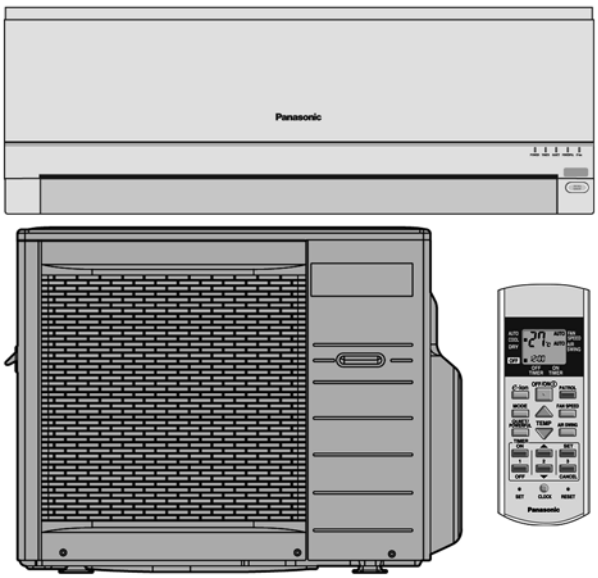
Order No. MAC0701015C3

Service Manual

Air Conditioner

CS-C9GKZW CU-2C18GKH
CS-C9GKZW CU-3C20GKH



⚠ 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 product or products dealt with in this service information by anyone else could result in serious injury or death.

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Panasonic®

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. Engage dealer or specialist for installation and servicing. If installation or servicing done by the user is defective, it will cause water leakage, electrical shock or fire.	
2. Install according to this installation instruction 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 and servicing. 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. 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.	
6. Use the specified cable and connect tightly for indoor/outdoor connection. Connect tightly and 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.	
7. 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.	
8. When connecting the piping, do not allow air or any substances other than the specified refrigerant to enter the refrigeration cycle. Otherwise, this may lower the capacity, cause abnormally high pressure in the refrigeration cycle, and possibly result in explosion and injury.	⃠
9. It is desirable that the amount of residual oil is less than 40 mg/10m.	⃠
10. Do not modify the length of the power supply cord or use of the extension cord, and do not share the single outlet with other electrical appliances. Otherwise, it will cause fire or electrical shock.	⃠
11. After completion of the installation servicing confirm there is no leakage of refrigerant gas. It may generate toxic gas when the refrigerant contacts with fire.	

⚠ WARNING
12. Ventilate if there is refrigerant gas leakage during operation. It may cause toxic gas when the refrigerant contacts with fire.

⚠ CAUTION
1. The equipment must be earthed. It may cause electrical shock if grounding is not perfect.
2. 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.
3. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.
4. Pb free solder has a higher melting point than standard solder; typically the melting point is 50 - 70°F (30 - 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).
5. 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.
6. Do not touch outdoor unit air inlet and aluminium fin. It may cause injury.

ATTENTION
1. Selection of the installation location. Select an installation location which is rigid and strong enough to support or hold the unit, and select a location for easy maintenance.
2. Power supply connection to the 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 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. 1. Power supply connection to the receptacle using a power plug. Use an approved power plug with earth pin for the connection to the socket. 2. Power supply connection to a circuit breaker for the permanent connection. Use an approved circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.5 mm contact gap.
3. Do not release refrigerant during piping work for installation, servicing, reinstallation and during repairing a refrigeration parts. Take care of the liquid refrigerant, it may cause frostbite.
4. Installation work. It may need two people to carry out the installation work.
5. Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc.

2 Specifications

2.1. CS-C9GKZW CU-2C18GKH

Item			Unit	Indoor unit	Outdoor unit
Performance Test Condition				ISO 5151	
Capacity			kW	(1 Unit) 2.40 - 2.44 (2 Units) 4.80 - 4.88	
			BTU/h	(1 Unit) 8180 - 8320 (2 Units) 16400 - 16600	
			*kJ/h	(1 Unit) 8640 - 8780 (2 Units) 17280 - 17570	
EER			W/W	(1 Unit) 3.29 - 3.17 (2 Units) 3.29 - 3.17	
			BTU/hW	(1 Unit) 11.21 - 10.81 (2 Units) 11.23 - 10.78	
Noise Level			dB (A)	High: 36 Low: 26	High: 53 - 55
Moisture Removal			l/h	(1 Unit) 1.5 (2 Units) 2.6	
			(pt/h)	(1 Unit) 3.2 (2 Units) 5.5	
Air Volume	Lo		m^3/m (ft^3/m)	5.7 (200) - 5.7 (200)	—
	Me		m^3/m (ft^3/m)	7.8 (274) - 7.8 (274)	—
	Hi		m^3/m (ft^3/m)	9.4 (332) - 9.4 (332)	51.5 (1818) - 53.5 (1889)
	SHi		m^3/m (ft^3/m)	10.1 (356) - 10.1 (356)	—
Refrigerant Control Device				—	Capillary Tube
Refrigerant Oil (Charged)			cm^3	—	ATMOS NM56M or SUNISO 4GDID (270)
Refrigerant (Charged) R22			kg (oz)	—	0.72 × 2 (25.4 × 2)
Dimension	Height		mm (inch)	280 (11 - 1/32)	750 (29 - 17/32)
	Width		mm (inch)	799 (31 - 15/32)	875 (34 - 7/16)
	Depth		mm (inch)	183 (7 - 7/32)	345 (13 - 19/32)
Net Weight			kg (lbs)	9 (20)	54 (119)
Pipe Diameter	Gas		mm (inch)	9.52 (3/8")	
	Liquid		mm (inch)	6.35 (1/4")	
Height Difference			m (ft)	5 (16.4)	
Pipe Length Range			m (ft)	3 (9.8) ~ 15 (49.2)	
Additional Gas Amount			g/m (oz/ft)	10 (0.1)	
Refrigeration Charge Less			m (ft)	7.5 (24.6)	
Drain Hose	Inner diameter		mm	12	—
	Length		mm	650	—
Compressor	Type			—	Rotary (1 cylinder) rolling piston type
	Motor Type			—	Induction (2-poles)
	Rated Output		W	—	650
Fan	Type			Cross-flow Fan	Propeller Fan
	Material			ASG20K1	PP Resin
	Motor Type			Induction (4-poles)	Induction (6-poles)
	Input power		W	45 - 47	126 - 142
	Output power		W	15	74
	Fan Speed	Lo (Cool)	rpm	730 - 730	—
		Me (Cool)	rpm	1000 - 1000	—
		Hi (Cool)	rpm	1210 - 1210	720 - 760
		SHi (Cool)	rpm	1300 - 1300	—
Heat Exchanger	Fin material			Aluminium (Pre Coat)	Aluminium (Blue Coat)
	Fin Type			Slit Fin	Louver Fin
	Row × Stage × FPI			2 × 15 × 19	1 × 28 × 18
	Size (W × H × L)		mm	610 × 315 × 25.4	855 × 711 × 22
Air Filter Type	Material			Polypropelene	—
	Style			One-touch	—

1. Cooling capacities are based on indoor temperature of 27°C D.B. (80.6°F D.B.), 19.0°C W.B. (66.2°F W.B.) and outdoor air temperature of 35°C D.B. (95°F D.B.), 24°C W.B. (75.2°F W.B.)

Item		Unit		
Power Source (Phase, Voltage, Cycle)		ø	Single	Single
		V	220	240
		Hz	50	50
Input power		W	(1 Unit) 730 (2 Units) 1.46k	(1 Unit) 770 (2 Units) 1.54k
Starting Current		A	15	15
Running Current	Cooling	A	(1 Unit) 3.5 (2 Units) 7.0	(1 Unit) 3.3 (2 Units) 6.6
Power Factor	Cooling	%	95	97
Power factor means total figure of compressor, indoor fan motor and outdoor fan motor.				
Power Cord	Number of core		—	—
	Length	m (ft)	—	—
Thermostat			—	—
Protection Device			—	2 Stage Overload Protector

Note:

- Specification are subjected to change without prior notice for further improvement.

2.2. CS-C9GKZW CU-3C20GKH

Item			Unit	Indoor unit	Outdoor unit				
Performance Test Condition				ISO 5151					
				Single Operation (B, A1, A2)	Single Operation		Double Operation		Triple Operation
					(B)	(A1 or A2)	(A1 + A2)	(B + A1 or A2)	(B + A1 + A2)
Capacity			kW	—	2.40 - 2.34	2.82 - 2.78	3.60 - 3.52	5.22 - 5.12	6.00 - 5.86
			BTU/h	—	8,180 - 7,980	9,620 - 9,480	12,300 - 12,000	17,800 - 17,500	20,500 - 20,000
			*kJ/h	—	8,640 - 8,420	10,150 - 10,010	12,960 - 12,670	18,790 - 18,430	21,600 - 21,100
EER			W/W	—	2.93 - 3.04	2.52 - 2.60	2.98 - 3.06	2.82 - 2.93	3.13 - 3.18
			BTU/hW	—	9.98 - 10.36	8.59 - 8.86	10.17 - 10.43	9.62 - 10.00	10.68 - 10.87
Noise Level			dB (A)	High: 36 - 36 Low: 26 - 26	High: 56 - 54				
Moisture Removal			l/h	—	1.5	1.7 - 1.6	2.1	2.9 - 2.8	3.3 - 3.2
			(pt/h)	—	3.2	3.6 - 3.4	4.4	6.1 - 5.9	7.0 - 6.8
Air Volume	Lo		m^3/m (ft^3/m)	5.7 - 5.7 (200 - 200)	—				
	Me		m^3/m (ft^3/m)	7.8 - 7.8 (274 - 274)	—				
	Hi		m^3/m (ft^3/m)	9.4 - 9.4 (332 - 332)	53.5 (1889) - 51.5 (1818)				
	SHi		m^3/m (ft^3/m)	10.1 - 10.1 (357 - 357)	—				
Refrigerant Control Device				—	Capillary Tube				
Refrigerant Oil			cm^3	—	SUNISO 4GDID or ATMOS NM56M (B unit) 270 (A unit) 350				
Refrigerant R22			g (oz)	—	(B unit) 720 (25.4) (A unit) 800 (28.2)				
Dimension	Height		inch (mm)	11 - 1/32 (280)	29 - 17/32 (750)				
	Width		inch (mm)	31 - 15/32 (799)	34 - 7/16 (875)				
	Depth		inch (mm)	7 - 7/32 (183)	13 - 19/32 (345)				
Net Weight			lb (kg)	20 (9.0)	123 (56)				
Pipe Diameter	Gas		inch (mm)	3/8” (9.52)					
	Liquid		inch (mm)	1/4” (6.35)					
Difference			m (ft)	5 (16.4)					
Pipe Range			m (ft)	3 (9.8) ~ 15 (49.2)					
Gas Amount			g/m (oz/ft)	10 (0.1)					
Pipe Length			m (ft)	7.5 (24.6)					
Drain Hose	Inner diameter		mm	12	—				
	Length		mm	650	—				
Compressor	Type			—	Rotary (1 cylinder) rolling piston type				
	Motor Type			—	Induction (2-poles)				
	Rated Output		W	—	(B unit) 650 (A unit) 900				
Fan Motor	Type			Cross-flow Fan	Propeller Fan				
	Material			ASG20K1	PP Resin				
	Motor Type			Induction (4-poles)	Induction (6-poles)				
	Input Power		W	47 - 45	142 - 126				
	Output Power		W	15	74				
	Fan Speed	Lo (Cool)	rpm	730 - 730	—				
		Me (Cool)	rpm	1000 - 1000	—				
		Hi (Cool)	rpm	1210 - 1210	850 - 820				
		SHi (Cool)	rpm	1300 - 1300	—				
Heat Exchanger	Fin material			Aluminium (Pre Coat)	Aluminium (Blue Coat)				
	Fin Type			Slit Fin	Louver Fin				
	Row × Stage × FPI			2 × 15 × 19	1 × 28 × 18				
	Size (W × H × L)		mm	610 × 315 × 25.4	855 × 711 × 22				
Air Filter	Material			Polypropelene	—				
	Style			One-touch	—				

1. Cooling capacities are based on indoor temperature of 27°C D.B. (80.6°F D.B.), 19.0°C W.B. (66.2°F W.B.) and outdoor air temperature of 35°C D.B. (95°F D.B.), 24°C W.B. (75.2°F W.B.)

Item		Unit	Indoor unit	Outdoor unit				
Power Source (Phase, Voltage, Cycle)		ø	Single					
		V	240 - 220					
		Hz	50					
Input power		W	60 - 50	820 - 770	1.12k - 1.07k	1.21k - 1.15k	1.85k - 1.75k	1.92k - 1.84k
Starting Current		A	—	15.0	21.0	A: 21.0	A: 21.0 B: 15.0	A: 21.0 B: 15.0
Running Current	Cooling	A	0.26 - 0.23	3.6 - 3.7	5.1 - 5.2	5.5 - 5.6	8.1 - 8.3	8.3 - 8.7
Power Factor	Cooling	%	—	95 - 95	92 - 94	92 - 93	95 - 96	96 - 96
Power factor means total figure of compressor, indoor fan motor and outdoor fan motor.								
Power Cord	Number of core		—					
	Length	m (ft)	—					
Running Current			—					
Protection Device			—	2 Stage Overload Protector				

Note:

- Specification are subjected to change without prior notice for further improvement.

3 Features

- **High Efficiency**

- **Compact Design**

- **Wider range of horizontal discharge air**

- **Air Filter with function to reduce dust and smoke**

- **Automatic air swing and manual adjusted by Remote Control for vertical airflow**

- **Long Installation Piping**
  - **-** long piping up to 15 meter

- **e-ion Air Purifying System with Patrol Sensor**
  - Discharged Active e-ions capture dust particles and bring it back with a boomerang-like mechanism

- **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

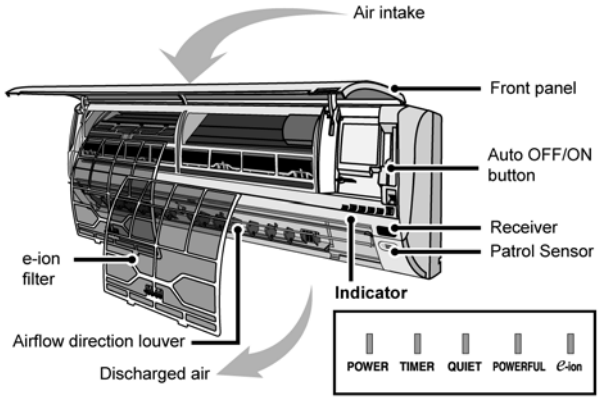
- **Operation Improvement**
  - **-** Quiet mode to provide quiet operation
  - Powerful mode to reach the desired room temperature quickly
  - 24-hour timer setting

- **Serviceability Improvement**
  - **-** Removable and washable front panel

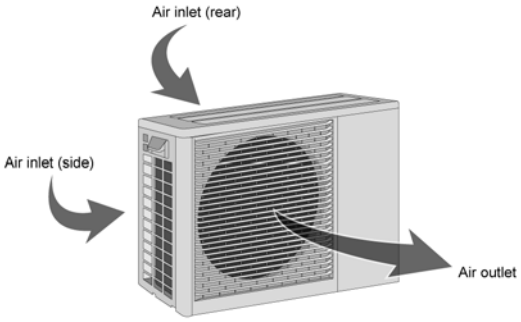
4 Location of Controls and Components

4.1. Product Overview

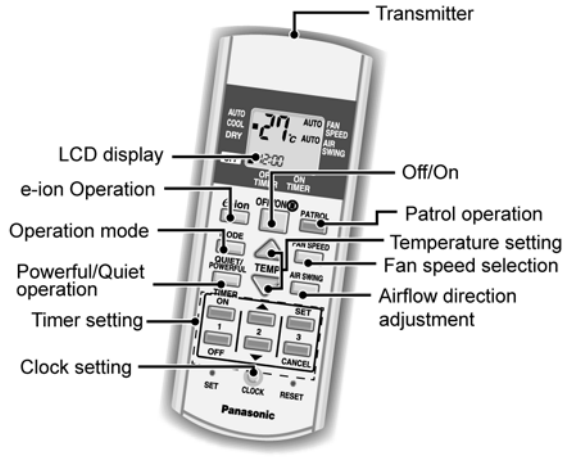
4.1.1. Indoor Unit



4.1.2. Outdoor Unit



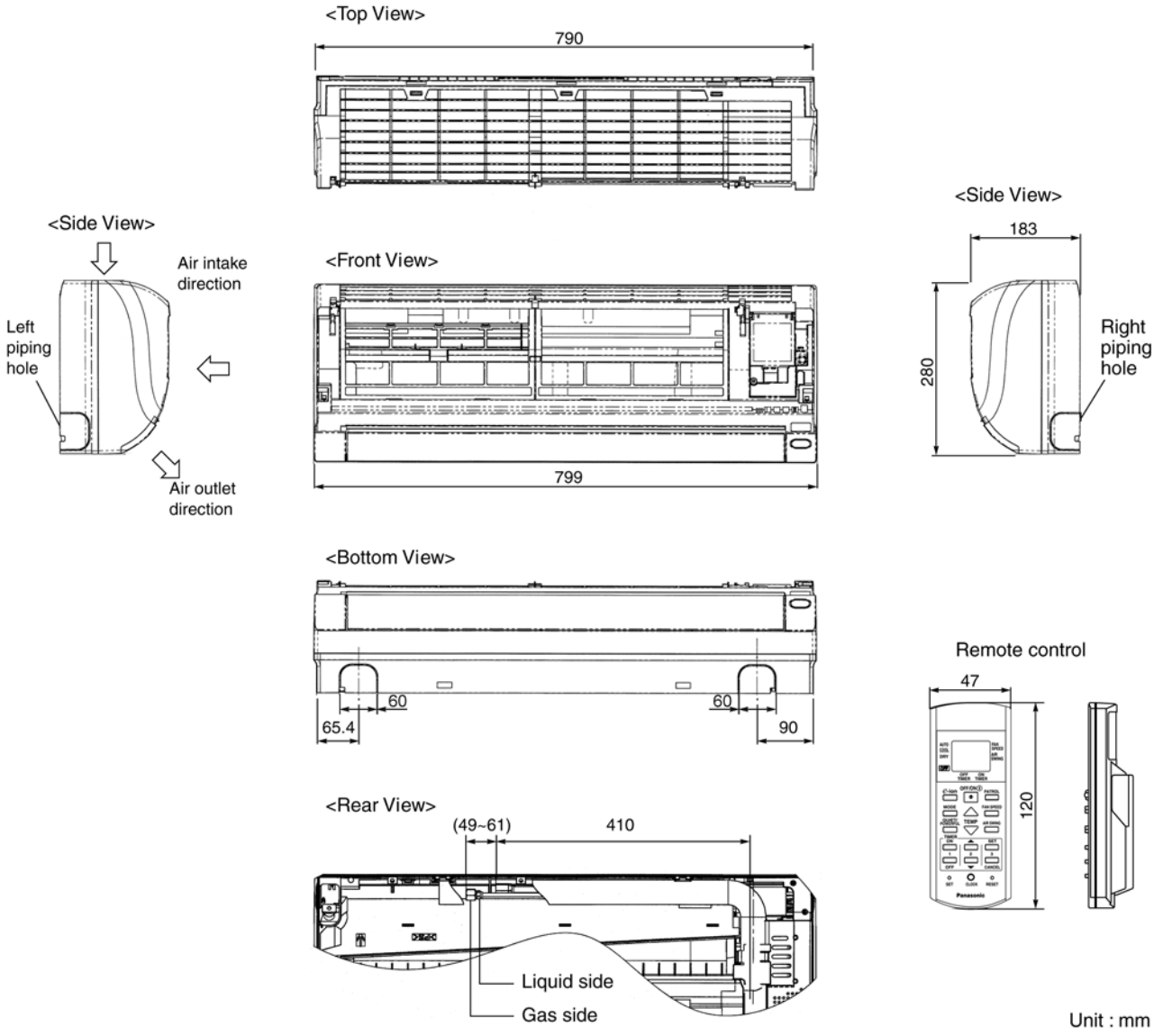
4.1.3. Remote Control



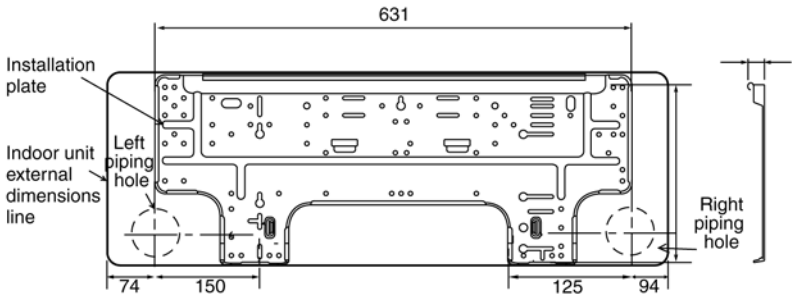
* For normal operation, the SET button is not in use.
* Press RESET button to restore the remote control's default setting.

5 Dimensions

5.1. Indoor Unit & Remote Control

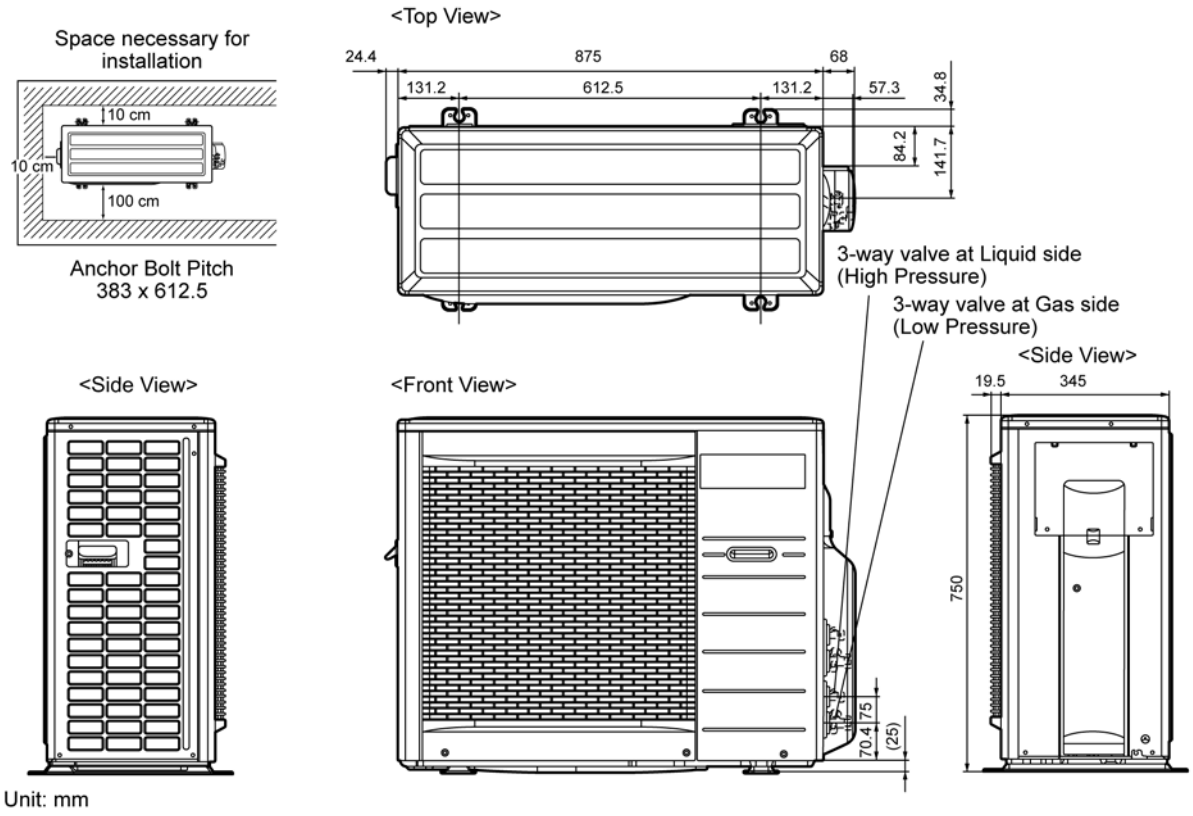


Relative position between the indoor unit and the installation plate <Front View>

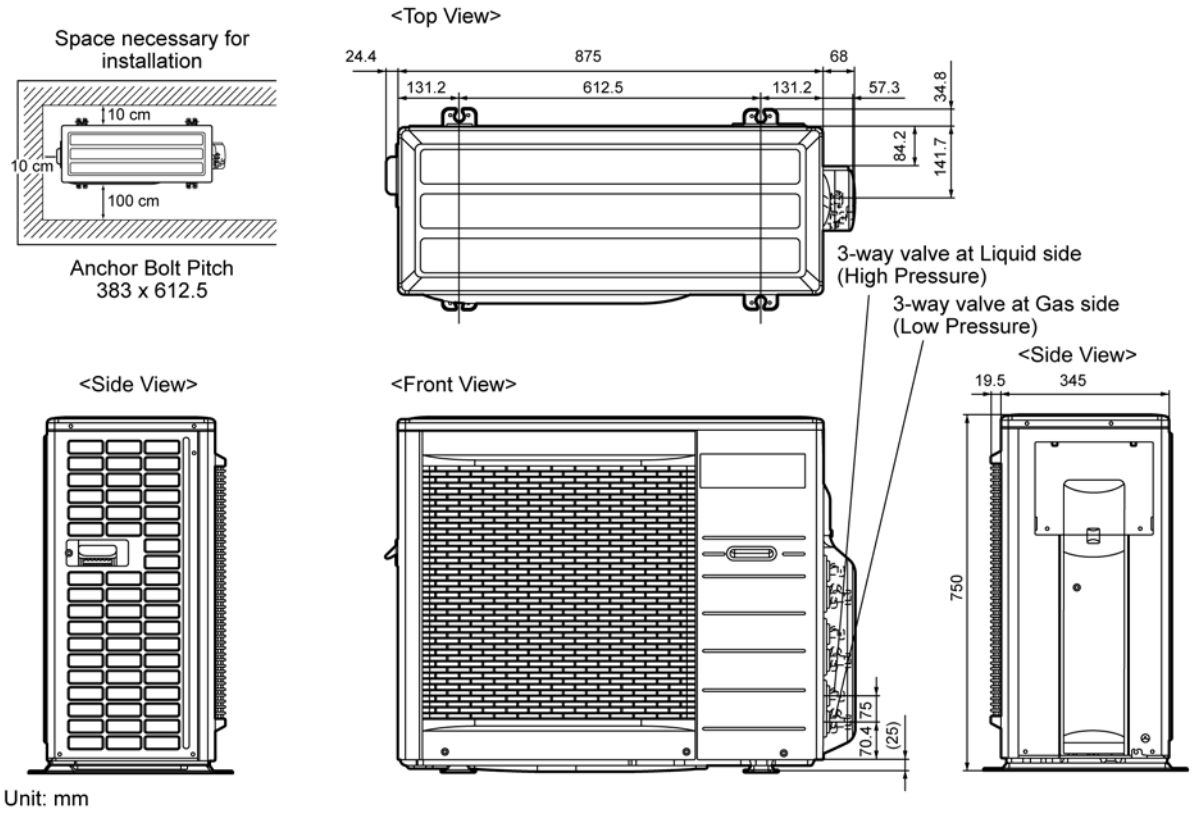


5.2. Outdoor Unit

5.2.1. CU-2C18GKH

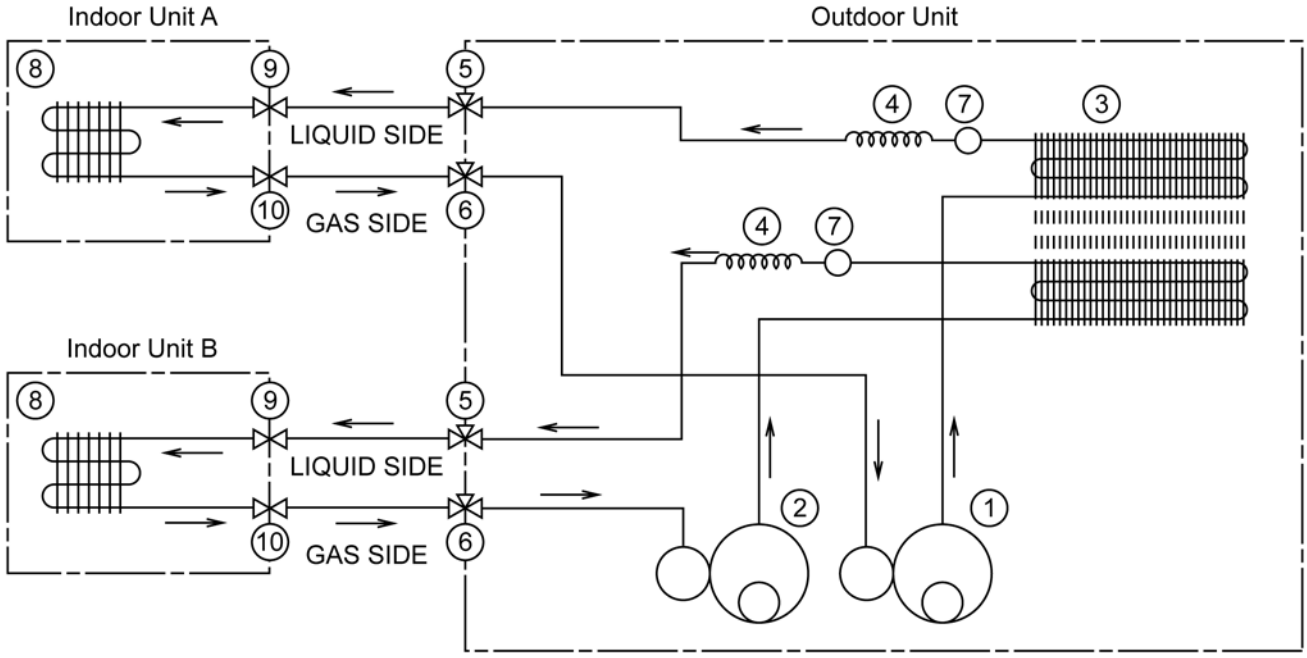


5.2.2. CU-3C20GKH



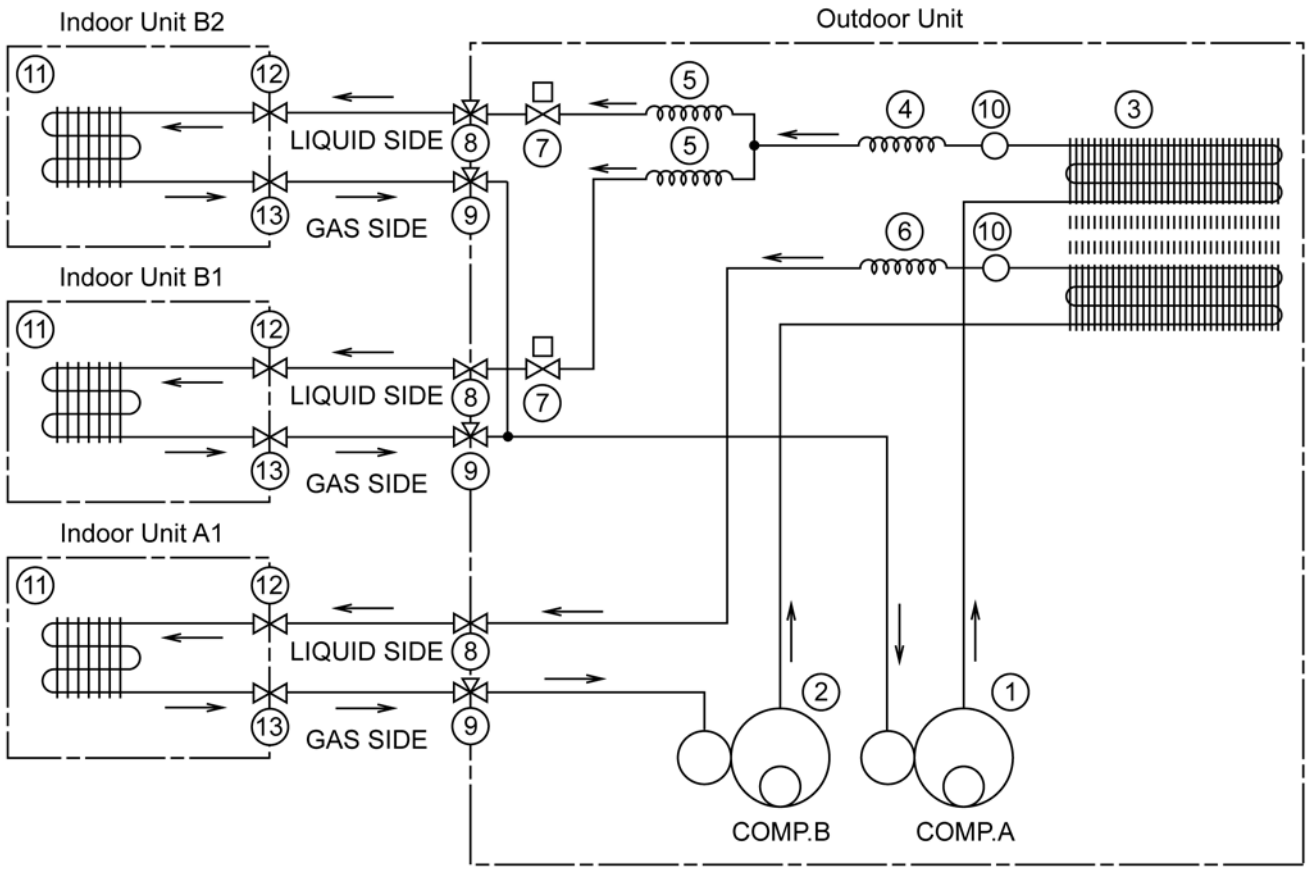
6 Refrigeration Cycle Diagram

6.1. CS-C9GKZW CU-2C18GKH



① COMPRESSOR A	④ CAPILLARY TUBE	⑦ STRAINER
② COMPRESSOR B	⑤ 3 - WAYS VALVE (1/4)	⑧ EVAPORATOR
③ CONDENSER	⑥ 3 - WAYS VALVE (3/8)	⑨ HALF UNION (1/4)
		⑩ HALF UNION (3/8)

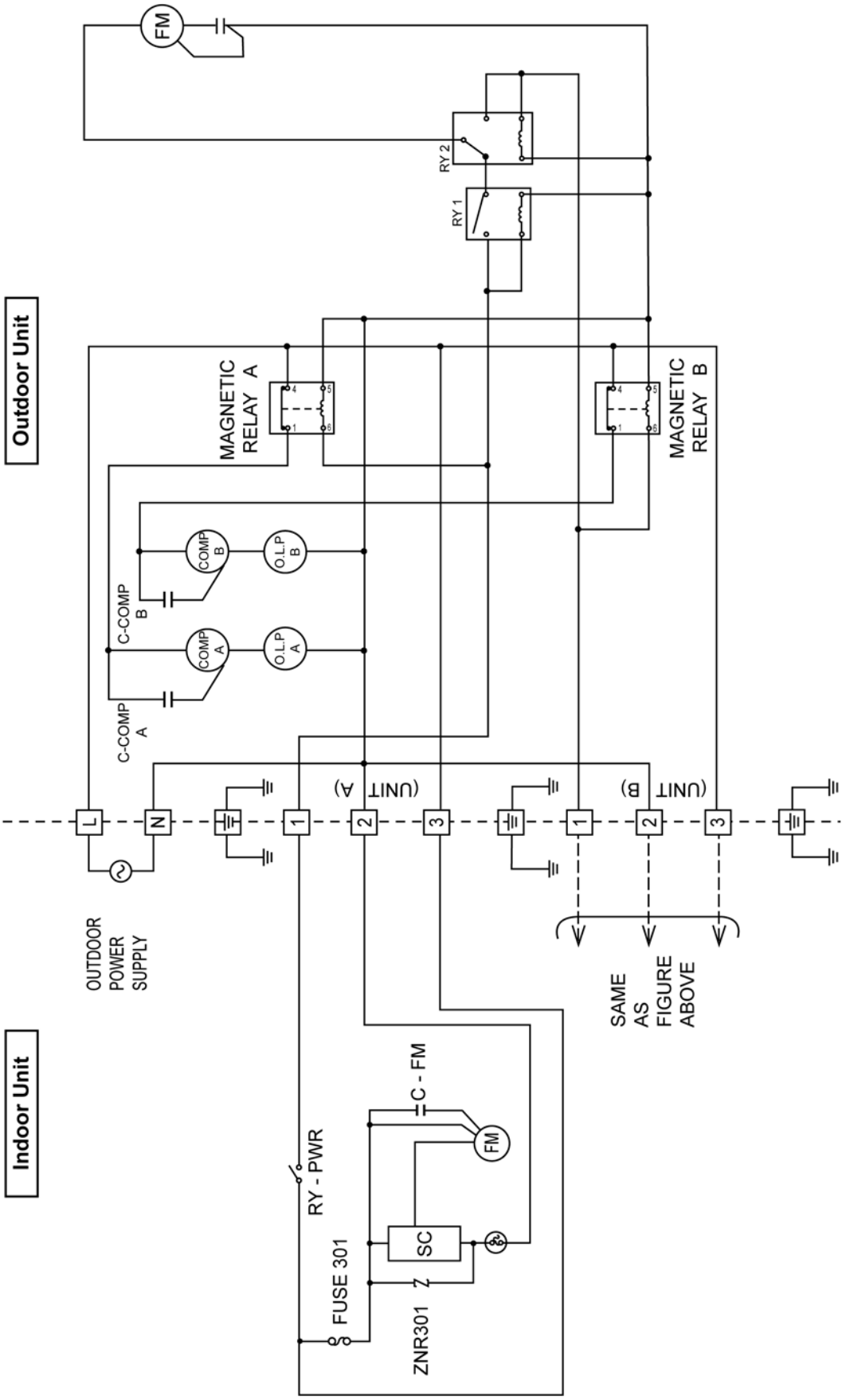
6.2. CS-C9GKZW CU-3C20GKH



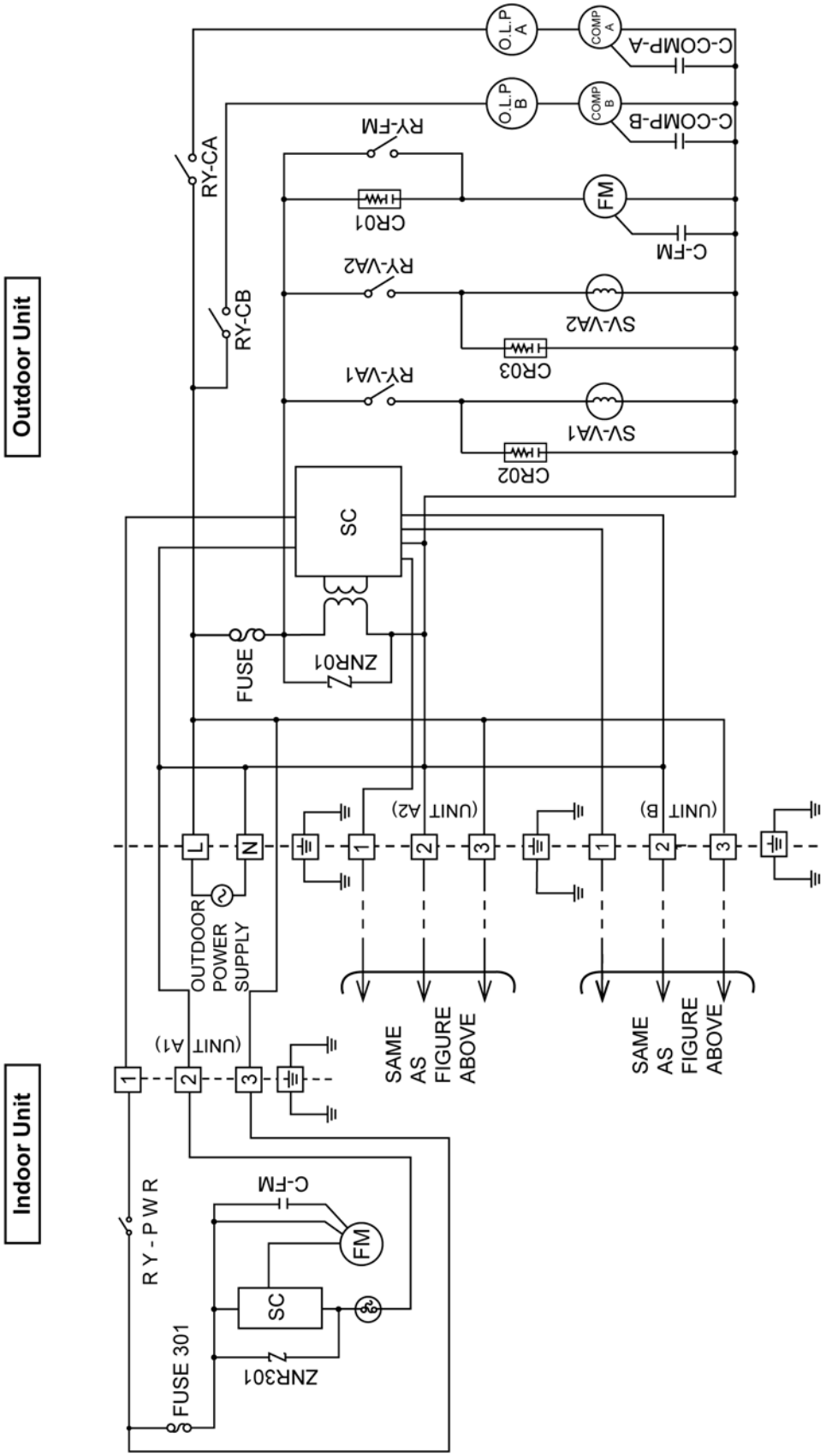
① COMPRESSOR A	⑤ CAPILLARY TUBE (2)	⑨ 3 - WAYS VALVE (3/8)
② COMPRESSOR B	⑥ CAPILLARY TUBE (3)	⑩ STRAINER
③ CONDENSER	⑦ SOLENOID VALVE	⑪ EVAPORATOR
④ CAPILLARY TUBE (1)	⑧ 3 - WAYS VALVE (1/4)	⑫ HALF UNION (1/4)
		⑬ HALF UNION (3/8)

7 Block Diagram

7.1. CS-C9GKZW CU-2C18GKH

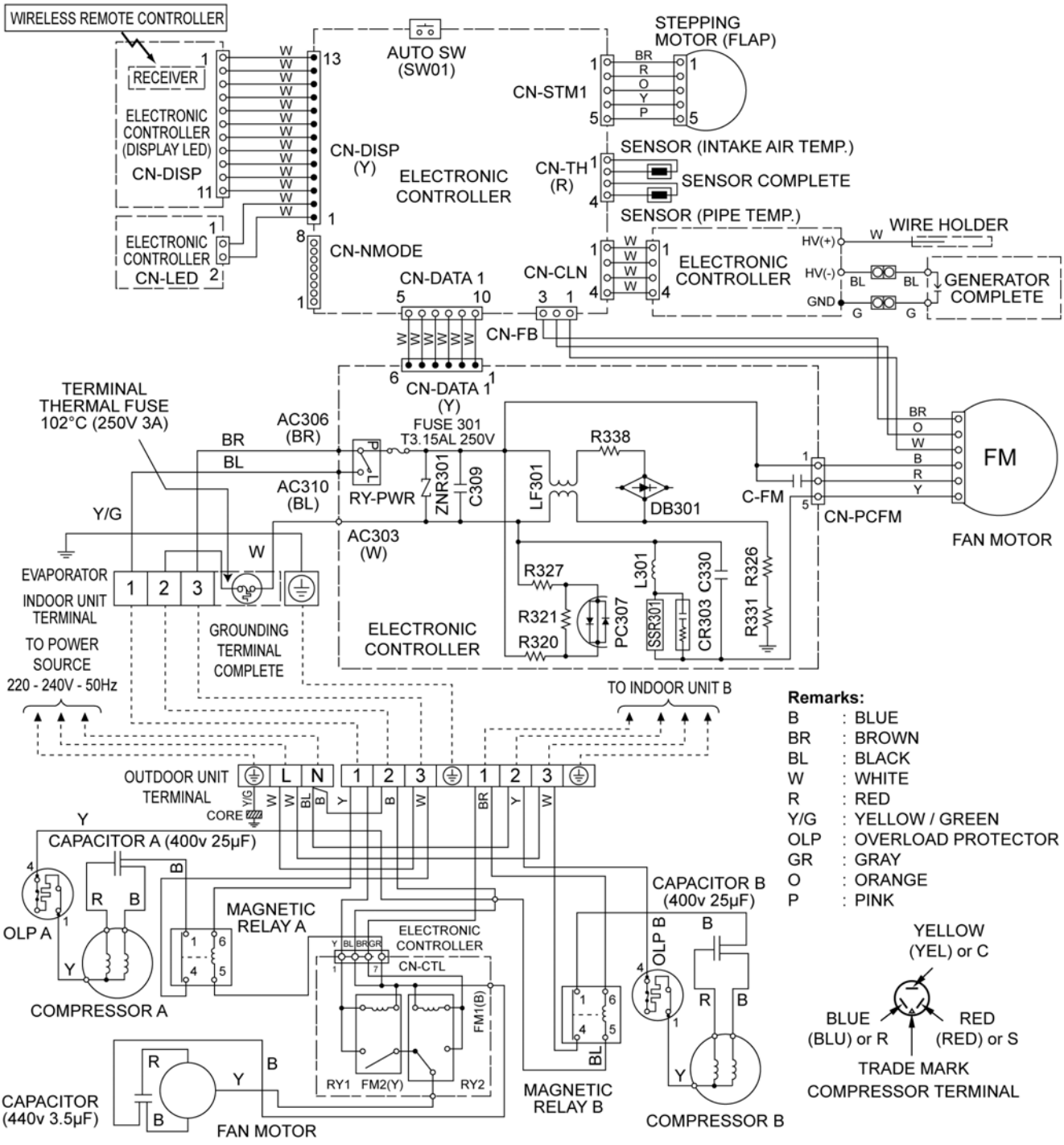


7.2. CS-C9GKZW CU-3C20GKH



8 Wiring Connection Diagram

8.1. CS-C9GKZW CU-2C18GKH



Resistance of Indoor Fan Motor Windings

CONNECTION	CWA921181J
YELLOW-BLUE	390.0 Ω
YELLOW-RED	394.0 Ω

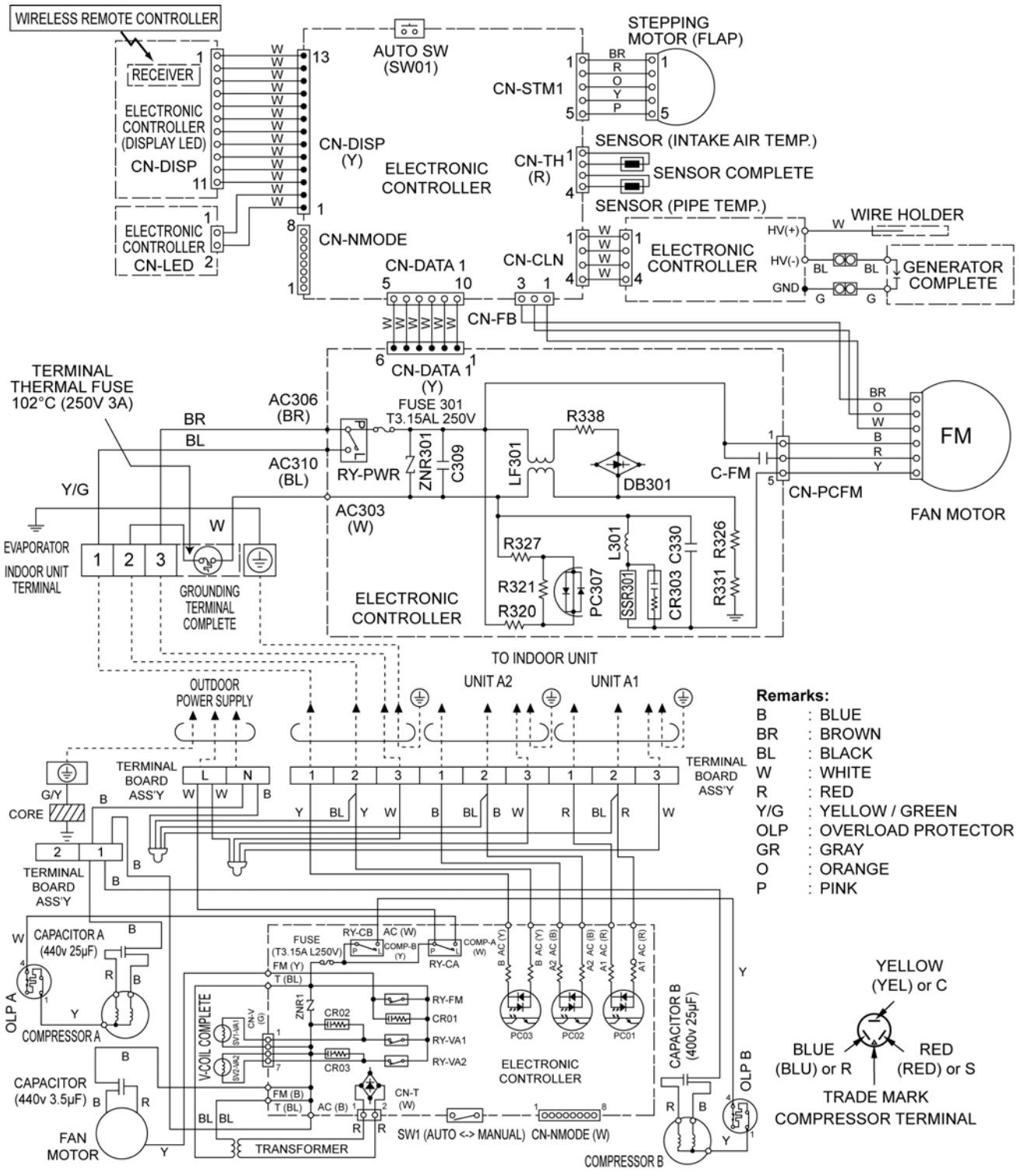
Resistance of Compressor Windings

CONNECTION	2PS132D3AA02
C - R	4.2 Ω
C - S	4.954 Ω

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA951576
BLUE-YELLOW	81 Ω
YELLOW-RED	93 Ω

8.2. CS-C9GKZW CU-3C20GKH



Resistance of Indoor Fan Motor Windings

CONNECTION	CWA921181J
YELLOW-BLUE	390.0 Ω
YELLOW-RED	394.0 Ω

Resistance of Compressor Windings

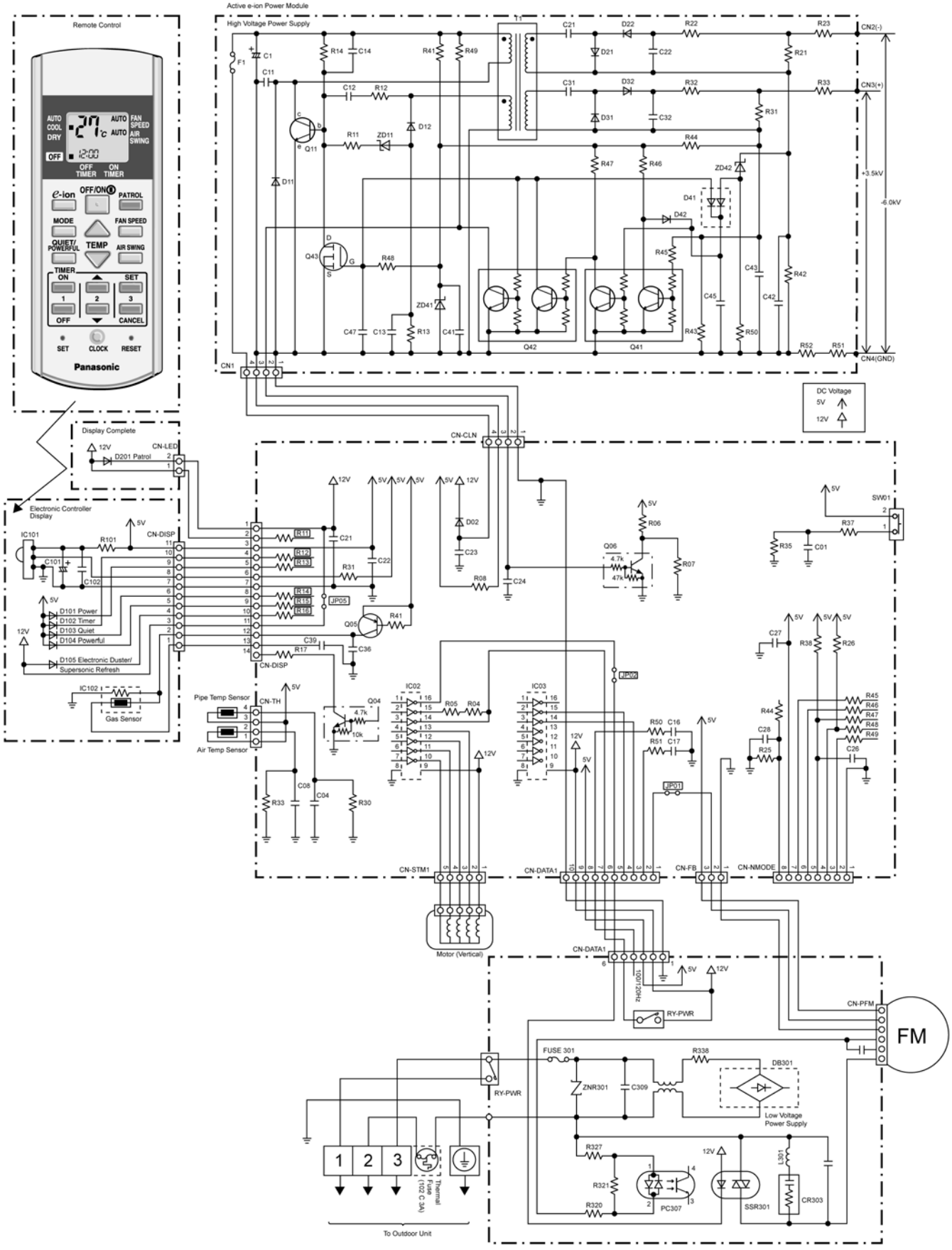
CONNECTION	2PS132D3AA02
C - R	4.2 Ω
C - S	4.954 Ω

Resistance of Outdoor Fan Motor Windings

CONNECTION	CWA951576
BLUE-YELLOW	81 Ω
YELLOW-RED	93 Ω

CONNECTION	2PS192D3BA02
C - R	3.187 Ω
C - S	5.297 Ω

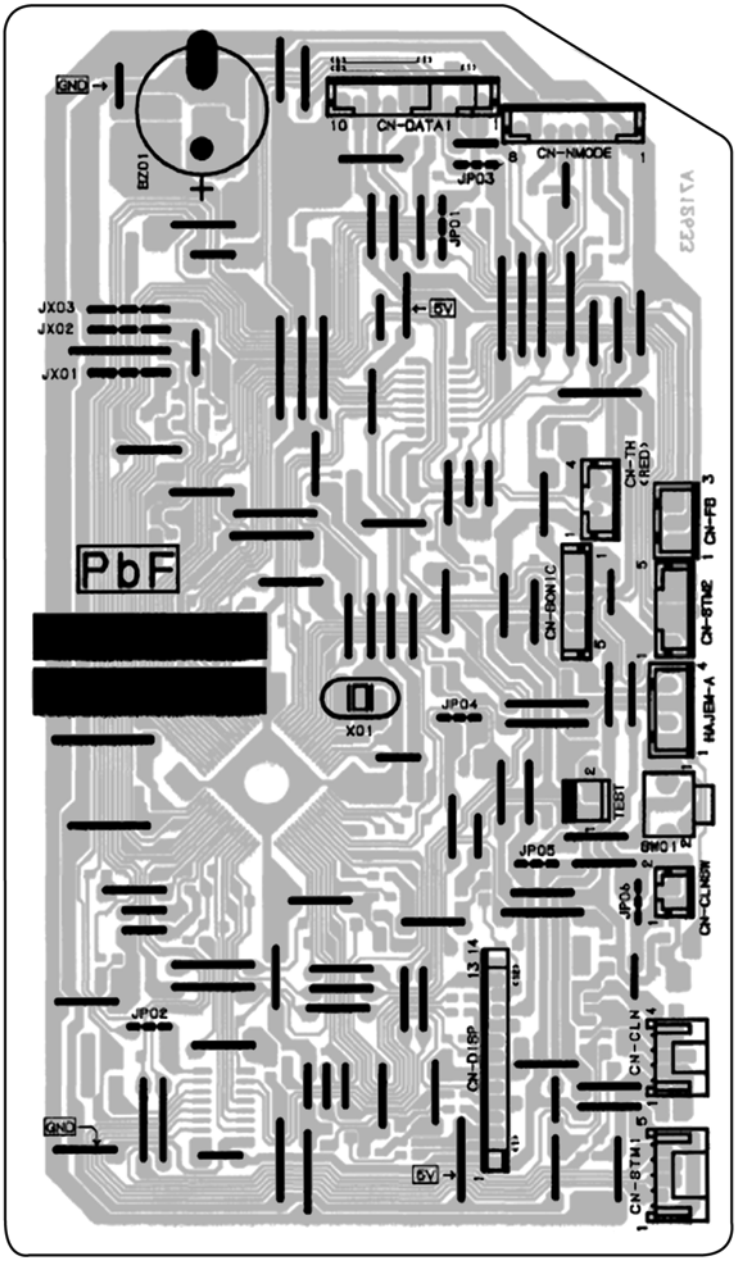
9 Electronic Circuit Diagram



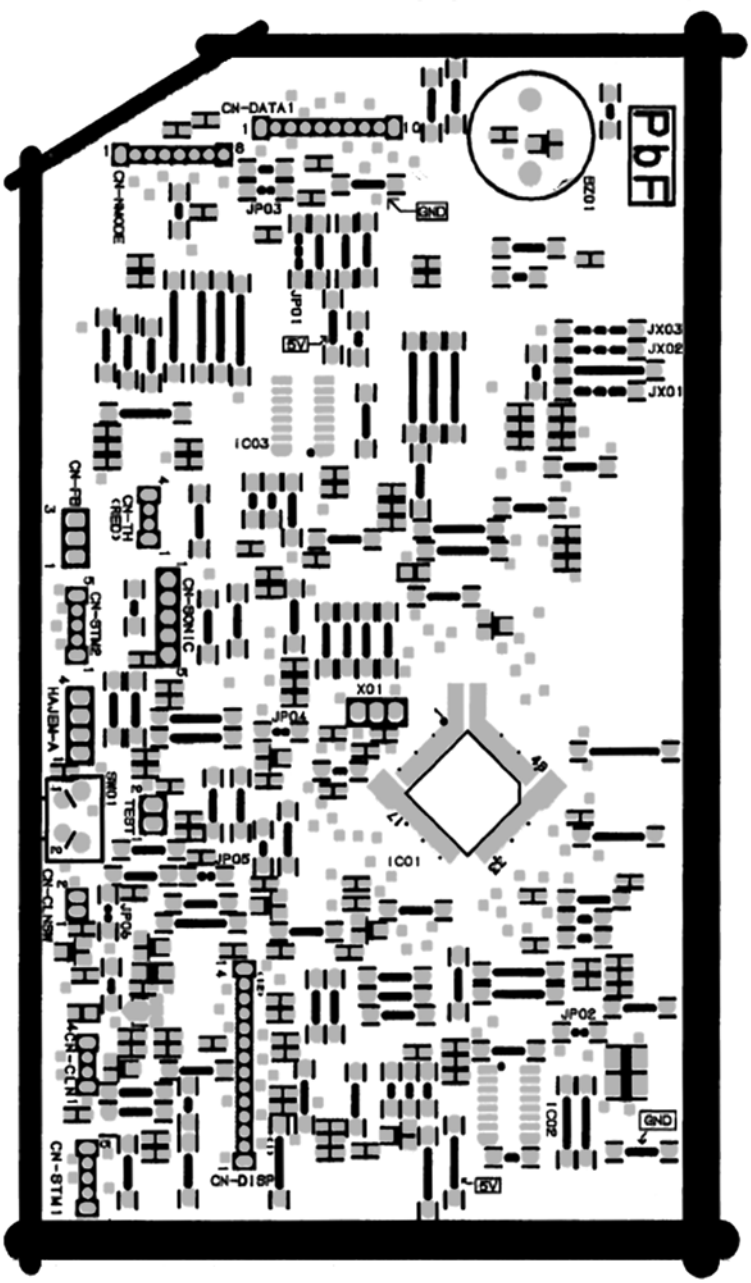
10 Printed Circuit Board

10.1. Indoor Unit

TOP VIEW

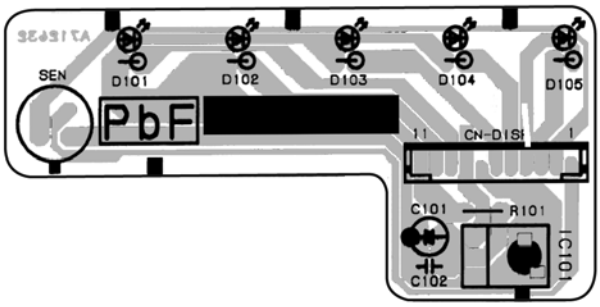


BOTTOM VIEW

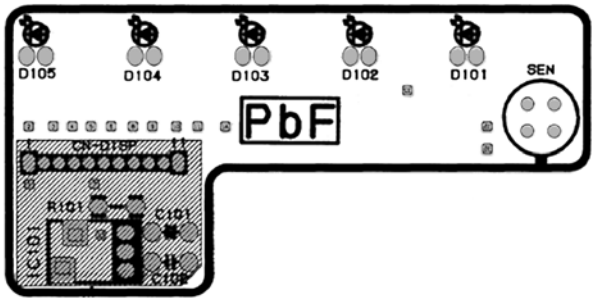

CN-DATA1
CN-MODE
JP03
GND
PbF
SZ01
JP01
5V
JX03
JX02
JX01
IC03
CN-FB
CN-TH
(RED)
CN-STM2
CN-DGNIC
X01
JP04
HAJBM-A
SW01
TEST
JP05
IC01
JP06
CN-GLNSR
JP02
IC02
GND
5V
CN-DISP
CN-STM1

10.2. Indicator

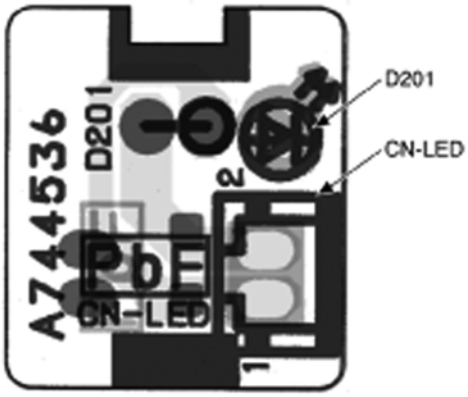
TOP VIEW



BOTTOM VIEW



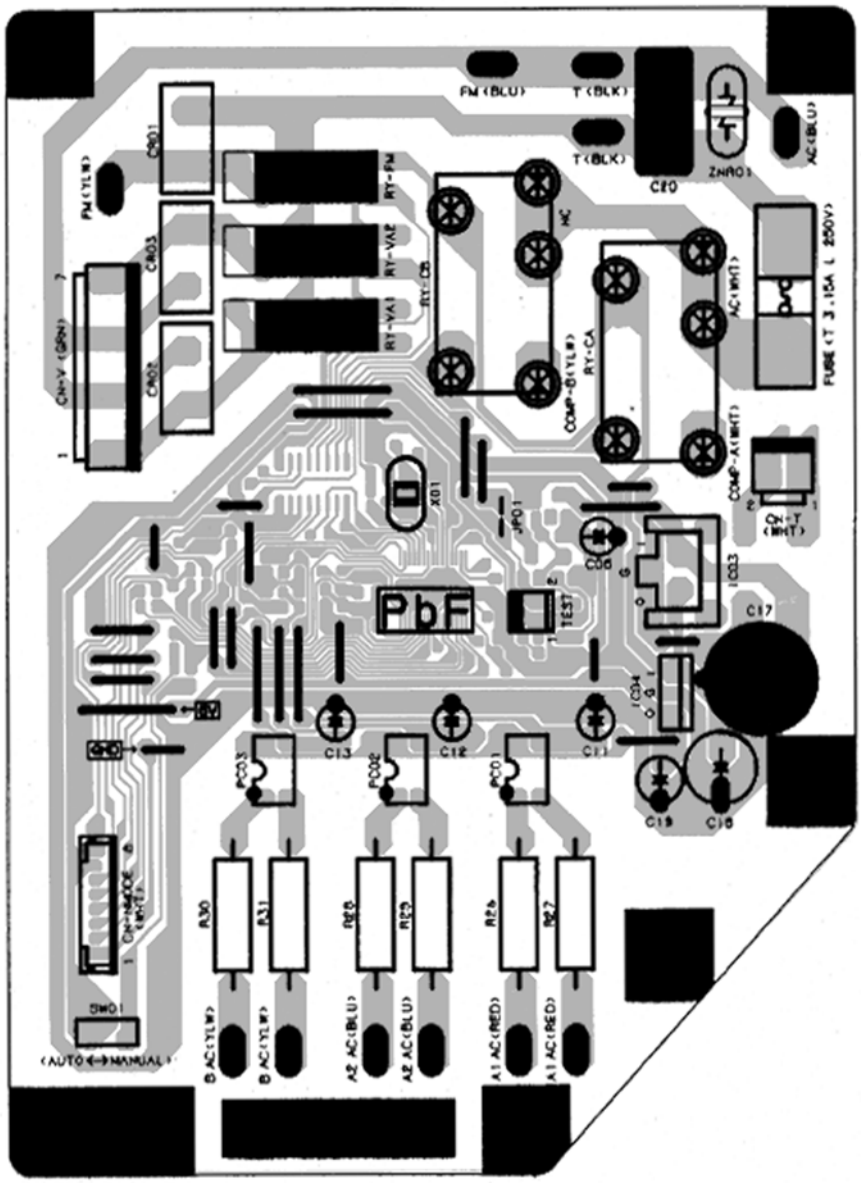
10.3. Patrol



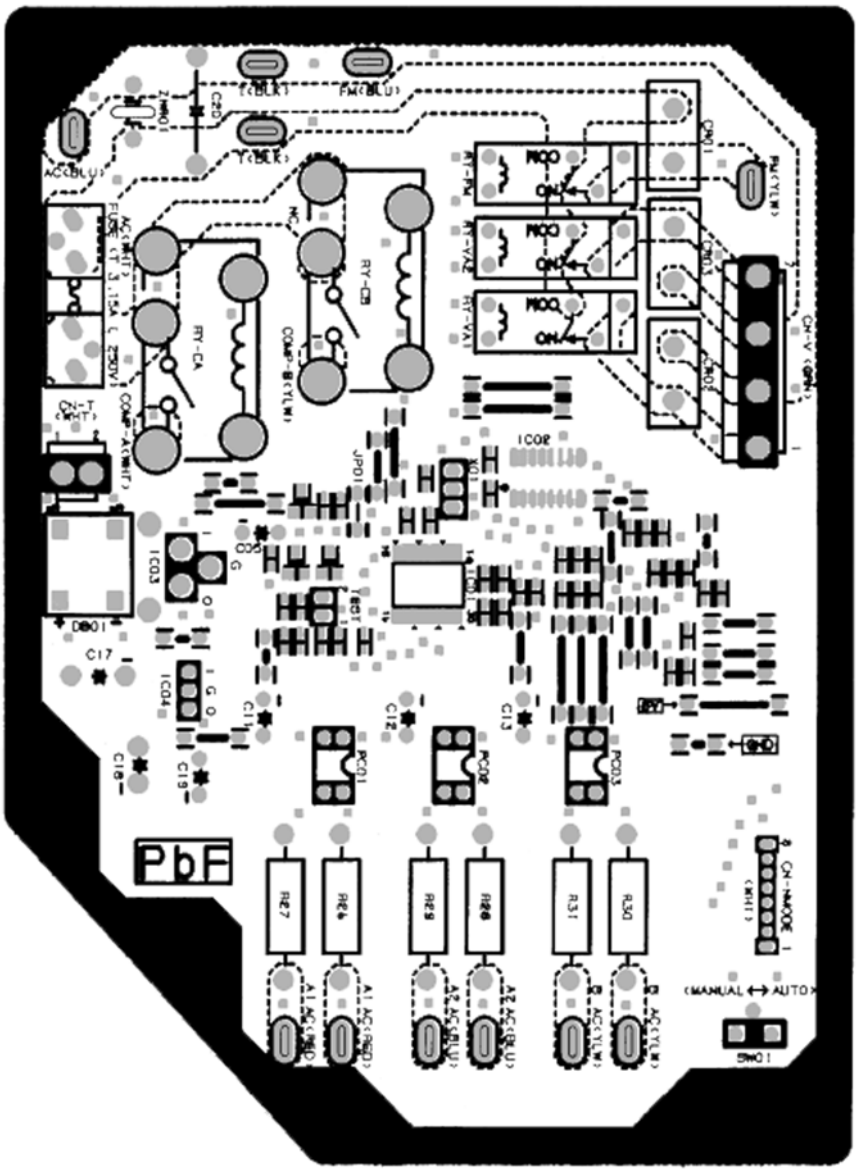
10.4. Outdoor Unit

10.4.1. CU-3C20GKH

TOP VIEW



BOTTOM VIEW



11 Installation Instruction

11.1. Select The Best Location

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 2.5 m.

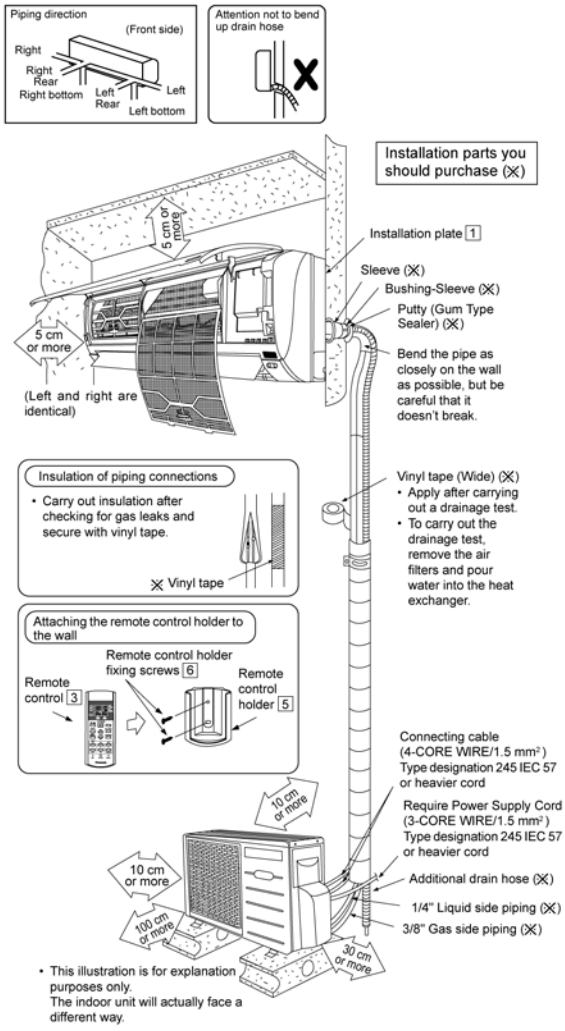
Outdoor Unit

- 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.

Model	Piping size		Rated Length (m)	Max. Elevation (m)	Min. Piping Length (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)
	Gas	Liquid					
CS-C9GKZW x 2 CU-2C18GKH	3/8"	1/4"	7.5	5	3	15	10
CS-C9GKZW x 3 CU-3C20GKH	3/8"	1/4"	7.5	5	3	15	10

- The above models will be installed at 15 m (max) distance.
  The refrigerant should be added 75g. (15 - 7.5) × 10g = 75g

Indoor/Outdoor Unit Installation Diagram

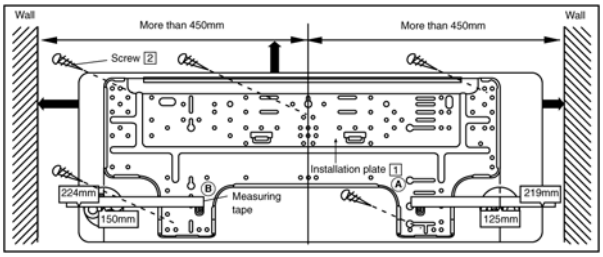


- This illustration is for explanation purposes only.
  The indoor unit will actually face a different way.

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.



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 67 mm.
From installation plate left edge to unit's left side is 74 mm.
From installation plate right edge to unit's right is 94 mm.

Ⓑ : For left side piping, piping connection for liquid should be about 15 mm from this line.

: 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 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.
2. Drill the piping plate hole with ø70 mm hole-core drill.
   • Line according to the left and right side edge of the installation plate. The meeting point of the extended line is the centre of the hole. Another method is by putting measuring tape at position as shown in the diagram above. The hole centre is obtained by measuring the distance namely 150 mm and 125 mm for left and right hole respectively.
   • Drill the piping hole at either the right or the left and the hole should be slightly slanted to the outdoor side.

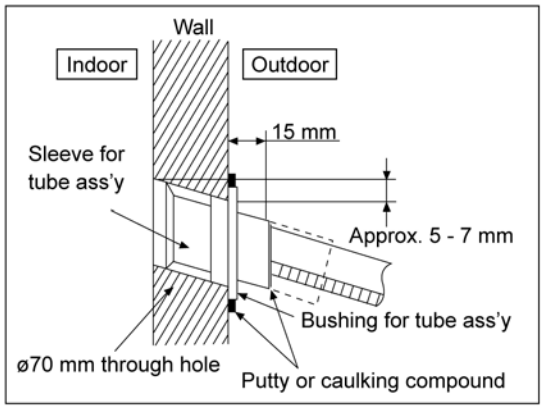
11.2.2. To Drill A Hole In The Wall And Install A Sleeve Of Piping

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

Caution

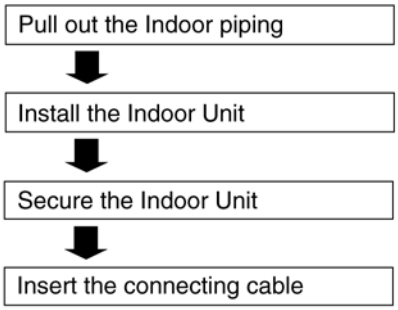
When the wall is hollow, please be sure to use the sleeve for tube ass'y to prevent dangers caused by mice biting the connecting cable.

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

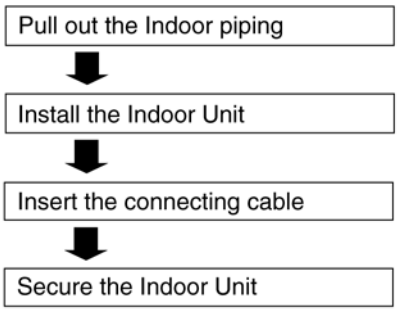


11.2.3. Indoor Unit Installation

For the right rear piping



For the right and right bottom piping



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

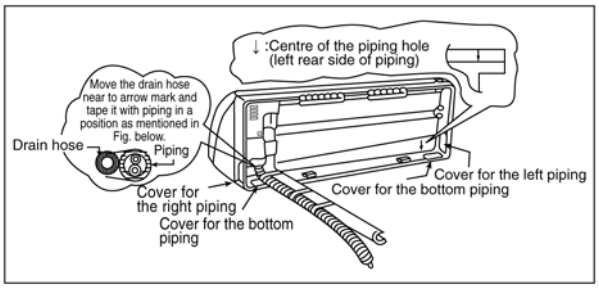
↓ • Please refer to "Connecting the piping" column in outdoor unit section. (Below steps are done after connecting the outdoor piping and gas-leakage confirmation.)

Insulate and finish the piping

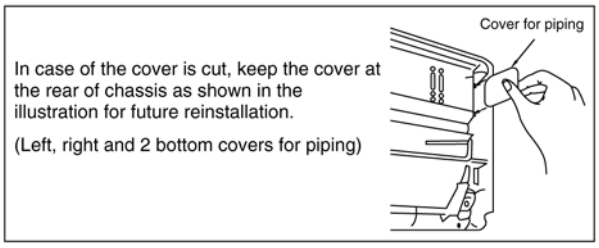
↓ • Please refer to "Piping and finishing" column of outdoor section and "Insulation of piping connections" column as mentioned in Indoor/Outdoor unit installation.

Secure the Indoor Unit

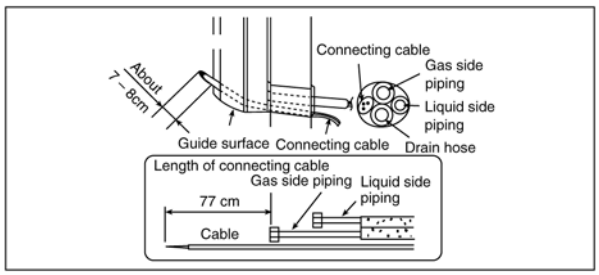
Pull out the piping and drain hose



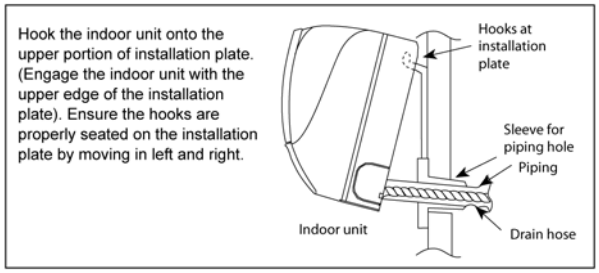
How to keep the cover



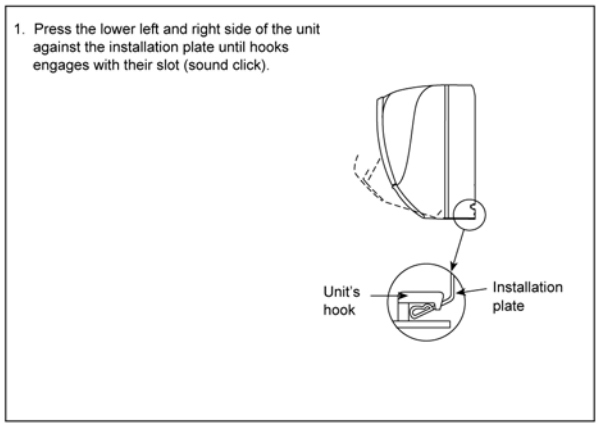
Insert the connecting cable

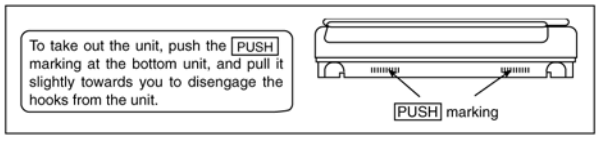


Install the Indoor unit

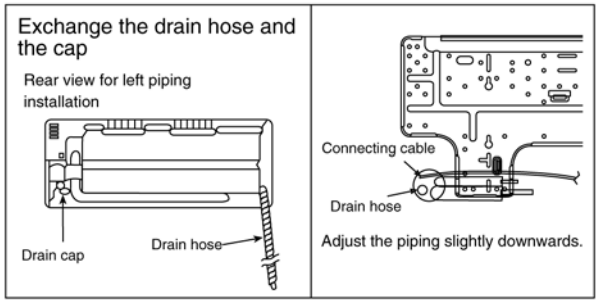


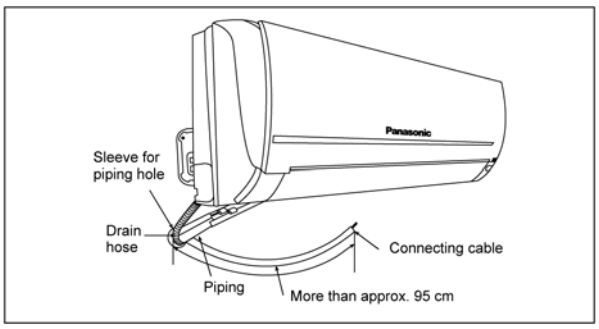
Secure the Indoor Unit



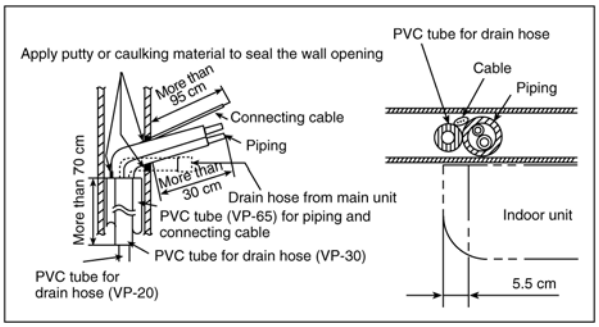


(This can be used for left rear piping & left bottom piping also.)

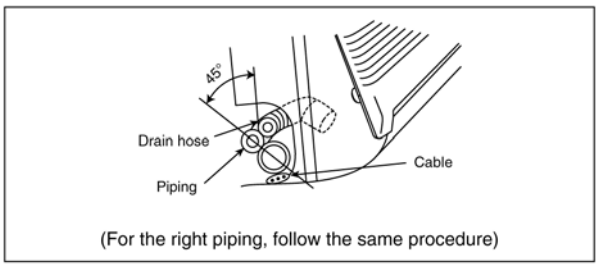




• How to pull the piping and drain hose out, in case of the embedded piping.



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

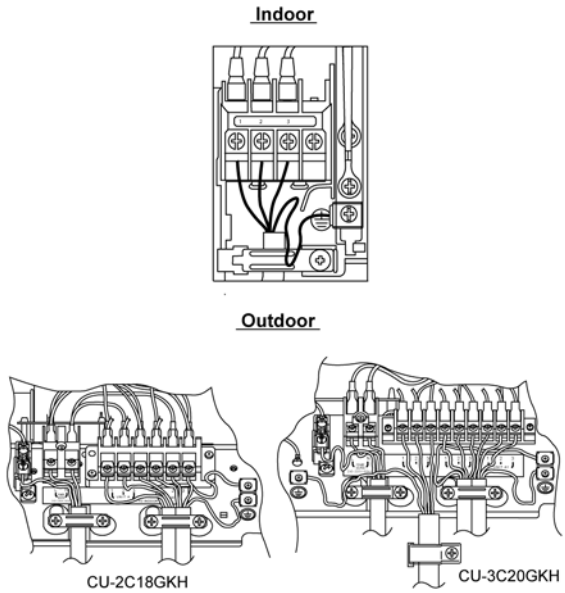


11.2.4. Connect The Cable To The Indoor Unit

1. The inside and outside connecting cable can be connected without removing the front grille.
2. Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4 × 1.5mm^2 flexible cord, type designation 245 IEC 57 or heavier cord.
   • Ensure the colour of wires of outdoor unit and the terminal Nos. 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.

Terminals on the indoor unit	1	2	3	⏚
Colour of wires				
Terminals on the outdoor unit	1	2	3	⏚

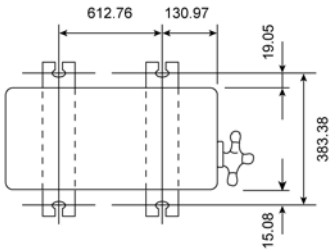
• Secure the cable onto the control board with the holder (clamper).



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.
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.



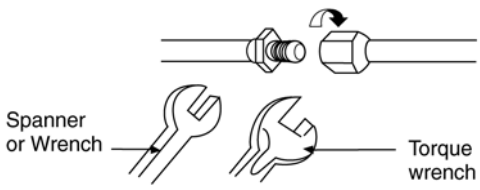
11.3.2. Connecting The Piping

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.



Model	Piping size (Torque)	
	Gas	Liquid
CU-C9GKZW	3/8" [42 N•m]	1/4" [18 N•m]

Connecting The Piping To Outdoor Unit

1. Align the center of the piping and sufficiently tighten the flare nut with fingers.
2. Finally, tighten the flare nut with torque wrench until the wrench clicks.
   • When tightening the flare nut with torque wrench, ensure the direction for tightening follows the arrow on the wrench.

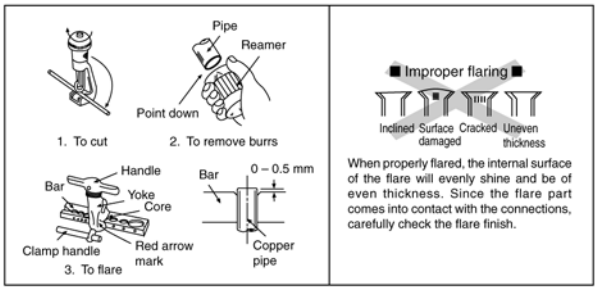
CAUTION :

The CU-3C20GKH/CS-C9GKZW have different cooling capacities depending on the connection to A_1 A_2 and/or B on CU-3C20GKH individually.
(Refer to SPECIFICATIONS on CATALOG)

1. The Cooling Capacity of Indoor Unit connecting "B" on CU-3C20GKH (Called B unit) is different from that of A_1 and A_2 Units.
2. A_1 and A_2 Units share the same compressor, their cooling capacities thus change depending on whether one, the other, or both of the units is in use.
3. Reflect the B or A (A_1 and/or A_2) on the Indoor Unit for later reference.

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 is 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.



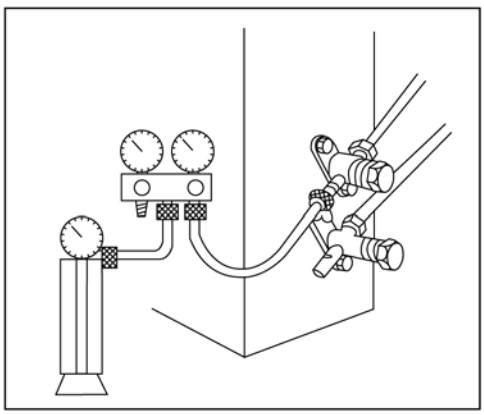
11.3.3. Air Purging Of The Pipings And Indoor Unit

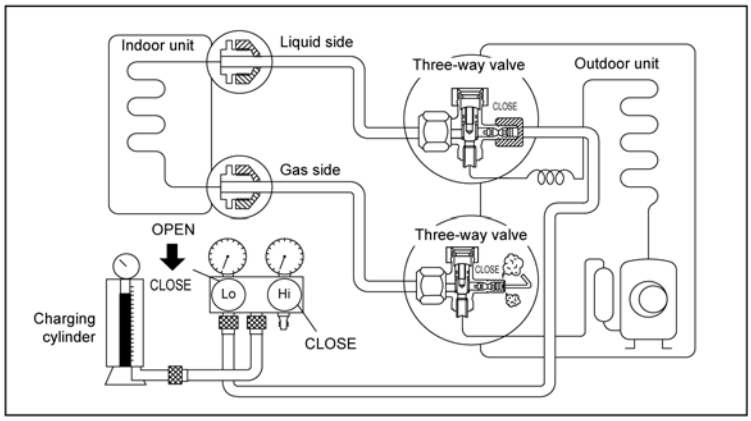
1) Checking gas leakage

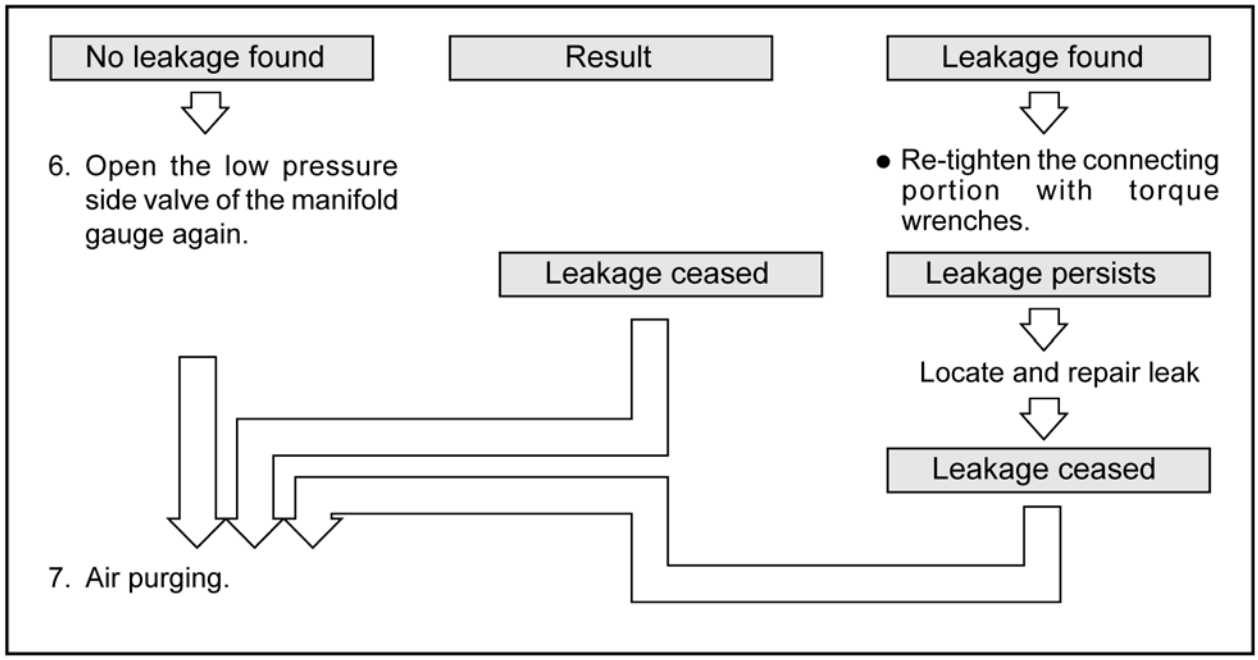
1. Remove the service port caps from both 3-way valves.
2. Connect the manifold gauge set to the service port of liquid side 3-way valve.
3. Connect the charging cylinder to the manifold gauge set and open the valve of the cylinder.
4. Open the low pressure side valve of the manifold gauge for approx. 10 seconds and then close.
5. Check a gas leakage of the connecting portion of pipings with the gas-leak detector.

<For the left pipings>

1. Measure the pressure
2. Keep it for 5 - 10 minutes
   • Ensure if the pressure indicated on the gauge is as same as that measured at first time.



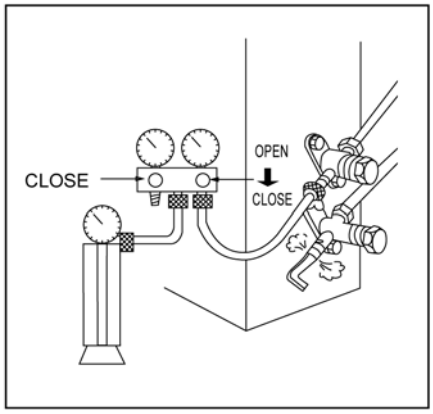




2) Air purging

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

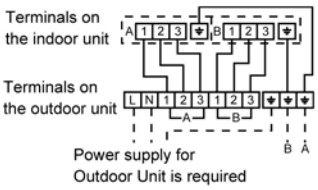
1. To purge the air, push the pin on the gas side 3-way valve for three seconds using with a hexagonal wrench and set it free for one minute.
   • Repeat this three times.
2. To balance the refrigerant, close the low pressure side valve on the manifold gauge and release a refrigerant from the piping through service port until the gauge indicates 0.49 ~ 0.294 MPa.
3. Set the both 3-way valves to open position with the hexagonal wrench for the unit operation.



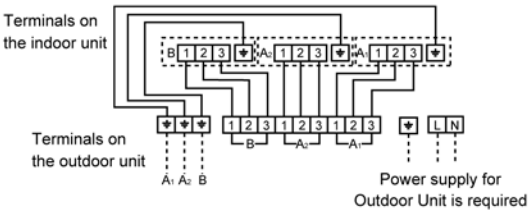
11.3.4. Connect The Cable To The Outdoor Unit

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 4 × 1.5 mm^2 flexible cord, type designation 245 IEC 57 or heavier cord.
   Power supply cord cable use 3 x 1.5 mm2 flexible cord, type designation 245 IEC 57 or heavier cord.

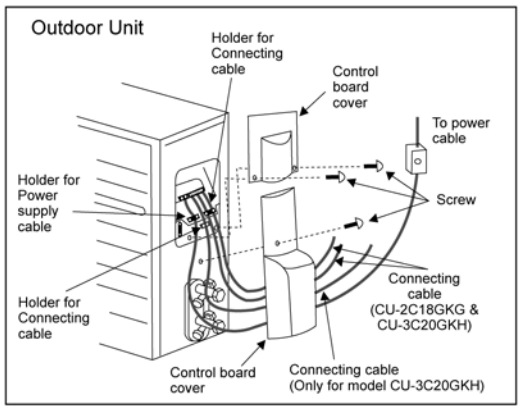
• CU-2C18GKH/CS-C9GKZW



• CU-3C20GKH/CS-C9GKZW



3. Secure the cable onto the control board with the holder (clamper).
4. Confirm the SW1 Switch at AUTO position. (CU-3C20GKH)
5. Attach the control board cover back to the original position with the screw.



Note: Knife switch (Disconnecting means) should have minimum 3.5 mm contact gap.
Secure the cable onto the control board with the holder (clamper).

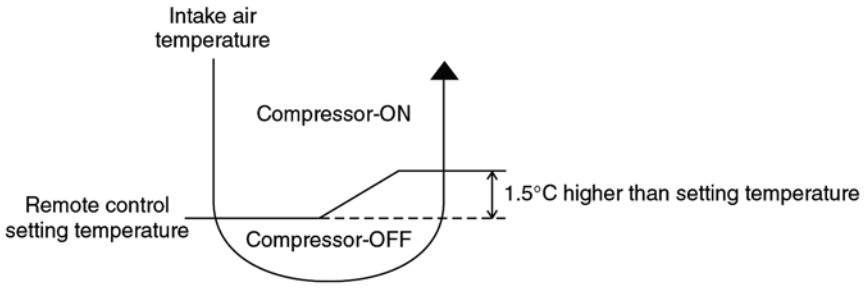
11.3.5. Pipe Insulation

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 6 mm or above.

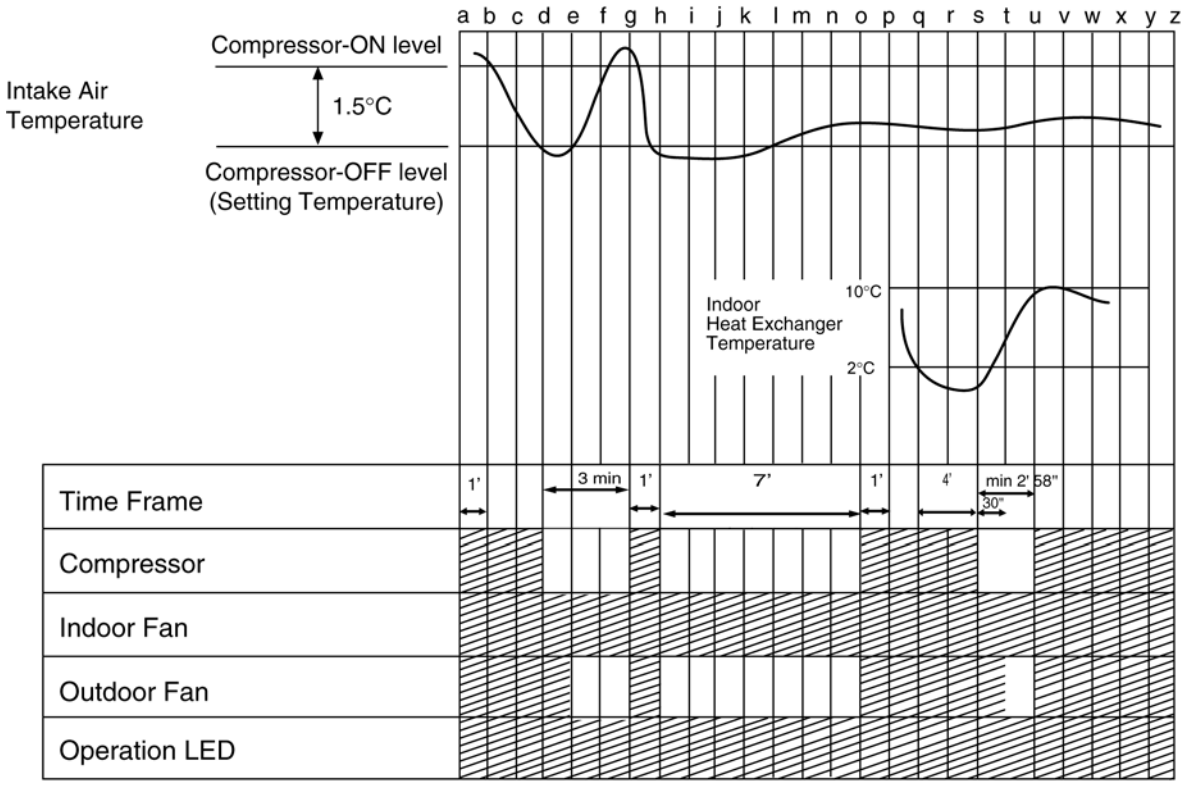
12 Operation and Control

12.1. Cooling Operation

- Cooling operation can be set using remote control.
- This operation is applied to cool down the room temperature reaches the setting temperature set on 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 running and restart as shown in below figure.



12.1.1. Cooling Operation Time Diagram

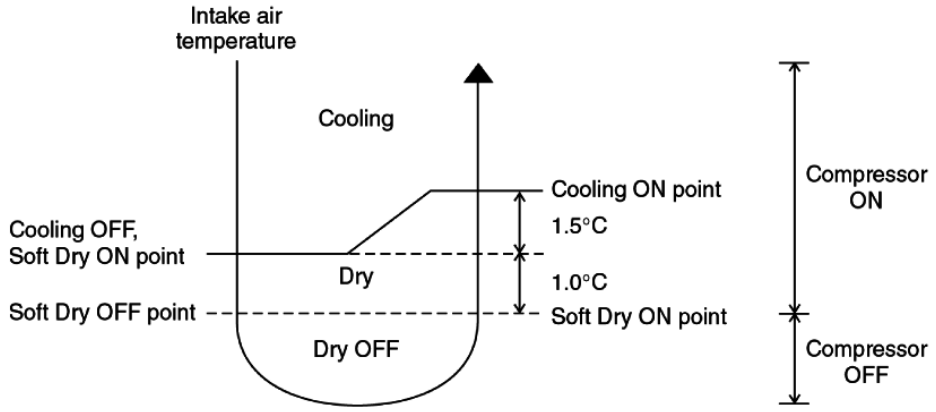


<Description of operation>

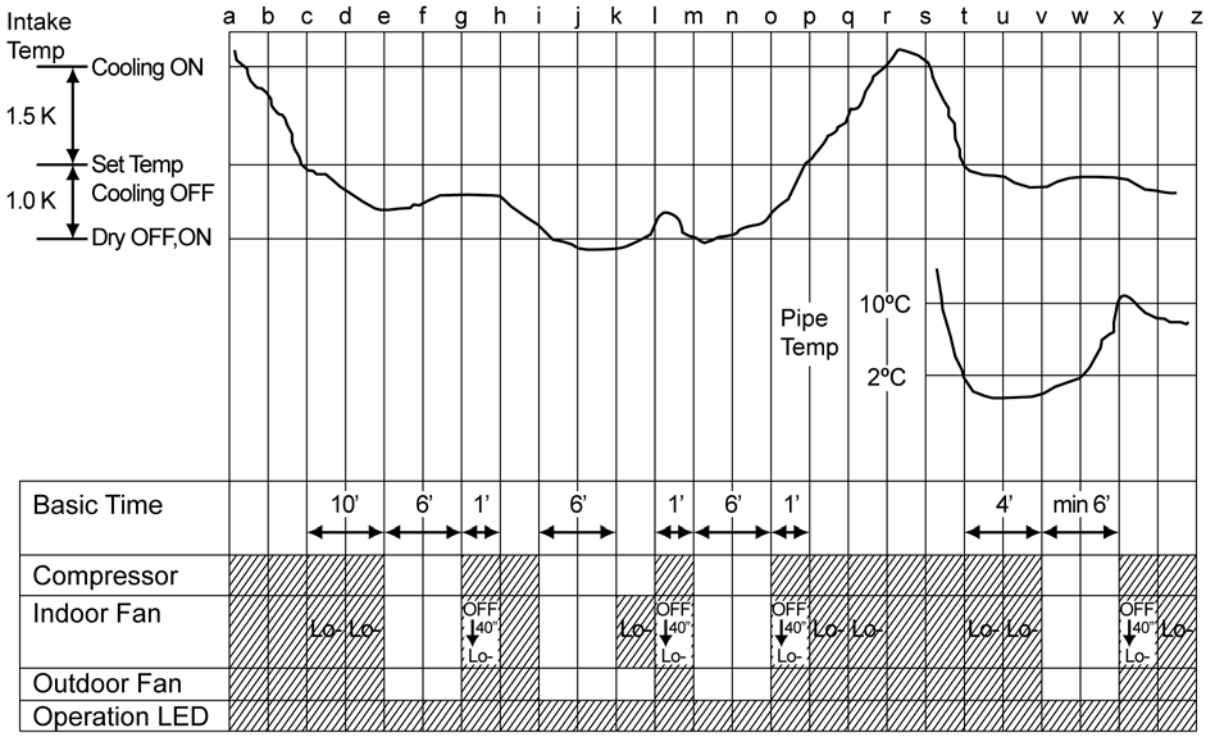
a – b, g – h	: Minimum 60 seconds forced operation	Operation
d – g, s – u	: Minimum 3 minutes restart control (Time Delay Safety Control)	Stop
h – o	: Maximum 7 minutes time save control	
q – u	: Freeze Prevention Control	

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 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 below figure.
- 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>

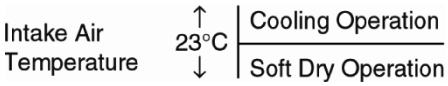
a – c	: Minimum 3 minutes restart control (Time Delay Safety Control) - Cooling operation.
c – e	: 10 minutes dry operation.
e – g, l – k, m – o, v – x	: Minimum 6 minutes restart control (Time Delay Safety Control) - Soft Dry operation.
g – h, l – m, o – p	: Minimum 60 seconds force operation.
t – v	: Freeze Prevention Control.

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.



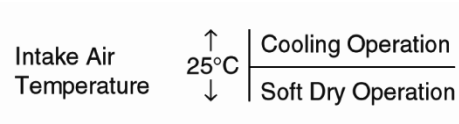
- Then, the unit start to operate at determined operation mode, until it is switched off using remote control, with the setting temperature as shown in below table.

	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 below table by pressing on 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 JX1 at indoor electronic controller.



	Setting Temperature (Standard)
Cooling Operation	27°C
Soft Dry Operation	24°C

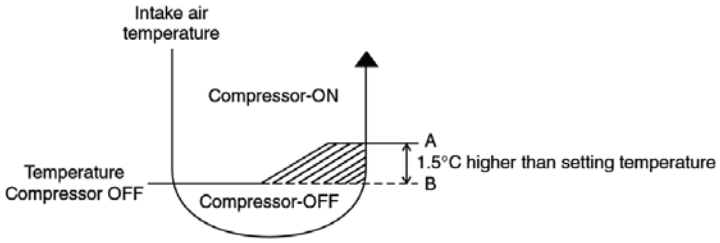
12.4. Operation Control

12.4.1. 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.

12.4.2. 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 temperature (A) and compressor OFF temperature (B) during the period.
- This phenomenon is to reduce the built up humidity inside a room.



12.4.3. 60 Seconds Forced Operation

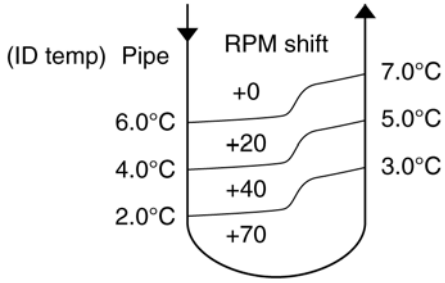
- Once the air conditioner is turned on, the compressor will not stop within 60 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, force stop by pressing the OFF/ON operation button at the remote control is permitted.
- The reason for the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

12.4.4. Starting current Control

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

12.4.5. Freeze Preventive Control

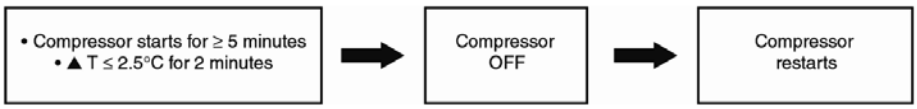
- To protect indoor heat exchanger from freezing and to prevent higher volume of refrigerant in liquid form return to compressor.
- This control will activate when the temperature of indoor heat exchanger falls below 2°C continuously for more than 4 minutes.
- The current fan speed will change to freeze prevention speed after 70 seconds compressor on. When indoor pipe temperature reaches certain temperature for 5 sec. the speed will be increased as in below figure.



- Compressor will turn off when indoor temperature falls below 2°C for more than 4 minutes. It will restart again when indoor heat exchanger temperature rises to 10°C.
- Restart control (Time Delay Safety Control) will be applied in this control.

12.4.6. 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 continuous 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.

12.4.7. Dew Prevention control

- To prevent dew formation at indoor unit discharge area.
- This control will be activated if:-
  - Cooling mode or Quiet mode.
  - Remote Control setting temperature is less than 25°C.
  - Fan speed is at CLo or QLo.
  - Room temperature is constant (±1°C) for 30 minutes.
  - Compressor is continuously running.
- Fan speed and angle of horizontal louver (vertical airflow angle) 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.
  - The angle of horizontal louver will be changed as below figure.

Operation mode		Airflow direction auto-control	Airflow direction manual control
Cooling, Soft Dry	A	12° ~ 32°	12°, 15°, 20°, 26°, 32°
	B	20° ~ 30°	22°, 24°, 26°, 28°, 30°

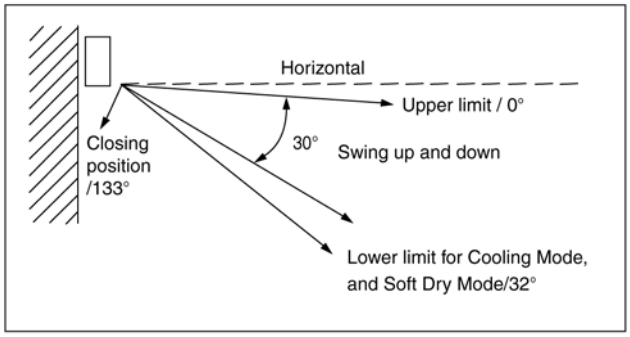
Note:

A = Normal operation angle of rotation

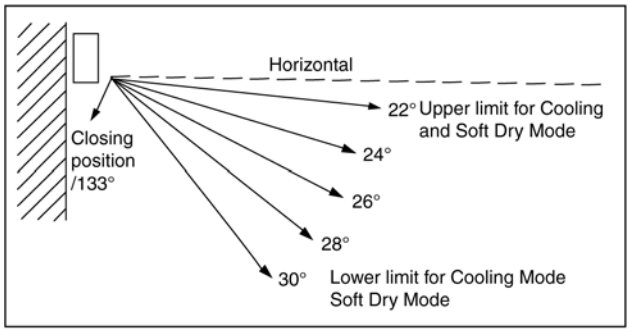
B = Dew prevention angle of rotation

Horizontal Louver Angle

During Anti-Dew condensation prevention, the horizontal louver angle in Auto-control are as below figure.



During Anti-Dew condensation prevention, the horizontal louver angle in Manual control are as below figure.



12.5. Indoor Fan Speed Control

• Indoor Fan Speed can be set using remote control.

12.5.1. Fan Speed Rotation Chart

Speed	Fan Speed (rpm)
	CS-C9GKZW
S Hi	1300
Hi	1210
Me	1000
H Lo	790
C Lo	730
Lo-	680
S Lo	630
Q Hi	1110
Q Me	900
Q Lo	630

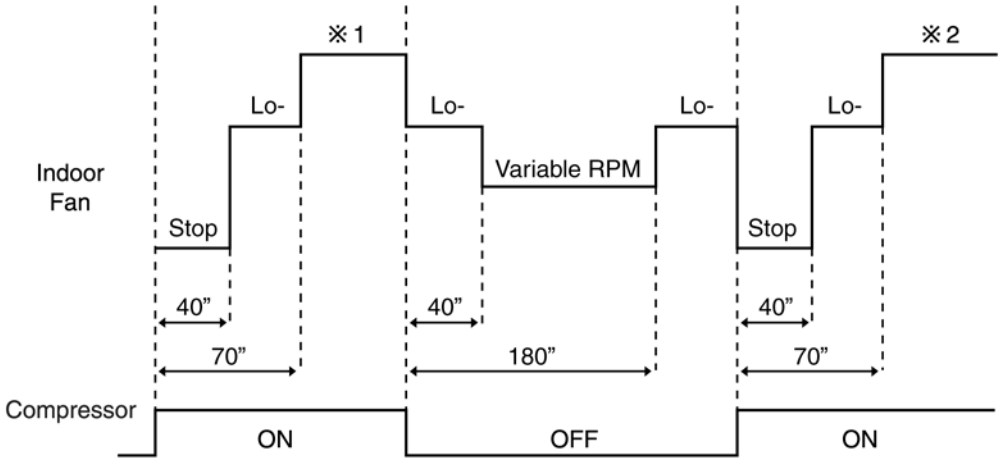
12.5.2. Automatic Fan Speed Control

• 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.

Speed Mode				SHi	Hi	Me	HLo	CLo	Lo-	SLo	Stop
Cooling	Normal	Manual	Hi		○						
			Me			○					
			Lo					○			
		Auto			○	○			○		○
	Powerful	Manual		○							
		Auto		○							
Soft Dry		Manual							○		○
		Auto							○		○
Cooling	Quiet	Manual	QHi		Hi-100						
			QMe			Me-100					
			QLo					CLo-100			
		Auto			Hi-100	Me-100			○		○
Soft Dry	Quiet	Manual							○		○
		Auto							○		○
Mode Jugdement										○	

• Auto Fan Speed during cooling operation:

1. Indoor fan will rotate alternately between off and on as shown in below diagram.
2. At the beginning of each compressor start operation, indoor fan will increase fan speed gradually for deodorizing purpose.
3. For the first time the compressor operate, 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.
4. During compressor stop, indoor fan will operate at Lo- for the beginning 3 minutes to prevent higher volume of refrigerant in liquid form returning to the compressor.
5. 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 restart of compressor.

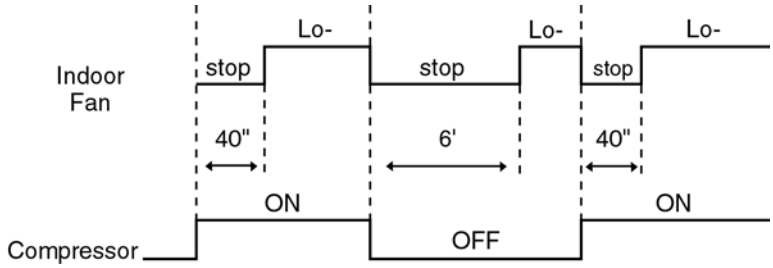


※ 1 Fan Speed is Hi until the compressor stops (when the room temperature reaches setting temperature).

※ 2 Fan Speed is Me after the compressor restarts.

• Auto Fan Speed during Soft Dry operation:

1. Indoor fan will rotate alternately between off and Lo-.
2. At the beginning of each compressor start operation, indoor fan will increase fan speed gradually for deodorizing purpose.
3. When compressor at turn off condition for 6 minutes, indoor fan will start fan speed at Lo- to circulate the air in the room. This is to obtain the actual reading of intake air temperature.



12.5.3. 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.

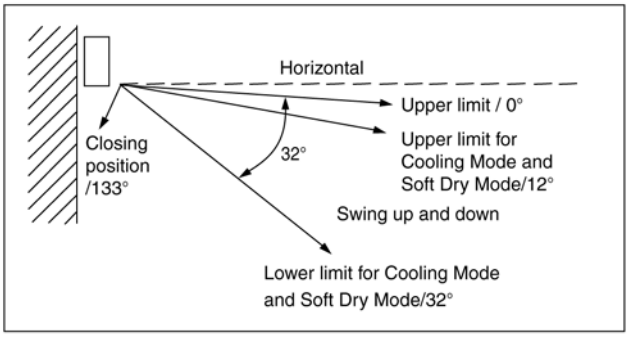
12.6. Outdoor Fan Speed Control

• 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.

12.7. Vertical Airflow Direction Control

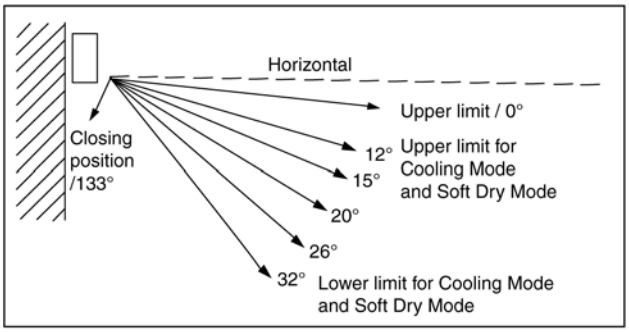
12.7.1. Auto Control

- 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 stop operation using the remote control, the discharge vent is reset, and stop 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 and rest at the upper limit.



12.7.2. 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.



12.8. Horizontal Airflow Direction Control

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

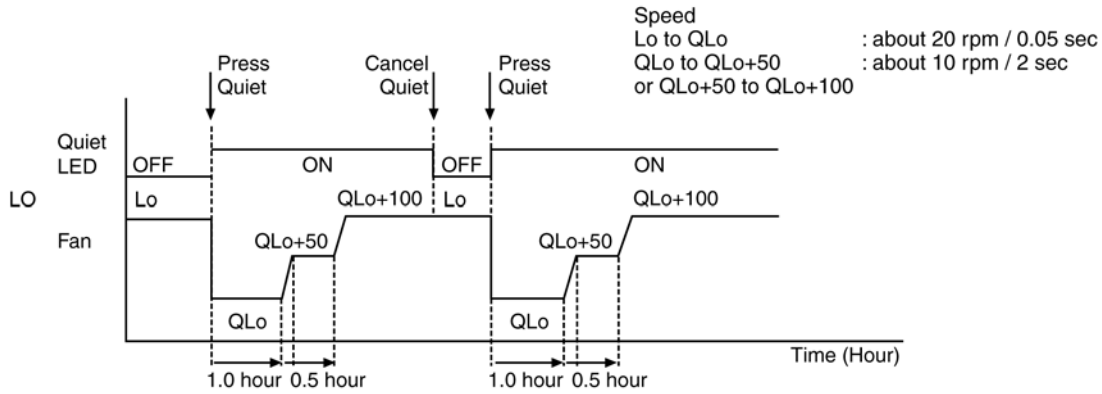
12.9. Powerful Operation

- 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 will be 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 4 hours.
  - Stopped by OFF/ON operation button.
  - Timer OFF activates.
  - Operation mode is changed.

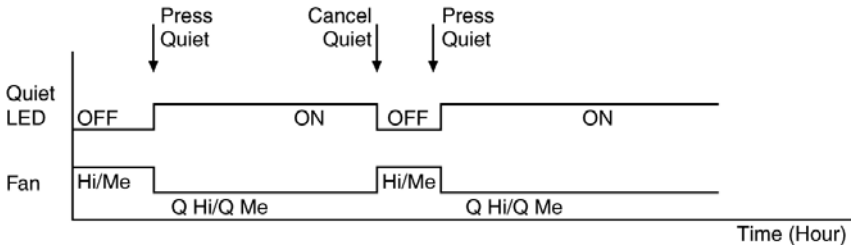
12.10. Quiet Operation

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

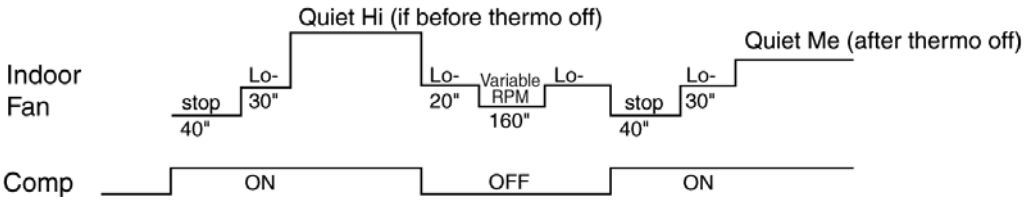
- To provide quiet cooling operation condition compare to normal operation.
- Once the Quiet Mode is set at the remote control, the Quiet Mode LED illuminated. The sound level will reduce around 2 dB(A) for Lo fan speed or 3 dB(A) for Hi/Me fan speed against the present operation sound level.
- Dew formation become severe at Quiet Lo cool, therefore Quiet Lo cool is operated only 1hr 30 min (1hr QLo, 30 min QLo + 50 rpm). After that, it goes back to Lo cool (However Quiet LED remains on).
- 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.

12.11. Timer Control

12.11.1. ON Timer

- When the ON Timer is set by 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, 15 minutes before the set time to detect the intake air temperature to determine the operation mode. The operation indication lamp will blink at this time.

12.11.2. 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.

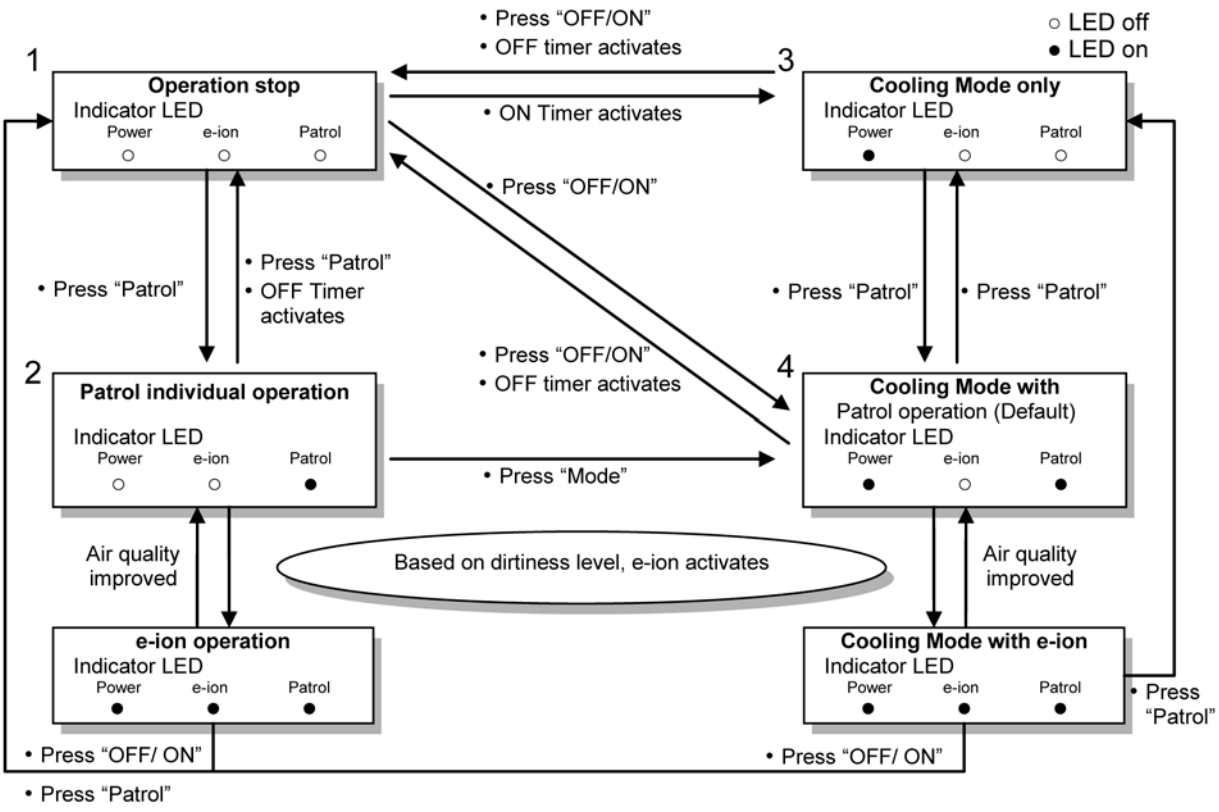
12.12. Random Auto Restart Control

- 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.

12.13. Remote Control Signal Receiving Sound

- Short beep sound will be heard when:-
  - enable initial Patrol Operation.
- Long beep sound will be heard for others setting.

12.14. Patrol Operation



1. Purpose
   To monitor air dirtiness level by using gas sensor and activates e-ion operation whenever air is dirty.

2. Control Condition
   a. Patrol operation start 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.

   b. Patrol operation stop 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.

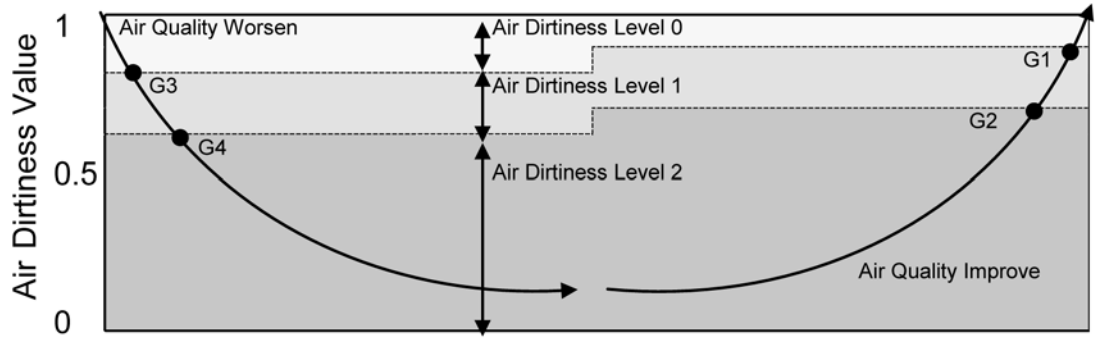
   c. Patrol operation disable
   - To disable the Patrol Operation during unit start (default) with “OFF/ON” button, press “Patrol” button and hold for 5 seconds, then release.
   - To disable the Patrol Operation, press “Patrol” button and hold for 15 seconds, then release.

3. Control Content

a. Gas 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 level 2.
- After that, gas 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
- Air Dirtiness level 1: Moderate
- Air Dirtiness level 2: Contaminated



- Dirtiness level sensitivity adjustment.

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

a. Press and release “SET” button.

b. Press “Timer increment” / “Timer decrement” button to select sensitivity. (Low <–> Standard (Default) <–> High)

c. Confirm setting by pressing “Timer Set” button. LCD returned to original display after 2 seconds.

d. LCD returned to original display if remote control does not operate for 30 seconds.

b. e-ion Control

- When dirtiness level is 1 or 2, e-ion operation starts.
- If dirtiness level improves from level 2 to level 1, the unit carries out level change after 60 seconds.
- When dirtiness level returns to level 0 continuously for 10 minutes or more, e-ion operation stops.

Dirtiness Level Shift

- For Auto Fan Speed, the fan speed increased 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

c. 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.

d. 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.

e. Indicator

- When Patrol operation starts, Patrol Sensor indicator ON.
- When e-ion operation starts based on dirtiness level, e-ion indicator ON.

f. Remote Control Receiving Sound

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

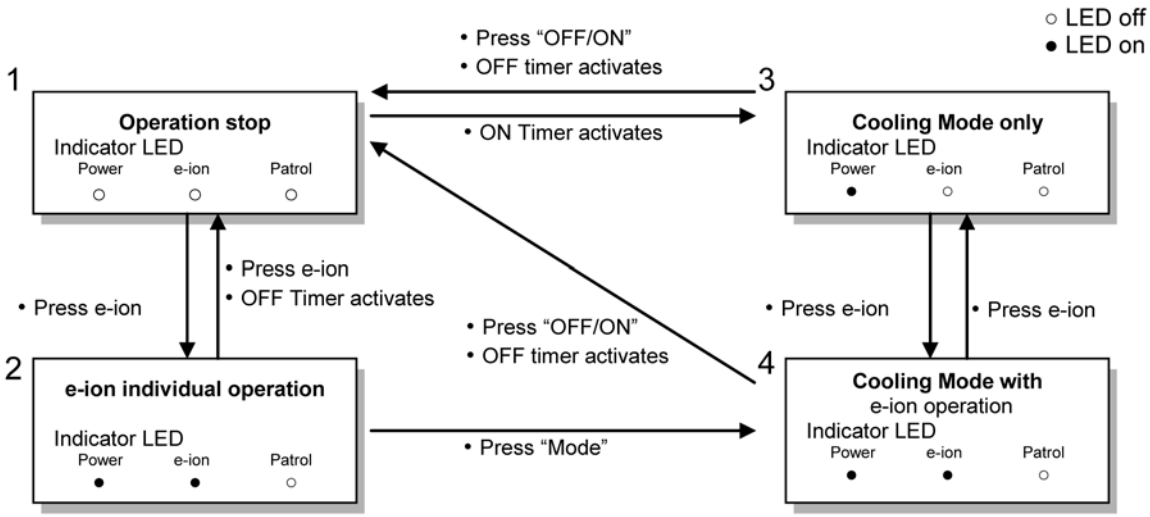
g. Timer Control

- When ON timer activates when unit stops, previous operation resumes without Patrol operation.
- When ON timer activates during any operation, no change and carry on current operation.
- When OFF timer activates during any operation, all operation stops.

h. Power failure

- 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.

12.15. e-ion Operation



1. Purpose
   This operation provides clean air by producing negative ions to attract dust captured at the positively charged e-ion filters.

2. Control Condition
   a. 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.

   b. 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.

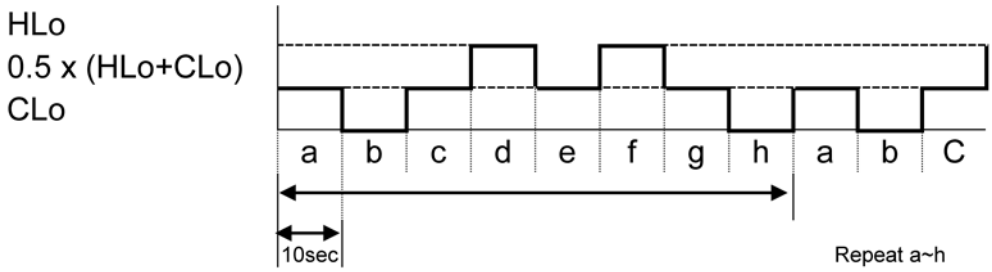
   c. e-ion operation pause condition
   - When indoor fan stop (during deice, odor cut control, thermostat off, etc.). e-ion operation resume after indoor fan restarts.
   - When indoor intake temperature ≥ 40°C. e-ion operation resume after indoor intake temperature < 40°C continuously for 30 minutes.

3. Control Content

a. 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.

Auto Fan Speed for e-ion operation switches between HLo and CLo at pattern below:



b. 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.

c. Timer control

- When ON timer activates when unit stops, previous operation resumes without e-ion operation.
- When ON timer activates during any operation, no change and carry on current operation.
- When OFF timer activates during any operation, all operation stops.

d. Indicator

- When e-ion operation starts, e-ion indicator ON.

e. 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 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.

f. 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.

g. Error Detection Control

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

a. e-ion AIR PURIFYING SYSTEM main connector to PCB is open:

Judgment Method

- During e-ion operation (include during Patrol operation), 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.

b. Abnormal Discharge

Judgment Method

- During e-ion operation, when feedback voltage is-Lo (at micro controller) is detected, it is judged abnormal discharge and stops power supplies to the e-ion AIR PURIFYING SYSTEM.
- The unit retries after 30 minutes and repeat for 24 times. (not applicable for e-ion Check Mode)

Troubleshooting Method

- Press “e-ion” button or “OFF/ON” button to stop the operation and check the 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.

c. e-ion breakdown

Judgment Method

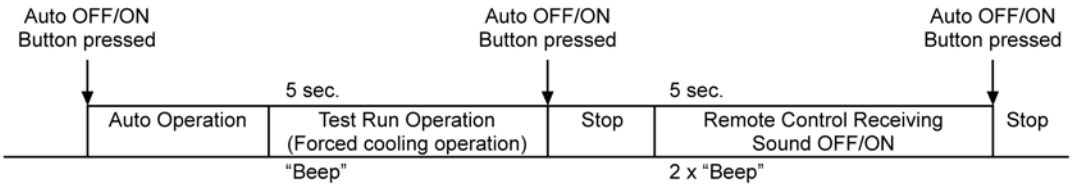
- When hi-feedback voltage (at micro controller) supplied to filter during e-ion stop, due to PCB or filter's high voltage power supply damage.
- Operations except e-ion continue. Both Timer indicator and e-ion indicator blinks.

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 e-ion AIR PURIFYING SYSTEM during e-ion operation, e-ion indicator and Timer indicator stop blinking.

13 Servicing Mode

13.1. 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 use 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 occur at the fifth seconds, in order to identify the starting of Test Run operation.

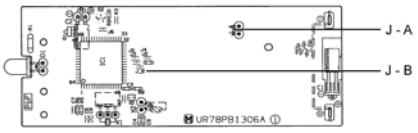
3. REMOTE CONTROL RECEIVING SOUND OFF/ON MODE
   The Remote Control Receiving Sound OFF/ON operation will be activated if (within 20 seconds of Test Run Operation) the Auto OFF/ON button is pressed for more than 5 seconds. 2 "beep" sound will occur at to identify the starting of Remote Control Receiving Sound Off/On Mode.

   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.

13.2. Select Remote Control Transmission Code

- There are 4 type 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 unit 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 Remote Control Receiving Sound OFF/ON Mode, press any button at remote control to transmit and store the desired transmission code to the EEPROM.

13.3. Remote Control Button

13.3.1. SET BUTTON

- To check current remote control transmission code.
  - Press for more than 10 seconds.

- To change the air quality sensor sensitivity:
  - Press and release with 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.

13.3.2. CLOCK BUTTON

- To change the remote control’s time format.
  - Press for more than 5 seconds.

13.3.3. RESET (RC)

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

13.3.4. TIMER ▲

- To change indoor unit indicator’s LED intensity.
  - Press continuously for 5 seconds.

13.3.5. TIMER ▼

- To change remote control display from Degree Celsius to Degree Fahrenheit.
  - Press continuously for 10 seconds.

14 Troubleshooting Guide

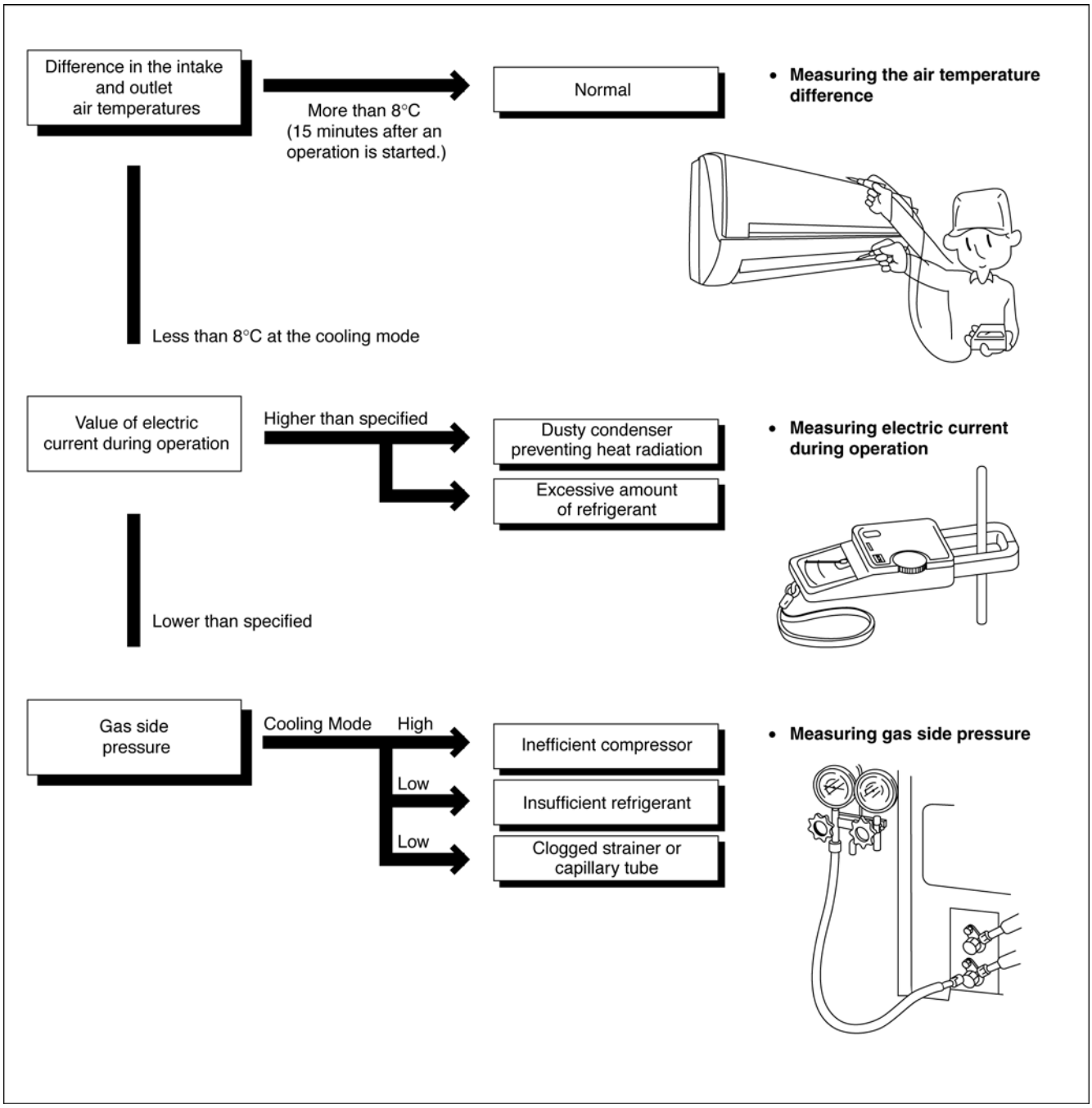
14.1. Refrigeration cycle system

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 to the right.

Normal Pressure and Outlet Air Temperature (Standard)

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

* Condition: Indoor fan speed; High
Outdoor temperature: 35°C



14.1.1. 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 measurements of pressure, electric current, and temperature fifteen minutes after an operation is started.

14.1.2. Diagnosis methods of a malfunction of a compressor

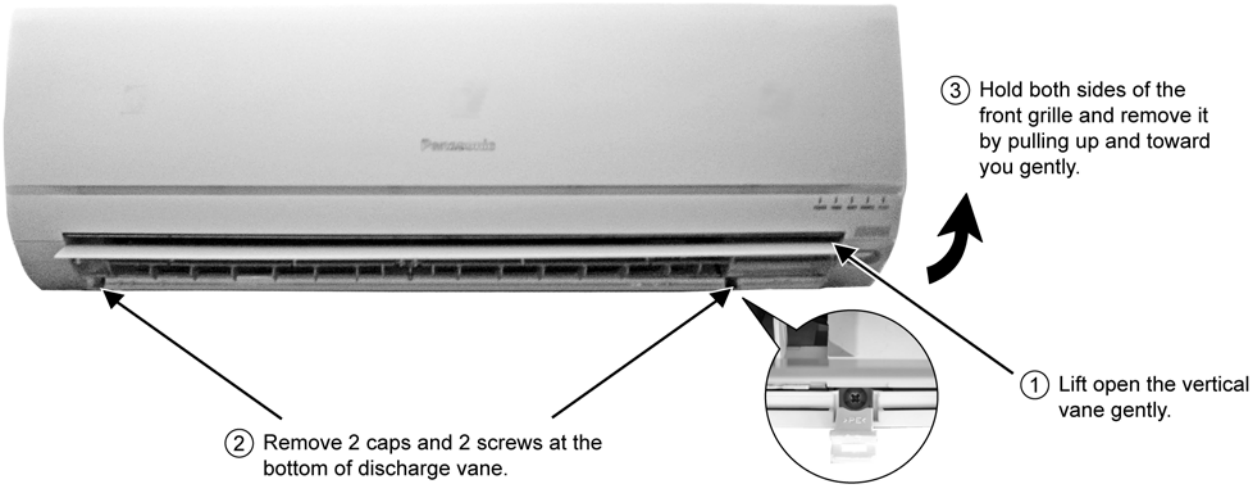
Nature of fault	Symptom
Insufficient compressing of a compressor	• Electric current during operation becomes approximately 20% lower than the normal value. • The discharge tube of the compressor becomes abnormally hot (normally 70 to 90°C). • The difference between high pressure and low pressure becomes almost zero.
Locked compressor	• 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.

15 Disassembly and Assembly Instructions

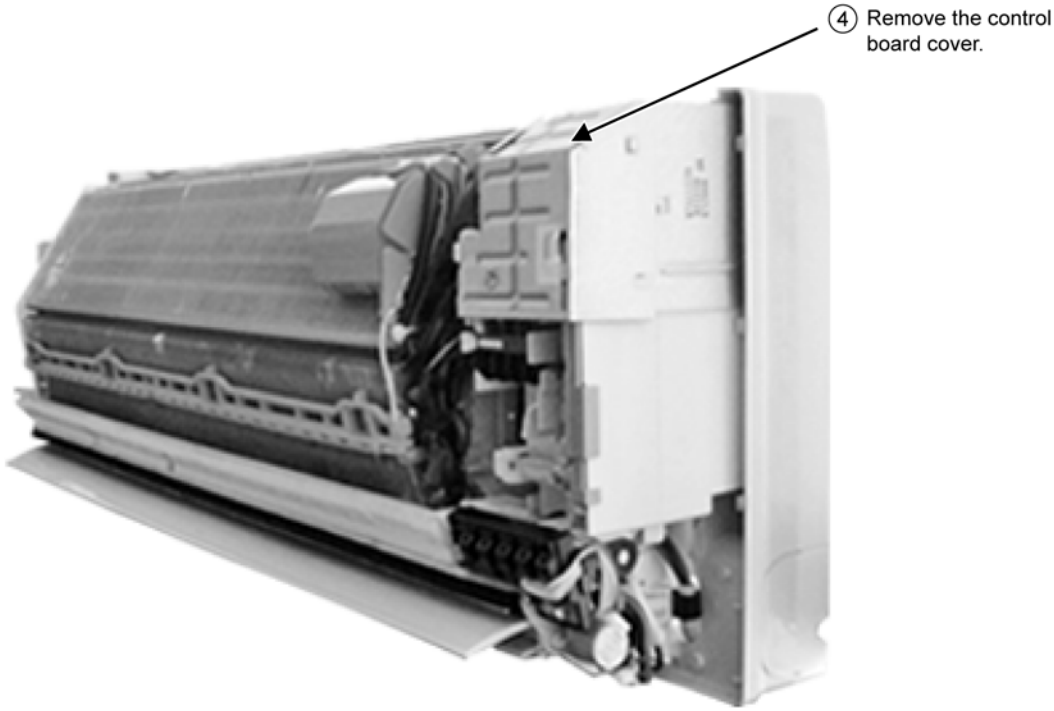
⚠ WARNING

- Cautions! When handling electronic controller, be careful of electrostatic discharge.
- Be sure to return the wiring to its original position.
- There are many high voltage components within the heat sink cover so never touch the interior during operation. Wait at least two minutes after power has been turned off.

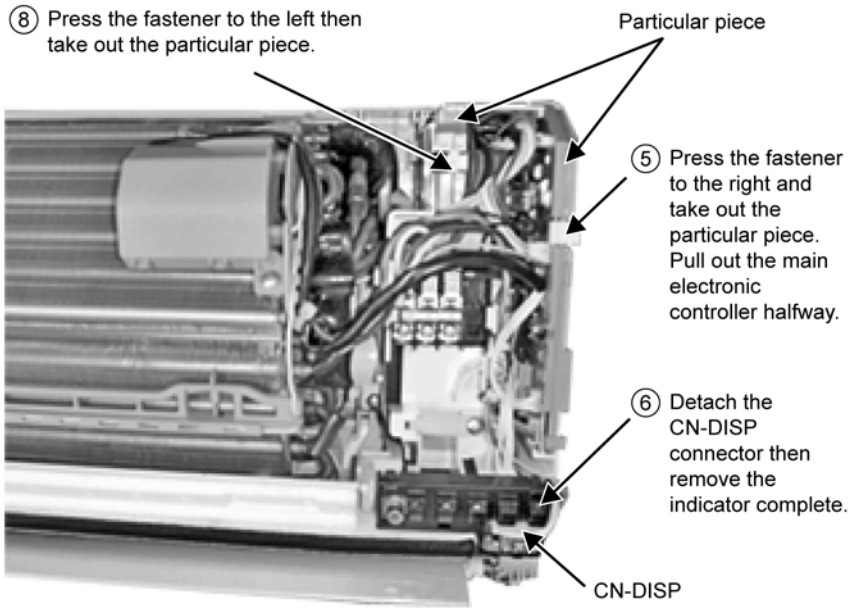
15.1. Indoor Electronic Controllers and Control Board Removal Procedures



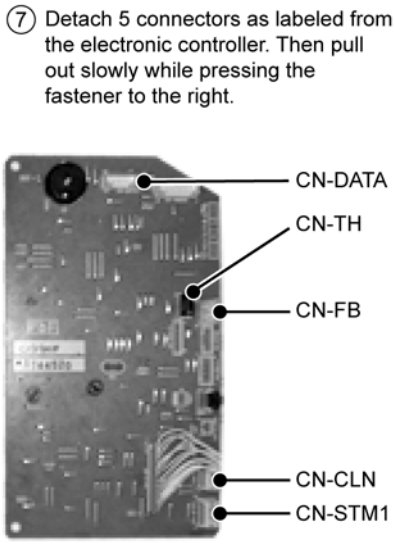
(Fig.1)



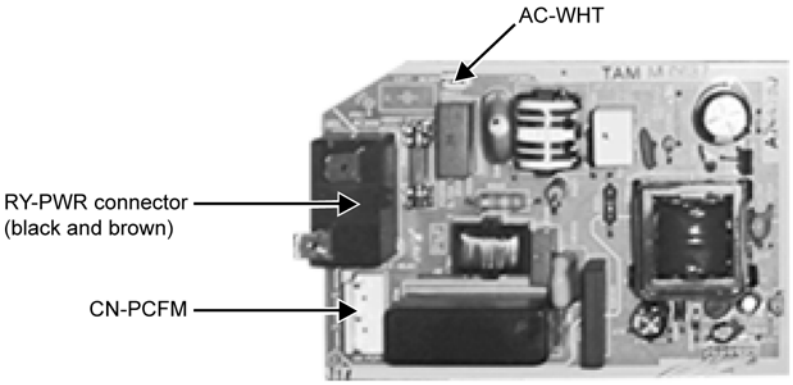
(Fig.2)



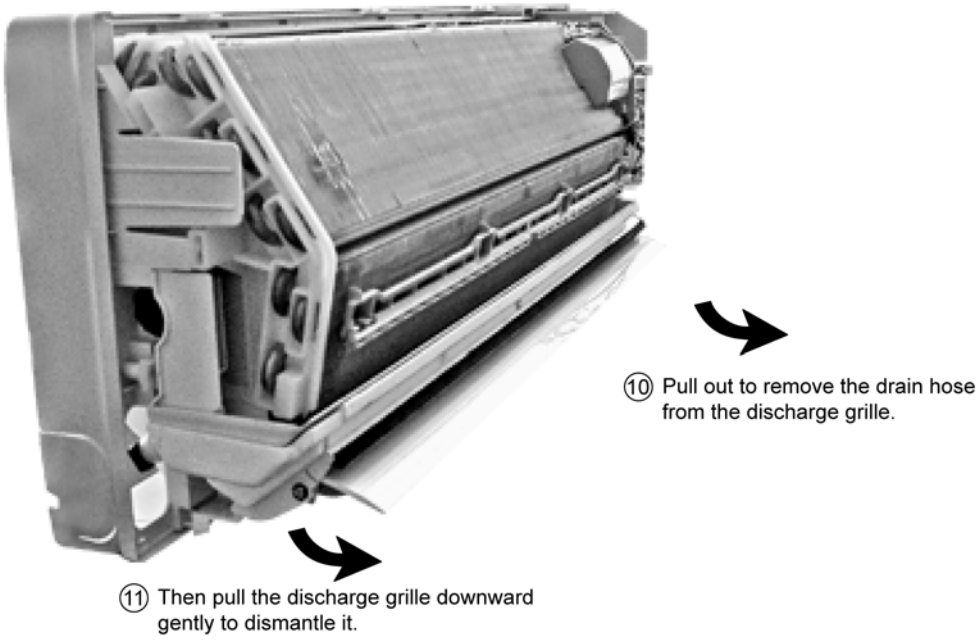
(Fig.3)



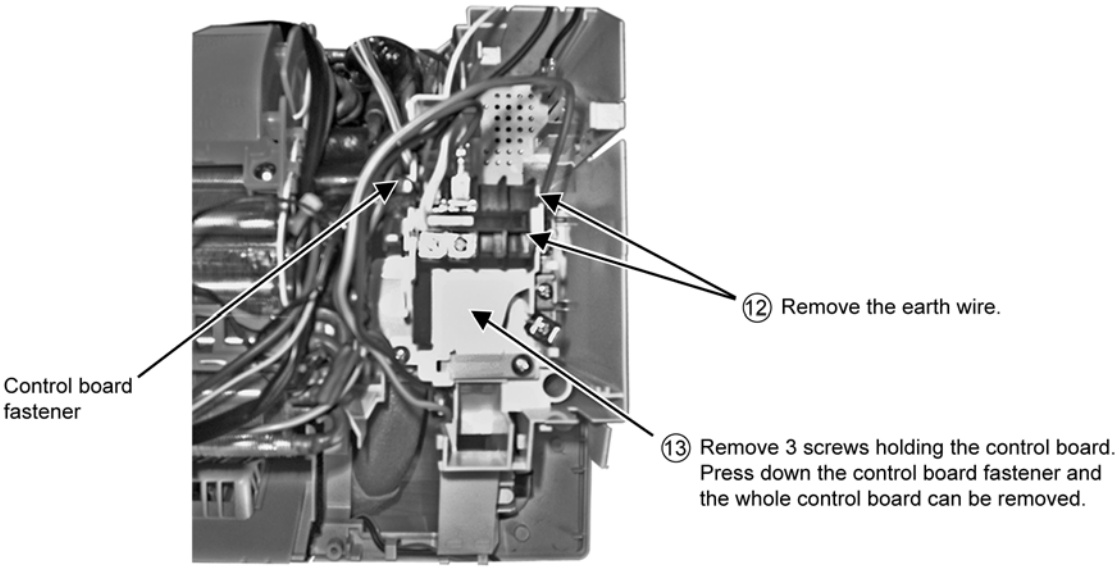
(Fig.4)



(Fig.5)

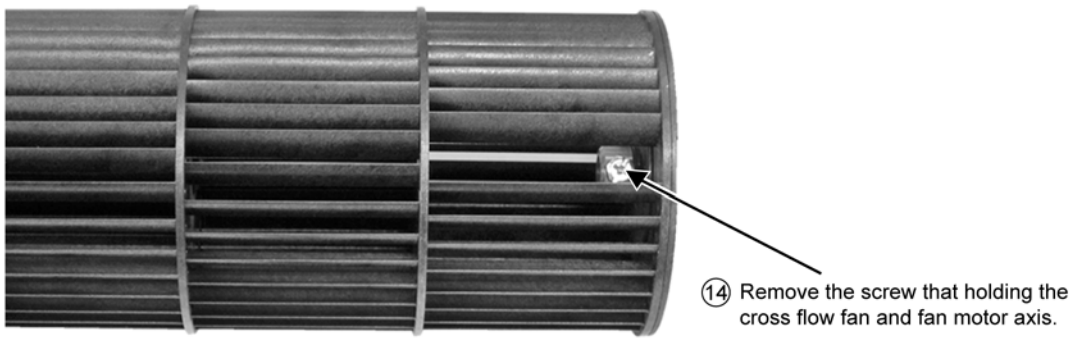


(Fig.6)

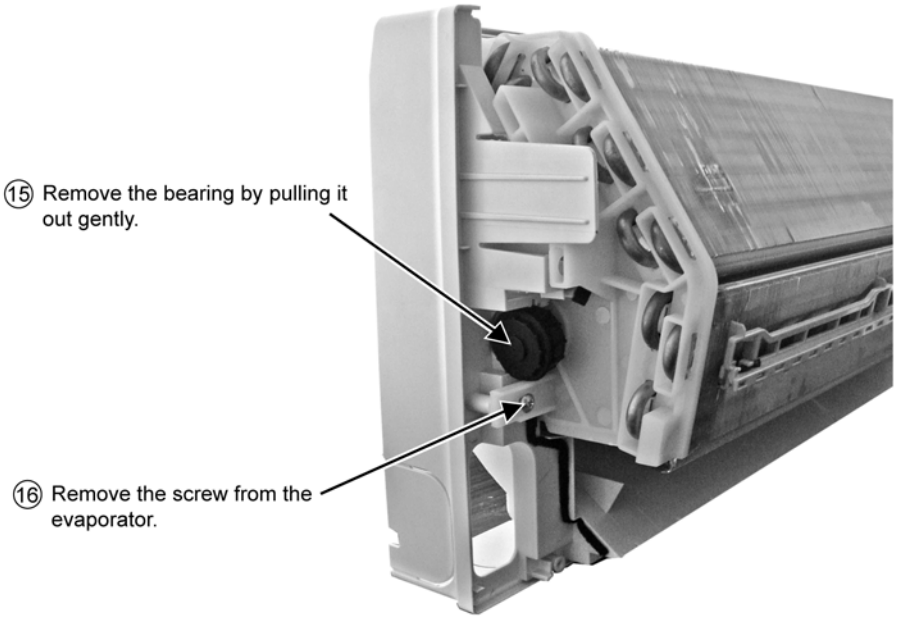


(Fig.7)

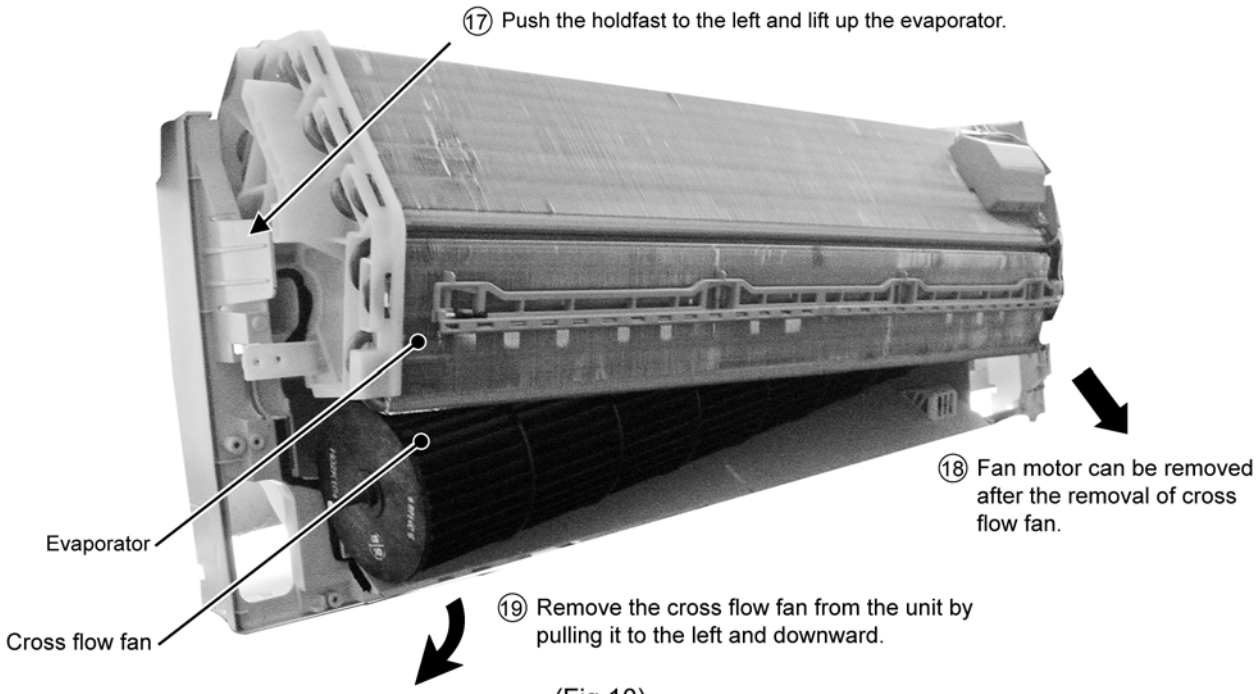
15.2. Indoor Fan Motor and Cross Flow Fan Removal Procedures



(Fig.8)



(Fig.9)

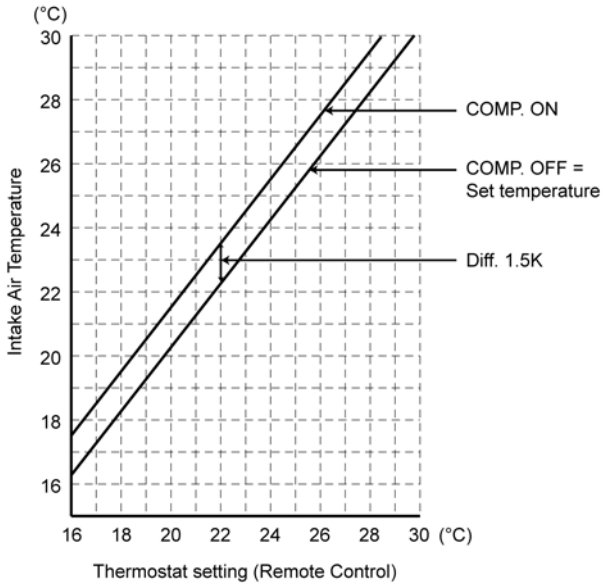

⑰ Push the holdfast to the left and lift up the evaporator.
⑱ Fan motor can be removed after the removal of cross flow fan.
Evaporator
Cross flow fan
⑲ Remove the cross flow fan from the unit by pulling it to the left and downward.

(Fig.10)

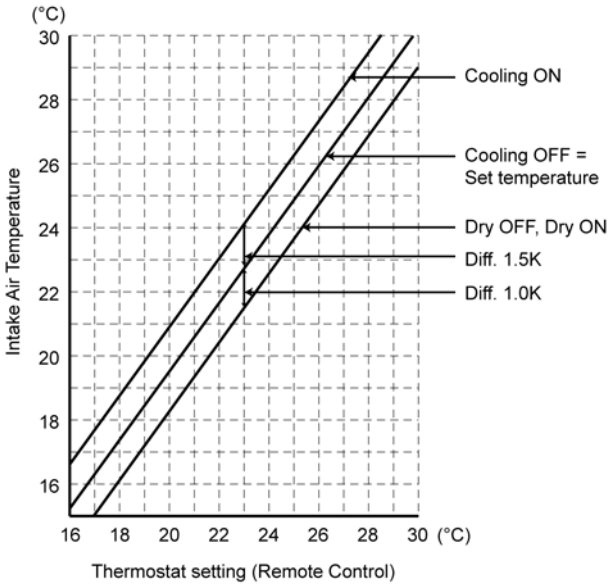
16 Technical Data

16.1. Thermostat Characteristics

Cooling



Soft Dry

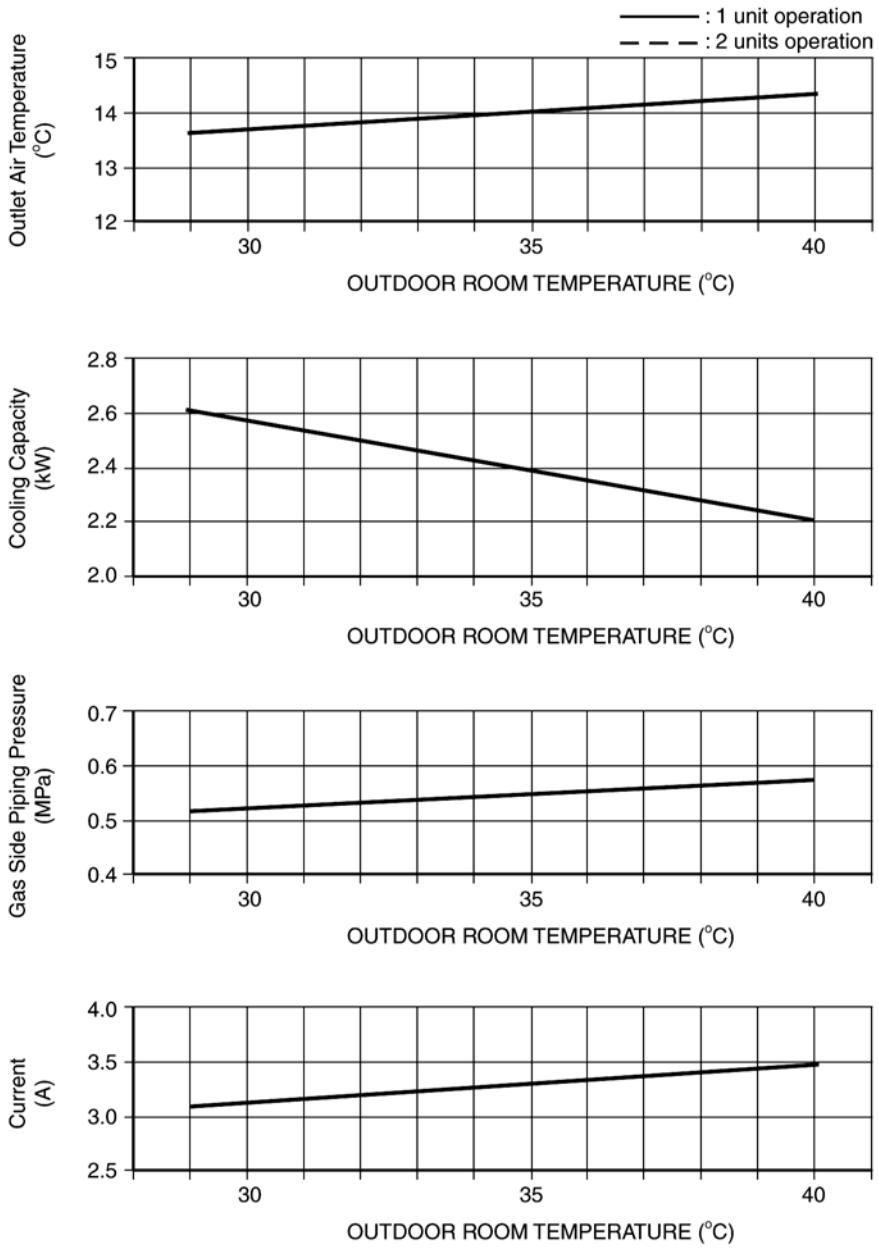


16.2. Operation Characteristics

16.2.1. CS-C9GKZW CU-2C18GKH

The capability value shown is the value for one unit.
For a total for two units, multiply by 2.

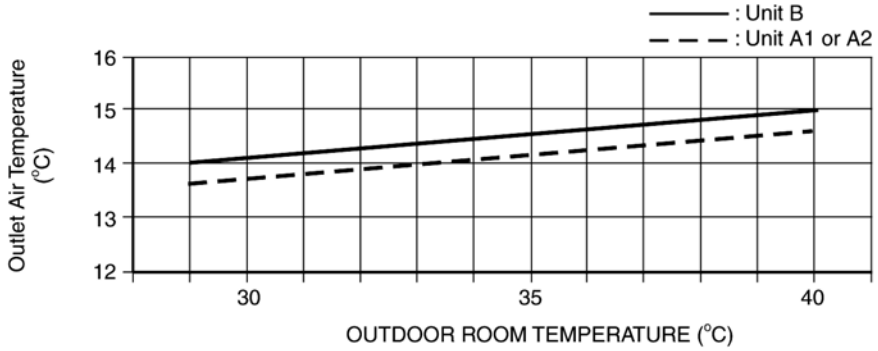
[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 5 m
At 220V

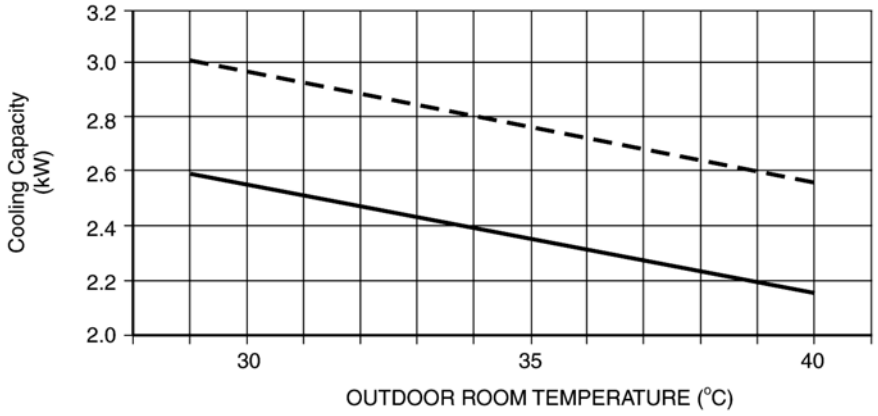


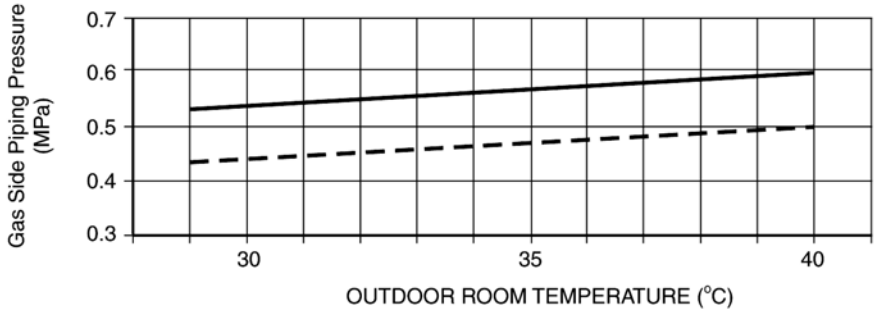
16.2.2. CS-C9GKZW CU-3C20GKH

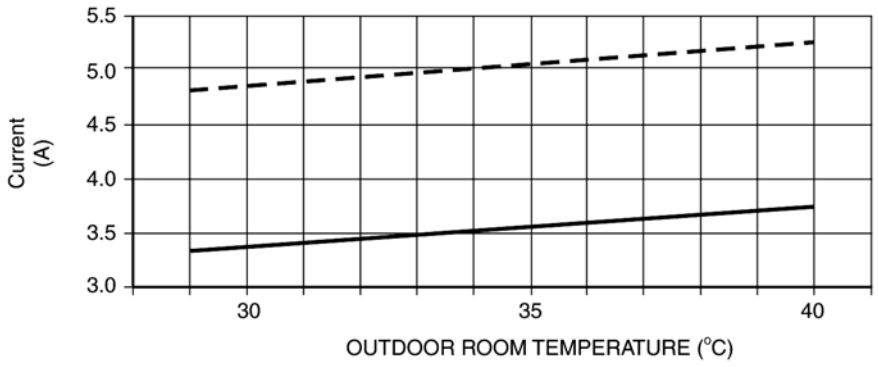
• 1 Unit Operation

[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 5 m
At 220V



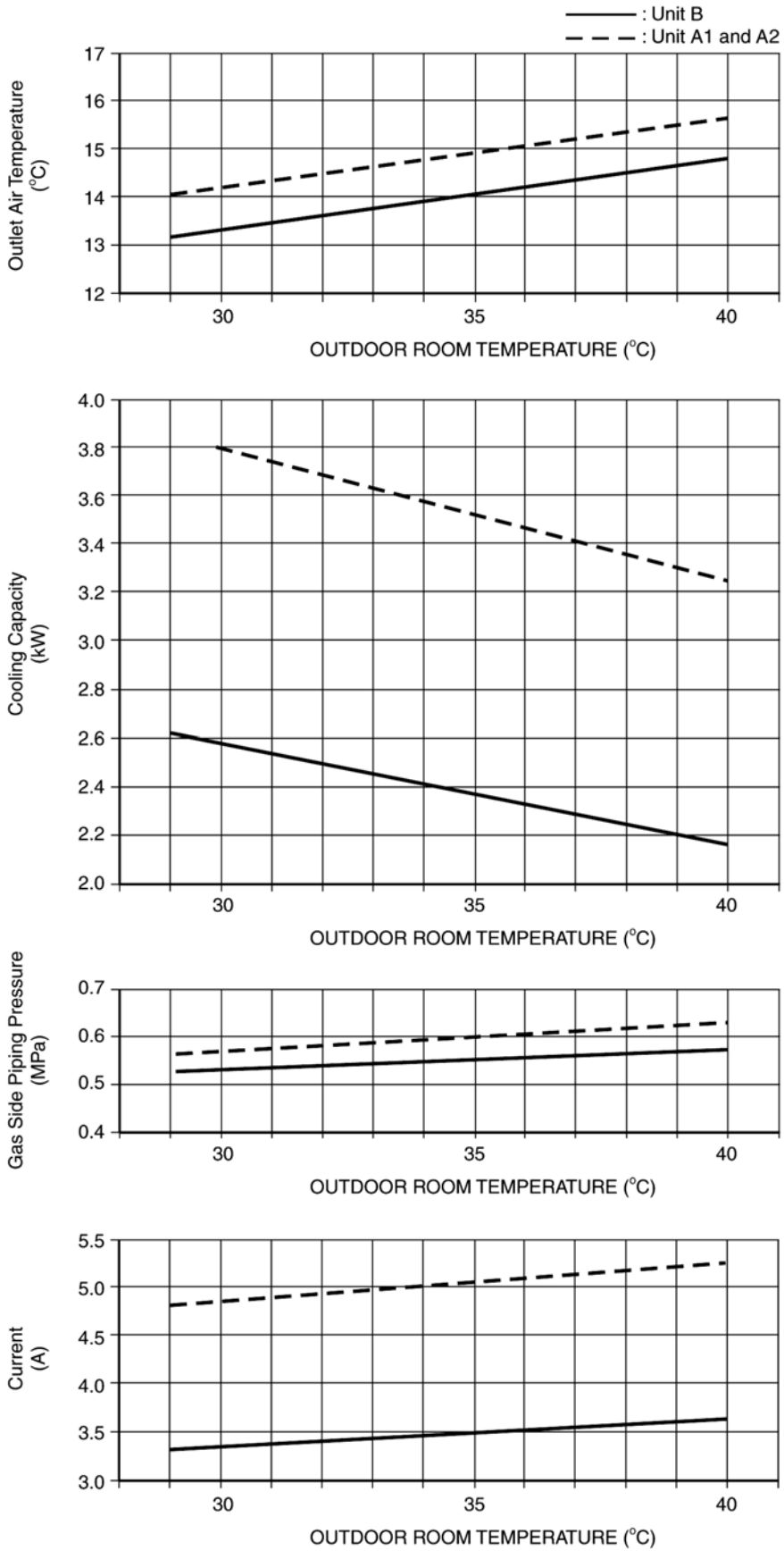






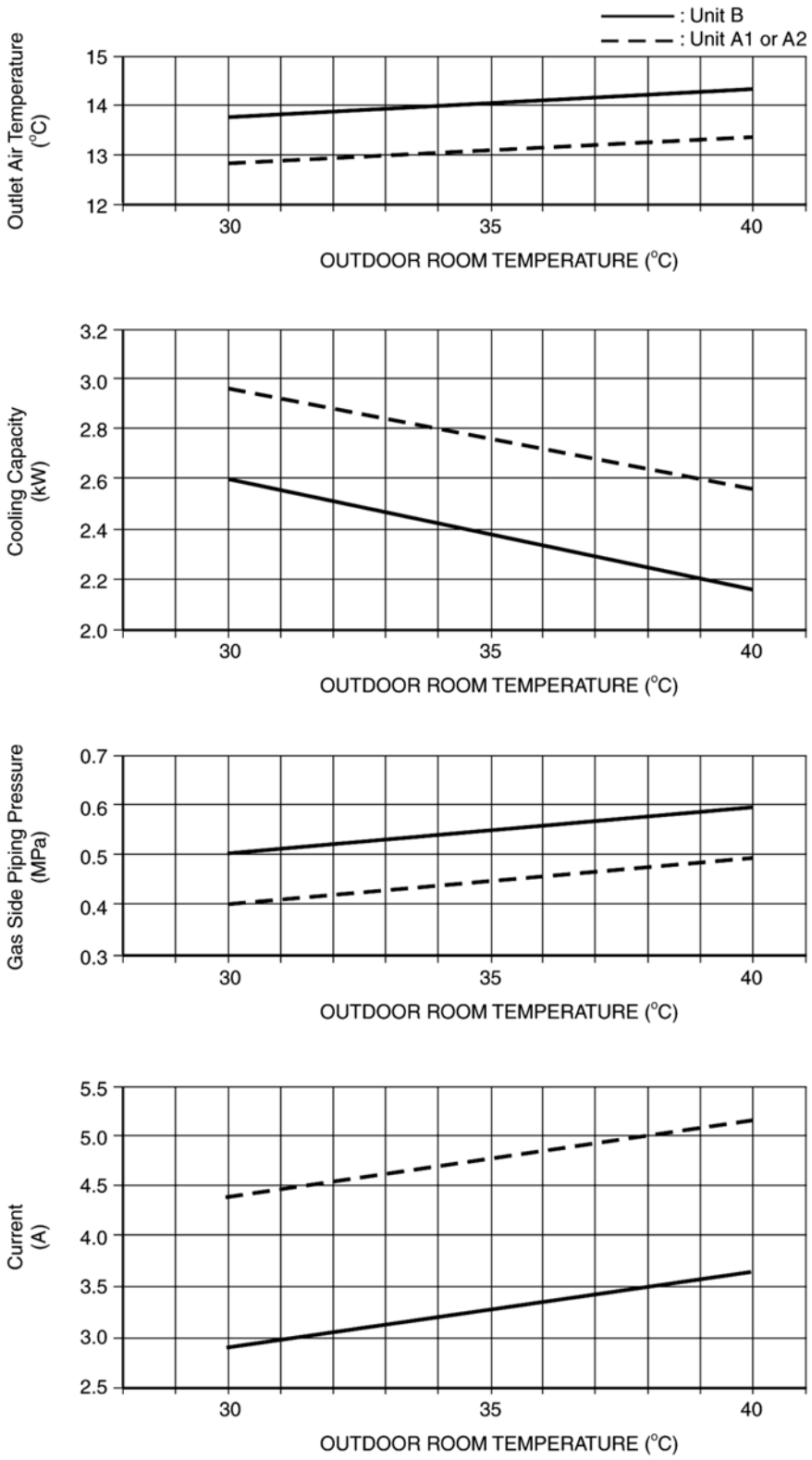
• 3 Units Operation

[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 5 m
At 220V



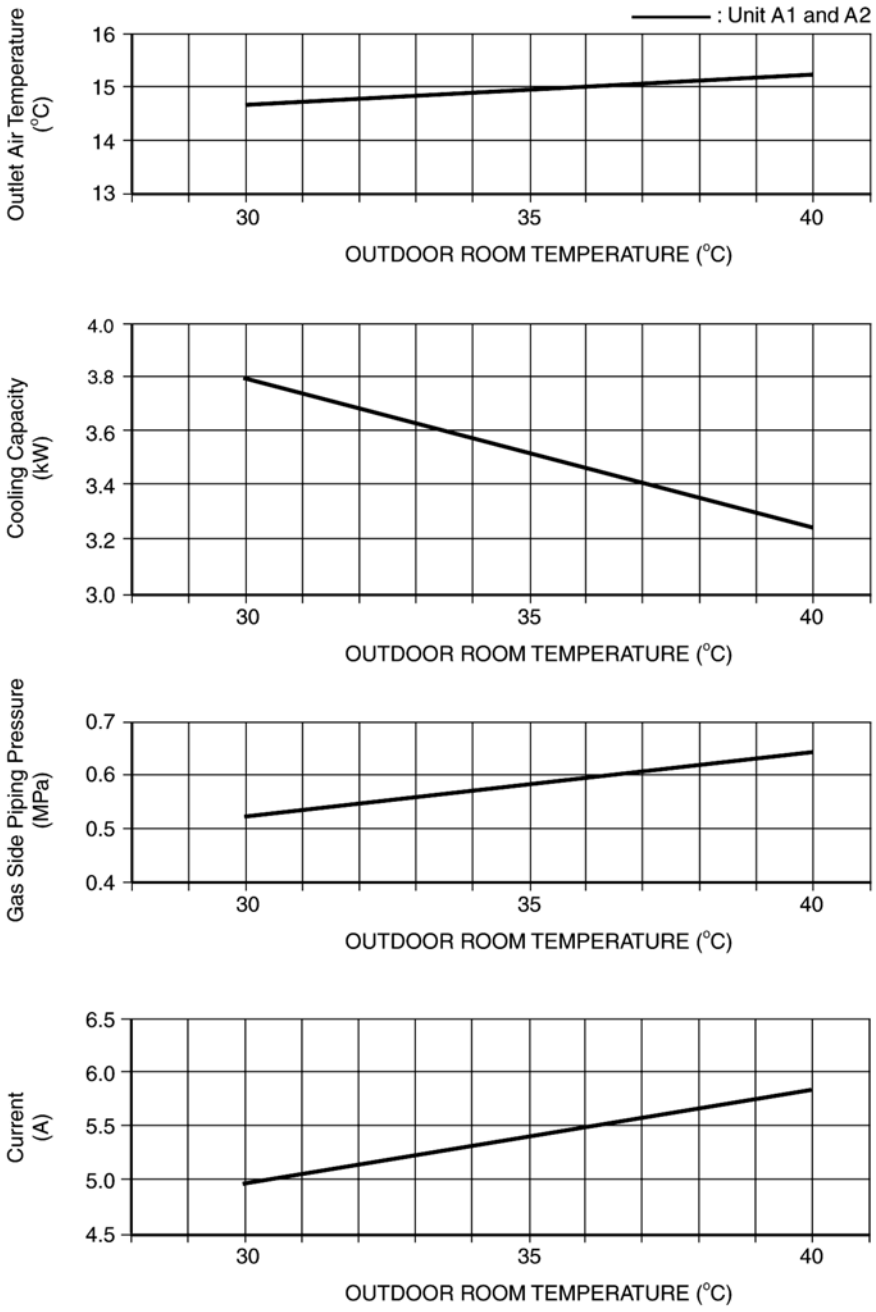
• 2 Units Operation (B + A1 or A2)

[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 5 m
At 220V



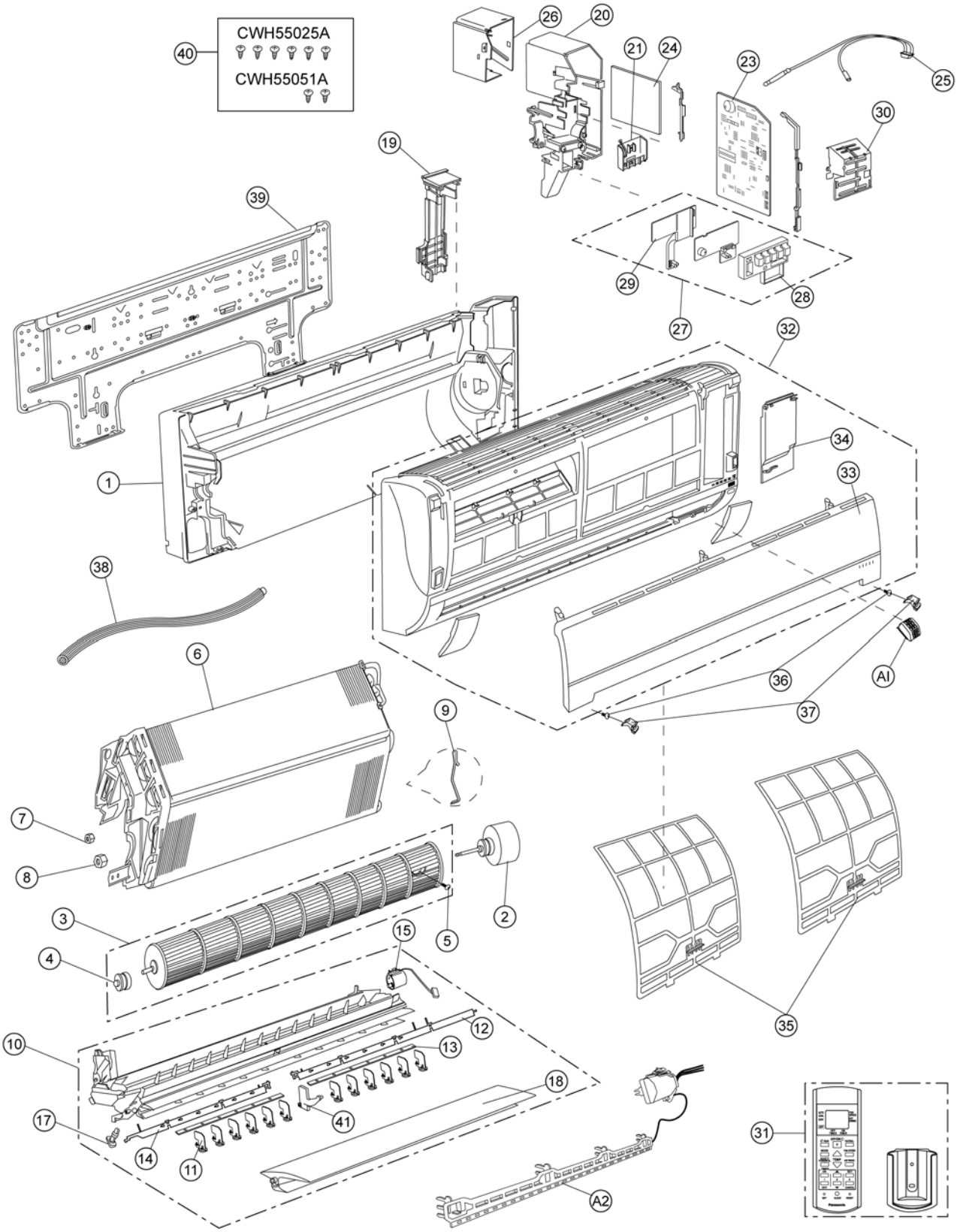
• 2 Units Operation (A1 + A2)

[Condition] Room temperature: 27/19°C
Cooling operation: At High fan
Piping length: 5 m
At 220V



17 Exploded View and Replacement Parts List

17.1. Indoor Unit



Note:
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

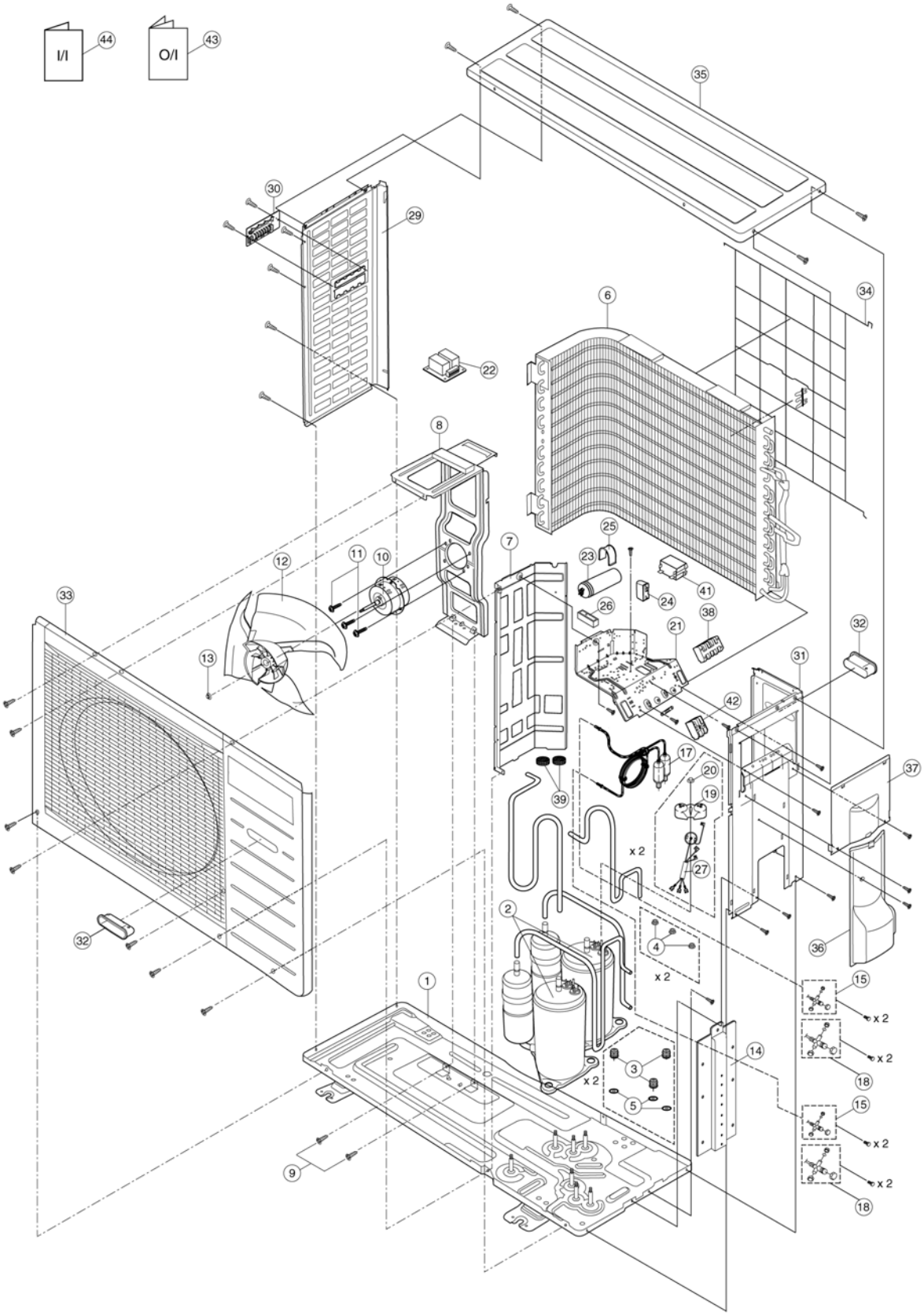
REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-C9GKZW
1	CHASSY COMPLETE	1	CWD50C1513
2	FAN MOTOR, AC 15W SINGLE	1	CWA921181J
3	CROSS FLOW FAN COMPLETE	1	CWH02C1045
4	BEARING ASS'Y	1	CWH64K007
5	SCREW - CROSS FLOW FAN	1	CWH551146
AI	ION GENERATOR	1	CWH94C0014
6	EVAPORATOR CO.	1	CWB30C2133
7	FLARE NUT (1/4)	1	CWT251026
8	FLARE NUT (3/8)	1	CWT251027
A2	E-ION AIR PURIFYING SYSTEM	1	CWH14C5332
9	CLIP FOR SENSOR	1	CWH32143
10	DISCHARGE GRILLE COMPLETE	1	CWE20C2621
11	VERTICAL VANE	12	CWE241157
12	CONNECTING BAR	1	CWE261092
13	CONNECTING BAR	1	CWE261071
14	CONNECTING BAR	1	CWE261091
15	A.S.MOTOR, DC SINGLE 12V300 OHM	1	CWA981091
17	CAP - DRAIN TRAY	1	CWH521096
18	HORIZONTAL VANE COMPLETE	1	CWE24C1176
19	BACK COVER CHASSIS	1	CWD932454
20	CONTROL BOARD CASING	1	CWH102321
21	TERMINAL BOARD COMPLETE	1	CWA28C2128J
23	ELECTRONIC CONTROLLER - MAIN	1	CWA73C2623
24	ELECTRONIC CONTROLLER - POWER	1	CWA744528
25	SENSOR COMPLETE	1	CWA50C2122
26	CONTROL BOARD FRONT COVER	1	CWH131207
27	INDICATOR COMPLETE	1	CWE39C1168
28	INDICATOR HOLDER	1	CWD932744
29	INDICATOR HOLDER	1	CWD932745
30	CONTROL BOARD TOP COVER	1	CWH13C1171
31	REMOTE CONTROL COMPLETE	1	CWA75C2998
32	FRONT GRILLE COMPLETE	1	CWE11C3628
33	INTAKE GRILLE COMPLETE	1	CWE22C1325
34	GRILLE DOOR COMPLETE	1	CWE14C1010
35	E-ION FILTER	2	CWD00K1001
36	SCREW - FRONT GRILLE	2	XTT4+16CFJ
37	CAP - FRONT GRILLE	2	CWH521109
38	DRAIN HOSE	1	CWH851063
39	INSTALLATION PLATE	1	CWH361067
40	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C067
41	FULCRUM	1	CWH621049

(Note)

• All parts are supplied from PHAAM, Malaysia (Vendor Code: 061).

17.2. Outdoor Unit

17.2.1. CU-2C18GKH



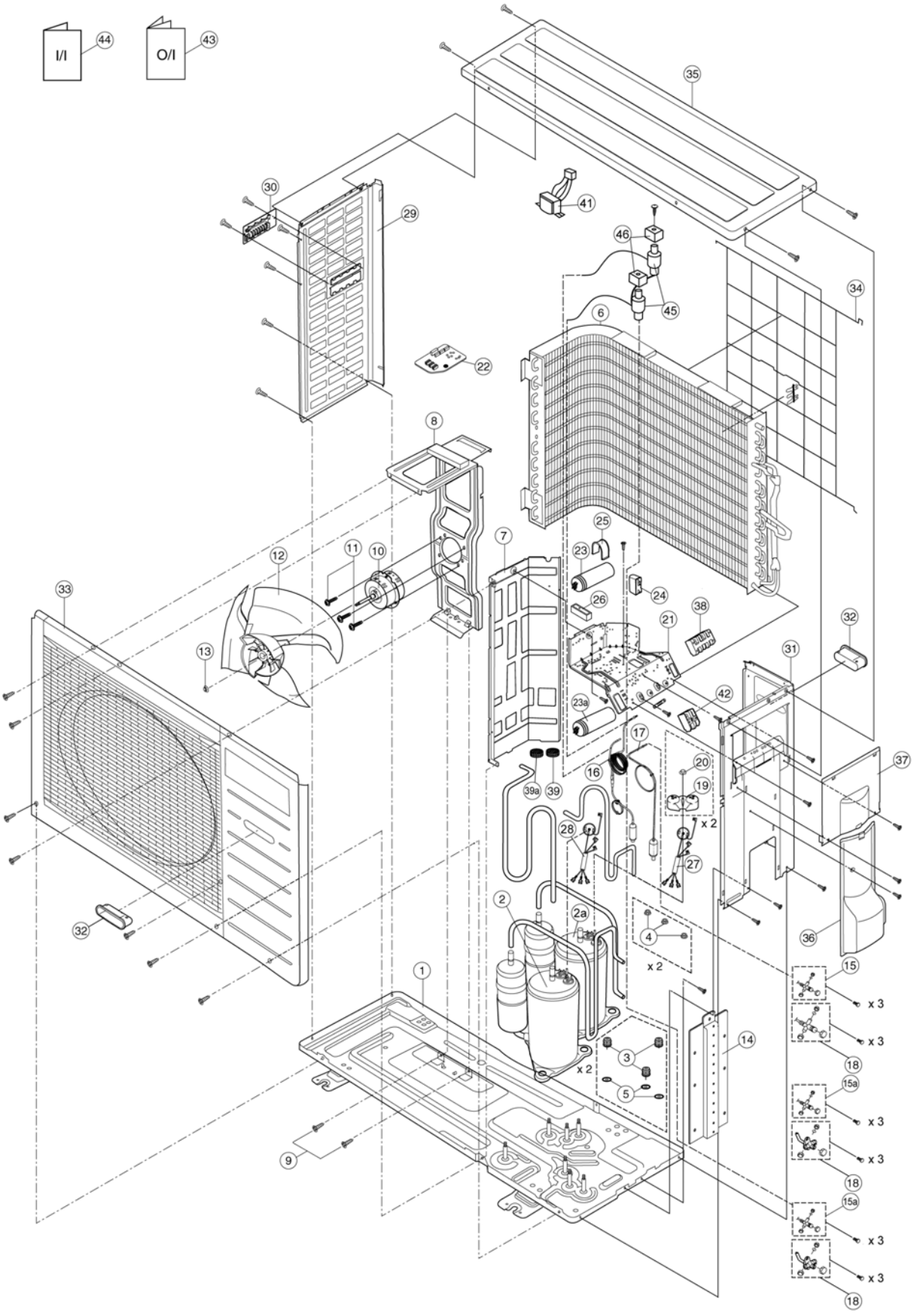
Note:
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

NO.	DESCRIPTION & NAME	Q'TY	CU-2C18GKH	REMARKS
1	BASE PAN ASS'Y	1	CWD50K2166	0
2	COMPRESSOR	2	2PS132D3AA02	0
3	ANTI - VIBRATION BUSHING	6	CWH50077	
4	NUT - COMPRESSOR	6	CWH56000J	
5	PACKING	6	CWB81043	
6	CONDENSER	1	CWB32C2115	0
7	SOUND PROOF BOARD	1	CWH151051	
8	FAN MOTOR BRACKET	1	CWD541056	0
9	SCREW FAN MOTOR BRACKET	3	CWH551198 (S.E.ASIA) CWH551060J (MALAYSIA)	
10	FAN MOTOR	1	CWA951576	0
11	SCREW FAN MOTOR MOUNT	3	CWH55252J	
12	PROPELLER FAN ASS'Y	1	CWH03K1017	
13	NUT - PROPELLER FAN	1	CWH561038J	
14	HOLDER COUPLING	1	CWH351073	
15	3-WAY VALVE (LIQUID SIDE)(1/4")	2	CWB011506	
17	TUBE ASS'Y (CAPILLARY TUBE)	1	CWB15K1218	0
18	3-WAY VALVE (GAS SIDE)(3/8")	2	CWB011508	
19	TERMINAL COVER	2	CWH171011	
20	NUT TERMINAL COVER	2	CWH7080300J	
21	CONTROL BOARD CASING	1	CWH102206	
22	ELECTRONIC CONTROLLER - MAIN	1	CWA742811	0
23	CAPACITOR - COMPRESSOR (25μF, 400VAC)	2	CWA312075	0
24	CAPACITOR - FAN MOTOR (3.5μF, 440VAC)	1	DS441355NPQA	0
25	HOLDER CAPACITOR	2	CWH30078	
26	TERMINAL BOARD ASS'Y	1	CWA28K1144	0
27	OVERLOAD PROTECTOR	2	CWA67C4716	
29	CABINET SIDE PLATE (L)	1	CWE041082A	0
30	HANDLE	1	CWE161010	
31	CABINET SIDE PLATE (R)	1	CWE041257A	0
32	HANDLE	2	CWE16000E	
33	CABINET FRONT PLATE ASS'Y	1	CWE06K1043	0
34	WIRE NET	1	CWD041041A	
35	CABINET TOP PLATE ASS'Y	1	CWE03K1009A	0
36	CONTROL BOARD COVER PLATE	1	CWH131247	
37	CONTROL BOARD COVER	1	CWH131169A	
38	TERMINAL BOARD	1	K4AA06H00085	0
39	STRAINER	2	CWB11002	
41	ELECTRO MAGNETIC SWITCH	2	CWA00192	0
42	TERMINAL BOARD ASS'Y	1	CWA28K234J	0
43	OPERATING INSTRUCTION	1	CWF565646	
44	INSTALLATION INSTRUCTION	1	CWF613218	

(Note)

- All parts are supplied from PHAAM, Malaysia (Vendor Code: 061).
- "O" marked parts are recommended to be kept in stock.

17.2.2. CU-3C20GKH



Note:
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

NO.	DESCRIPTION & NAME	Q'TY	CU-3C20GKH	REMARKS
1	BASE PAN ASS'Y	1	CWD50K2166	0
2	COMPRESSOR	1	2PS132D3AA02	0
2a	COMPRESSOR	1	2PS192D3BA02	0
3	ANTI - VIBRATION BUSHING	6	CWH50077	
4	NUT - COMPRESSOR	6	CWH56000J	
5	PACKING	6	CWB81043	
6	CONDENSER	1	CWB32C2133	0
7	SOUND PROOF BOARD	1	CWH151051	
8	FAN MOTOR BRACKET	1	CWD541056	0
9	SCREW FAN MOTOR BRACKET	3	CWD551198 (S.E.ASIA) CWH551060J (MALAYSIA)	
10	FAN MOTOR	1	CWA951576	0
11	SCREW FAN MOTOR MOUNT	3	CWH55252J	
12	PROPELLER FAN ASS'Y	1	CWH03K1017	
13	NUT - PROPELLER FAN	1	CWH561038J	
14	HOLDER COUPLING	1	CWH351074	
15	3-WAY VALVE (LIQUID SIDE)(1/4")	1	CWB011506	
15a	3-WAY VALVE (LIQUID SIDE)(1/4")	2	CWB011194	
16	TUBE ASS'Y (CAPILLARY TUBE)	1	CWB15K1216	0
17	TUBE ASS'Y (CAPILLARY TUBE)	1	CWB15K1217	0
18	3-WAY VALVE (GAS SIDE)(3/8")	3	CWB011508	
19	TERMINAL COVER	2	CWH171011	
20	NUT TERMINAL COVER	2	CWH7080300J	
21	CONTROL BOARD CASING	2	CWH102206	
22	ELECTRONIC CONTROLLER - MAIN	1	CWA744801	0
23	CAPACITOR - COMPRESSOR (25μF, 440VAC)	1	DS441256CPNA	0
23a	CAPACITOR - COMPRESSOR (25μF, 400VAC)	1	CWA312075	0
24	CAPACITOR - FAN MOTOR (3.5μF, 440VAC)	1	DS441355NPQA	0
25	HOLDER CAPACITOR	2	CWH30078	
26	TERMINAL BOARD ASS'Y	1	CWA28K1144	0
27	OVERLOAD PROTECTOR	1	CWA67C4145	
28	OVERLOAD PROTECTOR	1	CWA67C4146	
29	CABINET SIDE PLATE (L)	1	CWE041082A	0
30	HANDLE	1	CWE161010	
31	CABINET SIDE PLATE (R)	1	CWE041257A	0
32	HANDLE	2	CWE16000E	
33	CABINET FRONT PLATE ASS'Y	1	CWE06K1043	0
34	WIRE NET	1	CWD041041A	
35	CABINET TOP PLATE ASS'Y	1	CWE03K1009A	0
36	CONTROL BOARD COVER PLATE	1	CWH131247	
37	CONTROL BOARD COVER	1	CWH131169A	
38	TERMINAL BOARD	1	CWA28064J	0
39	STRAINER	1	CWB11002	
39a	STRAINER	1	CWB11004	
41	TRANSFORMER	1	CWA40C1033	0
42	TERMINAL BOARD ASS'Y	1	CWA28K234J	0
43	OPERATING INSTRUCTION	1	CWF565646	
44	INSTALLATION INSTRUCTION	1	CWF613218	
45	2-WAY VALVE	2	CWB021394	
46	V-COIL COMPLETE	1	CWA43C2279	

(Note)

- All parts are supplied from PHAAM, Malaysia (Vendor Code: 061).
- "O" marked parts are recommended to be kept in stock.

[PHAAM] Printed in Malaysia
SSYW0701-00