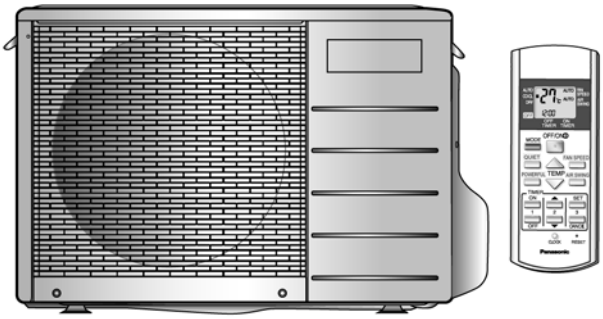
Order No. MAC0601005C3

Service Manual

Air Conditioner

CS-C12EKF CU-C12EKF



⚠ 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. Thickness of copper pipes used must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm.	⃠
10. It is desirable that the amount of residual oil is less than 40 mg/10m.	⃠
11. 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.	⃠

⚠ 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).	

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-C12EKF CU-C12EKF

			Unit	Indoor unit	Outdoor unit
Power Source	(Phase, Voltage, Cycle)		ø, V, Hz	Single, 220 - 240, 50	
Cooling Capacity			kW (BTU/h)	3.58 - 3.60 (12,200 - 12,300)	
Moisture Removal			l/h (Pint/h)	2.1 (4.4)	
Airflow Method			OUTLET INTAKE	SIDE VIEW	TOP VIEW
Air Volume	Lo		m^3/min (cfm)	6.9 (243) - 6.9 (243)	—
	Me		m^3/min (cfm)	8.1 (286) - 8.1 (286)	—
	Hi		m^3/min (cfm)	9.7 (342) - 9.7 (342)	30.3 (1,070) - 31.3 (342)
	SHi		m^3/min (cfm)	10.1 (356) - 10.1 (356)	—
Noise Level			dB (A)	High 39 - 39, Low 29 - 29	High 48 - 49
			Power level dB	High 52 - 52	High 63 - 64
Electrical Data	Input Power		W	1.13 - 1.16	
	Running Current		A	5.3 - 5.1	
	EER		W/W (BTU/hW)	3.17 - 3.10 (10.8 - 10.6)	
	Starting Current		A	29.5	
Piping Connection Port (Flare piping)			inch inch	G ; Half Union 1/2” L ; Half Union 1/4”	G ; 3-way valve 1/2” L ; 2-way valve 1/4”
Pipe Size (Flare piping)			inch inch	G ; (Gas side) 1/2” L ; (Liquid side) 1/4”	G ; (Gas side) 1/2” L ; (Liquid side) 1/4”
Drain Hose	Inner diameter		mm	16	—
	Length		mm	650	—
Power Cord	Length		m	2.0	—
	Number of core-wire			3 (1.5 mm^2)	—
Dimensions	Height		inch (mm)	11 - 1/32 (280)	21 - 1/4 (540)
	Width		inch (mm)	31 - 15/32 (799)	30 - 23/32 (780)
	Depth		inch (mm)	7 - 7/32 (183)	11 - 3/8 (289)
Net Weight			lb (kg)	18 (8)	82 (37)
Compressor	Description			—	Rotary (1 cylinder) rolling piston type
	Motor	Type		—	Induction (2-poles)
	Rated	Output	W	—	1000
Air Circulation	Description			Cross-flow Fan	Propeller Fan
	Material			AS + Glass Fiber 20%	PP Resin
	Motor	Type		Induction (4-poles)	Induction (6-poles)
	Input		W	55.0 - 66.0	63.0 - 71.3
	Rated	Output	W	15	35
	Fan Speed	Low	rpm	900 - 900	—
		Medium	rpm	1,060 - 1,060	—
		High	rpm	1,270 - 1,270	830 - 855
		SuperHigh	rpm	1,320 - 1,320	—
Heat Exchanger	Description			Evaporator	Condenser
	Tube material			Copper	Copper
	Fin material			Aluminium (Pre Coat)	Aluminium (Blue Coat)
	Fin Type			Slit Fin	Louver Fin
	Row / Stage			(Plate fin configuration, forced draft)	
				2 × 15	1 × 20
	FPI			21	19
	Size (W × H × L)		mm	610 × 315 × 25.4	22 × 508 × 735
Refrigerant Control Device				—	Capillary Tube
Refrigerations Oil			(cm^3)	—	ATMOS M60 or SUNISO 4GDID

		Unit	Indoor unit	Outdoor unit
Refrigerant (R-22)		g (oz)	—	870 (30.7)
Thermostat			—	—
Protection Device			—	2 Stage Overload Protector
Capillary Tube	Length	mm	—	830
	Flow Rate	l/min	—	14.0
	Inner Diameter	mm	—	1.7
Air Filter	Material Style		P.P. Honeycomb	—
Capacity Control			Capillary Tube	
Compressor Capacitor		μF, VAC	—	35 μF, 370/440VAC
Fan Motor Capacitor		μF, VAC	1.5 μF, 440VAC	2.0 μF, 440VAC

Note:

- Specifications are subject to change without 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**
  - CS/CU-C12EKF, long piping up to 15 meter

- **Supersonic Air Purifying Device with SUPER allerubuster**
  - Inactivate various harmful airborne elements including allergens, viruses and bacteria
  - Generated supersonic waves enhance the ability to collect dust and dirt in the air

- **Auto Refresh Deo**
  - Regenerated the deodorizing performance so it stays the same as when it was first used

- **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

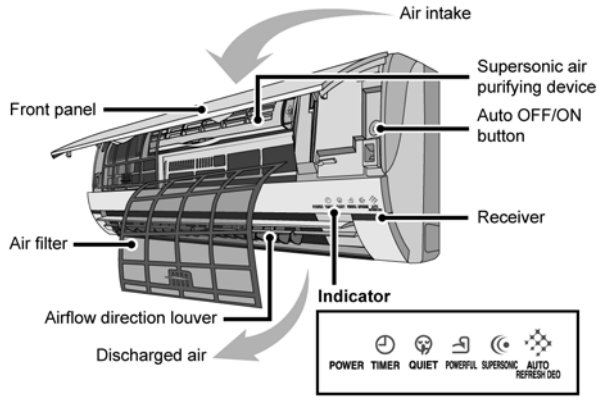
- **Operation Improvement**
  - Quiet mode to provide quiet operation
  - Powerful mode to reach the desired room temperature quickly
  - 24-hour timer setting

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

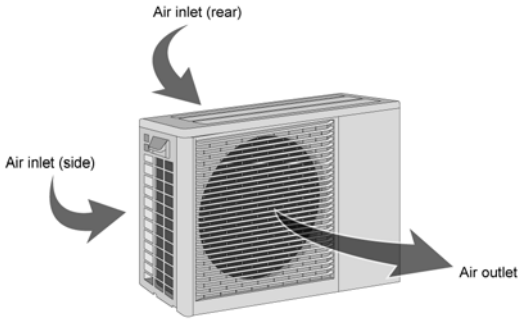
4 Location of Controls and Components

4.1. Product Overview

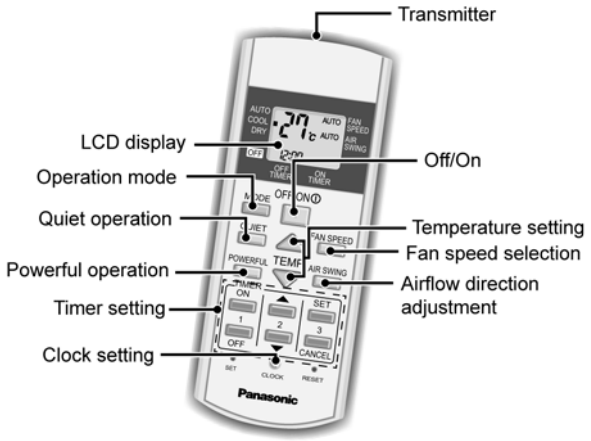
4.1.1. Indoor Unit



4.1.2. Outdoor Unit



4.1.3. Remote Control

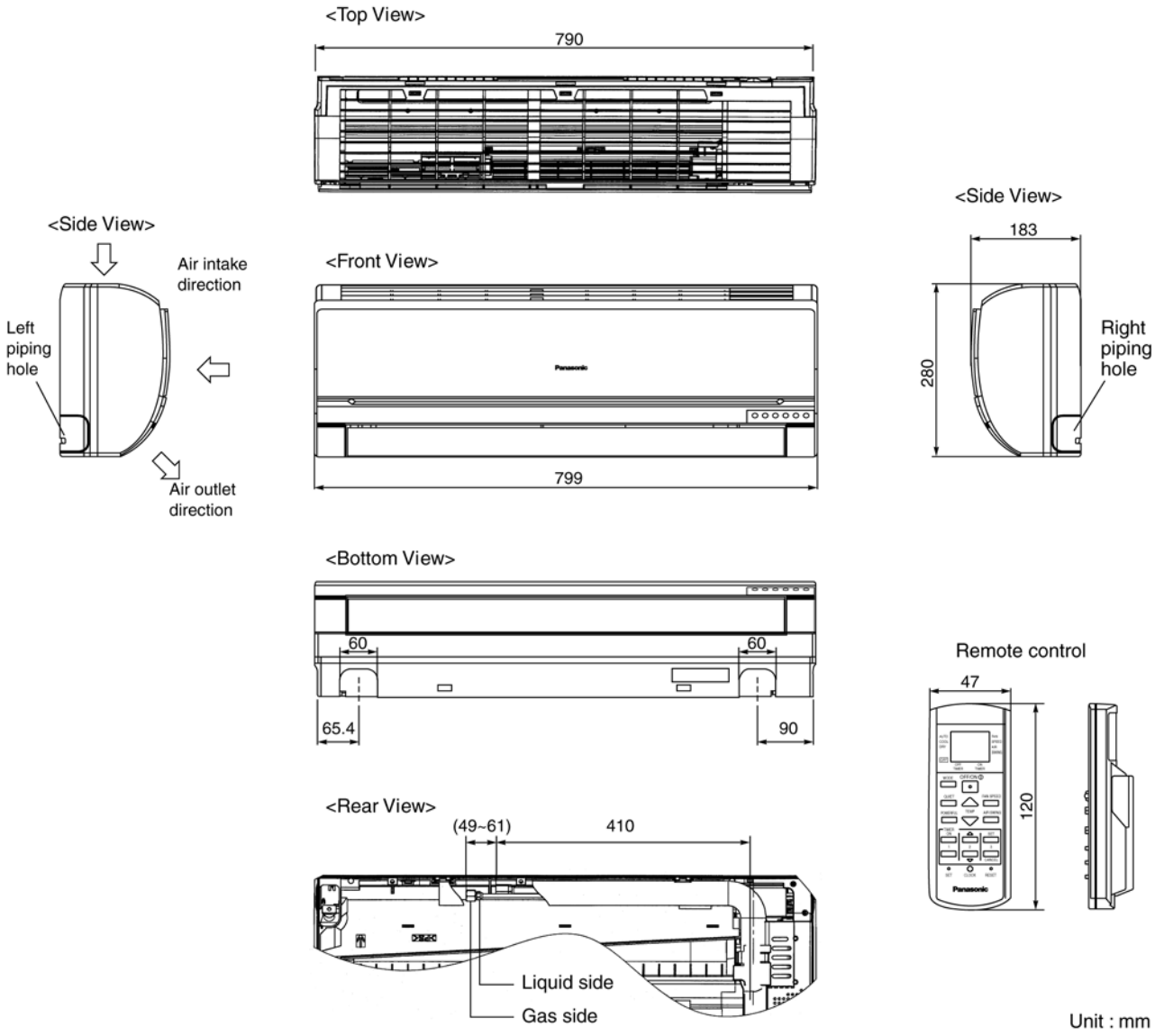


* For normal operation, the SET button is not in use.
* Press RESET button to restore the remote control's default setting.

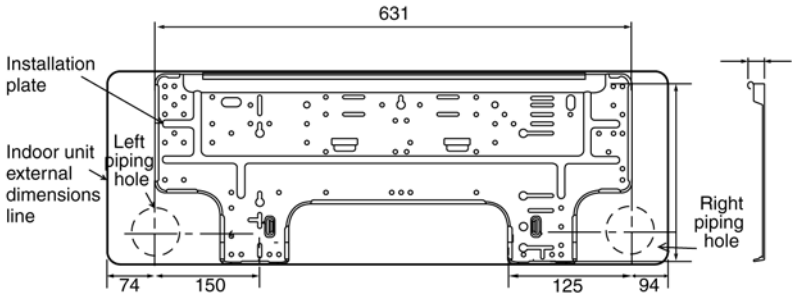
5 Dimensions

5.1. Indoor Unit & Remote Control

5.1.1. CS-C12EKF

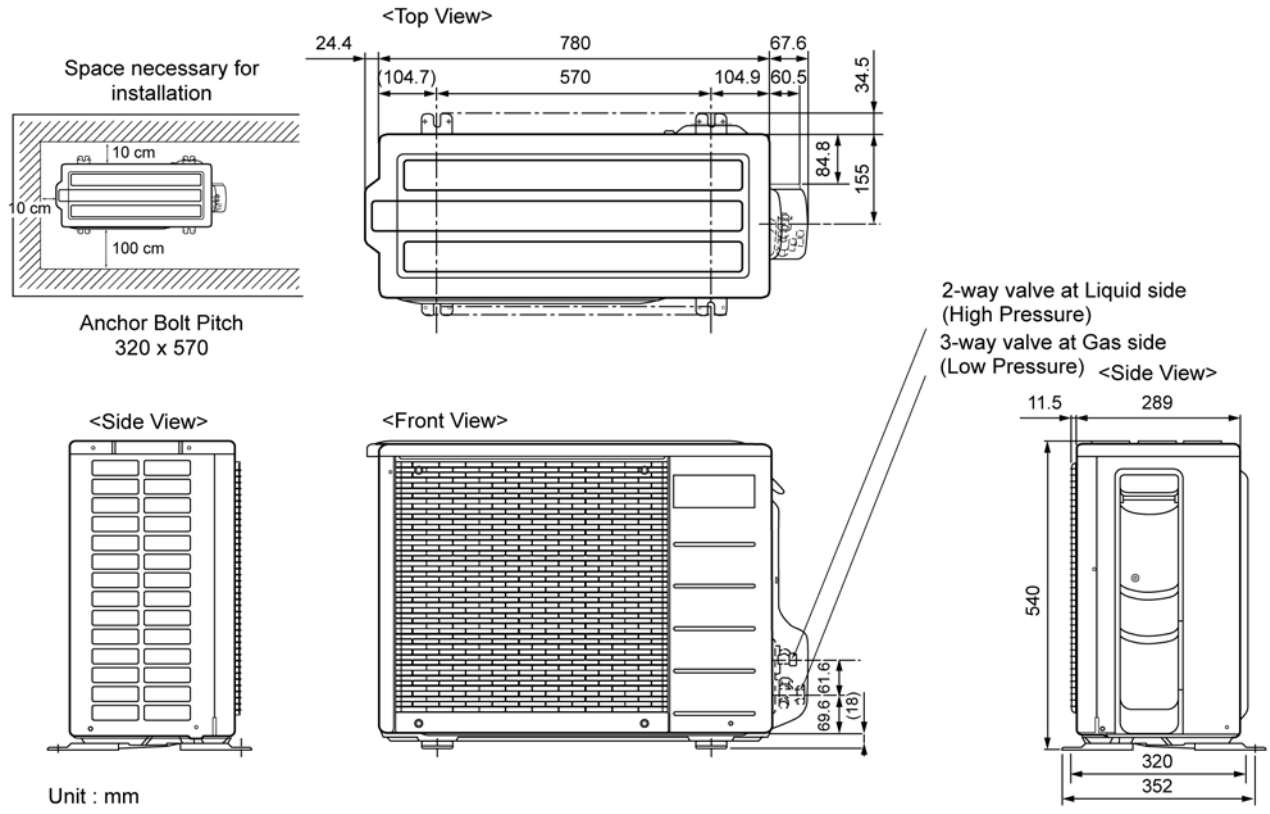


Relative position between the indoor unit and the installation plate <Front View>

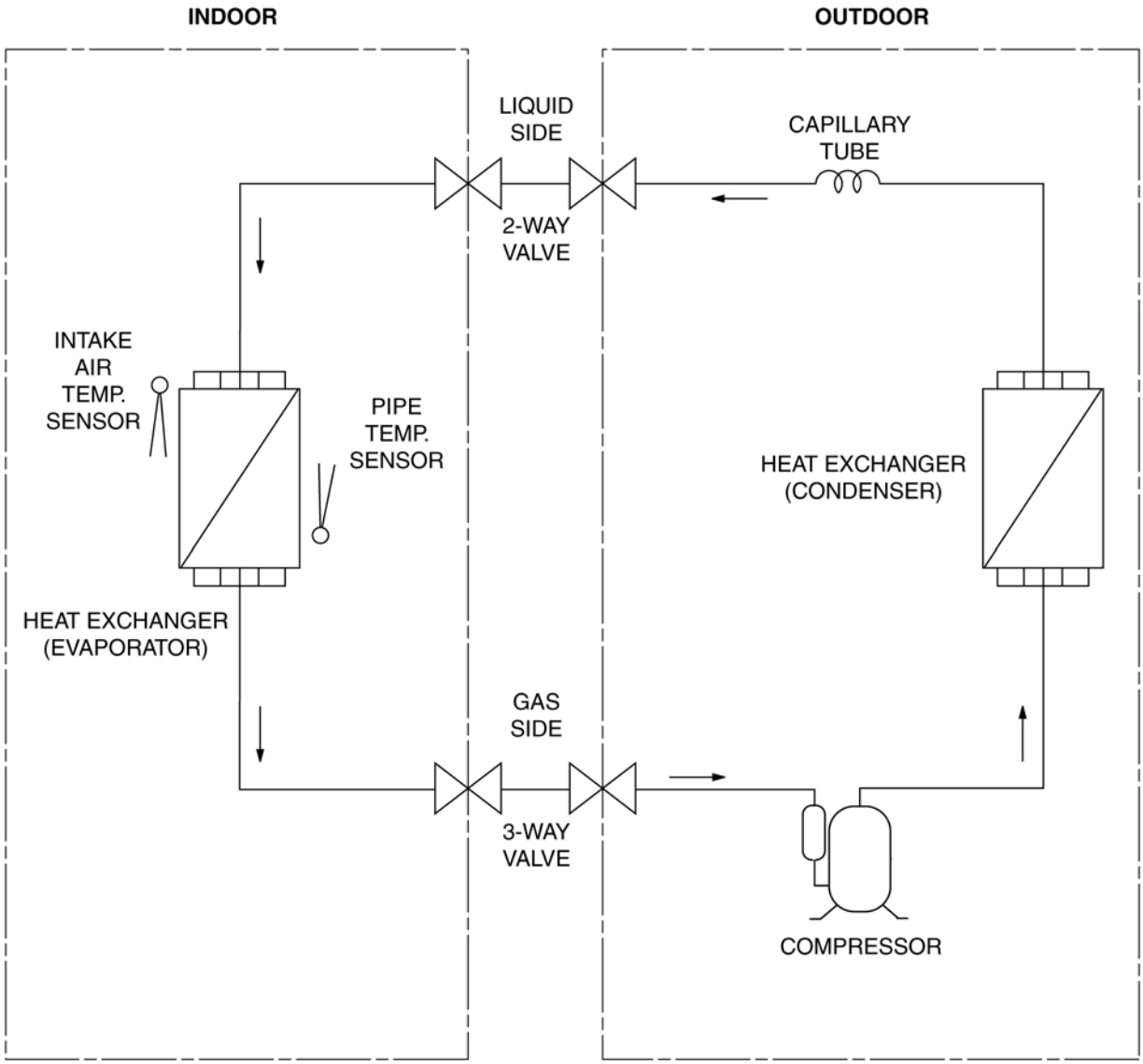


5.2. Outdoor Unit

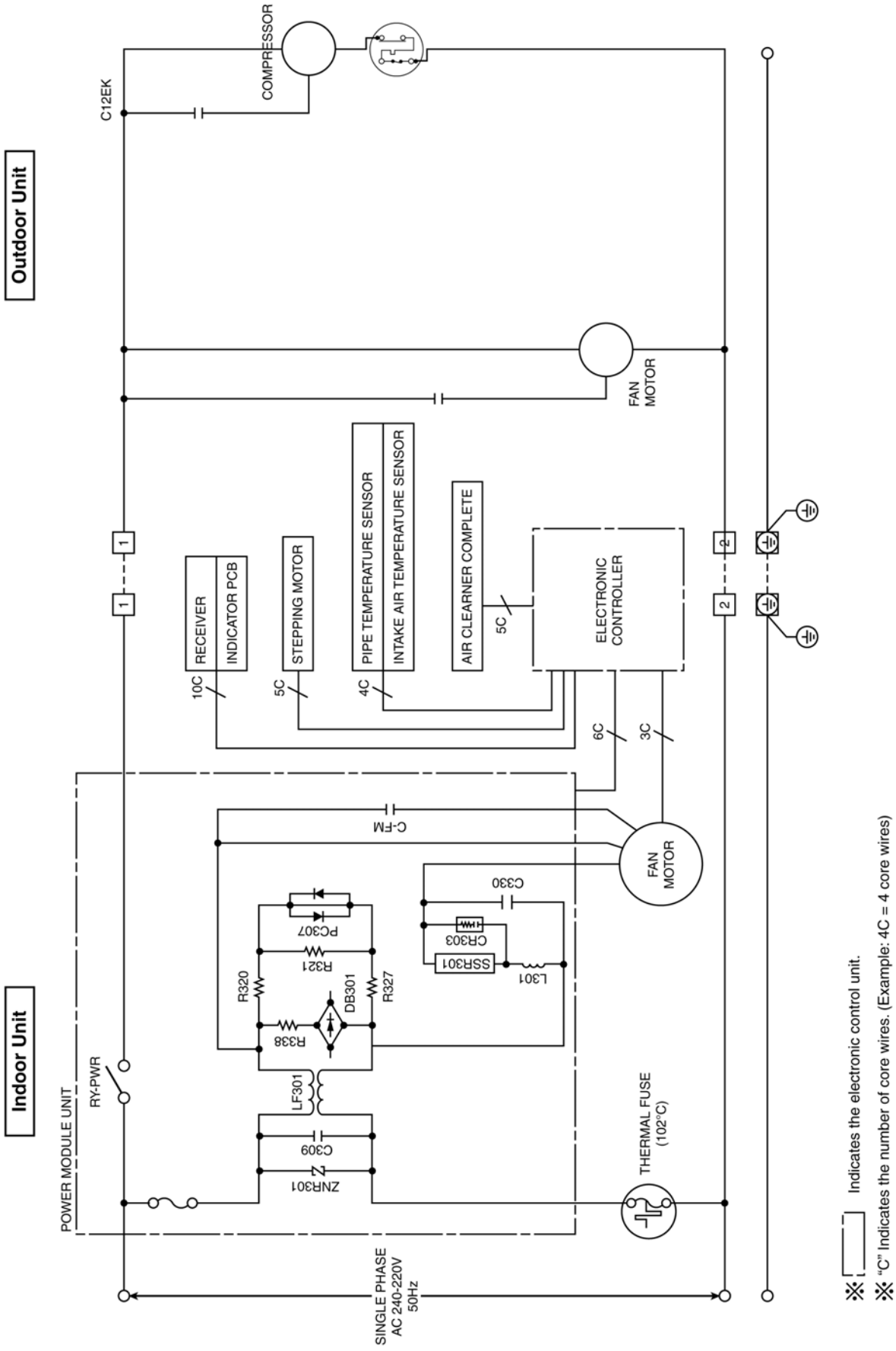
5.2.1. CU-C12EKF



6 Refrigeration Cycle Diagram

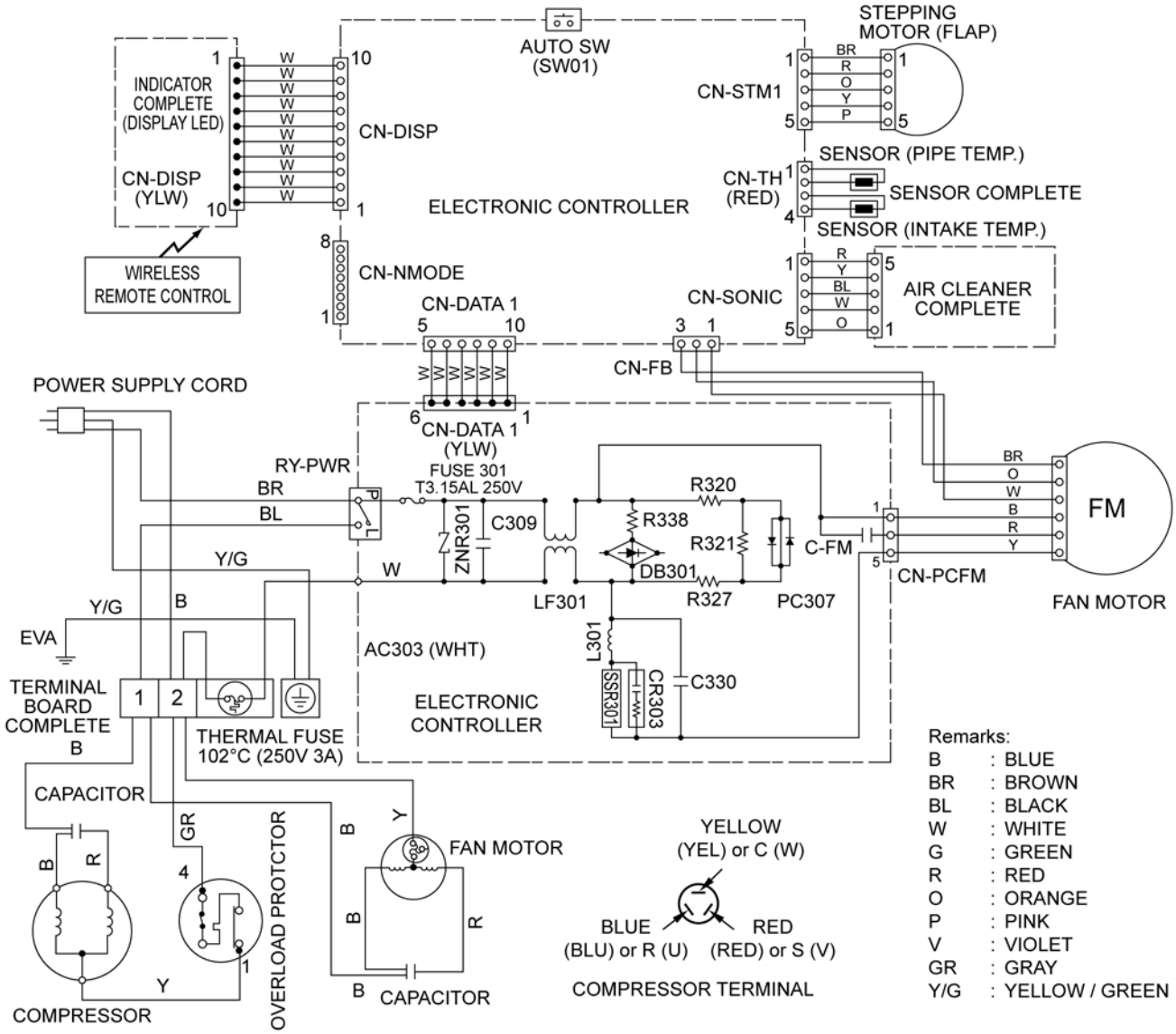


7 Block Diagram



8 Wiring Connection Diagram

8.1. CS-C12EKF CU-C12EKF



Resistance of Outdoor Fan Motor Windings

MODEL	CU-C12EKF
CONNECTION	CWA951120
BLUE-YELLOW	200.4 Ω
YELLOW-RED	252.5 Ω

Note: Resistance at 26°C of ambient temperature.

Resistance of Compressor Windings

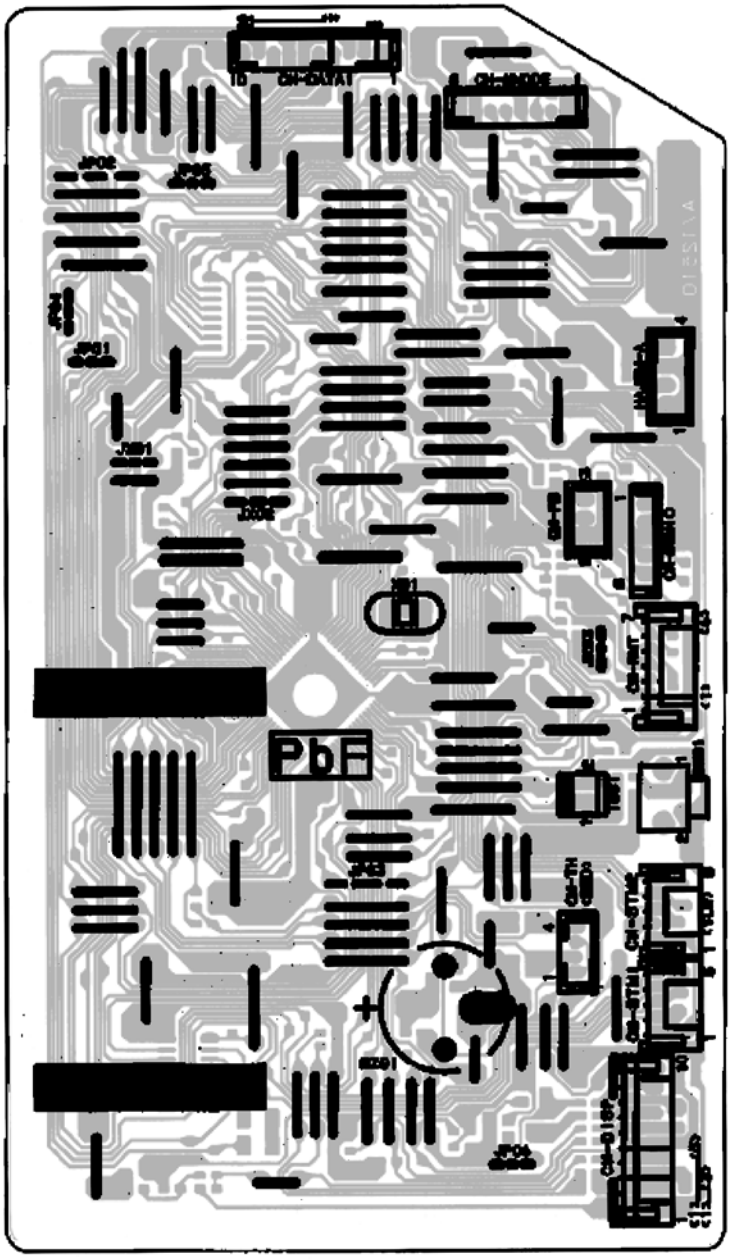
MODEL	CU-C12EKF
CONNECTION	2KS210D3BA02
C - R	1.930 Ω
C - S	2.449 Ω

Note: Resistance at 20°C of ambient temperature.

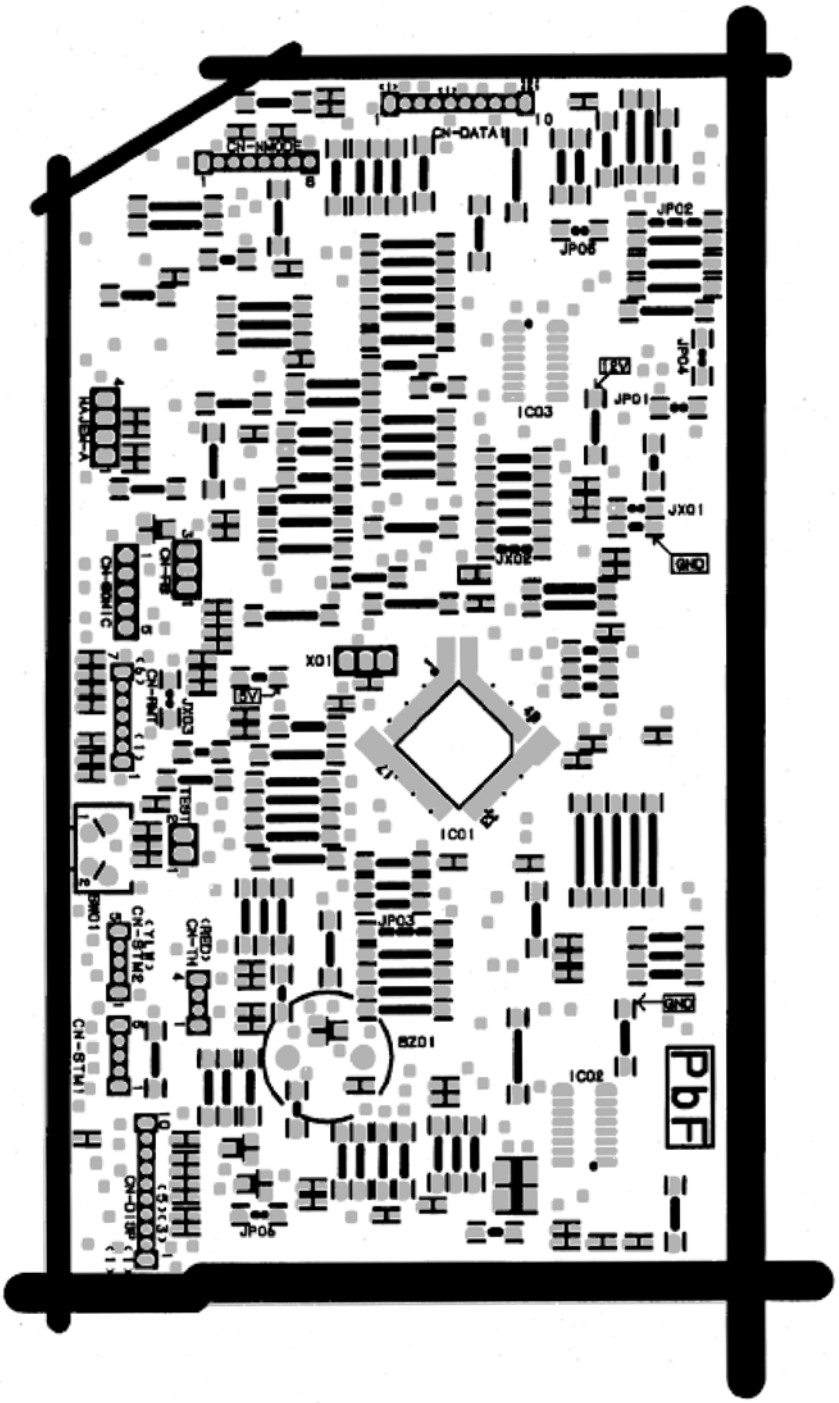
9 Printed Circuit Board

9.1. Indoor Unit

TOP VIEW

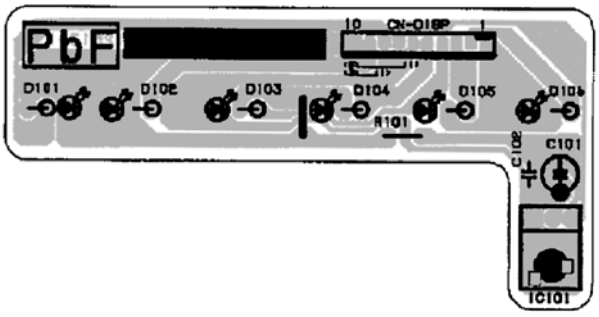


BOTTOM VIEW

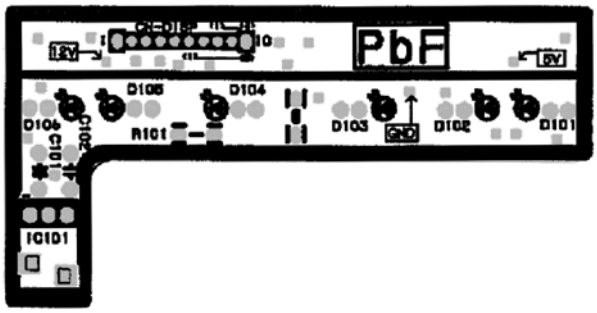

CN-DATA1
JP02
JP06
JP04
JP01
IC03
JX01
GND
JX02
X01
IC01
JP03
BZ01
IC02
PbF
JP05

9.2. Indicator

TOP VIEW



BOTTOM VIEW



10 Installation Instruction

10.1. Select The Best Location

Indoor Unit

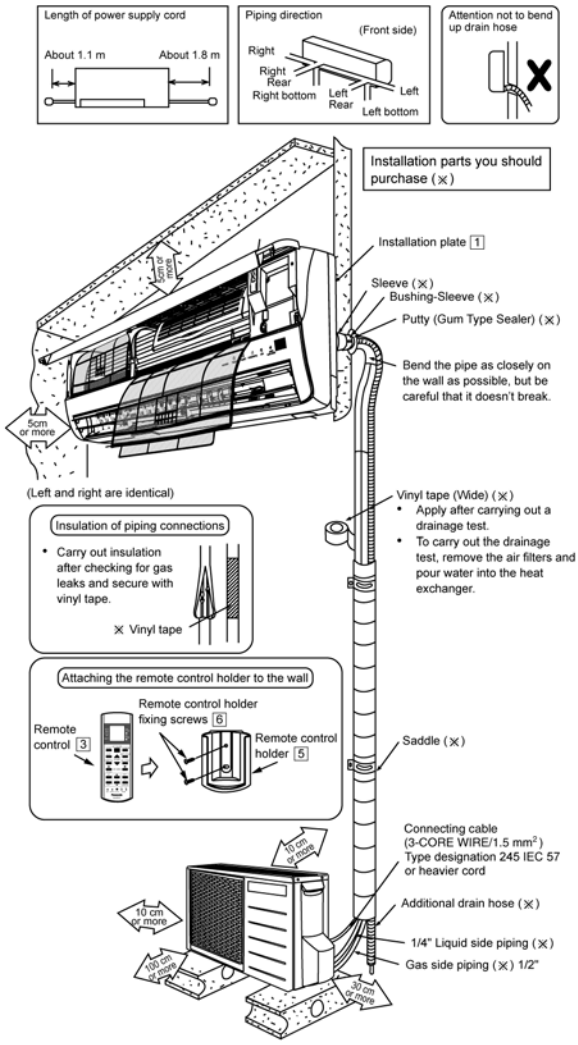
- There should not be any heat source or steam near the unit.
- There should not be any obstacles blocking the air circulation.
- A place where air circulation in the room is good.
- A place where drainage can be easily done.
- A place where noise prevention is taken into consideration.
- Do not install 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)	Max. Piping Length (m)	Additional Refrigerant (g/m)
	Gas	Liquid				
C12EK	1/2”	1/4”	7.5	5	10	10

Indoor/Outdoor Unit Installation Diagram

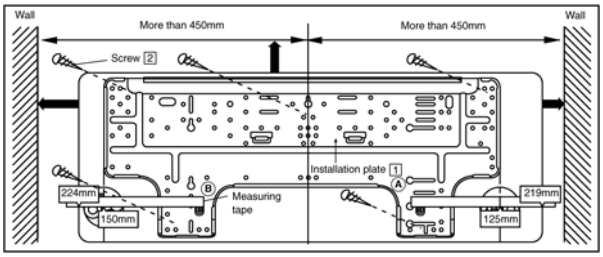


- This illustration is for explanation purposes only. The indoor unit will actually face a different way.

10.2. Indoor Unit

10.2.1. How To Fix Installation Plate

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



The centre of installation plate should be at more than 450 mm at right and left of the wall.
The distance from installation plate edge to ceiling should more than 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 5 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.

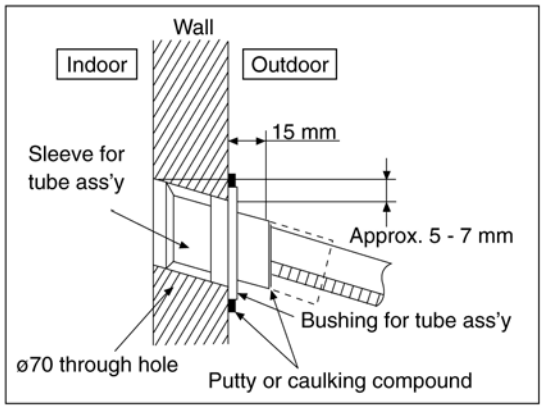
10.2.2. To Drill A Hole In The Wall And Install A Sleeve Of Piping

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

Caution

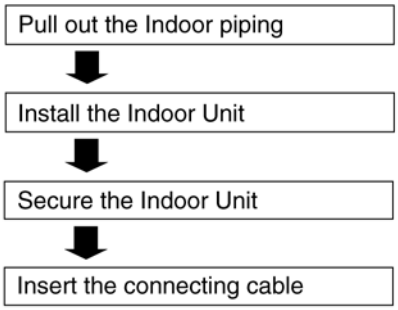
When the wall is hollow, please be sure to use the sleeve for tube ass'y to prevent dangers caused by mice biting the connecting cable.

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

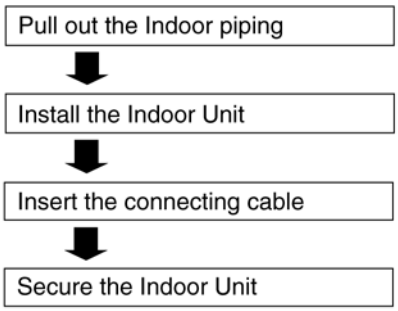


10.2.3. Indoor Unit Installation

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

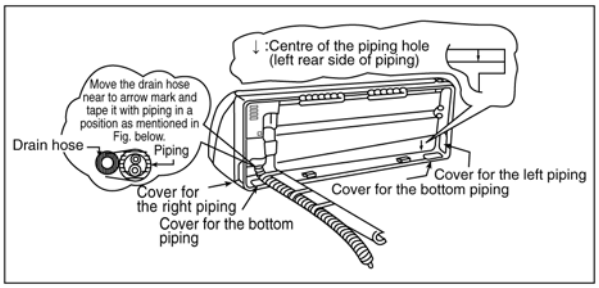
↓ • Please refer to "Connecting the piping" column in outdoor unit section. (Below steps are done after connecting the outdoor piping and gas-leakage confirmation.)

Insulate and finish the piping

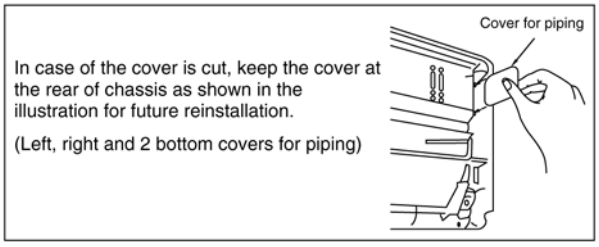
↓ • Please refer to "Piping and finishing" column of outdoor section and "Insulation of piping connections" column as mentioned in Indoor/Outdoor unit installation.

Secure the Indoor Unit

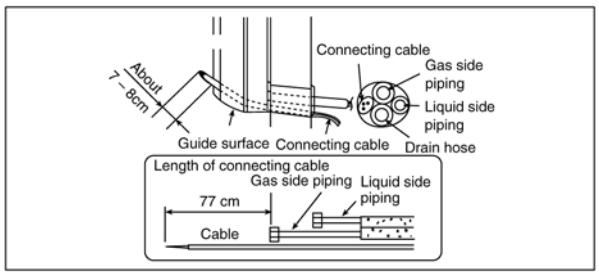
Pull out the piping and drain hose



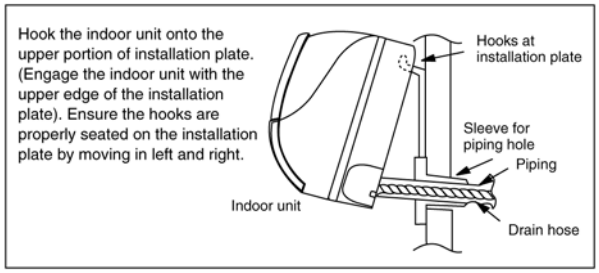
How to keep the cover



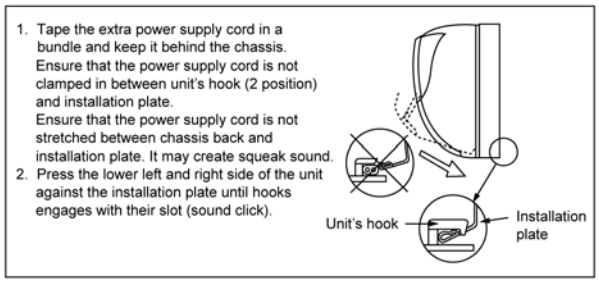
Insert the connecting cable

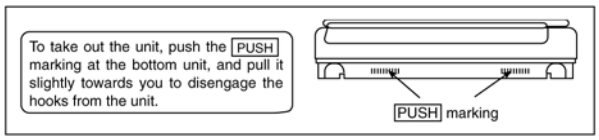


Install the Indoor unit

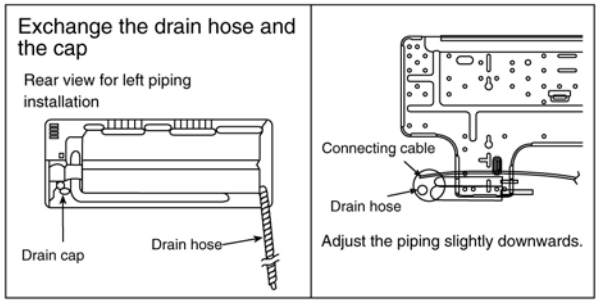


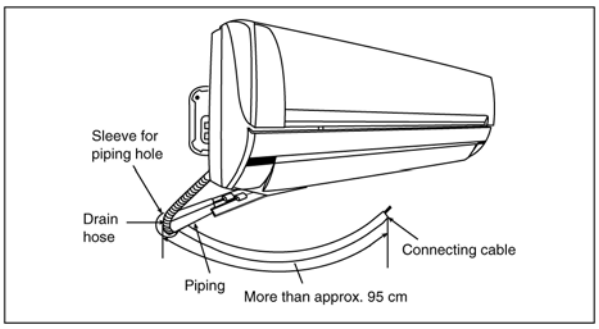
Secure the Indoor Unit



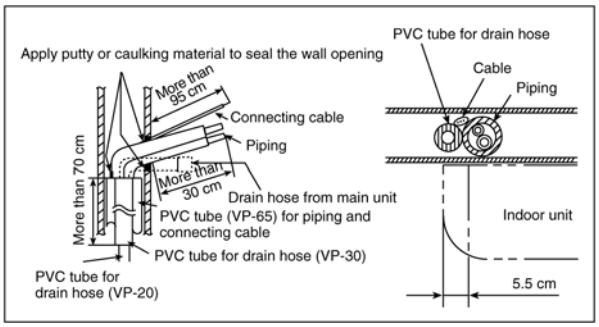


(This can be used for left rear piping & left bottom piping also.)

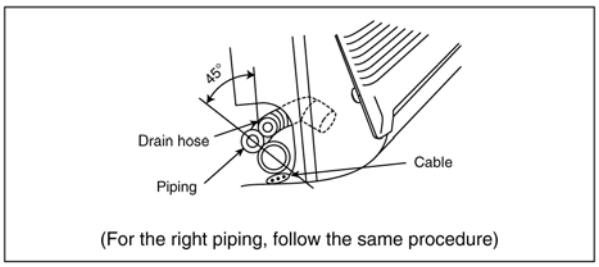




• How to pull the piping and drain hose out, in case of the embedded piping.

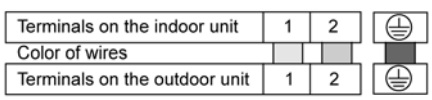


• In case of left piping how to insert the connecting cable and drain hose.

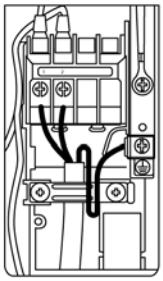


10.2.4. Connect The Cable To The Indoor Unit

1. The inside and outside connecting cable can be connected without removing the front grille.
2. Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 3 × 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.



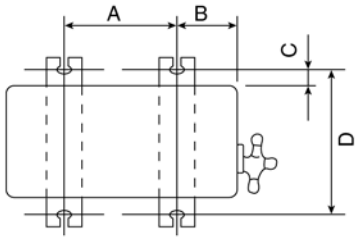
   • Secure the cable onto the control board with the holder (clamper).



10.3. Outdoor Unit

10.3.1. Install The Outdoor Unit

• After selecting the best location, start installation according to Indoor/Outdoor Unit Installation Diagram.
1. Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut (ø10 mm).
2. When installing at roof, please consider strong wind and earthquake. Please fasten the installation stand firmly with bolt or nails.



Model	A	B	C	D
C12EK	570	105	18.5	320

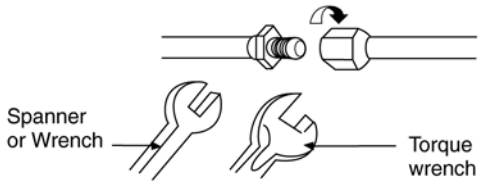
10.3.2. Connecting The Piping

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

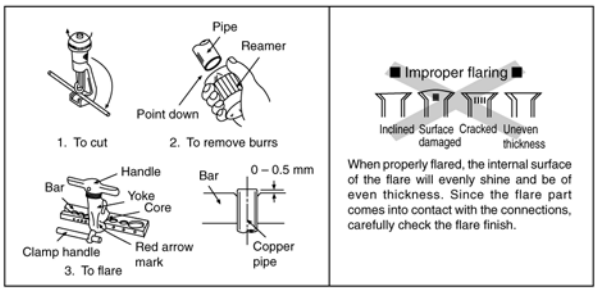
• Align the center of piping and sufficiently tighten the flare nut with fingers.
• Further tighten the flare nut with torque wrench in specified torque as stated in the table.



Model	Piping size (Torque)	
	Gas	Liquid
C12EK	1/2" [55 N•m]	1/4" [18 N•m]

Connecting The Piping To Outdoor Unit

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



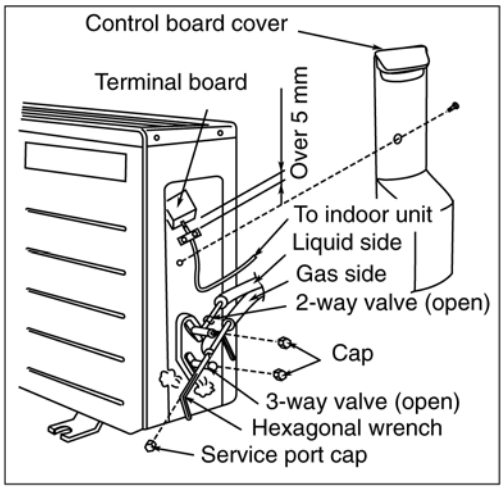
CUTTING AND FLARING THE PIPING

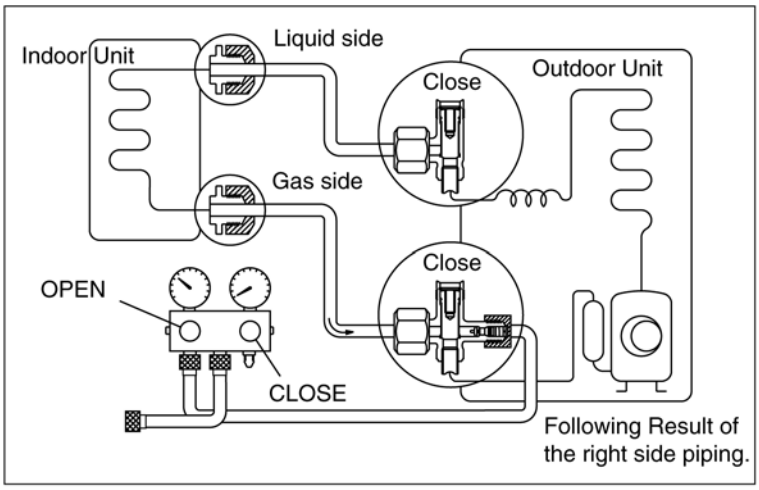
1. Please cut using pipe cutter and then remove the burrs.
2. Remove the burrs by using reamer. If burrs is not removed, gas leakage may be caused. Turn the piping end down to avoid the metal powder entering the pipe.
3. Please make flare after inserting the flare nut onto the copper pipes.

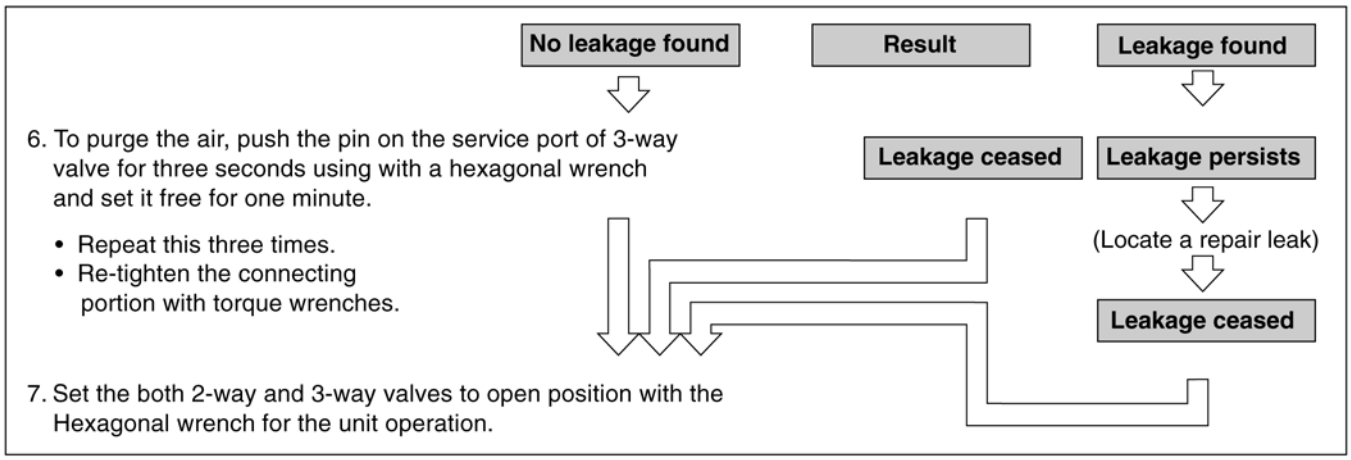
10.3.3. Air Purging Of The Pipings And Indoor Unit

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

1. Remove the caps from the 2-way and 3-way valves.
2. 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 pipings, refer to item 4(A).**
5. To open 2-way valve again, turn the valve stem counter-clockwise until it stops.







4(A). Checking gas leakage for the left piping

(1) * Connect the manifold gauge to the service port of 3-way valve.

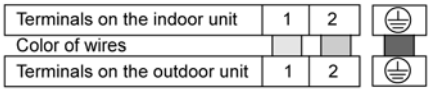
* Measure the pressure.

(2) * Keep it for 5-10 minutes.

* Ensure that the pressure indicated on the gauge is the same as that of measured during the first time.

10.3.4. Connect The Cable To The Outdoor Unit

1. Remove the control board cover from the unit by loosening the screw.
2. Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 3 × 1.5 mm^2 flexible cord, type designation 245 IEC 57 or heavier cord.



3. Secure the cable onto the control board with the holder (clamper).
4. Attach the control board cover back to the original position with the screw.

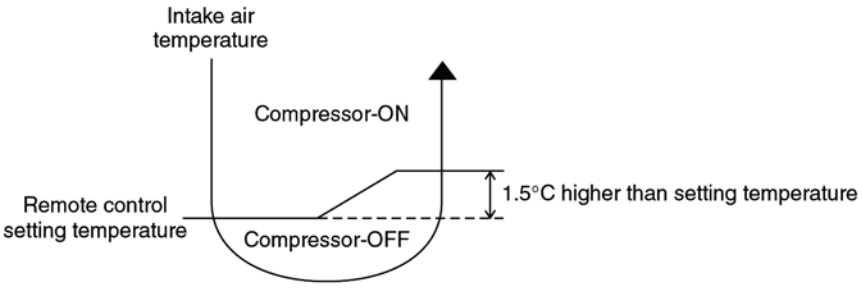
10.3.5. Pipe Insulation

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 6mm or above.

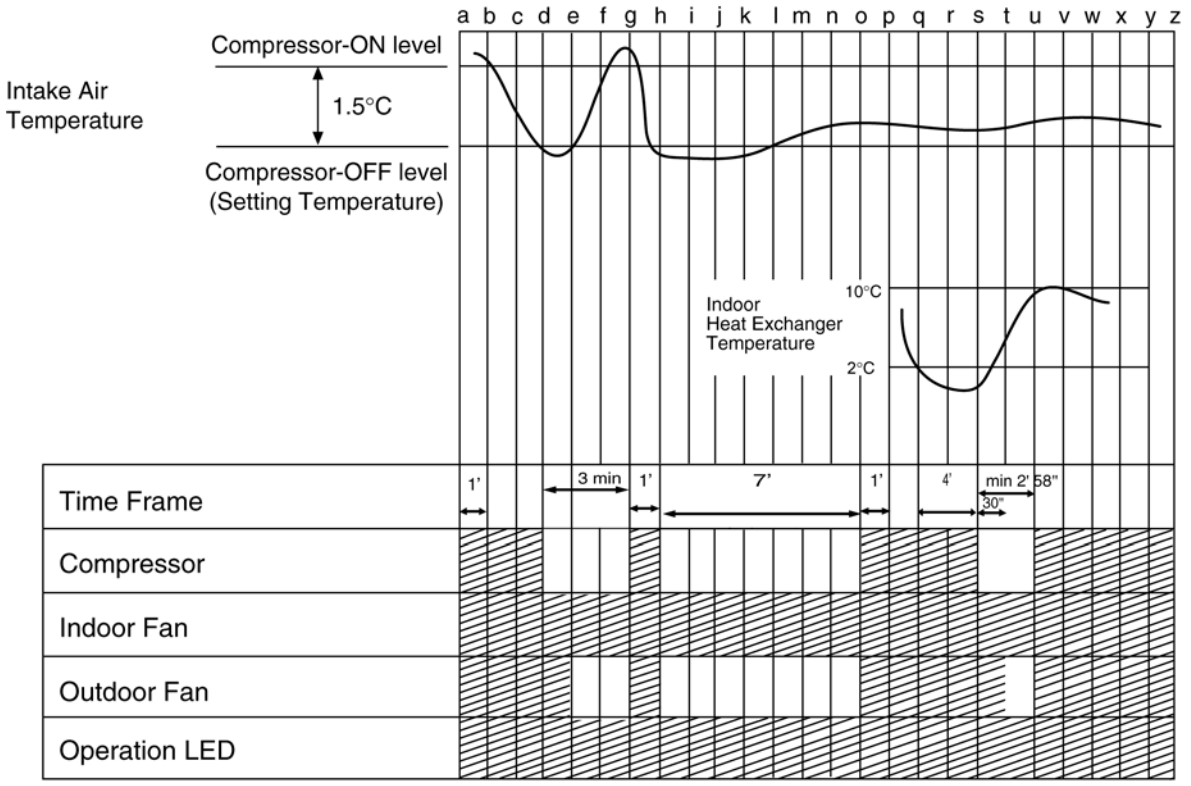
11 Operation and Control

11.1. 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.



11.1.1. Cooling Operation Time Diagram

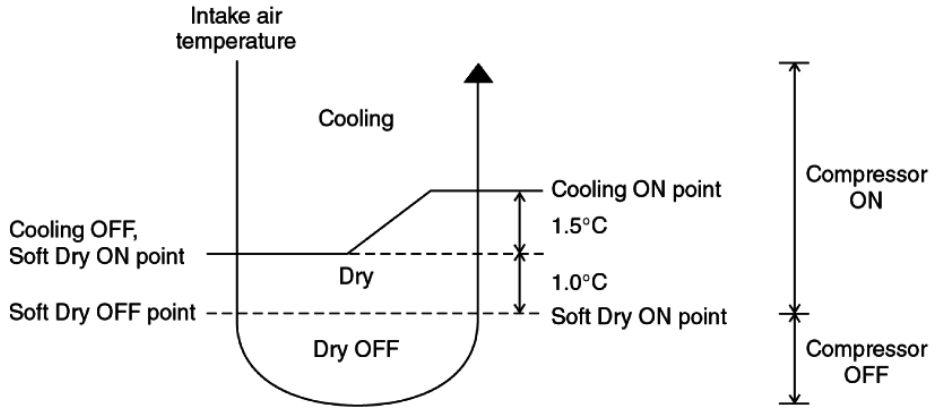


<Description of operation>

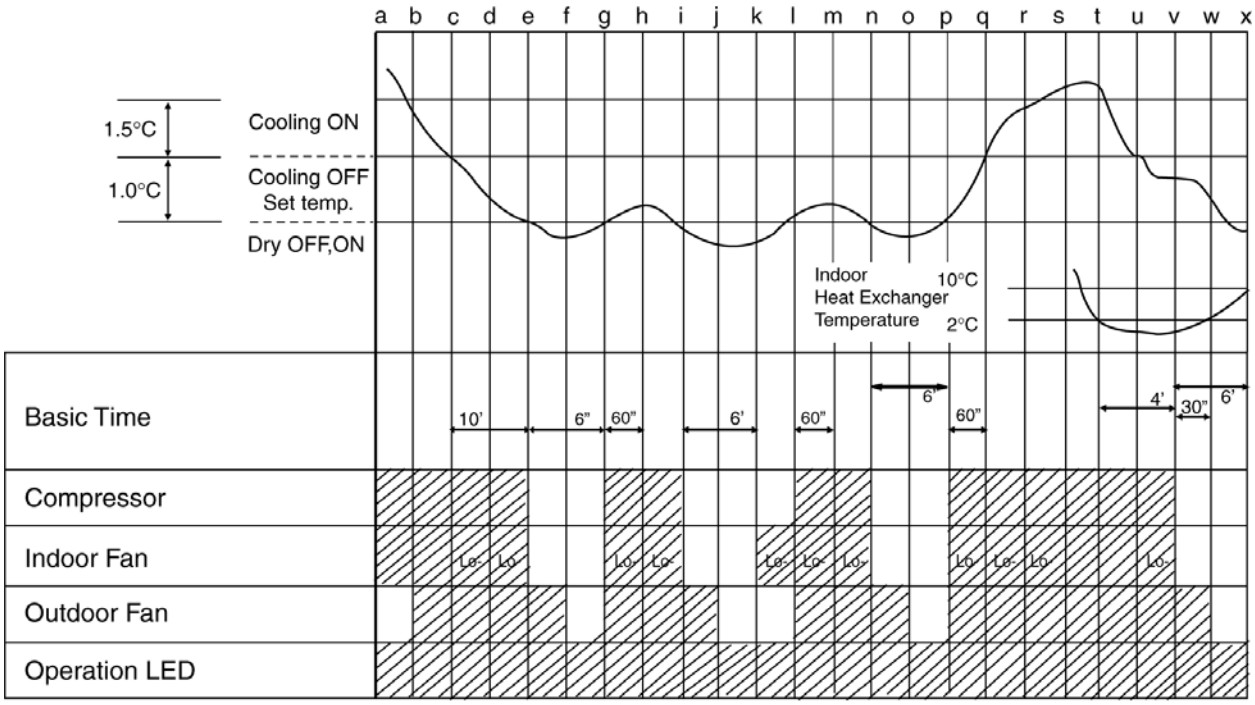
a – b, g – h	: Minimum 60 seconds forced operation	Operation
d – g, s – u	: Minimum 3 minutes restart control (Time Delay Safety Control)	Stop
h – o	: Maximum 7 minutes time save control	
q – u	: Anti-Freezing Control	

11.2. 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.



11.2.1. Soft Dry Operation Time Diagram

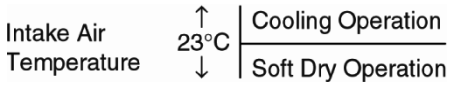


<Description of operation>

g – h, l – m, p – q,	:	Minimum 60 seconds forced operation
a – c	:	Minimum 3 minutes restart control (Time Delay Safety Control) - Cooling operation
e – g, n – o	:	Minimum 6 minutes restart control (Time Delay Safety Control) - Soft dry operation
t – x	:	Anti-Freezing Control

11.3. 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.



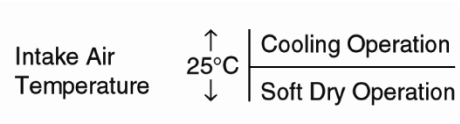
- Then, the unit start to operate at determined operation mode, until it is switched off using remote control, with the setting temperature as shown in below table.

	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

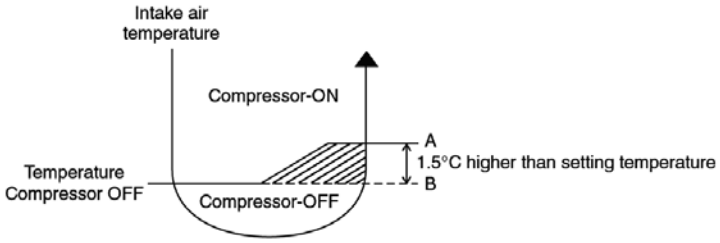
11.4. Operation Control

11.4.1. 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.

11.4.2. 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.



11.4.3. 60 Seconds Forced Operation

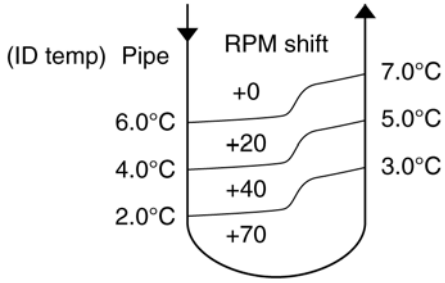
- Once the air conditioner is turned on, the compressor will not stop within 60 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, force stop by pressing the OFF/ON operation button at the remote control is permitted.
- The reason for the 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.

11.4.4. 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.

11.4.5. Freeze Prevention Control

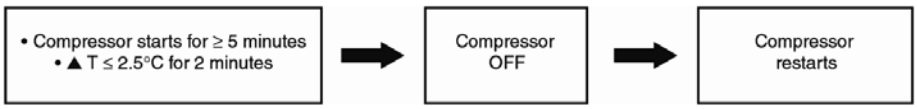
- To protect indoor heat exchanger from freezing and to prevent higher volume of refrigerant in liquid form return to compressor.
- This control will activate when the temperature of indoor heat exchanger falls below 2°C continuously for more than 4 minutes.
- The current fan speed will change to freeze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

11.4.6. 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.

11.4.7. 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 Low 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°

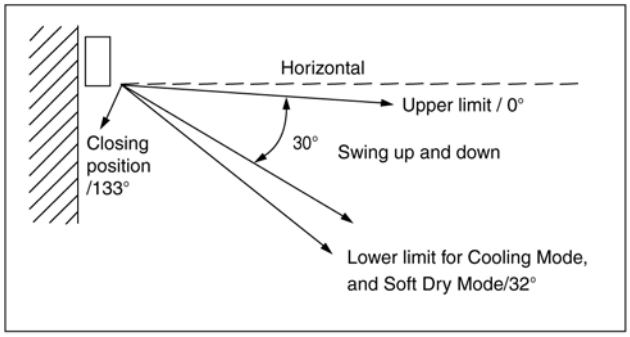
Note:

A = Normal operation angle of rotation

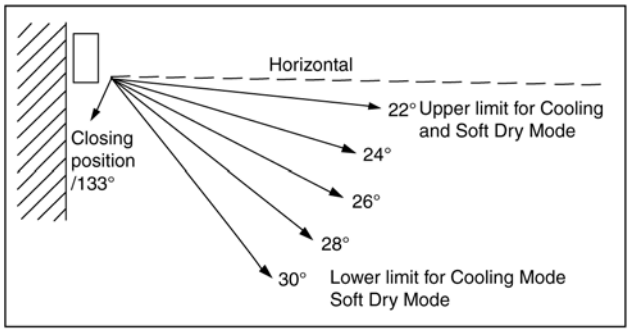
B = Dew prevention angle of rotation

Horizontal Louver Angle

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



During dew prevention, the horizontal louver angle in Manual control are as below figure.



11.5. Indoor Fan Speed Control

• Indoor Fan Speed can be set using remote control.

11.5.1. Fan Speed Rotation Chart

Speed	Fan Speed (rpm)
	CS-C12EKF
S Hi	1320
Hi	1270
Me	1060
H Lo	960
C Lo	900
Lo-	850
S Lo	820
Q Hi	1170
Q Me	960
Q Lo	800

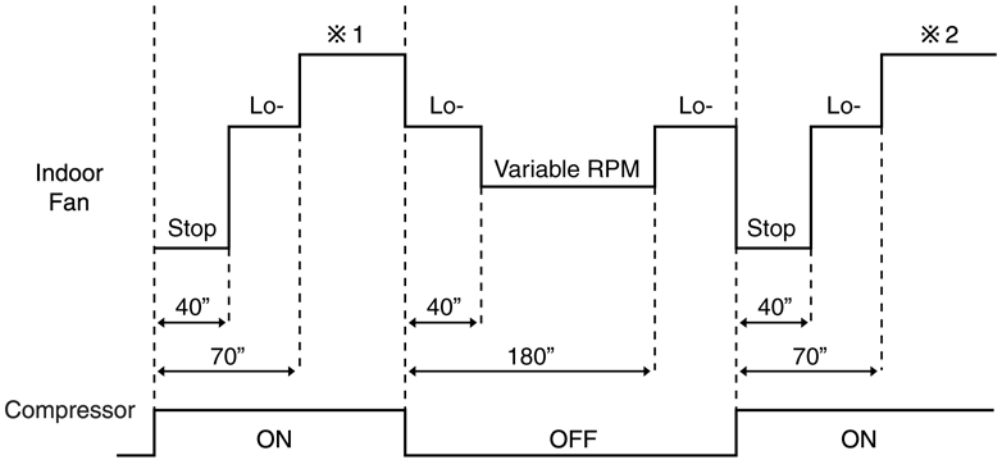
11.5.2. Automatic Fan Speed Control

• 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.

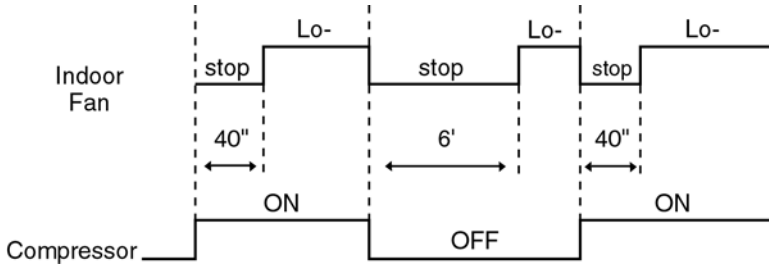


※ 1 Fan Speed is Hi until the compressor stops (when the room temperature reaches setting temperature).

※ 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.



11.5.3. 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.

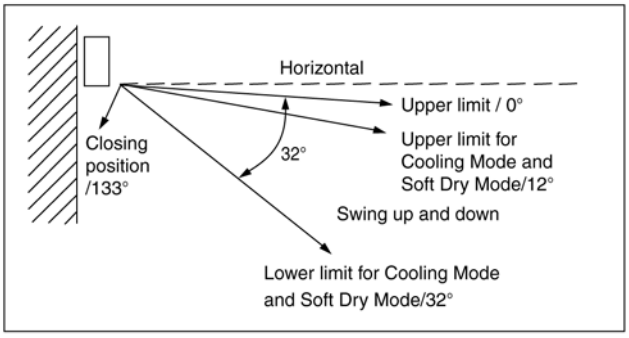
11.6. Outdoor Fan Speed Control

• 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.

11.7. Vertical Airflow Direction Control

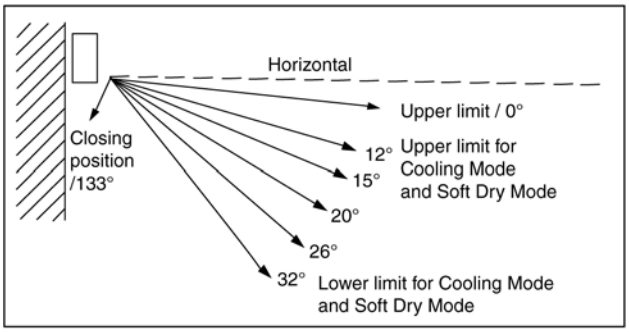
11.7.1. Auto Control

- 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.



11.7.2. 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.



11.8. Horizontal Airflow Direction Control

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

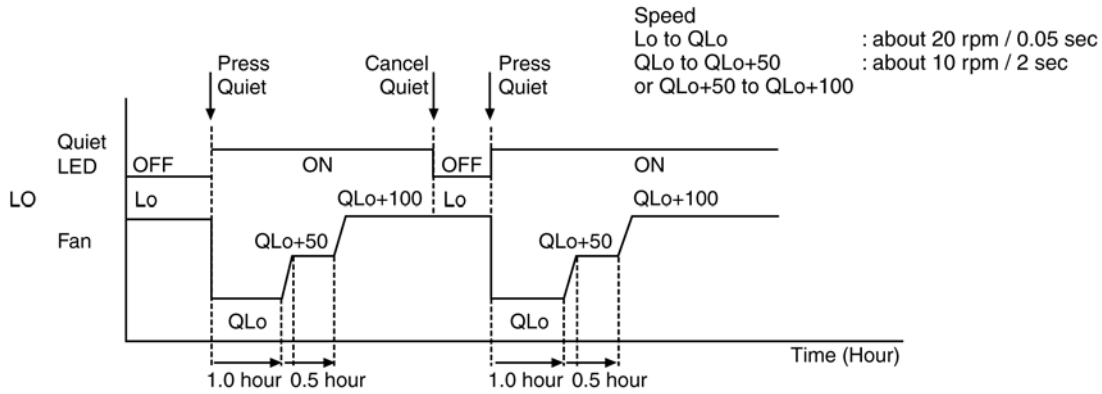
11.9. Powerful Operation

- 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:-
  - Powerful mode button is pressed again.
  - Powerful operation has operate for 15 minutes.
  - Stopped by OFF/ON operation button.
  - Timer OFF activates.
  - Quiet mode button is pressed.
  - Operation mode is changed.

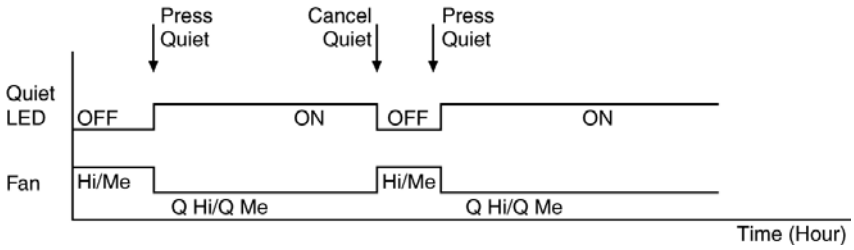
11.10. Quiet Operation

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

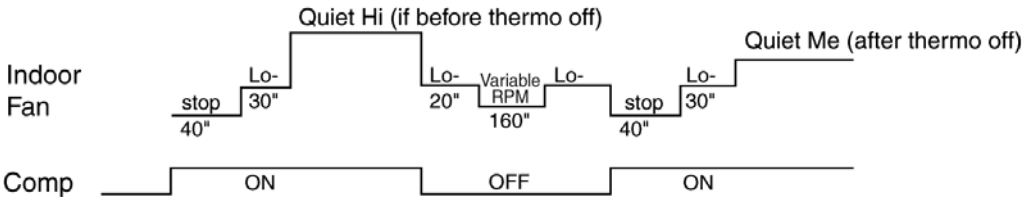
- To provide quiet/cooling operation condition compare to normal operation.
- Once the Quiet Mode is set at the remote control, the Quiet Mode LED illuminated. The sound level will reduce around 2 dB(A) for Lo fan speed or 3 dB(A) for Hi/Me fan speed against the present operation sound level.
- Dew formation 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.
  - Powerful button is pressed.
  - Operation mode button is changed.

11.11. Timer Control

11.11.1. 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, 30 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.

11.11.2. 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.

11.12. 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.
- This control can be omitted by open the circuit of JX2. (Refer Circuit Diagram) (Indoor PCB)

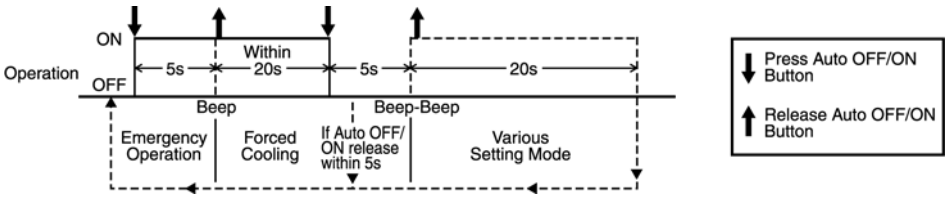
11.13. Remote Control Signal Receiving Sound

- Long beep sound will be heard when:-
  - Stopping the air conditioner using ON/OFF switch.
  - Stopping the Quiet Mode.
  - Stopping the Powerful Mode.
- Short beep sound will be heard for others setting.

12 Service Mode

12.1. Auto OFF/ON Button

- The “Auto OFF/ON Button” (behind the front grille) is used to operate the air conditioner if remote control is misplaced or malfunctioning.
- Forced cooling operation is possible by pressing the “Auto OFF/ON Button” for more than 5s where “beep” sound is heard then release the button.
- User able to select remote control transmission code and toggle remote control signal receiving sound under various setting mode.
- To enter various setting mode:
  - Press the “Auto OFF/ON Button” continuously for 5s (“beep” sound is heard) and release.
  - Within 20s, press the “Auto OFF/ON Button” continuously for 5s again (2 “beep” sound is heard) and release.
  - Various setting mode has limit up to 20s. Then return to normal operation.

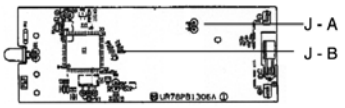


12.1.1. Toggle Remote Control Signal Receiving Sound

- Under various setting mode, press the “Auto OFF/ON Button” to toggle the remote control sound.
  - Short “beep”: Turn ON remote control signal receiving sound.
  - Long “beep”: Turn OFF remote control signal receiving sound.
- After “Auto OFF/ON Button” is pressed, the 20s counter for various setting mode is restarted.

12.1.2. 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	Transmission Code Combination		
	J - A	J - B	Remote Control No.
	Short	Open	A (Default)
	Open	Open	B
	Short	Short	C
	Open	Short	D

- Under various setting mode, after select the transmission code combination of remote control, press any button of remote control to transmit a signal to indoor unit. The transmission code will be stored in EEPROM.
- After signal is received, the various setting mode is cancelled and return to normal operation.

12.2. Remote Control Button

12.2.1. SET

- To change the type of remote control transmission signal (there are totally four types of transmission codes).
  - Modify the jumper (back of PCB) & connector (front of PCB) at remote control PCB.
  - Press with pointer for more than 10 seconds.
  - Face the transmitter towards indoor unit receiver and press the timer SET button (to send the signal) or if the timer SET button is not pressed for 30 seconds, the setting mode is cancelled.
  - Press timer CANCEL button to exit the setting mode.

12.2.2. CLOCK

- To change the remote control's clock-hour and minute.
  - Press once to enter the clock setting mode.
  - Use timer increment button timer decrement button to change the time.
  - Press once again to exit the setting mode.
- To change the time format (24 hours & 12 hours timer display).
  - Press for more than 5 seconds.

12.2.3. RESET

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

12.2.4. TIMER " ▲ "

- Press continuously for 5 seconds, LED intensity for Remote Control dimmer code is transmitted.
- Above condition will not happen when Timer is set.

12.2.5. TIMER " ▼ "

- Press continuously for 10 seconds, set the operation and display changes as Celsius or Fahrenheit.
- Above condition will not happen when Timer is set.

12.3. Test Mode Timer Table

Name		Time	Test Mode (When test point Short-circuited)	Remarks
Real Timer		1 hr.	1 min.	
		10 min.	10 sec.	
		1 min.	1 sec.	
Timer Delay Safety Control		2 min. 58 sec.	0 sec.	
Forced Operation		60 sec.	0 sec.	
Timer Save Control		7 min.	4.2 sec.	
Anti-Freezing		4 min.	0 sec.	
Auto Mode Judgement		20 sec.	0 sec.	
Soft Dry	OFF	6 min.	36 sec.	
	ON	10 min.	60 sec.	Soft Dry: 10 min. operation
Deodorizing Control	Cooling	40 sec.	4 sec.	
		70 sec.	7 sec.	
		20 sec.	2 sec.	
		180 sec.	18 sec.	
	Soft Dry	40 sec.	4 sec.	
		360 sec.	36 sec.	
Comp. Reverse Rotation Detection		5 min.	30 sec.	Com. ON 5 min. and above
		2 min.	0 sec.	
Comp./ Fan Motor Delay Timer		1.6 sec.	0 sec.	
Powerful Mode Operation		15 min.	15 sec.	
Random Auto Restart Control		0 ~ 62 sec.	0 ~ 6.2 sec.	
Quiet Operation Timer		1 hr. 30 min.	9 sec.	

13 Troubleshooting Guide

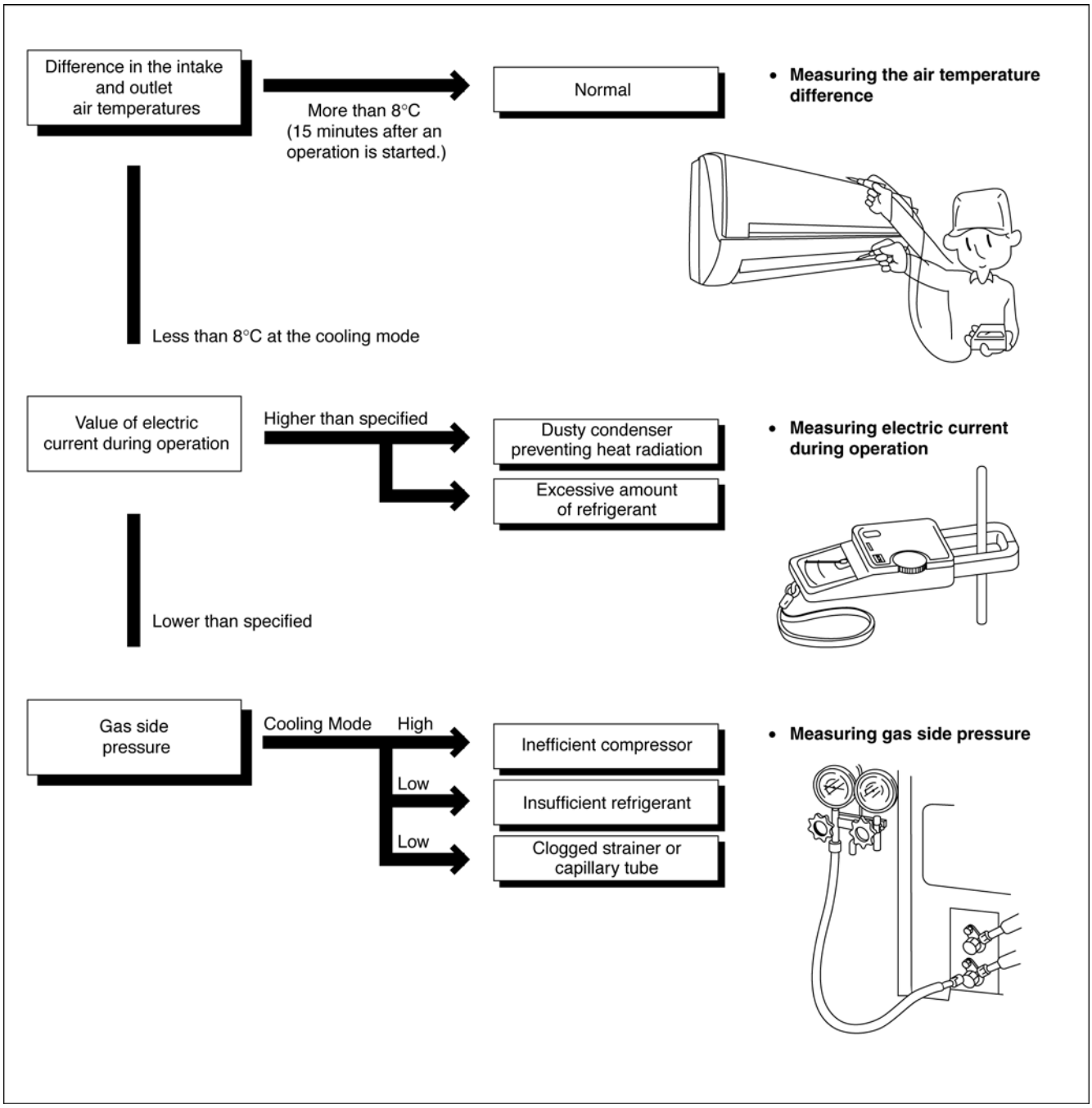
13.1. Refrigeration cycle system

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/cm²G)	Outlet air temperature (°C)
Cooling Mode	0.4 ~ 0.6 (4 ~ 6)	12 ~ 16

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



13.1.1. 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.

13.1.2. 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.

14 Disassembly and Assembly Instructions

14.1. Indoor Electronic Controllers Removal Procedures

- Remove the 2 caps and 2 screws at the bottom of the Front Grille. (Fig. 1)

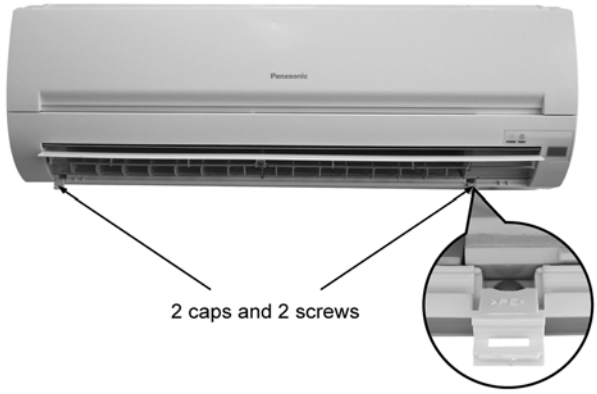


Fig. 1

- Remove the Front Grille Complete. (Fig. 2)

Fig. 2

- Release the taps on the top and on the right side of Control Board Front Cover. (Fig. 3)
- Then remove the Control Board Front Cover. (Fig. 3)
- Remove the Indicator Complete. (Fig. 3)

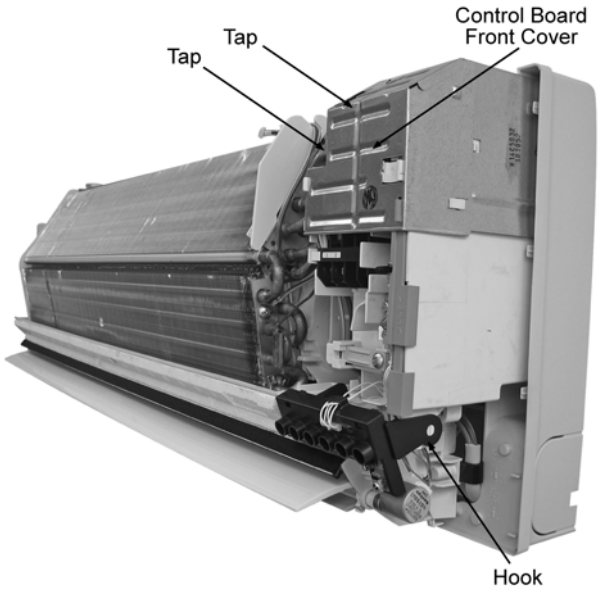


Fig. 3

• How to remove PCBs from the control board
  - Pull the hook then remove the particular piece. (Fig. 4)
  - Release CN-DISP. (Fig. 4)
  - Release CN-STM. (Fig. 4)
  - Release CN-TH. (Fig. 4)
  - Release CN-SONIC. (Fig. 4)
  - Release CN-FB. (Fig. 4)
  - Release CN-DATA. (Fig. 4)
  - Release CN-FM. (Fig. 4)
  - Remove RY-PWR connector (black and brown) and AC-WHT connector from power PCB.
  - Pull the hooks and remove the PCBs.

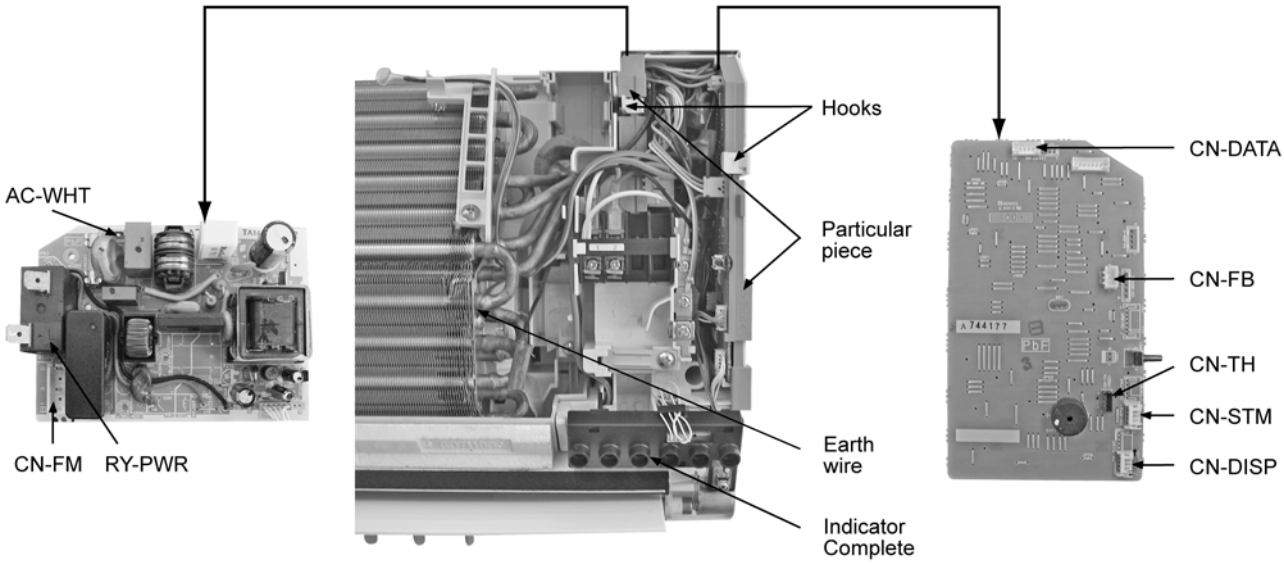


Fig. 4

14.2. Indoor Fan Motor and Cross Flow Fan Removal Procedures

- Pull down the Discharge Grille Complete. (Fig. 5)

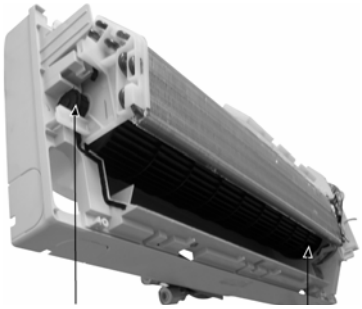


Fig. 5

- Remove the earth wire from the evaporator. (Fig. 6)
- Remove 2 screws on the right and 1 screw at the left side of control board. (Fig. 6)
- Then pull out the control board from the unit. (Fig. 6)

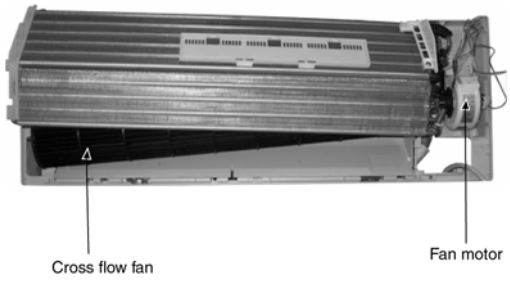


Fig. 6

- Remove the cross flow fan bushing from the chassis. (Fig. 7)
- Loosen the fan boss screw at the cross flow fan.

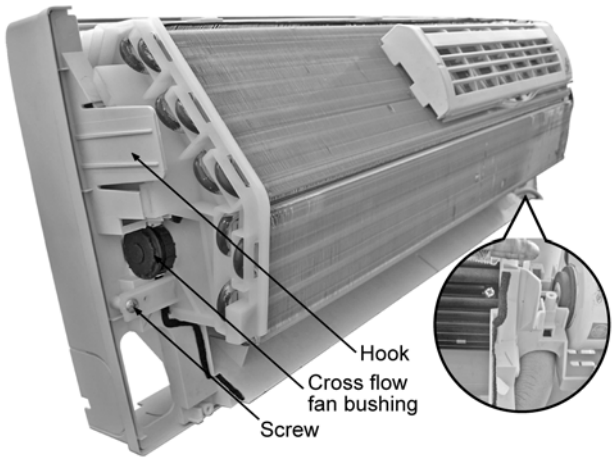


Fig. 7

• Pull the hook at the left side of evaporator. (Fig. 7)

• Then push up the evaporator and remove cross flow fan by pulling both cross flow fan and fan motor. (Fig. 8)

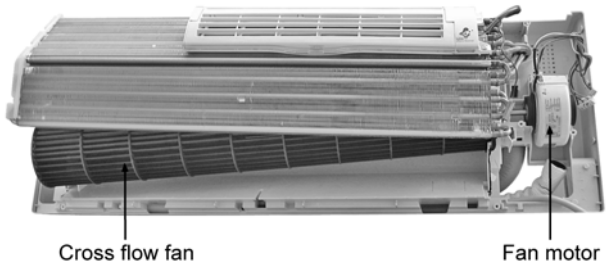
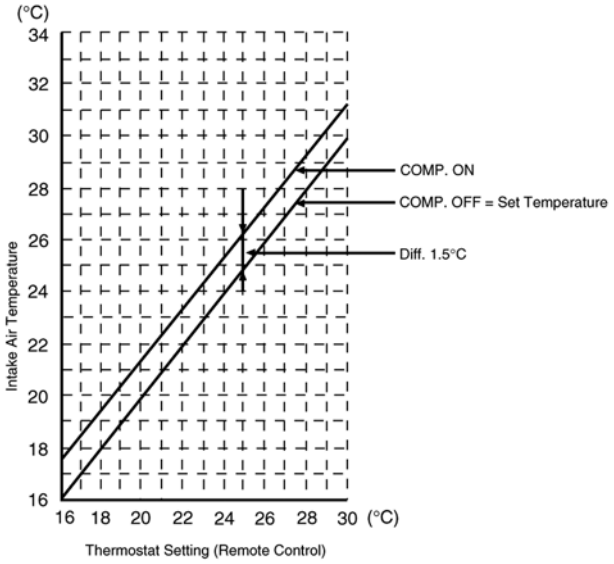


Fig. 8

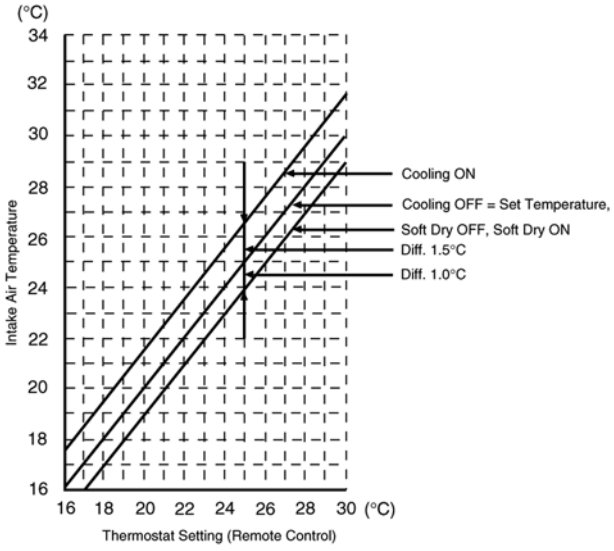
15 Technical Data

15.1. Thermostat Characteristics

Cooling



Soft Dry

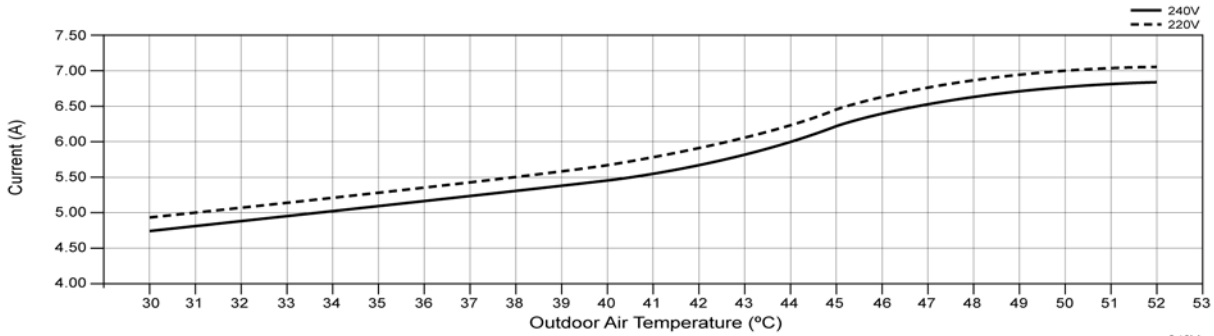


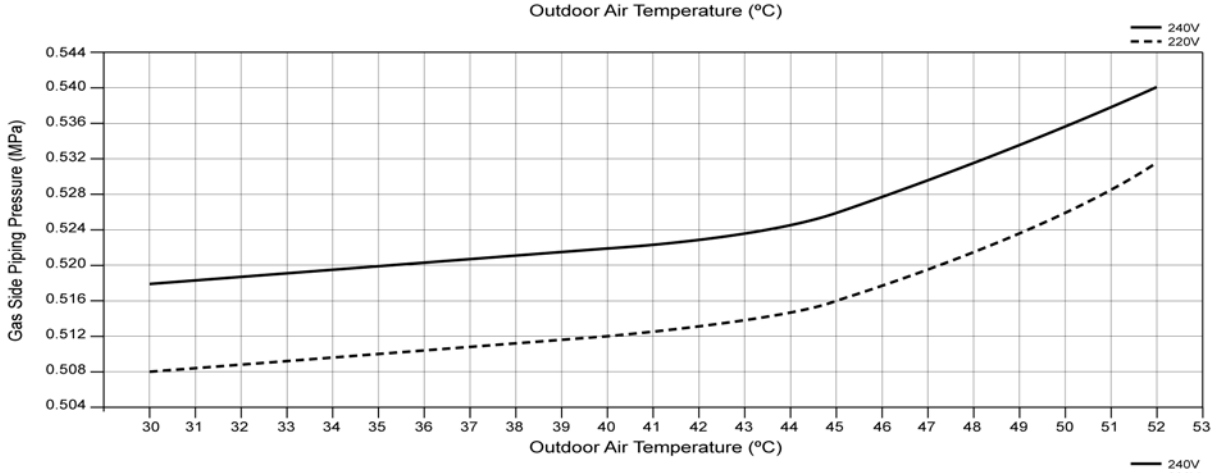
15.2. Operation Characteristics

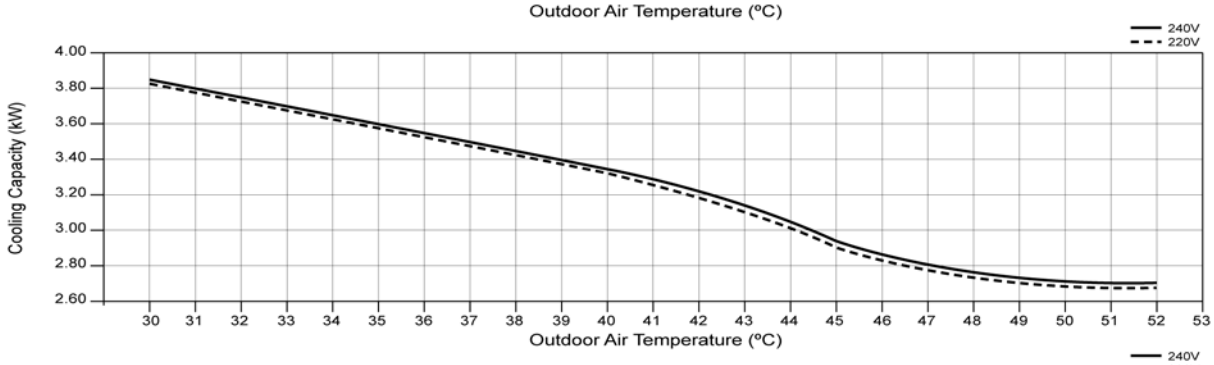
15.2.1. CS-C12EKF CU-C12EKF

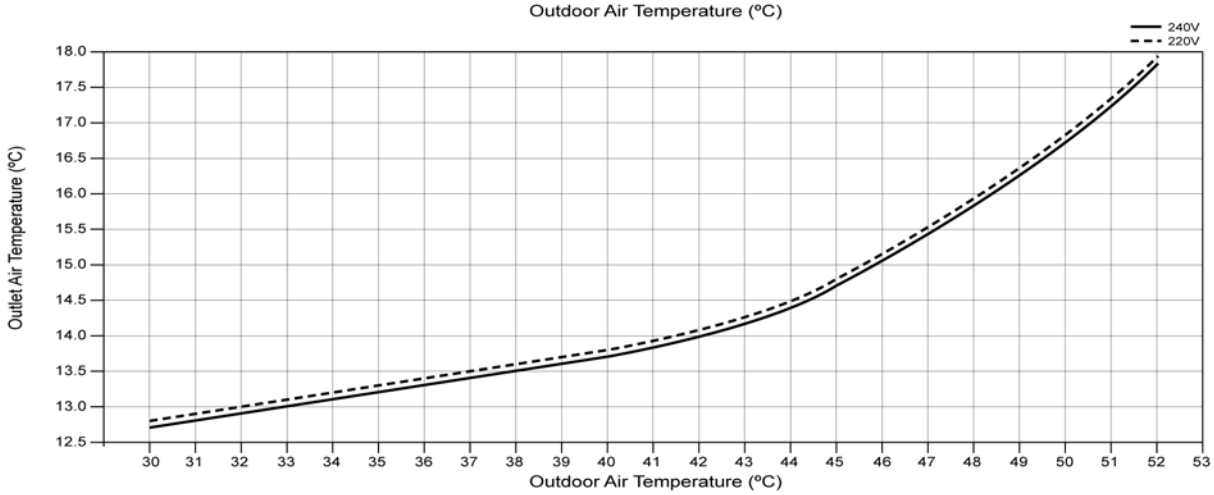
- Cooling Characteristic

Room temperature : 27ºC (DBT), 19ºC (WBT)
Operation condition : High fan speed
Piping length : 7.5m



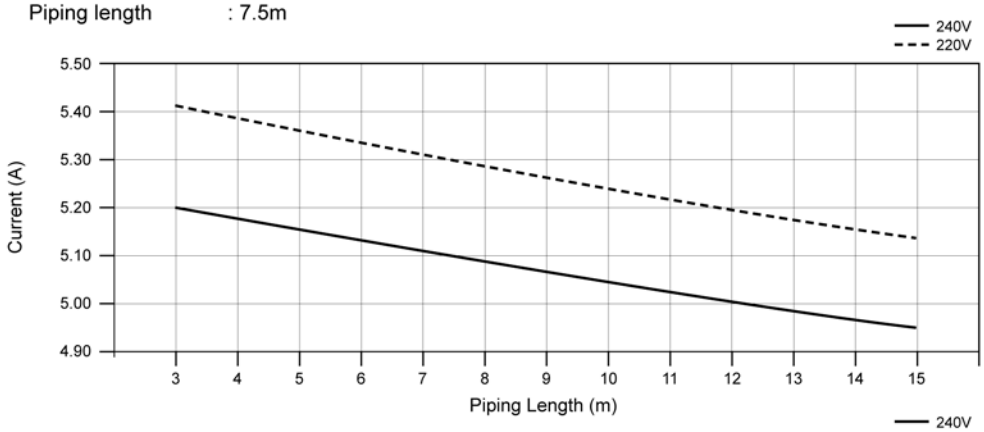


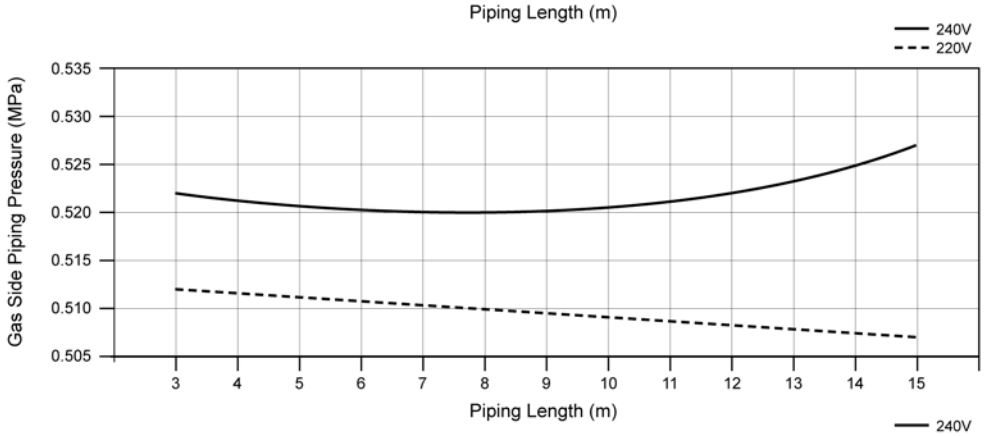


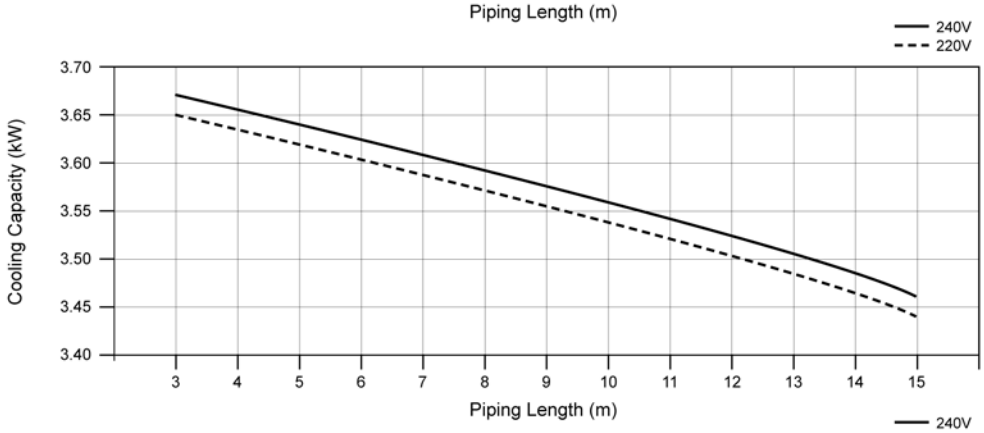


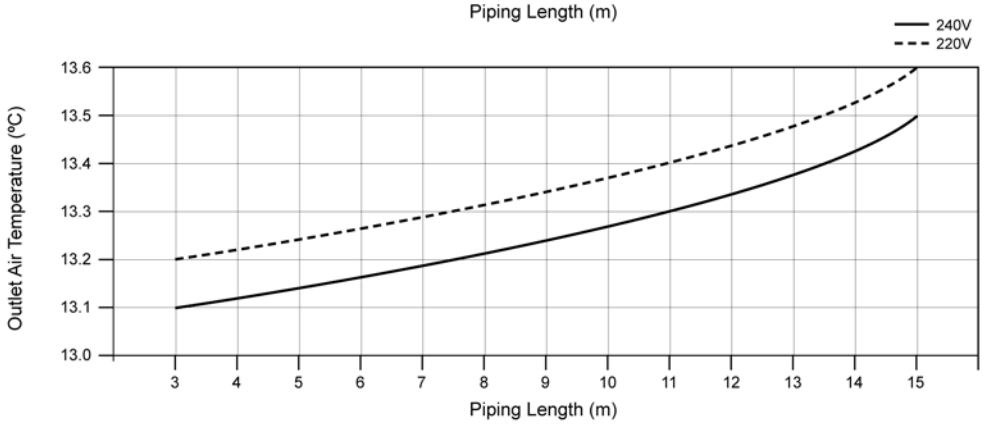
- Piping Length Characteristic

Room temperature : 27ºC (DBT), 19ºC (WBT)
Operation condition : High fan speed
Piping length : 7.5m









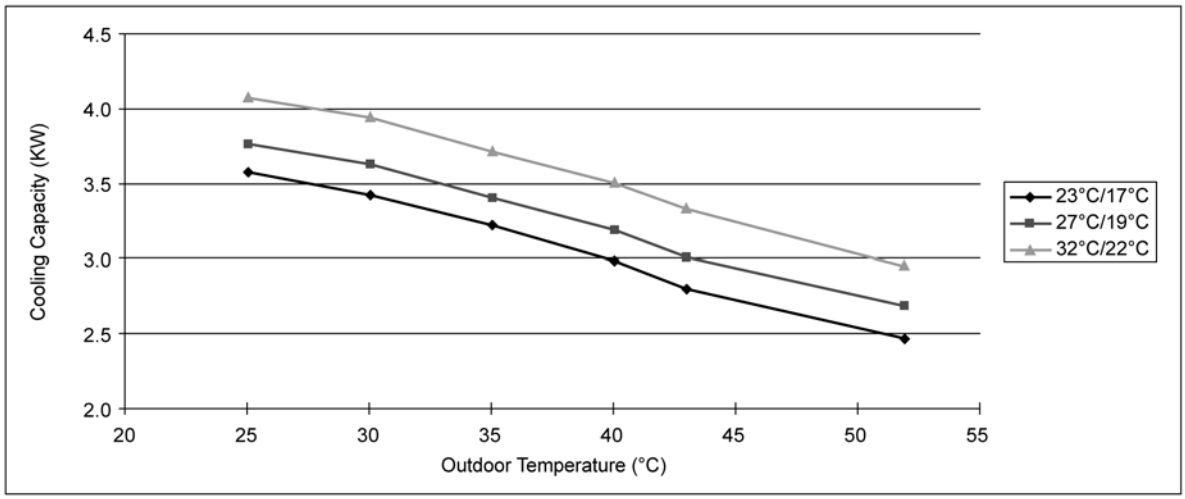
15.3. Cooling Capacity perfomance Data

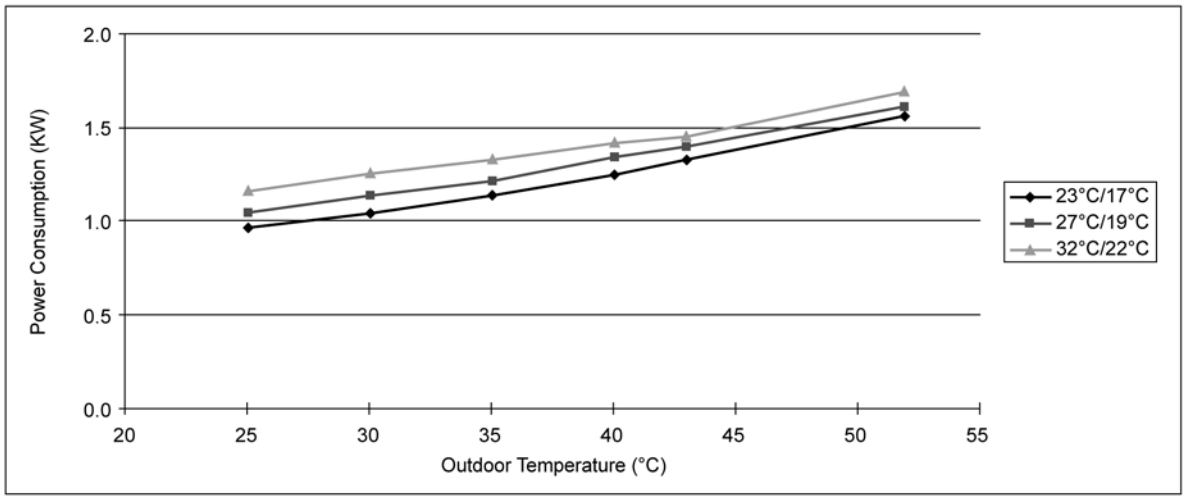
15.3.1. CS-C12EKF

Power source : 220 ~240V, 50Hz, 1 phase

Model	Power Source	Indoor Ambient Temp.		Air Temperature entering Condenser °C (D.B.)								
				25°C			30°C			35°C		
				TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT
		D.B	W.B	KW	KW	KW	KW	KW	KW	KW	KW	KW
C12EKF	220~240V 50Hz 1 phase	23	17	3.5527	2.3334	0.9663	3.4110	2.3658	1.0489	3.2116	2.2903	1.1412
			19	3.7521	1.9616	1.0246	3.6314	1.9777	1.1072	3.4477	1.9454	1.2091
			22	4.0932	1.5143	1.1072	3.9830	1.5574	1.1994	3.8046	1.5628	1.3063
		25	17	3.5107	2.7538	0.9663	3.3743	2.7160	1.0440	3.1749	2.6244	1.1363
			19	3.7521	2.4304	1.0295	3.6262	2.4196	1.1120	3.4267	2.3604	1.2091
			22	4.0932	1.9131	1.1120	3.9673	1.9346	1.1994	3.7731	1.9185	1.3063
		27	17	3.4635	3.1687	0.9712	3.3323	3.1148	1.0440	3.1434	3.0016	1.1363
			19	3.7573	2.8561	1.0343	3.6157	2.8238	1.1169	3.4110	2.7322	1.2140
			22	4.0880	2.3119	1.1169	3.9515	2.3119	1.2043	3.7469	2.2687	1.3111
		29	17	3.4582	3.4813	0.9615	3.3323	3.3897	1.0440	3.1381	3.2226	1.1217
			19	3.7521	3.2765	1.0295	3.6157	3.2334	1.1120	3.4110	3.1202	1.1994
			22	4.0722	2.7376	1.1314	3.9358	2.7268	1.2286	3.7206	2.6568	1.3208
		32	17	3.4530	3.4759	0.9566	3.3323	3.4220	1.0392	2.9177	2.9963	1.1120
			19	3.7469	3.8100	1.0246	3.6157	3.7130	1.1120	3.4110	3.5028	1.1897
			22	4.0617	3.4220	1.1460	3.9253	3.3843	1.2431	3.7154	3.2819	1.3305

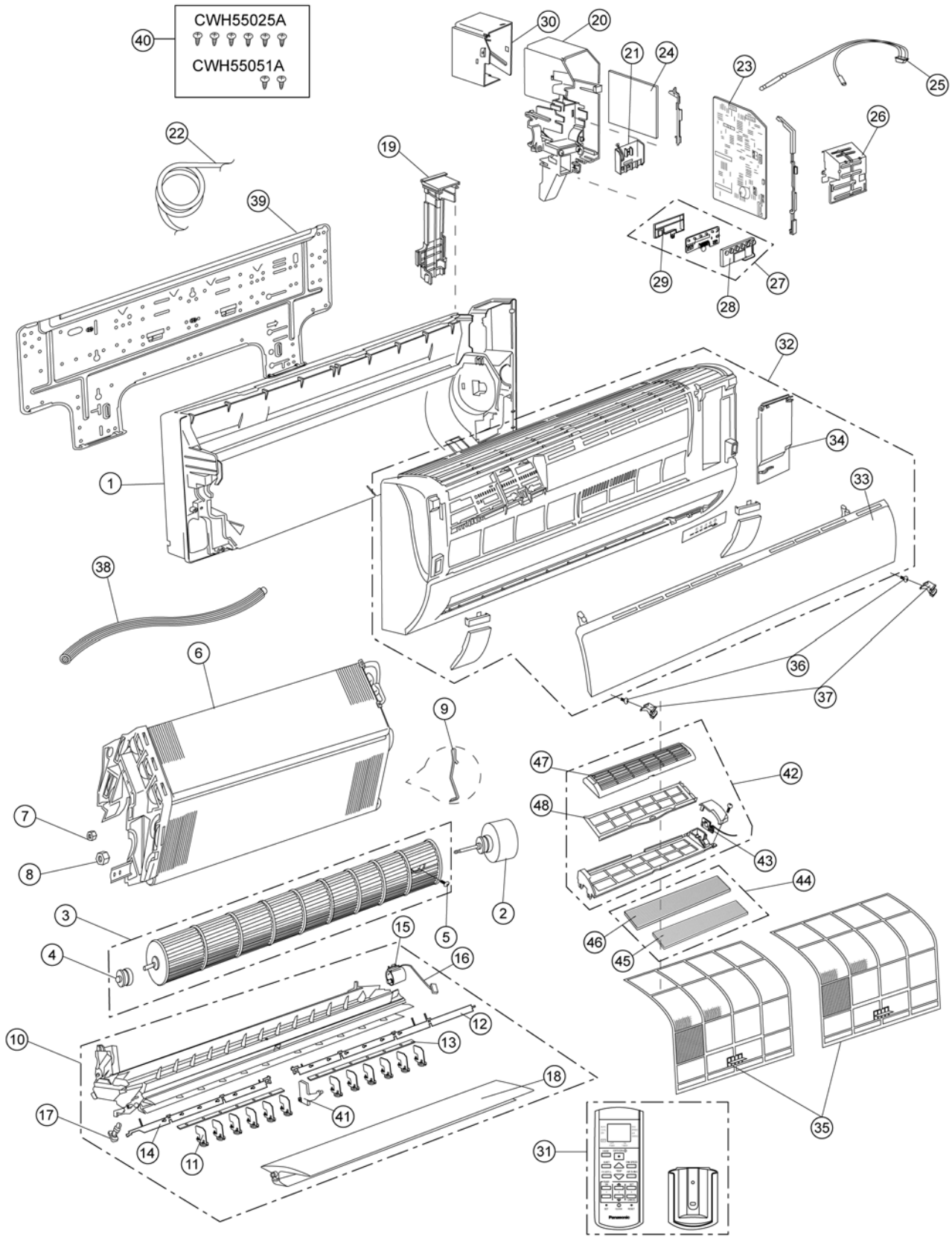
Model	Power Source	Indoor Ambient Temp.		Air Temperature entering Condenser °C (D.B.)								
				40°C			43°C			52°C		
				TC	SHC	IPT	TC	SHC	IPT	TC	SHC	IPT
		D.B	W.B	KW	KW	KW	KW	KW	KW	KW	KW	KW
C12EKF	220~240V 50Hz 1 phase	23	17	2.9702	2.1933	1.2528	2.7918	2.1232	1.3257	2.4759	1.7584	1.5726
			19	3.2116	1.8807	1.3257	3.0489	1.8484	1.4034	2.7728	1.7394	1.7106
			22	3.5579	1.5359	1.4325	3.3900	1.5305	1.5199	3.0158	1.5093	1.9312
		25	17	2.9440	2.5274	1.2431	2.7813	2.4412	1.3160	2.5047	2.0081	1.5631
			19	3.1906	2.2795	1.3208	3.0279	2.2202	1.4034	2.7508	2.0336	1.7296
			22	3.7431	1.8592	1.4277	3.3585	1.8430	1.5151	3.0106	1.7893	1.9262
		27	17	2.9230	2.8831	1.2334	2.7655	2.8130	1.3063	2.5016	2.3852	1.5536
			19	3.1749	2.6406	1.3451	3.0017	2.5598	1.3985	2.6964	2.3114	1.6151
			22	3.4792	2.1825	1.4228	3.3270	2.1502	1.5102	2.9921	2.0492	1.9212
		29	17	2.9492	3.0286	1.2043	2.8023	2.8777	1.2577	2.5674	2.2535	1.4344
			19	3.1958	3.0070	1.2868	3.0384	2.9316	1.3403	2.7754	2.6927	1.5558
			22	3.4845	2.5759	1.4180	3.3218	2.5274	1.4762	2.9599	2.3793	1.7720
		32	17	2.9649	3.0448	1.1849	2.8233	2.8993	1.2237	2.6033	2.2850	1.3498
			19	3.2116	3.2980	1.2674	3.0647	3.1471	1.3063	2.8305	2.7108	1.4694
			22	3.4845	3.1849	1.4131	3.3218	3.1040	1.4568	2.9599	2.8640	1.6980


Cooling Capacity (KW)
4.5
4.0
3.5
3.0
2.5
2.0
20
25
30
35
40
45
50
55
Outdoor Temperature (°C)
23°C/17°C
27°C/19°C
32°C/22°C


Power Consumption (KW)
2.0
1.5
1.0
0.5
0.0
20
25
30
35
40
45
50
55
Outdoor Temperature (°C)
23°C/17°C
27°C/19°C
32°C/22°C

16 Exploded View and Replacement Parts List

16.1. 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.

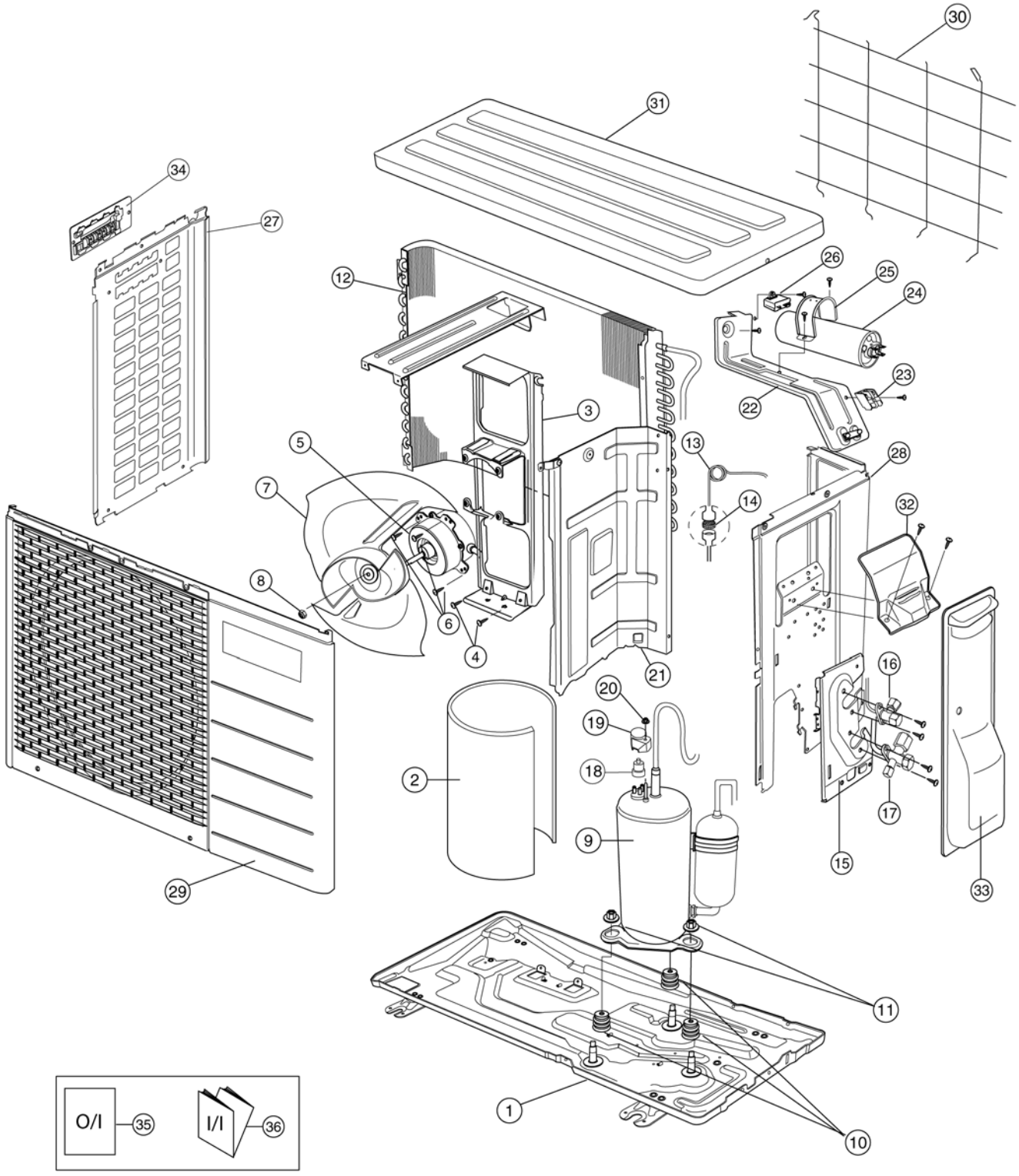
REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-C12EKF	REMARKS
1	CHASSY COMPLETE	1	CWD50C1492	
2	FAN MOTOR, AC 15W SINGLE	1	CWA921324	0
3	CROSS FLOW FAN COMPLETE	1	CWH02C1045	
4	BEARING ASS'Y	1	CWH64K007	
5	SCREW - CROSS FLOW FAN	1	CWH551146	
6	EVAPORATOR	1	CWB30C1837	
7	FLARE NUT (1/4)	1	CWT251026	
8	FLARE NUT (1/2)	1	CWT251035	
9	INTAKE AIR SENSOR HOLDER	1	CWH32143	
10	DISCHARGE GRILLE COMPLETE	1	CWE20C2509	
11	VERTICAL VANE	12	CWE241157	
12	CONNECTING BAR	1	CWE261092	
13	CONNECTING BAR	2	CWE261091	
14	CONNECTING BAR	1	CWE261071	
15	AIR SWING MOTOR, DC SINGLE 12V 300HM	1	CWA981106J	0
16	LEAD WIRE - AIR SWING MOTOR	1	CWA67C4445	
17	CAP - DRAIN TRAY	1	CWH521096	
18	HORIZONTAL VANE COMPLETE	1	CWE24C1141	
19	BACK COVER CHASSIS	1	CWD932454	
20	CONTROL BOARD CASING	1	CWH102289	
21	TERMINAL BOARD COMPLETE	1	CWA28C2152	
22	POWER SUPPLY CORD W/OUT PLUG	1	CWA20C2253	
23	ELECTRONIC CONTROLLER - MAIN	1	CWA73C2029	0
24	ELECTRONIC CONTROLLER - POWER	1	CWA744057	0
25	SENSOR COMPLETE	1	CWA50C2122	0
26	CONTROL BOARD FRONT COVER	1	CWH131207	
27	INDICATOR COMPLETE	1	CWE39C1149	
28	INDICATOR HOLDER	1	CWD932609	
29	INDICATOR HOLDER	1	CWD932610	
30	CONTROL BOARD TOP COVER	1	CWH13C1120	
31	REMOTE CONTROL COMPLETE	1	CWA75C2815	0
32	FRONT GRILLE COMPLETE	1	CWE11C3451	
33	INTAKE GRILLE COMPLETE	1	CWE22C1237	
34	GRILLE DOOR	1	CWE141073	
35	AIR FILTER	2	CWD001144	
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	
42	SUPERSONIC AIR PURIFYING DEVICE	1	CWH91C1016	
43	ELECTRONIC CONTROLLER - SUPERSONIC	1	CWA744249	
44	SUPER ALLERU BUSTER FILTER	1	CWD00C1161	
45	DEODORIZING FILTER	1	CWD001192	
46	AIR FILTER - SUPERSONIC	1	CWD001147	
47	FRAME FOR AIR FILTER SUPERSONIC	1	CWD011035	
48	FRAME FOR AIR FILTER SUPERSONIC	1	CWD011027	

(Note)

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

16.2. Outdoor Unit

16.2.1. CU-C12EKF



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.	CU-C12EKF	REMARKS
1	CHASSY ASS'Y	1	CWD50K2088	
2	SOUND PROOF MATERIAL	1	CWG302110	
3	FAN MOTOR BRACKET	1	CWD541030	
4	SCREW - FAN MOTOR BRACKET	2	CWH551059J	
5	FAN MOTOR, AC 36W SINGLE	1	CWA951120	0
6	SCREW - FAN MOTOR MOUNT	3	CWH55406J	
7	PROPELLER FAN ASS'Y	1	CWH03K1006	
8	NUT - PROPELLER FAN	1	CWH56053J	
9	COMPRESSOR (50HZ, 220/240V)	1	2KS210D3BA02	0
10	ANTI - VIBRATION BUSHING	3	CWH50055	
11	NUT - COMPRESSOR MOUNT	3	CWH561049	
12	CONDENSER	1	CWB32C1152	
13	CAPILLARY TUBE ASS'Y	1	CWB15K1165	
14	STRAINER	1	CWB111011	
15	HOLDER COUPLING	1	CWB351023	
16	2-WAY VALVE (LIQUID)	1	CWB021116	0
17	3-WAY VALVE (GAS)	1	CWB011148	0
18	OVERLOAD PROTECTOR	1	CWA121202J	
19	TERMINAL COVER	1	CWH171011	
20	NUT - TERMINAL COVER	1	CWH7080300J	
21	SOUND PROOF BOARD	1	CWH151023	
22	CONTROL BOARD	1	CWH102202	
23	TERMINAL BOARD ASS'Y	1	CWA28K1064J	
24	CAPACITOR - COMPRESSOR (35μF, 370V)	1	DS371356CPNA	0
25	HOLDER CAPACITOR	1	CWH30057	
26	CAPACITOR - FAN MOTOR (2.0μF, 440V)	1	DS441205NPQA	0
27	CABINET SIDE PLATE (L)	1	CWE041031A	
28	CABINET SIDE PLATE (R)	1	CWE041037A	
29	CABINET FRONT PLATE	1	CWE06K1034	
30	WIRE NET COMPLETE	1	CWD04C1007	
31	CABINET TOP PLATE	1	CWE031014A	
32	PLATE - C. B. COVER	1	CWH131088	
33	CONTROL BOARD COVER	1	CWH13C1065	
34	HANDLE	1	CWE161010	
35	OPERATION INSTRUCTIONS	1	CWF565084	
36	INSTALLATION INSTRUCTIONS	1	CWF612901	

(Note)

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