## Ceiling Concealed Duct Type (Built in)

<b>1. Specifications .....</b>	<b>110</b>
<b>2. Funtions .....</b>	<b>112</b>
<b>3. Operation Details.....</b>	<b>113</b>
<b>4. Dimensions .....</b>	<b>116</b>
<b>5. Piping Diagrams .....</b>	<b>117</b>
<b>6. Wiring Diagrams .....</b>	<b>118</b>

# 1. Specifications

Type			Ceiling Concealed Duct (Built-in)		
Accessory			PBSGB10	PBSGB10	PBSGB10
Model		Unit	ARNU07GB3G1	ARNU09GB3G1	ARNU12GB3G1
Cooling Capacity		W	2,200	2,800	3,600
		kcal/h	1,900	2,400	3,100
		Btu/h	7,500	9,600	12,300
Heating Capacity		W	2,500	3,200	4,000
		kcal/h	2,200	2,800	3,400
		Btu/h	8,500	10,900	13,600
Casing			Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate
Dimensions (W*D*H)	Body	mm	820 x 575 x 190	820 x 575 x 190	820 x 575 x 190
		inch	32.3 x 21.7 x 7.5	32.3 x 21.7 x 7.5	32.3 x 21.7 x 7.5
Coil	Rows x Columns x FPI		2x11x21	2x11x21	2x11x21
	Face Area	m <sup>2</sup>	0.16	0.16	0.16
Fan	Type		Sirocco Fan	Sirocco Fan	Sirocco Fan
	Motor Output x Number	W	30	30	30
	Running Current	A	0.1	0.1	0.1
	Air Flow Rate(H/M/L)	cmm	8.5/7.5/6.5	9.5/8.5/7.5	10.5/9.5/8.5
		cfm	300.2/264.9/229.6	335.5/300.2/264.9	370.9/335.5/300.2
	External Static Pressure	Pa	19.6	19.6	19.6
	Drive		Direct	Direct	Direct
Motor type		BLDC	BLDC	BLDC	
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	Foamed polystyrene
Air Filter			Net(Washable)	Net(Washable)	Net(Washable)
Safety Device			Fuse	Fuse	Fuse
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø6.35(1/4)	Ø6.35(1/4)
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø12.7(1/2)	Ø12.7(1/2)
	Drain Pipe(Internal Dia.)	mm	25.4	25.4	25.4
Net Weight		kg(lbs)	17(37.5)	17(37.5)	17(37.5)
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	35/33/31	36/34/32	37/35/33
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60
Refrigerant Control			EEV	EEV	EEV
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C

**Notes:-**

- Capacities are based on the following conditions:
  - Cooling
    - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
    - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
  - Heating
    - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
    - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
- Capacities are net capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve
- To be added for more available Models

Type			Ceiling Concealed Duct (Built-in)	
Accessory			PBSGB20	PBSGB20
Model		Unit	ARNU18GB4G1	ARNU24GB4G1
Cooling Capacity		W	5,600	7,100
		kcal/h	4,800	6,100
		Btu/h	19,100	24,200
Heating Capacity		W	6,300	8,000
		kcal/h	5,400	6,900
		Btu/h	21,500	27,300
Casing			Galvanized Steel Plate	Galvanized Steel Plate
Dimensions (W*D*H)	Body	mm	1100 x 575 x 190	1100 x 575 x 190
		inch	43.3 x 21.7 x 7.5	43.3 x 21.7 x 7.5
Coil	Rows x Columns x FPI		2x10x19	2x10x19
	Face Area	m <sup>2</sup>	0.23	0.23
Fan	Type		Sirocco Fan	Sirocco Fan
	Motor Output x Number	W	80	80
	Running Current	A	0.25	0.25
	Air Flow Rate(H/M/L)	cmm	16/14/12	17.5/15/13
		cfm	565/494.4/423.8	618/530/459
	External Static Pressure	Pa	19.6	19.6
	Drive		Direct	Direct
Motor type		BLDC	BLDC	
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene
Air Filter			Net(Washable)	Net(Washable)
Safety Device			Fuse	Fuse
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø9.52(3/8)
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø15.88(5/8)
	Drain Pipe(Internal Dia.)	mm	25.4	25.4
Net Weight		kg(lbs)	21(46.3)	21(46.3)
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	40/37/34	43/40/37
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60
Refrigerant Control			EEV	EEV
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
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  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

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4. EEV : Electronic Expansion Valve

5. To be added for more available Models

## 2. Functions

### Indoor Unit

**Operation ON/OFF by Remote controller**

**Sensing the Room Temperature** • Room temperature sensor. (Thermistor)

**Room temperature control** • Maintains the room temperature in accordance with the Setting Temperature.

**Starting Current Control** • Indoor fan is delayed for 5 seconds at the starting.

**Indoor Fan Speed Control** • High, Med, Low

**Soft Dry Operation Mode** • Intermittent operation of fan at low speed.

**Auto Restart** • Although the air-conditioner is turned off by a power failure, it is restarted automatically previous operation mode after power supply.

**Deice (defrost) control (Heating)** • Both the indoor and outdoor fan stops during defrosting.  
• Hot start after defrost ends.

**Hot-start Control (Heating)** • The indoor fan does not rotate until the evaporator piping temperature reaches 25°C.

**High head height Drain pump** • A standard drain-head height of up to 700mm is possible.

**Central Control(Optional)** • It is operating individually or totally by central control function.

**Auto Change Over** • It is operating cooling and heating mode automatically according to setting temperature.



## 3. Operation Details

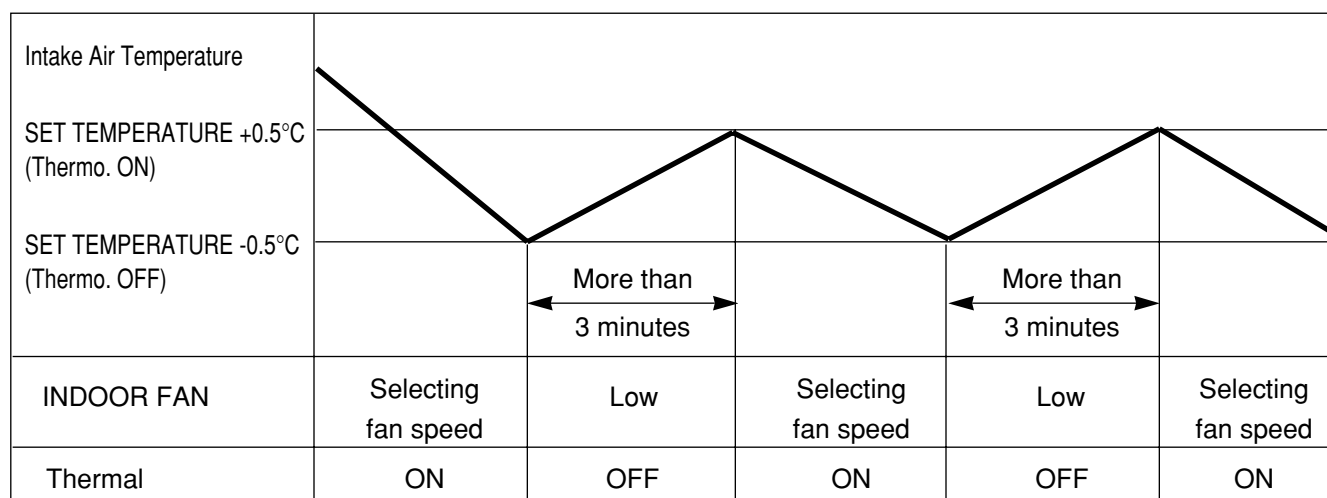
### (1) The function of main control

#### ■ Soft-Dry Operation

- The indoor fan speed is automatically set to the low, so the shift of the indoor fan speed is impossible because of already being set to the best speed for Dry Operation by microcontroller control.

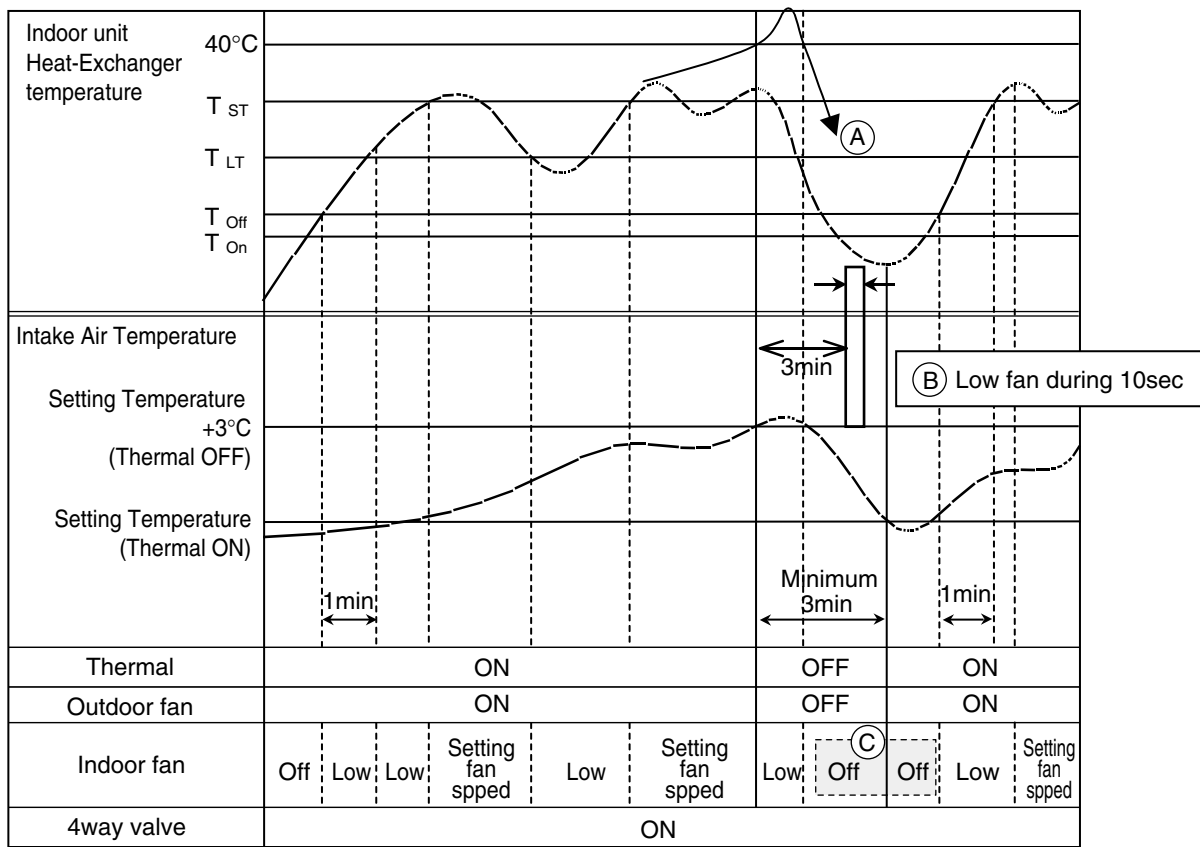
#### ■ Cooling Mode Operation

- When selecting the Cooling(✳) Mode Operation, the unit will operate according to the setting by the remote controller and the operation diagram is as following.



## ■ Heating Mode Operation

The unit will operate according to the setting by the remote controller and the operation diagram is shown as following.

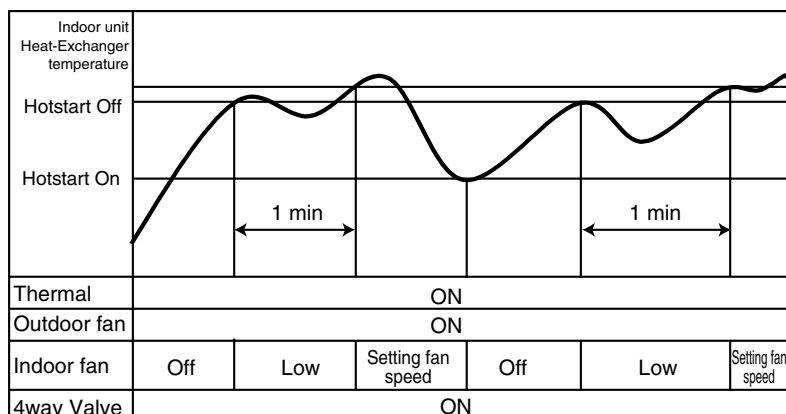


- **Compressor-off interval** : - (A) While the indoor Heat-Exchanger temperature is higher than 40°C, fan operates at low speed, when it becomes lower than 40°C fan stops.
- (B) For eliminating latent heat-loss, fan operates at low speed for 10 seconds periodically.
- (C) To be operated "Low" except initial Hotstart operation

	High Static			Low Static				Convertible	
Chassis	BH	BG	BR	B1	B2	CE	CF	VE	VJ
Hotstart On $T_{On}$	19°C	19°C	19°C	19°C	19°C	19°C	19°C	26°C	26°C
Hotstart Off $T_{Off}$	22°C	22°C	22°C	22°C	22°C	22°C	22°C	27°C	27°C
Low temperature $T_{LT}$	25°C	25°C	25°C	25°C	25°C	25°C	25°C	28°C	28°C
Setting Temperature $T_{ST}$	27°C	27°C	27°C	27°C	27°C	27°C	27°C	30°C	30°C

## ■ Hot-Start Control

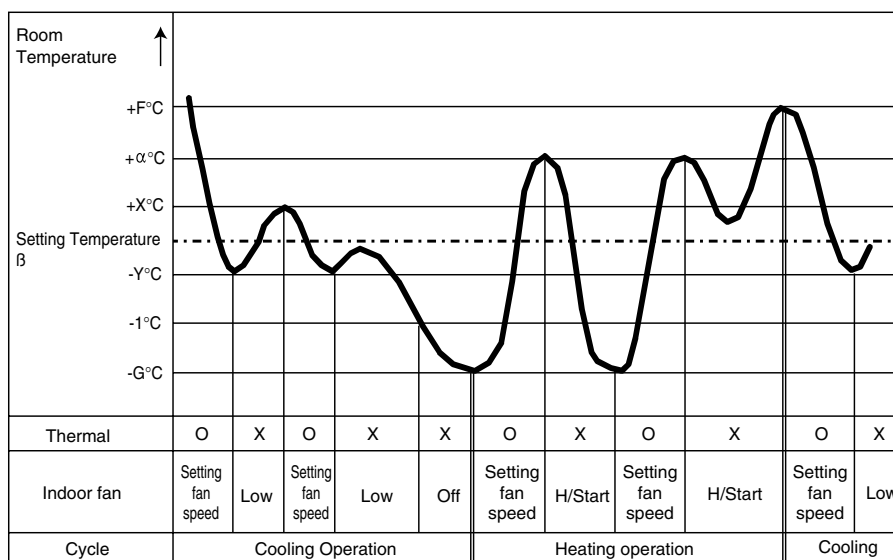
- The indoor fan does not rotate until the indoor unit Hex-Exchanger temperature reaches 30°C.
- The operation diagram is as following.



- Initial Hotstart On state
  - ① Power Off → On
  - ② Operation Off → On
  - ③ Cooling operation → Heating operation
  - ④ Defrost operation

## ■ Auto Change Over

- In response to user wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)^\circ\text{C}$	Cooling → Heating
$T_{ai} \geq T_s + F(2)^\circ\text{C}$	Heating → Cooling

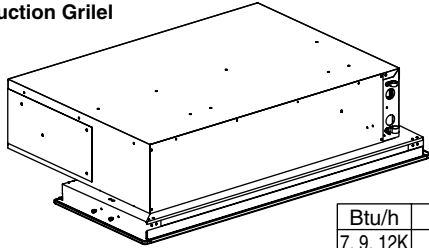
Definition		Default(°C)
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
α	Thermal Off Temperature for Heating	1
β	Thermal On Temperature for Heating	0

- \*  $T_{ai}$  : Indoor Temperature
- \*  $T_s$  : Setting Temperature

# 4. Dimensional Drawings

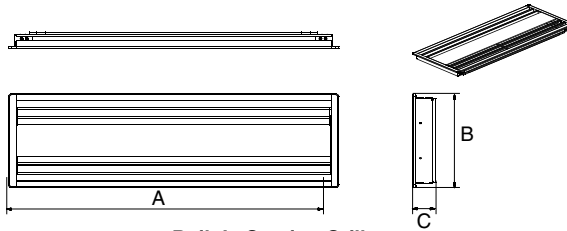
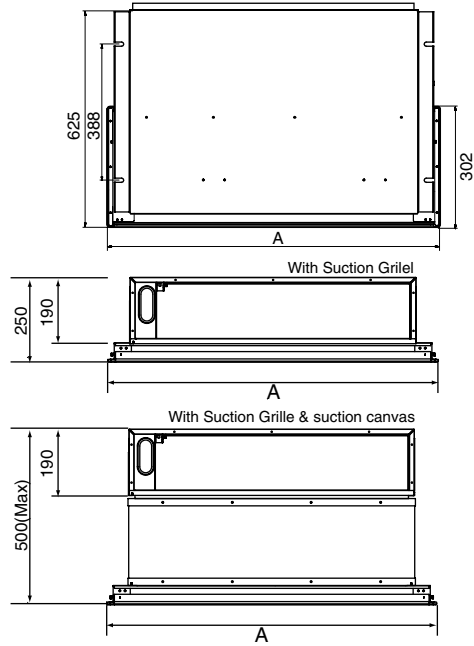
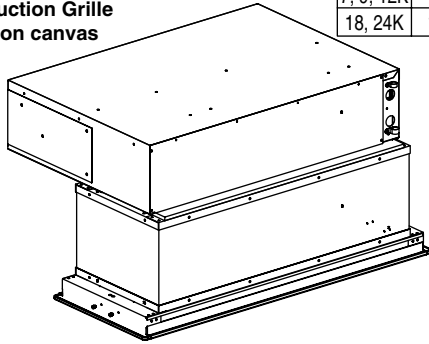
ARNU07GB3G1+PBSGB10(Acc'y), PBSC10(Acc'y)  
 ARNU09GB3G1+PBSGB10(Acc'y), PBSC10(Acc'y)  
 ARNU12GB3G1+PBSGB10(Acc'y), PBSC10(Acc'y)  
 ARNU18GB4G1+PBSGB20(Acc'y), PBSC20(Acc'y)  
 ARNU24GB4G1+PBSGB20(Acc'y), PBSC20(Acc'y)

With Suction Grille

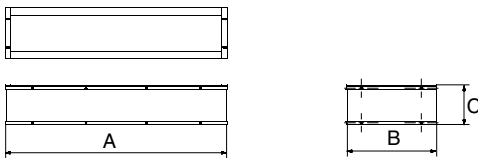


Btu/h	A
7, 9, 12K	938
18, 24K	1218

With Suction Grille & suction canvas



Built In Suction Grille



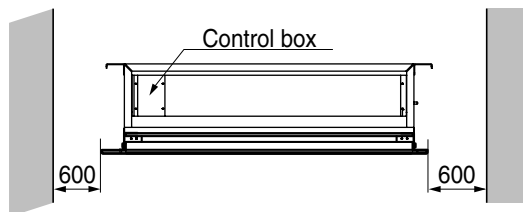
Built In Suction Canvas

	A	B	C
PBSGB10	949	372	56.5
PBSGB20	1227	372	56.5

	A	B	C
PBSGB10	826.6	336	42-250
PBSGB20	1104.6	336	42-250

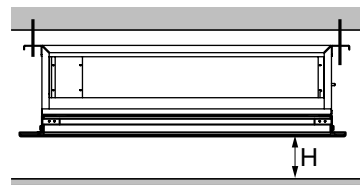
(unit: mm)

Top view  
(unit: mm)



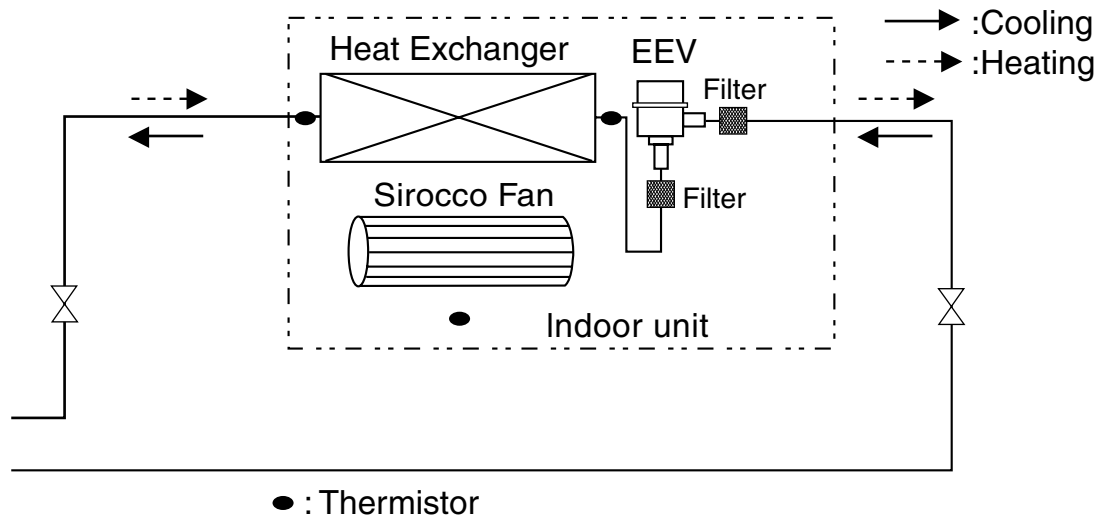
Front view

(unit: mm)



\* Suitable dimension "H" is necessary to get a slope to drain as given in the figure

## 5. Piping Diagrams

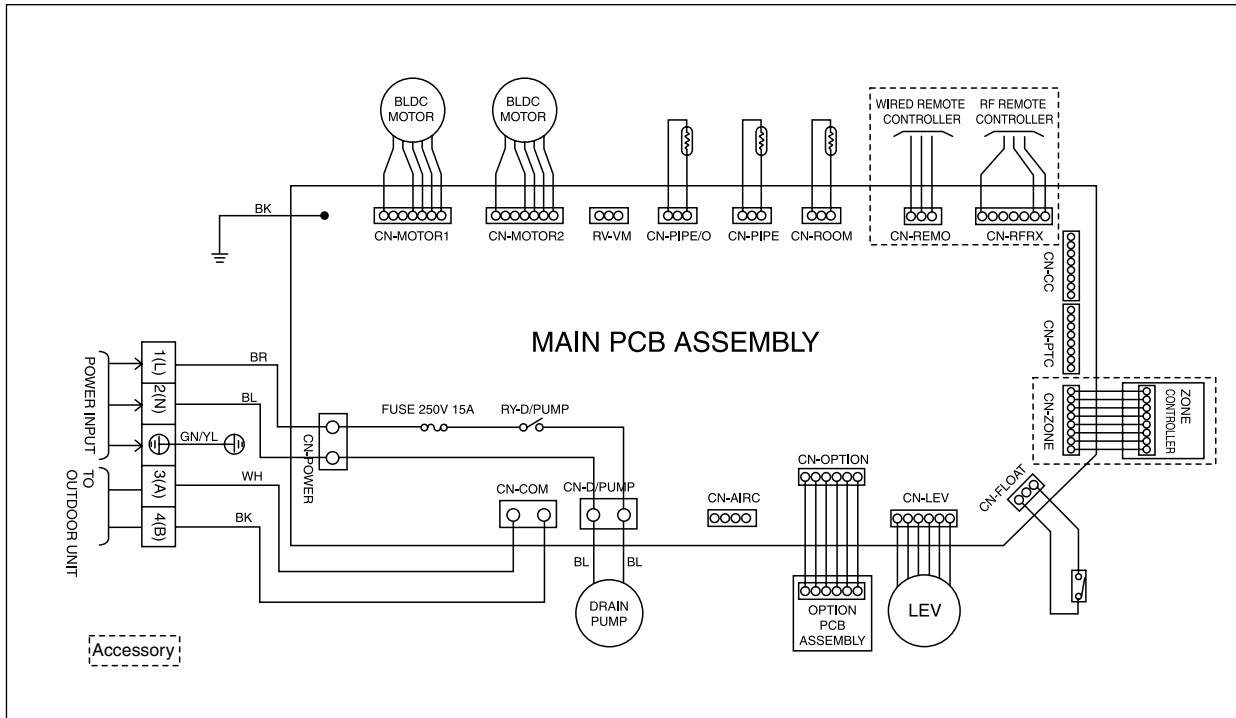


Refrigerant pipe connection port diameter

[unit: mm(inch)]

MODEL	GAS	LIQUID
ARNU07GB3G1+PBSGB10(Acc'y), PBSC10(Acc'y)	Ø12.7(1/2)	Ø6.35(1/4)
ARNU09GB3G1+PBSGB10(Acc'y), PBSC10(Acc'y)	Ø12.7(1/2)	Ø6.35(1/4)
ARNU12GB3G1+PBSGB10(Acc'y), PBSC10(Acc'y)	Ø12.7(1/2)	Ø6.35(1/4)
ARNU18GB4G1+PBSGB20(Acc'y), PBSC20(Acc'y)	Ø12.7(1/2)	Ø6.35(1/4)
ARNU24GB4G1+PBSGB20(Acc'y), PBSC20(Acc'y)	Ø15.88(5/8)	Ø9.52(3/8)

# 6. Wiring Diagrams



CONNECTOR NUMBER	SPEC.	DESCRIPTION
CN-MOTOR1	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-MOTOR2	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-PIPE/O	DISCHARGE PIPE THERMISTOR	DISCHARGE PIPE THERMISTOR
CN-PIPE	PIPE SENSOR	PIPE THERMISTOR
CN-ROOM	ROOM SENSOR	ROOM THERMISTOR
CN-REMO	REMOTE CONTROLLER	REMOTE CONTROL LINE
CN-FLOAT	FLOAT SWITCH INPUT	FLOAT SWITCH SENSING
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-OPTION	OPTION PWB.	COMMUNICATION BETWEEN MAIN AND OPTION
CN-COM	COMMUNICATION	COMMUNICATION BETWEEN INDOOR AND OUTDOOR
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER

## Ceiling Concealed Duct Type (High Static)

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<b>4. Dimensions .....</b>	<b>126</b>
<b>5. Piping Diagrams .....</b>	<b>127</b>
<b>6. Wiring Diagrams .....</b>	<b>128</b>

# 1. Specifications

Type			Ceiling Concealed Duct(High Static)		
Model		Unit	ARNU18GBHA1	ARNU24GBHA1	ARNU28GBGA1
Cooling Capacity		W	5,600	7,100	8,200
		kcal/h	4,800	6,100	7,100
		Btu/h	19,100	24,200	28,000
Heating Capacity		W	6,300	8,000	9,200
		kcal/h	5,400	6,900	8,000
		Btu/h	21,500	27,300	31,500
Casing			Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate
Dimensions (W*D*H)	Body	mm	882x450x260	882x450x260	1182x450x298
		inch	34.7x17.7x10.2	34.7x17.7x10.2	46.5x17.7x10.2
Coil	Rows x Columns x FPI		2x10x21	3x10x21	3x12x21
	Face Area	m <sup>2</sup>	0.15	0.15	0.26
Fan	Type		Sirocco Fan	Sirocco Fan	Sirocco Fan
	Motor Output x Number	W	150	150	450
	Running Current	A	0.92	0.92	2.30
	Air Flow Rate(H/M/L)	cmm	16.5/14.5/13	18/16.5/14	25.2/22/17.1
		cfm	582/512/459	635/582/494	890/777/604
	External Static Pressure	Pa	58.8	58.8	78.5
	Drive		Direct	Direct	Direct
Motor type		BLDC	BLDC	BLDC	
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	Foamed polystyrene
Air Filter			Net(Washable)	Net(Washable)	Net(Washable)
Safety Device			Fuse	Fuse	Fuse
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø9.52(3/8)	Ø9.52(3/8)
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø15.88(5/8)	Ø15.88(5/8)
	Drain Pipe(Internal Dia.)	mm	25.0	25.0	25.0
Net Weight		kg(lbs)	35(77.2)	35(77.2)	38(83.8)
Noise Level(Sound Press, 1.5m, H/M/L)		dBA±3	42.5/41/37	45/43/41	44/42/40
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60
Refrigerant Control			EEV	EEV	EEV
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

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4. EEV : Electronic Expansion Valve

5. To be added for more available Models



Type		Ceiling Concealed Duct(High Static)				
Model	Unit	ARNU36GBGA1	ARNU42GBGA1	ARNU48GBRA1		
Cooling Capacity	W	10,600	12,300	14,100		
	kcal/h	9,100	10,600	12,100		
	Btu/h	36,200	42,000	48,100		
Heating Capacity	W	11,900	13,800	15,900		
	kcal/h	10,200	11,000	13,200		
	Btu/h	40,600	43,800	51,200		
Casing		Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate		
Dimensions (W*D*H)	Body	mm	1182x450x298	1182x450x298	1230x590x380	
		inch	46.5x17.7x10.2	46.5x17.7x10.2	48.4x23.2x15	
Coil	Rows x Columns x FPI		3x12x21	3x12x21	3x13x19	
	Face Area	m <sup>2</sup>	0.26	0.26	0.38	
Fan	Type		Sirocco Fan	Sirocco Fan	Sirocco Fan	
	Motor Output x Number	W	450	450	450	
	Running Current	A	2.3	2.3	2.4	
	Air Flow Rate(H/M/L)	cmm		28.4/25.2/22	32/29/27	45/40/34
		cfm		1003/890/777	1130/1024/953	1589/1413/1201
	External Static Pressure	Pa		78.5	78.5	98.1
	Drive			Direct	Direct	Direct
Motor type			BLDC	BLDC	BLDC	
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	Foamed polystyrene	
Air Filter			Net(Washable)	Net(Washable)	Net(Washable)	
Safety Device			Fuse	Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø9.52(3/8)	Ø9.52(3/8)	Ø9.52(3/8)	
	Gas Side	mm(inch)	Ø15.88(5/8)	Ø15.88(5/8)	Ø15.88(5/8)	
	Drain Pipe(Internal Dia.)	mm	25	25.0	25.0	
Net Weight		kg(lbs)	38(83.8)	38(83.8)	53(117)	
Noise Level(Sound Press, 1.5m, H/M/L)		dBA±3	46/44/42	48/46/45	45/43/41	
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	
Refrigerant Control			EEV	EEV	EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	

**Notes:-**

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- Cooling
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  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

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- Room temperature sensor. (Thermistor)

**Room temperature control**

- Maintains the room temperature in accordance with the Setting Temperature.

**Starting Current Control**

- Indoor fan is delayed for 5 seconds at the starting.

**Indoor Fan Speed Control**

- High, Med, Low

**Soft Dry Operation Mode**

- Intermittent operation of fan at low speed.

**Auto Restart**

- Although the air-conditioner is turned off by a power failure, it is restarted automatically previous operation mode after power supply.

**Deice (defrost) control (Heating)**

- Both the indoor and outdoor fan stops during defrosting.
- Hot start after defrost ends.

**Hot-start Control (Heating)**

- The indoor fan does not rotate until the evaporator piping temperature reaches 30°C.

**High head height Drain pump**

- A standard drain-head height of up to 700mm is possible.

**Central Control(Optional)**

- It is operating individually or totally by central control function.

**Auto Change Over**

- It is operating cooling and heating mode automatically according to setting temperature.

## 3. Operation Details

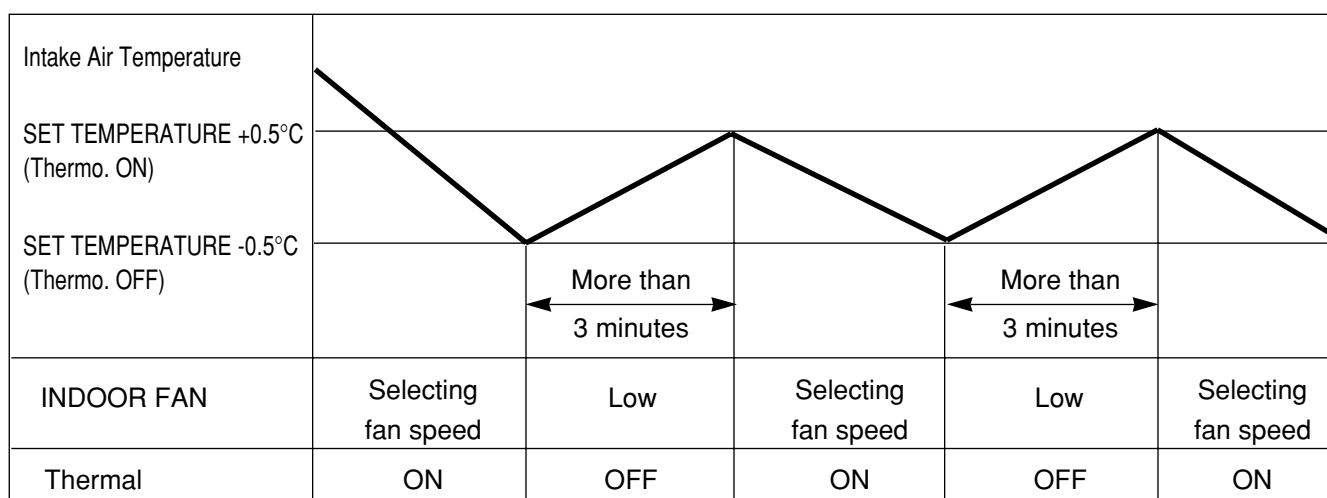
### The functions of main control

#### ■ Soft-Dry Operation

- The indoor fan speed is automatically set to the low, so the shift of the indoor fan speed is impossible because of already being set to the best speed for Dry Operation by microcontroller control.

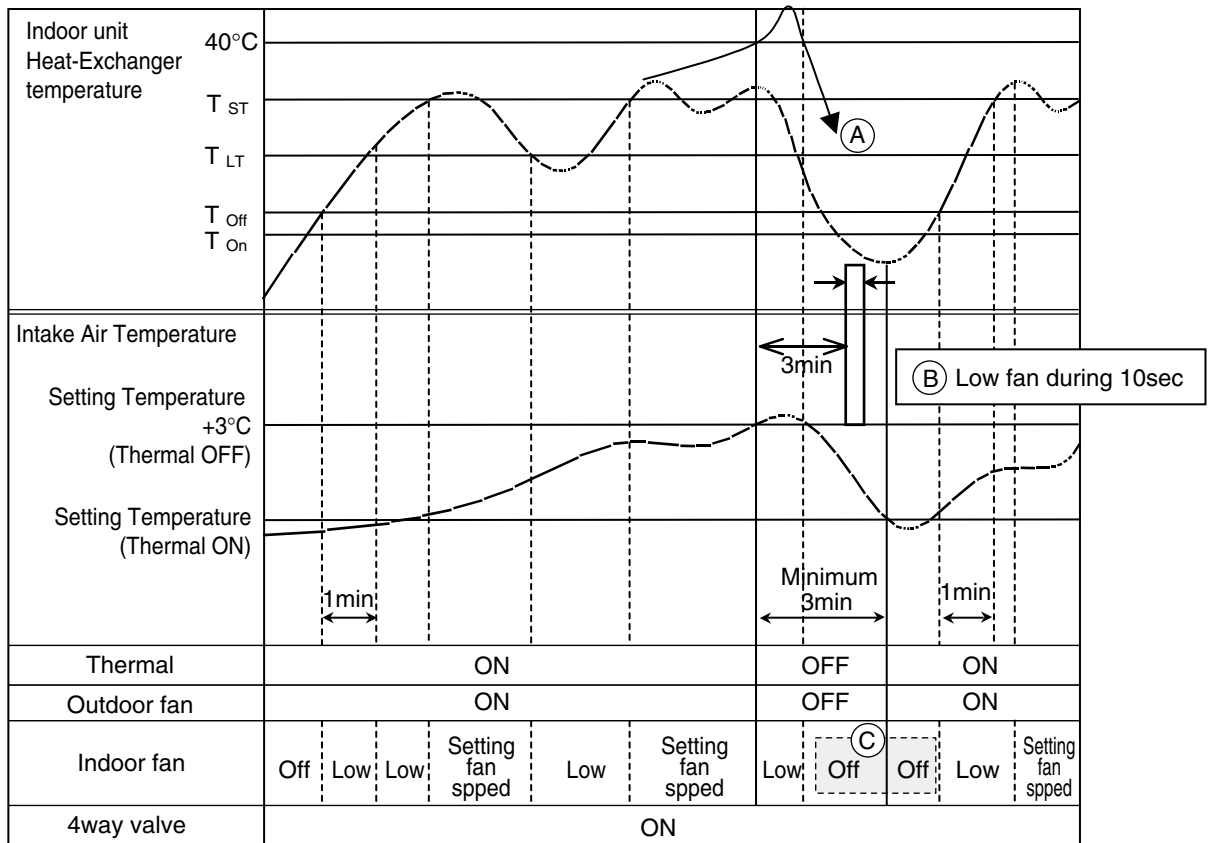
#### ■ Cooling Mode Operation

- When selecting the Cooling (✳) Mode Operation, the unit will operate according to the setting by the remote controller and the operation diagram is as following.



## ■ Heating Mode Operation

The unit will operate according to the setting by the remote controller and the operation diagram is shown as following.

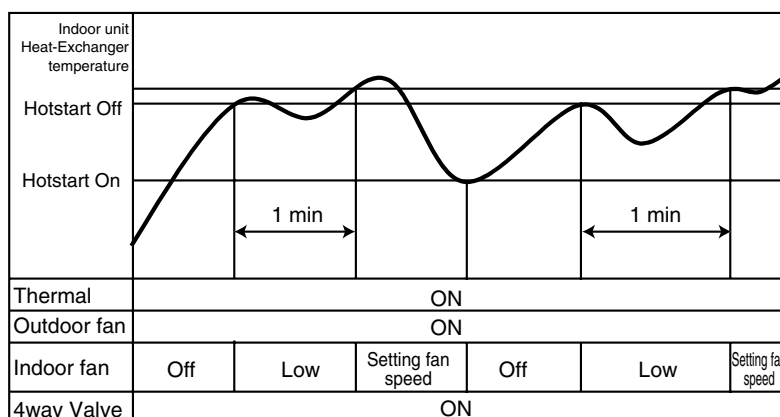


- **Compressor-off interval** : - (A) While the indoor Heat-Exchanger temperature is higher than 40°C, fan operates at low speed, when it becomes lower than 40°C fan stops.
- (B) For eliminating latent heat-loss, fan operates at low speed for 10 seconds periodically.
- (C) To be operated "Low" except initial Hotstart operation

	High Static			Low Static				Convertible	
Chassis	BH	BG	BR	B1	B2	CE	CF	VE	VJ
Hotstart On $T_{On}$	19°C	19°C	19°C	19°C	19°C	19°C	19°C	26°C	26°C
Hotstart Off $T_{Off}$	22°C	22°C	22°C	22°C	22°C	22°C	22°C	27°C	27°C
Low temperature $T_{LT}$	25°C	25°C	25°C	25°C	25°C	25°C	25°C	28°C	28°C
Setting Temperature $T_{ST}$	27°C	27°C	27°C	27°C	27°C	27°C	27°C	30°C	30°C

## Hot-Start Control

- The indoor fan does not rotate until the indoor unit Hex-Exchanger temperature reaches 30°C.
- The operation diagram is as following.

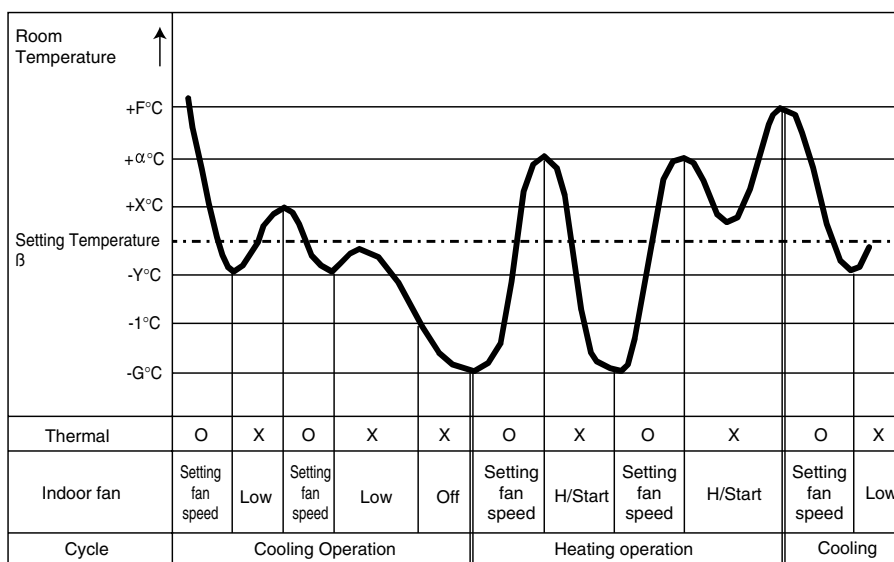


- Initial Hotstart On state

- Power Off ➡ On
- Operation Off ➡ On
- Cooling operation ➡ Heating operation
- Defrost operation

## Auto Change Over

- In response to user wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)^\circ\text{C}$	Cooling → Heating
$T_{ai} \geq T_s + F(2)^\circ\text{C}$	Heating → Cooling

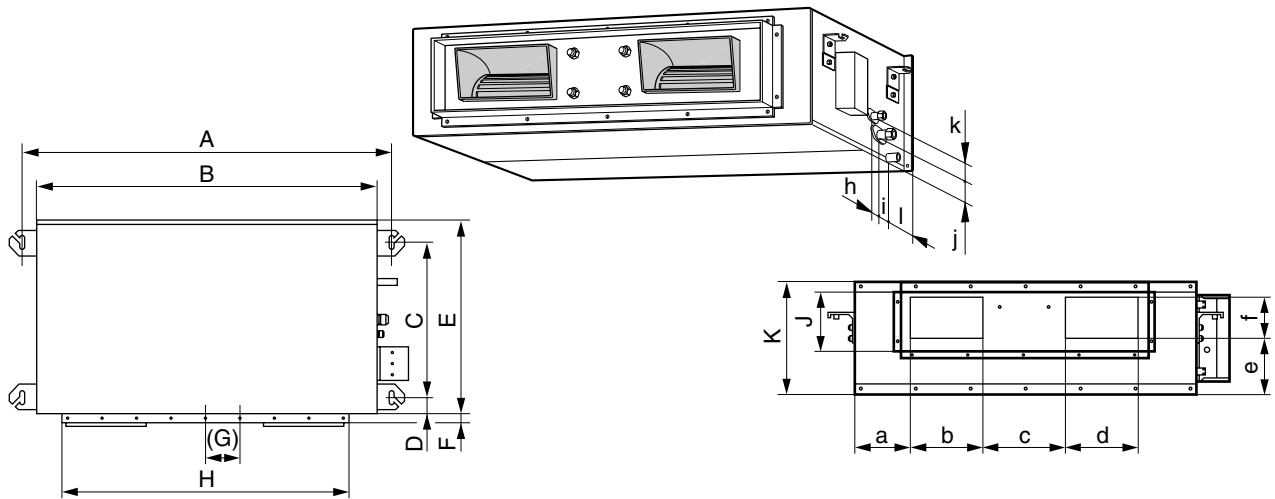
- \*  $T_{ai}$  : Indoor Temperature
- \*  $T_s$  : Setting Temperature

Definition		Default(°C)
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
α	Thermal Off Temperature for Heating	1
β	Thermal On Temperature for Heating	0

# 4. Dimensions

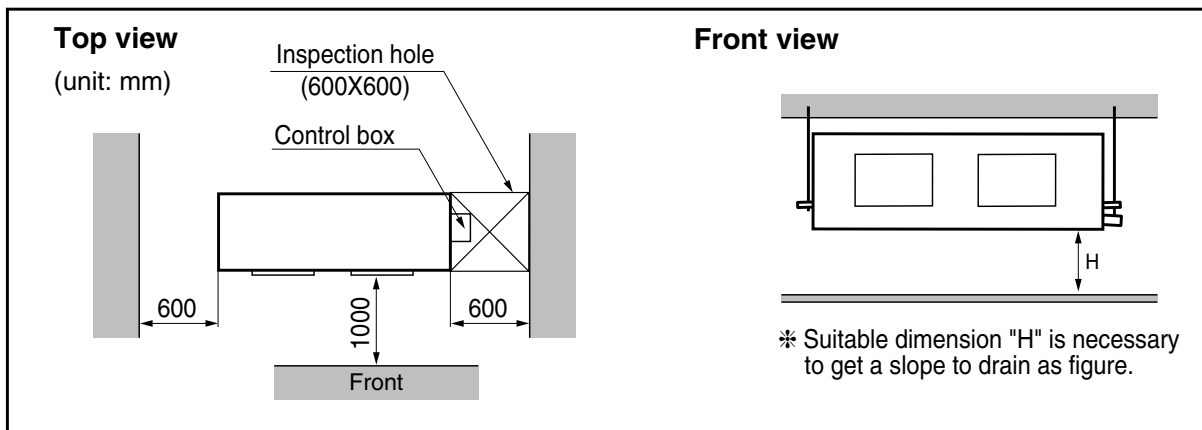
ARNU18GBHA1  
 ARNU24GBHA1  
 ARNU28GBGA1  
 ARNU36GBGA1

ARNU42GBGA1  
 ARNU48GBRA1

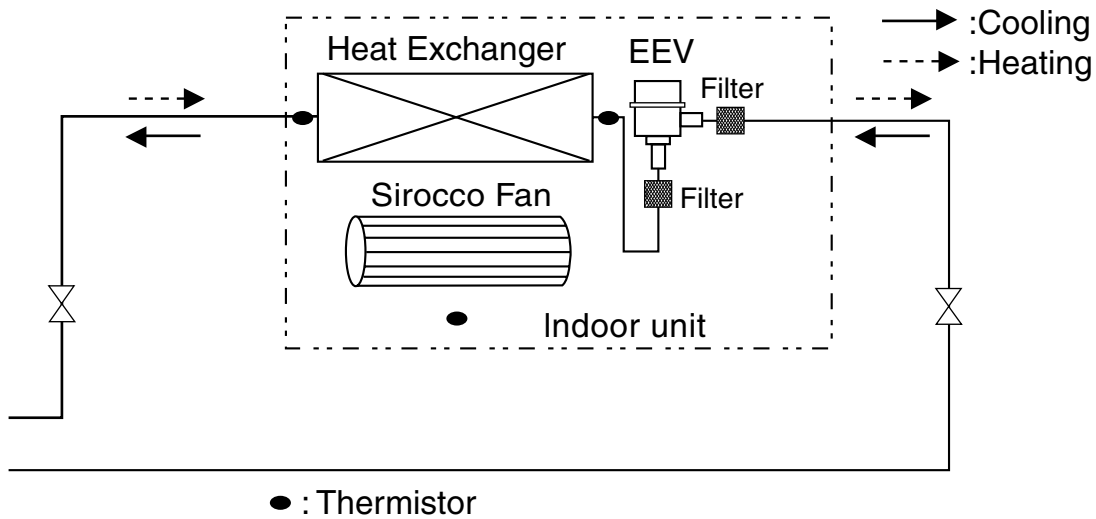


(Unit: mm)

Model	A	B	C	D	E	F	(G)	H	J	K	a	b	c	d	e	f	h	i	j	k	l
18/24k BH	932	882	355	47	450	30	87	750	158	260	64	243	212	243	106	130	52	65	83	19	165
28/36/42k BG	1232	1182	355	47	450	30	87	830	186	298	232	243	232	243	116	160	53	65	83	19	165
48k BR	1282	1230	477	56	590	30	120	1006	294	380	215	279	241	279	185	168	51	98	83	17	172



## 5. Piping Diagrams



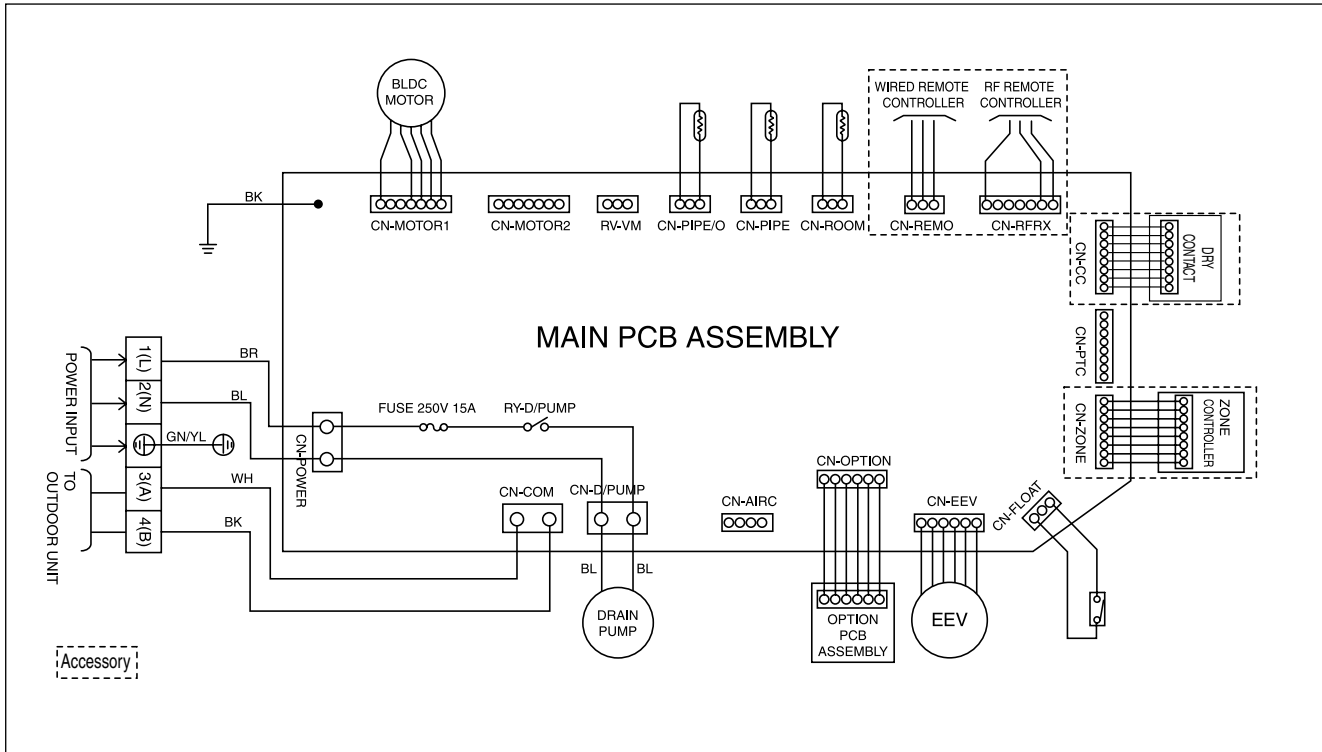
Refrigerant pipe connection port diameter

[unit: mm(inch)]

MODEL	GAS	LIQUID
ARNU18GBHA1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU24GBHA1	Ø15.88(5/8)	Ø9.52(3/8)
ARNU28GBGA1	Ø15.88(5/8)	Ø9.52(3/8)
ARNU36GBGA1	Ø15.88(5/8)	Ø9.52(3/8)
ARNU42GBGA1	Ø15.88(5/8)	Ø9.52(3/8)
ARNU48GBRA1	Ø15.88(5/8)	Ø9.52(3/8)

# 6. Wiring Diagrams

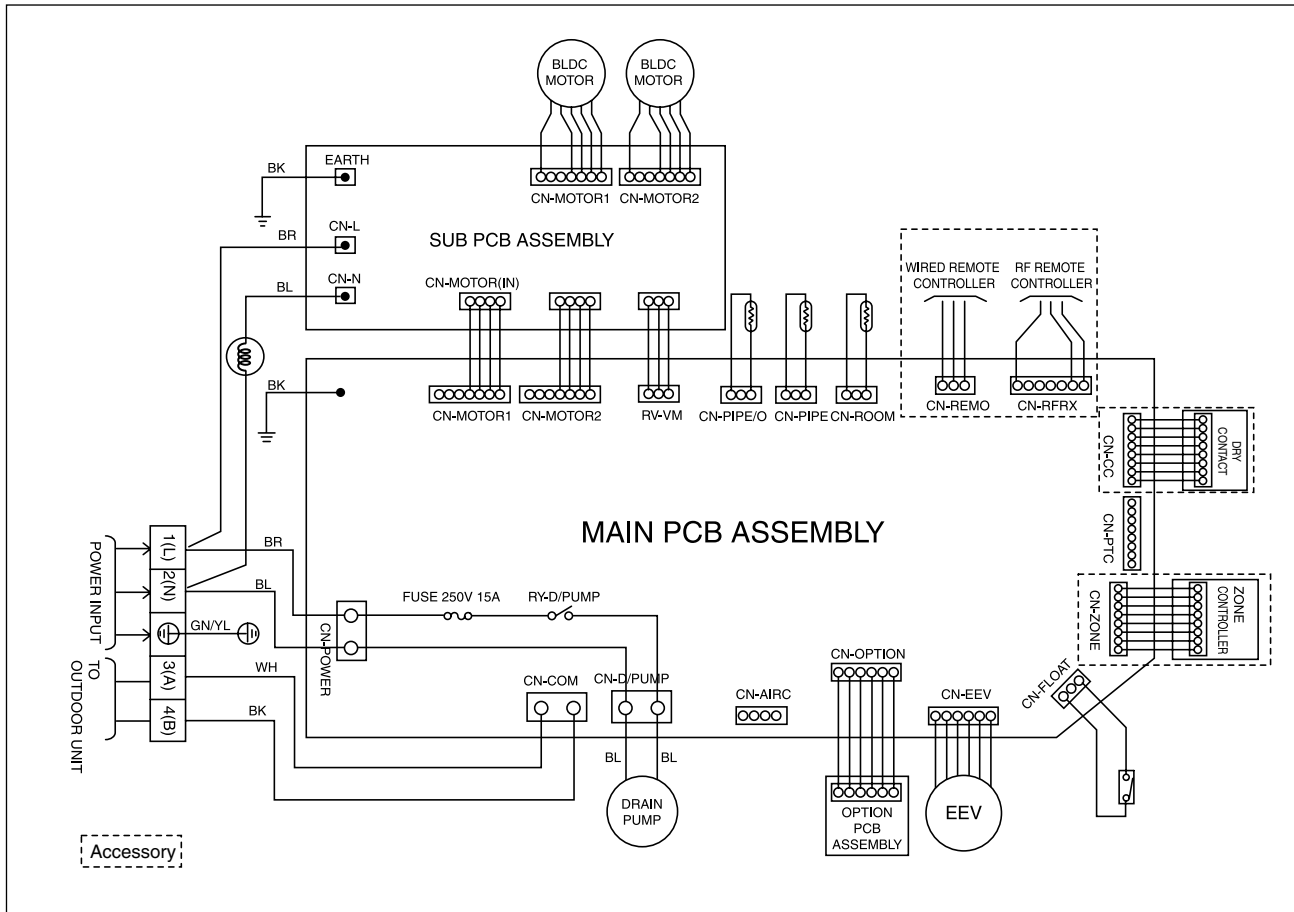
## BH Chassis



CONNECTOR NUMBER	LOCATION POINT	FUNCTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR2	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-COMM	COMMUNICATION	CONNECTION BETWEEN INDOOR AND OUTDOOR
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-FLOAT	FLOAT SWITCH INPUT	FLOAT SWITCH SENSING
CN-PIPE	PIPE SENSOR	PIPE THERMISTOR
CN-PIPE/O	DISCHARGE PIPE SENSOR	DISCHARGE PIPE THERMISTOR
CN-ROOM	ROOM SENSOR	ROOM THERMISTOR
CN-REMO	REMOTE CONTROLLER	REMOTE CONTROL LINE



BG/BR Chassis



CONNECTOR NUMBER	LOCATION POINT	FUNCTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR2	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-COMM	COMMUNICATION	CONNECTION BETWEEN INDOOR AND OUTDOOR
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-FLOAT	FLOAT SWITCH INPUT	FLOAT SWITCH SENSING
CN-PIPE	PIPE SENSOR	PIPE THERMISTOR
CN-PIPE/O	DISCHARGE PIPE SENSOR	DISCHARGE PIPE THERMISTOR
CN-ROOM	ROOM SENSOR	ROOM THERMISTOR
CN-REMO	REMOTE CONTROLLER	REMOTE CONTROL LINE
CN-INFANSUB	STARTING SIGNAL CONTROL	STARTING SIGNAL CONTROL



# Wall Mounted Type

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<b>2. Functions .....</b>	<b>134</b>
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<b>4. Dimensions .....</b>	<b>142</b>
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<b>6. Wiring Diagrams .....</b>	<b>144</b>

# 1. Specifications

\* Model Name  
A:Basic L:Plasma

Type		Wall Mounted			
Model	Unit	ARNU07GSE*1	ARNU09GSE*1	ARNU12GSE*1	
Cooling Capacity	W	2,200	2,800	3,600	
	kcal/h	1,900	2,400	3,100	
	Btu/h	7,500	9,600	12,300	
Heating Capacity	W	2,500	3,200	4,000	
	kcal/h	2,200	2,800	3,400	
	Btu/h	8,500	10,900	13,600	
Dimensions (W*D*H)	Body	mm	895x165x282	895x165x282	
		inch	35.2x6.5x11.1	35.2x6.5x11.1	
Coil	Rows x Columns x FPI		2x15x20	2x15x20	
	Face Area	m <sup>2</sup>	0.32	0.32	
Fan	Type		Cross Flow Fan	Cross Flow Fan	
	Motor Output x Number	W	40	40	
	Running Current	A	0.2	0.2	
	Air Flow Rate(H/M/L)	cmm	5.6/5/4.6	7/ 6.5 /6	9.5/ 9/8.5
		cfm	198/177/162.5	247/230/212	336/318/300
	Drive		Direct	Direct	
Motor type		BLDC	BLDC		
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	
Air Filter			Net(Washable)	Net(Washable)	
Safety Device			Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø6.35(1/4)	
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø12.7(1/2)	
	Drain Pipe(Internal Dia.)	mm	16	16	
Net Weight		kg(lbs)	9(19.8)	9(19.8)	
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	37/33/23	39/35/25	
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~240, 50 1, 220, 60	
Refrigerant Control			EEV	EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	
Color			Morning fog	Morning fog	

**Notes:-**

- Capacities are based on the following conditions:
  - Cooling
    - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
    - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
  - Heating
    - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
    - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
- Capacities are net capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve
- To be added for more available Models

\* Model Name  
A:Basic L:Plasma

Type			Wall Mounted	
Model	Unit	ARNU18GS5*1	ARNU24GS5*1	
Cooling Capacity	W	5,600	7,100	
	kcal/h	4,800	6,100	
	Btu/h	19,100	24,200	
Heating Capacity	W	6,300	8,000	
	kcal/h	5,400	6,900	
	Btu/h	21,500	27,300	
Dimensions (W*D*H)	Body	mm	1090x178x300	1090x178x300
		inch	42.9x7x11.8	42.9x7x11.8
Coil	Rows x Columns x FPI		2x15x20	2x15x20
	Face Area	m <sup>2</sup>	0.23	0.23
Fan	Type		Cross Flow Fan	Cross Flow Fan
	Motor Output x Number	W	40	40
	Running Current	A	0.2	0.2
	Air Flow Rate(H/M/L)	cmm	12/10.5/9	14/13/11
		cfm	424/371/318	494/459/388
	Drive		Direct	Direct
Motor type		BLDC	BLDC	
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene
Air Filter			Net(Washable)	Net(Washable)
Safety Device			Fuse	Fuse
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø9.52(3/8)
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø15.88(5/8)
	Drain Pipe(Internal Dia.)	mm	16	16
Net Weight	kg(lbs)	12(26.5)	12(26.5)	
Noise Level(Sound Press, 1m, H/M/L)	dBA±3	44/40/36	46/41/38	
Power Supply	Ø / V / Hz		1, 220 ~ 240, 50	1, 220 ~ 240, 50
			1, 220, 60	1, 220, 60
Refrigerant Control			EEV	EEV
Power cable	mm <sup>2</sup>		CV2.0 X 3C	CV2.0 X 3C
Transmission cable	mm <sup>2</sup>		CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C
Color			Morning fog	Morning fog

**Notes:-**

- Capacities are based on the following conditions:
  - Cooling
    - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
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    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
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    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
- Capacities are net capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve
- To be added for more available Models

## 2. Functions

### Indoor Unit

#### Operation ON/OFF by Remote controller

#### Sensing the Room Temperature

- Room temperature sensor. (THERMISTOR)

#### Room temperature control

- Maintains the room temperature in accordance with the Setting temperature

#### Starting Current Control

- Indoor fan is delayed for 5 sec at the starting.

#### Indoor Fan Speed Control

- High, Med, Low, CHAOS

#### Operation indication Lamps (LED)

Signal Receptor

Receives the signals from the remote control.(Signal receiving sound: two short beeps or one long beep.)

Operation Indication Lamps

- |    |              |                                                         |
|----|--------------|---------------------------------------------------------|
| ①  | On/Off       | : Lights up during the system operation.                |
| ☆  | Sleep Mode   | : Lights up during Sleep Mode Auto operation.           |
| ⌚  | Timer        | : Lights up during Timer operation.                     |
| ✱  | Defrost Mode | : Lights up during Defrost Mode or Hot Start operation. |
| BB | Temperature  | : Indicate the setting temperature.                     |

#### Soft Dry Operation Mode

- Intermittent operation of fan at low speed.

#### Sleep Mode Auto Control

- The fan is switched to low(Cooling), med(Heating) speed.
- The unit will be stopped after 1, 2, 3, 4, 5, 6, 7 hours.

#### Natural Air Control by CHAOS Logic

- The fan is switched to intermittent or irregular operation
- The fan speed is automatically switched from high to low speed.

#### Airflow Direction Control

- The louver can be set at the desired position or swing up and down automatically.

#### Defrost(Deice) control (Heating)

- Both the indoor and outdoor fan stops during defrosting.

#### Hot-start Control (Heating)

- The indoor fan does not rotate until the evaporator pipe temperature will be reached at 28°C.

#### Auto Change Over

- It is operating cooling and heating mode automatically according to setting temperature.

## 3. Operation Details

### *The functions of main control*

#### DISPLAY

##### (1) High quality LCD remote controller supplied

##### Operation Indicator

- On while in appliance operation, off while in appliance pause

##### Timer(on/off) and Sleep timer Indicator

- On while in timer mode (on/off) and in sleep timer mode, off when timer mode is completed or canceled

##### Defrost Indicator

- Off except when hot start during heating mode operation or while in defrost control.

##### Plasma Indicator

- On while in plasma mode, off while plasma mode is canceled.

##### Auto restart

- In case the power comes on again after a power failure, Auto Restarting Operation is the function to operate procedures automatically to the previous operating conditions.  
If you want to use this operation, press the Auto Restart Button.

##### Power(Forced Operation)

- Operation starts, when this button is pressed and stops when you press the button again.

#### ■ Cooling Mode Operation

- When the intake air temperature reaches 0.5°C below the setting temp, the compressor and the outdoor fan stop.
- When it reaches 0.5°C above the setting temp, they start to operate again.  
Compressor ON Temp=> Setting Temp+0.5°C  
Compressor OFF Temp => Setting Temp-0.5°C
- While in compressor running, operating with the airflow speed set by the remote controller. While in compressor not running, operating with the low airflow speed regardless of the setting.

### ■ Healthy Dehumidification Mode

- When the dehumidification operation input by the remote controller is received, the intake air temperature is detected and the setting temp is automatically set according to the intake air temperature.  
26°C ≤ Intake Air Temp ⇒ 25°C  
24°C ≤ Intake Air Temp < 26°C ⇒ Intake Air Temp-1°C  
18°C ≤ Intake Air Temp < 24°C ⇒ Intake Air Temp-0.5°C  
Intake Air Temp < 18°C ⇒ 18°C
- While in compressor off, the indoor fan repeats low airflow speed and pause.
- While the intake air temp is between compressor on temp. and compressor off temp., 10-min dehumidification operation and 4-min compressor off repeat  
Compressor ON Temp. ⇒ Setting Temp+0.5°C  
Compressor OFF Temp. ⇒ Setting Temp-0.5°C
- In 10-min dehumidification operation, the indoor fan operates with the low airflow speed.

### ■ Heating Mode Operation

- When the intake air temp reaches +3°C above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.  
Thermo ON Temp. ⇒ Setting Temp. +2°C  
Thermo OFF Temp. ⇒ Setting Temp. +4°C
- While in compressor on, when above 38°C, it operates with or setting airflow speed (while in sleep mode, with the medium airflow speed).
- While in compressor off, the indoor fan is off when the indoor pipe temp is below 33°C, when above 35°C, it operates with the low airflow speed.
- While in defrost control, both of the indoor and outdoor fans are turned off.

### ■ Defrost Control

- While in heating mode operation in order to protect outdoor unit from freezing, reversed to cooling cycle to defrost the outdoor unit.

### ■ Fuzzy Operation (Outdoor unit C/O Model)

- According to the temperature set by Fuzzy rule, when the intake air temp is 0.5°C or more below the setting temp, the compressor is turned off. When 0.5°C or more above the setting temp, the compressor is turned on.  
Compressor ON Temp ⇒ Setting Temp+0.5°C  
Compressor OFF Temp ⇒ Setting Temp+0.5°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.



$26^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow 25^{\circ}\text{C}$   
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} < 26^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 1^{\circ}\text{C}$   
 $22^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 0.5^{\circ}\text{C}$   
 $18^{\circ}\text{C} \leq \text{Intake Air Temp} < 22^{\circ}\text{C} \Rightarrow \text{Intake Air Temp}$   
 $\text{Intake Air Temp} < 18^{\circ}\text{C} \Rightarrow 18^{\circ}\text{C}$

- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature

## ■ Fuzzy Operation (Outdoor unit H/P Model)

- When any of operation mode is not selected like the moment of the power on or when 3 hrs has passed since the operation off, the operation mode is selected.
- When determining the operation mode, the compressor, the outdoor fan, and the 4 way valve are off and only the indoor fan is operated for 15 seconds. Then an operation mode is selected according to the intake air temp at that moment as follows.  
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow \text{Fuzzy Operation for Cooling}$   
 $21^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Fuzzy Operation for Dehumidification}$   
 $\text{Intake Air Temp} < 21^{\circ}\text{C} \Rightarrow \text{Fuzzy Operation for Heating}$
- If any of the operation modes among cooling / dehumidification / heating mode operations is carried out for 10 sec or longer before Fuzzy operation, the mode before Fuzzy operation is operated.

### 1) Fuzzy Operation for Cooling

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is  $0.5^{\circ}\text{C}$  or more below the setting temp, the compressor is turned off. When  $0.5^{\circ}\text{C}$  or more above the setting temp, the compressor is turned on.  
 $\text{Compressor ON Temp} \Rightarrow \text{Setting Temp} + 0.5^{\circ}\text{C}$   
 $\text{Compressor OFF Temp} \Rightarrow \text{Setting Temp} - 0.5^{\circ}\text{C}$
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
 $26^{\circ}\text{C} \leq \text{Intake Air Temp} \Rightarrow 25^{\circ}\text{C}$   
 $24^{\circ}\text{C} \leq \text{Intake Air Temp} < 26^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 1^{\circ}\text{C}$   
 $22^{\circ}\text{C} \leq \text{Intake Air Temp} < 24^{\circ}\text{C} \Rightarrow \text{Intake Air Temp} + 0.5^{\circ}\text{C}$   
 $18^{\circ}\text{C} \leq \text{Intake Air Temp} < 22^{\circ}\text{C} \Rightarrow \text{Intake Air Temp}$   
 $\text{Intake Air Temp} < 18^{\circ}\text{C} \Rightarrow 18^{\circ}\text{C}$
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is automatically selected according to the temperature.

### 2) Fuzzy Operation for Dehumidification

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is  $0.5^{\circ}\text{C}$  or more below the setting temp, the compressor is turned off. When  $0.5^{\circ}\text{C}$  or more above the setting temp, the compressor is turned on.  
 $\text{Compressor ON Temp} \Rightarrow \text{Setting Temp} + 0.5^{\circ}\text{C}$   
 $\text{Compressor OFF Temp} \Rightarrow \text{Setting Temp} - 0.5^{\circ}\text{C}$

- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
26°C ≤ Intake Air Temp ⇒ 25°C  
24°C ≤ Intake Air Temp < 26°C ⇒ Intake Air Temp + 1°C  
22°C ≤ Intake Air Temp < 24°C ⇒ Intake Air Temp + 0.5°C  
18°C ≤ Intake Air Temp < 22°C ⇒ Intake Air Temp  
Intake Air Temp < 18°C ⇒ 18°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan repeats the low airflow speed or pause as in dehumidification operation.

### 3) Fuzzy Operation for Heating

- According to the setting temperature selected by Fuzzy rule, when the intake air temp is 3°C or more above the setting temp, the compressor is turned off. When below the setting temp, the compressor is turned on.  
Compressor ON Temp ⇒ Setting Temp. + 2°C  
Compressor OFF Temp ⇒ Setting Temp. + 4°C
- At the beginning of Fuzzy mode operation, the setting temperature is automatically selected according to the intake air temp at that time.  
20°C ≤ Intake Air Temp ⇒ Intake Air Temp + 0.5°C  
Intake Air Temp < 20°C ⇒ 20°C
- When the Fuzzy key (Temperature Control key) is input after the initial setting temperature is selected, the Fuzzy key value and the intake air temperature at that time are compared to select the setting temperature automatically according to the Fuzzy rule.
- While in Fuzzy operation, the airflow speed of the indoor fan is set to the high or the medium according to the intake air temperature and the setting temperature.

#### ■ Airflow Speed Selection

- The airflow speed of the indoor fan is set to high, medium, low, or chaos by the input of the airflow speed selection key on the remote controller.

#### ■ On-Timer Operation

- When the set time is reached after the time is input by the remote controller, the appliance starts to operate.
- The timer LED is on when the on-timer is input. It is off when the time set by the timer is reached.
- If the appliance is operating at the time set by the timer, the operation continues.

#### ■ Off-Timer Operation

- When the set time is reached after the time is input by the remote controller, the appliance stops operating.
- The timer LED is on when the off-timer is input. It is off when the time set by the timer is reached.
- If the appliance is on pause at the time set by the timer, the pause continues.

### ■ Off-Timer <=> On-Timer Operation

- When the set time is reached after the on/off time is input by the remote controller, the on/off-timer operation is carried out according to the set time.

### ■ Sleep Timer Operation

- When the sleep time is reached after <1,2,3,4,5,6,7,0(cancel) hr> is input by the remote controller while in appliance operation, the operation of the appliance stops.
- While the appliance is on pause, the sleep timer mode cannot be input.
- While in cooling mode operation, 30 min later since the start of the sleep timer, the setting temperature increases by 1°C. After another 30 min elapse, it increases by 1°C again.
- When the sleep timer mode is input while in cooling cycle mode, the airflow speed of the indoor fan is set to the low.
- When the sleep timer mode is input while in heating cycle mode, the airflow speed of the indoor fan is set to the medium.

### ■ Chaos Swing Mode

- By the Chaos Swing key input, the vane automatically operates with the Chaos Swing or they are fixed to the desired direction.

### ■ Chaos Natural Wind Mode

- When the Chaos Natural Wind mode is selected and then operated, the high, medium, or low speed of the airflow mode is operated for 2~15 sec randomly by the Chaos Simulation.”

### ■ Jet Cool Mode Operation (Outdoor unit C/O Model)

- If the Jet Cool key is input at any operation mode while in appliance operation, the Jet Cool mode operates.
- In the Jet Cool mode, the indoor fan is operated at super-high speed for 30 min at cooling mode operation.
- In the Jet Cool mode operation, the room temperature is controlled to the setting temperature, 18°C
- When the sleep timer mode is input while in the Jet Cool mode operation, the Jet Cool mode has the priority.
- During the JET COOL function at any moment, the A/C starts to blow the cool air with side louvers closed at extremely high speed for 30 minutes setting the room temp. automatically to 18°C.

### ■ Jet Cool Mode Operation (Outdoor unit H/P Model)

- While in heating mode or Fuzzy operation, the Jet Cool key cannot be input. When it is input while in the other mode operation (cooling, dehumidification, ventilation), the Jet Cool mode is operated.”
- In the Jet Cool mode, the indoor fan is operated at super-high speed for 30 min at cooling mode operation.
- In the Jet Cool mode operation, the room temperature is controlled to the setting temperature, 18°C
- When the sleep timer mode is input while in the Jet Cool mode operation, the Jet Cool mode has the priority.
- During the JET HEAT function at any moment, the A/C starts to blow the hot air with side louvers closed at extremely high speed for 60 minutes setting the room temp. automatically to 30°C.

### ■ Auto Restarting Operation

- When the power is restored after a sudden power failure while in appliance operation, the mode before the power failure is kept on the memory and the appliance automatically operates in the mode on the memory.
- Operation Mode that is kept on the memory
  - State of Operation ON/OFF

## Operation Details

---

- Operation Mode/Setting Temp/Selected Airflow Speed
- Sleep Timer Mode/Remaining Time of Sleep Timer (unit of hour)

### ■ Forced Operation

- Operation procedures when the remote control can't be used.
- The operation will be started if the power button is pressed.
- If you want to stop operation, re-press the button.

	Cooling Model	Heat pump Model		
		Room Temp. $\geq 24^{\circ}\text{C}$	$21^{\circ}\text{C} \leq$ Room Temp. $< 24^{\circ}\text{C}$	Room Temp. $< 21^{\circ}\text{C}$
Operating mode	Cooling	Cooling	Healthy Dehumidification	Heating
Indoor Fan Speed	High	High	High	High
Setting Temperature	22°C	22°C	23°C	24°C

- While in forced operation, the key input by the remote control has no effect and the buzzer sounds 10 times to indicate the forced operation.

### ■ Test operation

- During the TEST OPERATION, the unit operates in cooling mode at high speed fan, regardless of room temperature and resets in  $18 \pm 1$  minutes.
- During test operation, if remote controller signal is received, the unit operates as remote controller sets. If you want to use this operation, Press and hold ON/OFF button 3~5 seconds, then the buzzer sound 1 "beep".
- If you want to stop the operation, re-press the button.

### ■ Protection of the evaporator pipe from frosting

- If the indoor pipe temp is below  $0^{\circ}\text{C}$  in 7 min. after the compressor operates without any pause while in cooling cycle operation mode, the compressor and the outdoor fan are turned off in order to protect the indoor evaporator pipe from frosting.
- When the indoor pipe temp is  $7^{\circ}\text{C}$  or higher after 3 min. pause of the compressor, the compressor and the outdoor fan is turned on according to the condition of the room temperature.

### ■ Buzzer Sounding Operation

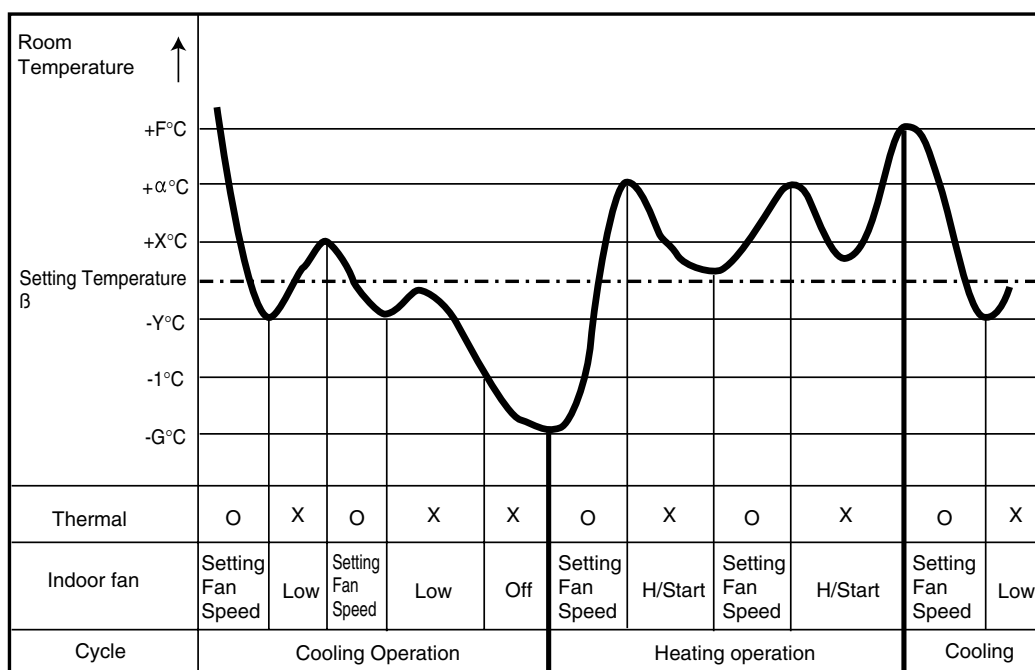
- When the appliance-operation key is input by the remote control, the short "beep-beep-" sounds.
- When the appliance-pause key is input by the remote control, the long "beep—" sounds.
- When a key is input by the remote control while the slide switch on the main unit of the appliance is on the forced operation position, the error sound "beep-beep-beep-beep-beep-" is made 10 times to indicate that the remote control signal cannot be received.

### ■ Air Cleaner Operation

- When an air cleaner function is selected during Air Conditioner operation
  - Plasma air cleaner function will be operated while in any operation mode with selecting the function.
  - The function is to be stopped while it is operating with selecting the function.
- When an air cleaner function is selected during operation off
  - The function will be only operated.
- When inlet grille of air conditioner is opened during plasma operation, High Voltage Generator(H.V.B) is to be stopped. When inlet grille of air conditioner is closed during plasma operation, High Voltage Generator(H.V.B) will be operated again.

### ■ Auto Change Over

- In response to user's wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)^\circ\text{C}$	Cooling → Heating
$T_{ai} \geq T_s + F(2)^\circ\text{C}$	Heating → Cooling

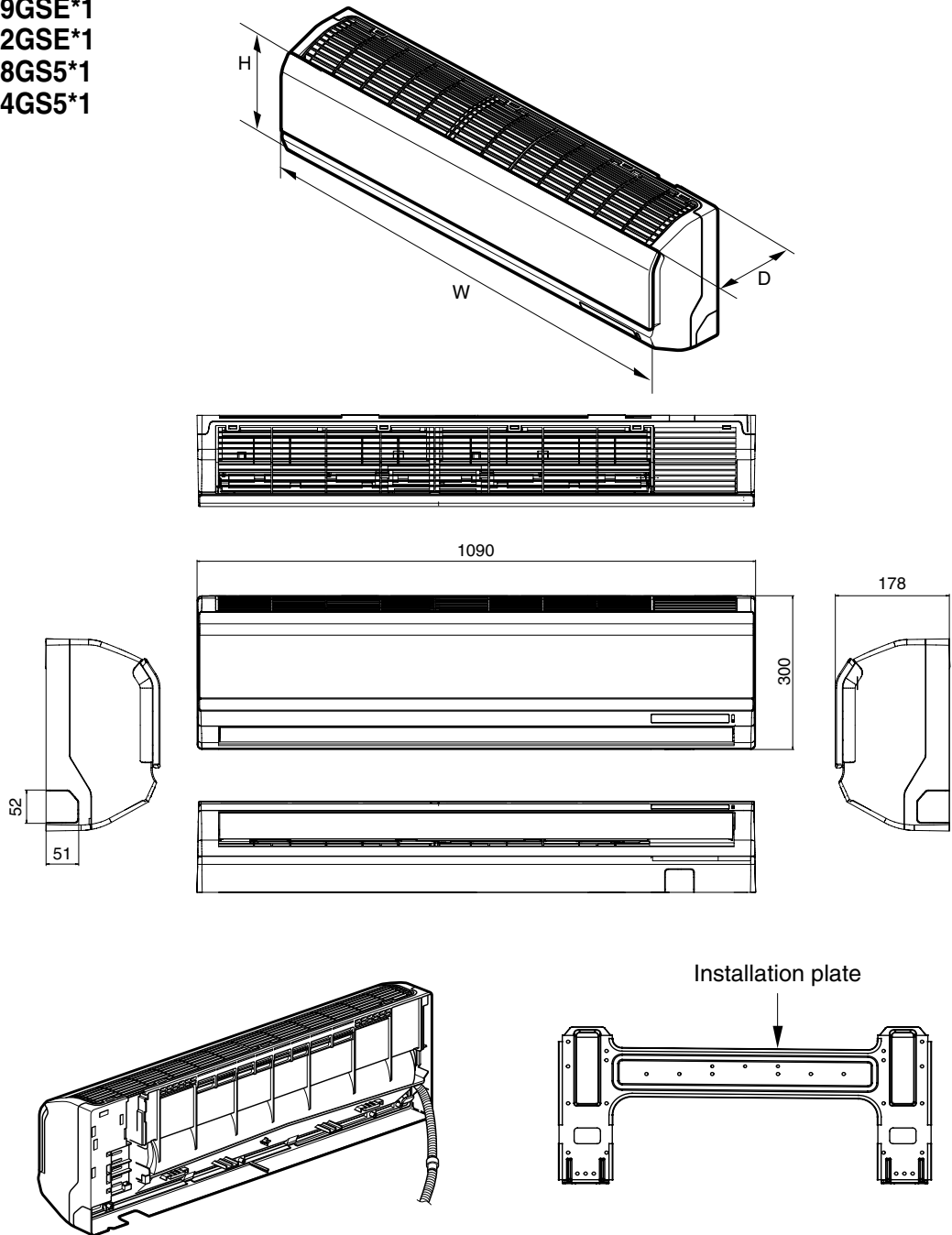
Definition		Default(°C)
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
α	Thermal Off Temperature for Heating	1
β	Thermal On Temperature for Heating	0

\*  $T_{ai}$  : Indoor Temperature

\*  $T_s$  : Setting Temperature

# 4. Dimensions

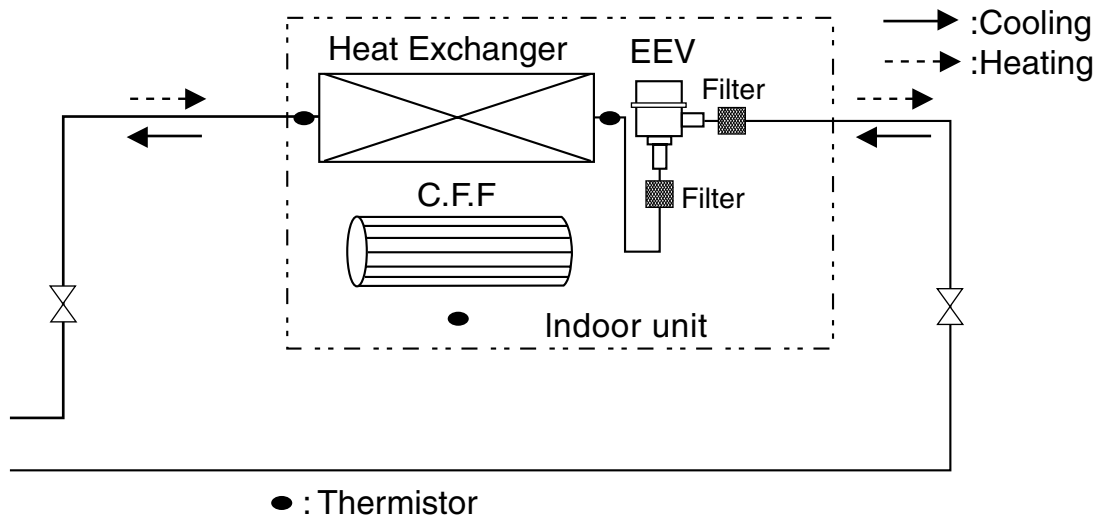
- ARNU07GSE\*1
- ARNU09GSE\*1
- ARNU12GSE\*1
- ARNU18GS5\*1
- ARNU24GS5\*1



(unit:mm)

Dimension		Model	SE(7, 9, 12K)	S5(18, 24K)
W	mm		895	1090
H	mm		282	300
D	mm		165	178

# 5. Piping Diagrams

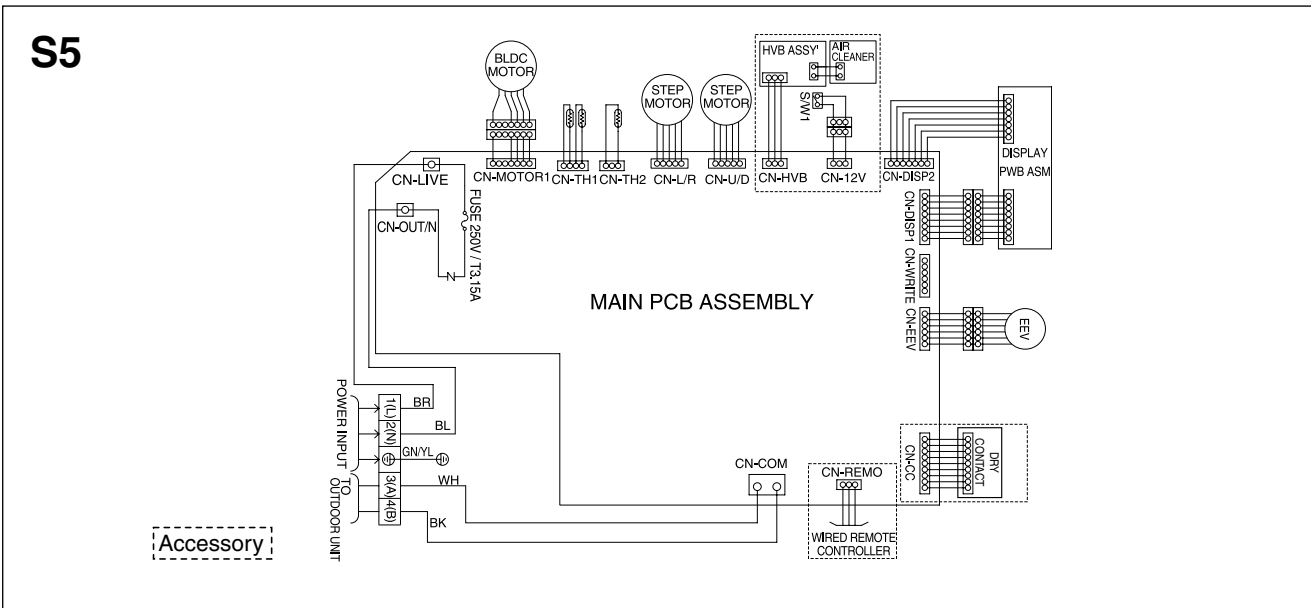
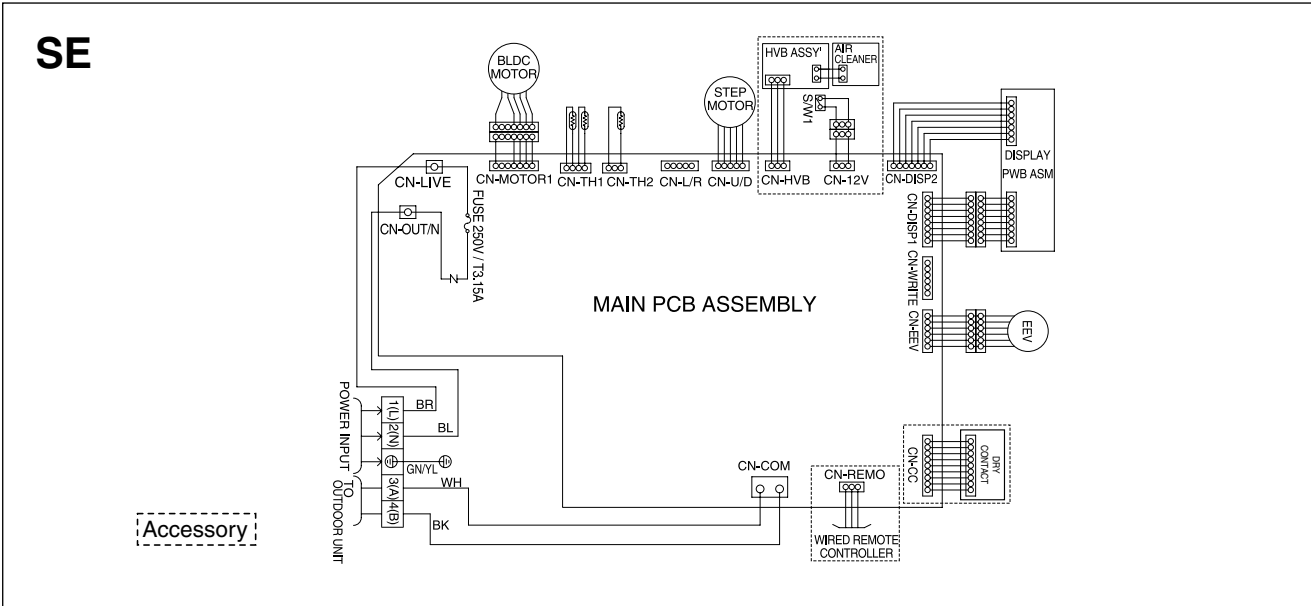


Refrigerant pipe connection port diameter

[unit: mm(inch)]

MODEL	GAS	LIQUID
ARNU07GSE*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU09GSE*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU12GSE*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU18GS5*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU24GS5*1	Ø15.88(5/8)	Ø9.52(3/8)

# 6. Wiring Diagrams



CONNECTOR NUMBER	LOCATION POINT	FUNCTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-COM	COMMUNICATION	CONNECTION BETWEEN INDOOR AND OUTDOOR
CN-DISP1	DISPLAY	DISPLAY OF INDOOR STATUS
CN-DISP2	DISPLAY	DISPLAY OF INDOOR STATUS
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-U/D	STEP MOTOR	STEP MOTOR OUTPUT
CN-TH1	ROOM/PIPE SENSOR	ROOM AND PIPE THERMISTOR



# Convertible Type

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<b>4. Dimensions .....</b>	<b>152</b>
<b>5. Piping Diagrams .....</b>	<b>154</b>
<b>6. Wiring Diagrams.....</b>	<b>155</b>

# 1. Specifications

Type		Ceiling & Floor		
Model	Unit	ARNU09GVEA1	ARNU12GVEA1	
Cooling Capacity	W	2,800	3,600	
	kcal/h	2,400	3,100	
	Btu/h	9,600	12,300	
Heating Capacity	W	3,200	4,000	
	kcal/h	2,800	3,400	
	Btu/h	10,900	13,600	
Dimensions (W*D*H)	Body	mm	900x200x490	
		inch	35.4x7.9x19.3	
Coil	Rows x Columns x FPI		2x12x20	
	Face Area	m <sup>2</sup>	0.10	
Fan	Type		Cross Flow Fan	
	Motor Output x Number	W	30	
	Running Current	A	0.13	
	Air Flow Rate(H/M/L)	cmm	7.6/6.9/6.2	9.2/7.6/6.9
		cfm	268/244/219	325/269/244
	Drive		Direct	
Motor type		BLDC		
Temperature Control		Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material		Foamed polystyrene	Foamed polystyrene	
Safety Device		Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	
	Gas Side	mm(inch)	Ø12.7(1/2)	
	Drain Pipe(Internal Dia.)	mm	16	
Net Weight		kg(lbs)	12(26.5)	
Noise Level(Sound Press, 1.5m, H/M/L)		dBA±3	36/32/28	
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50	
			1, 220, 60	
Refrigerant Control			EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	
Color			Morning fog	

**Notes:-**

- Capacities are based on the following conditions:
  - Cooling
    - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
    - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
  - Heating
    - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
    - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
- Capacities are net capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve
- To be added for more available Models

Type			Ceiling Suspended		
Model		Unit	ARNU18GVJA1	ARNU24GVJA1	
Cooling Capacity		W	5,600	7,100	
		kcal/h	4,800	6,100	
		Btu/h	19,100	24,200	
Heating Capacity		W	6,300	8,000	
		kcal/h	5,400	6,900	
		Btu/h	21,500	27,300	
Casing			Galvanized Steel Plate+Painting	Galvanized Steel Plate+Painting	
Dimensions (W*D*H)	Body	mm	950x220x650	950x220x650	
		inch	37.4x8.7x25.6	37.4x8.7x25.6	
Coil	Rows x Columns x FPI		3x14x19	3x14x19	
	Face Area	m <sup>2</sup>	0.23	0.23	
Fan	Type		Sirocco Fan	Sirocco Fan	
	Motor Output x Number	W	63.0	63.0	
	Running Current	A	0.31	0.31	
	Air Flow Rate(H/M/L)	cmm		16/ 14 /12	18/16/14
		cfm		565/495/424	636/566/495
	Drive		Direct	Direct	
Motor type		BLDC	BLDC		
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material			Foamed polystyrene	Foamed polystyrene	
Safety Device			Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø9.52(3/8)	
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø15.88(5/8)	
	Drain Pipe(Internal Dia.)	mm	16	16	
Net Weight		kg(lbs)	15(33.1)	15(33.1)	
Noise Level(Sound Press, 1.5m, H/M/L)		dBA±3	42/40/37	43/41/39	
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	
Refrigerant Control			EEV	EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	
Color			Morning fog	Morning fog	

**Notes:-**

- Capacities are based on the following conditions:
  - Cooling
    - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
    - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
  - Heating
    - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
    - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
    - Interconnecting Piping Length 7.5m
    - Level Difference of Zero
- Capacities are net capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve
- To be added for more available Models

## 2. Functions

### Indoor Unit

#### Operation ON/OFF by Remote controller

**Sensing the Room Temperature** • Room temperature sensor. (Thermistor)

**Room temperature control** • Maintains the room temperature in accordance with the Setting Temperature.

**Starting Current Control** • Indoor fan is delayed for 5 seconds at the starting.

**Indoor Fan Speed Control** • High, Med, Low

**Soft Dry Operation Mode** • Intermittent operation of fan at low speed.

**Auto Restart** • Although the air-conditioner is turned off by a power failure, it is restarted automatically previous operation mode after power supply.

**Deice (defrost) control (Heating)** • Both the indoor and outdoor fan stops during defrosting.  
• Hot start after defrost ends.

**Hot-start Control (Heating)** • The indoor fan does not rotate until the evaporator piping temperature reaches 25°C.

**High head height Drain pump** • A standard drain-head height of up to 700mm is possible.

**Central Control(Optional)** • It is operating individually or totally by central control function.

**Auto Change Over** • It is operating cooling and heating mode automatically according to setting temperature.

## 3. Operation Details

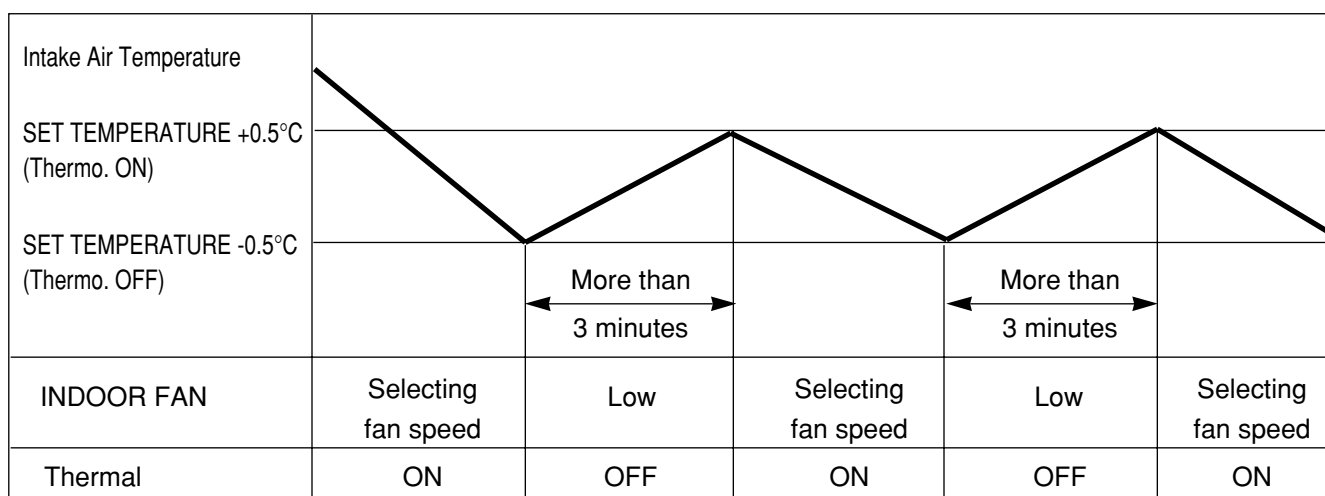
### The functions of main control

#### ■ Soft-Dry Operation

- The indoor fan speed is automatically set to the low, so the shift of the indoor fan speed is impossible because of already being set to the best speed for Dry Operation by microcontroller control.

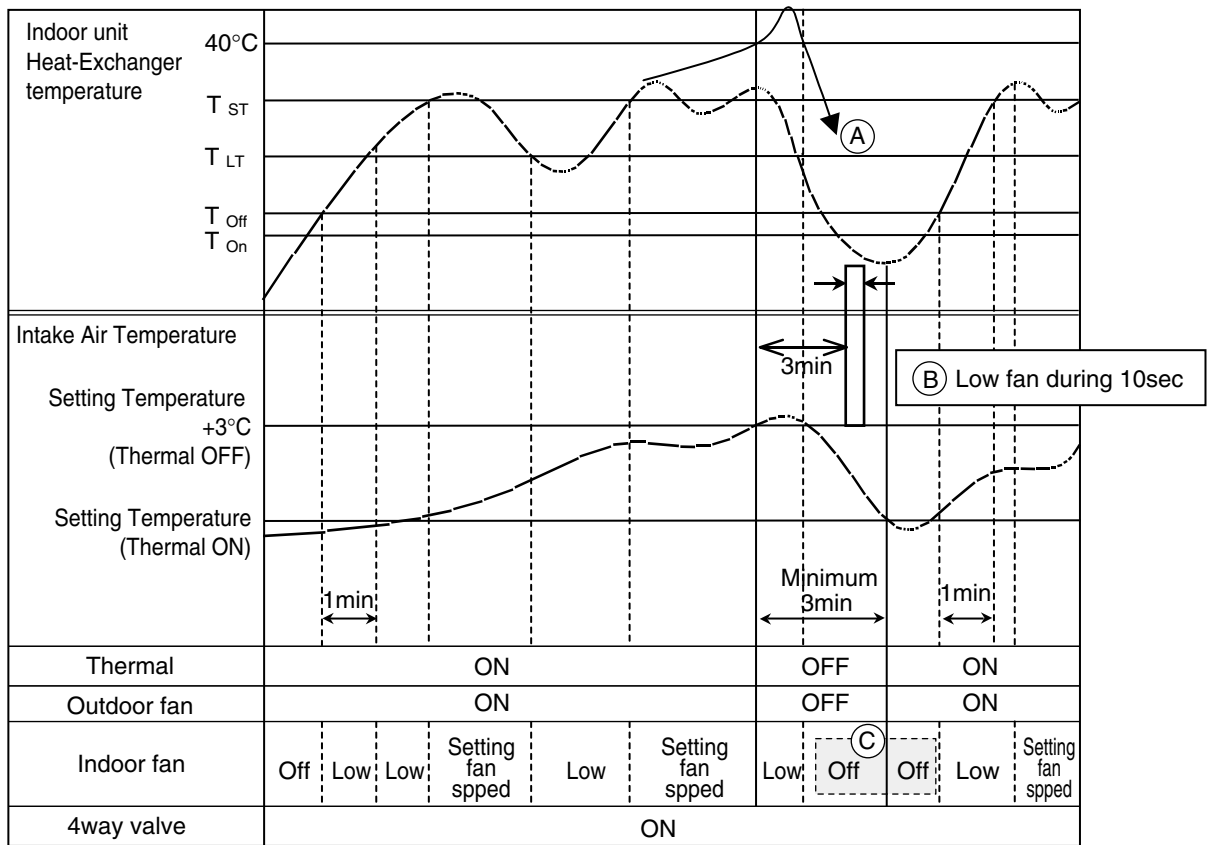
#### ■ Cooling Mode Operation

- When selecting the Cooling(※) Mode Operation, the unit will operate according to the setting by the remote controller and the operation diagram is as following.



## ■ Heating Mode Operation

The unit will operate according to the setting by the remote controller and the operation diagram is shown as following.

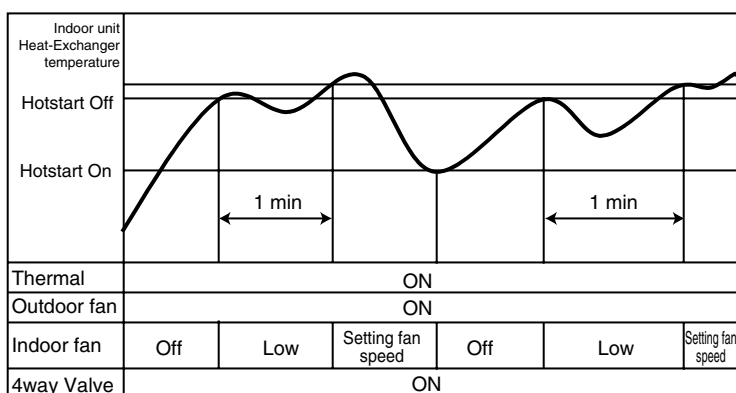


- **Compressor-off interval** : - (A) While the indoor Heat-Exchanger temperature is higher than 40°C, fan operates at low speed, when it becomes lower than 40°C fan stops.
- (B) For eliminating latent heat-loss, fan operates at low speed for 10 seconds periodically.
- (C) To be operated "Low" except initial Hotstart operation

	High Static			Low Static				Convertible	
	BH	BG	BR	B1	B2	CE	CF	VE	VJ
Hotstart On T <sub>On</sub>	19°C	19°C	19°C	19°C	19°C	19°C	19°C	26°C	26°C
Hotstart Off T <sub>Off</sub>	22°C	22°C	22°C	22°C	22°C	22°C	22°C	27°C	27°C
Low temperature T <sub>LT</sub>	25°C	25°C	25°C	25°C	25°C	25°C	25°C	28°C	28°C
Setting Temperature T <sub>ST</sub>	27°C	27°C	27°C	27°C	27°C	27°C	27°C	30°C	30°C

## Hot-Start Control

- The indoor fan does not rotate until the indoor unit Hex-Exchanger temperature reaches 30°C.
- The operation diagram is as following.

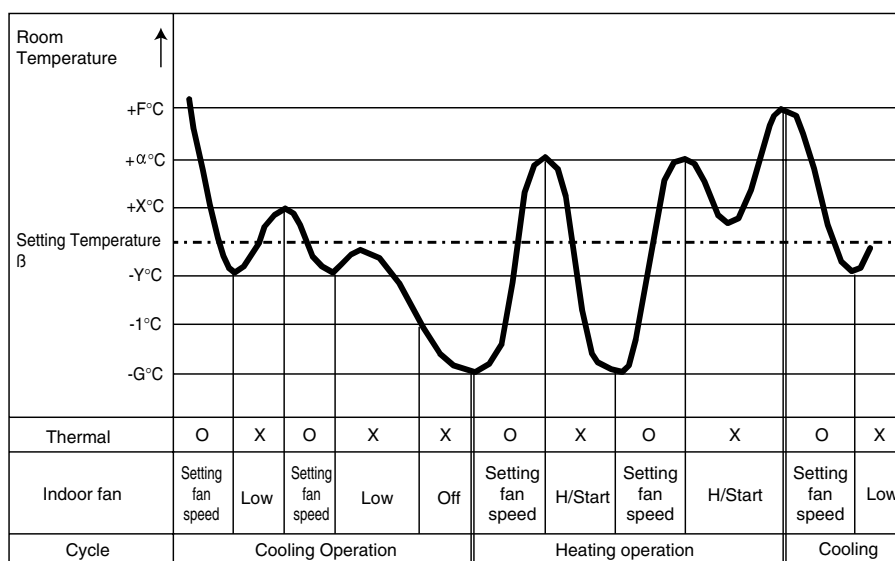


- Initial Hotstart On state

- Power Off → On
- Operation Off → On
- Cooling operation → Heating operation
- Defrost operation

## Auto Change Over

- In response to user wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



- Operation mode switching condition/ Definition

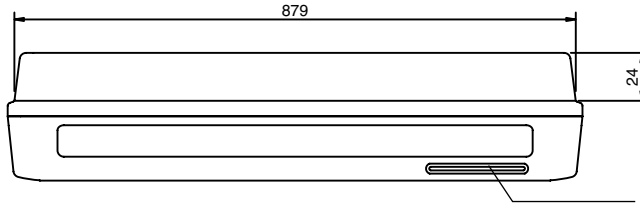
Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)^\circ\text{C}$	Cooling → Heating
$T_{ai} \geq T_s + F(2)^\circ\text{C}$	Heating → Cooling

- \*  $T_{ai}$  : Indoor Temperature
- \*  $T_s$  : Setting Temperature

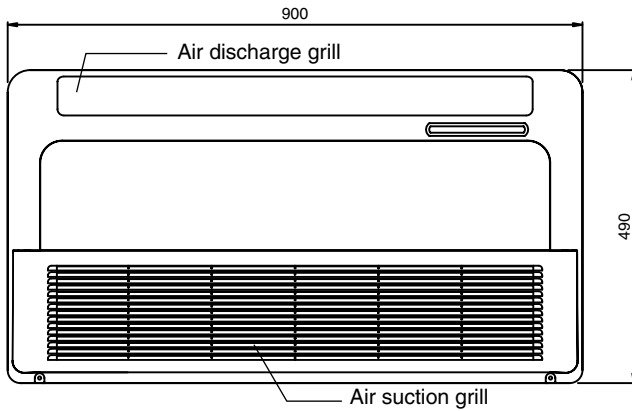
Definition		Default(°C)
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
α	Thermal Off Temperature for Heating	1
β	Thermal On Temperature for Heating	0

# 4. Dimensions

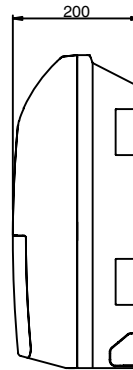
ARNU09GVEA1  
ARNU12GVEA1



Signal receiver & Operation indicator

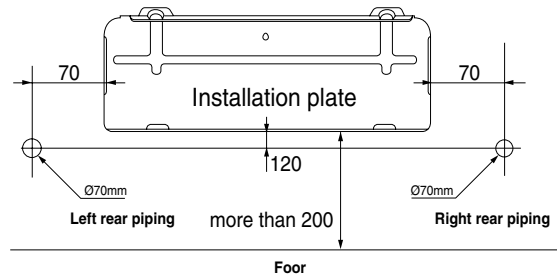
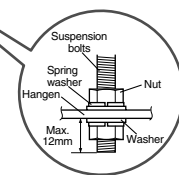
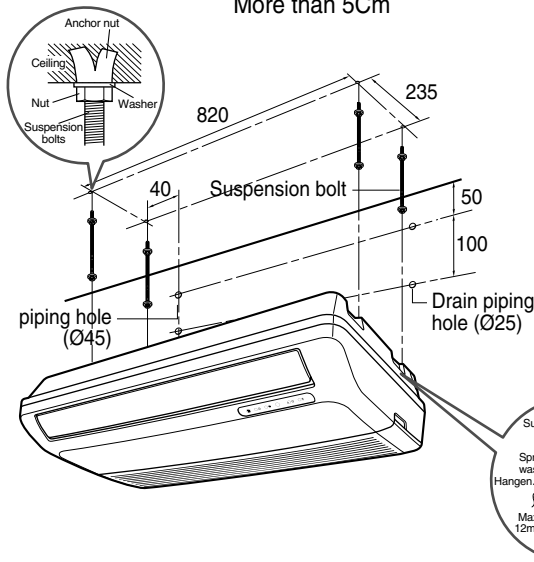
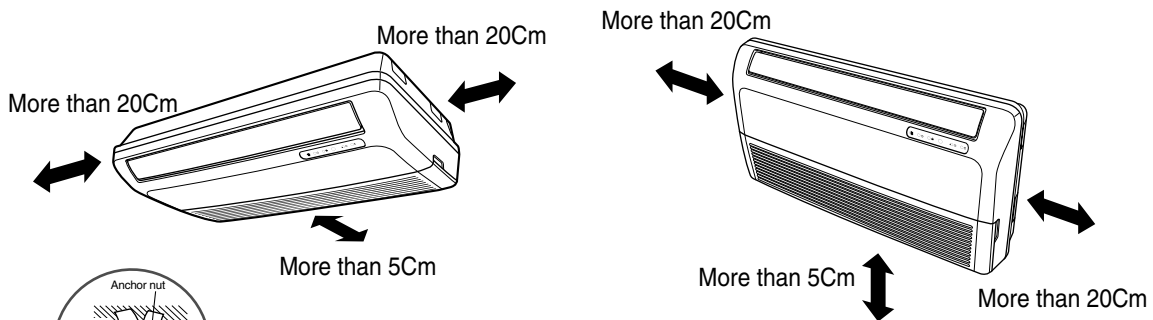


<Ceiling Installation>



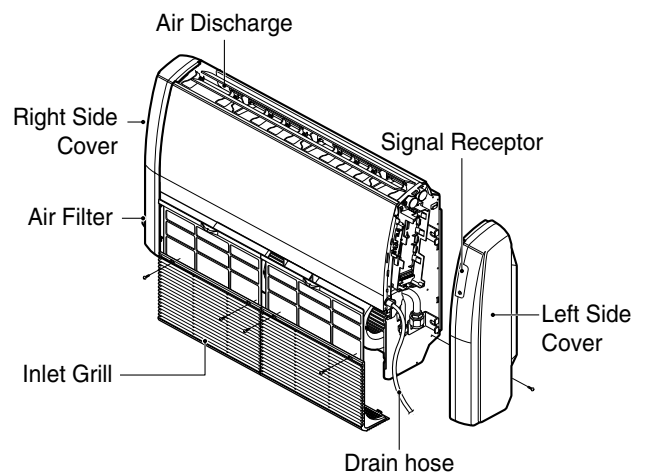
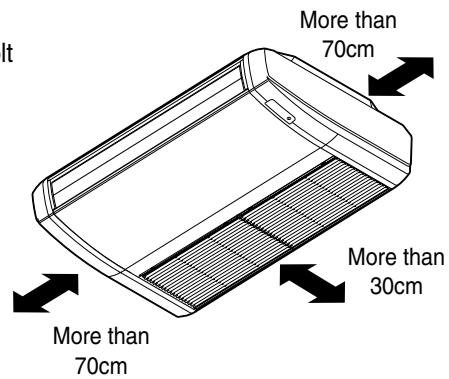
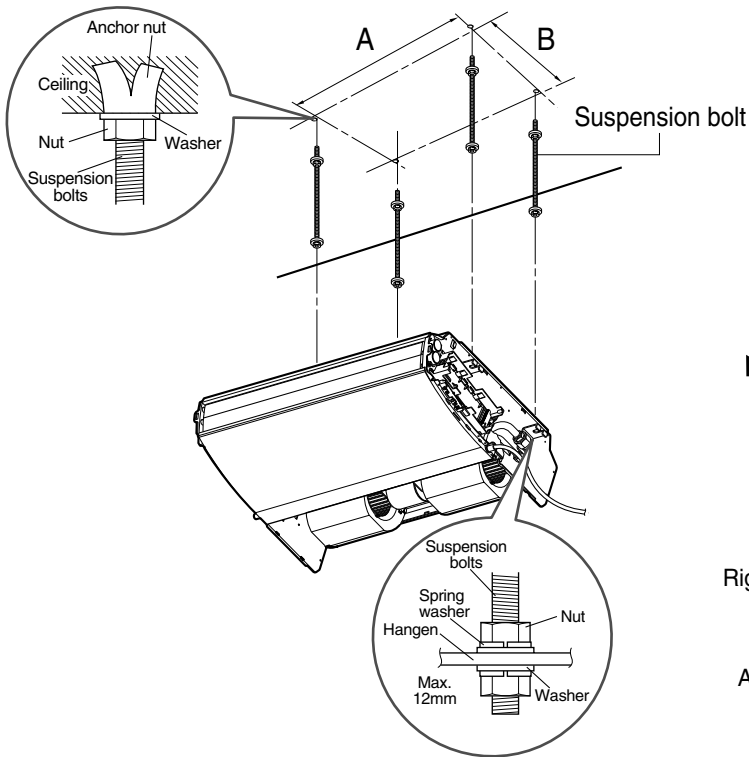
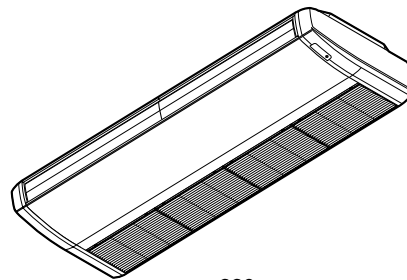
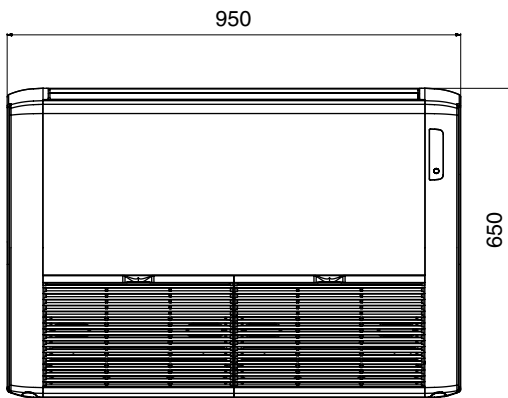
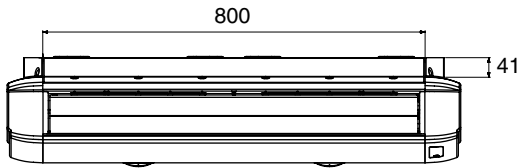
(Unit: mm)

<Floor Installation>





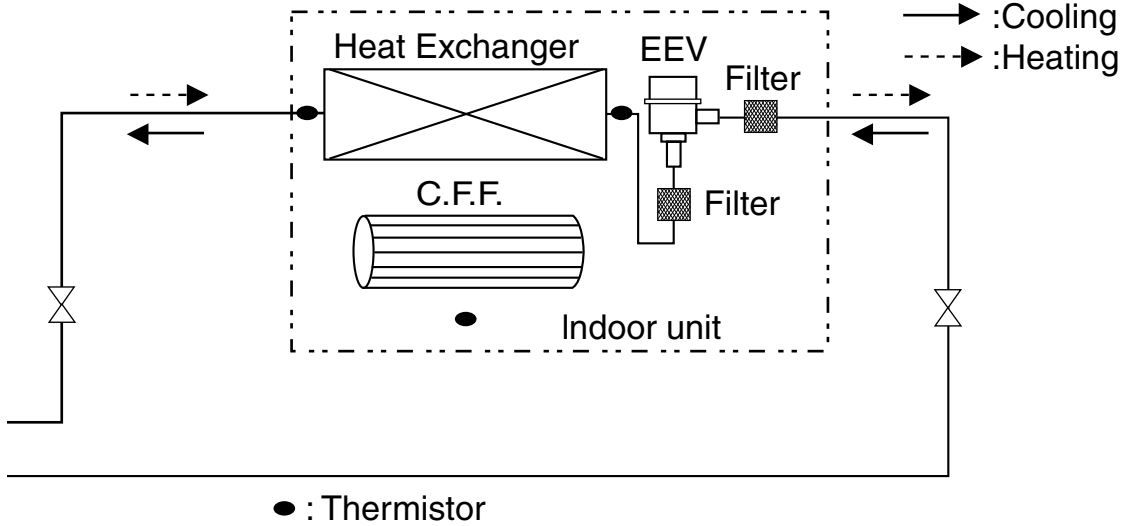
**ARNU18GVJA1**  
**ARNU24GVJA1**



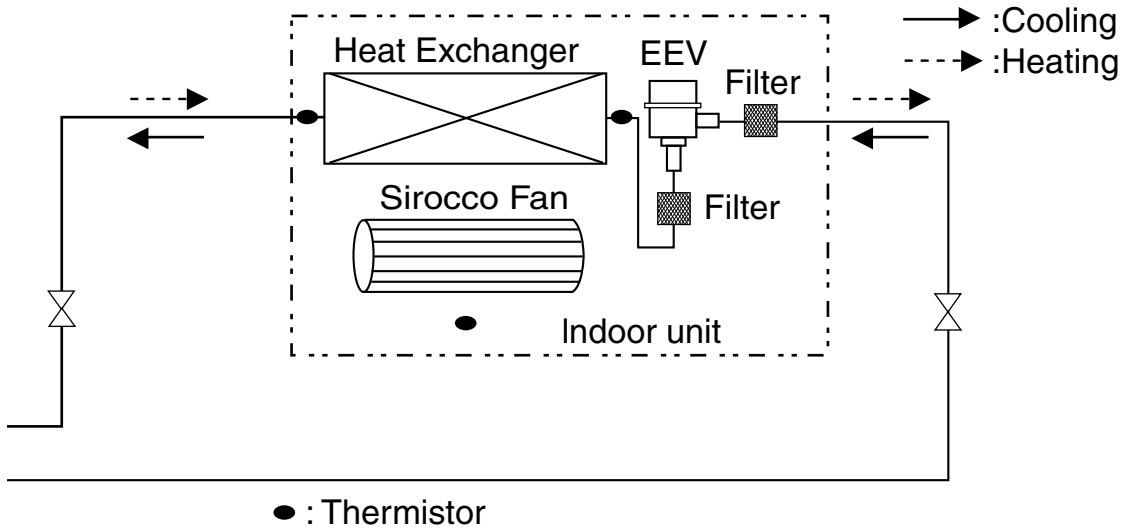
MODEL \ DIM.	A	B
VJ	855	320

# 5. Piping Diagrams

VE



VJ

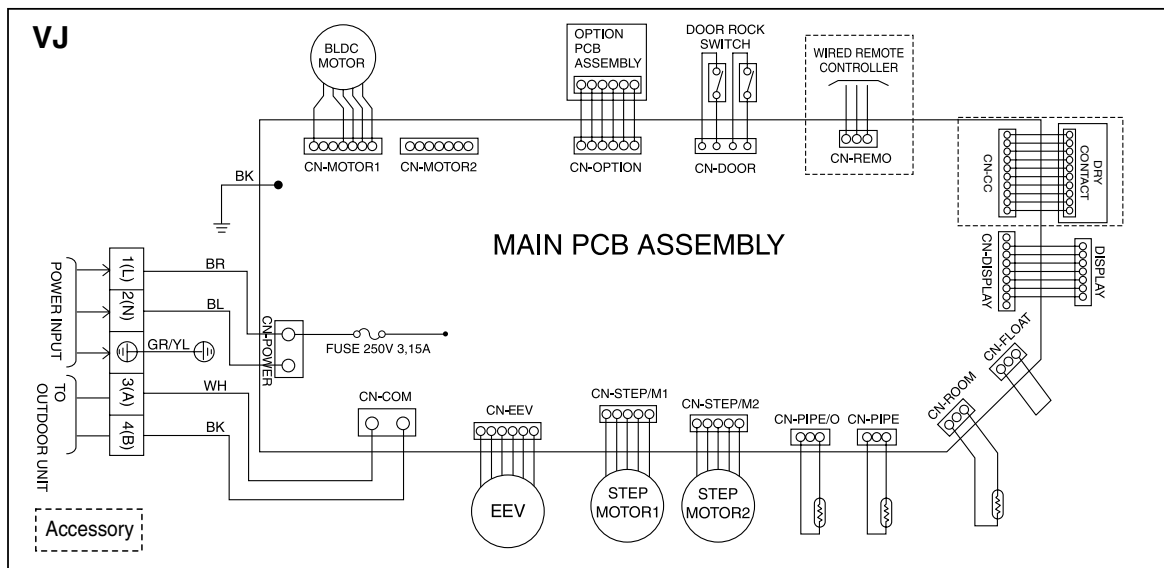
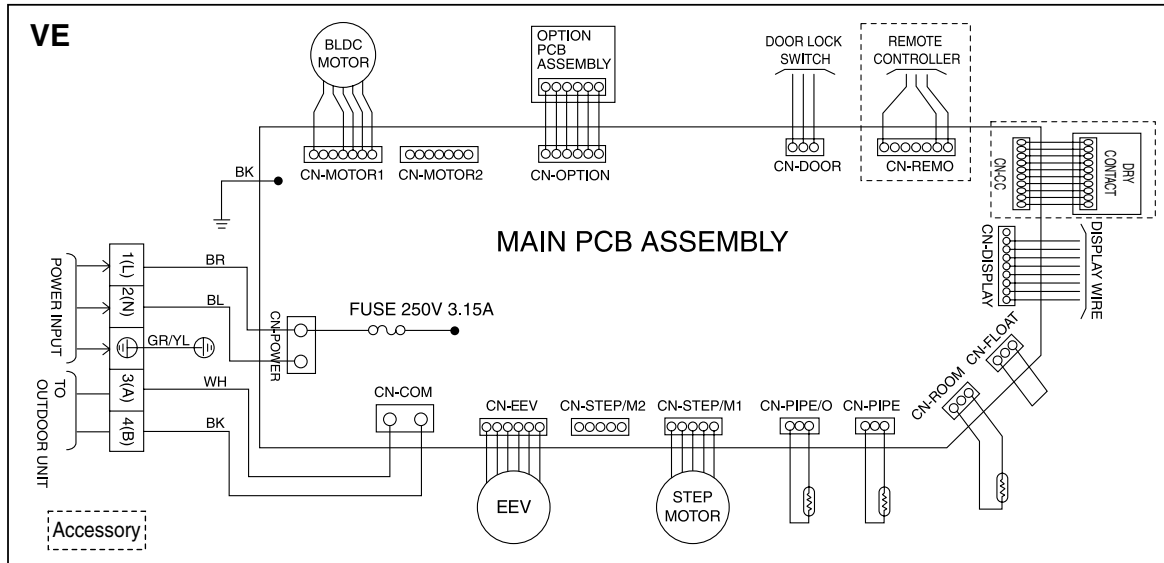


Refrigerant pipe connection port diameter

[unit: mm(inch)]

MODEL	GAS	LIQUID
ARNU09GVEA1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU12GVEA1		
ARNU18GVJA1	Ø15.88(5/8)	Ø9.52(3/8)
ARNU24GVJA1		

# 6. Wiring Diagrams



CONNECTOR NUMBER	SPEC.	DESCRIPTION
CN-MOTOR1	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-MOTOR2	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-PIPE/O	DISCHARGE PIPE THERMISTOR	DISCHARGE PIPE THERMISTOR
CN-PIPE	PIPE SENSOR	PIPE THERMISTOR
CN-ROOM	ROOM SENSOR	ROOM THERMISTOR
CN-REMO	REMOTE CONTROLLER	REMOTE CONTROL LINE
CN-FLOAT	FLOAT SWITCH INPUT	FLOAT SWITCH SENSING
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-OPTION	OPTION PWB.	COMMUNICATION BETWEEN MAIN AND OPTION
CN-COM	COMMUNICATION	COMMUNICATION BETWEEN INDOOR AND OUTDOOR
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER



# Floor Standing Type

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<b>4. Dimensions .....</b>	<b>164</b>
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<b>6. Wiring Diagrams.....</b>	<b>166</b>

# 1. Specifications

Type		Floor Standing						
Model	Unit	ARNU07GCEA1	ARNU09GCEA1	ARNU12GCEA1	ARNU07GCEU1	ARNU09GCEU1	ARNU12GCEU1	
Cooling Capacity	W	2,200	2,800	3,600	2,200	2,800	3,600	
	kcal/h	1,900	2,400	3,100	1,900	2,400	3,100	
	Btu/h	7,500	9,600	12,300	7,500	9,600	12,300	
Heating Capacity	W	2,500	3,200	4,000	2,500	3,200	4,000	
	kcal/h	2,200	2,800	3,400	2,200	2,800	3,400	
	Btu/h	8,500	10,900	13,600	8,500	10,900	13,600	
Casing		Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate	
Dimensions (W*D*H) Body		mm	1067x203x635	1067x203x635	1067x203x635	978x190x625	978x190x625	978x190x625
		inch	42.2x8.0x25.0	42.2x8.0x25.0	42.2x8.0x25.0	38.5x7.5x24.6	38.5x7.5x24.6	38.5x7.5x24.6
Coil	Rows x Columns x FPI	2x12x19	2x12x19	2x12x19	2x12x19	2x12x19	2x12x19	
	Face Area	m <sup>2</sup>	0.16	0.16	0.16	0.16	0.16	0.16
Fan	Type	Sirocco Fan	Sirocco Fan	Sirocco Fan	Sirocco Fan	Sirocco Fan	Sirocco Fan	
	Motor Output x Number	W	30	30	30	30	30	
	Running Current	A	0.1	0.1	0.1	0.1	0.1	0.1
	Air Flow Rate(H/M/L)	cmm	8.5/7.5/6.5	9.5/8.5/7.5	10.5/9.5/8.5	8.5/7.5/6.5	9.5/8.5/7.5	10.5/9.5/8.5
		cfm	300/265/229	335/300/265	371/335/300	300/265/229	335/300/265	371/335/300
	Drive	Direct	Direct	Direct	Direct	Direct	Direct	Direct
Motor type	BLDC	BLDC	BLDC	BLDC	BLDC	BLDC	BLDC	
Temperature Control		Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	
Sound Absorbing Thermal Insulation Material		Foamed polystyrene	Foamed polystyrene	Foamed polystyrene	Foamed polystyrene	Foamed polystyrene	Foamed polystyrene	
Air Filter		Net(Washable)	Net(Washable)	Net(Washable)	Net(Washable)	Net(Washable)	Net(Washable)	
Safety Device		Fuse	Fuse	Fuse	Fuse	Fuse	Fuse	
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø6.35(1/4)	Ø6.35(1/4)	Ø6.35(1/4)	Ø6.35(1/4)	
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø12.7(1/2)	Ø12.7(1/2)	Ø12.7(1/2)	Ø12.7(1/2)	
	Drain Pipe(Internal Dia.)	mm	12	12	12	12	12	
Net Weight		kg(lbs)	27(59.5)	27(59.5)	27(59.5)	19(41.9)	19(41.9)	
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	35/33/31	36/34/32	37/35/33	35/33/31	36/34/32	
Power Supply		Ø / V / Hz	1,220 ~ 240, 50 1, 220, 60	1,220 ~ 240, 50 1, 220, 60	1,220 ~ 240, 50 1, 220, 60	1,220 ~ 240, 50 1, 220, 60	1,220 ~ 240, 50 1, 220, 60	
Refrigerant Control		EEV	EEV	EEV	EEV	EEV	EEV	
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C	
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

5. To be added for more available Models

Type			Floor Standing			
Model		Unit	ARNU18GCFA1	ARNU24GCFA1	ARNU18GCFA1	ARNU24GCFA1
Cooling Capacity	W		5,600	7,100	5,600	7,100
	kcal/h		4,800	6,100	4,800	6,100
	Btu/h		19,100	24,200	19,100	24,200
Heating Capacity	W		6,300	8,000	6,300	8,000
	kcal/h		5,400	6,900	5,400	6,900
	Btu/h		21,500	27,300	21,500	27,300
Casing			Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate	Galvanized Steel Plate
Dimensions (W*D*H)	Body	mm	1345x203x635	1345x203x635	1256x190x625	1256x190x625
		inch	52.9x8.0x25.0	52.9x8.0x25.0	49.4x7.5x24.6	49.4x7.5x24.6
Coil	Rows x Columns x FPI		2x12x19	2x12x19	2x12x19	2x12x19
	Face Area	m <sup>2</sup>	0.23	0.23	0.23	0.23
Fan	Type		Sirocco Fan	Sirocco Fan	Sirocco Fan	Sirocco Fan
	Motor Output x Number	W	80	80	80	80
	Running Current	A	0.25	0.25	0.25	0.25
	Air Flow Rate(H/M/L)	cmm	16/14/12	18/16/14	16/14/12	18/16/14
		cfm	565/494/424	635/565/494	565/494/424	635/565/494
	Drive		Direct	Direct	Direct	Direct
Motor type		BLDC	BLDC	BLDC	BLDC	
Temperature Control			Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating	Microprocessor, Thermostat for cooling and heating
Sound Absorbing Thermal Insulation Material			Foamed polystrene	Foamed polystrene	Foamed polystrene	Foamed polystrene
Air Filter			Net(Washable)	Net(Washable)	Net(Washable)	Net(Washable)
Safety Device			Fuse	Fuse	Fuse	Fuse
Pipe Connections	Liquid Side	mm(inch)	Ø6.35(1/4)	Ø9.52(3/8)	Ø6.35(1/4)	Ø9.52(3/8)
	Gas Side	mm(inch)	Ø12.7(1/2)	Ø15.88(5/8)	Ø12.7(1/2)	Ø15.88(5/8)
	Drain Pipe(Internal Dia.)	mm	12	12	12	12
Net Weight		kg(lbs)	34(75.0)	34(75.0)	27(59.5)	27(59.5)
Noise Level(Sound Press, 1m, H/M/L)		dBA±3	40/37/34	43/40/37	40/37/34	43/40/37
Power Supply		Ø / V / Hz	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60	1, 220 ~ 240, 50 1, 220, 60
Refrigerant Control			EEV	EEV	EEV	EEV
Power cable		mm <sup>2</sup>	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C	CV2.0 X 3C
Transmission cable		mm <sup>2</sup>	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C	CVV-SB 1.25 X 2C

**Notes:-**

1. Capacities are based on the following conditions:

- Cooling
  - Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero
- Heating
  - Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - Interconnecting Piping Length 7.5m
  - Level Difference of Zero

2. Capacities are net capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

5. To be added for more available Models

## 2. Functions

### Indoor Unit

#### Operation ON/OFF by Remote controller

**Sensing the Room Temperature** • Room temperature sensor. (Thermistor)

**Room temperature control** • Maintains the room temperature in accordance with the Setting Temperature.

**Starting Current Control** • Indoor fan is delayed for 5 seconds at the starting.

**Indoor Fan Speed Control** • High, Med, Low

**Soft Dry Operation Mode** • Intermittent operation of fan at low speed.

**Auto Restart** • Although the air-conditioner is turned off by a power failure, it is restarted automatically previous operation mode after power supply.

**Deice (defrost) control (Heating)** • Both the indoor and outdoor fan stops during defrosting.  
• Hot start after defrost ends.

**Hot-start Control (Heating)** • The indoor fan does not rotate until the evaporator piping temperature reaches 25°C.

**High head height Drain pump** • A standard drain-head height of up to 700mm is possible.

**Central Control(Optional)** • It is operating individually or totally by central control function.

**Auto Change Over** • It is operating cooling and heating mode automatically according to setting temperature.



## 3. Operation Details

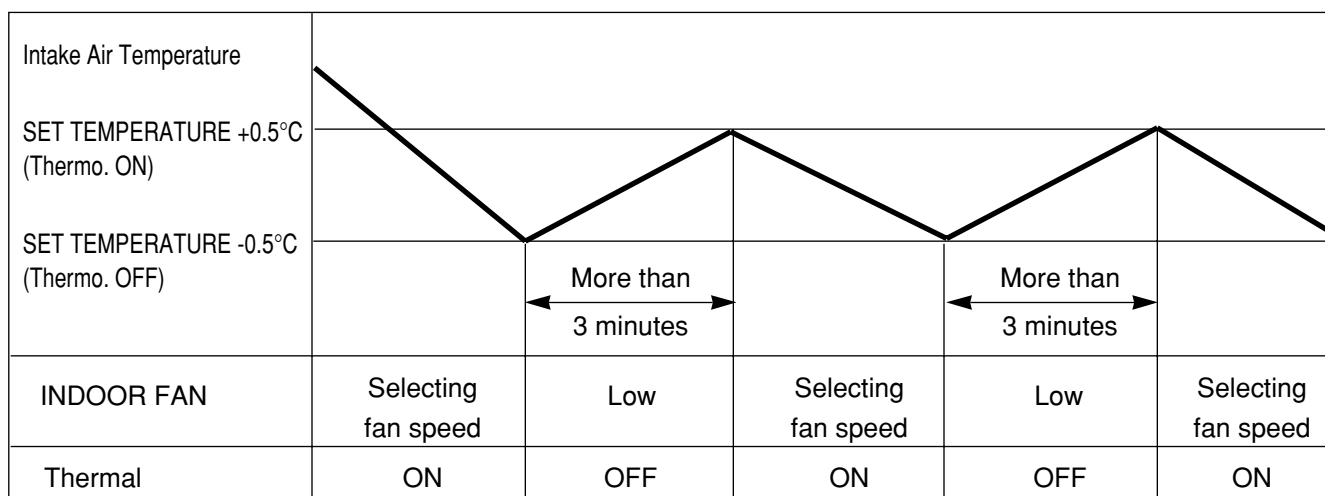
### The functions of main control

#### ■ Soft-Dry Operation

- The indoor fan speed is automatically set to the low, so the shift of the indoor fan speed is impossible because of already being set to the best speed for Dry Operation by microcontroller control.

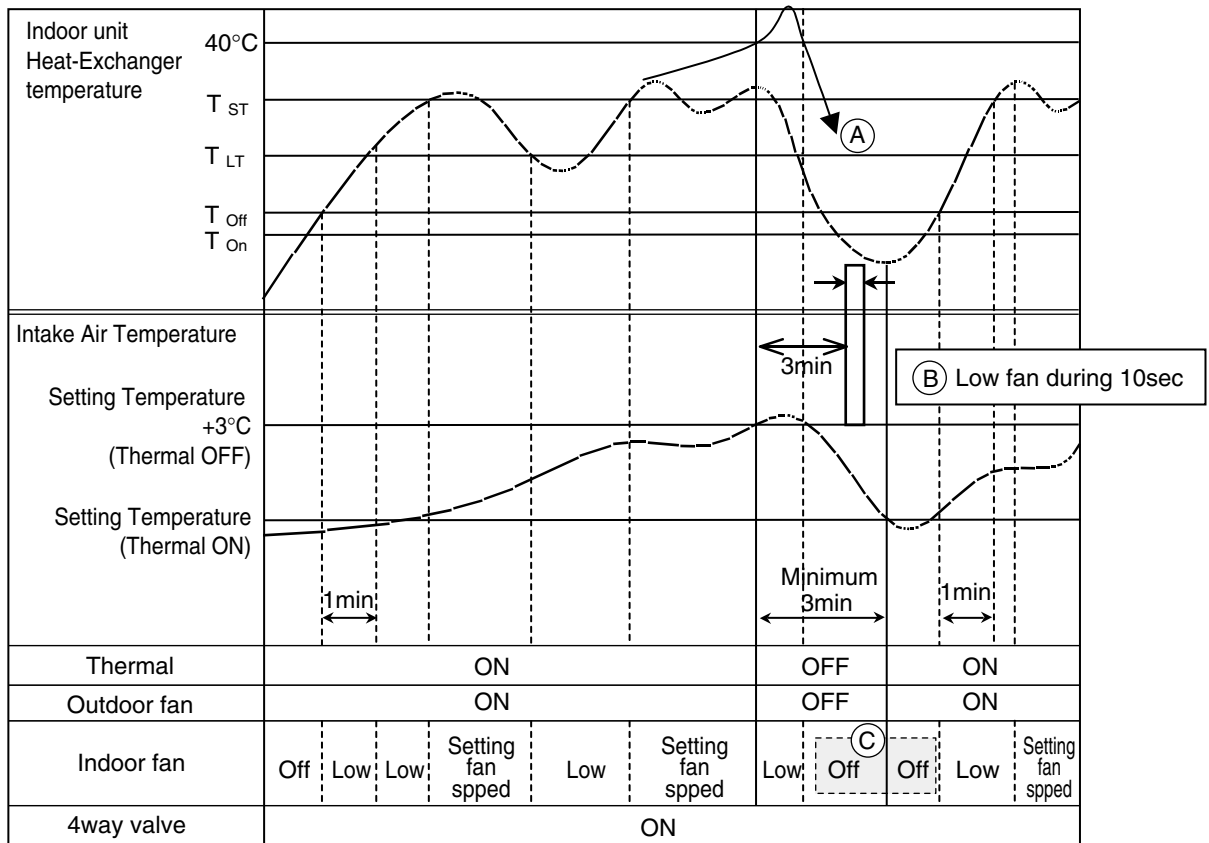
#### ■ Cooling Mode Operation

- When selecting the Cooling(✳) Mode Operation, the unit will operate according to the setting by the remote controller and the operation diagram is as following.



## ■ Heating Mode Operation

The unit will operate according to the setting by the remote controller and the operation diagram is shown as following.

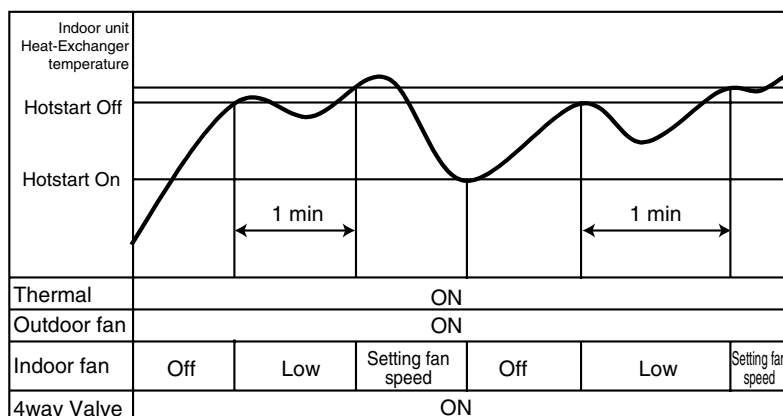


- **Compressor-off interval** : - (A) While the indoor Heat-Exchanger temperature is higher than 40°C, fan operates at low speed, when it becomes lower than 40°C fan stops.
- (B) For eliminating latent heat-loss, fan operates at low speed for 10 seconds periodically.
- (C) To be operated "Low" except initial Hotstart operation

	High Static			Low Static				Convertible	
Chassis	BH	BG	BR	B1	B2	CE	CF	VE	VJ
Hotstart On T <sub>On</sub>	19°C	19°C	19°C	19°C	19°C	19°C	19°C	26°C	26°C
Hotstart Off T <sub>Off</sub>	22°C	22°C	22°C	22°C	22°C	22°C	22°C	27°C	27°C
Low temperature T <sub>LT</sub>	25°C	25°C	25°C	25°C	25°C	25°C	25°C	28°C	28°C
Setting Temperature T <sub>ST</sub>	27°C	27°C	27°C	27°C	27°C	27°C	27°C	30°C	30°C

## Hot-Start Control

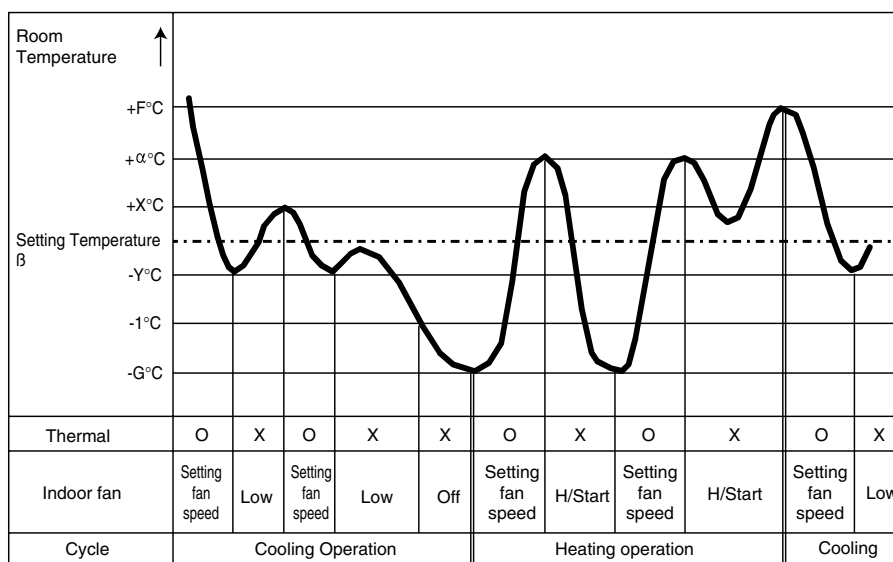
- The indoor fan does not rotate until the indoor unit Hex-Exchanger temperature reaches 30°C.
- The operation diagram is as following.



- Initial Hotstart On state
  - Power Off → On
  - Operation Off → On
  - Cooling operation → Heating operation
  - Defrost operation

## Auto Change Over

- In response to user wanted room temperature, cooling and heating mode of indoor units are switched automatically.
- The Operation diagram is as following.



### Operation mode switching condition/ Definition

Switching condition	Operation mode switching
$T_{ai} \leq T_s - G(2)^{\circ}\text{C}$	Cooling → Heating
$T_{ai} \geq T_s + F(2)^{\circ}\text{C}$	Heating → Cooling

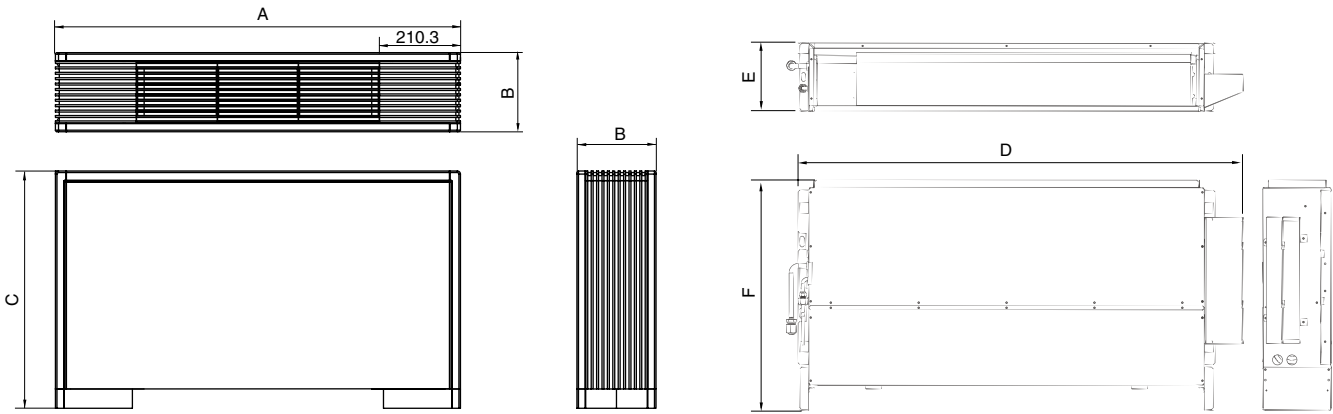
\*  $T_{ai}$  : Indoor Temperature  
 \*  $T_s$  : Setting Temperature

Definition		Default(°C)
F	Cooling switching temperature	2
G	Heating switching temperature	2
X	Thermal Off Temperature for Cooling	0.5
Y	Thermal On Temperature for Cooling	0.5
$\alpha$	Thermal Off Temperature for Heating	1
$\beta$	Thermal On Temperature for Heating	0

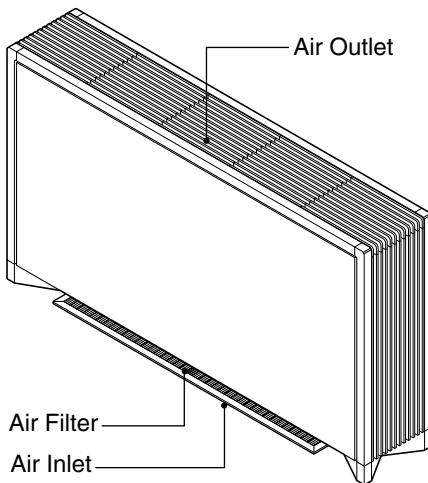
# 4. Dimensions

ARNU07GCEA1  
 ARNU09GCEA1  
 ARNU12GCEA1  
 ARNU18GCFA1  
 ARNU24GCFA1

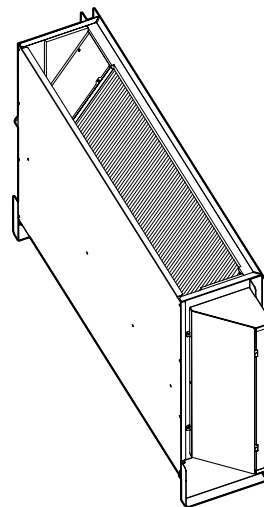
ARNU07GCFU1  
 ARNU09GCFU1  
 ARNU12GCFU1  
 ARNU18GCFU1  
 ARNU24GCFU1



Model	A	B	C	Model	D	E	F
ARNU07GCEA1	1,067	203	635	ARNU07GCEU1	978	190	639
ARNU09GCEA1	1,067	203	635	ARNU09GCEU1	978	190	639
ARNU12GCEA1	1,067	203	635	ARNU12GCEU1	978	190	639
ARNU18GCFA1	1,345	203	635	ARNU18GCFU1	1,256	190	639
ARNU24GCFA1	1,345	203	635	ARNU24GCFU1	1,256	190	639

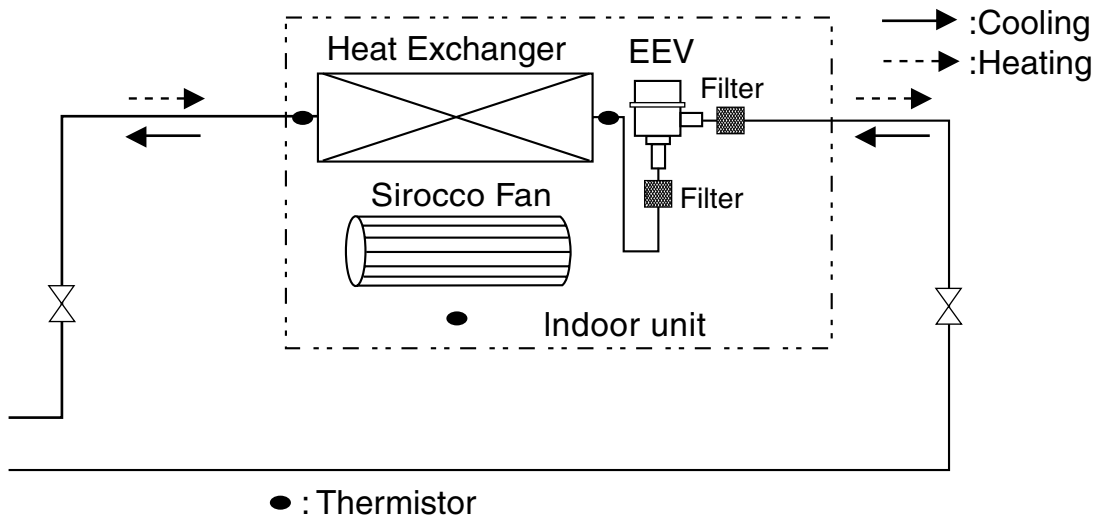


**With Case**



**Without Case**

# 5. Piping Diagrams

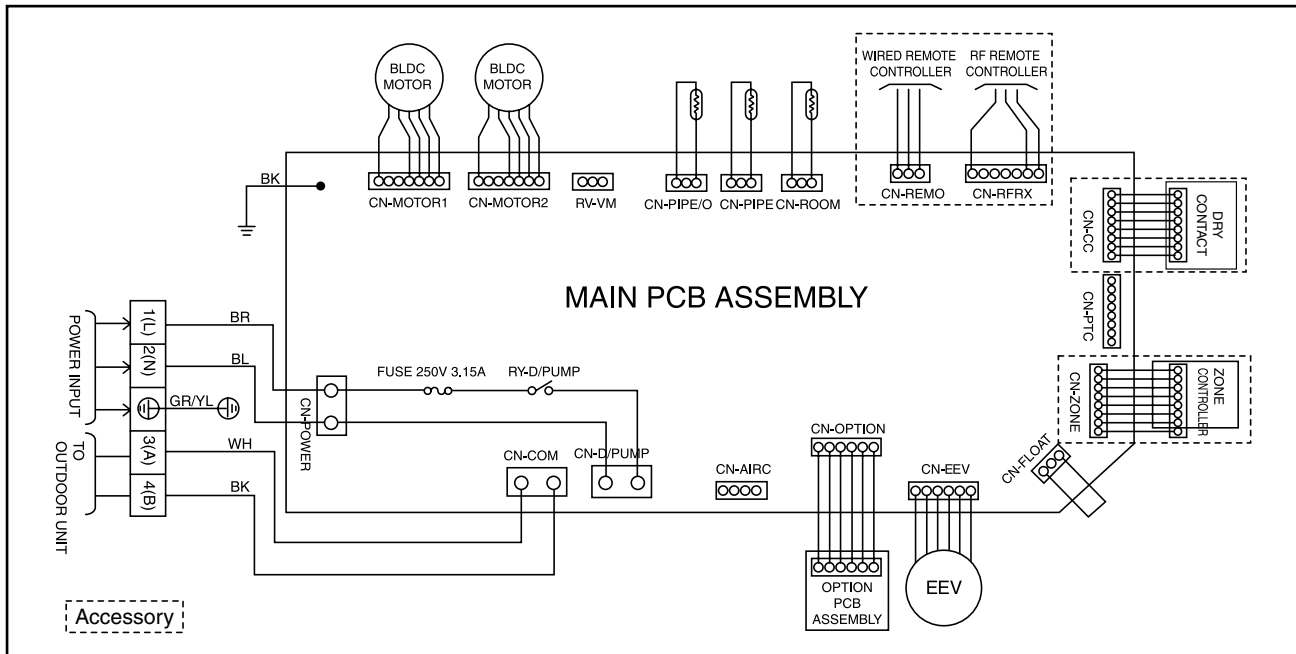


Refrigerant pipe connection port diameter

[unit: mm(inch)]

MODEL	GAS	LIQUID
ARNU07GCE*1		
ARNU09GCE*1		
ARNU12GCE*1	Ø12.7(1/2)	Ø6.35(1/4)
ARNU18GCF*1		
ARNU24GCF*1	Ø15.88(5/8)	Ø9.52(3/8)

## 6. Wiring Diagrams



CONNECTOR NUMBER	LOCATION POINT	FUNCTION
CN-POWER	AC POWER SUPPLY	AC POWER LINE INPUT FOR INDOOR CONTROLLER
CN-MOTOR	FAN MOTOR OUTPUT	MOTOR OUTPUT OF BLDC
CN-D/PUMP	DRAIN PUMP OUTPUT	AC OUTPUT FOR DRAIN PUMP
CN-COMM	COMMUNICATION	COMMUNICATION BETWEEN INDOOR AND OUTDOOR
CN-EEV	EEV OUTPUT	EEV CONTROL OUTPUT
CN-FLOAT	FLOAT SWITCH INPUT	FLOAT SWITCH SENSING
CN-PIPE	PIPE SENSOR	PIPE THERMISTOR
CN-PIPE/O	DISCHARGE PIPE SENSOR	DISCHARGE PIPE THERMISTOR
CN-ROOM	ROOM SENSOR	ROOM THERMISTOR
CN-REMO	REMOTE CONTROLLER	REMOTE CONTROL LINE

# **Part 3**

## **Outdoor Units**

# ARUB Series

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# 1. Specifications

## Heat Recovery

HP			8	10	12	14
Model Name		Combination Unit	ARUB808T1	ARUB1008T1	ARUB1208T1	ARUB1408T1
		Independent Unit	ARUB808T1	ARUB1008T1	ARUB1208T1	ARUB1408T1
Capacity	Cooling	W	22,400	28,000	33,600	39,200
		kcal/h	19,300	24,100	28,900	33,700
		Btu/h	76,400	95,900	114,700	133,800
	Heating	W	25,200	31,500	37,800	44,100
		kcal/h	21,700	27,100	32,500	37,900
		Btu/h	86,000	107,500	129,000	150,500
Input	Cooling	kW	6.8	8.5	10.6	12.8
	Heating	kW	6.4	8.1	9.7	11.5
Casing Color			WARM GRAY	WARM GRAY	WARM GRAY	WARM GRAY
Heat Exchanger			Corrugated Fin	Corrugated Fin	Corrugated Fin	Corrugated Fin
Compressor	Type		Scroll	Scroll	Scroll	Scroll
	Maker		LG	LG	LG	LG
	Piston Displacement	cm <sup>3</sup> /rev	55.42+82.86	55.42+82.86	55.42+82.86	55.42+82.86
	Number of Revolution	r.p.m	3477, 2900	3477, 2900	3477, 2900	3477, 2900
	Motor Output x Number	W	(4285+5500)x1	(4285+5500)x1	(4285+5500)x1	(4285+5500)x1
	Starting Method		Direct on Line	Direct on Line	Direct on Line	Direct on Line
	Oil Type		FVC68D(PVE)	FVC68D(PVE)	FVC68D(PVE)	FVC68D(PVE)
Oil Charge		L	5.6	5.6	5.6	5.6
Fan	Type		Propeller Fan	Propeller Fan	Propeller Fan	Propeller Fan
	Motor Output x Number	W	291x2	291x2	291x2	291x2
	Air Flow Rate(High)	cmm	190	190	190	190
		cfm	3177x2	3177x2	3177x2	3177x2
	Drive		Inverter	Inverter	Inverter	Inverter
Pipe Connctions	Discharge	Side / Top	Top	Top	Top	Top
	Liquid Pipes	mm(inch)	Ø9.52(3/8)	Ø9.52(3/8)	Ø12.7(1/2)	Ø12.7(1/2)
	Low Pressure Gas pipes	mm(inch)	Ø19.05(6/8)	Ø22.2(7/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)
	High Pressure Gas Pipes	mm(inch)	Ø15.88(5/8)	Ø19.05(3/4)	Ø19.05(3/4)	Ø22.2(7/8)
Dimensions (W*H*D)		mm	1280*1607*730	1280*1607*730	1280*1607*730	1280*1607*730
		inch	50.4*63.3*28.7	50.4*63.3*28.7	50.4*63.3*28.7	50.4*63.3*28.7
Net Weight		kg	300	300	300	300
		lbs	661.4	661.4	661.4	661.4
Power Supply Cable		mm <sup>2</sup>	CV 8X5C	CV 8X5C	CV 8X5C	CV 8X5C
Transmission Cable		mm <sup>2</sup>	CVV-SB 1.25X2C	CVV-SB 1.25X2C	CVV-SB 1.25X2C	CVV-SB 1.25X2C
Refrigerant	Charge	Kg(Oz)	8(282.2)	8(282.2)	8(282.2)	8(282.2)
	Type		R410a	R410a	R410a	R410a
	Control		EEV	EEV	EEV	EEV
Power Supply		Ø / V / Hz	3 / 380 ~ 415 / 50	3 / 380 ~ 415 / 50	3 / 380 ~ 415 / 50	3 / 380 ~ 415 / 50

### Notes:

1. Capacities are based on the following conditions:

- Cooling \* Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
- \* Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
- \* Interconnecting Piping Length 7.5m
- \* Level Difference of Zero

- Heating \* Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
- \* Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
- \* Interconnecting Piping Length 7.5m
- \* Level Difference of Zero

2. Capacities are net capacities

3. Due to our policy of innovation some specifications may be changed without notification

4. EEV : Electronic Expansion Valve

## Specifications

HP			16	18	20	22
Model Name		Combination Unit	ARUB1608T1	ARUB1808T1	ARUB2008T1	ARUB2208T1
		Independent Unit	ARUB808T1	ARUB1208T1	ARUB1008T1	ARUB1208T1
			ARUS808T1	ARUS808T1	ARUS1008T1	ARUS1008T1
Capacity	Cooling	W	44,800	50,400	56,000	61,600
		kcal/h	38,500	43,300	48,200	53,000
		Btu/h	152,900	172,000	191,100	210,200
	Heating	W	50,400	56,700	63,000	69,300
		kcal/h	43,300	48,800	54,200	59,600
		Btu/h	172,000	193,500	225,000	236,500
Input	Cooling	kW	13.6	15.3	17	19.1
	Heating	kW	12.8	14.5	16.2	17.8
Casing Color			WARM GRAY	WARM GRAY	WARM GRAY	WARM GRAY
Heat Exchanger			Corrugated Fin	Corrugated Fin	Corrugated Fin	Corrugated Fin
Compressor	Type		Scroll	Scroll	Scroll	Scroll
	Maker		LG	LG	LG	LG
	Piston Displacement	cm <sup>3</sup> /rev	(55.42+82.86)+(82.86+82.86)	(55.42+82.86)+(82.86+82.86)	(55.42+82.86)+(82.86+82.86)	(55.42+82.86)+(82.86+82.86)
	Number of Revolution	r.p.m	(3477, 2900)+(2900, 2900)	(3477, 2900)+(2900, 2900)	(3477, 2900)+(2900, 2900)	(3477, 2900)+(2900, 2900)
	Motor Output x Number	W	(4285+5500)+(5500+5500)	(4285+5500)+(5500+5500)	(4285+5500)+(5500+5500)	(4285+5500)+(5500+5500)
	Starting Method		Direct on Line	Direct on Line	Direct on Line	Direct on Line
	Oil Type		FVC68D(PVE)	FVC68D(PVE)	FVC68D(PVE)	FVC68D(PVE)
	Oil Charge	L	5.6 + 5.6	5.6 + 5.6	5.6 + 5.6	5.6 + 5.6
Fan	Type		Propeller Fan	Propeller Fan	Propeller Fan	Propeller Fan
	Motor Output x Number	W	291x2+271x2	291x2+271x2	291x2+271x2	291x2+271x2
	Air Flow Rate(High)	cmm	380	380	380	380
		cfm	3177x4	3177x4	3177x4	3177x4
	Drive		Inverter+Capacity Run	Inverter+Capacity Run	Inverter+Capacity Run	Inverter+Capacity Run
	Discharge	Side / Top	Top	Top	Top	Top
Pipe Connctions	Liquid Pipes	mm(inch)	Ø12.7(1/2)	Ø15.88(5/8)	Ø15.88(5/8)	Ø15.88(5/8)
	Low Pressure Gas pipes	mm(inch)	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø34.9(1 3/8)
	High Pressure Gas Pipes	mm(inch)	Ø22.2(7/8)	Ø22.2(7/8)	Ø22.2(7/8)	Ø28.58(1 1/8)
Dimensions (W*H*D)	mm		(1280 * 1607 * 730)x2	(1280 * 1607 * 730)x2	(1280 * 1607 * 730)x2	(1280 * 1607 * 730)x2
	inch		(50.4 * 63.3 * 28.7)x2	(50.4 * 63.3 * 28.7)x2	(50.4 * 63.3 * 28.7)x2	(50.4 * 63.3 * 28.7)x2
Net Weight	kg		300x2	300x2	300x2	300x2
	lbs		661.4x2	661.4x2	661.4x2	661.4x2
Power Supply Cable	mm <sup>2</sup>		CV 14X5C	CV 14X5C	CV 14X5C	CV 14X5C
Transmission Cable	mm <sup>2</sup>		CVV-SB 1.25X2C	CVV-SB 1.25X2C	CVV-SB 1.25X2C	CVV-SB 1.25X2C
Refrigerant	Charge	Kg(Oz)	16(564.4)	16(564.4)	16(564.4)	16(564.4)
	Type		R410a	R410a	R410a	R410a
	Control		EEV	EEV	EEV	EEV
Power Supply	Ø / V / Hz		3 / 380 ~ 415 / 50	3 / 380 ~ 415 / 50	3 / 380 ~ 415 / 50	3 / 380 ~ 415 / 50

### Notes:

- Capacities are based on the following conditions:
  - Cooling \* Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - \* Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - \* Interconnecting Piping Length 7.5m
  - \* Level Difference of Zero
  - Heating \* Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - \* Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - \* Interconnecting Piping Length 7.5m
  - \* Level Difference of Zero
- Capacities are net capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve

HP			24	26	28	30
Model Name	Combination Unit		ARUB2408T1	ARUB2608T1	ARUB2808T1	ARUB3008T1
		Independent Unit	ARUB1208T1	ARUB1008T1	ARUB1008T1	ARUB1008T1
			ARUS1208T1	ARUS808T1	ARUS1008T1	ARUS1008T1
Capacity	Cooling	W	67,200	72,800	78,400	84,000
		kcal/h	57,800	62,600	67,400	72,200
		Btu/h	229,300	248,400	267,500	286,600
	Heating	W	75,600	81,900	88,200	94,500
		kcal/h	65,000	70,400	75,900	81,300
		Btu/h	258,000	279,500	301,000	322,500
Input	Cooling	kW	21.2	22.1	23.8	25.5
	Heating	kW	19.4	20.9	22.6	24.3
Casing Color			WARM GRAY	WARM GRAY	WARM GRAY	WARM GRAY
Heat Exchanger			Corrugated Fin	Corrugated Fin	Corrugated Fin	Corrugated Fin
Compressor	Type		Scroll	Scroll	Scroll	Scroll
	Maker		LG	LG	LG	LG
	Piston Displacement	cm <sup>3</sup> /rev	(55.42+82.86)+(82.86+82.86)	(55.42+82.86)+(82.86+82.86)x2	(55.42+82.86)+(82.86+82.86)x2	(55.42+82.86)+(82.86+82.86)x2
	Number of Revolution	r.p.m	(3477, 2900)+(2900, 2900)	(3477, 2900)+(2900, 2900)x2	(3477, 2900)+(2900, 2900)x2	(3477, 2900)+(2900, 2900)x2
	Motor Output x Number	W	(4285+5500)+(5500+5500)	(4285+5500)+(5500+5500)x2	(4285+5500)+(5500+5500)x2	(4285+5500)+(5500+5500)x2
	Starting Method		Direct on Line	Direct on Line	Direct on Line	Direct on Line
	Oil Type		FVC68D(PVE)	FVC68D(PVE)	FVC68D(PVE)	FVC68D(PVE)
	Oil Charge	L	5.6+ 5.6	5.6+ 5.6+5.6	5.6+ 5.6+5.6	5.6+ 5.6+5.6
Fan	Type		Propeller Fan	Propeller Fan	Propeller Fan	Propeller Fan
	Motor Output x Number	W	291x2+271x2	291x2+271x4	291x2+271x4	291x2+271x4
	Air Flow Rate(High)	cmm	380	570	570	570
		cfm	3177x4	3177x6	3177x6	3177x6
	Drive		Inverter+Capacity Run	Inverter+Capacity Run	Inverter+Capacity Run	Inverter+Capacity Run
Pipe Connctions	Liquid Pipes	mm(inch)	Ø15.88(5/8)	Ø19.05(6/8)	Ø19.05(6/8)	Ø19.05(6/8)
	Low Pressure Gas pipes	mm(inch)	Ø34.9(1 3/8)	Ø34.9(1 3/8)	Ø34.9(1 3/8)	Ø34.9(1 3/8)
	High Pressure Gas Pipes	mm(inch)	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)	Ø28.58(1 1/8)
Dimensions (W*H*D)	mm		(1280 * 1607 * 730)x2	(1280 * 1607 * 730)x3	(1280 * 1607 * 730)x3	(1280 * 1607 * 730)x3
	inch		(50.4 * 63.3 * 28.7)x2	(50.4 * 63.3 * 28.7)x3	(50.4 * 63.3 * 28.7)x3	(50.4 * 63.3 * 28.7)x3
Net Weight	kg		300x2	300x3	300x3	300x3
	lbs		661.4x2	661.4x3	661.4x3	661.4x3
Power Supply Cable		mm <sup>2</sup>	CV 14X5C	CV 38X5C	CV 38X5C	CV 38X5C
Transmission Cable		mm <sup>2</sup>	CVV-SB 1.25X2C	CVV-SB 1.25X2C	CVV-SB 1.25X2C	CVV-SB 1.25X2C
Refrigerant	Charge	Kg(Oz)	16(564.4)	24(846.6)	24(846.6)	24(846.6)
	Type		R410a	R410a	R410a	R410a
	Control		EEV	EEV	EEV	EEV
Power Supply		Ø / V / Hz	3 / 380 ~ 415 / 50	3 / 380 ~ 415 / 50	3 / 380 ~ 415 / 50	3 / 380 ~ 415 / 50

**Notes:**

- Capacities are based on the following conditions:
  - Cooling \* Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - \* Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - \* Interconnecting Piping Length 7.5m
  - \* Level Difference of Zero
  - Heating \* Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - \* Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - \* Interconnecting Piping Length 7.5m
  - \* Level Difference of Zero
- Capacities are net capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve

## Specifications

HP			32	34	36
Model Name		Combination Unit	ARUB3208T1	ARUB3408T1	ARUB3608T1
		Independent Unit	ARUB1208T1	ARUB1208T1	ARUB1208T1
			ARUS1008T1	ARUS1208T1	ARUS1208T1
			ARUS1008T1	ARUS1008T1	ARUS1208T1
Capacity	Cooling	W	89,600	95,200	100,800
		kcal/h	77,100	81,900	86,700
		Btu/h	305,700	324,800	343,900
	Heating	W	100,800	107,100	113,400
		kcal/h	86,700	92,100	97,500
		Btu/h	343,900	365,400	386,900
Input	Cooling	kW	27.6	29.7	31.8
	Heating	kW	25.9	27.5	29.1
Casing Color			WARM GRAY	WARM GRAY	WARM GRAY
Heat Exchanger			Corrugated Fin	Corrugated Fin	Corrugated Fin
Compressor	Type		Scroll		
	Maker		LG		
	Piston Displacement	cm <sup>3</sup> /rev	(55.42+82.86)+(82.86+82.86)x2	(55.42+82.86)+(82.86+82.86)x2	(55.42+82.86)+(82.86+82.86)x2
	Number of Revolution	r.p.m	(3477, 2900)+(2900, 2900)x2	(3477, 2900)+(2900, 2900)x2	(3477, 2900)+(2900, 2900)x2
	Motor Output x Number	W	(4285+5500)+(5500+5500)x2	(4285+5500)+(5500+5500)x2	(4285+5500)+(5500+5500)x2
	Starting Method		Direct on Line		
	Oil Type		FVC68D(PVE)		
	Oil Charge	L	5.6 + 5.6 + 5.6		
Fan	Type		Propeller Fan		
	Motor Output x Number	W	291x2+271x4		
	Air Flow Rate(High)	cmm	570		
		cfm	3177x6		
	Drive		Inverter+Capacity Run		
Pipe Connctions	Discharge	Side / Top	Top		
	Liquid Pipes	mm(inch)	Ø19.05(6/8)		
	Low Pressure Gas pipes	mm(inch)	Ø34.9(1 3/8)		
High Pressure Gas Pipes	mm(inch)	Ø28.58(1 1/8)			
Dimensions (W*H*D)	mm		(1280 * 1607 * 730)x3		
	inch		(50.4 * 63.3 * 28.7)x3		
Net Weight	kg		300x3		
	lbs		661.4x3		
Power Supply Cable	mm <sup>2</sup>		CV 38X5C		
Transmission Cable	mm <sup>2</sup>		CVV-SB 1.25X2C		
Refrigerant	Charge	Kg(Oz)	24(846.6)		
	Type		R410a		
	Control		EEV		
Power Supply	Ø / V / Hz		3 / 380 ~ 415 / 50		

### Notes:

- Capacities are based on the following conditions:
  - Cooling \* Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
  - \* Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
  - \* Interconnecting Piping Length 7.5m
  - \* Level Difference of Zero
  - Heating \* Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
  - \* Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
  - \* Interconnecting Piping Length 7.5m
  - \* Level Difference of Zero
- Capacities are net capacities
- Due to our policy of innovation some specifications may be changed without notification
- EEV : Electronic Expansion Valve

HP			38	40
Model Name	Combination Unit		<b>ARUB3808T1</b>	<b>ARUB4008T1</b>
		Independent Unit	<b>ARUB1408T1</b>	<b>ARUB1408T1</b>
			<b>ARUS1208T1</b>	<b>ARUS1408T1</b>
			<b>ARUS1208T1</b>	<b>ARUS1208T1</b>
Capacity	Cooling	W	106,400	112,000
		kcal/h	91,500	96,300
		Btu/h	363,100	382,200
	Heating	W	119,700	126,000
		kcal/h	102,900	108,400
		Btu/h	408,400	429,900
Input	Cooling	kW	34	36.2
	Heating	kW	30.9	32.7
Casing Color			WARM GRAY	WARM GRAY
Heat Exchanger			Corrugated Fin	Corrugated Fin
Compressor	Type		Scroll	Scroll
	Maker		LG	LG
	Piston Displacement	cm <sup>3</sup> /rev	(55.42+82.86)+(82.86+82.86)x2	(55.42+82.86)+(82.86+82.86)x2
	Number of Revolution	r.p.m	(3477, 2900)+(2900, 2900)x2	(3477, 2900)+(2900, 2900)x2
	Motor Output x Number	W	(4285+5500)+(5500+5500)x2	(4285+5500)+(5500+5500)x2
	Starting Method		Direct on Line	Direct on Line
	Oil Type		FVC68D(PVE)	FVC68D(PVE)
	Oil Charge	L	5.6+ 5.6+5.6	5.6+ 5.6+5.6
Fan	Type		Propeller Fan	Propeller Fan
	Motor Output x Number	W	291x2+271x4	291x2+271x4
	Air Flow Rate(High)	cmm	570	570
		cfm	3177x6	3177x6
	Drive		Inverter+Capacity Run	Inverter+Capacity Run
	Discharge	Side / Top	Top	Top
Pipe Connctions	Liquid Pipes	mm(inch)	Ø19.05(6/8)	Ø19.05(6/8)
	Low Pressure Gas pipes	mm(inch)	Ø41.3(1 5/8)	Ø41.3(1 5/8)
	High Pressure Gas Pipes	mm(inch)	Ø34.9(1 3/8)	Ø34.9(1 3/8)
Dimensions (W*H*D)		mm	(1280 * 1607 * 730)x3	(1280 * 1607 * 730)x3
		inch	(50.4 * 63.3 * 28.7)x3	(50.4 * 63.3 * 28.7)x3
Net Weight		kg	300x3	300x3
		lbs	661.4x3	661.4x3
Power Supply Cable		mm <sup>2</sup>	CV 38X5C	CV 38X5C
Transmission Cable		mm <sup>2</sup>	CVV-SB 1.25X2C	CVV-SB 1.25X2C
Refrigerant	Charge	Kg(Oz)	24(846.6)	24(846.6)
	Type		R410a	R410a
	Control		EEV	EEV
Power Supply		Ø / V / Hz	3 / 380 ~ 415 / 50	3 / 380 ~ 415 / 50

**Notes:**

1. Capacities are based on the following conditions:

- Cooling \* Indoor temp. 27°C[80.6°F]DB/ 19°C[66.2°F]WB
- \* Outdoor temp. 35°C[95°F]DB/ 24°C[75.2°F]WB
- \* Interconnecting Piping Length 7.5m
- \* Level Difference of Zero
- Heating \* Indoor temp. 20°C[68°F]DB/ 15°C[59°F]WB
- \* Outdoor temp. 7°C[44.6°F]DB/ 6°C[42.8°F]WB
- \* Interconnecting Piping Length 7.5m
- \* Level Difference of Zero

2. Capacities are net capacities

3. Due to our policy of innovation some specifications may be changed without notification

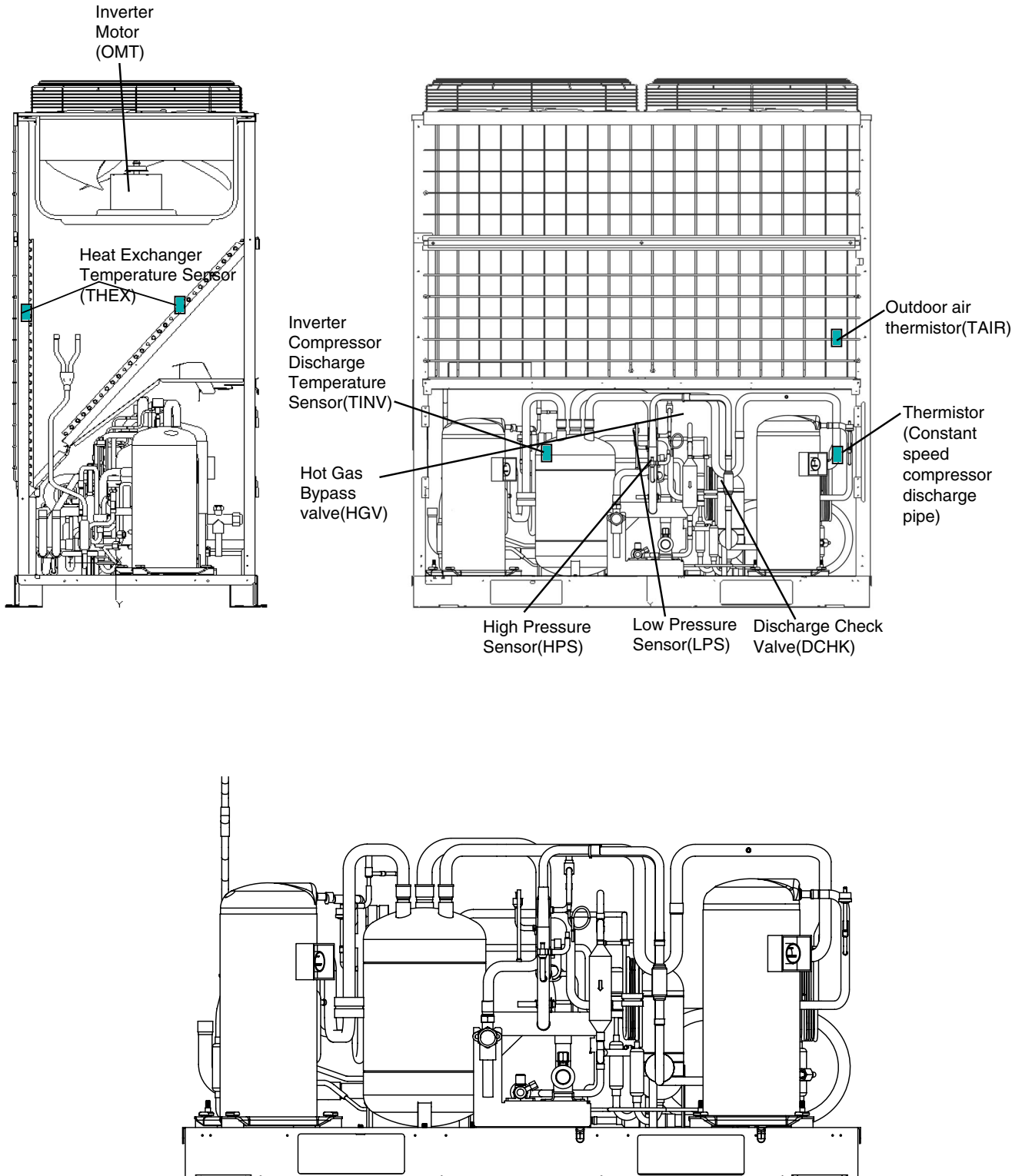
4. EEV : Electronic Expansion Valve

## 2. Parts Function/Layout Drawing

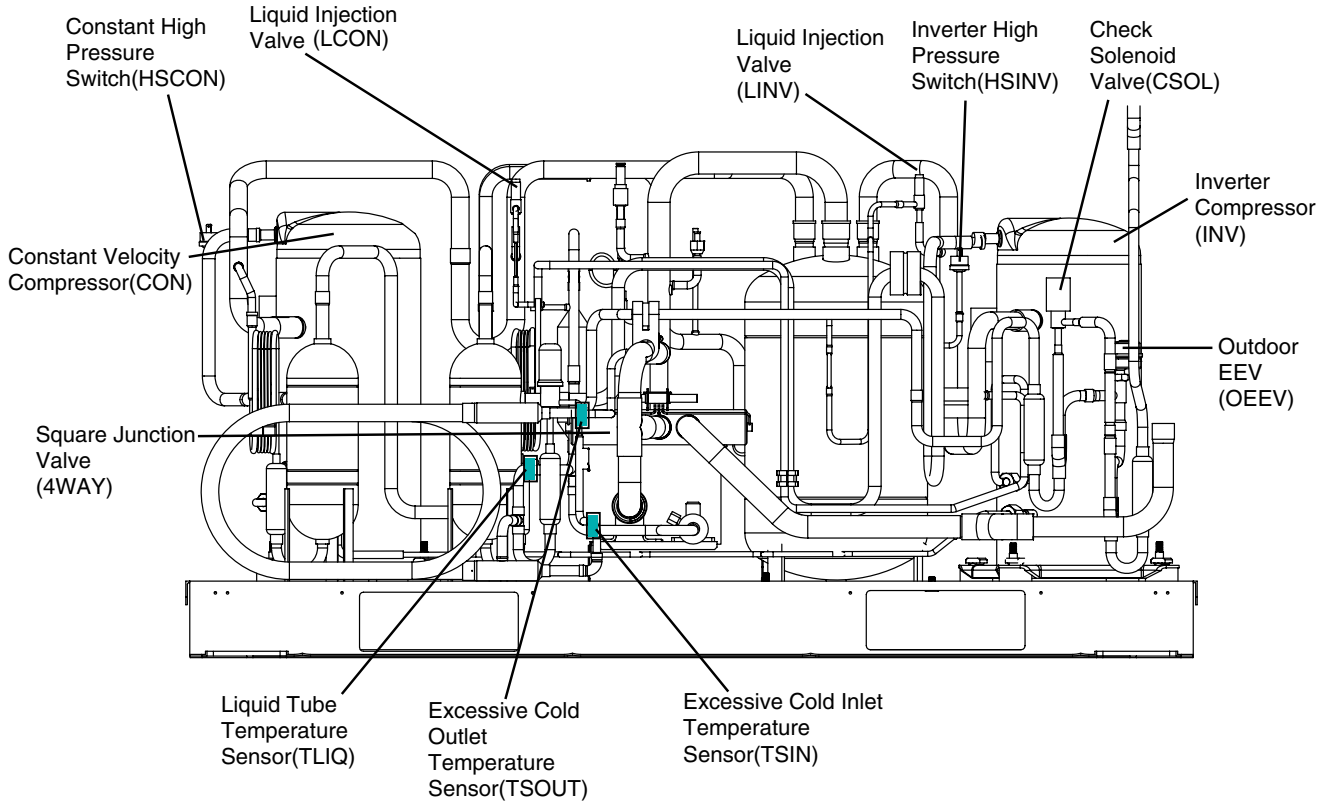
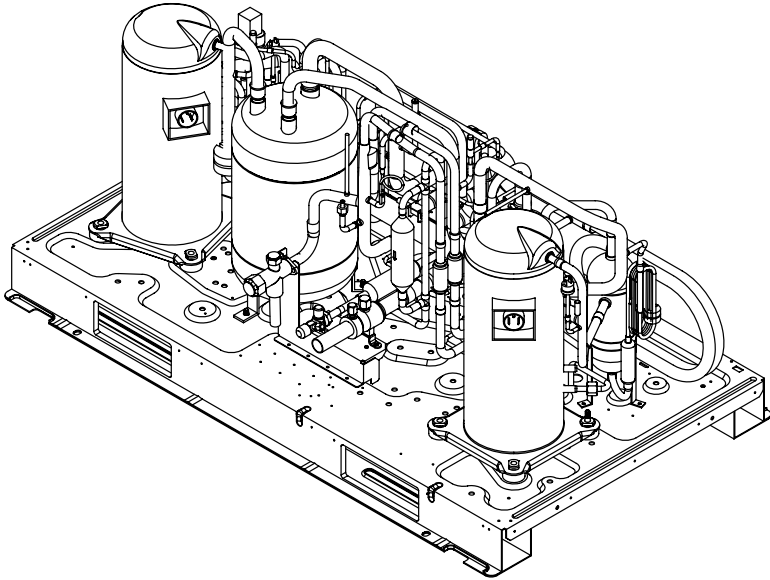
### 8HP/10HP/12HP/14HP Parts Function

Parts Name	Symbol	Major Function
Inverter compressor	INV.	Operated up to 30Hz~100Hz by inverter operation. Pressurize high temperature, low pressure refrigerant to high temperature, high pressure.
Constant velocity compressor	CON.	Operated cold/heat load with assembly with inverter compressor.
Inverter fan motor	IMT	Adjust outdoor wind quantity while varying the outdoor fan by 0~60Hz.
Outdoor EEV	OEEV	Adjust flow quantity depending on overheat level of refrigerant in the outdoor side in heat status.
Sub-cooling Lev	SEEV	Adjust flow quantity depending on overheat level of the outlet of the excessive cold heat exchanger in cold status.
Liquid injection Valve(Inv.)	LINV	Prevent overheat of the compressor by supplying liquid refrigerant after opening the valve when discharge temperature of the compressor rises.
Liquid injection Valve(Con.)	LCON	
Hot gas bypass valve	HGV	Stabilize the system by high pressure gas to the low pressure part after opening when bypass and low pressure of refrigerant rapidly the valve
Square Junction valve	4 WAY	Cut-off the outdoor heat exchanger with the evaporator or condenser depending on operation of the indoor unit.
Outdoor check valve	OCHK	Used to obtain flow quantity of refrigerant in cold condition.
Discharge check valve	DCHK	Prevent reverse flow of high pressure refrigerant into the compressor.
Inverter high pressure S/W	HSINV	Mechanically stop the compressor where the compressor rises to the high pressure limit valve due to abnormal operation.
Constant velocity high pressure S/W	HSCON	
High pressure sensor	HPS	Measure high pressure of the system.
Low pressure sensor	LPS	Measure low pressure of the system.
Heat exchanger temperature sensor	THEX	Used for control by measuring temperature of the outdoor heat exchanger.
Inverter discharger temperature sensor	TINV	Used for protecting and controlling the compressor by measuring discharge temperature.
Constant velocity discharger temperature sensor	TCON	
Air temperature sensor	TAIR	Measure outdoor temperature.
Suction temperature sensor	TSUC	Used for controlling excessive heat level by measuring refrigerant temperature of the suction pipe.
Liquid tube temperature sensor	TLIQ	Used for controlling excessive cold level by measuring refrigerant temperature of the liquid pipe.
Excessive cold outlet temperature sensor	TSOUT	Used for controlling excessive heat level by measuring outlet temperature of the excessive cold circuit.
Excessive cold inlet temperature sensor	TSIN	Used for controlling excessive heat level by measuring outlet temperature of the excessive cold circuit.
Check solenoid Valve	CSOL	Used for controlling flow quantity Of refrigerant in simultaneous operation mode (Cooling oriented operation)

8HP/10HP/12HP/14HP Parts Layout Drawing (sensor, etc)

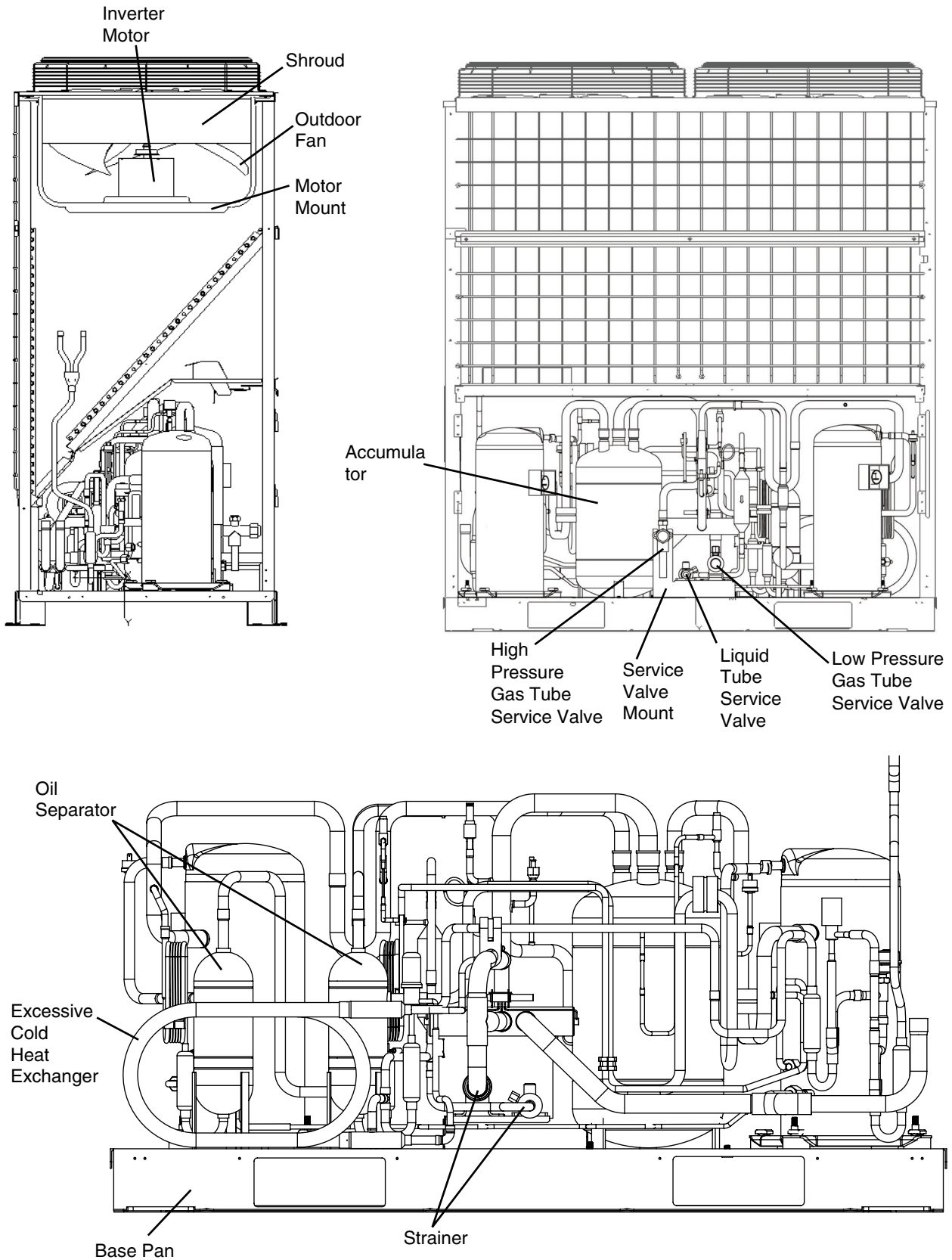


8HP/10HP/12HP/14HP Parts Layout Drawing (sensor, etc)



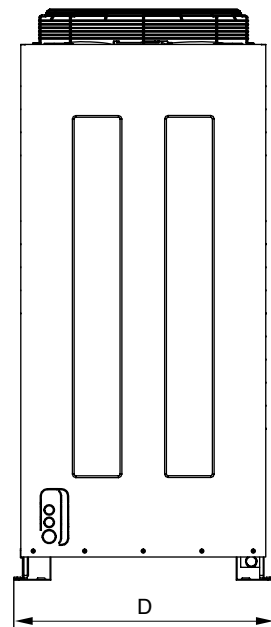
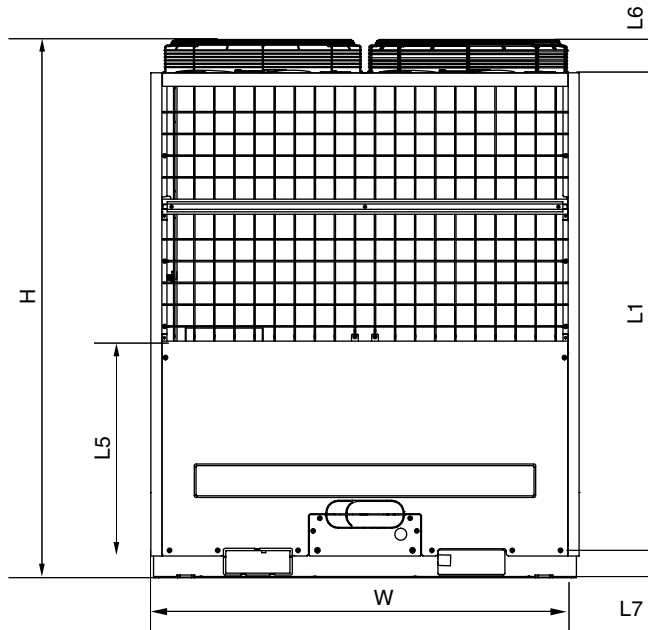
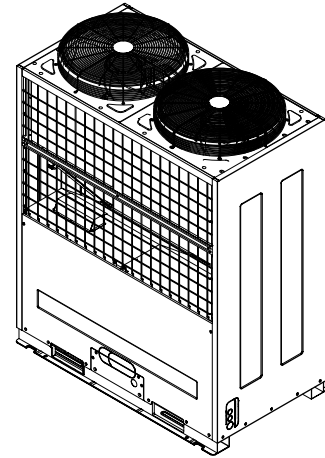
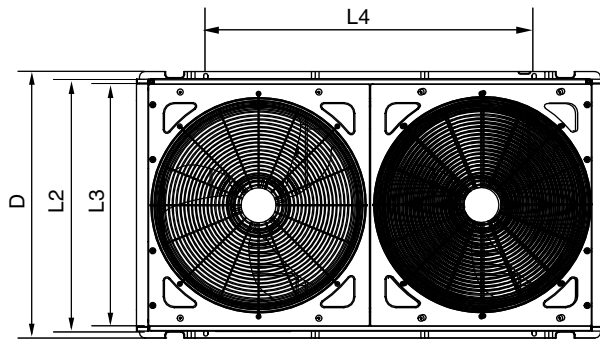


8HP/10HP/12HP/14HP Parts Layout Drawing (Tool Part)



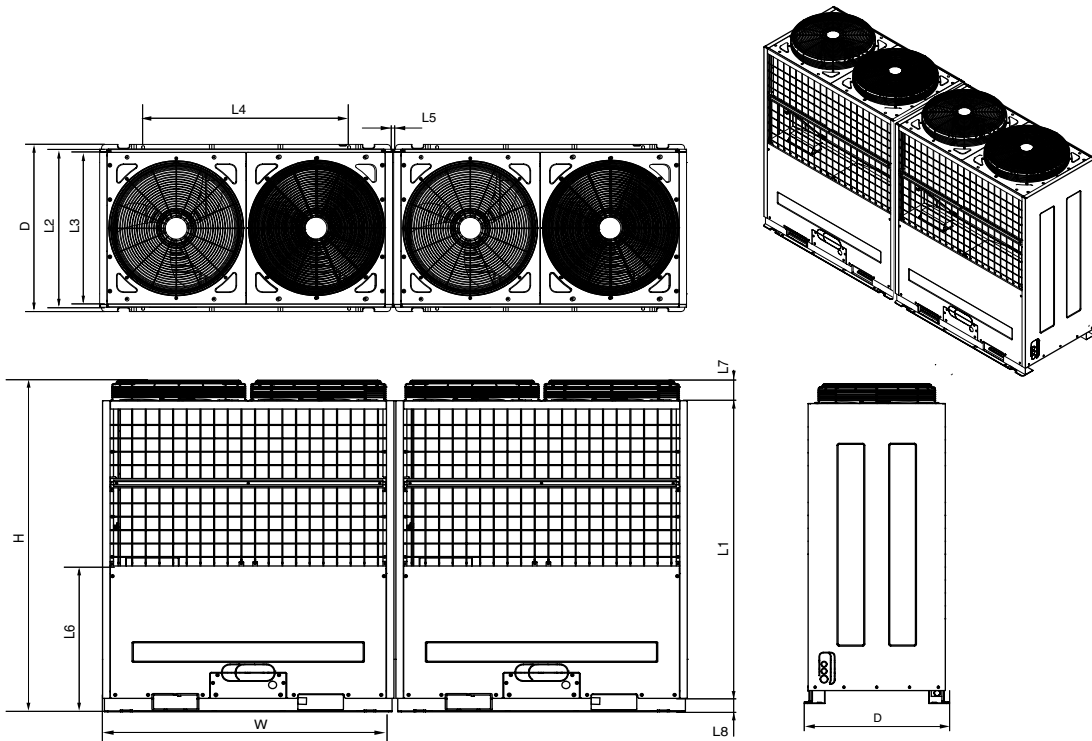
### 3. Dimensions

#### 1 Outdoor Unit (8, 10, 12, 14HP)



W	mm(inch)	1280(50.4)
H	mm(inch)	1607(63.3)
D	mm(inch)	730(28.7)
L1	mm(inch)	1427(56.1)
L2	mm(inch)	692(27.2)
L3	mm(inch)	670(26.3)
L4	mm(inch)	900(35.4)
L5	mm(inch)	704(27.7)
L6	mm(inch)	99(3.9)
L7	mm(inch)	82(3.2)

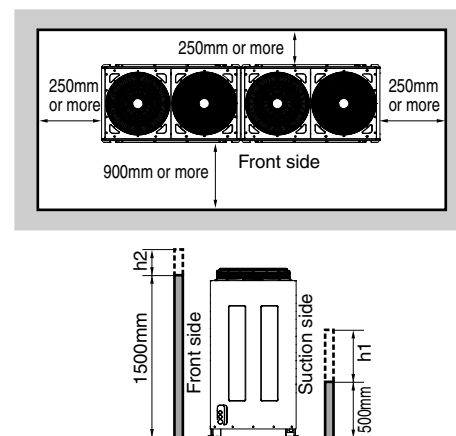
**2 Outdoor Units (16, 18, 20, 22, 24HP)**



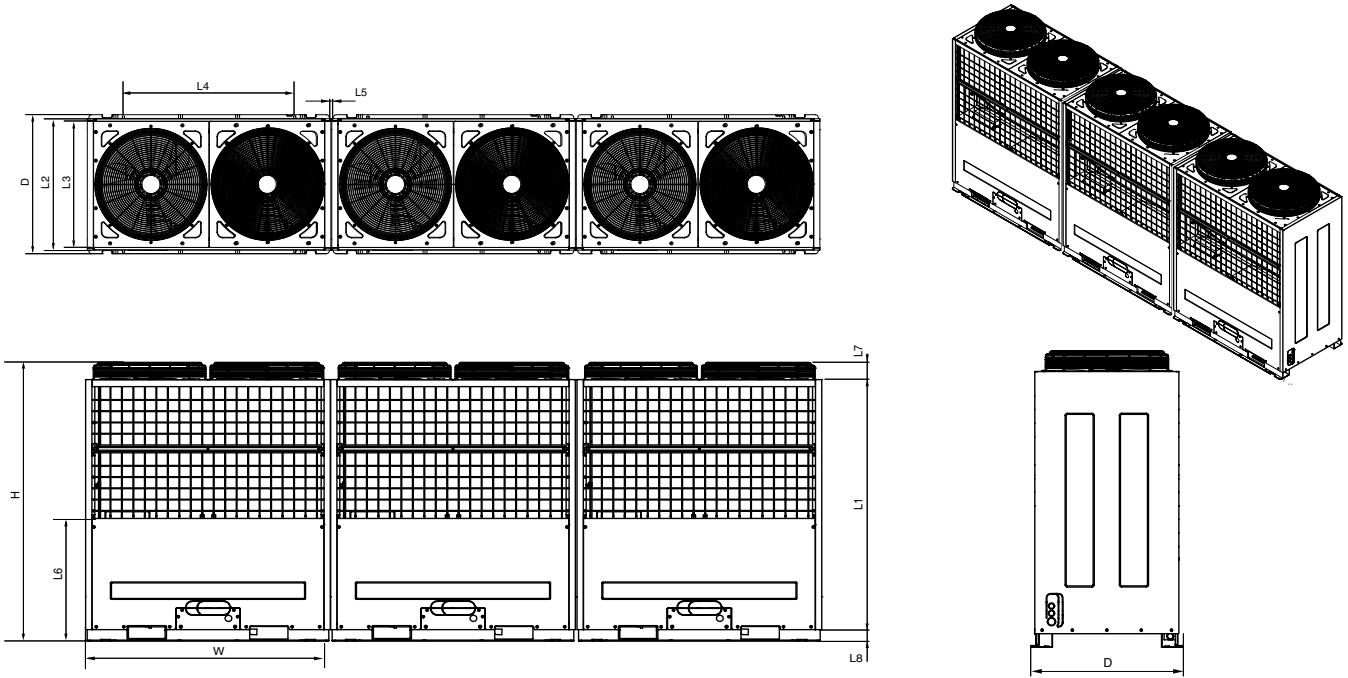
W	mm(inch)	1280(50.4)
H	mm(inch)	1607(63.3)
D	mm(inch)	730(28.7)
L1	mm(inch)	1427(56.1)
L2	mm(inch)	692(27.2)
L3	mm(inch)	670(26.3)
L4	mm(inch)	900(35.4)
L5	mm(inch)	10(0.4)
L6	mm(inch)	704(27.7)
L7	mm(inch)	99(3.9)
L8	mm(inch)	82(3.2)

**Notes:**

1. Height of walls in case of pattern1:  
Front side:1500mm, Suction side:500mm
2. If the above wall heights are exceeded, then h1/2 and h2/2 should be added to the front and suction side service spaces respectively as shown in the following figure.
3. When installing the units, the most appropriate pattern should be selected from those shown.  
In order to obtain the best fit in the space available, always bear in mind the need to leave enough room for a person to pass between units and wall and for the air to circulate freely. Your layout should be taken account the possibility of short circuits.
4. The Units should be installed to leave sufficient space in front for the on site refrigerant piping work to be carried out comfortably.



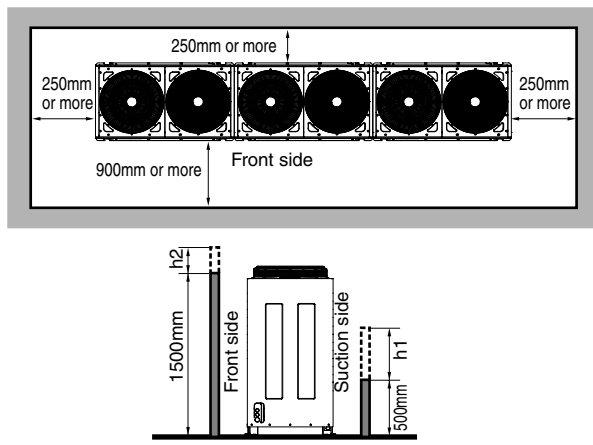
**3 Outdoor Units (26, 28, 30, 32, 34, 36, 38, 40HP)**



W	mm(inch)	1280(50.4)
H	mm(inch)	1607(63.3)
D	mm(inch)	730(28.7)
L1	mm(inch)	1427(56.1)
L2	mm(inch)	692(27.2)
L3	mm(inch)	670(26.3)
L4	mm(inch)	900(35.4)
L5	mm(inch)	10(0.4)
L6	mm(inch)	704(27.7)
L7	mm(inch)	99(3.9)
L8	mm(inch)	82(3.2)

**Notes:**

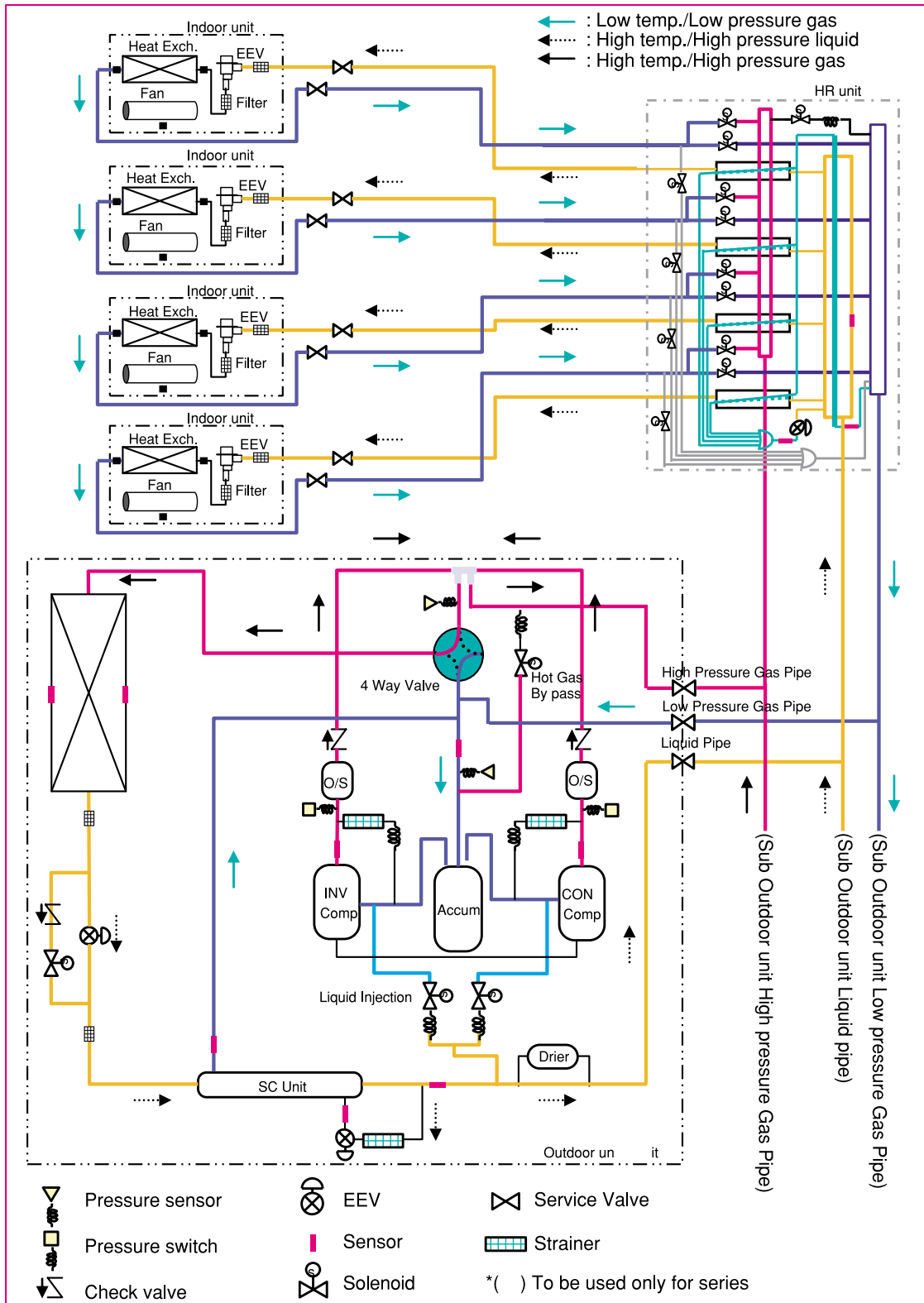
- Height of walls in case of pattern1:  
Front side:1500mm, Suction side:500mm
- If the above wall heights are exceeded, then h1/2 and h2/2 should be added to the front and suction side service spaces respectively as shown in the following figure.
- When installing the units, the most appropriate pattern should be selected from those shown.  
In order to obtain the best fit in the space available, always bear in mind the need to leave enough room for a person to pass between units and wall and for the air to circulate freely. Your layout should be taken account the possibility of short circuits.
- The Units should be installed to leave sufficient space in front for the on site refrigerant piping work to be carried out comfortably.



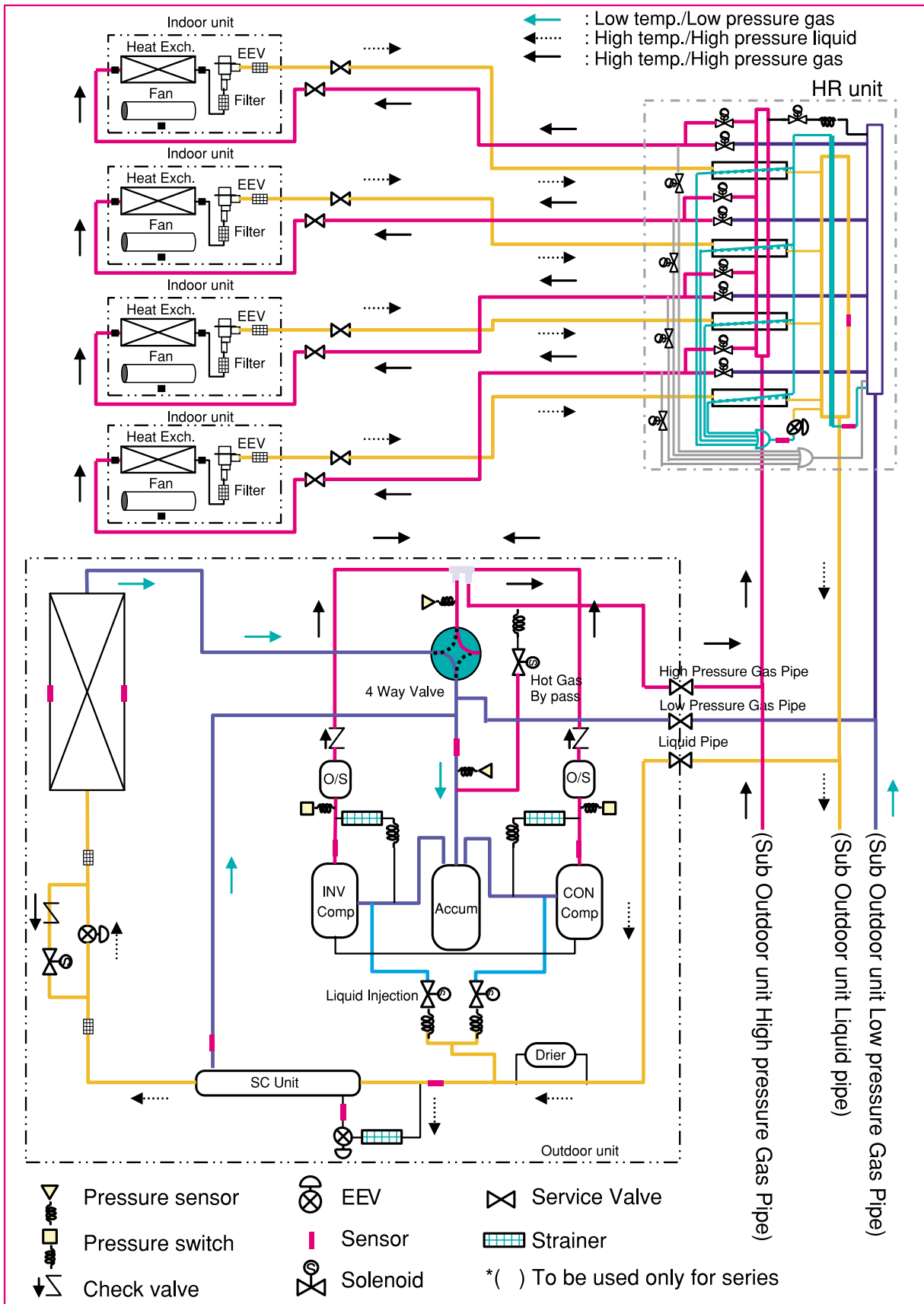
# 4. Piping Diagrams

## 4.1 Refrigerant Flow for Each Operation Mode

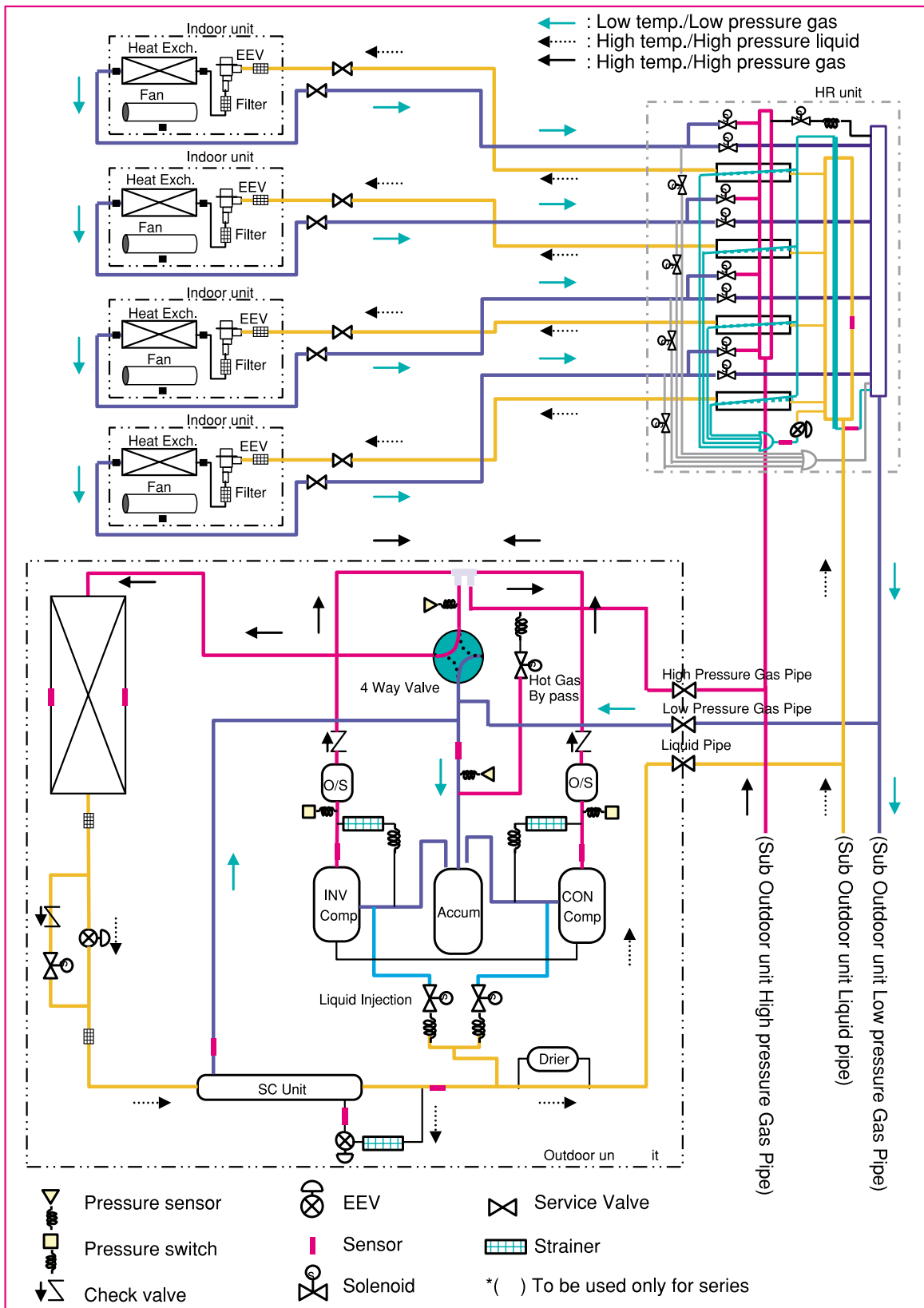
### 4.1.1 Cooling Operation



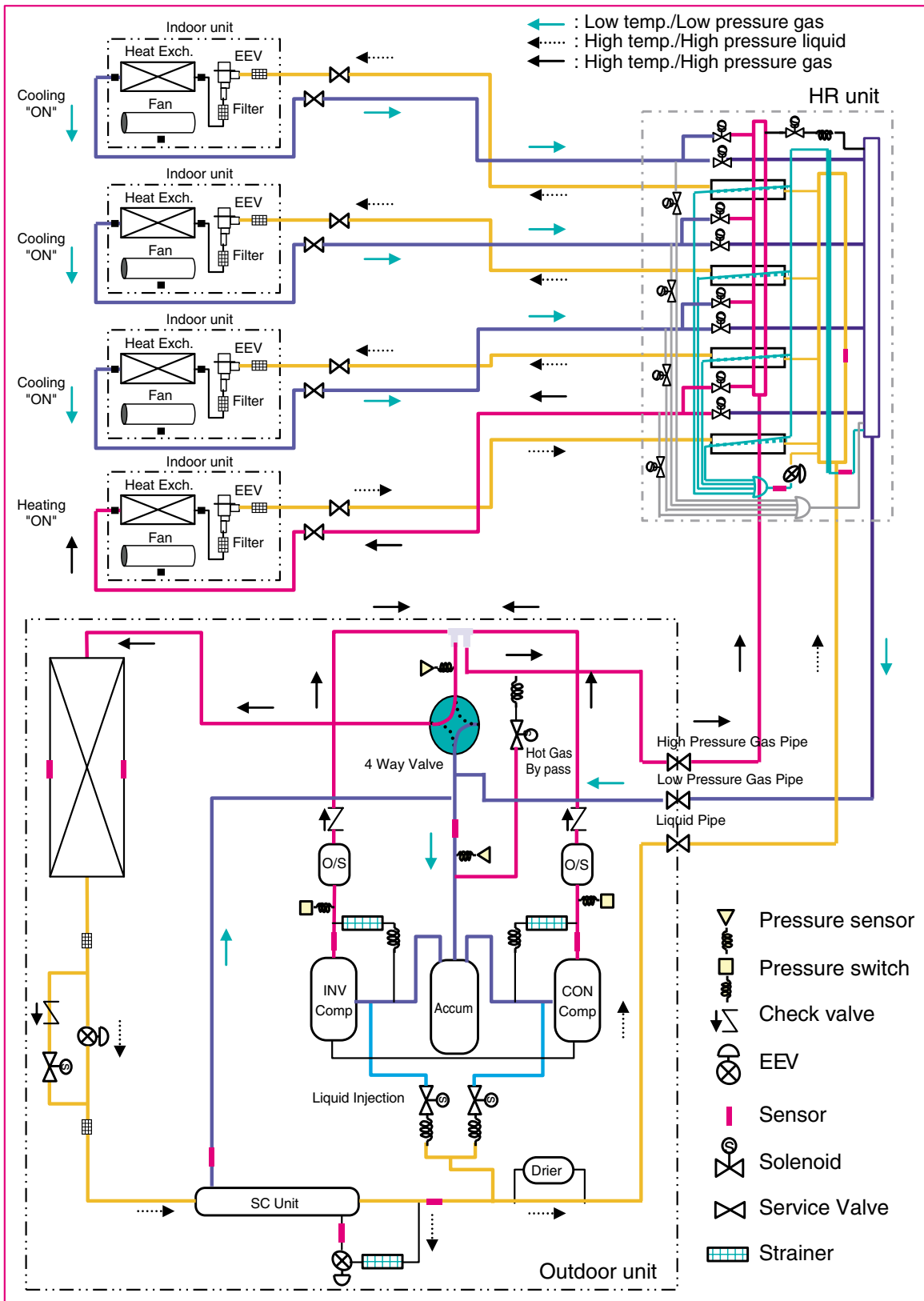
4.1.2 Heating Operation



### 4.1.3 Oil Return/Defrost Operation

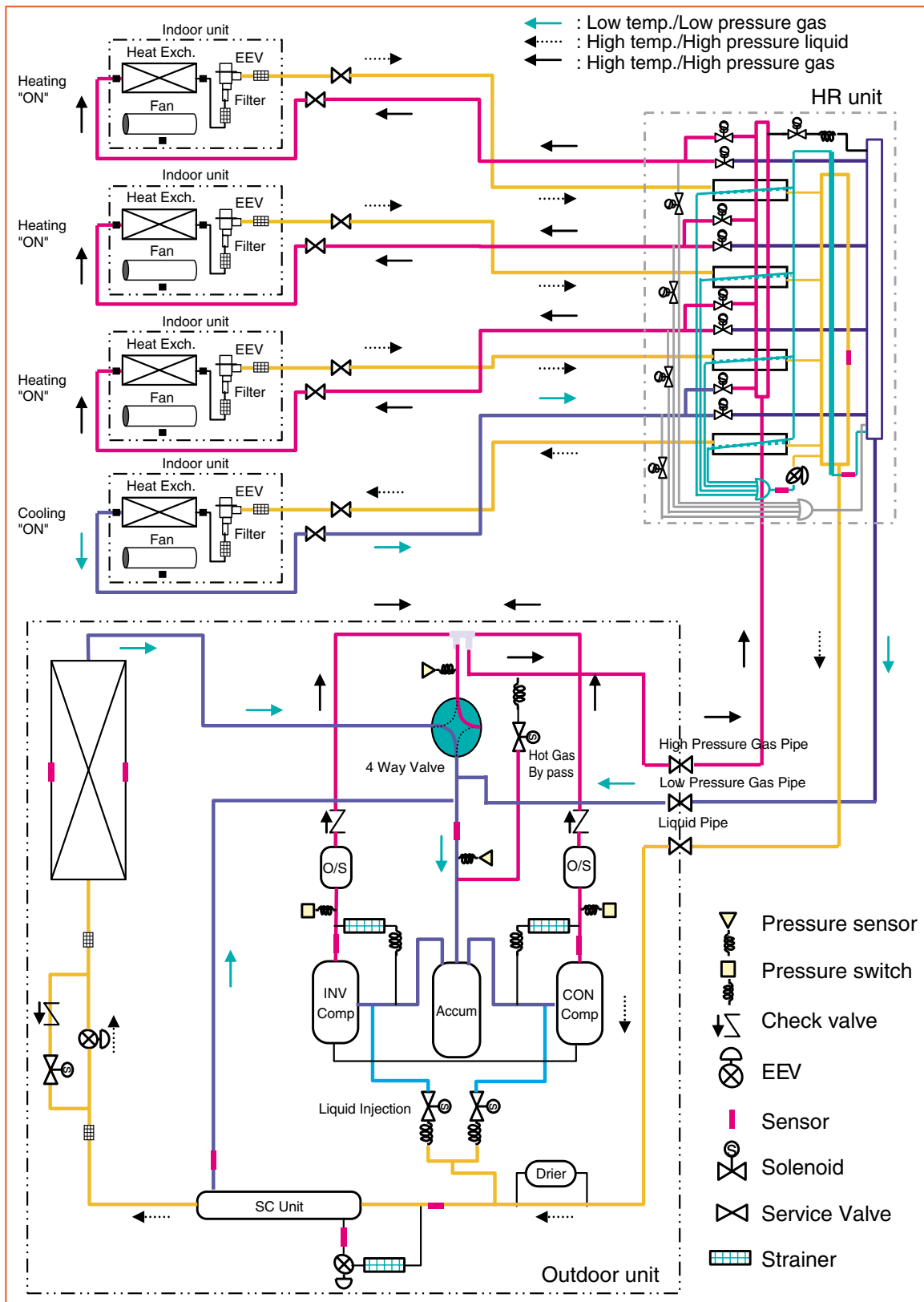


4.2.1 Simultaneous Operation Mode 1 (Cooling Oriented operation)



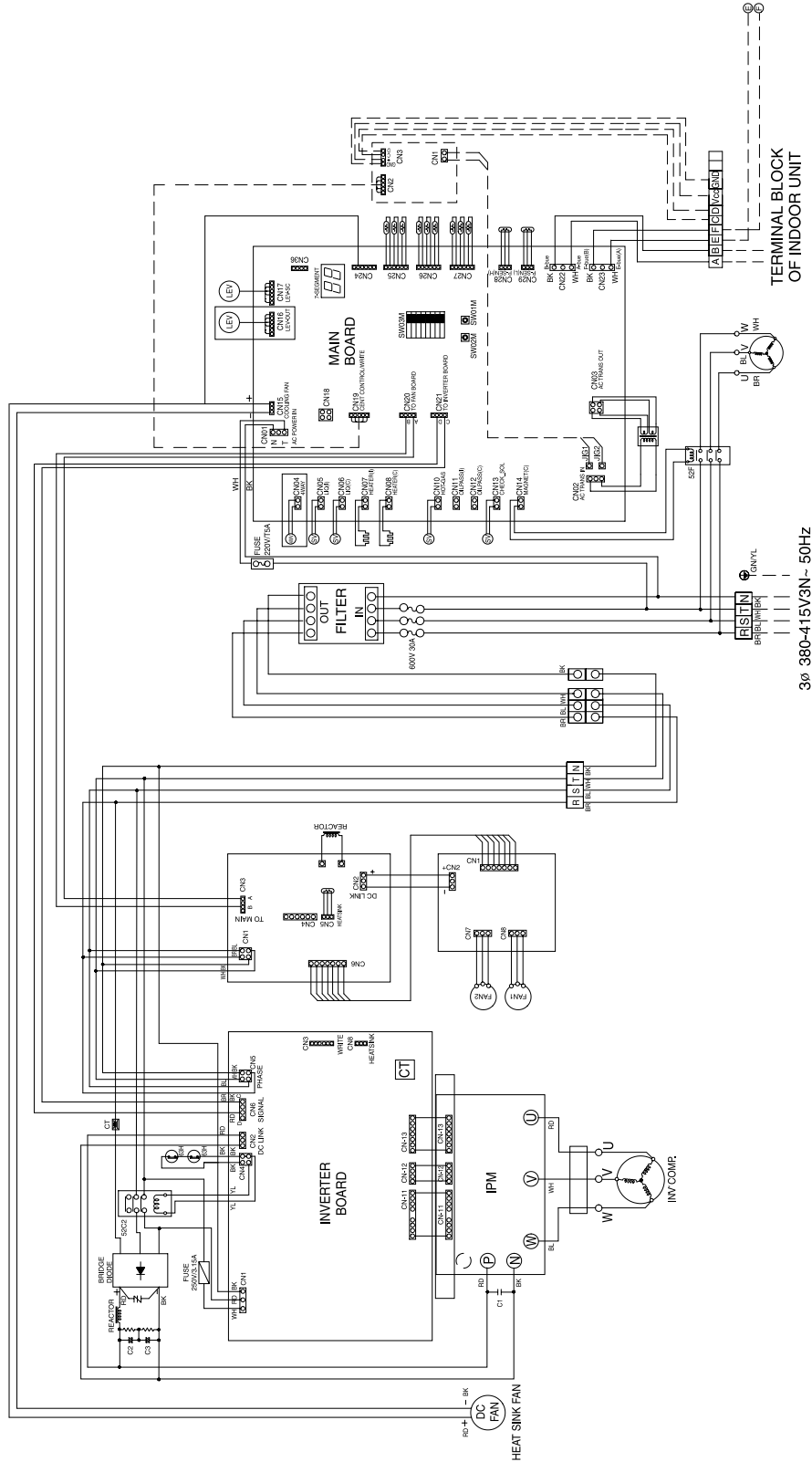


### 4.2.2 Simultaneous Operation Mode 2 (Heating Oriented operation)



# 5. Wiring Diagrams

## Main Outdoor Unit



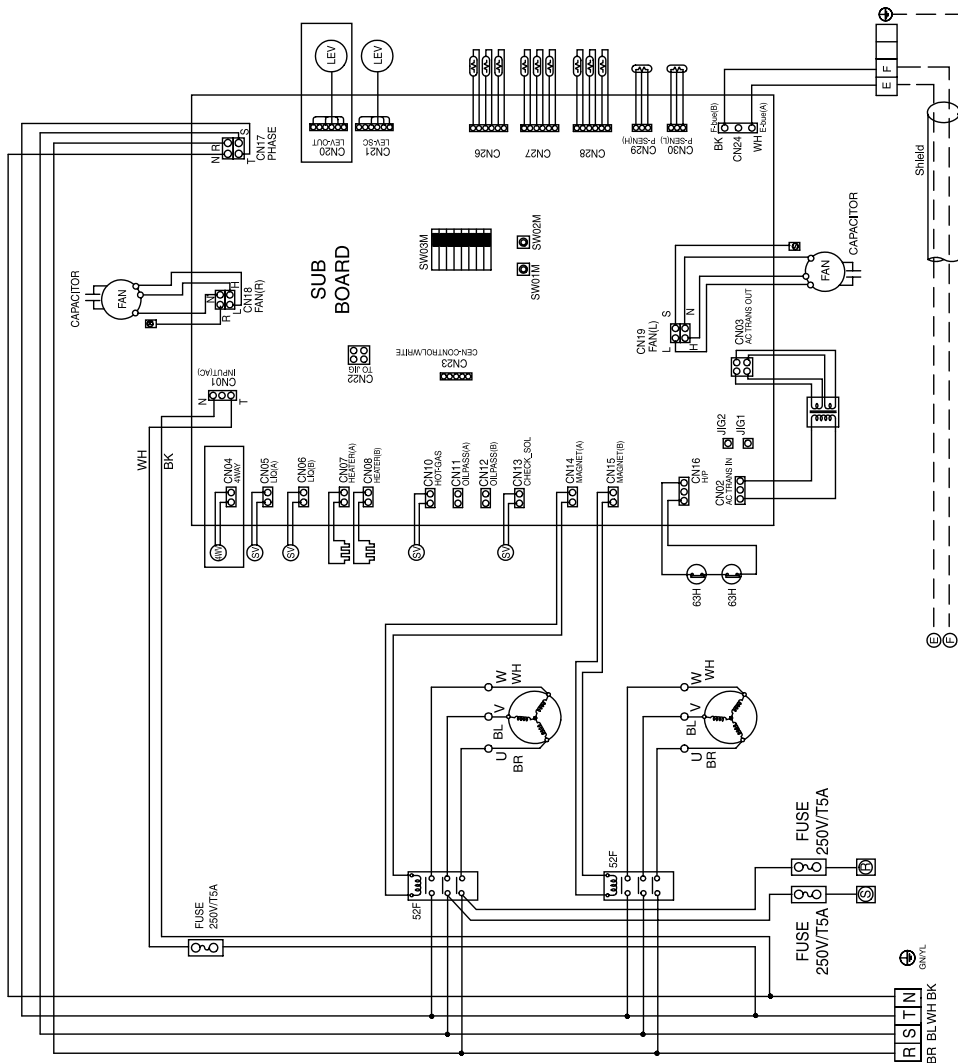
NOTE

RV	4WAY VALVE
63H	HPS/SW

EXCEPT COOLING ONLY MODEL

OPTION

**Sub Outdoor Unit**



EXCEPT COOLING ONLY MODEL  
 OPTION

## Inverter Board

CONNECTOR No.	SPEC	DESCRIPTION
CN1	POWER	AC POWER
CN2	DC-LINK	DC LINK VOLTAGE DETECT
CN3	WRITE	ON BOARD WRITING
CN4	H/P, M	HIGH PRESSURE MAGNETIC SWITCH
CN5	PHASE	3 PHASE DETECT
CN6	SIGNAL	TRANSMISSION WITH CONTROL BOARD
CN10, 11, 12	IPM	PWM SIGNAL
CN13	IPM	PWM CONTROL POWER

## Main Board

CONNECTOR No.	SPEC	DESCRIPTION
CN01	AC POWER IN	AC POWER
CN02	AC TRANS IN	AC POWER TO TRANS
CN03	AC TRANS OUT	AC POWER FROM TRANS
CN04	4WAY	4WAY REVERSING VALVE
CN05	LIQ(I)	INVERTER COMP LIQUID INJECTION VALVE
CN06	LIQ(C)	CONSTANT COMP LIQUID INJECTION VALVE
CN07	HEATER(I)	INVERTER COMP CRANK HEATER
CN08	HEATER(C)	CONSTANT COMP CRANK HEATER
CN10	HOT-GAS	HOT GAS BYPASS VALVE
CN11	OILPASS(I)	NO USE
CN12	OILPASS(C)	NO USE
CN13	CHECK_SOL/ACC	CHECK SOLENOID VALVE
CN14	MAGNET(C)	MAGNETIC SWITCH
CN15	COOLING FAN	HEATSINK FAN
CN16	EEV-OUT	ELECTRONIC EXPANSION VALVE(MAIN)
CN17	EEV-SC	ELECTRONIC EXPANSION VALVE(SUBCOOLING CIRCUIT)
CN18	TO-JIG	TRANSMISSION WITH JIG
CN19	CEN-CONTROL/WRITE	TRANSMISSION WITH CENTRAL CONTROLLER
CN20	TO FAN BOARD	TRANSMISSION WITH FAN BOARD
CN21	TO INVERTER BOARD	TRANSMISSION WITH INVERTER BOARD
CN22	TO INDOOR UNIT	TRANSMISSION WITH INDOOR UNIT
CN23	TO SUB OUTDOOR	TRANSMISSION WITH SUB OUTDOOR UNIT
CN25	OUT-AIR	OUTDOOR AIR THERMISTOR
	S_PIPE(I)	INVERTER COMP SUCTION PIPE THERMISTOR
	D_PIPE(C)	CONSTANT COMP DISCHARGE PIPE THERMISTOR
CN26	D_PIPE(I)	INVERTER COMP DISCHARGE PIPE THERMISTOR
	HEX_PIPE(C)	CONDENSOR PIPE THERMISTOR(C)
	HEX_PIPE(I)	CONDENSOR PIPE THERMISTOR(I)
CN27	SC-OUT	SUBCOOLING CIRCUIT OUTLET PIPE THERMISTOR
	SC-IN	SUBCOOLING CIRCUIT INLET PIPE THERMISTOR
	SC-L	SUBCOOLING CIRCUIT LIQUID PIPE THERMISTOR
CN28	P-SEN(H)	HIGH PRESSURE SENSOR
CN29	P-SEN(L)	LOW PRESSURE SENSOR
JIG 1	JIG	JIG POWER
JIG 2	JIG	JIG POWER
CN36	EEV-HOUT	ELECTRONIC EXPANSION VALVE(MAIN)
CN24	DRY CONTACT	OPERATING MODE LOCKING(COOL, HOT ,GENERAL)
CN34	DRY CONTACT	OPERATING MODE LOCKING(COOL, HOT ,GENERAL)

## Sub Board

CONNECTOR No.	SPEC	DESCRIPTION
CN01	AC POWER IN	AC POWER
CN02	AC TRANS IN	AC POWER TO TRANS
CN03	AC TRANS OUT	AC POWER FROM TRANS
CN04	4WAY	4WAY REVERSING VALVE
CN05	LIQ(A)	CONSTANT(A) COMP LIQUID INJECTION VALVE
CN06	LIQ(B)	CONSTANT(B) COMP LIQUID INJECTION VALVE
CN07	HEATER(A)	CONSTANT(A) COMP CRANK HEATER
CN08	HEATER(B)	CONSTANT(B) COMP CRANK HEATER
CN10	HOT-GAS	HOT GAS BYPASS VALVE
CN11	OILPASS(A)	NO USE
CN12	OILPASS(B)	NO USE
CN14	MAGNET(A)	CONSTANT(A) COMP MAGNETIC SWITCH
CN15	MAGNET(B)	CONSTANT(B) COMP MAGNETIC SWITCH
CN16	H/P	HIGH PRESSURE
CN17	PHASE	3 PHASE DETECT
CN18	FAN(R)	FAN MOTOR(RIGHT)
CN19	FAN(L)	FAN MOTOR(LEFT)
CN20	EEV-OUT	ELECTRONIC EXPANSION VALVE(MAIN)
CN21	EEV-SC	ELECTRONIC EXPANSION VALVE(SUBCOOLING CIRCUIT)
CN22	TO JIG	TRANSMISSION WITH JIG
CN23	CEN_CONTROL/WRITE	NO USE
CN24	TO MAIN OUTDOOR	TRANSMISSION WITH MAIN OUTDOOR UNIT
CN26	OUT-AIR	OUTDOOR AIR THERMISTOR
	S_PIPE(A)	CONSTANT(A) COMP SUCTION PIPE THERMISTOR
	D_PIPE(B)	CONSTANT(B) COMP DISCHARGE PIPE THERMISTOR
CN27	D_PIPE(A)	CONSTANT(A) COMP DISCHARGE PIPE THERMISTOR
	HEX_PIPE(A)	CONDENSOR PIPE THERMISTOR(A)
	HEX_PIPE(B)	CONDENSOR PIPE THERMISTOR(B)
CN28	SC-OUT	SUBCOOLING CIRCUIT OUTLET PIPE THERMISTOR
	SC-IN	SUBCOOLING CIRCUIT INLET PIPE THERMISTOR
	SC-L	SUBCOOLING CIRCUIT LIQUID PIPE THERMISTOR
CN29	P-SEN(H)	HIGH PRESSURE SENSOR
CN30	P-SEN(L)	LOW PRESSURE SENSOR
JIG1	JIG	JIG POWER
JIG2	JIG	JIG POWER

## 6. Functions

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# 1. Basic control

## 1.1 Normal operation

Actuator	Cooling only & cooling based heating	Heating only & heating based cooling	Stop state
Compressor	Fuzzy control	Fuzzy control	stop
Fan	Fuzzy control	Fuzzy control	stop
Main EEV	Full open	Fuzzy control	After 15min, min. pulse
4 way valve	Off	On	After 15min, Off
Subcooling EEV	Fuzzy control	Fuzzy control	After 15min, min. pulse

## 1.2 Compressor control

Fuzzy control : Maintain evaporating temperature(Te) to be constant on cooling mode and condensing temperature(Tc) on heating mode by Fuzzy control to ensure the stable system performance.  
(Tc:47 ~51°C, Te:2 ~ 5°C)

(1) Cooling mode

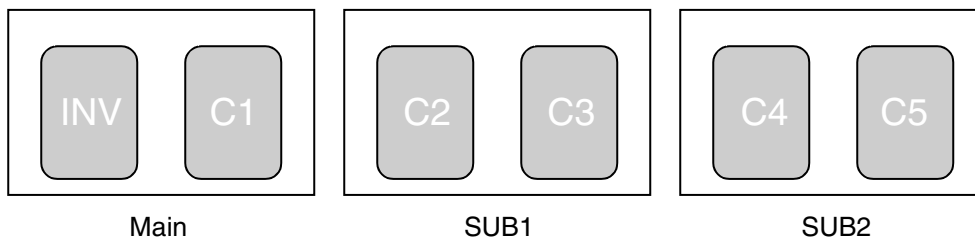
Te can be set by initial dip switch setting. (Normal mode, capacity up mode, and energy save mode)

(2) Heating mode

Tc can be set by initial dip switch setting. (Normal mode, capacity up mode, and energy save mode)

**Note:** By setting dip switch, Te and Tc are decided simultaneously.

(1) The sequence of compressor operation for 3 unit system



1) Stage increasing situation

- Inv → C3 → C5 → C2 → C4 → C1(full)
- Inv → C5 → C2 → C4 → C3 → C1(full)
- Inv → C2 → C4 → C3 → C5 → C1(full)
- Inv → C4 → C3 → C5 → C2 → C1(full)

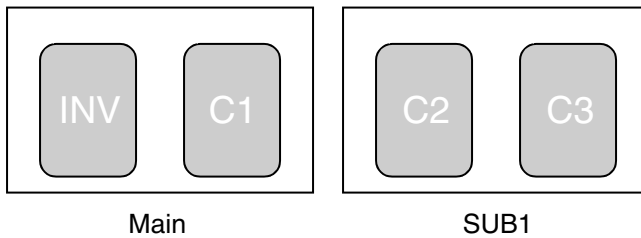
2) Stage decreasing situation

- Full → C1 → C3 → C5 → C2 → C4 → Inv
- Full → C1 → C5 → C2 → C4 → C3 → Inv
- Full → C1 → C2 → C4 → C3 → C5 → Inv
- Full → C1 → C4 → C3 → C5 → C2 → Inv

\*Stage means how many constant compressors operate

**Example)** Stage 2: 2 constant compressors operate  
Stage 1: 1 constant compressor operate

(2) The sequence of compressor operation for 2 unit system



1) Stage increasing situation

Inv → C2 → C1 → C3(full)

Inv → C3 → C1 → C2(full)

2) Stage decreasing situation

Full → C2 → C1 → C3

Full → C3 → C1 → C2

### 1.3 Main and sub unit's EEV control

(1) Main EEV control

Main EEV operates with fuzzy control rules to keep the degree of super Heat(Superheat) (about 3°C) at the evaporator outlet stable during heating mode

The degree of Superheat =  $T_{\text{suction}} - T_{\text{evaporation}}$

$T_{\text{suction}}$  : temperature at suction pipe sensor(°C)

$T_{\text{evaporation}}$  : evaporation temperature equivalent to low pressure(°C)

(2) Sub EEV control

Sub EEV operates according to the opening of main EEV, otherwise the opening range is limited by the open degree of the main EEV

- Limited conditions : liquid back control, discharge temperature control etc.

(3) Subcooling EEV control(about 15°C)

Subcooling EEV works with fuzzy rules to keep the degree of Subcool at the outlet of subcooler during cooling mode

The degree of Subcool =  $T_{\text{condensation}} - T_{\text{liquid}}$

$T_{\text{liquid}}$  : temperature at outlet of subcooler(°C)

$T_{\text{condensation}}$  : condensation temperature equivalent to high pressure(°C)



## 1.4 Fan control

The fan motors of the main unit are operated by the inverter drive with fuzzy control rules. Those of the sub units are all step motors. The operating status of the fan motors is shown below for each step.

## 1.5 Fan mode

Fan Step	Sub unit		Main unit
	Left fan	Right fan	Fan frequency
0	Stop	Stop	<5 Hz
1	Low	Stop	5Hz ≤ f < 10Hz
2	High	Stop	10 Hz ≤ f < 20Hz
3	Low	Low	20 Hz ≤ f < 30Hz
4	High	Low	30 Hz ≤ f < 40Hz
5	High	High	f ≥ 40Hz

The main unit has two inverter motors and both operate together .

- The sub unit has two tap motors and run in steps of stop , low and high .
- The tap motor functioning is decided as per the frequency of the inverter motors of the main unit.

## 2. Special control

### 2.1 Oil return control

#### 2.1.1 Oil return control on cooling mode

Component	Starting	Running	Ending
Inv. Comp.	0 Hz	Refer to Table1	40 Hz
Const. Comp.	All off	Refer to Table1	Off
Main EEV	Full open	Full open	Full open
SC EEV	Normal control	min	100 pls
Fan	Normal control	Normal control	Normal control
Reversing Valve	Off	Off	Off
Hot gas bypass	Normal control	Normal control	Normal control

Indoor unit	Starting	Running	Ending
Indoor EEV	Normal control	1200 pls	Normal control
Indoor Fan	Normal control	Off	Normal control
Signal	Off	On	Off

Table 1. Compressor combination during Oil return control

	Pressure limit		Normal	
	Before 70 s	After 70 s	Before 70 s	After 70 s
UW	50Hz	80Hz	60Hz	60Hz+ Const Comp1
UW+UW	45Hz	45Hz+ Const Comp1	60Hz+ Const Comp1	60Hz+ Const Comp2
UW+UW+UW	45Hz+ Const Comp1	45Hz+ Const Comp2	60Hz+ Const Comp2	60Hz+ Const Comp3

- Oil return operation time : 3 min for running step
- Starting condition:every 6 hours operate

## 2.1.2 Oil return control on heating mode

Component	Starting	Running	Ending
Inv. Comp.	0 Hz	Refer to Table2	40 Hz
Const. Comp.	All off	Refer to Table2	Off
Main EEV	Full open	Full open	Full open
SC EEV	Normal control	min	100 pls
Fan	Normal control	Normal control	Normal control
Reversing Valve	Off	Off	Off
Hot gas bypass	Normal control	Normal control	Normal control

Indoor unit	Starting	Running	Ending
Indoor EEV	Normal control	1200 pls	Normal control
Indoor Fan	Normal control	Off	Normal control
Signal	Off	On	Off

Table 2. Compressor combination during Oil return control

	Pressure limit		Normal	
	Before 70 s	After 70 s	Before 70 s	After 70 s
UW	50Hz	80Hz	60Hz	60Hz+ Const Comp1
UW+UW	Minimum Hz	45Hz+ Const Comp1	Minimum Hz	60Hz+ Const Comp2
UW+UW+UW	Minimum Hz + Const Comp1	45Hz+ Const Comp2	Minimum Hz + Const Comp2	60Hz+ Const Comp3

- Oil return operation time : 3 min for running step
- Min. frequency
  - temp. out > -5°C: 30Hz    temp. out ≤ -5°C: 40Hz
- Starting condition:same as cooling mode

### 2.1.3 Compressor stage during oil return control and defrost control

■ High pressure limit during defrost and oil return control on heating mode

Pressure range	Compressor combination
$P_d \geq 3546 \text{ kPa}$	Refer to combination table2 and table 3
$P_d < 3284 \text{ kPa}$	Refer to combination table2 and table 3

■ Low pressure limit during defrost and oil return control on heating mode

Pressure range	Compressor combination
$P_s \leq 229 \text{ kPa}$	Refer to combination table2 and table 3
$P_s \geq 242 \text{ kPa}$	Refer to combination table2 and table 3

■ High pressure limit during oil return control on cooling mode

Pressure range	Compressor combination
$P_d \geq 3546 \text{ kPa}$	Refer to combination table1
$P_d < 3284 \text{ kPa}$	Refer to combination table1

■ Low pressure limit during oil return control on cooling mode

Pressure range	Compressor combination
$P_s \leq 229 \text{ kPa}$	Refer to combination table1
$P_s \geq 242 \text{ kPa}$	Refer to combination table1

## 2.2 Defrost control

Starting condition

Starting defrost control if one case of bellowing 2 cases is satisfied

### 1) Partly defrost

When there is one or more bellowing cases of hex pipe temp. as each unit

- a) air temp.  $\geq 0^{\circ}\text{C}$  : hex pipe temp.  $< -7^{\circ}\text{C}$
- b)  $-5^{\circ}\text{C} < \text{air temp.} < 0^{\circ}\text{C}$  : hex pipe temp.  $< (\text{air temp.} - 8^{\circ}\text{C})$
- air temp.  $\leq -5^{\circ}\text{C} \leq$  : hex pipe temp.  $< (\text{air temp.} - 9^{\circ}\text{C})$

### 2) All defrost

When all hex pipe temp. is satisfied bellowing cases

- a) air temp.  $\geq 0^{\circ}\text{C}$  : hex pipe temp.  $< -10^{\circ}\text{C}$
- b) air temp.  $< 0^{\circ}\text{C}$  : hex pipe temp.  $< (\text{air temp.} - 11^{\circ}\text{C})$

Component	Starting	Running	Ending
Inv Compressor	Min. frequency	60 Hz	30 Hz
Sub unit compressor	All off	On	Off
Fan	0Hz	High pressure control	High pressure control
Main EEV	Full open	Full open	Base pulse
4 way valve	On $\rightarrow$ off	Off	On
Subcooling EEV	min.	min.	min.
Hot gas bypass valve	On	On	On

Indoor unit	Starting	Running	Ending
Fan	Off	Off	Off
Thermo on unit EEV	Oil return pulse	Oil return operation pulse	Return to base pulse
Thermo off unit EEV	Heating close pulse	Oil return operation pulse	Heating close pulse

## Functions

### ■ Ending condition

- 1) All Heat exchanger pipe temperature are above 15°C for 30 sec.
- 2) The running time of defrost operation is over 30% of the total heating time
- 3) If liquid injection begins.

Table3. Compressor combination during defrost control

	Pressure limit		Normal	
	Before 70 s	After 70 s	Before 70 s	After 70 s
UW	50Hz	80Hz	60Hz	60Hz+ Const Comp1
UW+UW	45Hz	45Hz+ Const Comp1	60Hz	60Hz+ Const Comp2
UW+UW+UW	45Hz+ Const Comp1	45Hz+ Const Comp2	60Hz+ Const Comp2	60Hz+ Const Comp3

## 2.3 Oil equalizing control

### 2.3.1 Oil equalizing control on cooling mode

Component	Starting	Running	Ending
Inv Compressor	Equalizing control	Equalizing control	Equalizing control
Sub unit compressor	Equalizing control	Equalizing control	Equalizing control
Fan	High pressure control	High pressure control	High pressure control
Main EEV	Full open	Full open	Full open
4 way valve	Off	Off	Off
Subcooling EEV	Subcooling control	Subcooling control	Subcooling control
Hot gas bypass valve	Off	Off	Off

Indoor unit	Starting	Running	Ending
Fan	Normal	Normal	Normal
Thermo on unit EEV	Normal	Normal	Normal
Thermo off unit EEV	min. pulse	min. pulse	min. pulse

### ■ Ending condition

- 1) About 4min after control begins

### ■ Starting condition:every 2hours operation with constant compressors.

### 2.3.2 Oil equalizing control on heating mode

Component	Starting	Running	Ending
Inv Compressor	Equalizing control	Equalizing control	Equalizing control
Sub unit compressor	Equalizing control	Equalizing control	Equalizing control
Fan	Low pressure control	Low pressure control	Low pressure control
Main EEV	Depending on the indoor pipe temp. condition		
4 way valve	On	On	On
Subcooling EEV	min. pulse	min. pulse	min. pulse
Hot gas bypass valve	Off	Off	Off

Indoor unit	Starting	Running	Ending
Fan	Normal	Normal	Normal
Thermo on unit EEV	Normal	Normal	Normal
Thermo off unit EEV	min. pulse	min. pulse	min. pulse

■ Ending condition

1) About 4min after control begins

■ Starting condition:same as cooling mode

### 2.3.3 Equalizing operation of compressors' oil

- The equalizing operation of a sub unit which no compressor operates is not performed.
- The equalizing operation of a sub unit which one compressor operates.
  - 1) The operating compressor runs for 2 min. and stop.
  - 2) The other compressor runs for 2 min.
  - 3) After the equalizing operation, the primarily operating compressor runs.
- The equalizing operation of a sub unit which two compressors operate.
  - 1) One compressor stops at the beginning of equalizing operation of compressors oil by decrease of one stage. The compressor which stops is decided by the stage table.
  - 2) The operating compressor runs for 2 min.
  - 3) The operating compressor stops after 2 min.
  - 4) The other compressor runs for 2 min.
  - 5) After 2 min., two compressors run by increase of one stage.
- Equalizing control about inverter compressor.
  - 1) Inverter compressor keeps Min. frequency for 2 min.
  - 2) Frequency increases 80Hz about 2 min.
  - 3) Thereafter, Inverter compressor decreases to 40Hz.
- The change condition of equalizing operation.

If high pressure rises up to the high pressure limit condition.  
Alternative equalizing operation begins.
- ※ Alternate equalizing operation runs only one compressor in turn for 2 min.
- The skip conditions of oil equalizing operation.

liquid injection on  
Abnormal high pressure



## 2.4 Stopping operation

### 2.4.1 Stopping operation on cooling mode

Component	Operation	Note
Inv Compressor	0Hz	-
Sub unit compressor	Off	-
Fan	0Hz	-
Main EEV	Full open	After 15 min from stop, min.
4 way valve	Off	Off
Subcooling EEV	Full open	After 15 min from stop, min.
Hot gas bypass	On	After 15 min from stop, Off

### 2.4.2 Stopping operation on heating mode

Component	Operation	Note
Inv Compressor	0Hz	-
Sub unit compressor	Off	-
Fan	0Hz	-
Main EEV	Full open	After 15 min from stop, min.
4 way valve	On	After 15 min from stop, off
Subcooling EEV	Full open	After 15 min from stop, min.
Hot gas bypass	On	After 15 min from stop, Off

### 2.4.3 Stopping operation of sub units when only main unit operates

Component	Operation	Note
Sub unit compressor	Off	
Fan	Depends on main unit fan frequency	
Main EEV	Full open(cooling) SH control(heating)	
4 way valve	Same state to main unit	
Hot gas bypass	Normally Off	
Subcooling EEV	Subcooling control(cooling) min. pulse(heating)	

### 3. Protection control

#### 3.1 Pressure protection control

##### 3.1.1 Pressure control on cooling mode

###### ■ High pressure control

Pressure Range	Compressor	Fan	Hot gas
$P_d \geq 3807 \text{ kPa}$	Stop	Stop	-
$P_d > 3676 \text{ kPa}$	-5Hz/2sec.	+10Hz/2sec.	
$P_d \geq 3448 \text{ kPa}$	Frequency holding	Normal control	
$P_d < 3284 \text{ kPa}$	Normal control		Off

###### ■ Low pressure control

Pressure Range	Compressor	Fan	Hot gas
$P_s \leq 229 \text{ kPa}$ after 1min	Stop	Stop	On
$P_s \leq 229 \text{ kPa}$ before 1min	-5 Hz/2sec.	-10Hz/2sec.	
$P_s \leq 242 \text{ kPa}$	Normal control	Frequency holding	
$P_s \geq 399 \text{ kPa}$	Normal control		Off

### 3.1.2 Pressure control on heating mode

#### ■ High pressure control

Pressure Range	Compressor	Fan	Hot gas
$P_d \geq 3807 \text{ kPa}$	Stop	Stop	On
$P_d \geq 3676 \text{ kPa}$	-5Hz/2sec.	-5Hz/2sec.	
$P_d \leq 3448 \text{ kPa}$	Normal control	Frequency holding	
$P_d \leq \text{Target press}$	Normal control		Off

#### ■ Low pressure control

Pressure Range	Compressor	Fan	Hot gas
$P_s \leq 229 \text{ kPa}$ after 1min	Stop	Stop	On
$P_s \leq 229 \text{ kPa}$ before 1min	-5 Hz/2sec.	+10Hz/2sec.	
$P_s \leq 242 \text{ kPa}$	Frequency holding	Normal control	
$P_s \leq 268 \text{ kPa}$	Normal control		Off
$P_s \geq 307 \text{ kPa}$			

### 3.2 Discharge temperature control

#### ■ Outdoor unit control

Temperature range	Compressor	Liquid injection	Subcooling EEV
$T_{dis} > 115^{\circ}\text{C}$	System stop		
$105^{\circ}\text{C} < T_{dis} \leq 112^{\circ}\text{C}$	Frequency down + const. Comp off	On	Max. limit 350 pulse
$98^{\circ}\text{C} < T_{dis} \leq 103^{\circ}\text{C}$	Liquid injection on No frequency up	Keep state	If liquid is on, Max. limit 350 pulse
$T_{dis} \leq 98^{\circ}\text{C}$	Pressure control	Off	Max. limit 150 pulse
$T_{dis} > 95^{\circ}\text{C}$	Pressure control	Off	10 pulse open /10sec

#### ■ Indoor unit control

Temperature range	EEV
$T_{dis} > 115^{\circ}\text{C}$	System stop
$103^{\circ}\text{C} < T_{dis} \leq 115^{\circ}\text{C}$	Emergency SH control
$98^{\circ}\text{C} < T_{dis} \leq 103^{\circ}\text{C}$	Keep current control
$T_{dis} \leq 98^{\circ}\text{C}$	SH control

### 3.3 Inverter protection control

item	control
Current > 20A	System stop
Current < 20A	Inv compressor 5Hz down/10 sec
Current > 18A	Inv. compressor no frequency up
Current < 18A	Inv. Compressor normal control
DC Peak	System stop
High pressure switch	System stop
Low voltage	System stop

### 3.4 Liquid back control

■ Main unit on cooling mode

Discharge temperature	Indoor unit's EEV
$T_{dis} < T_c + 12^{\circ}\text{C}$	SH increasing control
$T_{dis} > T_c + 16^{\circ}\text{C}$	Normal SH control

■ Sub unit on cooling mode

Discharge temperature	Indoor unit's EEV
$T_{dis} < T_c + 12^{\circ}\text{C}$	SH increasing control
$T_{dis} > T_c + 16^{\circ}\text{C}$	Normal SH control

■ Main unit on heating mode

Discharge temperature	Outdoor unit's EEV
$T_{dis} < T_c + 17^{\circ}\text{C}$	SH increasing control
$T_{dis} > T_c + 18^{\circ}\text{C}$	Normal SH control

■ Sub unit on heating mode

Discharge temperature	Indoor unit's EEV
$T_{dis} < T_c + 17^{\circ}\text{C}$	Normal operation
$T_{dis} > T_c + 18^{\circ}\text{C}$	Normal operation

\* The logic starts after 9 min. on heating mode and 4 min. on cooling mode from the compressor running.

### 3.5 Phase detection

#### ■ Main unit

- Inverter PCB has phase fault detection circuit. If a phase is missed or phases are reversed, error LED(red) flickers once per second when power is on.

#### ■ Sub unit

- Sub PCB has phase fault detection circuit. If a phase is missed or phases are reversed, phase fault error occurs and LED 6 is on.

\* Phase fault detection is enable only for 5 sec after power is on.

### 3.6 Pressure switch

#### ■ Sub unit

- Sub PCB has pressure sensing switch in series between compressor and power relay.

- The state of pressure sensing switch is normally on. It has small electric current from 220V AC. Never touch the connecting terminal with hand nor short two wires directly.

## 4. Other control

### 4.1 Initial setup

There are 4 initial setup steps before running.  
All DIP switch setting must be completed before initial setup.

1) Step 1 : factory setting value display

■ **Main unit**









Factory setting value is displayed in 7 segment on PCB for 24sec.  
All dip switches must be set properly before step 1.





Power is on	
Main model code is displayed (3sec)	
sub1 model code is displayed (3sec)	(sub 1)
sub2 model code is displayed (3sec)	(sub 2)
Total capacity including sub units is displayed (2sec)	(main+sub1,2)
Heat pump : Display 2 is default value Cooling only : no display	(normal)
Factory setting(25 is normal)	(normal)
Refrigerant display	

















■ Sub unit

- Factory setting value is displayed by LED's for 3sec
- All dip switches must be set as sub 1, 2 (refer to DIP switch setting)
- LED display disappears after 10 sec.
- LED's

led2				
led1				
	8 HP	10 HP	12 HP	14 HP

led4		-		-
led3		-		-
	C/O	-	H/P	-

led6				-
led5				-
	-	Sub1	Sub2	-

led8				
led7				
	normal	Comp. 2 on	Comp. 1 on	-

## Functions

---

### 2) Step 2 : Communication check

- If all model code is displayed in 7 segment including all sub unit, communication between outdoor units is normal.
- LED5 of sub unit PCB blinks when the sub unit transfers information to the main unit.
- If LED5 doesn't blink periodically, check communication wires or dip switch setting.

### 3) Step 3 : PCB error check

- After 40 sec, error check begins.

#### ■ Main unit

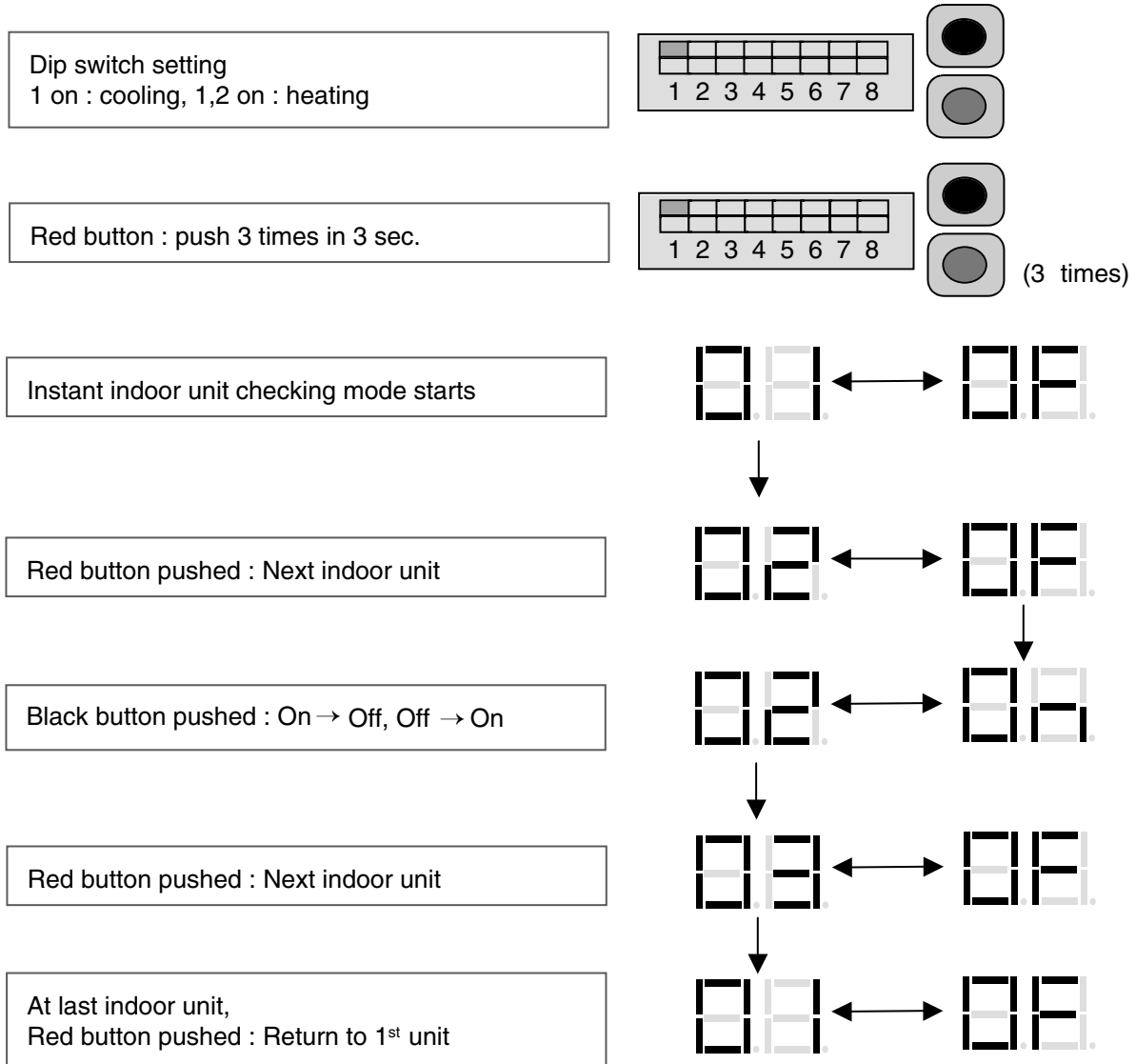
- All errors of units including sub units are displayed in 7 segment.
- If communication with the inverter fan PCB and that with the inverter compressor PCB are normal, 2 LED's on the main PCB are blink.  
LED01k represents the communication state with the inverter compressor PCB.  
LED02k represents the communication state with the inverter fan PCB.

#### ■ Sub unit

- After 40 sec, LED1 blinks once per second.
- If electric phase is reversed or missed, LED6 is on.
- Other LED' except LED1 must be off in initial setup steps.

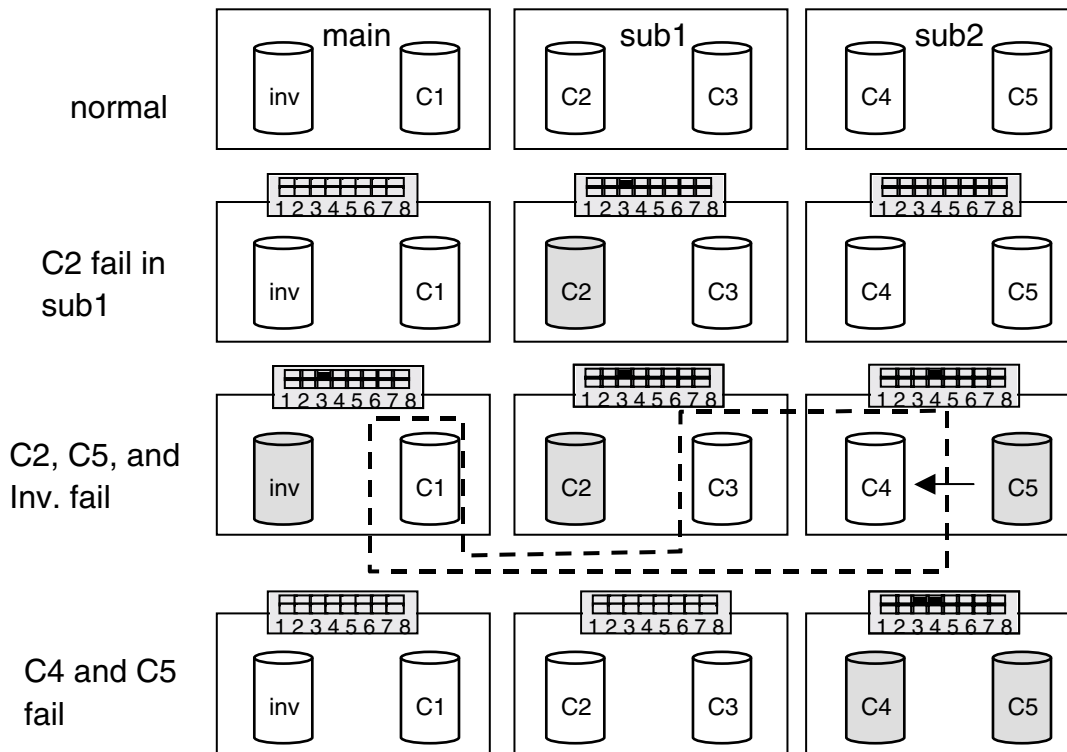
## 4.2 Instant indoor unit checking mode

- Indoor units can be turned on/off by outdoor unit without central controller or central control address setting with this function.
- All indoor units will be turned off and be wait for 3 min. at the beginning.
- All indoor units can be run on only one mode, cooling or heating by dip switch setting.
- In instant indoor unit checking mode, the indoor unit cannot be controlled by the wired remote controller and there is no display in indoor unit's remote controller. If the indoor unit is turned on/off by the remote controller, it has no effect on the unit.



### 4.3 Emergency operation

- If a compressor is out of order, the system can be run except the defective compressor by backup function.
- There are two backup modes. One is the backup of constant speed compressor, and the other is the backup of inverter compressor.
- In inverter compressor backup mode, there is a restriction on the capacity of the running indoor units. In case of inverter failure, backup operation is possible when 110kBTu/hr. or more indoor units are ON.
- On the case of single outdoor unit, the required indoor operating capacity is 70kBTu/hr.
- Under the limit capacity in inverter backup mode, outdoor unit will not be run even indoor units are still running.



# Part 4

## HR Units

# HR Units

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<b>4. Piping Diagrams .....</b>	<b>218</b>
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# 1. Specifications

## HR Unit

Model		PRHR020	PRHR030	PRHR040	
Max. Connectable No. of Indoor Units		2	3	4	
Nominal Input	Cooling	26	40	40	
	Heating	26	40	40	
Net. Weight	kg	19	20	21	
	lbs	44.1	48.5	52.9	
Dimensions (W*H*D)	Inch	31.5*8.6*24.3	31.5*8.6*24.3	31.5*8.6*24.3	
	Mm	801*218*617	801*218*617	801*218*617	
Casing		Galvanized steel plate			
Connecting Pipes	Indoor	Liquid Pipe [mm/inch]	Ø9.52[3/8]		
		Gas Pipe [mm/inch]	Ø15.88[5/8]		
	Outdoor	Liquid [mm/inch]	Ø9.52[3/8]	Ø12.7[1/2]	Ø12.7[7/8]
		Low Pressure [mm/inch]	Ø22.2[7/8]	Ø28.58[1 1/8]	Ø28.58[1 1/8]
		High Pressure [mm/inch]	Ø19.05[3/4]	Ø22.2[7/8]	Ø22.2[7/8]
Sound Absorbing Insulation Material		Flame and resistant foamed polyethylene			
Current	Minimum circuit Amps(MCA)	0.2			
	Maximum fuse Amps(MFA)	15			
Power Supply		1Ø, 220~240V, 50Hz			

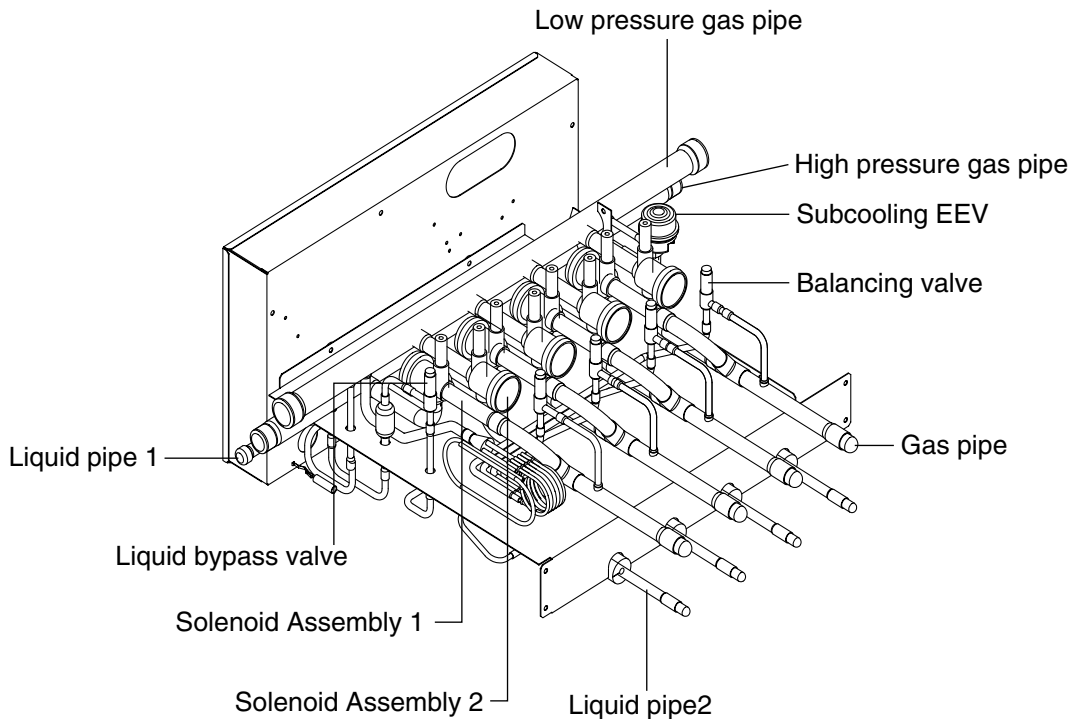
### Notes:

1. Voltage range : Units are suitable for use on electrical systems where voltage supplied to units terminals is not below or above listed range limits.
2. Maximum allowable voltage unbalance between phases is 2%
3. MCA/MFA  $MCA = 1.25 * FLA$   
 $MFA \leq 4 * FLA$   
(Next lower standard fuse rating. Min. 15A)
4. Select wire size based on the MCA
5. Instead of fuse, use circuit.

## 2. Parts Functions

### 2.1 Parts Functions

Parts Name	Symbol	Major Function
Low pressure gas pipe	LPGV	Pipe for Low pressure gas
High pressure gas pipe	HPGV	Pipe for High pressure gas
Liquid pipe 1	LP1	Liquid pipe connected with outdoor unit
Liquid bypass valve	LBV	Prevent Liquid charging
Solenoid Assembly 1, 2	SOL1, 2	Control the path for heating or cooling
Liquid pipe 2	LP2	Liquid pipe connected with indoor unit
Gas pipe	GSP	Gas pipe connected with indoor unit
Balancing valve	BLV	Control the pressure between High and Low pressure pipe during operation switching
Subcooling EEV	SCEEV	Control the subcooling

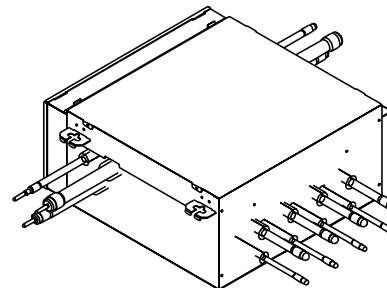
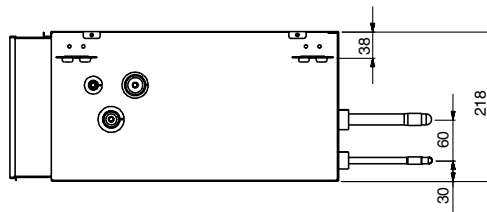
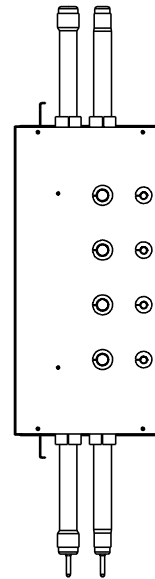
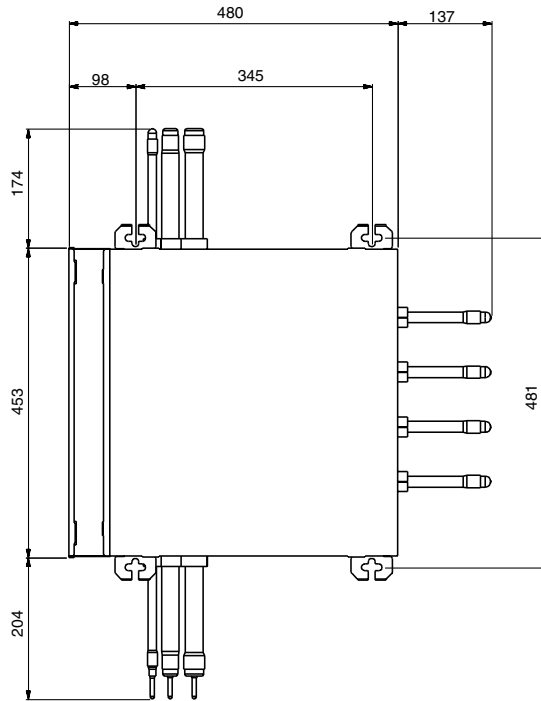




# 3. Dimensions

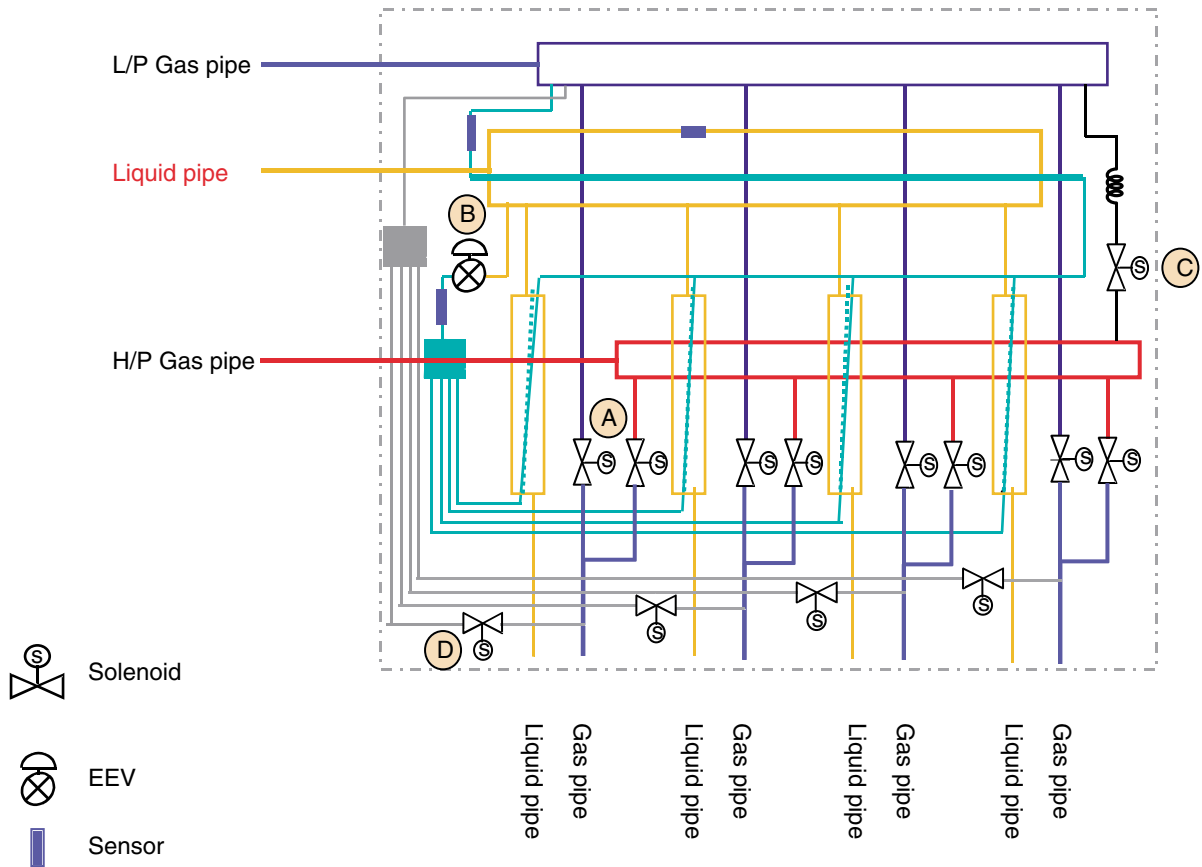
## 3.1 HR Units

PRHR020  
PRHR030  
PRHR040



# 4. Piping Diagrams

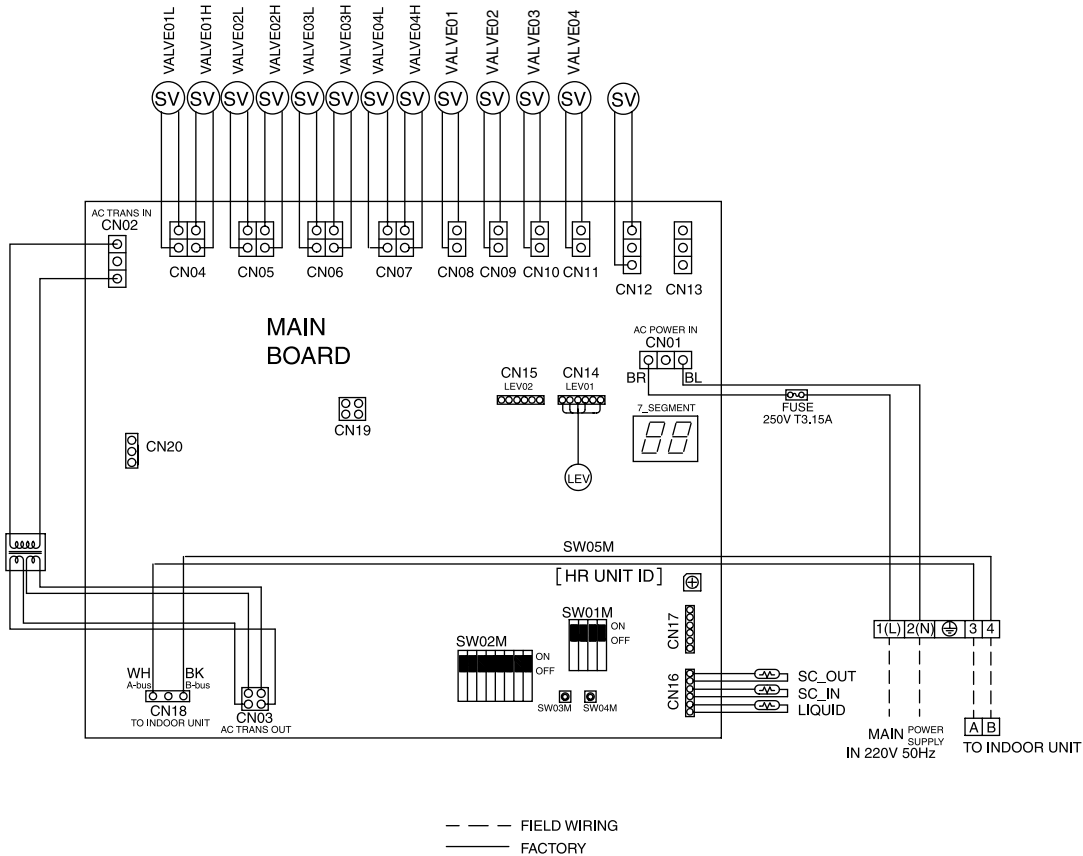
## 4.1 HR Unit



- Ⓐ : To be switched operation between cooling and heating by two Sol. Valves
- Ⓑ : To be used decreasing noise according to sub-cooling of inlet and outlet of indoor unit (Simultaneous operation)
- Ⓒ : To prevent liquid charging between H/P gas valve and HR unit at cooling mode
- Ⓓ : To be controlled the pressure between High and Low pressure pipe during operation switching

# 5. Wiring Diagrams

## 5.1 HR Units



CN04	Solenoid Valve 01L/H(For Room1)
CN05	Solenoid Valve 02L/H(For Room2)
CN06	Solenoid Valve 03L/H(For Room3)
CN07	Solenoid Valve 04L/H(For Room4)
CN08	Solenoid Valve 01 (Bypass for Room1)
CN09	Solenoid Valve 02 (Bypass for Room2)
CN10	Solenoid Valve 03 (Bypass for Room3)
CN11	Solenoid Valve 04 (Bypass for Room4)
CN12	Solenoid Valve Bypass
CN14	Sub Cooling EEV
CN16(SC Out)	Sensor, Sub Cooling Out
CN16(SC In)	Sensor, Sub Cooling in
CN18(Liquid)	Sensor, Liquid Receiver
SW01M	Solenoid Valve Number Setting(When Manual address)
SW02M(1)	Selecting, Auto Address( ↓ ) or manual Address( ↑ )
SW02M(2~3)	Setting, Total Number of Indoor connected
SW03M	Setting, the Address of indoor_10(When manual Address)
SW04M	Setting, the Address of indoor_1(When Manual Address)
SW05M	Setting, HR Unit Number

## 6. Functions

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2.1 Oil return/defrost control .....	224
2.2 Liquid bypass control .....	224
2.3 Subcooling EEV control .....	224

## 1. Basic control

### 1.1 Normal operation

Actuator	Power on	Cooling operation	Heating operation	Stop state
H/P gas valve	Close	Close	Open	Keep
L/P gas valve	After 30 sec. Open	Open	Close	Keep
Liquid valve	Close	Open	Close	Close

### 1.2 Starting control(Heating mode only)

If the system is operated in the heating mode, all high pressure gas valves are opened

### 1.3 Valve control

Mode change timer is calculated as Table 1, and valves are controlled by Mode change timer according to Table 2.

Table 1. Mode change timer calculation

Previous mode	Changing Mode	Mode change timer
Stop or Ventilation	Cooling or Heating	120 s
Cooling mode	Heating	180 s
Heating mode	Cooling	120 s
Cooling or Heating	Stop or Ventilation	Keep

Table 2. Valve control by Mode change timer

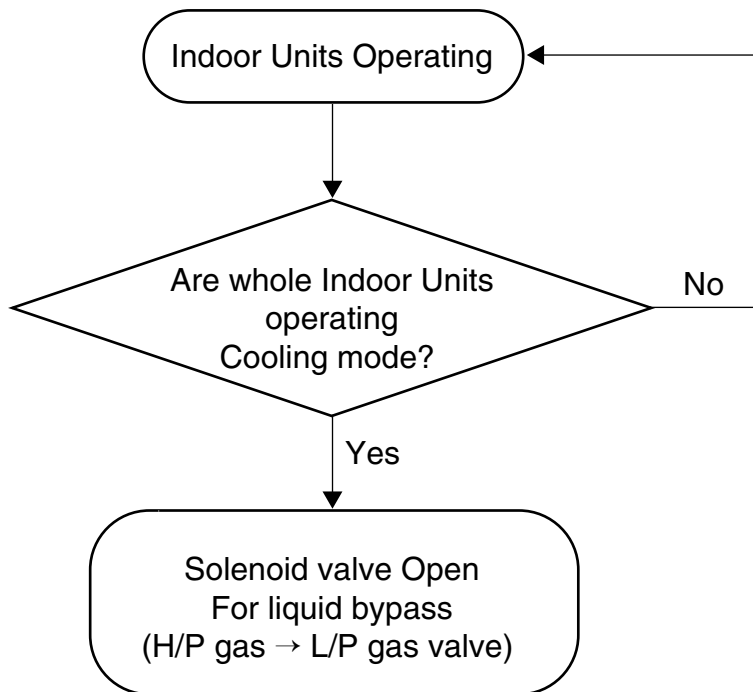
Operating mode	Mode change timer	H/P gas Valve	L/P gas Valve	Balancing Valve
Cooling	$120 \leq \text{timer}$	Keep	Keep	Close
	$0 < \text{timer} < 120$	Close	Close	Open
	timer = 0	Close	Open	Close
Heating	$180 \leq \text{timer}$	Keep	Keep	Close
	$0 < \text{timer} < 180$	Close	Close	Close
	timer = 0	Open	Close	Close
Stop or Ventilation	-	Keep	Keep	Close

## 2. Special control

### 2.1 Oil return/defrost control

Component	Starting	Running	Ending
Inv. Compressor	Stop	60 Hz	40 Hz
H/P gas valve	Keep	Close	Open or Close
L/P gas valve	Keep	Open	Open or Close
Balancing valve	Open for 30s	Close	Close

### 2.2 Liquid bypass control



### 2.3 Subcooling EEV control

Target : about 15°C

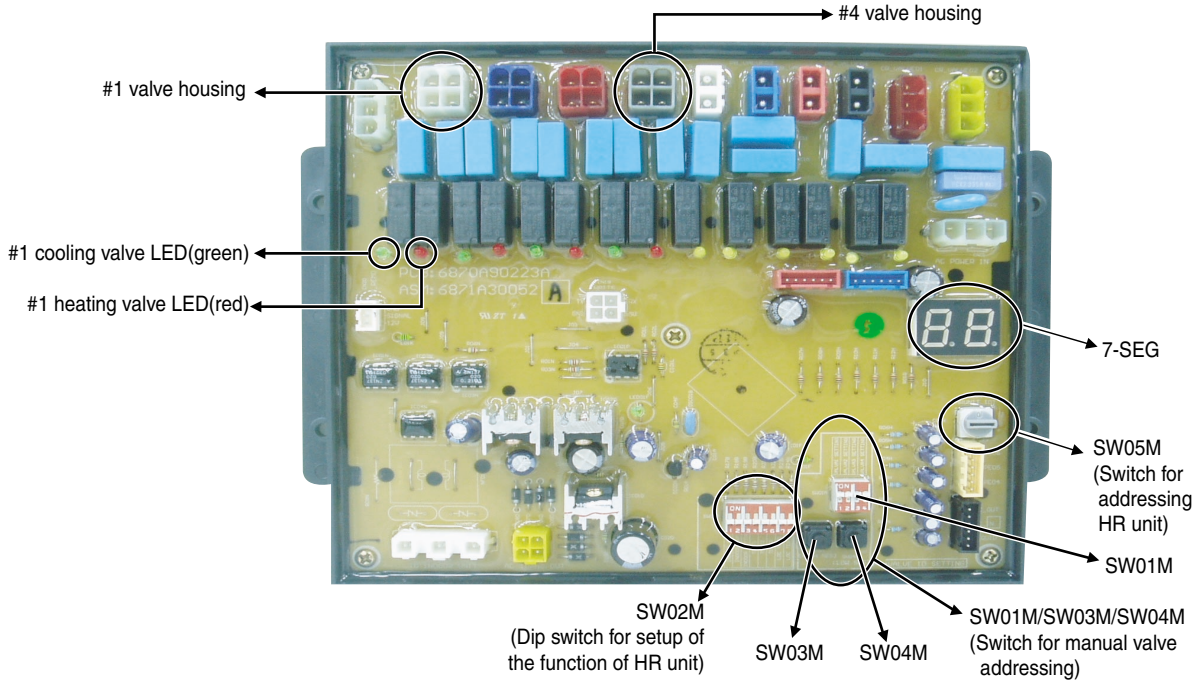
Subcooling EEV works with Fuzzy rules to keep the degree of subcooling at the outlet of subcooler during simultaneous operation

The degree of Subcooling = T outlet of Subcooler – T inlet of Subcooler.

# Part 5

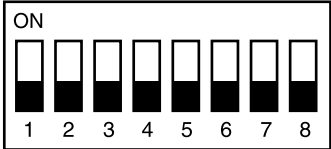
## PCB Setting and Test Run

# HR Unit PCB

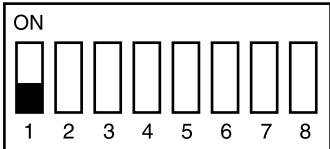
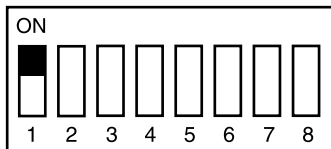


## Switch for setup of HR Unit

### 1. Main function of SW02M

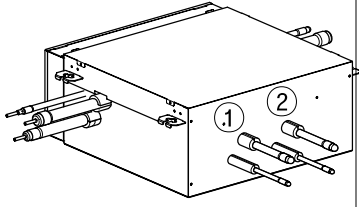
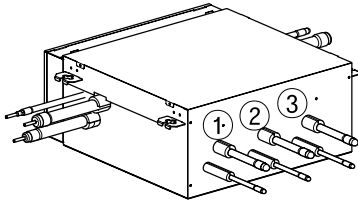
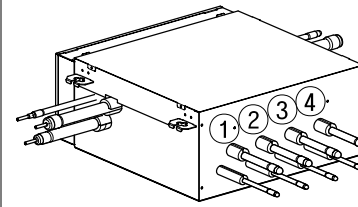
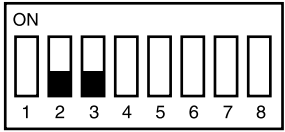
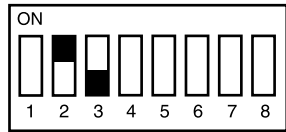
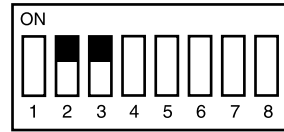

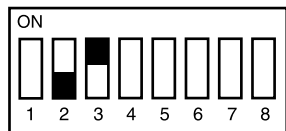
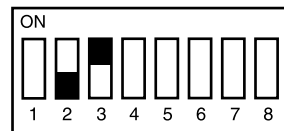
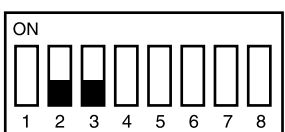
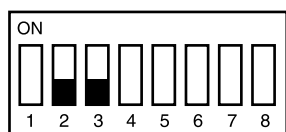
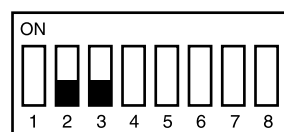

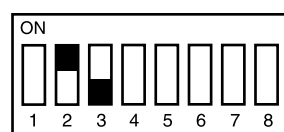
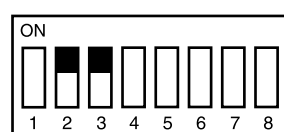
 <b>SW02M</b>	ON S/W	Selection
	No.1	Method for addressing valves of an HR unit (Auto/Manual)
	No.2	Model of HR unit
	No.3	Model of HR unit
	No.4	Not used
	No.5	Not used
	No.6	Not used
	No.7	Use only in factory production (preset to "OFF")
	No.8	Use only in factory production (preset to "OFF")

#### 1) Selection of the method for addressing valves of an HR unit (Auto/Manual)

Switch No.1 Off  <b>Auto</b>	Switch No.1 On  <b>Manual</b>
-----------------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------



2) Selection of the model of the HR unit

	 <p>(For 2 rooms) PRHR020</p>	 <p>(For 3 rooms) PRHR040</p>	 <p>(For 4 rooms) PRHR040</p>
Initial Setting			
1 room Connected			
2 rooms Connected			
3 rooms Connected			
4 rooms Connected			

\* Each model is shipped with the switches No.2 and No.3 pre-adjusted as above in the factory.

**WARNING**

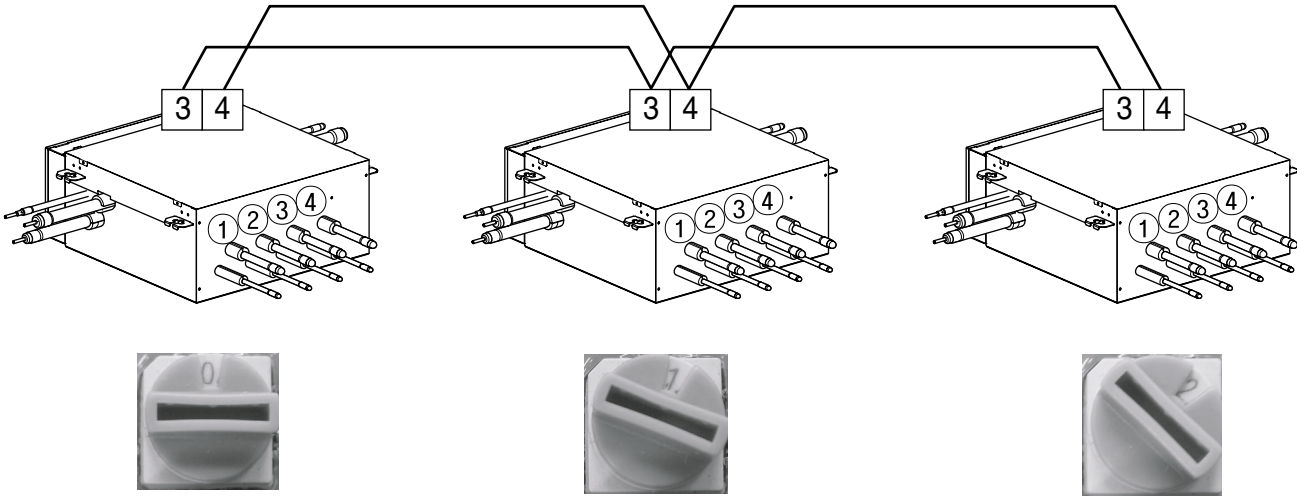
If you want to use a PRHR030 for 2 rooms HR unit after closing the 3rd pipes, set the dip switch for 2 rooms HR unit.  
 If you want to use a PRHR040 for 3 rooms HR unit after closing the 4th pipes, set the dip switch for 3 rooms HR unit.  
 If you want to use a PRHR040 for 2 rooms HR unit after closing the 3rd and 4th pipes, set the dip switch for 2 rooms HR unit.  
 The unused port must be closed with a copper cap, not with a plastic cap.

## 2. SW05M (Rotary S/W for addressing HR unit)

Must be set to '0' when installing only one HR unit.

When installing multiple HR units, address the HR units with sequentially increasing numbers starting from '0'.

Ex) Installation of 3 HR units



## 3. SW01M/SW03M/SW04M (Dip S/W and tact S/W for manual valve addressing)

- Used in manual addressing of the valve in the HR unit
- Set the address of the valve of the HR unit to the central control address of the connected indoor unit.
- SW01M: selection of the valve to address  
 SW03M: increase in the digit of 10 of valve address  
 SW04M: increase in the last digit of valve address
- Prerequisite for manual valve addressing : central control address of each indoor unit must be preset differently at its wired remote control.

	S/W No.	Setup
<p>ON</p> <p>1 2 3 4</p> <p>SW01M</p>	No.1	Manual addressing of valve #1
	No.2	Manual addressing of valve #2
	No.3	Manual addressing of valve #3
	No.4	Manual addressing of valve #4
<p>SW03M</p>	SW03M	Increase in the digit of 10 of valve address
<p>SW04M</p>	SW04M	Increase in the last digit of valve address

## Method for addressing of indoor and HR Unit

### 1) Auto addressing for indoor unit

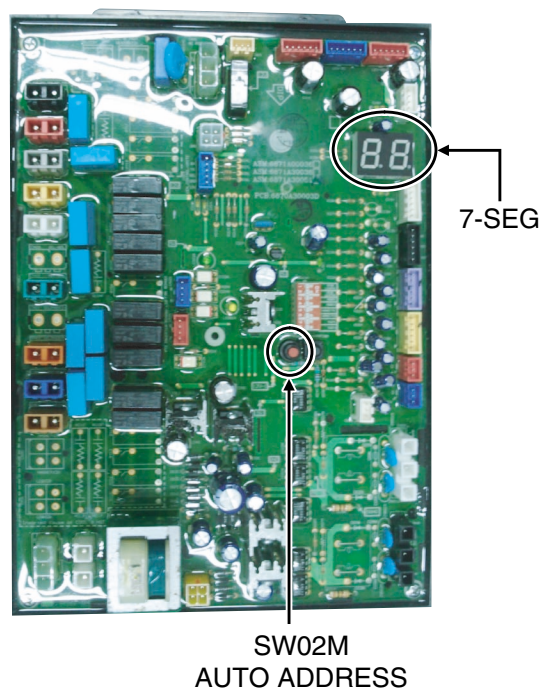
#### 2) Auto pipe detection

#### 3) Manual pipe detection(Execute in case of Auto pipe detection failure)

- Turn off all the indoor units before auto addressing.
- If indoor unit is operated, auto addressing would not be completed.

### 1) Auto addressing for indoor unit

- ① Wait 3 minutes after turning on the outdoor unit, HR unit, indoor unit.
- ② Press SW02M of the outdoor unit main PCB for 5 seconds
- ③ 2~7 minutes are required depending on the number of indoor units connected.
- ④ The number of the indoor units and HR units connected is displayed at 7-SEG of the outdoor unit main PCB after completion of indoor unit addressing and the address of each indoor unit appears in the window of its own wired remote control. (Example: CH01, CH02, CH03....CH06)
- ⑤ Indoor Unit auto addressing is completed



### 2) Auto pipe detection

- Turn No.1 of SW02M of HR unit PCB off.
  - Confirm that the setting of No.2, 3 of SW02M corresponds with the number of indoor units.
  - Reset the power of HR unit PCB
  - Turn off the No.5 DIP S/W of outdoor PCB when outdoor temperature is below 15°C
  - Turn on the No.5 DIP S/W of outdoor PCB when outdoor temperature is over 15°C
  - Reset the power of outdoor unit.
  - Wait 3 minuts.
  - Press SW01M of the outdoor unit main PCB for 5 Seconds.
  - The number of connected HR unit is displayed.  
Ex) In case of installing four HR units : 04
  - Operated after 88 is displayed on 7-SEG of the outdoor unit main PCB.
  - Pipe detection proceed.
  - 5~30 minutes are required depending on the number of the indoor units and outdoor temperature.
  - The number of the indoor units installed is displayed on 7-SEG of the outdoor unit main PCB for about 1 minute  
(For a HR unit, the number of the indoor units connected to each HR unit is displayed.
  - '200' is displayed in case of auto pipe detection error, and auto detection is completed after '88' is disappeared.
- ※ Auto pipe detection function : the function that sets connection relationship automatically between the indoor unit and HR unit.



## **WARNING**

1. Execute auto addressing and auto pipe detection again whenever the indoor PCB and HR unit PCB is replaced.
  - Operation error occurs unless power is applied to the indoor and HR units.
2. Error No.200 occurs if the number of connected indoor units and that of scanned indoor units are different.
3. When auto pipe detection fails, complete it with manual pipe detection (see Manual pipe detection).
4. When auto pipe detection addressing is completed normally, manual pipe detection is not required.
5. If you want to do auto pipe detection again after auto pipe detection fails, do after reset of outdoor unit by all means.

### **3) Manual pipe detection**

- Enter the central control address into each indoor unit using its wired remote control.
- Turn No.1 of SW02M of HR unit PCB on.
- Reset the power of HR unit PCB.
- On the HR unit PCB, manually set address of each valve of the HR unit to the central control address of the indoor unit connected to the valve.
- Turn No.6 of SW03M of outdoor unit PCB on.
- Reset the power of outdoor unit PCB.
- The number of the indoor unit installed is displayed after about 5 minutes.  
ex) Ex) HR ➡ The number of the indoor
- Turn No.6 of SW03M of outdoor unit PCB off.
- Reset the power of outdoor unit PCB.
- Manual pipe detection is completed

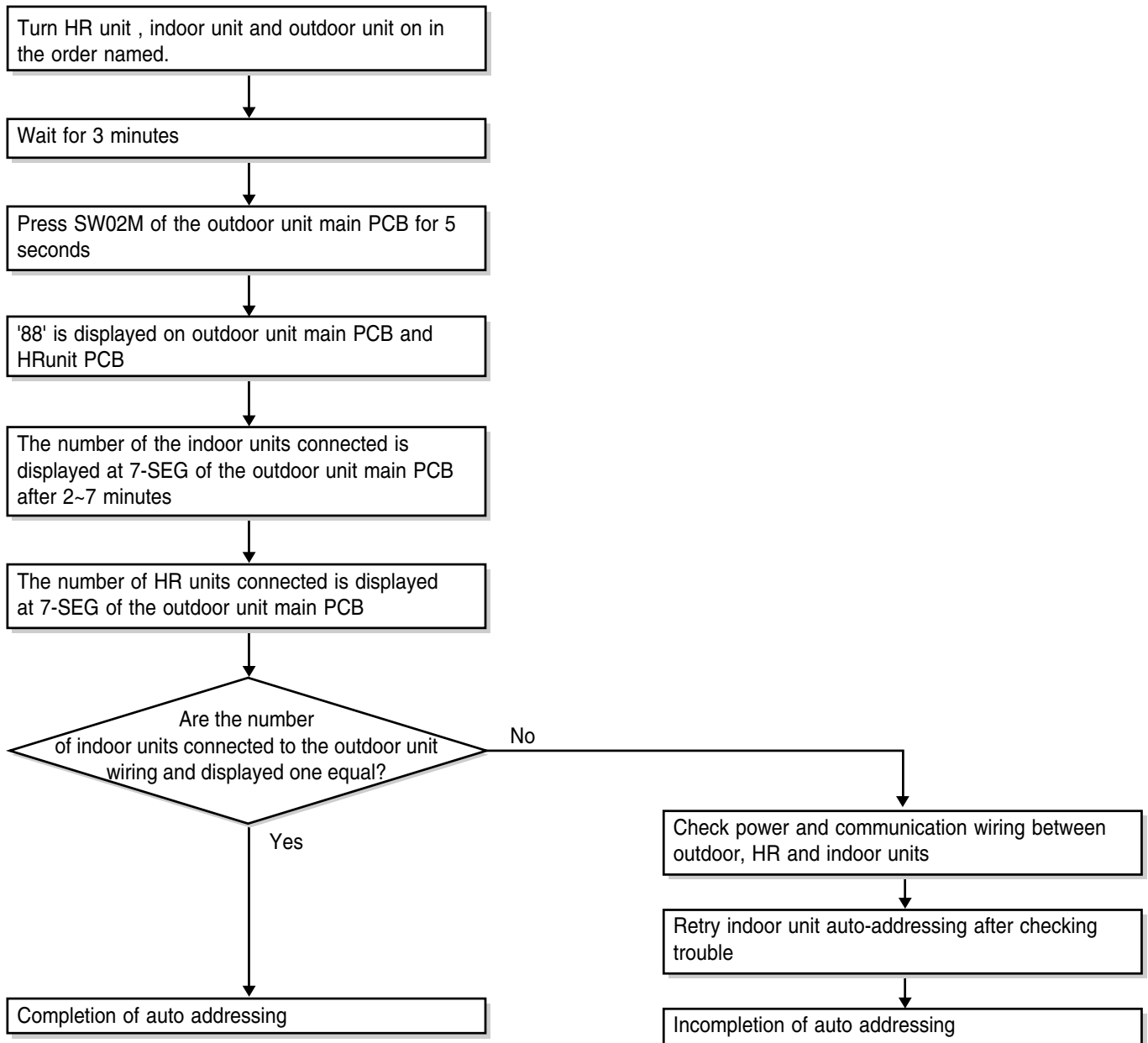


## **WARNING**

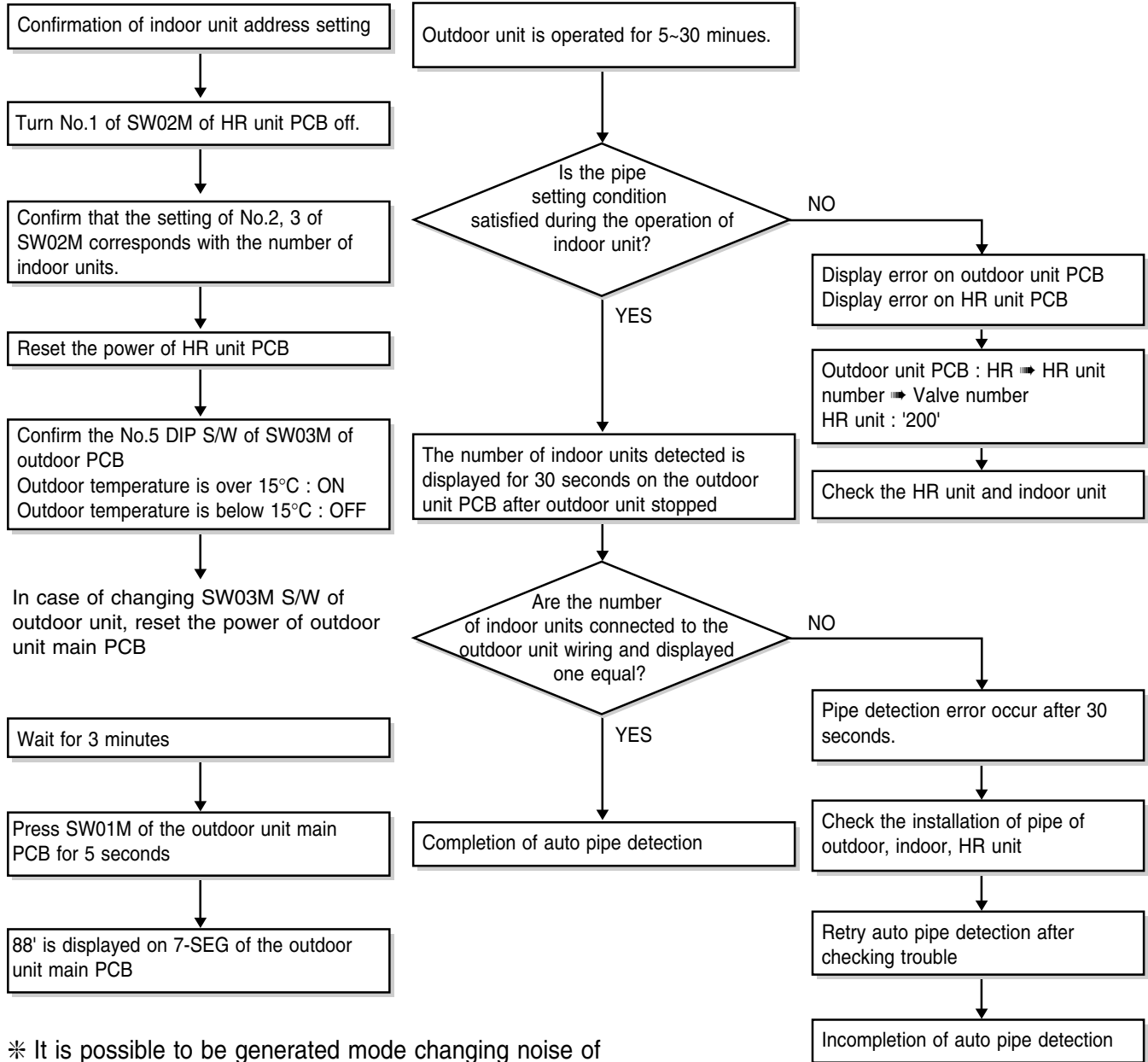
- In case that central controller is not installed, remain the address data after installer sets central control address as he wants
- In case that central controller is installed, there would be central control address in wired remote control of indoor unit.
- In this case, set the HR unit manual pipe address according to central control address of indoor unit.
- Pipe which is not connected with indoor unit should be set different address with pipe Connected with indoor unit.  
(If addresses are piled up, corresponding valve is not working.
- If you want to change the setting of manual pipe, you should do it on HR unit PCB.
- If an error occurred, it means that manual pipe setting is not completed.

**Flow chart for addressing of indoor and HR Unit**

**1) Flow chart for Auto addressing**

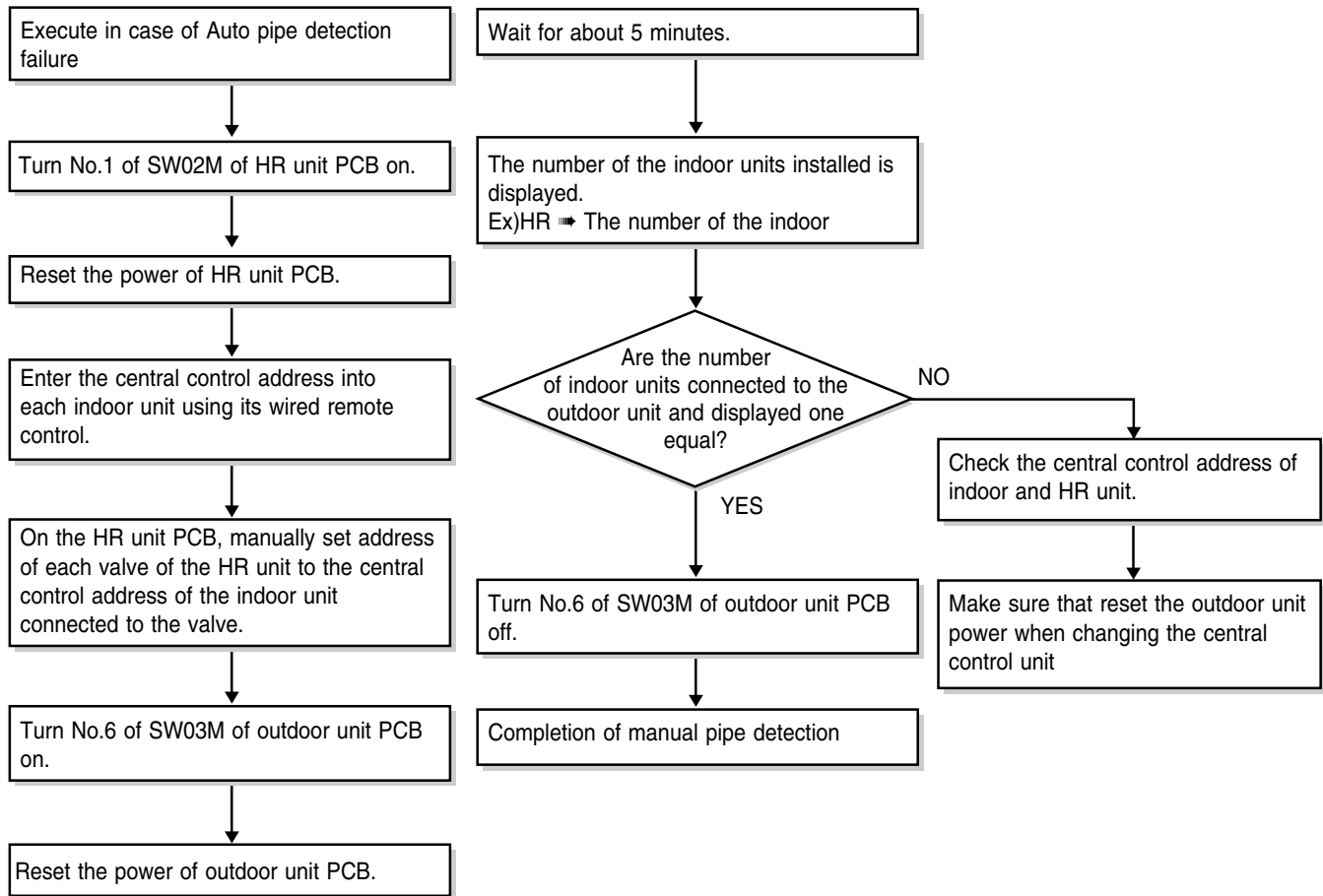


2) Flow chart for Auto pipe detection



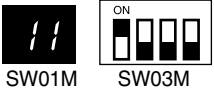
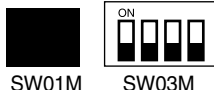
\* It is possible to be generated mode changing noise of heating and cooling which is normal.  
There is no mode changing noise at normal operation.

### 3) Flow chart for Manual pipe detection




### Example of checking valve address

(In case that an indoor unit of central control address '11' is connected to a valve #1 of an HR unit)

No.	Display and Setup	Setup and Contents
1	 <p>SW01M SW03M</p>	<ul style="list-style-type: none"> <li>• Operation: Turn dip S/W No.1 on.</li> <li>• Display: "11" is displayed in 7-SEG</li> </ul>
2	 <p>SW01M SW03M</p>	<ul style="list-style-type: none"> <li>• Operation: Turn dip S/W No.1 on.</li> <li>• 7-SEG disappeared</li> </ul>

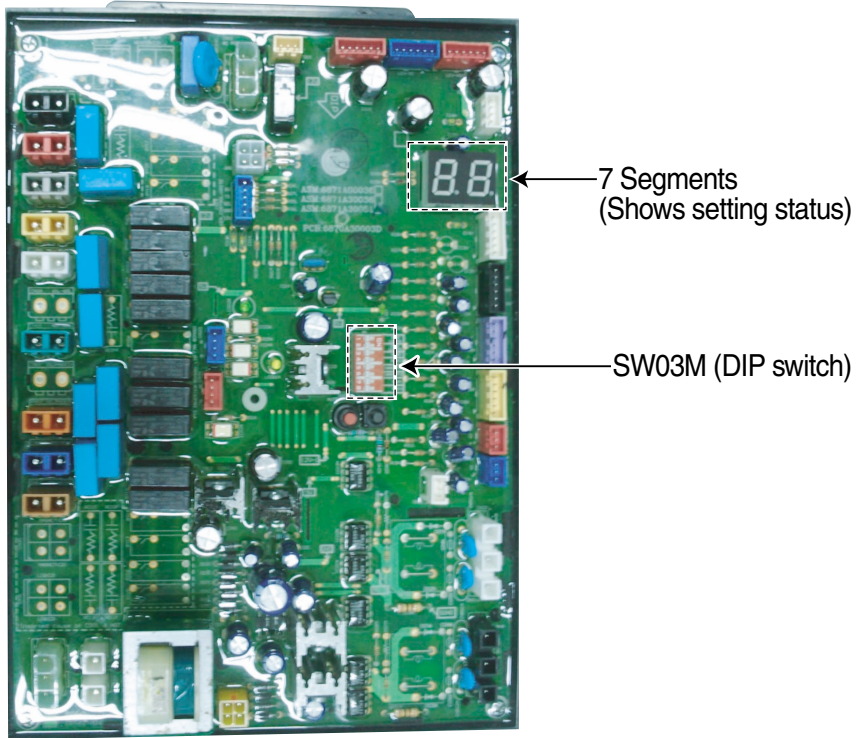
### Identification of Manual Valve ID (Address)

No.	Display and Setup	Setup and Contents
1	 <p>SW01M SW03M</p>	<ul style="list-style-type: none"> <li>• Operation: more than 2 dip switches turned on.</li> <li>• Display: "Er" is displayed in 7-SEG</li> </ul>

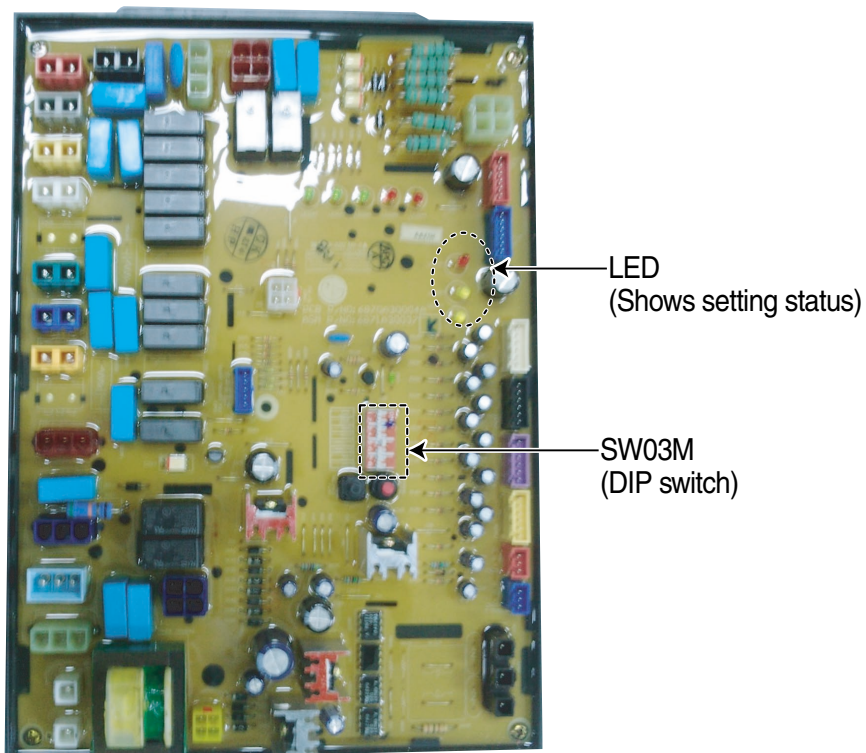


# Main unit and Sub unit PCB

Main Unit PCB



Sub Unit PCB



## DIP switch setting

### ■ Checking according to dip switch setting

1. You can check the setting values of the main outdoor unit from the 7 segment LED and those of the sub outdoor unit from the LED. The dip switch setting should be changed when the power is OFF.
2. It checks whether the input is properly performed without the bad contact of the dip switch or not

### ■ Checking the setting of the main unit

The number is sequentially appeared at the 7 segment in 10 seconds after applying the power. This number represents the setting condition.

For example, R410a 30HP(Combined 10+10+10HP), Normal mode ;

Main model code ➡ Sub1 model code ➡ Sub2 model code ➡ total capacity ➡ 3 ➡ 25 ➡ 41  
 (93) (97) (97) (30)

1~255: Main model code

1~255: Sub1 model code

1~255: Sub2 model code

5~40: HP number(sum of main capacity and sub capacity)

1: Save mode                      3: Normal mode                      4: Capacity up mode

25: Normal

22: R22 model                      41: R410a model

**Code Table**

Main Unit		Sub Unit	
HP	Code	HP	Code
8	92	10	97
10	93	12	98
12	94		
14	95		

### ■ Checking the setting of the sub unit

It is displayed by 8 LED of the sub unit. A set of two LED's represents 0, 1, 2 and 3 in binary. LED1, LED3, LED5, and LED7 are least significant bit of each digit. LED2, LED4, LED6, and LED8 are most significant bit of each digit.

1) LED2, LED1

00 : 8HP unit                      01 : 10HP unit                      10 : 12HP unit                      11 : 14HP unit

2) LED6, LED5

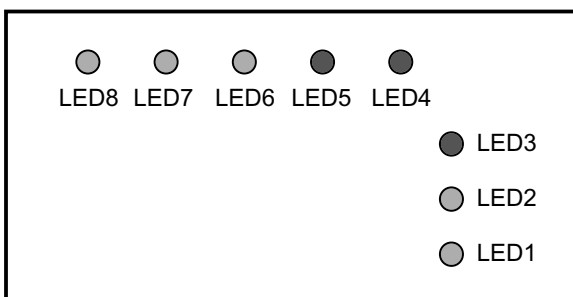
00 : -                      01 : sub1                      10 : sub2                      11 : sub3

3) LED8, LED7

00 : normal                      11 : data display

**CAUTION**  
 Product may not properly operate if the relevant DIP switch is not properly setup.

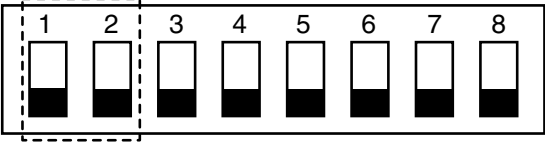
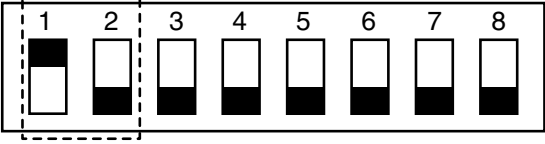
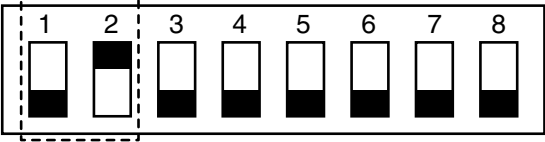
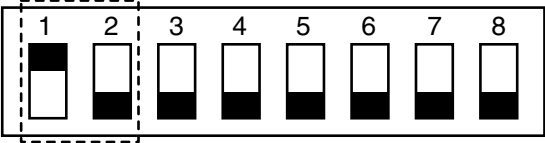
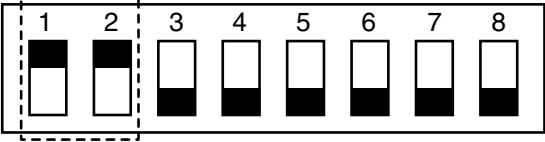
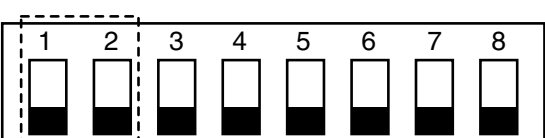
### LED location of the sub part



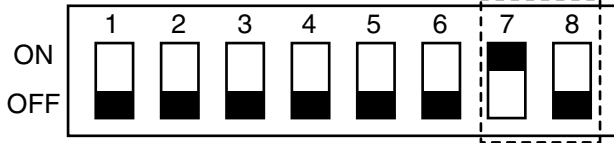
## ■ Setting the DIP switch (SW03M)

- Set the dip switch with the power turned off. If you change the setting when the power is on, the changed setting is not applied immediately. The changed setting is applied at the moment that the power is on.
- Instant indoor unit checking, data display mode, and forced oil collecting operation are used when the units are running. If you don't have to use those functions after using them, restore the dip switch setting.

### 1. Settings of main outdoor unit

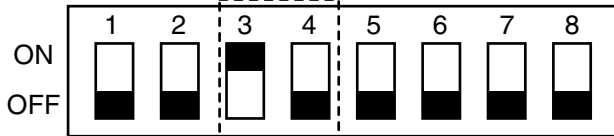
<p><b>1) Standard mode(default)</b></p>  <p>ON OFF</p> <p>● Setting before applying the power ● When the installation condition is normal (almost all cases), use standard mode.</p>	
<p><b>2) Save mode</b></p>  <p>ON OFF</p> <p>● Setting before applying the power ● When the total pipe length is extremely short, use save mode.</p>	
<p><b>3) Capacity up</b></p>  <p>ON OFF</p> <p>● Setting before applying the power ● When the total pipe length is extremely long, use capacity up mode.</p>	
<p><b>4) Instant indoor unit checking: Cooling mode</b></p>  <p>ON OFF</p> <p>● data ● address</p>	<p>With dip switch setting as left side, push address(red) button 3 times in 3 sec. With data button, select the indoor unit that you want to turn on/off. Push address button for 3 sec, and the indoor unit will be turned on/off. After using, restore the dip switch setting.</p>
<p><b>5) Instant indoor unit checking: Heating mode</b></p>  <p>ON OFF</p> <p>● data ● address</p>	
<p><b>6) Instant indoor unit checking: Restoring</b></p>  <p>ON OFF</p> <p>● data ● address</p>	<p>If you set the dip switch #1 and #2 off during the instant indoor checking mode, the mode is ended. After that, restore the dip switch setting.</p>

**7) Forced oil collecting operation**



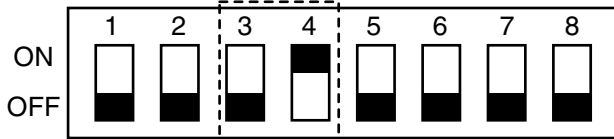
With dip switch setting as left side, push data button for 5 sec.  
Oil collecting operation is enabled after 10 minutes running of comp.

**8) Backup operation 1 : In case of Inverter compressor damaged.**



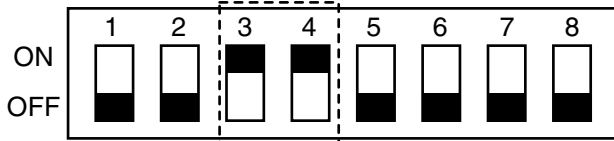
Setting before applying the power  
Set at the unit of the inverter(constant speed comp.1) failure  
In case of inverter failure, backup operation is possible when 110k or more indoor units are ON.

**9) Backup operation 2 : In case of constant speed compressor damaged.**



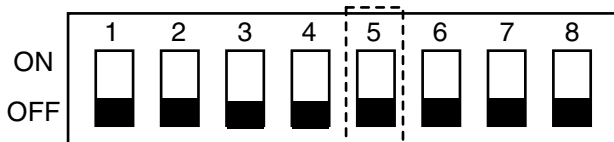
Set at the unit of the constant speed comp. failure.

**10) Backup operation 3 : In case of both compressors damaged.**

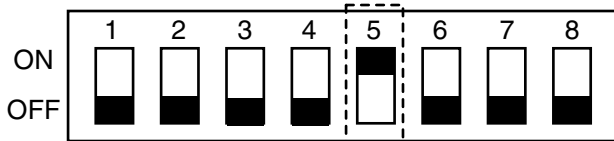


Setting before applying the power  
Set at the disabled unit.

**11) Select Auto pipe Detection mode**

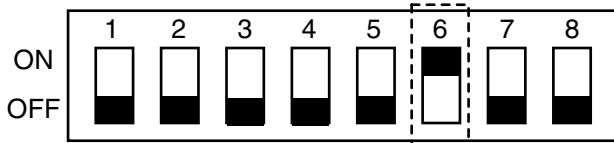


When outdoor temperature is below 15°C



When outdoor temperature is over 15°C

**12) Manual Pipe Detection : Matching HR UNIT Valve and Indoor Unit**



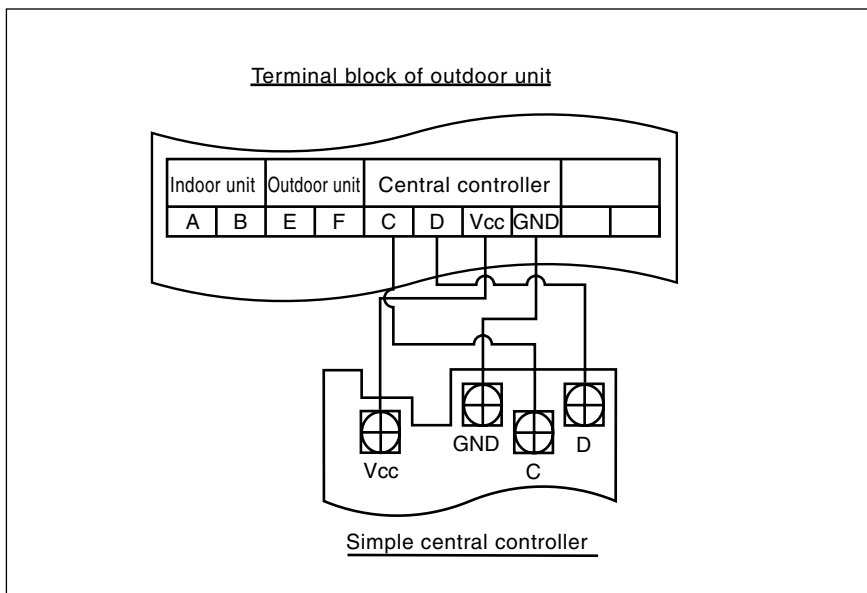
After turn no6 s/w on ,Reset PCB power  
After finish Manual Pipe Detection,  
Must turn off no6 s/w

## 2. Settings of sub outdoor unit

<b>1) The sequence of sub unit : 1<sup>st</sup> sub unit</b>		
	At the 1 <sup>st</sup> sub unit, set dip switch as the left side. Setting before applying the power.	
<b>2) The sequence of sub unit : 2<sup>nd</sup> sub unit</b>		
	At the 2 <sup>nd</sup> sub unit, set dip switch as the left side. Setting before applying the power.	
<b>3) The sequence of sub unit : 3<sup>rd</sup> sub unit</b>		
	At the 3 <sup>rd</sup> sub unit, set dip switch as the left side. Setting before applying the power.	
<b>4) Backup operation 1 : in case of constant speed compressor 1 damaged</b>		
	Setting before applying the power Set at the unit of the inverter(constant speed comp.1) failure In case of inverter failure, backup operation is possible when 110k or more indoor units are ON.	
<b>5) Backup operation 2 : in case of constant speed compressor 2 damaged</b>		
	Setting before applying the power Set at the unit of the constant speed comp.2 failure. 	
<b>6) Backup operation 3 : in case of both compressors damaged</b>		
	Setting before applying the power Set at the disabled unit. 	

## Installation of Simple Central Controller

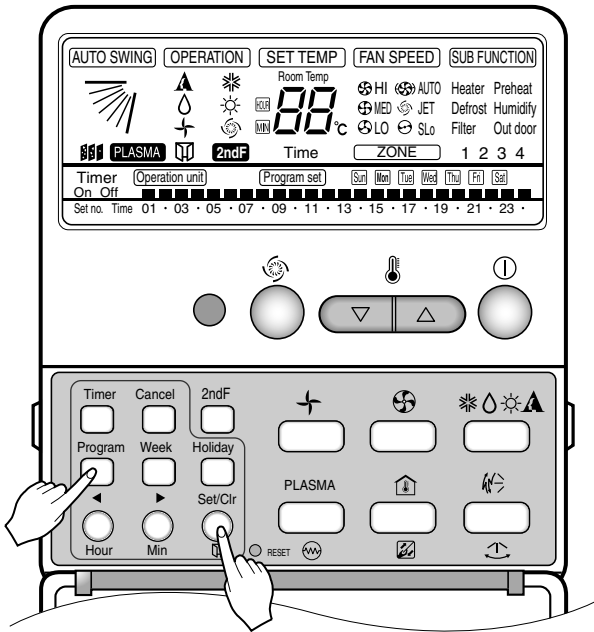
- ① Confirm the power of whole system(outdoor unit and indoor/HR units) is OFF, otherwise turn off.
- ② The transmission lines connected to C, D of simple central controller should be connected to C,D terminal port for central control of outdoor unit with care for their polarity (C → C, D → D)
- ③ Both the DC power (Vcc) and the GND connect the simple central controller according to the polarity of Vcc terminal and GND.
- ④ Turn the whole system on.
- ⑤ Set the group and indoor unit number with a wired remote control.
- ⑥ To control several sets of indoor units into a group, set the group ID from 0 to F for this purpose.



Group recognition of the simple central controller	
No. 0 group (00~0F)	
No. 1 group (10~1F)	
No. 2 group (20~2F)	
No. 3 group (30~3F)	
No. 4 group (40~4F)	
No. 5 group (50~5F)	
No. 6 group (60~6F)	
No. 7 group (70~7F)	
No. 8 group (80~8F)	
No. 9 group (90~9F)	
No. A group (A0~AF)	
No. B group (B0~BF)	
No. C group (C0~CF)	
No. D group (D0~DF)	
No. E group (E0~EF)	
No. F group (F0~FF)	

## Group Number Setting of Indoor Units

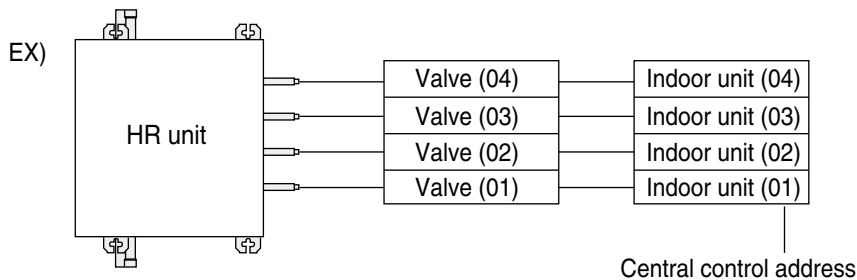
1. Press Program button and Set/Clr button at the same time for 3 seconds.
2. The current group and the indoor unit numbers are indicated on the "88" of the wired remote control.



3. Set numbers by using the temperature adjust key.
4. Press Program button and Set/Clr button at the same time for 3 seconds.
5. If transmit recognition data is received from the indoor unit, it returns to the general operation mode.

### WARNING

- Valve address and central control address of its corresponding indoor unit should be set identical in manual addressing.



# Test Run

## Checks Before Test Run

1	Check to see whether there is any refrigerant leakage, and slack of power or transmission cable.
2	<p>Confirm that 500 V megger shows 2.0 MΩ or more between power supply terminal block and ground. Do not operate in the case of 2.0 MΩ or less.</p> <p>NOTE: Never carry out megaohm check over terminal control board. Otherwise the control board would be broken.</p> <p>Immediately after mounting the unit or after leaving it turned off for an extended length of time, the resistance of the insulation between the power supply terminal board and the ground may decrease to approx. 2 MΩ as a result of refrigerant accumulating in the internal compressor. If the insulation resistance is less than 2 MΩ, turning on the main power supply and energizing the crankcase heater for more than 6 hours will cause the refrigerant to evaporate, increasing the insulation resistance.</p>
3	<p>Check if Liquid pipe, High Pressure Gas, Low Pressure Gas are fully opened</p> <p>NOTE: Be sure to tighten caps.</p>
4	<p>Check if there are any problems in automatic addressing or not:</p> <p>Check and confirm that there are no error messages in the display of indoor units or remote controls and LED in outdoor units.</p>



### CAUTION

- Before operating the Unit, main power to be supplied for 6 hours.



# Replacement procedure for Compressor(ARUB808T1 TO ARUB4008T1)

<b>1. Replacement procedure for Compressor.....</b>	<b>242</b>
1.1 Replacement procedure .....	244

## Replacement procedure for Compressor(ARUB808T1-ARUB4008T1)

**1) Collect the refrigerant by using refrigerant recovery unit**

(Since the setting on outdoor unit PCB is required for refrigerant recovery, refer to the warning plate "Precautions in service work "attached on the switch box cover)

**2) Remove the sound insulator mat covering the faulty compressor, and disconnect the power**

**3) Disconnect the brazing sections of suction pipe and discharge pipe by using brazing torch after the refrigerant has been collected completely.**

**4) Remove equalizing pipe nut.**

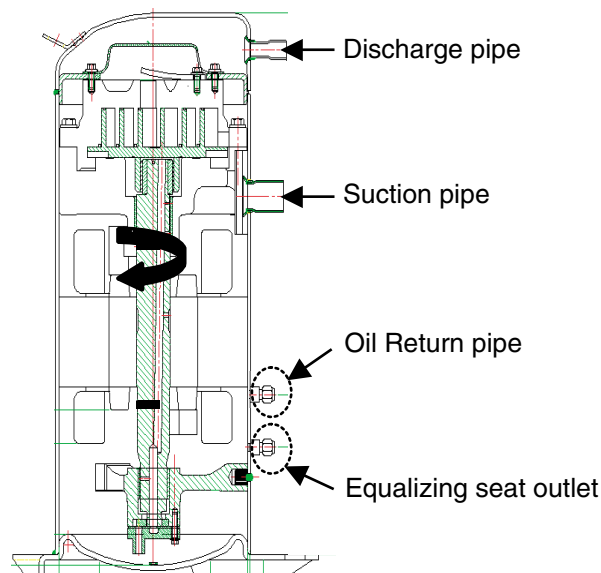
**5) Remove three bolts at cushion rubber section to take out the faulty compressor outside the unit.**

**6) Install the new compressor in the unit.(Be sure to insert the cushion rubbers before tightening the fixing bolts of compressor.)**

**7) Remove the rubber caps put on the suction and discharge pipe of the new compressor to release the sealing nitrogen gas.(Take note that oil may spout due to the pipe inside pressure if the plug put on the equalizing seat is removed before removing of rubber cap.)**

**8) Fasten equalizing pipe with nut.(14 ~ 18N.m)**

**9) Braze the suction and discharge pipe with brazing torch to the compressor.**



### Cut section

**10) Conduct air tight test to check the piping system is free from leakage.**

**11) Connect power cable to the terminal board of compressor and cover the compressor with sound insulator mat.**

**12) Conduct vacuum drying.(Since the setting on out-door unit PCB is required for vacuum drying, refer to the warning plate precautions in service work" attached on the switch box cover.)**

**13) Charge refrigerant after the completion of vacuum drying, and check the function of compressor with cooling or heating operation.**

# **Part 6**

## **Trouble shooting guide**

## Trouble Shooting guide

<b>1. The phenomena from main component failure .....</b>	<b>245</b>
<b>2. Checking Method for key components.....</b>	<b>246</b>
<b>3. Selt-diagnosis function.....</b>	<b>254</b>

# 1. The phenomena from main component failure

## The phenomena from main component failure

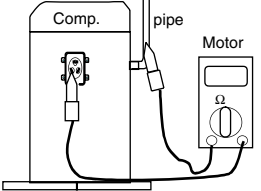
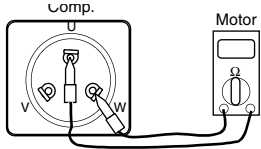
Component	Phenomenon	Cause	Check method and Trouble shooting
<b>Compressor</b>	Not operating	Motor insulation broken	Check resistance between terminals and chassis
	Stop during running	Motor insulation failure	Check resistance between terminals and chassis
<b>Outdoor fan</b>	High pressure error at cooling	Motor failure, bad ventilation around outdoor heat exchanger	Check the outdoor fan operation after being turned the outdoor units off for some time. Remove obstacles around the outdoor units
<b>Outdoor EEV</b>	Heating failure, frequent defrosting	Bad connector contact	Check connector
	No operating sound at applying power	Coil failure	Check resistance between terminals
	Heating failure, frozen outdoor heat exchanger part	EEV clogged	Service necessary
	Low pressure error or discharge temperature error	EEV clogged	Service necessary

When system fault occurs, the error code is displayed at indoor unit display or remote control display, the trouble shooting guide is in the service manual

## 2. Checking Method for Key Components

### 2.1 Compressor

Check and ensure in following order when error related with the compressor or error related with power occurs during operation:

No.	Checking Item	Symptom	Countermeasure
1	Is how long power on during operation?	1) Power on for 6 hours or more	* Go to No.2.
		2) Power on for 6 hours or less	* Go to No.2 after applying power for designated time (12 hours).
2	Does failure appears again when starting operation?  Method to measure insulation resistance   Figure 1.  Method to measure coil resistance   Figure 2.	1) The compressor stops and same error appears again.	* Check IPM may fail.
		2) If output voltage of the inverter is stably output. *1	* Check coil resistor and insulation resistor. If normal, restart the unit. If same symptom occurs, replace the compressor.  * Insulation resistor: 2MW or more Coil resistor: U-V: $1.16 \pm 7\% \Omega$ V-W: $1.19 \pm 7\% \Omega$ W-U: $1.21 \pm 7\% \Omega$
		3) If output voltage of the inverter is unstable or it is 0V. (When incapable of using a digital tester)	* Check the IPM. If the IPM is normal, replace the inverter board.  * Check coil resistor and insulation resistor.

#### [Cautions when measuring voltage and current of inverter power circuit]

Measuring values may differ depending on measuring tools and measuring circuits since voltage, current in the power supply or output side of the inverter has no sine waveform.

Especially, output voltage changes when output voltage of the inverter has a pattern of pulse wave.

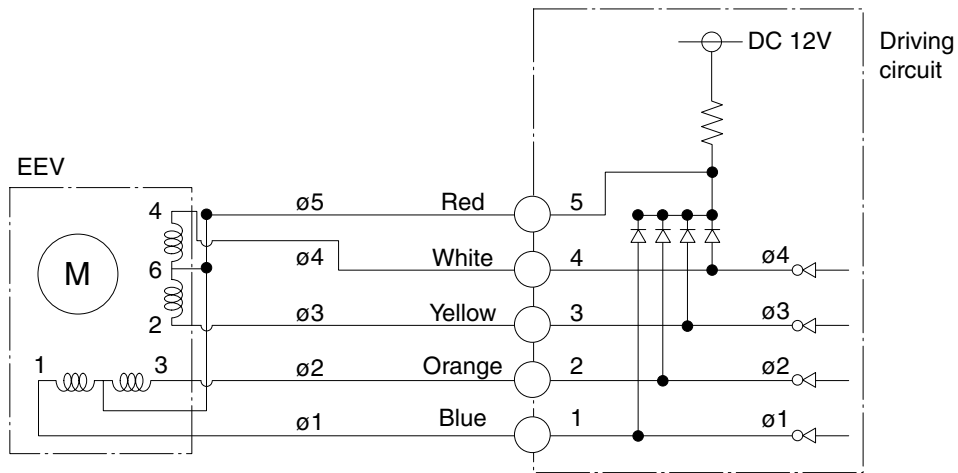
In addition, measuring values appear largely differently depending on measuring tools.

- 1) If using a movable tester when checking that output voltage of the inverter is constant (when comparing relative voltage between lines), always use an analog tester. Especially exercise particular caution if the output frequency of the inverter is low, when using a movable tester, where change of measured voltage values is large between other lines, when virtually same values appear actually or where there is danger to determine that failure of the inverter occurred.
- 2) You can use rectification voltmeter (→+) if using commercial frequency tester when measuring output values of the inverter (when measuring absolute values). Accurate measuring values cannot be obtained with a general movable tester (For analog and digital mode).

## 2.2 Fan Motor

Checking Item	Symptom	Countermeasure
<p>(1) The fan motor does not operate. Does failure appears again when starting operation?</p> <p>(2) Vibration of the fan motor is large.</p>	1) When power supply is abnormal	<p>* Modify connection status in front of or at the rear of the breaker, or if the power terminal console is at frosting condition.</p> <p>* Modify the power supply voltage is beyond specified scope.</p>
	2) For wrong wiring	<p>* For following wiring.</p> <ol style="list-style-type: none"> <li>1. Check connection status.</li> <li>2. Check contact of the connector.</li> <li>3. Check that parts are firmly secured by tightening screws.</li> <li>4. Check connection of polarity.</li> <li>5. Check short circuit and grounding.</li> </ol>
	3) For failure of motor	<p>* Measure winding resistance of the motor coils.</p> <p>Main outdoor unit: INV [19.0±7%Ω(75°C)] Sub outdoor unit: Main [22.8±7%Ω(75°C)] R1 [34.8±7%Ω(75°C)] R2 [3.7±7%Ω(75°C)]</p>
	4) For defective fuse 5) For failure of circuit board	<p>* Replace the fuse if there is defect (Fuse 800V 30A). Replace the circuit board in following procedures if problems occur again when powering on and if there are no matters equivalent to items as specified in above 1) through 4). (Carefully check both connector and grounding wires when replacing the circuit board.)</p> <ol style="list-style-type: none"> <li>1. Replace only fan control boards. If starting is done, it means that the fan control board has defect.</li> <li>2. Replace both fan control board and the main board. If starting is done, it means that the main board has defect.</li> <li>3. If problems continue to occur even after counter-measure of No.1 and No.2, it means that both boards has defect.</li> </ol>

## 2.3 Electronic Expansion Valve



### • Pulse signal output value and valve operation

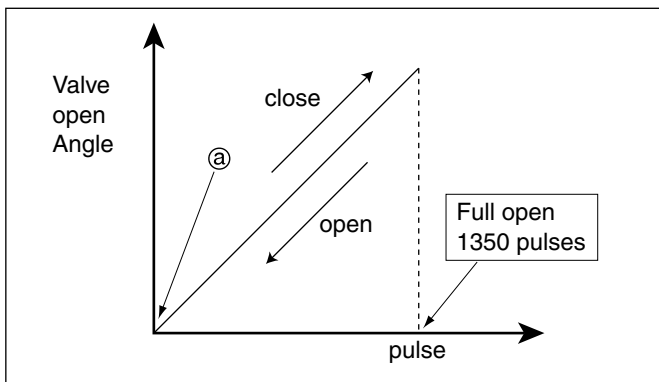
Output(ø) No.	Output state							
	1	2	3	4	5	6	7	8
ø1	ON	OFF	OFF	OFF	OFF	OFF	ON	ON
ø2	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
ø3	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
ø4	OFF	OFF	OFF	OFF	ON	ON	ON	OFF

### • Output pulse sequence

- In valve close state: 1 → 2 → 3 → 4 → 5 → 6 → 7 → 8 → 1
- In valve open state: 8 → 7 → 6 → 5 → 4 → 3 → 2 → 1 → 8

- \* 1. If EEV open angle is not change, all of output phase will be OFF
- 2. If output phase is different or continuously in the ON state, motor will not operate smoothly and start vibrating.

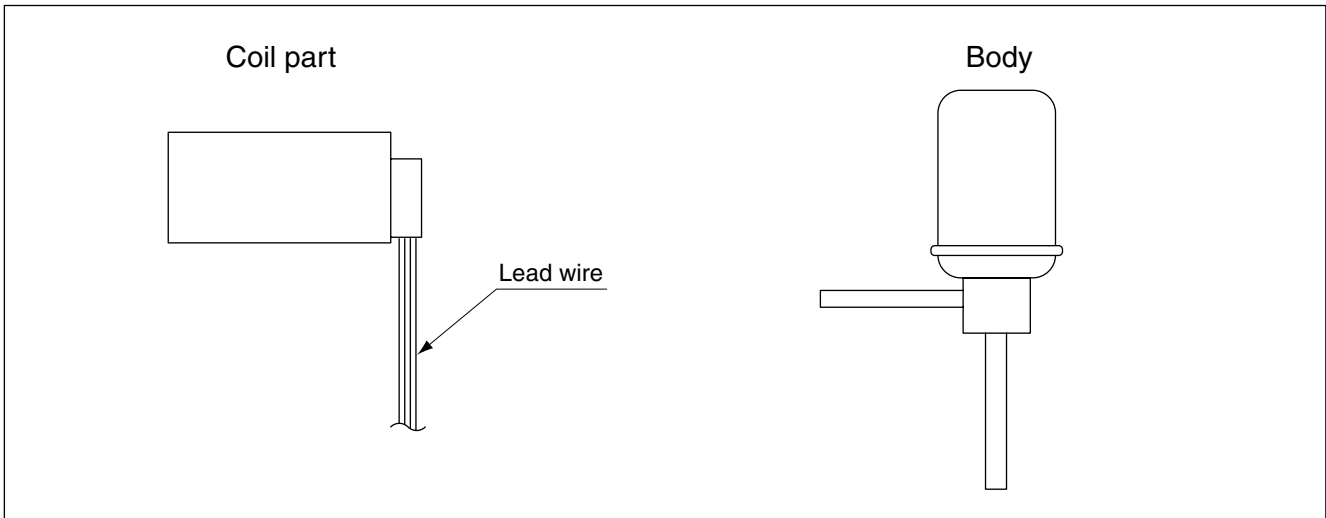
### • EEV valve operation



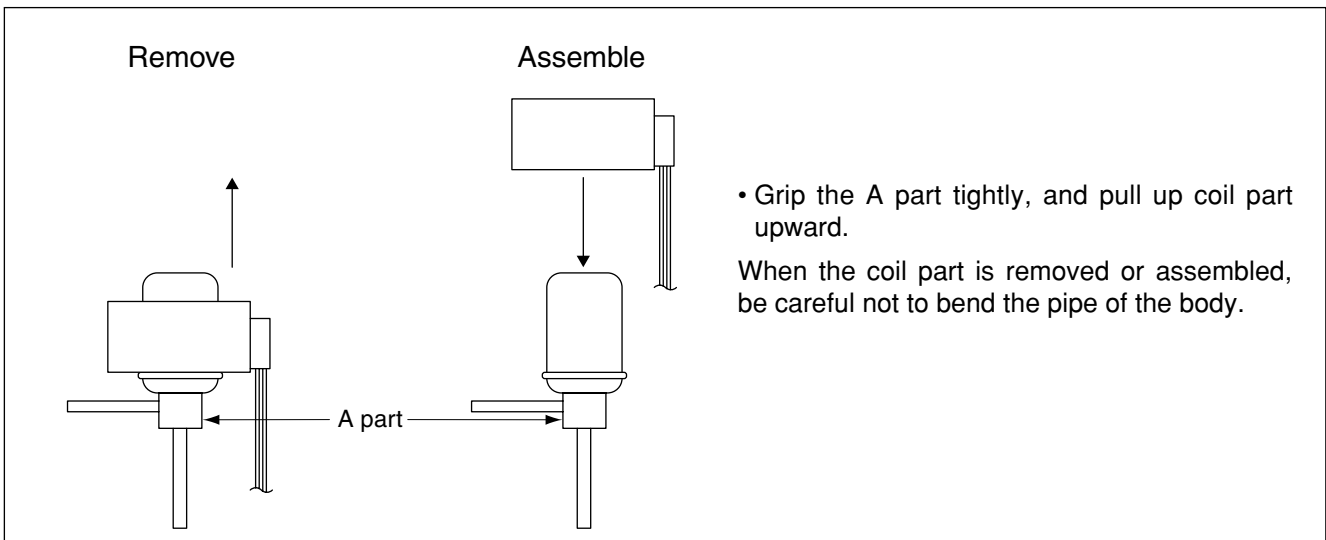
- At power ON, open angle signal of 1400 pulses output and valve position is set to @  
If valve is operated smoothly, no noise and vibration is occurred and if valve is closed. noise occurs.
- If you contact screw driver to EEV, and contact your ear to driver hand grip. you can confirm the noise from EEV.
- If liquid refrigerant is in EEV, the noise is lower.



• EEV Coil and body(Outdoor unit)

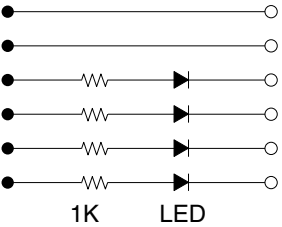


• Remove and assemble the coil



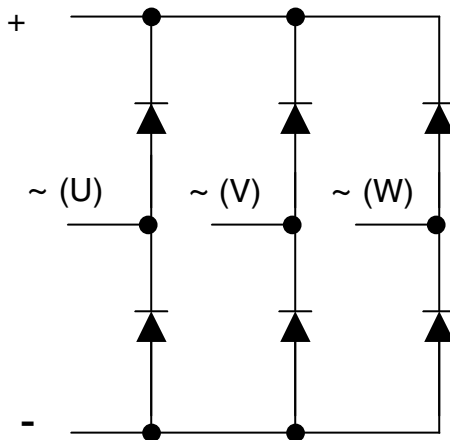
## Checking Method for Key Components

### • EEV failure check method

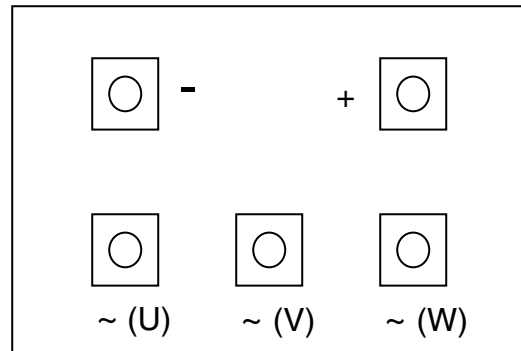
Failure mode	Diagnosis	Repair process	Unit
Microcomputer Driving circuit failure	<p>1. Disconnect the EEV connector form control board and connect testing LED</p>  <p style="text-align: center;">1K      LED</p> <p>2. Main power ON, pulse signal is out from EEV for 17 sec. If LEDs do not turn on, or are in on state continuously, then driving circuit is abnormal</p>	Check and replace Indoor unit control board	Indoor unit
EEV locking	1. If EEV is locked, in no load state, the driving motor rotate, and clicking sound always occurs	Replace EEV	Indoor / Outdoor unit
EEV Motor coil short or misconnection	<p>1. Check the resistance between coil terminal (red-white, red-yellow, red-orange, red-blue)</p> <p>2. If the estimated resistance value is in <math>52 \pm 3\Omega</math> then the EEV is normal</p>	Replace EEV	Outdoor unit
	<p>1. Check the resistance between coil terminal (brown-white, brown-yellow, brown-orange, brown-blue)</p> <p>2. If the estimated resistance value is in <math>150 \pm 10\Omega</math> then the EEV is normal</p>	Replace EEV	Indoor unit
Full closing (valve leakage)	<p>1. Operate indoor unit with FAN mode and operate another indoor unit with COOLING mode</p> <p>2. Check indoor unit(FAN mode) liquid pipe temperature (from operation monitor of outdoor unit control board)</p> <p>3. When fan rotate and EEV is fully closed, if there is any leakage, then the temperature is down</p> <p>If estimated temperature is very low in comparison with suction temperature which is displayed at remote controller then the valve is not fully closed</p>	If the amount of leakage is much, Replace EEV	Indoor unit

## 2.4 3Phase Bridge Diode

### Internal circuit diagram



### Appearance



1. Unplug the + terminal of electrolytic capacitor from the + terminal of 3phase bridge diode
2. Set the multi meter to resistance mode  
Check and estimate the resistance between each pair of terminal (+, -), (+, ~(U)), (+, ~(V)), (+, ~(W)), (~(U), -), (~(V), -), (~(W), -), the estimated value should be large enough to Mega Ohm unit.
3. Set the multi meter to diode mode, and estimate between each pair of terminal (~(U), +), (~(V), +), (~(W), +), (-, ~(U)), (-, ~(V)), (-, ~(W)), the estimated value should be stable and be in between 0 to 1.  
(ex: 0.35, 0.46 etc.)



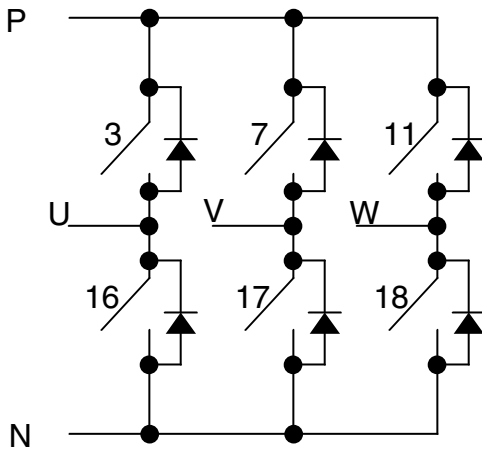
If one of the above articles is not satisfied, bridge diode must be inferior and to be replaced

### Caution

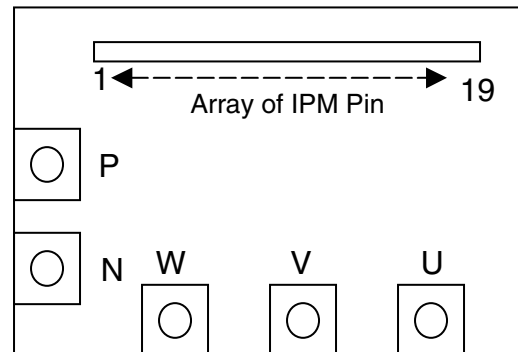
In case that the control box is opened and before checking electrical parts, it should be checked that the LED 01Y (in inverter board, refer to page 172) turned off (wait 3 minutes after main power OFF), otherwise it may cause electrical shock.

## 2.5 IPM(Integrated Power Module)

### Internal circuit diagram



### Appearance



1. Unplug the +, - terminal of electrolytic capacitor from the P and N terminal of IPM
2. Set the multi meter to resistance mode  
Check and estimate the resistance between each pair of terminal **(P, N), (P, U), (P, V), (P, W), (U, N), (V, N), (W, N)**, the estimated value should be large enough to Mega Ohm unit.
3. Set the multi meter to resistance mode  
Check and estimate the resistance between each pair of terminal **(3, U), (7, V), (11, W), (16, N), (17, N), (18, N)**, the estimated value should be large enough to Mega Ohm unit.  
the check point is inside of the screw hole **(U, V, W, N)**, if check points are plate face of the terminal, then estimated values are gate resistance.
4. Set the multi meter to diode mode, and estimate between each pair of terminal **(U, P), (V, P), (W, P), (N, U), (N, V), (N, W)**, the estimated value should be stable and be in between 0 to 1. (ex: 0.35, 0.46 etc.)



*If one of the above articles is not satisfied,  
IPM must be inferior and is to be replaced*

### Caution

In case that the control box is opened and before checking electrical parts, it should be checked that the LED 01Y (in inverter board, refer to page 172) turned off (wait 3 minutes after main power OFF), otherwise it may cause electrical shock.

## 2.6 Other

### Electrolytic capacitor and resistor for voltage distribution

- 1) Disconnect an terminal of voltage distribution resistor from each DC link electrolytic capacitor
- 2) Set the multi meter to resistance mode, connect the probe to +,- terminal of the capacitor. If the estimated resistance value is increase continuously without short(value is 0), then the resistor is normal
- 3) Set the multi meter to resistance mode, confirm that the resistance value of the resistor is around 270 kOhm



*Check and replace inferior components*

#### **Caution**

In case that the control box is opened and before checking electrical parts, it should be checked that the LED 01Y turned off (wait 3 minutes after main power OFF), otherwise it may cause electrical shock.

## 3. Self-diagnosis function

### Self-Diagnosis Function

#### Error Indicator

- This function indicates types of failure in self-diagnosis and occurrence of failure for air condition.
- Error mark is displayed on display window of indoor units and wired remote controller, and 7-segment LED of outdoor unit control board as shown in the table.
- If more than two troubles occur simultaneously, lower number of error code is first displayed.
- After error occurrence, if error is released, error LED is also released simultaneously.

	Display		Title	Cause of Error
Indoor unit related error	0	1	Air temperature sensor of indoor unit	Air temperature sensor of indoor unit is open or short
	0	2	Inlet pipe temperature sensor of indoor unit	Inlet pipe temperature sensor of indoor unit is open or short
	0	3	Transmission error : wired remote controller ↔ indoor unit	Failing to receive wired remote controller signal at indoor unit PCB
	0	4	Drain pump	Malfunction of drain pump
	0	5	Transmission error : outdoor unit ↔ indoor unit	Failing to receive outdoor unit signal at indoor unit PCB
	0	6	Outlet pipe temperature sensor of indoor unit	Outlet pipe temperature sensor of indoor unit is open or short
	0	7	Different operation mode	Operation mode between indoor unit and outdoor unit is different
	0	9	Serial No.	In the case that the serial number marked on EEPROM of Indoor unit is 0 or FFFFFFFF
	1	0	Poor fan motor operation	Disconnecting the fan motor connector/Failure or indoor fan motor lock
	1	1	Transmission error: indoor unit → main PCB of outdoor.	When the addressing signal doesn't come out for 3mins. suddenly, while the indoor unit gets the calling signal coming from the outdoor unit,
Power related error	2	1	DC peak	IPM fault or overcurrent to compressor
	2	2	Overcurrent of inverter comp.	Overcurrent flows to inverter compressor
	2	3	Poor voltage charge for driving INV compressor	DC charging is not performed after starting relay turn on
	2	4	High pressure switch of main outdoor unit	System is off by high pressure switch
	2	5	Low/Over voltage	Input voltage is out of tolerable range.
Compressor related error	3	2	Discharge temperature of main outdoor unit (INV compressor)	System is off due to rising of INV compressor discharge temperature
	3	3	Discharge temperature of main outdoor unit (constant speed compressor)	System is off due to rising of constant speed compressor discharge temperature
	3	4	High pressure of main outdoor unit	System is off by excessive increase of high pressure of main outdoor unit
	3	5	Low pressure of main outdoor unit	System is off by excessive decrease of low pressure of main outdoor unit

	Display		Title	Cause of Error
Outdoor unit related error	4	0	Current sensor of inverter compressor	Current sensor of inverter compressor is open or short
	4	1	Discharge temperature sensor of inverter compressor	Discharge temperature sensor of inverter compressor is open or short
	4	2	Low pressure sensor of main outdoor unit	Low pressure sensor of main outdoor unit is open or short
	4	3	High pressure sensor of main outdoor unit	High pressure sensor of main outdoor unit is open or short
	4	4	Air temperature sensor of main outdoor unit	Air temperature sensor of main outdoor unit is open or short
	4	5	Temperature sensor of front-side heat exchanger	Temperature sensor of front-side heat exchanger is open or short
	4	6	Suction temperature sensor of main outdoor unit	Suction temperature sensor of main outdoor unit is open or short
	4	7	Discharge temperature sensor of the constant speed compressor of main outdoor unit	Discharge temperature sensor of the constant speed compressor of main outdoor unit is open or short
	4	8	Temperature sensor of rear-side heat exchanger	Temperature sensor of rear-side heat exchanger is open or short
Transmission related error	5	1	Excessive capacity of indoor units	Excessive connection of indoor units compared to capacity of outdoor unit
	5	2	Transmission error : inverter PCB → main PCB	Failing to receive inverter signal at main PCB
	5	3	Transmission error : indoor unit → main PCB of outdoor unit	Failing to receive indoor unit signal at main PCB of outdoor unit
	5	4	Reverse connection of R, S, T power of main outdoor unit	Reverse connection or omitting connection of R, S, T power of main outdoor unit
	5	7	Transmission error : main PCB → inverter PCB	Failing to receive main PCB signal at inverter PCB
Outdoor unit related error	6	2	Overheat of inverter heatsink	Overheat of inverter heatsink
	6	5	Temperature sensor of fan	Temperature sensor of fan is open or short

Self-diagnosis function

	Display			Title	Cause of Error
Compressor related error	1	0	0	Discharge temperature of constant speed compressor 1 of sub1 outdoor unit	System is off by excessive increase of discharge temperature of constant speed compressor 1 of sub1 outdoor unit
	1	0	1	Discharge temperature of constant speed compressor 2 of sub1 outdoor unit	System is off by excessive increase of discharge temperature of constant speed compressor 2 of sub1 outdoor unit
	1	0	2	Discharge temperature of constant speed compressor 1 of sub2 outdoor unit	System is off by excessive increase of discharge temperature of constant speed compressor 1 of sub2 outdoor unit
	1	0	3	Discharge temperature of constant speed compressor 2 of sub2 outdoor unit	System is off by excessive increase of discharge temperature of constant speed compressor 2 of sub2 outdoor unit
Transmission related error	1	0	4	Transmission error : sub1 outdoor unit → main outdoor unit	Failing to receive sub1 signal at main PCB of main outdoor unit
	1	0	5	Transmission error : fan PCB → main PCB	Failing to receive fan signal at main PCB
	1	0	6	Over-current of fan motor (IPM fault)	Over-current of fan motor (IPM fault)
	1	0	7	Low voltage of fan motor driver	Low voltage of fan motor driver
	1	0	8	Transmission error : main PCB → fan PCB	Failing to receive main signal at fan PCB
	1	0	9	High pressure switch of sub1 outdoor unit	High pressure switch of sub1 outdoor unit is operated by high pressure rising
	1	1	0	Reverse connection of R, S, T power of sub1 outdoor unit	Reverse connection or omitting connection of R, S, T power of sub1 outdoor unit
Outdoor unit related error	1	1	3	Liquid pipe temperature sensor of main outdoor unit	Liquid pipe temperature sensor of main outdoor unit is open or short
	1	1	4	Subcooling inlet temperature sensor of main outdoor unit	Subcooling inlet temperature sensor of main outdoor unit is open or short
	1	1	5	Subcooling outlet temperature sensor of main outdoor unit	Subcooling outlet temperature sensor of main outdoor unit is open or short
	1	1	6	High pressure sensor of sub1 outdoor unit	High pressure sensor of sub1 outdoor unit is open or short
	1	1	7	Low pressure sensor of sub1 outdoor unit	Low pressure sensor of sub1 outdoor unit is open or short
	1	1	8	Air temperature sensor of sub1 outdoor unit	Air temperature sensor of sub1 outdoor unit is open or short
	1	2	0	Suction temperature sensor of sub1 outdoor unit	Suction temperature sensor of sub1 outdoor unit is open or short
	1	2	1	Discharge temperature sensor of the constant speed compressor 1 of sub1 outdoor unit	Discharge temperature sensor of the constant speed compressor 1 of sub1 outdoor unit is open or short
	1	2	2	Discharge temperature sensor of the constant speed compressor 2 of sub1 outdoor unit	Discharge temperature sensor of the constant speed compressor 2 of sub1 outdoor unit is open or short
	1	2	3	Temperature sensor of front-side heat exchanger of sub1 outdoor unit	Temperature sensor of front-side heat exchanger of sub1 unit is open or short



			Display	Title	Cause of Error
Outdoor unit related error	1	2	4	Temperature sensor of rear-side heat exchanger of sub1 outdoor unit	Temperature sensor of rear-side heat exchanger of sub1 unit is open or short
	1	2	5	Liquid pipe temperature sensor of sub1 outdoor unit	Liquid pipe temperature sensor of sub1 outdoor unit is open or short
	1	2	6	Subcooling inlet temperature sensor of sub1 outdoor unit	Subcooling inlet temperature sensor of sub1 outdoor unit is open or short
	1	2	7	Subcooling outlet temperature sensor of sub1 outdoor unit	Subcooling outlet temperature sensor of sub1 outdoor unit is open or short
	1	2	8	High pressure sensor of sub2 outdoor unit	High pressure sensor of sub2 outdoor unit is open or short
	1	2	9	Low pressure sensor of sub2 outdoor unit	Low pressure sensor of sub2 outdoor unit is open or short
	1	3	0	Air temperature sensor of sub2 outdoor unit	Air temperature sensor of sub2 outdoor unit is open or short
	1	3	2	Suction temperature sensor of sub2 outdoor unit	Suction temperature sensor of sub2 outdoor unit is open or short
	1	3	3	Discharge temperature sensor of the constant speed compressor 1 of sub2 outdoor unit	Discharge temperature sensor of the constant speed compressor 1 of sub2 outdoor unit is open or short
	1	3	4	Discharge temperature sensor of the constant speed compressor 2 of sub2 outdoor unit	Discharge temperature sensor of the constant speed compressor 2 of sub2 outdoor unit is open or short
	1	3	5	Temperature sensor of front-side heat exchanger of sub2 outdoor unit	Temperature sensor of front-side heat exchanger of sub2 unit is open or short
	1	3	6	Temperature sensor of rear-side heat exchanger of sub2 outdoor unit	Temperature sensor of rear-side heat exchanger of sub2 unit is open or short
	1	3	7	Liquid pipe temperature sensor of sub2 outdoor unit	Liquid pipe temperature sensor of sub2 outdoor unit is open or short
	1	3	8	Subcooling inlet temperature sensor of sub2 outdoor unit	Subcooling inlet temperature sensor of sub2 outdoor unit is open or short
	1	3	9	Subcooling outlet temperature sensor of sub2 outdoor unit	Subcooling outlet temperature sensor of sub2 outdoor unit is open or short
	1	4	0	High pressure sensor of sub2 outdoor unit	High pressure sensor of sub2 outdoor unit is open or short
	1	4	1	Reverse connection of R, S, T power of sub2 outdoor unit	Reverse connection or omitting connection of R, S, T power of sub2 outdoor unit
	1	4	2	Transmission error : main outdoor unit → sub1 outdoor unit	Failing to receive main signal at main PCB of sub2 outdoor unit
	1	4	3	High pressure of sub1 outdoor unit	System is off by excessive increase of high pressure of sub1 outdoor unit
	1	4	4	Low pressure of sub1 outdoor unit	System is off by excessive decrease of low pressure of sub1 outdoor unit
1	4	5	High pressure of sub2 outdoor unit	System is off by excessive increase of high pressure of sub2 outdoor unit	
1	4	6	Low pressure of sub2 outdoor unit	System is off by excessive decrease of low pressure of sub2 outdoor unit	
1	4	7	Low/high voltage of sub1 outdoor unit	Input voltage of sub1 outdoor unit is more than 487V or less than 270V	

## Self-diagnosis function

	Display			Title	Cause of Error
Outdoor unit related error	1	4	8	Voltage detection circuit of sub1 outdoor unit	Voltage detection circuit of sub1 outdoor unit is out of order
	1	4	9	Low/high voltage of sub2 outdoor unit	Input voltage of sub2 outdoor unit is more than 487V or less than 270V
	1	5	0	Voltage detection circuit of sub2 outdoor unit	Voltage detection circuit of sub2 outdoor unit is out of order
	1	5	1	Failure of operation mode conversion	Pressure unbalance between outdoor units
	1	7	3	Failure of Main constant speed compressor operation	Comp locking, Check Valve leakage, comp dielectric breakdown
	1	7	4	Failure of Sub1 constant speed compressor1 operation	Comp locking, Check Valve leakage, comp dielectric breakdown
	1	7	5	Failure of Sub1 constant speed compressor2 operation	Comp locking, Check Valve leakage, comp dielectric breakdown
	1	7	6	Failure of Sub2 constant speed compressor1 operation	Comp locking, Check Valve leakage, comp dielectric breakdown
	1	7	7	Failure of Sub2 constant speed compressor2 operation	Comp locking, Check Valve leakage, comp dielectric breakdown
	1	7	8	Failure of Sub3 constant speed compressor1 operation	Comp locking, Check Valve leakage, comp dielectric breakdown
	1	7	9	Failure of Sub3 constant speed compressor2 operation	Comp locking, Check Valve leakage, comp dielectric breakdown
HR unit related error	2	0	0	Automatic addressing of valves	Failure of automatic addressing of valves
	2	0	1	Liquid pipe sensor of HR unit 1	Liquid pipe sensor of HR unit 1 is open or short
	2	0	2	Inlet sensor of subcooler of HR unit 1	Inlet sensor of subcooler of HR unit 1 is open or short
	2	0	3	Outlet sensor of subcooler of HR unit 1	Outlet sensor of subcooler of HR unit 1 is open or short
	2	0	4	Transmission error : HR unit 1 → outdoor unit	Failing to receive HR unit 1 signal at outdoor unit
	2	0	5	Liquid pipe sensor of HR unit 2	Liquid pipe sensor of HR unit 2 is open or short
	2	0	6	Inlet sensor of subcooler of HR unit 2	Inlet sensor of subcooler of HR unit 2 is open or short
	2	0	7	Outlet sensor of subcooler of HR unit 2	Outlet sensor of subcooler of HR unit 2 is open or short
	2	0	8	Transmission error : HR unit 2 → outdoor unit	Failing to receive HR unit 2 signal at outdoor unit
	2	0	9	Liquid pipe sensor of HR unit 3	Liquid pipe sensor of HR unit 3 is open or short
	2	1	0	Inlet sensor of subcooler of HR unit 3	Inlet sensor of subcooler of HR unit 3 is open or short
	2	1	1	Outlet sensor of subcooler of HR unit 3	Outlet sensor of subcooler of HR unit 3 is open or short
	2	1	2	Transmission error : HR unit 3 → outdoor unit	Failing to receive HR unit 3 signal at outdoor unit
	2	1	3	Liquid pipe sensor of HR unit 4	Liquid pipe sensor of HR unit 4 is open or short
	2	1	4	Inlet sensor of subcooler of HR unit 4	Inlet sensor of subcooler of HR unit 4 is open or short
	2	1	5	Outlet sensor of subcooler of HR unit 4	Outlet sensor of subcooler of HR unit 4 is open or short
	2	1	6	Transmission error : HR unit 4 → outdoor unit	Failing to receive HR unit 4 signal at outdoor unit
	2	1	7	Liquid pipe sensor of HR unit 5	Liquid pipe sensor of HR unit 5 is open or short
	2	1	8	Inlet sensor of subcooler of HR unit 5	Inlet sensor of subcooler of HR unit 5 is open or short
	2	1	9	Outlet sensor of subcooler of HR unit 5	Outlet sensor of subcooler of HR unit 5 is open or short
	2	2	0	Transmission error: HR unit 5 → outdoor unit	Failing to receive HR unit 5 signal at outdoor unit
2	2	1	Liquid pipe sensor of HR unit 6	Liquid pipe sensor of HR unit 6 is open or short	
2	2	2	Inlet sensor of subcooler of HR unit 6	Inlet sensor of subcooler of HR unit 6 is open or short	
2	2	3	Outlet sensor of subcooler of HR unit 6	Outlet sensor of subcooler of HR unit 6 is open or short	
2	2	4	Transmission error: HR unit 6 → outdoor unit	Failing to receive HR unit 6 signal at outdoor unit	
2	2	5	Liquid pipe sensor of HR unit 7	Liquid pipe sensor of HR unit 7 is open or short	

	Display			Title	Cause of Error
HR unit related error	2	2	6	Inlet sensor of subcooler of HR unit 7	Inlet sensor of subcooler of HR unit 7 is open or short
	2	2	7	Outlet sensor of subcooler of HR unit 7	Outlet sensor of subcooler of HR unit 7 is open or short
	2	2	8	Transmission error: HR unit 7 → outdoor unit	Failling to receive HR unit 7 signal at outdoor unit
	2	2	9	Liquid pipe sensor of HR unit 8	Liquid pipe sensor of HR unit 8 is open or short
	2	3	0	Inlet sensor of subcooler of HR unit 8	Inlet sensor of subcooler of HR unit 8 is open or short
	2	3	1	Outlet sensor of subcooler of HR unit 8	Outlet sensor of subcooler of HR unit 8 is open or short

■ Please refer to trouble shooting guide in service manual for each error title



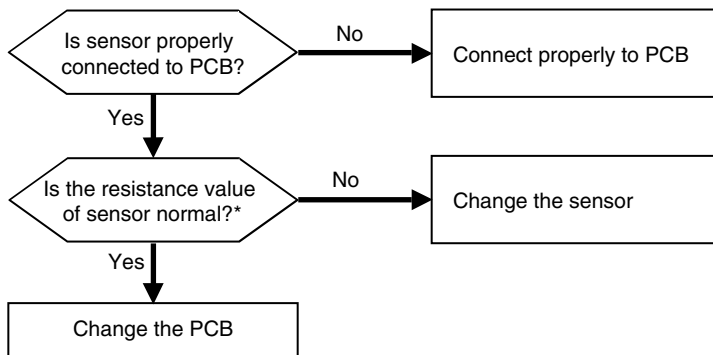
### CAUTION

In case that the control box is opened and before checking electrical parts, it should be checked that the LED 01Y turned off (wait 3 minutes after main power OFF), otherwise, it may cause electrical shock.

## Troubleshooting Guide

Error No.	Error Type	Error Point	Main Reasons
01	Indoor unit air sensor error	Indoor unit sensor is open/short	1. Indoor unit PCB wrong connection 2. Indoor unit PCB failure 3. Sensor problem (main reason)
02	Indoor unit pipe inlet sensor error		
06	Indoor unit pipe outlet sensor error		

### ■ Error diagnosis and countermeasure flow chart

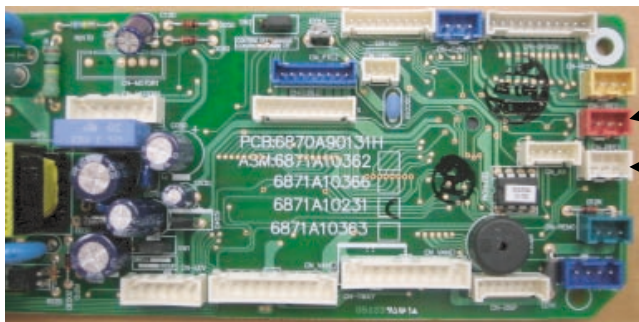


\*\* In case the value is more than 100kΩ (open) or less than 100Ω (short), Error occurs

Refer: Resistance value maybe change according to temperature of temp sensor,  
It shows according to criteria of current temperature(±5% margin) → Normal

Air temp sensor: 10°C = 20.7kΩ : 25°C= 10kΩ : 50°C= 3.4kΩ

Pipe temp sensor: 10°C = 10kΩ : 25°C= 5kΩ : 50°C= 1.8kΩ



← **CN-ROOM** : Indoor air temp sensor

← **CN-PIPE2** : Pipe outlet temp sensor

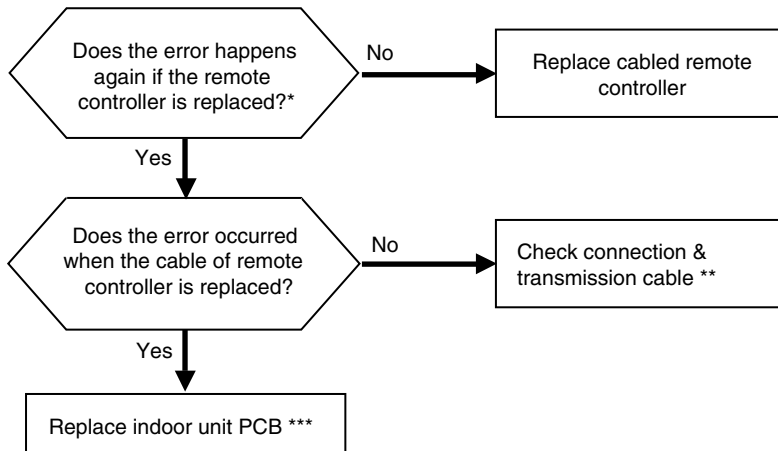
← **CN-PIPE1** : Pipe inlet temp sensor



← Measure the resistance of outlet pipe temp sensor.

Error No.	Error Type	Error Point	Main Reasons
03	No transmission between cabled remote controller & indoor unit	The remote controller did not receive the signal from indoor unit during specific time	1. Remote controller fault 2. Indoor unit PCB fault 3. Connector fault, Wrong connection 4. transmission cable problem

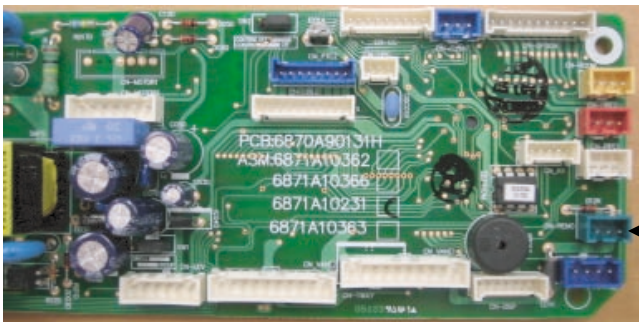
■ Error diagnosis and countermeasure flow chart



\* If there is no remote controller to replace : Use another unit's remote controller doing well

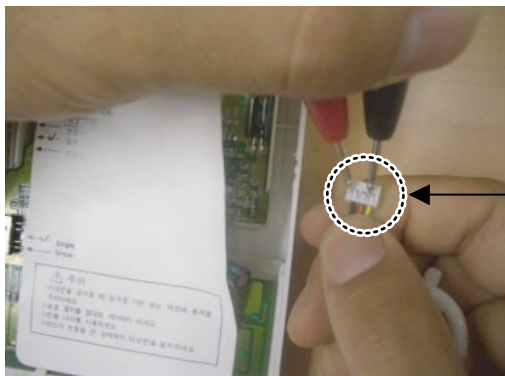
\*\* Check cable : Contact failure of connected portion or extension of cable are main cause  
 Check any surrounded noise ( check the distance with main power cable)  
 → make safe distance from the devices generate electromagnetic wave

\*\*\* After replacing indoor unit PCB, do Auto Addressing & input unit's address if connected to central controller.  
 (All the indoor units connected should be turned on before Auto Addressing



← **CN-REMO** : Remote controller connection

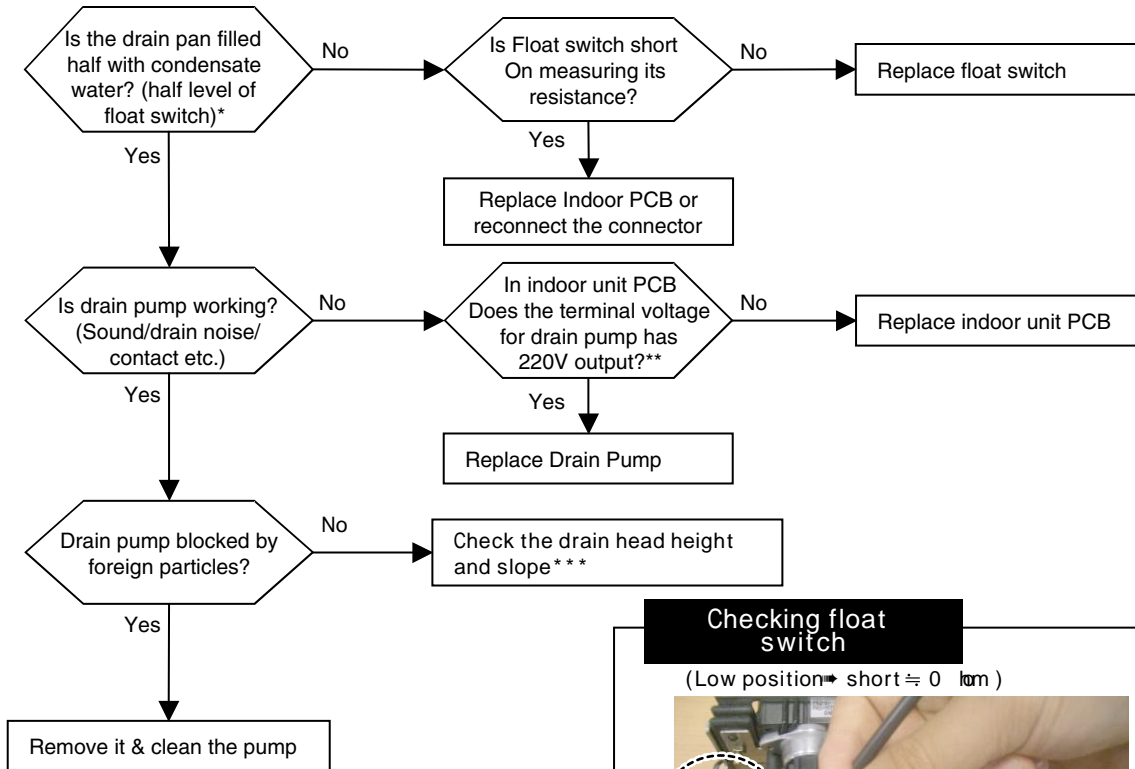
※ The PCB can differ from model to model.  
 Check from the right source.



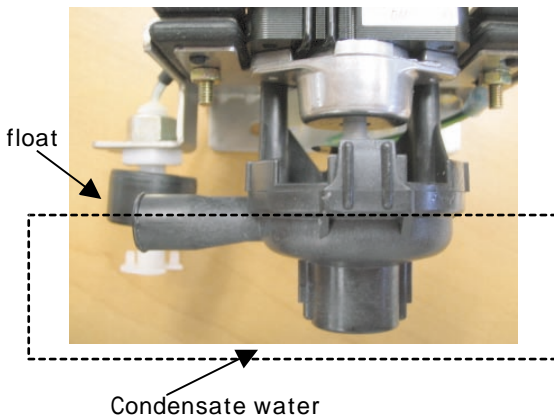
← Checking transmission cable connection status

Error No.	Error Type	Error Point	Main Reasons
04	Drain pump error	Float switch is open due to rising of condensate water level because of drain pump fault or drain pipe clogging	1. Drain pump/float switch fault 2. Improper drain pipe location, clogging of drain pipe 3. Indoor unit PCB fault

■ Error diagnosis and countermeasure flow chart



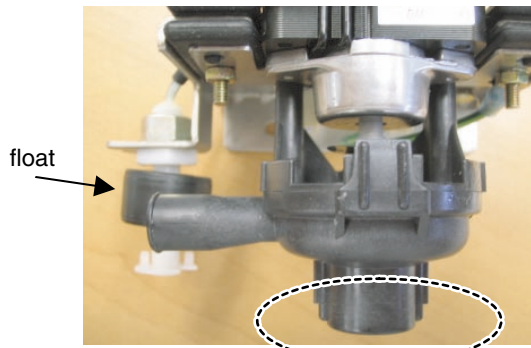
\* If the float goes up higher than a half of float switch then the circuit is open & the unit is stopped automatically.



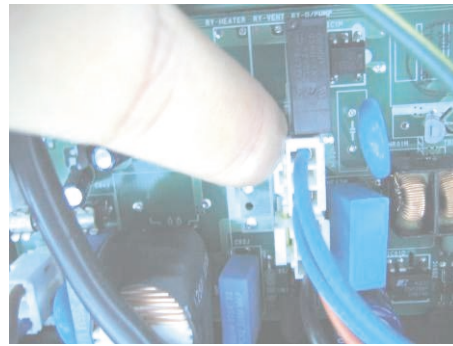
**Checking float switch**

(Low position → short ≈ 0 Ω)

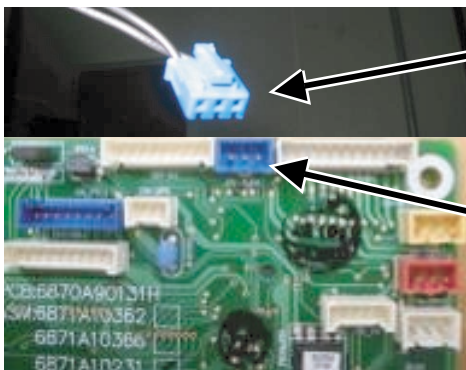
(High position → Open)



A:Point to check rotating



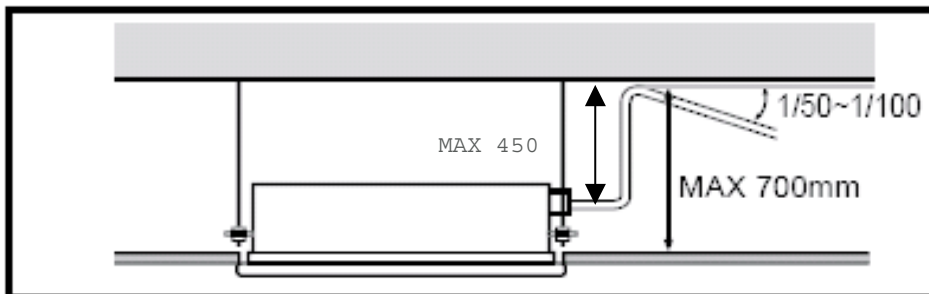
\*\*\* Indoor PCB drain pump connector  
(Check input of 220V)  
(Marked as **CN-DPUMP**)



Float switch connector

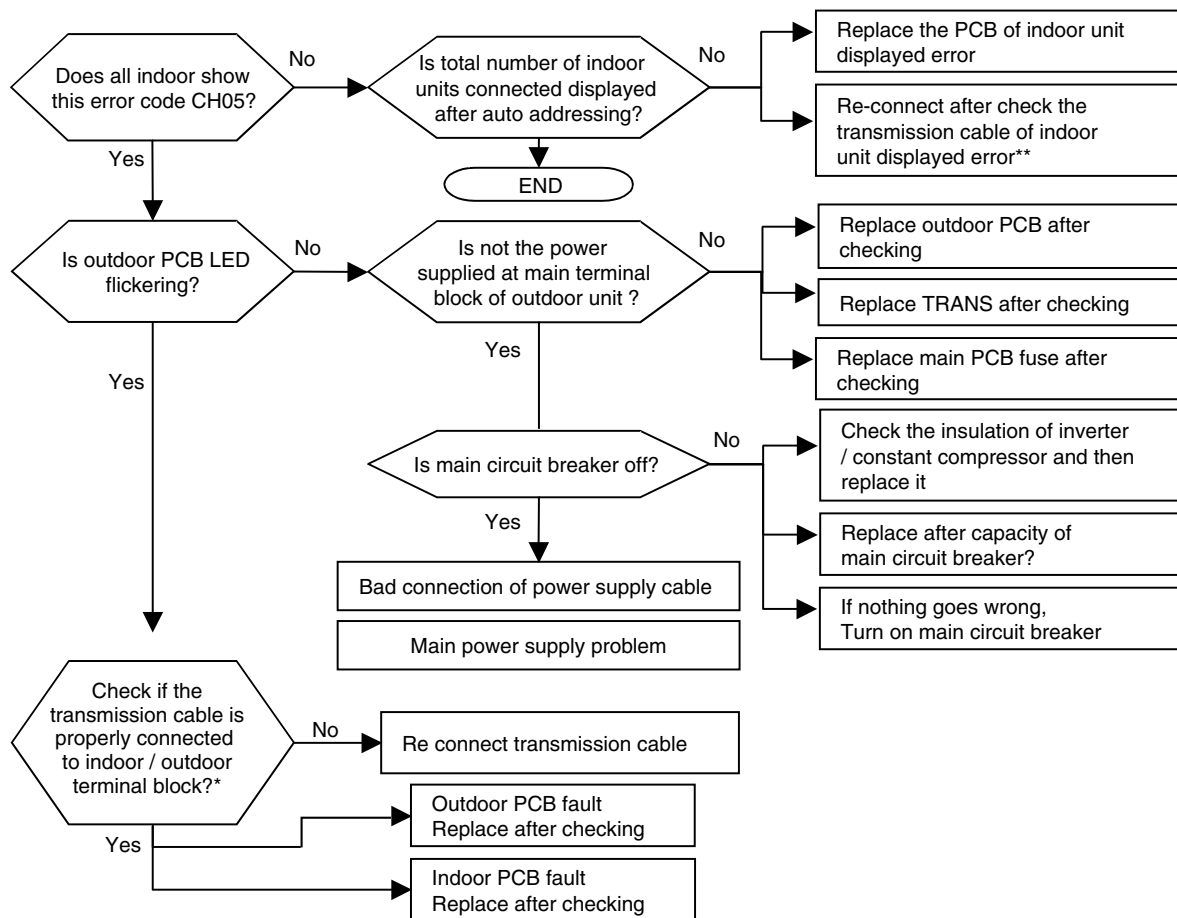
Float switch Housing (**CN-FLOAT**)

[\*\*\*] Standard of drain pipe head height / slope



Error No.	Error Type	Error Point	Main Reasons
05	Indoor & Outdoor unit transmission error	No signal transmission between indoor & outdoor units.	1. Auto addressing is not done 2. transmission cable is not connected 3. Short circuit of transmission cable 4. Indoor unit transmission circuit fault 5. Outdoor unit transmission circuit fault 6. Not enough distance between power and transmission cable? 7. Is the fuse for main PCB power of outdoor unit burnt out?

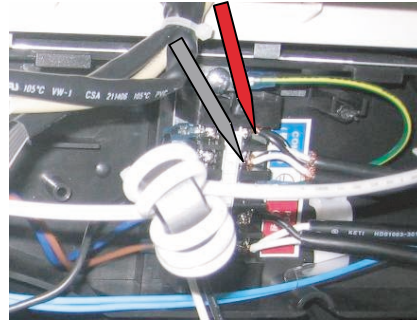
■ Error diagnosis and countermeasure flow chart



\* If the DC voltage between transmission terminal A, B of outdoor unit is fluctuate within (-9V~+9V) then transmission from indoor unit is normal



\* If the DC voltage between transmission terminal A, B of indoor unit is fluctuate within (-9V~+9V) then transmission from outdoor unit is normal

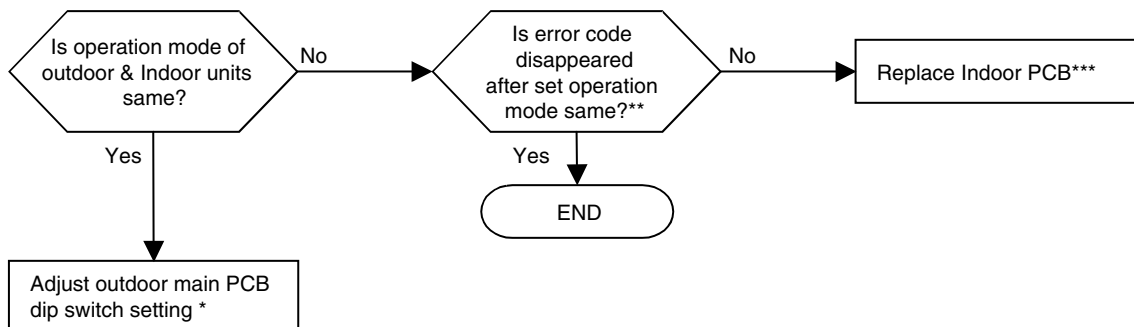




Error No.	Error Type	Error Point	Main Reasons
06	Indoor unit outlet pipe temperature sensor error	Indoor unit outlet pipe temperature sensor open or short	Refer to CH02

Error No.	Error Type	Error Point	Main Reasons
07	All Indoor units are not running in same mode	The Indoor units started later are operated in different mode from earlier one.	1. Indoor units are in different mode 2. PCB fault 3. cabled remote controller fault

■ Error diagnosis and countermeasure flow chart



\* Outdoor main PCB dip switch no.5 (Cooling) or no.6 (heating) is in On, different mode operation error may be occurred because the operation mode is fixed by dip switch setting.

\*\* Dissolution method CH07 with remote controller

- 1) Error removal method : Turn off remote controller by pressing the On/Off button on the cabled remote controller. The error code will be removed automatically after a few seconds.  
With cableless remote controller: Turn off indoor unit, and turn on with the other operation mode the error will disappeared

- 2) Immediately change the operation mode after the pressing the On/Off button .  
The same operation mode as in the indoor unit started at first other than the defective unit mode (heating /cooling)

\*\*\* After replacing the indoor unit PCB, it should be done to do Auto addressing and input the address of central control

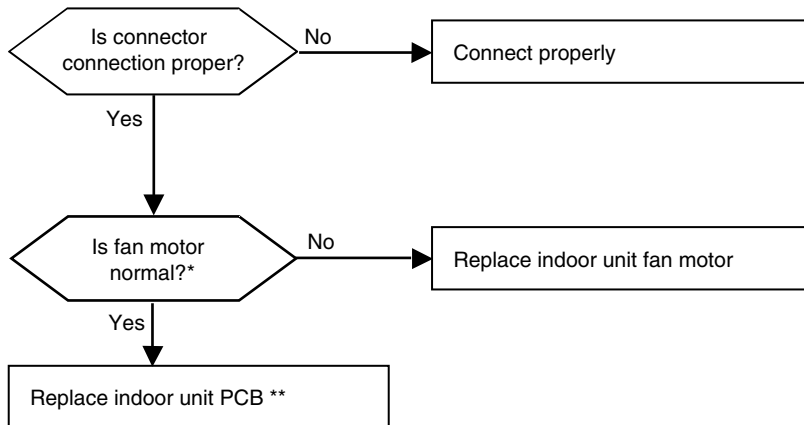
Error No.	Error Type	Error Point	Main Reasons
09	Indoor unit EEPROM error	Problem in EEPROM inside Indoor PCB ASS'Y EEPROM	1. Error developed in transmission between the micro- processor and the EEPROM on the surface of the PCB. 2. ERROR due to the EEPROM damage

■ Error diagnosis and countermeasure flow chart

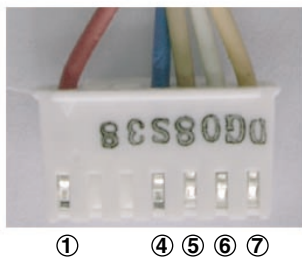
- Replace the indoor unit PCB, and then make sure to do Auto addressing and input the address of central control

Error No.	Error Type	Error Point	Main Reasons
10	Indoor unit BLDC fan motor failure	Indoor BLDC fan motor feedback signal is absent (for 50 sec.)	1. Motor connector connection fault 2. Indoor PCB fault 3. Motor fault

■ Error diagnosis and countermeasure flow chart



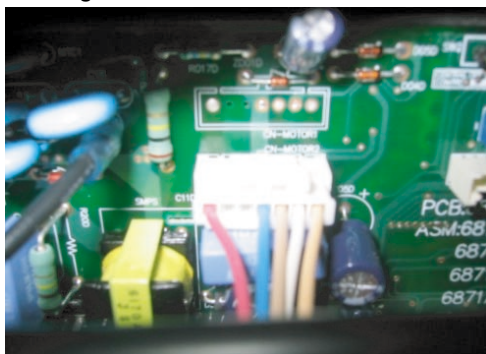
\* It is normal when check hall sensor of indoor fan motor as shown below



Each terminal with the tester

Tester		Normal resistance(±10%)	
+	-	TH chassis	TD chassis
①	④	∞	∞
⑤	④	hundreds kΩ	hundreds kΩ
⑥	④	∞	∞
⑦	④	hundreds kΩ	hundreds kΩ

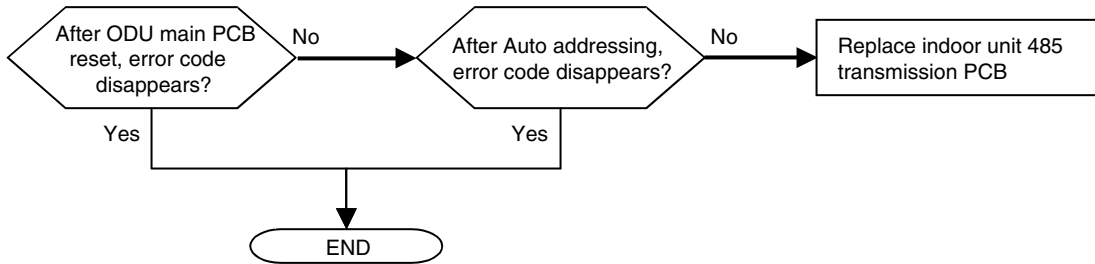
<Checking connection state of fan motor connector>



\*\* Replace the indoor unit PCB, and then make sure to do Auto addressing and input the address of central control  
(Notice: The connection of motor connector to PCB should be done under no power supplying to PCB)

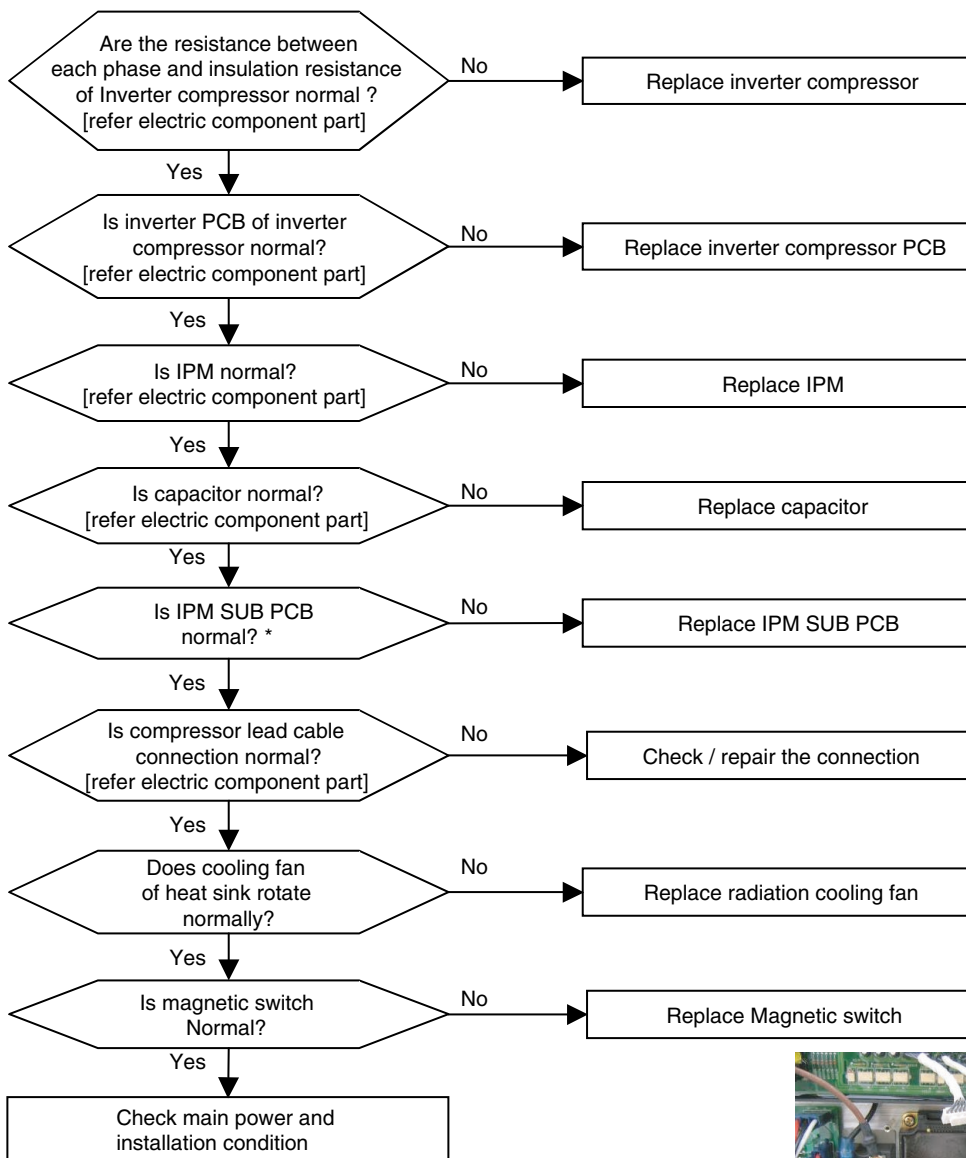
Error No.	Error Type	Error Point	Main Reasons
11	Indoor unit transmission error	Indoor unit doesn't get signal from ODU for 3 minutes continuously	1. Indoor 485 transmission PCB fault 2. After PCB replacing, auto addressing was not done

■ Error diagnosis and countermeasure flow chart



Error No.	Error Type	Error Point	Main Reasons
21	IPM fault of inverter compressor	Defective inverter compressor, Inverter element (IPM) defect	1. Over current detection at the inverter compressor (U,V,W) 2. IPM overheating. 3. Insulation damage of the compressor / compressor motor damage 4. Low input voltage at the outdoor 5. Inverter compressor terminal disconnected or loose. 6. Inverter PCB / IPM PCB defect

■ Error diagnosis and countermeasure flow chart

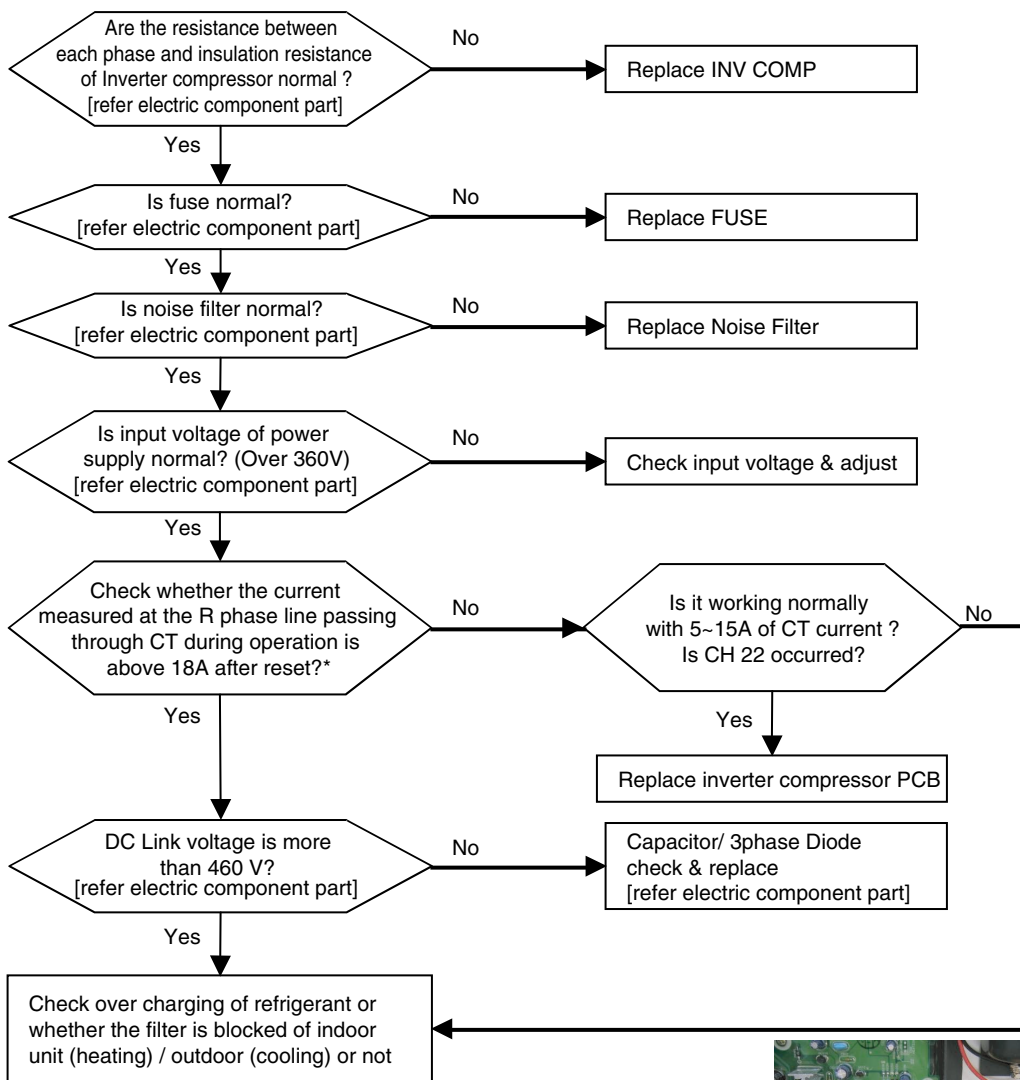


\* Check the soldering state of IPM SUB PCB



Error No.	Error Type	Error Point	Main Reasons
22	Over current of inverter compressor	The current flowing at the CT sensing circuit is more than the allowable maximum value of the current during cooling mode	<ol style="list-style-type: none"> <li>1. Compressor damage</li> <li>2. Current sensing sensor (CT) damage</li> <li>3. Low input voltage</li> <li>4. Compressor terminal is disconnected or loose</li> <li>5. Abnormality at the outdoor / indoor unit fan</li> <li>7. Cover or clogging(Outdoor unit covering during cooling mode/ Filter clogged at the indoor during heating mode )</li> <li>8. Defective inverter PCB/IPM PCB</li> </ol>

■ Error diagnosis and countermeasure flow chart

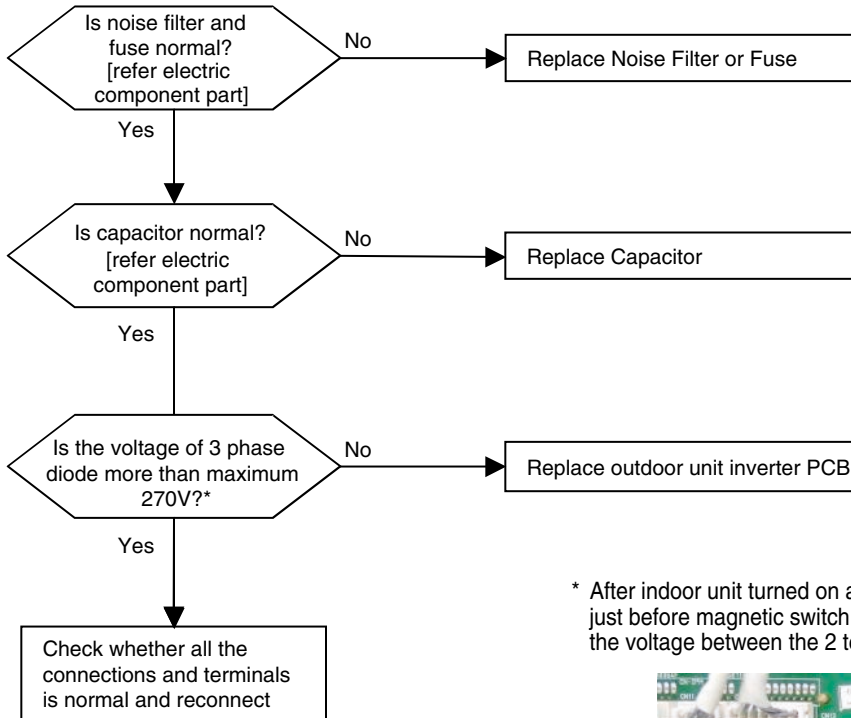


\* measure the current passing through CT by clamp meter

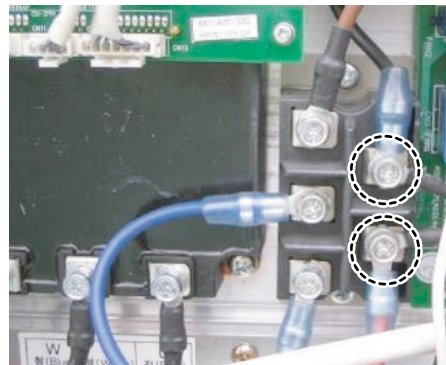


Error No.	Error Type	Error Point	Main Reasons
23	DC voltage charging for inverter compressor driving defect	Problem in DC charging voltage after starting relay turned on	1. Looseness of DC link terminal 2. Damage in starting relay 3. Capacitor damage 4. Defective sensing circuit of the inverter PCB

■ Error diagnosis and countermeasure flow chart

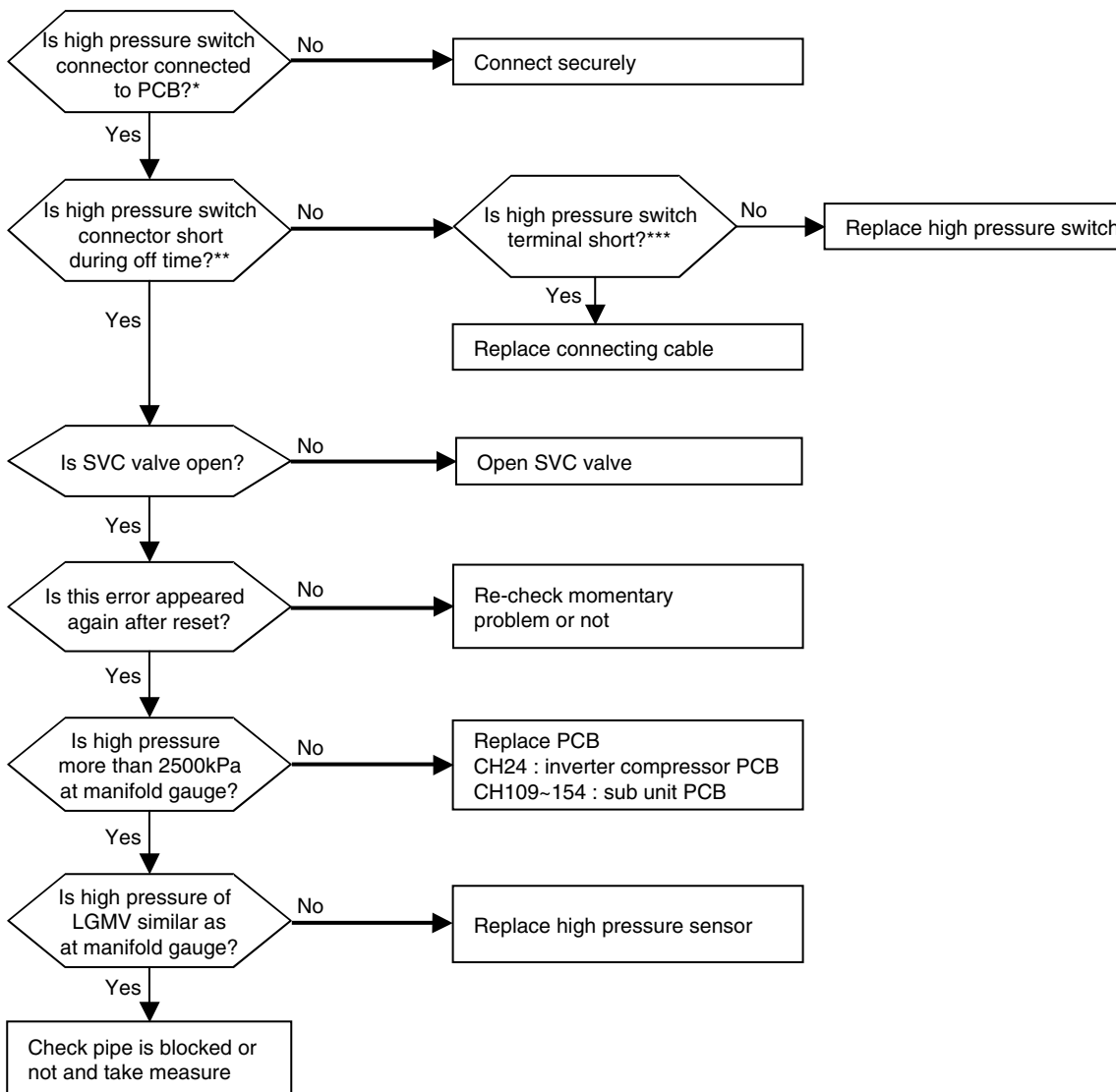


\* After indoor unit turned on and the compressor is not operated, just before magnetic switch is turned on the voltage between the 2 terminal as below is more than 270V



Error No.	Error Type	Error Point	Main Reasons
24 (Main) 109 (Sub1) 140 (Sub2) 154 (Sub3)	Excessive rise of discharge pressure in outdoor compressor	Compressor off due to the high pressure switch in outdoor unit	<ol style="list-style-type: none"> <li>1. Defective high pressure switch</li> <li>2. Defective fan of indoor unit or outdoor unit</li> <li>3. Check valve of compressor clogged</li> <li>4. Pipe distortion due to the pipe damage</li> <li>5. Refrigerant overcharge</li> <li>6. Defective LEV at the indoor or outdoor unit .</li> <li>7. Covering or clogging(Outdoor covering during the cooling mode /Indoor unit filter clogging during the heating mode)</li> <li>8. SVC valve clogging</li> <li>9. Defective outdoor PCB</li> </ol>

■ Error diagnosis and countermeasure flow chart

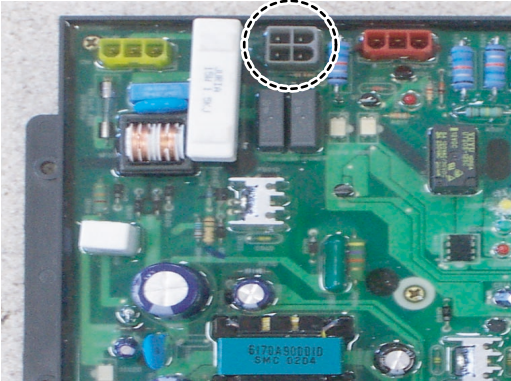


## Troubleshooting Guide

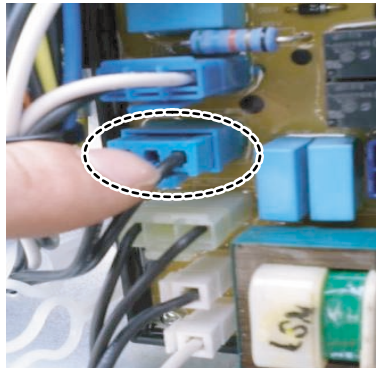
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\* Connector location of high pressure switch at PCB

**Inverter compressor PCB**



**SUB outdoor unit PCB**



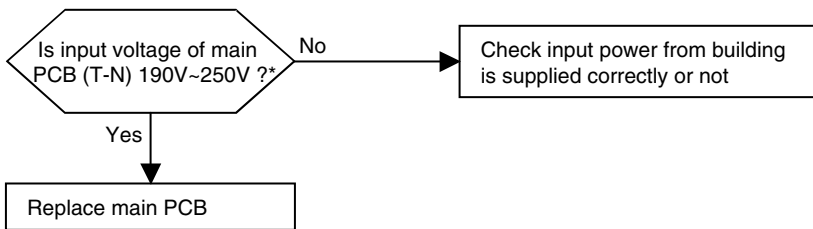
\*\* Checking short or not at connector of high pressure switch



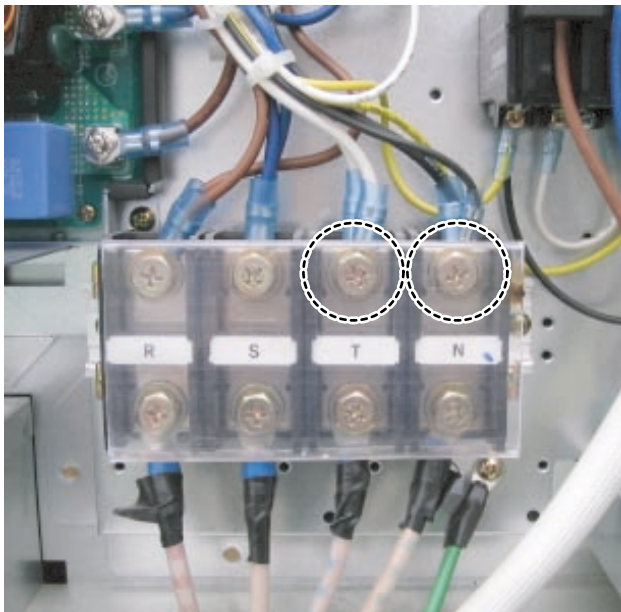


Error No.	Error Type	Error Point	Main Reasons
25(Main) 147(Sub1) 149(Sub2) 171(Sub3)	Low / over voltage of main PCB input	The power supply input voltage tolerance is more or less than allowable standard	1. Input voltage is abnormal(T-N) 2. Outdoor unit main PCB defect

■ Error diagnosis and countermeasure flow chart



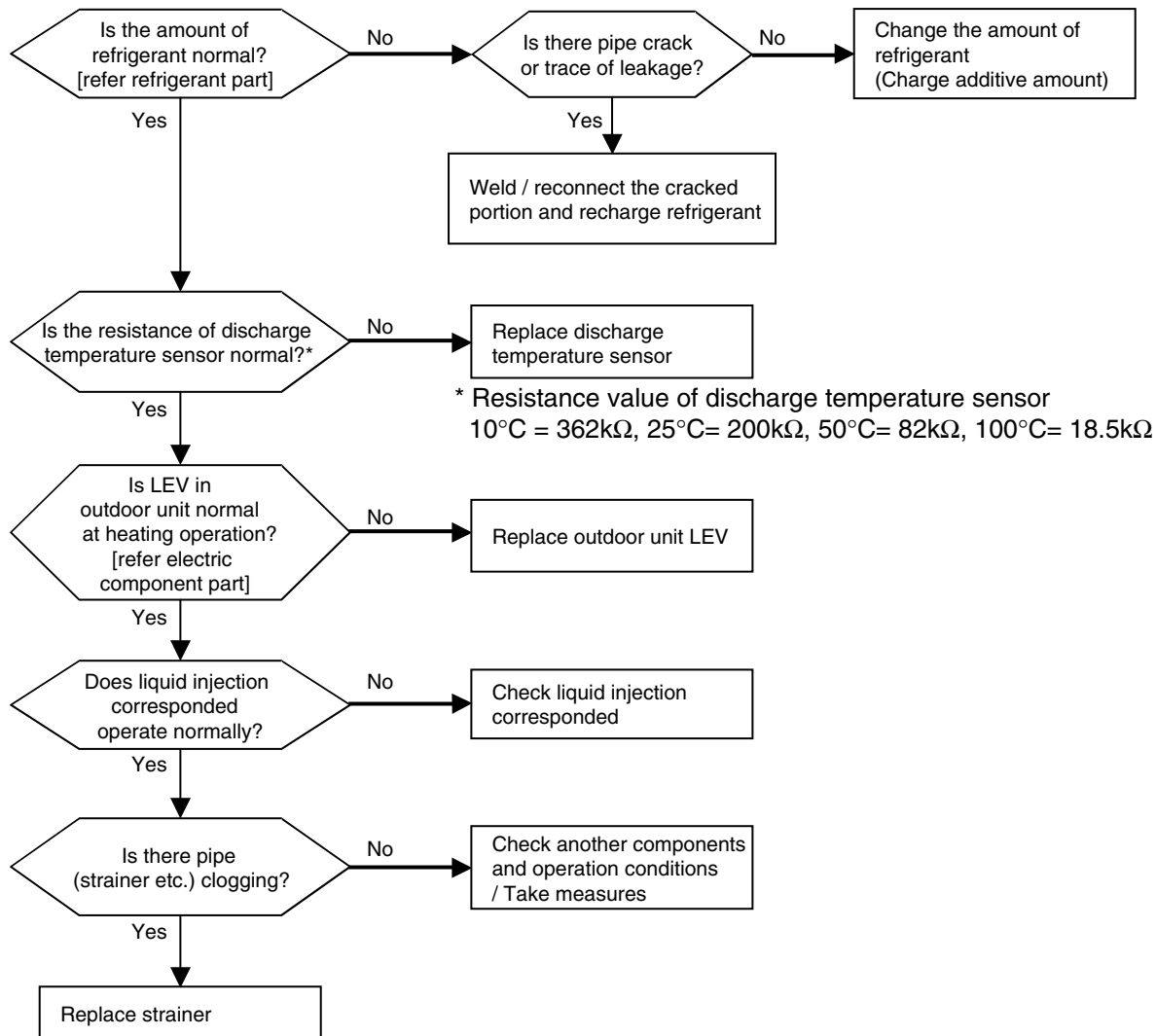
\* Check voltage at outdoor T/Block(220V)



## Troubleshooting Guide

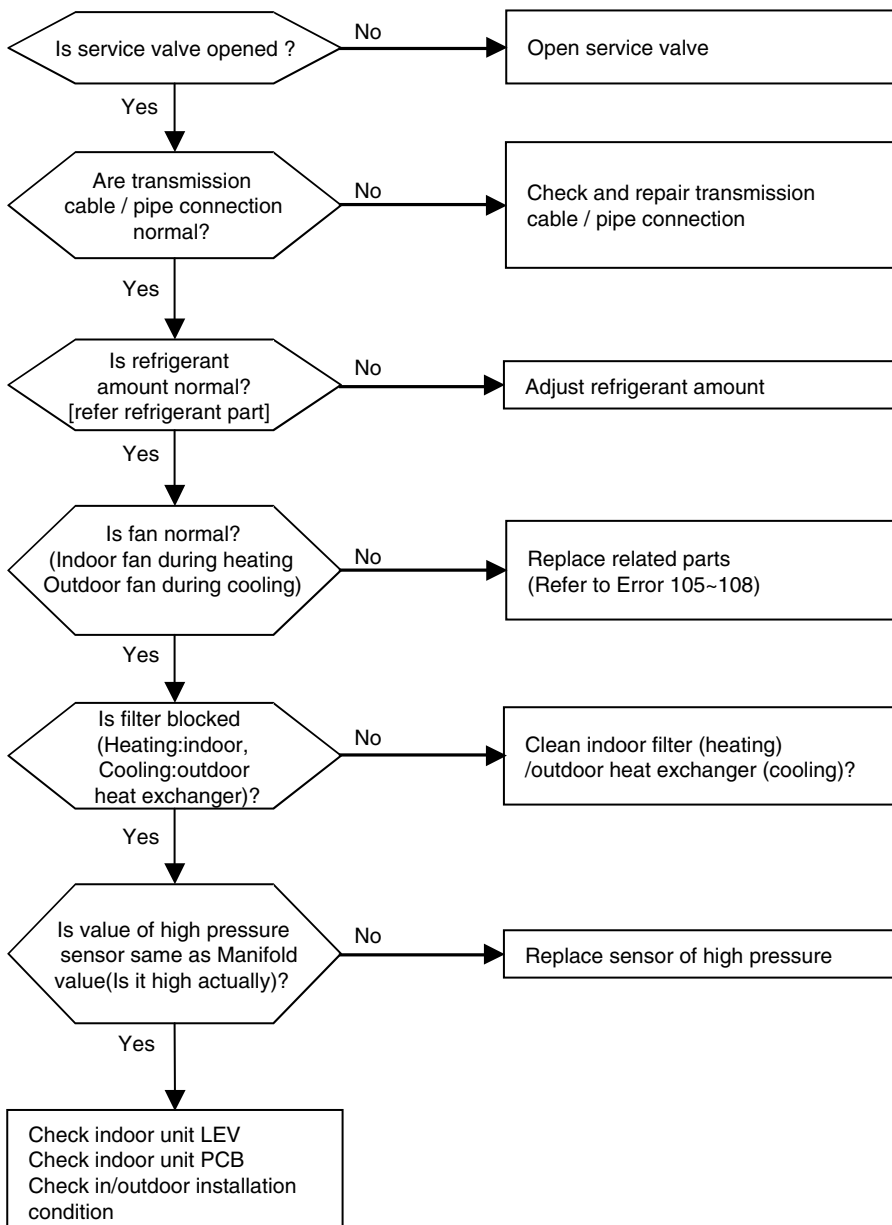
Error No.	Error Type	Error Point	Main Reasons
32(Main)	Over-increase discharge temperature of inverter compressor at main outdoor unit	Compressor is off because of over-increase discharge temperature of inverter compressor	<ol style="list-style-type: none"> <li>1. Temperature sensor defect of inverter compressor discharge pipe</li> <li>2. Refrigerant shortage / leak</li> <li>3. LEV defect</li> <li>4. Liquid injection valve defect</li> </ol>
33 (Main) 100,101 (Sub1) 102,103 (Sub2) 152,153 (Sub3)	Over-increase discharge temperature of constant compressor at main constant outdoor and sub constant outdoor unit	Compressor is off because of over-increase discharge temperature of constant compressor at main and sub outdoor unit	<ol style="list-style-type: none"> <li>1. Temperature sensor defect of constant compressor discharge pipe?</li> <li>2. Refrigerant shortage/leak</li> <li>3. LEV defect</li> <li>4. Liquid injection valve defect</li> </ol>

### ■ Error diagnosis and countermeasure flow chart



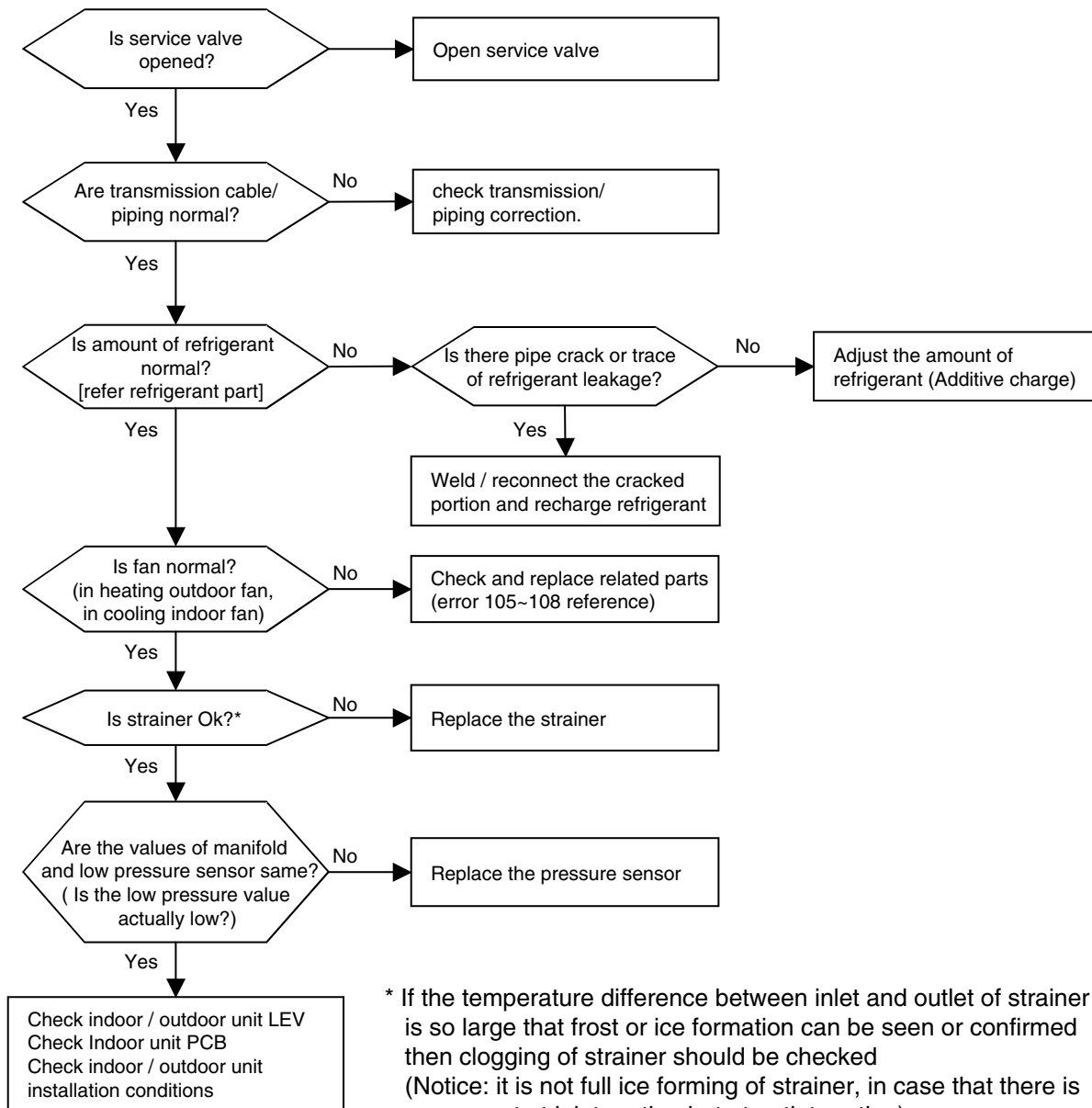
Error No.	Error Type	Error Point	Main Reasons
34 (Main) 143 (Sub1) 145 (Sub2) 169 (Sub3)	Over-increase of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to over-increase of high pressure by high pressure sensor	<ol style="list-style-type: none"> <li>1. Defect of high pressure sensor</li> <li>2. Defect of indoor or outdoor unit fan</li> <li>3. Deformation because of damage of refrigerant pipe</li> <li>4. Over-charged refrigerant</li> <li>5. Defective indoor / outdoor unit LEV</li> <li>6. When blocked                             <ul style="list-style-type: none"> <li>- Outdoor unit is blocked during cooling</li> <li>- Indoor unit filter is blocked during heating</li> </ul> </li> <li>7. SVC valve is clogged</li> <li>8. PCB defect of outdoor unit</li> <li>10. Indoor unit pipe temperature sensor defect</li> </ol>

■ Error diagnosis and countermeasure flow chart



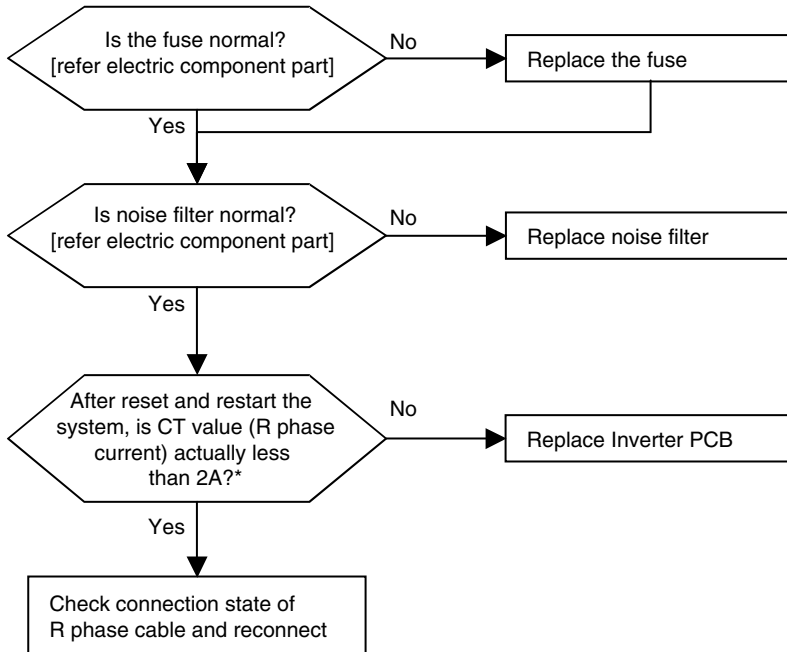
Error No.	Error Type	Error Point	Main Reasons
35 (Main) 144 (Sub1) 146 (Sub2) 170 (Sub3)	Excessive drop of discharge pressure of compressor	Error happens because of 3 times successive compressor off due to excessive drop of low pressure by the low pressure sensor	<ol style="list-style-type: none"> <li>1. Defective low pressure sensor</li> <li>2. Defective outdoor/indoor unit fan</li> <li>3. Refrigerant shortage/leakage</li> <li>4. Deformation because of damage of refrigerant pipe</li> <li>5. Defective indoor / outdoor unit LEV</li> <li>6. Covering / clogging (outdoor unit covering during the cooling mode/ indoor unit filter clogging during heating mode)</li> <li>7. SVC valve clogging</li> <li>8. Defective outdoor unit PCB</li> <li>9. Defective indoor unit pipe sensor</li> </ol>

■ Error diagnosis and countermeasure flow chart

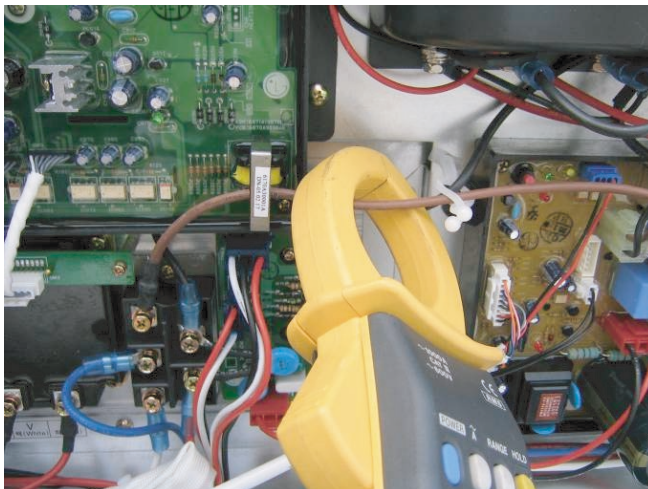


Error No.	Error Type	Error Point	Main Reasons
40	Low current at CT	While inverter compressor operation R phase current drops below 2A	1. Fuse failure 2. Defective noise filter 3. R phase connection problem 4. CT sensor failure (inverter PCB failure)

■ Error diagnosis and countermeasure flow chart

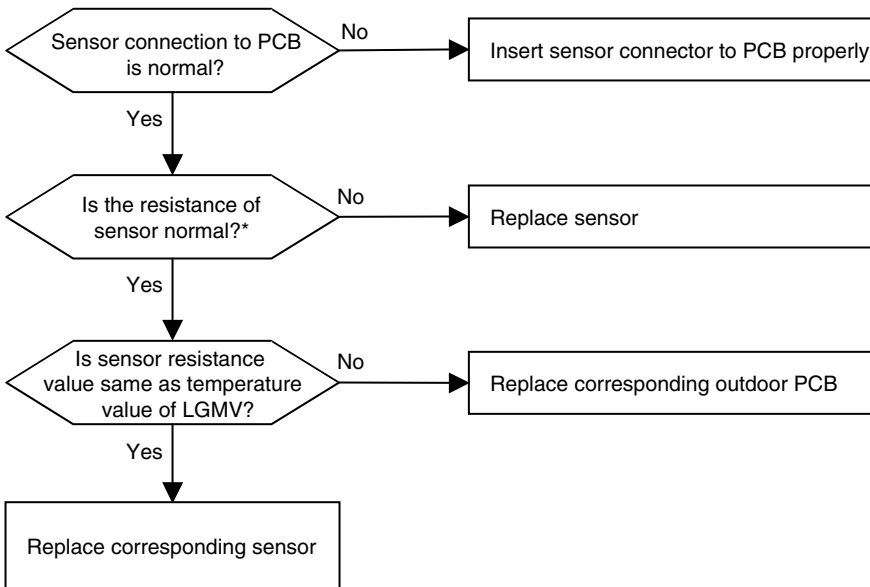


\* Measure the R phase current with clamp meter



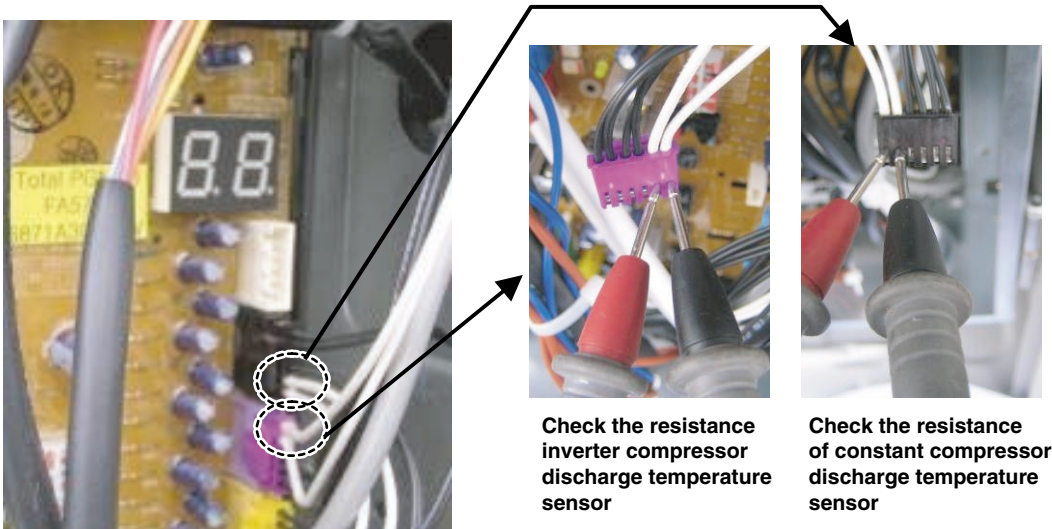
Error No.	Error Type	Error Point	Main Reasons
41 (Main inverter compressor) 47 (Main constant compressor) 121 (Sub1 constant compressor 1) 122 (Sub1 constant compressor 2) 133 (Sub2 constant compressor 1) 134 (Sub2 constant compressor 2) 162 (Sub3 constant compressor 1) 163 (Sub3 constant compressor 2)	Compressor discharge pipe temperature sensor error	Sensor measurement valve is abnormal (Open/Short)	<ol style="list-style-type: none"> <li>1. Defective connection of the compressor discharge pipe temperature sensor</li> <li>2. Defective discharge pipe compressor sensor of the compressor (open/short)</li> <li>3. Defective outdoor PCB</li> </ol>

■ Error diagnosis and countermeasure flow chart



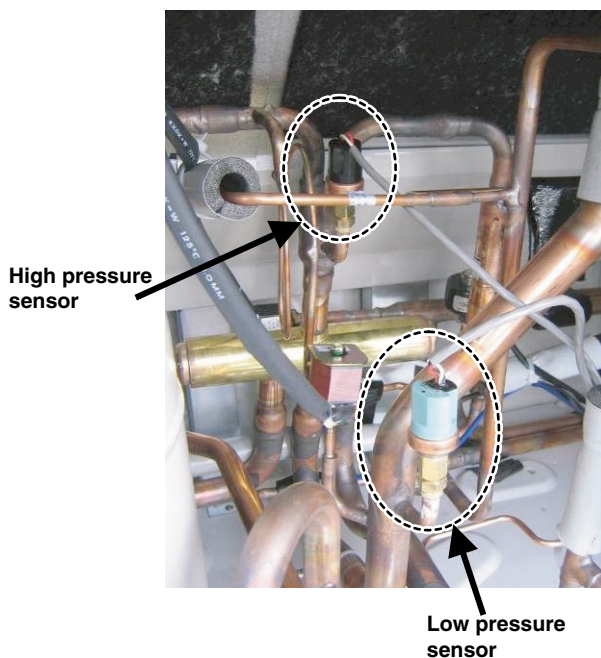
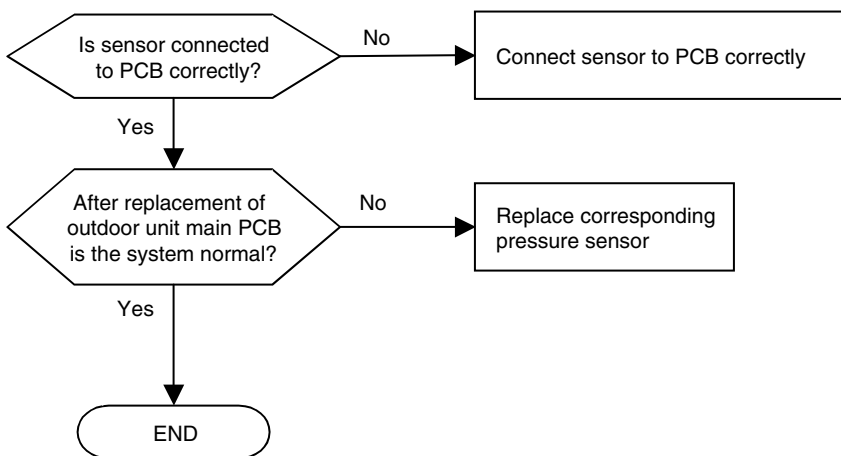
\* Error is generated if the resistance is more than 5MΩ(open) and less than 2kΩ (short)

Note: Standard values of resistance of sensors at different temperatures (±5% variation)  
 10°C = 362kΩ : 25°C= 200kΩ : 50°C= 82kΩ : 100°C= 18.5kΩ



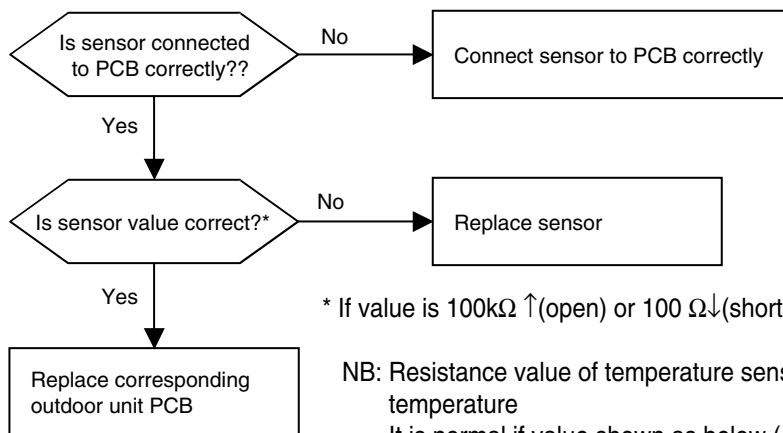
Error No.	Error Type	Error Point	Main Reasons
42 (Main) 117 (Sub1) 129 (Sub2) 158 (Sub3)	Sensor error of low pressure	Abnormal value of sensor (Open/Short)	1. Bad connection of low pressure connector 2. Defect of low pressure connector (Open/Short) 3. Defect of outdoor PCB
43 (Main) 116 (Sub1) 128 (Sub2) 157 (Sub3)	Sensor error of high pressure	Abnormal value of sensor (Open/Short)	1. Bad connection of high pressure connector 2. Defect of high pressure connector (Open/Short) 3. Defect of outdoor PCB

■ Error diagnosis and countermeasure flow chart



Error No.	Error Type	Error Point	Main Reasons
44 (Main) 118 (Sub1) 130 (Sub2) 159 (Sub3)	Sensor error of outdoor air temperature	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB
45 (Main H/E A) 48 (Main H/E B) 123 (Sub1 H/E A) 124 (Sub1 H/E B) 135 (Sub2 H/E A) 136 (Sub2 H/E B) 164 (Sub3 H/E A) 165 (Sub3 H/E B)	Piping temperature sensor error of heat exchanger in main & sub outdoor unit heat exchanger (A,B)	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB
46 (Main) 120 (Sub1) 132 (Sub2) 161 (Sub3)	Compressor suction temperature sensor error	Abnormal value of sensor (Open/Short)	1. Bad connection of air temperature connector 2. Defect of air temperature connector(Open/Short) 3. Defect of outdoor PCB

■ Error diagnosis and countermeasure flow chart



\* If value is 100kΩ ↑(open) or 100 Ω↓(short), error occurs

NB: Resistance value of temperature sensor change according to temperature

It is normal if value shown as below (±5% error)

Sensor of air temperature: 10°C = 20.7kΩ : 25°C= 10kΩ : 50°C= 3.4kΩ

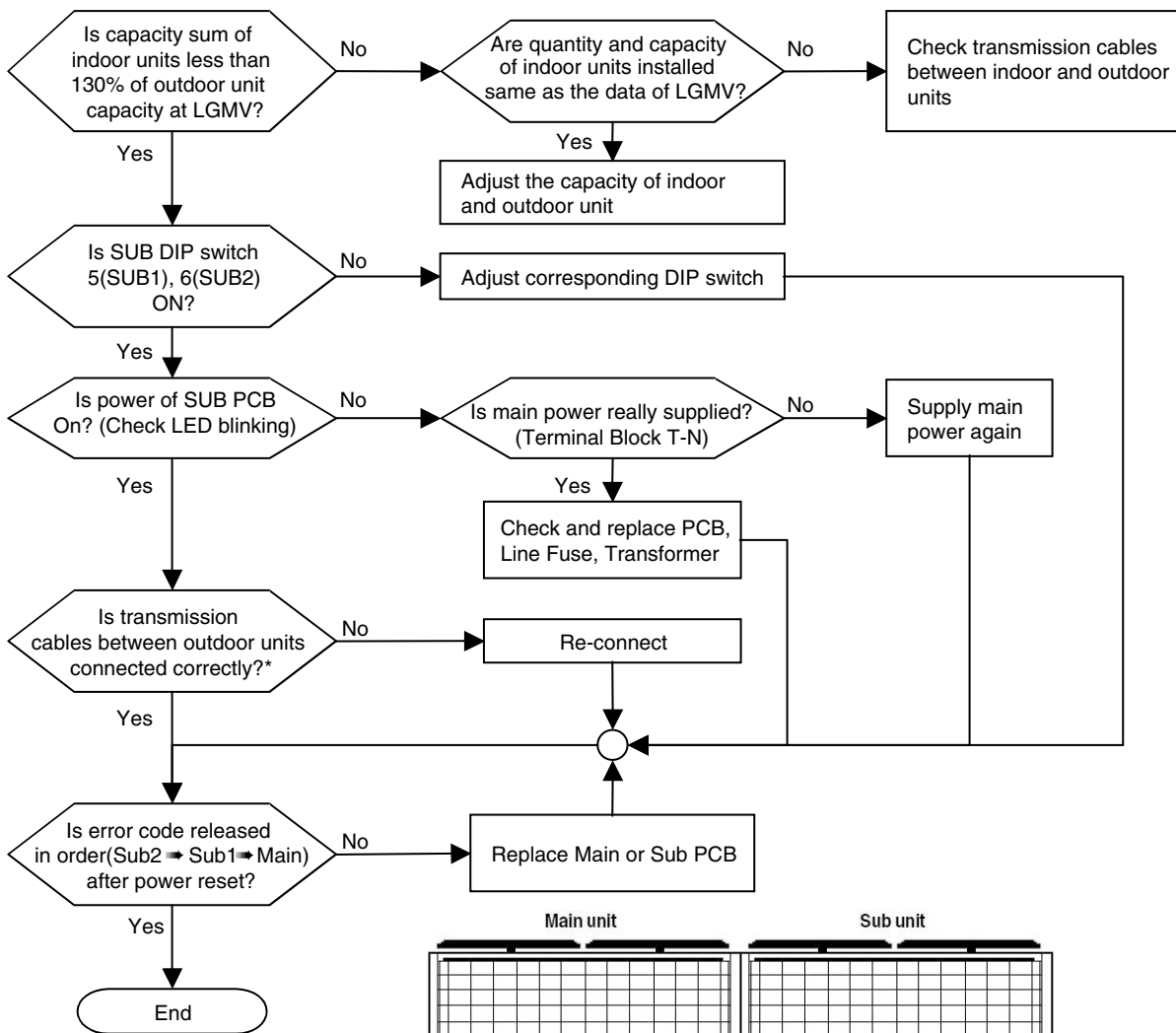
Sensor of piping temperature: 10°C = 10kΩ : 25°C= 5kΩ : 50°C= 1.8kΩ

Error No.	Error Type	Error Point	Main Reasons
47 (constant compressor of main outdoor unit)	Discharge piping temperature sensor error of constant compressor (Main unit)	Abnormal value of sensor (Open/Short)	Refer to CH41
48 (Heat exchanger B)	Piping temperature sensor error of heat exchanger in main & sub outdoor unit heat exchanger (B)	Abnormal value of sensor (Open/Short)	Refer to CH45

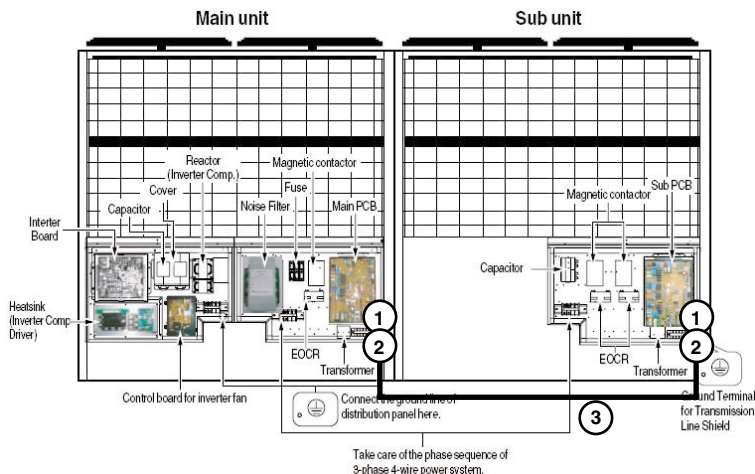


Error No.	Error Type	Error Point	Main Reasons
51	Over-Capacity (Sum of indoor unit capacity is more than outdoor capacity)	Sum of indoor unit capacity exceed outdoor unit capacity specification	1. 130% more than outdoor unit rated capacity 2. Wrong connection of transmission cable/piping 3. Control error of sub outdoor unit DIP switch 4. Power supply defect of Sub unit PCB 5. Defect of outdoor unit PCB

■ Error diagnosis and countermeasure flow chart

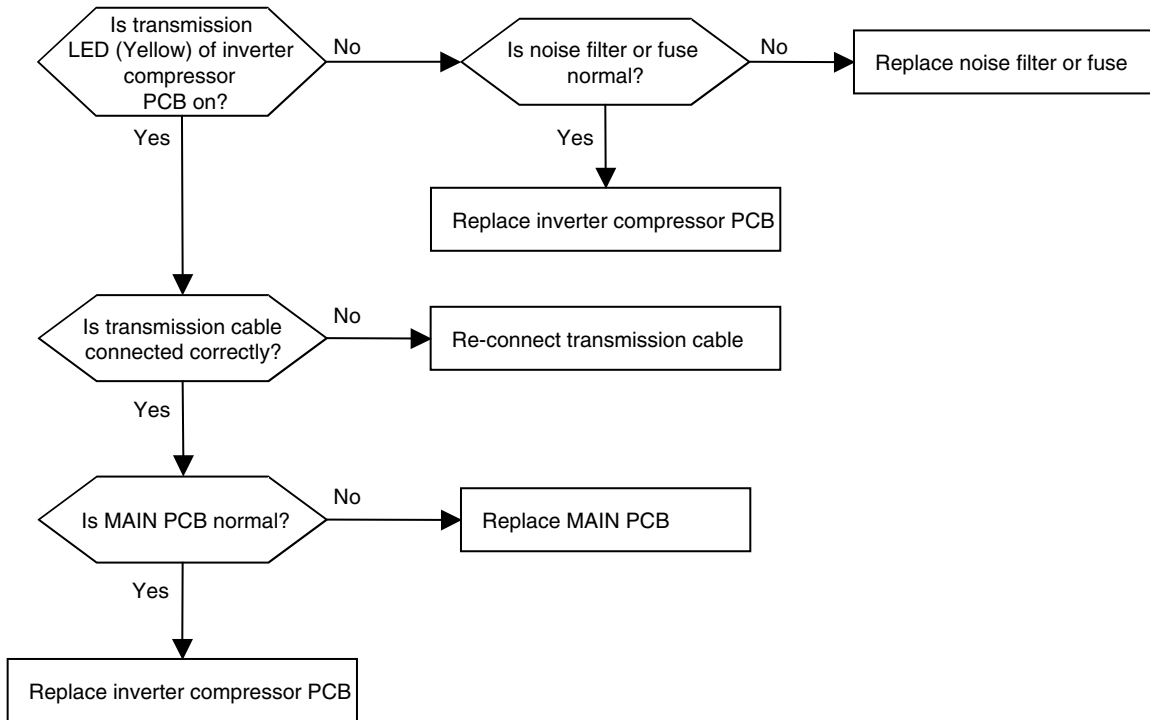


\* In order to check transmission cables between outdoor units, check in order as below : PCB connectors → terminal block → transmission cables

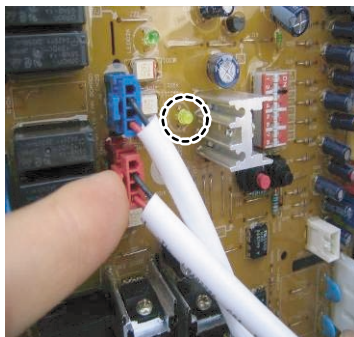


Error No.	Error Type	Error Point	Main Reasons
52	Transmission error between (Inverter PCB → Main PCB)	Main controller can't receive signal from inverter controller	1. Power cable or transmission cable is not connected 2. Defect of outdoor Main fuse/Noise Filter 3. Defect of outdoor Main / inverter PCB

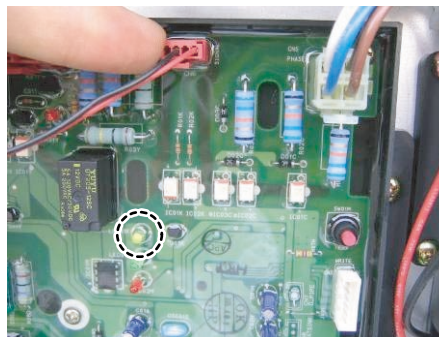
■ Error diagnosis and countermeasure flow chart



\* The method of checking MAIN PCB and inverter compressor PCB (If normal, transmission LED blinks)



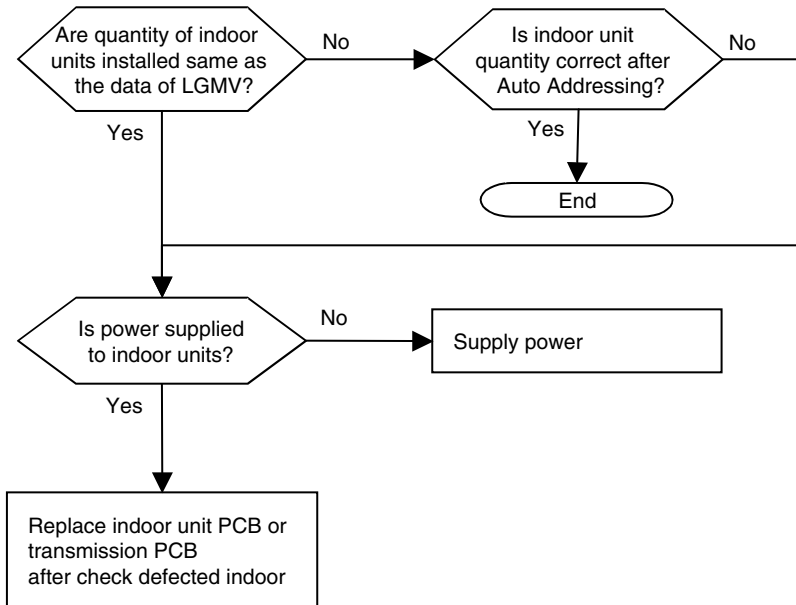
Transmission connector & LED in MAIN PCB



Transmission connector & LED in inverter compressor PCB

Error No.	Error Type	Error Point	Main Reasons
53	Transmission error (Indoor unit → Main PCB)	In case Main PCB can't receive signal from indoor unit	1. Transmission cables are not connected 2. Transmission cables are short / open 3. Defect of outdoor Main / indoor PCB

■ Error diagnosis and countermeasure flow chart



In case of CH53, almost happened with CH05, the indoor units not operated actually are normal so check with same method of CH05. and additionally check as shown as below and above flow chart

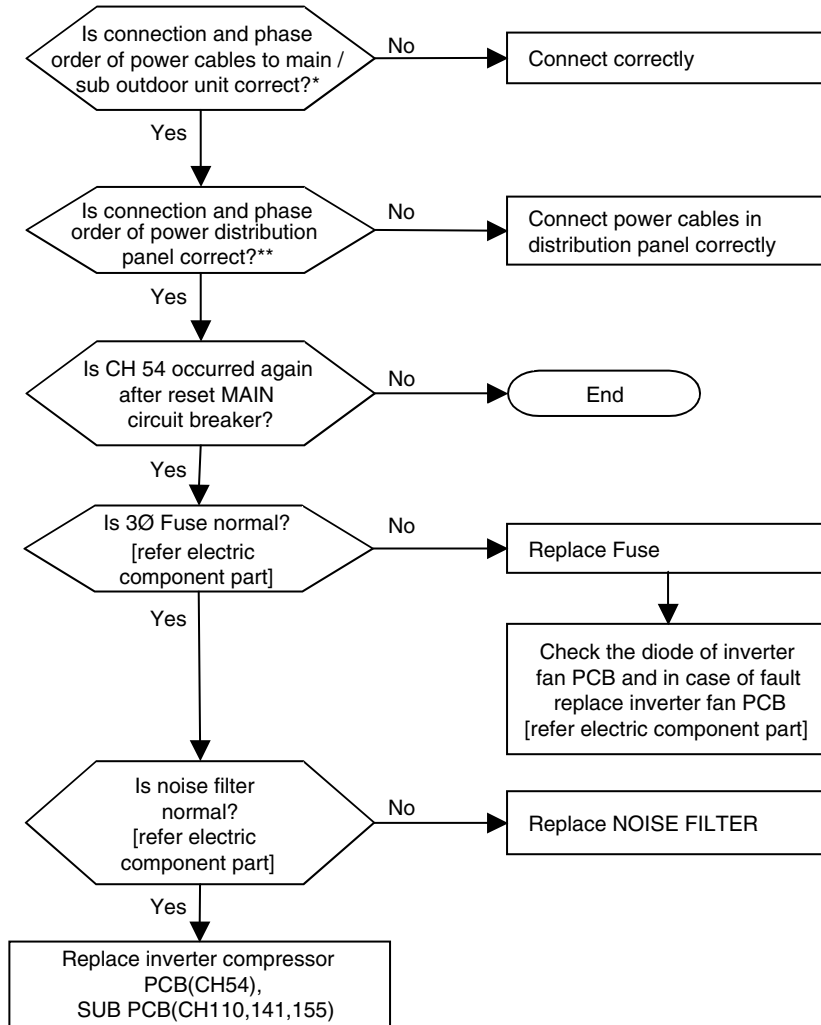
- Although the quantity of indoor units installed is same as LGMV data there may be a few indoor units with which the number of transmission is not increased with LGMV
- Although the quantity of indoor units installed is not same as LGMV data, and if transmission of the indoor unit displayed at LGMV is done well then the indoor unit suspected to have some problem (and is not appear at LGMV) may have following problems
  - ① wrong connection of transmission cable or power cable
  - ② fault of power / PCB / transmission cable
  - ③ duplication of indoor unit number
- If transmission is not doing well wholly then the Auto Addressing is not done
- The case that CH53 appear at indoor unit also Auto Addressing is not done so indoor unit address may be duplicated

\* After replacement of indoor unit PCB, Auto Addressing should be done, if central controller is installed then the central control address also should be input.

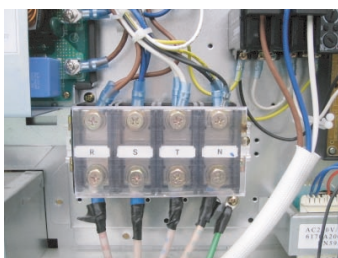
In case that only transmission PCB is replaced above process is not needed

Error No.	Error Type	Error Point	Main Reasons
54 (Main) 110 (Sub1) 141 (Sub2) 155 (Sub3)	Wrong connection of 3Ø power supply cable (Reverse direction / missing a phase)	Wrong connection of 3Ø power supply cable (Reverse direction / missing a phase)	1. Defect of inverter PCB 2. No power of R, S, T supplied 3. Wrong connection of R, S, T cables 4. Main fuse failure

■ Error diagnosis and countermeasure flow chart



\* Check power cable connection state, phase (R-S-T) order, power supply state in control box of product

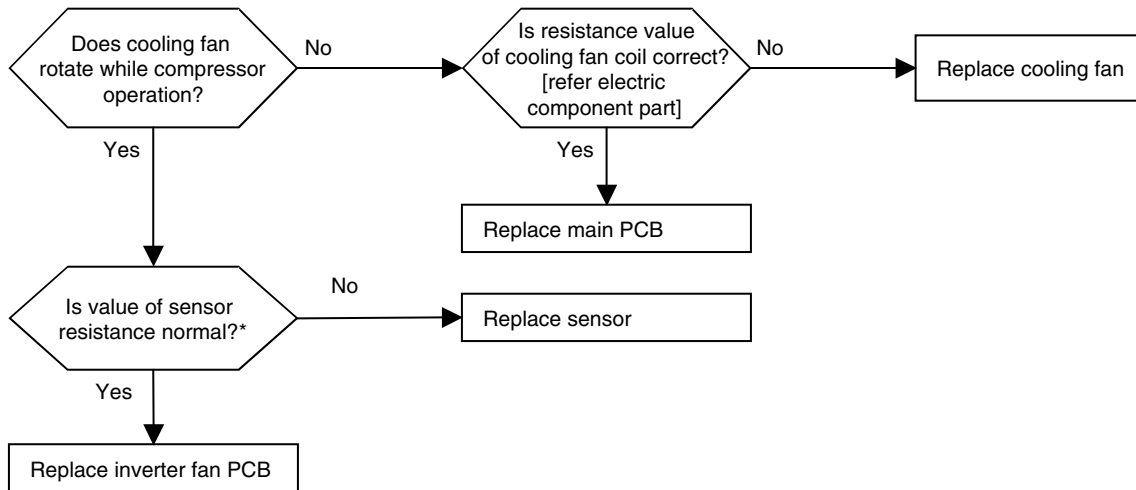


\*\* Check power cable connection state, phase order, power supply state in distribution panel



Error No.	Error Type	Error Point	Main Reasons
62	Heat sink over heat	Heat sink over heat	1. Defect of heat sink cooling fan 2. Defect of inverter compressor PCB 3. Loose connection of connector of cooling fan 4. Defect of temperature sensor of heat sink

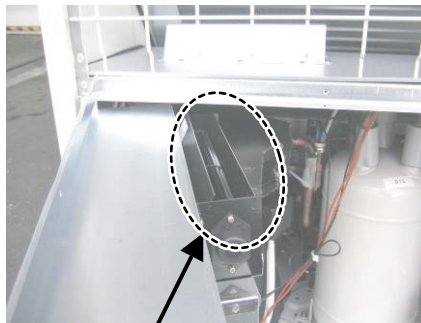
■ Error diagnosis and countermeasure flow chart



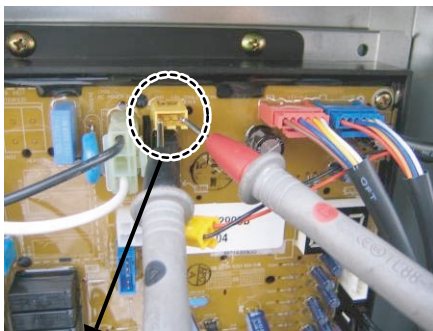
\* Heat sink temperature sensor ( $\pm 5\%$  tolerance) :  $10^{\circ}\text{C} = 20.0\text{k}\Omega$  :  $25^{\circ}\text{C} = 10.0\text{k}\Omega$  :  $50^{\circ}\text{C} = 3.5\text{k}\Omega$  :  $85^{\circ}\text{C} = 1.0\text{k}\Omega$



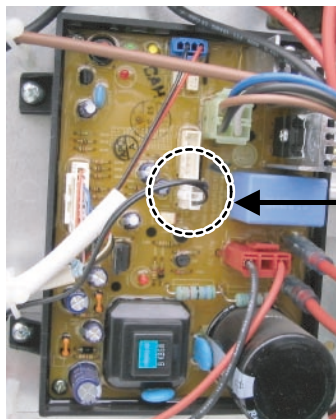
Position of cooling fan drive connector in main PCB



Heat sink cooling fan



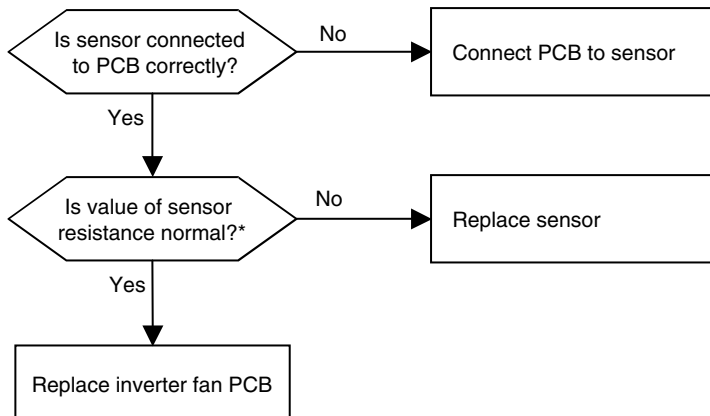
Check DC 12V output during inverter compressor operation



Heat sink temperature sensor connection

Error No.	Error Type	Error Point	Main Reasons
65	Heat sink temperature sensor error of inverter control PCB	Abnormal value of sensor (Open/Short)	1. Loose connection of temperature sensor connector 2. Defect of temperature sensor (Open/Short) 3. Defect of Fan Main PCB

■ Error diagnosis and countermeasure flow chart



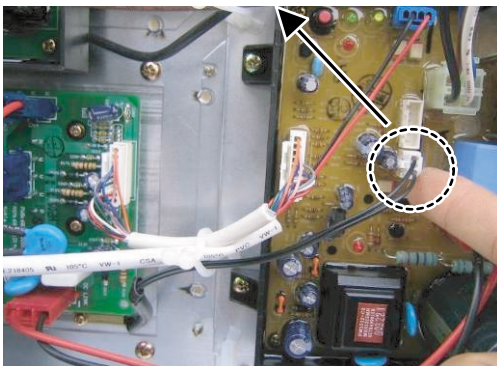
\* If value is  $100K\Omega \uparrow$  (open) or  $100\Omega \downarrow$  (short), error occurs

NB: Resistance value of temperature sensor change according to temperature

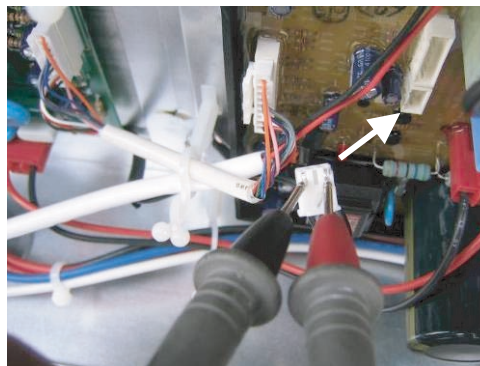
It is normal if value shown as below ( $\pm 5\%$  error)

Heat sink sensor( $\pm 5\%$  tolerance) :  $10^{\circ}C = 20.0K\Omega$  :  $25^{\circ}C = 10.0K\Omega$  :  $50^{\circ}C = 3.5K\Omega$  :  $85^{\circ}C = 1.0K\Omega$

Temperature sensor location of Heat sink



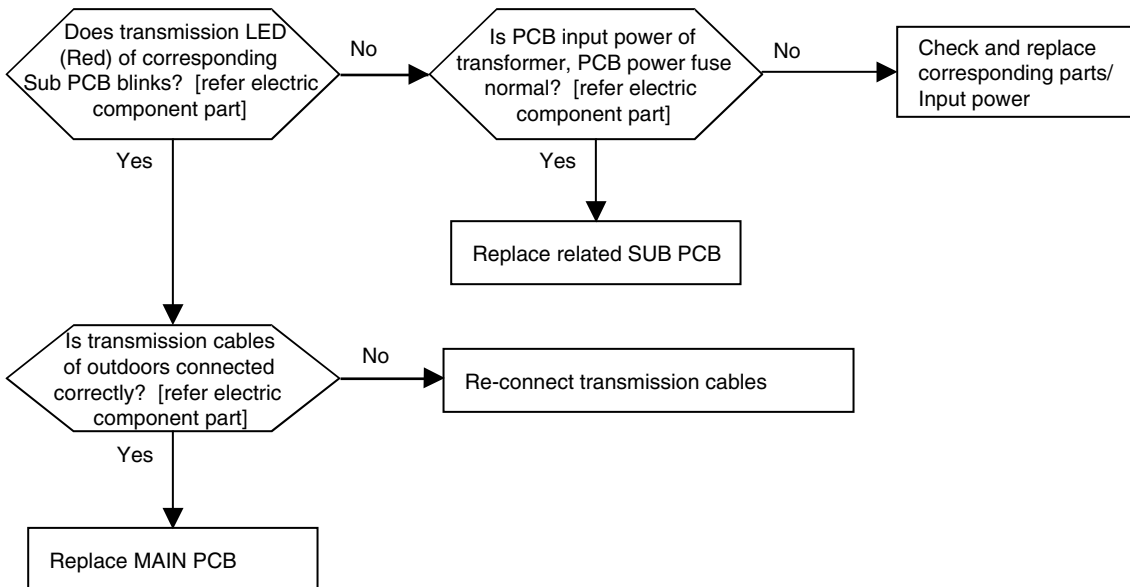
Measure the resistance of heat sink temperature sensor



Error No.	Error Type	Error Point	Main Reasons
100,101 (Sub1) 102,103 (Sub2) 152,153 (Sub3)	Over-increase of constant compressor discharge temperature of Sub outdoor	Compressor is off because of Over-increase of constant compressor discharge temperature of Sub outdoor unit	Refer to CH33

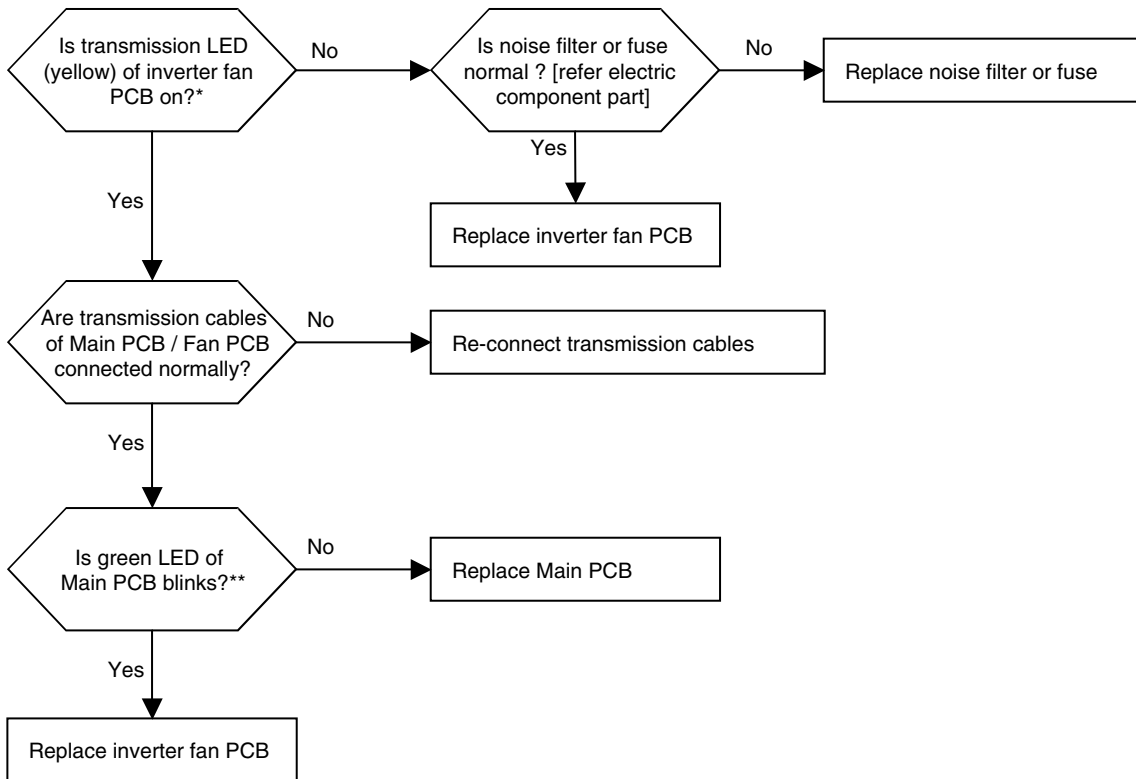
Error No.	Error Type	Error Point	Main Reasons
104 (Main) 111 (Sub1) 142 (Sub2) 156 (Sub3)	Transmission error of outdoor each other	Transmission error of outdoor unit each other 104: Main outdoor unit can't receive signal from Sub 1 111, 142, 156 : each Sub outdoor unit can't receive signal from Main outdoor unit	1. Loose connection of power cables /transmission cables (Open/Short) 2. Defect of each outdoor unit PCB 3. Defect of PCB power fuse / transformer

■ Error diagnosis and countermeasure flow chart

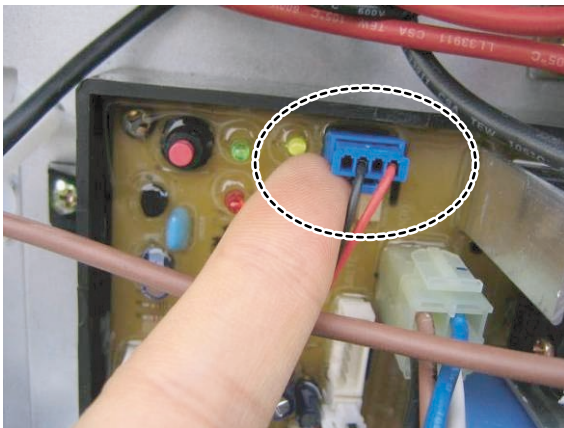


Error No.	Error Type	Error Point	Main Reasons
105	Transmission error between outdoor unit Main PCB and fan Main PCB	Transmission error between outdoor Main PCB and fan Main PCB (Fan → outdoor main)	1. Loose connection of transmission cables 2. Transmission cables are open/sort 3. Defect of outdoor PCB 4. Defect of fan Main PCB

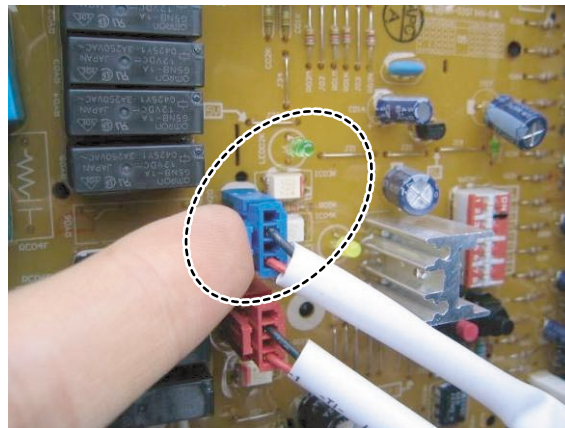
■ Error diagnosis and countermeasure flow chart



\*\* Location of inverter transmission connector of Main PCB and LED



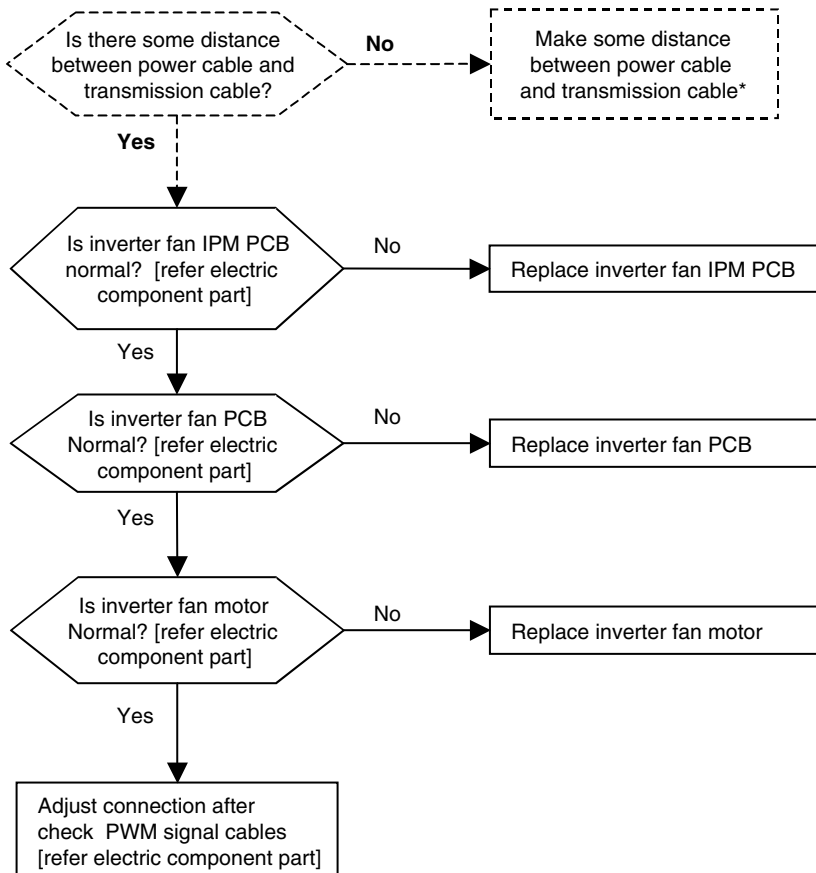
\* Location of PCB transmission connector of Inverter FAN and LED





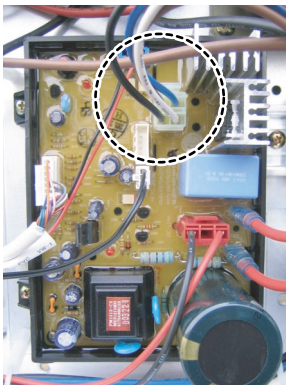
Error No.	Error Type	Error Point	Main Reasons
106	Over current of Main outdoor fan motor (inverter fan IPM fault)	Over current of Main outdoor fan motor	1. Bad connection of fan motor connector 2. Defect of fan Motor. 3. Defect of heat sink cooling fan

■ Error diagnosis and countermeasure flow chart



\* The dashed line(---) in above flow chart is only applicable for Multi V Space

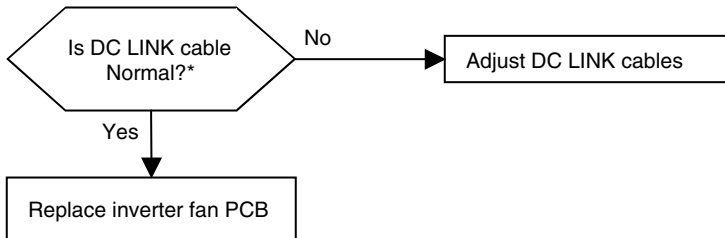
\*\* position of inverter fan motor connector



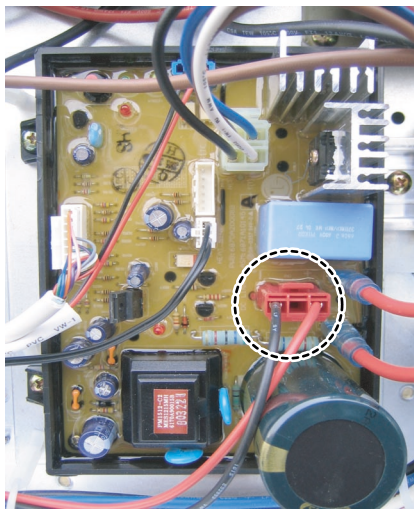
Inverter fan main PCB

Error No.	Error Type	Error Point	Main Reasons
107	DC voltage charging failure of inverter fan motor drive	Low voltage of Main outdoor fan motor	1. Bad connection of voltage lead cable of main PCB DC link 2. Defect of fan main PCB Capacitor 3. Defect of fan PCB

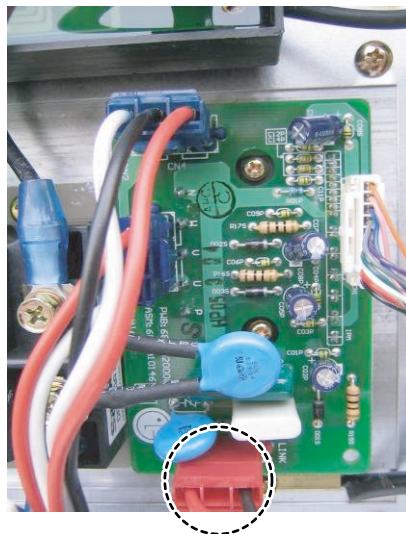
■ Error diagnosis and countermeasure flow chart



\* Location of fan DC link connector



Inverter fan main PCB



Inverter fan IPM PCB

Error No.	Error Type	Error Point	Main Reasons
108	Transmission error between main PCB and the Fan PCB	Transmission error between main PCB and the Fan PCB (Fan → outdoor, outdoor → Fan)	Refer to CH105

Error No.	Error Type	Error Point	Main Reasons
109 (Sub1)	Excessive rise of high pressure in outdoor unit	Compressor Off due to the high pressure switch in outdoor unit	Refer to CH24

Error No.	Error Type	Error Point	Main Reasons
110 (Sub1)	Outdoor 3 phase power supply problem(Reverse phase / No power in 1 or 2 phase)	Wrong connection of 3 phase power cable (Reverse phase / Phase omission)	Refer to CH54

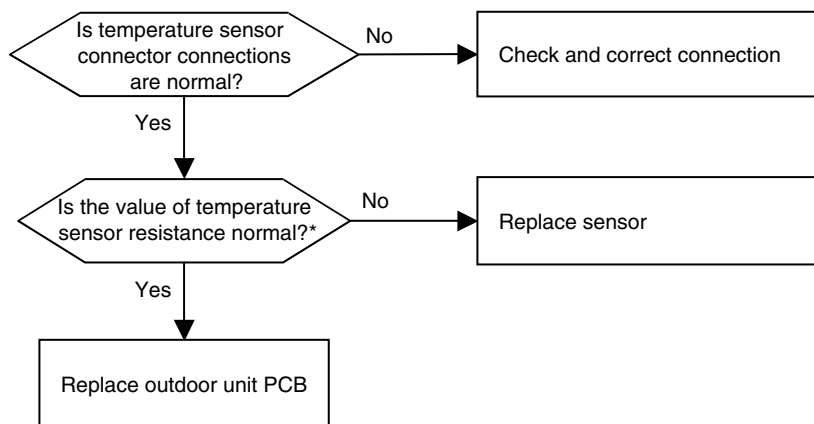
Error No.	Error Type	Error Point	Main Reasons
111 (Sub1)	Transmission error between outdoor units	104 → transmission error between the outdoor units (Main outdoor unit is not receiving signal from Sub units) 147, 149, 171 → Sub outdoor units are not receiving signal from Main outdoor unit	Refer to CH104

## Troubleshooting Guide

Error No.	Error Type	Error Point	Main Reasons
113 (Main) 125 (Sub1) 137 (Sub2) 166 (Sub3)	Outdoor unit liquid pipe (condenser) temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connection 2. Defective temperature sensor (Open / Short) 3. Defective outdoor unit PCB

Error No.	Error Type	Error Point	Main Reasons
114 (Main sub-cool inlet) 115 (Main sub-cool outlet) 126 (Sub1 sub-cool inlet) 127 (Sub1 sub-cool outlet) 138 (Sub2 sub-cool inlet) 139 (Sub2 sub-cool outlet) 167 Sub3 sub-cool inlet) 168 (Sub3 sub-cool outlet)	Outdoor unit sub-cooling inlet / outlet temperature sensor error	Abnormal sensor resistance value (Open/Short)	1. Defective temperature sensor connector connection 2. Defective temperature sensor (Open/Short) 3. Defective outdoor PCB

### ■ Error diagnosis and countermeasure flow chart



\* Sensor resistance 100 k $\Omega$ over (open) or 100  $\Omega$  below (short) will generate error

Note: Temperate sensor resistance vary with temperature, So compare temperature sensor resistance value according to outdoor unit temperature by referring below table ( $\pm 5\%$  tolerance)

Air temperature sensor: 10°C = 20.7k $\Omega$  : 25°C = 10k $\Omega$  : 50°C= 3.4k $\Omega$

Pipe temperature sensor: 10°C = 10k $\Omega$  : 25°C = 5k $\Omega$  : 50°C= 1.8k $\Omega$

Error No.	Error Type	Error Point	Main Reasons
116 (Sub1)	High pressure sensor	Sensor measured value of resistance is abnormal (Open / Short)	Refer CH43

Error No.	Error Type	Error Point	Main Reasons
117 (Sub1)	Low pressure sensor	Sensor measured value of resistance is abnormal (Open/Short)	Refer to CH42

Error No.	Error Type	Error Point	Main Reasons
118 (Sub1)	Outdoor unit air temperature sensor error	Sensor measured value of resistance is abnormal (Open / Short)	Refer to CH44

Error No.	Error Type	Error Point	Main Reasons
120 (Sub1)	Compressor suction pipe temperature sensor error	Sensor measured of resistance value is abnormal (Open/Short)	Refer to CH46

Error No.	Error Type	Error Point	Main Reasons
121 (Sub1 constant-compressor 1) 122 (Sub1 constant compressor 2)	Compressor discharge pipe temperature sensor error	Sensor measured value of resistance is abnormal (Open/Short)	Refer to CH41

Error No.	Error Type	Error Point	Main Reasons
123 (Sub1 HEX A) 124 (Sub1 HEX B)	Sub outdoor unit heat exchanger (A,B) pipe sensor error.	Sensor measured value of resistance is abnormal (Open/Short)	Refer to CH45

Error No.	Error Type	Error Point	Main Reasons
125 (Sub1)	Outdoor liquid pipe (condenser) sensor error	Sensor measured value of resistance is abnormal (Open/Short)	Refer to CH113

## Troubleshooting Guide

Error No.	Error Type	Error Point	Main Reasons
126 (Sub1 Sub-cool inlet) 127(Sub1 Sub-cool outlet)	Outdoor unit sub-cool inlet / outlet sensor error	Sensor measured value of resistance is abnormal (Open/Short)	Refer to CH114

Error No.	Error Type	Error Point	Main Reasons
128 (Sub2)	High pressure sensor error	Sensor measured value is abnormal (Open/Short)	Refer to CH43

Error No.	Error Type	Error Point	Main Reasons
129 (Sub2)	Low pressure sensor error	Sensor measured value is abnormal (Open/Short)	Refer to CH42

Error No.	Error Type	Error Point	Main Reasons
130 (Sub2)	Outdoor unit air temperature sensor error	Sensor measured value is abnormal (Open/Short)	Refer to CH44

Error No.	Error Type	Error Point	Main Reasons
132 (Sub2)	Compressor suction temperature sensor error	Sensor measured value is abnormal (Open/Short)	Refer to CH46

Error No.	Error Type	Error Point	Main Reasons
133 (Sub2 Const compressor1) 134 (Sub2 Const compressor2)	Compressor discharge pipe temperature sensor error	Sensor measured value is abnormal (Open/Short)	Refer to CH41

Error No.	Error Type	Error Point	Main Reasons
135 (Sub2 HEX A) 136 (Sub2 HEX B)	Sub Outdoor unit heat exchanger (A,B) pipe temperature sensor error	Sensor measured value is abnormal (Open/Short)	Refer to CH45

Error No.	Error Type	Error Point	Main Reasons
140 (Sub2)	Excessive rise in outdoor high pressure	Compressor Off due to the high pressure switch in outdoor unit	Refer to CH24

Error No.	Error Type	Error Point	Main Reasons
141 (Sub2)	Outdoor 3 phase power supply problem (Reverse phase / phase omission)	Wrong wiring at outdoor unit (phase reversal / phase omission )	Refer to CH54

Error No.	Error Type	Error Point	Main Reasons
142 (Sub2)	Transmission error between outdoor units	Transmission error between outdoor units 104 (Main outdoor unit is not receiving sub outdoor unit s signals) 147, 149, 171 (Sub outdoor units are not receiving main unit signals)	Refer to CH104

Error No.	Error Type	Error Point	Main Reasons
143 (Sub1) 145 (Sub2)	Excessive rise in high pressure	Compressor Off due to high pressure sensor	Refer to CH34

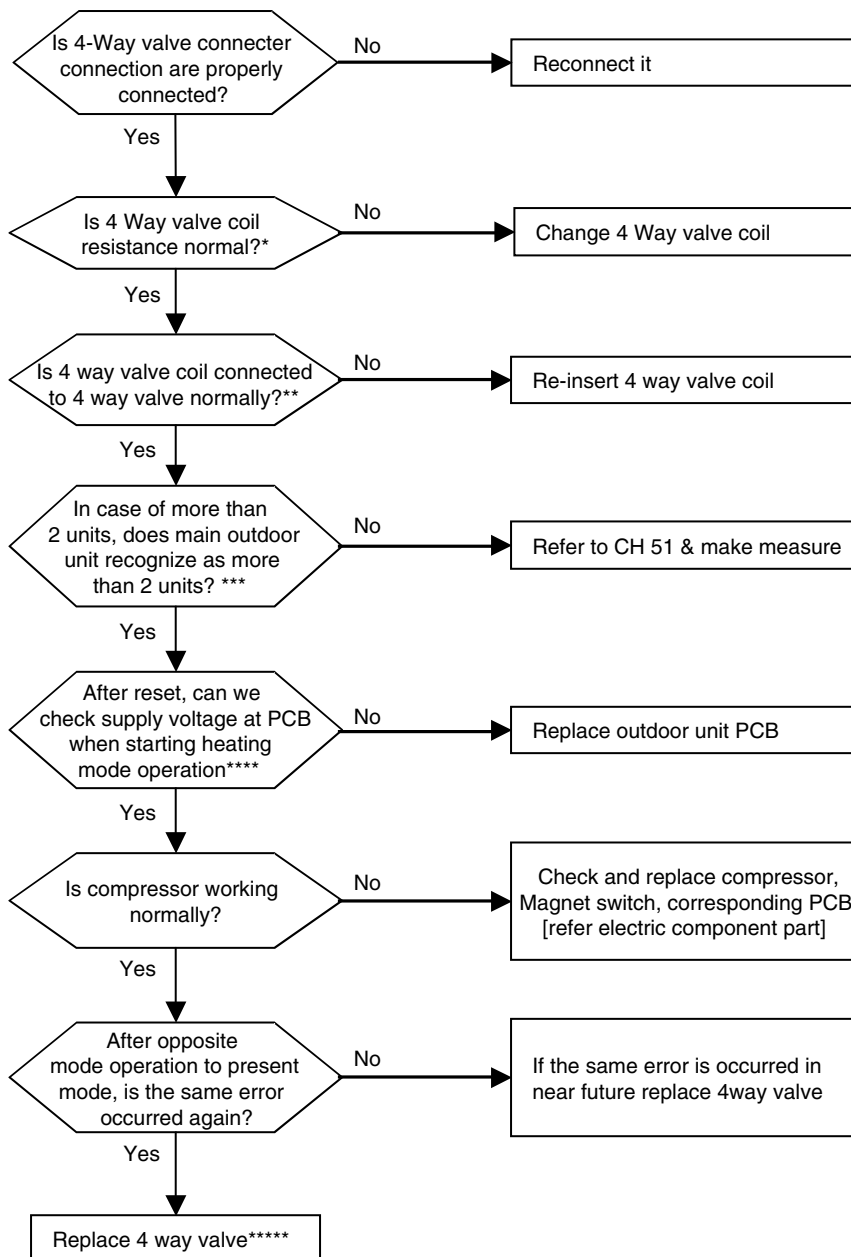
Error No.	Error Type	Error Point	Main Reasons
144 (Sub1) 146 (Sub2)	Excessive drop in low pressure	Compressor Off due to low pressure sensor	Refer to CH35

Error No.	Error Type	Error Point	Main Reasons
147 (Sub1) 149 (Sub2)	Low voltage/ High voltage	1. Input Voltage in the installation region = 3phase 380V±10% 2. Single Phase = 220 ±10%	Refer to CH25

Error No.	Error Type	Error Point	Main Reasons
148 (Sub1) 150 (Sub2)	Outdoor voltage sensing error	Measured value is abnormal (Open/Short)	Refer to CH49

Error No.	Error Type	Error Point	Main Reasons
151	Function error of outdoor 4way (reversing valve)	Function error of 4way (reversing valve) in Main or Sub outdoor units	1. Wrong operation of 4way valve because of sludge etc. inflow 2. No pressure difference because of compressor fault 3. Wrong installation of In/outdoor common pipe 4. Defect of 4way valve

■ Error diagnosis and countermeasure flow chart

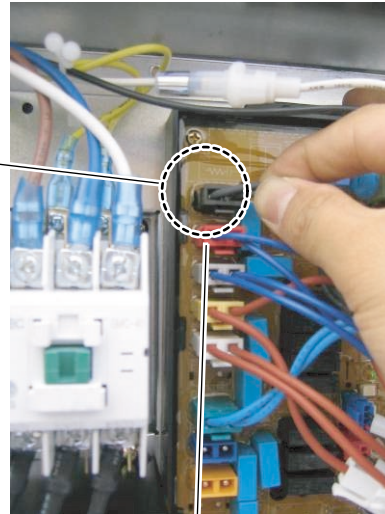




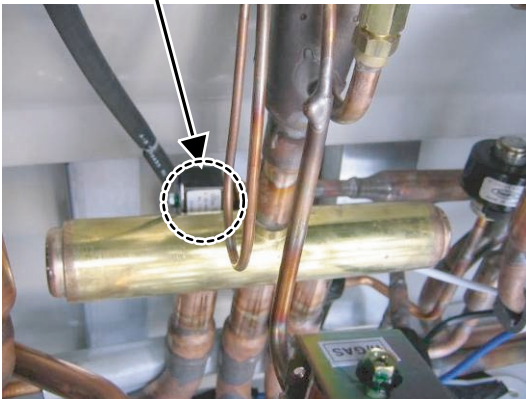
\* Measure the resistance of 4way valve



Location of 4way valve connector on Main / Sub PCB (marked as 4way)

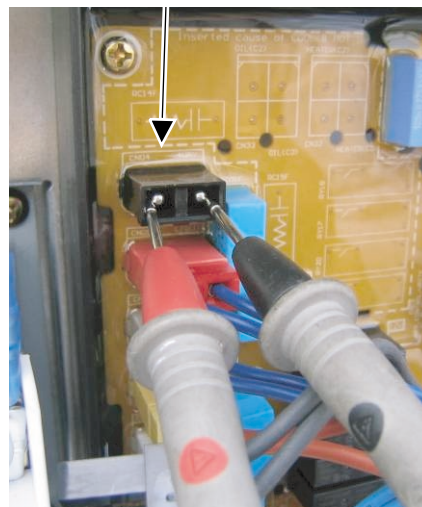


\*\* Confirm the 4way valve coil is inserted to the end



\*\*\* When power is supplied in order as follow  
(Sub2 → Sub1 → Main)  
3<sup>rd</sup> number indicates outdoor quantity at Main PCB  
7-segment LED  
- Outdoor unit 1set : 44-capacity(or 10)-..  
- Outdoor unit 2set : 44-50-capacity(or 20)-..  
- Outdoor unit 3set : 44-50-50-capacity(or 30)- ..

\*\*\*\* Check the output voltage of terminal socket during heating operation



\*\*\*\*\* Checking method for outdoor unit of 3unit system  
(Main + Sub1 + Sub2)  
① Close all the SVC valves of high / low pressure common pipe  
② Operate system  
③ Check the difference of high and low pressure with LGMV for each unit (Main, Sub1, Sub2)  
④ If there is a unit in which the difference is not increased then the 4way valve of that unit is defective

## Troubleshooting Guide

Error No.	Error Type	Error Point	Main Reasons
152,153 (Sub3)	Excessive rise of the constant compressor discharge temperature	Constant speed compressor Off due to the excessive rise in discharge temp	Refer to CH33

Error No.	Error Type	Error Point	Main Reasons
155(Sub3)	Outdoor 3 phase power supply wiring wrong (Reverse phase / Phase omission)	Wrong wiring at the outdoor 3 phase(Reverse phase / Phase omission)	Refer to CH54

Error No.	Error Type	Error Point	Main Reasons
156(Sub3)	Transmission error between outdoor units	Transmission error between outdoor units 104 (Main outdoor unit is not receiving sub outdoor unit s signals) 147, 149, 171 (Sub outdoor units are not receiving main unit signals)	Refer to CH104

Error No.	Error Type	Error Point	Main Reasons
157(Sub3)	High pressure sensor error	Abnormal resistance value of sensor measurement ( Open / Short )	Refer to CH43

Error No.	Error Type	Error Point	Main Reasons
158(Sub3)	Low pressure sensor error	Abnormal resistance value of sensor measurement( Open / Short )	Refer to CH42

Error No.	Error Type	Error Point	Main Reasons
159(Sub3)	Outdoor unit air temperature sensor error	Abnormal resistance value of sensor measurement( Open / Short )	Refer to CH44

Error No.	Error Type	Error Point	Main Reasons
161(Sub3)	Compressor suction temperature error	Abnormal resistance value of sensor measurement ( Open / Short )	Refer to CH46

Error No.	Error Type	Error Point	Main Reasons
162 (Sub3 constant compressor1) 163 (Sub3 constant compressor2)	Compressor discharge pipe temperature sensor error	Abnormal resistance value of sensor measurement ( Open / Short )	Refer to CH41

Error No.	Error Type	Error Point	Main Reasons
164 (Sub3 HEX A) 165 (Sub3 HEX B)	Pipe sensor error of the main and sub units heat exchanger (A,B)	Abnormal resistance value of sensor measurement ( Open / Short )	Refer to CH45

Error No.	Error Type	Error Point	Main Reasons
166(Sub3)	Sensor error at the outdoor liquid refrigerant pipe	Abnormal resistance value of sensor measurement( Open / Short )	Refer CH113

Error No.	Error Type	Error Point	Main Reasons
167 (Sub3 sub-cooling inlet) 168 (Sub3 sub-cooling outlet)	Outdoor unit sub-cooling sensor error at inlet / outlet	Abnormal resistance value of sensor measurement( Open / Short )	Refer to CH114

Error No.	Error Type	Error Point	Main Reasons
169(Sub3)	Excessive rise in high pressure	Compressor Off due to the high pressure sensor	Refer to CH34

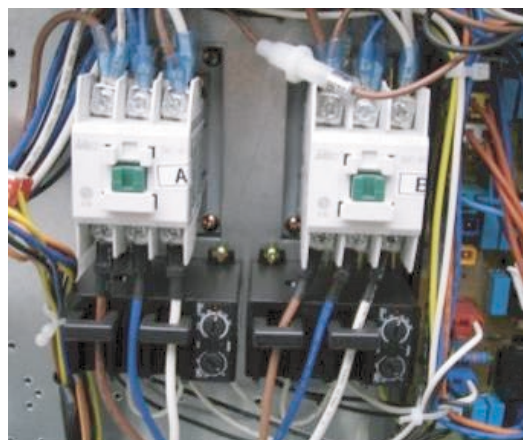
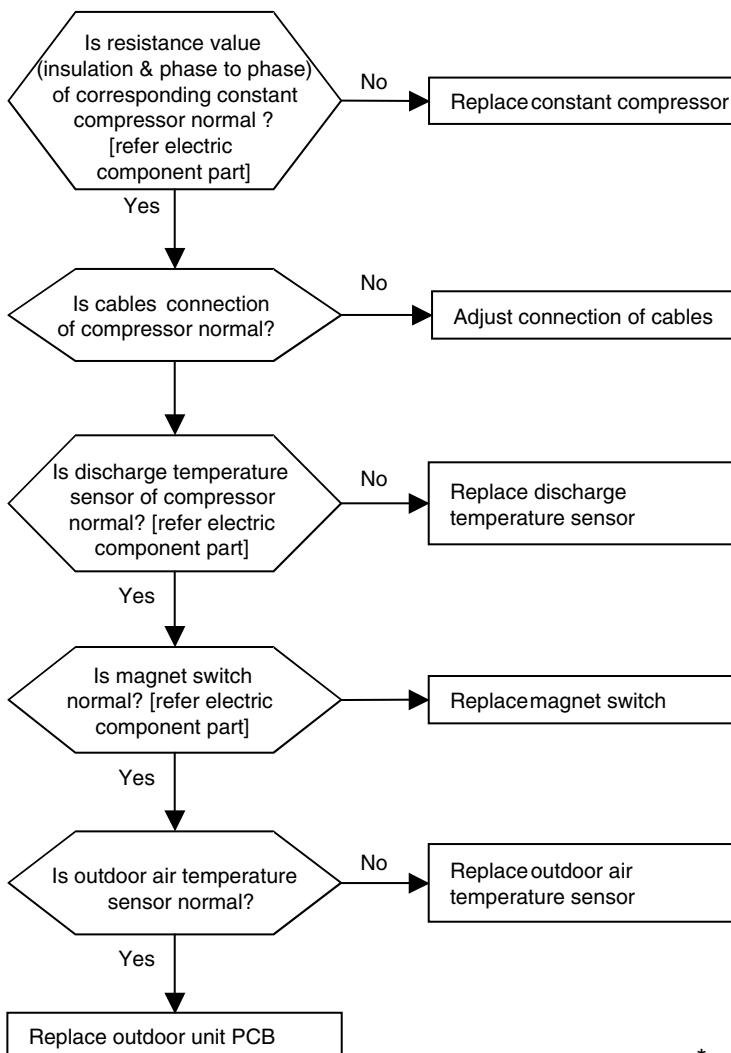
Error No.	Error Type	Error Point	Main Reasons
170(Sub3)	Excessive low pressure drop	Compressor Off due to the low pressure sensor	Refer to CH35

Error No.	Error Type	Error Point	Main Reasons
171(Sub3)	Excessive Low voltage / High voltage	1. Input voltage in the installation region = 3phase 380V±10% 2. Single phase = 220V ±10%	Refer to CH25

Error No.	Error Type	Error Point	Main Reasons
172(Sub3)	Outdoor voltage sensing error	Abnormal resistance value of sensor measurement ( Open / Short )	Refer to CH49

Error No.	Error Type	Error Point	Main Reasons
173 (MAIN constant) 174, 175 (sub1 constant 1,2) 176, 177 (sub2 constant 1,2)	Abnormal starting of constant compressor	Over-increase of temperature after constant compressor starts	<ul style="list-style-type: none"> <li>• Defect of constant compressor</li> <li>• Defect of discharge temperature sensor</li> <li>• Defect of outdoor temperature sensor</li> <li>• Defect of outdoor PCB</li> <li>• Defect of magnet switch</li> <li>• Wrong connection of constant compressor cables</li> </ul>

■ Error diagnosis and countermeasure flow chart



\* cables connection between constant compressor and magnetic switch

Error No.	Error Type	Error Point	Main Reasons
200	Pipe detection error	After the Auto operation, if the number of the indoor units detected is different from the number communicating indoor unit	1. HR unit's power cable or transmission cable connection defect 2. After Auto-Addressing, wrong address setting of the indoor unit (Defective indoor power / transmission error and PCB defect) 3. Wrong setting of the HR unit's rotary switch or dip switch 4. HR unit PCB defect

HR: Heat Recovery

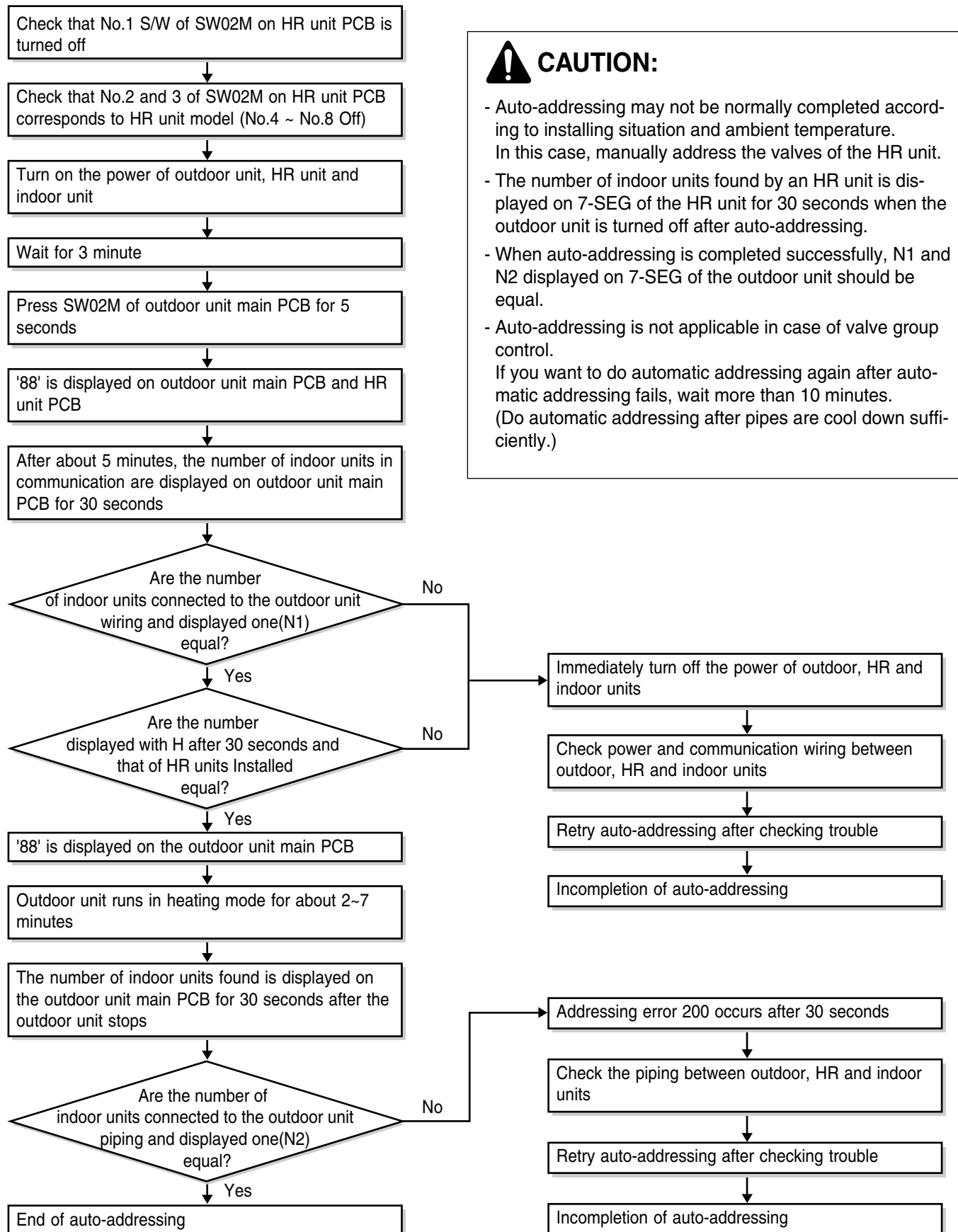
### ■ Error diagnosis and countermeasure flow chart

- 1) Check the periodic blinking of the HR unit's green LED (transmission LED )
- 2) When green LED (transmission LED) of HR unit blinks regularly,
  - 2.1) Check input power of HR unit.(220V±10%)
  - 2.2) After reset of power of outdoor, wait for more than 30 minutes, temperature of pipes will be cool down then, Do Auto-Addressing
  - 2.2) While power of HR unit is on, check total indoors display 'CH05' or not.(Refer to CH05)
- 3) When green LED (transmission LED) of HR unit blinks regularly, Check setting of rotary switch and Dip switch, After reset of power of outdoor and HR unit, wait for more than 30 minutes, temperature of pipes will be cool down then, Do Auto-Addressing \*
- 4) If indoor unit quantity is different between installed quantity and quantity which check thru piping searching, check pipe installation condition  
Outdoor unit ↔ HR unit ↔ Indoor unit
- 5) If indoor unit has not been connected to #1 valve of HR unit, set pipes of HR unit manually\*\*
- 6) If it is not applied as above, set pipes of HR unit as manual

[NB] How to check display method of outdoor Main PCB 7-segment ?:

'88' → Indoor qty which check thru 'Auto-Addressing' → '88' → Indoor qty which check thru 'piping checking'

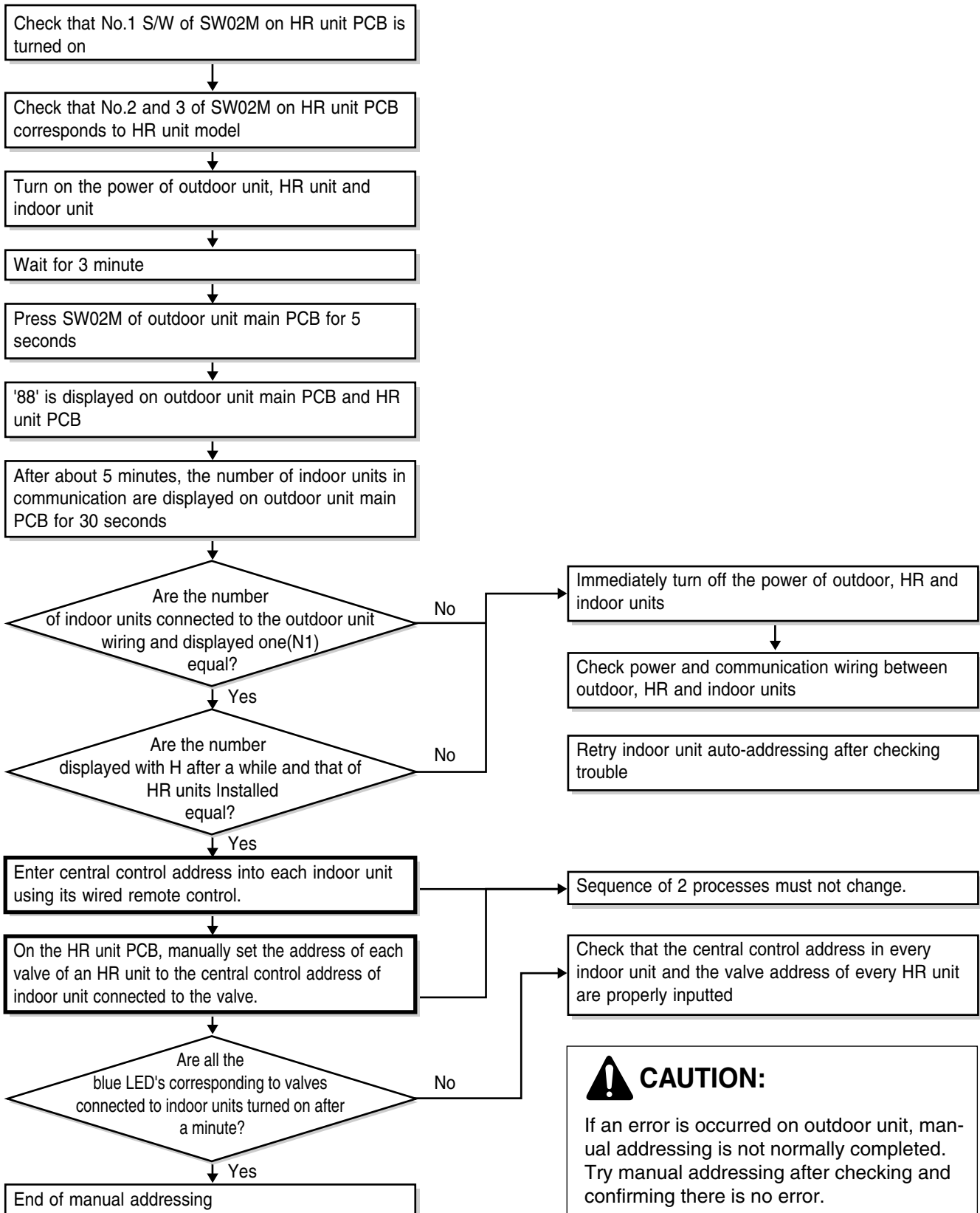
## Auto-addressing of valves flow chart



### CAUTION:

- Auto-addressing may not be normally completed according to installing situation and ambient temperature. In this case, manually address the valves of the HR unit.
- The number of indoor units found by an HR unit is displayed on 7-SEG of the HR unit for 30 seconds when the outdoor unit is turned off after auto-addressing.
- When auto-addressing is completed successfully, N1 and N2 displayed on 7-SEG of the outdoor unit should be equal.
- Auto-addressing is not applicable in case of valve group control. If you want to do automatic addressing again after automatic addressing fails, wait more than 10 minutes. (Do automatic addressing after pipes are cool down sufficiently.)

### Manual valve addressing flow chart





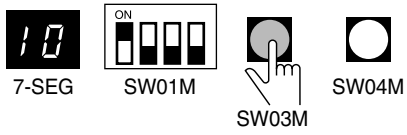
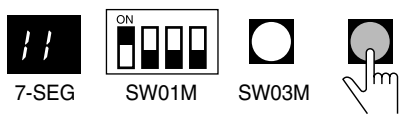

**CAUTION:**

If an error is occurred on outdoor unit, manual addressing is not normally completed. Try manual addressing after checking and confirming there is no error.

## Manual valve addressing example

(In case that an indoor unit of central control address "11" is connected to a valve #1 of an HR unit)

- Prerequisite for manual valve addressing: central control address of each indoor unit must be preset differently at its wired remote control

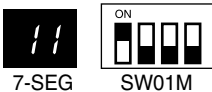

No.	Display and setup	Setup and Contents
1	 <p>7-SEG SW01M SW03M SW04M</p>	<ul style="list-style-type: none"> <li>• Operation: None</li> <li>• Display: None</li> </ul>
2	 <p>7-SEG SW01M SW03M SW04M</p>	<ul style="list-style-type: none"> <li>• Operation: Turn dip S/W01M No.1 on to address valve #1</li> <li>• Display: Existing value saved in EEPROM is displayed in 7-SEG.</li> </ul>
3	 <p>7-SEG SW01M SW03M SW04M</p>	<ul style="list-style-type: none"> <li>• Operation: Set the digit of 10 to the number in Group High data of the wired remote control connected to the corresponding indoor unit to the valve #1 by pressing left tack S/W03M.</li> <li>• Display: Digit increasing with the times of pressing tack S/W03M is displayed in left 7-SEG</li> </ul>
4	 <p>7-SEG SW01M SW03M SW04M</p>	<ul style="list-style-type: none"> <li>• Operation: Set the digit of 1 to the number in Group Low data of the wired remote control connected to the corresponding indoor unit to the valve #1 by pressing right tack S/W04M.</li> <li>• Display: Digit increasing with the times of pressing tack S/W04M is displayed in right 7-SEG</li> </ul>
5	 <p>7-SEG SW01M SW03M SW04M</p>	<ul style="list-style-type: none"> <li>• Operation: Turn dip S/W No.1 off to save the address of valve #1</li> <li>• Display: "11" displayed in 7-SEG disappears</li> </ul>

- Above setup must be done for all HR unit valves.
- The valve that is not connected with any indoor unit should be addressed with any other number than used address numbers of the valves connected with indoor units.  
(The valves does not work if the address numbers are same.)



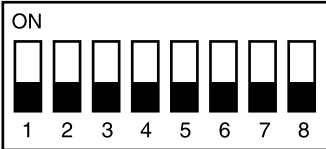
## ■ Checking valve address

(In case that an indoor unit of central control address '11' is connected to a valve #1 of an HR unit)

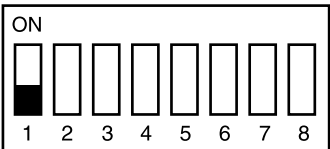
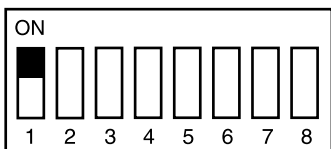
No.	Display and Setup	Setup and Contents
1	 <p>7-SEG SW01M</p>	<ul style="list-style-type: none"> <li>• Operation: Turn dip S/W01M No.1 on.</li> <li>• Display: "11" is displayed in 7-SEG</li> </ul>
2	 <p>7-SEG SW01M</p>	<ul style="list-style-type: none"> <li>• Operation: Turn dip S/W01M No.1 off.</li> <li>• 7-SEG disappeared</li> </ul>

## ■ Dip switch function

### 1. Main function of SW02M

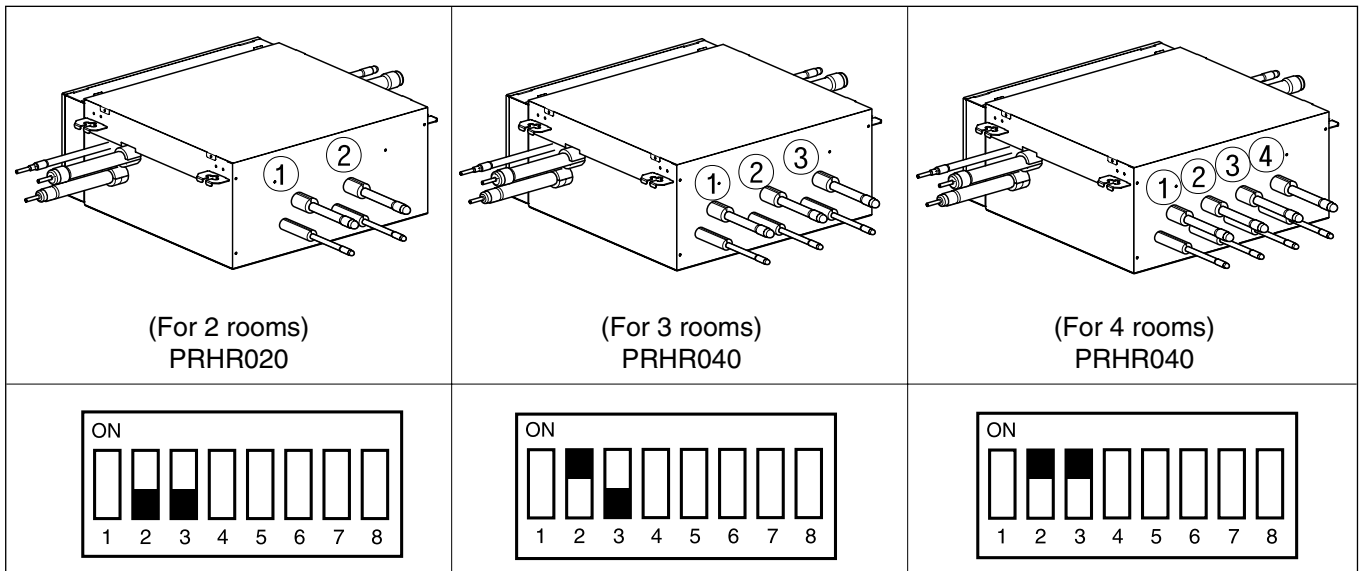
 SW02M	ON S/W	Selection
	No.1	Method for addressing valves of an HR unit (Auto/Manual)
	No.2	Model of HR unit
	No.3	Model of HR unit
	No.4	Not used
	No.5	Not used
	No.6	Not used
	No.7	Use only in factory production (preset to "OFF")
	No.8	Use only in factory production (preset to "OFF")

#### 1) Selection of the method for addressing valves of an HR unit (Auto/Manual)

<p>Switch No.1 Off</p> 	<p>Switch No.1 On</p> 
------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------

## Troubleshooting Guide

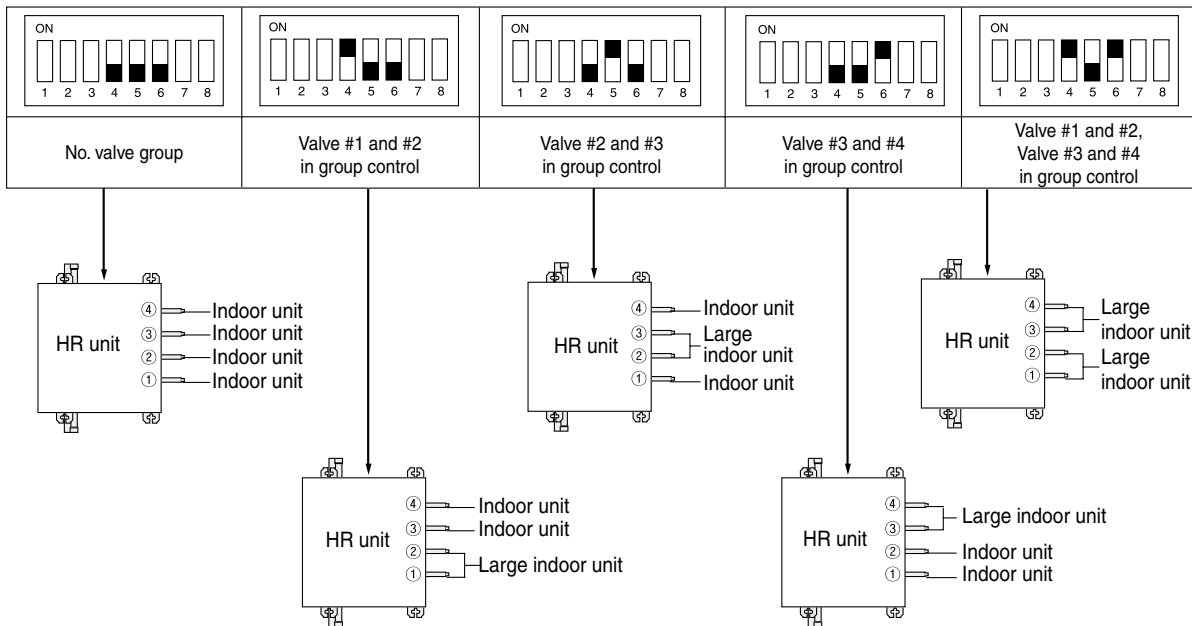
### 2) Selection of the model of the HR unit



\* Each model is shipped with the switches No.2 and No.3 pre-adjusted as above in the factory.

### 3) Selection of the valve group

Valve group control is the function for connecting 2 valves of an HR unit with an indoor unit of large capacity (More than 12kw) using a Y-branch.



**Notice:** If you installed by valve grouping you need to use manual addressing.

Error No.	Error Type	Error Point	Main Reasons
201(HR unit1) 205(HR unit2) 209(HR unit3) 213(HR unit4) 217(HR unit5) 221(HR unit6) 225(HR unit7) 229(HR unit8)	HR unit liquid pipe temperature sensor error	Abnormal value of sensor measurement (Open / Short)	<ul style="list-style-type: none"> <li>• Defective temperature sensor connection</li> <li>• Defective temperature sensor (Open/Short)</li> <li>• Defective outdoor unit PCB</li> </ul>

Error No.	Error Type	Error Point	Main Reasons
202(HR unit1) 206(HR unit2) 210(HR unit3) 214(HR unit4) 218(HR unit5) 222(HR unit6) 226(HR unit7) 230(HR unit8)	HR unit Sub-cooling inlet pipe temperature sensor error	Abnormal value of sensor measurement(Open / Short )	<ul style="list-style-type: none"> <li>• Defective temperature sensor connection</li> <li>• Defective temperature sensor (Open/Short)</li> <li>• Defective outdoor unit PCB</li> </ul>

Error No.	Error Type	Error Point	Main Reasons
203(HR unit1) 207(HR unit2) 211(HR unit3) 215(HR unit4) 219(HR unit5) 223(HR unit6) 227(HR unit7) 231(HR unit8)	HR unit Sub-cooling discharge pipe temperature sensor error	Abnormal value of sensor measurement(Open / Short)	<ul style="list-style-type: none"> <li>• Defective temperature sensor connection</li> <li>• Defective temperature sensor (Open/Short)</li> <li>• Defective outdoor unit PCB</li> </ul>

### ■ Error diagnosis and countermeasure flow chart

- 1) Check connection condition of temperature sensor and lead cable
- 2) Is value of temperature sensor normal? If not replace sensor
  - Piping temperature sensor : 10°C = 10kΩ : 25°C= 5kΩ : 50°C= 1.8kΩ
- 3) If connection of sensor and value is correct, replace outdoor unit PCB

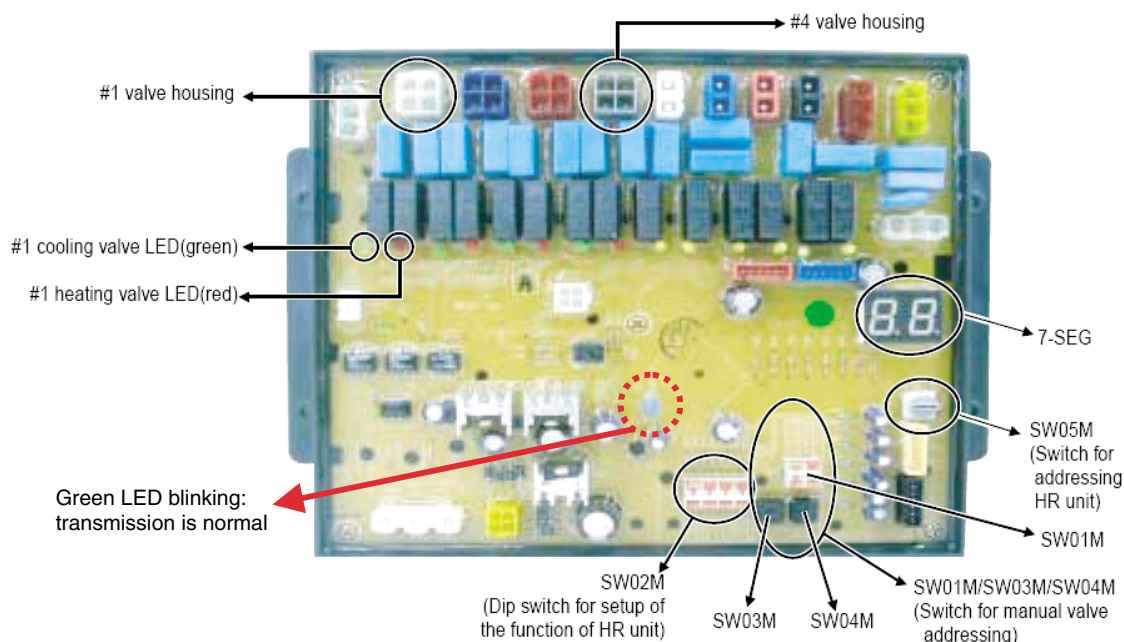
Error No.	Error Type	Error Point	Main Reasons
204(HR unit1) 208(HR unit2) 212(HR unit3) 216(HR unit4) 220(HR unit5) 224(HR unit6) 228(HR unit7) 232(HR unit8)	Transmission error between the HR unit and outdoor unit	Transmission error between the HR unit and outdoor unit	1. Defective connection in HR unit power supply and transmission connection 2. Wrong setting of the HR unit Rotary switch and Dip switch 3. Defective HR unit PCB

**■ Error diagnosis and countermeasure flow chart**

- 1) Check connection between power cables and transmission cables, check transmission green LED blink of HR unit PCB
- 2) If transmission green LED blink of HR unit PCB is normal, check setting of rotary switch of HR unit and Dip switch(Refer to CH200),  
Reset power of outdoor and HR unit  
(If transmission error of HR unit occurs, it can't be released until reset of outdoor power)
- 3) If transmission green LED blink of HR unit PCB is abnormal(not blinking,just on), check transmission condition of total indoor units(Refer to CH05)  
If transmission green LED blink of HR unit PCB is abnormal(not blinking, just on) even if transmission condition is normal, replace HR unit PCB

[NB] If Indoor units/transmission cables of HR unit and cables of power 220V has been changed each other, transmission parts and indoor will be burnt

**HR Unit PCB**



Error No.	Error Type	Error Point	Main Reasons
240	Central controller connector error (CNU Connection failure)	Transmission failure between central controller and CNU	<ol style="list-style-type: none"> <li>1. Defective transmission connection</li> <li>2. Defective CNU</li> <li>3. Incorrect IP address of central controller or CNU</li> <li>4. Defective transmission network</li> </ol>

**■ Error diagnosis and countermeasure flow chart**

- 1) Check transmission cables are connected correctly or not
- 2) If central controller is connected to total network, check IP of CNU, central controller
- 3) Replace CNU

Error No.	Error Type	Error Point	Main Reasons
241	Central controller data transmission error (Sending error)	Central controller to CNU data transmission failure	<ol style="list-style-type: none"> <li>1. Defective CNU</li> <li>2. Center controller initialization failure</li> </ol>

Error No.	Error Type	Error Point	Main Reasons
242	Central controller receive Error (Data receiving error )	CNU to Central controller on time data receiving error	<ol style="list-style-type: none"> <li>1. Defective CNU</li> <li>2. Central controller initialization error</li> </ol>

Error No.	Error Type	Error Point	Main Reasons
243	Central controller receive buffer overflow (In excess data receive)	When data length from CNU is longer than data length defined at protocol	<ol style="list-style-type: none"> <li>1. Mismatching</li> <li>2. Defective CNU</li> <li>3. transmission noise error</li> </ol>

Error No.	Error Type	Error Point	Main Reasons
244	Central controller receive time out (Receiving time : 3sec ↑)	Transmission failure between central controller and CNU	<ol style="list-style-type: none"> <li>1. Defective CNU</li> <li>2. Initialization failure of central controller</li> </ol>

Error No.	Error Type	Error Point	Main Reasons
245	Central controller Send Timeout	Data sending failure from central controller to CNU within designated time	<ol style="list-style-type: none"> <li>1. CNU defect</li> <li>2. Initialization failure of central controller</li> </ol>

Error No.	Error Type	Error Point	Main Reasons
246	Central controller Receive Timeout	Data receiving failure of central controller from CNU within designated time	<ol style="list-style-type: none"> <li>1. CNU defect</li> <li>2. Initialization failure of central controller</li> </ol>

Error No.	Error Type	Error Point	Main Reasons
250	Central controller Check sum Error	Received check sum is different from calculated check sum data	1. NOISE occurs 2. CNU defect 3. Temporary error of Timing mismatch 4. A/C product defect

Error No.	Error Type	Error Point	Main Reasons
251	Central controller Receive Zero Error	Length of received data : 0	1. NOISE occurs 2. CNU defect 3. Temporary error of Timing mismatch 4. A/C product defect

Error No.	Error Type	Error Point	Main Reasons
252	Central controller Wrong Address Error	Setting address and actual address are different each other	1. NOISE occurs 2. CNU defect 3. Temporary error of Timing mismatch 4. A/C product defect

■ Error diagnosis and countermeasure flow chart

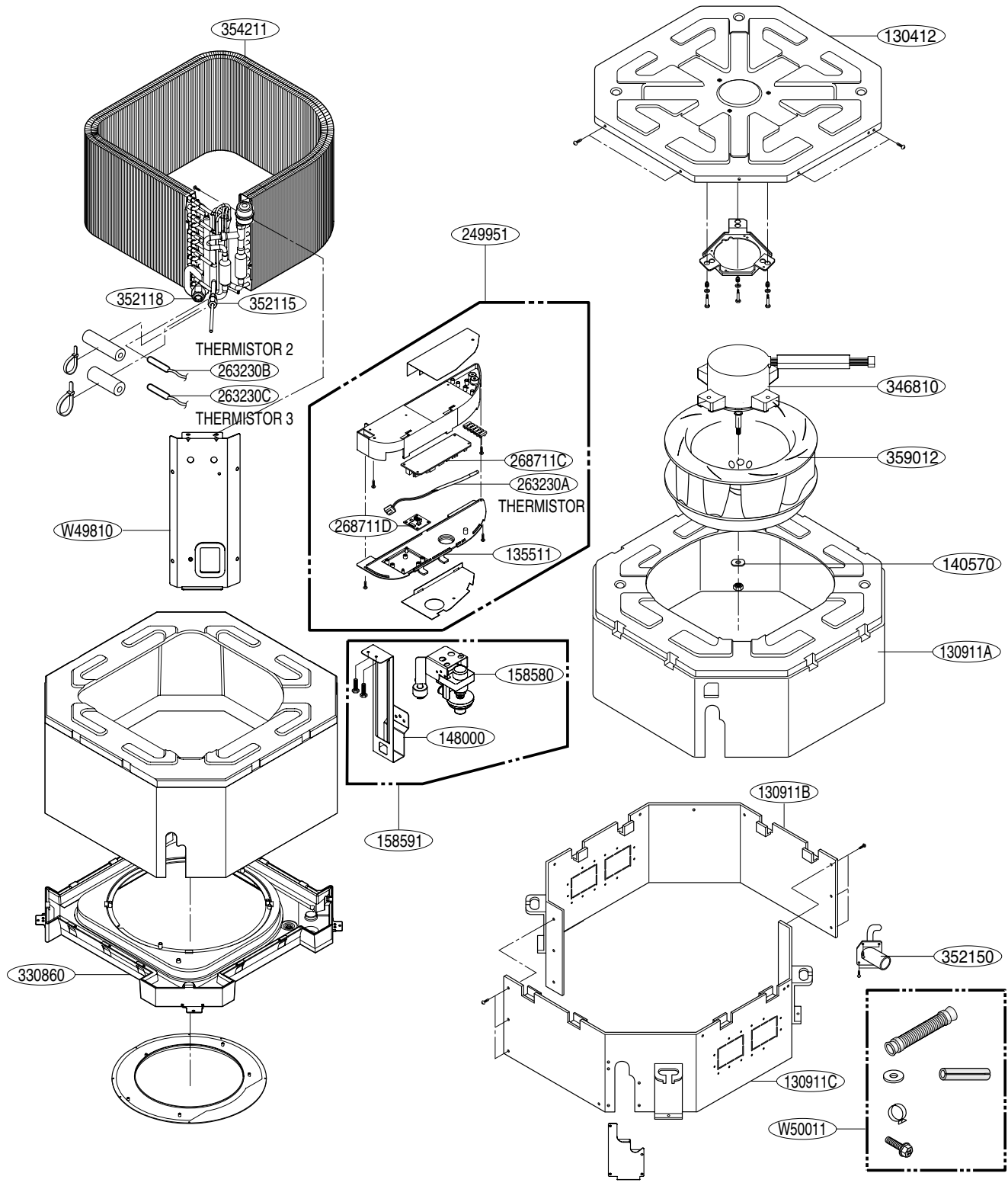
- 1) Check system setting address of central controller and actual address is matched or not
- 2) Re-start service program(engine) of central controller
- 3) Replace CNU



# Part 7

## Exploded view

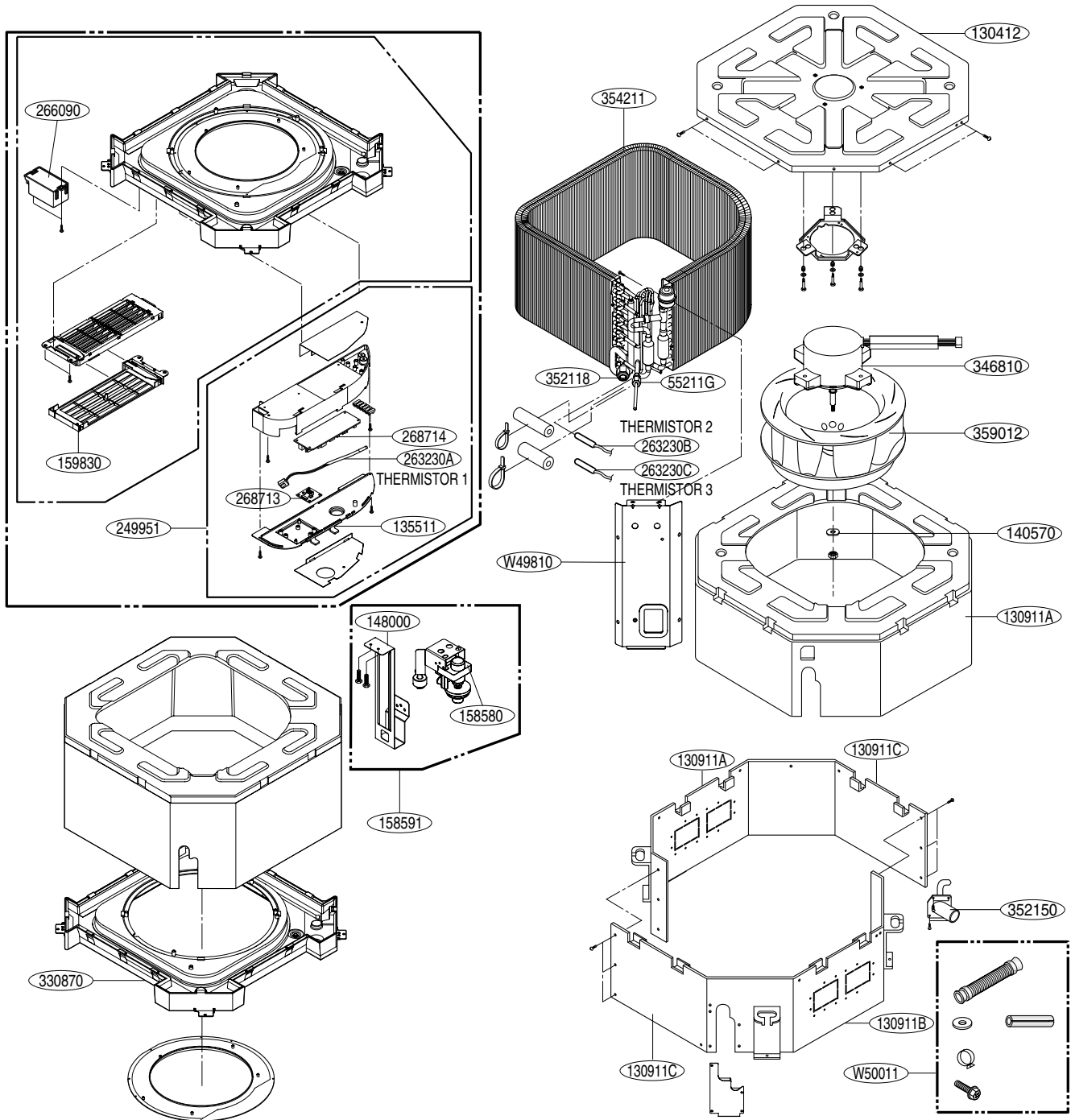
**TE (Standard model)**



THERMISTOR 1	263230A	Air	Housing color : yellow
THERMISTOR 2	263230B	Eva. IN	Housing color : white
THERMISTOR 3	263230C	Eva. OUT	Housing color : red

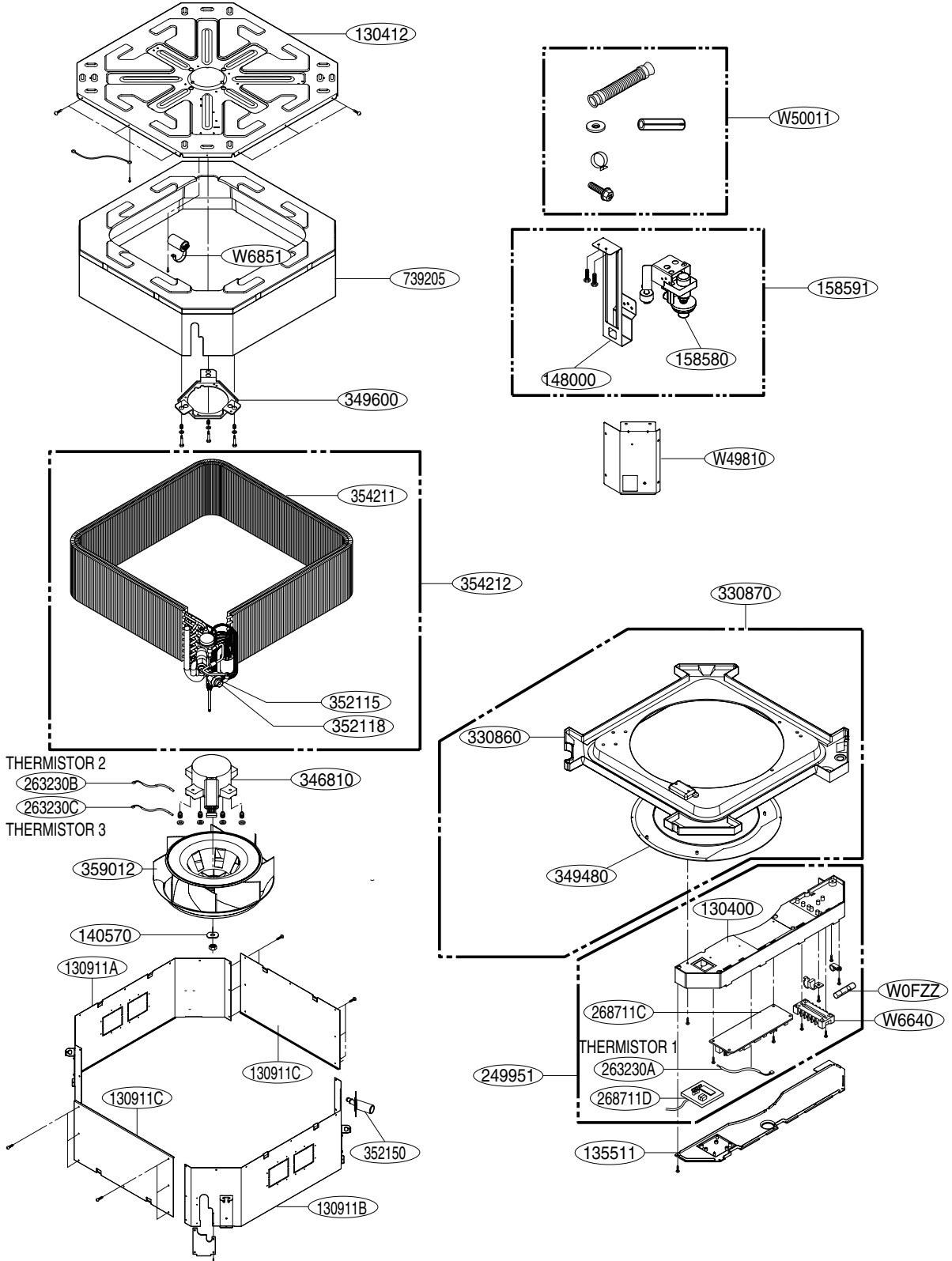


**TE (Plasma model)**



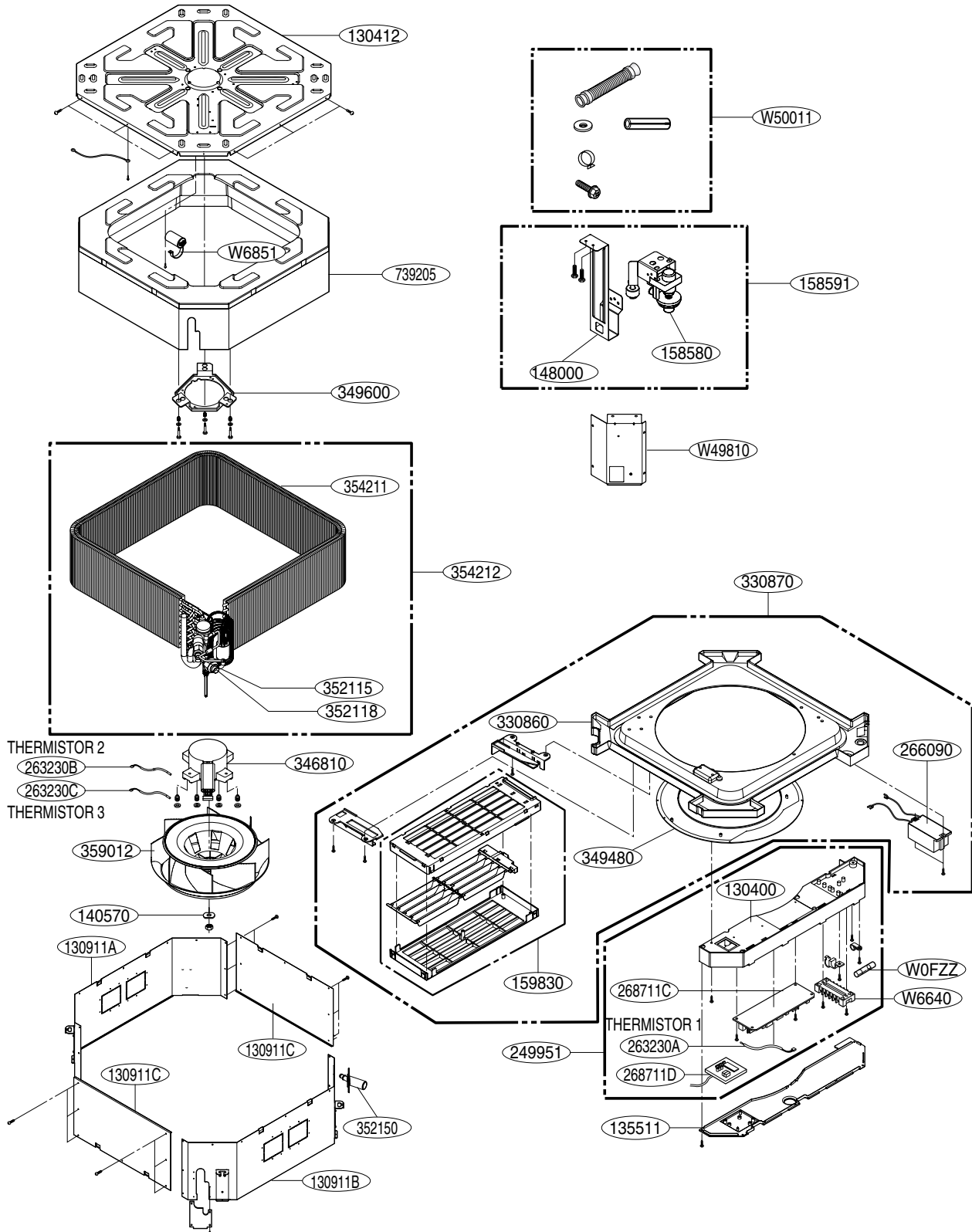
THERMISTOR 1	263230A	Air	Housing color : yellow
THERMISTOR 2	263230B	Eva. IN	Housing color : white
THERMISTOR 3	263230C	Eva. OUT	Housing color : red

TH (Standard model)



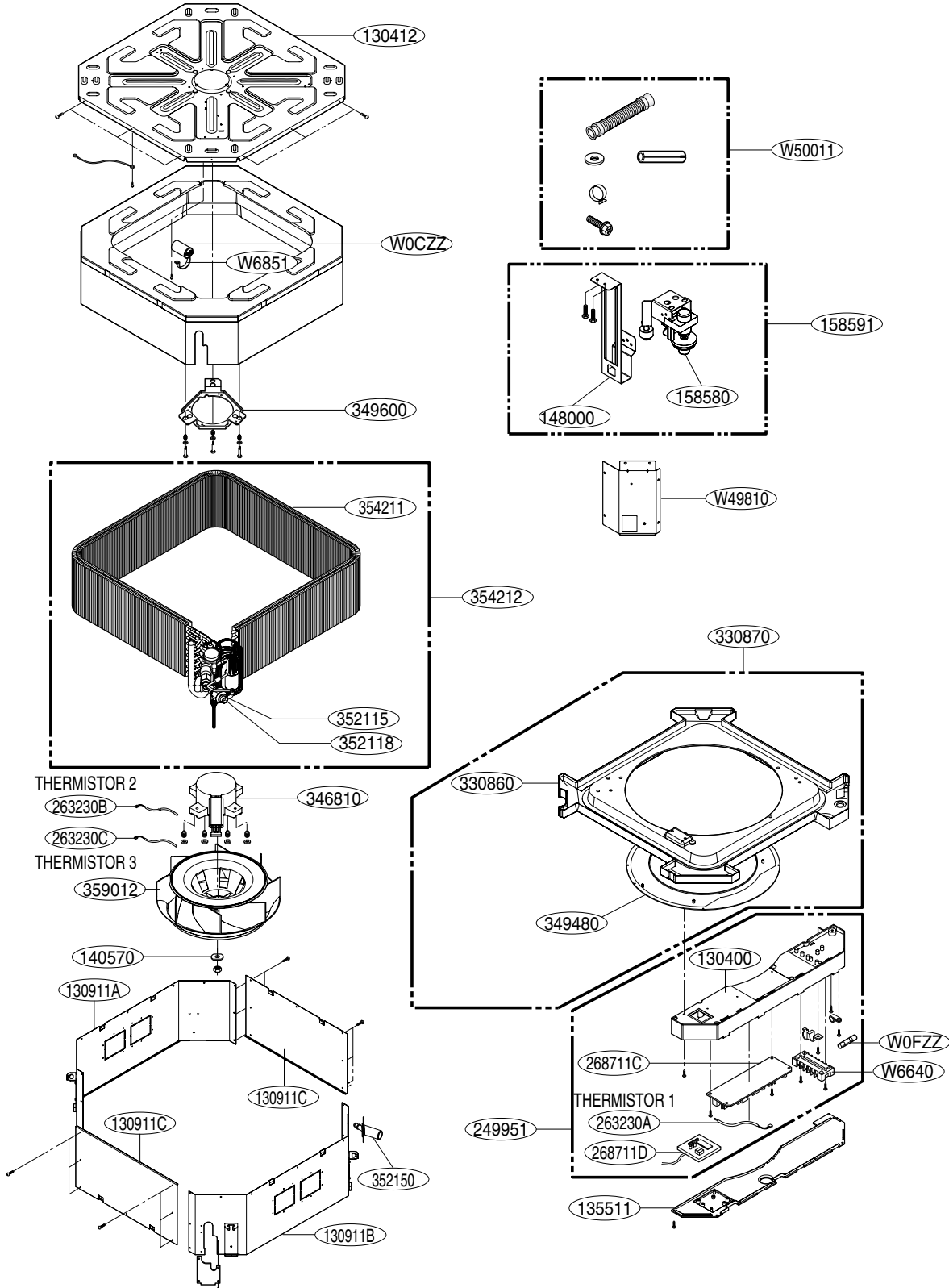
THERMISTOR 1	263230A	Air	Housing color : yellow
THERMISTOR 2	263230B	Eva. IN	Housing color : white
THERMISTOR 3	263230C	Eva. OUT	Housing color : red

TH (Plasma model)



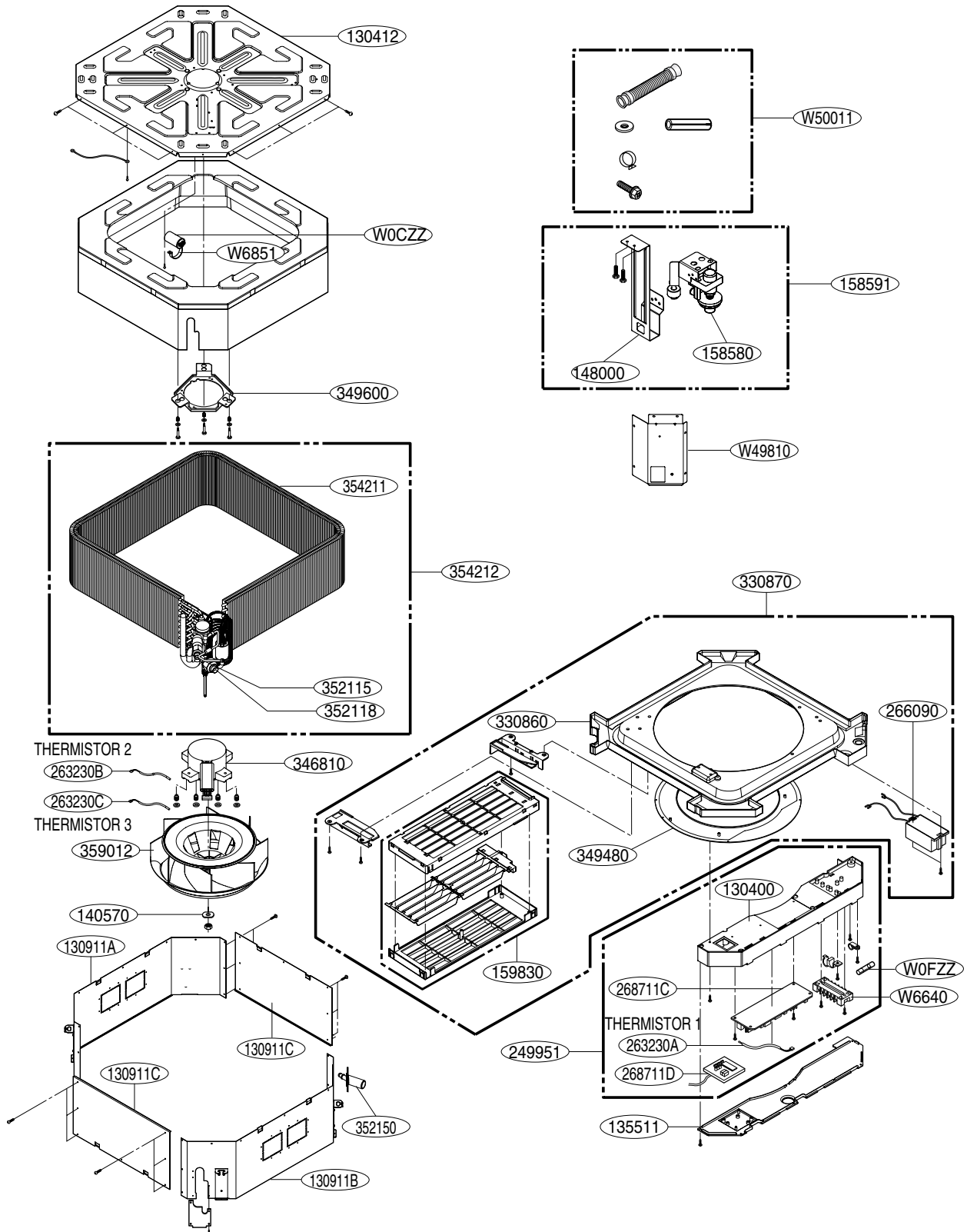
THERMISTOR 1	263230A	Air	Housing color : yellow
THERMISTOR 2	263230B	Eva. IN	Housing color : white
THERMISTOR 3	263230C	Eva. OUT	Housing color : red

TD1 (Standard model)



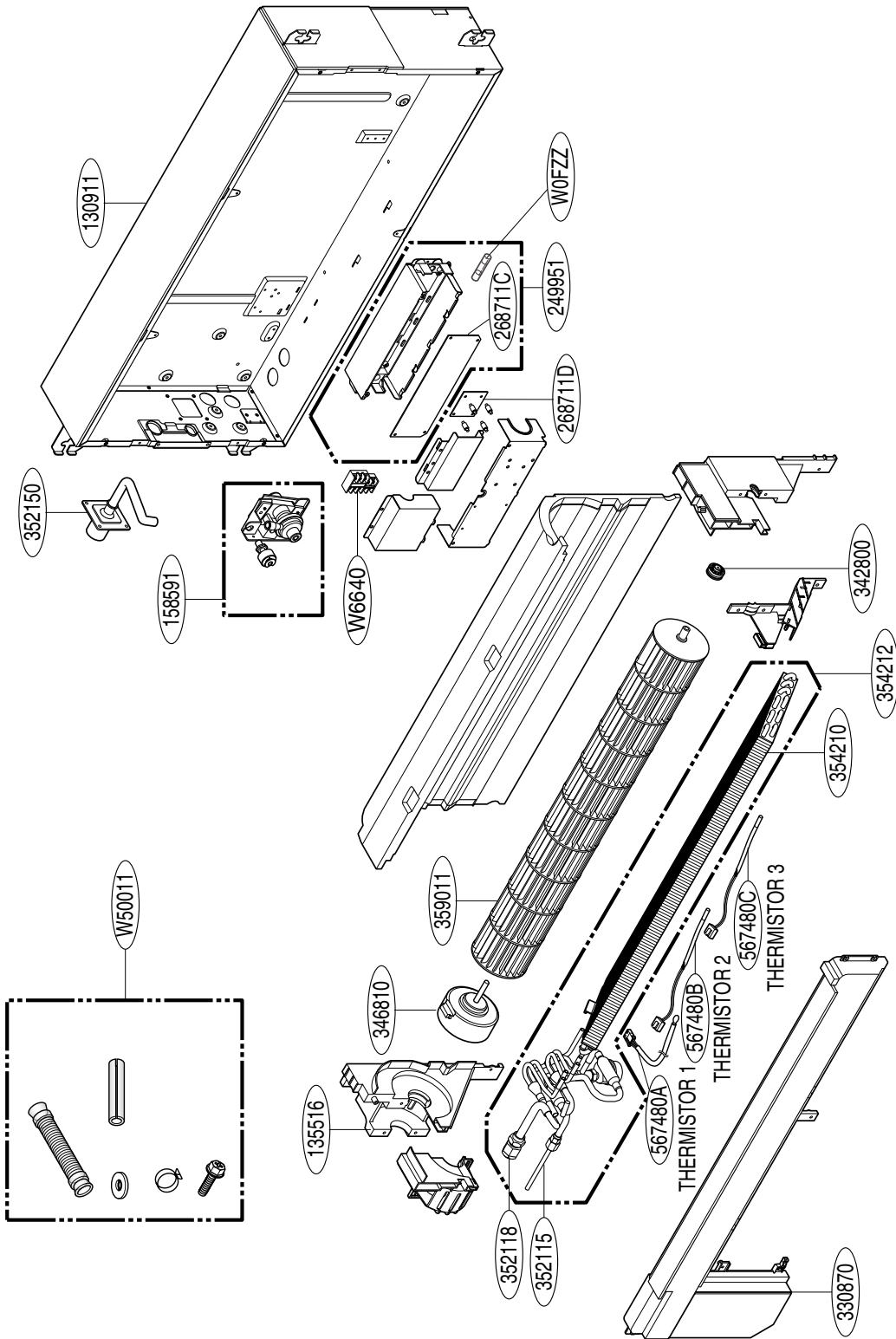
THERMISTOR 1	263230A	Air	Housing color : yellow
THERMISTOR 2	263230B	Eva. IN	Housing color : white
THERMISTOR 3	263230C	Eva. OUT	Housing color : red

TD1 (Plasma model)



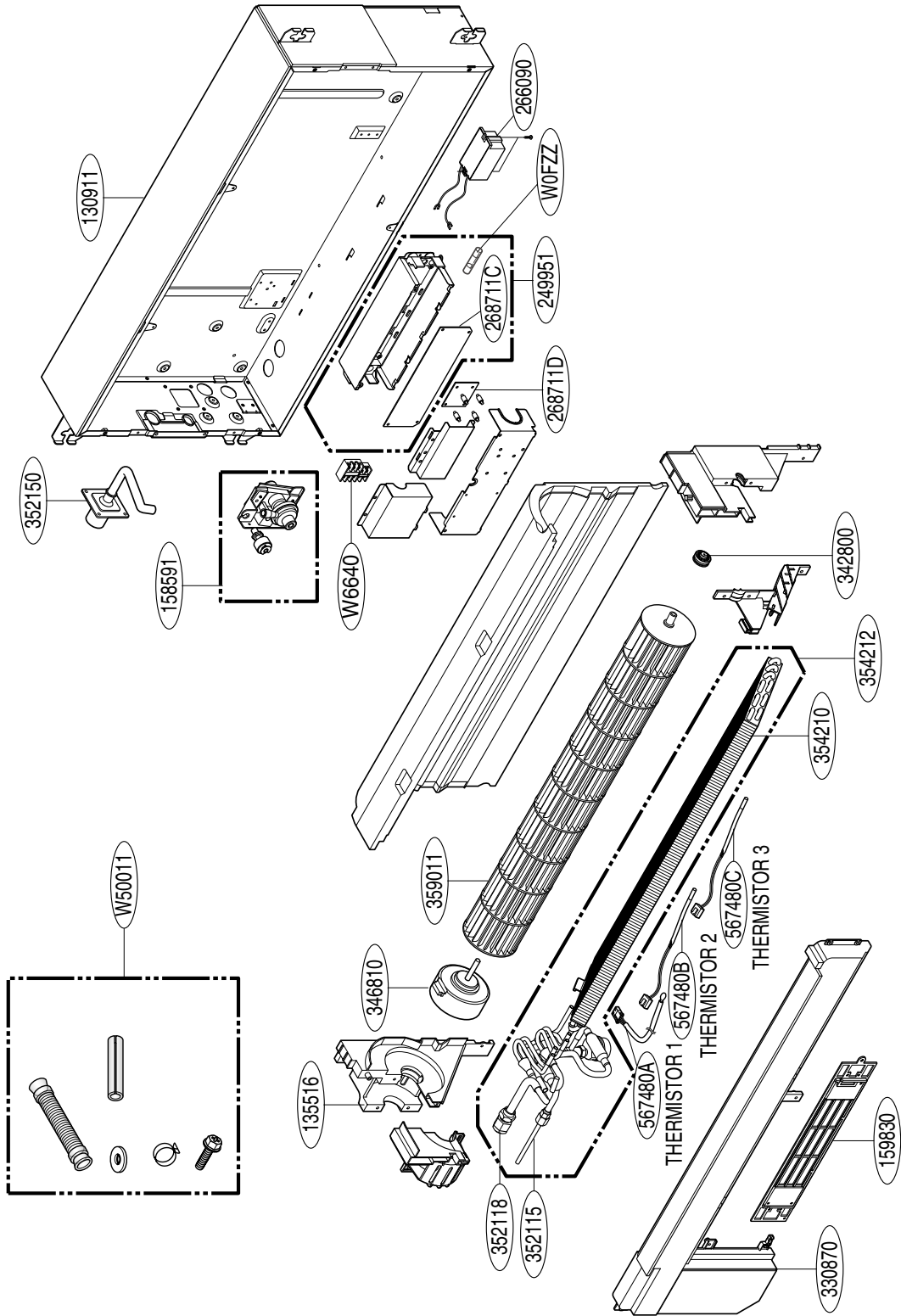
THERMISTOR 1	263230A	Air	Housing color : yellow
THERMISTOR 2	263230B	Eva. IN	Housing color : white
THERMISTOR 3	263230C	Eva. OUT	Housing color : red

**TJ (Standard model)**



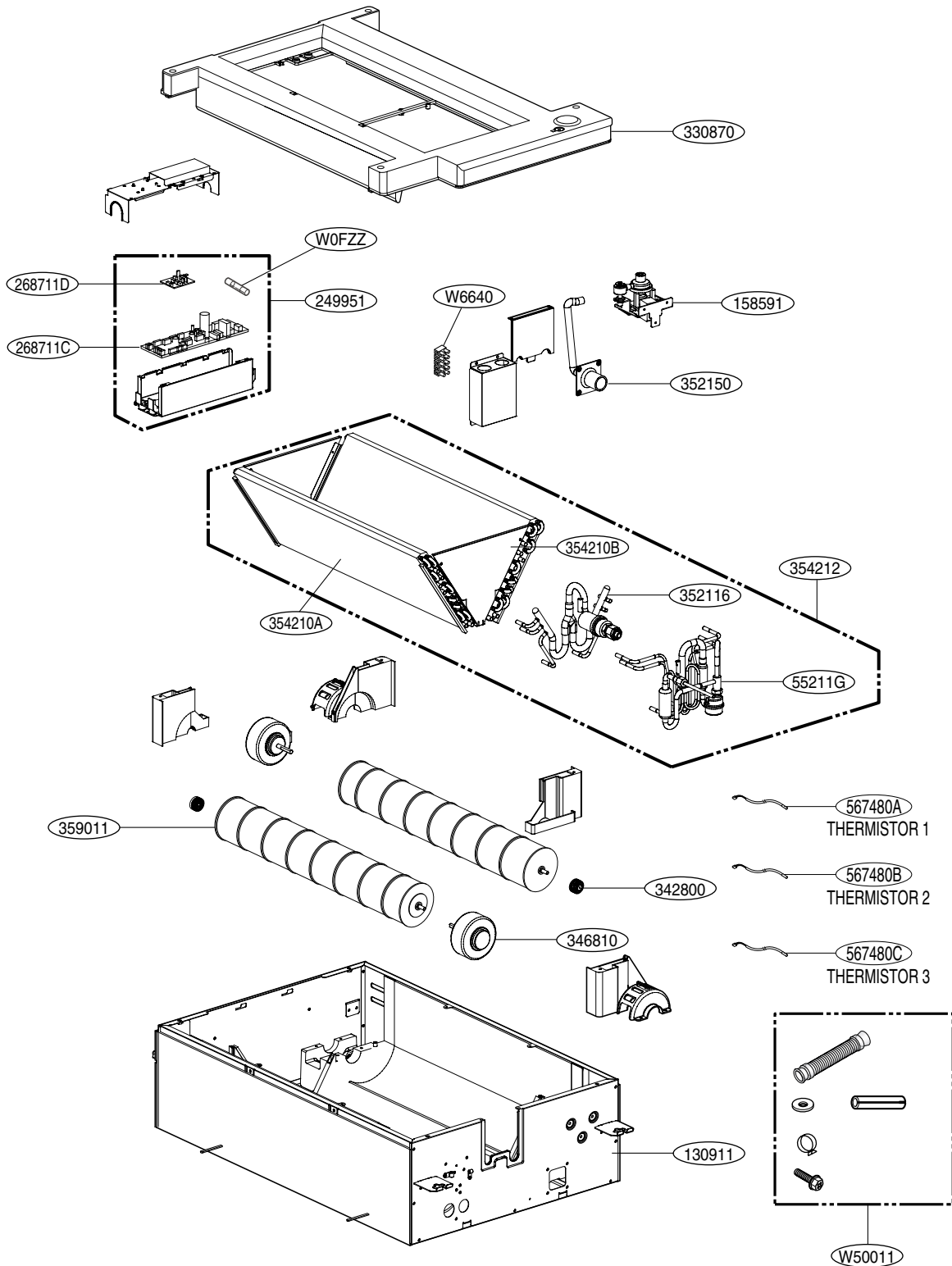
THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

**TJ (Plasma model)**



THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

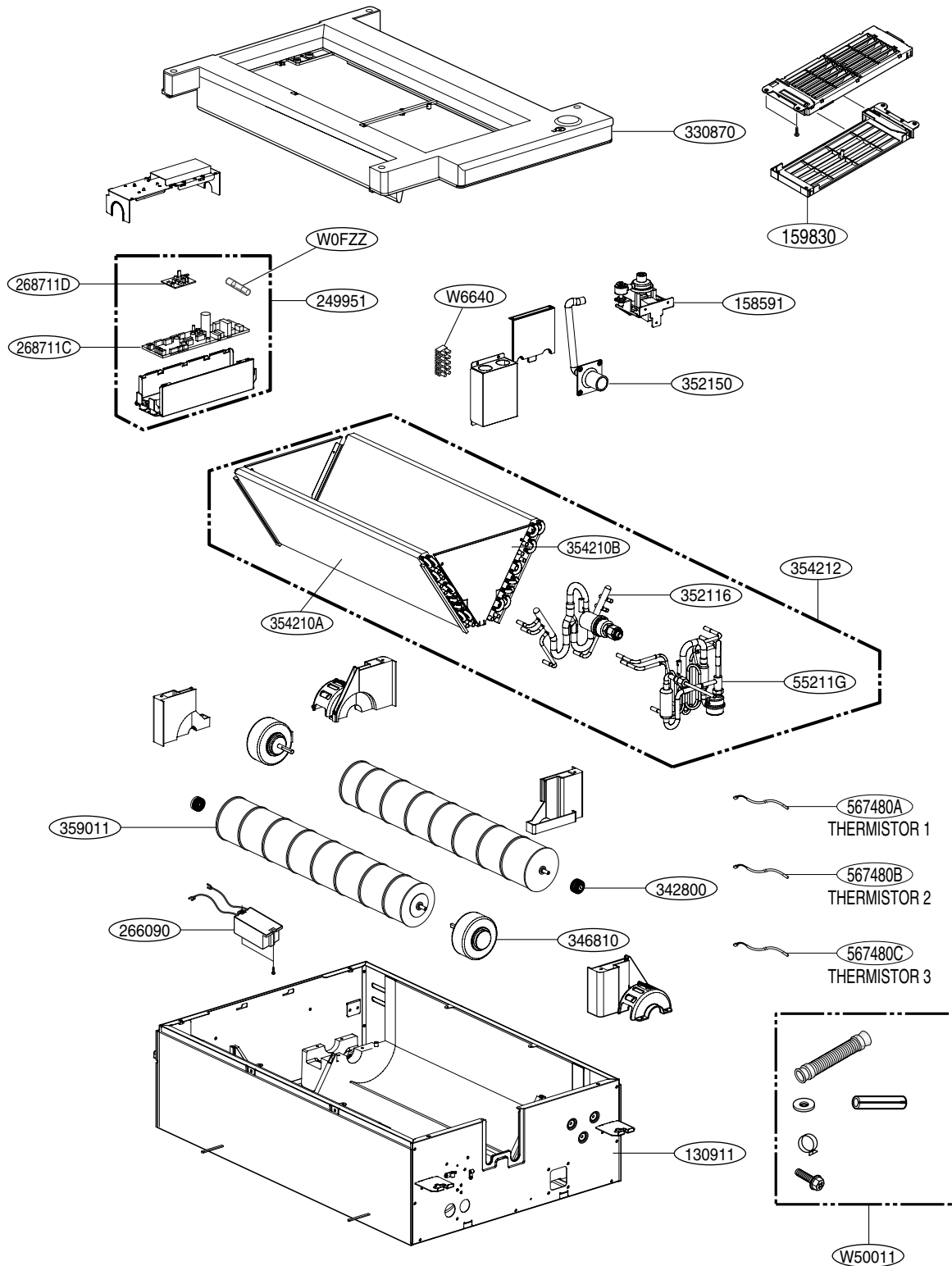
**TL (Standard model)**



THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

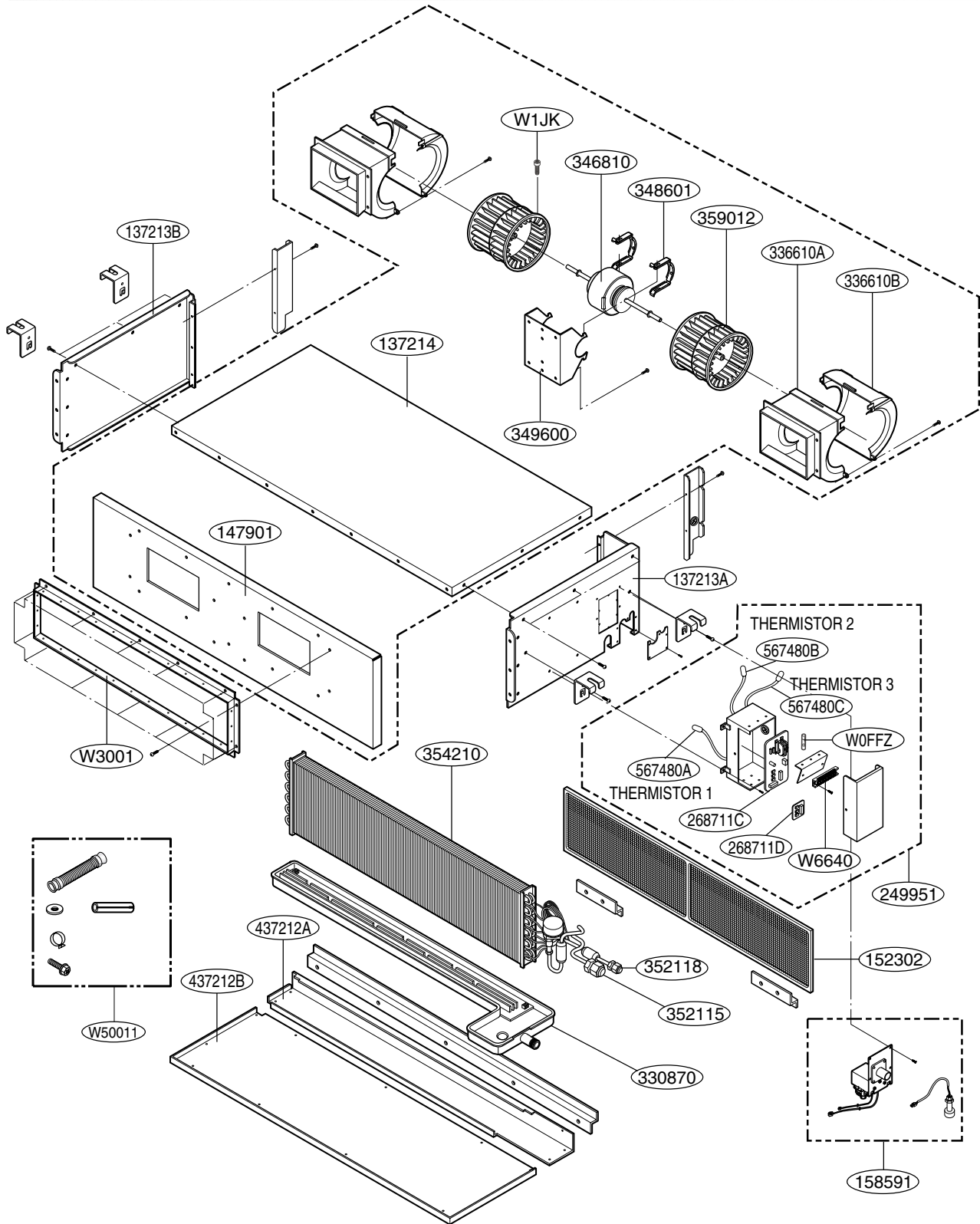


**TL (Plasma model)**



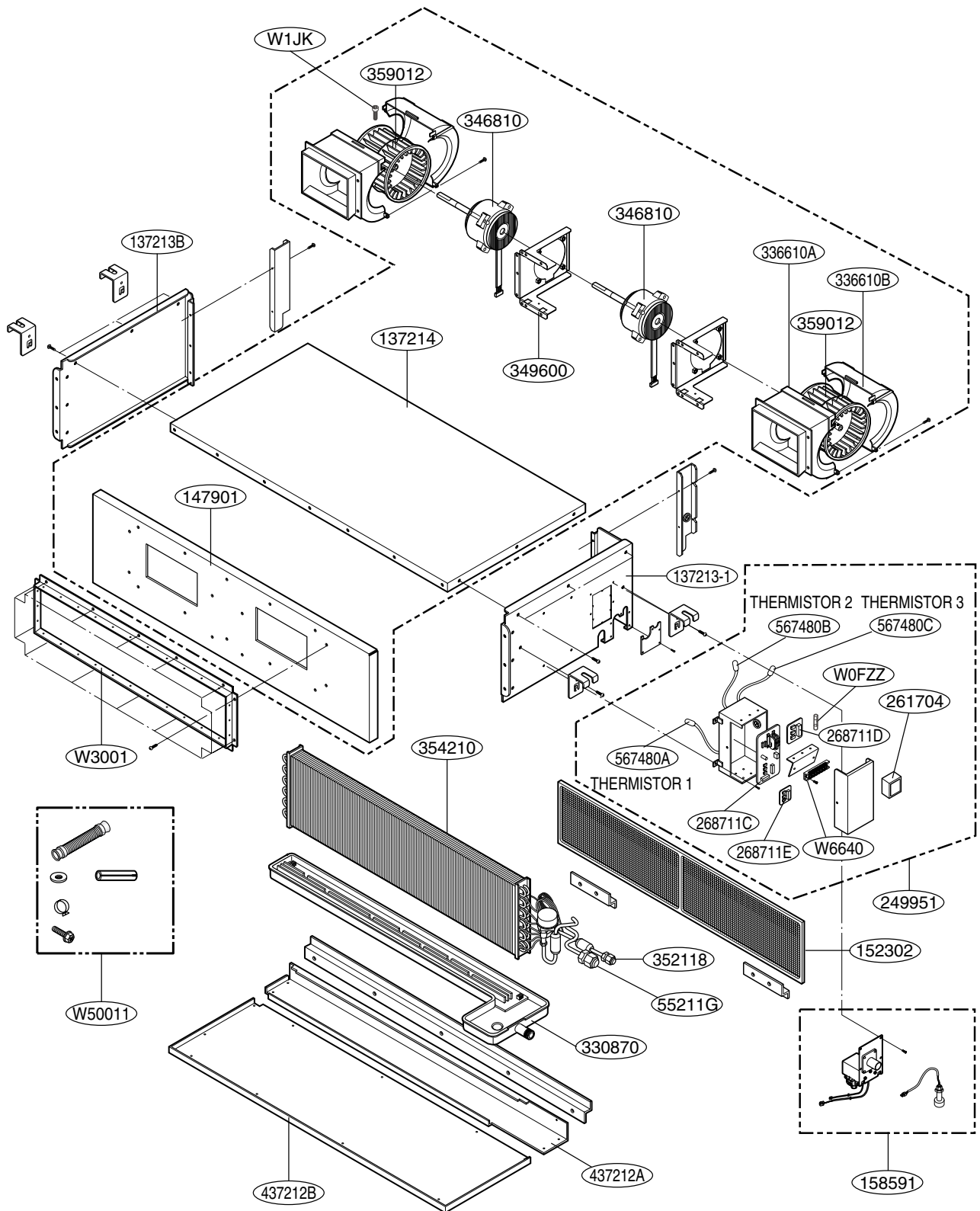
THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

BH



THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

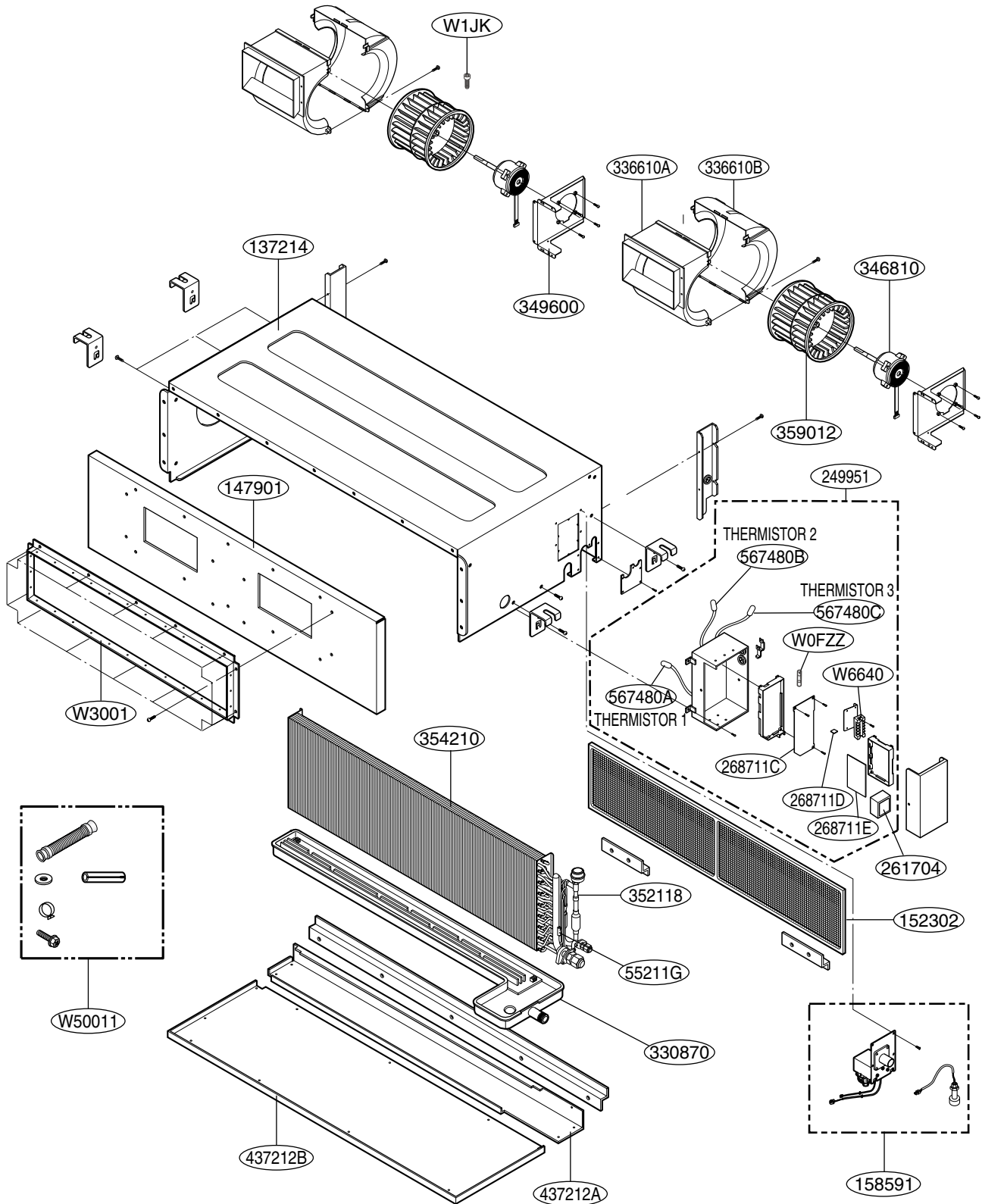
BG



THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

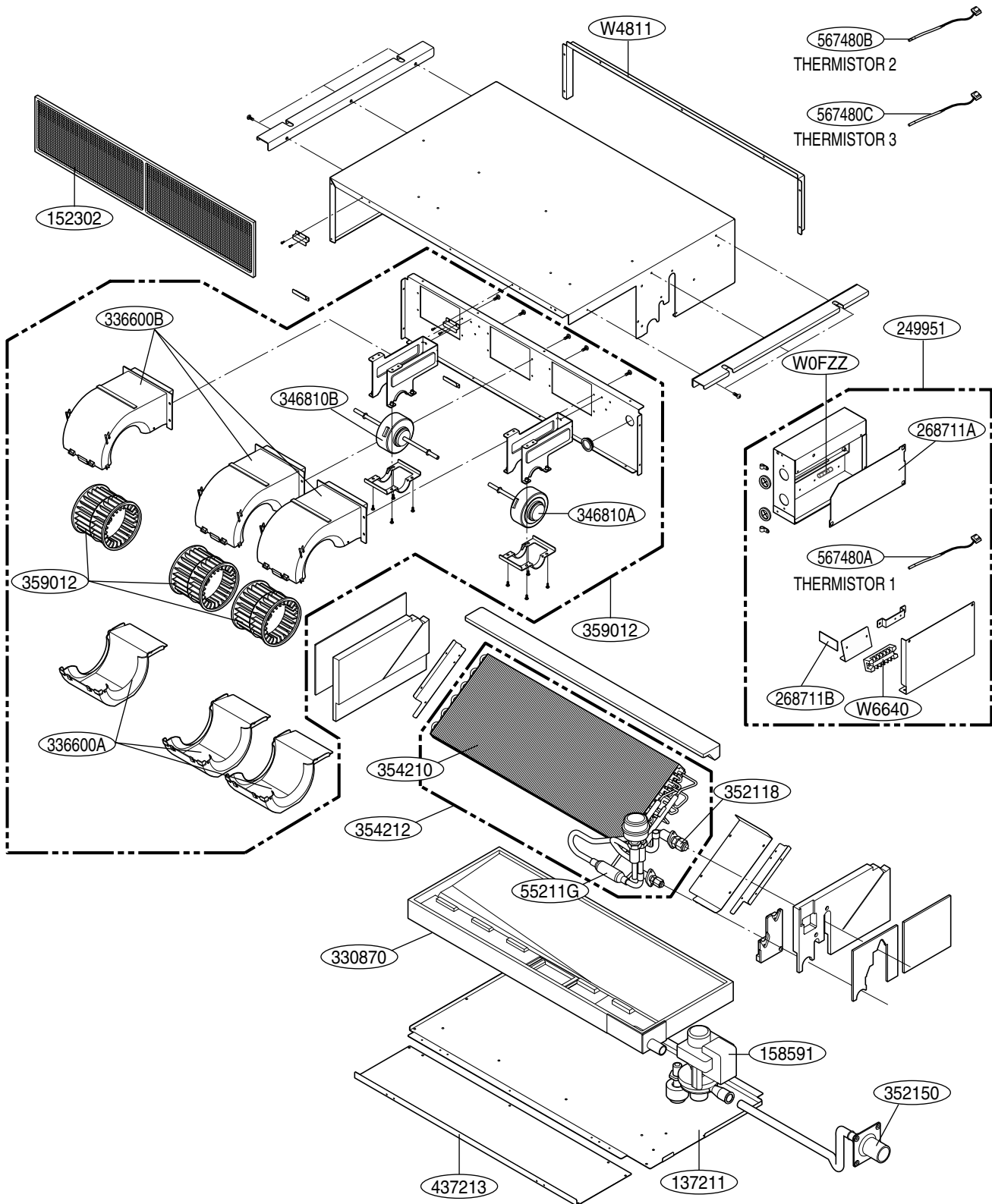
Exploded View

**BR**



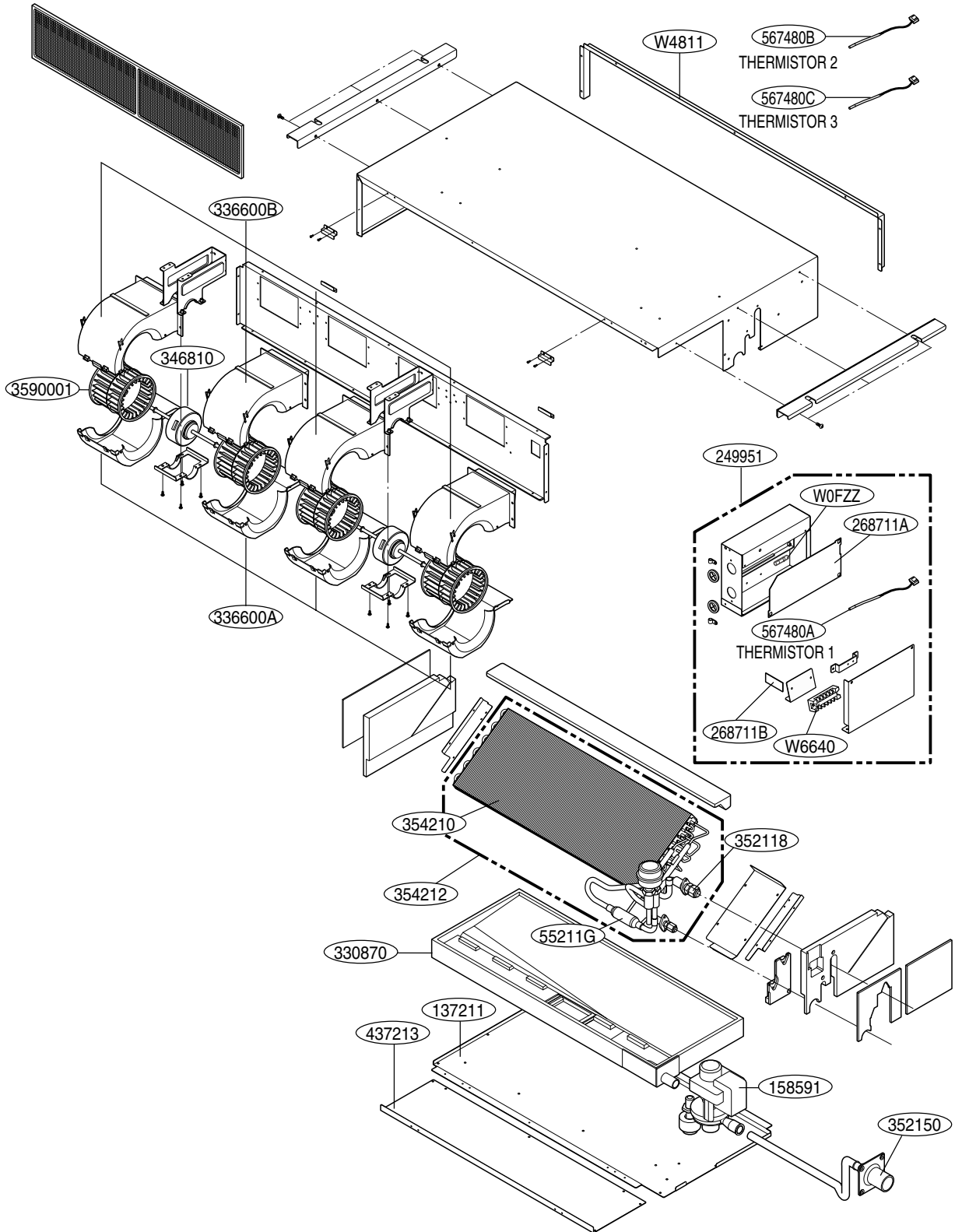
THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

B1



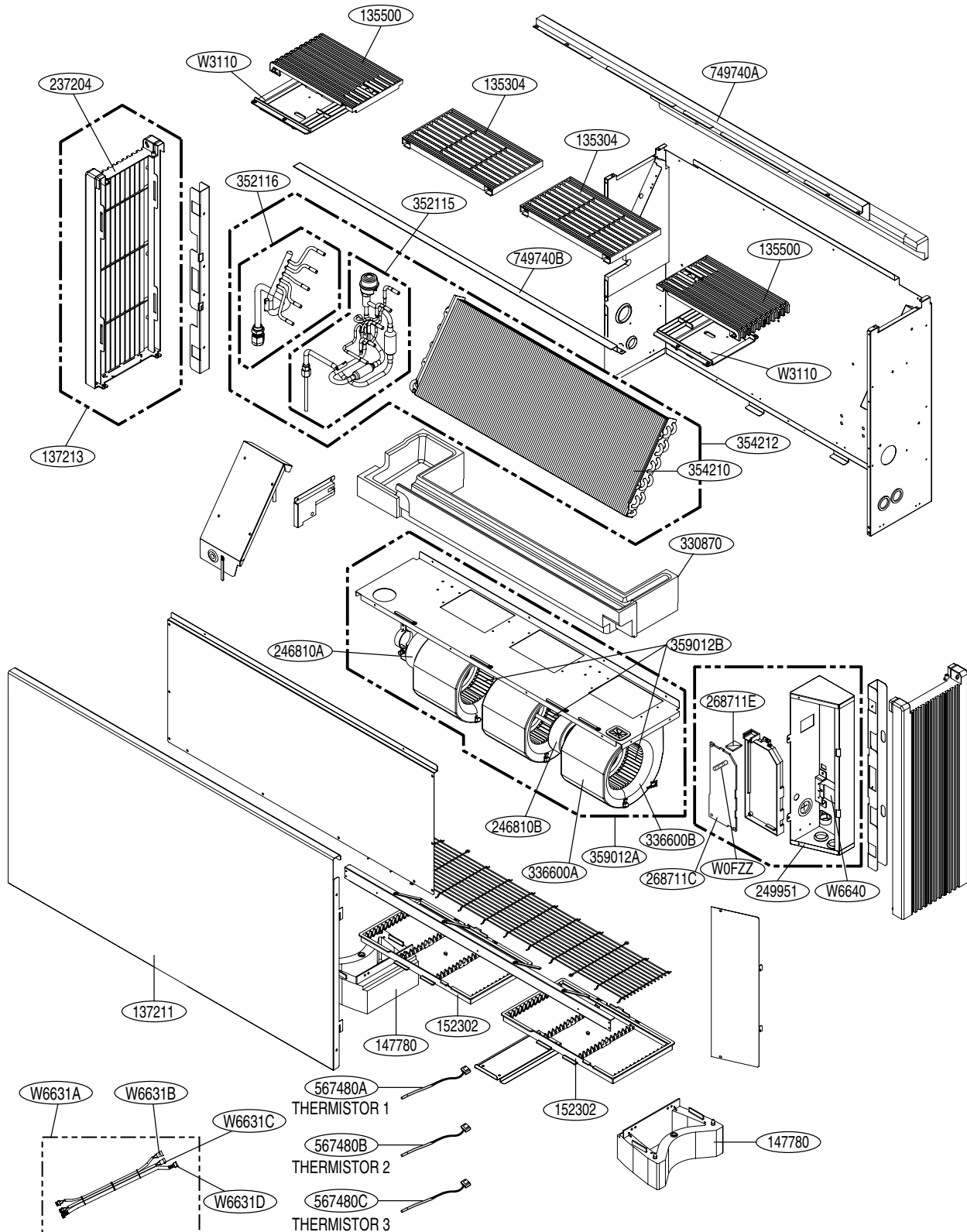
THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

B2



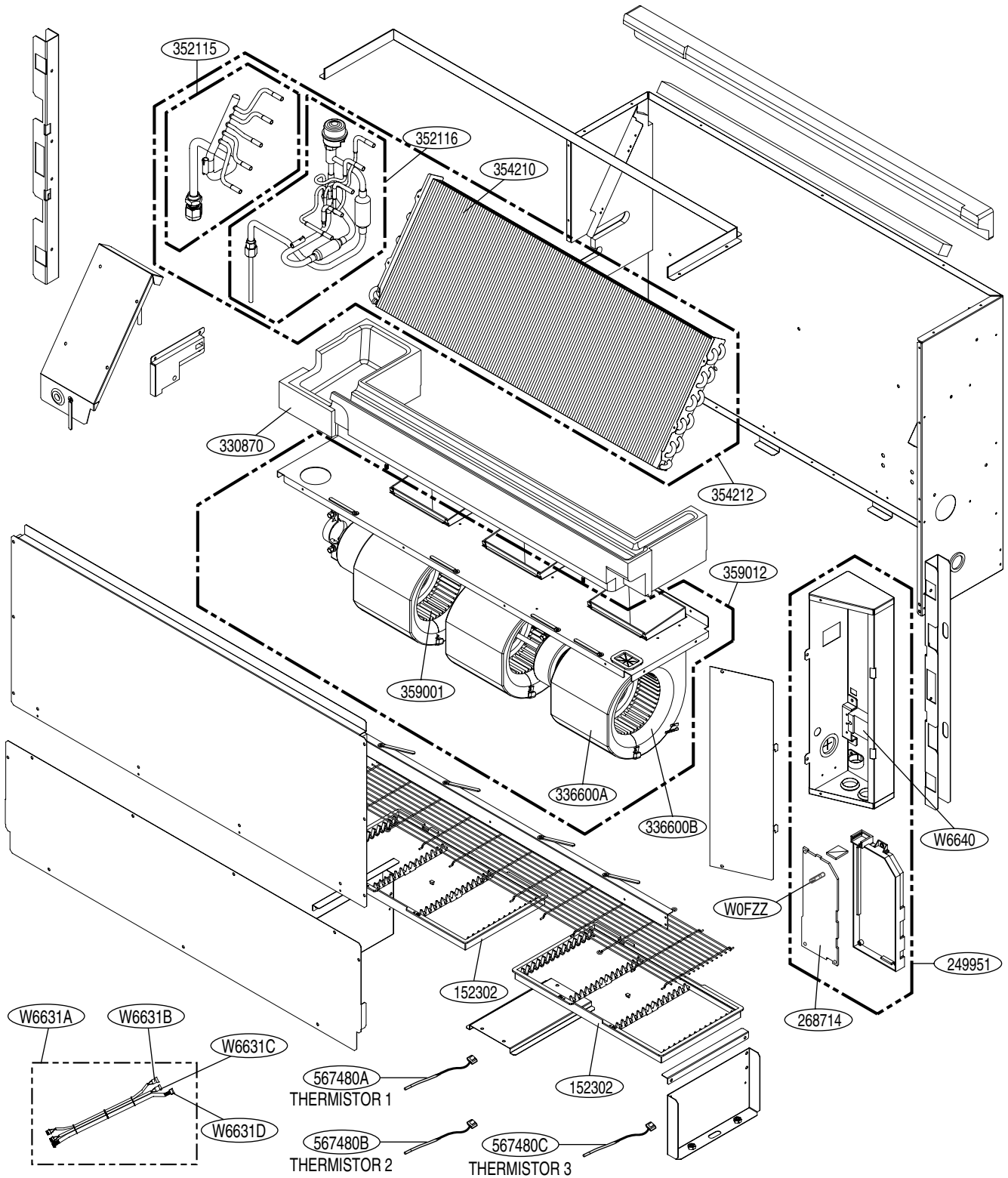
THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

**CE (WITH CASE)**



THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

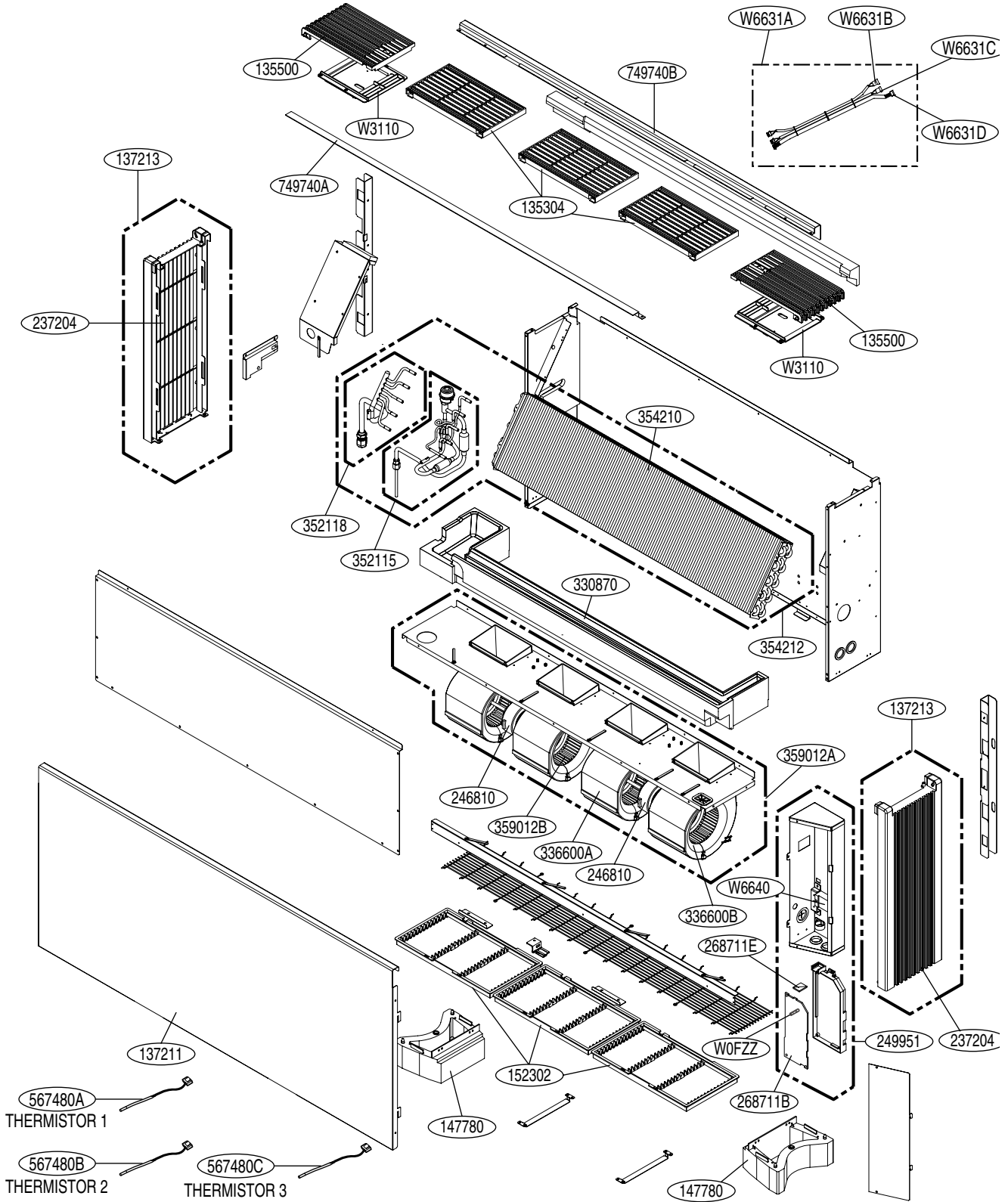
**CE (WITHOUT CASE)**



THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

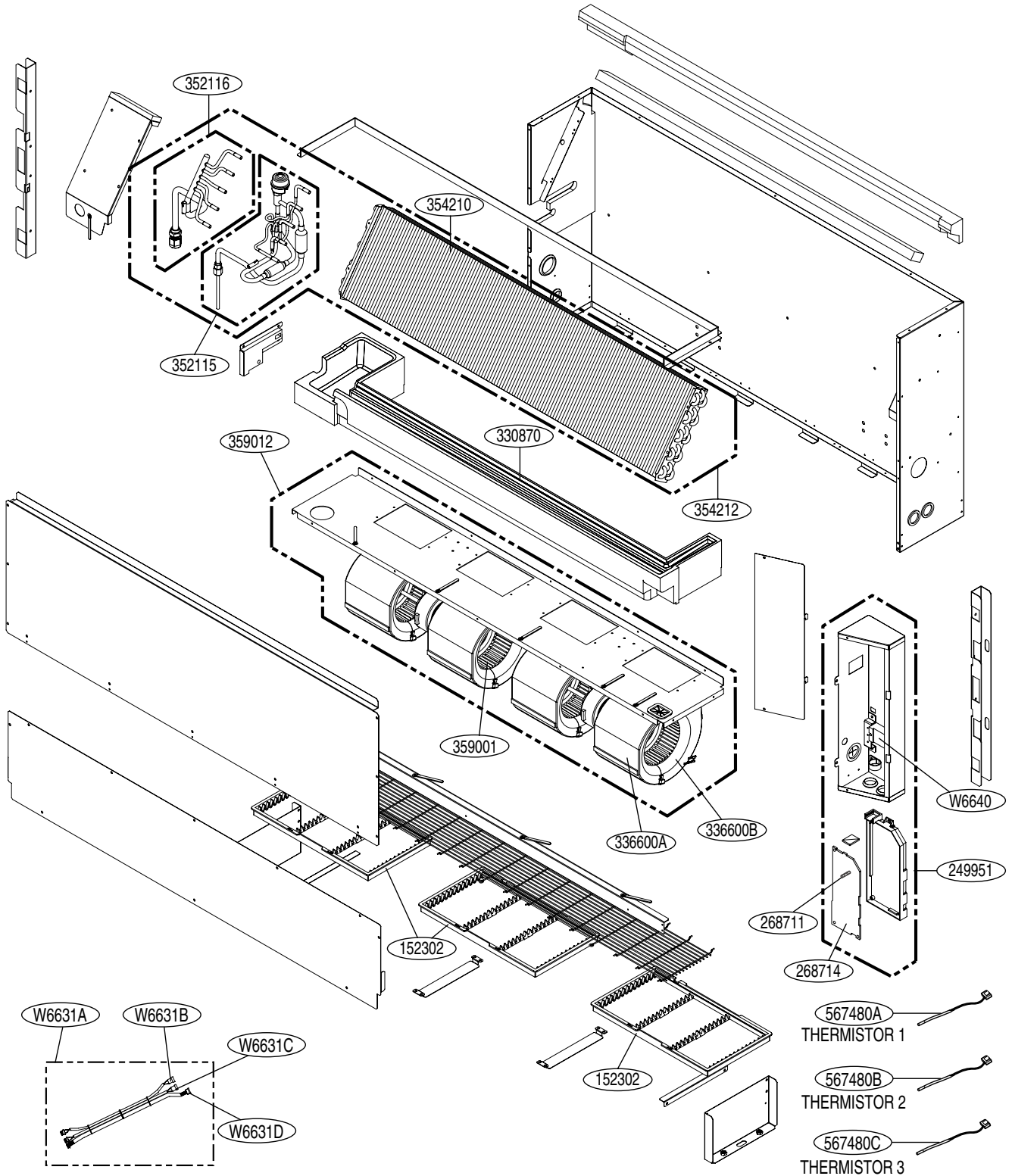


**CF (WITH CASE)**



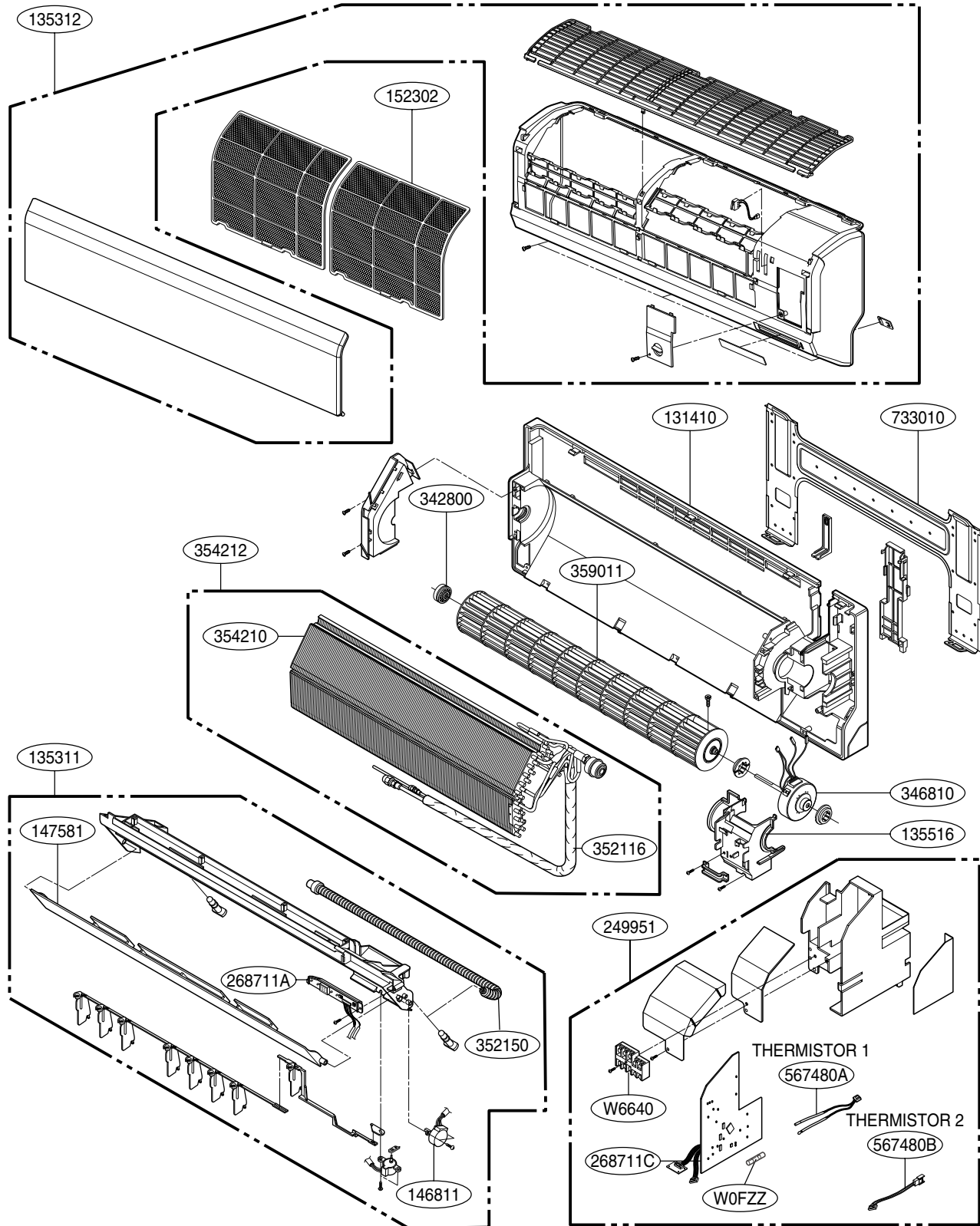
THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

**CF (WITHOUT CASE)**



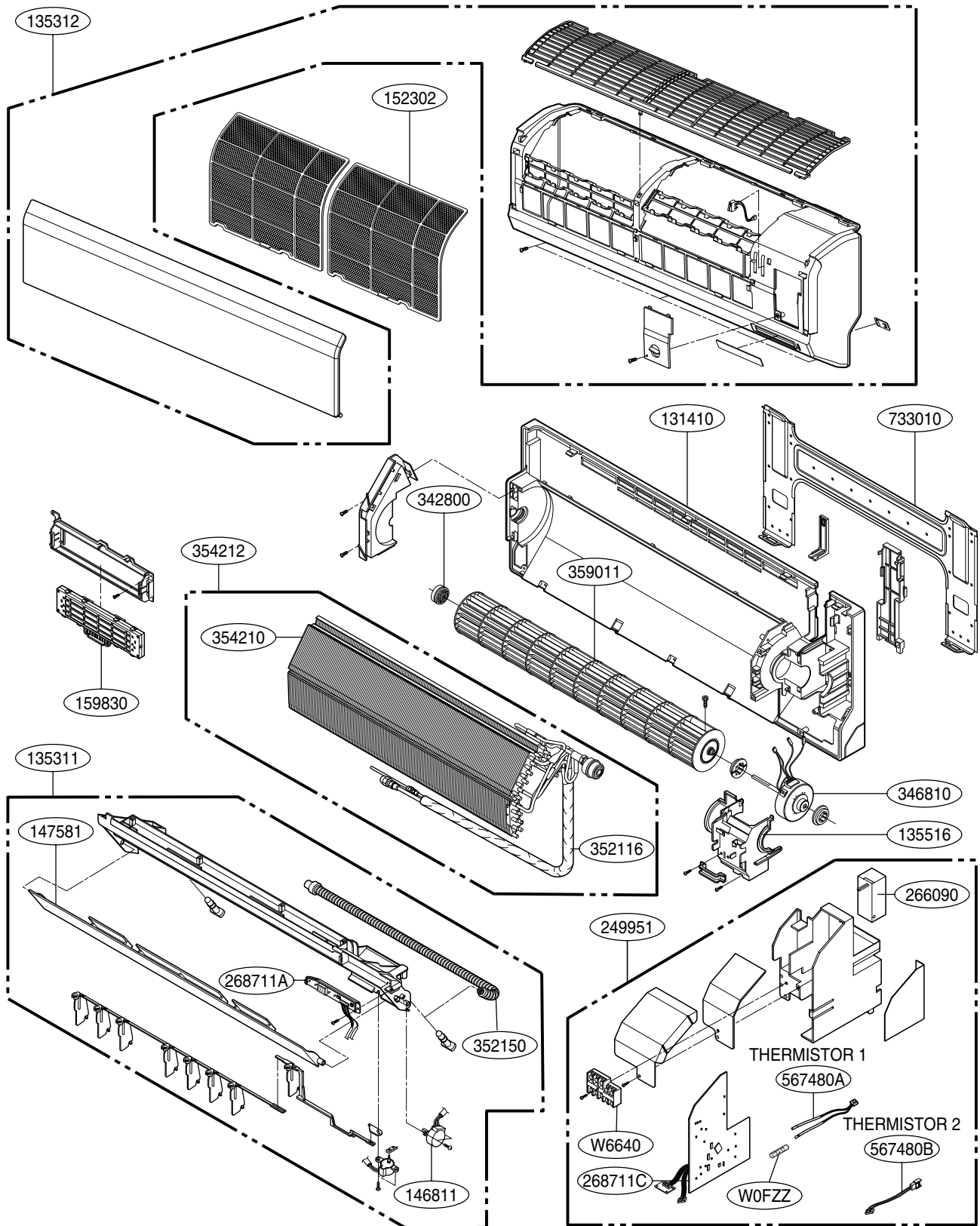
THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

SE1 (Standard)



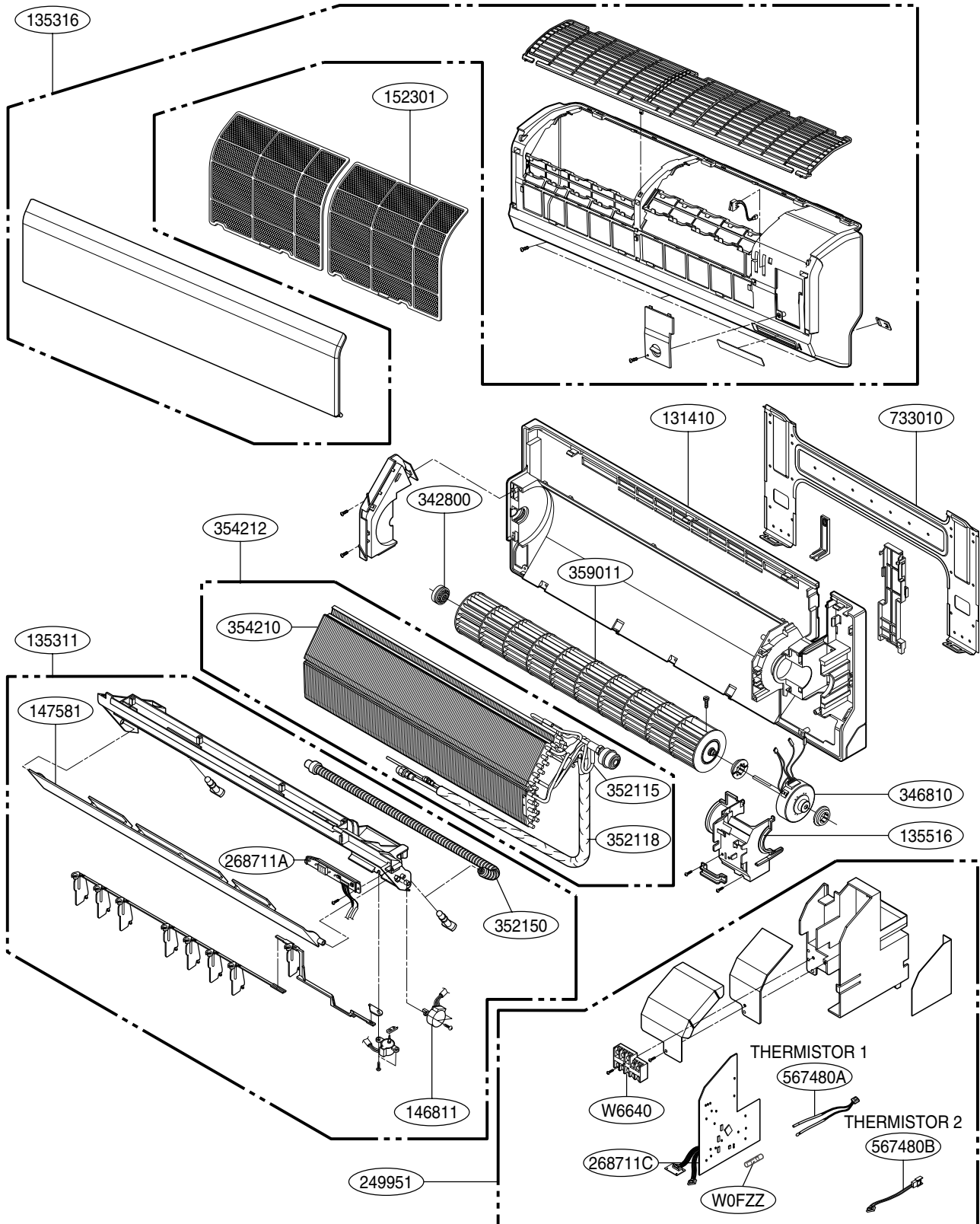
THERMISTOR 1	567480A	Air + Eva. IN	Housing color : white
THERMISTOR 2	567480B	Eva. OUT	Housing color : red

**SE1 (Plasma)**



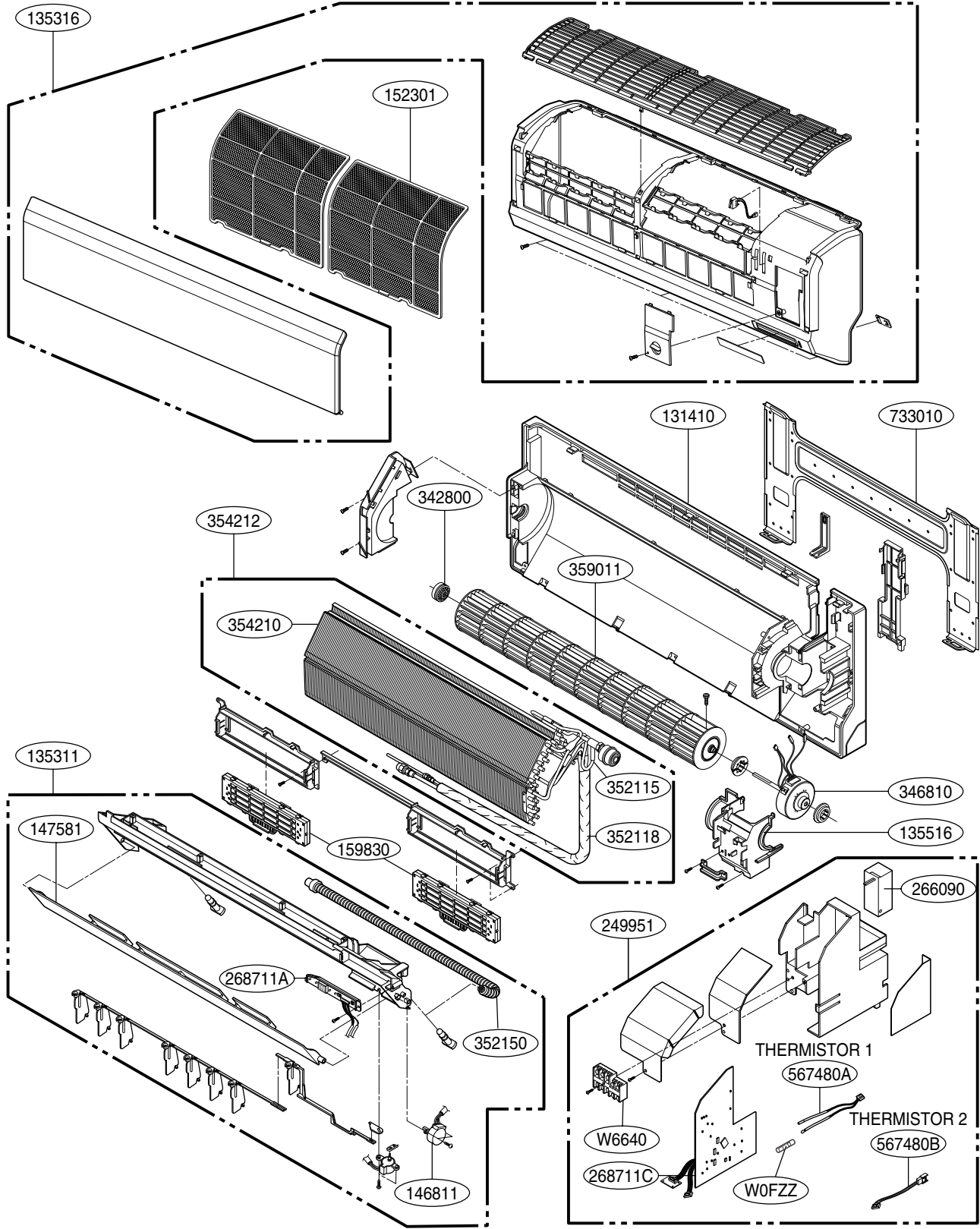
THERMISTOR 1	567480A	Air + Eva. IN	Housing color : white
THERMISTOR 2	567480B	Eva. OUT	Housing color : red

S5 (Standard)



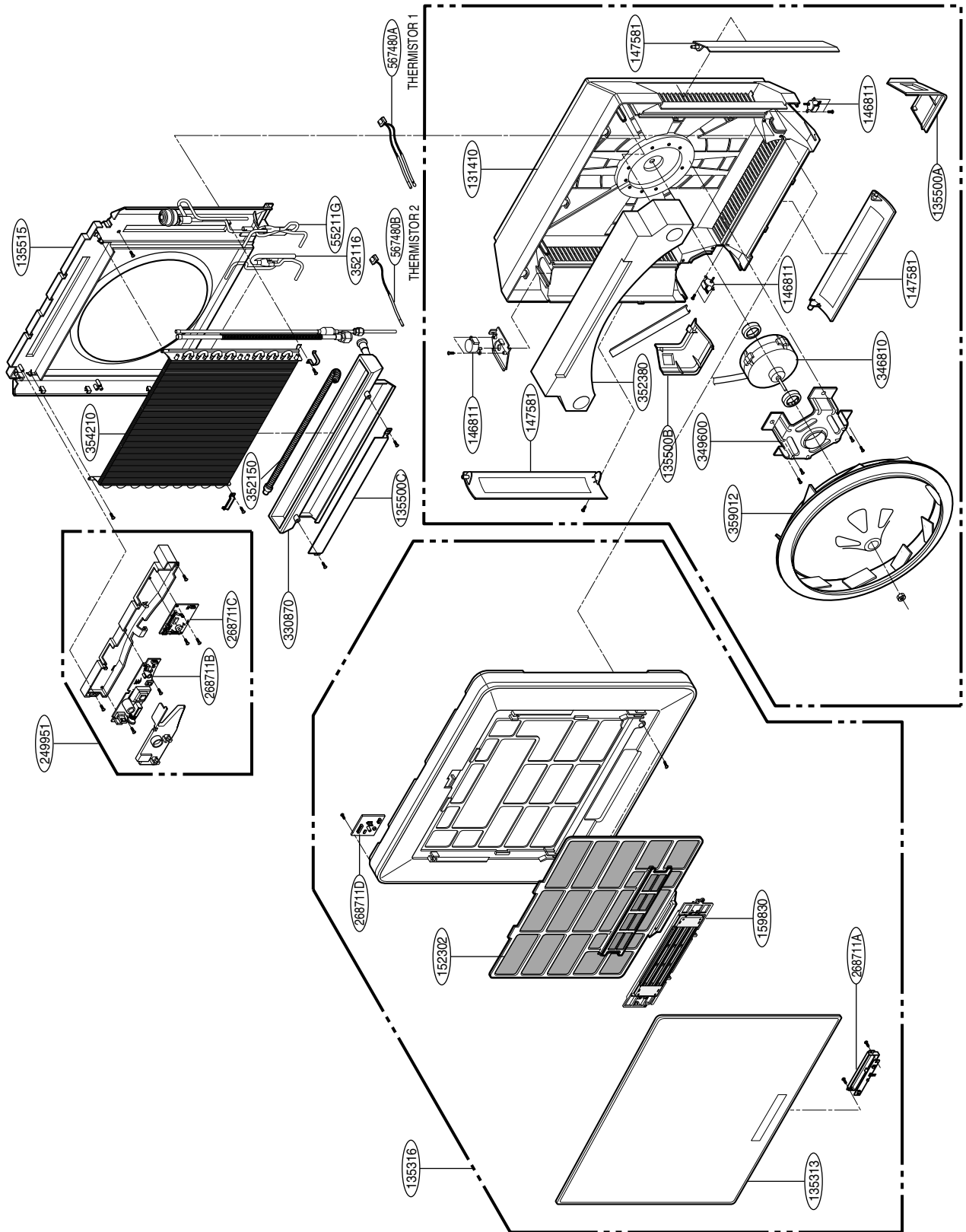
THERMISTOR 1	567480A	Air + Eva. IN	Housing color : white
THERMISTOR 2	567480B	Eva. OUT	Housing color : red

**S5 (Plasma)**



THERMISTOR 1	567480A	Air + Eva. IN	Housing color : white
THERMISTOR 2	567480B	Eva. OUT	Housing color : red

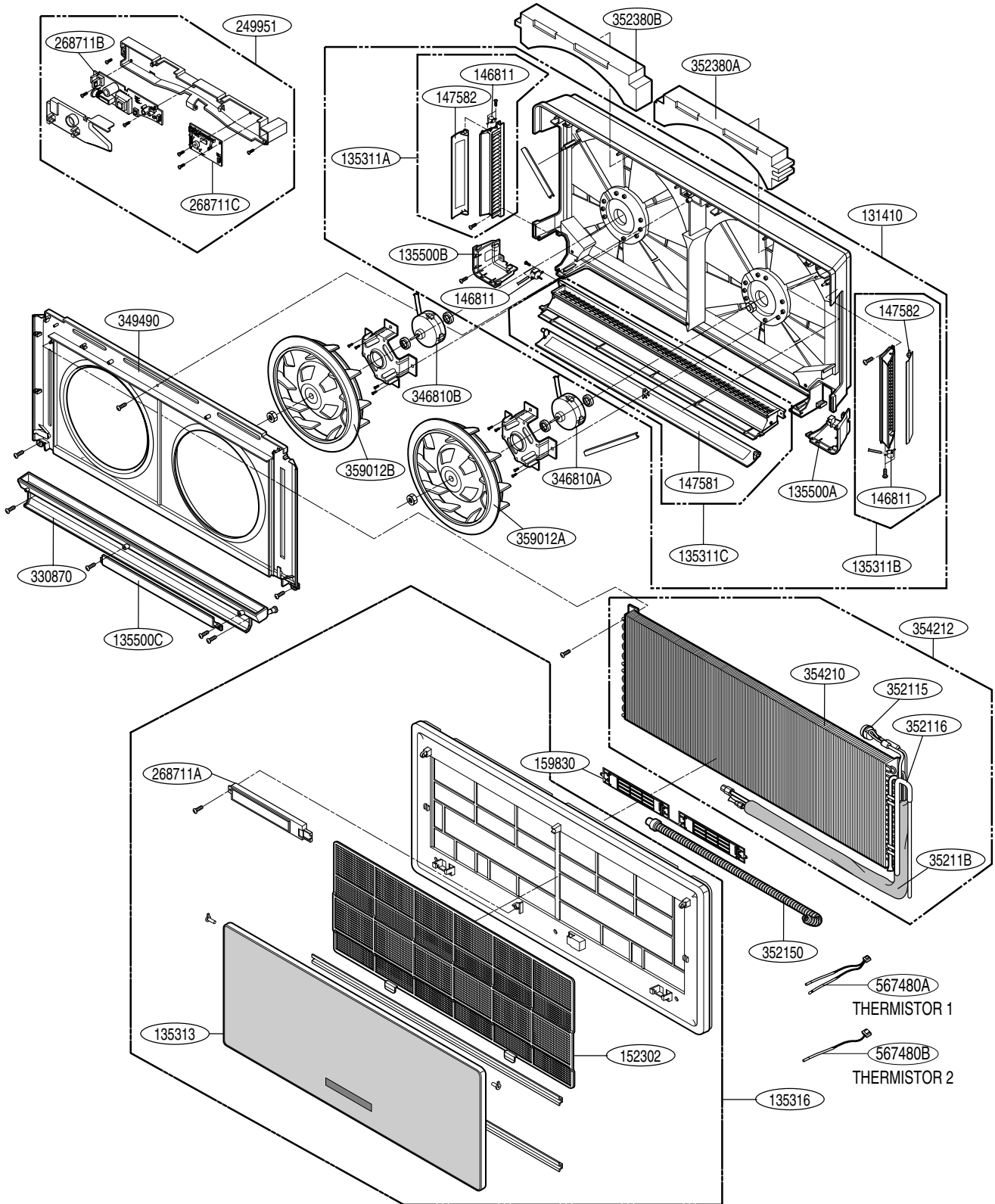
SP



THERMISTOR 1	567480A	Air + Eva. IN	Housing color : white
THERMISTOR 2	567480B	Eva. OUT	Housing color : red

Exploded View

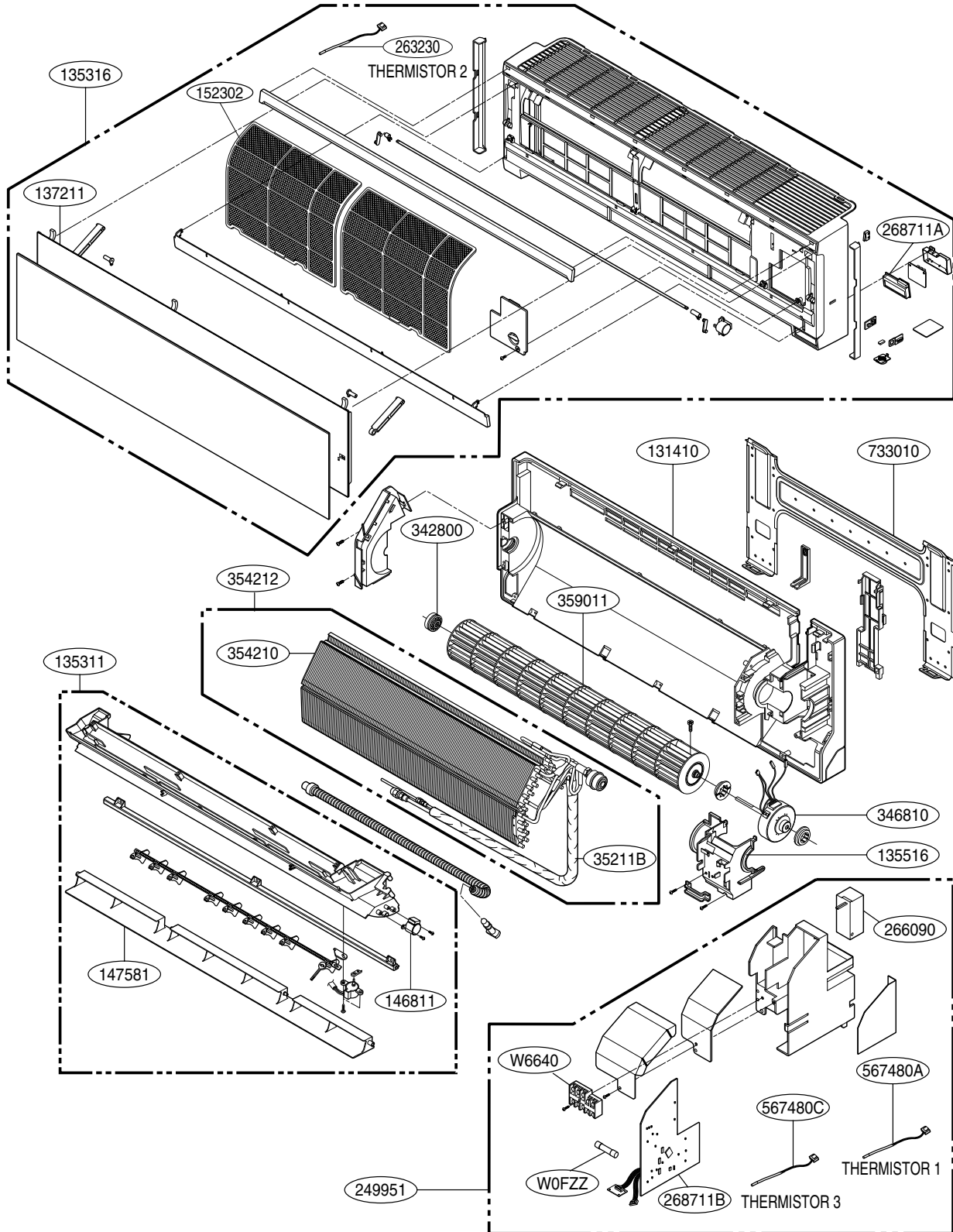
SV



THERMISTOR 1	567480A	Air + Eva. IN	Housing color : white
THERMISTOR 2	567480B	Eva. OUT	Housing color : red

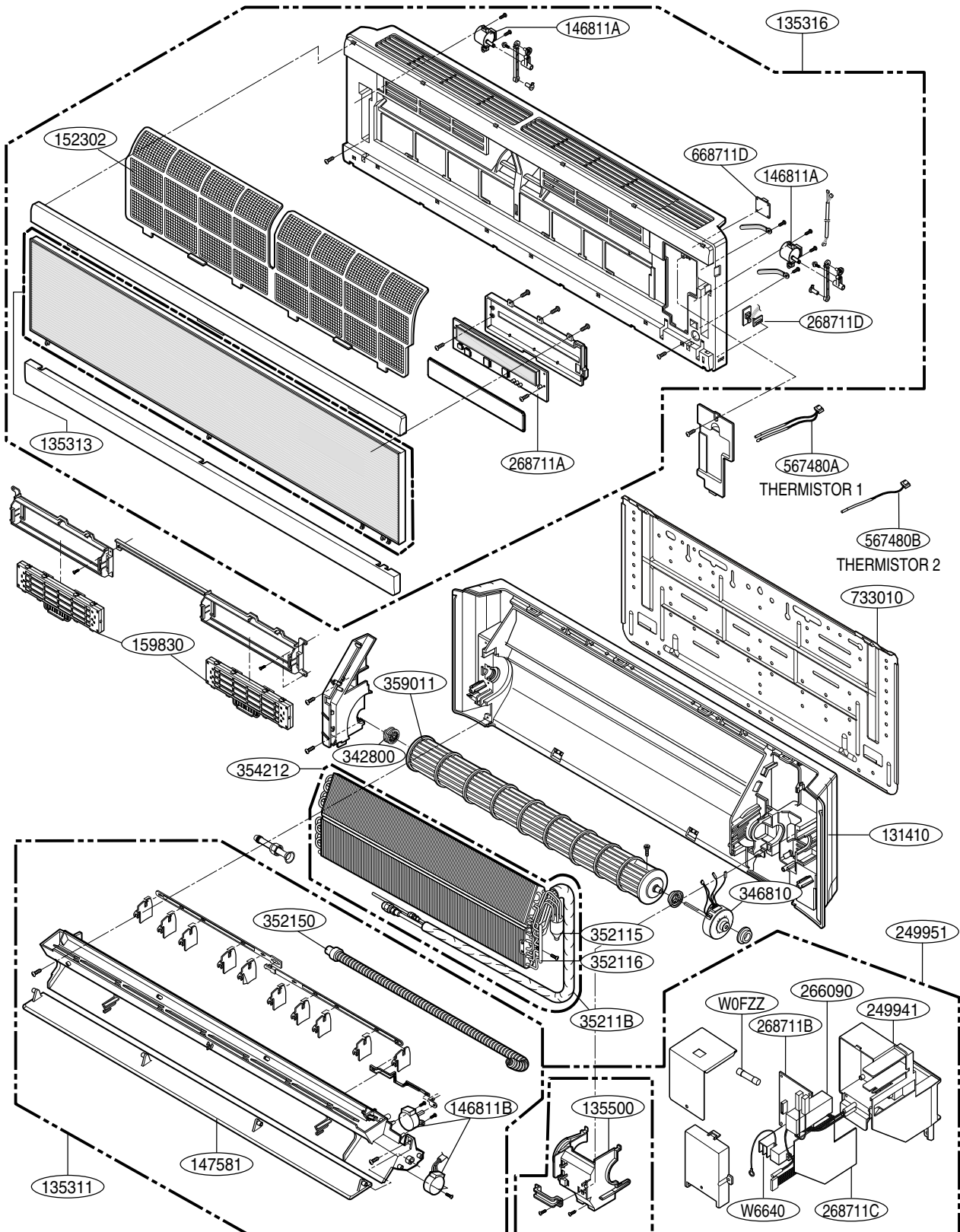


**SE (DELUXE)**



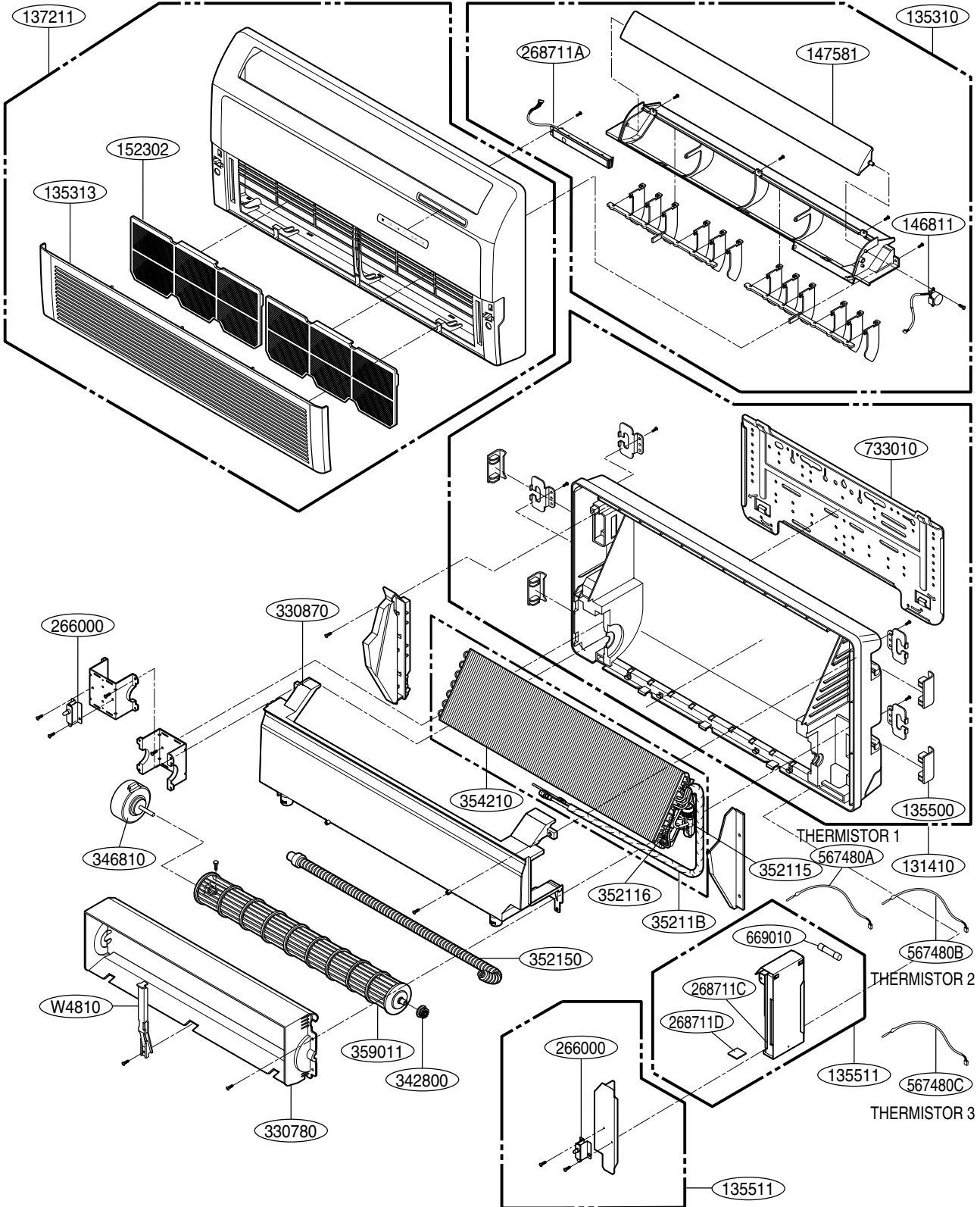
THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	263230	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

S3



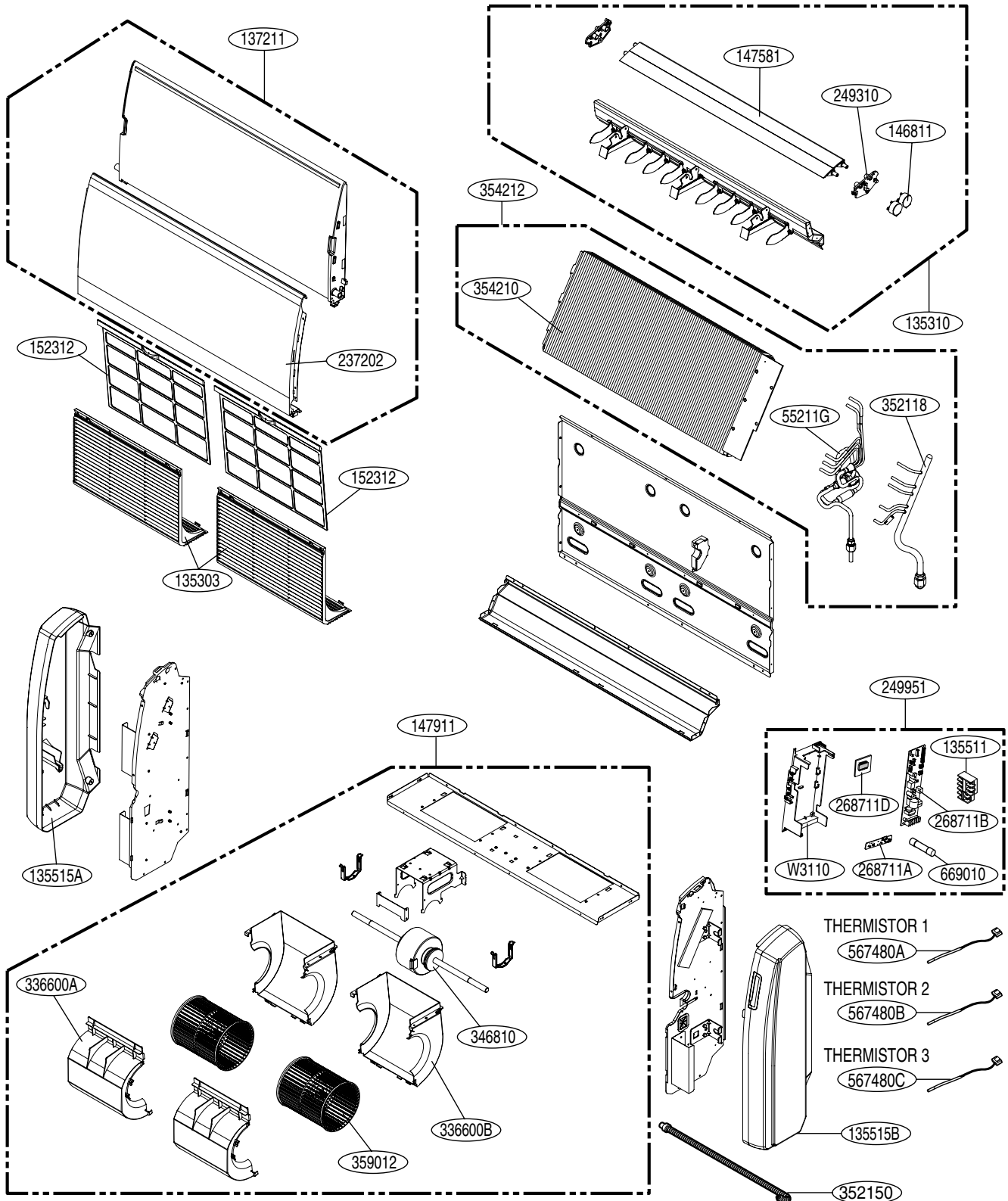
THERMISTOR 1	567480A	Air + Eva. IN	Housing color : white
THERMISTOR 2	567480B	Eva. OUT	Housing color : red

VE (Convertible type)



THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

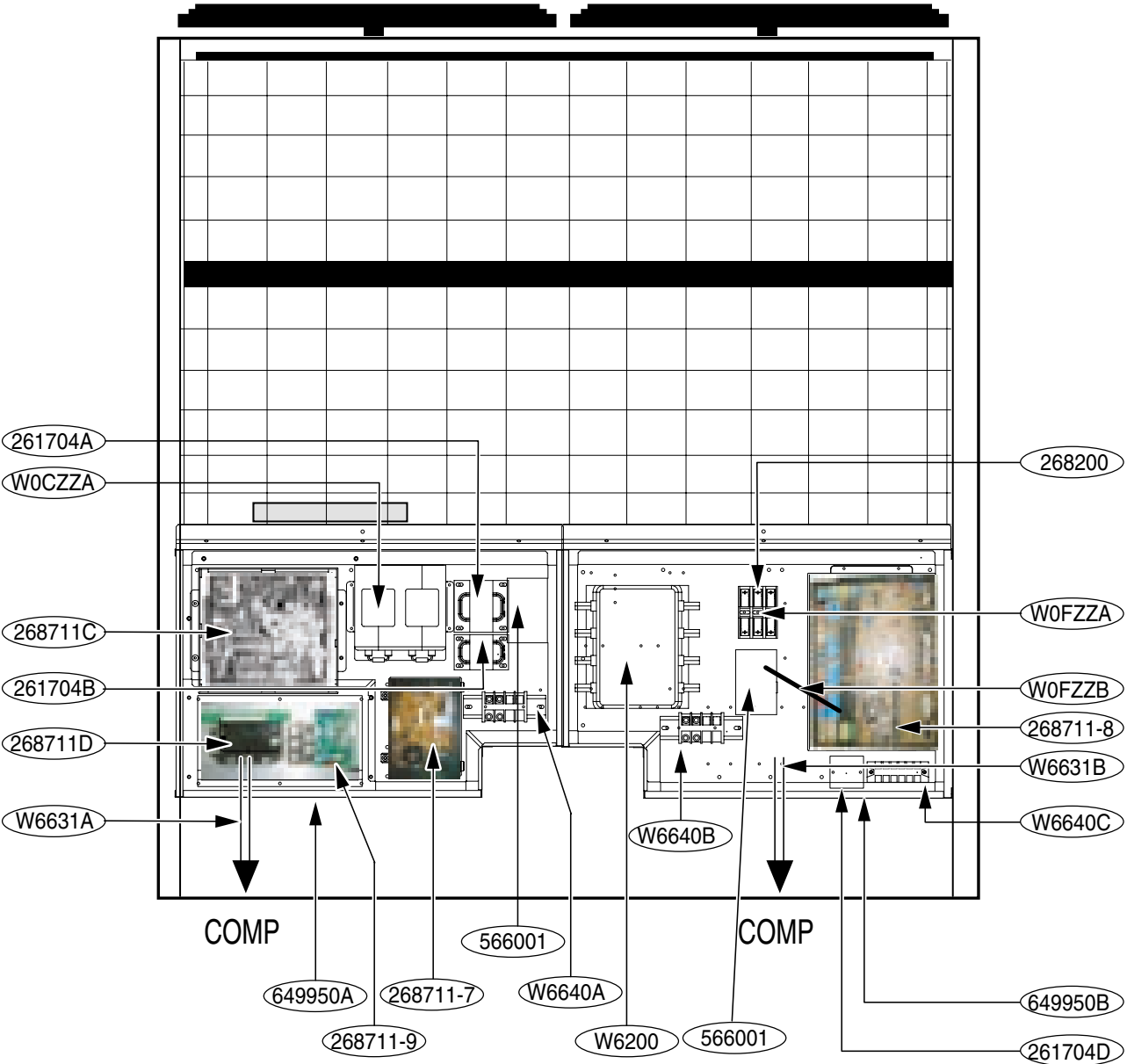
VJ (Convertible type)



THERMISTOR 1	567480A	Air	Housing color : yellow
THERMISTOR 2	567480B	Eva. IN	Housing color : white
THERMISTOR 3	567480C	Eva. OUT	Housing color : red

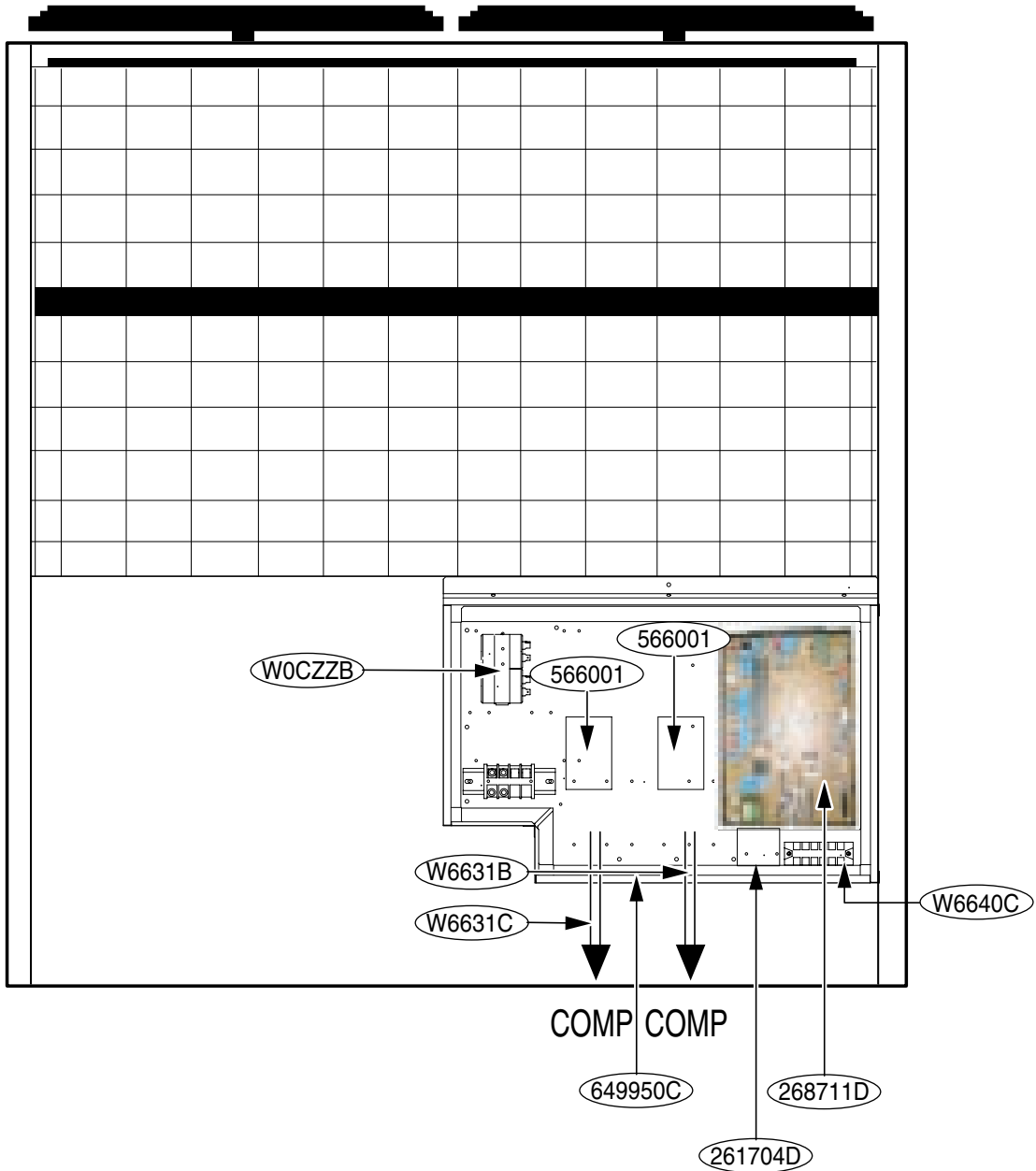
**UW1**

**Main Unit**

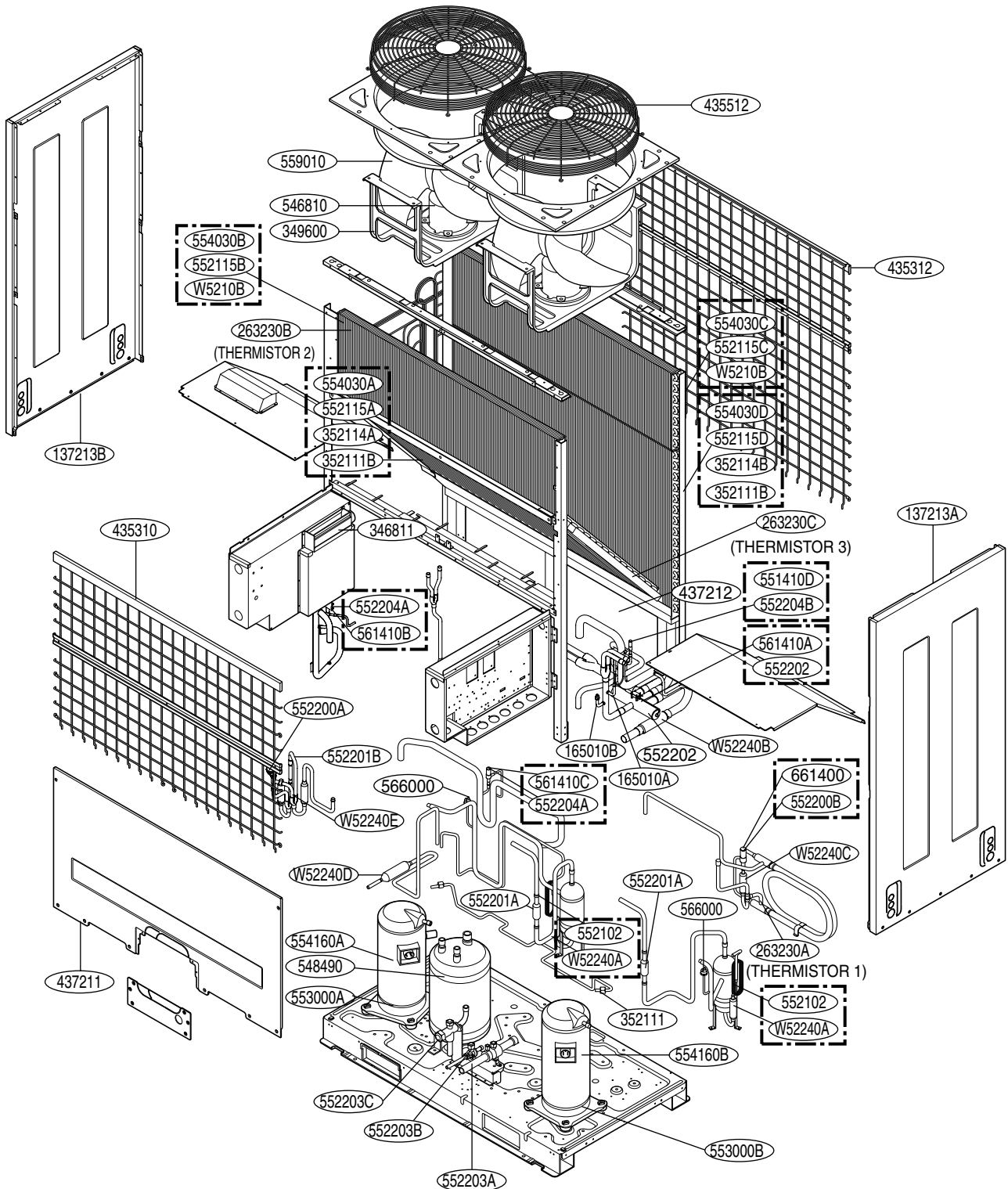


**UW1**

**Sub Unit**

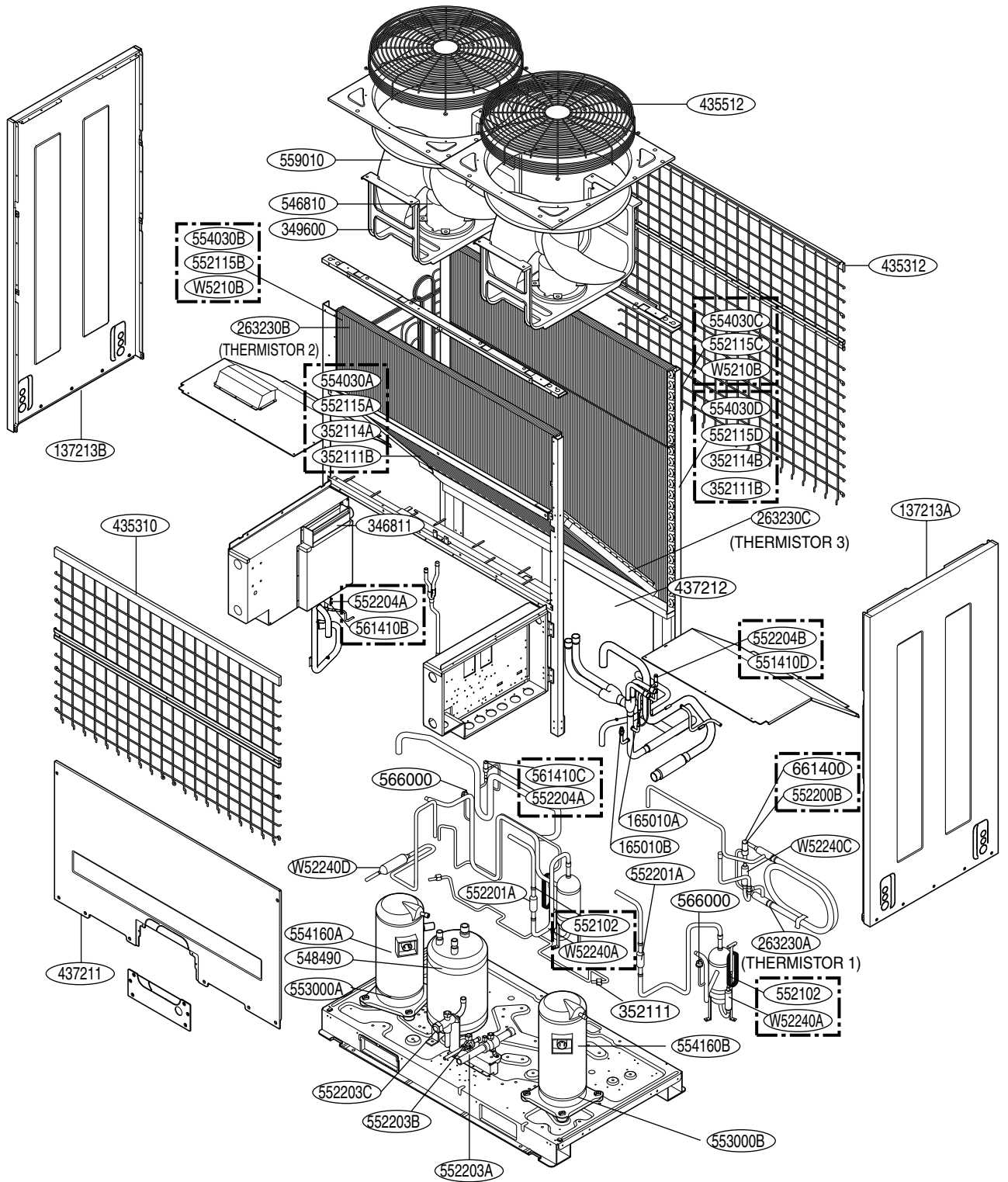


UW1 (Heat pump \_main & sub model)



THERMISTOR 1	263230A	Liquid Pipe + Sub Cooler IN + Sub Cooler OUT	Housing color : yellow
THERMISTOR 2	263230B	Inv. Discharge Pipe + HEX (Front) + HEX (back)	Housing color : purple
THERMISTOR 3	263230C	Air + Suction Pipe + Const. Discharge Pipe	Housing color : black

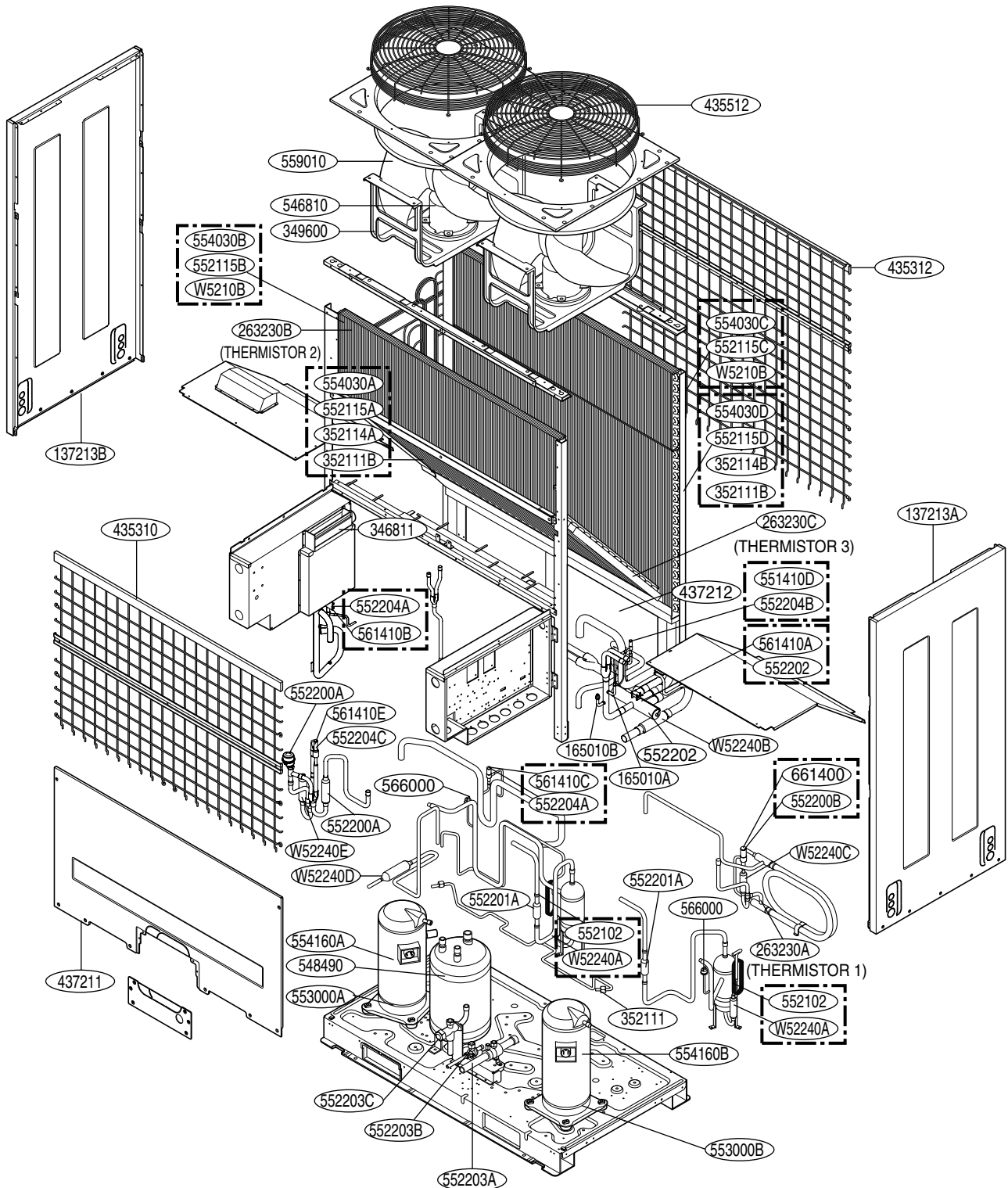
**UW1 (cooling only\_main & sub model)**



THERMISTOR 1	263230A	Liquid Pipe + Sub Cooler IN + Sub Cooler OUT	Housing color : yellow
THERMISTOR 2	263230B	Inv. Discharge Pipe	Housing color : purple
THERMISTOR 3	263230C	Air + Suction Pipe + Const. Discharge Pipe	Housing color : black



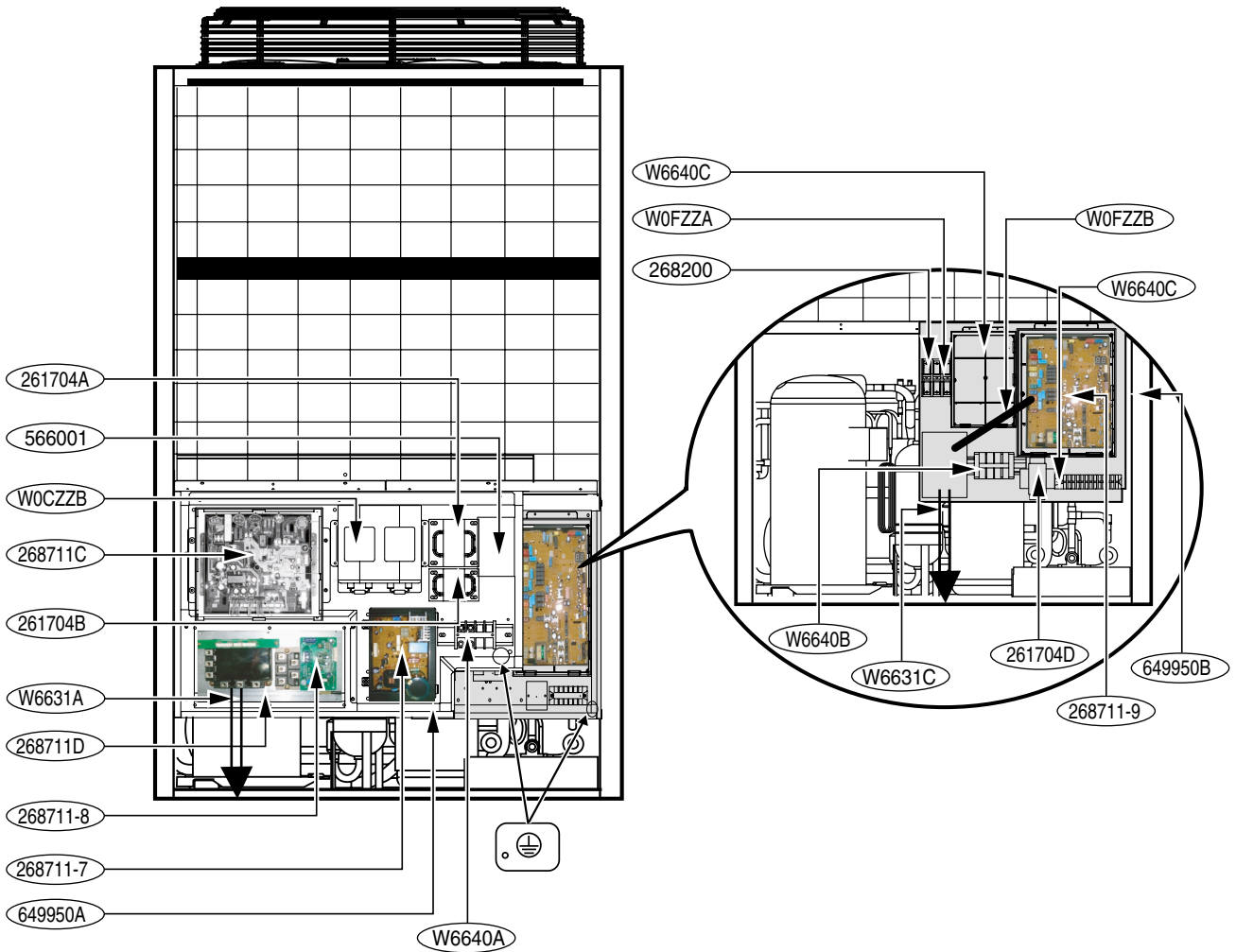
UW1 (sync. Main & sub model)



THERMISTOR 1	263230A	Liquid Pipe + Sub Cooler IN + Sub Cooler OUT	Housing color : yellow
THERMISTOR 2	263230B	Inv. Discharge Pipe + HEX (Front) + HEX (back)	Housing color : purple
THERMISTOR 3	263230C	Air + Suction Pipe + Const. Discharge Pipe	Housing color : black

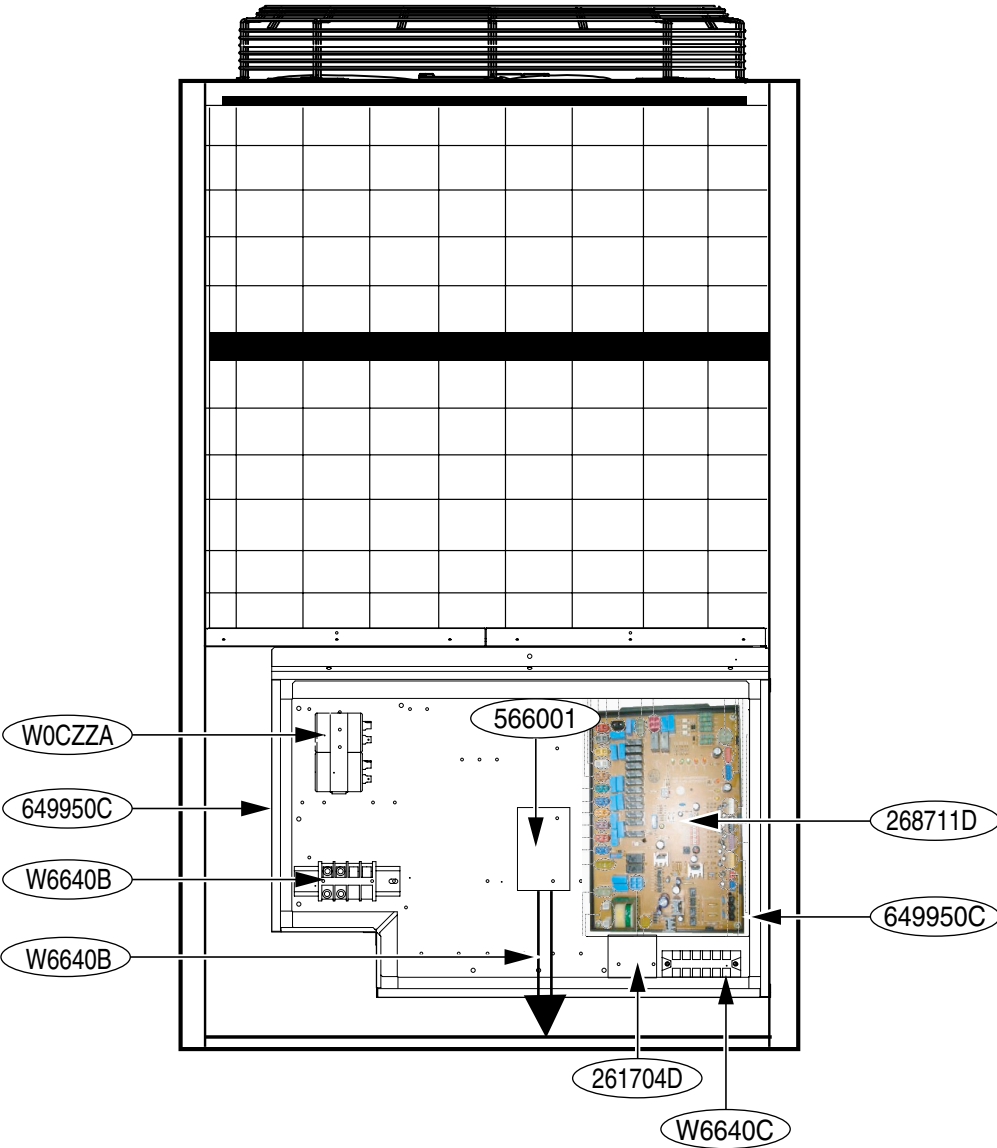
UY2

Main Unit

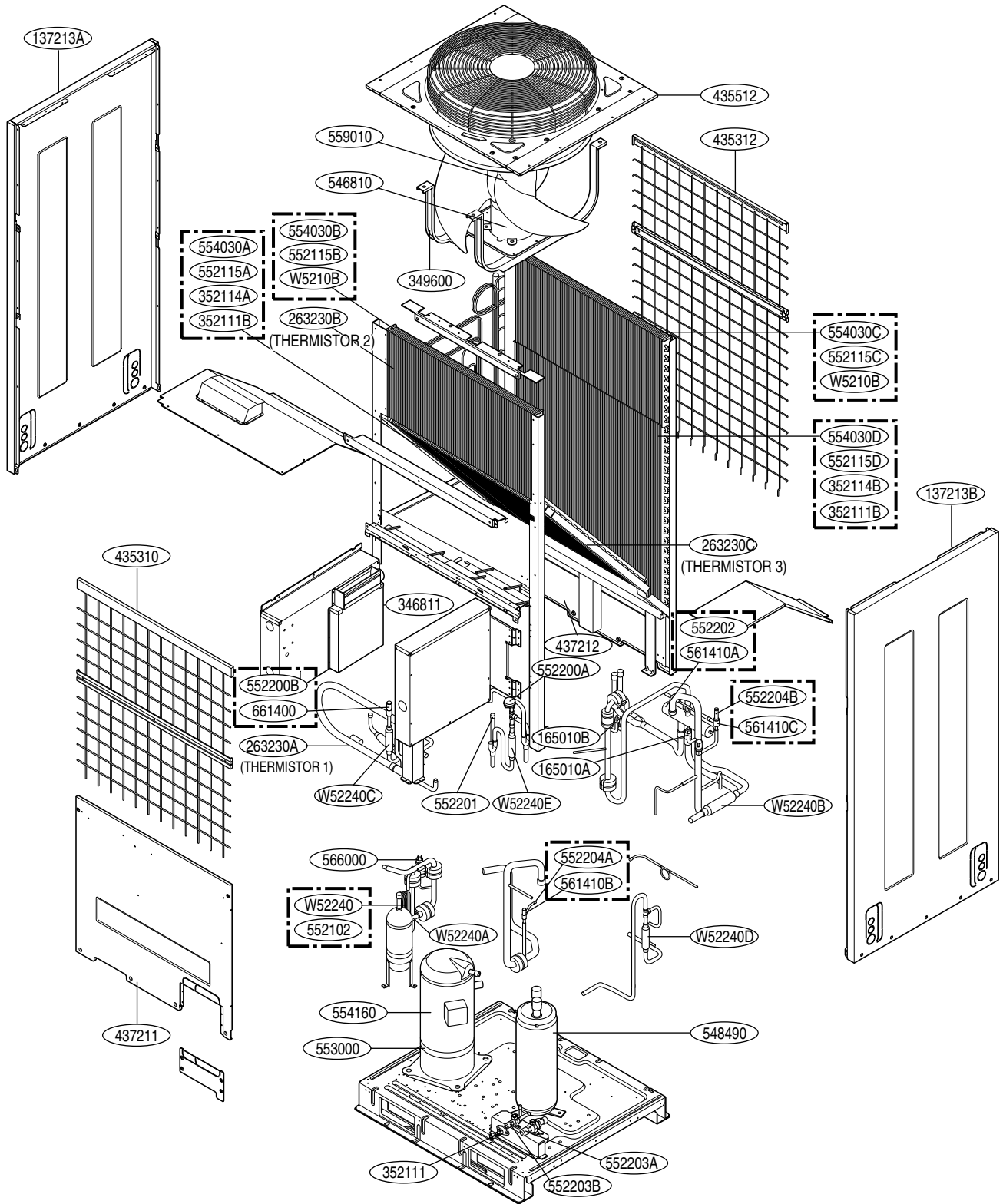


**UY2**

**Sub Unit**

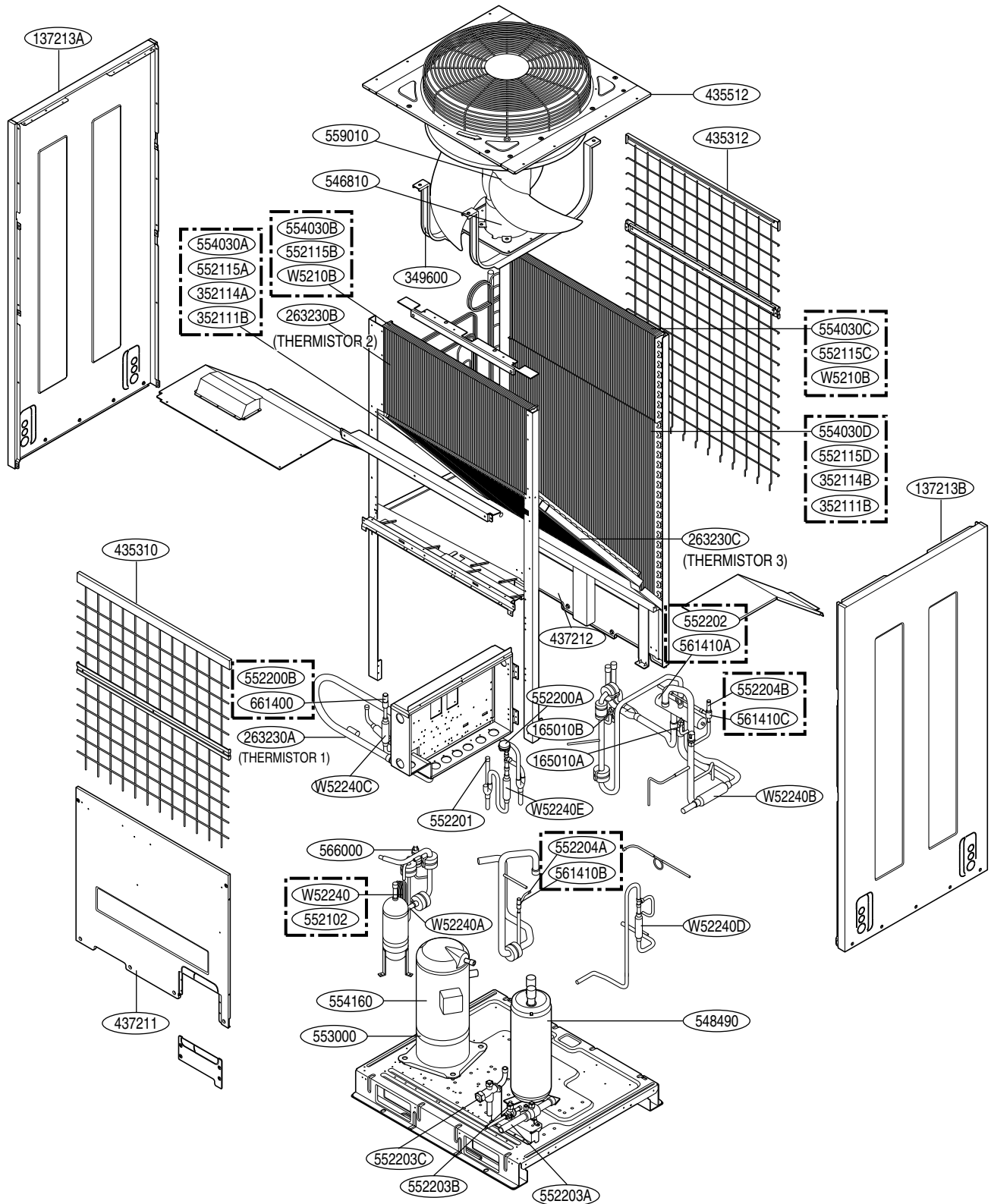


**UY2 (Heat pump\_main model)**



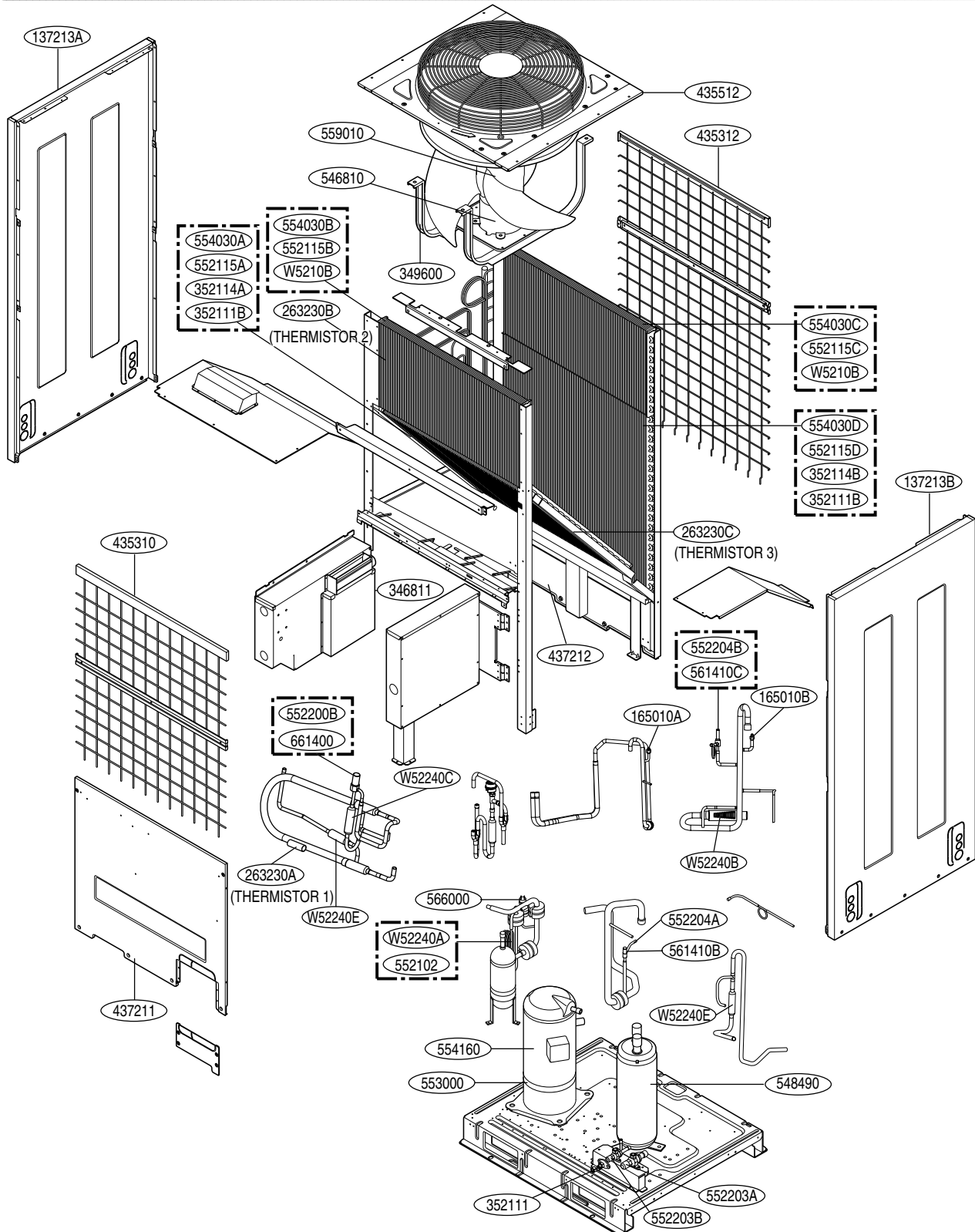
THERMISTOR 1	263230A	Liquid Pipe + Sub Cooler IN + Sub Cooler OUT	Housing color : yellow
THERMISTOR 2	263230B	Inv. Discharge Pipe + HEX (Front) + HEX (back)	Housing color : purple
THERMISTOR 3	263230C	Air + Suction Pipe + Const. Discharge Pipe	Housing color : black

UY2 (Heat pump\_sub model)



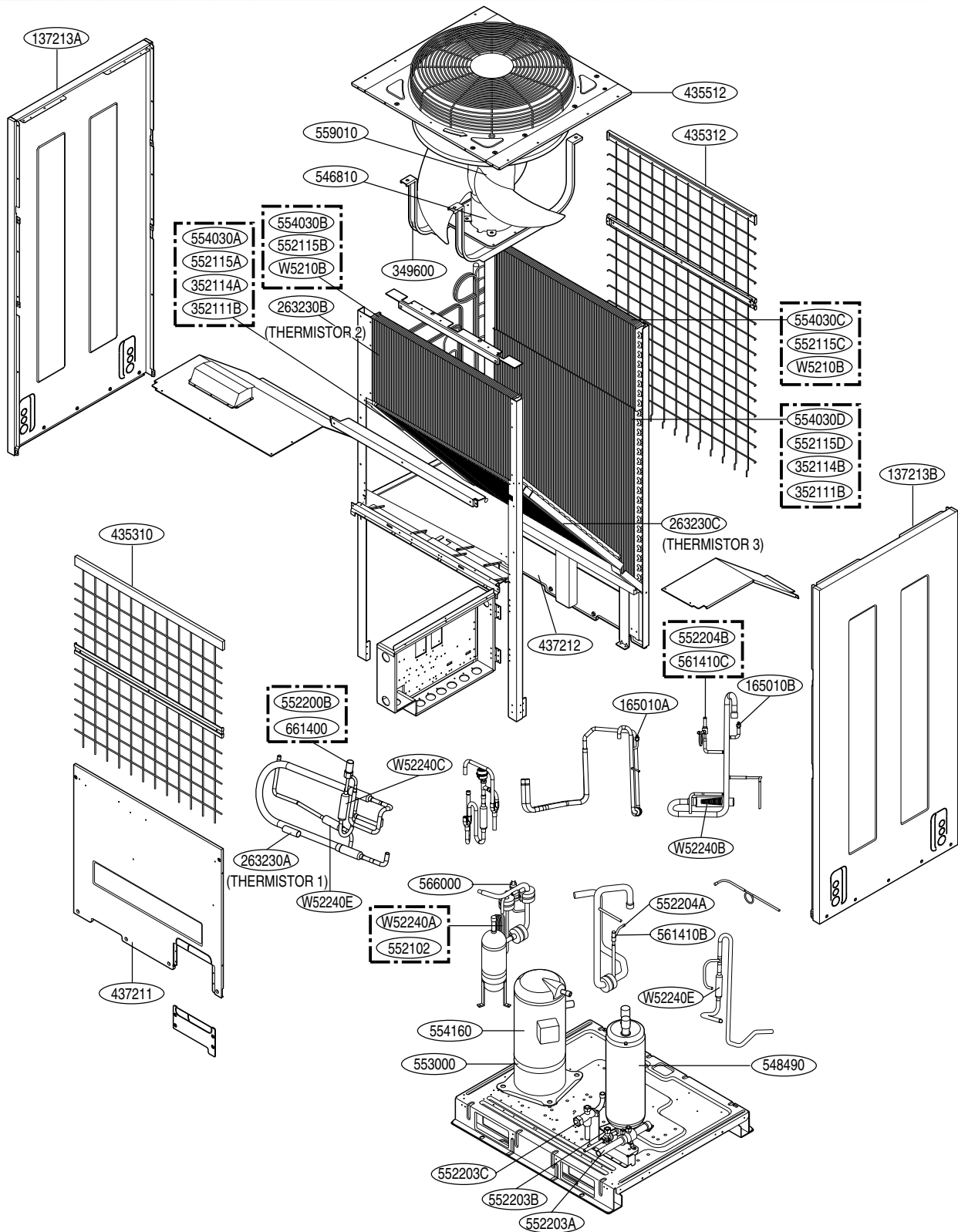
THERMISTOR 1	263230A	Liquid Pipe + Sub Cooler IN + Sub Cooler OUT	Housing color : yellow
THERMISTOR 2	263230B	Inv. Discharge Pipe	Housing color : purple
THERMISTOR 3	263230C	Air + Suction Pipe + Const. Discharge Pipe	Housing color : black

**UY2 (cooling only\_main model)**



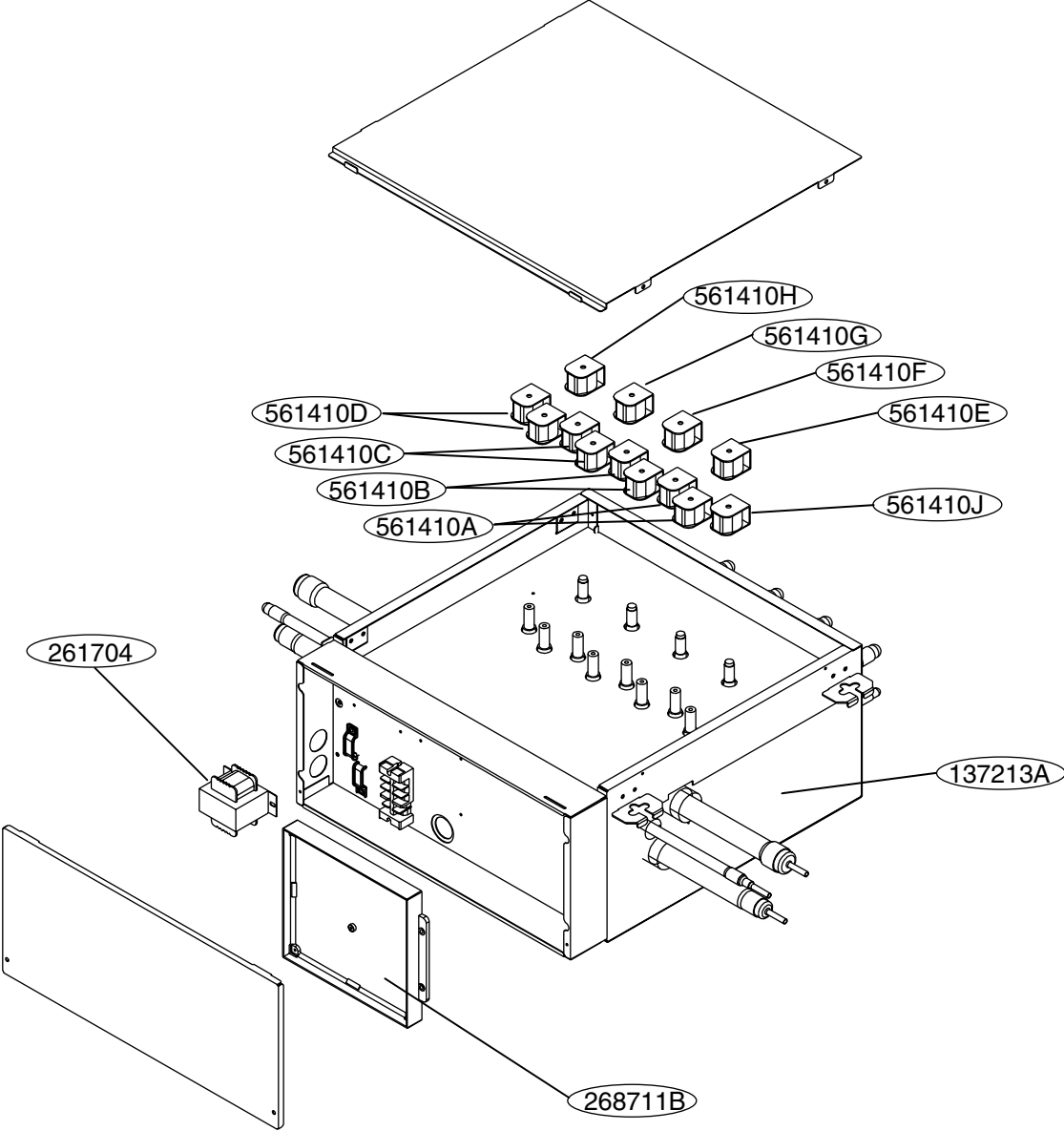
THERMISTOR 1	263230A	Liquid Pipe + Sub Cooler IN + Sub Cooler OUT	Housing color : yellow
THERMISTOR 2	263230B	Inv. Discharge Pipe + HEX (Front) + HEX (back)	Housing color : purple
THERMISTOR 3	263230C	Air + Suction Pipe + Const. Discharge Pipe	Housing color : black

UY2 (cooling only\_sub model)



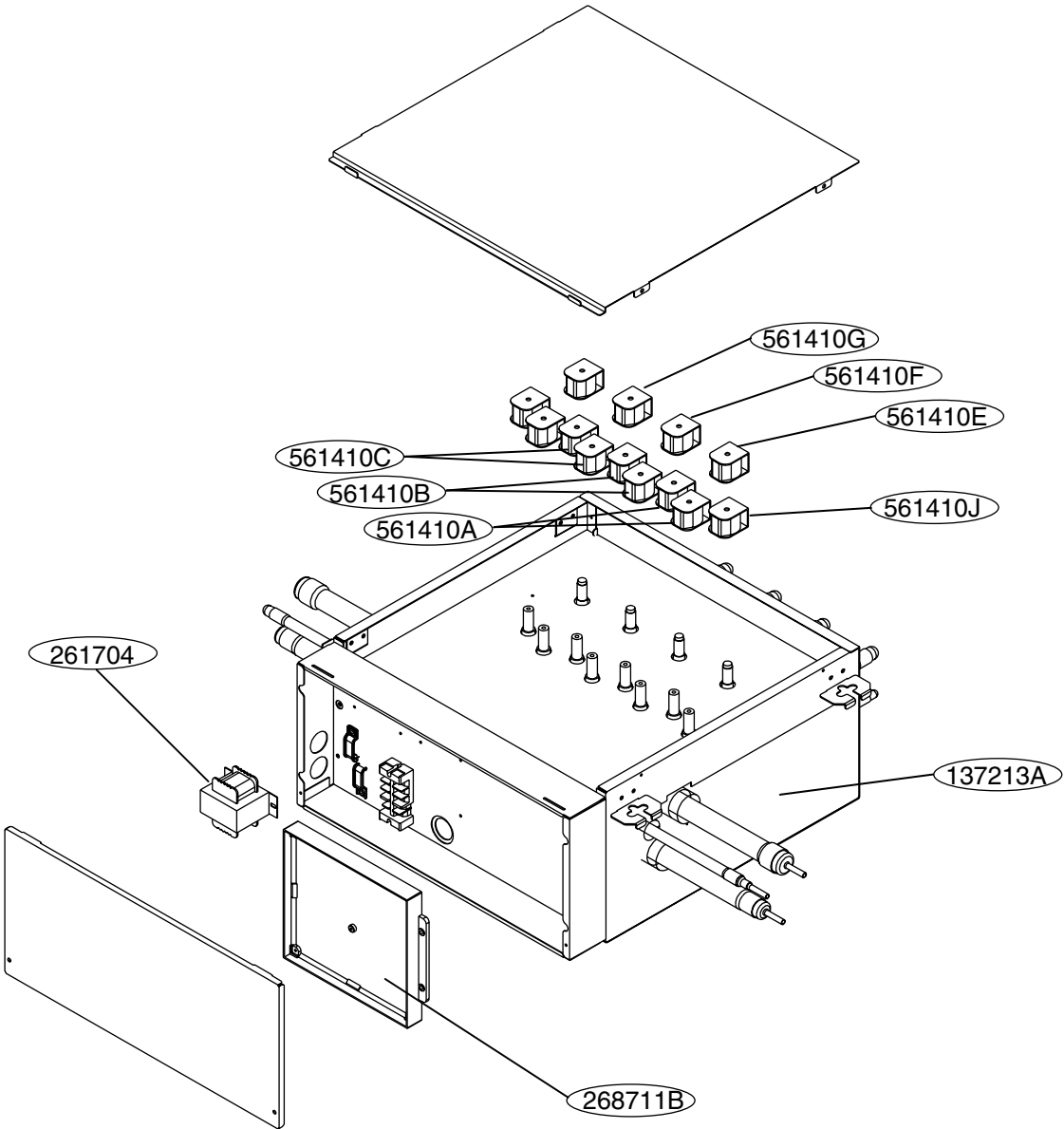
THERMISTOR 1	263230A	Liquid Pipe + Sub Cooler IN + Sub Cooler OUT	Housing color : yellow
THERMISTOR 2	263230B	Inv. Discharge Pipe	Housing color : purple
THERMISTOR 3	263230C	Air + Suction Pipe + Const. Discharge Pipe	Housing color : black

HR UNIT / 40

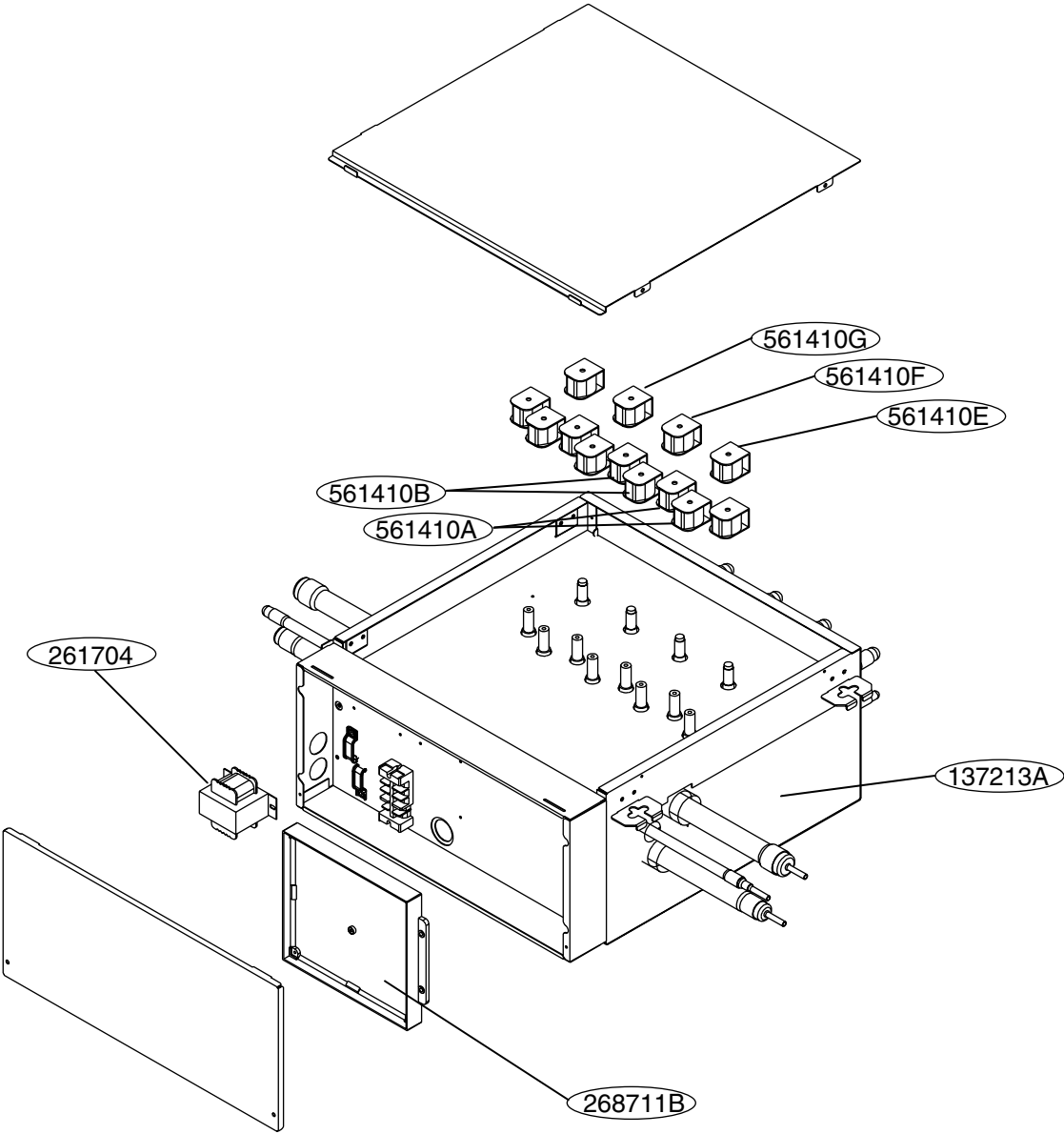




HR UNIT / 30



HR UNIT / 20





P/NO : 3828A24006G

January, 2008