

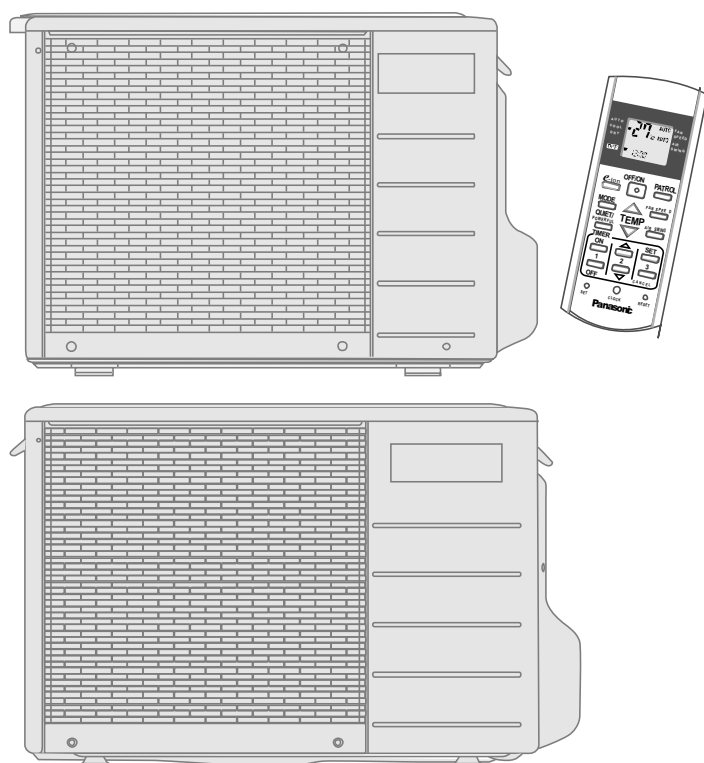
Service Manual

Air Conditioner



Indoor Unit
CS-C9JKV
CS-C12JKV

Outdoor Unit
CU-C9JKV
CU-C12JKV



⚠ 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.

TABLE OF CONTENTS

1. Safety Precautions	3	5. Dimensions	11
2. Specification	5	5.1 Indoor Unit	11
3. Features	9	5.2 Outdoor Unit	12
4. Location of Controls and Components	10	6. Refrigeration Cycle Diagram	13
4.1 Indoor Unit	10	7. Block Diagram	14
4.2 Outdoor Unit	10	8. Wiring Connection Diagram	15
4.3 Remote Control	10	8.1 CS-C9JKV CU-C9JKV	15



Panasonic®

© Panasonic HA Air Conditioning (M) Sdn. Bhd. 2008
 Unauthorized copying and distribution is a violation of law.

8.2	CS-C12JKV CU-C12JKV	16
9.	Electronic Circuit Diagram	17
9.1	CS-C9JKV CU-C9JKV	17
9.2	CS-C12JKV CU-C12JKV	18
10.	Printed Circuit Board	19
10.1	Indoor Unit	19
11.	Installation Instruction	22
11.1	Select the Best Location	22
11.2	Indoor Unit	23
11.3	Outdoor Unit	26
12.	Operation Control	29
12.1	Cooling Operation	29
12.2	Soft Dry Operation	30
12.3	Automatic Operation	31
12.4	Indoor Fan Speed Control	32
12.5	Outdoor Fan Speed Control	33
12.6	Vertical Airflow Direction Control	34
12.7	Horizontal Airflow Direction Control	34
12.8	Powerful Operation	34
12.9	Quiet Operation	35
12.10	Timer Control	36
12.11	Random Auto Restart Control	36
12.12	Remote Control Signal Receiving Sound	36
12.13	Patrol Operation	37
12.14	e-ion operation	40
13.	Protection Control	43
13.1	Restart Control (Time Delay Safety Control) 43	
13.2	7 Minutes Time Save Control	43
13.3	60 Seconds Forced Operation	43
13.4	Starting Current Control	43
13.5	Freeze Prevention Control	44
13.6	Compressor Reverse Rotation Protection Control	44
13.7	Dew Prevention Control	45
14.	Servicing Mode	46
14.1	Auto OFF/ON Button	46
14.2	Remote Control Button	47
15.	Troubleshooting Guide	48
15.1	Refrigeration cycle system	48
16.	Disassembly and Assembly Instructions	50
16.1	Indoor Electronic Controllers, Cross Flow Fan and Indoor Fan Motor Removal Procedures	50
17.	Technical Data	54
17.1	Thermostat Characteristics	54
17.2	Operation Characteristics	55
18.	Exploded View and Replacement Pars List	59
18.1	Indoor Unit	59
18.2	Outdoor Unit	61

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:

	This symbol denotes item that is PROHIBITED from doing.
---	---

- Carry out test running 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. Do not modify the machine, part, material during repairing service.	
2. If wiring unit is supplied as repairing part, do not repair or connect the wire even only partial wire break. Exchange the whole wiring unit.	
3. Do not wrench the fasten terminal. Pull it out or insert it straightly.	
4. Engage dealer or specialist for installation and servicing. If installation of servicing done by the user is defective, it will cause water leakage, electrical shock or fire.	
5. Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electric shock or fire.	
6. Use the attached accessories parts and specified parts for installation and servicing. Otherwise, it will cause the set to fall, water leakage, fire or electrical shock.	
7. 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.	
8. For electrical work, follow the local national wiring standard, regulation and the 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.	
9. This equipment is strongly recommended to install 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.	
10. Do not use joint cable for indoor / outdoor connection cable. Use the specified indoor / outdoor connection cable, refer to installation instruction 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 connecting or fixing is not perfect, it will cause heat up or fire at the connection.	
11. 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 heat-up or fire at the connection point of terminal, fire or electrical shock.	
12. 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 refrigeration cycle and result in explosion, injury etc.).	
13. 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.	
14. 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 electric shock in case equipment breakdown or insulation breakdown.	
15. Keep away from small children, the thin film may cling to nose and mouth and prevent breathing.	
16. Do not use unspecified cord, modified cord, joint cord or extension cord for power supply cord. Do not share the single outlet with other electrical appliances. Poor contact, poor insulation or over current will cause electrical shock or fire.	
17. 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.	
18. During pump down operation, stop the compressor before remove the refrigeration piping. (Removal of compressor 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.)	
19. During installation, install the refrigerant piping properly before run the compressor. (Operation of compressor without fixing refrigeration piping and valves at opened condition will caused suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury, etc.)	

**WARNING**

20. After completion of installation or service, confirm there is no leakage or refrigerant gas. It may generate toxic gas when the refrigerant contacts with fire.

21. Ventilate if there is refrigerant gas leakage during operation. It may cause toxic gas when refrigerant contacts with fire.

22. Do not insert your fingers or other objects into the unit, high speed rotating fan may cause injury.



23. Must not use other parts except original parts described 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. 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.

4. Do not touch outdoor unit air inlet and aluminium fin. It may cause injury.



5. Select an installation location which is easy for maintenance.

6. Pb free solder has a higher melting point than standard solder; typically the melting point is 50°F – 70°F (30°C – 40°C) higher. Please use a high temperature solder iron. In case of the soldering iron with temperature control, please set it to 700 ± 20°F (370 ± 10°C). Pb free solder will tend to splash when heated too high (about 1100°F / 600°C).

7. 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 shall be the place where there is ease for access for the power disconnection in case of emergency. In some countries, permanent connection of this room air conditioner to the power supply is prohibited.

i. Power supply connection to the receptacle using a power plug.

Use an approved 15/16A (1.0~1.5HP) or 16A (2.0HP) or 20A (2.5HP) power plug with earth pin for the connection to the socket.

ii. Power supply connection to a circuit breaker for the permanent component.

Use an approved 15/16A (1.0~1.5HP) or 20A (2.5HP) circuit

breaker for the permanent connection. It must be a double pole switch with a minimum 3.0 mm contact gap.

8. Do not release refrigerant during piping work for installation, servicing, reinstallation and during repairing a refrigerant parts. Take care of the liquid refrigerant, it may cause frostbite



9. Installation or servicing work: It may need two people to carry out the installation or servicing work.

10. Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc.



11. Do not sit or step on the unit, you may fall down accidentally.



12. Do not touch the sharp aluminium fin, sharp parts may cause injury.



2. Specification

Model			Indoor	CS-C9JKV
			Outdoor	CU-C9JKV
Performance Test Condition			NEW JIS	
Power Supply			Phase, Hz	SINGLE, 60
			V	220
Cooling	Capacity		kW	2.65
			BTU/h	9040
			kJ/h	9540
	Running Current		A	3.9
	Input Power		W	830
	EER		W/W	3.19
			Btu/hW	10.9
	Power Factor		%	93
	Indoor Noise (H / L)		dB-A	36 / 26
			Power Level dB	49 / -
Outdoor Noise (H / L)		dB-A	48	
		Power Level dB	63	
Max Current (A) / Max Input Power (W)			4.6 / 990	
Starting Current (A)			23.0	
Compressor		Type	Hermetic Motor	
		Motor Type	Induction (2-poles)	
		Output Power	W	600
Indoor Fan	Type		Cross-Flow Fan	
	Material		ASG20K1	
	Motor Type		Induction (4-poles)	
	Input Power		W	53.2
	Output Power (I/D / O/D)		W	20
	Speed	QLo	rpm	580
		Lo	rpm	650
		Me	rpm	850
		Hi	rpm	1030
	SHi	rpm	1130	
Outdoor Fan	Type		Propeller Fan	
	Material		PP Resin	
	Motor Type		Induction (6-poles)	
	Input Power		W	74.0
	Output Power		W	30
	Speed	Hi	rpm	810
Moisture Removal		L/h (Pt/h)	1.6 (3.4)	
Indoor Airflow		Lo	m ³ /min (ft ³ /min)	6.0 (212)
		Me	m ³ /min (ft ³ /min)	7.8 (277)
		Hi	m ³ /min (ft ³ /min)	9.5 (335)
		SHi	m ³ /min (ft ³ /min)	10.4 (368)
Outdoor Airflow		Hi	m ³ /min (ft ³ /min)	29.2 (1030)
Refrigeration Cycle		Control Device	Capillary tube	
		Refrigerant Oil	cm ³	Atmos M60 or Suniso 4GDID (290)
		Refrigerant Type	g (oz)	R22, 590 (20.8)
Dimension		Height(I/D / O/D)	mm (inch)	290 (11-7/16)
		Width (I/D / O/D)	mm (inch)	870 (34-9/32)
		Depth (I/D / O/D)	mm (inch)	204 (8-1/16)
Weight		Net (I/D / O/D)	kg (lb)	9 (20)
				23 (51)
Piping	Pipe Diameter (Liquid / Gas)		mm (inch)	6.35 (1/4) / 9.52 (3/8)
	Standard length		m (ft)	7.5 (24.6)
	Length range (min – max)		m (ft)	3 ~ 10 (9.8 ~ 32.8)
	I/D & O/D Height different		m (ft)	5 (16.4)
	Additional Gas Amount		g/m (oz/ft)	10 (0.1)
	Length for Additional Gas		m (ft)	7.5 (24.6)
Drain Hose		Inner Diameter	mm	16
		Length	mm	550
Indoor Heat Exchanger		Fin Material	Pre Coat	
		Fin Type	Slit Fin	
		Row x Stage x FPI	2 x 15 x 21	
		Size (W x H x L)	mm	610 x 315 x 25.4
Outdoor Heat Exchanger		Fin Material	Blue Coated	
		Fin Type	Corrugated Fin	
		Row x Stage x FPI	1 x 19 x 17	
		Size (W x H x L)	mm	22 x 482.6 x 567.4
Air Filter		Material	Polypropelene	
		Type	One-touch	
Power Supply			Indoor	
Power Supply Cord		A	10	

Thermostat		-	
Protection Device		2-stage Overload Protector	
		Dry Bulb	Wet Bulb
Indoor Operation Range	Maximum	32	23
	Minimum	16	11
Outdoor Operation Range	Maximum	43	26
	Minimum	16	11

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb).
2. Specifications are subjected to change without prior notice for further improvement.

Model			Indoor	CS-C12JKV	
			Outdoor	CU-C12JKV	
Performance Test Condition			NEW JIS		
Power Supply			Phase, Hz	SINGLE, 60	
			V	220	
Cooling	Capacity		kW	3.56	
			BTU/h	12140	
			kJ/h	12820	
	Running Current		A	5.3	
	Input Power		W	1.11k	
	EER		W/W	3.21	
			Btu/hW	10.9	
	Power Factor		%	95	
	Indoor Noise (H / L)		dB-A	39 / 29	
			Power Level dB	52 / -	
	Outdoor Noise (H / L)		dB-A	48	
			Power Level dB	63	
Max Current (A) / Max Input Power (W)			6.5 / 1.35k		
Starting Current (A)			33.0		
Compressor		Type	Hermetic Motor		
		Motor Type	Induction (2-poles)		
		Output Power	W	850	
Indoor Fan	Type		Cross-Flow Fan		
	Material		ASG20K1		
	Motor Type		Induction (4-poles)		
	Input Power		W	53.2	
	Output Power (I/D / O/D)		W	20	
	Speed	QLo	rpm	680	
		Lo	rpm	750	
		Me	rpm	930	
Hi		rpm	1110		
Outdoor Fan	SHi		rpm	1130	
	Type		Propeller Fan		
	Material		PP Resin		
	Motor Type		Induction (6-poles)		
	Input Power		W	74	
	Output Power		W	30	
	Speed	Hi	rpm	835	
	Moisture Removal			L/h (Pt/h)	2.1 (4.4)
Indoor Airflow		Lo	m³/min (ft³/min)	7.0 (248)	
		Me	m³/min (ft³/min)	8.7 (308)	
		Hi	m³/min (ft³/min)	10.4 (367)	
		SHi	m³/min (ft³/min)	10.6 (374)	
Outdoor Airflow		Hi	m³/min (ft³/min)	32.4 (1140)	
Refrigeration Cycle		Control Device	Capillary tube		
		Refrigerant Oil	cm³	Atmos M60 or Suniso 4GDID (350)	
		Refrigerant Type	g (oz)	R22, 770 (27.2)	
Dimension		Height(I/D / O/D)	mm (inch)	290 (11-7/16)	540 (21-9/32)
		Width (I/D / O/D)	mm (inch)	870 (34-9/32)	780 (30-23/32)
		Depth (I/D / O/D)	mm (inch)	204 (8-1/16)	289 (11-13/32)
Weight		Net (I/D / O/D)	kg (lb)	9 (20)	29 (64)
Piping	Pipe Diameter (Liquid / Gas)		mm (inch)	6.35 (1/4) / 12.70 (1/2)	
	Standard length		m (ft)	7.5 (24.6)	
	Length range (min – max)		m (ft)	3 ~ 15 (9.8 ~ 49.2)	
	I/D & O/D Height different		m (ft)	5 (16.4)	
	Additional Gas Amount		g/m (oz/ft)	10 (0.1)	
	Length for Additional Gas		m (ft)	7.5 (24.6)	
Drain Hose		Inner Diameter	mm	16	
		Length	mm	550	
Indoor Heat Exchanger		Fin Material	Pre Coat		
		Fin Type	Slit Fin		
		Row x Stage x FPI	2 x 15 x 21		
		Size (W x H x L)	mm	610 x 315 x 25.4	
Outdoor Heat Exchanger		Fin Material	Blue Coated		
		Fin Type	Corrugated Fin		
		Row x Stage x FPI	1 x 20 x 17		
		Size (W x H x L)	mm	22 x 508 x 814.4	
Air Filter		Material	Polypropelene		
		Type	One-touch		
Power Supply			Indoor		
Power Supply Cord			A	10	
Thermostat			-		
Protection Device			2-stage Overload Protector		
			Dry Bulb	Wet Bulb	
Indoor Operation Range			Maximum	32	23
			Minimum	16	11

Outdoor Operation Range	Maximum	43	26
	Minimum	16	11

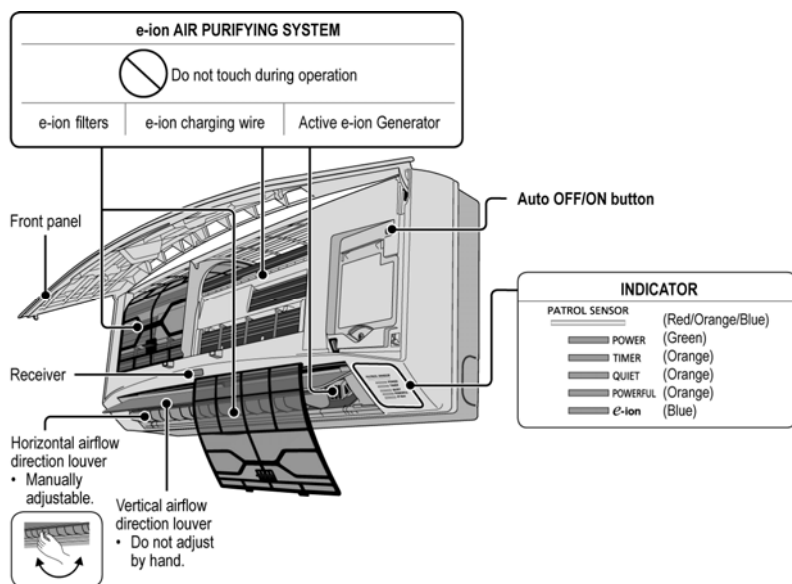
1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb).
2. Specifications are subjected to change without prior notice for further improvement.

3. Features

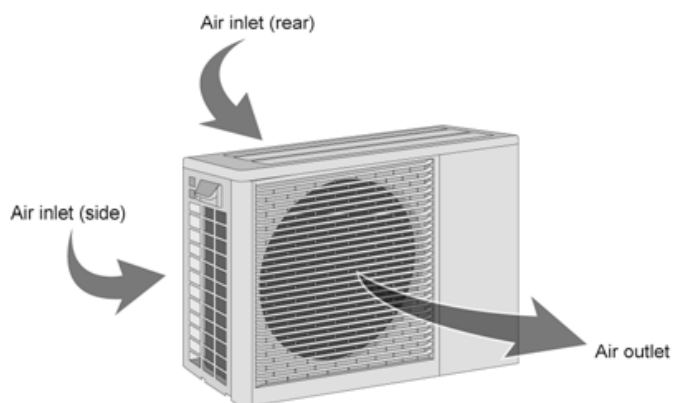
- E-ion Air Purifying System with Patrol Sensor
 - Active e-ions are released to catch dust particles and bring them back the large positively charged filter.
 - Patrol Sensor color changes to indicate the dirt level in the air
- Long Installation Piping
 - CS/CU-C9JK, long piping up to 10 meters.
 - CS/CU-C12JK, long piping up to 15 meters.
- Easy to use remote control
- Quality Improvement
 - Random auto restart after power failure for safety restart operation
 - Gas leakage protection
 - Prevent compressor reverse cycle
 - Inner protector to protect compressor
 - Noise prevention during soft dry operation
 - Blue coated condenser for high resistance to corrosion
- Operation Improvement
 - Quiet mode to reduce the indoor unit operating sound
 - Powerful mode to reach the desired room temperature quickly
 - 24-hour timer setting

4. Location of Controls and Components

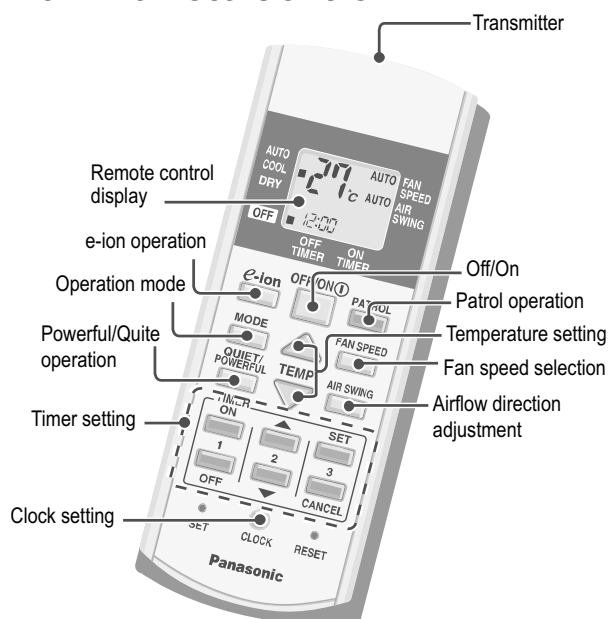
4.1 Indoor Unit



4.2 Outdoor Unit



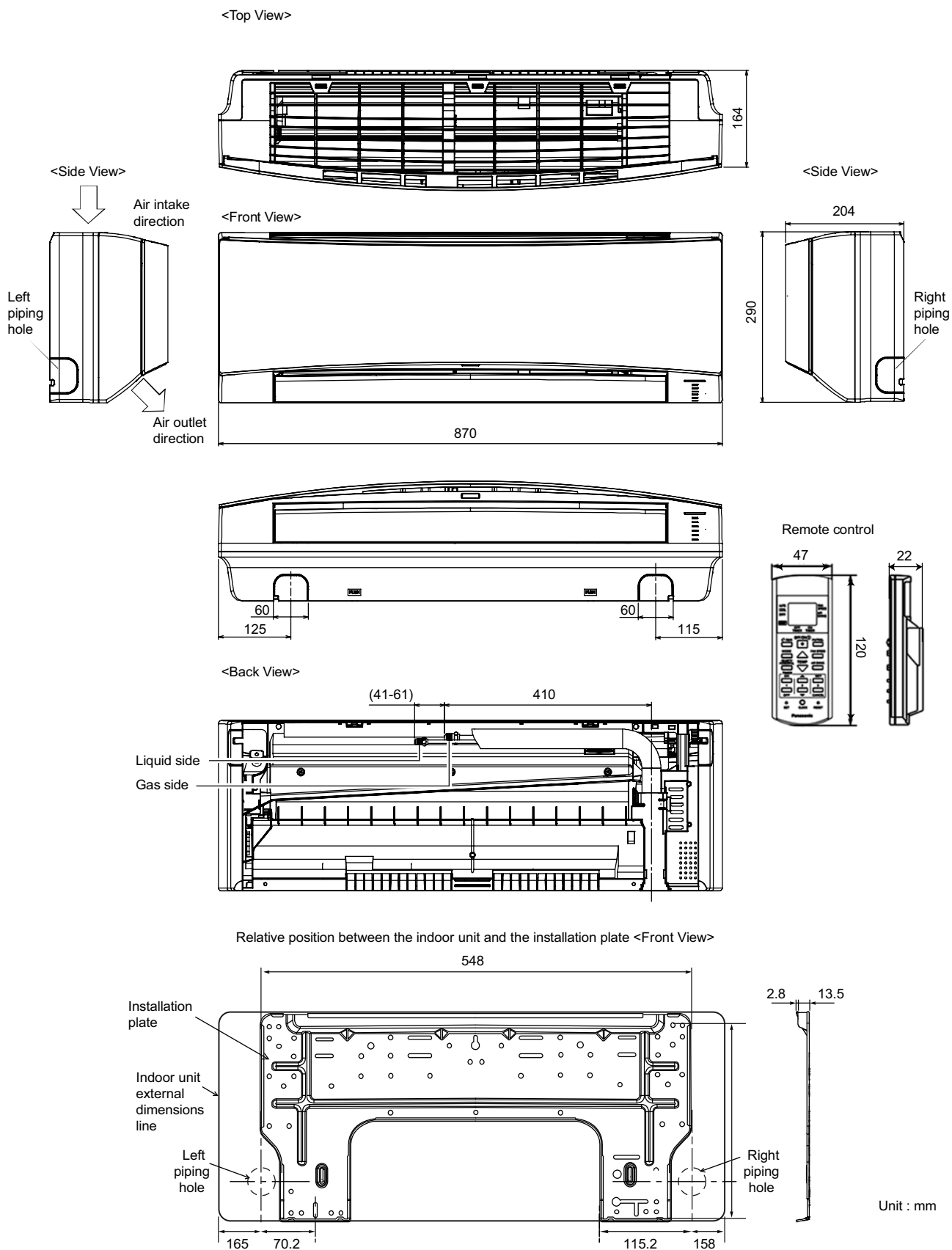
4.3 Remote Control



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

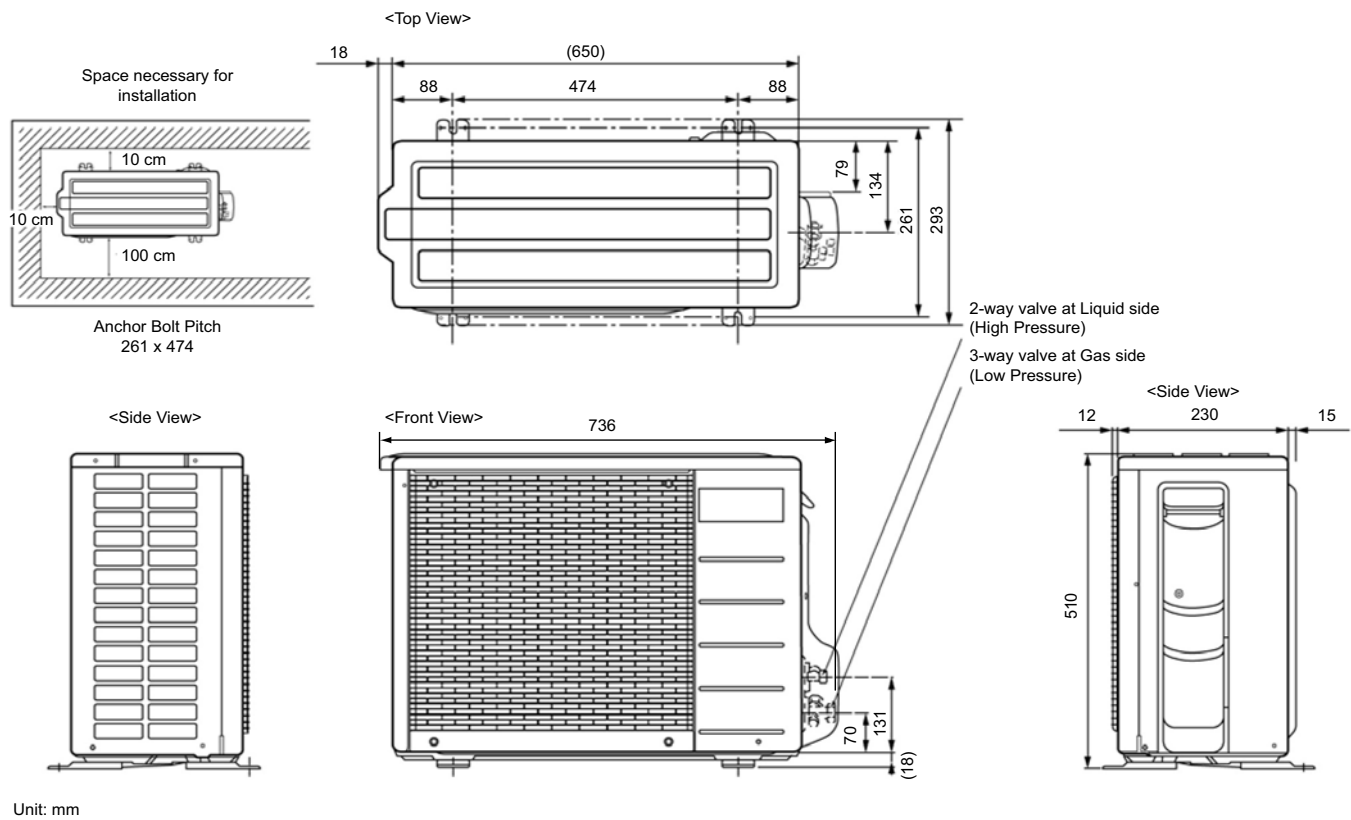
5. Dimensions

5.1 Indoor Unit

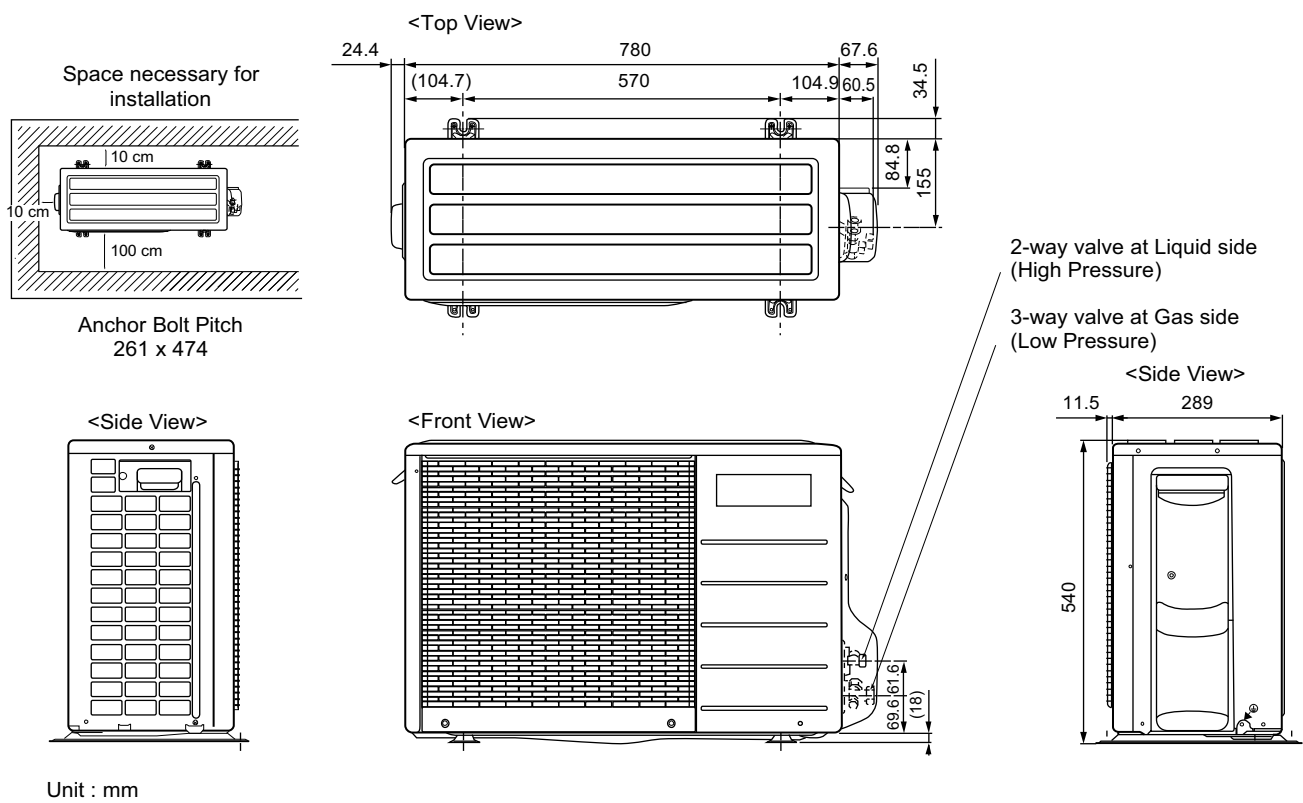


5.2 Outdoor Unit

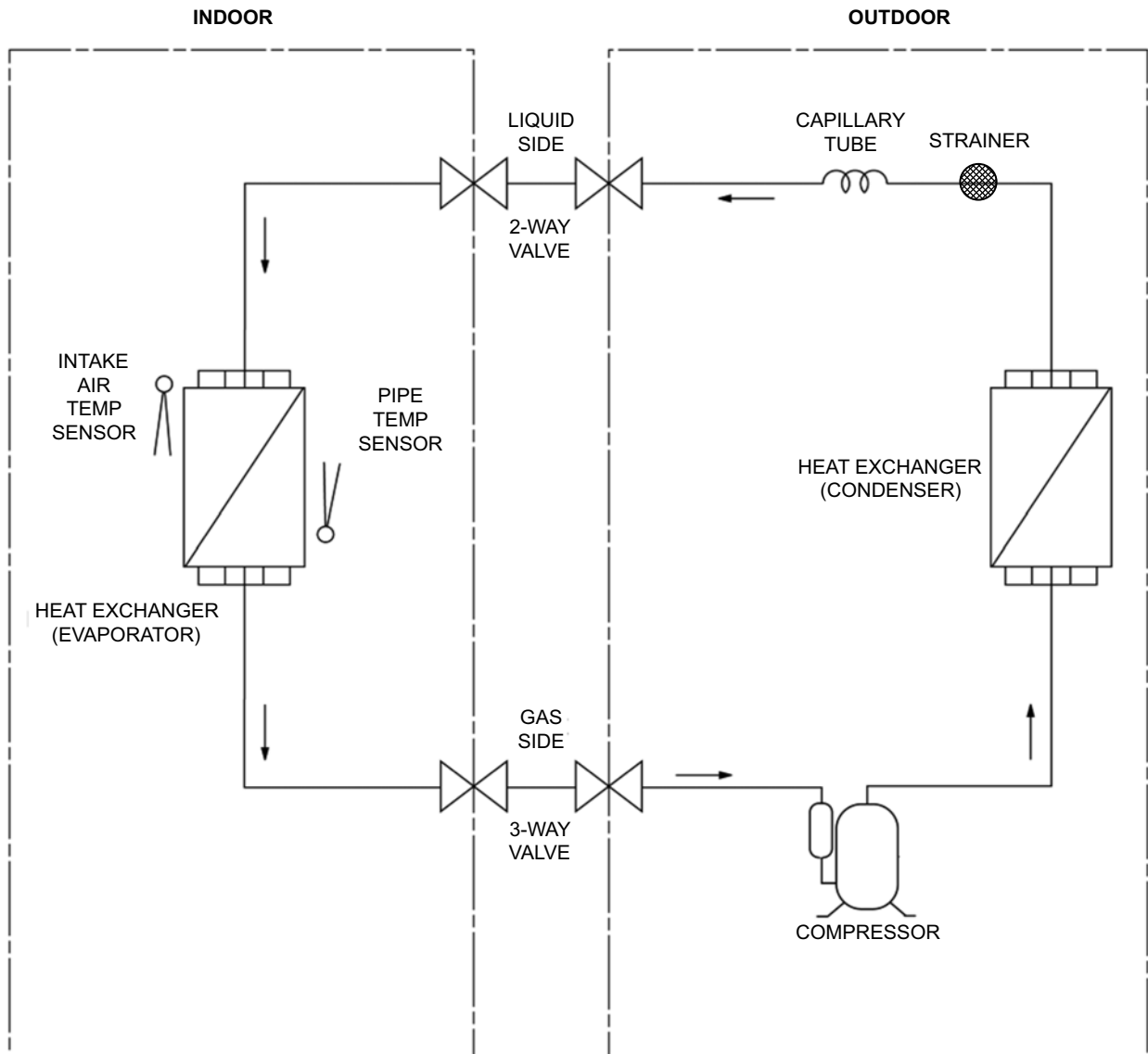
5.2.1 CU-C9JKV



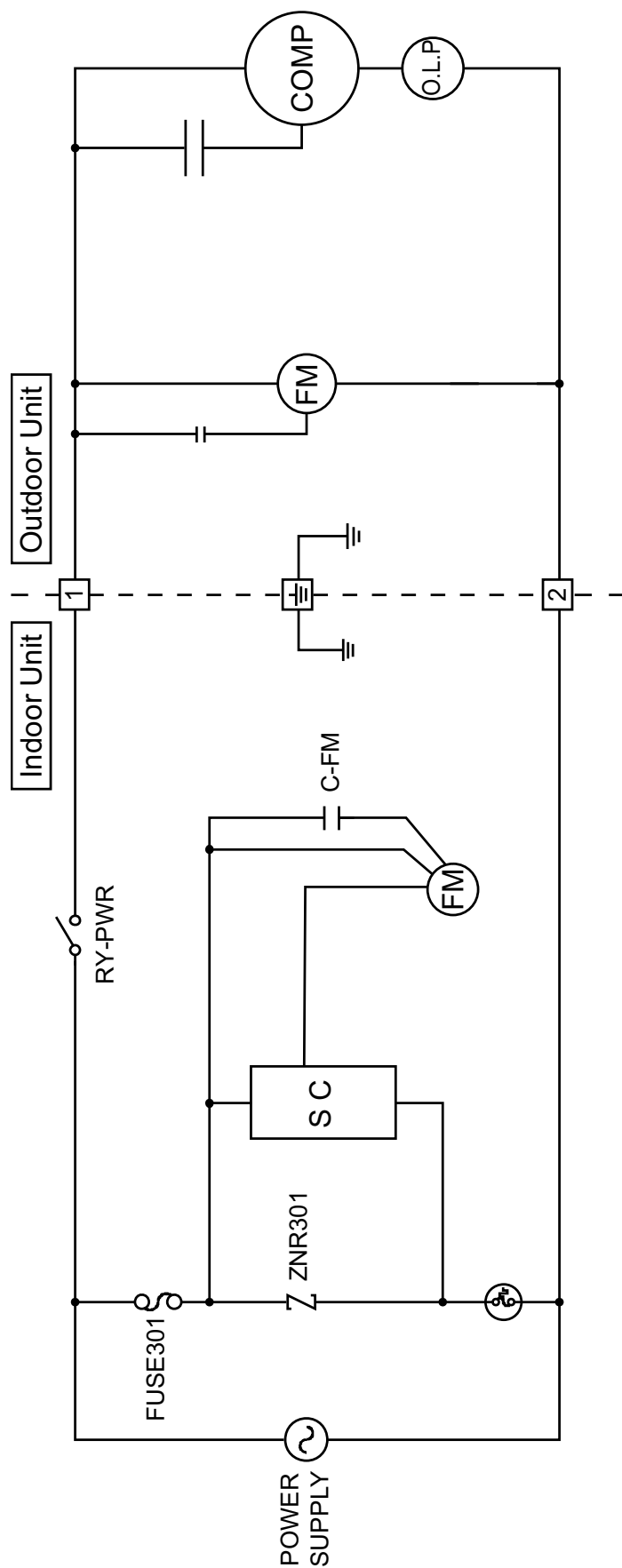
5.2.2 CU-C12JKV



6. Refrigeration Cycle Diagram

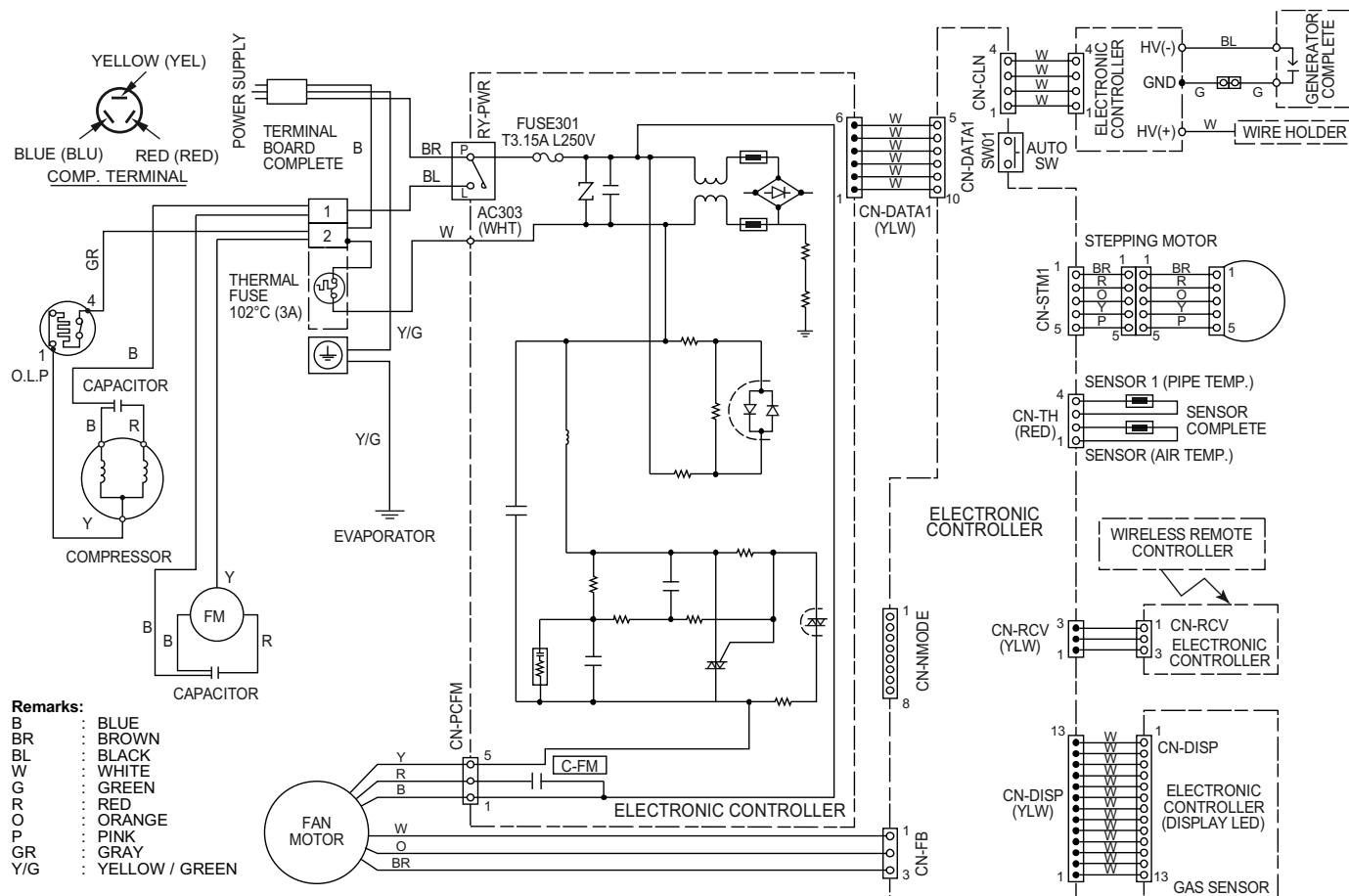


7. Block Diagram



8. Wiring Connection Diagram

8.1 CS-C9JKV CU-C9JKV



Resistance of Indoor Fan Motor Windings

MODEL	CS-C9JKV
CONNECTION	CWA921420
BLUE-YELLOW	192Ω
YELLOW-RED	226Ω

Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-C9JKV
CONNECTION	2R13C236BSC
C-R	3.298Ω
C-S	5.500Ω

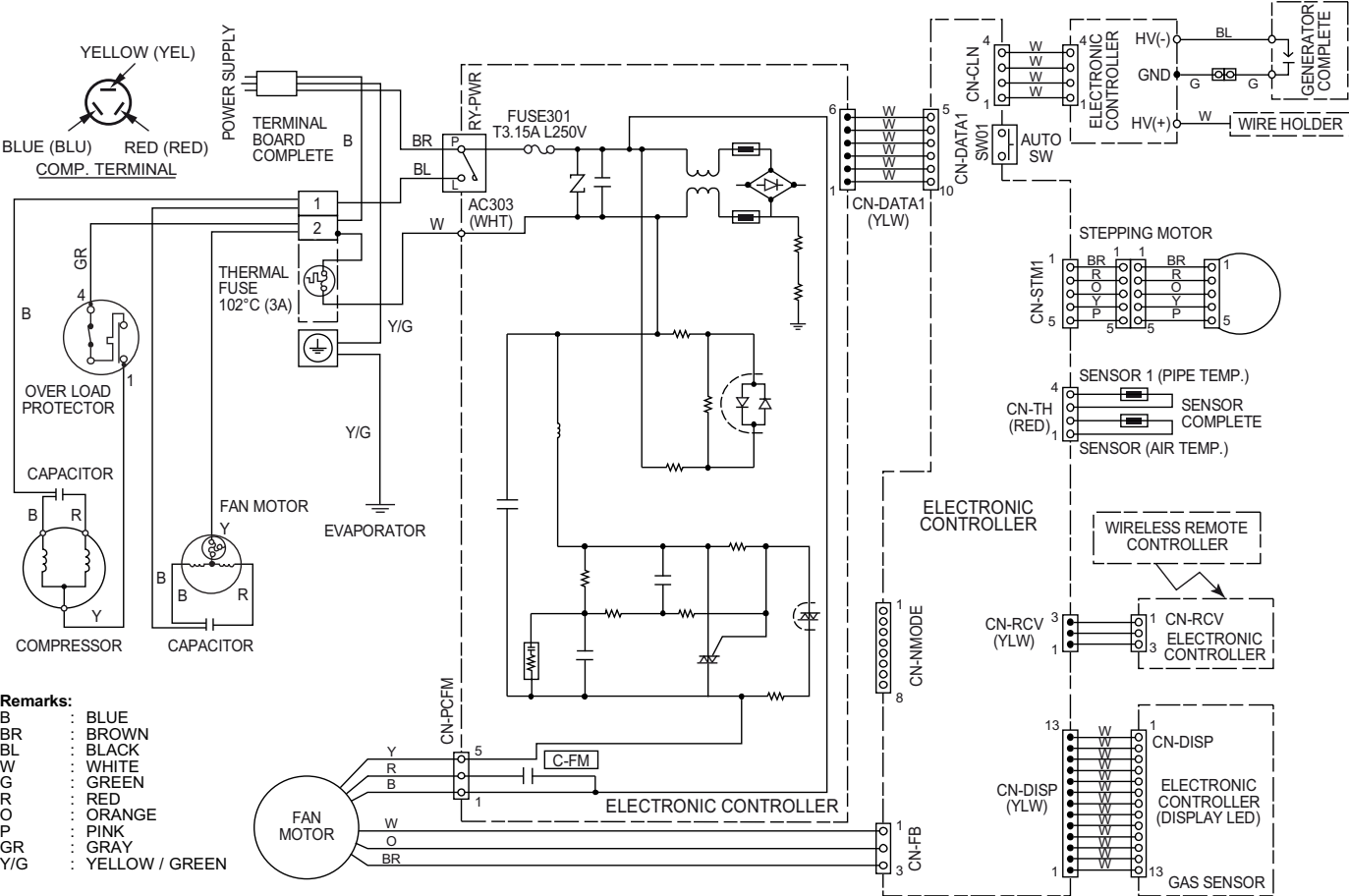
Note: Resistance at 20°C of ambient temperature.

Resistance of Outdoor Fan Motor Windings

MODEL	CU-C9JKV
CONNECTION	CWA951562
BLUE-YELLOW	307.4Ω
YELLOW-RED	202.4Ω

Note: Resistance at 20°C of ambient temperature.

8.2
CS-C12JKV CU-C12JKV



Resistance of Indoor Fan Motor Windings

MODEL	CS-C12JKV
CONNECTION	CWA921420
BLUE-YELLOW	192Ω
YELLOW-RED	226Ω

Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-C12JKV
CONNECTION	2P19S236A1L
C-R	2.237Ω
C-S	2.710Ω

Note: Resistance at 20°C of ambient temperature.

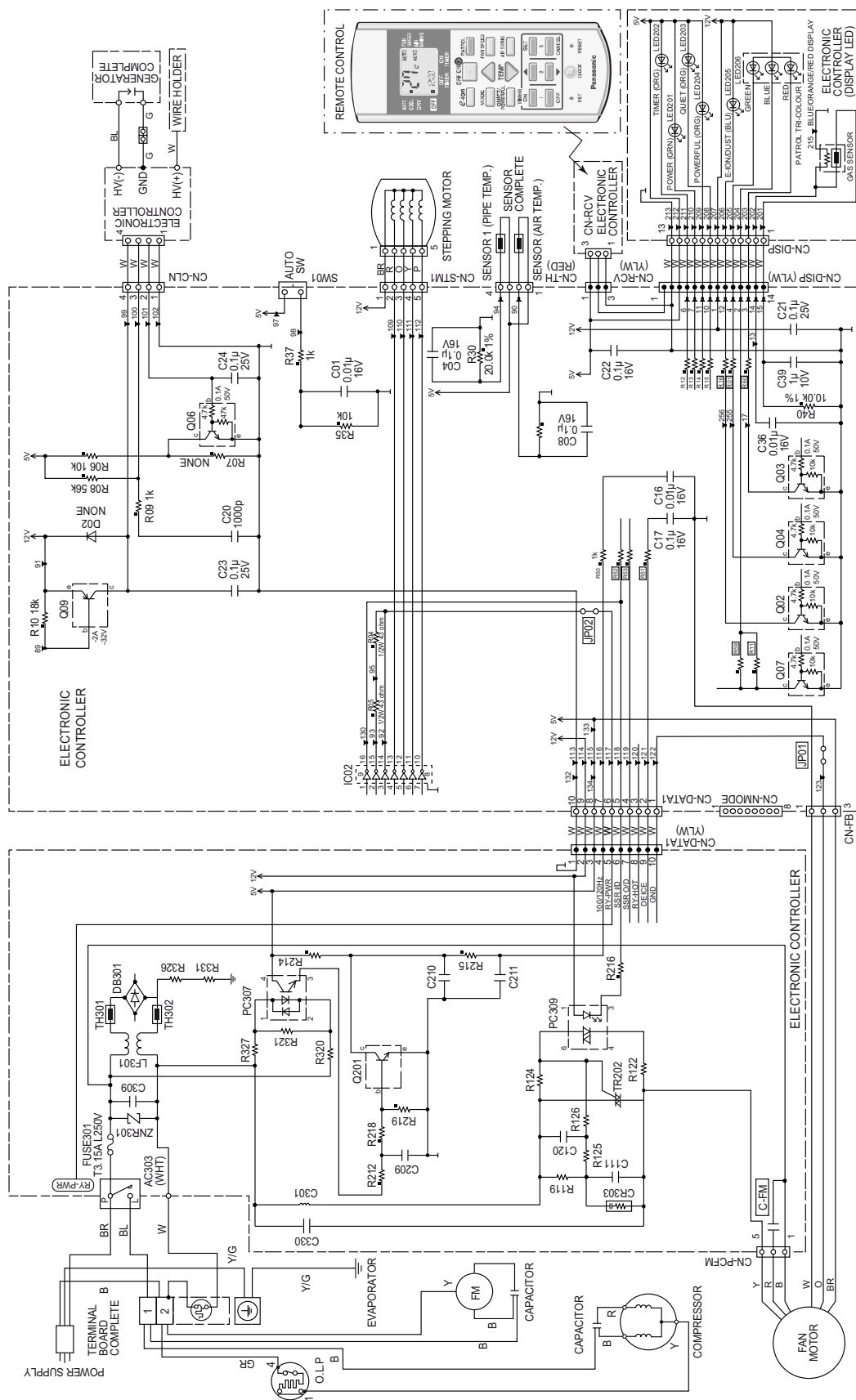
Resistance of Outdoor Fan Motor Windings

MODEL	CU-C12JKV
CONNECTION	CWA951329J
BLUE-YELLOW	258.3Ω
YELLOW-RED	245.9Ω

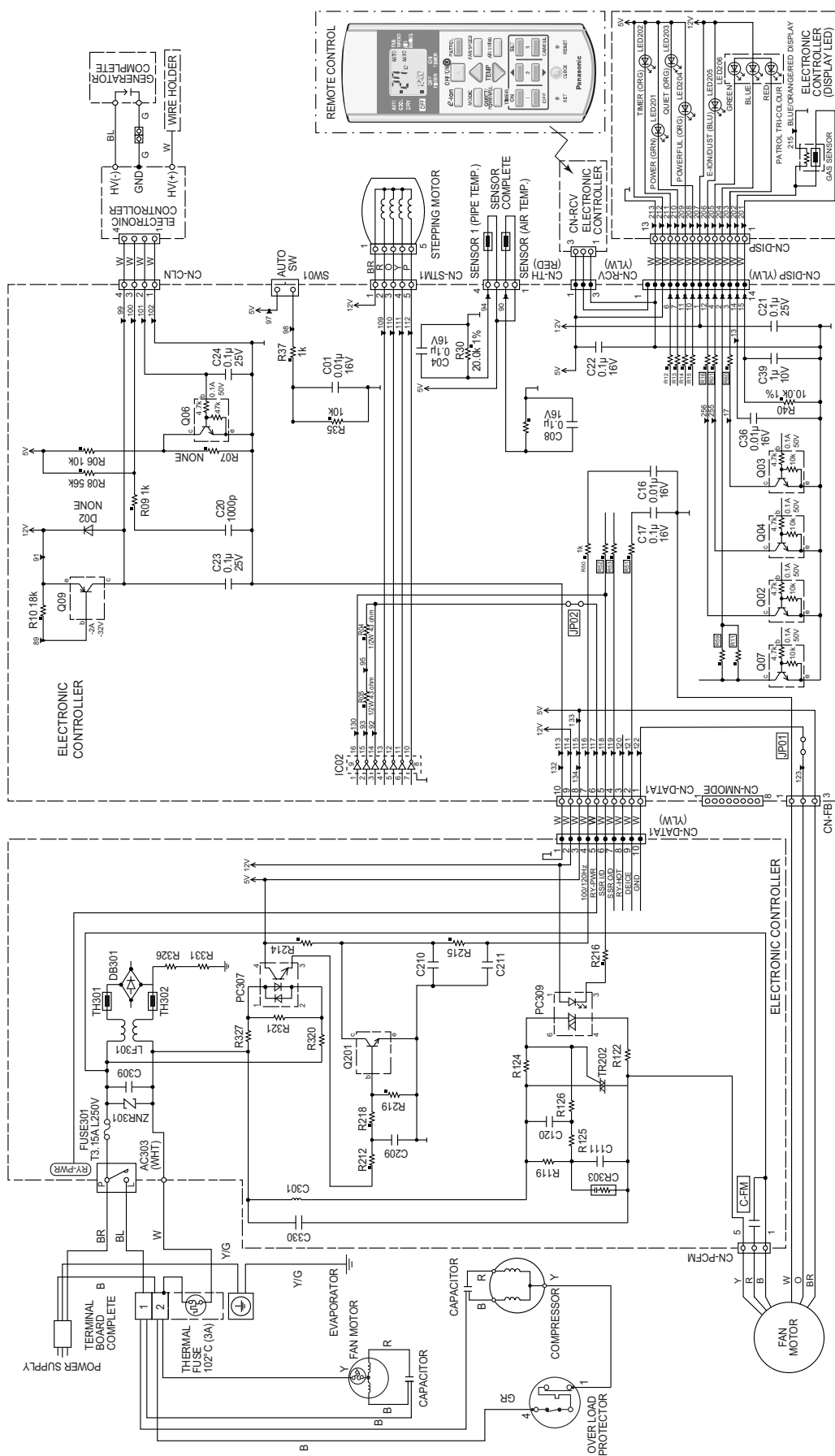
Note: Resistance at 20°C of ambient temperature.

9. Electronic Circuit Diagram

9.1 CS-C9JKV CU-C9JKV



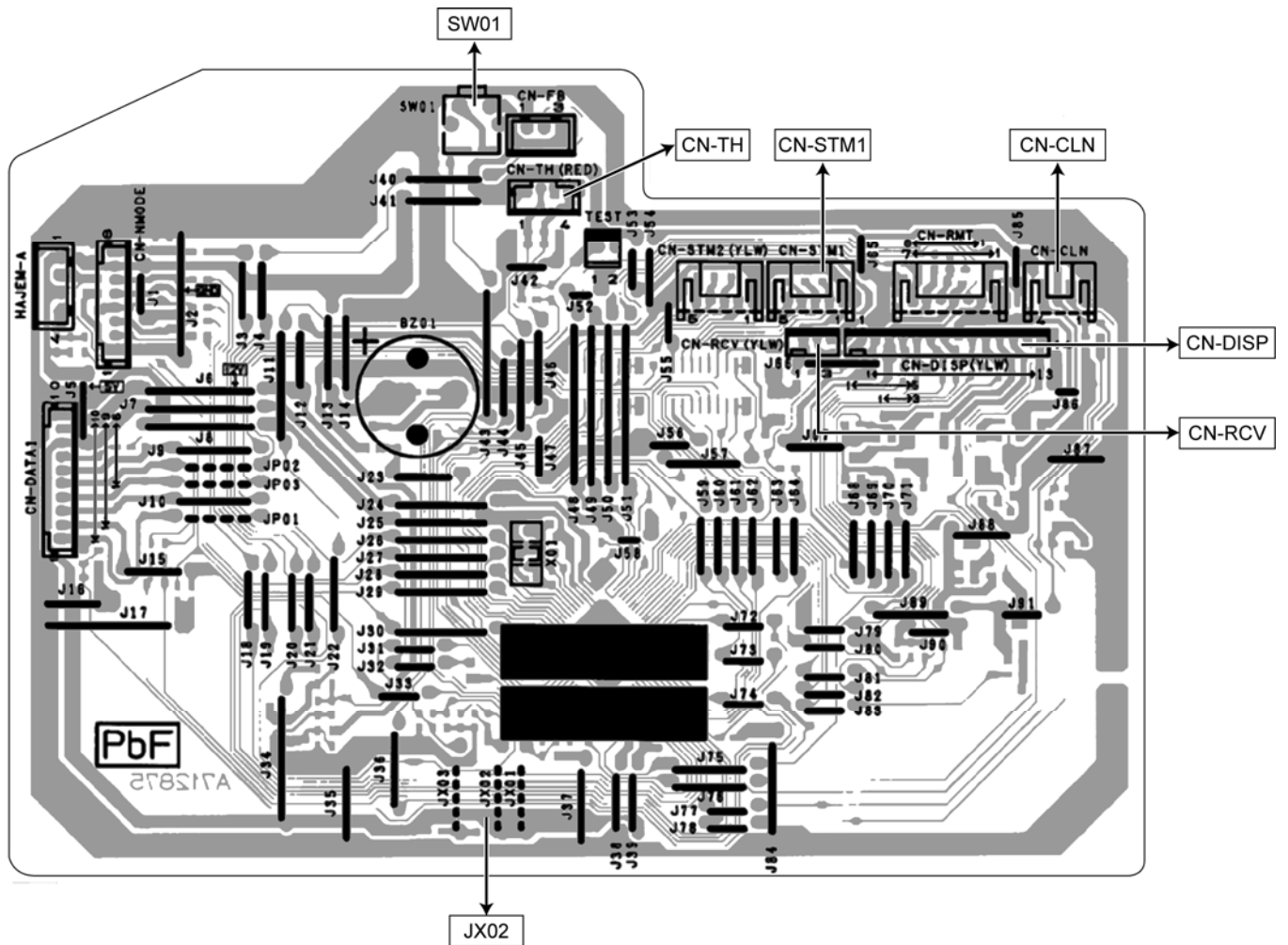
9.2 CS-C12JKV CU-C12JKV



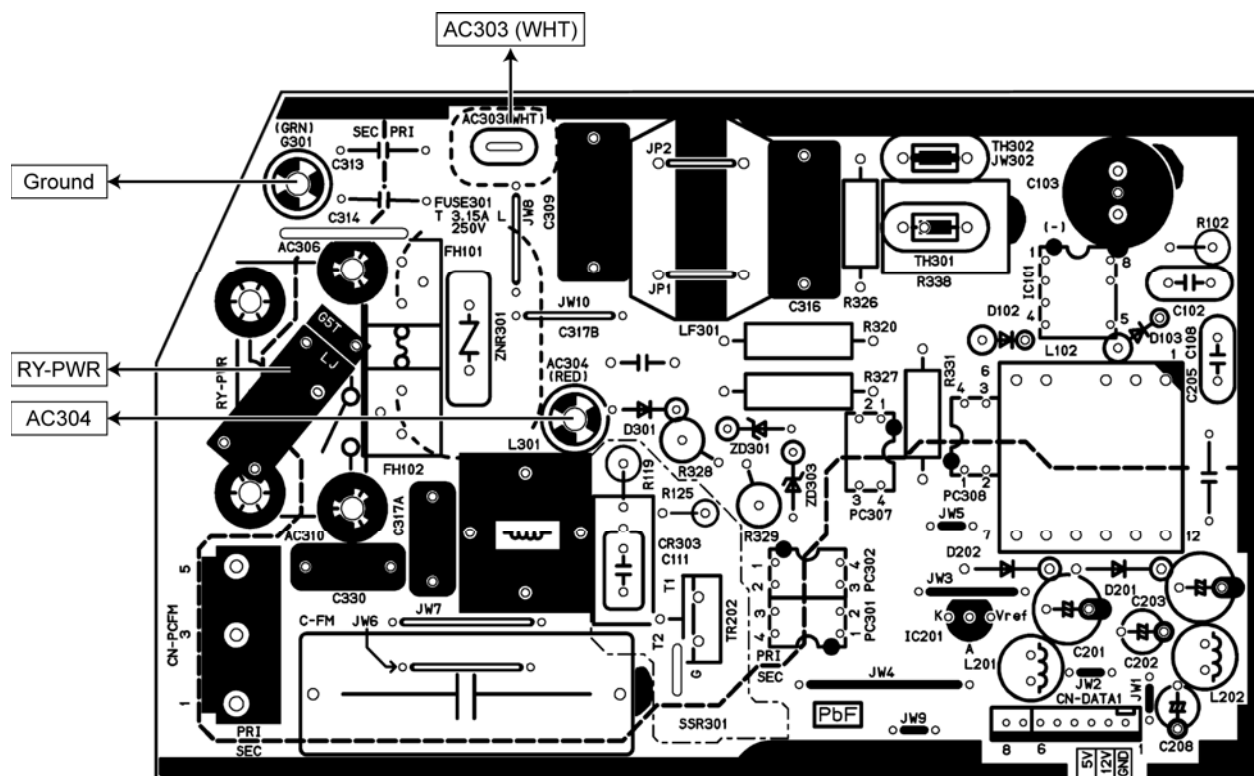
10. Printed Circuit Board

10.1 Indoor Unit

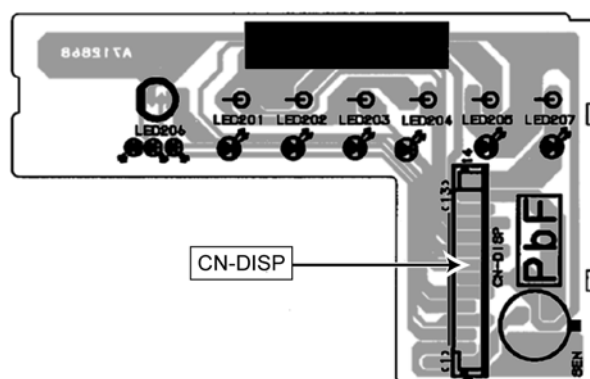
10.1.1 Main Printed Circuit Board



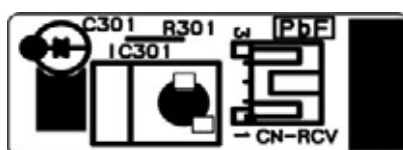
10.1.2 Power Printed Circuit Board



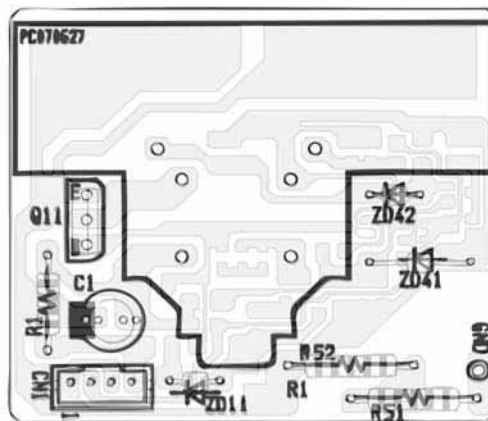
10.1.3 Indicator Printed Circuit Board



10.1.4 Receiver Printed Circuit Board



10.1.5 High Voltage Power Supply Printed Circuit Board



11. Installation Instruction

11.1 Select the Best Location

11.1.1 Indoor Unit

- Do not install the unit in excessive oil fume area such as kitchen, workshop and etc.
- 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 2.5 m.

11.1.2 Outdoor Unit

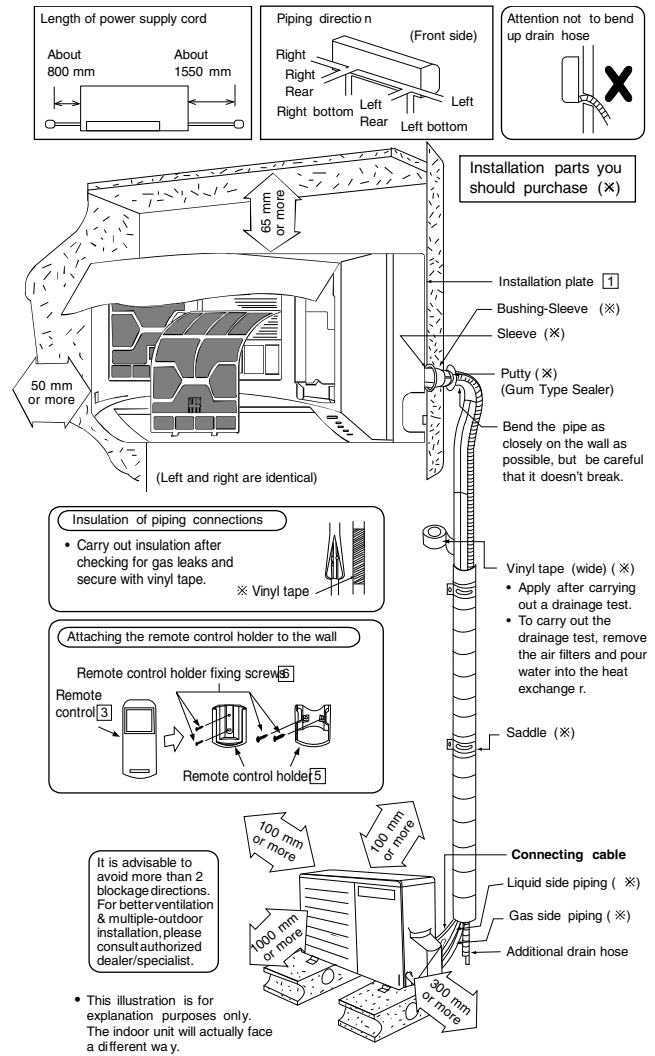
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other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

Model	Horse Power (HP)	Piping size		Std. Length (m)	Max. Elevation (m)	Min. Piping Length (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)	Piping Length for add. gas (m)
		Gas	Liquid						
C7***, RS-C7**	3/4~1.5HP	3/8"	1/4"	7.5	5	3	10	10	7.5
C9***, RS-C9**					5	3	10	10	7.5
C12***, RS-C12**					5	3	15	10	7.5
C18***, RS-C18**	2.0HP	1/2"	1/4"	5	20	3	25	20	7.5
C24***, RS-C24**	2.5HP				20	3	25	30	7.5
C28***	3.0HP	5/8"			20	3	30	30	7.5

Example: For C9***

If the unit is installed at 10 m distance, the quantity of additional refrigerant should be 25 g... $(10-7.5) \text{ m} \times 10 \text{ g/m} = 25 \text{ g}$.

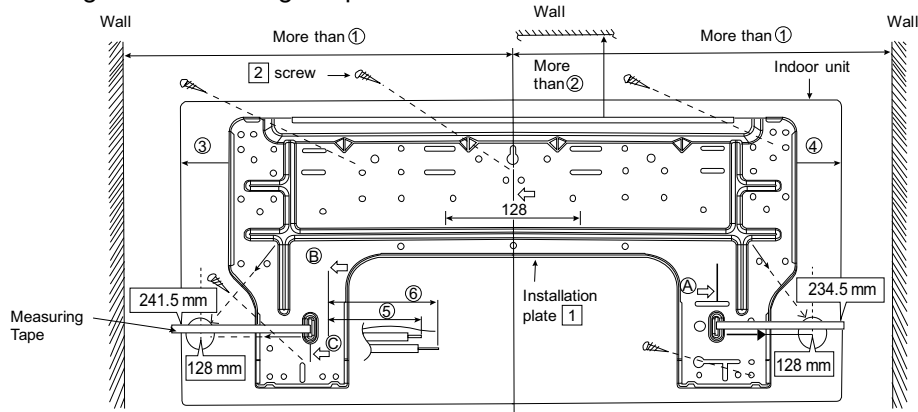
11.1.3 Indoor/Outdoor Unit Installation Diagram



11.2 Indoor Unit

11.2.1 How to Fix Installation Plate

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



Model	Dimension					
	①	②	③	④	⑤	⑥
C7***, C9***, C12***, RS-C7**, RS-C9**, RS-C12**	485 mm	82 mm	165 mm	158 mm	43 mm	95 mm
C18***, C24***, C28***, RS-C18**, RS-C24**	585 mm	82 mm	165 mm	158 mm	169 mm	219 mm

The centre of installation plate should be at more than ① at right and left of the wall.

The distance from installation plate edge to ceiling should more than ②.

From installation plate left edge to unit's left side is ③.

From installation plate right edge to unit's right side is ④.

- Ⓑ : For left side piping, piping connection for liquid should be about ⑤ from this line.
: For left side piping, piping connection gas should be about ⑥ from this line.

- Mount the installation plate on the wall with 5 screws or more (at least 5 screws).
(If mounting the unit on the concrete 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.
- Drill the piping plate hole with $\varnothing 70$ mm hole-core drill.
 - Putting measuring tape at position as shown in the diagram above.
The hole centre is obtained by measuring the distance namely 128 mm for left and right hole respectively. Another method is intersection point of arrow mark extension.
The meeting point of the extension arrow mark is the hole center position.
 - Drill the piping hole at either the right or the left and the hole should be slightly slanting to the outdoor side. (refer to step 3)

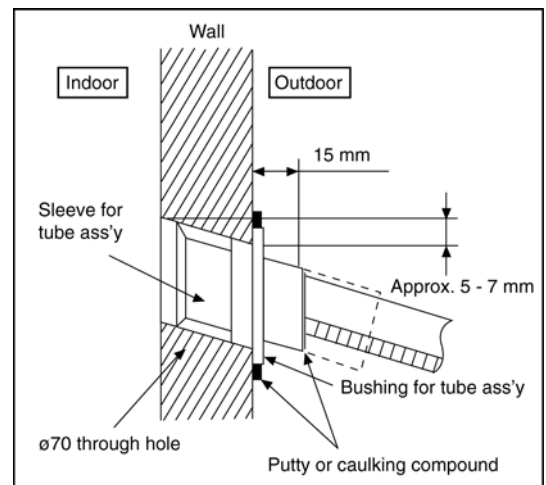
11.2.2 To Drill a Hole in the Wall and Install a Sleeve of Piping

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

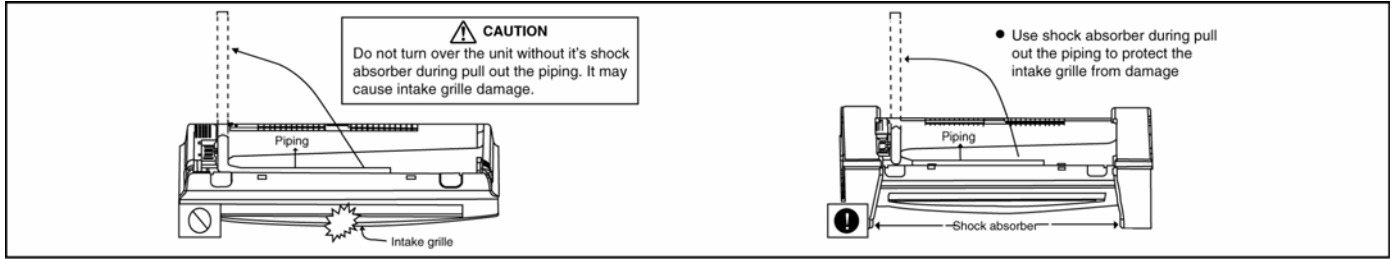
Caution

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.

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



11.2.3 Indoor Unit Installation



11.2.3.1 For the right rear piping

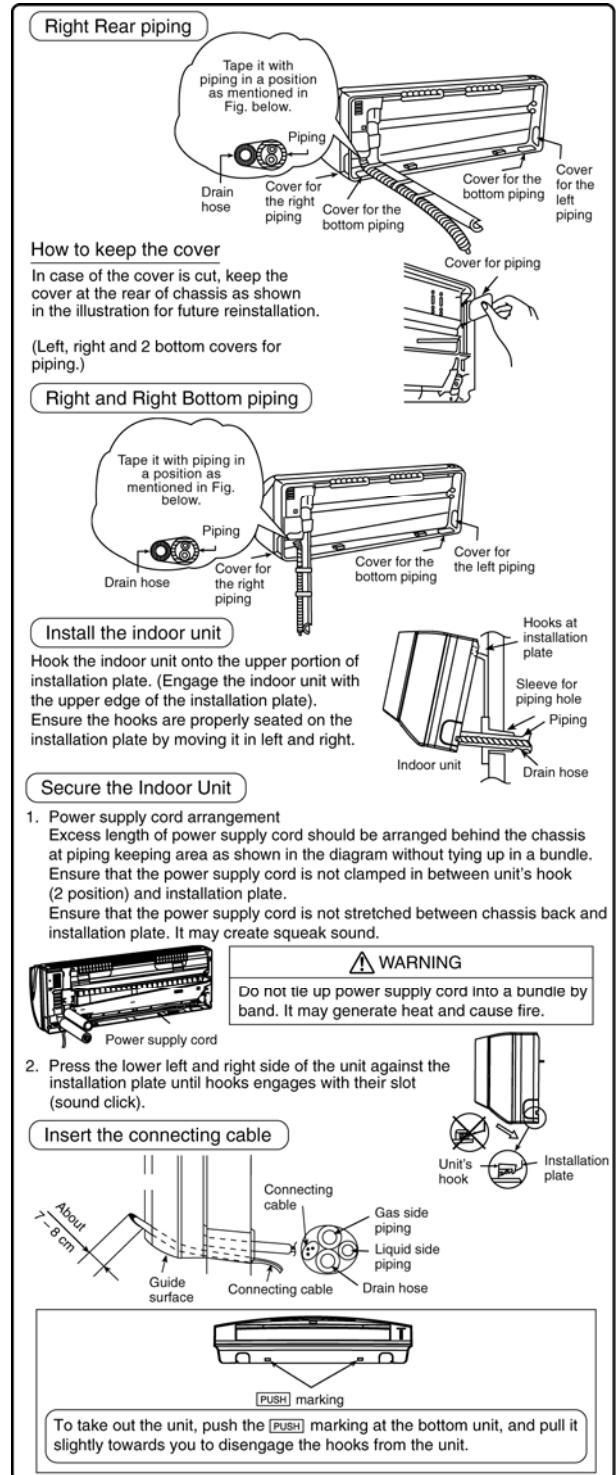
- Step-1** Pull out the Indoor piping
- Step-2** Install the Indoor Unit
- Step-3** Secure the Indoor Unit
 - If indoor power supply, excess length of power supply must arrange accordingly, please refer "Power supply cord arrangement" before secure the indoor unit.
- Step-4** Insert the connecting cable

11.2.3.2 For the right and right bottom piping

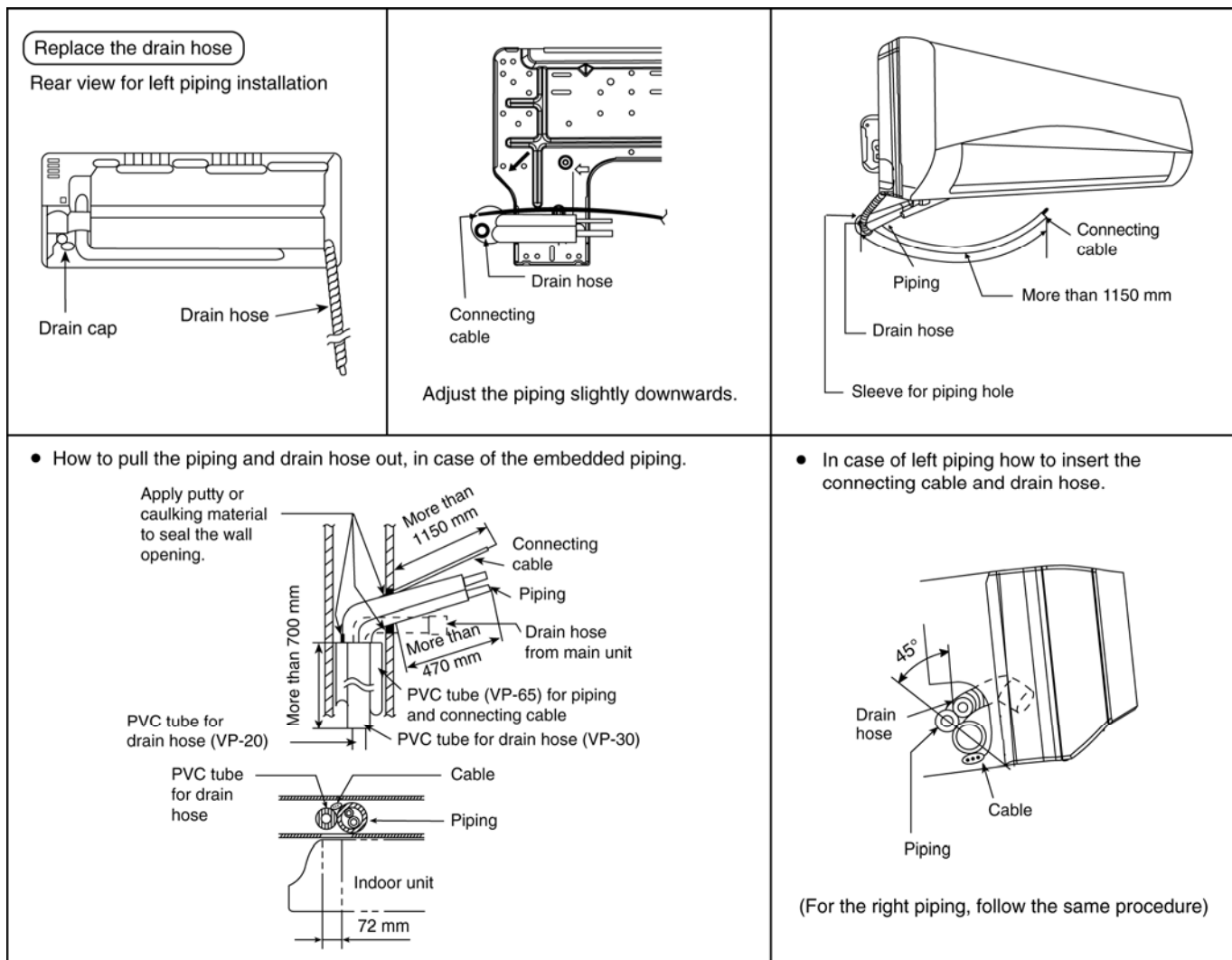
- Step-1** Pull out the Indoor piping
- Step-2** Install the Indoor Unit
- Step-3** Insert the connecting cable
- Step-4** Secure the Indoor Unit
 - If indoor power supply, excess length of power supply must arrange accordingly, please refer "Power supply cord arrangement" before secure the indoor unit.

11.2.3.3 For the embedded piping

- Step-1** Replace the drain hose
- Step-2** Bend the embedded piping
 - Use a spring bender or equivalent to bend the piping so that the piping is not crushed.
- Step-3** Pull the connecting cable into Indoor Unit
 - The power supply cable and indoor unit and outdoor unit connecting cable can be connected without removing the front grille.
- Step-4** 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".
- Step-5** Install the Indoor Unit
- Step-6** 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.)
- Step-7** Insulate and finish the piping
 - Please refer to "Piping and finishing" column of outdoor section and "Insulation of piping connection" column as mentioned in indoor/outdoor unit installation.
- Step-8** Secure the Indoor Unit



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

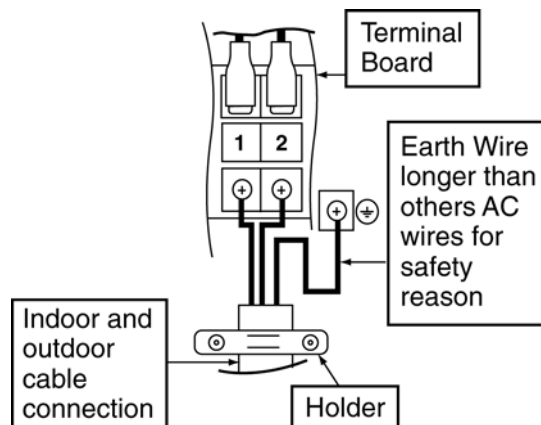


11.2.4 Connect the Cable to the Indoor Unit

1. The inside and outside connecting cable can be connected without removing the front grille.
2. a) INDOOR POWER SUPPLY MODEL

Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 3 x 1.5 mm² (3/4 ~ 1.5HP) or 3 x 2.5 mm² (2.0 ~ 2.5HP) or 3 x 4.0 mm² (3.0HP) flexible cord, type designation 245 IEC 57 or heavier cord.

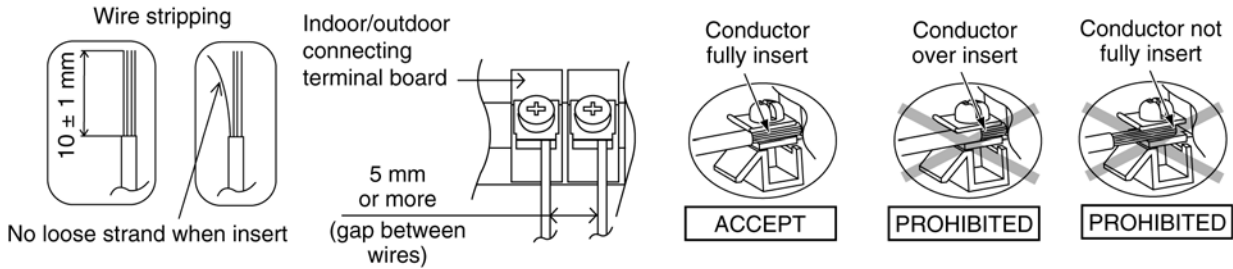
Terminals on the indoor unit	1	2	
Colour of wires			
Terminals on the outdoor unit	1	2	



Secure the connecting cable onto the control board with the holder.

⊕ This equipment must be properly earthed.

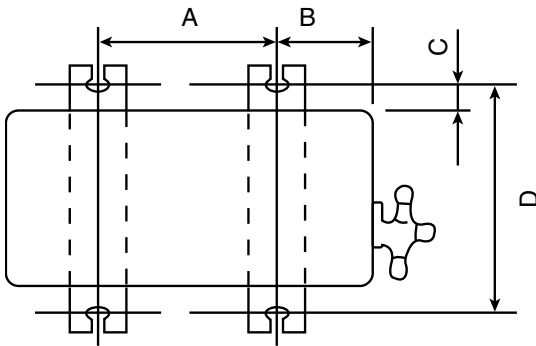
11.2.5 Wire Stripping And Connecting Requirement



11.3 Outdoor Unit

11.3.1 Install the Outdoor Unit

- After selecting the best location, start installation according to indoor/outdoor unit installation diagram.
 - Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut (ø10mm).
 - When installing at roof, please consider strong wind and earthquake. Please fasten the installation stand firmly with bolt or nails.



Model	A	B	C	D
C7**, RU-C7** C9**, RU-C9**	474 mm	87 mm	18.5 mm	261 mm
C12**, RU-C12**	570 mm	105 mm	18.5 mm	320 mm
C18**, RU-C18**, C24**, RU-C24**, C28**	612.5 mm	131 mm	19 mm	383 mm

11.3.2 Connecting the Piping

11.3.2.1 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.

11.3.2.2 Connecting the piping to outdoor unit

Decide piping length and then cut by using pipe cutter. Remove burrs from cut edge.

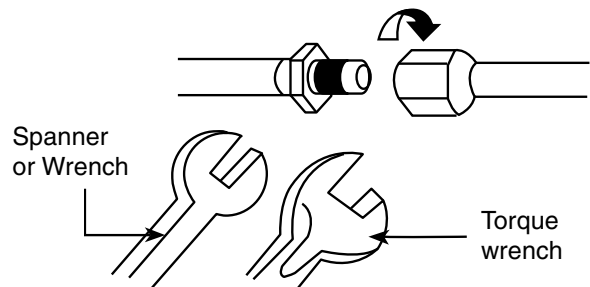
Make flare after inserting the flare nut (locate at valve) onto the copper pipe.

Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.

Piping size	Torque
1/4" (6.35 mm)	[18 N•m (1.8 kgf.m)]
3/8" (9.52 mm)	[42 N•m (4.3 kgf.m)]
1/2" (12.7 mm)	[55 N•m (5.6 kgf.m)]
5/8" (15.88 mm)	[65 N•m (6.6 kgf.m)]
3/4" (19.05 mm)	[100 N•m (10.2 kgf.m)]

WARNING

Do not over tighten, over tightening cause gas leakage

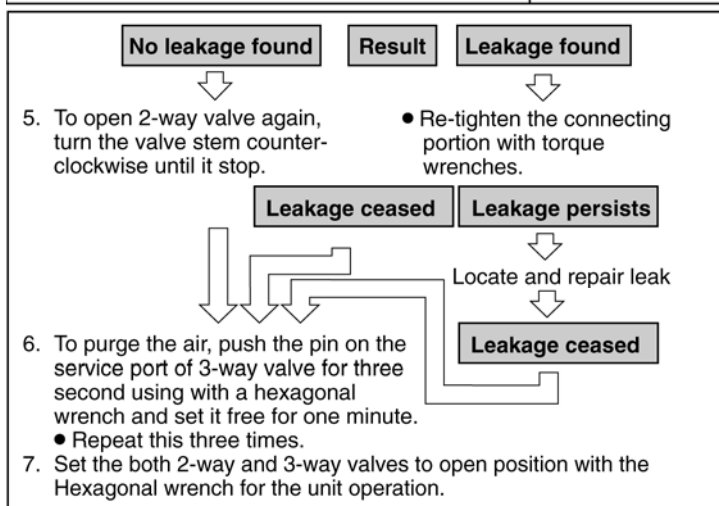
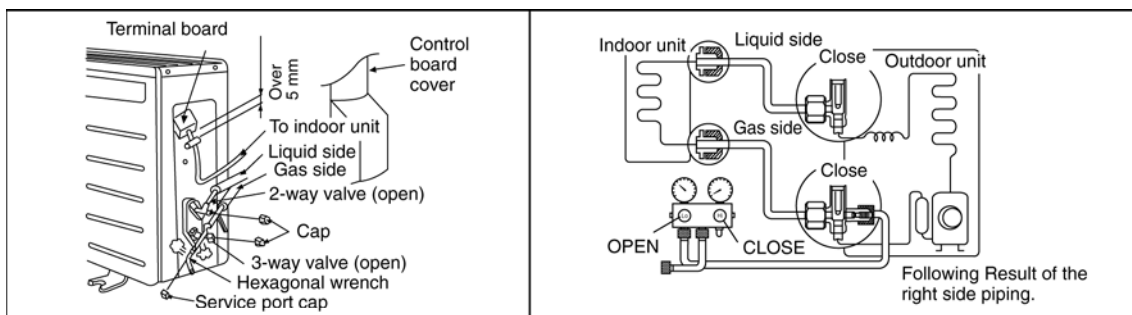


11.3.3 Air Purging of the Piping and Indoor

The remaining air in the Refrigerant cycle which contains moisture may cause malfunction on the compressor.

- Remove the caps from the 2-way and 3-way valves.
- Remove the service-port cap from the 3-way valves.

- 3 To open the valve, turn the valve stem of 2-way valve counter-clockwise approx. 90° and hold it there for ten seconds, then close it.
- 4 Check gas-leakage of the connecting portion of the pipings.
 - For the left piping, refer to 4 (A).

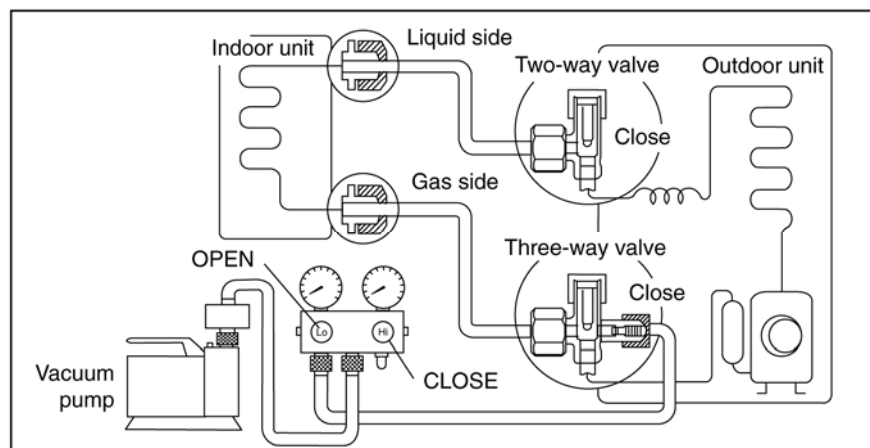


- 4(A). Checking gas leakage for left piping
- 1) a. Connect the manifold gauge to the service port of 3-way valve.
b. Measure the pressure.
 - 2) a. Keep it for 5-10 minutes.
b. Ensure that the pressure indicated on the gauge is the same as that of measured during the first time.

Evacuation (vacuum method) is recommended, for model 2.0 HP ~ 3.0 HP with the piping length more than 5 meter.

11.3.4 Evacuation of the Equipment

WHEN INSTALLING AN AIR CONDITIONER, BE SURE TO EVACUATE THE AIR INSIDE THE INDOOR UNIT AND PIPES in the following procedure.



- 1 Connect a charging hose with a push pin to the Low side of a charging set and the service port of the 3-way valve.
 - Be sure to connect the end of the charging hose with the push pin to the service port.
- 2 Connect the center hose of the charging set to a vacuum pump.
- 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 TAKE THIS PROCEDURE IN ORDER TO AVOID REFRIGERENT GAS LEAKAGE.
- 5 Disconnect the charging hose from the vacuum pump and 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 (4 mm).
- 8 Mount valve caps onto the 2-way valve and the 3-way valve.
 - Be sure to check for gas leakage.

- If gauge needle does not move from 0 cmHg (0 MPa) to -76 cmHg (-01 MPa), in the 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 location of leak.
- Do not release refrigerant during piping work for installation and reinstallation.
Take care of the liquid refrigerant, it may cause frostbite.

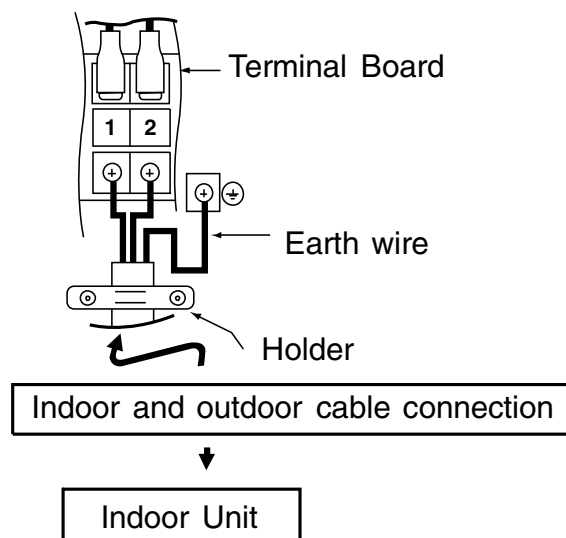
11.3.5 Connect the cable to the Outdoor Unit

a) INDOOR POWER SUPPLY MODEL

- 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 $3 \times 1.5\text{mm}^2$ (3/4 ~ 1.5HP) or $3 \times 2.5\text{mm}^2$ (2.0 ~ 2.5HP) or $3 \times 4.0\text{mm}^2$ (3.0HP) flexible cord, type designation 245 IEC 57 or heavier cord.

Terminals on the outdoor unit	1	2	
Colour of wires			
Terminals on the indoor unit	1	2	

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



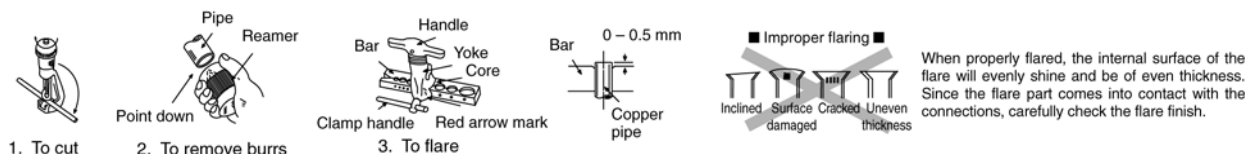
⚡ This equipment must be properly earthed.

11.3.6 Pipe Insulation

- 1 Please carry out insulation at pipe connection portion as mentioned in Indoor/Outdoor Unit Installation Diagram. Please wrap 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.

11.3.6.1 Cutting and flaring the piping

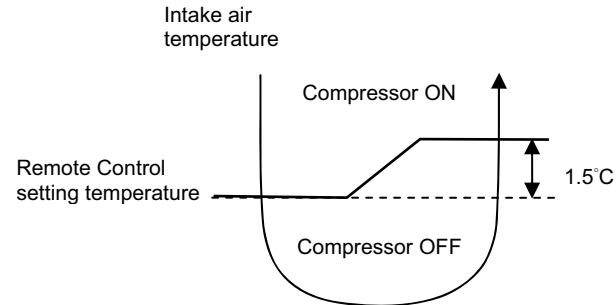
- 1 Please cut using pipe cutter and then remove the burrs.
- 2 Remove the burrs by using reamer. If burrs are not removed, gas leakage may be caused. Turn the piping end down to avoid the metal powder entering the pipe.
- 3 Please make flare after inserting the flare nut onto the copper pipes.



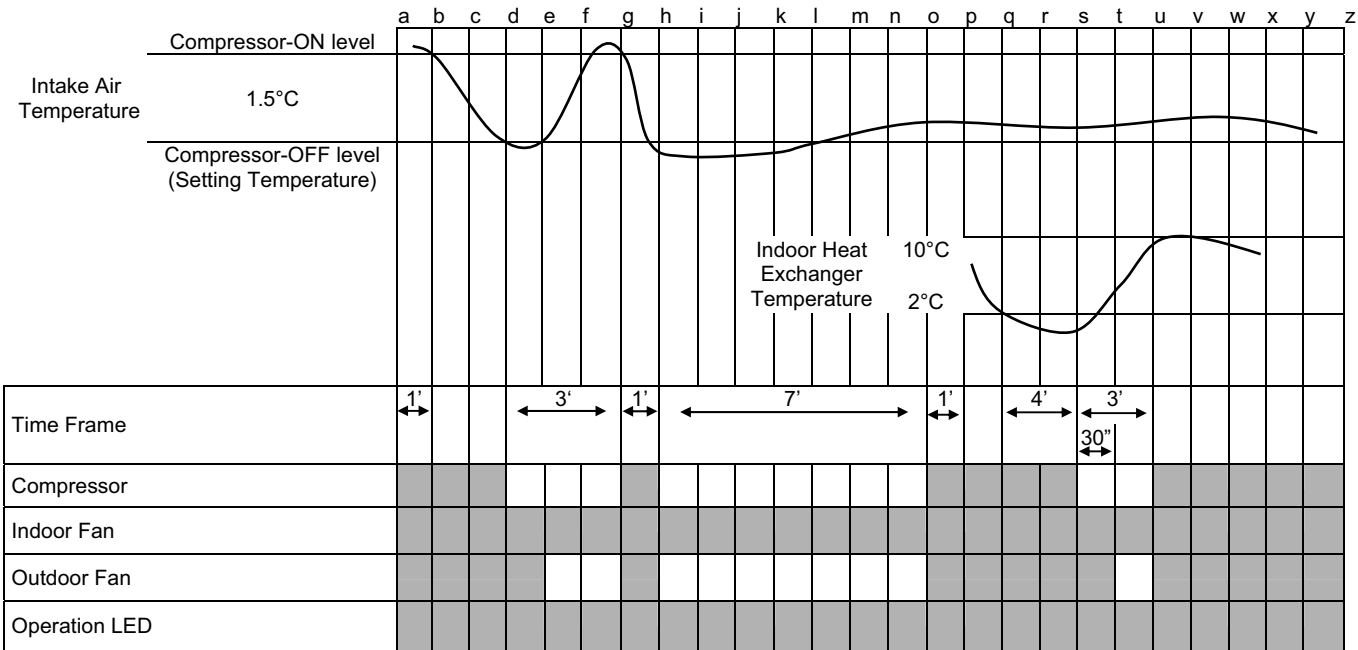
12. Operation Control

12.1 Cooling Operation

- Cooling operation can be set using remote control.
- This operation is applied to cool down the room temperature to the setting temperature sets by the remote control.
- The remote control setting temperature, which takes the reading of intake air temperature sensor, can be adjusted from 16°C to 30°C.
- During cooling operation, the compressor will stop and restart as shown in figure below:



12.1.1 Cooling Operation Time Diagram



<Description of operation>

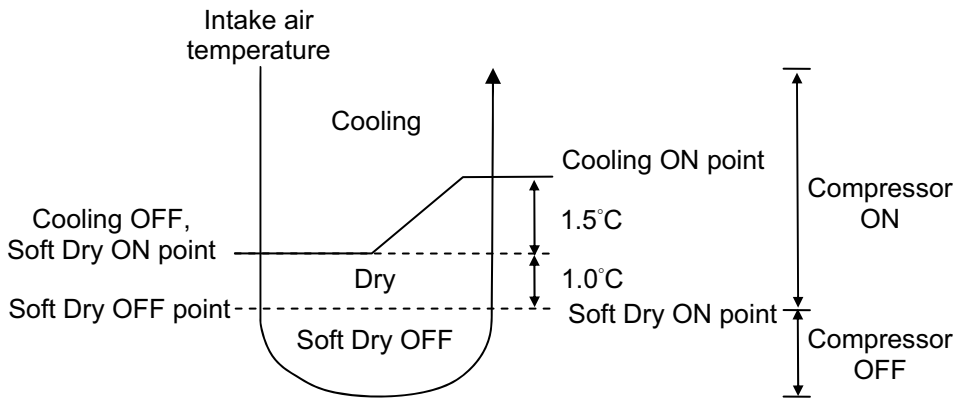
- a – b, g – h : Minimum 60 seconds forced operation
- d – g, s – u : Minimum 3 minutes restart control (Time Delay Safety Control)
- h – o : Maximum 7 minutes time save control
- q – u : Freeze Prevention Control

■ Operation

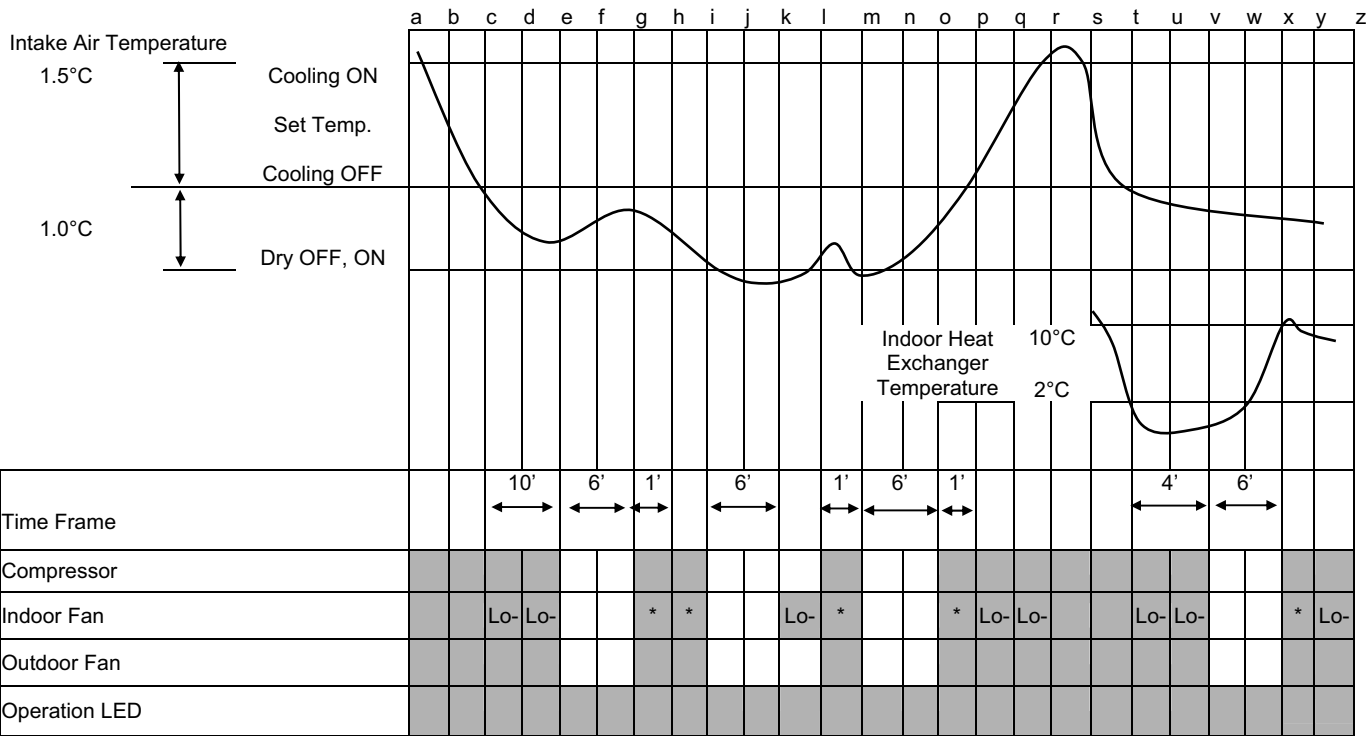
□ Stop

12.2 Soft Dry Operation

- Soft Dry operation can be set using remote control.
- Soft Dry operation is applied to dehumidify and to perform a gentle cooling to the room.
- This operation starts when the intake air temperature sensor reaches -1.5°C from the setting temperature on the remote control.
- When operation begins, Soft Dry will be switched ON for a maximum 10 minutes, then Soft Dry operation will be turned OFF for a minimum 6 minutes. After that, the Soft Dry operation will be ON and OFF based on the setting temperature as shown in figure below.
- However after 3 minutes of compressor off, during Soft Dry OFF (within 6 minutes Soft Dry restart control), the indoor unit will start to operate at normal Cooling mode if the intake temperature is higher than Cooling ON point.



12.2.1 Soft Dry Operation Time Diagram



<Description of operation>

- g – h, l – m, o – p : Minimum 60 seconds forced operation
- a – c : Minimum 3 minutes restart control (Time Delay Safety Control) – Cooling operation
- c – e : 10 minutes dry operation
- e – g, i – k, m – o, v – x : Minimum 6 minutes restart control (Time Delay Safety Control) – Soft dry operation
- t – x : Freeze Prevention Control
- * : Indoor fan OFF for 40" and then rotates at Lo-

Operation

Stop

12.3 Automatic Operation

- Automatic operation can be set using remote control.
- This operation starts to operate with indoor fan at SLo speed for 20 seconds to judge the intake air temperature.
- After judged the temperature, the operation mode is determined by referring to the below standard.

Intake Air Temperature	↑ 23°C ↓	Cooling Operation
		Soft Dry Operation

- Then, the unit starts to operate at determined operation mode, until it is switched off using remote control, with the setting temperature as shown in table below.

	Setting Temperature (Standard)
Cooling Operation	25°C
Soft Dry Operation	22°C

- The setting temperature for all the operations can be changed one level up or one level down from the standard temperature as shown in table below by pressing the temperature up or temperature down button at remote control.

			Cooling	Soft Dry
Higher	→	+2°C	27°C	24°C
Standard	→	±0°C	25°C	22°C
Lower	→	-2°C	23°C	20°C

- The operation mode judging temperature and standard setting temperature can be increased by 2°C permanently, by open the circuit of JX03 at indoor unit's printed circuit board.

Intake Air Temperature	↑ 25°C ↓	Cooling Operation		Setting Temperature (Standard)
		Soft Dry Operation		
		Cooling Operation		27°C
		Soft Dry Operation		24°C

12.4 Indoor Fan Speed Control

- Indoor fan speed can be set using remote control

12.4.1 Fan Speed Rotation Chart

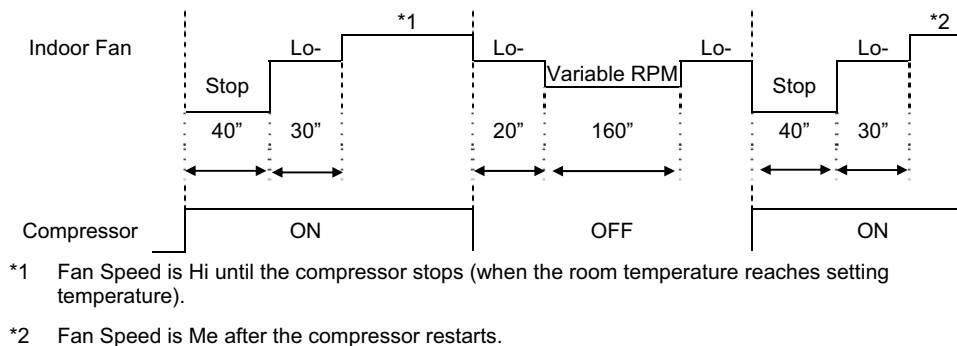
Speed	Fan Speed (rpm)	
	CS-C9JKV	CS-C12JKV
SHi	1130	1130
Hi	1030	1110
Me	850	930
HLo	690	790
CLo	650	750
Lo-	610	710
SLo	590	690
QHi	960	1040
QMe	780	860
QLo	580	680

12.4.2 Automatic Fan Speed Control

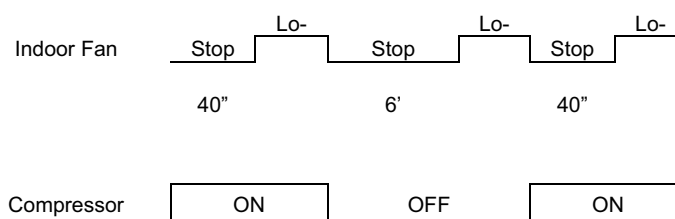
- When set to Auto Fan Speed, the fan speed is adjusted between maximum and minimum setting as shown in the table.
 - Fan speed rotates in the range of Hi and Me.
 - Deodorizing Control will be activated.

				SHi	Hi	Me	HLo	CLo	Lo-	SLo	Stop
Cooling	Normal	Manual	Hi		○						
			Me			○					
			Lo				○				
		Auto			○	○		○			○
	Quiet	Manual	QHi		Hi-70						
			QMe			Me-70					
			QLo					CLo-70			
		Auto			○	○			○		○
	Powerful	Manual		○							
		Auto			○	○		○			○
Soft Dry	Normal	Manual							○		○
		Auto			○	○		○	○		○
	Quiet	Manual							○		○
		Auto			○	○		○	○		○
	Powerful	Manual							○		○
		Auto			○	○		○	○		○
Mode Judgment										○	

- Auto Fan Speed during cooling operation:
 - Indoor fan will rotate alternately between off and on as shown in below diagram.
 - At the beginning of each compressor starts operation, indoor fan speed increases gradually for deodorizing purpose.
 - For the first time the compressor operates, indoor fan will be switched to Hi fan speed from Lo- after 70 seconds from the start of compressor. This cause the room temperature to achieve the setting temperature quickly.
 - During compressor stops, indoor fan will operate at Lo- for the beginning 20 seconds to prevent higher volume of refrigerant in liquid form returning to the compressor.
 - After the compressor turned off for 3 minutes, indoor fan will start to operate at Lo- to circulate the air in the room. This is to obtain the actual reading of the intake air temperature.
 - For the resume of compressor operation, indoor fan will operate at Me fan speed to provide comfort and lesser noise environment, after 70 seconds from the restarts of compressor.



- Auto Fan Speed during Soft Dry operation:
 - Indoor fan will rotate alternately between off and Lo-.
 - At the beginning of each compressor starts operation, indoor fan will increase fan speed gradually for deodorizing purpose.
 - When compressor turned off for 6 minutes, indoor fan will start at Lo- to circulate the air in the room. This is to obtain the actual reading of intake air temperature.



12.4.3 Manual Fan Speed Control

- Manual fan speed adjustment can be carried out by using the Fan Speed selection button at the remote control.
- There are 3 types of fan speed settings: Lo, Me, Hi.

12.4.4 Indoor Fan Motor rpm Abnormal Control

- Immediate after the fan motor is started, rpm abnormal control is performed every second.
- During fan motor on, if fan motor feedback ≥ 2550 rpm or < 50 rpm continuously for 10 seconds, the fan motor error counter increased; fan motor is then stopped and restarted. If the fan motor error counter increased to 7, then air conditioner will stop operation.

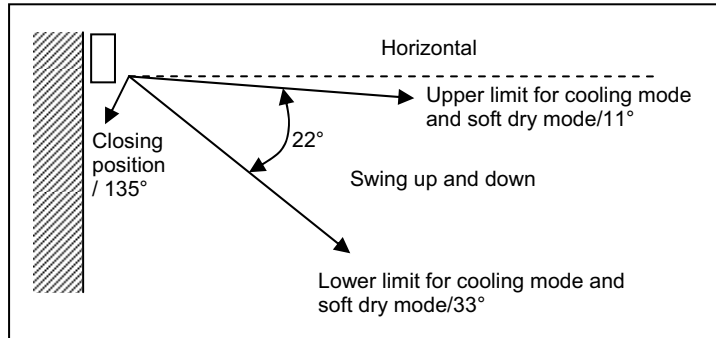
12.5 Outdoor Fan Speed Control

- There is only one speed for outdoor fan motor.
- When the air conditioner is turned on, the compressor and the outdoor fan will operate simultaneously.
- Likewise, both compressor and outdoor fan will stop at the same time if the unit is turned off.

12.6 Vertical Airflow Direction Control

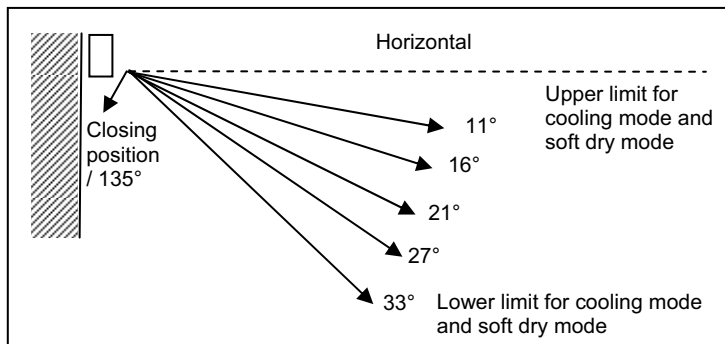
12.6.1 Auto Control

- When the vertical airflow direction is set to Auto using the remote control, the louver swings up and down as shown in the diagram.
- When stops operation using the remote control, the discharge vent is reset and stops at the closing position.
- During Cooling operation or Soft Dry operation, indoor fan motor may stop to rotate at certain periods. At that condition, the louver will stop swinging.



12.6.2 Manual Control

- When the vertical airflow direction is set to Manual using the remote control, the automatic airflow is released and the airflow direction louver move up and down in the range shown in the diagram.
- The louver can be adjusted by pressing the button to the desired louver position.
- When stop operation using the remote control, the discharge vent is reset, and stop at the closing position.



12.7 Horizontal Airflow Direction Control

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

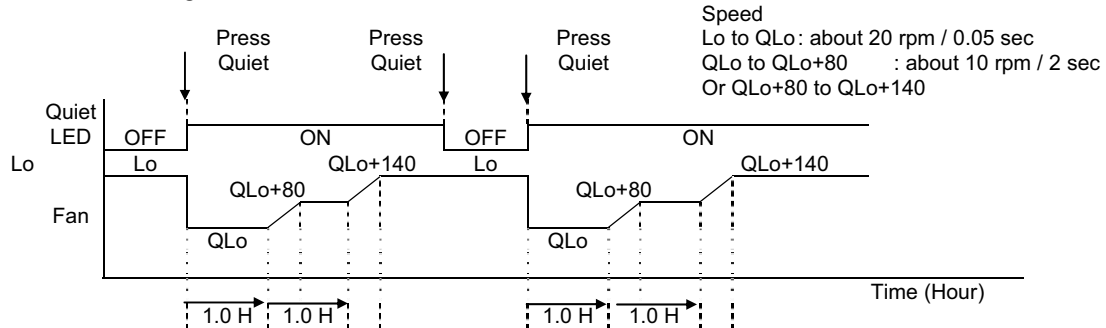
12.8 Powerful Operation

- To achieve the setting temperature quickly.
- When powerful operation is set, the setting temperature will be automatically decreased 3°C internally against the present setting temperature (Lower temperature limit: 16°C).
- This operation automatically running under Shi fan speed (Cooling), Lo- Fan Speed (Soft Dry).
- Vertical Airflow Direction:
 - In "Manual" setting, the vane will automatically shift down 10° lower than previous setting.
 - In "Auto" setting, the vane will automatically swing up and down. However the lower limit will be shifted 10° downward.
- Powerful operation stops when:
 - Quiet/Powerful button is pressed again
 - Powerful operation has operate for 15 minutes
 - Stopped by OFF/ON operation button.
 - Timer OFF activates
 - Operation mode is changed

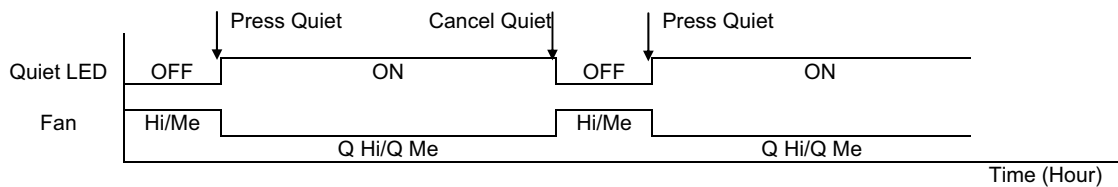
12.9 Quiet Operation

(For Cooling Operation or cooling region of Soft Dry Operation)

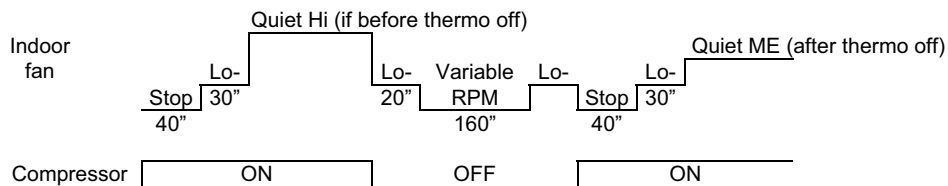
- To provide quiet cooling operation condition.
- Once the Quiet Operation is set at the remote control, the Quiet LED illuminated. The sound level will reduce around 2dB(A) for Lo fan speed or 3dB(A) for Hi/Me fan speed against the present operation sound level.
- Dew formation become severe at Quite Lo Cool, therefore Quiet Lo cool operated only for 2 hours (1 hour QLo, 1 hour QLo + 80 rpm). After that, it goes back to Lo cool (However Quiet LED remains illuminated).
- Manual Airflow Direction:
 - RPM control during Lo cool



- RPM control during Hi & Me cool



- Auto Fan Speed



- Quiet operation stops when:
 - Quiet button is pressed again.
 - Stopped by OFF/ON operation button.
 - Timer OFF activates.
 - Operation mode button is changed.

12.10 Timer Control

12.10.1 ON Timer

- When the ON Timer is set using the remote control, the unit will start to operate slightly before the set time, so that the room will reach nearly to the set temperature by the set time.
- For Cooling and Soft Dry operation, the operation will start 15 minutes before the set time.
- For Automatic operation, the indoor fan will operate at SLo speed for 20 seconds, 30 minutes before the set time to detect the intake air temperature to determine the operation mode. The Power indicator will blink at this time.

12.10.2 OFF Timer

- When the OFF Timer is set by using the remote control, the unit will stop operate according to the desired setting.
Notes:
 - 1 By pressing ON/OFF operation button, the ON Timer or OFF Timer setting will not be cancelled.
 - 2 To cancel the previous timer setting, press CANCEL button.
 - 3 To activate the previous timer setting, press SET button.
 - 4 If main power supply is switched off, the Timer setting will be cancelled.

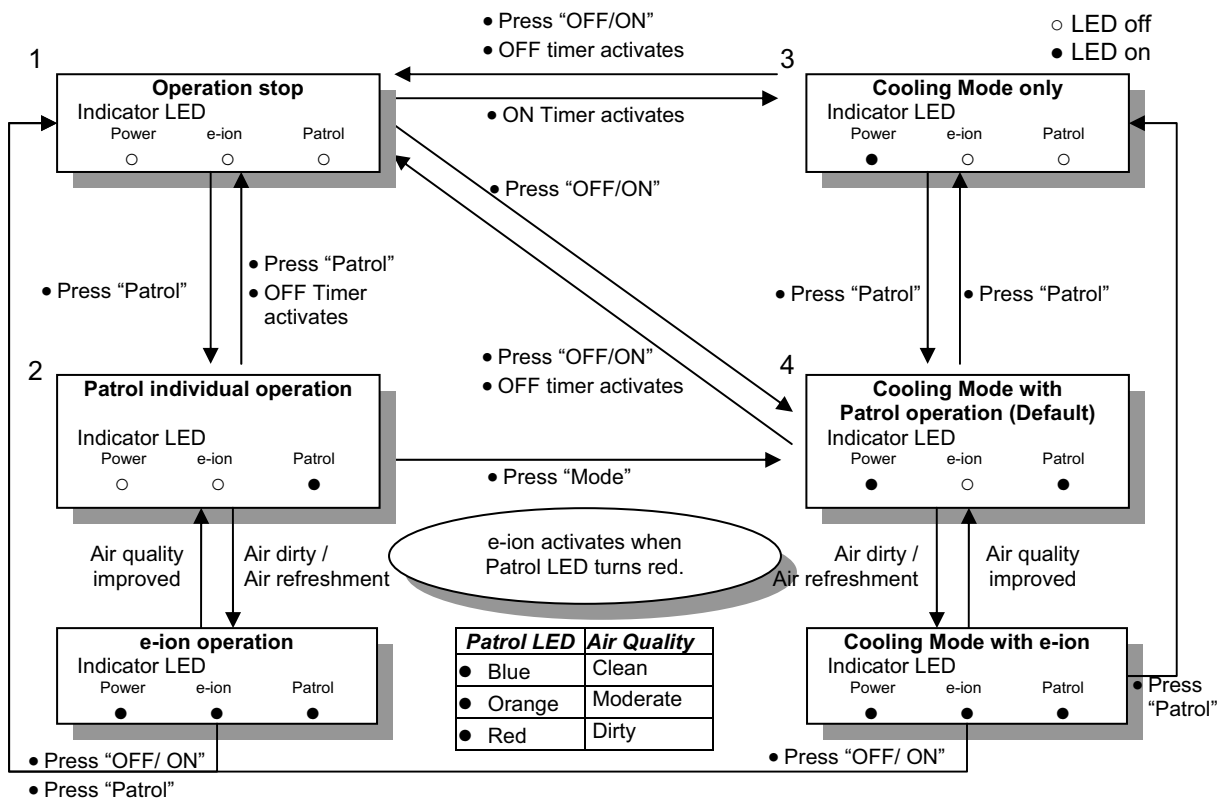
12.11 Random Auto Restart Control

- If there is a power failure during operation, the air conditioner will automatically restart after 3 to 4 minutes when the power is resumed.
- It will start with previous operation mode and airflow direction.
- If there are more than one air conditioner unit in operation and power failure occur, restart time for each unit to operate will be decided randomly using 4 parameters: intake air temperature, setting temperature, fan speed and air swing louver position.
- This random Auto Restart Control is not available when Timer is set.

12.12 Remote Control Signal Receiving Sound

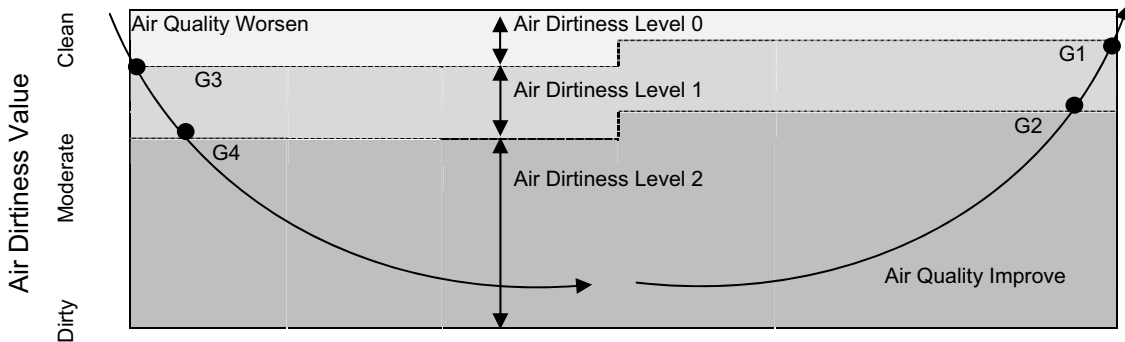
- Short beep sound will be heard when turn ON the air conditioner or enabling other operations.
- Long beep sound will be heard when turn OFF the air conditioner or disabling other operations.

12.13 Patrol Operation



- To monitor air dirtiness level by using Patrol sensor and to maintain air freshness by activates e-ion operation
- Patrol operation starts condition
 - When the unit operation is started with "OFF/ON" button
 - When the unit stops, "Patrol" button is pressed, Patrol individual operation will start.
 - During cooling only operation, "Patrol" button is pressed.
- Patrol operation stops condition (when any of the following condition is fulfilled):
 - When "OFF/ON" button is pressed.
 - During any operation with Patrol, "Patrol" button is pressed again.
 - When "e-ion" button is pressed.
 - When OFF Timer activates.
- Patrol operation disable
 - To disable the Patrol Operation during unit starts (default) with "OFF/ON" button, press "Patrol" button and hold for 5 seconds, then release.
 - To disable the Patrol Operation, press "Patrol" button and hold for 15 seconds, then release.

- Patrol Sensor Control
 - First 2 minutes from Patrol function activates is stabilization time, during stabilization time, no air dirtiness level is monitored. The Air Dirtiness level is set to Clean, Patrol LED turns blue color.
 - After that, Patrol sensor starts to record the resistance value at fixed interval. Higher resistance value indicates cleaner air.
 - The air dirtiness level is monitored by comparing the current resistance value with maximum resistance value from time to time to get the Air Dirtiness Value.
 - There are 3 air dirtiness level, based on the Air Dirtiness Value:
 - Air Dirtiness level 0: Clean – Patrol LED = blue color
 - Air Dirtiness level 1: Moderate – Patrol LED = orange color
 - Air Dirtiness level 2: Contaminated – Patrol LED = red color



- Dirtiness level sensitivity adjustment

It is possible to change the Patrol sensor sensitivity, where the Threshold value (G1 ~ G4) will be shifted accordingly:

 - 1 Press and release “SET” button.
 - 2 Press Timer ▲ / Timer ▼ button to select sensitivity.
(Air 1 “Low Sensitivity” ↔ Air 2 “Standard” (Default) ↔ Air 3 “High Sensitivity”)
 - 3 Confirm setting by pressing “Timer Set” button. LCD returned to original display after 2 seconds.
 - 4 LCD returned to original display if remote control does not operate for 30 seconds
- e-ion Control
 - e-ion operation starts condition
 - When dirtiness at level 2 (Patrol LED turns red).
 - 2 minutes after stabilization time (Patrol LED turns red).
 - 4 hours at level 0 (Patrol LED turns red).
 - e-ion operation time
 - If dirtiness level improves from level 2 to level 1 (Patrol LED from red to orange), the unit carries out level change after 60 seconds.
 - When dirtiness level returns to level 0 (Patrol LED turns blue) continuously for 11 minutes or more, e-ion operation stops.
- Dirtiness Level and fan speed
 - When e-ion operation starts, the fan speed increases based on dirtiness level:

	Dirtiness level	rpm shift	
		Patrol individual operation	Combine operation
e-ion ON	Dirtiness level 0	No change	No change
	Dirtiness level 1	+ 20	+ 20
	Dirtiness level 2	+ 40	+ 40

 - Indoor Fan Control
 - During any operation mode combines with Patrol operation, fan speed follows respective operation mode.
 - During Patrol individual operation if e-ion starts, only Auto Fan Speed and no Powerful operation is allowed. Even if “Fan Speed” button is pressed, no signal is sent to air conditioner, and no change on LCD display.
 - During Patrol individual operation if e-ion stops, Indoor Fan stop operation.
- Airflow direction (Horizontal, Vertical) Control
 - During any operation mode combines with Patrol operation, air flow direction follows respective operation mode.
 - During Patrol individual operation if e-ion starts, only Auto Air Swing is allowed. Even if “Air Swing” button is pressed, no signal is sent to air conditioner, and no change on LCD display.
 - During Patrol individual operation if e-ion stops, Airflow direction louver closed.

- Indicator

- When Patrol operation starts, Patrol LED is ON with 3 different colors:

Patrol LED	Air Quality
Blue	Clean
Orange	Moderate
Red	Dirty

- Then e-ion operation starts based on dirtiness level, both Patrol LED and e-ion LED are ON

- Remote Control Receiving Sound

- Normal Operation → Patrol Mode : Beep
- Patrol Mode → Stop : Long Beep
- Patrol Mode → Normal Operation : Beep
- Stop → Patrol : Beep

- Timer Control

- When ON timer activates when unit stops, previous operation resumes and restored last saved Patrol operation status.
- When ON timer activates during any operation, no change and carry on current operation.
- When OFF timer activates during any operation, all operation stops and the latest Patrol operation status is saved.

- Power Failure Control

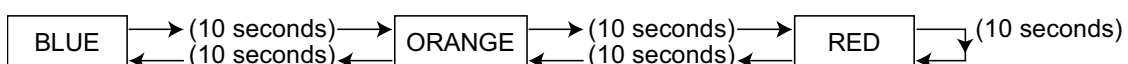
- During Patrol individual operation, if power failure occurs, after power resumes, Patrol individual operation resumes immediately.
- During combination operation, if power failure occurs, after power resumes combination operation resume immediately.
- When e-ion operation is ON during Patrol operation, if power failure occurs, after power resumes, only Patrol operation will resume but e-ion operation will not resume.

- Error Detection Control

- The Patrol error detection control starts once the power is supplied to Patrol sensor. However, the error will display when the Patrol operation is ON.
- Error detection method:
 - If the Patrol sensor is opened circuit continuously for 6 hours, Patrol sensor error occurs. However, the error will display only when the Patrol operation is ON.
- Patrol Sensor Control after error occurs
 - During any operation mode combines with Patrol operation
 - Power supply to Patrol sensor is OFF
 - Air conditioner normal mode operation continues with Patrol LED blinking.
 - The Patrol LED continues blinking if the patrol operation is ON and stops blinking if the patrol operation is OFF.
 - During Patrol individual mode
 - Power supply to Patrol sensor is OFF
 - Patrol LED blinks.
 - The Patrol LED continues blinking if the Patrol operation is ON and stops blinking if the Patrol operation is OFF
- Error cancel condition:
- Power supply reset

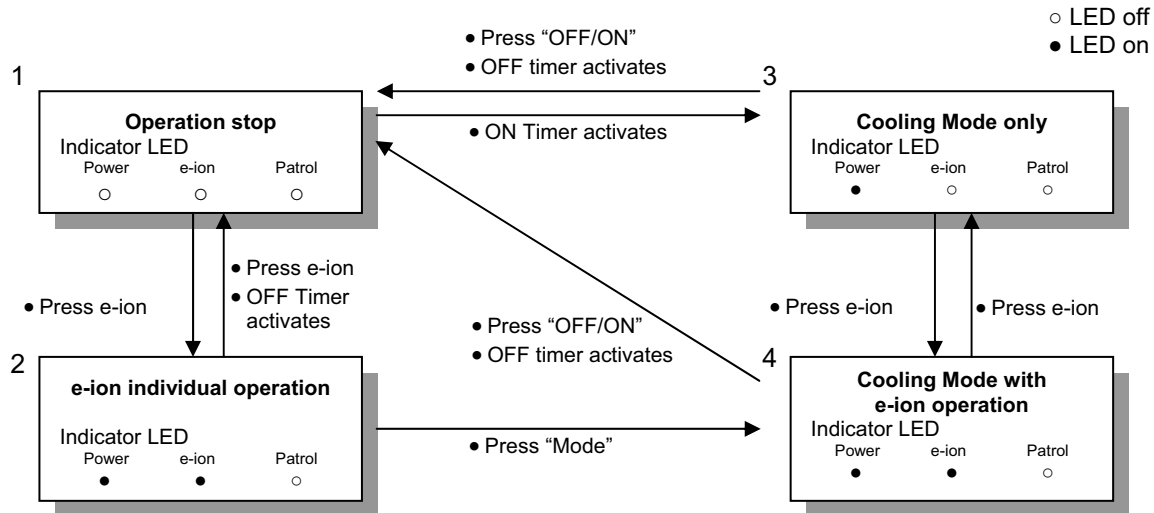
- Patrol Operation Demo Mode

- Patrol Operation Demo Mode start condition
 - Press "Auto OFF/ON" button at indoor unit for 5 seconds to enter Forced Cooling Operation, then press "Patrol" button at remote control for 5 seconds and release.
- The Patrol indicator change color every 10 seconds follows the pattern below for demo purpose:



- During demo, all operation stops, remote control buttons and auto OFF/ON button are ignored.
- Patrol Operation Demo Mode stop condition
 - Press "Patrol" button for 5 seconds and release.
 - Power supply reset.

12.14 e-ion operation



- This operation provides clean air by producing negative ions to attract dust captured at the positively charged active e-ion filters.
- e-ion operation start condition
 - During unit running at any operation mode, if “e-ion” button is pressed, combination operation (operation mode + e-ion operation) starts.
 - During unit is OFF, if “e-ion” button is pressed, e-ion individual operation starts.
- e-ion operation stop condition
 - When “OFF/ON” button is pressed to stop the operation.
 - When “e-ion” button is pressed again.
 - When “Patrol” button is pressed.
 - When OFF Timer activates.
- e-ion operation pause condition
 - When indoor fan stop (during deice, odor cut control, thermostat off, etc.). e-ion operation resume after indoor fan restarts.
 - When indoor intake temperature $\geq 40^{\circ}\text{C}$. e-ion operation resume after indoor intake temperature $< 40^{\circ}\text{C}$ continuously for 30 minutes.
- Indoor fan control
 - During any operation mode combines with e-ion operation, fan speed follows respective operation mode.
 - During e-ion individual operation – only Auto Fan Speed and no Powerful operation is allowed. Even if Fan Speed button is pressed, no signal is sent to air conditioner, and no change on LCD display.
- Airflow direction control
 - During any operation mode combines with e-ion operation, air flow direction follows respective operation mode.
 - During e-ion individual operation, only Auto Air Swing is allowed. Even if Air Swing button is pressed, no signal is sent to air conditioner, and no change on LCD display.
- Timer control
 - When ON timer activates when unit stops, previous operation resumes and restored last saved e-ion operation status.
 - When ON timer activates during any operation, no change and carry on current operation.
 - When OFF timer activates during any operation, all operation stops and the latest e-ion operation status is saved.
- Indicator
 - When e-ion operation starts, e-ion indicator ON.

- Remote Control Receiving Sound

○ Normal Operation	➔ e-ion Operation	: Beep
○ e-ion Operation	➔ Normal Operation	: Beep
○ Stop	➔ e-ion individual Operation	: Beep
○ e-ion individual Operation	➔ Stop	: Long Beep

- Power failure
 - During e-ion individual operation, if power failure occurs, after power resumes, e-ion individual operation resumes immediately.
 - During combination operation, if power failure occurs, after power resumes, combination operation resume immediately.
 - e-ion operation status is not memorized after OFF the unit. After OFF, when the operation is ON again, air conditioner operates without e-ion operation.

- e-ion Check Mode
 - To check if e-ion is malfunctioning, during e-ion operation press e-ion button for 15 seconds and release to enter e-ion Check Mode and supplies power to the Active e-ion Air Purifying System.
 - If abnormal discharge is detected at filter (short-circuited) due to water or dust adhesion, etc., the e-ion indicator blinks immediately.

- Error Detection Control

When e-ion indicator blink, it indicates error listed below:

 - Active e-ion Air Purifying system PCB main connector open:
 - Judgment Method
 - During e-ion operation (include during Patrol operation), Active e-ion Air Purifying system main connector to PCB is opened.
 - Troubleshooting Methods
 - Connect the connector or stop operation (include during Patrol operation) to cancel the blinking.

- Abnormal Discharge error:
 - Judgment Method
 - During e-ion operation, feedback voltage is-Low (at microcontroller) is detected, it is judged abnormal discharge and stops power supplies to the Active e-ion Air Purifying system.
 - Abnormal discharge is caused by ionizer or filter's high voltage power supply short-circuits due to water or dust adhesion, and so forth.
 - When abnormal discharge occurred, every 30 minutes the unit supplies power to the Active e-ion Air Purifying system.
 - When abnormal discharge occurs for 24 times continuously, e-ion indicator blinks (not applicable for e-ion Check Mode, where the error will show immediately despite the 24 times counter)
 - Troubleshooting Method
 - Press "e-ion" button or "OFF/ON" button to stop the operation and check the Active e-ion Air Purifying system main connector to PCB.
 - After that, press "e-ion" button again to confirm the e-ion indicator not blinking.
 - The 24 times counter will be clear after 10 minutes of normal operation or when operation stops.
 - Error Reset Method
 - Press "OFF/ON" button to OFF the operation.
 - Press AUTO OFF/ON button at indoor unit to OFF the operation.
 - OFF Timer activates
 - Press "e-ion" button during e-ion individual mode.
 - Power supply reset
- Active e-ion Air Purifying system breakdown error:
 - Judgment Method
 - When hi-feedback voltage (at microcontroller) supplied to filter during e-ion stop, Active e-ion Air Purifying system breakdown error shows immediately.
 - It is due to indoor PCB or filter's high voltage power supply damage.
 - Operations except e-ion continue. Both Timer indicator and e-ion indicator blink.
 - Troubleshooting Method
 - Press "e-ion" button or "OFF/ON" button to stop the operation.
 - Change main circuit board or filter's high voltage power supply.
 - When lo-feedback voltage supplied to Active e-ion Air Purifying system during e-ion operation, e-ion indicator and Timer indicator stop blinking.

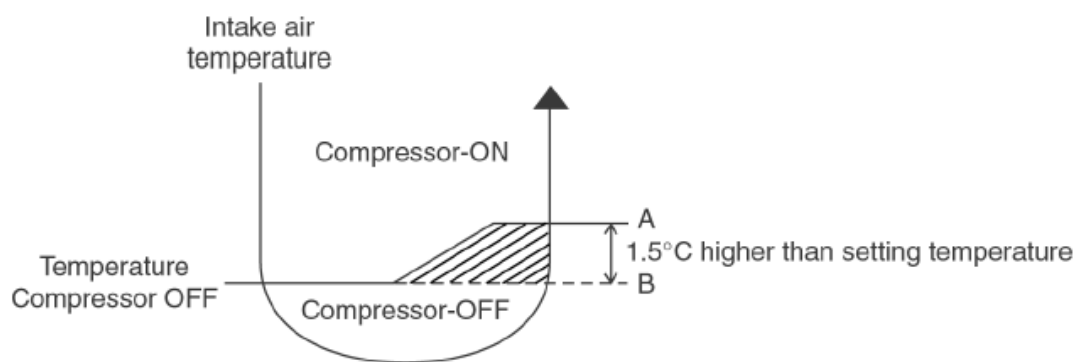
13. Protection Control

13.1 Restart Control (Time Delay Safety Control)

- When the thermo-off temperature (temperature which compressor stops to operate) is reached during:
 - Cooling operation – the compressor stops for 3 minutes (minimum) before resume operation.
 - Soft Dry operation – the compressor stops for 6 minutes (minimum) before resume operation.
- If the operation is stopped by the remote control, the compressor will not turn on within 3 minutes from the moment operation stop, although the unit is turn on again within the period.
- This phenomenon is to balance the pressure inside the refrigerant cycle.

13.2 7 Minutes Time Save Control

- The compressor will start automatically if it has stopped for 7 minutes and the intake air temperature falls between the compressor ON (A) temperature and compressor OFF temperature (B) during the period.
- This phenomenon is to reduce the built up humidity inside a room.



13.3 60 Seconds Forced Operation

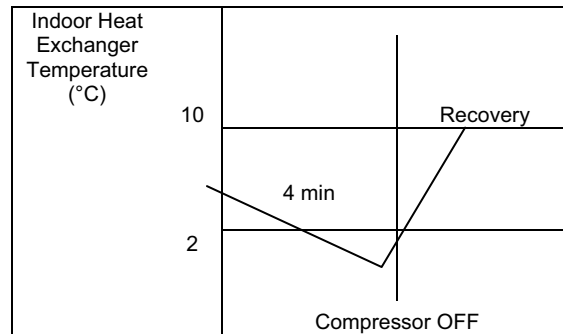
- Once the air conditioner is turned on, the compressor will not stop within 60 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, force stop by pressing the OFF/ON button at the remote control is permitted.
- The reason for the compressor to force operation for minimum 60 seconds is to allow the refrigerant oil run in a full cycle and return back to the outdoor unit.

13.4 Starting Current Control

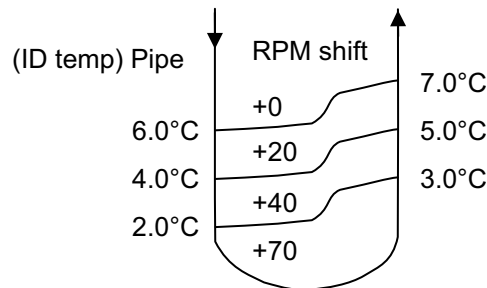
- When the compressor, outdoor fan motor and indoor fan motor are simultaneously started, the indoor fan motor will start to operate 1.6 second later.
- The reason of the difference is to reduce the starting current flow.

13.5 Freeze Prevention Control

- To protect indoor heat exchanger from freezing and to prevent higher volume of refrigerant in liquid form return to compressor.
- This control will activate when temperature of indoor heat exchanger falls below 2°C continuously for more than 4 minutes and compressor turn off.



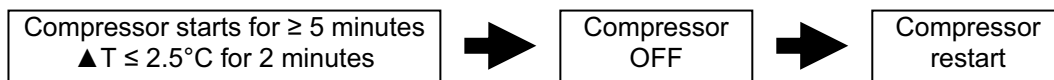
- The current fan speed will change to freeze prevention speed after 70 seconds compressor on. The fan speed will be increased according to the indoor pipe temperature the figure below:



- Restart control (Time Delay Safety Control) will be applied in this control if the recovery time is too short.

13.6 Compressor Reverse Rotation Protection Control

- If the compressor is operating continuously for 5 minutes or longer and the temperature difference between intake air and indoor heat exchanger is 2.5°C or less for continuously 2 minutes, compressor will stop and restart automatically.
- Time Delay Safety Control is activated before the compressor restart.



▲ T = Intake air temperature – Indoor heat exchanger temperature

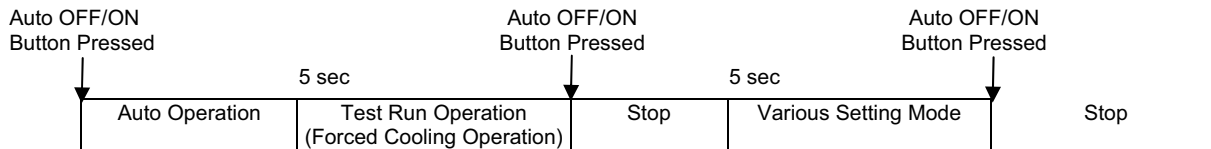
- This is to prevent compressor from rotate reversely when there is an instantaneous power failure.
- If this condition happens continuously for 5 times within 50 minutes, unit will turns OFF with TIMER indicator blinks.
- The 5 Times counter can be reset when either one of the following condition happen:
 - Unit is OFF by remote control or AUTO OFF/ON button.
 - Indoor intake temperature – Indoor piping temperature > 5°C for 1 minute or more.
 - Operation mode change.
- The unit could be ON by pressing OFF/ON button at remote control but the TIMER LED will continue blinking.
- TIMER LED blinking will be reset if:
 - Indoor intake temperature – Indoor piping temperature > 5°C for 1 minute or more.
 - Power supply reset.

13.7 Dew Prevention Control

- To prevent dew formation at indoor unit discharge area.
- This control starts if:
 - Cooling mode or Quiet mode is activated
 - Remote Control setting temperature is less than 25°C
 - Fan speed is at CLo or QLo.
 - Room temperature is constant ($\pm 1^{\circ}\text{C}$) for 60 minutes
 - Compressor is continuously running.
- Fan speed will be adjusted accordingly in this control.
 - Fan speed will be increased slowly if the unit is in quiet mode but no change in normal cooling mode.
- Dew prevention stop condition
 - Remote control setting temperature is more than 25°C
 - Fan speed is not set to CLo or QLo
 - Select Powerful operation

14. Servicing Mode

14.1 Auto OFF/ON Button



1 AUTO OPERATION MODE

The Auto Operation will be activated immediately once the Auto OFF/ON button is pressed. 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)

The Test Run Operation will be activated if the Auto OFF/ON button is pressed continuously for more than 5 seconds. A “beep” sound will be heard at the fifth seconds, in order to identify the starting of this operation.

3 VARIOUS SETTING MODE

The Various Setting Mode will be activated if (within 20 seconds of Test Run Operation) the Auto OFF/ON button is pressed for more than 5 seconds. 2 “beep” sounds will be heard to identify the starting of this operation.

Under Various Setting Mode, user could perform the following operation:

i. Press Auto OFF/ON button to toggle remote control receiving sound.

- Short “beep”: Turn ON remote control receiving sound.

- Long “beep”: Turn OFF remote control receiving sound.

After Auto OFF/ON button is pressed, the 20 seconds counter for Remote Control Receiving Sound OFF/ON Mode is restarted.

ii. Remote Control Number Switch.

- There are 4 types of remote control transmission code could be selected and stored in EEPROM of indoor unit. 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 nearby together.
- To change remote control transmission code, short or open jumpers at the remote control printed circuit board.

Remote Control Printed Circuit Board		
Jumper A (J-A)	Jumper B (J-B)	Remote Control No.
Short	Open	A (Default)
Open	Open	B
Short	Short	C
Open	Short	D

- During Various Setting Mode, press any button at remote control to transmit and store the desired transmission code to the EEPROM.
- After signal is received, the Various Setting Mode is cancelled and return to normal operation.
- If there is no code is transmitted of Auto OFF/ON button is not pressed within 20 seconds, the Various Setting Mode will be cancelled.

14.2 Remote Control Button

14.2.1 SET Button

- To check current remote control transmission code and store the transmission code to EEPROM:
 - Press “Set” button for more than 10 seconds
 - Press “Timer Set” button until a “beep” sound is heard as confirmation of transmission code change.
- To change the air quality sensor:
 - Press and release by using pointer
 - Press the Timer Decrement button to select sensitivity:
 1. Low sensitivity
 2. Standard (Default)
 3. Hi sensitivity
 - Confirm setting by pressing Timer Set button, a “beep” sound will be heard. LCD returns to original display after 2 seconds.
 - LCD returns to original display if remote control does not operate for 30 seconds.

14.2.2 CLOCK Button

- To change the remote control time format:
 - Press for more than 5 seconds

14.2.3 RESET (RC) Button

- To clear and restore the remote control setting to factory default.
 - Press once to clear the memory

14.2.4 TIMER ▲

- To change indoor unit indicators' intensity:
 - Press continuously for 5 seconds.

14.2.5 TIMER ▼

- To change remote control display from Degree Celsius (°C) to Degree Fahrenheit (°F)
 - Press continuously for 10 seconds.

15. Troubleshooting Guide

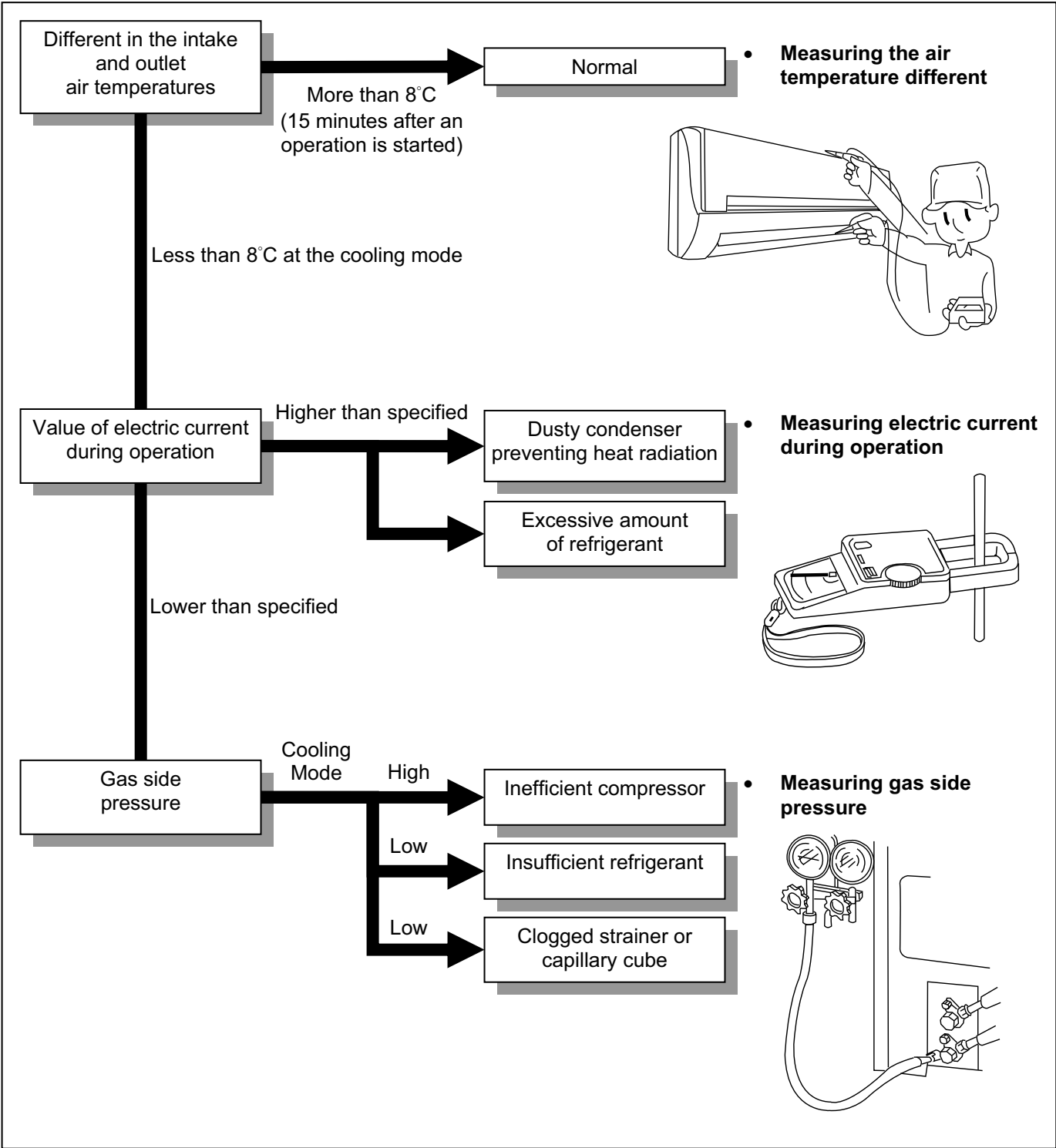
15.1 Refrigeration cycle system

In order to diagnose malfunctions, ensure the air conditioner is free from 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 to the right.

Normal Pressure and Outlet Air Temperature (Standard)

	Gas Pressure Mpa (kg/cm ² G)	Outlet air Temperature (°C)
Cooling Mode	0.4 ~ 0.6 (4 ~ 6)	12 ~ 16

Condition: Indoor fan speed = High
Outdoor temperature = 35°C



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

Condition of the air conditioner	Cooling Mode		
	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.

15.1.2 Diagnosis methods of a malfunction of a compressor

Nature of fault	Symptom
Insufficient compressing of a compressor	<ul style="list-style-type: none"> • Electric current during operation becomes approximately 20% lower than the normal value. • The discharge tube of the compressor becomes abnormally hot (normally 70°C to 90°C). • The different between high pressure and low pressure becomes almost zero.
Locked compressor	<ul style="list-style-type: none"> • Electric current reaches a high level abnormally, and the value exceeds the limit of an ammeter. In some cases, a breaker turns off. • The compressor has a humming sound.

16. 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.

16.1 Indoor Electronic Controllers, Cross Flow Fan and Indoor Fan Motor Removal Procedures

16.1.1 To remove front grille

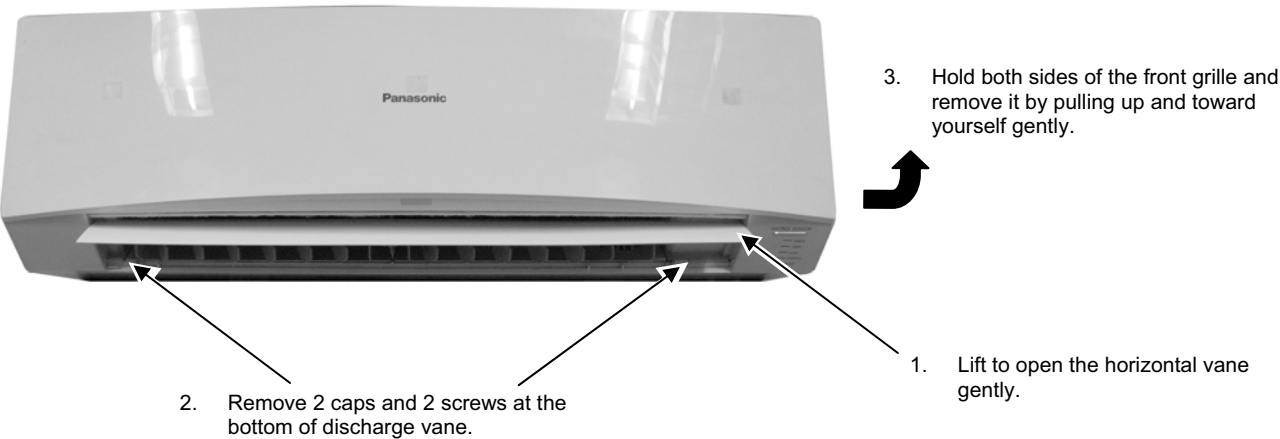


Figure 1

16.1.2 To remove electronic controller

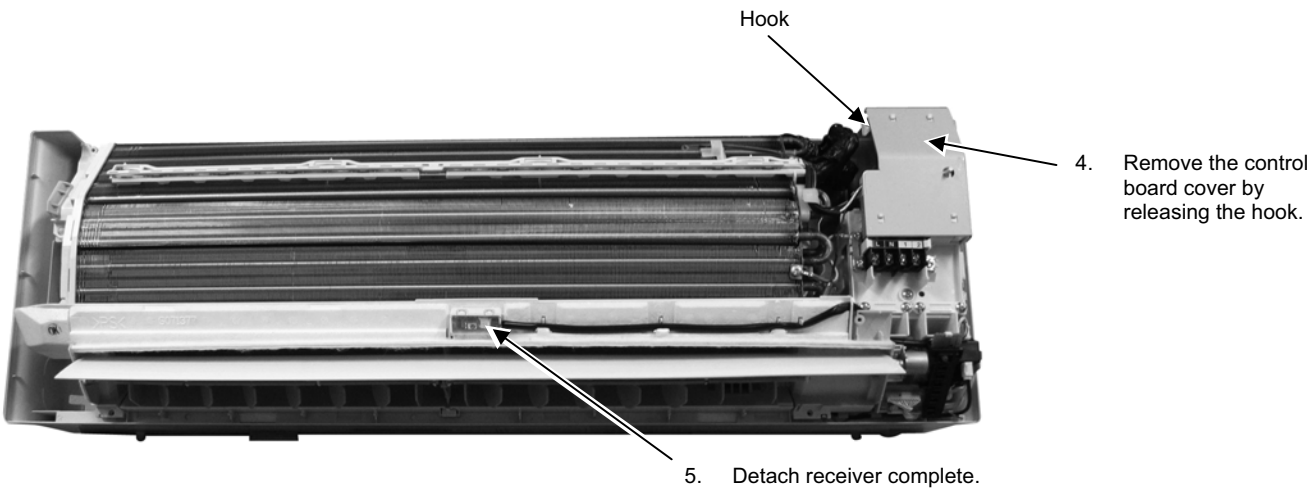


Figure 2

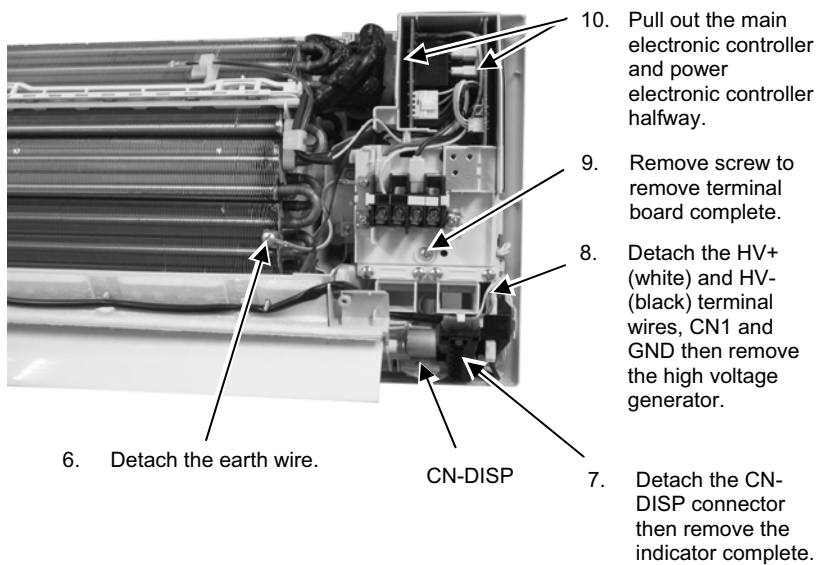


Figure 3

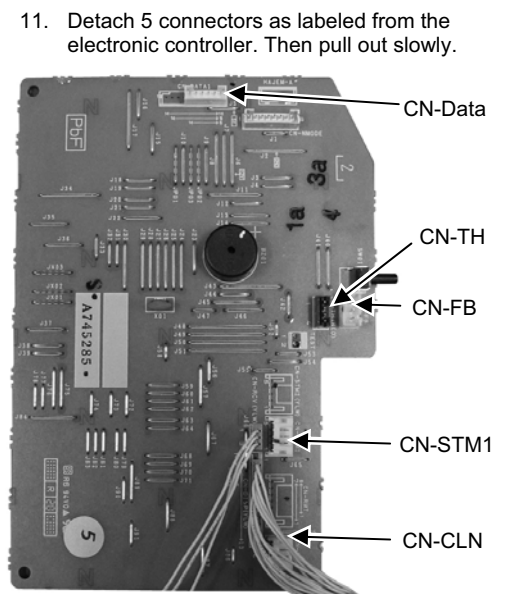


Figure 4

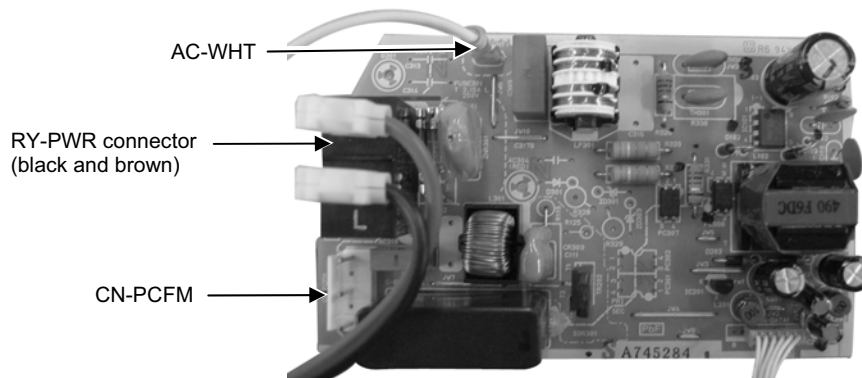
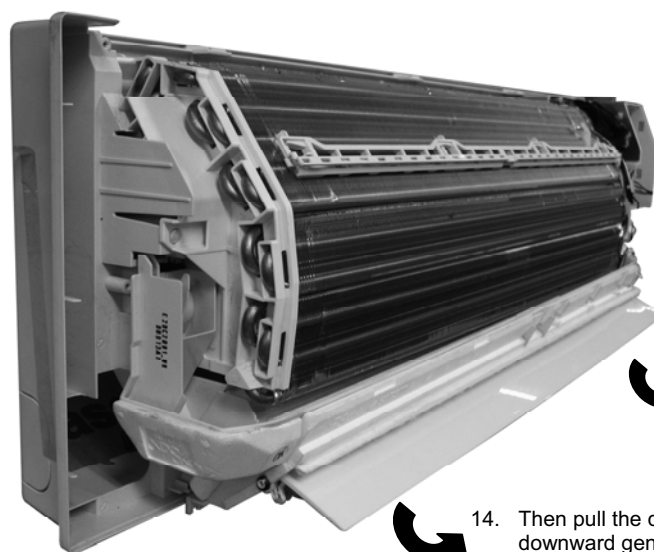


Figure 5

12. Detach AC-WHT, RY-PWR and CN-PCFM connector from the electronic controller. Then, pull out the power electronic controller gently.

16.1.3 To remove discharge grille



13. Pull out the drain hose from the discharge grille.
14. Then pull the discharge grille downward gently to dismantle it.

Figure 6

16.1.4 To remove control board

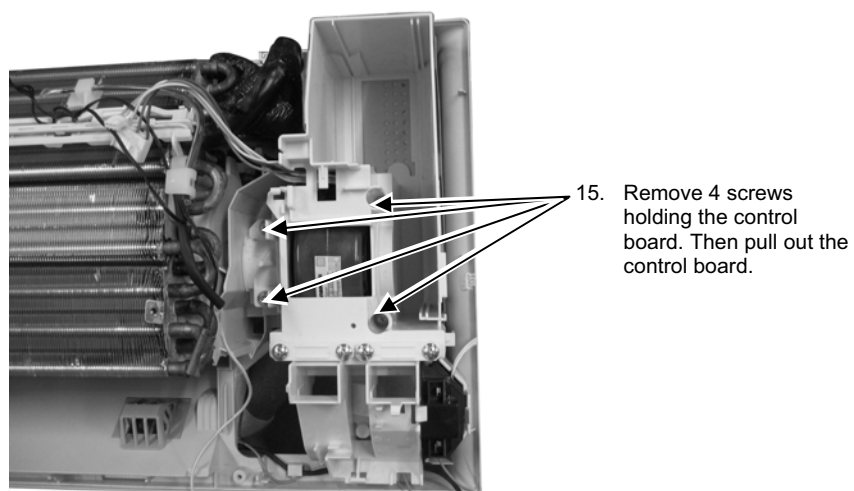


Figure 7

16.1.5 To remove cross flow fan and indoor fan motor

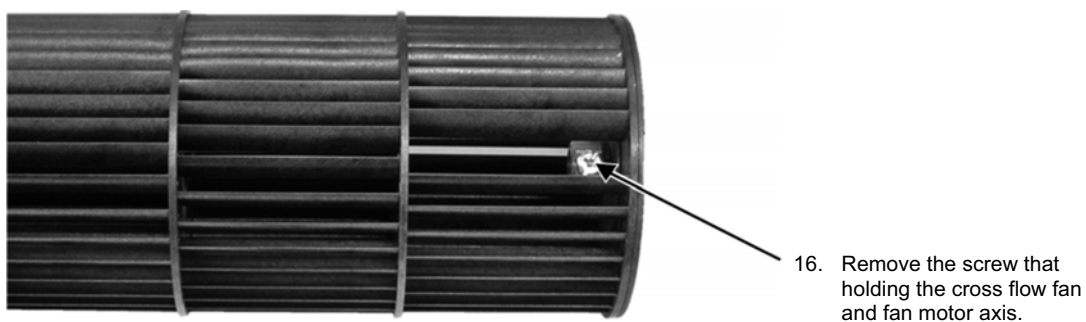


Figure 8

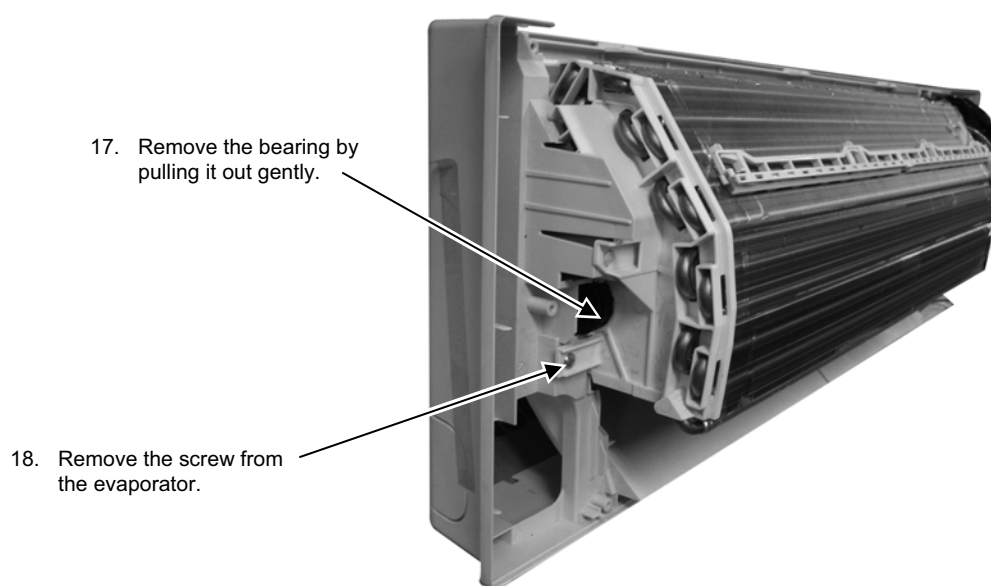


Figure 9

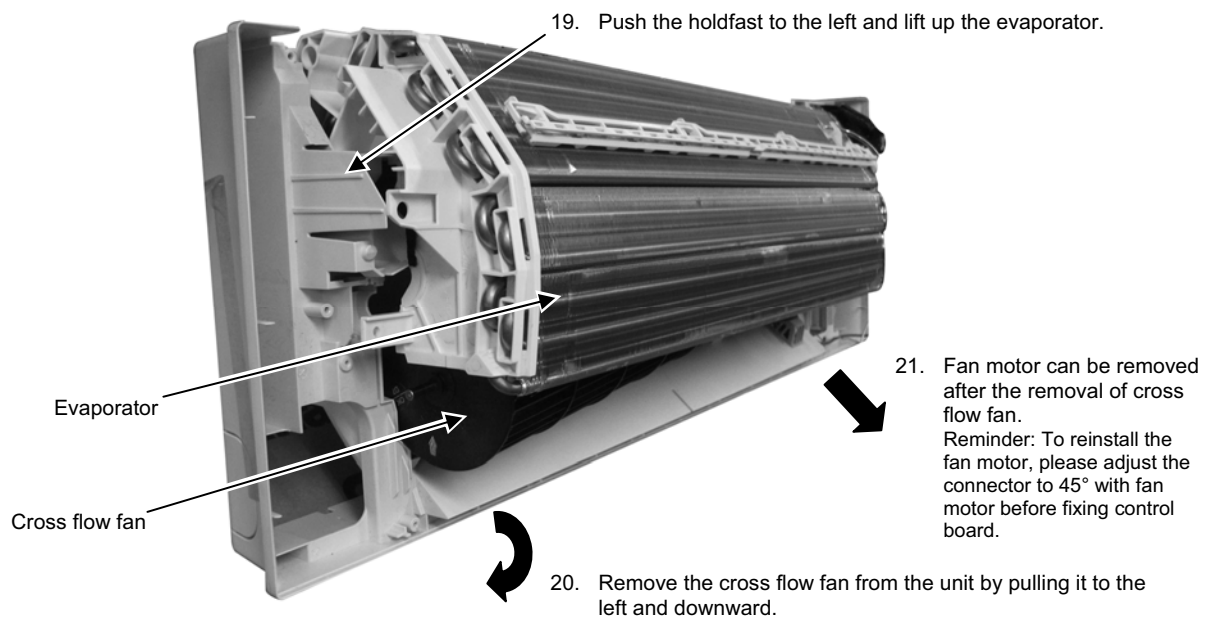


Figure 10

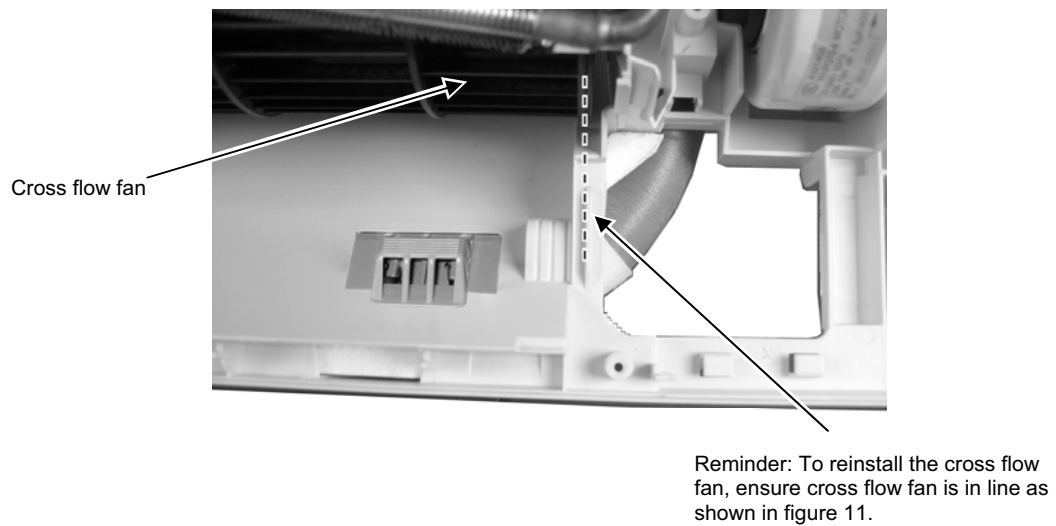


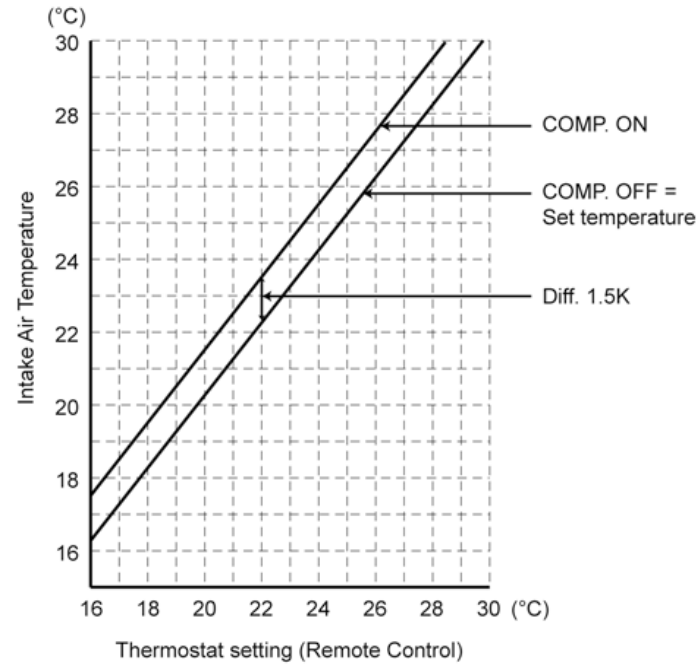
Figure 11

17. Technical Data

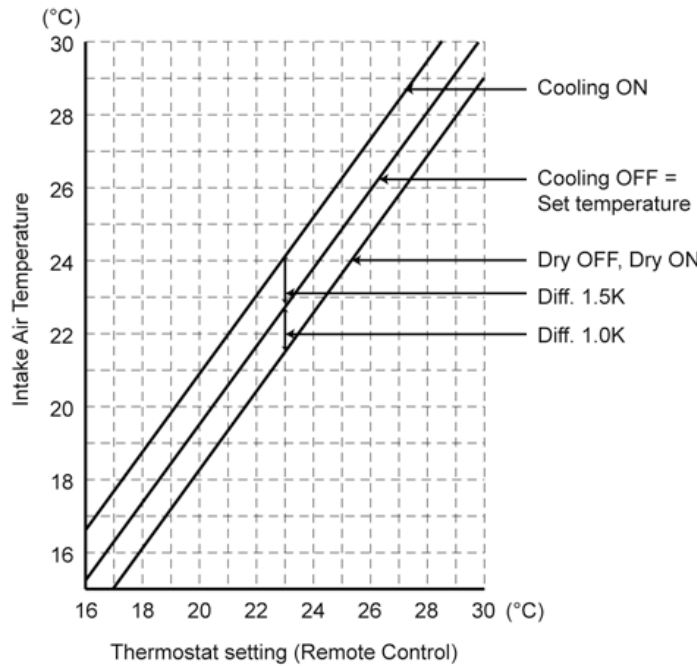
17.1 Thermostat Characteristics

17.1.1 CS-C9JKV CS-C12JKV

Cooling



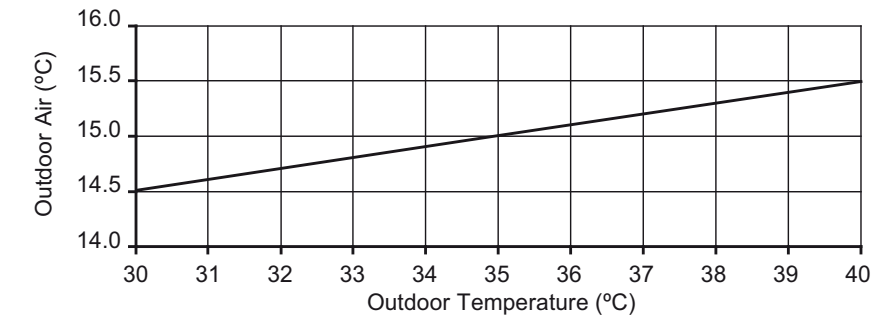
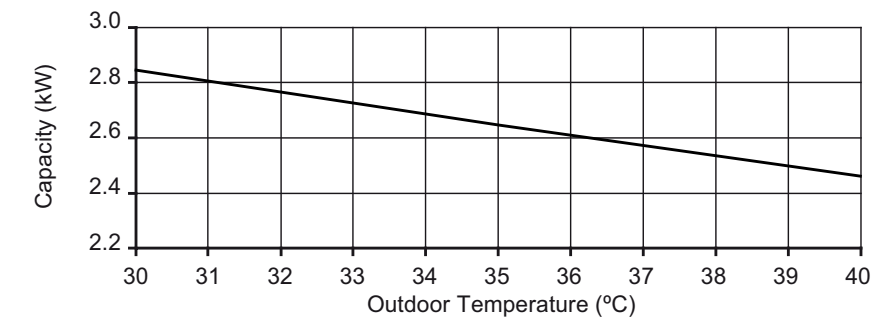
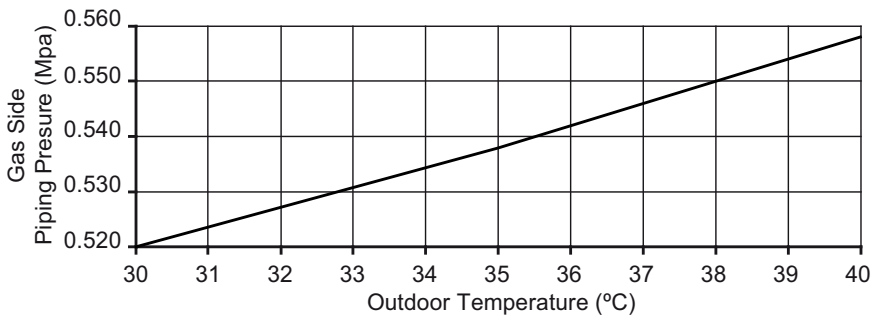
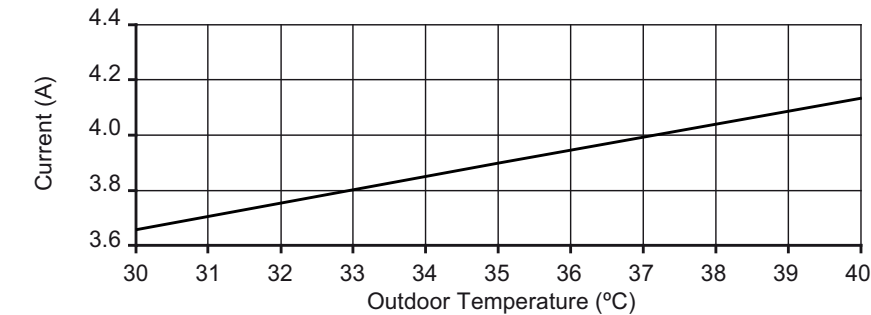
Soft Dry



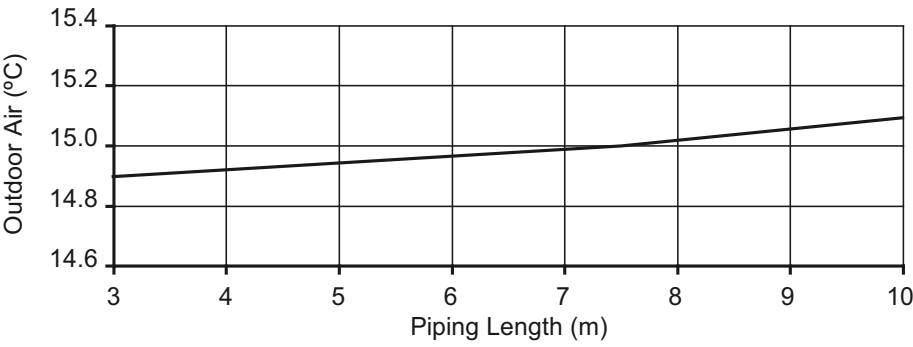
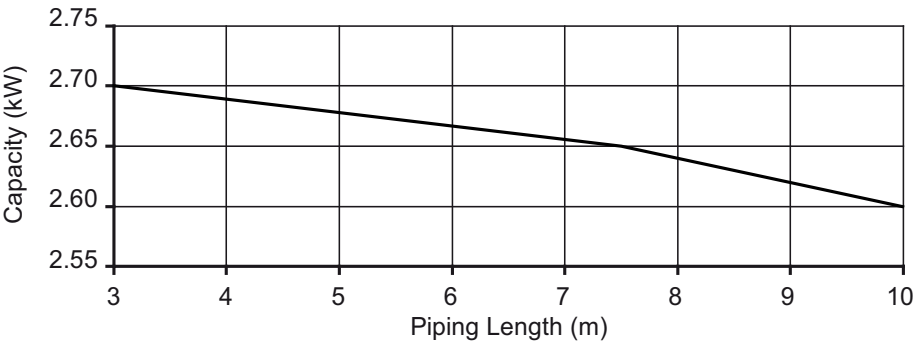
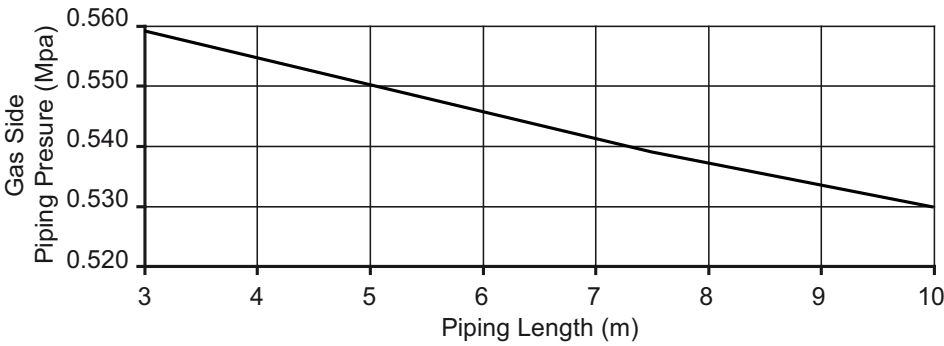
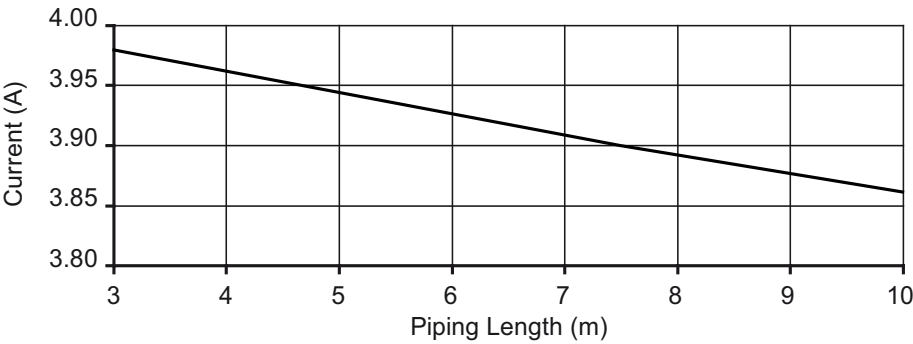
17.2 Operation Characteristics

17.2.1 CS-C9JKV CU-C9JKV

- Cooling Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 7.5m

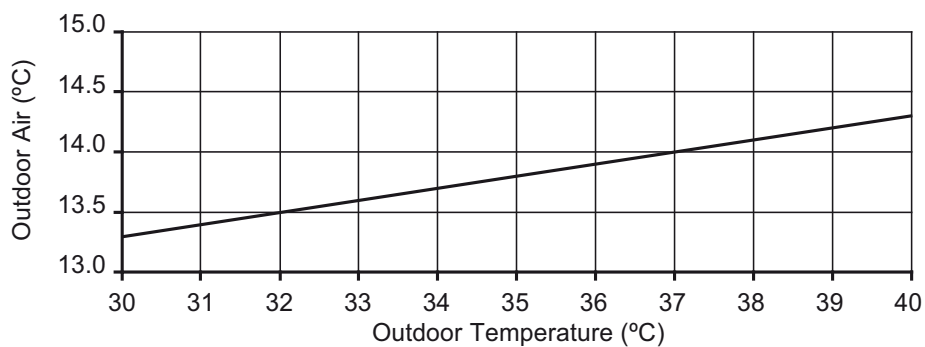
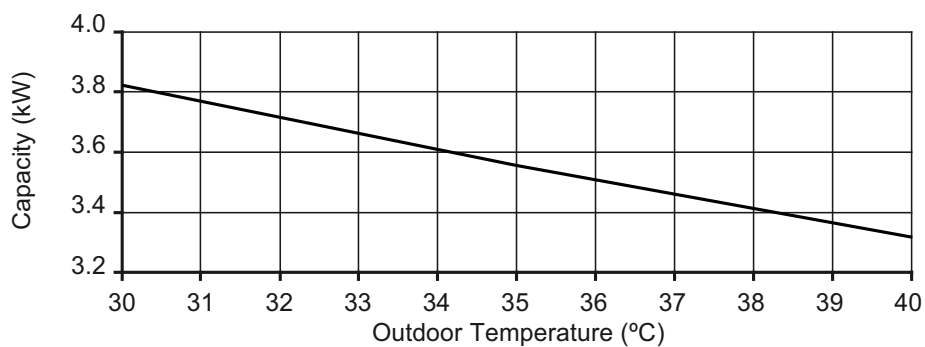
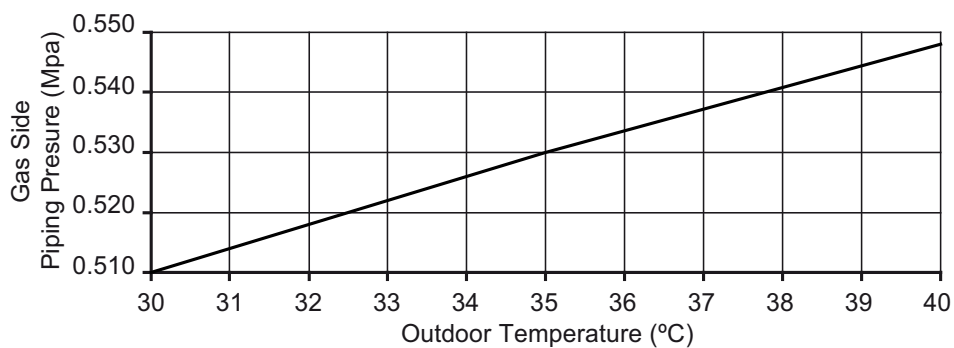
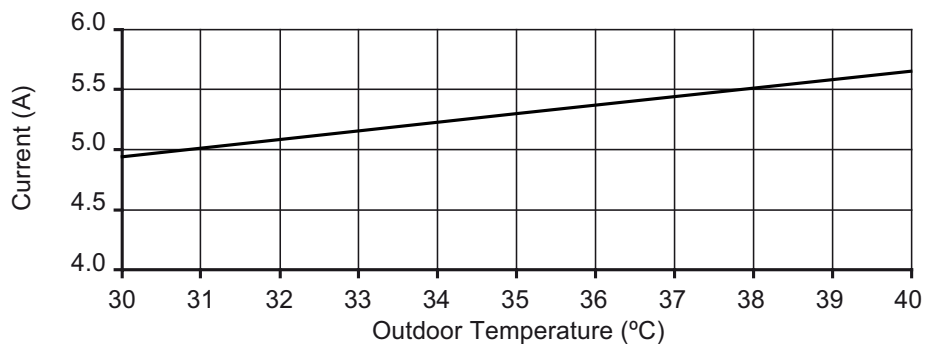


- Piping Length Characteristic
 - Outdoor temperature: 35°C (DBT), 24°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 7.5m

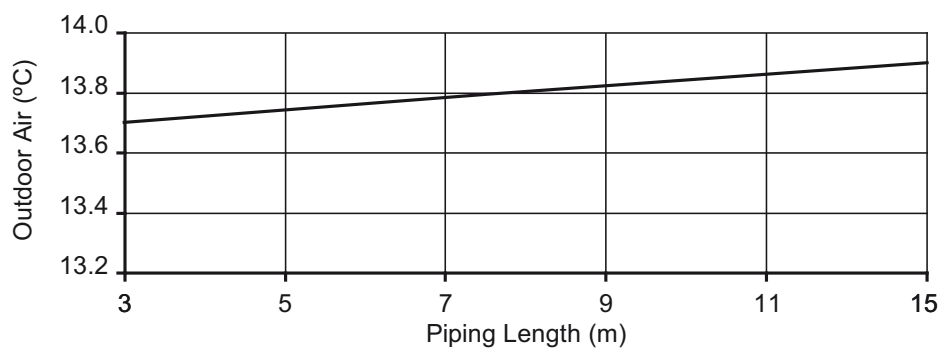
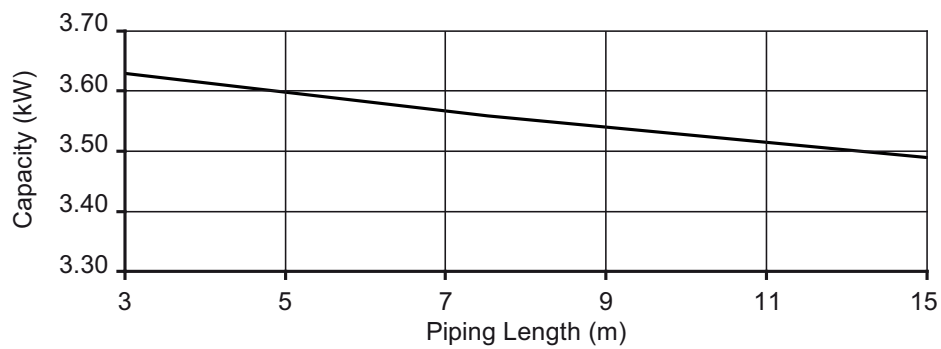
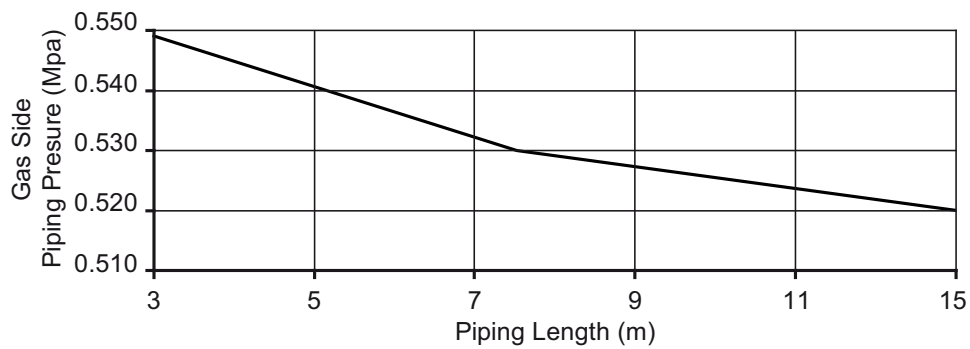
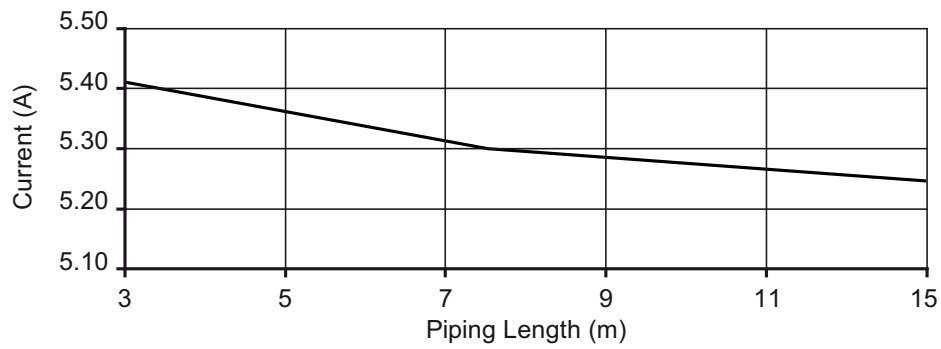


17.2.2 CS-C12JKV CU-C12JKV

- Cooling Characteristic
 - Room temperature: 27°C (DBT), 19°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 7.5m

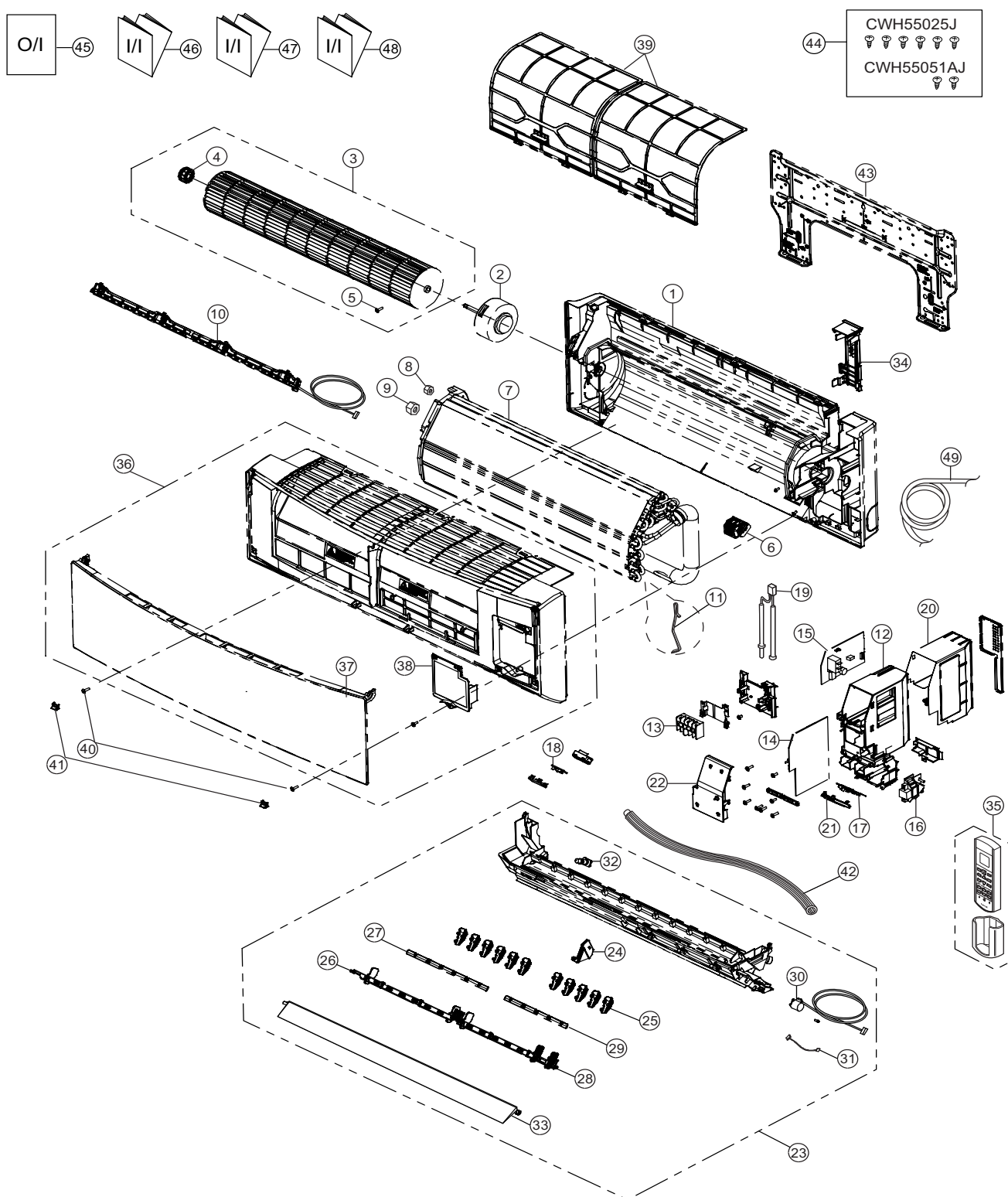


- Piping Length Characteristic
 - Outdoor temperature: 35°C (DBT), 24°C (WBT)
 - Operation condition: High fan speed
 - Piping length: 7.5m



18. Exploded View and Replacement Parts List

18.1 Indoor Unit



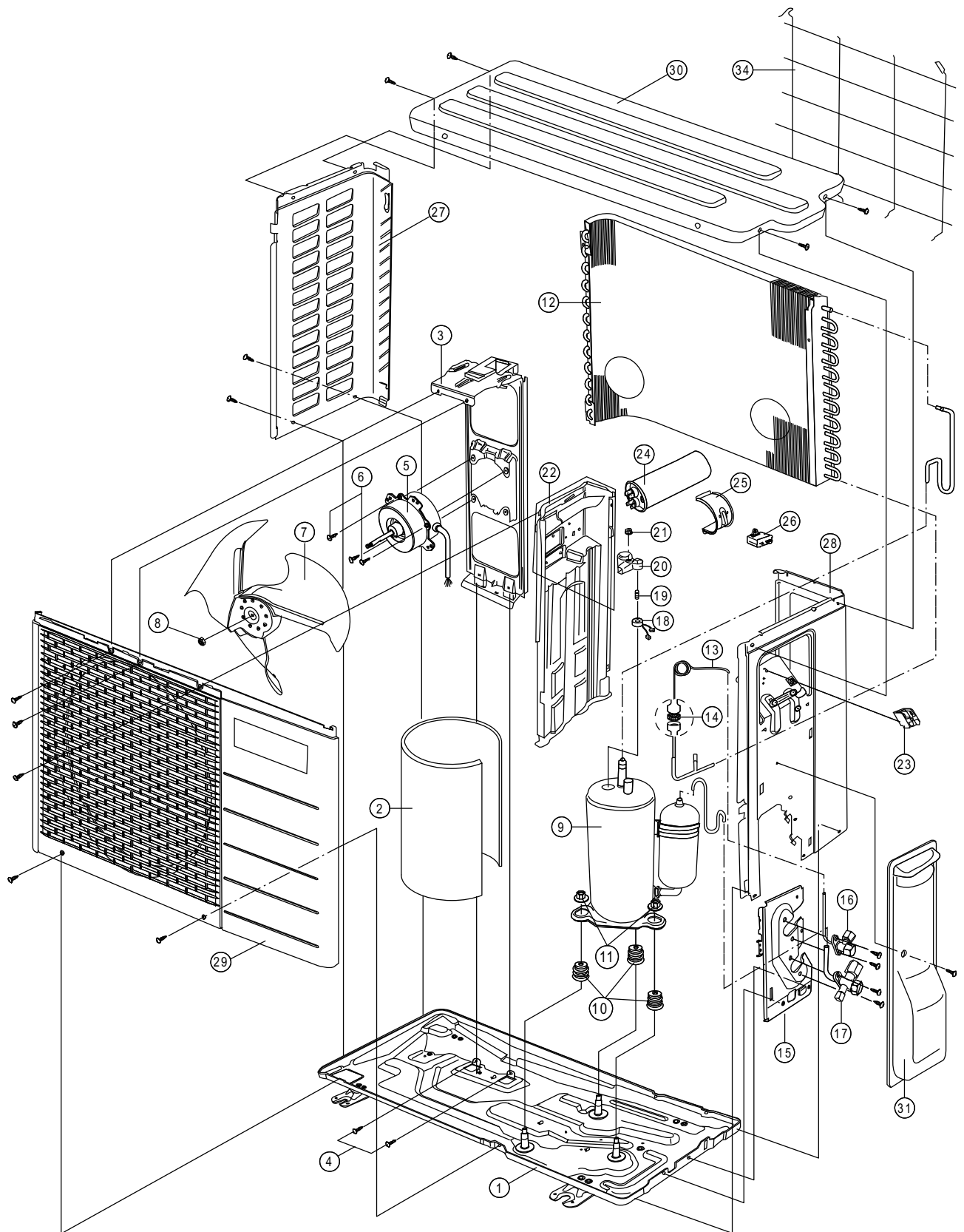
REF. NO.	PART NAME & DESCRIPTION	QTY	CS-C9JKV	CS-C12JKV	REMARK
1	CHASSY COMPLETE	1	CWD50C1599	←	
2	FAN MOTOR	1	CWA921420	←	O
3	CROSS FLOW FAN COMPLETE	1	CWH02C1076	←	
4	BEARING ASS'Y	1	CWH64K007	←	
5	SCREW - CROSS FLOW FAN	1	CWH551146	←	
6	ION GENERATOR	1	CWH94C0028	←	
7	EVAPORATOR CO.	1	CWB30C2969	CWB30C2850	
8	FLARE NUT (LIQUID)	1	CWT251026	←	
9	FLARE NUT (GAS)	1	CWT25005	CWT25007	
10	E-ION AIR PURIFYING SYSTEM	1	CWD93C1090	←	
11	CLIP FOR SENSOR	1	CWH32143	←	
12	CONTROL BOARD CASING	1	CWH102370	←	
13	TERMINAL BOARD COMPLETE	1	CWA28C2356	←	O
14	ELECTRONIC CONTROLLER - MAIN	1	CWA73C3451	CWA73C3444	O
15	ELECTRONIC CONTROLLER - POWER	1	CWA745284	←	O
16	ELECTRONIC CONTROLLER - HVU	1	CWA745348	←	O
17	ELECTRONIC CONTROLLER - INDICATOR	1	CWA745299	←	O
18	ELECTRONIC CONTROLLER - RECEIVER	1	CWA745288	←	O
19	SENSOR COMPLETE	1	CWA50C2122	←	O
20	CONTROL BOARD TOP COVER	1	CWH131350	←	
21	INDICATOR HOLDER	1	CWD933021	←	
22	CONTROL BOARD FRONT COVER	1	CWH13C1183	←	
23	DISCHARGE GRILLE COMPLETE	1	CWE20C3009	←	
24	FULCRUM	1	CWH621102	←	
25	VERTICAL VANE	11	CWE241287	←	
26	CONNECTING BAR	1	CWE261152	←	
27	CONNECTING BAR	1	CWE261153	←	
28	CONNECTING BAR	1	CWE261154	←	
29	CONNECTING BAR	1	CWE261155	←	
30	A.S.MOTOR, DC SINGLE 12V 300Ω	1	CWA981240	←	O
31	LEAD WIRE-COMPLETE (AIR SWING MOTOR)	1	-	←	
32	CAP - DRAIN TRAY	1	CWH521096	←	
33	HORIZONTAL VANE COMPLETE	1	CWE24C1268	←	
34	BACK COVER CHASSIS	1	CWD933019	←	
35	REMOTE CONTROL COMPLETE	1	CWA75C3182	←	O
36	FRONT GRILLE COMPLETE	1	CWE11C4248	←	O
37	INTAKE GRILLE COMPLETE	1	CWE22C1507	←	O
38	GRILLE DOOR COMPLETE	1	CWE14C1029	←	
39	E-ION FILTER	2	CWD00K1014	←	
40	SCREW – FRONT GRILLE	2	XTT4+16CFJ	←	
41	CAP - FRONT GRILLE	2	CWH521194	←	
42	DRAIN HOSE	1	CWH851063	←	
43	INSTALLATION PLATE	1	CWH361097	←	
44	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C067	←	
45	OPERATING INSTRUCTION	1	CWF566340	←	
46	INSTALLATION INSTRUCTION	1	CWF613788	←	
47	INSTALLATION INSTRUCTION	1	CWF613772	←	
48	INSTALLATION INSTRUCTION	1	CWF613790	←	
49	P.S.CORD	1	CWA20C2827	←	

(Note)

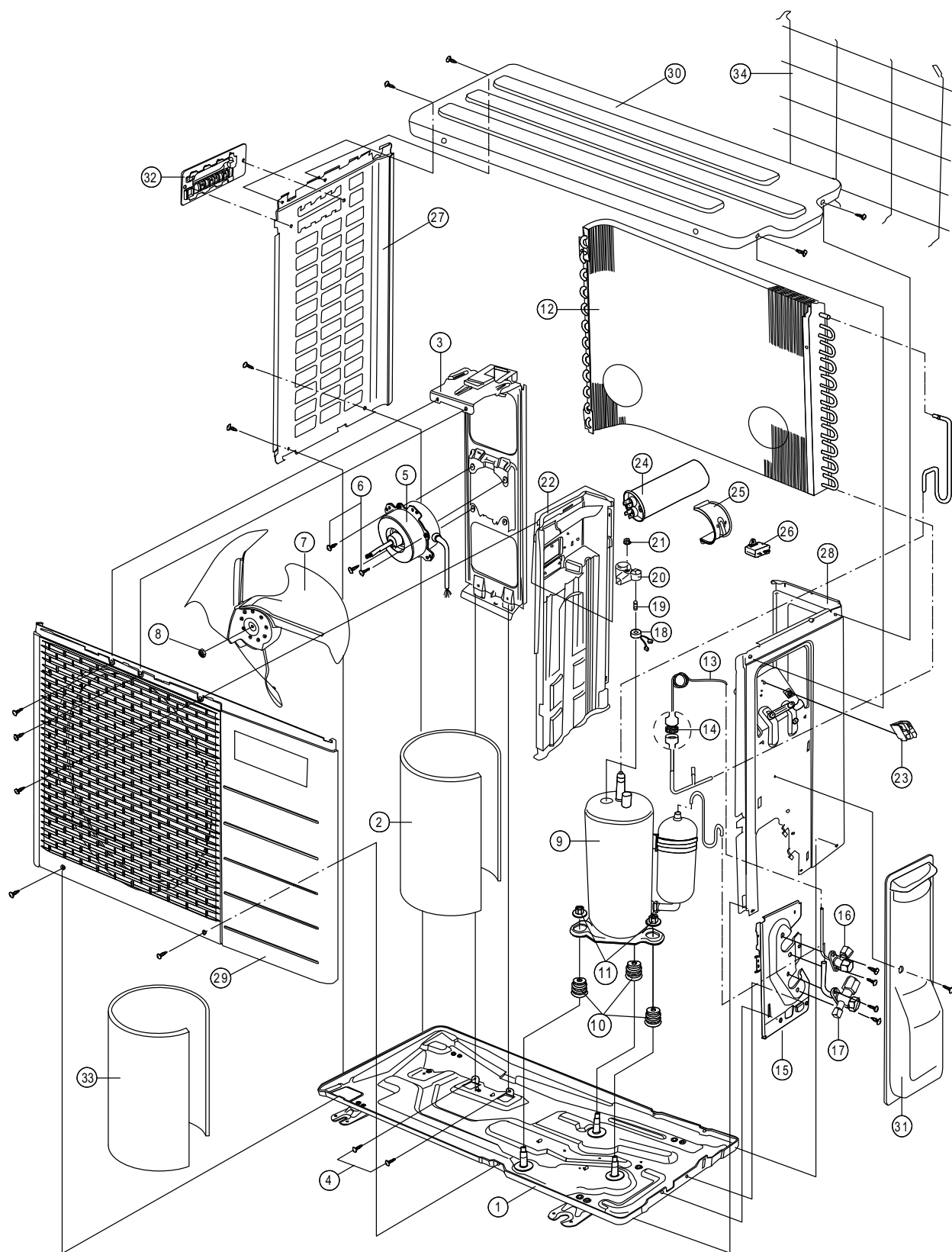
- All parts are supplied from PHAAM, Malaysia (Vendor Code: 00029488).
- “O” marked parts are recommended to be kept in stock.

18.2 Outdoor Unit

18.2.1 CU-C9JKV



18.2.2 CU-C12JKV



REF. NO.	PART NAME & DESCRIPTION	QTY	CU-C9JKV	CU-C12JKV	REMARK
1	CHASSY ASS'Y	1	CWD50K2107	CWD50K2071	
2	SOUND PROOF MATERIAL	1	CWG302254	CWG302110	
3	FAN MOTOR BRACKET	1	CWD541075	CWD541030	
4	SCREW - FAN MOTOR BRACKET	2	CWH551217	←	
5	FAN MOTOR	1	CWA951562	CWA951329J	O
6	SCREW - FAN MOTOR MOUNT	3	CWH55406J	←	
7	PROPELLER FAN ASS'Y	1	CWH03K1020	CWH03K1006	
8	NUT - PROPELLER FAN	1	CWH56053J	←	
9	COMPRESSOR (50Hz, 220/240V)	1	2R13C236BSC	2P19S236A1L	O
10	ANTI - VIBRATION BUSHING	3	CWH50077	←	
11	NUT - COMPRESSOR MOUNT	3	CWH56000J	←	
12	CONDENSER	1	CWB32C2798	CWB32C2796	
13	CAPILLARY TUBE ASS'Y	1	CWB15K1271	CWB15K1147	
14	STRAINER	1	CWB11025	CWB111011	
15	HOLDER COUPLING	1	CWH351047	CWH351023	
16	2-WAY VALVE (LIQUID)	1	CWB021217	CWB021362	O
17	3-WAY VALVE (GAS)	1	CWB011257	CWB011482	O
18	OVERLOAD PROTECTOR WITH WIRE	1	CWA67C5701	CWA67C7548	O
19	HOLDER - O.L.P.	1	CWH7041200	←	
20	TERMINAL COVER	1	CWH171011	←	
21	NUT - TERMINAL COVER	1	CWH7080300J	←	
22	SOUND PROOF BOARD	1	CWH151074	CWH151022	
23	TERMINAL BOARD ASS'Y	1	CWA28K1064J	←	
24	CAPACITOR - COM. (15μF/370V)(30μF/400V)	1	DS371156CPNA	CWA312076	O
25	HOLDER CAPACITOR	1	CWH301038	CWH30057	
26	CAPACITOR - F.M (2.0μF/440V)	1	DS441205NPQA	←	O
27	CABINET SIDE PLATE	1	CWE041110A	CWE041248A	
28	CABINET SIDE PLATE COMPLETE	1	CWE04C1042	CWE04C1119	
29	CABINET FRONT PLATE ASS'Y	1	CWE06K1048	CWE06K1034	
30	CABINET TOP PLATE	1	CWE031041A	CWE031014A	
31	CONTROL BOARD COVER COMP	1	CWH13C1099	CWH13C1064	
32	HANDLE	1	-	CWE161010	
33	SOUND PROOF MATERIAL	1	-	CWG302126	
34	WIRE NET	1	CWD041057A	CWD041111A	

(Note)

- All parts are supplied from PHAAM, Malaysia (Vendor Code: 00029488).
- "O" marked parts are recommended to be kept in stock.