Order No: PHA-AG1002006C2

Service Manual

Air Conditioner

Indoor Unit	Outdoor Unit
CS-RE9JKE-1	CU-RE9JKE-1
CS-RE12JKE-1	CU-RE12JKE-1
CS-RE15JKE-1	CU-RE15JKE-1

⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public.
It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the products dealt with in this service information by anyone else could result in serious injury or death.

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1. Safety Precautions

- Read the following “SAFETY PRECAUTIONS” carefully before perform any servicing.
- Electrical work must be installed or serviced by a licensed electrician. Be sure to use the correct rating of the power plug and main circuit for the model installed.
- The caution items stated here must be followed because these important contents are related to safety. The meaning of each indication used is as below. Incorrect installation or servicing due to ignoring of the instruction will cause harm or damage, and the seriousness is classified by the following indications.

WARNING	This indication shows the possibility of causing death or serious injury
CAUTION	This indication shows the possibility of causing injury or damage to properties.

- The items to be followed are classified by the symbols:

	Symbol with white background denotes item that is PROHIBITED from doing.
	Symbol with dark background denotes item that must be carried out.

- Carry out test run to confirm that no abnormality occurs after the servicing. Then, explain to user the operation, care and maintenance as stated in instructions. Please remind the customer to keep the operating instructions for future reference.

WARNING	
	1. Engage dealer or specialist for installation. If installation done by the user is defective, it will cause water leakage, electrical shock or fire.
	2. Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electrical shock or fire.
	3. Use the attached accessories parts and specified parts for installation. Otherwise, it will cause the set to fall, water leakage, fire or electrical shock.
	4. Install at a strong and firm location which is able to withstand the set’s weight. If the strength is not enough or installation is not properly done, the set will drop and cause injury.
	5. Do not install outdoor unit near handrail of veranda. When installing air-conditioner unit at veranda of high rise building, child may climb up to outdoor unit and cross over the handrail and causing accident.
	6. For electrical work, follow the local national wiring standard, regulation and this installation instruction. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or defect found in electrical work, it will cause electrical shock or fire.
	7. This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case equipment breakdown or insulation breakdown.
	8. This equipment must be properly earthed. Earth line must not be connected to gas pipe, water pipe, earth of lightning rod and telephone. Otherwise, it may cause electrical shock in case equipment breakdown or insulation breakdown.
	9. Do not use joint cable for indoor/outdoor connection cable. Use the specified Indoor/Outdoor connection cable, refer to installation instructions CONNECT THE CABLE TO THE INDOOR UNIT and connect tightly for indoor / outdoor connection. Clamp the cable so that no external force will be acted on the terminal. If connection or fixing is not perfect, it will cause heat up or fire at the connection
	10. Wire routing must be properly arranged so that control board cover is fixed properly. If control board cover is not fixed perfectly, it will cause fire or electrical shock.
	11. When install or relocate air conditioner, do not let any substance other than the specified refrigerant , eg. Air etc. mix into refrigeration cycle (piping) . Mixing of air etc. will cause abnormal high pressure in refrigerant cycle and result in explosion, injury etc.
	12. Do not use unspecified cord, modified cord, joint cord or extension cord for power supply cord. Do not share the single outlet with other appliances. Poor contact, poor insulation or over current will cause electrical shock or fire.
	13. • For R410A models, when connecting the piping, do not use any existing (R22) pipes and flare nuts. Using such same may cause abnormally high pressure in the refrigeration cycle (piping), and possibly result in explosion and injury. Use only R410A materials. • Thickness or copper pipes used with R410A must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm • It is desirable that the amount of residual oil is less than 40 mg/10 m.
	14. During installation, install the refrigerant piping properly before run the compressor. Operation of compressor without fixing refrigeration piping and valves at opened condition will cause suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc.
	15. During pump down operation, stop the compressor before remove the refrigeration piping. Removal of refrigeration piping while compressor is operating and valves are opened will cause suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc.

	16. After completion of installation, confirm there is no leakage of refrigerant gas. It may generate toxic gas when the refrigerant contacts with fire.
	17. Ventilate if there is refrigerant gas leakage during operation. It may cause toxic gas when the refrigerant contacts with fire.
	18. Recommended installation height for indoor unit shall be at least 2.5 m.
	19. The appliance shall be installed in accordance with national wiring regulations.
	20. Keep plastic bag (package material) away from small children, it may cling to nose and mouth and prevent breathing.
	21. Tighten the flare nut with torque wrench according to specified method. If the flare nut is over-tightened, after a long period, the flare may break and cause refrigerant gas leakage. 
	22. Do not insert your fingers or other objects into the unit, high speed rotating fan may cause injury.
	23. Do not modify the machine, part, material during repairing service.
	24. Must not use other parts except original parts describe in catalog and manual.

	CAUTION
	1. Do not install the unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire.
	2. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.
	3. Do not touch outdoor unit air inlet and aluminums fin. It may cause injury.
	4. Select an installation location which is easy for maintenance.
	5. Power supply connection to the air conditioner. Connect the power supply cord of the air conditioner to the mains using one of the following methods. Power supply point should be in easily accessible place for power disconnection in case of emergency. In some countries, permanent connection of this air conditioner to the power supply is prohibited. 1) Power supply connection to the receptacle using a power plug. Use an approved 15/16A power plug with earth pin for the connection to the receptacle. 2) Power supply connection to a circuit breaker for the permanent connection. Use an approved 16A circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.5 mm contact gap.
	6. Do not release refrigerant. Do not release refrigerant during piping work for installation, re-installation and during repairing a refrigeration parts. Take care of the liquid refrigerant, it may cause frostbite.
	7. Installation work. It may need two people to carry out the installation work.
	8. Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc.
	9. Do not sit ot step on the unit, you may fall down accidentally.
	10. Do not touch the sharp aluminium fin, sharp parts may cause injury.
	11. Thermal fuse specification for indoor unit: 250V 3.15A T3.15AL; outdoor unit: 205V 3.15A T3.15AL, 205V 20A T20AL.

2. Specification

Model			Indoor	CS-RE9JKE-1			CS-RE12JKE-1		
			Outdoor	CU-RE9JKE-1			CU-RE12JKE-1		
Power Supply			Phase, Hz	Single, 50			Single, 50		
			V	230			230		
				Min	Rate	Max	Min	Rate	Max
COOLING	Capacity		kW	0.900	2.500	3.000	0.900	3.500	3.900
			BTU/h	3070	8530	10230	3070	11940	1330
			kJ/h	770	2150	2580	770	3010	3350
	Running Current		A	-	3.30	-	-	4.70	-
	Input Power		W	190	700	1000	170	1010	1200
	EER		W/W	4.74	3.57	3.00	5.29	3.47	3.25
			BTU/hW	16.16	12.18	10.23	18.06	11.82	11.08
	Power Factor		%	92			93		
	Indoor Noise		dB-A (H / L / QLo)	Hi: 42 Lo: 27 QLo: 22			Hi: 42 Lo: 30 QLo: 22		
			Power Level	58			58		
	Outdoor Noise		dB-A (H / L)	Hi: 47 Lo: -			Hi: 48 Lo: -		
			Power Level	63			64		
HEATING	Capacity		kW	0.900	3.300	4.100	0.900	4.250	5.100
			BTU/h	3070	11250	13980	3070	14490	17390
			kJ/h	770	2840	3530	770	3660	4390
	Running Current		A	-	3.70	-	-	5.20	-
	Input Power		W	170	820	1150	150	1120	1460
	COP		W/W	5.29	4.02	3.57	6.00	3.79	3.49
			BTU/hW	18.06	13.71	12.16	20.47	12.94	11.91
	Power Factor		%	96			93		
	Indoor Noise		dB-A (H / L / QLo)	Hi: 42 Lo: 27 QLo: 25			Hi: 42 Lo: 33 QLo: 25		
			Power Level	58			58		
	Outdoor Noise		dB-A (H / L)	Hi: 48 Lo: -			Hi: 50 Lo: -		
			Power Level	64			66		
Max Current (A) / Max Input Power (W)				5.10 / 1.150k			6.80 / 1.460k		
Starting Current (A)				3.70			5.20		
Compressor	Type			Hermetic Motor			Hermetic Motor		
	Motor Type			BRUSHLESS (6 poles)			BRUSHLESS (6 poles)		
	Output Power		W	750			900		
Indoor Fan	Type			Cross-flow fan			Cross-flow fan		
	Material			AS			AS		
	Motor Type			DC (8 poles)			DC (8 poles)		
	Input Power		W	35.2			35.2		
	Output Power		W	30			30		
	Speed (COOLING)	Q-Lo	rpm	640			640		
		Lo	rpm	740			840		
		Me	rpm	940			1020		
		Hi	rpm	1190			1210		
	Speed (HEATING)	Q-Lo	rpm	700			750		
		Lo	rpm	780			960		
		Me	rpm	980			1100		
		Hi	rpm	1200			1260		
Outdoor Fan	Type			Propeller			Propeller		
	Material			PP			PP		
	Motor Type			AC (6 poles)			AC (6 poles)		
	Input Power		W	60			80		
	Output Power		W	15			25		
	Speed	Hi	rpm	750			870		
Moisture Removal			L/h (Pt/h)	1.4 (2.4)			2.0 (3.5)		
Indoor Airflow (COOLING)	O-Lo		m^3/min (ft^3/m)	6.72 (237)			6.66 (235)		
	Lo		m^3/min (ft^3/m)	7.77 (274)			8.74 (309)		
	Me		m^3/min (ft^3/m)	9.87 (348)			10.62 (375)		
	Hi		m^3/min (ft^3/m)	12.5 (441)			12.6 (445)		
Indoor Airflow (HEATING)	O-Lo		m^3/min (ft^3/m)	7.29 (257)			7.92 (279)		
	Lo		m^3/min (ft^3/m)	8.12 (286)			10.13 (358)		

	Me	m^3/min (ft^3/m)	10.21 (360)		11.61 (410)		
	Hi	m^3/min (ft^3/m)	12.5 (441)		13.3 (470)		
Outdoor Airflow	Hi (Cooling)	m^3/min (ft^3/m)	28.9 (1021)		30.5 (1077)		
	Hi (Heating)	m^3/min (ft^3/m)	28.9 (1021)		30.5 (1077)		
Refrigeration Cycle	Control Device		Capillary Tube		Capillary Tube		
	Refrigerant Oil	cm^3	GV50S (280)		RB68A OR FREOL ALPHA68M (320)		
	Refrigerant Type	g (oz)	R410A, 850 (29.9)		R410A, 970 (34.2)		
Dimension	Height(I/D / O/D)	mm (inch)	290 (11-15/32)	540 (21-1/4)	290 (11-15/32)	540 (21-1/4)	
	Width (I/D / O/D)	mm (inch)	848 (33-13/32)	780 (30-23/32)	848 (33-13/32)	780 (30-23/32)	
	Depth (I/D / O/D)	mm (inch)	204 (8-1/32)	289 (11-3/8)	204 (8-1/32)	289 (11-3/8)	
Weight	Net (I/D / O/D)	kg (lb)	9.0 (20)	24 (53)	9.0 (20)	28 (62)	
Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 9.52 (3/8)		6.35 (1/4) / 9.52 (3/8)		
	Standard length	m (ft)	7.5 (24.6)		7.5 (24.6)		
	Length range (min – max)	m (ft)	3 (9.8) ~ 15 (49.2)		3 (9.8) ~ 15 (49.2)		
	I/D & O/D Height different	m (ft)	5.0 (16.4)		5.0 (16.4)		
	Additional Gas Amount	g/m (oz/ft)	20 (0.2)		20 (0.2)		
	Length for Additional Gas	m (ft)	7.5 (24.6)		7.5 (24.6)		
Drain Hose	Inner diameter	mm	16		16		
	Length	mm	500		500		
Indoor Heat Exchanger	Fin Material		Pre coated		Pre coated		
	Fin Type		Slit Fin		Slit Fin		
	Row x Stage x FPI		2 x 15 x 19		2 x 15 x 19		
	Size (W x H x L)	mm	610 x 315 x 25.4		610 x 315 x 25.4		
Outdoor Heat Exchanger	Fin Material		Pre coated		Pre coated		
	Fin Type		Slit Fin		Slit Fin		
	Row x Stage x FPI		1 x 24 x 20		2 x 24 x 17		
	Size (W x H x D)	mm	709 x 504 x 18.2		709 x 504 x 36.45 679		
Air Filter	Material		P.P.HONEY COMB		P.P.HONEY COMB		
	Type		One-touch		One-touch		
Power Supply			Indoor		Indoor		
Power Supply Cord		A	16A		16A		
Thermostat			-		-		
Protection Device			-		-		

TEMPERATURE (°C)		COOLING		HEATING		COOLING		HEATING	
		DB	WB	DB	WB	DB	WB	DB	WB
Indoor Operation Range	Maximum	32	23	30	-	32	23	30	-
	Minimum	16	11	16	-	16	11	16	-
Outdoor Operation Range	Maximum	43	26	24	18	43	26	24	18
	Minimum	16	11	-5	-6	16	11	-5	-6

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95.0°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb).
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb).
3. Specifications are subjected to change without prior notice for further improvement.

Model			Indoor	CS-RE15JKE-1		
			Outdoor	CU-RE15JKE-1		
Power Supply			Phase, Hz	Single, 50		
			V	230		
				Min	Rate	Max
COOLING	Capacity		kW	1.000	4.200	4.600
			BTU/h	3410	14330	15700
			kJ/h	860	3610	3960
	Running Current		A	-	6.00	-
	Input Power		W	210	1260	1650
	EER		W/W	4.76	3.33	2.78
			BTU/hW	16.23	11.37	9.51
	Power Factor		%	91		
	Indoor Noise		dB-A (H / L / QLo)	Hi: 46 Lo: 31 QLo: 29		
			Power Level	62		
	Outdoor Noise		dB-A (H / L)	Hi: 50 Lo: -		
			Power Level	66		
HEATING	Capacity		kW	0.900	5.000	6.800
			BTU/h	3070	17060	23200
			kJ/h	770	4300	5850
	Running Current		A	-	6.30	-
	Input Power		W	210	1385	2280
	COP		W/W	4.28	3.61	2.98
			BTU/hW	14.61	12.31	10.17
	Power Factor		%	95		
	Indoor Noise		dB-A (H / L / QLo)	Hi: 46 Lo: 34 QLo: 28		
			Power Level	62		
	Outdoor Noise		dB-A (H / L)	Hi: 51 Lo: -		
			Power Level	67		
Max Current (A) / Max Input Power (W)				10.5 / 2.280k		
Starting Current (A)				6.30		
Compressor	Type			Hermetic Motor		
	Motor Type			BRUSHLESS (6 poles)		
	Output Power		W	1100		
Indoor Fan	Type			Cross-flow fan		
	Material			AS		
	Motor Type			DC (8 poles)		
	Input Power		W	35.2		
	Output Power		W	30		
	Speed (COOLING)	O-Lo	rpm	810		
		Lo	rpm	860		
		Me	rpm	1040		
		Hi	rpm	1240		
	Speed (HEATING)	O-Lo	rpm	820		
		Lo	rpm	970		
		Me	rpm	1130		
		Hi	rpm	1300		
Outdoor Fan	Type			Propeller		
	Material			PP		
	Motor Type			AC (6 poles)		
	Input Power		W	60		
	Output Power		W	15		
	Speed	Hi	rpm	750		
Moisture Removal			L/h (Pt/h)	2.4 (4.2)		
Indoor Airflow (COOLING)	Q-Lo		m^3/min (ft^3/m)	9.14 (322)		
	Lo		m^3/min (ft^3/m)	9.70 (342)		
	Me		m^3/min (ft^3/m)	11.7 (414)		
	Hi		m^3/min (ft^3/m)	14.0 (494)		
Indoor Airflow (HEATING)	Q-Lo		m^3/min (ft^3/m)	9.84 (347)		
	Lo		m^3/min (ft^3/m)	11.6 (411)		
	Me		m^3/min (ft^3/m)	13.5 (479)		
	Hi		m^3/min (ft^3/m)	15.6 (551)		
Outdoor Airflow	Hi (COOLING)		m^3/min (ft^3/m)	31.2 (1102)		

	Hi (HEATING)	m^3/min (ft^3/m)	29.9 (1056)		
Refrigeration Cycle	Control Device		Expansion valve		
	Refrigerant Oil	cm^3	RB 68A OR FREOL ALPHA68M (320)		
	Refrigerant Type	g (oz)	R410A, 1000 (35.2)		
Dimension	Height(I/D / O/D)	mm (inch)	290 (11-15/32)	540 (21-1/4)	
	Width (I/D / O/D)	mm (inch)	848 (33-13/32)	780 (30-23/32)	
	Depth (I/D / O/D)	mm (inch)	204 (8-1/32)	289 (11-3/8)	
Weight	Net (I/D / O/D)	kg (lb)	9.0 (20)	29 (64)	
Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 12.7 (1/2)		
	Standard length	m (ft)	7.5 (24.6)		
	Length range (min – max)	m (ft)	3 (9.8) ~ 15 (49.2)		
	I/D & O/D Height different	m (ft)	5.0 (16.4)		
	Additional Gas Amount	g/m (oz/ft)	20 (0.2)		
	Length for Additional Gas	m (ft)	7.5 (24.6)		
Drain Hose	Inner diameter	mm	16		
	Length	mm	500		
Indoor Heat Exchanger	Fin Material		Pre coated		
	Fin Type		Slit Fin		
	Row x Stage x FPI		2 x 15 x 19		
	Size (W x H x L)	mm	610 x 315 x 25.4		
Outdoor Heat Exchanger	Fin Material		Pre coated		
	Fin Type		Slit Fin		
	Row x Stage x FPI		2 x 24 x 17		
	Size (W x H x D)	mm	709 x 504 x 18.2 679		
Air Filter	Material		P.P.HONEY COMB		
	Type		One-touch		
Power Supply			Indoor		
Power Supply Cord		A	16A		
Thermostat			-		
Protection Device			-		

TEMPERATURE (°C)		COOLING		HEATING	
		DRY BULB	WET BULB	DRY BULB	WET BULB
Indoor Operation Range	Maximum	32	23	30	-
	Minimum	16	11	16	-
Outdoor Operation Range	Maximum	43	26	24	18
	Minimum	16	11	-5	-6

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95.0°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb).
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb).
3. Specifications are subjected to change without prior notice for further improvement.

3. Features

- Inverter Technology
  - o Wider output power range
  - o Energy saving
  - o Quick Cooling
  - o More precise temperature control

- Long Installation Piping
  - o CS/CU-RE9/12/15JKE-1, long piping up to 15 meters.

- Easy to use remote control

- Quality Improvement
  - o Random auto restart after power failure for safety restart operation
  - o Gas leakage protection
  - o Prevent compressor reverse cycle
  - o Inner protector to protect compressor

- Operation Improvement
  - o Quiet mode to reduce the indoor unit operating sound
  - o Powerful mode to reach the desired room temperature quickly
  - o 12-hour timer

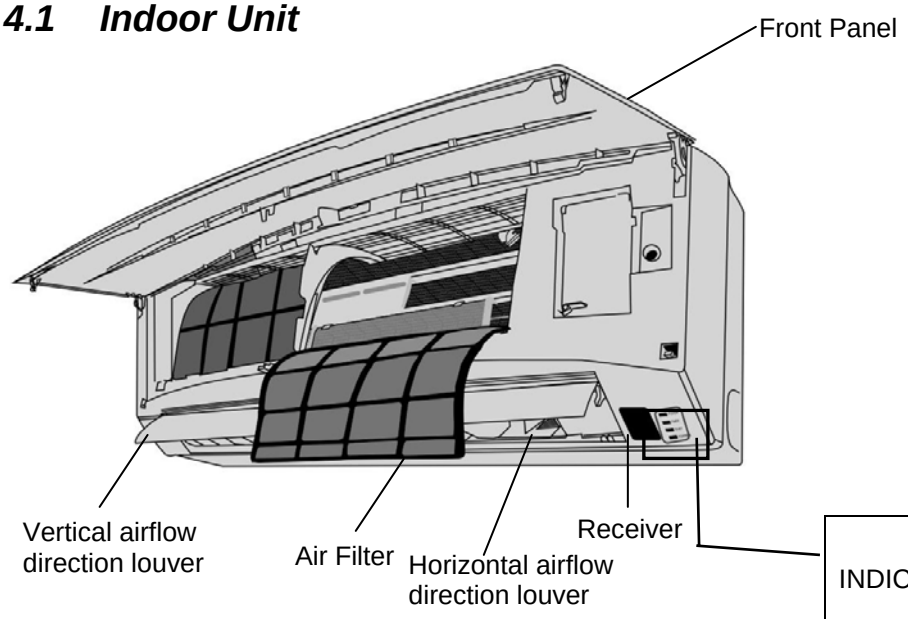
- Serviceability Improvement
  - o Breakdown Self Diagnosis Function.

SUPER ALLERU-BUSTER Filter supplied

- SUPER ALLERU-BUSTER Filter supplied..

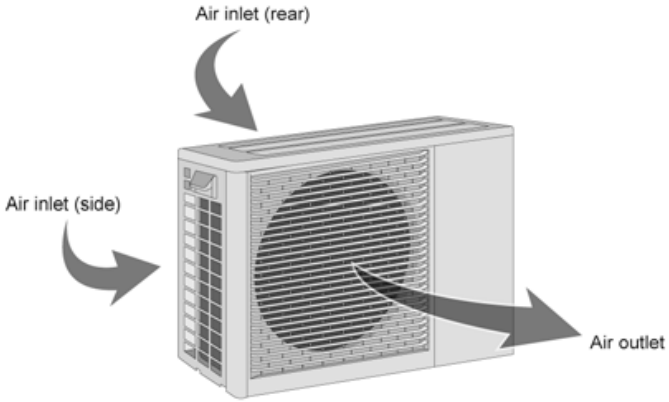
4. Location of Controls and Components

4.1 Indoor Unit

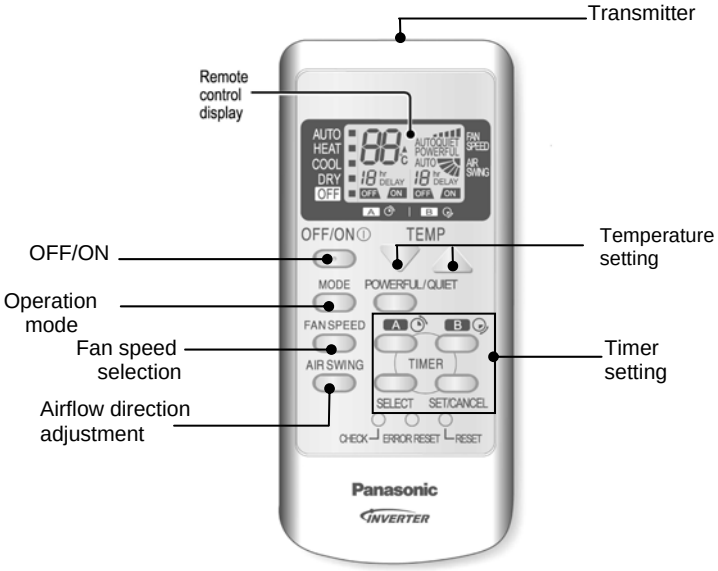


INDICATOR	POWER	GREEN
	TIMER	ORANGE
	QUIET	GREEN
	POWERFUL	RED

4.2 Outdoor Unit



4.3 Remote Control

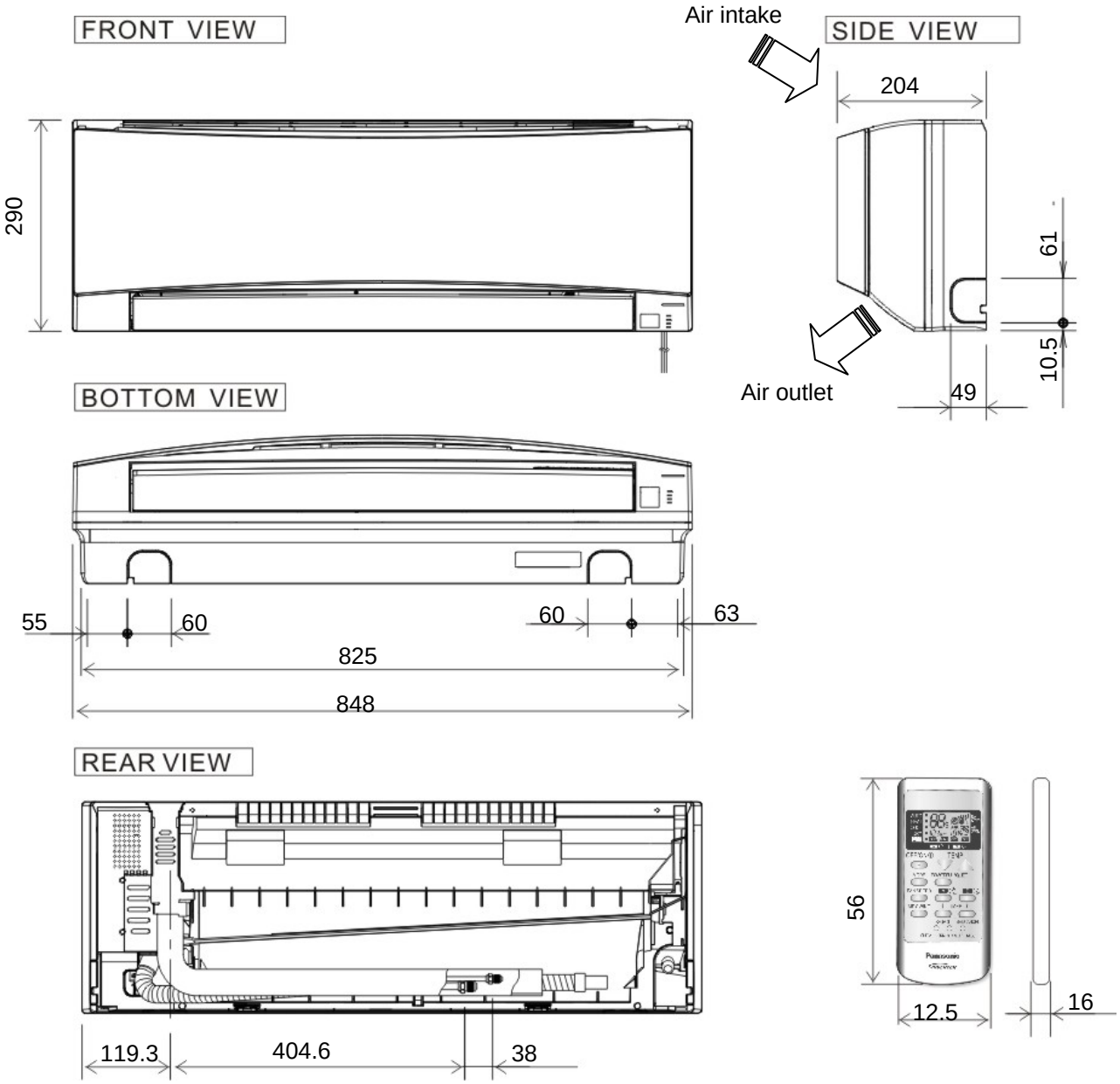


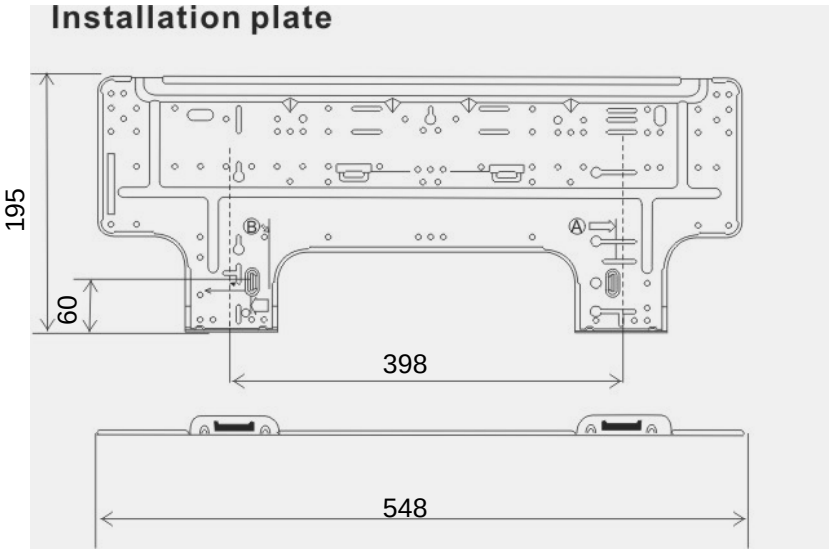
- For normal operation, the ERROR RESET button is not in use.
- Press RESET button to restore the remote control's default setting.

5. Dimensions

5.1 Indoor Unit

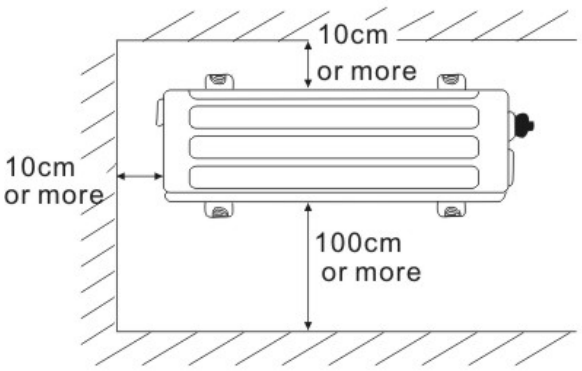
Unit：mm



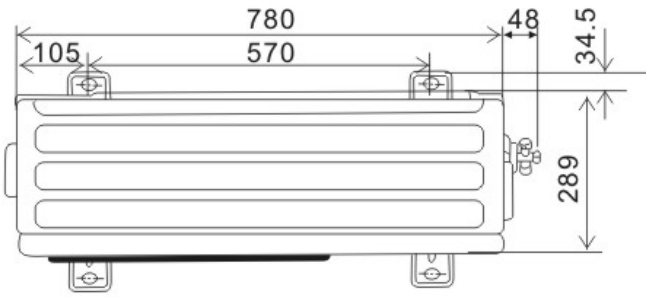


5.2 Outdoor Unit

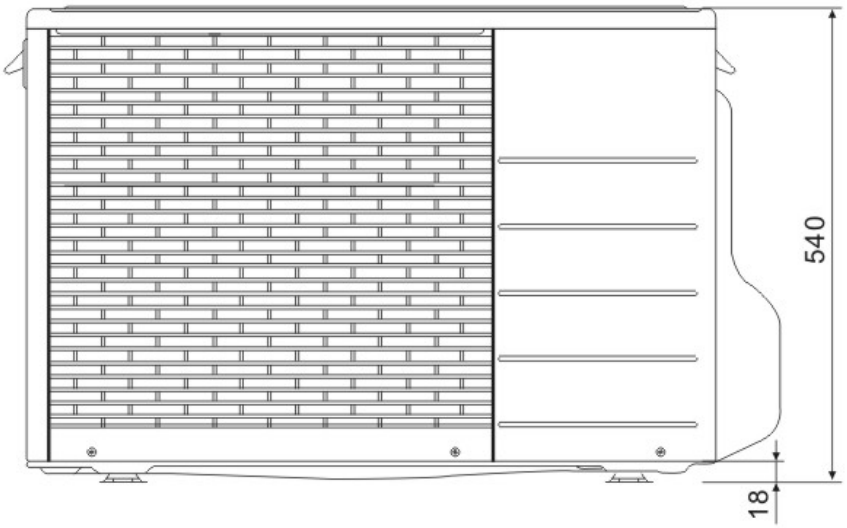
Unit: mm



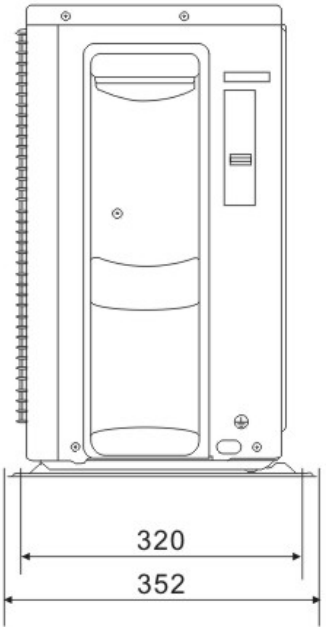
TOP VIEW



FRONT VIEW

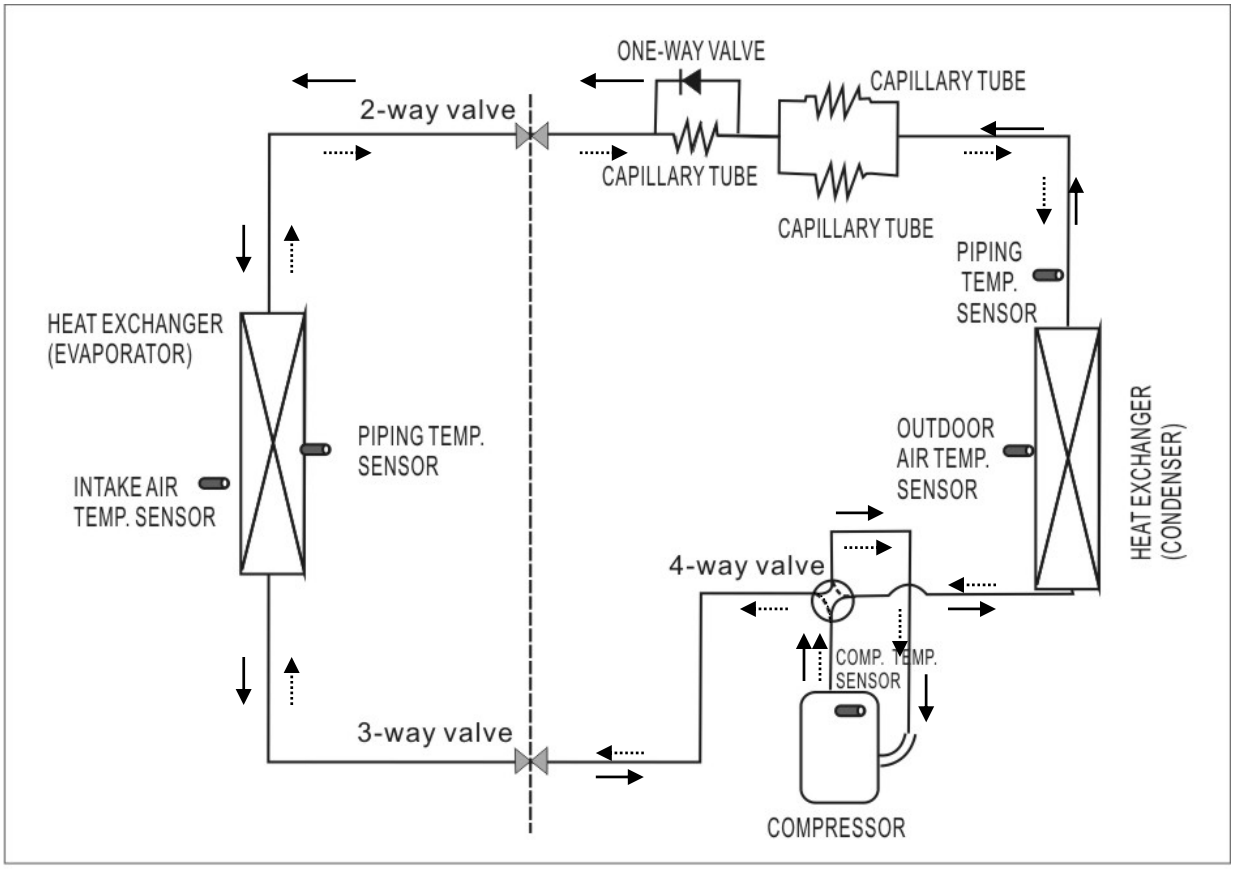


SIDE VIEW

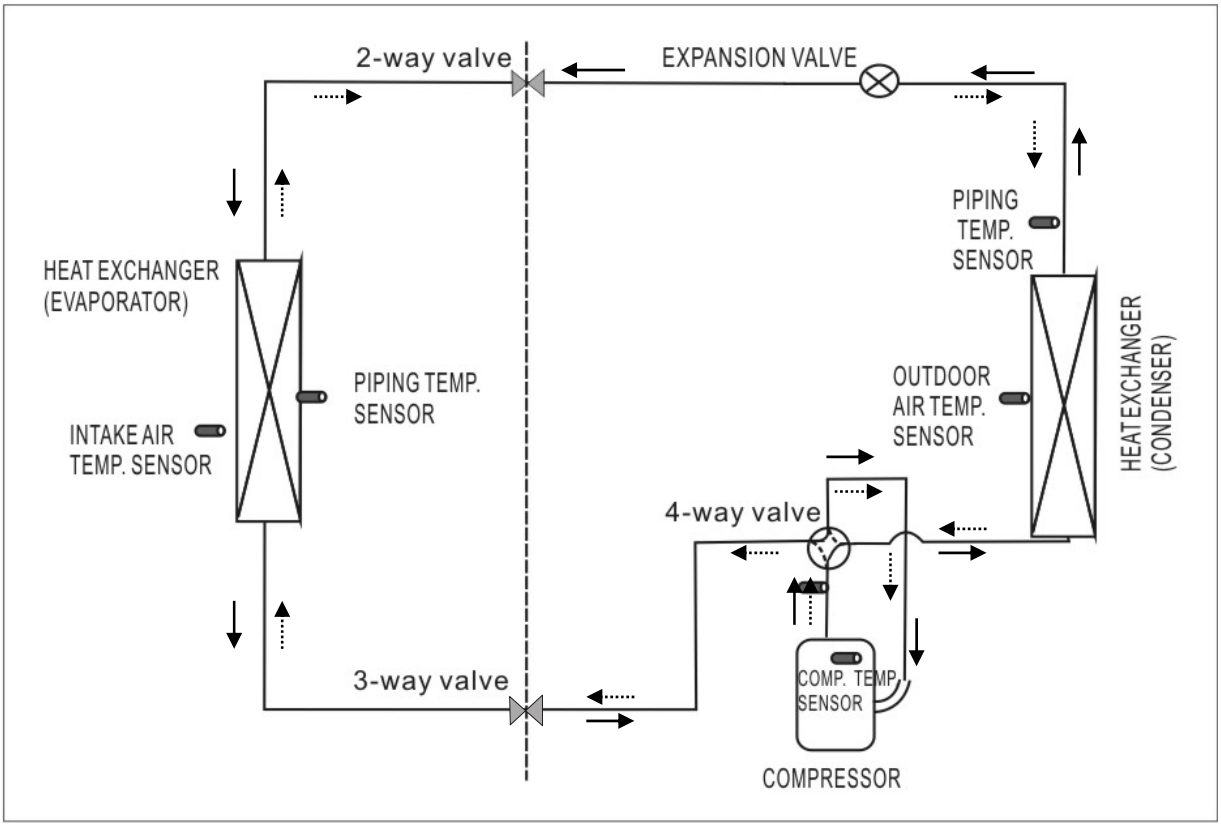


6. Refrigeration Cycle Diagram

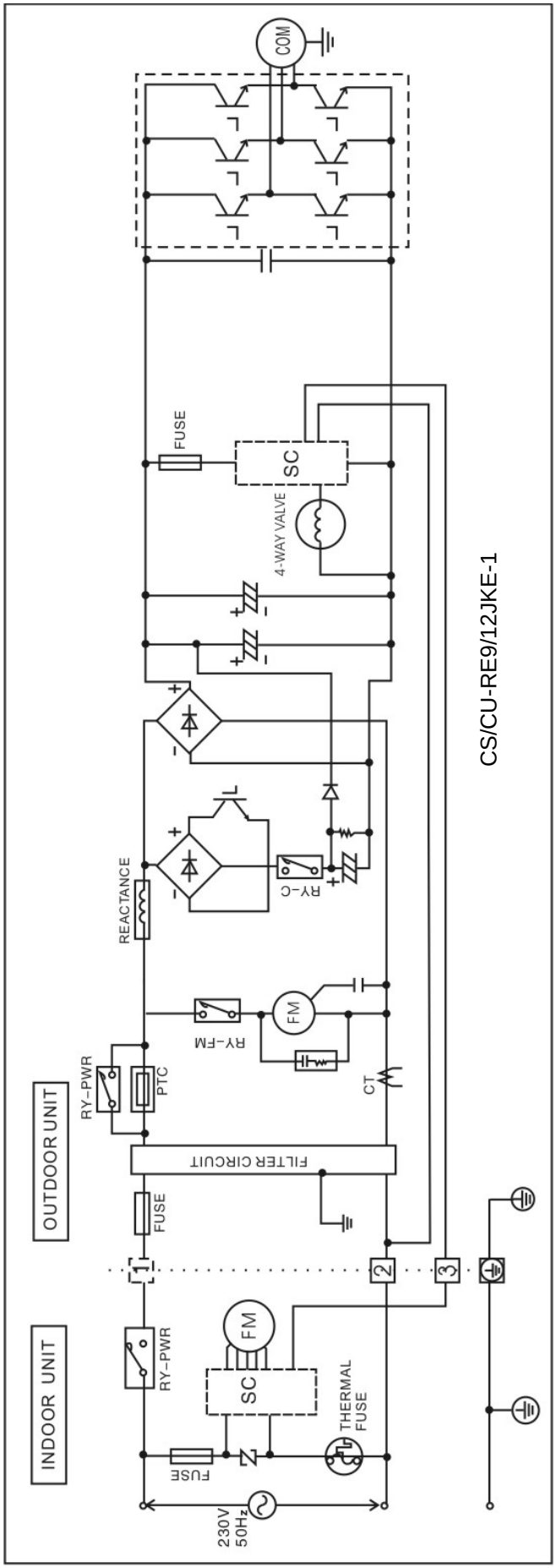
CS/CU-RE9JKE-1, CS/CU- RE12JKE-1

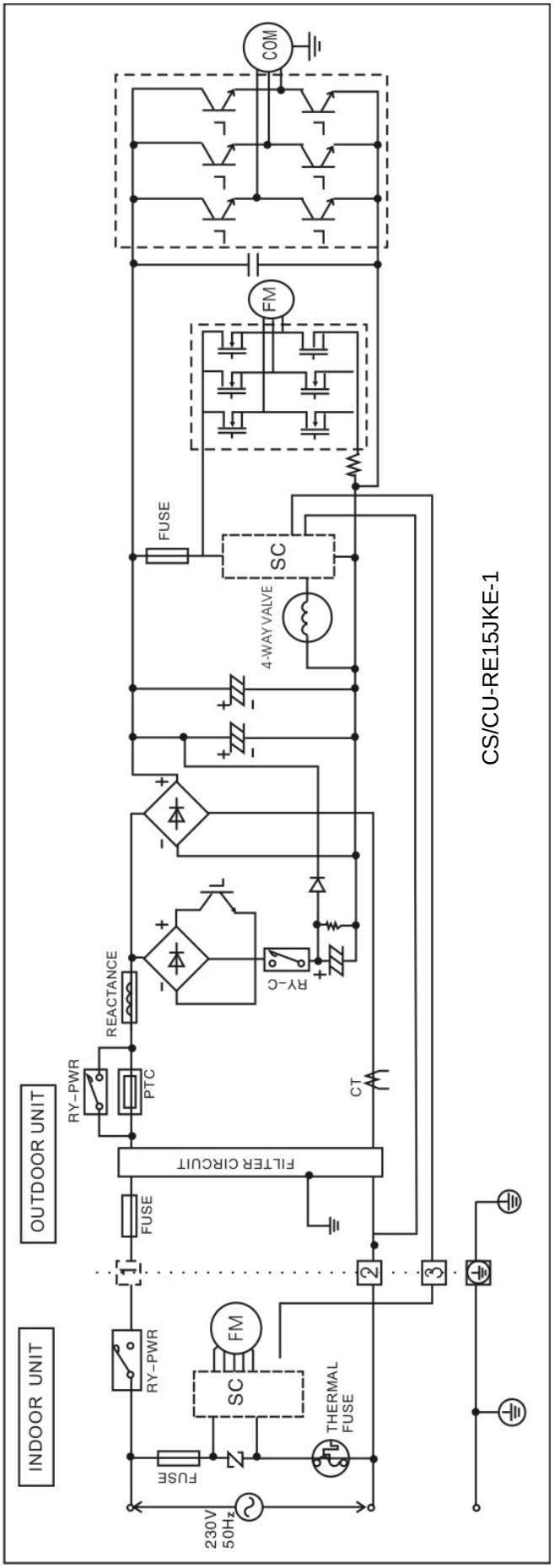


CS/CU-RE15JKE-1



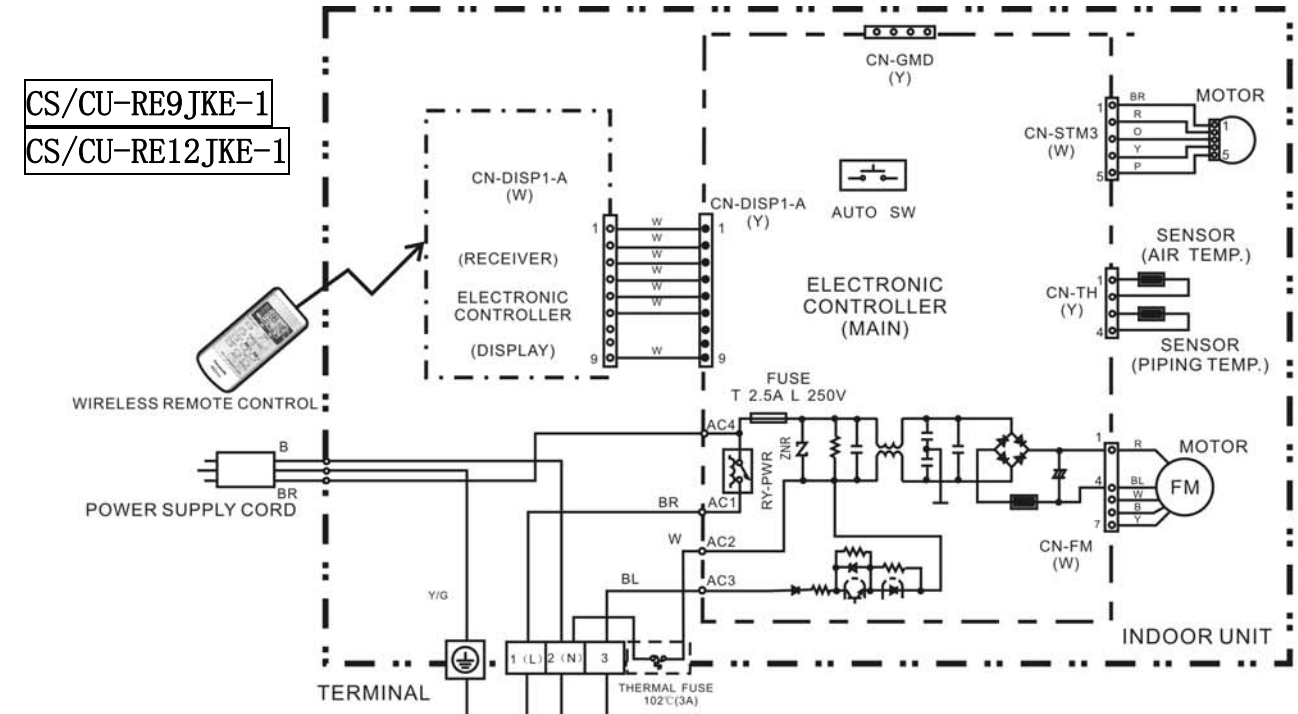
7. Block Diagram

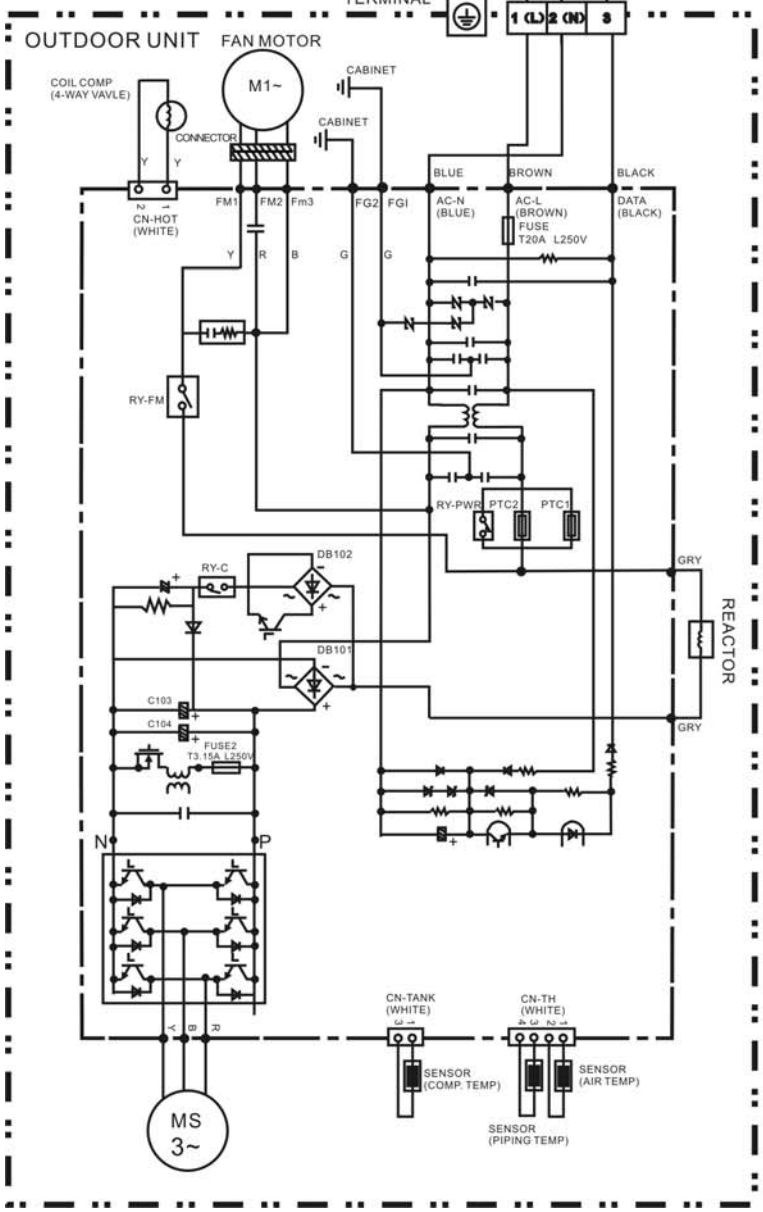


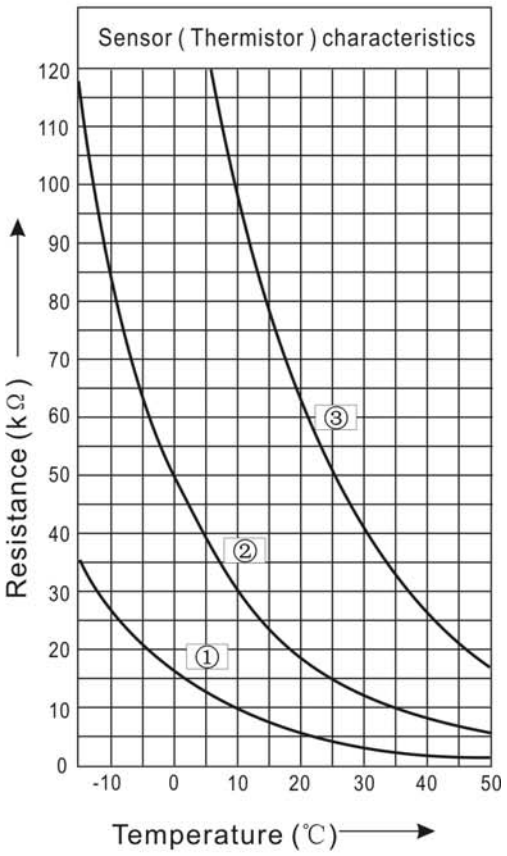


8. Wiring Diagram

CS/CU-RE9JKE-1
CS/CU-RE12JKE-1

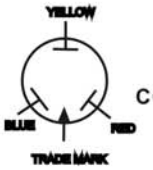






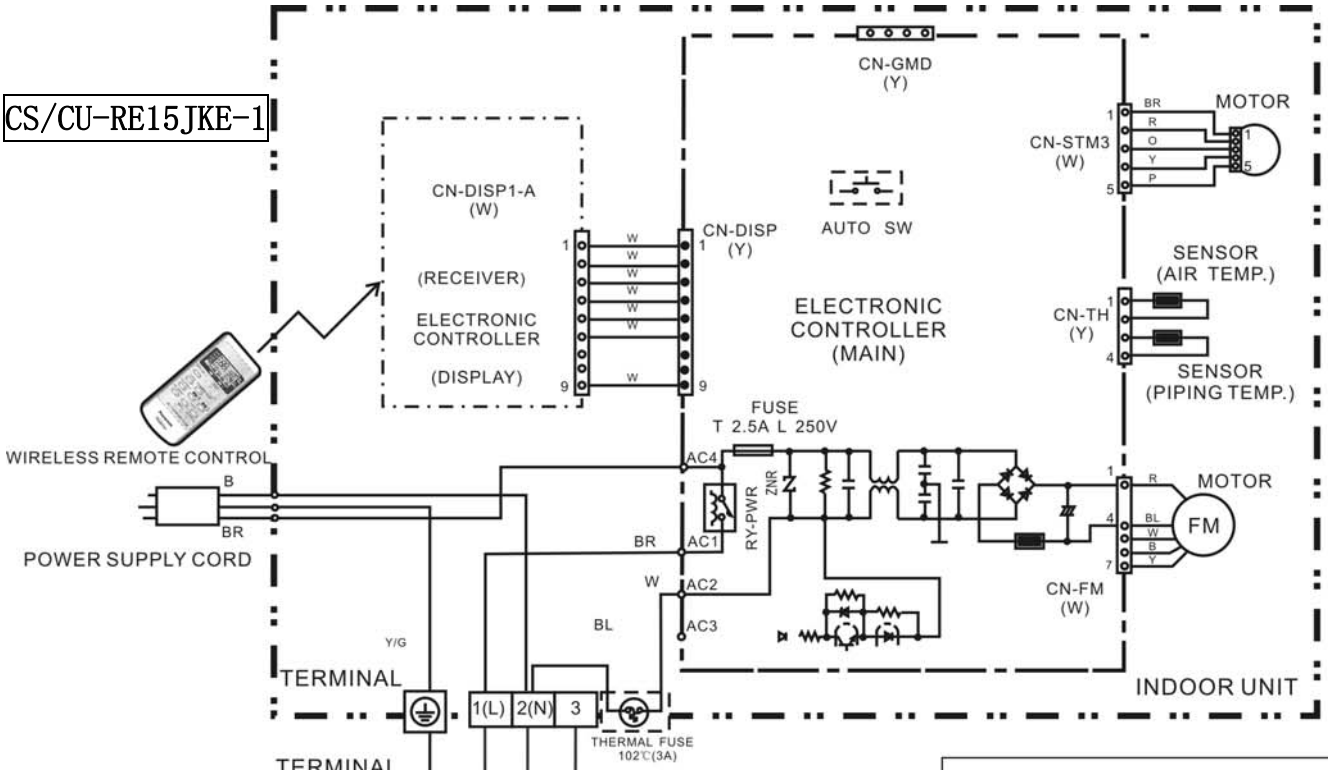
Remark:

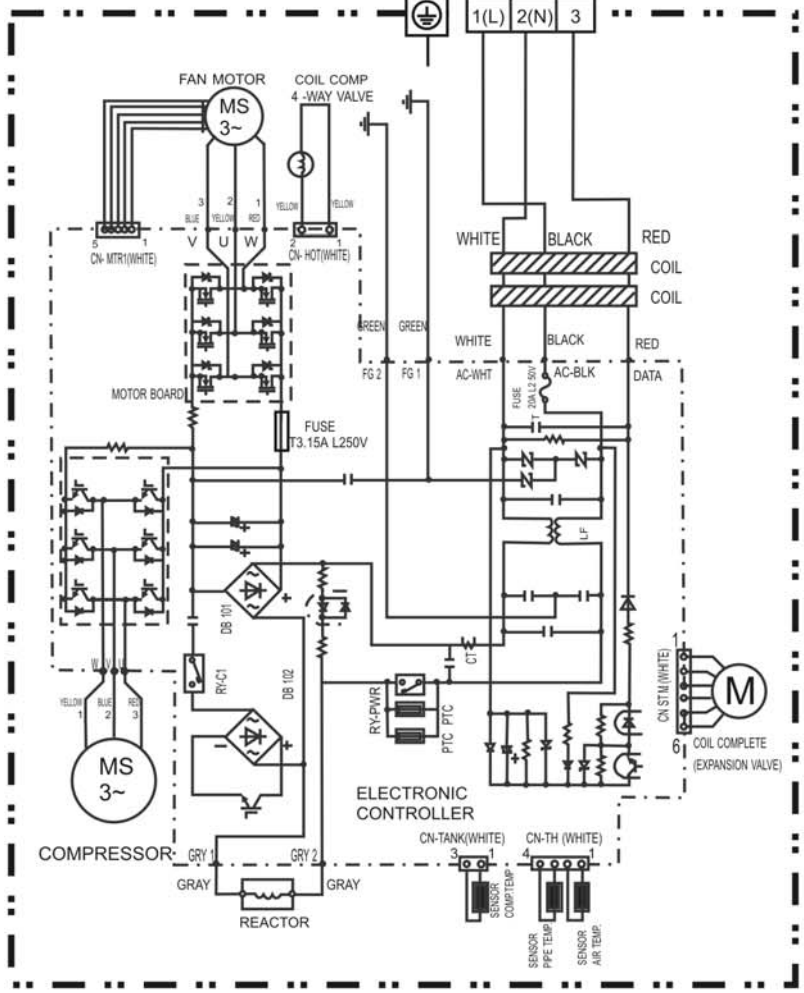
①:Pipe Temp. Sensor
②:Outdoor air sensor
③: Discharge Temp.Sensor

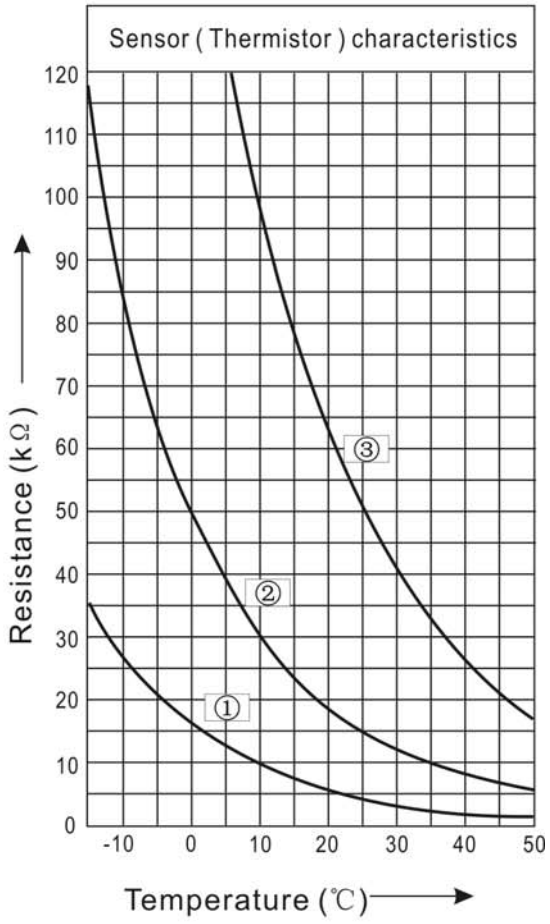


COMPRESSOR TERMINAL

CS/CU-RE15JKE-1



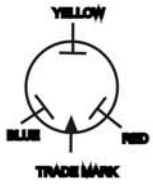




Remark:

①:Pipe Temp. Sensor
②:Outdoor air sensor
③: Discharge Temp.Sensor

COMPRESSOR TERMINAL

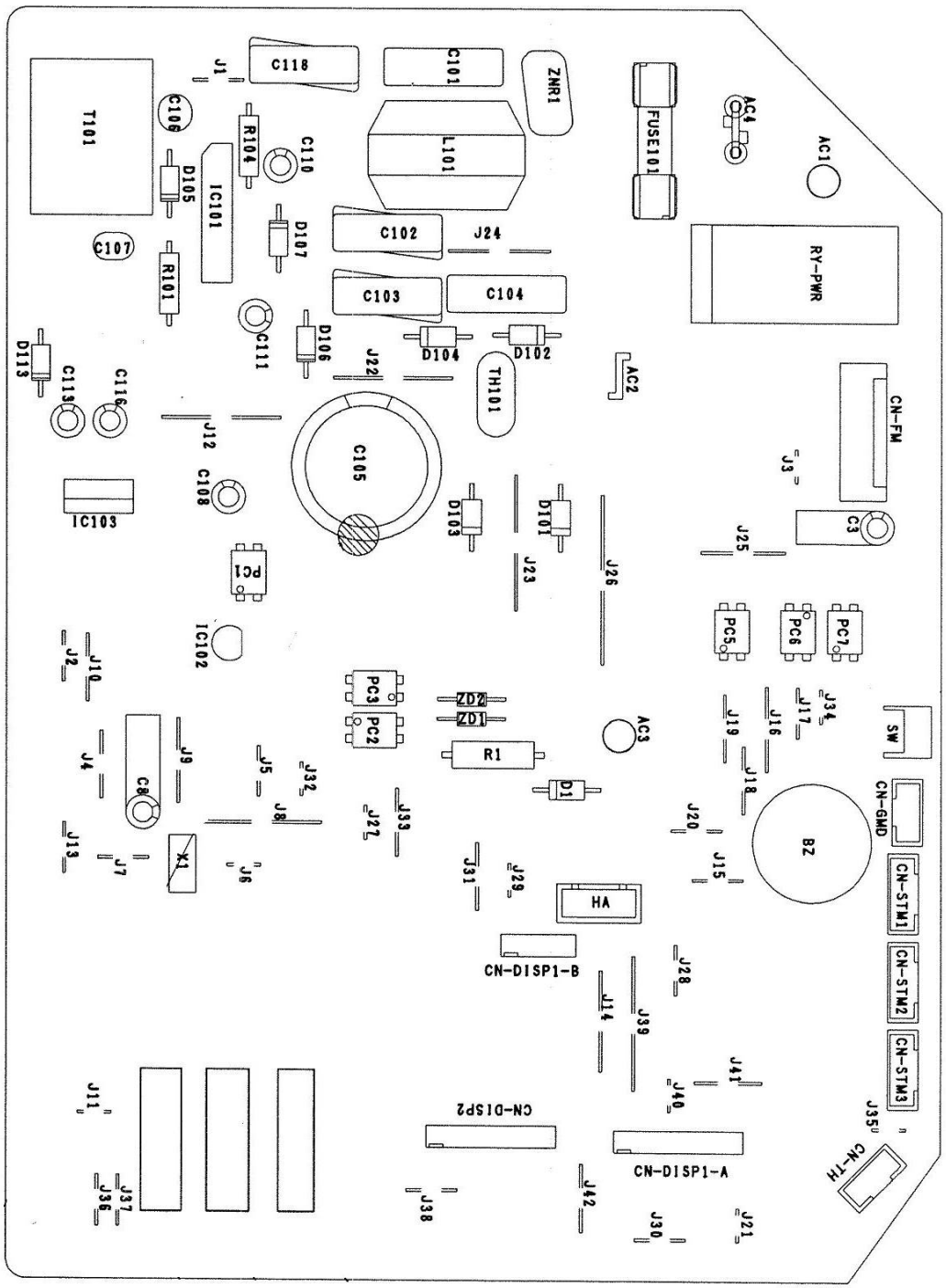


9. Printed Circuit Board

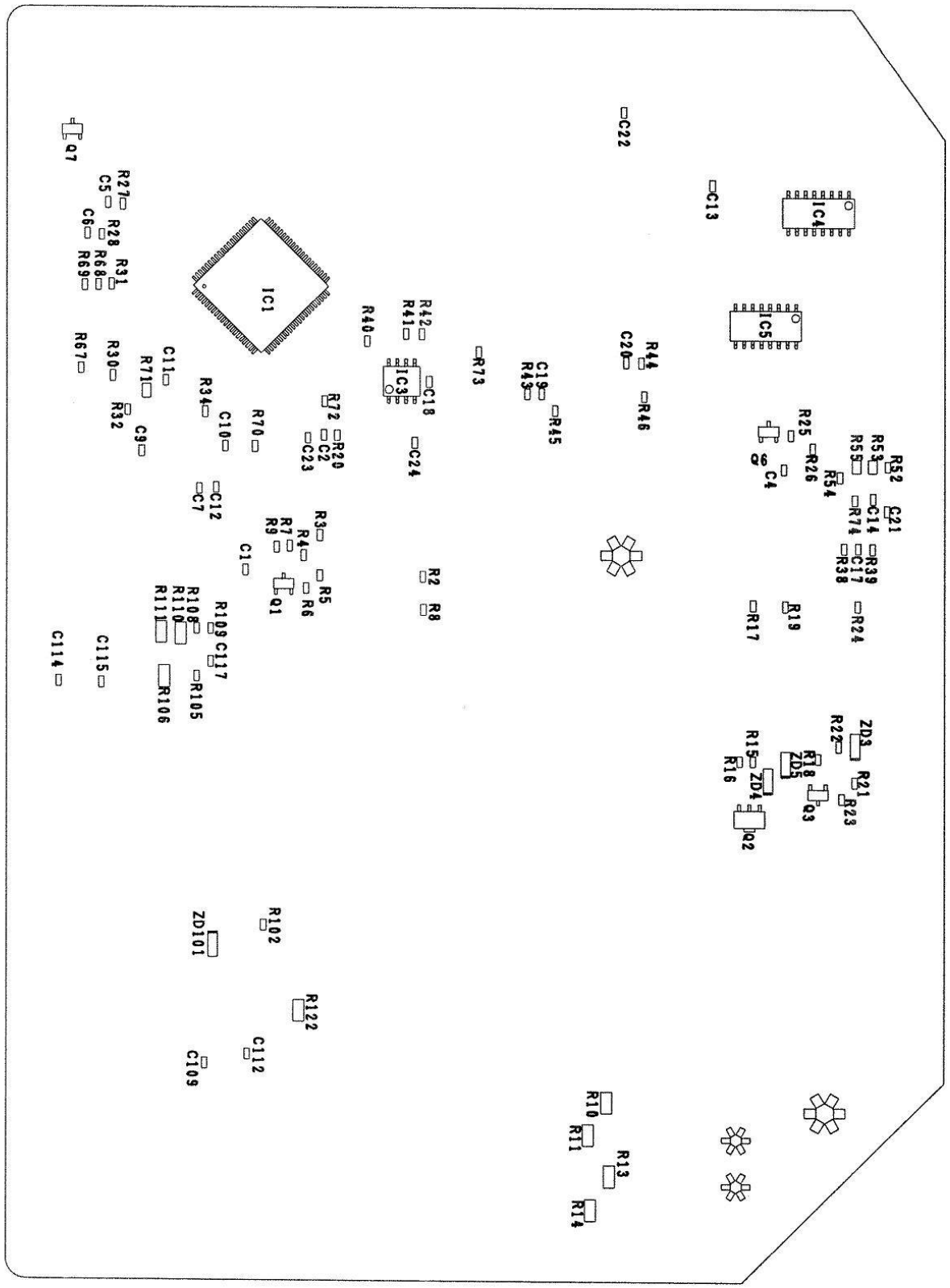
9.1 Indoor Unit

9.1.1 Main Printed Circuit Board

TOP VIEW



BOTTOM VIEW


IC1
IC3
IC4
IC5
Q1
Q2
Q3
Q4
Q7
ZD3
ZD4
ZD5
ZD101
C1
C2
C4
C5
C6
C7
C9
C10
C11
C12
C13
C14
C17
C18
C19
C20
C21
C22
C23
C24
C109
C112
C114
C115
C117
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R13
R14
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R52
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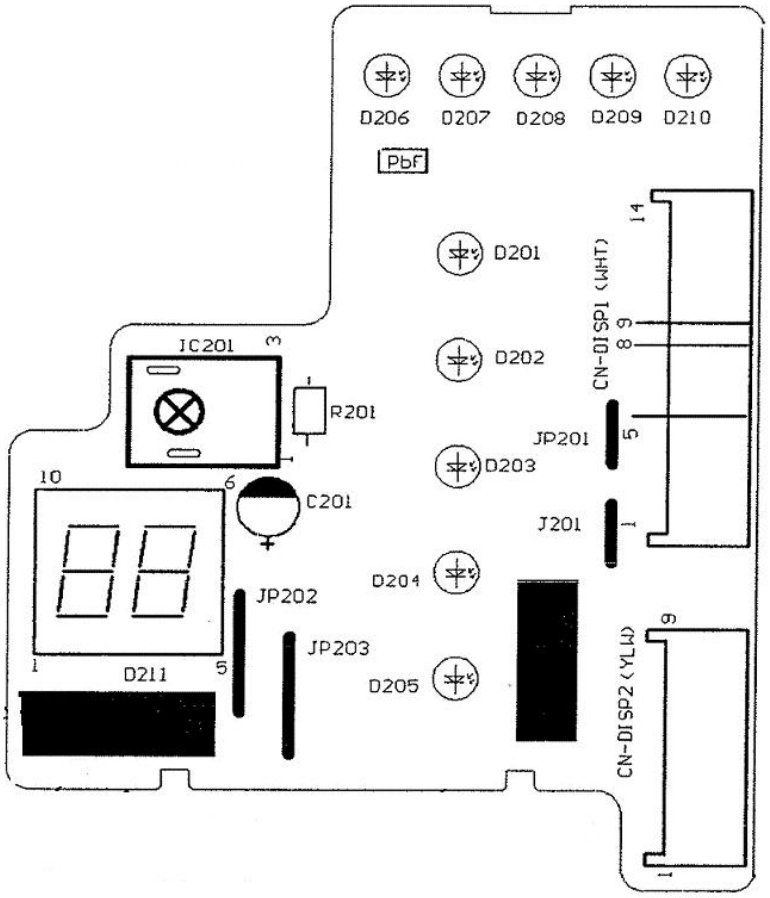
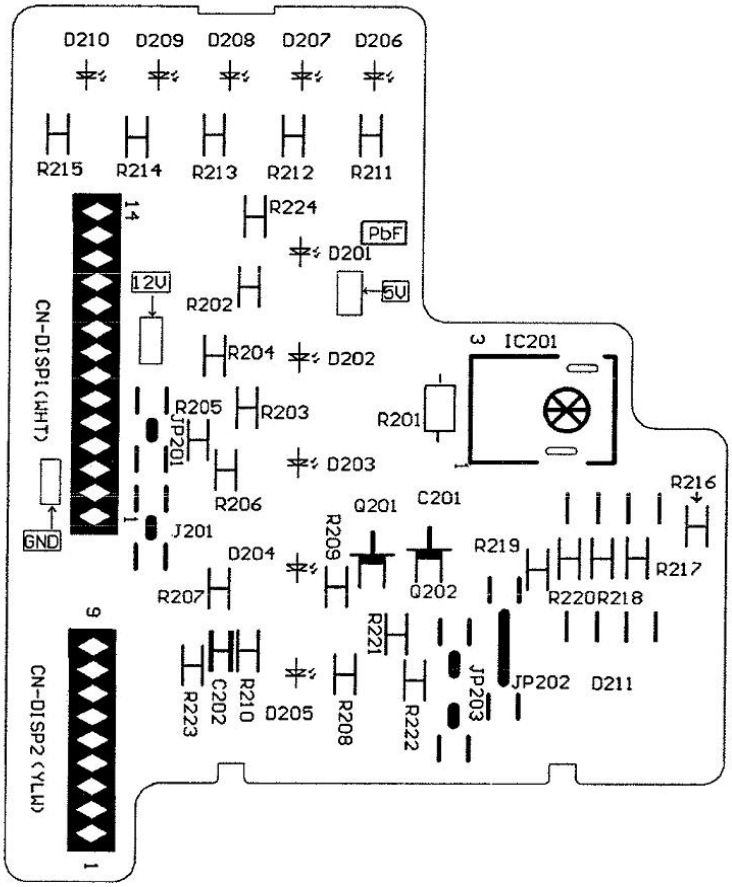
R54
R55
R67
R68
R69
R70
R71
R72
R73
R74
R102
R105
R106
R108
R109
R110
R111
R122

9.1.2 Indicator & receiver

TOP VIEW



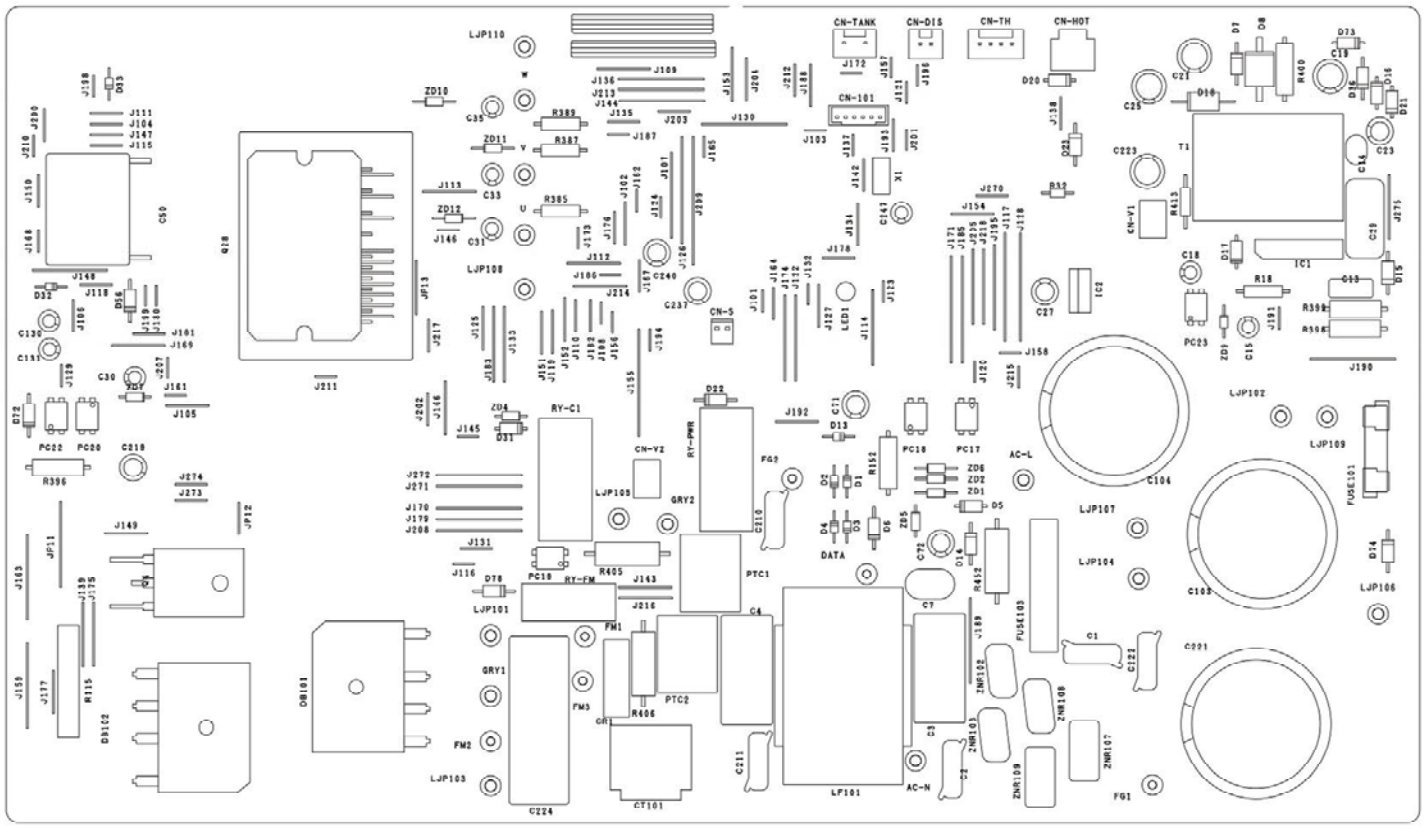
BOTTOM VIEW



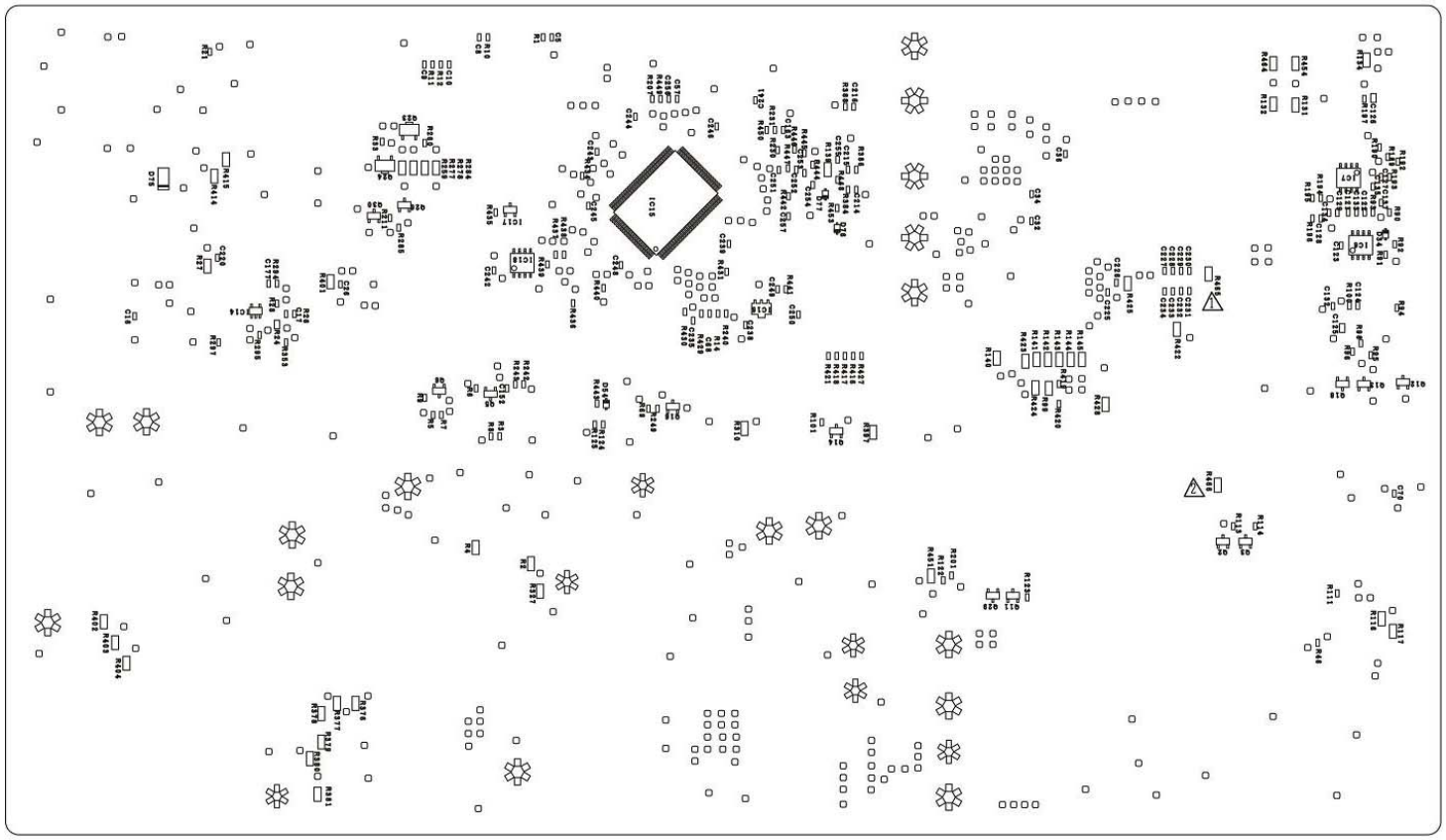
9.2 Outdoor Unit

9.2.1 CU-RE9JKE-1, CU-RE12JKE-1

TOP VIEW



BOTTOM VIEW



10. Installation Instruction

10.1 Select the Best Location

10.1.1 Indoor Unit

- There should not be any heat source or steam near the unit.
- There should not be any obstacles blocking the air circulation.
- A place where air circulation in the room is good.
- A place where drainage can be easily done.
- A place where noise prevention is taken into consideration.
- Do not install the unit near the door way.
- Ensure the spaces indicated by arrows from the wall, ceiling, fence or other obstacles.
- Recommended installation height for indoor unit shall be at least 2.5m.

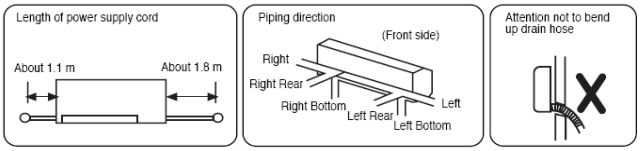
10.1.2 Outdoor Unit

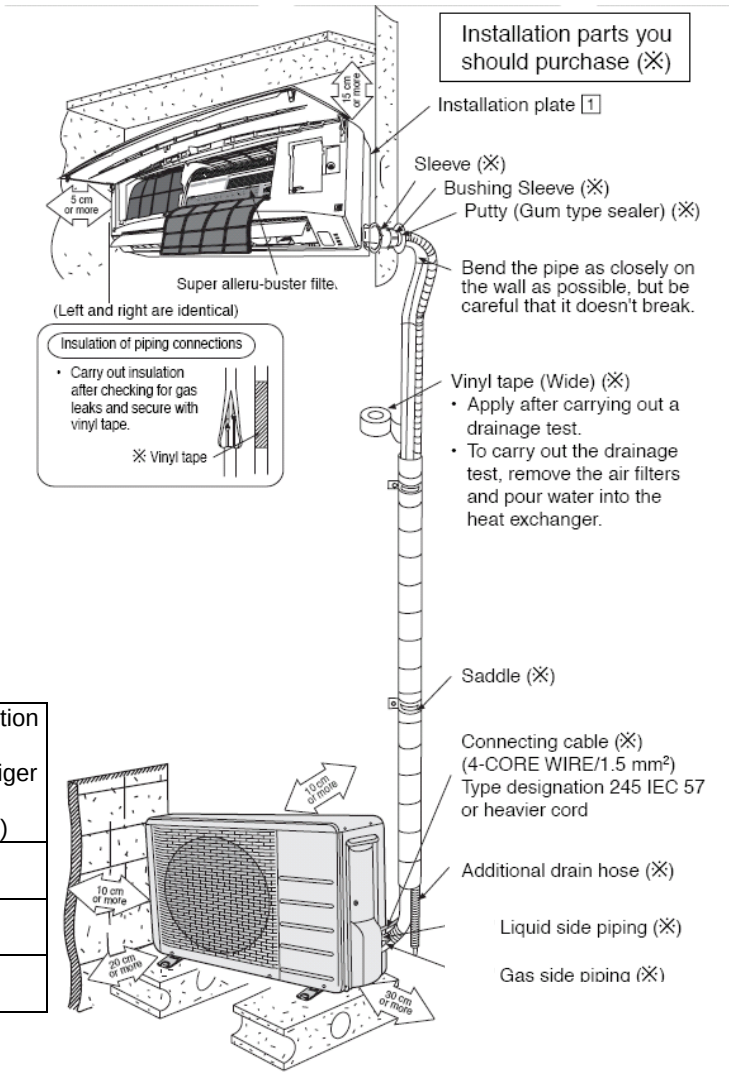
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.
- If piping length is over the rated length, additional refrigerant should be added as shown in the table below:

Model	Piping size		Rated Length (m)	Max Elevation (m)	Min Piping Length (m)	Max Piping Length (m)	Additional Refrigerant (g/m)
	Gas	Liquid					
RE9JKE-1	9.52 (3/8")	6.35 (1/4")	7.5	5	3	15	20
RE12JKE-1	9.52 (3/8")	6.35 (1/4")	7.5	5	3	15	20
RE15JKE-1	12.7 (1/2")	6.35 (1/4")	7.5	5	3	15	20

Example: If the unit is installed at a 10m distance, the quantity of additional refrigerant should be 50 g.
…… (10-7.5) m x 20g/m = 50 g

11.1.3 Indoor/Outdoor Unit





*This illustration is for explanation purposes only.
The indoor unit will actually face a different way.

10.2 Indoor Unit

10.2.1 How to Fix Installation Plate

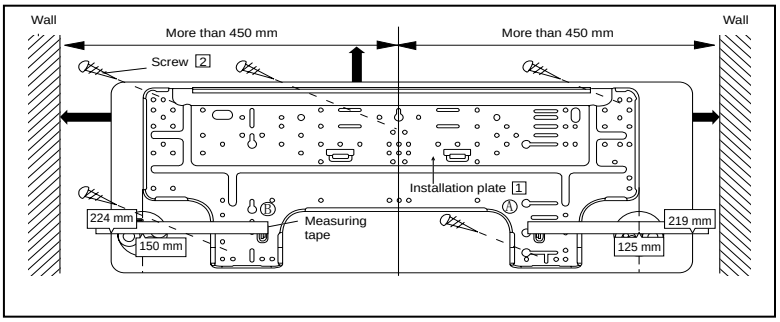
The mounting wall is strong and solid enough to prevent it from the vibration.

The centre of installation plate should be at more than 450 mm at right and left of the wall.

The distance from installation plate edge to ceiling should more than 75mm.

From installation plate left edge to unit's left side is 148 mm.

From installation plate right edge to unit's right side is 152 mm.



Ⓑ : For left side piping, piping connection for gas should be about 45 mm from this line.

: For left side piping, piping connection cable should be about 800 mm from this line.

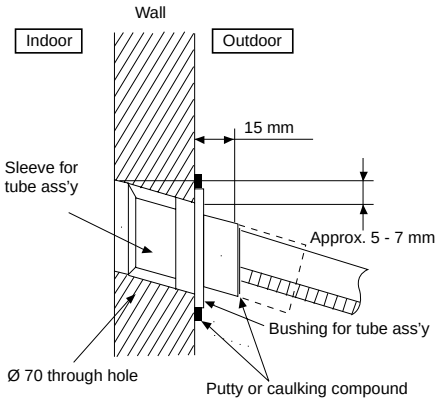
1 Mount the installation plate on the wall with 5 screws or more. (If mounting the unit on the wall, consider using anchor bolts.) Always mount the installation plate horizontally by aligning the marking-off line with the thread and using a level gauge.
2 Drill the piping plate hole with ø70 mm hole-core drill.
   - Put measuring tape at position as shown in the diagram above. The hole centre is obtained by measuring the distance namely 115 mm and 120 mm for left and right hole respectively.
   - Drill the piping plate hole at either the right or left and the hole should be slightly slanted to the outdoor side.

10.2.2 To Drill a Hole in the Wall and Install a Sleeve of Piping

1 Insert the piping sleeve to the hole.
2 Fix the busing to the sleeve.
3 Cut the sleeve until it extrudes about 15mm from the wall

Caution
When the wall is hollow, please be sure to use the sleeve for tube ass'y to prevent dangers caused by mice biting the connecting cable.

4 Finish by sealing the sleeve with putty or caulking compound at the final stage.



10.2.3 Indoor Unit Installation

1. FOR THE RIGHT REAR PIPING

Pull out the Indoor piping

↓

Install the Indoor Unit

↓

Secure the Indoor Unit

↓

Insert the connecting cable

2. FOR THE RIGHT AND RIGHT BOTTOM PIPING

Pull out the Indoor piping

↓

Install the Indoor Unit

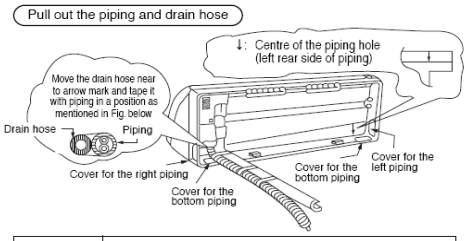
↓

Insert the connecting cable

↓

Secure the Indoor Unit

Pull out the piping and drain hose



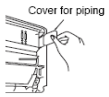
Warning

Make sure do not fasten and collect the power supply cord into the piping trough, otherwise, it will cause heat or fire. The power supply cord must not be stucked at the 2 clip-on positions and overly exposed between the mounting plate and the indoor unit. Abnormal noise may be produced.

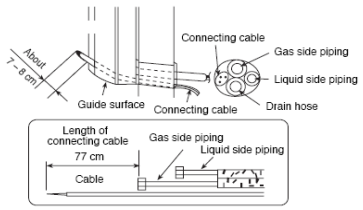
How to keep the cover

In case of the cover is cut, keep the cover at the rear of chassis as shown in the illustration for future reinstallation.

(Left, right and 2 bottom covers for piping)

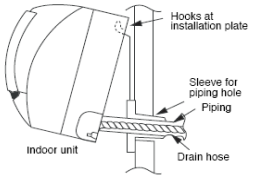


Insert the connecting cable



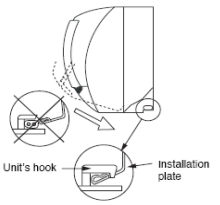
Install the Indoor Unit

Hook the indoor unit onto the upper portion of installation plate (Engage the indoor unit with the upper edge of the installation plate). Ensure the hooks are properly seated on the installation plate by moving in left and right.

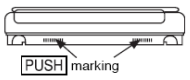


Secure the Indoor Unit

1. Tape the extra power supply cord in a bundle and keep it behind the chassis.
   - Ensure that the power supply cord is not clamped in between the unit's hook (2 positions) and installation plate.
2. Press the lower left and right side of the unit against the installation plate until hooks engages with their slots (sound click).



To take out the unit, push the PUSH marking at the bottom unit , and pull it slightly towards you to disengage the hooks from the unit.



3. FOR THE EMBEDDED PIPING

Replace the drain hose

↓

Bend the embedded piping

- Use a spring bender or equivalent to bend the piping so that the piping is not crushed.

↓

Install the Indoor Unit

↓

Cut and flare the embedded piping

- When determining the dimensions of the piping, slide the unit all the way to the left on the installation plate.
- Refer to the section "Cutting and flaring the piping".

↓

Pull the connecting cable into Indoor Unit

- The inside and outside connecting cable can be connected without removing the front grille.

↓

Connect the piping

- Please refer to "Connecting the piping" column in outdoor unit section. (Below steps are done after connecting the outdoor piping and gas-leakage confirmation.)

↓

Insulate and finish the piping

- Please refer to "Insulation of piping connections" column as mentioned in Indoor/Outdoor Unit installation.

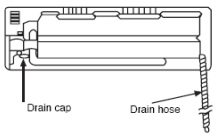
↓

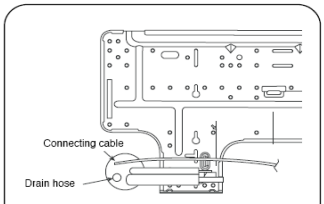
Secure the Indoor Unit

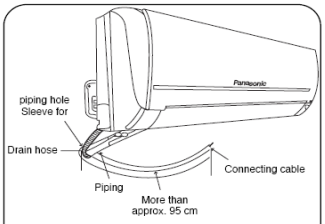
(This can be used for left rear piping & left bottom piping also.)

Exchange the drain hose and the cap

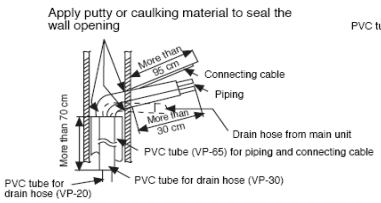
Rear view for left piping installation



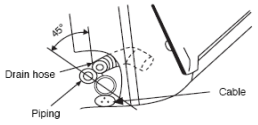




- How to pull the piping and drain hose out, in case of the embedded piping.



- In case of left piping how to insert the connecting cable and drain hose.



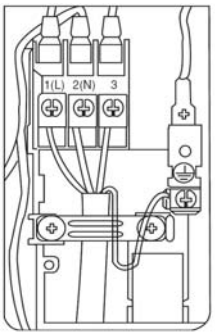
(For the right piping, follow the same procedure)

10.2.4 Connect the Cable to the Indoor Unit

1 The inside and outside connecting cable can be connected without removing the front grille.

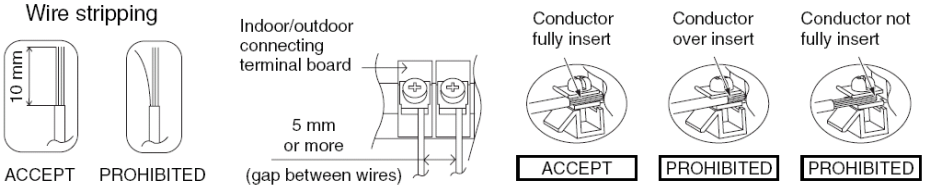
2 Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4x 1.5mm^2 flexible cords, type designation 245 IEC 57 or heavier cord.

- Ensure the color of wires of outdoor unit and the terminal numbers are the same to the indoor's respectively.
- Earth lead wire shall be longer than the other lead wires as shown in the figure for the electrical safety in case of the slipping out of the cord from the anchorage.



- Secure the cable onto the board with the holder (clamper).

3 Wire stripping and connecting requirement.



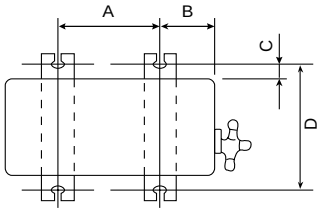
10.3 Outdoor Unit

10.3.1 Install the Outdoor Unit

- After selecting the best location, start installation according to indoor/outdoor unit installation diagram.

1 Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut (ø10 mm).

2 When installing at roof, please consider strong wind and earthquake. Please fasten the installation stand firmly with bolt or nails.



A	B	C	D
570	103.9	13.5	320

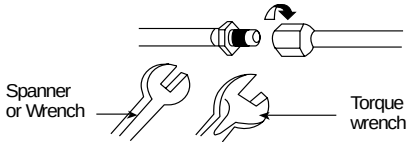
10.3.2 Connecting the Piping

10.3.2.1 Connecting the piping to indoor unit

Please make flare after inserting flare nut (locate at joint portion, of tube assembly) onto the copper pipe. (In case of using long piping)

Connect the piping

- Align the center of piping and sufficiently tighten the flare nut with fingers.
- Further tighten the flare nut with torque wrench in specified torque as stated in the table.



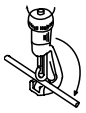
Caution : Do not over tighten, over tightening cause gas leakage	
Piping size	Torque
6.35mm (1/4")	18 N• m (1.8kgf•m)
9.52mm (3/8")	42 N• m (4.2kgf•m)
12.70mm (1/2")	55 N• m (5.5kgf•m)

Connecting the piping to outdoor unit

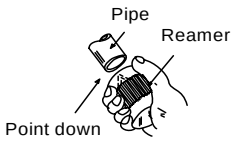
Decide piping length and then cut by using pipe cutter. Remove burrs from cut edge. Make flare after inserting the flare nut (locate at valve) onto the copper pipe. Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.

10.3.2.2 Cutting and flaring the piping

1 Please cut using pipe cutter and then remove the burrs.
2 Remove the burrs by using reamer. If burrs are not removed, gas leakage may be caused. Turn the piping end down to avoid the metal powder entering the pipe.
3 Please make flare after inserting the flare nut onto the copper pipes.

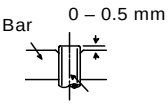


1. To cut



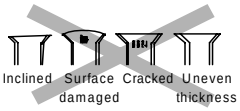
2. To remove burrs

3. To flare



Copper pipe

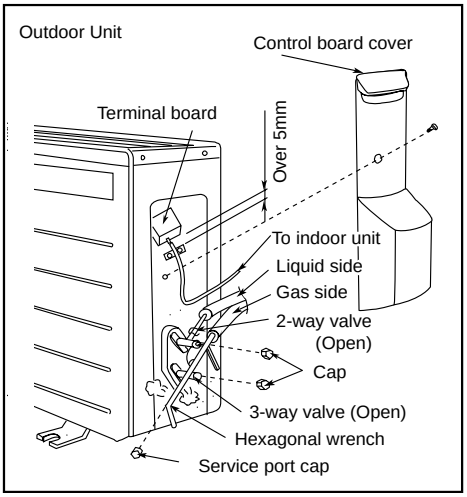
■ Improper flaring ■

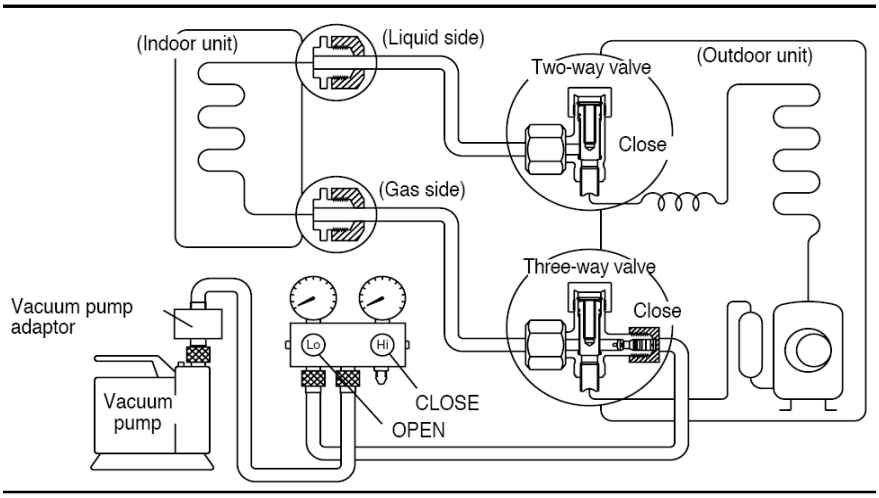


When properly flared, the internal surface of the flare will evenly shine and be of even thickness. Since the flare part comes into contact with the connections, carefully check the flare finish.

10.3.3 Evacuation of the equipment

When installing an air conditioner, be sure to evacuate the air inside the indoor unit and pipes in the follwing procidure.





1 Connect a charging hose with a push pin to the low side of a charging set and the service port at the 3-way valve.
   - Be sure to connect the end of charging hose with the push pin to the service port.
   - The size of charging hose fitting should be 1/2 UNF, 20 threads.
2 Connect the center hose of the charging set to a vacuum pump with check valve, or vacuum pump and vacuum pump adaptor.
3 Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 cmHg (0 Mpa) to –76 cmHg (-0.1 Mpa). Then evacuate the air approximately ten minutes.
4 Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.
   Note: BE SURE TO FOLLOW THIS PROCEDURE IN ORDER TO AVOID REFRIGEANT GAS LEAKAG
5 Disconnect the charging horse from the vacuum pump and from the service port of the 3-way valve.
6 Tighten the service port caps of the 3-way valve at a torque of 18 N.m with a torque wrench.
7 Remove the valve caps of both of the 2-way valve and 3-way valve. Position both of the valves to “OPEN” using a hexagonal wrench (4mm).
8 Mount valve caps onto the 2-way and the 3-way valve.
   - Be sure to check for gas leakage.

CAUTION:

- If gauge needle does not move from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa), in step 3 above take the following measure:
- If the leak stops when the piping connections are tightened further, continue working from step 3.
- If the leak does not stop when the connections are retightened, repair the location of leak.
- Do not release refrigerant during piping work for installation and reinstallation. Take care of the liquid refrigerant, it may cause frostbite.

10.3.4 Connect the cable to the Outdoor Unit

1 Remove the control board cover from the unit by loosening the screw.
2 Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4x 1.5mm^2 flexible cords, type designation 245 IEC 57 or heavier cord.

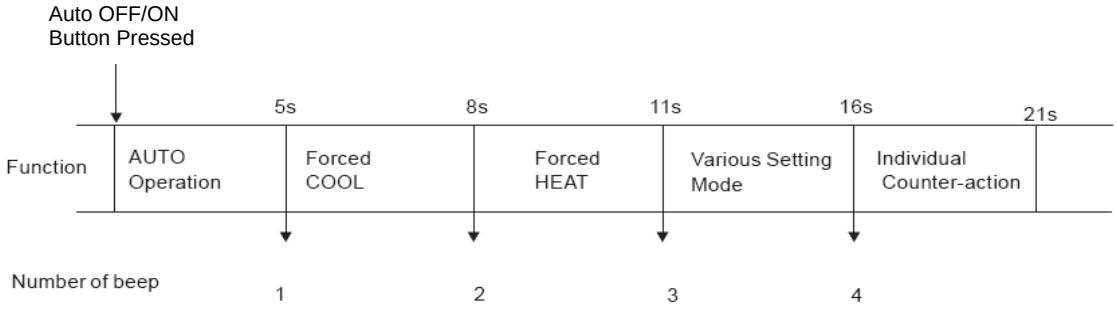
3 Secure the cable onto the control board with the holder (clamper).
4 Attach the control board cover back to the original position with the screw.
5 For wiring stripping and connection requirement, refer to instruction 10.2.4 of indoor unit.

10.3.5 Pipe Insulation

1 Please carry out insulation at pipe connection portion as mentioned in Indoor/Outdoor Unit Installation Diagram. Please warp the insulated piping end to prevent water from going inside the piping.
2 If drain hose or connecting piping is in the room (where dew may form), please increase the insulation by using POLY-E-FOAM with thickness 6mm or above.

11. Service Mode

11.1 Auto OFF/ON Button



1. AUTO OPERATION MODE
   Once the Auto OFF/ON button is slightly pressed, the unit will immediately operate in Auto operation. This operation can be used to operate air conditioner with limited function if remote control is misplaced or malfunction.

2. TEST RUN OPERATION(FOR PUMP DOWN/ SERVICING PURPOSE)
   Press the button continuously for approximate 5 second and then release. A “beep” sound will be heard to identify the starting of TEST RUN OPERATION.

3. HEATING OPERATION
   A) Within 5 minutes after TEST RUN operation starting, press the button again for more than 5 seconds until 2 “beep” sounds are heard, the unit will operate in heating mode.
   B) Pressed the button continuously for approximate 8 second and then released. 2 “beep” sounds will be heard to identify the starting of HEATING operation.

4. DIFFERENT CONTROLLING SETTING.
   Press the button continuously for approximate 11 until 3 “beep” sounds are heard and together with the signal from remote controller, the unit can be changed to different controlling setting.
   For transmission code selection method, please refer to “Select Remote Control Transmission Code”

5. INDIVIDUAL COUNTER-ACTION
   When the switch is continuously pressed between 16 to 21 seconds, either H14 error detection selection mode or remote controller’s signal receiving sound can be cancelled or turned on.

11.2 Select Remote Control Transmission Code

✧ There are 4 types of remote control transmission code could be selected and stored in EEPROM of indoor PCB. The indoor unit will only operate when received signal with same transmission code from remote control. This could prevent signal interference when there are 2 or more indoor units installed near by together.

✧ To Change the code of remote controller, following table I to join or cut jumper wire on the remote controller and setting with "Forced operation button". Four codes (A, B, C, D) can be selected. Taking code "B" for example, the process below should be follow.
   1. Press the "Auto OFF/ON” button on the indoor unit for approximate 11 seconds until 3 "Beep’s signal receiving sounds are heard.
   2. Within 5 minutes, gently press the "ERROR RESET" button on the remote control towards the indoor unit. One "Beep" sound is heard.
   3. Within 60 seconds, press any button on the remote control, the frequency of which was set as "B". Setting is completed after a "Beep" sound is heard. The corresponding signal sent by remote control "B" will be received by this indoor unit.

Table 1

Remote control	J02	J03
A(STANDARD)	SHORT	OPEN
B	OPEN	OPEN
C	SHORT	SHORT
D	OPEN	SHORT

11.3 Operate and Display of Remote Control

11.3.1 Original setting

11.3.2 Mode selecting button

AUTO, HEAT, COOL, DRY can be selected by pressing “MODE” button. Initial display of LCD is as follow

MODE	SET TEMP	FAN SPEED	AIR SWING
AUTO	25℃	AUTO	AUTO
HEAT	22℃	AUTO	AUTO
COOL	27℃	AUTO	AUTO
DRY	25℃	AUTO	AUTO

*Keeping the button depressed continuously, the operation mode will change in the following order in turn
AUTO—HEAT—COOL—DRY--AUTO

11.3.3 Temperature adjusting button

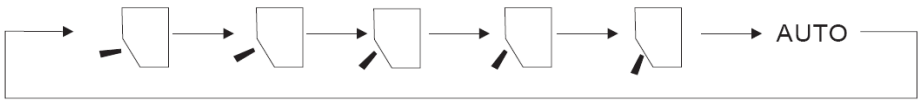
Temperature adjusting range is between 16 ℃~30 ℃

11.3.4 Fan speed button

There are 5 speed levels can be selected. The display on the remote controller changes as follows by pressing the AIR SWING button.

11.3.5 AIR SWING button

To adjust vertical airflow directions by pressing AIR SWING button (5 options)

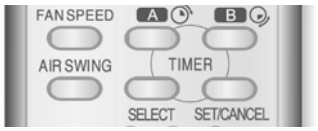


11.3.6 QUIET/POWERFULL button

Press this button to switch among QUIET operation, POWERFUL operation and normal operation.
Start Quiet operation: Press this button until “QUIET” displaying on remote control display to identify Quiet mode operating.
Start POWERFUL operation: Press this button until POWERUL displays on remote control display to identify Quiet mode operating.
Switch Quiet /Powerful operation to normal operation: Press this button until “QUIET” and ”POWERFUL” on remote control display disappear, which identifies the unit returns to normal operation.
Note: QUIET and POWERFUL operation can not be active simultaneously.

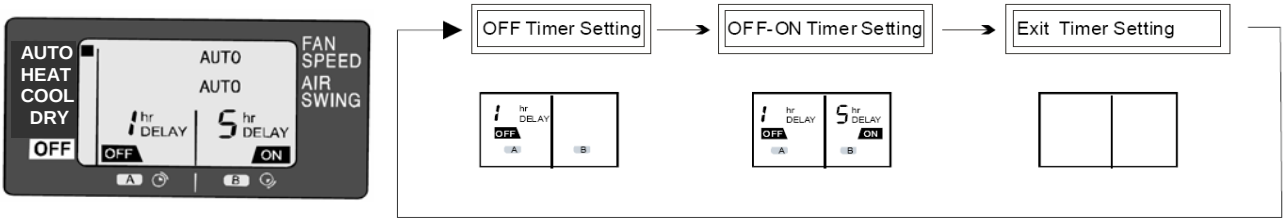
11.3.7 Timer setting button

There are 4 types of timer setting by pressing Timer setting button: ON-TIMER, OFF-TIMER, ON-OFF TIMER, OFF-ON TIMER.

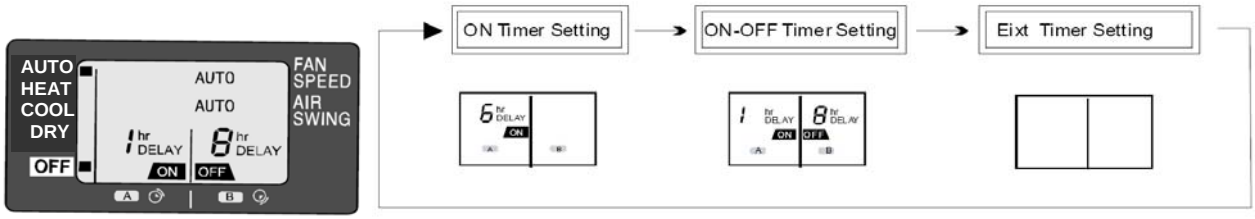


1) SELECT button

✧ When the air conditioner is ON, OFF-TIMER or OFF-ON TIMER can be selected by pressing SELECT button.



✧ When the air conditioner is turned off, ON-TIMER or ON-OFF-TIMER can be selected.



2) Button A and B

Pressing button A can change the time for ON-TIMER and OFF-TIMER, off time for OFF-ON Timer, on time for ON-OFF TIMER; Pressing button B can change the on time for OFF-ON Timer and off time for ON-OFF Timer setting.

3) SET/CANCEL button.

Pressing the button to set or cancel the set timer during the timer setting or activate the previous timer setting. After the timer setting is determined, “ON” or “OFF” will stop flashing. If the timer setting is cancelled, “ON” or “OFF” will disappear on the remote control display.

NOTE:

- ✧ OFF Timer and OFF- ON Timer can only be set during the operation;
- ✧ Timer setting can operate only once.
- ✧ If the OFF/ON button on the remote control or the AUTO Switch on the indoor unit is pressed, the timer setting will be cancelled.
- ✧ If Auto Restart Control occurs, timer setting will be cancelled.
- ✧ During the operation, if the ON Timer or ON-OFF Timer is set, the operation will be stopped.

11.3.8 About Cursor Key Which Points To “OFF” On Remote Control

When the ON/OFF button on the remote control is pressed, the cursor key which points to “OFF” will appear or disappear to indicate the ON/OFF status of the air conditioner.

For some reason (Ex. The signal of the remote control does not reach the signal receiver of the indoor unit.), the display of the remote control will not correspond with the actual ON/OFF status of the indoor unit:

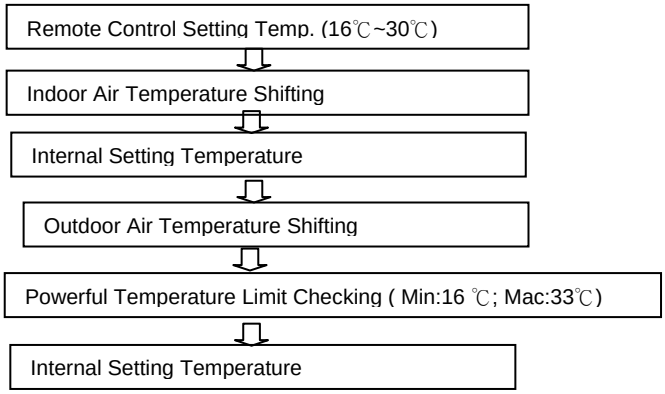
1. The air conditioner is running but the cursor key which points to “OFF” appears. The air conditioner can be stopped with any button (Except for “ON/OFF”, “TIMER SET”, “TIMER ON”) pressed.
2. The air conditioner is on standby, but the cursor key which points to “OFF” disappears. The air conditioner can be started with any button (Except for “ON/OFF”, “TIMER SET”, “TIMER OFF”) pressed.

12. Operation Control

12.1 Basic Function

12.1.1 Internal Setting Temperature

Once the operation starts, remote control setting temperature will be taken as base value for temperature shifting processes. These shifting processes are depending on the air conditioner settings and the operation environment. The final shifted value will be used as internal setting temperature and it is updated continuously whenever the electrical power is supplied to the unit.



12.1.2 Cooling Operation

12.1.2.1 Thermostat control

- Compressor is OFF when Intake Air Temperature - Internal Setting Temperature < -1.5℃
- Compressor is ON after waiting for 3 minutes, if the Intake Air Temperature - Internal Setting Temperature > Compressor OFF point.

12.1.3 Soft Dry Operation

12.1.3.1 Thermostat control (The same as Cooling mode)

12.1.4 Heating operation

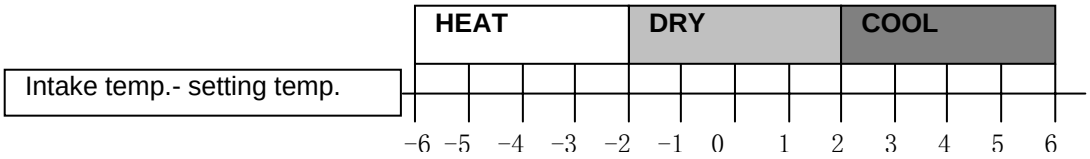
12.1.4.1 Thermostat control

- Compressor is OFF when Intake Air Temperature - Internal Setting Temperature > +2.0℃
- Compressor is ON after waiting for 3 minutes, if the Intake Air Temperature - Internal Setting Temperature< Compressor OFF point.

12.1.5 Automatic Operation

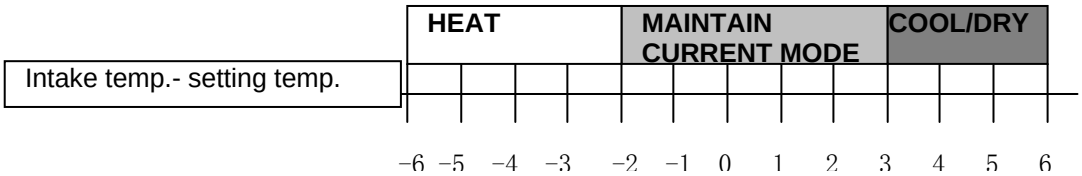
- Once AUTO mode is selected, operation mode is determined by set temperature of remote control and indoor intake temperature.
  1st judgment

JUDGE CONDITION	REFERANCE MODE
If indoor intake temp – Remote control temp setting ≥ +2	Cool mode
If -2 ≤ indoor intake temp. – Remote control Temp. setting ≤ +2	Dry mode
If indoor intake temp. – Remote control temp. setting < -2	Heat mode



2nd & following judgment (every 15 minutes after 1st judgment)

JUDGE CONDITION	REFERANCE MODE
If indoor intake temp – Remote control temp setting ⩾ +3	➢ Cool mode if previously is Cool / Heat mode ➢ Dry mode if previously is Dry mode
If -2 ⩽ indoor intake temp. – Remote control Temp. setting < +3	Maintain current mode
If indoor intake temp. – Remote control temp. setting < -2	Heat mode



12.2 Indoor Fan Motor Operation

Basic Rotation Speed

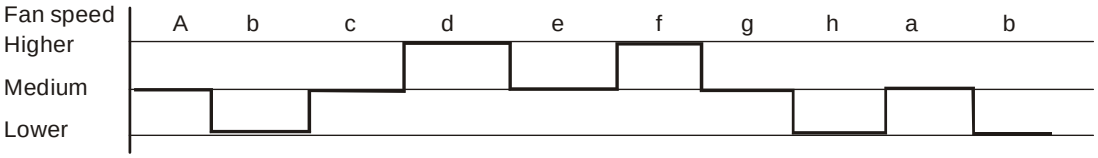
i. Manual Fan speed

Fan motor's number of rotation is determined according to remote control setting.

Model	Remote control Tab	O Hi	O Me+	O Me	O Me-	O Lo	QUIET QLo
CS-RE9JKE-1	COOLING(rpm)	1190	1040	940	840	740	640
	HEATING(rpm)	1200	1080	980	880	780	700
CS-RE12JKE-1	COOLING(rpm)	1210	1110	1020	930	840	640
	HEATING(rpm)	1260	1170	1100	1030	960	750
CS-RE15JKE-1	COOLING(rpm)	1240	1130	1040	950	860	810
	HEATING(rpm)	1300	1210	1130	1050	970	820

ii. Auto Fan Speed (Cooling, Soft Dry Mode)

According to room temperature and setting temperature, indoor fan speed is determined automatically. The indoor fan will operate according to pattern below.



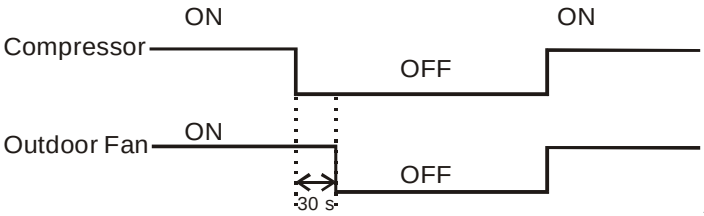
B. Feedback control

• Immediately after the fan motor started, feedback control is performed once every second.

• During fan motor on, if fan motor feedback 2550 rpm or < 50 rpm continue for 10 seconds, then fan motor error counter increases, fan motor then stops and restarts. If the fan motor counter becomes 7 times, then H19 - fan motor error is detected. Operation stops and cannot on back.

12.3 Outdoor Fan Motor Operation

Outdoor fan motor is operated with one fan speed only. It starts when compressor starts operation and it stops 30 seconds after compressor stops operation.



Airflow Direction

12.3.1 Vertical Airflow

Operating Mode			1	2	3	4	5
Cooling	Manual		10°	21°	31°	40°	50°
	Auto	Normal	10° ~ 50°				
		Powerful	35° (Begining of POWERFUL mode) , 6°				
Soft dry	Manual		10°	21°	31°	40°	50°
	Auto	Normal	12°				
		Powerful	10°				
Heating	Manual (POWERFUL)		7°（31°）	22°（40°）	35°（48°）	50°（58°）	60°（68°）
	Auto	Normal	7°, 8°, 36°				
		Powerful	7°, 8°, 33°, 45°,				

1. Automatic vertical airflow direction can be set using remote control; the vane swings up and down within the angles as stated above. For heating mode operation, the angle of the vane depends on the indoor heat exchanger temperature. When the air conditioner is stopped using remote control, the vane will shift to close position.
2. Manual vertical airflow direction can be set using remote control. The angels of the vane are as stated above. When the air conditioner is stopped using remote control, the vane will shift to close position.
* Above angle data is for reference only.

12.3.2 Horizontal Airflow

The horizontal airflow direction louvers can be adjusted manually by hand.

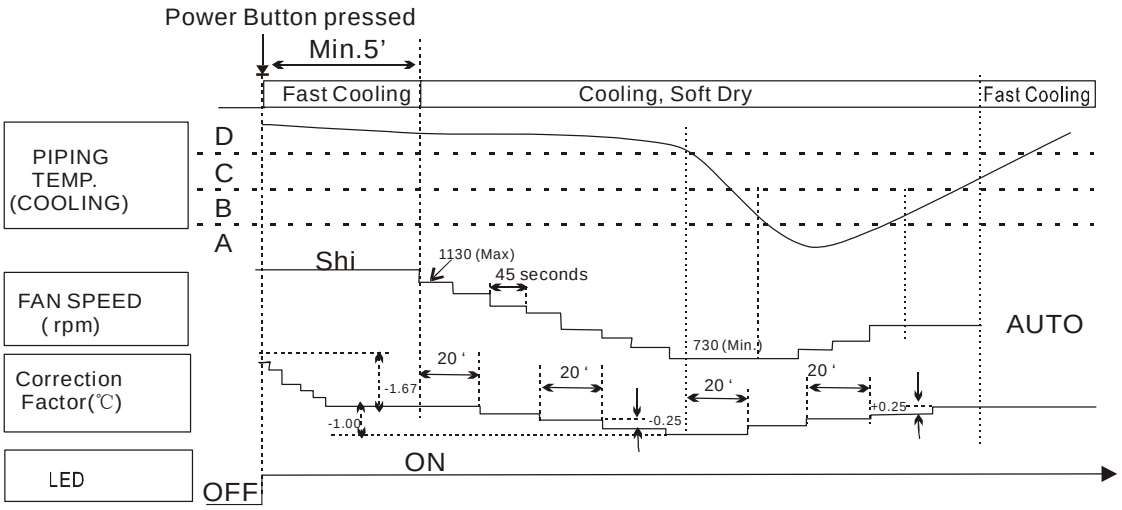
12.3.3 Quiet operation

- To provide quiet operation comparing to normal operation. The Quiet operation can be active or stop by pressing QUIET/POWERFUL button on remote control.
- Once Quiet mode is active ,the unit will continuously operate in QUIET Mode until cancel the mode by pressing QUIET/POWERFUL button on remote control.

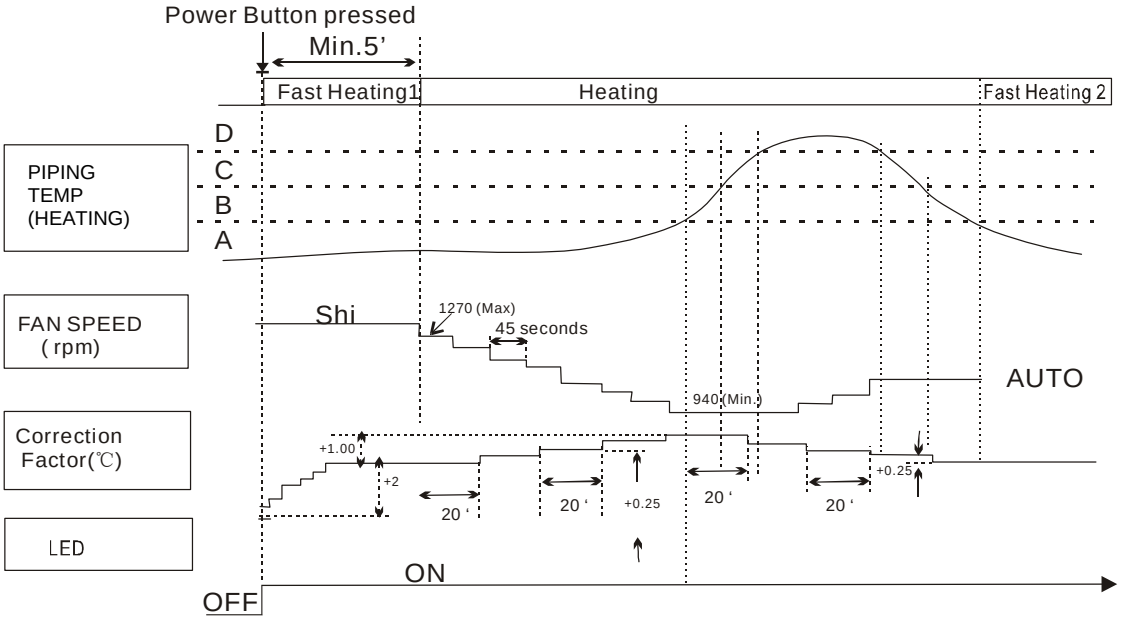
12.3.4 Powerful operation

- To cooling or heating the room faster comparing to normal operation. The POWERFUL operation can be active or stop by pressing QUIET/POWERFUL button on remote control.
- When powerful operation is active, the unit will continuously operate in POWERFUL mode until cancel the mode by pressing QUIET/POWERFUL button on remote control. Operation details are as the fig. below.

1. For cooling, soft Dry mode



2. For Heating mode:



Note: The value of A, B, C, D will change according to the indoor temperature.

12.3.5 Automatic Restart Control

When the power supply is cut off during the operation of air conditioner, the compressor will re-operate within three to four minutes after power supply resumes.

12.3.6 Indication Panel

LED	POWER	TIMER
Color	Green	Orange
Light ON	Operation ON	Timer setting ON
Light OFF	Operation OFF	Timer setting OFF

Note:

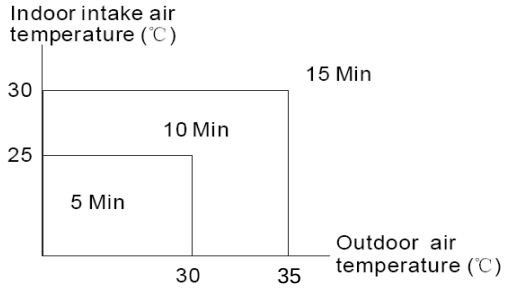
● If POWER LED blinks, the possible operation of the unit is operating mode judgment, or ON timer sampling.

● If Timer LED blinks, there is an abnormal operation occurs.

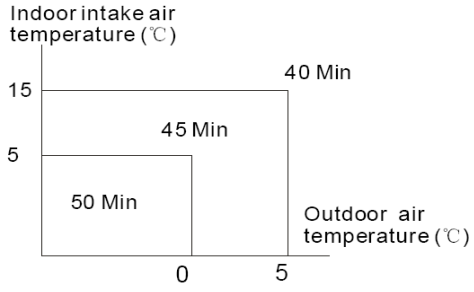
12.3.7 Timer control

Delay ON Timer can be set using remote controller, the unit with timer set will start operate earlier than the setting time. This is to provide a comfortable environment when reaching the set On time. Seventy minutes before the set time for ON Timer or ON-OFF Timer setting, indoor (at fan speed of Lo-) and outdoor fan motor start operate for 30

seconds to determine the indoor intake air temperature and outdoor air temperature in order to judge the operation mode. From the above judgment, the decided operation will start operate earlier than the set time as shown below.



Cooling/Soft Dry



Heating

Timer Signal Receiving sound During Operation.

	Operation	Sound	Timer LED	Timer Setting
ON Timer Set	OFF	Beep-	ON	Valid
OFF Timer Set	ON	Beep	ON	Valid
ON-OFF Timer Set	OFF	Beep-	ON	Valid
OFF-ON Timer Set	ON	Beep	ON	Valid

Timer Signal Receiving Sound When the Air Conditioner Stops.

	Operation	Sound	Timer LED	Timer Setting
ON Timer Set	OFF	Beep	ON	Valid
OFF Timer Set	OFF	None	OFF	Invalid
ON-OFF Timer Set	OFF	Beep	ON	Valid
OFF-ON Timer Set	OFF	None	OFF	Invalid

13. Protection control

13.1 Protection Control For All Operations

13.1.1 Time Delay Safety Control

● The Compressor will not turn on within 3 minutes from the moment operation stops, although the unit is turned on again by pressing OFF/ON button at remote control within this period.
● This control is not applicable if the power supply is cut off and on again.
● This phenomenon is to balance the pressure inside the refrigerant cycle.

13.1.2 30 Seconds Forced Control

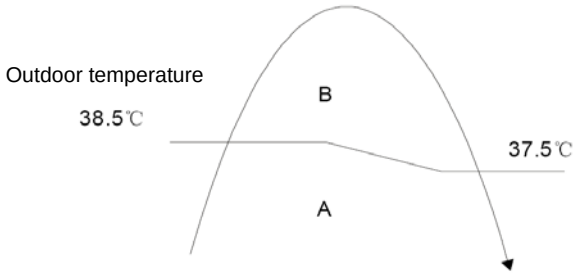
● Once the air conditioner is turned on, the compressor will not stop within 30 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, force stop by pressing the OFF/ON button at the remote control is permitted or the Auto OFF/ON button at indoor unit.
● The reason for the compressor to force operation for minimum 30 seconds is to allow the refrigerant oil run in a full cycle and return back to the outdoor unit.

13.1.3 Total running current control

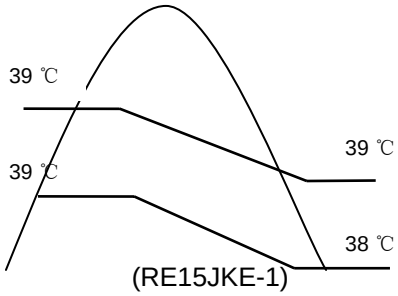
1. If the outdoor unit total running current is detected exceeding I_1(A), the frequency instructed for compressor operation will be decreased.
2. If the running current does not exceed I_1(A) for 5 seconds, the frequency instructed will be increased.

Operation mode	RE9JKE-1	RE12JKE-1	RE15JKE-1
	I_1(A)	I_1(A)	I_1(A)
Cooling/ Soft Dry /Fan A*	5.03	6.35	8.98
Cooling/ Soft Dry /Fan B	4.89	6.22	8.00
Heating	4.75	6.22	9.31

*The first 30 minutes of cooling operation, A will be applied.



(For RE9JKE-1,RE12JKE-1)



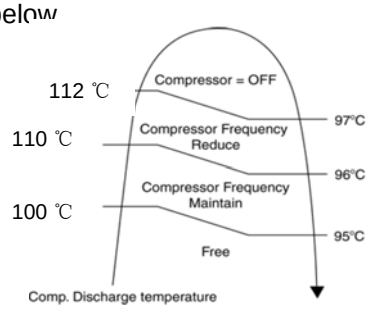
(RE15JKE-1)

13.1.4 IPM (Power transistor) Protection Control.

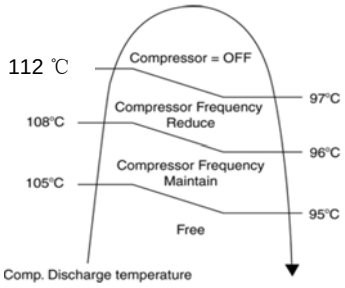
1. DC Peak Current Control
   - When electric current to IPM exceeds set value of DC17.3 1A, the compressor will stop. It will restart after three minutes.
   - If the set value is exceeded again within 30 seconds, the operation will restart after one minute.
   - If this condition repeats continuously for seven times, all indoor and outdoor relays will be cut off.
   - Error code [F99] will be displayed.
2. Overheating protection control
   When the IPM temperature rises to 112 ℃ , compressor will stop immediately.
   Compressor restarts after three minutes if the temperature decreases to 97℃

13.1.5 Compressor Overheating Prevention Control

Instructed frequency for compressor operation will be regulated compressor discharge temperature. The change of frequency is as below



RE9/12JKE-1



RE15JKE-1

13.1.6 Low pressure Prevention control (Gas Leakage Detection)

1. When the conditions listed in the table occur, the compressor stops and restarts after three minutes.
2. If this continuously occurs for twice within 20 minutes, all indoor and outdoor relays will be cut off.
3. This control is not applicable for deice operation.

Comp Frequency	45 Hz or above	64 Hz or above	58 Hz or above	73 Hz or above
Total Outdoor Current	1b≤1<3	1b≤1<1.6	1b≤1<1.3	1b≤1<1.6
Indoor Piping Temp	20 ℃ or above	25 ℃ or less	20 ℃ or above	25 ℃ or less
Operation Mode	Cool/Dry	Heat	Cool/Dry	Heat
Model	RE9JKE-1		RE12JKE-1	

13.1.7 Low Operation Frequency Protection Control

If all following conditions exists, the compressor will run with the frequency of 40 Hz (RE9JKE-1,RE12JKE-1) or 30Hz (RE15JKE)

Models	RE9JKE-1, RE12JKE-1		RE15JKE-1	
Intake Air Temp.	≥30 ℃ or <15 ℃	----------	≥30 ℃ or <14 ℃	≥28 ℃ or <14 ℃
Outdoor Temp.	≥38 ℃ or <16 ℃	≥24 ℃ or <4 ℃	≥38 ℃ or <13 ℃	≥24 ℃ or <4 ℃
Indoor Piping Temp.	<30 ℃	≥0 ℃	<30 ℃	≥0 ℃
Operation Mode	Cool / Dry	Heat	Cool/ Dry	Heat

13.1.8 Compressor Tank Temperature Rise Protection Control

a. Control start conditions
- For 5 minutes, the compressor continuously operates and outdoor total current is between 0.65A and 1.65A.
- During Cooling and Soft Dry operations:

Indoor suction temperature - indoor piping temperature is below 4℃.
Indoor temperature and outdoor temperature is 30±5℃.
Remote Control setting 16℃ and Hi Fan Speed.

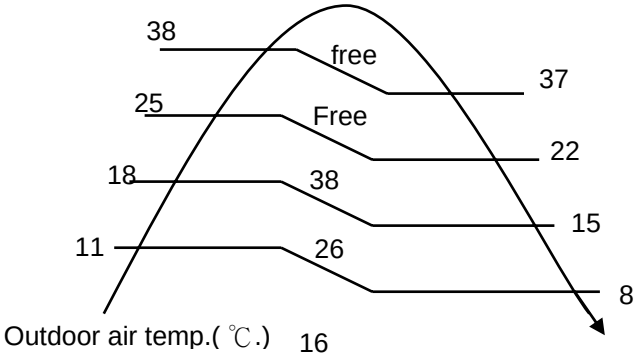
• During Heating operations:
Indoor piping temperature - indoor suction is under 5℃.
Indoor temperature and outdoor temperature is 20 ± 2℃.
Remote control setting 30℃ and Hi Fan Speed.

b. Control contents
• Compressor stops (and restart after 3 minutes)
• If the conditions above happen 2 times within 20 minutes, the unit will:
- Stop operation
- Timer LED blinks and “F91” indicated

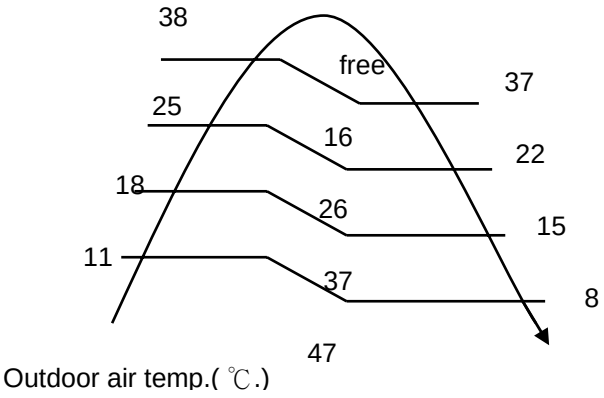
13.2 Protection Control For Cooling and Soft Dry Operation

13.2.1 Outdoor Air Temperature Control

• The compressor operating frequency is regulated in accordance to the outdoor air temperature as shown in the diagram below.
• This control will begin 1 minute after the compressor starts.
• Compressor frequency will adjust base on outdoor air temperature.



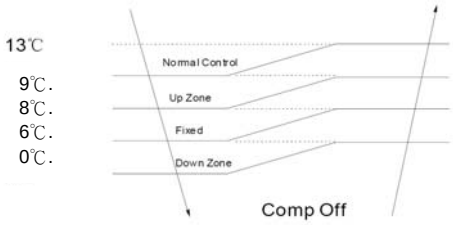
RE9JKE-1, RE12JKE-1



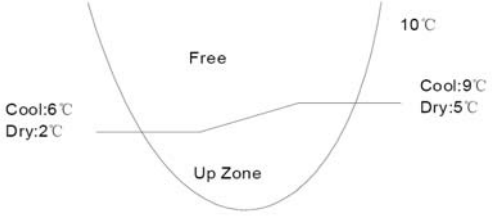
RE15JKE-1

13.2.2 Freeze Prevention Control

1 .Frequency of the compressor
For prevention of freezing of the indoor evaporator, the frequency of the compressor will be changed according to the indoor piping temperature.



2 .Indoor Fan Control
Indoor fan speed changes according to the indoor piping temperature.



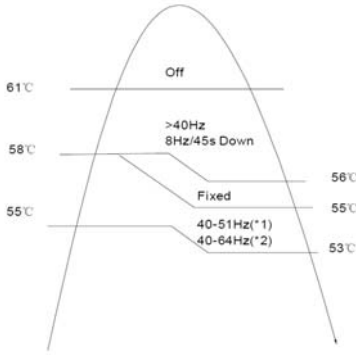
13.2.3 Dew Prevention Control

• To prevent dew formation at indoor unit discharge area.

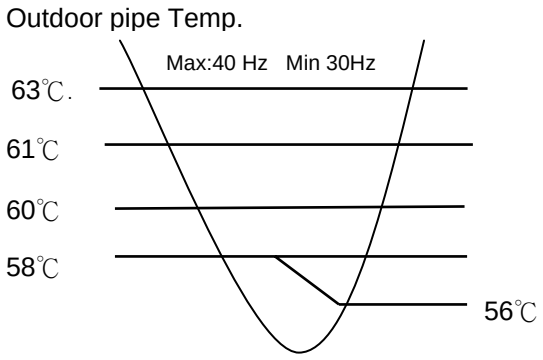
• This control starts if all conditions continue for 20 minutes:
  - Operated with Cooling or Soft Dry Mode.
  - Indoor intake temperature is between 25℃ and 29℃.
  - Outdoor air temperature is less than 30℃.
• This control stopped then receive air swing change signal from Remote Control.

13.2.4 Overload Protection For Cooling Operation

The frequency for the compressor will change according to the outdoor piping temperature.



RE9JKE-1. RE12JKE-1

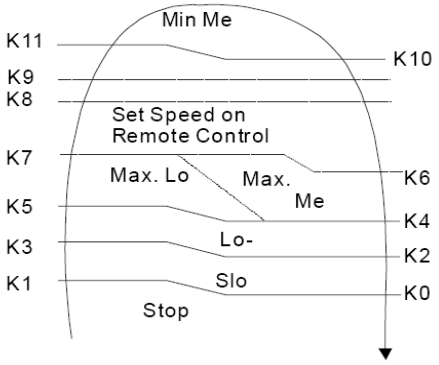


RE15JKE-1

13.3 Indoor Piping Air Temperature Control (Heating)

13.3.1 Indoor Fan Control

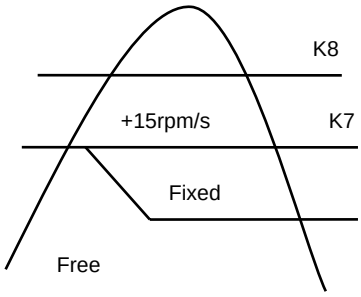
1. Indoor fan is controlled by the indoor piping temperature.
   ● Manual Fan Speed



Piping Temperature(℃)

K0	K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11
16	19	24	32	32	36	36	39	54	54	57	60

● Auto Fan Speed



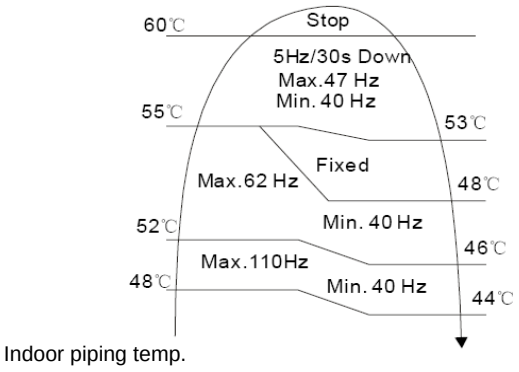
2. During heating operation, the indoor fan will run at the following speed when the compressor stops.

	1	2	3	4	5	6	7	8
Comp.	ON		OFF					
Fan speed (rpm)	Control by piping temp.		460					

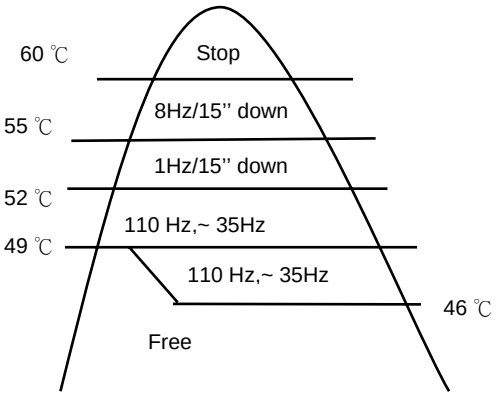
3. Hot Start
When the heating operation starts, the indoor fan stops and the compressor runs with a certain frequency.
This is to prevent the cold airflow from blowing.
If the piping temperature rises to 19 ℃, and the indoor fan speed and airflow direction varies with the indoor piping temperature, the hot start control is completed.

13.3.2 Overload Protection Control

The frequency for the compressor is determined by indoor piping temperature.



RE9JKE-1, RE12JKE-1



RE15JKE-1

14. Troubleshooting Guide

14.1 Refrigeration cycle system

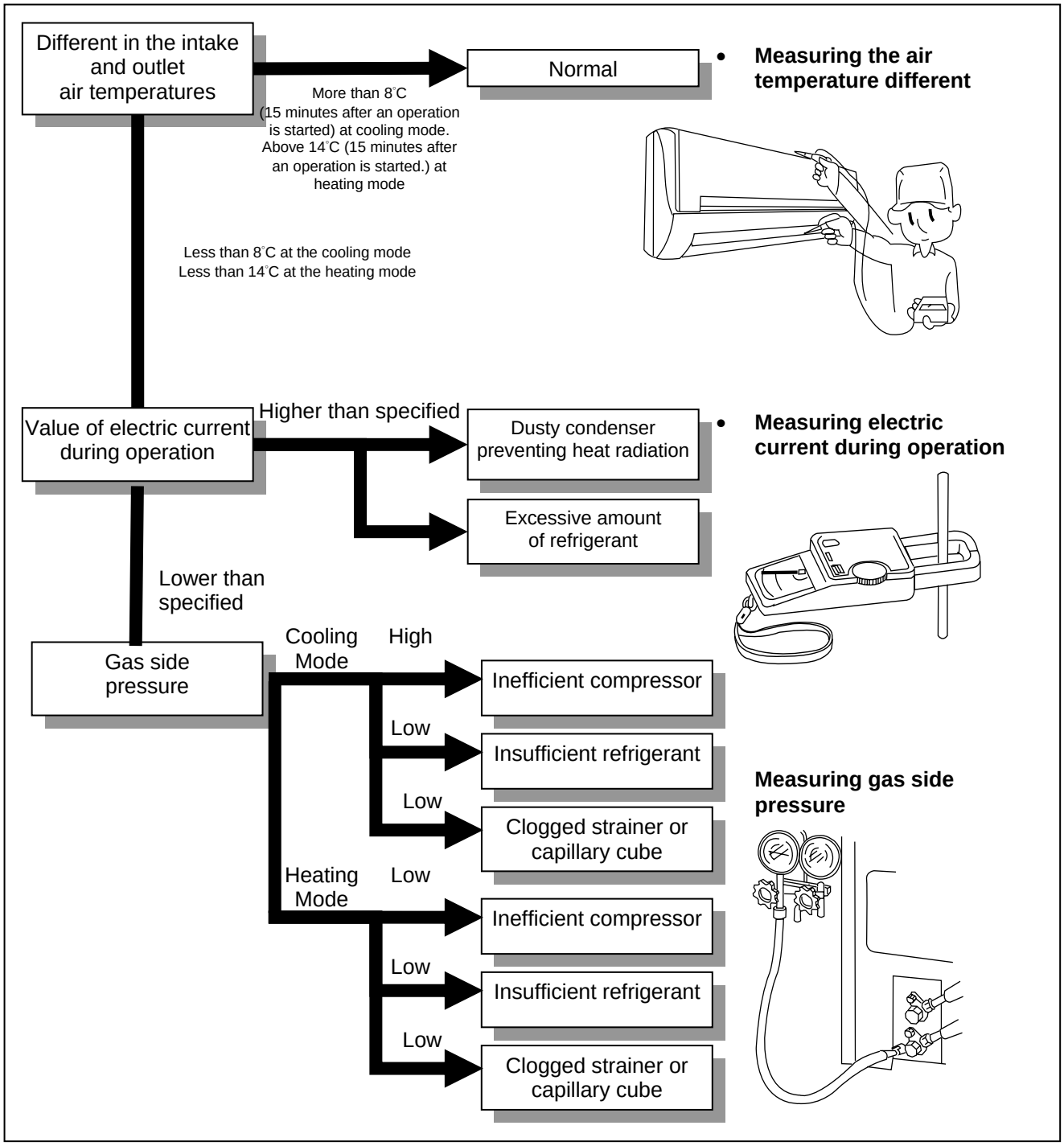
In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor and a fan. The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions, the standard values for them are shown in the table on the right.

Normal Pressure and Outlet Air Temperature (Standard)

	Gas Pressure Mpa (kg/cm^2G)	Outlet air Temperature (°C)
Cooling Mode	0.9~1.2 (9~12)	12~16
Heating Mode	2.3 ~2.9 (23~29)	36~45

Condition: Indoor fan speed = High
Outdoor temperature = 35°C at cooling mode and 7°C at heating mode.
Compressor operates at rated frequency

14.1.1



14.1.2 Relationship between the condition of the air conditioner and pressure and electric current

Condition of the air conditioner	Cooling Mode			Heating Mode		
	Low Pressure	High Pressure	Electric current during operation	Low Pressure	High Pressure	Electric current during operation
Insufficient refrigerant (gas leakage)	↘	↘	↘	↘	↘	↘
Clogged capillary tube or strainer	↘	↘	↘	↗	↗	↗
Short circuit in the indoor unit	↘	↘	↘	↗	↗	↗
Heat radiation deficiency of the outdoor unit	↗	↗	↗	↘	↘	↘
Inefficient compression	↗	↘	↘	↗	↘	↘

• Carry out the measurement of pressure, electric current, and temperature fifteen minutes after an operation is started.

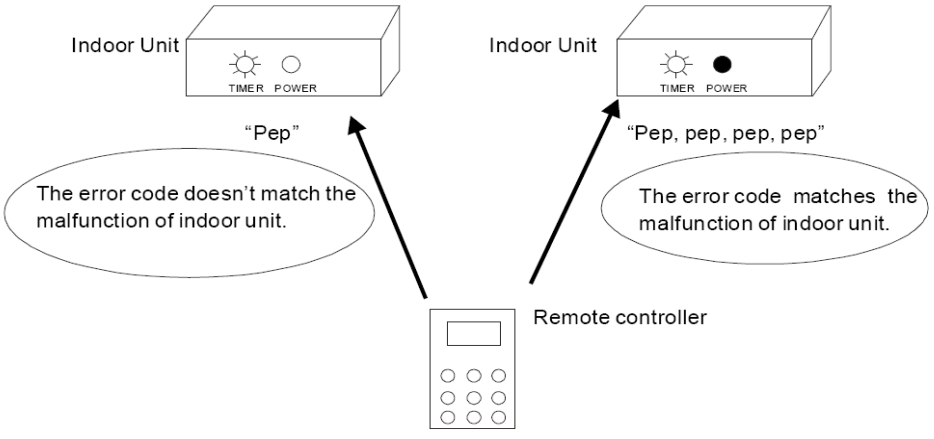
14.2 Breakdown Self Diagnosis Function

14.2.1 About Self Diagnosis

When the air-conditioner is stopped due to malfunction detected by itself, the operation can be restarted using AUTO Switch on the indoor unit. In forced operation, the frequency for compressor and fan speed can not be changed and the signal receiving sound is different.
Normal Operation ON: “pep”
Forced Operation ON: “pep”, “pep”, “pep”, “pep”
Stop: “pep”
Note: Refer to the Diagnosis Code Table for the malfunction when forced operation is not available.

14.2.2 Display of Error Code

1. Keeping the CHECK button on the remote controller depressed for 5 seconds, error code ranging fromH11 to H99 can be displayed on the remote controller.
2. The error code is changed and diagnosis signal is transmitted to the indoor unit by pressing the Temp Up button on the remote control.
3. When the malfunction of the air-conditioner matches the error code on the remote control, four beeps can be heard from the indoor unit and the operation indicator will light up.
4. Keep the CHECK button depressed continuously for 5 seconds to cancel the diagnosis function.



14.2.3 Error Codes Table

Code	Abnormality/Protection	Judgment	Check	Emergency Operation
H00	Normal			
H11	Indoor/Outdoor abnormal communication	>1minute after starting operation	Connecting cable, Indoor /outdoor PCB	○
H14	Indoor intake air temp sensor abnormality	-	Intake air temperature sensor(defected or disconnected)	X
H15	Outdoor compressor temperature sensor abnormality	Continue for 5 sec.	Compressor temperature sensor(defected or disconnected)	X
H16	Outdoor Current Transformer open circuit	-	Outdoor PCB, IPM module	X
H19	Indoor fan motor mechanism lock	-	Indoor PCB, fan motor	X
H23	Indoor heat exchanger temperature A sensor abnormality	Continue for 5 sec	Heat exchanger temperature sensor (defected or disconnected)	○
H25	Air filter abnormality	-		○
H27	Outdoor air temperature sensor abnormality	Continue for 5 sec	Outdoor temperature sensor(defected or disconnected)	○
H28	Outdoor heat exchanger temperature sensor abnormality	Continue for 5 sec.	Outdoor heat exchanger sensor (defected or disconnected)	○
H30	Discharge temperature sensor abnormality	Continue for 5 sec.	Discharge temperature sensor (defected or disconnected)	○
H33	Incorrect connection of Indoor/Outdoor cable	-	Indoor/outdoor supply voltage	X
H97	Outdoor fan motor lock	Twice within 30 minutes	Outdoor fan motor	X
H98	Indoor high pressure protection	-	Air filter dirty Air circulation short circuit	-
H99	Indoor heat exchanger anti-freezing protection	Indoor heat exchanger freezing	Insufficient refrigerant Air filter dirty	-
F11	Cooling/heating cycle changeover abnormality	4 times occurrence within 30 minutes	4-way valve V-coil	X
F16	Cooling/Dry cycle changeover abnormality	4 times occurrence within 30 minutes	Indoor PCB	X
F90	PFC control	4 times occurrence within 20 minutes	Voltage at PFC	X
F91	Refrigeration cycle abnormality	2 times occurrence within 20 minutes	No refrigerant (3-way valve is closed)	X
F93	Compressor abnormality	4 times occurrence within 20 minutes	Compressor	X
F95	Cool high pressure protection	4 times occurrence within 20 minutes	Outdoor refrigeration cycle	X
F96	IPM overheating protection	-	Excessive refrigerant Improper heat radiation IPM	X
F97	Outdoor compressor overheating protection	4 times occurrence within 20 minutes	Insufficient refrigerant Compressor	X
F98	Total running current protection	3 times occurrence within 20 minutes	Excess refrigerant Improper radiation	X
F99	Outdoor Peak Current Protection Control	4 times occurrence continuously within 30 minutes	Outdoor PCB IPM Compressor	X

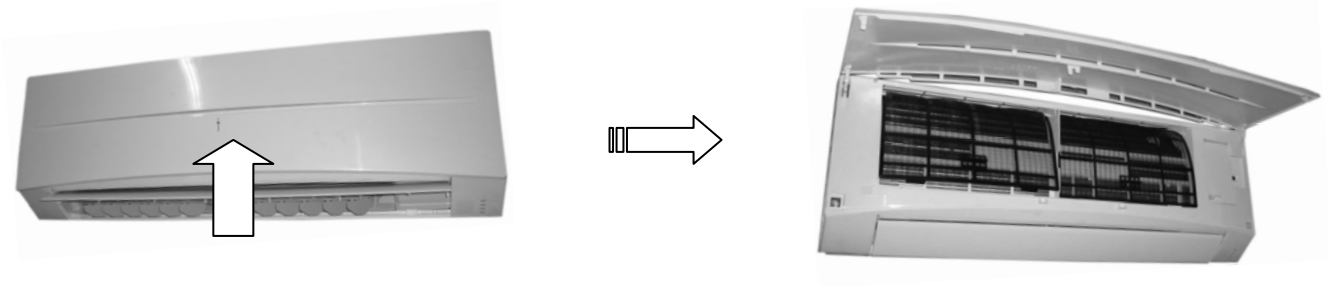
15. Disassembly and Assembly Instructions

WARNING

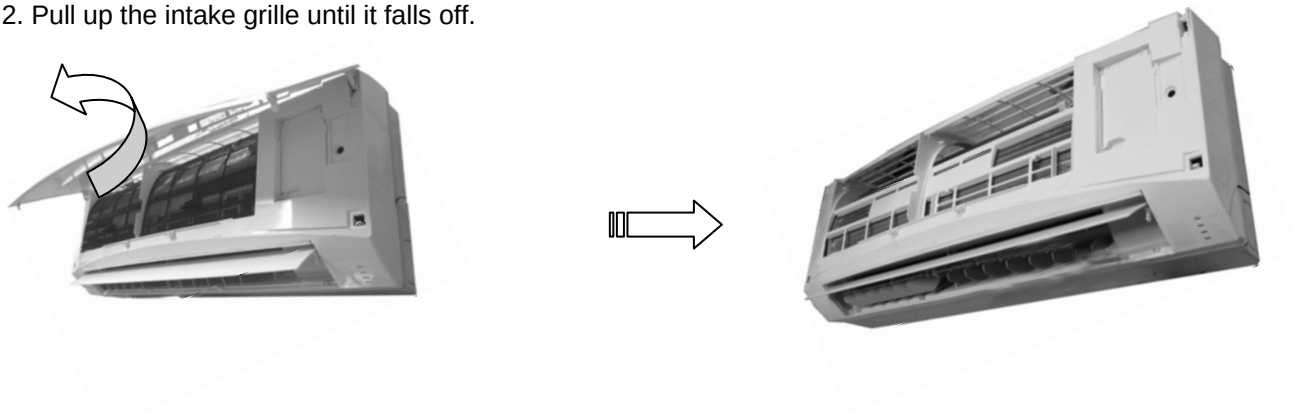
High Voltage is generated in the electrical parts area by the capacitor. Ensure that the capacitor has discharged sufficiently before proceeding with repair work. Failure to heed this caution may result in electric shocks.

Removal Procedure for Intake Grille

1. Open the intake grille and pull it to the horizontal position.

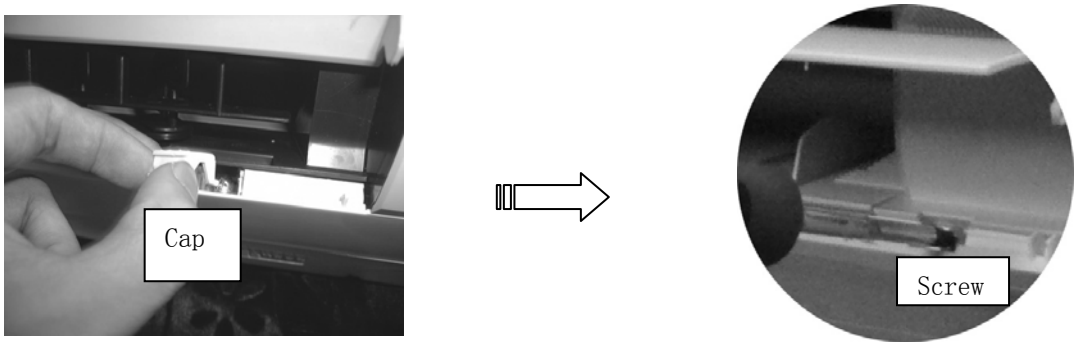


2. Pull up the intake grille until it falls off.

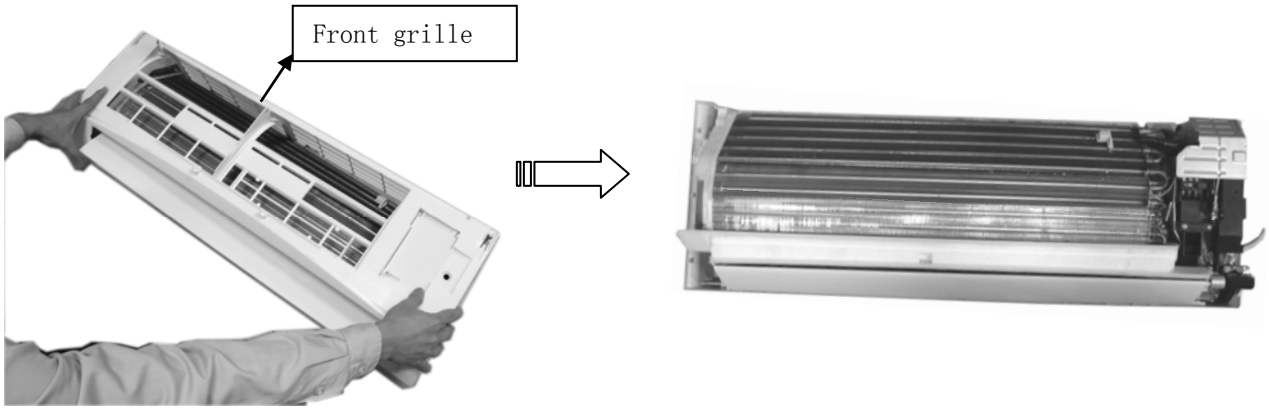


Removal Procedure for Front Grille

1. Remove the two caps at the discharge port (right and left) and then release the two screws on both sides.

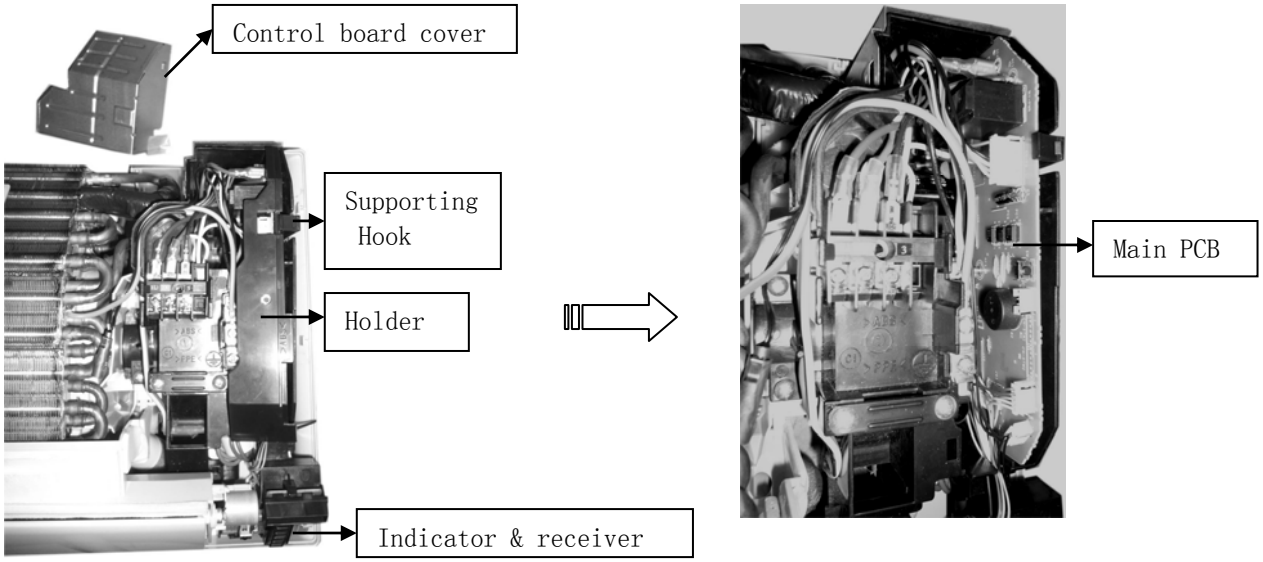


2. Pull out the front grille form the unit body.

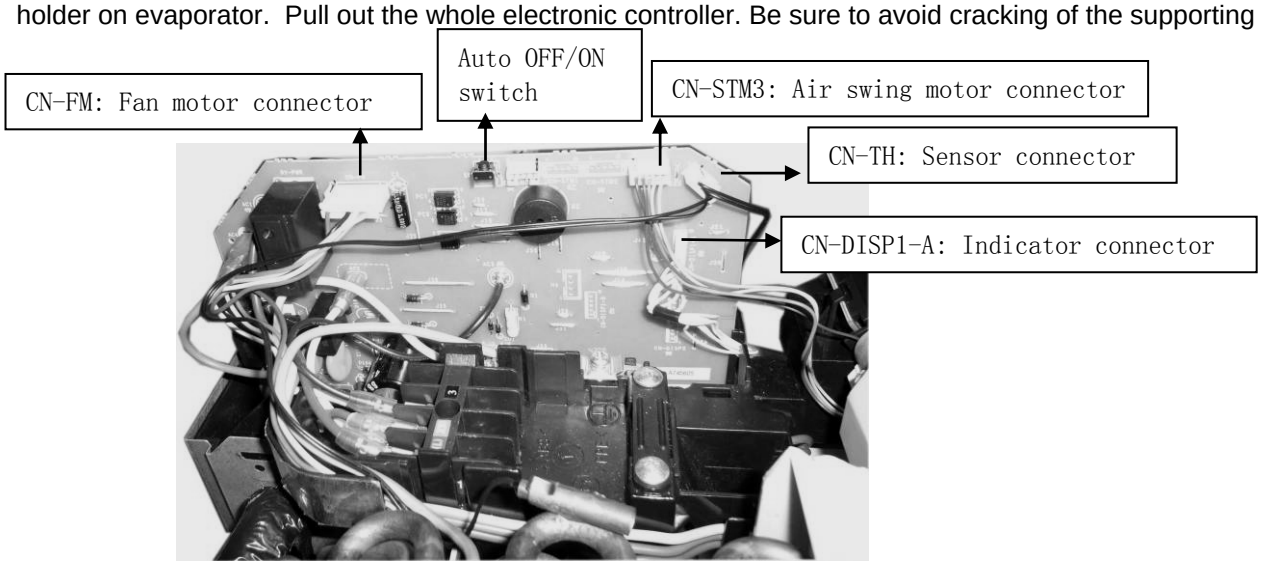


Removal Procedure for Main Electronic Controller

1. After front grille is taking off, remove the cover of control board and holder, then the Main PCB can be seen.



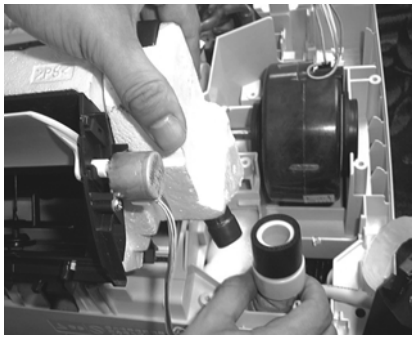
3. Drag out the supporting hook to the right side and pull up a bit the main PCB. Then release the lead wire connecting to CN-FM, CN-STM3, CN-DISP1-A, earth wire (Yellow/Green) and take out the sensor from the holder on evaporator. Pull out the whole electronic controller. Be sure to avoid cracking of the supporting hook.



4. Remove the control board complete
Loose the screws of control board complete, then the whole control board can be pulled out.

Removal Procedure for Main Electronic Controller

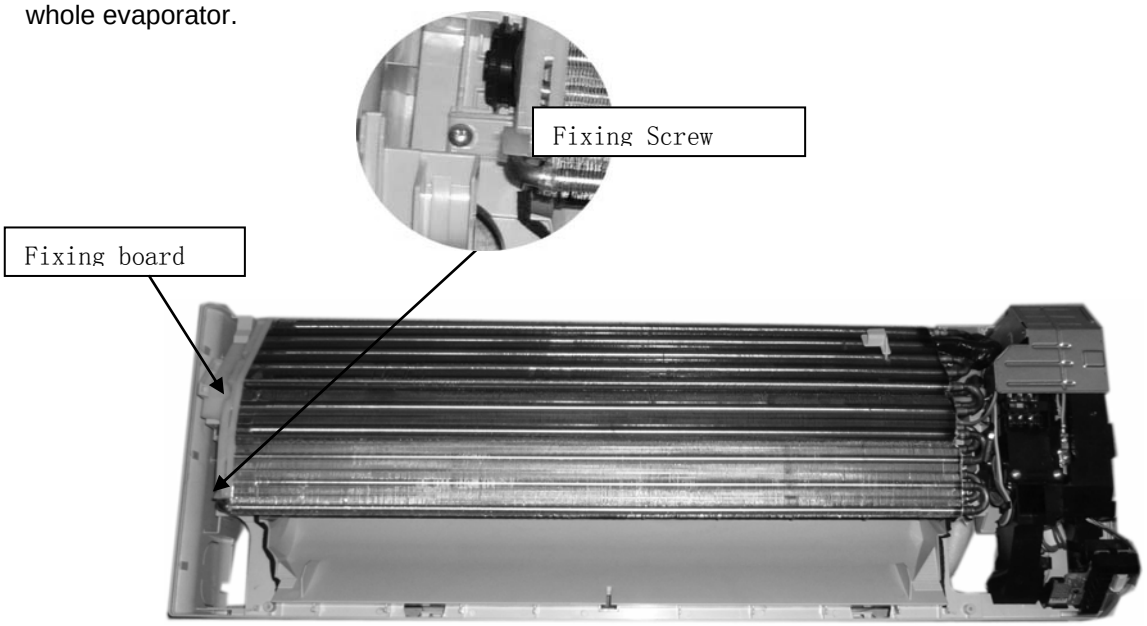
1. Separate the drain hose and the drain plate.



2. Pull out the discharge grille slightly.

Removal Procedure for Cross Flow Fan

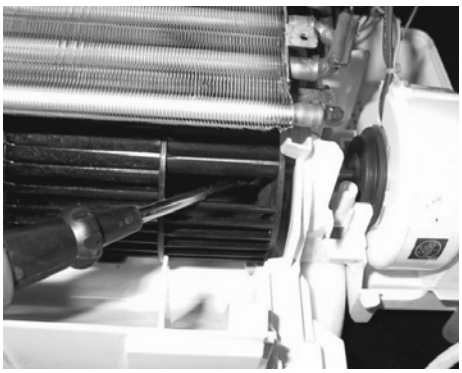
1. Release fixing screws on both side, disassembly the fixing board from evaporator on the left side and pull out the whole evaporator.

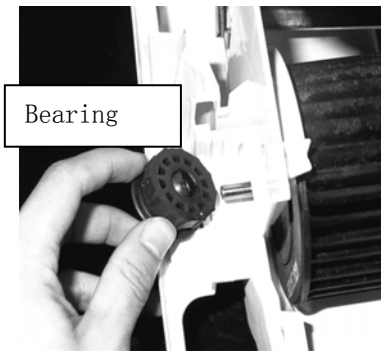


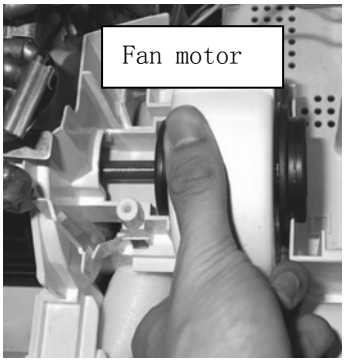
2. Loose the fixing screw of the cross flow fan.

3. After removing the bearing, indoor fan can be taken out from the left side

4. Lift up the indoor fan slightly, and then pull the fan motor out.



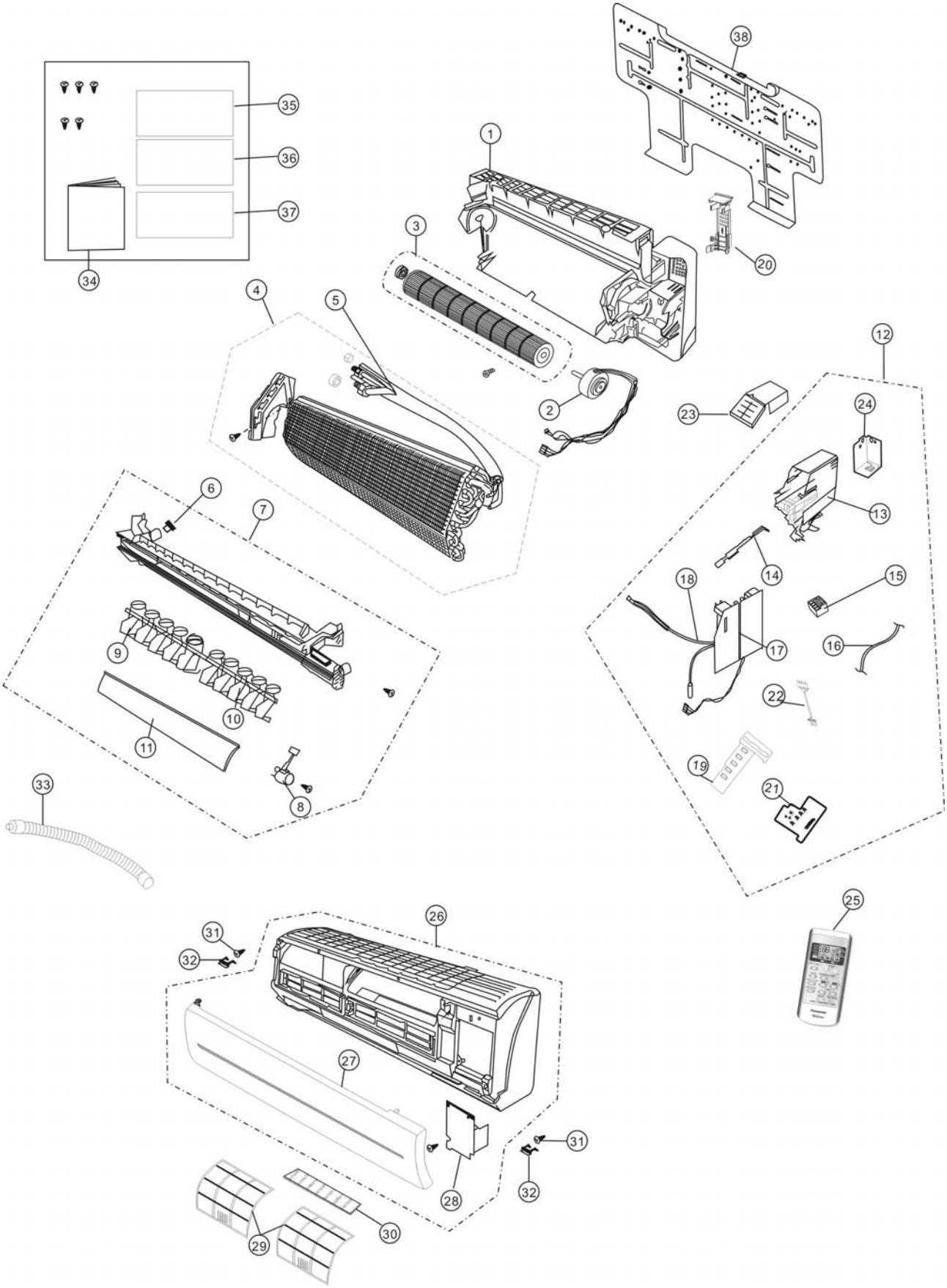




16. Exploded View and Replacement Pars List

16.1 Indoor Unit

CS-RE9JKE-1, CS-RE12JKE-1, CS-RE15JKE-1



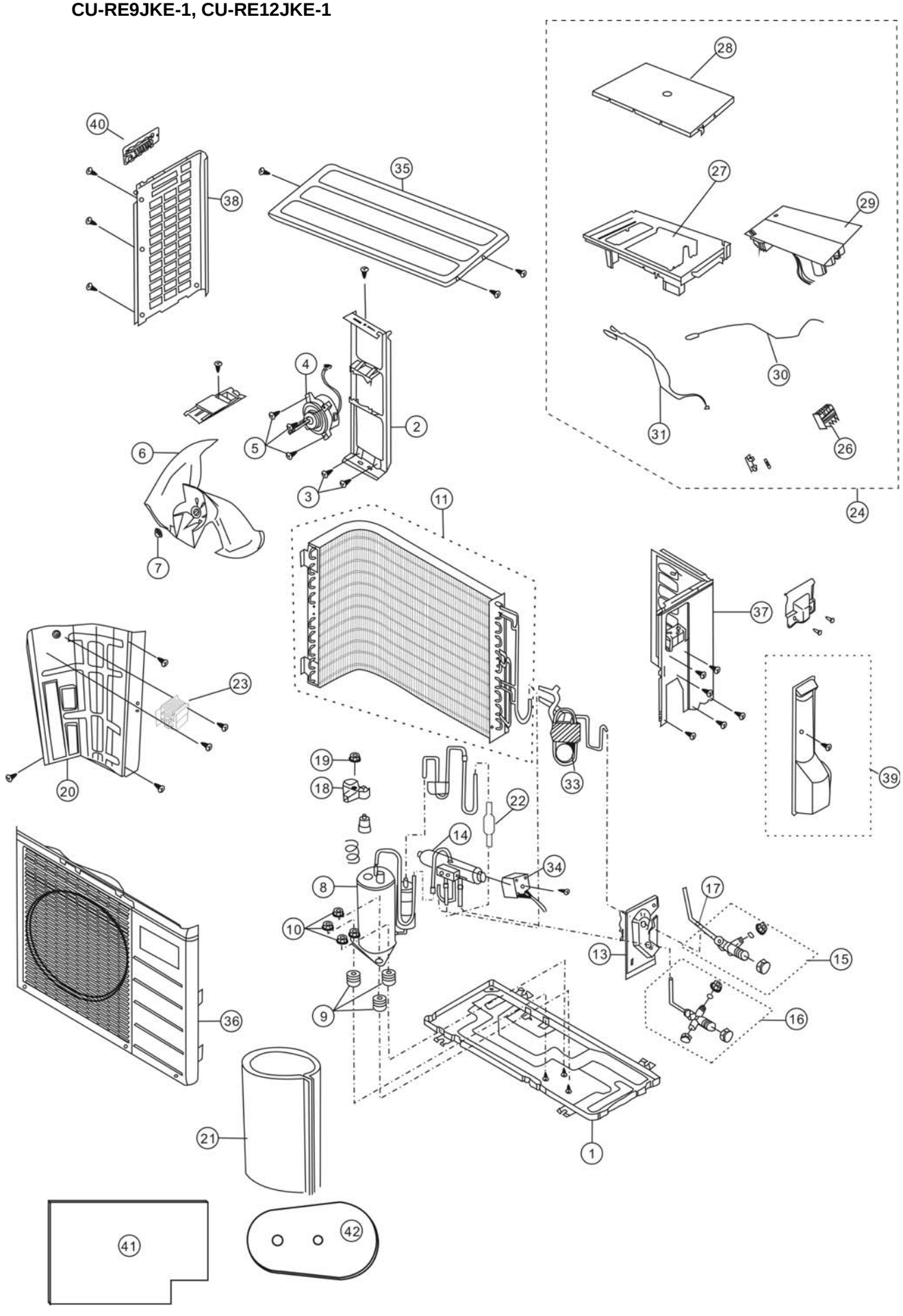
NO	PART NAME&DESCRIPTION	Q'TY	CS-RE9JKE-1	CS-RE12JKE-1	CS-RE15JKE-1	RE
1	CHASSIS COMPLETE	1	CWD50C1644	CWD50C1644	CWD50C1644	
2	FAN MOTOR	1	ARW7629AC	ARW7629AC	ARW7629AC	
3	CROSS FLOW FAN COMPLETE	1	CWH02C1095	CWH02C1095	CWH02C1095	
4	EVAPORATOR	1	CWB30C3215	CWB30C3274	CWB30C3275	
5	AUXILIARY TUBE ASS'Y	1	CWT01C4858	CWT01C4858	CWT01C4844	
6	DRAIN PLUG	1	CWH521096	CWH521096	CWH521096	
7	DISCHARGE GRILLE COMPLETE	1	CWE20C2970	CWE20C2970	CWE20C2970	
8	AIR SWING MOTOR	1	CWA981161	CWA981161	CWA981161	
9	HORIZONTAL AIR FLOW VANE (L)	1	CWE24C1292	CWE24C1292	CWE24C1292	
10	HORIZONTAL AIR FLOW VANE (R)	1	CWE24C1291	CWE24C1291	CWE24C1291	
11	VERTICAL AIR FLOW VANE	1	CWE241295	CWE241295	CWE241295	
12	C-BOX	1	CWH14C7672	CWH14C7671	CWH14C7538	
13	CONTROL BOARD CASING	1	CWH102377	CWH102377	CWH102377	
14	PARTICULAR PIECE	1	CWD933089	CWD933089	CWD933089	
15	TERMINAL BOARD COMPLETE	1	CWA28C2383	CWA28C2383	CWA28C2442	
16	POWER SUPPLY CORD COMPLETE	1	CWA20C2862	CWA20C2862	CWA20C2894	
17	MAIN PCB	1	CWA73C4038	CWA73C4037	CWA73C4036	
18	SENSOR	1	CWA50C2596	CWA50C2596	CWA50C2596	
19	INDICATOR HOLDER-FRONT	1	CWD933087	CWD933087	CWD933087	
20	FIXING PIECE	1	CWD933088	CWD933088	CWD933088	
21	INDICATOR PCB	1	CWA745415	CWA745415	CWA745415	
22	INDICATOR LEAD WIRE	1	CWA67C8070	CWA67C8070	CWA67C8070	
23	CONTROL BOARD TOP COVER	1	CWH131359	CWH131359	CWH131359	
24	CONTROL BOARD BACK COVER	1	CWH131358	CWH131358	CWH131358	
25	REMOTE CONTROL	1	CWA75C3077	CWA75C3077	CWA75C3077	
26	FRONT GRILLE COMPLETE	1	CWE11C4267	CWE11C4267	CWE11C4267	
27	INTAKE GRILLE	1	CWE22K1498	CWE22K1498	CWE22K1498	
28	GRILLE DOOR	1	CWE14C1039	CWE14C1039	CWE14C1039	
29	AIR FILTER	2	CWD001285	CWD001285	CWD001285	
30	ALIRUBUSTER FILTER	1	CWD001202	CWD001202	CWD001202	
31	SCREW-FRONT GRILLE	2	XTT4+16CFJ	XTT4+16CFJ	XTT4+16CFJ	
32	CAP-FRONT GRILLE	2	CWH521196	CWH521196	CWH521196	
33	DRAIN HOSE	1	CWH851136	CWH851136	CWH851136	
34	OPERATING INSTRUTIONS	1	CWF567311	CWF567311	CWF567311	
35	INSTALLATION INSTRUCTION	1	CWF614333	CWF614333	CWF614333	
36	INSTALLATION INSTRUCTION	1	CWF614334	CWF614334	CWF614334	
37	INSTALLATION INSTRUCTION	1	CWF614335	CWF614335	CWF614335	
38	INSTALLATION PLATE	1	CWH361105	CWH361105	CWH361105	

(Note)

- All parts are supplied from PHAAG, China

16.2 Outdoor Unit

CU-RE9JKE-1, CU-RE12JKE-1

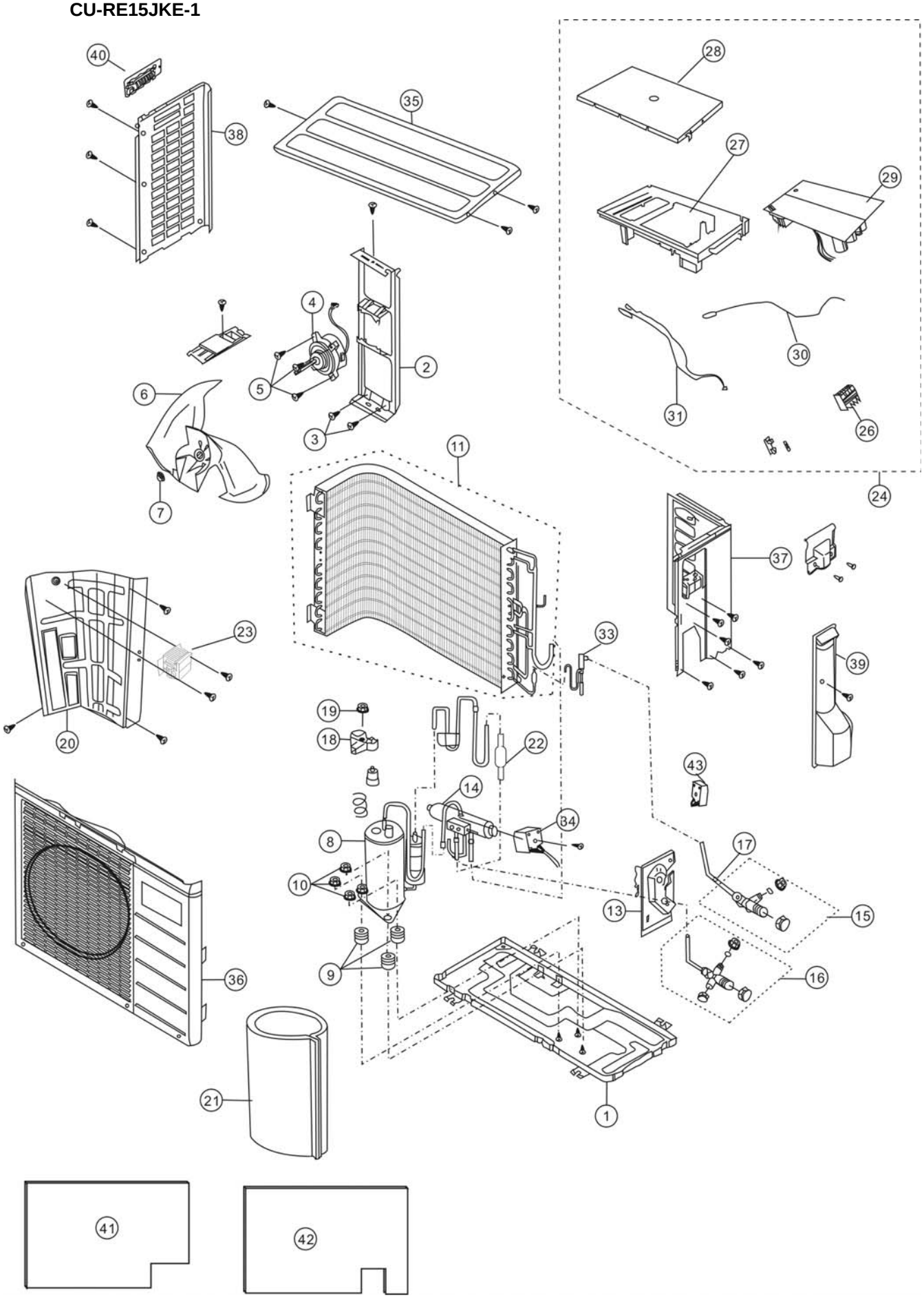


NO	PART NAME&DESCRIPTION	Q'TY	CU-RE9JKE-1	CU-RE12JKE-1	RE
1	CHASSIS ASS'Y	1	CWD50K2207A	CWD50K2193A	
2	FAN MOTOR BRACKET	1	CWD541123	CWD541123	
3	SCREW-FAN MOTOR BRACKET	2	CWH551148A	CWH551148A	
4	FAN MOTOR	1	CWA951654	CWA951656	
5	SCREW-FAN MOTOR MOUNT	4	CWH55406J	CWH55406J	
6	PROPELLER FAN ASS'Y	1	CWH03K1034	CWH03K1034	
7	NUT-PROPELLER FAN	1	CWH561036J	CWH561036J	
8	COMPRESSOR	1	CWB092528	CWB092256	
9	ANTI-VIBRATION BUSHING	3	CWH501038	CWH50077	
10	NUT-COMPRESSOR MOUNT	3	CWH56000J	CWH56000J	
11	CONDENSER	1	CWB32C2959A	CWB32C2953A	
13	HOLDER COUPLING ASS'Y	1	CWH351071	CWH351071	
14	4-WAY VALVE	1	CWB001063	CWB001063	
15	2-WAY VALVE	1	CWB021497	CWB021497	
16	3-WAY VALVE	1	CWB011603	CWB011603	
17	STRAINER	1	CWB111026	CWB111026	
18	TERMINAL COVER	1	CWH171041	CWH171048	
19	NUT FOR TERMIANL COVER	1	-	7080300J	
20	SOUND PROOF BOARD	1	CWH151187	CWH151187	
21	SOUND PROOF MATERIAL	1	CWG302412	CWG302342	
22	TUBE (NOISE SUPPRESSOR)	1	CWB121016	CWB121016	
23	REACTOR	1	G0C193J00007	G0C193J00007	
24	CONTROL BOX COMPLETE	1	CWH14C7735	CWH14C7737	
26	TERMINAL BOARD ASS'Y	1	CWA28K1185	CWA28K1185	
27	CONTROL BOARD CASING	1	CWH102399	CWH102399	
28	COVER-CONTROL BOX	1	CWH131300	CWH131300	
29	ELECTRONIC CONTROLLER	1	CWA73C4021	CWA73C4020	
30	SENSOR COMPLETE（COMP.)	1	CWA50C2273	CWA50C2209J	
31	SENSOR COMPLETE(PIPING)	1	CWA50C2521	CWA50C2521	
33	CAPILLARY	1	CWB15415	CWB15323	
34	V-COIL COMPLETE	1	CWA43C2360	CWA43C2360	
35	TOP PLATE	1	CWE031084A	CWE031084A	
36	CABINET FRONT PLATE	1	CWE06C1231	CWE06C1231	
37	CABINET SIDE PLATE (R)	1	CWE04K1049A	CWE04K1049A	
38	CABINET SIDE PLATE (L)	1	CWE041247A	CWE041247A	
39	CONTROL BOARD COVER(OUT)	1	CWH131277	CWH131277	
40	HANDLE	1	CWE161001	CWE161001	
41	SOUND PROOF MATERIAL	1	CWG302471	-	
42	SOUND PROOF MATERIAL	1	CWG302414	-	

(Note)

- All parts are supplied from PHAAG, China.

CU-RE15JKE-1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NO	PART NAME&DESCRIPTION	Q'TY	CU-RE15JKE-1	RE
1	CHASSIS ASS'Y	1	CWD50K2193A	
2	FAN MOTOR BRACKET	1	CWD541123	
3	SCREW-FAN MOTOR BRACKET	2	CWH551148A	
4	FAN MOTOR	1	CWARS5501AC	
5	SCREW-FAN MOTOR MOUNT	4	CWH551216J	
6	PROPELLER FAN ASS'Y	1	CWH03K1014	
7	NUT-PROPELLER FAN	1	CWH561034J	
8	COMPRESSOR	1	CWB092402	
9	ANTI-VIBRATION BUSHING	3	CWH50077	
10	NUT-COMPRESSOR MOUNT	3	CWH56000J	
11	CONDENSER	1	CWB32C2946A	
13	HOLDER COUPLING ASS'Y	1	CWH351071	
14	4-WAY VALVE	1	CWB001064	
15	2-WAY VALVE	1	CWB021497	
16	3-WAY VALVE	1	CWB011505	
17	STRAINER	1	CWB111026	
18	TERMINAL COVER	1	CWH171048	
19	NUT FOR TERMIANL COVER	1	CW7080300J	
20	SOUND PROOF BOARD	1	CWH151187	
21	SOUND PROOF MATERIAL	1	CWG302566	
22	Muffle	1	CWB121022	
23	REACTOR	1	G0C193J00007	
24	CONTROL BOX COMPLETE	1	CWH14C7733	
25	TUBE (STRAINER)	1	CWT024595	
26	TERMINAL BOARD ASS'Y	1	CWA28K1185	
27	CONTROL BOARD CASING	1	CWH102298	
28	COVER-CONTROL BOX	1	CWH131300	
29	ELECTRONIC CONTROLLER	1	CWA73C4019	
30	SENSOR COMPLETE（COMP.)	1	CWA50C2209J	
31	SENSOR COMPLETE(PIPING)	1	CWA50C2509	
33	EXPANSION VALE	1	CWB051030	
34	V-COIL COMPLETE FOR 4-WAY VALVE	1	CWA43C2143J	
35	TOP PLATE	1	CWE031084A	
36	CABINET FRONT PLATE	1	CWE06C1231	
37	CABINET SIDE PLATE (R)	1	CWE04K1049A	
38	CABINET SIDE PLATE (L)	1	CWE041247A	
39	CONTROL BOARD COVER(OUT)	1	CWH131277	
40	HANDLE	1	CWE161001	
41	SOUND PROOF MATERIAL	1	CWG302343	
42	SOUND PROOF MATERIAL	1	CWG302112	
43	V-COIL COMPLETE FOR EXPANSION VALVE	1	CWA43C2257	

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