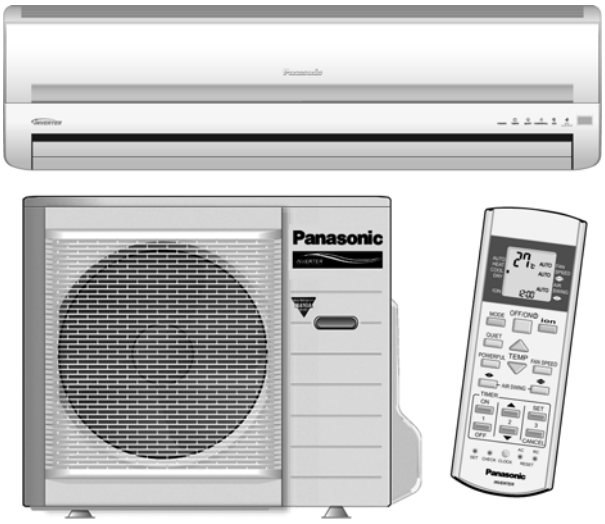
Order No. MAC0801007C8

Service Manual

Air Conditioner

Indoor Unit Outdoor Unit
CS-E18HKEA CU-E18HKEA
CS-E21HKEA CU-E21HKEA



⚠ 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.

⚠ PRECAUTION OF LOW TEMPERATURE

In order to avoid frostbite, be assured of no refrigerant leakage during the installation or repairing of refrigeration circuit.

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

⚠ WARNING	
1. Engage dealer or specialist for installation and servicing. If installation of servicing done by the user is defective, it will cause water leakage, electrical shock or fire.	
2. Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electric 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. This equipment is strongly recommended to install with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case equipment breakdown or insulation breakdown.	
7. 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.	
8. 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.	
9. When carrying out piping connection, take care not to let air substances other than the specified refrigerant go into refrigeration cycle. Otherwise, it will cause lower capacity, abnormal high pressure in the refrigeration cycle, explosive and injury.	
10. Do not install outdoor unit near handrail of veranda. When installing air-conditioner unit at veranda of high rise building, child may climb up to outdoor unit and cross over the handrail and causing accident.	
11. This equipment must be properly earthed. Earth line must not be connected to gas pipe, water pipe, earth of lightning rod and telephone. Otherwise, it may cause electric shock in case equipment breakdown or insulation breakdown.	⃠
12. 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.	⃠
13. Do not damage or use unspecified power supply cord. Otherwise it will cause fire or electric shock.	⃠
14. 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.	⃠
15. It is desirable that the amount of residual oil is less than 40 mg/10m. Thickness of copper pipes used with R410A must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm.	⃠
16. During installation, before run the compressor, confirm the refrigerant pipes are fixed. Operation of compressor without fixing the piping, setting the valves at open condition, a burst may occur and cause injury.	
17. 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.	
18. Ventilate if there is refrigerant gas leakage during operation. It may cause toxic gas when the refrigerant contacts with fire.	

⚠ CAUTION

1. Do not install the unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire.
2. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.
3. Tighten the flare nut with torque wrench according to specified method. If the flare nut is over-tightened, after a long period, the flare may break and cause refrigerant gas leakage.
4. Do not touch outdoor unit air inlet and aluminium fin. It may cause injury.
5. Select an installation location which is easy for maintenance.
6. Pb free solder has a higher melting point than standard solder; typically the melting point is 50°F - 70°F (30°C - 40°C) higher. Please use a high temperature solder iron. In case of the soldering iron with temperature control, please set it to 700 ± 20°F (370 ± 10°C). Pb free solder will tend to splash when heated too high (about 1100°F / 600°C).
7. Power supply connection to the conditioner. Connect the power supply cord of the air conditioner to the mains using one of the following methods.
   Power supply point shall be the place where there is ease for access for the power disconnection in case of emergency. In some countries, permanent connection of this room air conditioner to the power supply is prohibited.
   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 component. Use an approved circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.5 mm contact gap.
8. 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.
9. Installation work. It may need two people to carry out the installation work.
10. 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-E18HKEA CU-E18HKEA

ITEM			UNIT	INDOOR UNIT	OUTDOOR UNIT
Performance Test Condition				EUROVENT	
COOLING	Capacity		kW	5.30 (0.90 ~ 6.00)	
			BTU/h	18100 (3070 ~ 20500)	
			kCal/h	4560 (770 ~ 5160)	
	EER		W/W	3.21 (4.19 ~ 2.93)	
			kcal/hW	2.76 (3.58 ~ 2.52)	
	Noise Level		dB (A)	Hi: 44, Lo:37, Q-Lo: 34	Hi: 47
			Power level dB	Hi: 57, Lo:50, Q-Lo: 47	Hi: 60
HEATING	Capacity		kW	6.60 (0.90 ~ 8.00)	
			BTU/h	22500 (3070 ~ 27300)	
			kCal/h	5680 (770 ~ 6880)	
	COP		W/W	3.69 (3.67 ~ 3.02)	
			kcal/hW	3.17 (3.14 ~ 2.60)	
	Noise Level		dB (A)	Hi: 44, Lo:37, Q-Lo: 34	Hi: 47
			Power level dB	Hi: 57, Lo:50, Q-Lo: 47	Hi: 60
Moisture Removal			l/h	2.9	
			pt/h	6.1	
Air Volume		Q-Lo	m^3/min (ft^3/min)	Cooling; 12.11 (428) Heating; 13.20 (466)	—
		Lo	m^3/min (ft^3/min)	Cooling; 12.90 (457) Heating; 13.92 (492)	—
		Me	m^3/min (ft^3/min)	Cooling; 14.08 (497) Heating; 15.29 (540)	—
		Hi	m^3/min (ft^3/min)	Cooling; 15.20 (540) Heating; 16.70 (590)	Cooling; 40.0 (1410) Heating; 40.0 (1410)
		SHi	m^3/min (ft^3/min)	Cooling; 16.03 (566) Heating; 17.29 (616)	—
Refrigeration Control Device				—	Expansion Valve
Refrigeration Oil			cm^3	—	RB68A or Freol Alpha68M (400)
Refrigerant (R410A)			g (oz)	—	1.18k (41.7)
Dimension		Height	mm (inch)	275 (10-27/32)	750 (29-17/32)
		Width	mm (inch)	998 (39-5/16)	875 (34-15/32)
		Depth	mm (inch)	230 (9-1/16)	345 (13-19/32)
Net Weight			kg (lbs)	11 (24)	49 (108)
Pipe Diameter		Gas	mm (inch)	12.7 (1/2)	
		Liquid	mm (inch)	6.35 (1/4)	
Standard Length			m (ft)	5.0 (16.4)	
Pipe Length Range			m (ft)	3 (9.8) ~ 20 (65.6)	
Height Difference			m (ft)	15 (49.2)	
Additional Gas Amount			g/m (oz/ft)	20 (0.2)	
Refrigeration Charge Less			m (ft)	10 (32.8)	
Drain Hose		Inner Diameter	mm	12	—
		Length	mm	650	—
Compressor		Type		—	Hermetic Motor
		Motor Type		—	Brushless (4-pole)
		Rated Output	W	—	900

ITEM			UNIT	INDOOR UNIT	OUTDOOR UNIT
Fan	Type			Cross-Flow Fan	Propeller Fan
	Material			ASHT-18	PP
	Motor Type			Transistor (8-pole)	Transistor (8-pole)
	Input Power		W	68	62.1
	Output Power		W	30	40
	Fan Speed	Q-Lo (Cool/Heat)	rpm	1080 / 1170	—
		Lo (Cool/Heat)	rpm	1170 / 1240	—
		Me (Cool/Heat)	rpm	1310 / 1410	—
		Hi (Cool/Heat)	rpm	1450 / 1580	660 / 640
		SHi (Cool/Heat)	rpm	1540 / 1640	—
Heat Exchanger	Fin Material			Aluminium (Pre Coat)	Aluminium
	Fin Type			Slit Fin	Corrugated Fin
	Row x Stage x FPI			2 x 15 x 19	2 x 34 x 18
	Size (W x H x L)		mm	610 x 315 x 25.4	36.4 x 714 x 803 831
Air Filter	Material			P.P.Honeycomb	—
	Type			One-Touch	—

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)

Item		Unit	
Power Source (Phase, Voltage, Cycle)		ø	Single
		V	230
		Hz	50
Input Power		W	Cooling; 1.65k (215 ~ 2.05k) Heating; 1.79k (245 ~ 2.65k)
Starting Current		A	8.3
Running Current		A	Cooling; 7.5 Heating; 8.1
Maximum Current		A	11.9
Power Factor		%	Cooling; 96 Heating; 96
Power factor means total figure of compressor, indoor fan motor and outdoor fan motor.			
Power Cord	Number of core		3 (1.5mm^2)
	Length	m	1.9
Thermostat			Electronic Control
Protection Device			Electronic Control

Note

- Specifications are subject to change without notice for further improvement.

2.2. CS-E21HKEA CU-E21HKEA

ITEM			UNIT	INDOOR UNIT	OUTDOOR UNIT
Performance Test Condition				EUROVENT	
COOLING	Capacity		kW	6.30 (0.90 ~ 7.10)	
			BTU/h	21500 (3070 ~ 24200)	
			kCal/h	5420 (770 ~ 6110)	
	EER		W/W	2.85 (4.19 ~ 2.80)	
			kcal/hW	2.45 (3.58 ~ 2.41)	
	Noise Level		dB (A)	Hi: 45, Lo:37, Q-Lo: 34	Hi: 48
			Power level dB	Hi: 58, Lo:50, Q-Lo: 47	Hi: 61
HEATING	Capacity		kW	7.20 (0.90 ~ 8.50)	
			BTU/h	24600 (3070 ~ 29000)	
			kCal/h	6190 (770 ~ 7310)	
	COP		W/W	3.43 (3.67 ~ 3.09)	
			kcal/hW	2.95 (3.14 ~ 2.66)	
	Noise Level		dB (A)	Hi: 45, Lo:37, Q-Lo: 34	Hi: 49
			Power level dB	Hi: 58, Lo:50, Q-Lo: 47	Hi: 62
Moisture Removal			l/h	3.5	
			pt/h	7.4	
Air Volume		Q-Lo	m^3/min (ft^3/min)	Cooling; 12.60 (444) Heating; 13.53 (478)	—
		Lo	m^3/min (ft^3/min)	Cooling; 13.21 (467) Heating; 14.24 (503)	—
		Me	m^3/min (ft^3/min)	Cooling; 14.73 (520) Heating; 15.75 (556)	—
		Hi	m^3/min (ft^3/min)	Cooling; 16.2 (570) Heating; 17.3 (610)	Cooling; 42.8 (1510) Heating; 41.5 (1460)
		Hi	m^3/min (ft^3/min)	Cooling; 17.21 (608) Heating; 17.95 (634)	—
Refrigeration Control Device				—	Expansion Valve
Refrigeration Oil			cm^3	—	RB68A or Freol Alpha68M (400)
Refrigerant (R410A)			g (oz)	—	1.29k (45.5)
Dimension		Height	mm (inch)	275 (10-27/32)	750 (29-17/32)
		Width	mm (inch)	998 (39-5/16)	875 (34-15/32)
		Depth	mm (inch)	230 (9-1/16)	345 (13-19/32)
Net Weight			kg (lbs)	11 (24)	51 (112)
Pipe Diameter		Gas	mm (inch)	12.7 (1/2)	
		Liquid	mm (inch)	6.35 (1/4)	
Standard Length			m (ft)	5.0 (16.4)	
Pipe Length Range			m (ft)	3 (9.8) ~ 20 (65.6)	
Height Difference			m (ft)	15 (49.2)	
Additional Gas Amount			g/m (oz/ft)	20 (0.2)	
Refrigeration Charge Less			m (ft)	10 (32.8)	
Drain Hose		Inner Diameter	mm	12	—
		Length	mm	650	—
Compressor		Type		—	Hermetic Motor
		Motor Type		—	Brushless (4-pole)
		Rated Output	W	—	900

ITEM			UNIT	INDOOR UNIT	OUTDOOR UNIT
Fan	Type			Cross-Flow Fan	Propeller Fan
	Material			ASHT-18	PP
	Motor Type			Transistor (8-pole)	Transistor (8-pole)
	Input Power		W	68	74.8
	Output Power		W	30	40
	Fan Speed	Q-Lo (Cool/Heat)	rpm	1100 / 1190	—
		Lo (Cool/Heat)	rpm	1170 / 1270	—
		Me (Cool/Heat)	rpm	1345/ 1440	—
		Hi (Cool/Heat)	rpm	1520 / 1610	700 / 680
		SHi (Cool/Heat)	rpm	1630 / 1690	—
Heat Exchanger	Fin Material			Aluminium (Pre Coat)	Aluminium
	Fin Type			Slit Fin	Corrugated Fin
	Row x Stage x FPI			2 x 15 x 19	2 x 34 x 18
	Size (W x H x L)		mm	610 x 315 x 25.4	36.4 x 714 x 823 851
Air Filter	Material			P.P.Honeycomb	—
	Type			One-Touch	—

1. Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
2. Heating capacities are based on indoor temperature of 20°C Dry Bulb (68°F Dry Bulb) and outdoor air temperature of 7°C Dry Bulb (44.6°F Dry Bulb), 6°C Wet Bulb (42.8°F Wet Bulb)

Item		Unit	
Power Source (Phase, Voltage, Cycle)		ø	Single
		V	230
		Hz	50
Input Power		W	Cooling; 2.21k (215 ~ 2.54k) Heating; 2.10k (245 ~ 2.75k)
Starting Current		A	9.7
Running Current		A	Cooling; 9.9 Heating; 9.3
Maximum Current		A	12.6
Power Factor		%	Cooling; 97 Heating; 98
Power factor means total figure of compressor, indoor fan motor and outdoor fan motor.			
Power Cord	Number of core		3 (1.5mm^2)
	Length	m	1.9
Thermostat			Electronic Control
Protection Device			Electronic Control

Note

• Specifications are subject to change without notice for further improvement.

3 Features

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

- **Supersonic Air Purifying System with Super Alleru-Buster**
  - Inactive various harmful airborne elements including allergens, viruses and bacteria. Generated supersonic waves enhance the ability to collect dust and dirt in the air.

- **Ion Mode**
  - Provides fresh air effect by producing negative ion.

- **Environment Protection**
  - Non-ozone depletion substances refrigerant (R410A)

- **Long Installation Piping**
  - Long piping up to 20 meter

- **Easy to use remote control**

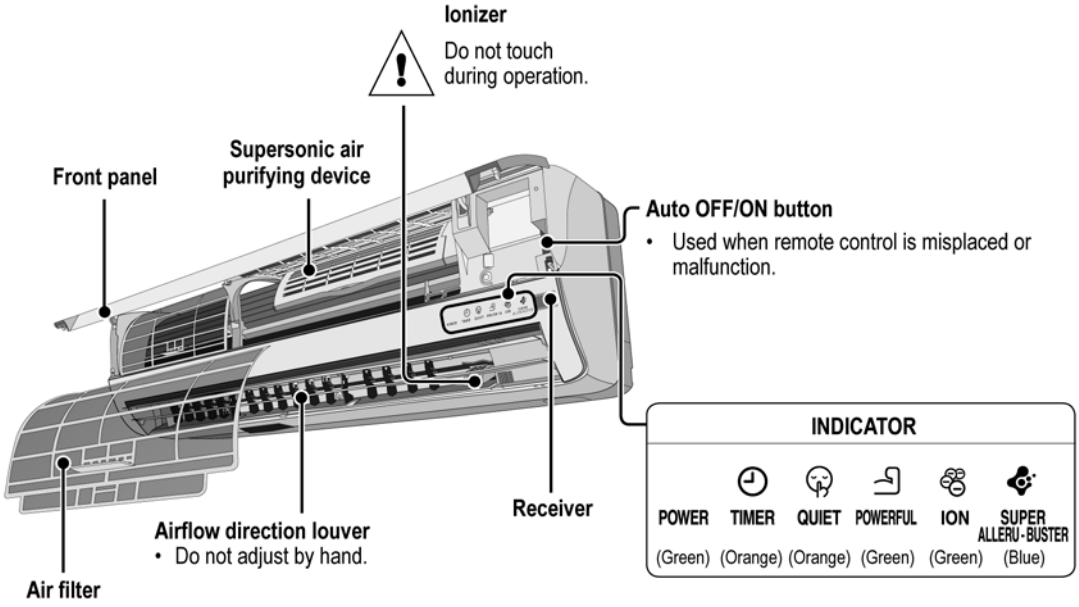
- **Quality Improvement**
  - Random auto restart after power failure for safety restart operation
  - Gas leakage protection
  - Prevent compressor reverse cycle
  - Inner protector to protect compressor
  - Noise prevention during soft dry operation

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

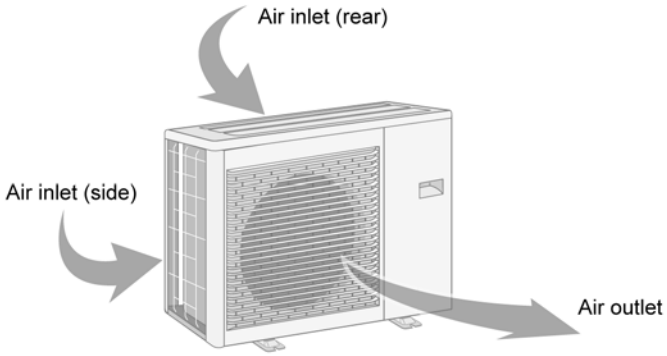
- **Serviceability Improvement**
  - Breakdown Self Diagnosis function

4 Location of Controls and Components

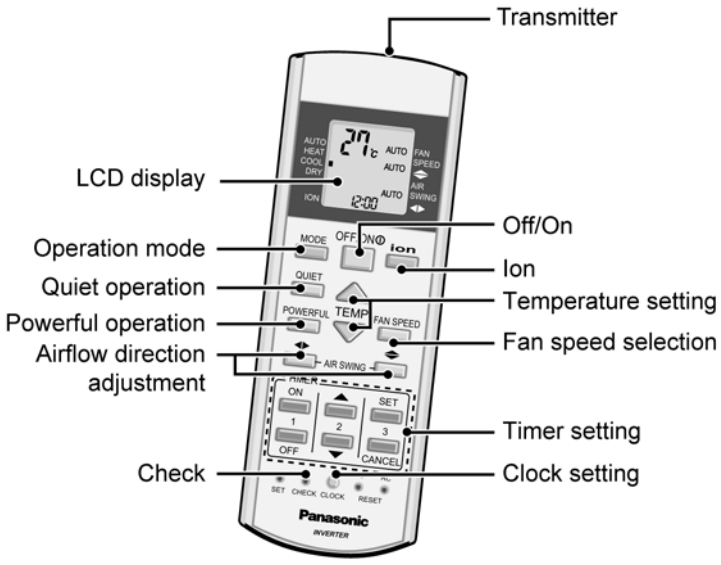
4.1. Indoor Unit



4.2. Outdoor Unit

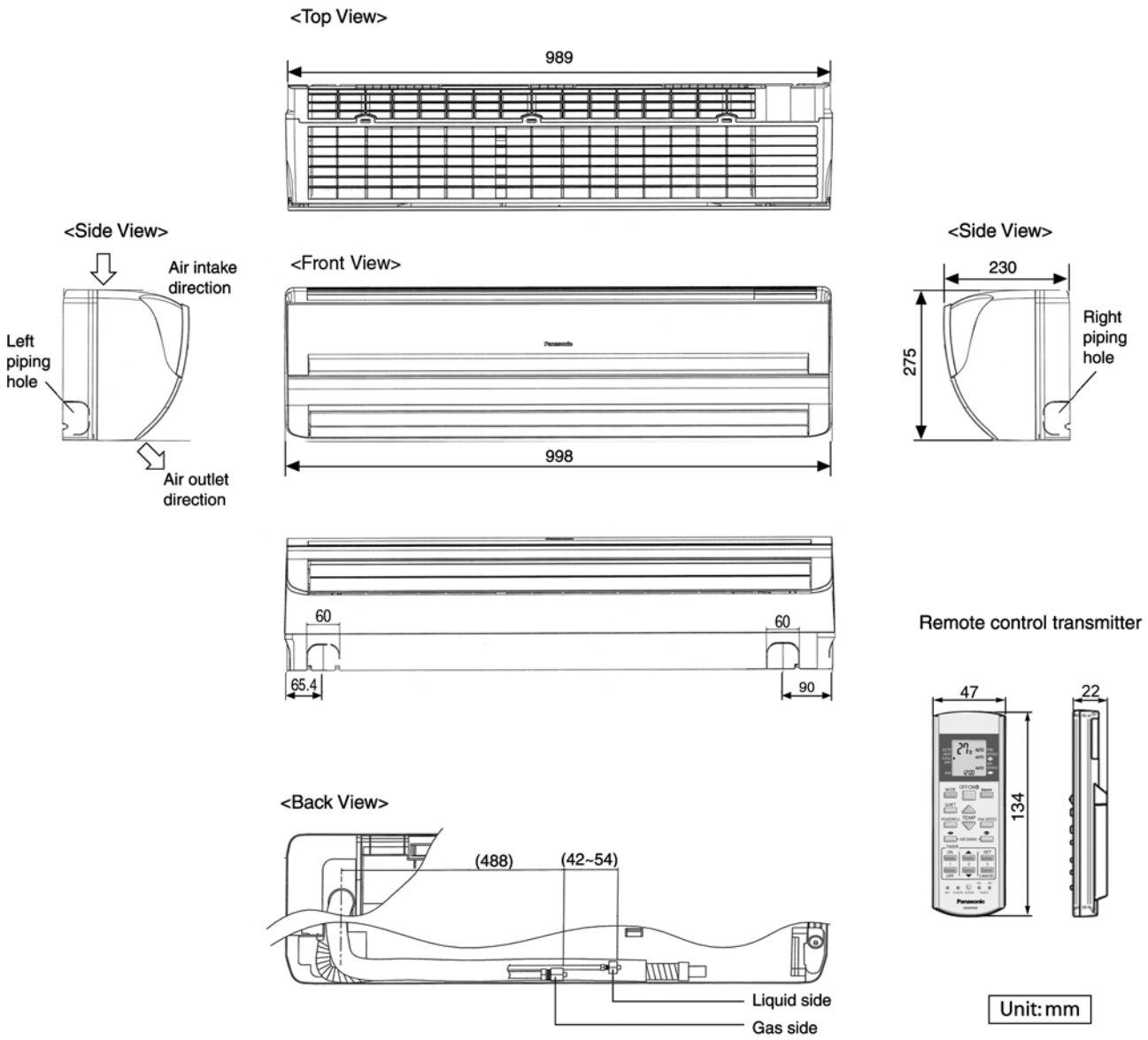


4.3. Remote Control

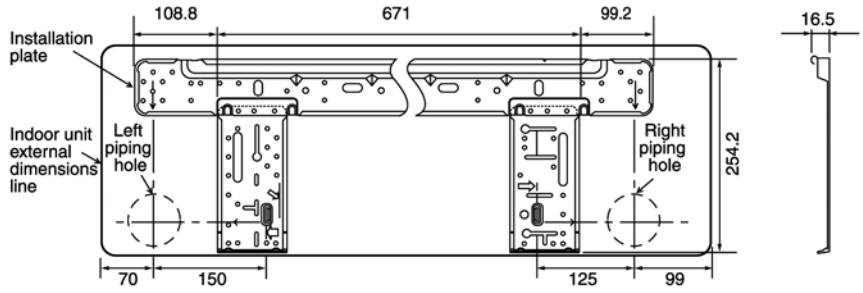


5 Dimensions

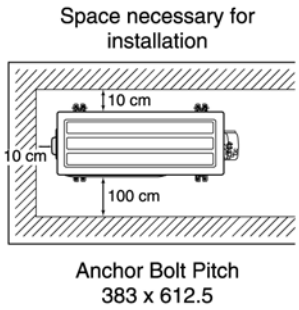
5.1. Indoor Unit & Remote Control

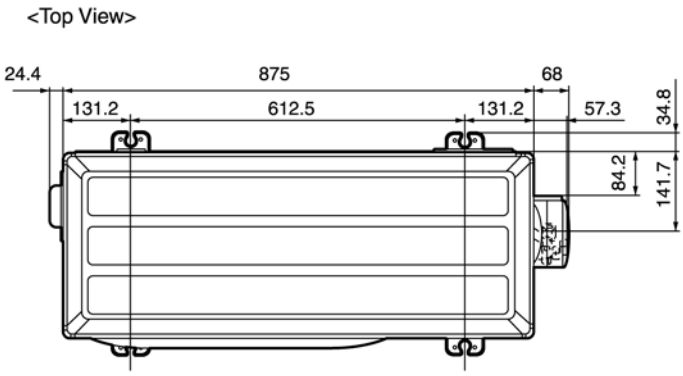


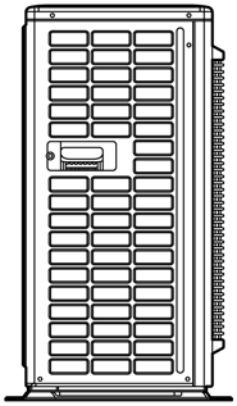
Relative position between the indoor unit and the installation plate <Front View>

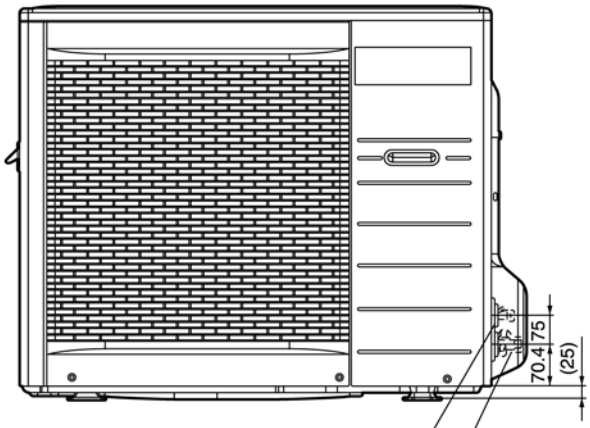


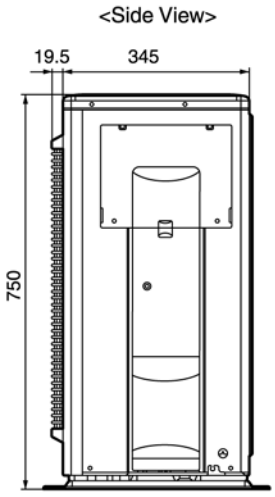
5.2. Outdoor Unit

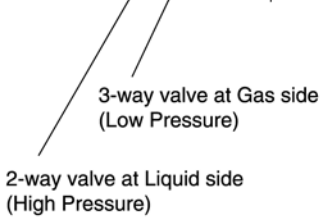






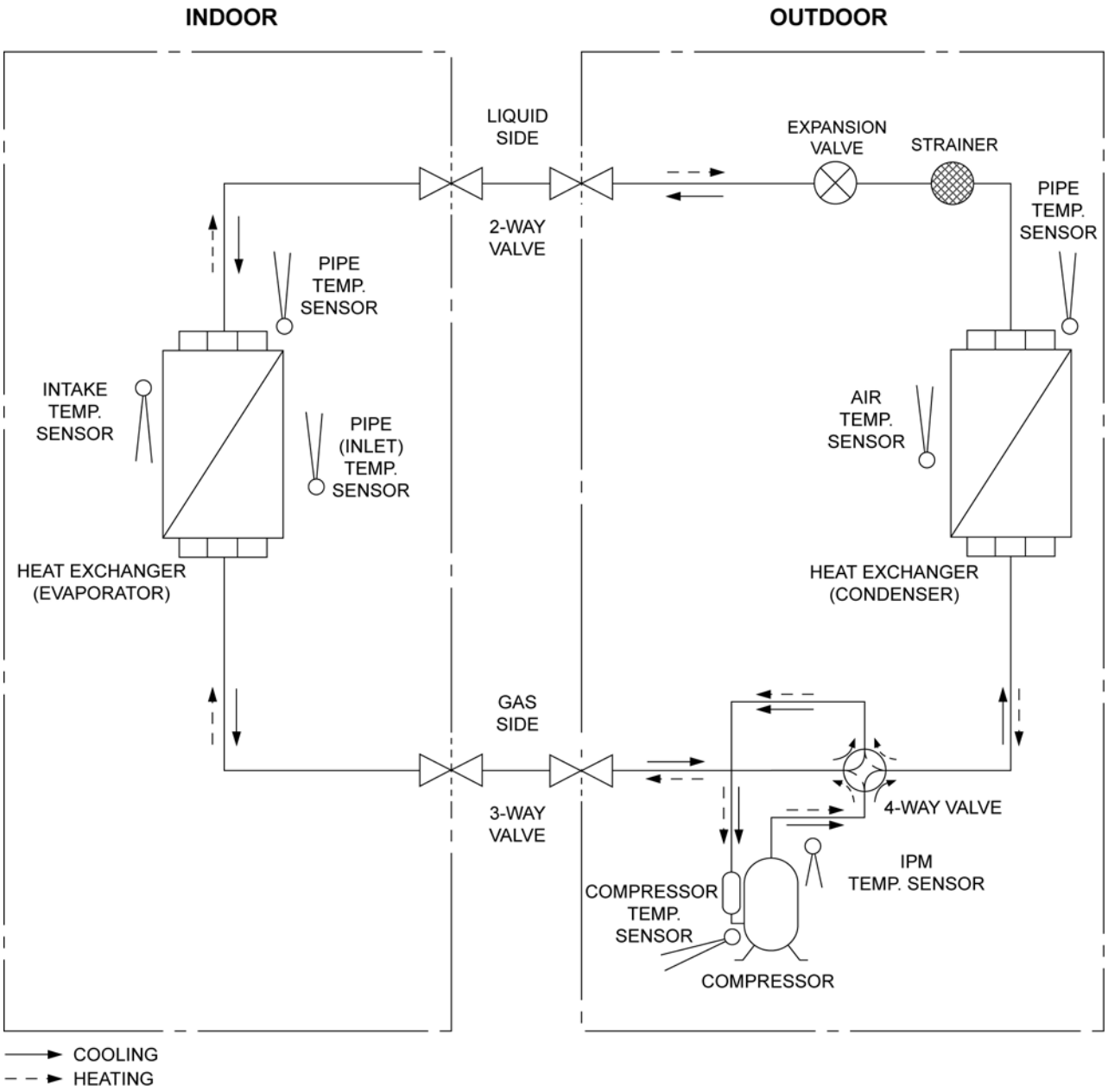






Unit: mm

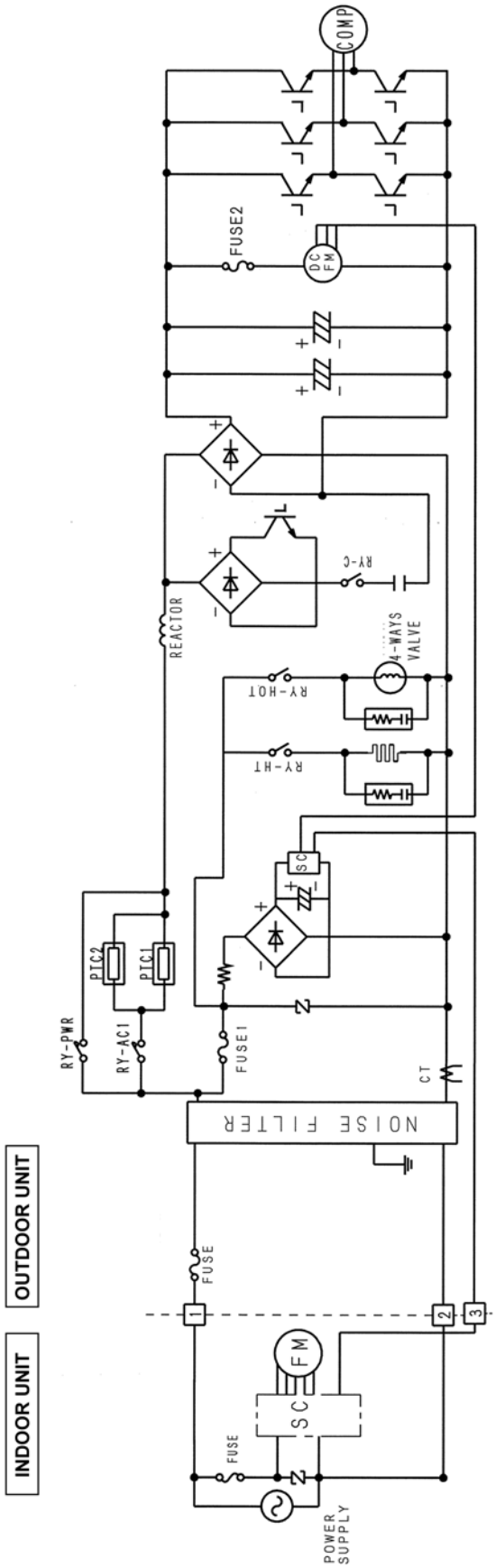
6 Refrigeration Cycle Diagram



Model	Piping size		Rated Length (m)	Common Length (m)	Max Elevation (m)	Min. Piping Length (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)
	Gas	Liquid						
E18HKEA, E21HKEA	1/2”	1/4”	5	10	15	3	20	20

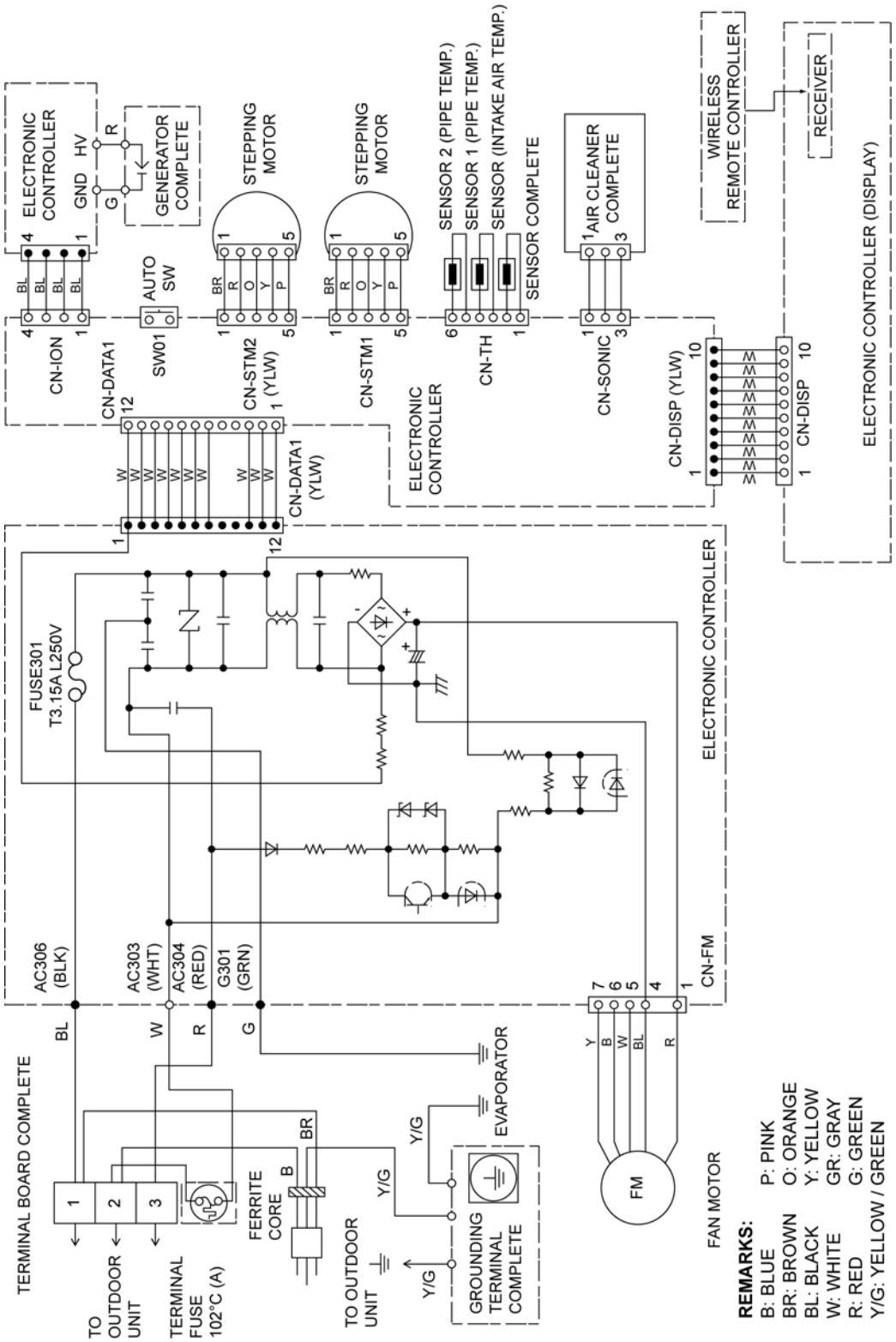
* If piping length is over common length, additional refrigerant should be added as shown in the table.

7 Block Diagram

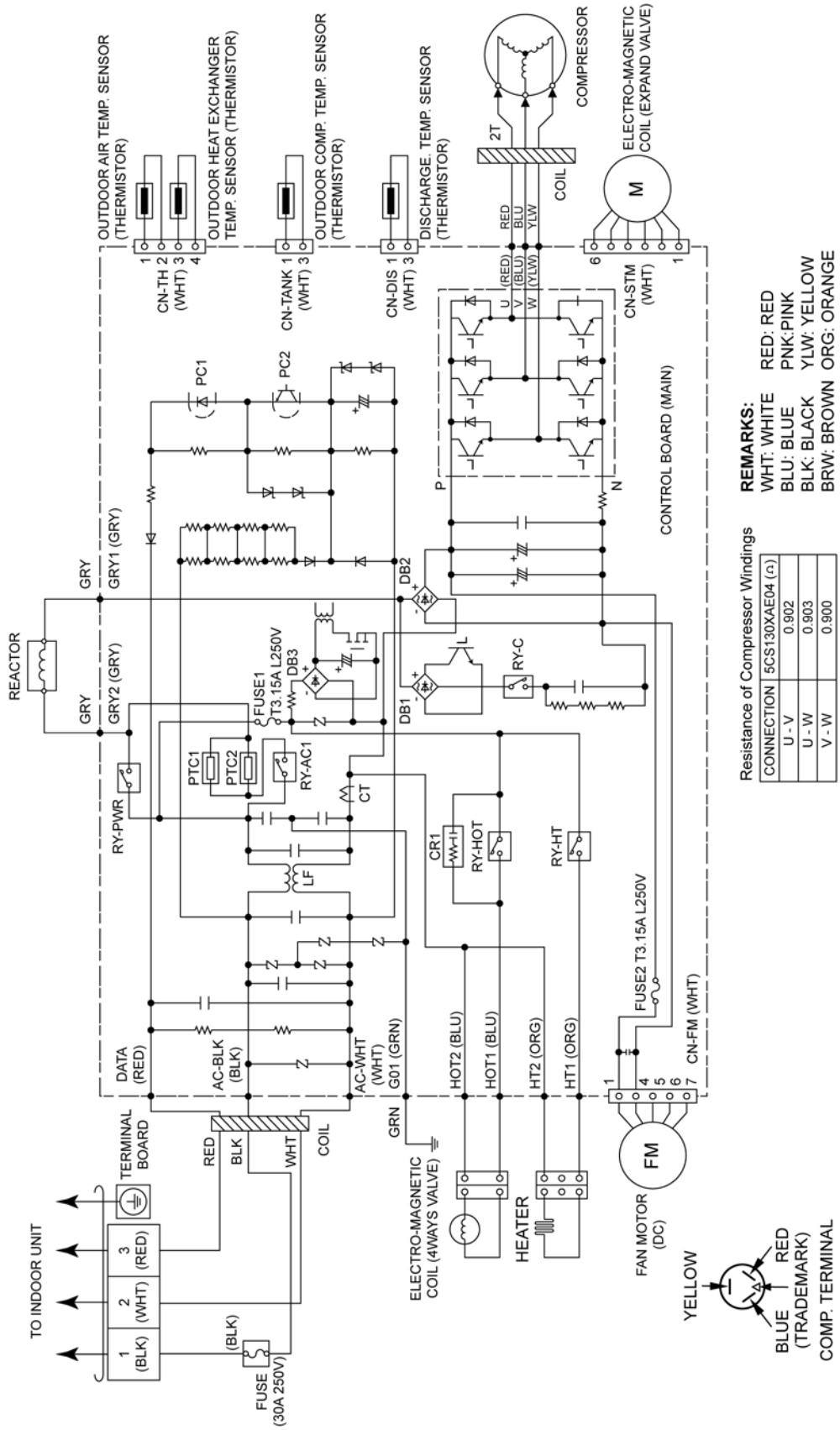


8 Wiring Connection Diagram

8.1. Indoor Unit

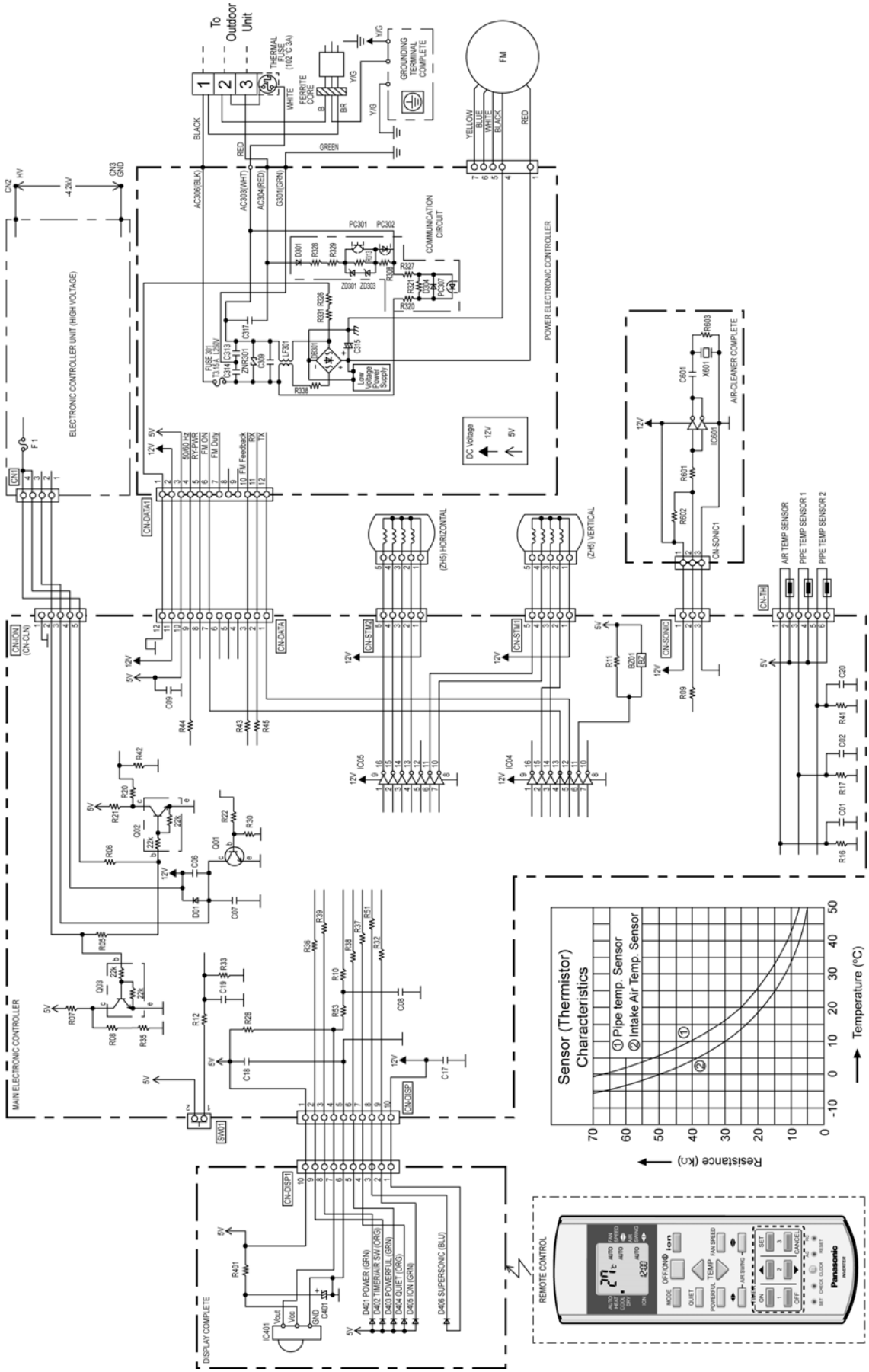


8.2. Outdoor Unit

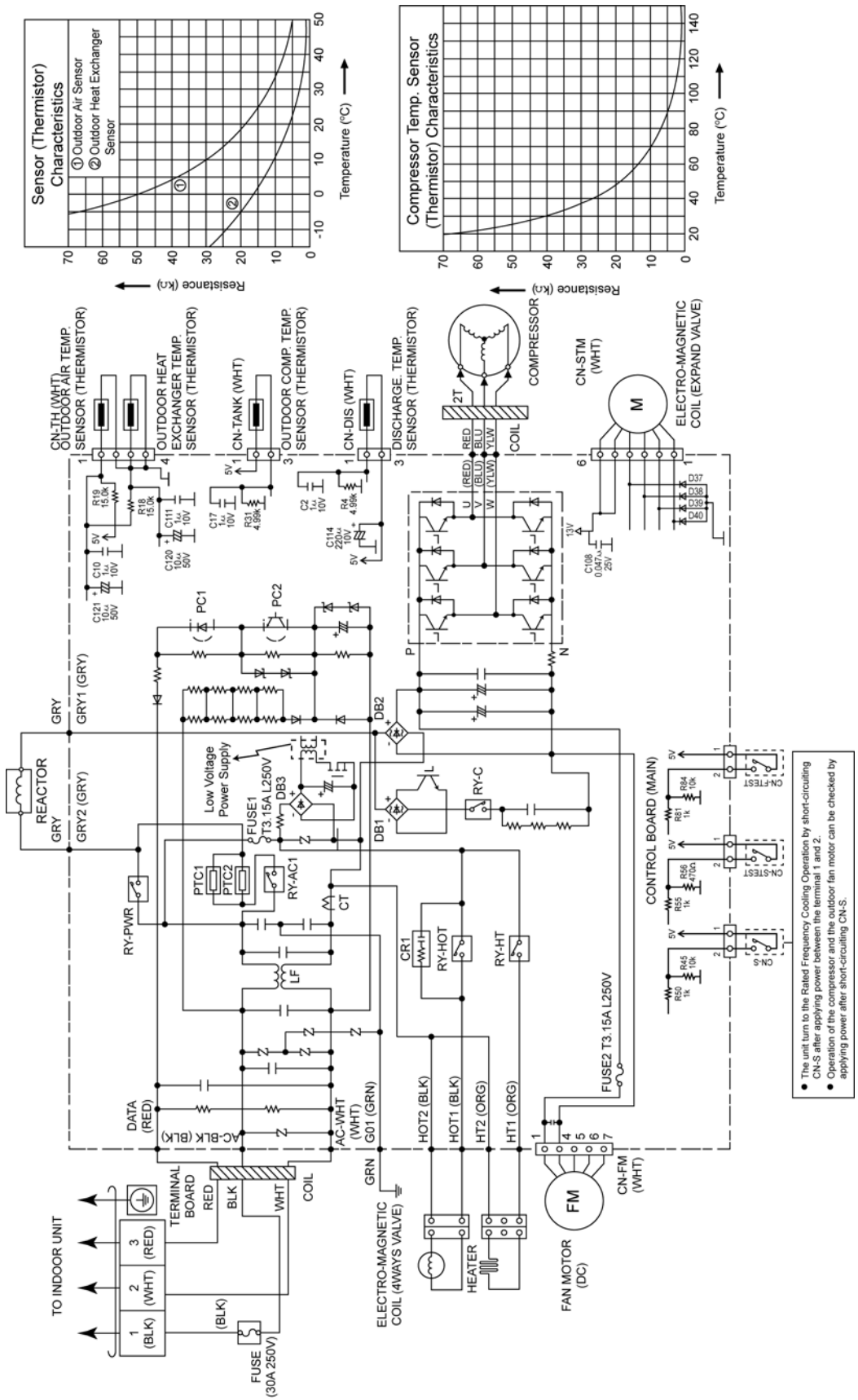


9 Electronic Circuit Diagram

9.1. Indoor Unit



9.2. Outdoor Unit

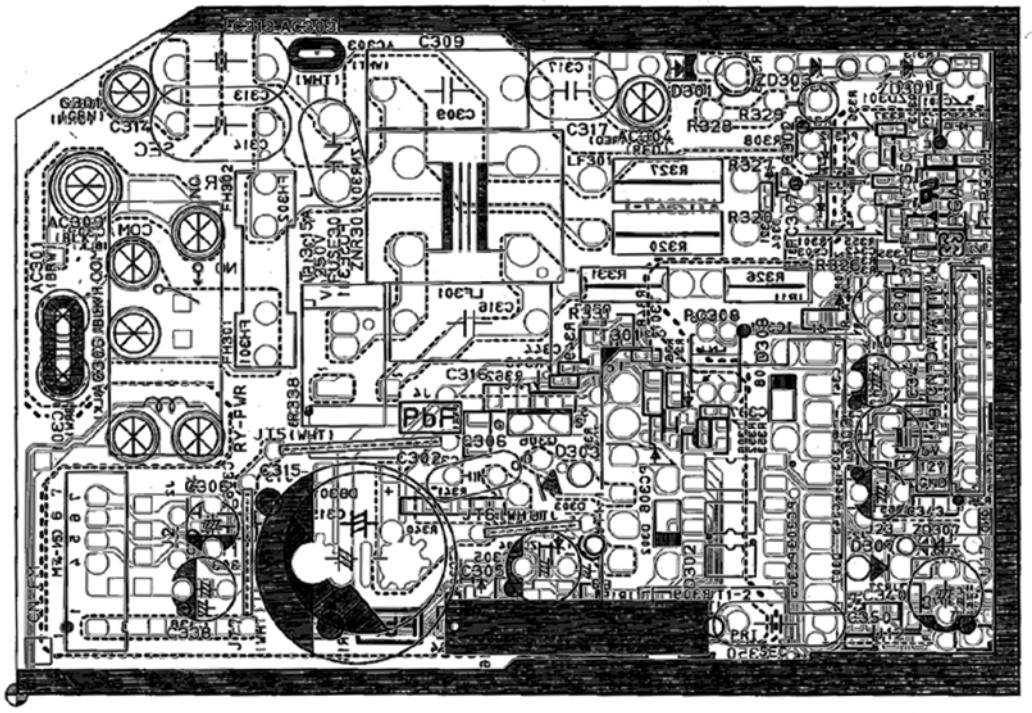


10 Printed Circuit Board

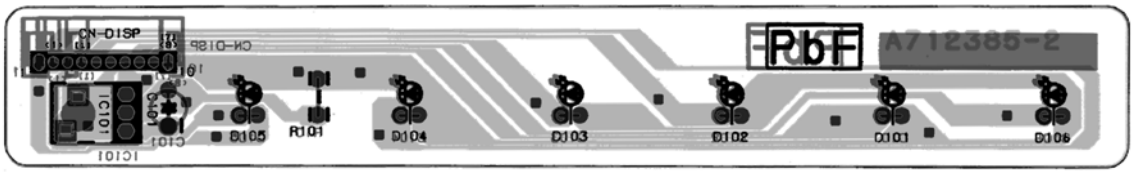
10.1. Indoor Unit

10.1.1. Main Printed Circuit Board

10.1.2. Power Printed Circuit Board

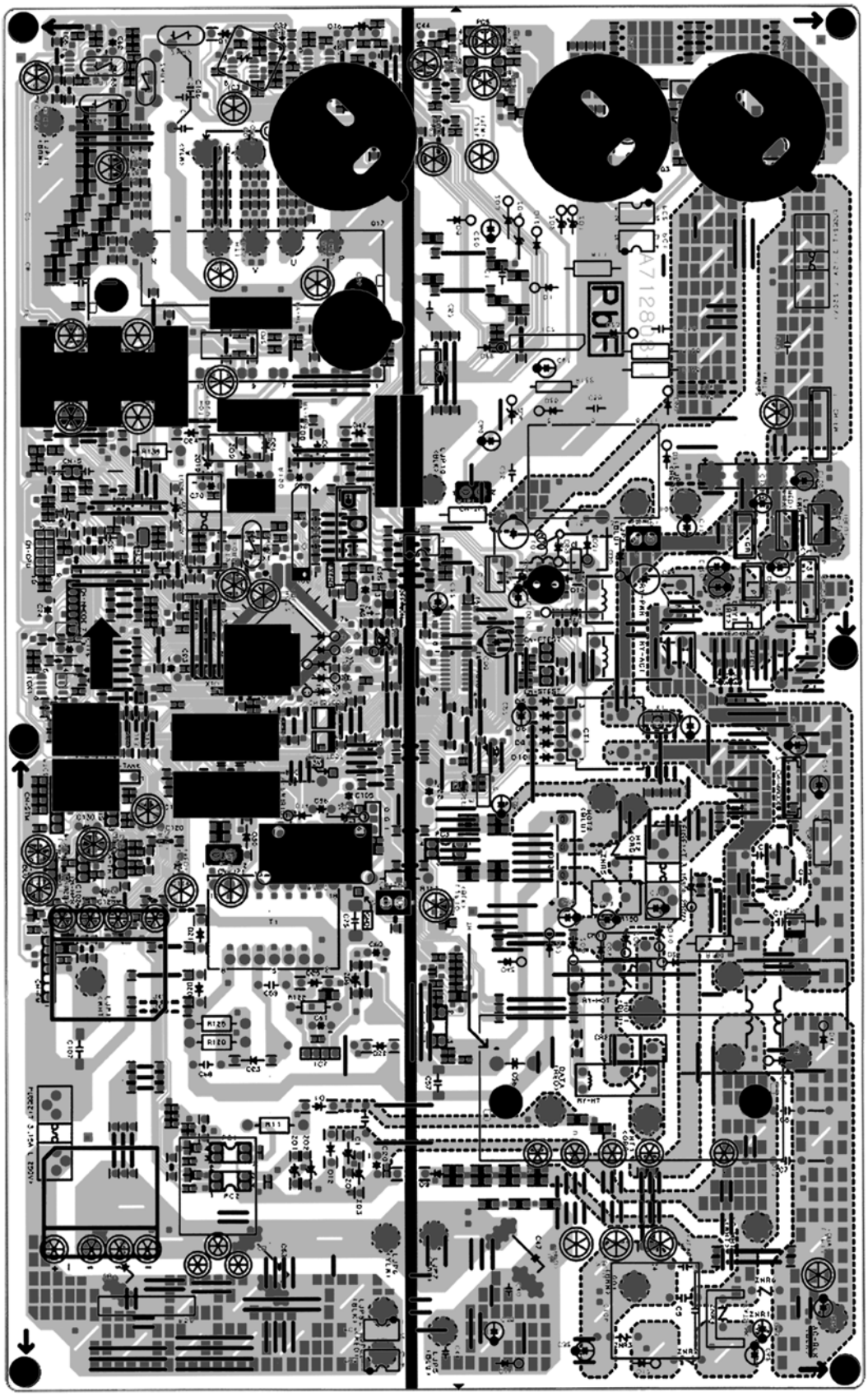


10.1.3. Indicator Printed Circuit Board



10.2. Outdoor Unit

10.2.1. Main Printed Circuit Board



11 Installation Instruction

11.1. Select The Best Location

INDOOR UNIT

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

OUTDOOR UNIT

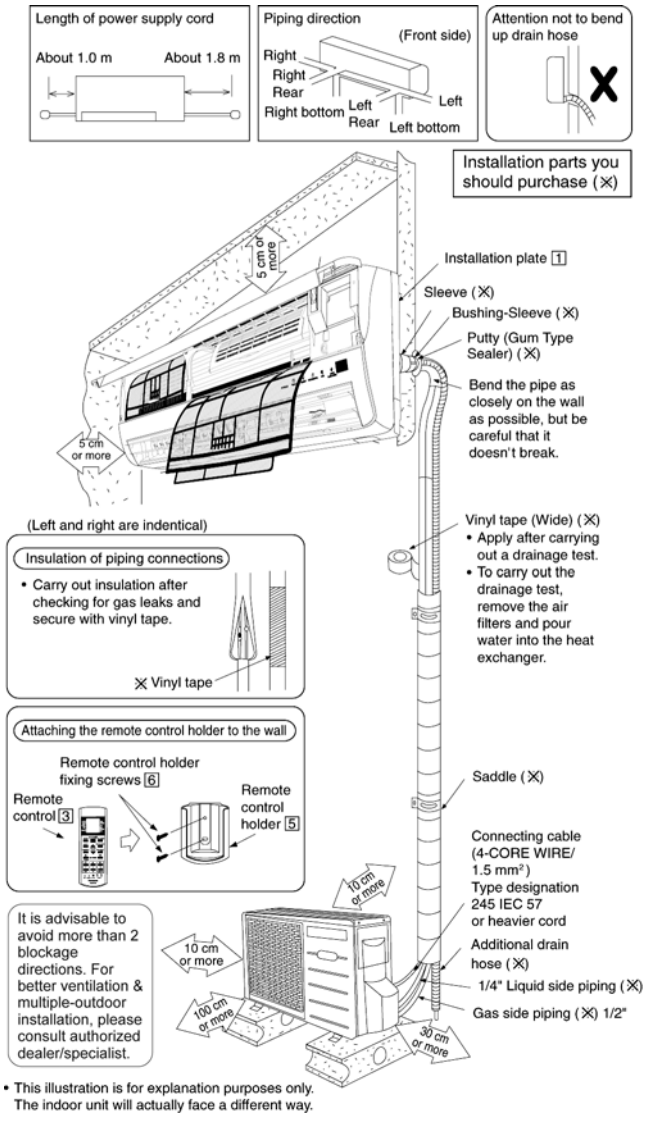
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other obstacles.
- Do not place any obstacles which may cause a short circuit of the discharged air.
- If piping length is over 10 m, 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					
E18HK E21HK	1/2”	1/4”	5	15	3	20	20

Example : For E18HKEA

If the unit is installed at 12.5 m distance, the quantity of additional refrigerant should be 50 g ..... (12.5 - 10) m x 20 g/m = 50 g.

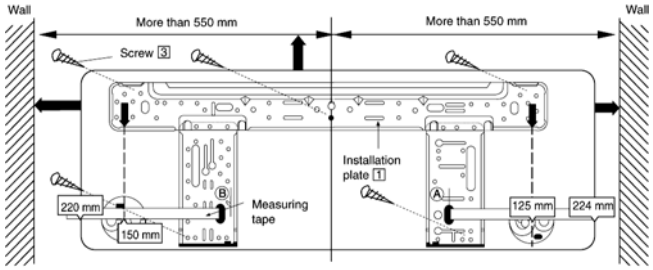
11.2. Indoor/Outdoor Unit Installation Diagram



11.3. Indoor Unit

11.3.1. 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 550 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 47 mm.
From installation plate right edge to unit's right is 73 mm.

Ⓑ : For left side piping, piping connection for liquid should be about 126 mm from this line.
: For left side piping, piping connection for gas should be about 174 mm from this line.
: For left side piping, piping connection cable should be about 984 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.

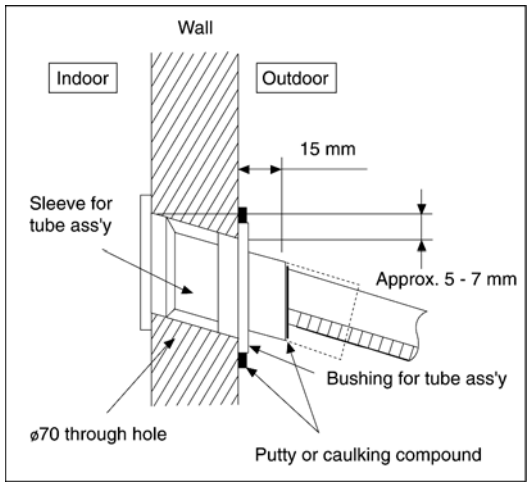
2. Drill the piping plate hole with ø70 mm hole-core drill.
   • Line according to the left and right side of the installation plate. The meeting point of the extended line is the centre of the hole. Another method is by putting measuring tape at position as shown in the diagram above. The hole centre 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.

11.3.2. 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.



11.3.3. INDOOR UNIT INSTALLATION

1. For the right rear piping

Pull out the Indoor piping
↓
Install the Indoor Unit
↓
Secure the Indoor Unit
↓
Insert the connecting cable

2. For the right and right bottom piping

Pull out the Indoor piping
↓
Install the Indoor Unit
↓
Insert the connecting cable
↓
Secure the Indoor Unit

3. For the embedded piping

Replace the drain hose

↓

Bend the embedded piping

↓

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

Install the Indoor Unit

↓

Cut and flare the embedded piping

↓

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

Pull the connecting cable into Indoor Unit

↓

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

Connect the piping

↓

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

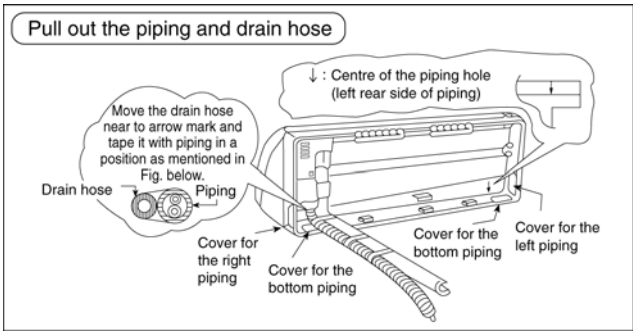
Insulate and finish the piping

↓

- Please refer to "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

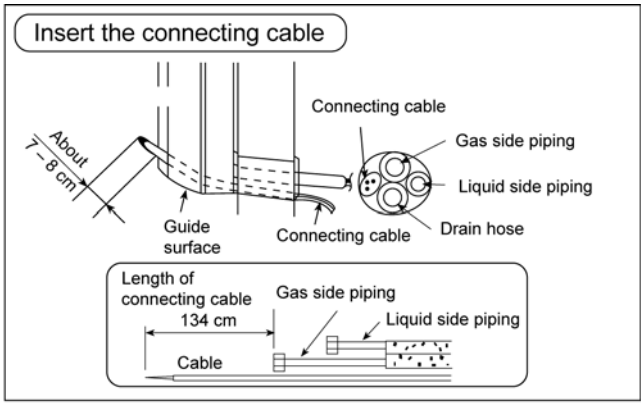


How to keep the cover

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

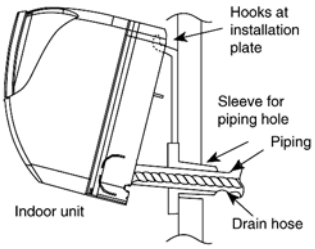
(Left, right and 2 bottom covers for piping.)

Insert the connecting cable



Install the indoor unit

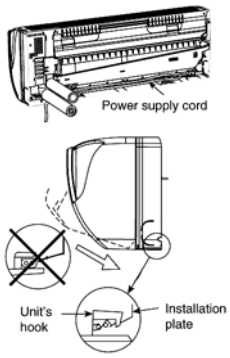
Hook the indoor unit onto the upper portion of installation plate. (Engage the indoor unit with the upper edge of the installation plate). Ensure the hooks are properly seated on the installation plate by moving it in left and right.



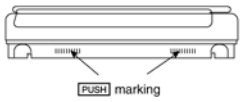
Secure the Indoor Unit

1. Power supply cord arrangement.
   Excess length of power supply cord should be arranged behind the chassis at piping keeping area as shown in the diagram without tying up in a bundle.
   Ensure that the power supply cord is not clamped in between unit's hook (2 position) and installation plate.
   Ensure that the power supply cord is not stretched between chassis back and installation plate. It may create squeak sound.
2. Press the lower left and right side of the unit against the installation plate until hooks engages with their slot (sound click).

Warning: Do not tie up power supply cord into a bundle by band. It may generate heat and cause fire.



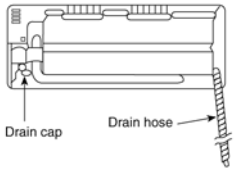
To take out the unit, push the PUSH marking at the bottom unit, and pull it slightly towards you to disengage the hooks from the unit.

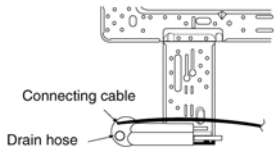


(This can be used for left rear piping & left bottom piping also.)

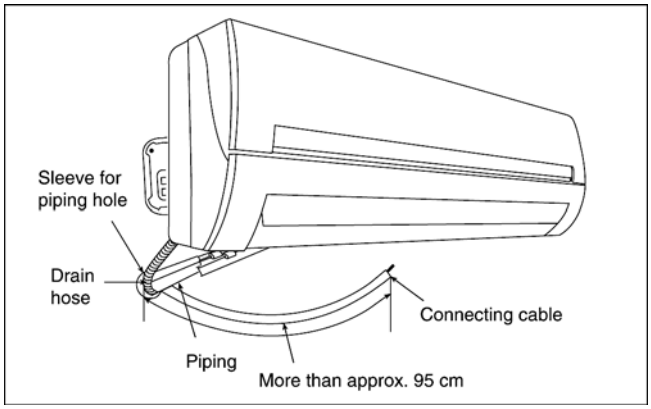
Exchange the drain hose and the cap

Rear view for left piping installation

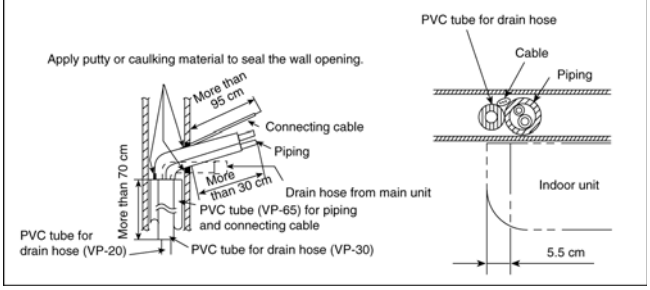




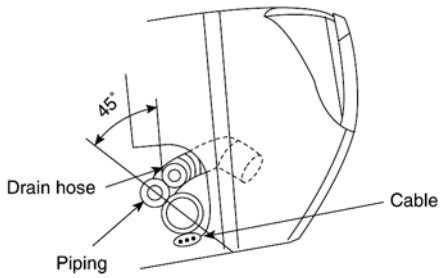
Adjust the piping slightly downwards.



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



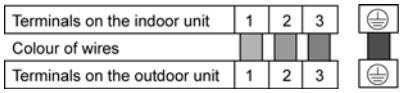
• In case of left piping how to insert the connecting cable and drain hose.



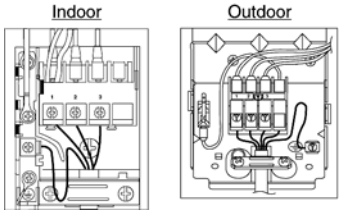
(For the right piping, follow the same procedure)

11.3.4. CONNECT THE CABLE TO THE INDOOR UNIT

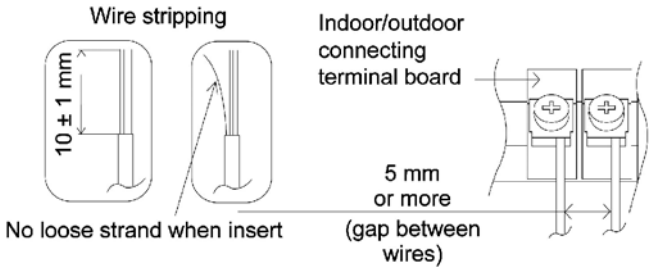
1. The inside and outside connecting cable can be connected without removing the front grille.
2. Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4×1.5 mm^2 flexible cord, type designation 245 IEC 57 or heavier cord.
   - Ensure the colour of wires of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

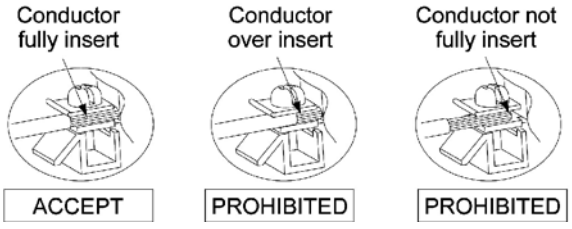


   - Secure the cable onto the control board with the holder (clamper).



11.3.4.1. Wire Stripping and Connecting Requirement

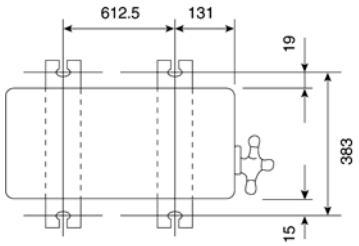




11.4. Outdoor Unit

11.4.1. 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.



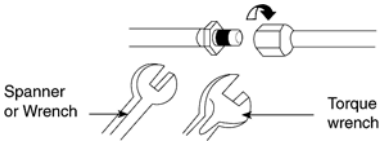
11.4.2. CONNECTING THE PIPING

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
E18HK, E21HK	1/2" [55 N·m]	1/4" [18 N·m)

⚠ CAUTION

Do not over tighten, over tightening cause gas leakage.

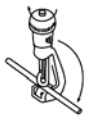
Connecting The Piping To Outdoor Unit

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.

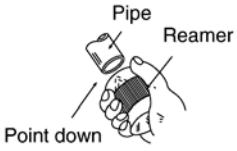
Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.

CUTTING AND FLARING THE PIPING

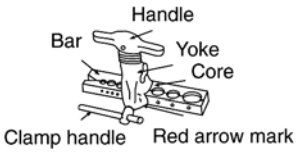
1. Please cut using pipe cutter and then remove the burrs.
2. Remove the burrs by using reamer. If burrs is not removed, gas leakage may be caused.
   Turn the piping end down to avoid the metal powder entering the pipe.
3. Please make flare after inserting the flare nut onto the copper pipes.



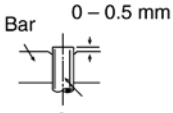
1. To cut

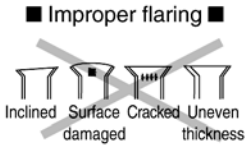


2. To remove burrs



3. To flare

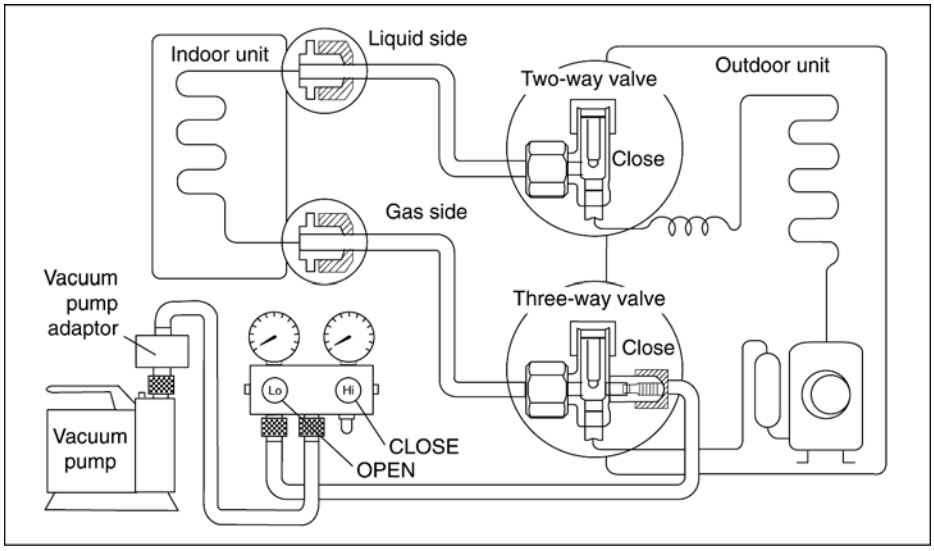




When properly flared, the internal surface of the flare will evenly shine and be of even thickness. Since the flare part comes into contact with the connections, carefully check the flare finish.

11.4.3. EVACUATION OF THE EQUIPMENT

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



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

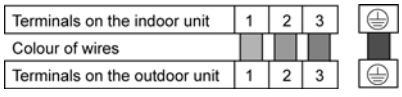
CAUTION

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

11.4.4. CONNECT THE CABLE TO THE OUTDOOR UNIT

(FOR DETAIL REFER TO WIRING DIAGRAM AT 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.



3. Secure the cable onto the control board with the holder (clamper).
4. Attache the control board cover back to the original position with the screw.
5. For wire stripping and connection requirement, refer to instruction 11.3.4. of indoor unit.

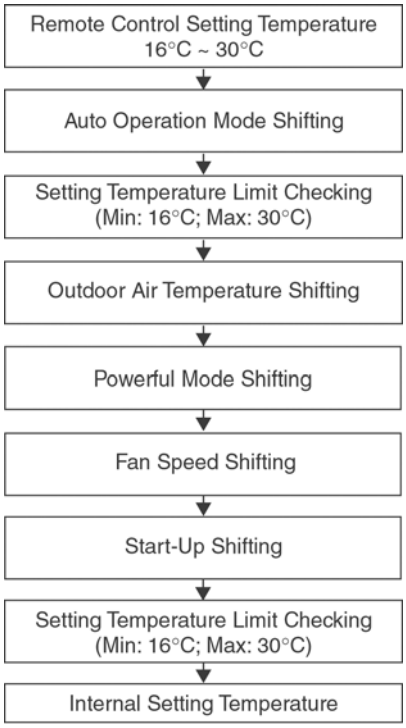
12 Operation and Control

12.1. Basic Function

Inverter control, which equipped with a microcomputer in determining the most suitable operating mode as time passes, automatically adjusts output power for maximum comfort always. In order to achieve the suitable operating mode, the microcomputer maintains the set temperature by measuring the temperature of the environment and performing temperature shifting. The compressor at outdoor unit is operating following the frequency instructed by the microcomputer at indoor unit that judging the condition according to internal setting temperature and intake air temperature.

12.1.1. Internal Setting Temperature

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



12.1.2. Cooling Operation

12.1.2.1. Thermostat control

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

12.1.3. Soft Dry Operation

12.1.3.1. Thermostat control

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

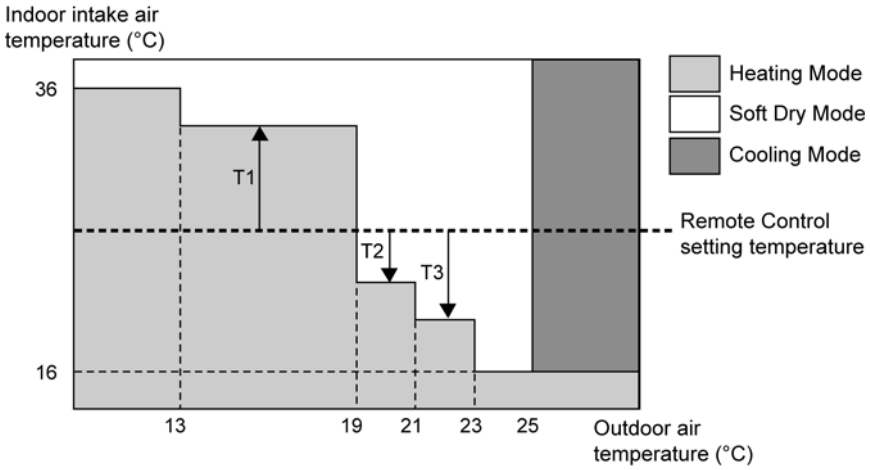
12.1.4. Heating Operation

12.1.4.1. Thermostat control

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

12.1.5. Automatic Operation

- This mode can be set using remote control and the operation is decided by remote control setting temperature, remote control operation mode, indoor intake air temperature and outdoor air temperature.
- During operation mode judgment, indoor fan motor (with speed of Lo-) and outdoor fan motor are running for 30 seconds to detect the indoor intake and outdoor air temperature. The operation mode is decided based on below chart.



Every 30 minutes, the indoor and outdoor temperature is judged. Based on remote control setting temperature, the value of T1 will increase up to 10°C, T2 will decreased by 3°C and T3 will decreased up to 8°C.
The Auto Operation Mode shifting will take place whenever operation mode changed from Cooling/Soft Dry to Heating or vice versa.

12.1.6. Indoor Fan Motor Operation

A. Basic Rotation Speed (rpm)

i. Manual Fan Speed

[Cooling, Dry]

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

Remote Control	O	O	O	O	O
Tab (rpm)	Hi	Me+	Me	Me-	Lo

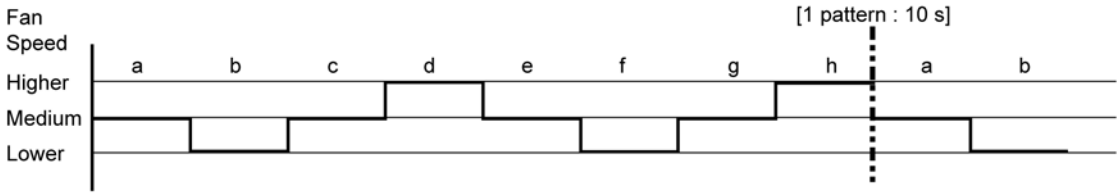
[Heating]

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

Remote Control	O	O	O	O	O
Tab (rpm)	Shi	Me+	Me	Me-	Lo

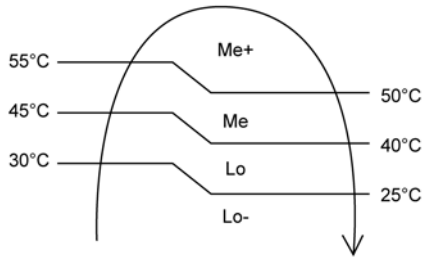
ii. Auto Fan Speed [Cooling, Dry]

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



[Heating]

- According to indoor pipe temperature, automatic heating fan speed is determined as follows.

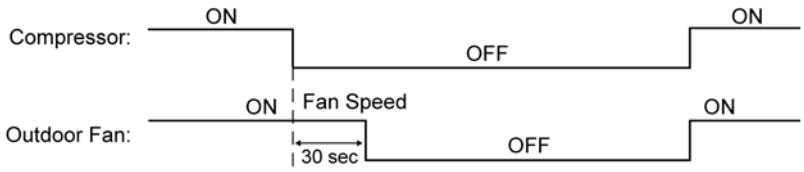


B. Feedback control

- Immediately after the fan motor started, feedback control is performed once every second.
- During fan motor on, if fan motor feedback ≥ 2550 rpm or < 50 rpm continue for 10 seconds, then fan motor error counter increase, fan motor is then stop and restart. If the fan motor counter becomes 7 times, then H19 - fan motor error is detected. Operation stops and cannot on back.

12.1.7. Outdoor Fan Motor Operation

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



12.2. Airflow Direction

1. There are two types of airflow, vertical airflow (directed by horizontal vane) and horizontal airflow (directed by vertical vanes).
2. Control of airflow direction can be automatic (angles of direction is determined by operation mode, heat exchanger temperature and intake air temperature) and manual (angles of direction can be adjusted using remote control).

12.2.1. Vertical Airflow

Operation Mode	Airflow Direction		Vane Angle (°)				
			1	2	3	4	5
Heating	Auto with Heat Exchanger Temperature	A	8				
		B	57				
		C	8				
		D	8				
	Manual		8	25	41	58	74
Cooling and Ion	Auto		10 ~ 38				
	Manual		10	14	19	23	27
Soft Dry	Auto		10 ~ 38				
	Manual		10	17	24	31	38

1. Automatic vertical airflow direction can be set using remote control; the vane swings up and down within the angles as stated above. For heating mode operation, the angle of the vane depends on the indoor heat exchanger temperature as Figure 1 below. When the air conditioner is stopped using remote control, the vane will shift to close position.

2. Manual vertical airflow direction can be set using remote control; the angles of the vane are as stated above and the positions of the vane are as Figure 2 below. When the air conditioner is stopped using remote control, the vane will shift to close position.

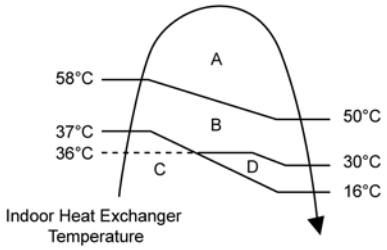


Figure 1

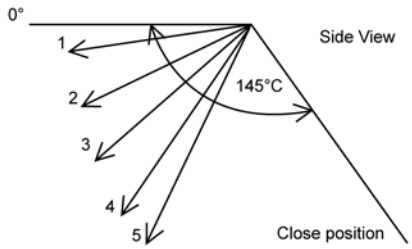


Figure 2

12.2.2. Horizontal Airflow

1. Automatic horizontal airflow direction can be set using remote control; the vane swings left and right within the angles as stated below. For heating mode operation, the angle of the vane depends on the indoor heat exchanger temperature as Figure 1 below.

Operation Mode		Vane Angle (°)
Heating, with heat exchanger temperature	A	68 ~ 112
	B	90
Cooling and Soft Dry		68 ~ 112

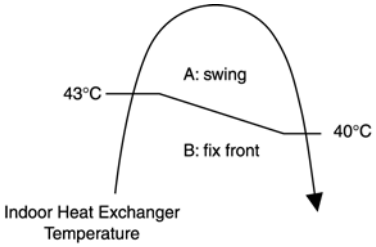


Figure 1

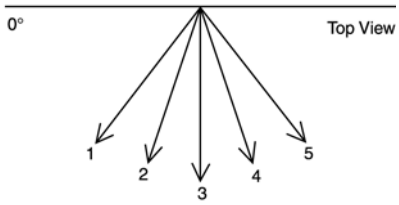


Figure 2

2. Manual horizontal airflow direction can be set using remote control; the angles of the vane are as stated below and the positions of the vane are as Figure 2 above.

Pattern	1	2	3	4	5
Airflow Direction Patterns at Remote Control					
Vane Angle (°)	90	68	79	101	112

12.3. Quiet operation (Cooling Mode/Cooling area of Soft Dry Mode)

A. Purpose

To provide quiet cooling operation compare to normal operation.

B. Control condition

a. Quiet operation start condition

- When “quiet” button at remote control is pressed.
  Quiet LED illuminates.

b. Quiet operation stop condition

1. When one of the following conditions is satisfied, quiet operation stops:
   a. Powerful button is pressed.
   b. Stop by OFF/ON switch.
   c. Timer “off” activates.
   d. Quiet button is pressed again.
2. When quiet operation is stopped, operation is shifted to normal operation with previous setting.
3. When fan speed is changed, quiet operation is shifted to quiet operation of the new fan speed.
4. When operation mode is changed, quiet operation is shifted to quiet operation of the new mode.
5. During quiet operation, if timer “on” activates, quiet operation maintains.
6. After off, when on back, quiet operation is not memorised.

C. Control contents

1. Auto fan speed is changed from normal setting to quiet setting of respective fan speed.
   This is to reduce sound of Hi, Me, Lo for 3dB.
2. Manual fan speed for quiet operation is 1 step from setting fan speed.
3. Outdoor fan speed is changed to Q-Lo
4. Compressor frequency reduced.

12.3.1. Quiet operation (Heating)

A. Purpose

To provide quiet heating operation compare to normal operation.

B. Control condition

a. Quiet operation start condition

- When “quiet” button at remote control is pressed.
  Quiet LED illuminates.

b. Quiet operation stop condition

1. When one of the following conditions is satisfied, quiet operation stops:
   a. Powerful button is pressed.
   b. Stop by OFF/ON switch.
   c. Timer “off” activates.
   d. Quiet button is pressed again.
2. When quiet operation is stopped, operation is shifted to normal operation with previous setting.
3. When fan speed is changed, quiet operation is shifted to quiet operation of the new fan speed.
4. When operation mode is changed, quiet operation is shifted to quiet operation of the new mode, except fan only mode.
5. During quiet operation, if timer “on” activates, quiet operation maintains.
6. After off, when on back, quiet operation is not memorised.

C. Control contents

a. Fan Speed Auto

- Indoor FM RPM depends on pipe temperature sensor of indoor heat exchanger.
  Auto fan speed is changed from normal setting to quiet setting of respective fan speed.
  This is to reduce sound of Hi, Me, Lo for 3dB.

b. Fan Speed Manual

- Manual fan speed for quiet operation is - 1 step from setting fan speed.

c. Compressor frequency reduced.

12.4. Powerful Mode Operation

When the powerful mode is selected, the internal setting temperature will shift higher up to 3.5°C (for Heating) or lower up to 2°C (for Cooling/Soft Dry) than remote control setting temperature for 20 minutes to achieve the setting temperature quickly.

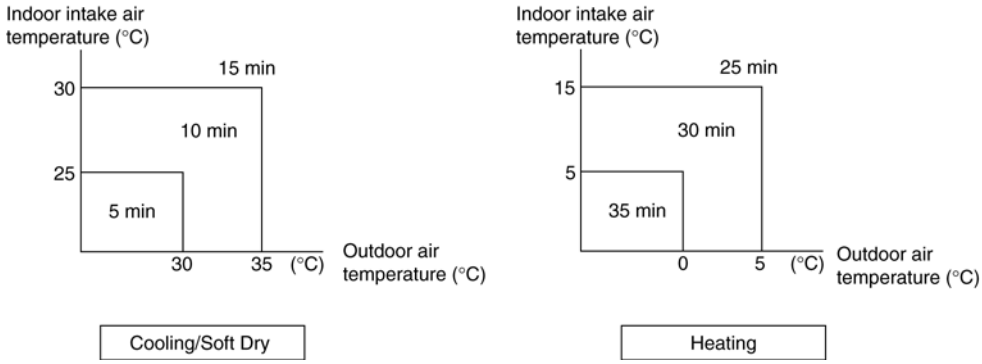
12.5. Timer Control

12.5.1. ON Timer Control

ON timer can be set using remote control, the unit with timer set will start operate earlier than the setting time. This is to provide a comfortable environment when reaching the set ON time.

60 minutes before the set time, indoor (at fan speed of Lo-) and outdoor fan motor start operate for 30 seconds to determine the indoor intake air temperature and outdoor air temperature in order to judge the operation starting time.

From the above judgment, the decided operation will start operate earlier than the set time as shown below.



12.5.2. OFF Timer Control

OFF timer can be set using remote control, the unit with timer set will stop operate at set time.

12.6. Auto Restart Control

1. When the power supply is cut off during the operation of air conditioner, the compressor will re-operate within three to four minutes (there are 10 patterns between 2 minutes 58 seconds and 3 minutes 52 seconds to be selected randomly) after power supply resumes.
2. This type of control is not applicable during ON/OFF Timer setting.

12.7. Indication Panel

LED	POWER	TIMER	QUIET	POWERFUL	ION	ALLERGEN BUSTER
Color	Green	Orange	Orange	Green	Green	Blue
Light ON	Operation ON	Timer Setting ON	Quiet Mode ON	Powerful Mode ON	Ion Mode ON	Operation ON
Light OFF	Operation OFF	Timer Setting OFF	Quiet Mode OFF	Powerful Mode OFF	Ion Mode OFF	Operation OFF

Note:

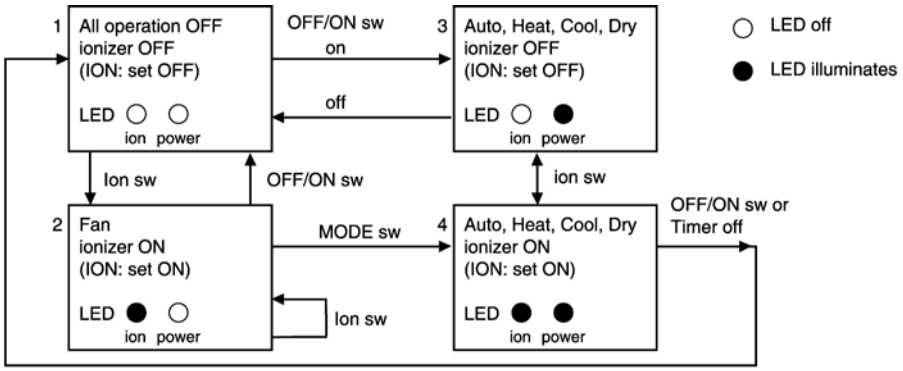
- If POWER LED is blinking, the possible operation of the unit are Hot Start, during Deice operation, operation mode judgment, or ON timer sampling.
- If Timer LED is blinking, there is an abnormality operation occurs.
- If Ion LED is blinking, there is an abnormality of Ion occurs.

12.8. Ion Operation

Purpose

To provide fresh air effect to users by discharging minus ion to air.

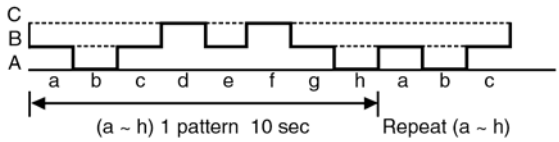
Control Condition



a. Ionizer Only Operation.

1. When air-conditioner unit is at “OFF” condition (standby) and ION operation button at remote control is pressed.
   Fan & ionizer on, ION LED illuminates, but power LED maintain off. (1 → 2)
   However, fan speed can be adjusted later by customer during this operation.

Fan speed	
manual	Remote Control set fan speed
Auto	Repetition of 8 patterns as shown below



   Airflow direction (Horizontal Vane) control:
   Follow vane direction control at cooling mode.
   Horizontal vane can be changed by customer during ion only operation.

b. Operation Mode + Ionizer Operation.

1. Ionising Operation Start Condition
   When air conditioner unit is in “ON” condition (Heat, Cool, Soft Dry, Auto mode) and ION operation button at remote control is pressed. Ionizer on & ION LED illuminates. (3 → 4)
   Power LED also illuminates.

2. Ionising Operation Stop Condition
   When one of the following condition is satisfied, ION operation stops.
   a. Stopped by ON/OFF switch.
   b. Timer OFF activates.
   c. ION feedback signal shows error.

3. Ionizer operation status is not memorised by micon. After OFF, when operation is “ON” again, air conditioner operates without ionizer operation.

13 Protection Control

13.1. Protection Control For All Operations

13.1.1. Restart Control (Time Delay Safety Control)

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

13.1.2. 30 Seconds Forced Operation

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

13.1.3. Total Running Current Control

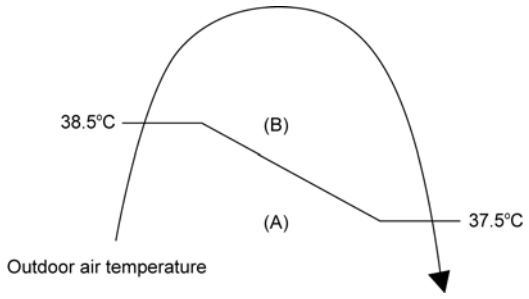
1. When the outdoor unit total running current (AC) exceeds X value, the frequency instructed for compressor operation will be decreased.

2. If the running current does not exceed X value for five seconds, the frequency instructed will be increased.

3. However, if total outdoor unit running current exceeds Y value, compressor will be stopped immediately for 3 minutes.

	E18HK		E21HK	
Operation Mode	X (A)	Y (A)	X (A)	Y (A)
Cooling/Soft Dry (A)	8.8	15.0	11.0	15.0
Cooling/Soft Dry (B)	7.7	15.0	9.6	15.0
Heating	10.8	17.0	11.5	17.0

4. The first 30 minutes of cooling operation, (A) will be applied.



13.1.4. IPM (Power transistor) Prevention Control

A. Overheating Prevention Control

1. When the IPM temperature rises to 110°C, compressor operation will stop immediately.

2. Compressor operation restarts after three minutes the temperature decreases to 95°C.

B. DC Peak Current Control

1. When electric current to IPM exceeds set value of 30.0 ± 5.0 A, the compressor will stop operate. Then, operation will restart after three minutes.

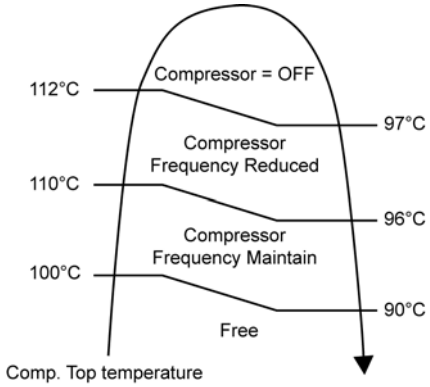
2. If the set value is exceeded again more than 30 seconds after the compressor starts, the operation will restart after two minutes.

3. If the set value is exceeded again within 30 seconds after the compressor starts, the operation will restart after one minute. If this condition repeats continuously for seven times, all indoor and outdoor relays will be cut off.

13.1.5. Compressor Overheating Prevention Control

Instructed frequency for compressor operation will be regulated by compressor discharge temperature. The changes of frequency are as below figure.

If compressor discharge temperature exceeds 112°C, compressor will be stop, occurs 4 times per 20 minutes, timer LED will be blinking (“F97” is to be confirmed).



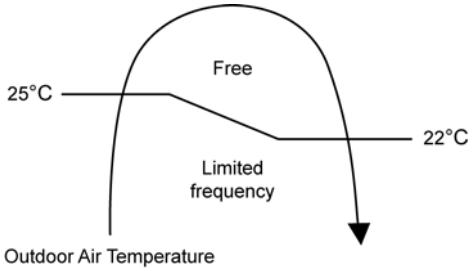
13.2. Protection Control For Cooling & Soft Dry Operation

13.2.1. Outdoor Air Temperature Control

The compressor operating frequency is regulated in accordance to the outdoor air temperature as shown in the diagram below.

This control will begin 1 minute after the compressor starts.

Compressor frequency will adjust base on Outdoor Air Temperature.



13.2.2. Cooling Overload Control

i. Pipe temperature limitation/restriction

• Detects the Outdoor pipe temperature and carry out below restriction/limitation (Limit the compressor Operation frequency)

• The compressor stop if outdoor pipe temperature exceeds 63°C.

• If the compressor stops 4 times in 20 minutes, Timer LED blinking (F95: outdoor high pressure rise protection)

13.2.3. Dew Prevention Control 1

1. To prevent dew formation at indoor unit discharge area.
2. This control activated if:
   • Outdoor air temperature and Indoor pipe temperature judgment by microcontroller if fulfilled.
   • When Cooling or Dry mode is operated more than 20 minutes or more.
3. This control stopped if:
   • Compressor stopped.
   • Remote control setting changed. (fan speed / temperature)
   • Outdoor air temperature and indoor intake temperature changed.
4. Fan speed, angle of 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 table below:

Operation Mode	Airflow Direction	Vane Angle (°)				
		1	2	3	4	5
Cooling and Ion	Auto	10 ~ 27				
	Manual	10	13	16	19	22

13.2.4. Dew Prevention Control 2

1. To prevent dew formation at indoor unit discharge area.
2. This control starts if all conditions continue for 20 minutes:
   • Operated with Cooling or Soft Dry Mode.
   • Indoor intake temperature is between 25°C and 29°C.
   • Outdoor air temperature is less than 30°C.
   • Quiet Lo fan speed.
3. This control stopped if:
   • When receive air swing change signal from Remote Control.
4. The horizontal louver will be fixed at 24° (regardless of Auto or Manual Airflow Direction Setting)

13.2.5. Freeze Prevention Control

1. When indoor heat exchanger temperature is lower than 2°C continuously for six minutes, compressor will stop operating.
2. Compressor will resume its operation 3 minutes after the indoor heat exchanger is higher than 10°C.
3. At the same time, indoor fan speed will be higher than during its normal operation.
4. If indoor heat exchanger temperature is higher than 10°C for 5 minutes, the fan speed will return to its normal operation.

13.3. Protection Control For Heating Operation

13.3.1. Intake Air Temperature Control

Compressor will operate at maximum frequency if below conditions occur:

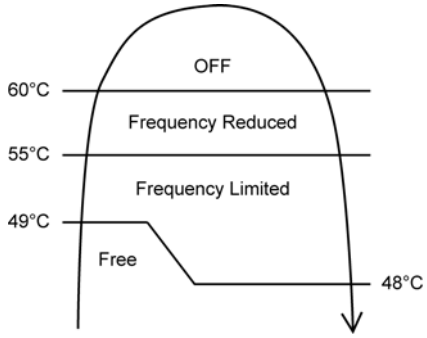
1. When the indoor intake air temperature is 30°C or above.

13.3.2. Outdoor Air Temperature Control

The maximum current value is regulated when the outdoor air temperature rises above 14°C in order to avoid compressor overloading.

13.3.3. Overload Protection Control

The compressor operating frequency is regulated in accordance to indoor heat exchanger temperature as shown in below figures. If the heat exchanger temperature exceeds 60°C, compressor will stop.



13.3.4. Cold Draught Operation

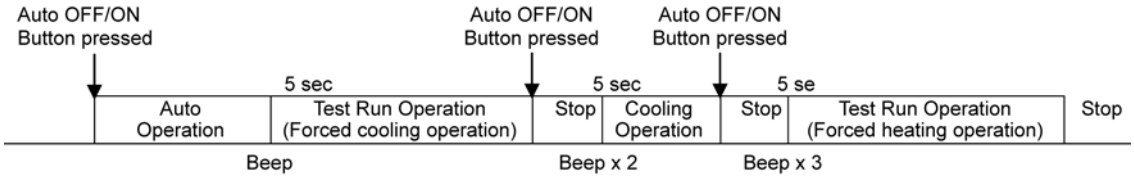
When indoor pipe temperature is low, cold draught operation start where indoor fan speed will be reduced.

13.3.5. Deice Operation

When outdoor pipe temperature and outdoor temperature is low, deice operation start where indoor fan motor and outdoor fan motor stop and operation LED blinks.

14 Servicing Mode

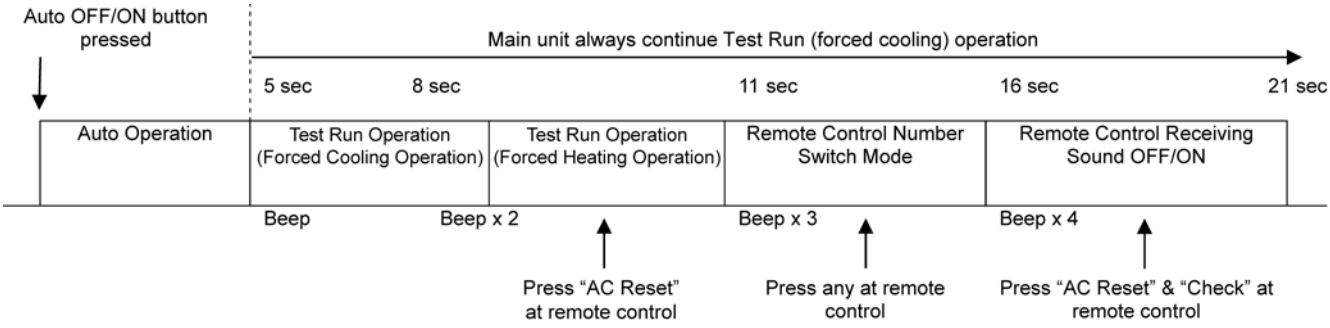
14.1. Auto OFF/ON Button



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

2. TEST RUN OPERATION (FOR PUMP DOWN/SERVICING PURPOSE)
   The Test Run operation will be activated if the Auto OFF/ON button is pressed continuously for more than 5 seconds. A “beep” sound will occur at the fifth seconds, in order to identify the starting of Test Run operation (Forced cooling operation). Within 5 minutes after Forced cooling operation start, the Auto OFF/ON button is pressed for more than 5 seconds. A 2 “beep” sounds will occur at the fifth seconds, in order to identify the starting of cooling operation. Within 5 minutes after cooling operation start, the Auto OFF/ON button is pressed for more than 5 seconds. A 3 “beep” sounds will occur at the fifth seconds, in order to identify the starting of Forced heating operation.

   The Auto OFF/ON button may be used together with remote control to set / change the advance setting of air conditioner operation.



3. REMOTE CONTROL NUMBER SWITCH MODE
   The Remote Control Number Switch Mode will be activated if the Auto OFF/ON button is pressed continuously for more than 11 seconds (3 “beep” sounds will occur at 11th seconds to identify the Remote Control Number Switch Mode is in standby condition) and press any button at remote control to transmit and store the desired transmission code to the EEPROM.

   For transmission code selection explanation, please refer to “Select Remote Control Transmission Code”.

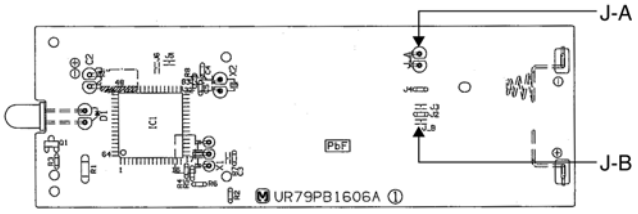
4. REMOTE CONTROL RECEIVING SOUND OFF/ON MODE
   The Remote Control Receiving Sound OFF/ON Mode will be activated if the Auto OFF/ON button is pressed continuously for more than 16 seconds (4 “beep” sounds will occur at 16th seconds to identify the Remote Control Receiving Sound Off/On Mode is in standby condition) and press “AC Reset” button and then press “Check” button at remote control.

   Press “Auto OFF/ON button” to toggle remote control receiving sound.
   - Short “beep”: Turn OFF remote control receiving sound.
   - Long “beep”: Turn ON 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.

14.2. Select Remote Control Transmission Code

- There are 4 types of remote control transmission code could be selected and stored in EEPROM of indoor unit. The indoor unit will only operate when received signal with same transmission code from remote control. This could prevent signal interference when there are 2 or more indoor units installed nearby together.
- To change remote control transmission code, short or open jumpers at the remote control printed circuit board.



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

14.3. Remote Control Button

14.3.1. SET BUTTON

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

14.3.2. CLOCK BUTTON

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

14.3.3. RESET (RC)

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

14.3.4. RESET (AC)

- To restore the unit's setting to factory default
  - Press once to restore the unit's setting.

14.3.5. TIMER ▲

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

14.3.6. TIMER ▼

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

15 Troubleshooting Guide

15.1. Refrigeration Cycle System

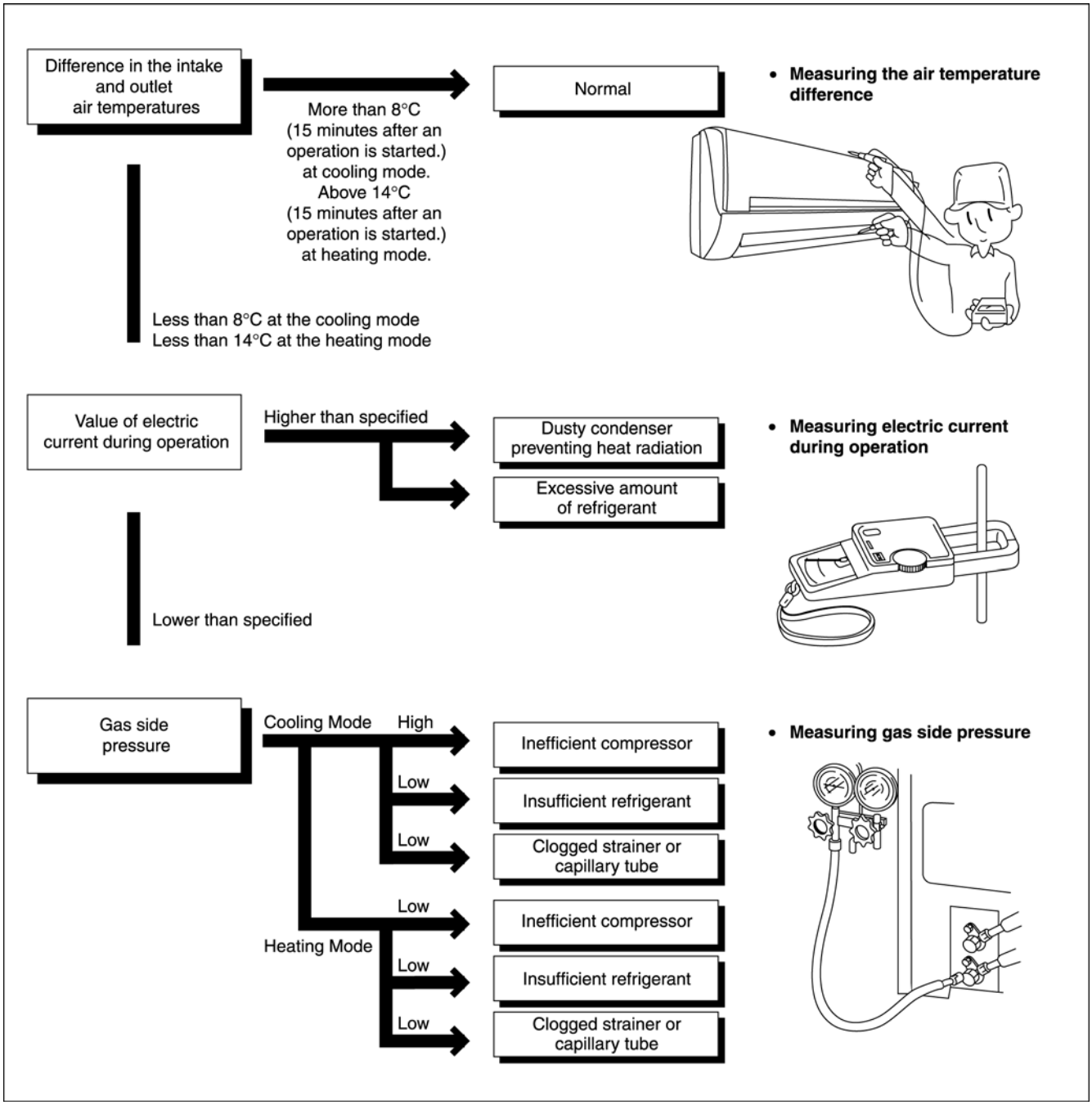
In order to diagnose malfunctions, make sure that there are no electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor and a fan.

The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions, the standard values for them are shown in the table on the right.

Normal Pressure and Outlet Air Temperature (Standard)

	Gas pressure MPa (kg/cm²G)	Outlet air temperature (°C)
Cooling Mode	0.9 ~ 1.2 (9 ~ 12)	12 ~ 16
Heating Mode	2.3 ~ 2.9 (23 ~ 29)	36 ~ 45

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



15.2. Relationship Between The Condition Of The Air Conditioner And Pressure And Electric Current

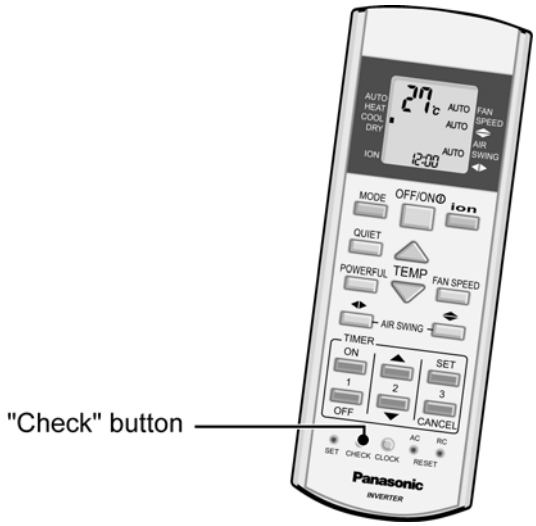
Condition of the air conditioner	Cooling Mode			Heating Mode		
	Low Pressure	High Pressure	Electric current during operation	Low Pressure	High Pressure	Electric current during operation
Insufficient refrigerant (gas leakage)						
Clogged capillary tube or Strainer						
Short circuit in the indoor unit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

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

15.3. Breakdown Self Diagnosis Function

15.3.1. Self Diagnosis Function (Three Digits Alphanumeric Code)

- Once abnormality has occurred during operation, the unit will stop its operation, and Timer LEDs blink.
- Although Timer LED goes off when power supply is turned off, if the unit is operated under a breakdown condition, the LED will light up again.
- In operation after breakdown repair, the Timer LED will no more blink. The last error code (abnormality) will be stored in IC memory.
- **To make a diagnosis**
    1. Timer LED start to blink and the unit automatically stops the operation.
    2. Press the CHECK button on the remote controller continuously for 5 seconds.
    3. "- -" will be displayed on the remote controller display. Note: Display only for "- -". (No transmitting signal, no receiving sound and no Power LED blinking.)
    4. Press the "TIMER" ▲ or ▼ button on the remote controller. The code "H00" (no abnormality) will be displayed and signal will be transmitted to the main unit.
    5. Every press of the button (up or down) will increase abnormality numbers and transmit abnormality code signal to the main unit.
    6. When the latest abnormality code on the main unit and code transmitted from the remote controller are matched, power LED will light up for 30 seconds and a beep sound (continuously for 4 seconds) will be heard. If no codes are matched, power LED will light up for 0.5 seconds and no sound will be heard.
    7. The breakdown diagnosis mode will be canceled by pressing the CHECK button continuously for 5 seconds or without any operation the remote control for 30 seconds.
    8. The LED will be off if the unit is turned off or the AC button on the main unit is pressed.
- **To display memorized error (Protective operation) status:**
    1. Turn power on.
    2. Press the CHECK button on the remote controller continuously for 5 seconds.
    3. "- -" will be displayed on the remote controller display. Note: Display only for "- -". (No transmitting signal, no receiving sound and no Power LED blinking.)
    4. Press the "TIMER" ▲ or ▼ button on the remote controller. The code "H00" (no abnormality) will be displayed and signal will be transmitted to the main unit. The power LED lights up. If no abnormality is stored in the memory, three beeps sound will be heard.
    5. Every press of the button (up or down) will increase abnormality numbers and transmit abnormality code signal to the main unit.
    6. When the latest abnormality code on the main unit and code transmitted from the remote controller are matched, power LED will light up for 30 seconds and a beep sound (continuously for 4 seconds) will be heard. If no codes are matched, power LED will light up for 0.5 seconds and no sound will be heard.
    7. The breakdown diagnosis mode will be canceled unless pressing the CHECK button continuously for 5 seconds or operating the unit for 30 seconds.
    8. The same diagnosis can be repeated by turning power on again.



- **To clear memorized error (Protective operation) status after repair:**
    1. Turn power on (in standby condition).
    2. Press the AUTO button for 5 seconds (A beep receiving sound) on the main unit to operate the unit at Forced Cooling Operation mode.
    3. Press the CHECK button on the remote controller for about 1 second with a pointed object to transmit signal to main unit. A beep sound is heard from main unit and the data is cleared.
- **Temporary Operation (Depending on breakdown status)**
    1. Press the AUTO button (A beep receiving sound) on the main unit to operate the unit. (Remote control will become possible.)
    2. The unit can temporarily be used until repaired.

Error Code	Operation	Temporary items
H23	Cooling	Emergency Operation with limited power
H27, H28	Cooling, Heating	
H26	Cooling, Heating	Emergency Operation without power limit

15.4. Error Codes Table

Diagnosis display	Abnormality / Protection control	Abnormality Judgement	Emergency operation	Primary location to verify
H00	No abnormality detected	—	Normal operation	—
H11	Indoor / outdoor abnormal communication	> 1 min. after starting operation	Indoor fan operation only	• Internal / external cable connections • Indoor / Outdoor PCB
H14	Indoor intake air temperature sensor abnormality	Continue for 5 sec.	—	• Intake air temperature sensor (defective or disconnected)
H15	Outdoor compressor temperature sensor abnormality	Continue for 5 sec.	—	• Compressor temperature sensor (defective or disconnected)
H16	Outdoor Current Transformer open circuit	—	—	• Outdoor PCB • IPM (Power transistor) module
H19	Indoor fan motor merchanism lock	—	—	• Indoor PCB • Fan motor
H23	Indoor heat exchanger temperature sensor abnormality	Continue for 5 sec.	O (Cooling only)	• Heat exchanger temperature sensor (defective or disconnected)
H24	Indoor heat exchanger temperature sensor 2 abnormality	Continue for 5 sec.	—	• Heat exchanger temperature sensor 2 (defective or disconnected)
H26	Ion abnormality	—	—	• Indoor PCB • Ion
H27	Outdoor air temperature sensor abnormality	Continue for 5 sec.	O	• Outdoor temperature sensor (defective or disconnected)
H28	Outdoor heat exchanger temperature sensor abnormality	Continue for 5 sec.	O	• Outdoor heat exchanger temperature sensor (defective or disconnected)
H30	Discharge temperature sensor abnormality	Continue for 5 sec.	—	• Discharge temperature sensor
H33	Indoor/Outdoor wrong connection	—	—	• Indoor/Outdoor supply voltage
H38	Indoor/Outdoor mismatch	—	—	—
H97	Outdoor Fan Motor lock abnormality	2 times occurrence within 30 minutes	—	• Outdoor PCB • Outdoor Fan Motor
H98	Indoor high pressure protection	—	—	• Air filter dirty • Air circulation short circuit
H99	Indoor heat exchanger anti-freezing protection	—	—	• Insufficient refrigerant • Air filter dirty
F11	Cooling / Heating cycle changeover abnormality	4 times occurrence within 30 minutes	—	• 4-way valve • V-coil
F90	PFC control	4 times occurrence within 10 minutes	—	• Voltage at PFC
F91	Refrigeration cycle abnormality	2 times occurrence within 20 minutes	—	• No refrigerant (3-way valve is closed)
F93	Outdoor compressor abnormal revolution	4 times occurrence within 20 minutes	—	• Outdoor compressor
F95	Cool high pressure protection	4 times occurrence within 20 minutes	—	• Outdoor refrigerant circuit
F96	IPM (power transistor) overheating protection	—	—	• Excess refrigerant • Improper heat radiation • IPM (Power transistor)
F97	Outdoor compressor overheating protection	4 times occurrence within 20 minutes	—	• Insufficient refrigerant • Compressor
F98	Total running current protection	3 times occurrence within 20 minutes	—	• Excess refrigerant • Improper heat radiation
F99	Outdoor Direct Current (DC) peak detection	7 times occurrence continuously	—	• Outdoor PCB • IPM (Power transistor) • Compressor

Note:
“O” - Frequency measured and fan speed fixed.

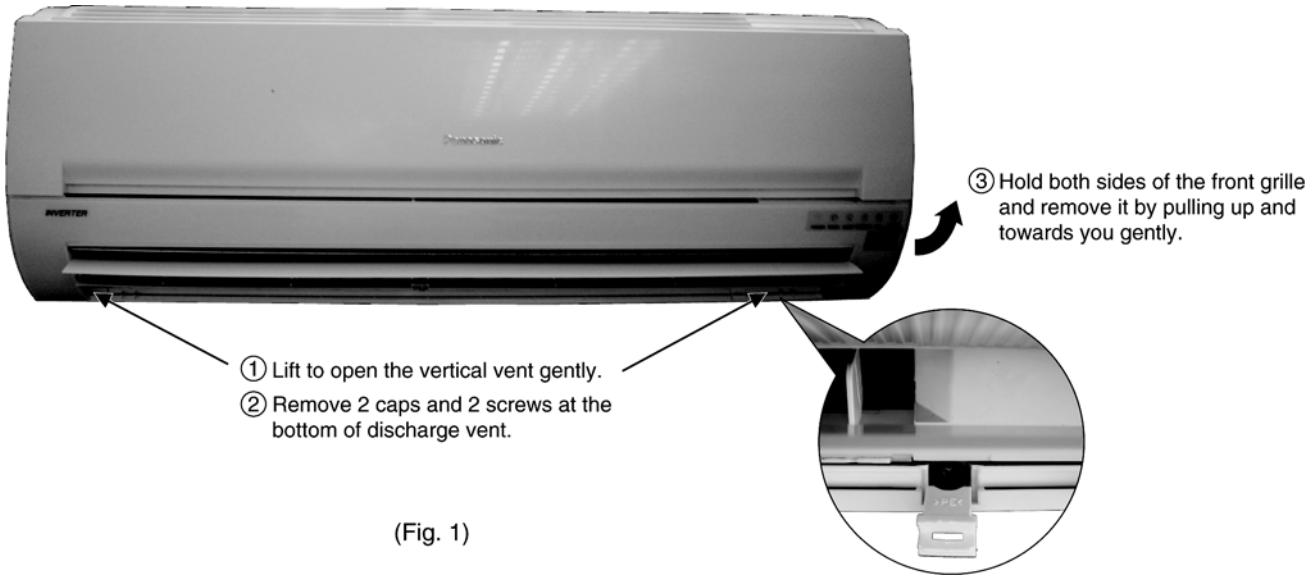
The memory data of error code is erased when the power supply is cut off, or press the Auto Switch until “beep” sound heard following by pressing the “CHECK” button at Remote Control.
Although operation forced to stop when abnormality detected, emergency operation is possible for certain errors (refer to Error Codes Table) by using Remote Control or Auto Switch at indoor unit. However, the Remote Control signal receiving sound is changed from one “beep” to four “beep” sounds.

16 Disassembly and Assembly Instructions

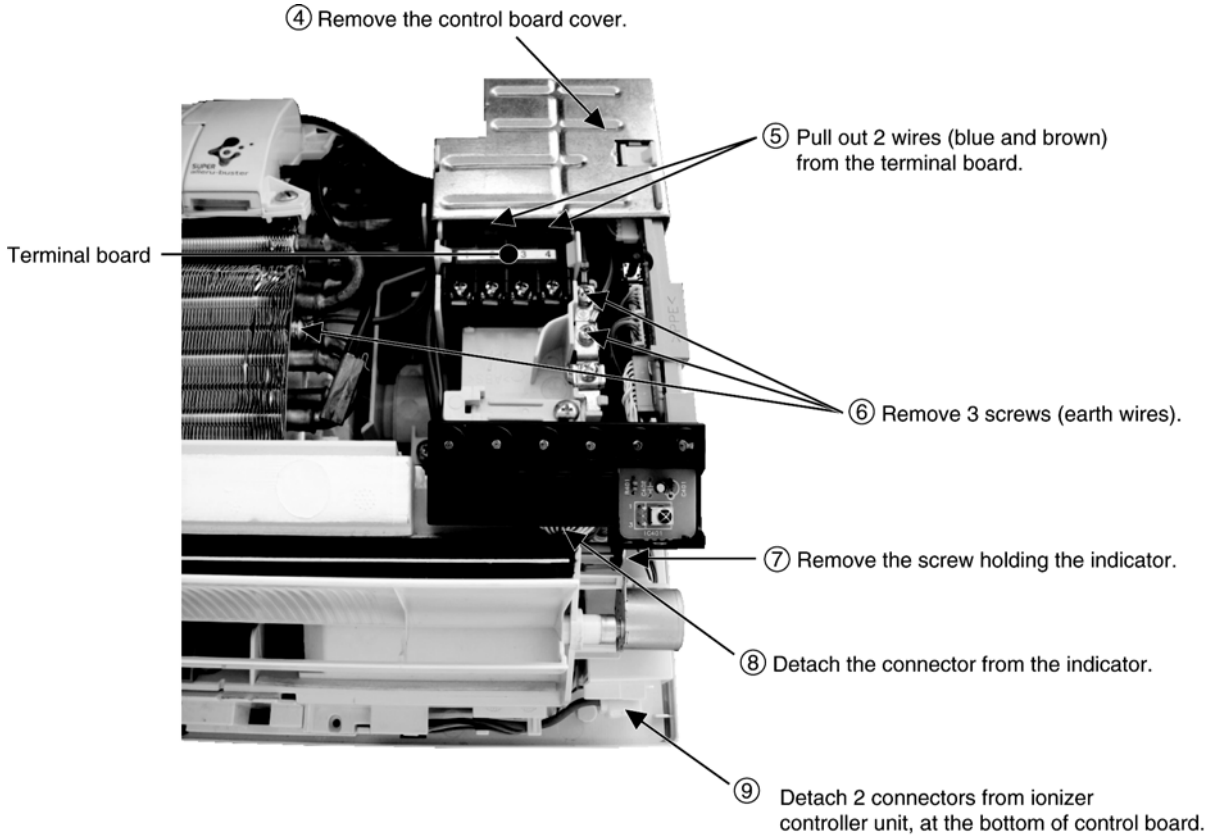
⚠ WARNING

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

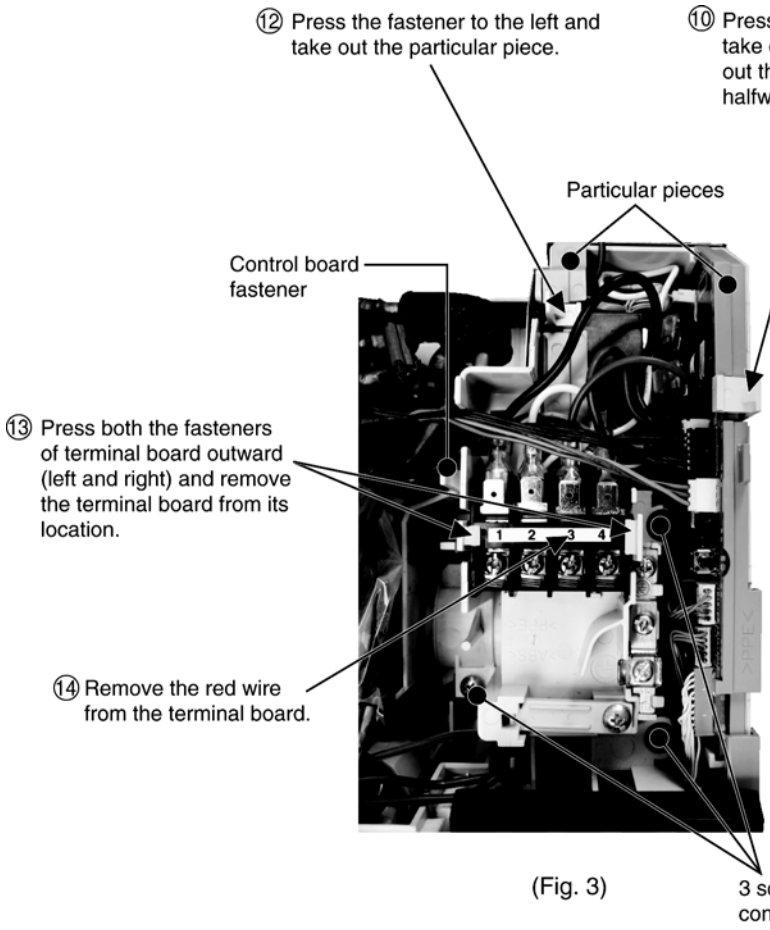
16.1. Indoor Electronic Controllers and Control Board



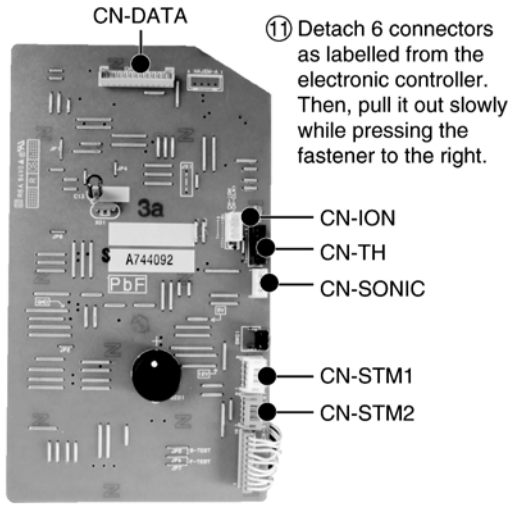
(Fig. 1)



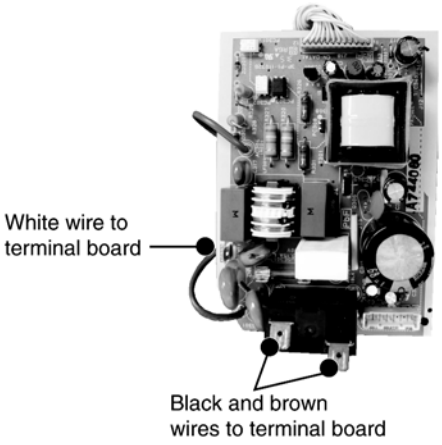
(Fig. 2)



(Fig. 3)

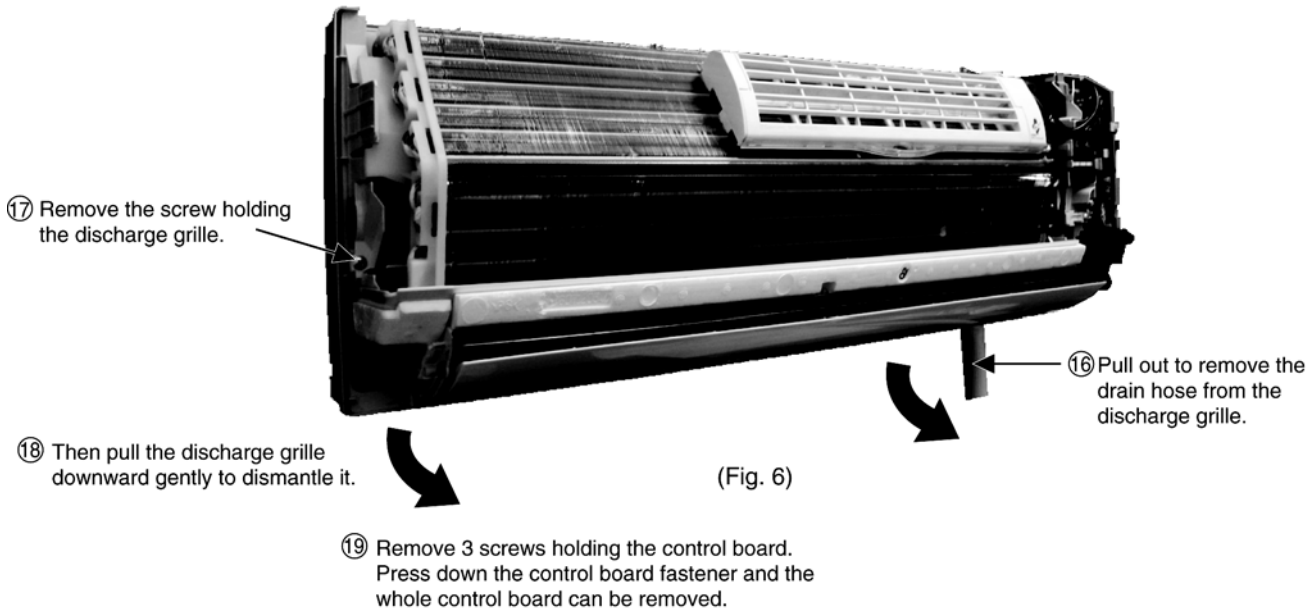


(Fig. 4)



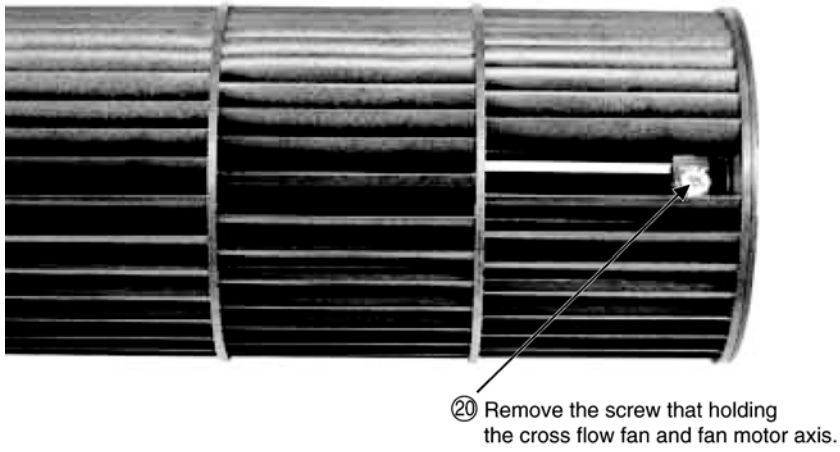
⑮ Detach 3 wires and one connector as labelled from the electronic controller. Then, pull it out slowly while pressing the fastener to the left.

(Fig. 5)

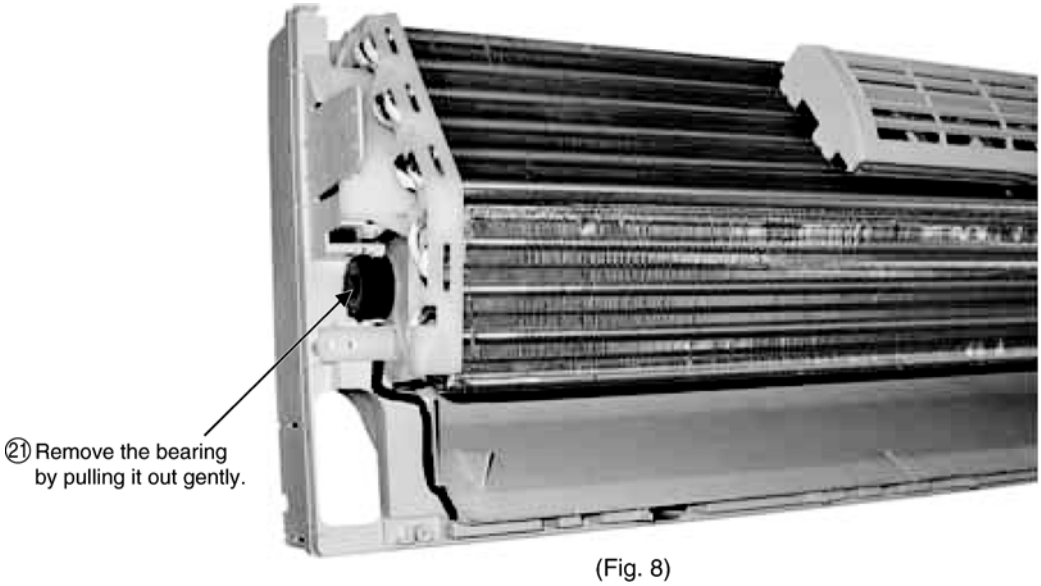


(Fig. 6)

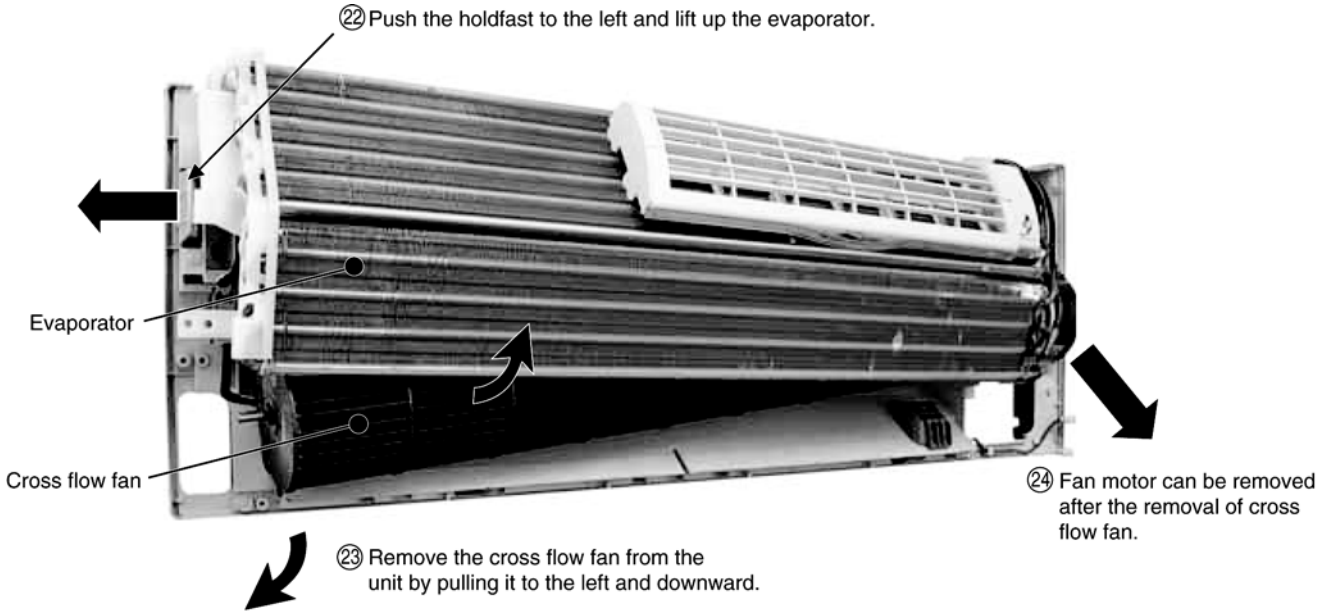
16.2. Indoor Cross Flow Fan and Fan Motor



(Fig. 7)


㉑ Remove the bearing
by pulling it out gently.

(Fig. 8)


㉒ Push the holdfast to the left and lift up the evaporator.
Evaporator
Cross flow fan
㉔ Fan motor can be removed
after the removal of cross
flow fan.
㉓ Remove the cross flow fan from the
unit by pulling it to the left and downward.

(Fig. 9)

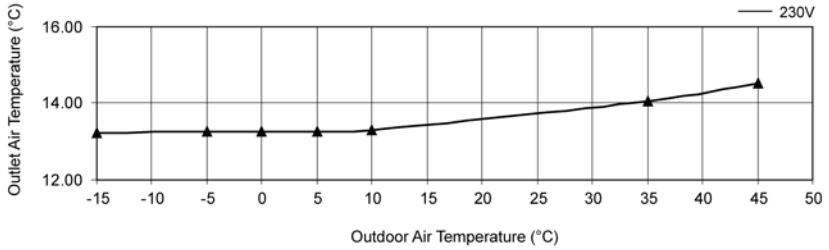
17 Technical Data

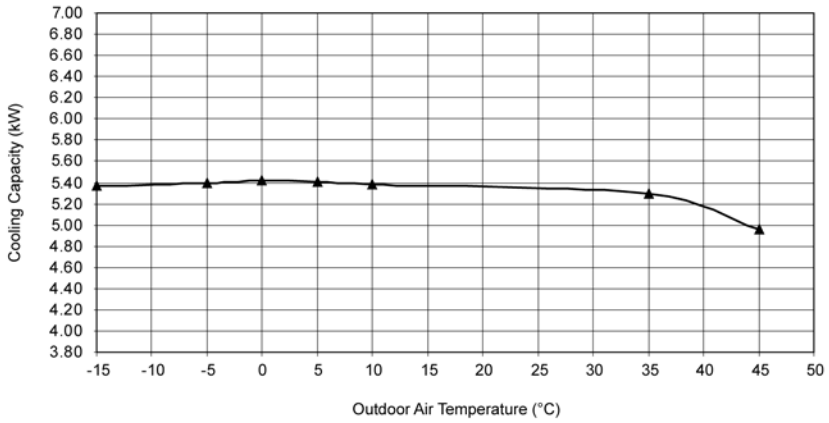
17.1. Operation Characteristics

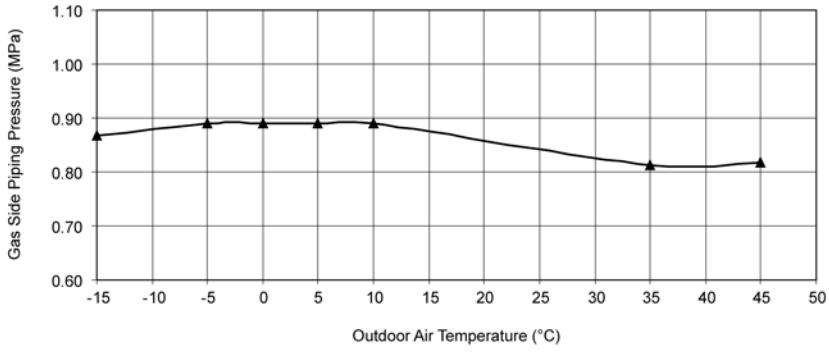
17.1.1. CS-E18HKEA CU-E18HKEA

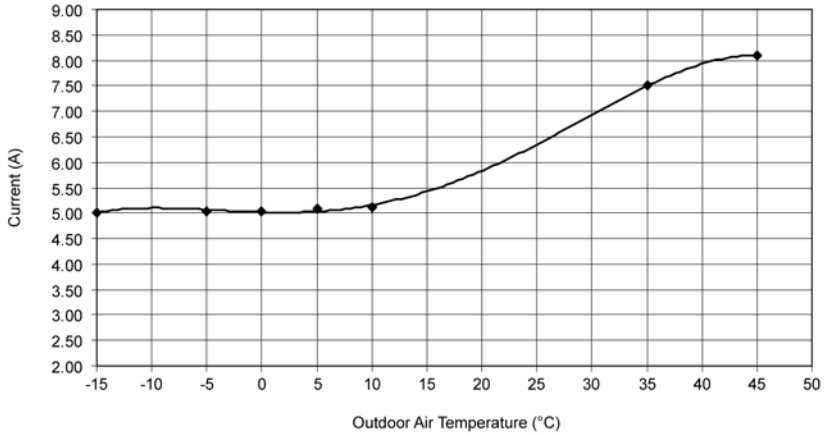
- **Cooling Characteristic**

[Condition] Room temperature : 27/19°C
Operation condition : At High fan
Piping length : 5 m



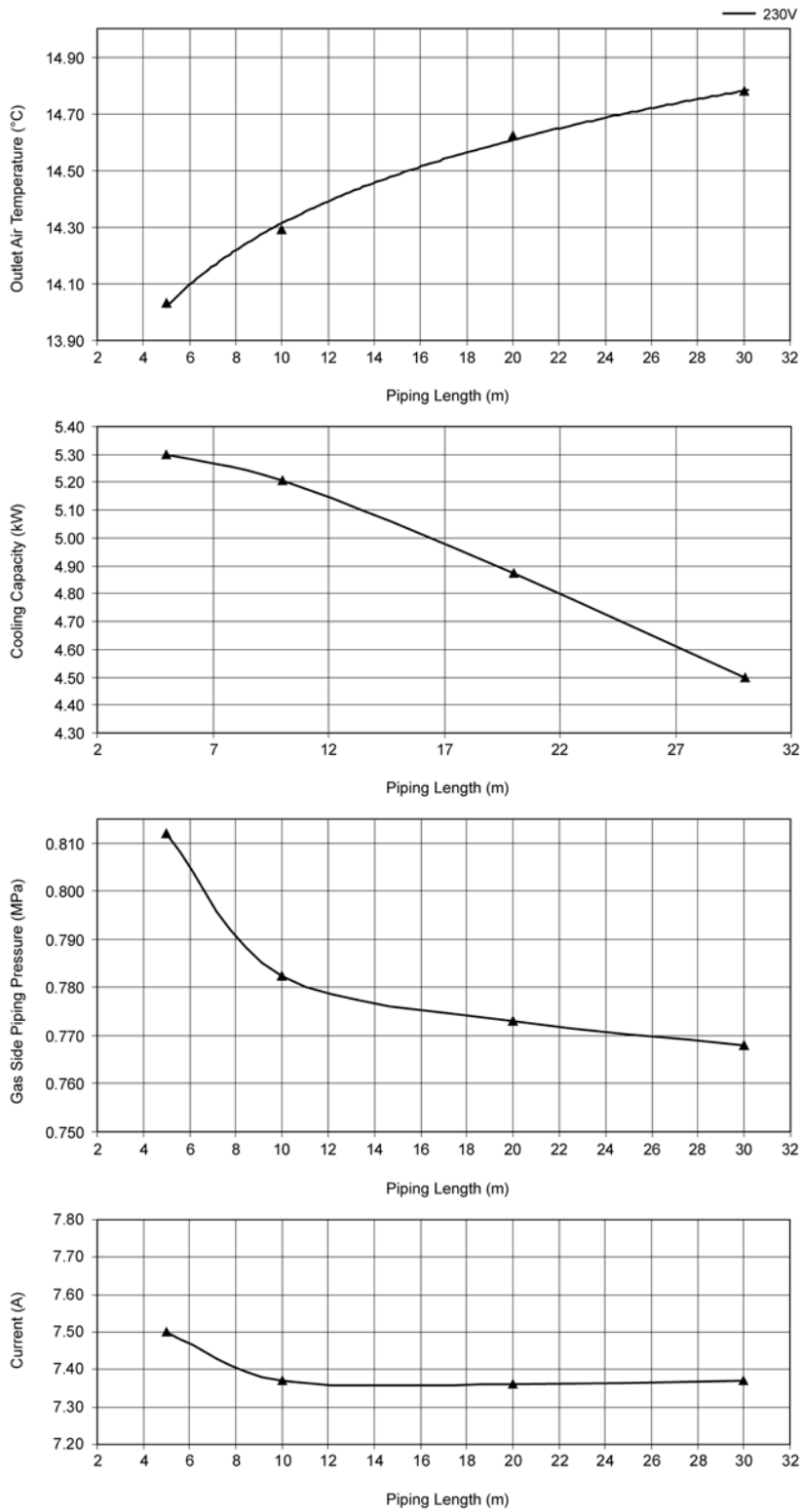






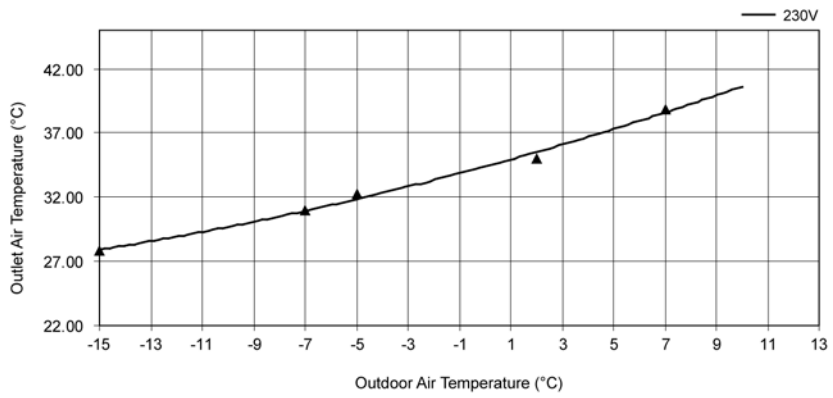
● Piping Length Characteristic

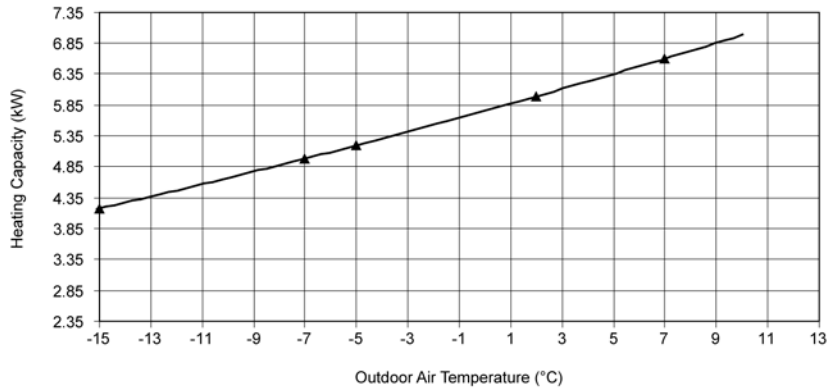
[Condition] Room temperature : 27/19°C
Outdoor temperature: 35/24°C
Operation condition : At High fan

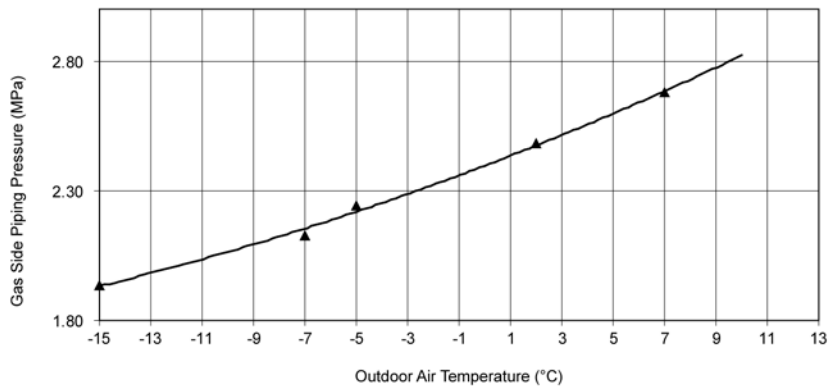


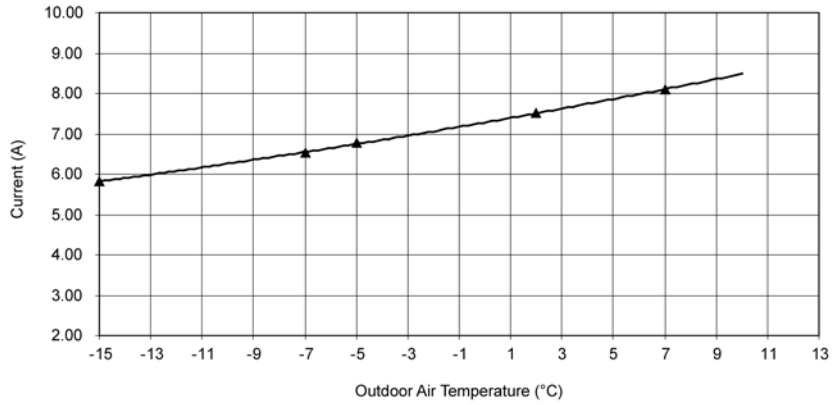
● Heating Characteristic

[Condition] Room temperature : 20°C
Operation condition : At High fan
Piping length : 5 m



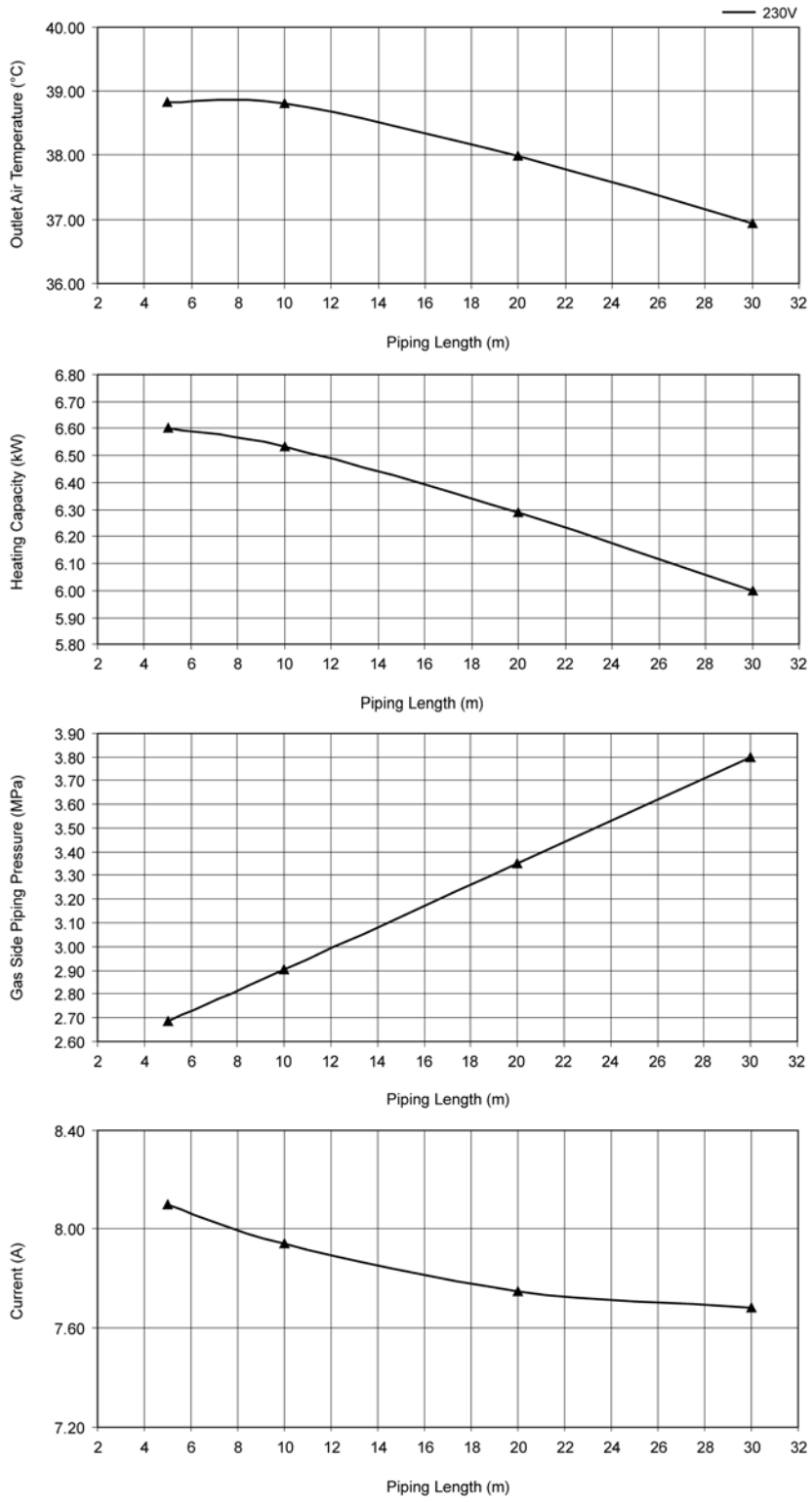






● Piping Length Characteristic (Heating)

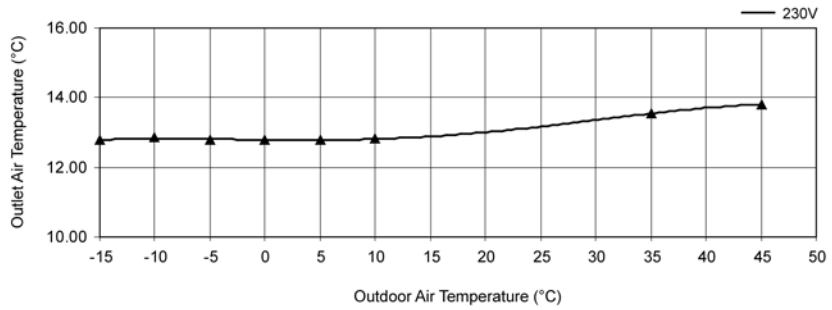
[Condition] Room temperature : 20°C
Outdoor temperature: 7/6°C
Operation condition : At High fan

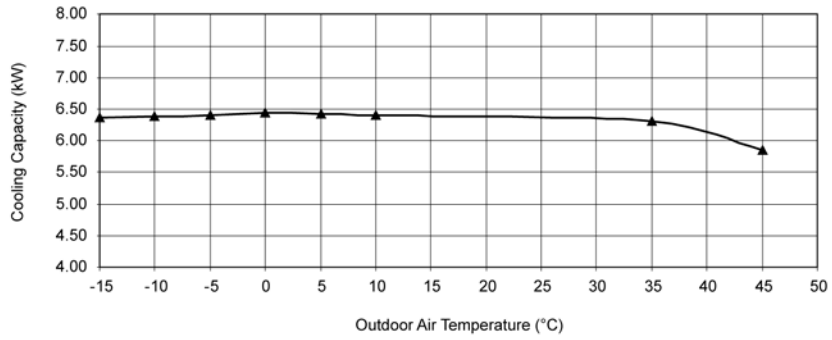


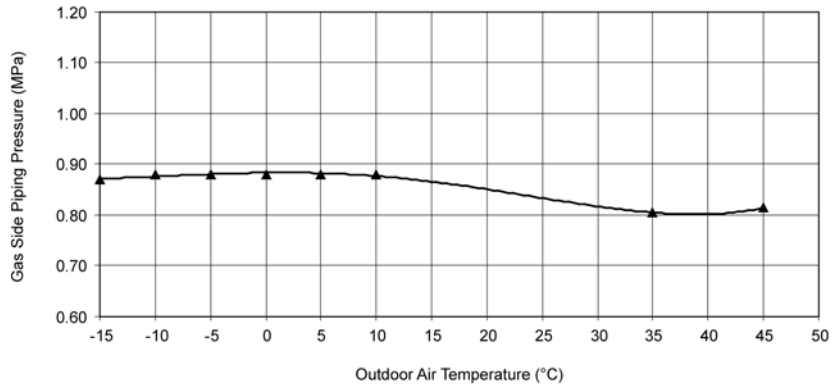
17.1.2. CS-E21HKEA CU-E21HKEA

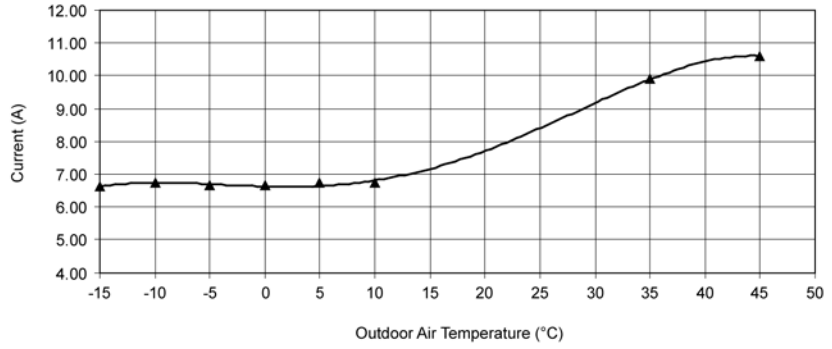
- **Cooling Characteristic**

[Condition] Room temperature : 27/19°C
Operation condition : At High fan
Piping length : 5 m



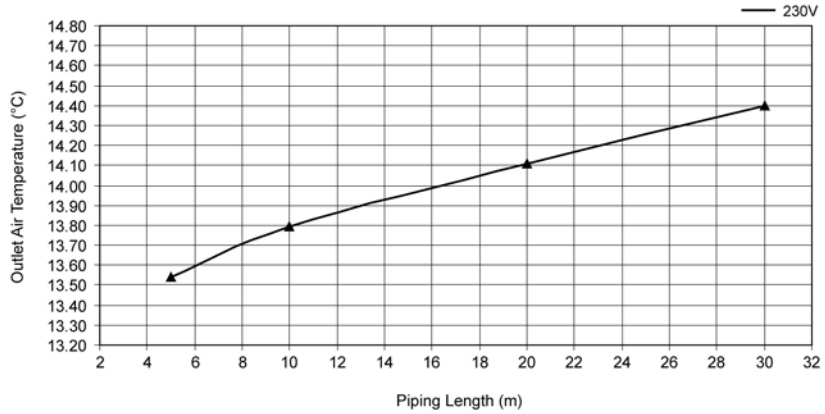


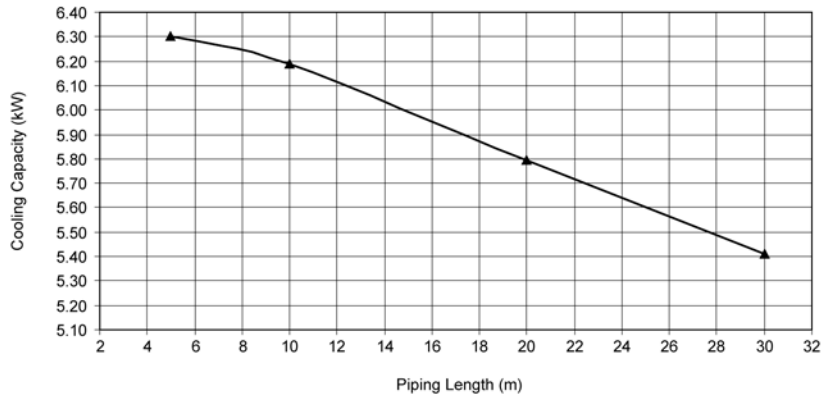


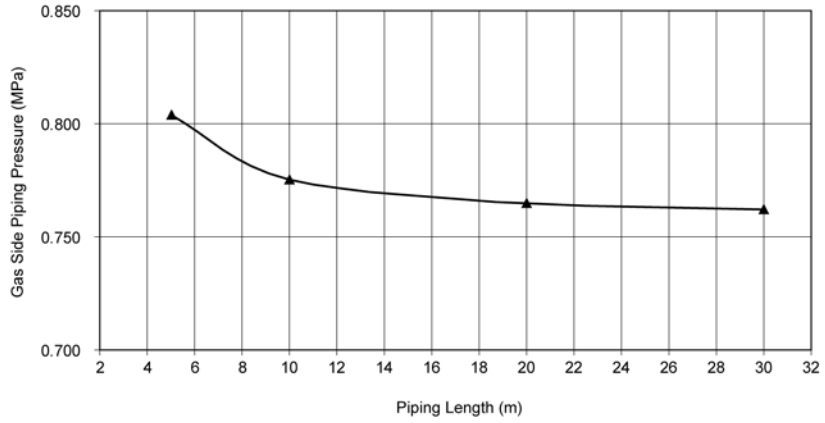


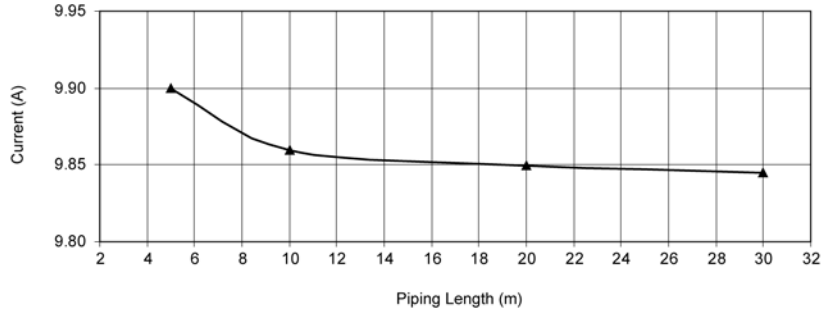
● Piping Length Characteristic

[Condition] Room temperature : 27/19°C
Outdoor temperature: 35/24°C
Operation condition : At High fan



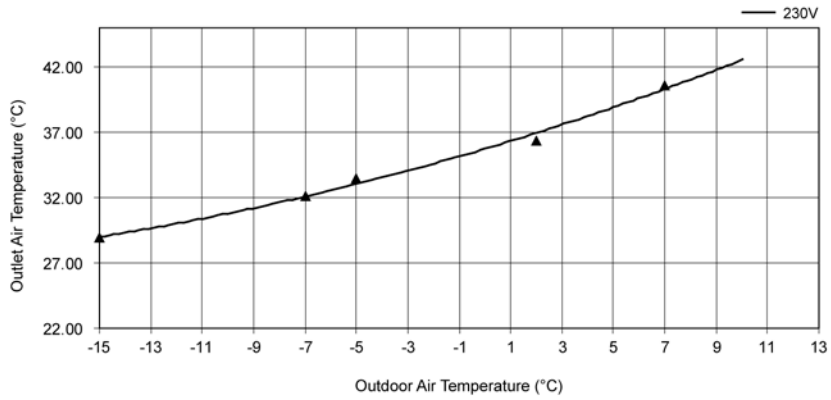


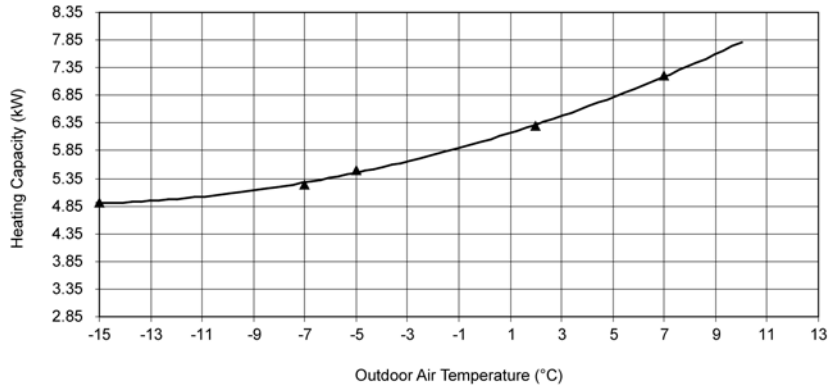


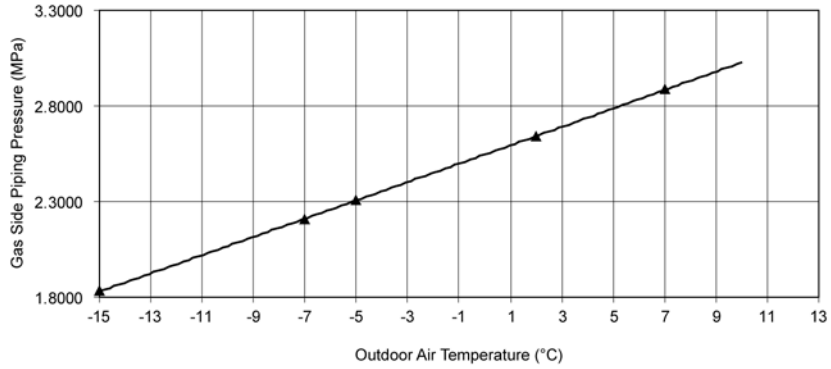


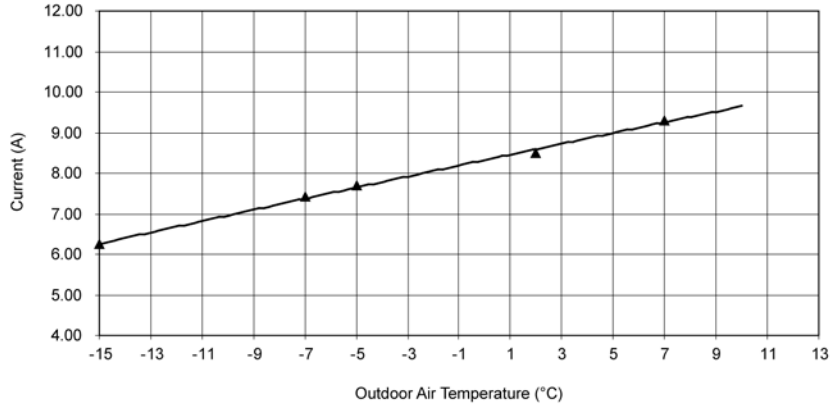
● Heating Characteristic

[Condition] Room temperature : 20°C
Operation condition : At High fan
Piping length : 5 m



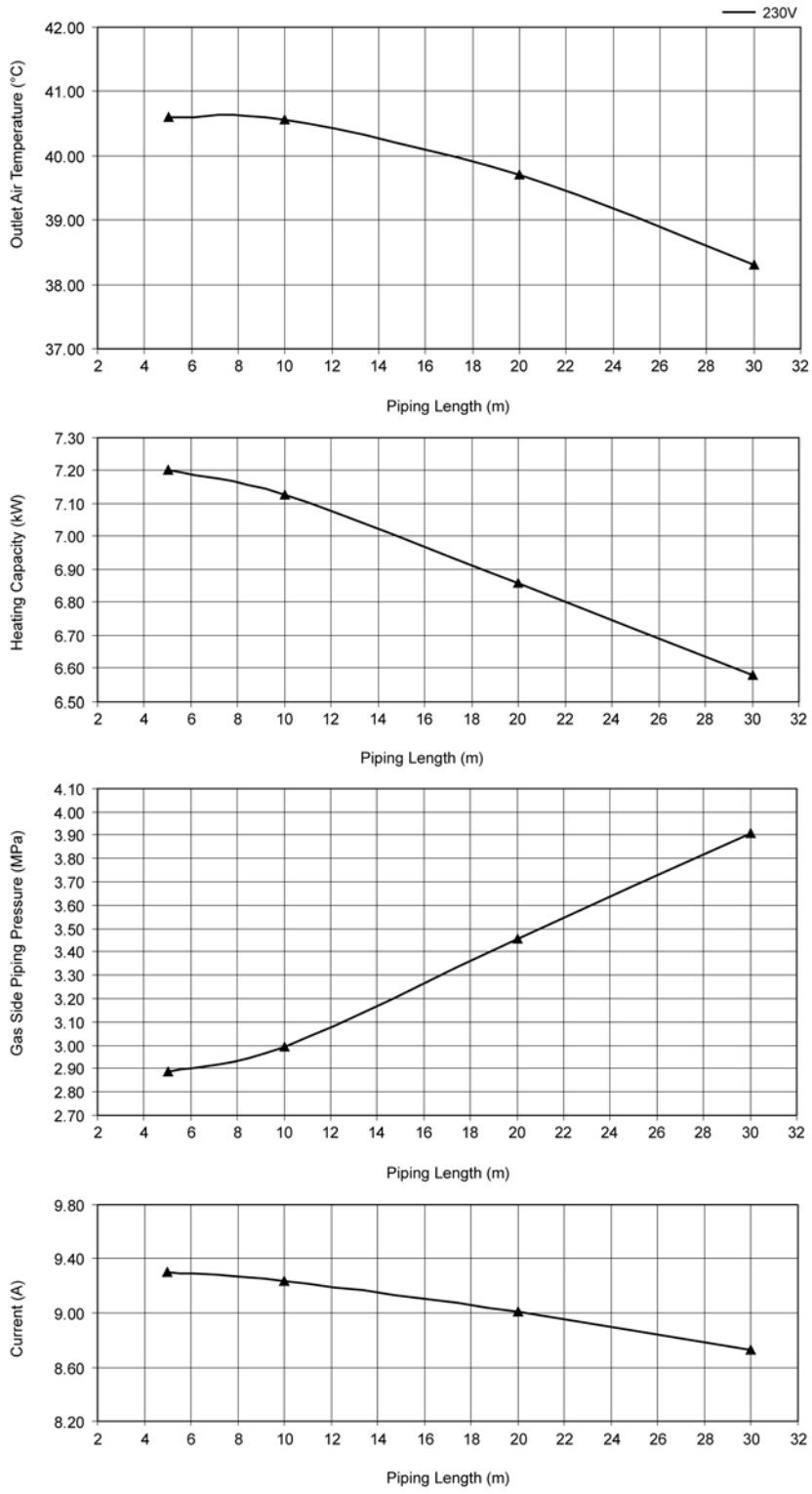






● Piping Length Characteristic (Heating)

[Condition] Room temperature : 20°C
Outdoor temperature: 7/6°C
Operation condition : At High fan



17.2. Sensible Capacity Chart

● **CS-E18HKEA CU-E18HKEA**

Indoor wet bulb temp.	Outdoor Temp. (°C)											
	30			35			40			46		
	TC	**SHC**	**IP**	**TC**	**SHC**	**IP**	**TC**	**SHC**	**IP**	**TC**	**SHC**	**IP**
17.0°C	5.26	3.99	1.51	4.91	3.82	1.63	4.57	3.67	1.74	4.16	3.49	1.88
19.0°C				5.30		1.65						
19.5°C	5.77	4.17	1.54	5.40	4.01	1.66	5.02	3.86	1.77	4.56	3.67	1.91
22.0°C	6.29	4.33	1.57	5.88	4.16	1.69	5.47	4.01	1.80	4.97	3.83	1.95

● **CS-E21HKEA CU-E21HKEA**

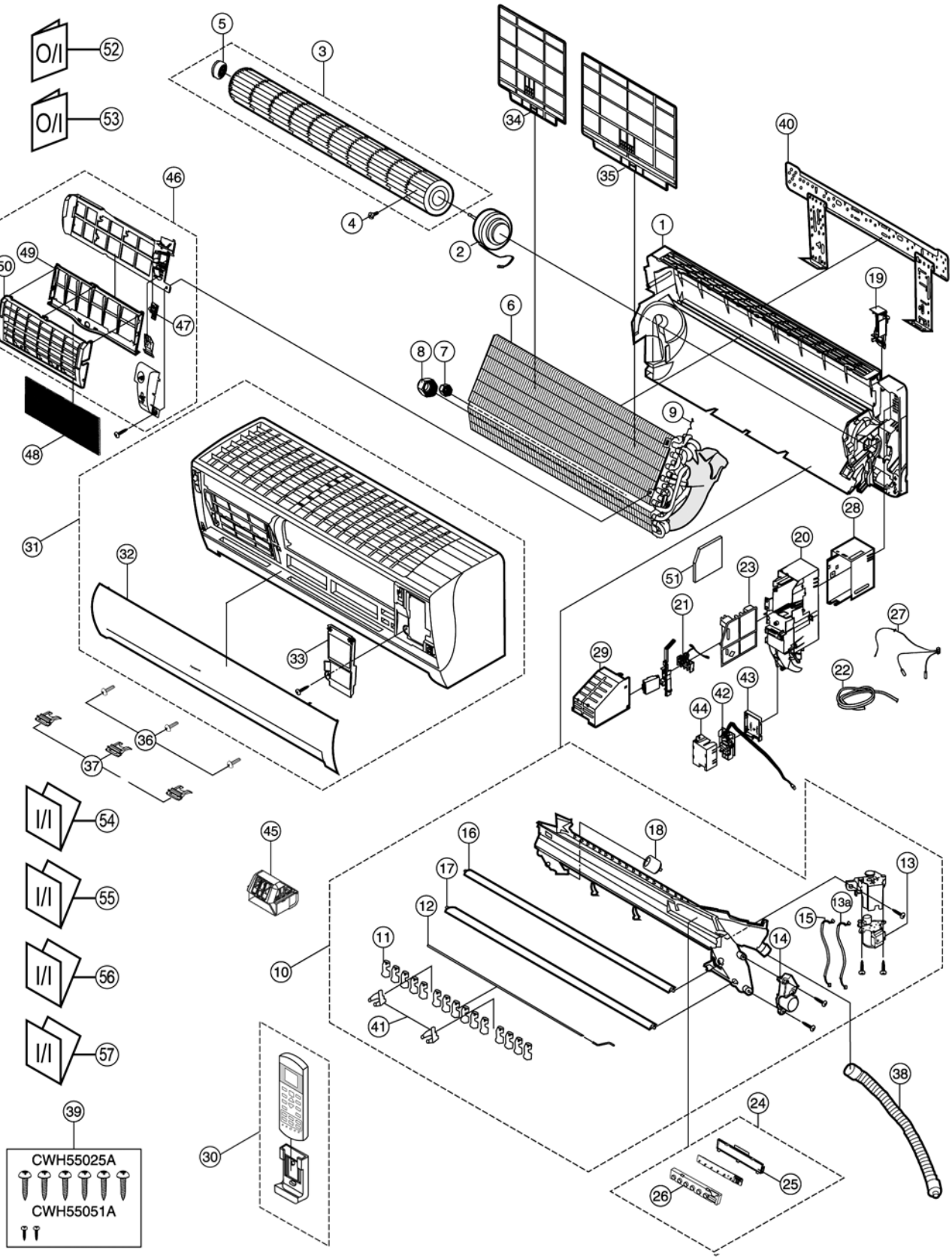
Indoor wet bulb temp.	Outdoor Temp. (°C)											
	30			35			40			46		
	TC	**SHC**	**IP**	**TC**	**SHC**	**IP**	**TC**	**SHC**	**IP**	**TC**	**SHC**	**IP**
17.0°C	6.25	4.74	2.02	5.84	4.54	2.18	5.43	4.37	2.33	4.94	4.15	2.51
19.0°C				6.30		2.21						
19.5°C	6.86	4.96	2.06	6.41	4.77	2.22	5.97	4.59	2.37	5.42	4.37	2.56
22.0°C	7.48	5.14	2.10	6.99	4.95	2.26	6.50	4.77	2.42	5.91	4.55	2.61

TC - Total Cooling Capacity (kW)
SHC - Sensible Heat Capacity (kW)
IP - Input Power (kW)

Indoor 27°C/19°C
Outdoor 35°C/24°C

18 Exploded View and Replacement Parts List

18.1. CS-E18HKEA CS-E21HKEA



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.

<Model: CS-E18HKEA, CS-E21HKEA>

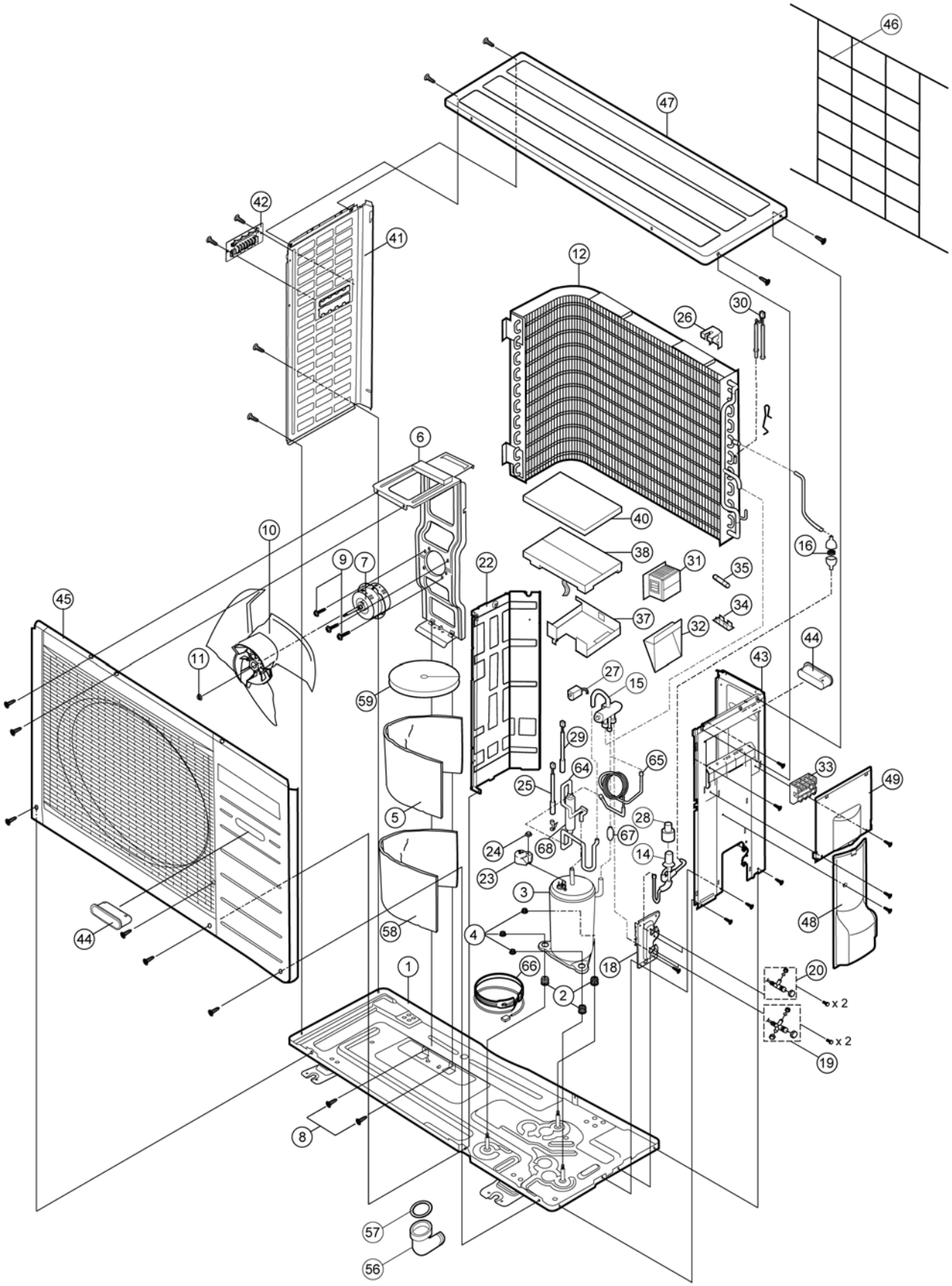
REF NO.	PART NAME & DESCRIPTION	QTY.	CS-E18HKEA	CS-E21HKEA	REMARKS
1	CHASSY COMPLETE	1	CWD50C1382	←	
2	FAN MOTOR	1	CWA981149CB	←	O
3	CROSS FLOW FAN COMPLETE	1	CWH02C1010	←	
4	SCREW - CROSS FLOW FAN	1	CWH551146	←	
5	BEARING ASS'Y	1	CWH64K007	←	
6	EVAPORATOR	1	CWB30C1859	←	
7	FLARE NUT (1/4")	1	CWT251030	←	
8	FLARE NUT (1/2")	1	CWT251032	←	
9	HOLDER SENSOR	1	CWH32143	←	
10	DISCHARGE GRILLE COMPLETE	1	CWE20C2441	←	
11	VERTICAL VANE	15	CWE241088	←	
12	CONNECTING BAR	1	CWE261025	←	
13	AIR SWING MOTOR	1	CWA98260+MJ	←	O
13a	LEAD WIRE - AIR SWING MOTOR	1	CWA67C3849	←	
14	AIR SWING MOTOR	1	CWA98K1008	←	O
15	LEAD WIRE - AIR SWING MOTOR	1	CWA67C4445	←	
16	HORIZONTAL VANE	1	CWE241152A	←	
17	HORIZONTAL VANE	1	CWE241153A	←	
18	CAP - DRAIN TRAY	1	CWH521096	←	
19	BACK COVER CHASSIS	1	CWD932162B	←	
20	CONTROL BOARD CASING	1	CWH102334	←	
21	TERMINAL BOARD COMPLETE	1	CWA28C2305	←	O
22	POWER SUPPLY CORD	1	CWA20C2493	←	
23	ELECTRONIC CONTROLLER - MAIN	1	CWA73C3248	CWA73C3249	O
24	INDICATOR COMPLETE	1	CWE39C1116	←	O
25	INDICATOR HOLDER	1	CWD932435	←	
26	INDICATOR HOLDER	1	CWD932436	←	
27	SENSOR COMPLETE	1	CWA50C2322	←	O
28	CONTROL BOARD TOP COVER	1	CWH131209	←	
29	CONTROL BOARD FRONT COVER	1	CWH131210	←	
30	REMOTE CONTROL COMPLETE	1	CWA75C3192	←	O
31	FRONT GRILLE COMPLETE	1	CWE11C3974	←	O
32	INTAKE GRILLE COMPLETE	1	CWE22C1159	←	O
33	GRILLE DOOR	1	CWE141076	←	
34	AIR FILTER (L)	1	CWD001137	←	
35	AIR FILTER (R)	1	CWD001138	←	
36	SCREW - FRONT GRILLE	3	XTT4+16CFJ	←	
37	CAP - FRONT GRILLE	3	CWH521062A	←	
38	DRAIN HOSE	1	CWH851063	←	
39	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C067	←	
40	INSTALLATION PLATE	1	CWH36K1007	←	
41	FULCRUM	2	CWH621047	←	
42	ELECTRONIC CONTROLLER - IONIZER	1	CWA743675	←	
43	CASING - IONIZER	1	CWD932464	←	
44	CASING - IONIZER	1	CWD932527	←	
45	ION - GENERATOR	1	CWH94C0001	←	
46	SUPERSONIC AIR PURIFYING DEVICE	1	CWH91C1013	←	
47	ELECTRONIC CONTROLLER SUPERSONIC	1	CWA743874	←	
48	SUPER ALLERU BUSTER FILTER	1	CWD00C1133	←	
49	FRAME FOR AIR FILTER SUPERSONIC	1	CWD011027	←	
50	FRAME FOR AIR FILTER SUPERSONIC	1	CWD011026	←	
51	ELECTRONIC CONTROLLER - POWER	1	CWA745229	←	O
52	OPERATING INSTRUCTION	1	CWF565939	←	

53	OPERATING INSTRUCTION	1	CWF565940	←	
54	INSTALLATION INSTRUCTION	1	CWF613423	←	
55	INSTALLATION INSTRUCTION	1	CWF613424	←	
56	INSTALLATION INSTRUCTION	1	CWF613425	←	
57	INSTALLATION INSTRUCTION	1	CWF613426	←	

(Note)

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

18.2. CU-E18HKEA CU-E21HKEA



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.

<Model: CU-E18HKEA CU-E21HKEA>

REF. NO.	DESCRIPTION & NAME	QTY.	CU-E18HKEA	CU-E21HKEA	REMARKS
1	CHASSY ASS'Y	1	CWD50K2085	←	
2	ANTI-VIBRATION BUSHING	3	CWH50077	←	
3	COMPRESSOR	1	5CS130XAE04	←	O
4	NUT-COMPRESSOR MOUNT	3	CWH56000J	←	
5	SOUND PROOF MATERIAL	1	CWG302302	←	
6	FAN MOTOR BRACKET	1	CWD541054	←	
7	FAN MOTOR	1	CWA981166J	←	O
8	SCREW - FAN MOTOR BRACKET	2	CWH551217	←	
9	SCREW - FAN MOTOR MOUNT	3	CWH551106J	←	
10	PROPELLER FAN ASSY	1	CWH03K1016	←	
11	NUT - PROPELLER FAN	1	CWH56053J	←	
12	CONDENSER COMPLETE	1	CWB32C2451	CWB32C2487	
14	TUBE ASS'Y (EXP. VALVE)	1	CWT023679	←	O
15	4 WAYS VALVE	1	CWB001026J	←	
16	STRAINER	1	CWB11094	←	
18	HOLDER - COUPLING	1	CWH351056	←	
19	3 WAYS VALVE (GAS)	1	CWB011361	←	O
20	2 WAYS VALVE (LIQUID)	1	CWB021292	←	O
22	SOUND PROOF BOARD	1	CWH151050	←	
23	TERMINAL COVER	1	CWH171039A	←	
24	NUT-TERMINAL COVER	1	CWH7080300J	←	
25	SENSOR COMPLETE (COMP. TOP)	1	CWA50C2185	←	
26	HOLDER SENSOR	1	CWMH320001	←	
27	V-COIL COMPLETE (4-WAYS VALVE)	1	CWA43C2168J	←	
28	V-COIL COMPLETE (EXPAND VALVE)	1	CWA43C2058J	←	
29	SENSOR COMPLETE (COMP. DISC.)	1	CWA50C2180	←	
30	SENSOR COMPLETE	1	CWA50C2181	←	
31	REACTOR	1	CWA421069	←	
32	CONTROL BOARD CASING (SIDE)	1	CWH102273	←	
33	TERMINAL BOARD ASSY	1	CWA28K1036J	←	
34	FUSE HOLDERS	1	K3GB1PH00016	←	
35	FUSE	1	K5D303BBA002	←	
37	CONTROL BOARD CASING (BOTTOM)	1	CWH102282	←	
38	ELECTRONIC CONTROLLER - MAIN	1	CWA73C3256R	CWA73C3257R	O
40	CONTROL BOARD COVER (TOP)	1	CWH131167	←	
41	CABINET SIDE PLATE (LEFT)	1	CWE041255A	CWE041082A	
42	HANDLE	1	CWE161010	←	
43	CABINET SIDE PLATE (RIGHT)	1	CWE041158A	←	
44	HANDLE	2	CWE16000E	←	
45	CABINET FRONT PLATE CO.	1	CWE06K1043	←	
46	WIRE NET	1	CWD041041A	←	
47	CABINET TOP PLATE	1	CWE031031A	←	
48	CONTROL BOARD COVER (BOTTOM)	1	CWH131168	←	
49	CONTROL BOARD COVER (TOP)	1	CWH131169A	←	
56	DRAIN HOSE	1	CWH5850080	←	
57	PACKING	1	CWB81012	←	
58	SOUND PROOF MATERIAL	1	CWG302270	←	
59	SOUND PROOF MATERIAL	1	CWG302300	←	
64	OIL SEPARATOR ASS'Y	1	—	CWB16K1008	
65	TUBE ASS'Y (CAP.TUBE)	1	—	CWT022997	
66	HEATER	1	CWA341039	←	
67	ACCUMULATOR	1	CWB131024	←	
68	RECEIVER	1	CWB14011	—	

(Note)

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

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