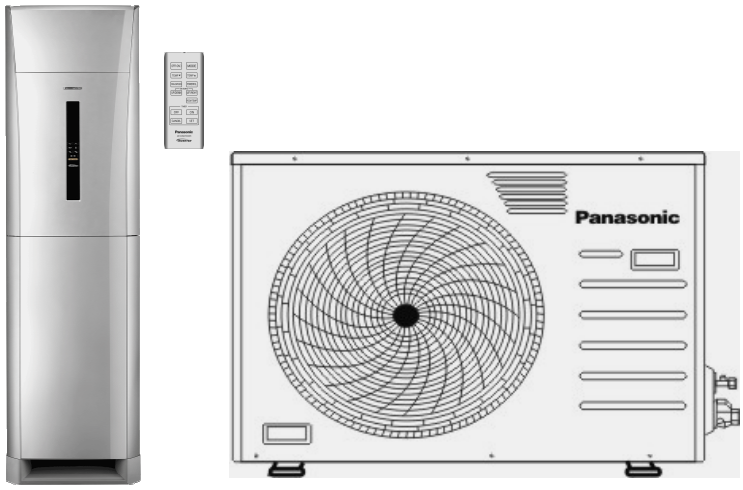
Order No: PAPAGZ120511CE

Service Manual

Air Conditioner

Indoor Unit CS-E28NFQ
Outdoor Unit CU-E28NFQ



⚠ WARNING

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

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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:

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

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

WARNING	
	1. 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.
	2. Do not use unspecified cord, modified cord, joint cord or extension cord for power supply cord. Do not share the single outlet with other appliances. Poor contact, poor insulation or over current will cause electrical shock or fire.
	3. Do not tie up the power supply cord into a bundle by hand. Abnormal temperature rise on power supply cord may happen.
	4. Do not insert your fingers or other objects into the unit, high speed rotating fan may cause injury. 
	5. Do not sit or step on the unit, you may fall down accidentally. 
	6. Keep plastic bag (packaging material) away from small children, it may cling to nose and mouth and prevent breathing.
	7. When install or relocate air conditioner, do not let any substance other than the specified refrigerant, eg. air etc. mix into refrigeration cycle (piping). Mixing of air etc. will cause abnormal high pressure in refrigeration cycle and result in explosion, injury etc.
	8. • For R410A models, when connecting the piping, do not use any existing (R22) pipes and flare nuts. Using such same may cause abnormally high pressure in the refrigeration cycle (piping), and possibly result in explosion and injury. Use only R410A materials. • Thickness or copper pipes used with R410A must be more than 0.8 mm. Never use copper pipes thinner than 0.8 mm • It is desirable that the amount of residual oil is less than 40 mg/10 m.
	9. Engage dealer or specialist for installation. If installation done by the user is defective, it will cause water leakage, electrical shock or fire.
	10. Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electrical shock or fire.
	11. Use the attached accessories parts and specified parts for installation. Otherwise, it will cause the set to fall, water leakage, fire or electrical shock.
	12. 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.
	13. For electrical work, follow the local national wiring standard, regulation and this installation instruction. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or defect found in electrical work, it will cause electrical shock or fire.

14. Do not use joint cable for indoor/outdoor connection cable. Use the specified Indoor/Outdoor connection cable, refer to installation instructions CONNECT THE CABLE TO THE INDOOR UNIT and connect tightly for indoor / outdoor connection. Clamp the cable so that no external force will be acted on the terminal. If connection or fixing is not perfect, it will cause heat up or fire at the connection.
15. Wire routing must be properly arranged so that control board cover is fixed properly. If control board cover is not fixed perfectly, it will cause fire or electrical shock.
16. This equipment is strongly recommended to be installed with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case equipment breakdown or insulation breakdown.
17. During installation, install the refrigerant piping properly before running the compressor. Operation of compressor without fixing refrigeration piping and valves at opened condition will cause suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc.
18. During pump down operation, stop the compressor before remove the refrigeration piping. Removal of refrigeration piping while compressor is operating and valves are opened will cause suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc.
19. 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.
20. After completion of installation or service, confirm there is no leakage of refrigerant gas. It may generate toxic gas when the refrigerant contacts with fire.
21. Ventilate if there is refrigerant gas leakage during operation. It may cause toxic gas when the refrigerant contacts with fire.
22. The appliance shall be installed in accordance with national wiring regulations.
23. Indoor unit must be installed close against the wall.
24. This equipment must be properly earthed. Earth line must not be connected to gas pipe, water pipe, earth of lightning rod and telephone. Otherwise, it may cause electrical shock in case equipment breakdown or insulation breakdown.

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. Do not release refrigerant during piping work for installation, re-installation and during repairing a refrigeration parts. Take care of the liquid refrigerant, it may cause frostbite.
3. Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc.
4. Thermal fuse specification for indoor unit: 250V 3.15A T3.15AL; outdoor unit: 250V 3.15A T3.15AL,.
5. Do not touch sharp aluminums fin. Sharp parts may cause injury. 
6. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.
7. Select an installation location which is easy for maintenance.
8. Power supply connection to the air conditioner. Connect the power supply cord of the air conditioner to the mains using one of the following method. Power supply point should be in easily accessible place for power disconnection in case of emergency. In some countries, permanent connection of this air conditioner to the power supply is prohibited. Power supply connection to a circuit breaker for the permanent connection. Use an approved 25A circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3 mm contact gap.
7. Installation or servicing work. It may need two people to carry out the installation and service work.

2. Specification

Model			Indoor	CS-E28NFQ		
			Outdoor	CU-E28NFQ		
Power Supply			Phase, Hz	Single, 50/60		
			V	230		
				Min	Rate	Max
COOLING	Capacity		kW	1.00	7.20	7.50
			BTU/h	-	-	-
			kJ/h	3600	25920	27000
	Running Current		A	-	12.2	-
	Input Power		W	210	2550	2600
	EER		kJ/hW	17.1	10.1	10.3
			BTU/hW	-	-	-
	Power Factor		%	95		
	Indoor Noise		dB-A(H / L / QLo)	Hi: 43 Lo: 36 QLo: 33		
			Power Level	-		
	Outdoor Noise		dB-A (H / L)	Hi: 51 Lo: -		
			Power Level	-		
HEATING	Capacity		kW	1.00	8.30	10.35
			BTU/h	-	-	-
			kJ/h	3600	29880	37260
	Running Current		A	-	11.8	-
	Input Power		W	200	2500	3400
	COP		kJ/hW	18.0	11.9	10.9
			BTU/hW	-	-	-
	Power Factor		%	96		
	Indoor Noise		dB-A(H / L / QLo)	Hi: 43 Lo: 36 QLo: 33		
			Power Level	-		
	Outdoor Noise		dB-A (H / L)	Hi: 53 Lo: -		
			Power Level	-		
Max Current (A) / Max Input Power (W)				14.8 / 3.400k		
Starting Current (A)				12.9		
Compressor	Type			Hermetic Motor compressor		
	Motor Type			BRUSHLESS (4 poles)		
	Output Power		W	2000		
Indoor Fan	Type			Acentric-flow fan		
	Material			ASG30K1(AS+30%GF)		
	Motor Type			DC (8 poles)		
	Input Power		W	67.5		
	Output Power		W	48		
	Speed (COOLING)	Q-Lo	rpm	300		
		Lo	rpm	320		
		Me	rpm	380		
		Hi	rpm	440		
	Speed (HEATING)	Q-Lo	rpm	290		
		Lo	rpm	320		
		Me	rpm	380		
		Hi	rpm	430		
Outdoor Fan	Type			Propeller		
	Material			PP(GF+PD)30%		
	Motor Type			DC (8 poles)		

	Input Power		W	104.8	
	Output Power		W	60	
	Speed	Hi(C)	rpm	690	
		Hi(H)	rpm	690	
Moisture Removal			L/h (Pt/h)	4.2 (7.39)	
Indoor Airflow (COOLING)	Q-Lo		m^3/min (ft^3/m)	6.51(230)	
	Lo		m^3/min (ft^3/m)	7.60(368)	
	Me		m^3/min (ft^3/m)	10.0(353)	
	Hi		m^3/min (ft^3/m)	16.0 (565)	
Indoor Airflow (HEATING)	Q-Lo		m^3/min (ft^3/m)	6.94 (245)	
	Lo		m^3/min (ft^3/m)	7.57 (267)	
	Me		m^3/min (ft^3/m)	8.86 (313)	
	Hi		m^3/min (ft^3/m)	16.0 (565)	
Outdoor Airflow	Hi (Cooling)		m^3/min (ft^3/m)	59.5 (2100)	
	Hi (Heating)		m^3/min (ft^3/m)	59.5 (2100)	
Refrigeration Cycle	Control Device			EXPANSION VALVE	
	Refrigerant Oil		cm^3	FV50S (480)	
	Refrigerant Type		g (oz)	R410A, 640 (22.6)	
Dimension	Height(I/D / O/D)		mm (inch)	1880 (74-1/64)	700 (27-9/16)
	Width (I/D / O/D)		mm (inch)	540 (21-16/64)	998 (39-19/64)
	Depth (I/D / O/D)		mm (inch)	357 (14-1/16)	320 (12-19/32)
Weight	Net (I/D / O/D)		kg (lb)	37 (82)	46 (101)
Piping	Pipe Diameter (Liquid / Gas)		mm (inch)	6.35 (1/4) / 12.70 (1/2)	
	Standard length		m (ft)	5 (16.4)	
	Length range (min – max)		m (ft)	3 (9.8) ~ 15 (49.2)	
	I/D & O/D Height different		m (ft)	10 (32.8)	
	Additional Gas Amount		g/m (oz/ft)	20 (0.2)	
	Length for Additional Gas		m (ft)	7.0 (23.0)	
Drain Hose	Inner diameter		mm	16	
	Length		mm	690	
Indoor Heat Exchanger	Fin Material			Pre coated	
	Fin Type			Slit Fin	
	Row x Stage x FPI			2 x 36 x 19	
	Size (W x H x L)		mm	380 x 756 x 25.4	
Outdoor Heat Exchanger	Fin Material			Pre coated	
	Fin Type			Slit Fin	
	Row x Stage x FPI			2 x 26 x 19	
	Size (W x H x D)		mm	969.4(934.8) x 660 x 44	
Air Filter	Material			PP-12X13H2	
	Type			One-touch	
Power Supply				Indoor	
Power Supply Cord			A	25A	
Thermostat				-	
Protection Device				-	

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

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

3. Feature

- R410A refrigerant

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

- Long Installation Piping
  - CS/CU-E28NFQ, long piping up to 15 meters.

- Easy to use wireless remote control

- Automatic movable panel of discharge grille

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

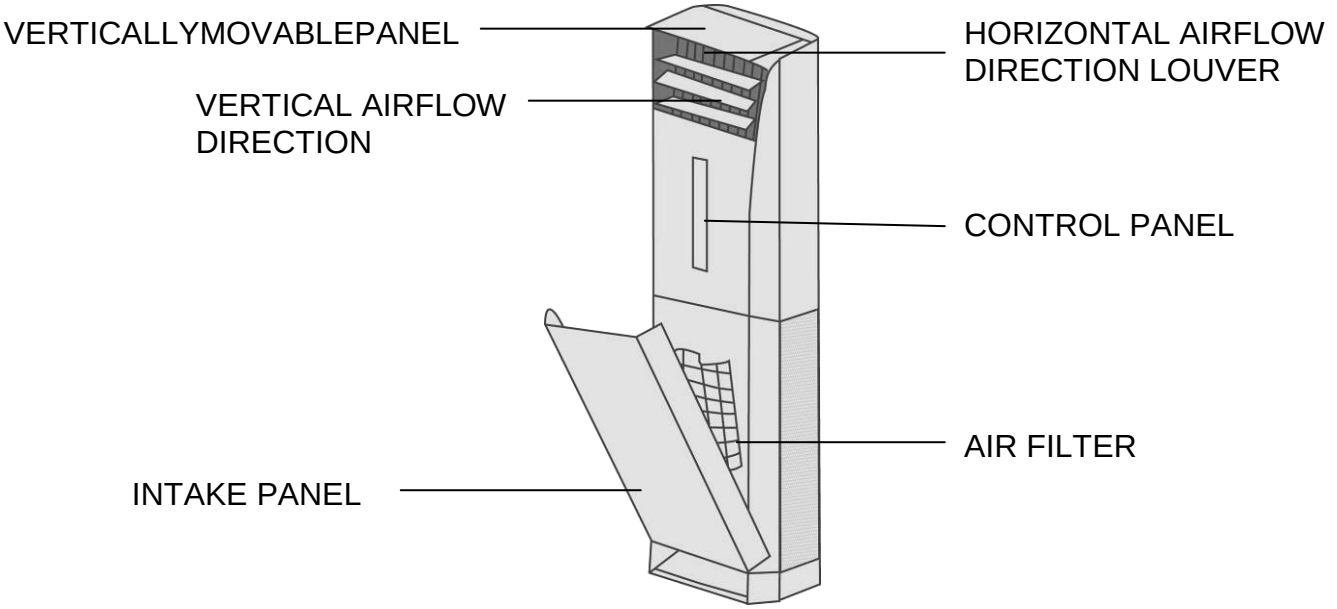
- Operation Improvement
  - Quiet mode to reduce the indoor unit operating sound
  - Powerful mode to reach the desired room temperature quickly
  - 12-hour timer
  - Child lock mode to prevent children from misoperating air conditioner.
  - Cleaning mode to make it convenient for cleaning and maintenance of the air conditioner.
  - Both vertical airflow louver and Horizontal airflow louver can be controlled by remote controller.

- Serviceability Improvement
  - Breakdown Self Diagnosis Function.

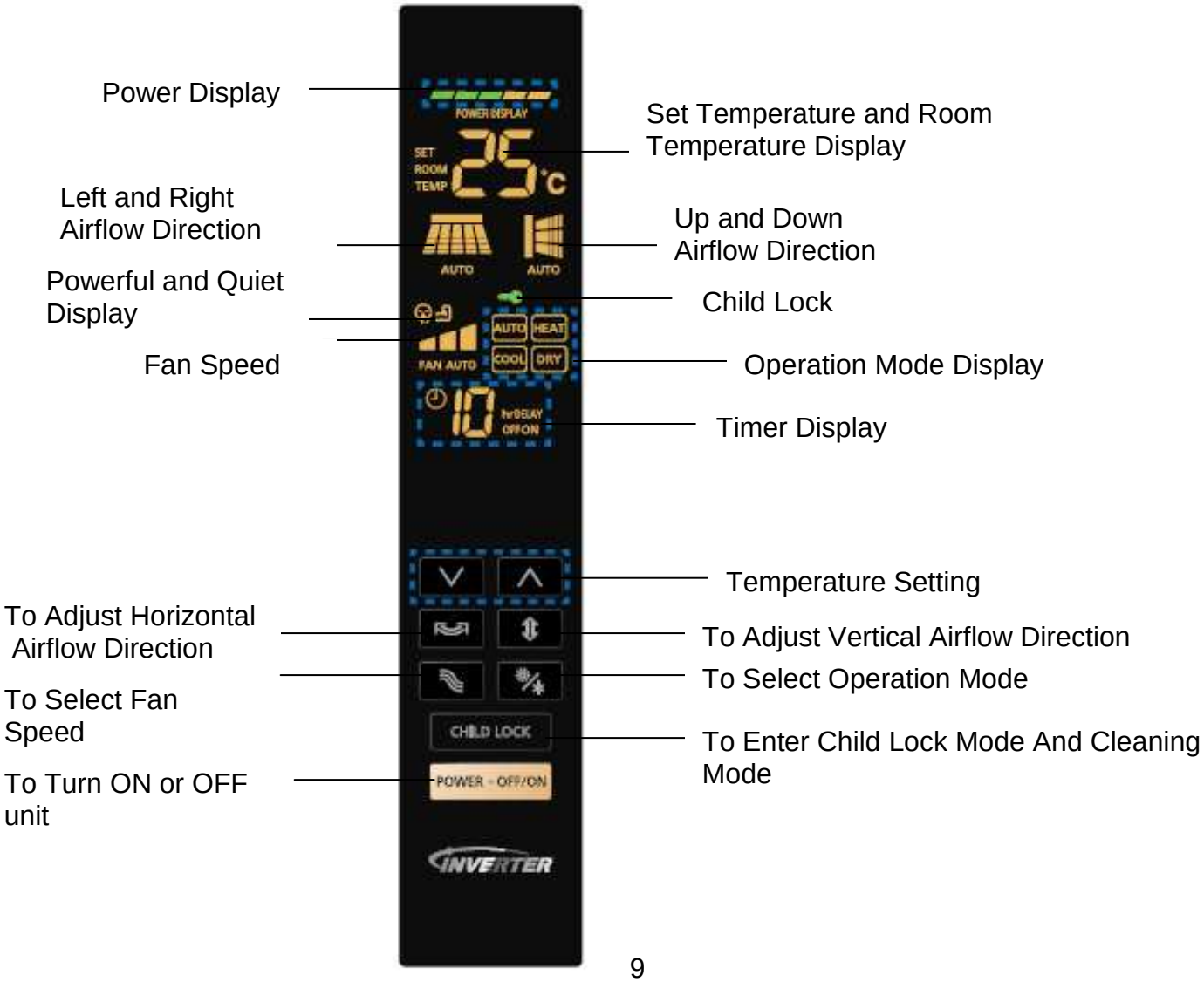
- AIR FILTER supplied.

4. Location of Controls and Components

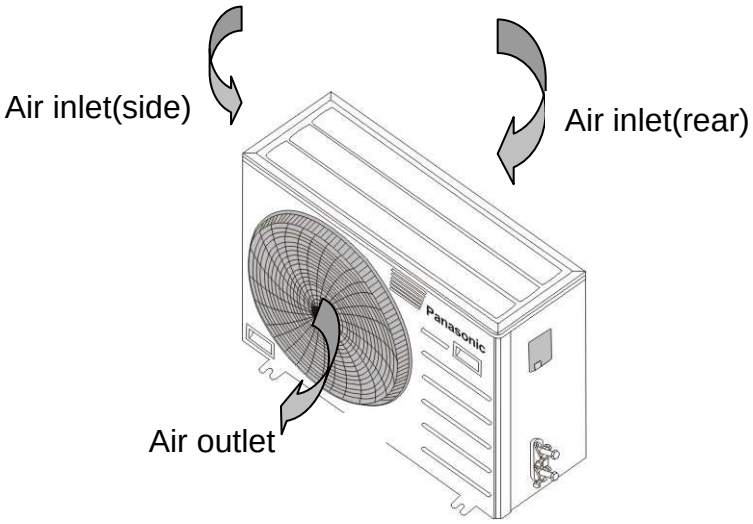
4.1 Indoor Unit



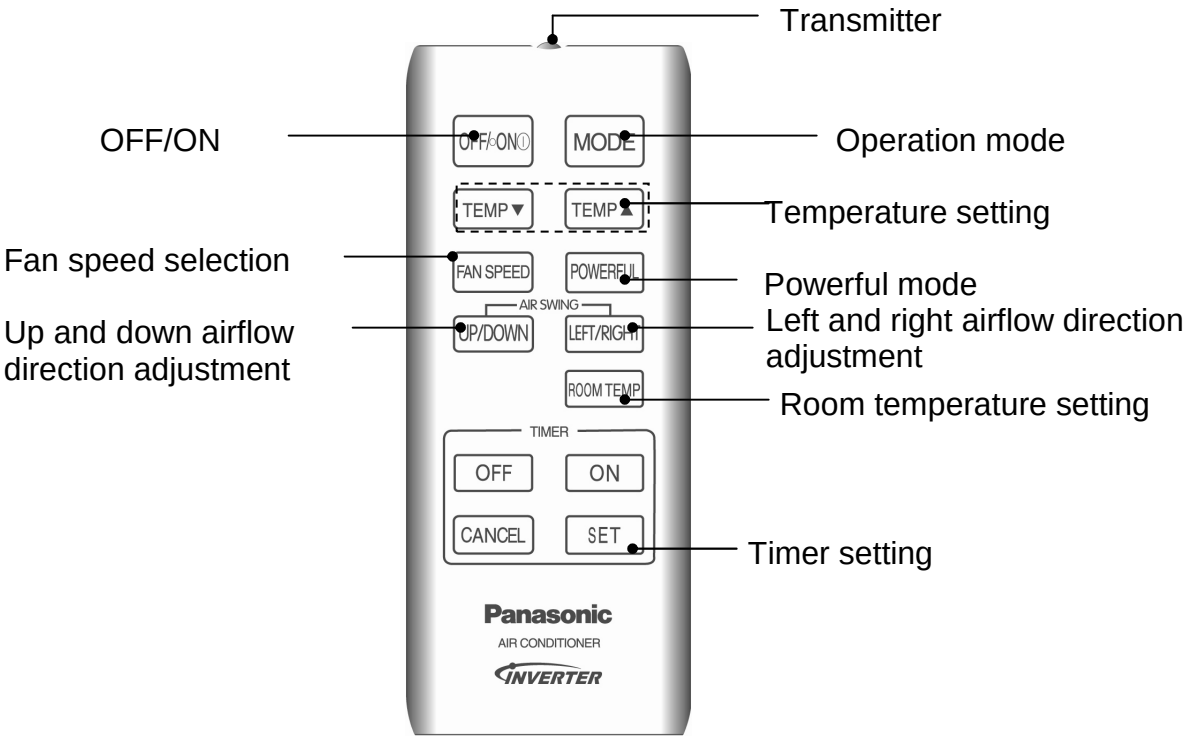
4.2 Control Panel of Indoor Unit



4.3 Outdoor Unit



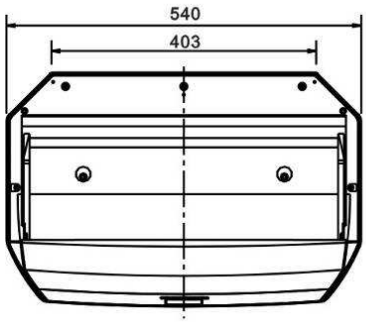
4.4 Remote Control

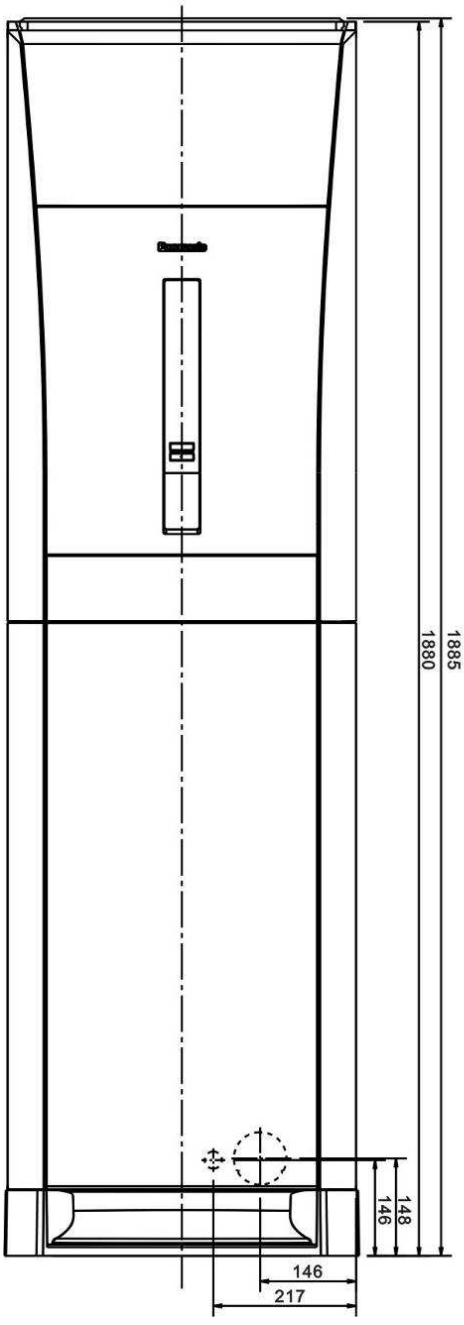


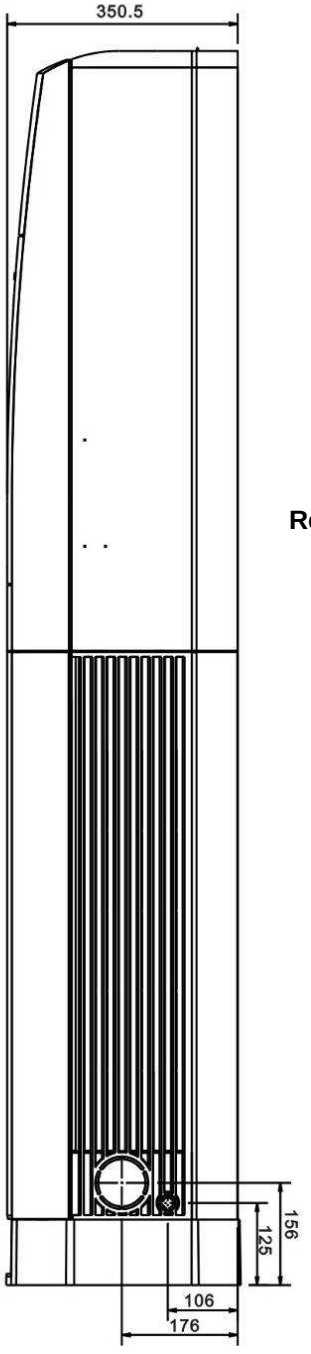
5. Dimensions

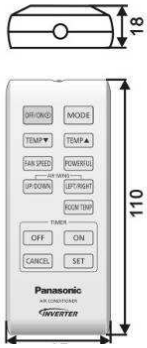
5.1 Indoor Unit

Unit: mm





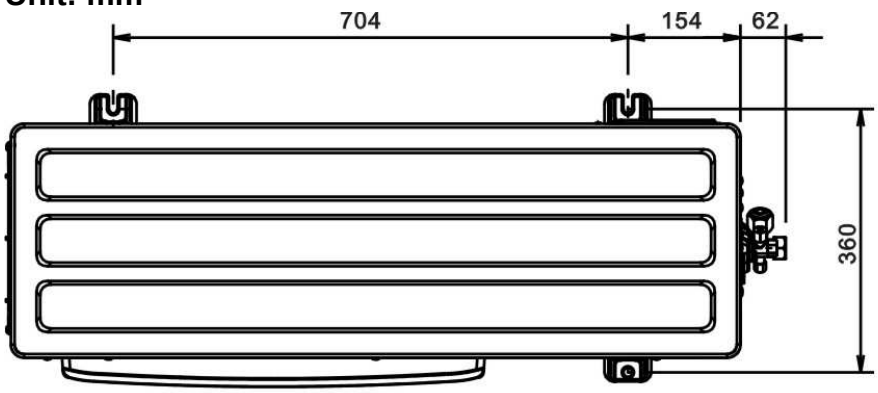


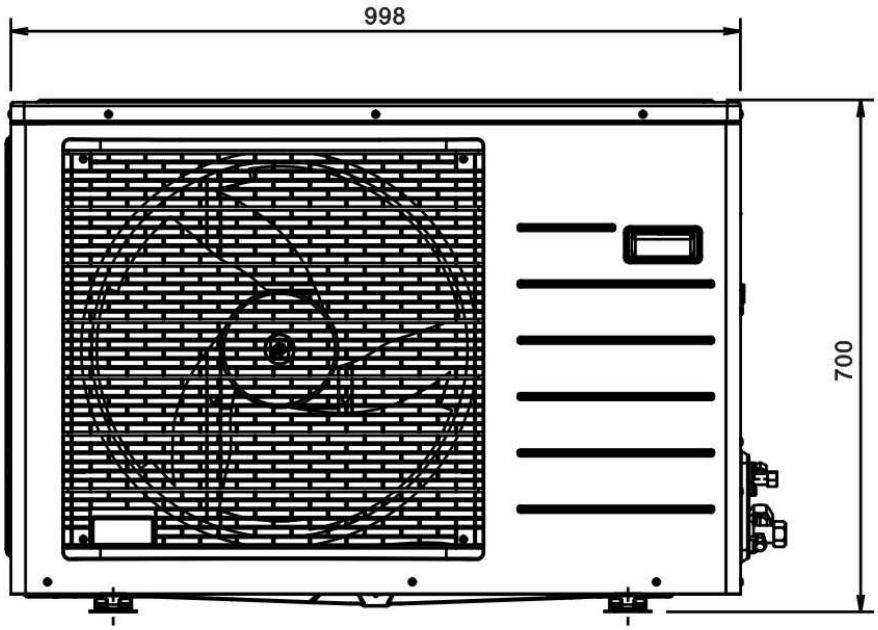


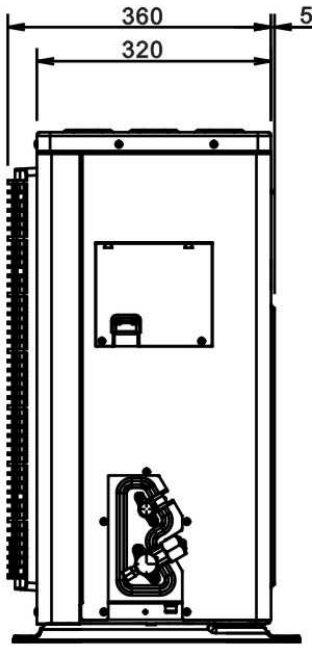
Remote control

5.2 Outdoor Unit

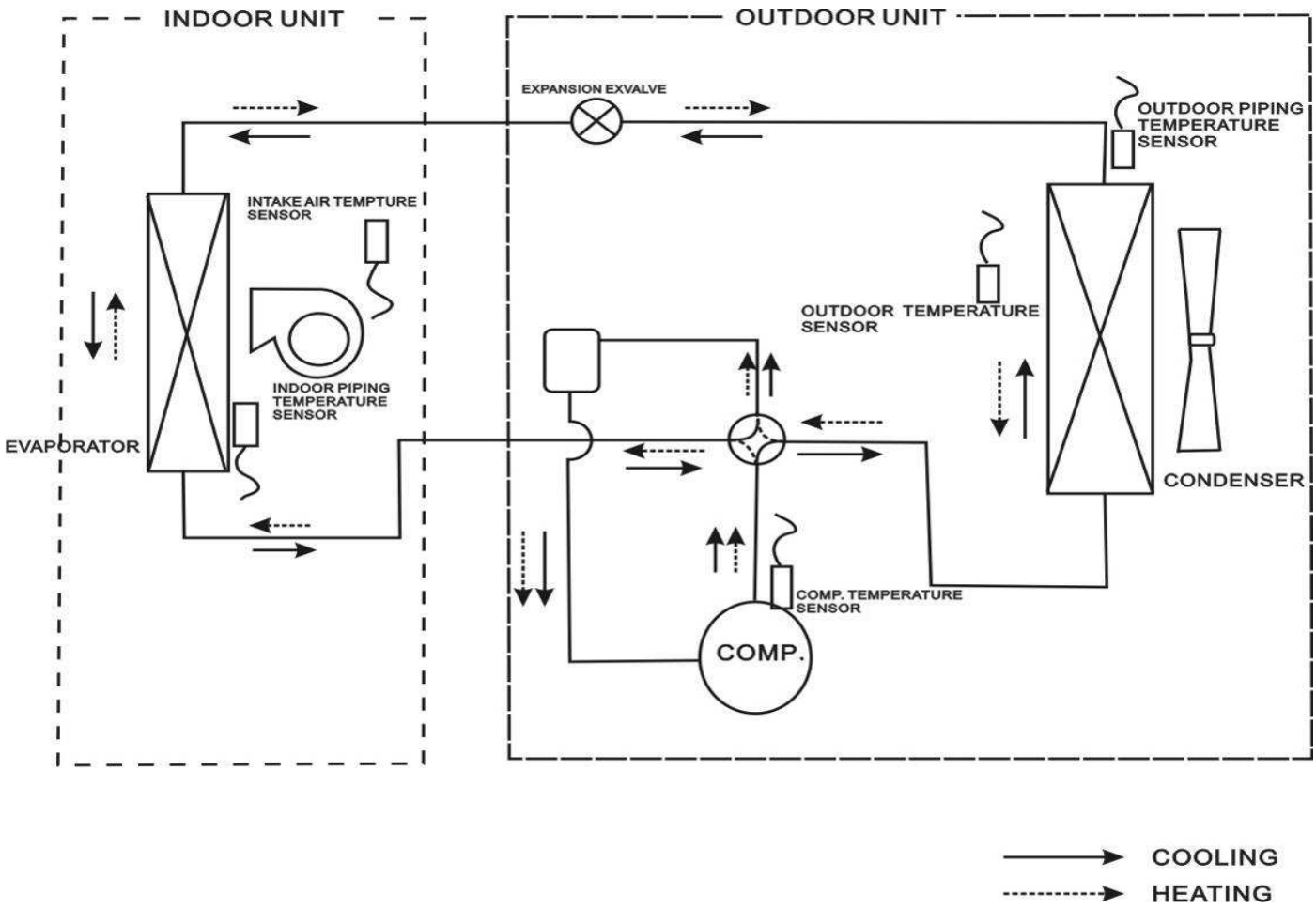
Unit: mm



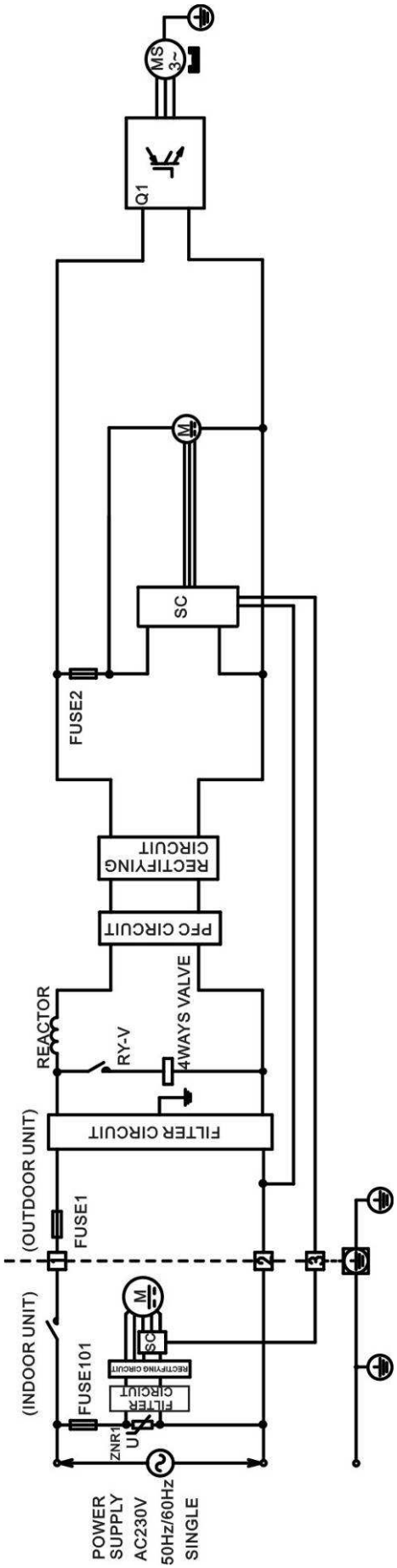




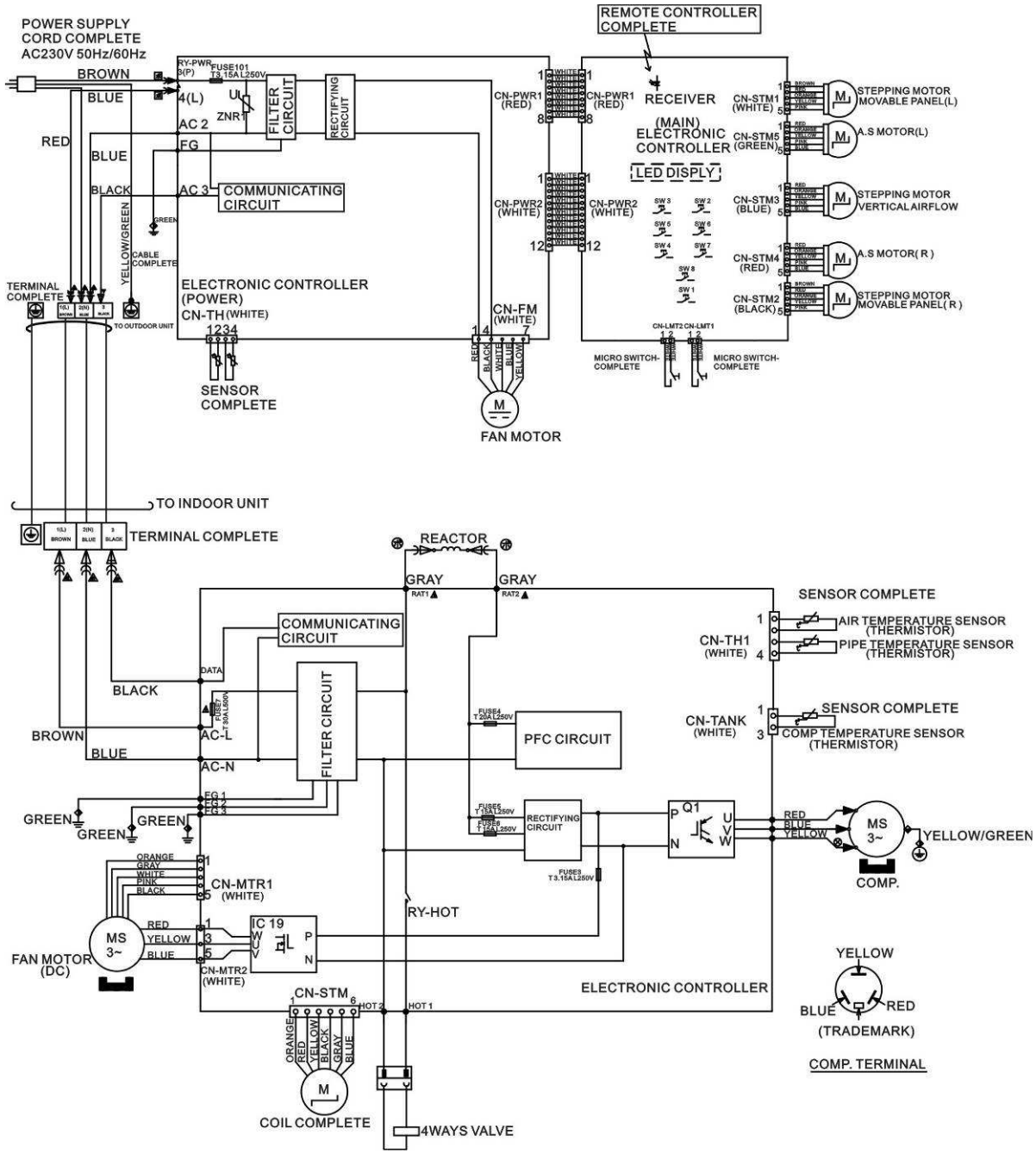
6. Refrigeration Cycle Diagram

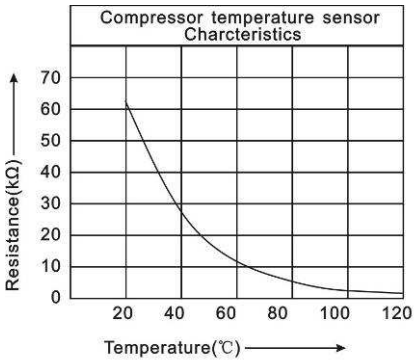


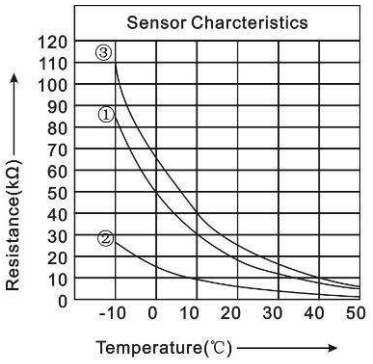
7. Block Diagram



8. Wiring Diagram







Resistance of Compressor Winding

CWB092568	
Model / Resistance(Ω)	CU-E28NFQ
U-V	1.727
V-W	1.699
U-W	1.750

①Indoor/Outdoor air temperature sensor

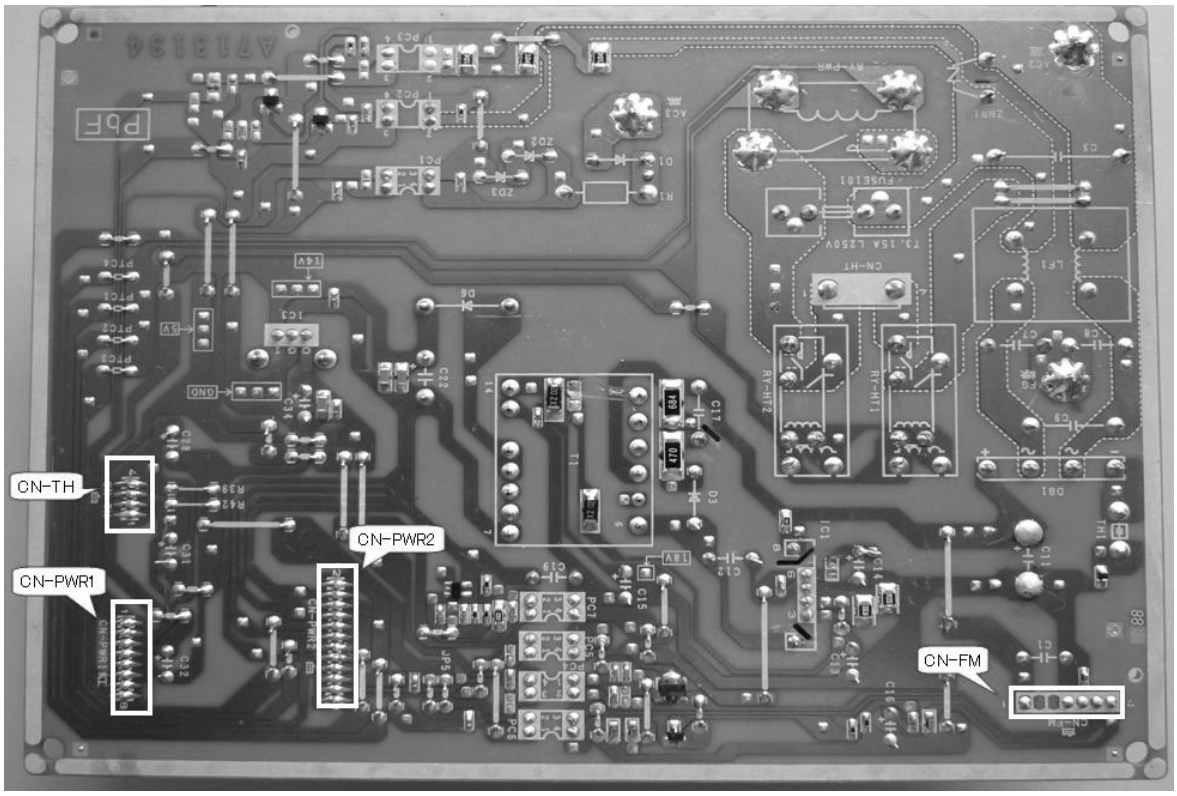
②Outdoor piping temperature sensor

③Indoor piping temperature sensor

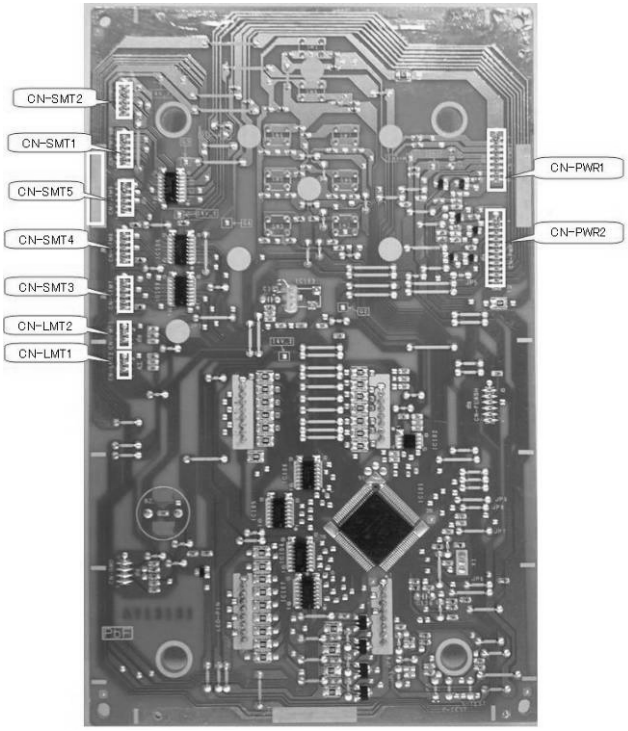
9. Printed Circuit Board

9.1 Indoor Unit

9.1.1 Main Printed Circuit Board



9.1.2 Display Printed Circuit Board



10. Installation Instruction

10.1 Select the Best Location

10.1.1 Indoor Unit

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

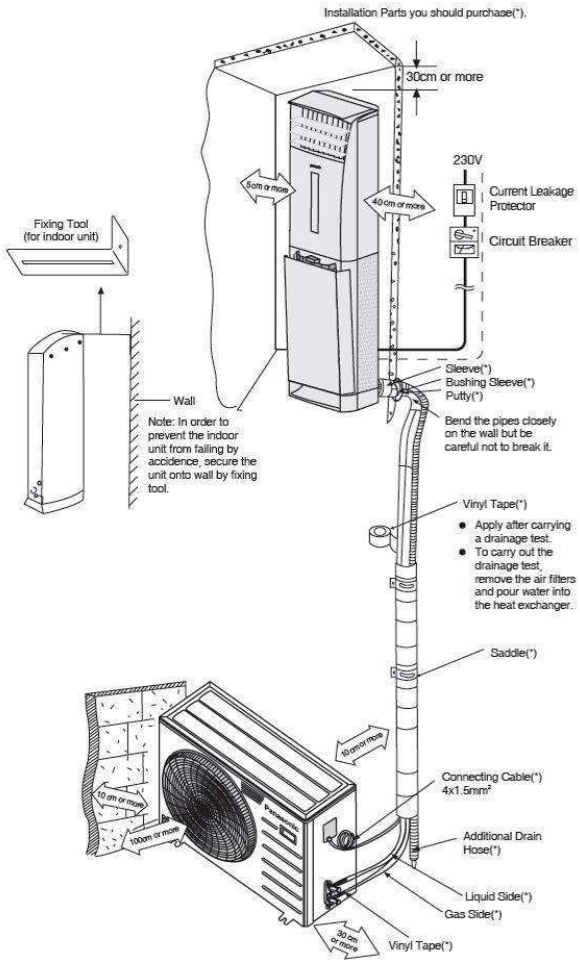
10.1.2 Outdoor Unit

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

Model	Piping size		Rated Length (m)	Max Elevation (m)	Min Piping Length (m)	Max Piping Length (m)	Additional Refrigerant (g/m)	Piping length for add. gas (m)
	Gas (inch)	Liquid (inch)						
E28NFQ	1/2”	1/4"	5	10	3	15	20	7

Example: If the unit is installed at a 10m distance, the quantity of additional refrigerant should be 60g……. (10-7)m x 20g/m = 60g.

10.1.3 Indoor/Outdoor Unit Installation Diagram

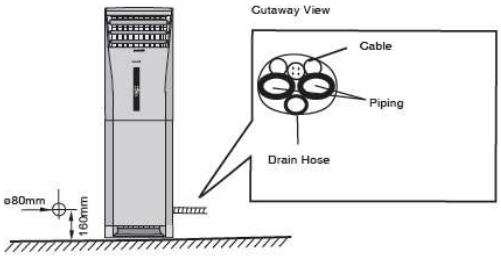


*This illustration is for explanation purposes only.
The indoor unit will actually face a different way.

10.2 Indoor Unit

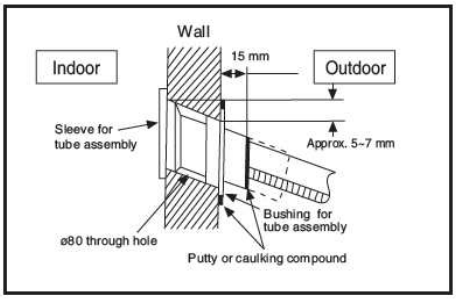
10.2.1 To Drill a Hole in the Wall and Install a Sleeve of Piping

There are three piping arrangements: left, right and right rear piping.



1 Drill a hole as the right figure.
2 Insert the piping sleeve to the hole.
3 Fix the busing to the sleeve.
4 Cut the sleeve until it extrudes about 15mm from the wall.

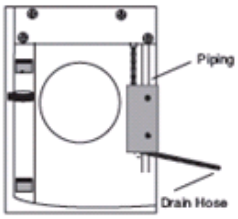
Caution
When the wall is hollow, please be sure to use the sleeve for tube ass'y to prevent dangers caused by mice biting the connecting cable.



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

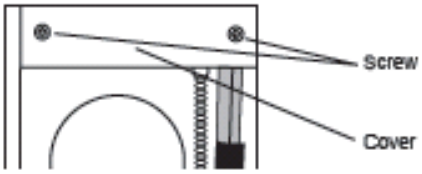
10.2.2 To Connect The Drain Hose

1. The drain hose should be insulated.
2. The drain hose should be sloped down. Any upturn is not permitted.
3. The foamed plastic around the air inlet duct should not be touched by the drain hose.
4. A drainage test should be carried out to assure a good drainage.



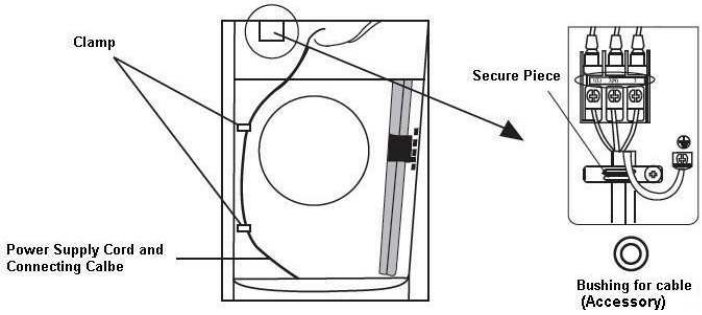
10.2.3 Connect the Cable to the Indoor Unit

1 Open and take away the intake grille.
2 Loosen the two fixing screws, remove the terminal board cover.
3 Fix the connecting cable onto the terminals on the control board.
4 Secure the connecting cable using clamp.

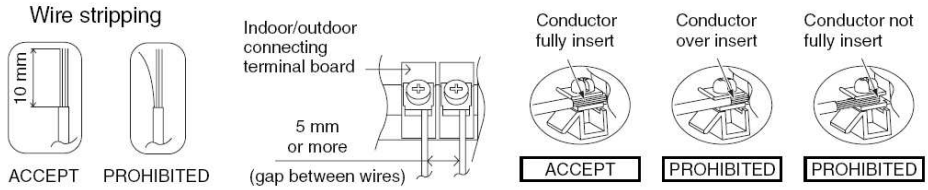


Notes:

- 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.
- The bushing must be fitted on after any installation aperture is opened. Otherwise the wire may be damaged cutting and lead to a fire.



WIRE STRIPPING AND CONNECTING REQUIRMENT

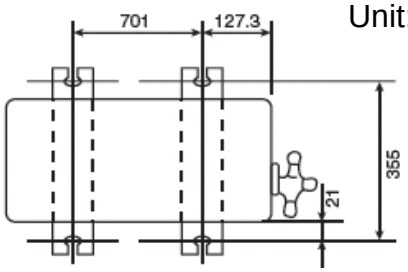


10.3 Outdoor Unit

10.3.1 Install the Outdoor Unit

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

Unit: mm



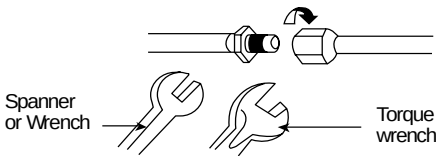
10.3.2 Connecting the Piping

10.3.2.1 Connecting the piping to indoor unit

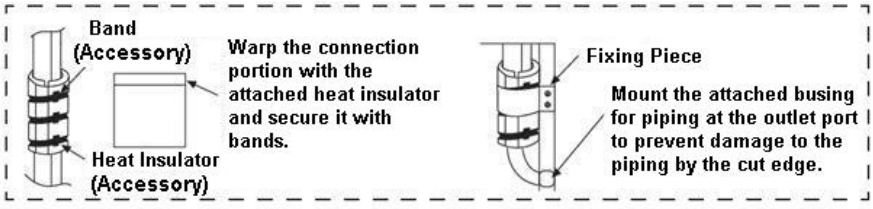
Please make flare after inserting flare nut (locate at joint portion, of tube assembly) onto the copper pipe. (In case of using long piping)

Connect the piping

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



Piping size	(Torque)
1/4”	18N•m(1.8kgf.m)
3/8"	42N•m(4.2kgf.m)
1/2”	55N•m(5.5kgf.m)
Caution: Do not over tighten. Over tightening causes gas leakage.	

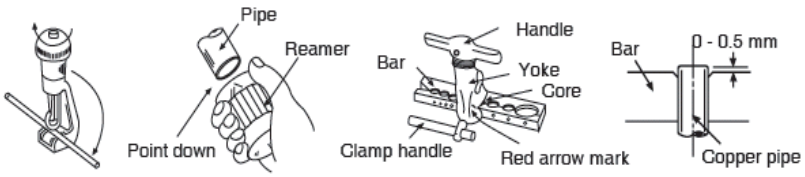


Connecting the piping to outdoor unit

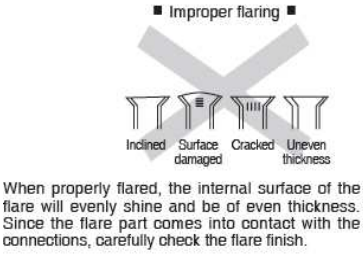
Decide piping length and then cut by using pipe cutter. Remove burrs from cut edge. Make flare after inserting the flare nut (locate at valve) onto the copper pipe. Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.

10.3.2.2 Cutting and flaring the piping

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



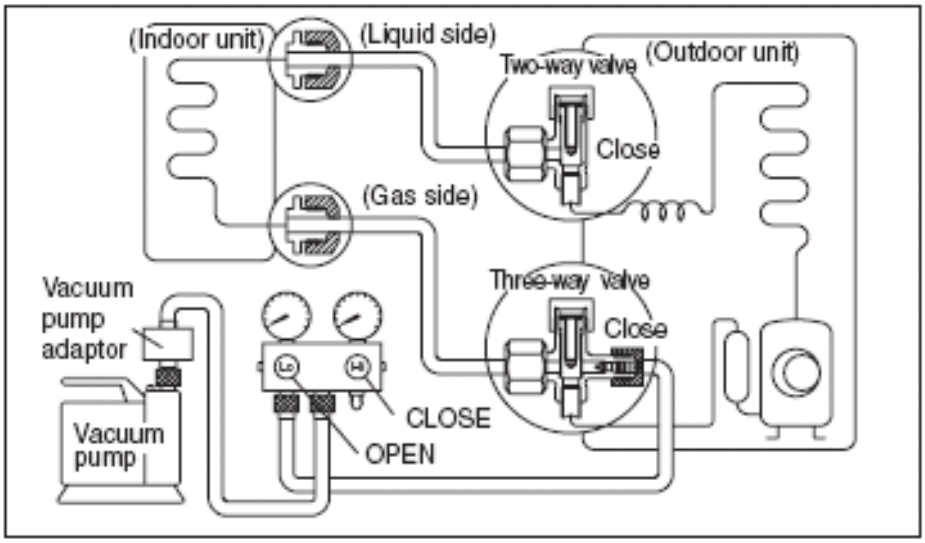
1. To cut 2. To remove burrs 3. To flare



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

10.3.3 Evacuation of the equipment

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



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

CAUTION:

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

10.3.4 Connect the cable to the Outdoor Unit

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

Terminals on the indoor unit	1(L)	2(N)	3	⏚
Colour of wires				
Terminals on the outdoor unit	1(L)	2(N)	3	⏚

3 Secure the cable onto the control board with the holder (clamper).
4 Attach the control board cover back to the original position with the screw.
5 For wiring stripping and connection requirement, refer to instruction 9.2.4 of indoor unit.

10.3.5 Pipe Insulation

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

11. Service Mode

11.1 Functions of Combination buttons ( *and*  *)*

1. AUTO OPERATION MODE

Press  and  buttons simultaneously on control area of control panel simultaneity to enter AUTO operation Mode.

2. Force Cooling Operation

Press  and  buttons simultaneously on control area of indoor control panel, hold for 5~9 seconds until a Beep sound is heard. Unit will enter force cooling operation mode.

3. Receiving Sound ON/OFF

Press  and  buttons simultaneously on control area of indoor control panel, hold for 9~13 seconds until double Beep sound is heard. And then, a Beep sound indicates receiving

sound OFF, and a long Beep sound indicates receiving sound ON.

4. Auto Restart ON/OFF

Press  and  buttons simultaneously on control area of indoor control panel, hold for 20~25 seconds until long Beep sound is heard. And then, a long Beep sound indicates Auto Restart OFF, and a Beep sound indicates Auto Restart ON.

11.2 Operation of Remote Control

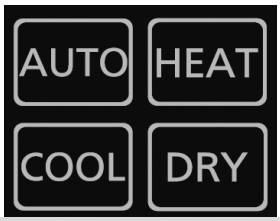
11.2.1 Mode selecting button

AUTO, HEAT, COOL, DRY can be selected by pressing “MODE” button.

*Keeping the button depressed continuously, the operation mode will change in the following order in turn.

AUTO—HEAT—COOL—DRY—AUTO

*Corresponding mode displays on Display area of control panel in indoor unit in accordance of signal given by remote control.



Display area of control panel in indoor unit.

11.2.2 Temperature adjusting button

Temperature adjusting range is between 16 ℃~30 ℃. Setting temperature displays on indoor unit displays in indoor unit display area.

11.2.3 Room Temperature Button

Room temperature can be displayed on setting temperature display area for approximately 5 seconds when this button is pressed and hold for 5 seconds.

11.2.4 Fan speed button

There are 4 speed levels can be selected. Press FAN SPEED button on remote control to adjust indoor fan speed. Fan speed selection displays corresponding level in accordance of the signal sent by remote control.

- QUIET OPERATION: To provide quiet environment comparing to normal operation by reducing the air flow noise.
  Press FAN SPEED button until QUIET MODE icon displayed on indoor display area to enter QUIET MODE.

11.2.5 Air swing button (LEFT/RIGHT)

Press LEFT/RIGHT button on remote control to adjust horizontal airflow direction. Left/right air louver status display on indoor display area as follows:-

11.2.6 Air swing button (UP/DOWN)

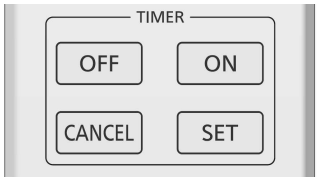
Press Up/Down button on remote control to adjust vertical airflow direction. Up/Down air louver status display on indoor display area as follows:-

11.2.7 Powerful button

Enable the desired set temperature to be reached quickly.
Start POWERFUL operation: Press POWERFUL button and powerful icon displays on indoor display area.
Switch Powerful operation to normal operation: Press the button again. Powerful icon goes OFF to indentify POWERFUL mode OFF.

11.2.8 Timer setting button

There are 2 types of timer setting by pressing Timer setting button: ON-TIMER, OFF-TIMER.



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

2) ON button
   - ✧ When the air conditioner is turned off, ON-TIMER can be selected by pressing ON button.

3) SET button
   - ✧ Pressing the button to set the set timer.

4) CANCEL button
   - ✧ Pressing the button to cancel the set timer. If the timer setting is cancelled, “ON” or “OFF” will disappear on the indoor unit display.

NOTE:
- ✧ OFF Timer can only be set during the operation;
- ✧ Timer setting can operate only once.
- ✧ If Auto Restart Control occurs, timer setting will be cancelled.
- ✧ During the operation, if the ON Timer is set, the operation will be stopped.

12. Control Panel

12.1 CHILD LOCK

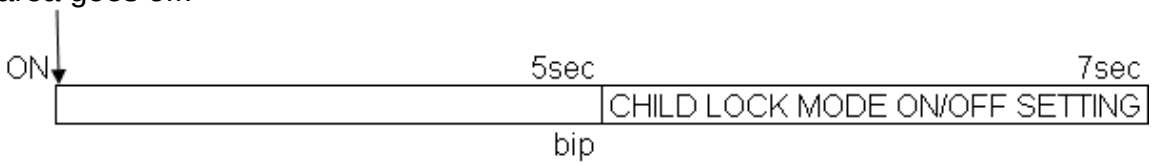
12.1.1 Child Lock Mode

The control is to prevent children from misoperating air-conditioner by touching the control panel in indoor unit.
A. To activate Child lock mode

Either the air-conditioner is turned OFF or during operation, press and hold the “CHILD LOCK” button for 5 seconds until “Beep” sound is heard, release your hand within 2 seconds. Child lock mode is activated. A Green color key-icon displays on control panel display area.

B. To cancel child lock mode

Repeat above steps to cancel child lock. The LED key-icon displayed on control panel display area goes off.



Notes:

- When encounter a power failure, the child lock mode will be canceled.
- Child lock mode is OFF as default setting.
- Once the Child lock mode is activated, the unit does not response any signal sent by remote control, and does not response any other touch of control buttons on indoor control panel.
- When the unit is in cleaning mode, child lock mode can not be set or cancelled.

12.1.2 Cleaning Mode

The control is to fully open the air outlet vent during the unit is turned OFF to make it convenient for cleaning and maintenance.

A. To activate cleaning mode

Turn off the unit, press and hold the CHILD LOCK button for approximately 7 seconds until two Beeps sound is heard. Then release your hand in 2 seconds and following a Beep sound will be heard. The LED key-icon on indoor display area lights up and OP appears on temperature display position. Cleaning mode is activated with air outlet vent open, up/down vanes in horizontal direction and left/right vanes in vertical direction.

B. To cancel cleaning mode

Repeat above steps to cancel child lock. The LED key-icon and OP display on control panel display area go off. The air outlet vent will be closed when cleaning mode is cancelled.

Notes:

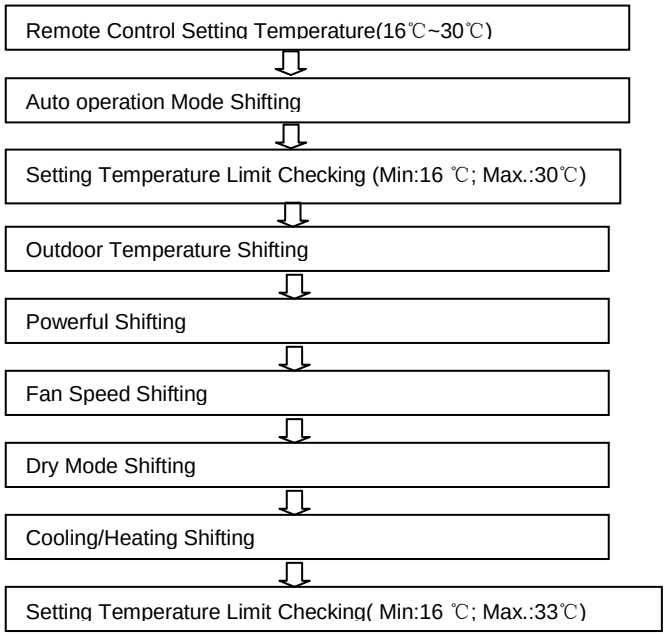
- Cleaning mode is OFF as default setting.
- Once the cleaning mode is activated, the unit does not response any signal sent by remote control, and does not response any other press of control buttons on indoor control panel.

13. Operation Control

13.1 Basic Function

13.1.1 Internal Setting Temperature

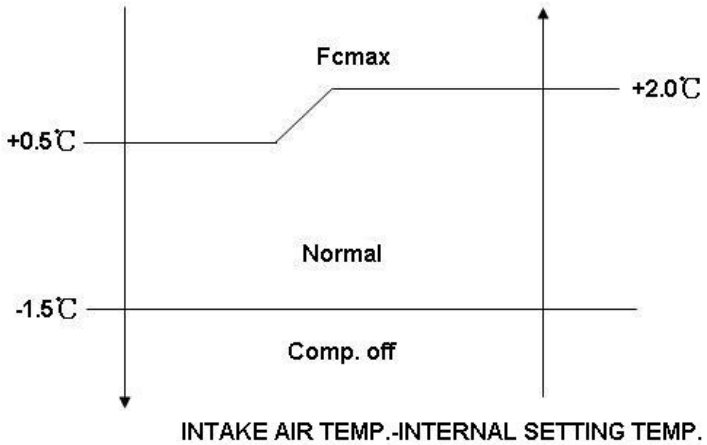
Once the operation starts, remote control setting temperature will be taken as base value for temperature shifting processes. These shifting processes are depending on the air conditioner settings and the operation environment. The final shifted value will be used as internal setting temperature and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



13.1.2 Cooling Operation

13.1.2.1 Thermostat control

- Compressor is OFF when Intake Air Temperature - Internal Setting Temperature < -1.5℃
- Compressor is ON after waiting for 3 minutes, if the Intake Air Temperature - Internal Setting Temperature > Compressor OFF point +0.5K.



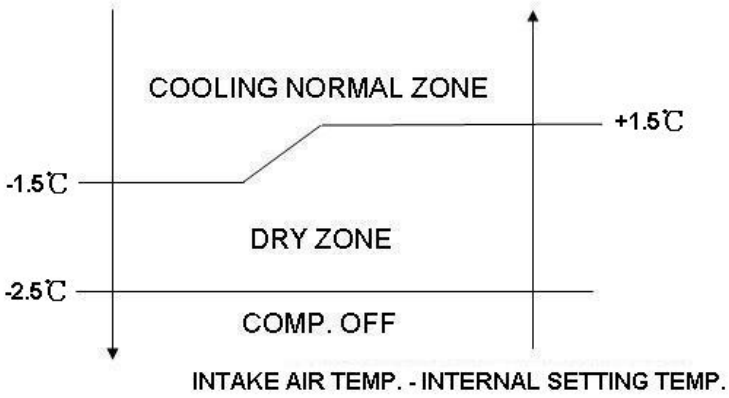
INTAKE AIR TEMP.-INTERNAL SETTING TEMP.

13.1.3 Soft Dry Operation

13.1.3.1 Thermostat control

- Compressor is OFF when Intake Air Temperature - Intake Setting Temperature < -2.5℃

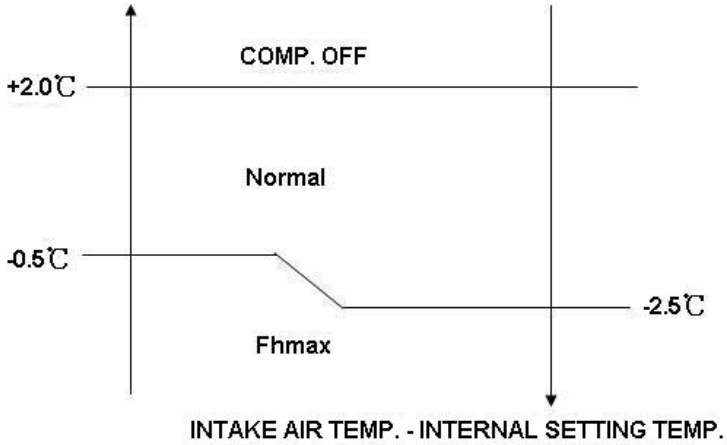
• Compressor is ON after waiting for 3 minutes, if the Intake Air Temperature - Internal Setting Temperature > Compressor OFF point +0.5K.



13.1.4 Heating operation

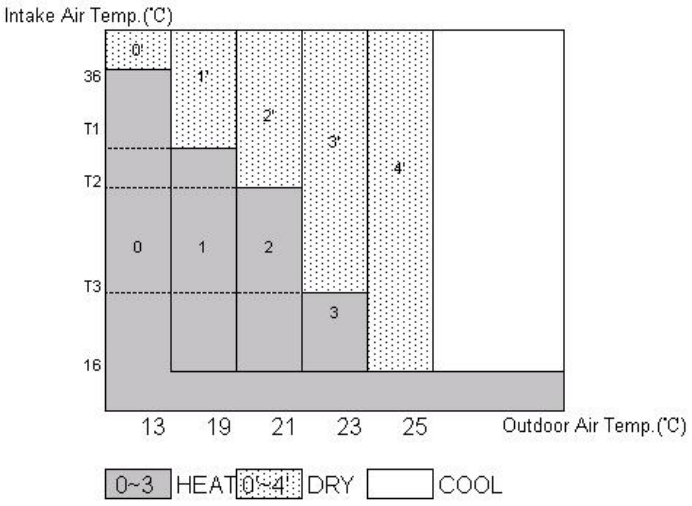
13.1.4.1 Thermostat control

• Compressor is OFF when Intake Air Temperature - Internal Setting Temperature > +2.0℃
• Compressor is ON after waiting for 3 minutes, if the Intake Air Temperature - Internal Setting Temperature< Compressor OFF point -0.5K.



13.1.5 Automatic Operation

Once AUTO mode is selected, operation mode is determined by set temperature of remote control, indoor intake temperature and outdoor temperature as shown in the table below.



The indoor intake air temperature T1, T2, T3 in above table is varied in accordance with different setting temperatures as shown below:-

Remote Control Setting Temp.	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
T1	26	27	28	27	28	29	30	30	31	32	33	33	34	35	36
T2	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
T3	11	12	13	12	13	14	15	16	17	18	19	19	20	21	22

However, when the operation mode is changed, for instance the determination is changed from cooling to heating due to surrounding condition change, T1, T2, T3 value will have correction data as follows:-

Cooling/Soft dry operation switched to Heating Operation: -2℃

Heating operation switched to Cooling/Soft dry Operation: +2℃

Note:

- For the first judgment, when intake air temperature is lower than 16℃, the unit enters heating operation.
- The unit makes new judgment once per 30minutes after the first judgment.
- After the second judgment, and if the unit is in deicing operation, the unit will be determined to operate in heat mode for the following judgment.
- If outdoor temperature is lower than 13℃ and the indoor temperature sensor is abnormal, the unit enters heating operation.

During powerful operation, the unit does not make judgment.

13.2 Indoor Fan Motor Operation

A. Basic Rotation Speed

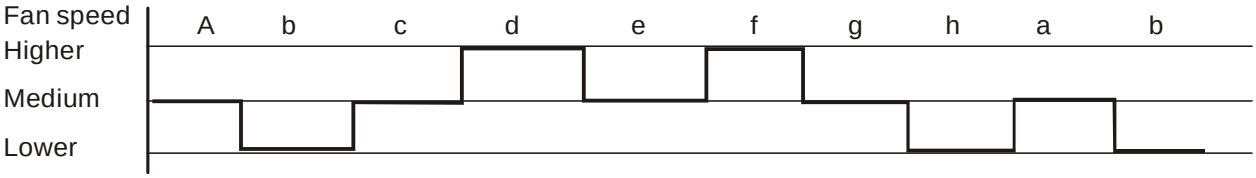
i. Manual Fan speed

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

Model	Remote control Tab	O Hi	O Me	O Lo
CS-E28NFQ	COOLING(rpm)	440	380	320
	HEATING(rpm)	440	380	320

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

The indoor fan operates according to pattern below.(cycle from a to h)



- When outdoor temperature is lower than 35℃, Higher Fan speed is 380rpm, Medium is 370rpm, Lower is 360rpm.
- When outdoor temperature is higher than 35℃, Higher Fan speed is 410 rpm, Medium is 400 rpm, Lower is 390 rpm.
- Outdoor temperature data is updated every 30 seconds

iii. Auto Fan Speed(Heating)

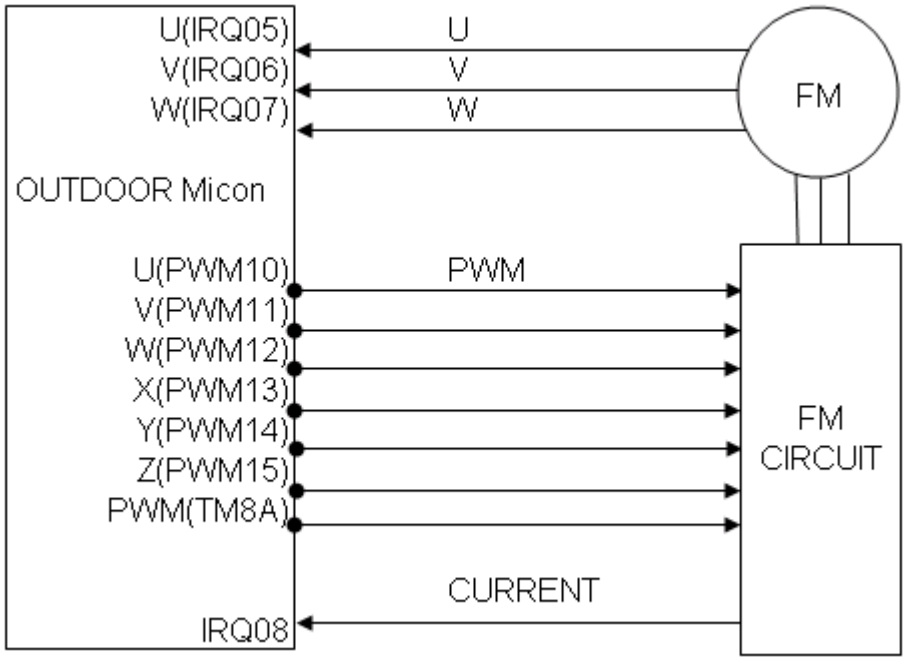
The indoor fan operates with the fan speed between 380 rpm and 420 rpm.

B. Feedback control

• Immediately after the fan motor started, feedback control is performed once every half a second.
• During fan motor on, if fan motor feedback is over 500rpm or < 50 rpm continue for 10 seconds, then fan motor error counter increases, fan motor then stops and restarts. If the fan motor counter becomes 7 times, then fan motor error F19 is detected. Operation stops and cannot on back.

13.3 Outdoor Fan Motor Operation

The outdoor Fan motor is high pressure PWM drive type. The fan motor circuit is composed with U.V.W.X.Y.Z.PWM drive signal, position checking detector and over load current protection.



Basic rotation speed is as follows:-
Table 1

No.	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
rpm	150	190	230	270	310	350	390	430	550	580	600	620	650	690	720

Outdoor fan motor is operated in accordance with compressor running frequency.
Ⅰ.Cooling operation

Frequency	Hz≤17	17＜Hz≤24	24＜Hz≤60	60＜Hz≤90	90＜Hz
Rotation speed	580rpm	600rpm	620rpm	690rpm	720rpm

Ⅱ. Soft Dry operation

Frequency	Hz≤17	17＜Hz
Rotation speed	550rpm	600rpm

Ⅲ. Heating

Frequency	Hz≤18	18＜Hz≤39	29＜Hz≤80	801＜Hz≤116	116＜Hz
Rotation speed	270rpm	550rpm	620rpm	690rpm	720rpm

*For the corresponding rotation speed (No.) in above tables, please refer to table 1 of outdoor fan basic rotation speed.

- When compressor stops, outdoor fan operates in speed of No.8 within 30 seconds.
- During Timer sampling operation, outdoor fan speed is in No.9.

13.3.1 Vertical Airflow

Vertical airflow vanes are controlled by on step motor, Basic control angel is as below:-

Operation Status				
Heating	AUTO	-20°, +10°		
	MANUAL	+10°	0°	-20°
Cooling	AUTO	+15°~ -15°		
	MANUAL	+15°	0°	-15°
Soft Dry	AUTO	0°		
	MANUAL	+15°	0°	-15°

13.3.2 Horizontal Airflow

There are two step motors controlling left and right vanes (4 pieces vanes on the left are controlled by left side motor and the right 4 pieces vanes are control by the right side motor). Adjustable range is from 45° to 90°.

Operation status					
Heating	AUTO	45°~90°			
	MANUAL	45°	60°	75°	90°
Cooling	AUTO	45°~90°			
	MANUAL	45°	60°	75°	90°
Soft Dry	AUTO	45°~90°			
	MANUAL	45°	45°	45°	45°

13.3.3 Top Movable Panel

The top movable panel covers the indoor outlet vane when unit off. It is open and automatically moved to top during operation. The stop position is depending on operation mode and controlled by two motors and two position-limited switches.

	Normal	Airflow
Cooling	0°	0°
Heating	-20°	-30°

13.3.4 Powerful operation

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

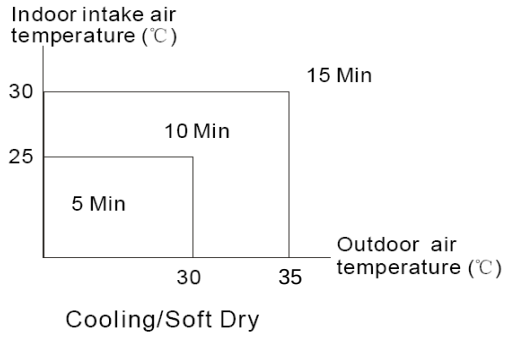
.

13.3.5 Automatic Restart Control

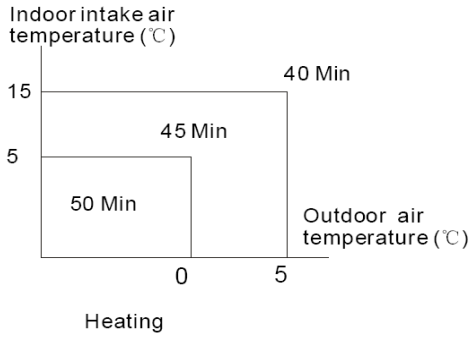
When the power supply is cut off during the operation of air conditioner, the compressor will re-operate within three to four minutes after power supply resumes.

13.3.6 Timer control

Delay ON Timer can be set using remote controller, the unit with timer set will start operate earlier than the setting time. This is to provide a comfortable environment when reaching the set ON time. Seventy minutes before the set time for ON Timer setting, indoor (at fan speed of Lo-) fan motor start operate for 30 seconds to determine the indoor intake air temperature and outdoor air temperature in order to judge the operation mode. From the above judgment, the decided operation will start operate earlier than the set time as shown below.



Cooling/Soft Dry



Heating

14. Protection control

14.1 Protection Control for All Operations

14.1.1 Time Delay Safety Control

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

14.1.2 30 Seconds Forced Control

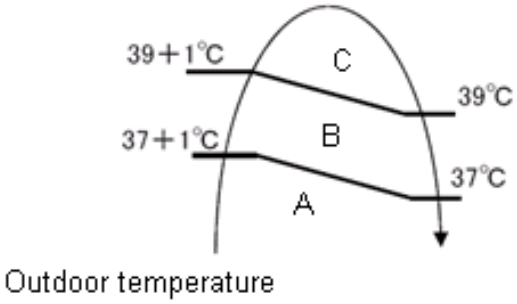
- Once the air conditioner is turned on, the compressor will not stop within 30 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, force stop by pressing the OFF/ON button at the remote control is permitted.
- The reason for the compressor 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.

14.1.3 Total running current control

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

Operation mode	E28NFQ
	I_1(A)
Cooling/ Soft Dry /Fan A*	13.73
Cooling/ Soft Dry /Fan B	13.55
Cooling/ Soft Dry /Fan C	13.55
Heating	14.35

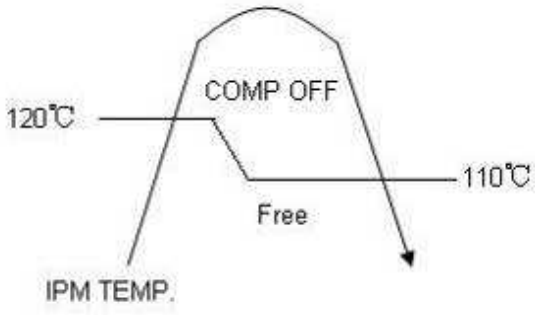
*The first 30 minutes of cooling operation, A will be applied.



14.1.4 IPM (Power transistor) Protection Control.

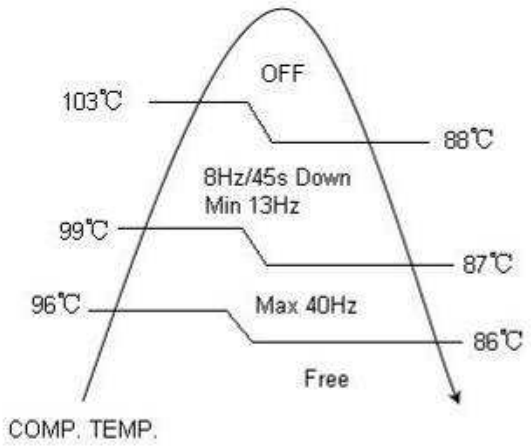
1. DC Peak Current Control
   - When electric current to IPM exceeds set value of 22.6A, the compressor will stop. It will restart after 3 minutes.
   - If the set value is exceeded again within 30 seconds, the operation will restart after one minute.
   - Within 30 minutes after compressor starts, if the peak current is over 22.6A for 7 times, relays of indoor unit and outdoor unit will be open.
   - Error code [F99] will be displayed.

2. Overheating protection control
   - When the IPM temperature rises to 120 ℃, compressor will stop immediately.
   - Compressor restarts after three minutes if the temperature decreases to 110℃
   - Error code [F96] will be displayed.



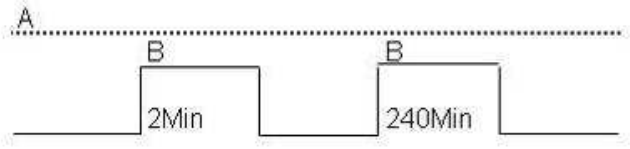
14.1.5 Compressor Overheat Protection

It is detected by compressor temperature sensor and discharge temperature. Compressor frequency and expansion valve is controlled by compressor temperature sensor. If compressor stop due to overheat for 4 times within 20 minutes, error code [97] will be displayed.



14.1.6 Low Operation Frequency Protection Control

- When the compressor operation frequency is lower than 24Hz and continuing for 240 minutes, the operation frequency will be changed to 23Hz for 2 minutes. This is to prevent the compressor running in too low frequency for long time.



- If all following conditions are fulfilled, the compressor will run in the frequency of 30 Hz .

Models	E28NFQ	
Intake Air Temp.	≥30 ℃ or ＜14 ℃	≥28 ℃ or ＜14 ℃
Outdoor Temp.	≥38 ℃ or ＜13 ℃	≥24 ℃ or ＜4 ℃
Indoor Piping Temp.	＜30 ℃	≥0 ℃
Operation Mode	Cool / Dry	Heat

14.1.7 Low pressure Prevention control (Gas Leakage Detection)

a. Control start conditions

• For 5 minutes, the compressor continuously operates and outdoor total current is between 1.16A and 1.37A(in cooling mode and1.16A and 1.77A(in heating mode).

• During Cooling and Soft Dry operations:
Frequency is over 108Hz Max.
Indoor suction temperature - indoor piping temperature is below 4℃.

• During Heating operations:
Frequency is over 101Hz.
Indoor piping temperature - indoor suction is under 5℃.

b. Control contents

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

14.1.8 Refrigeration Circuit Abnormality

a. Control start conditions

• For 5 minutes, the compressor continuously operates and outdoor total current is between 0.94A and 1.37A.

• During Cooling and Soft Dry operation:
Frequency is over 105Hz.
Indoor suction temperature - indoor piping temperature is below 4℃.
Indoor temperature and outdoor temperature is 30±5℃.
Remote Control setting 16℃ and Hi Fan Speed.

• During Heating operation:
Frequency is over 101.
Indoor piping temperature - indoor suction is under 5℃.
Indoor temperature and outdoor temperature is 20 ± 2℃.
Remote control setting 30℃ and Hi Fan Speed

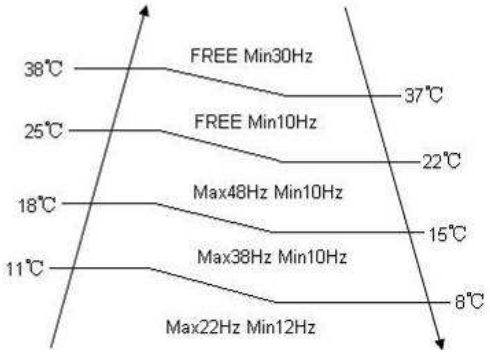
b. Control contents

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

14.2 Protection Control for Cooling and Soft Dry Operation

14.2.1 Outdoor Air Temperature Control

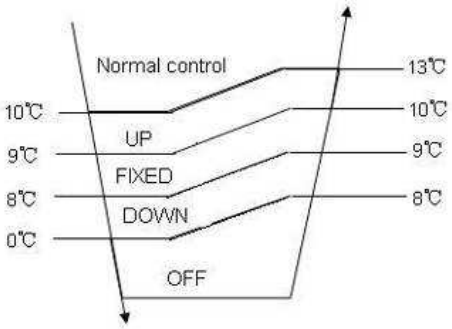
- The compressor operating frequency is regulated in accordance to the outdoor air temperature as shown in the diagram below.
- Compressor frequency will adjust base on outdoor air temperature.



14.2.2 Freeze Prevention Control

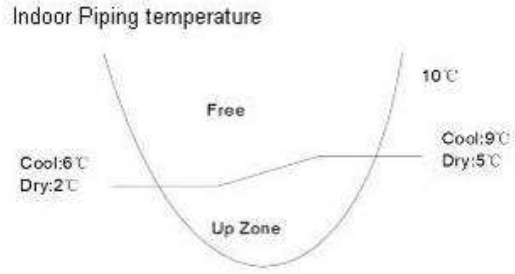
1 .Frequency of the compressor

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



2 .Indoor Fan Control

Indoor fan speed changes according to the indoor piping temperature. In up zone shown below, the fan speed increases by +50r/min until the indoor piping temperature reaches 9℃(cooling)/5℃(dry) or above for 5 minutes. However, the control is unavailable within 4 minutes after compress stars up.



14.2.3 Dew Prevention Protection

- Protection control starts when following conditions are fulfilled:-

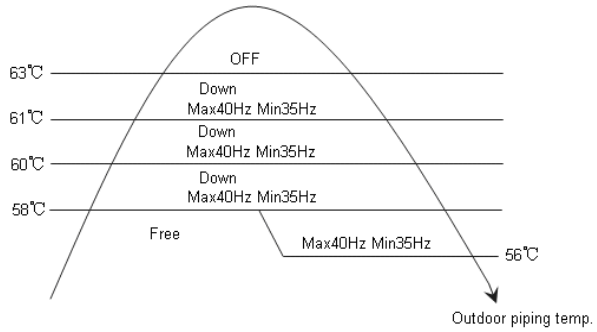
1. Air conditioner is operated in Cooling or Soft Dry mode.
2. Air intake temperature is over 24℃.
3. Outdoor temperature is less than 34℃.

- Protection control ends when any one of follow condition is achieved:-

1. Starting condition of protection is not fulfilled.
2. The control has operated for 420 minutes.
3. Change the temperature setting or fan speed setting.

14.2.4 Overload Protection for Cooling Operation

Frequency of the compressor will change according to the outdoor piping temperature.



14.3 Indoor Piping Air Temperature Control (Heating)

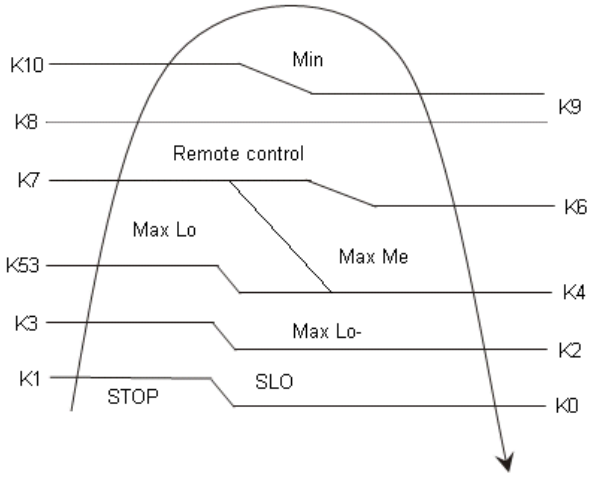
14.3.1 Indoor Fan Control

1. Indoor fan is controlled by the indoor piping temperature.

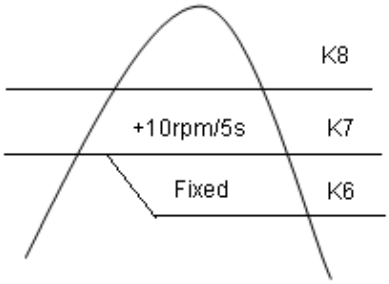
- Manual Fan Speed

Piping Temperature(℃)

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



- Auto Fan Speed



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

	1	2	3	4	5	6	7	8
Comp.	ON		OFF					
Indoor Fan(rpm)	Control by piping temp.		220	200	220	200	220	200
Time(Second)	–		20	100	10	100	20	100

3. Hot Start

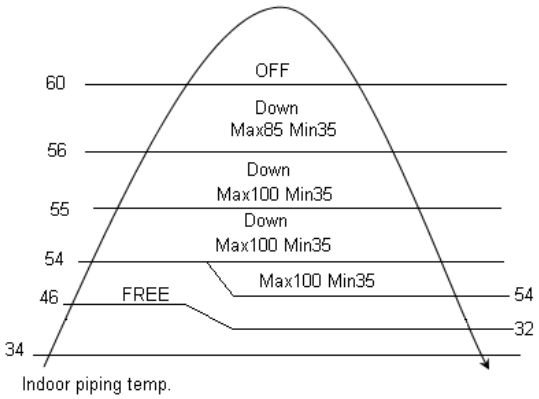
When the heating operation starts, the indoor fan stops and the compressor run with a certain frequency.

Hot start ends when any of following condition achieves:-

- Indoor piping temperature reaches 19℃.
- Heating operation has run for over 4 minutes.

14.3.2 Overload Protection Control

Frequency of compressor is determined by indoor piping temperature.



15. Troubleshooting Guide

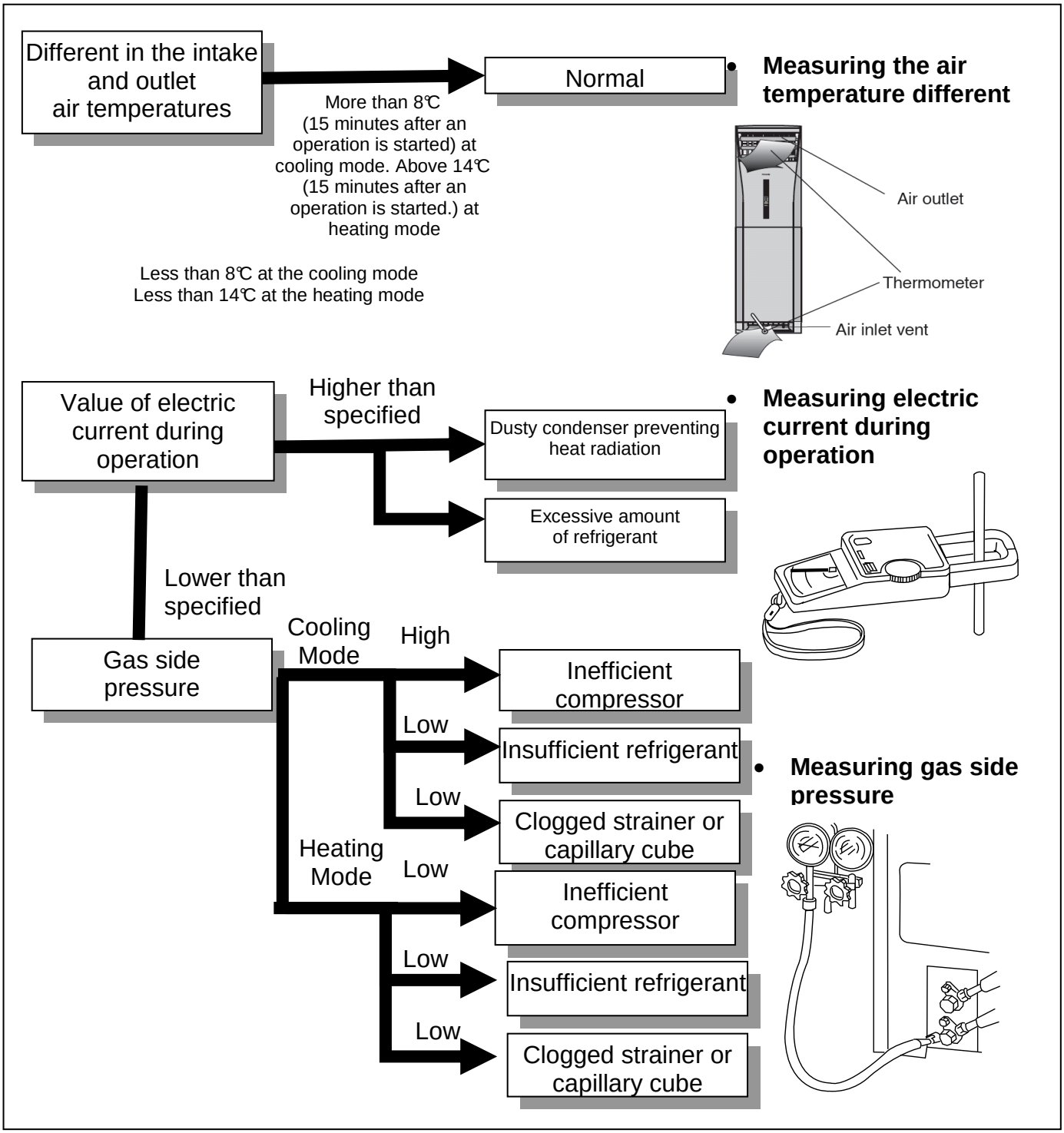
15.1 Refrigeration cycle system

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/cm^2G)	Outlet air Temperature (℃)
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℃ at cooling mode and 7° C at heating mode.
Compressor operates at rated frequency



15.2 Refrigeration cycle system

Code	Abnormality/Protection	Judgment	Check	Emergency Operation
H00	Normal			
H11	Indoor/Outdoor abnormal communication	Over 1minute after starting operation	Connecting cable, Indoor/Outdoor PCB	O
H15	Outdoor compressor temperature sensor abnormality	Continue for 5 seconds after compressor on for 5 minutes.	Compressor temperature sensor defective or disconnected.	x
H16	Outdoor Current Transformer open	-	Outdoor PCB, IPM module	X
H19	Indoor fan motor mechanism lock	Detect FB rotation data abnormal for 7 times(if it is normal for 25 seconds, counter will be cleared)	Indoor PCB, fan motor	X
H27	Outdoor air temperature sensor abnormality	Continue for 5 sec.	Outdoor temperature sensor(defected or disconnected)	O
H30	Discharge temperature sensor abnormality	Continue for 5 sec. heating mode	Discharge temperature sensor(defected or disconnected)	X
H33	Incorrect connection of Indoor/Outdoor cable	-	Indoor/outdoor supply voltage	X
H52	Movable panel position-limiting switch abnormality	Continue for 5 sec.	Position-limiting SW	X
H55	Movable panel operation abnormality	20 sec. continuously for 3 times	Position-limiting SW	X
H97	Outdoor fan motor lock	Twice within 30 minutes	Outdoor fan motor	X
H98	Indoor high pressure protection	-	Heat exchanger sensor; Air filter dirty; Air circulation short circuit	X
H99	Indoor heat exchanger anti-freezing protection	Indoor heat exchanger freezing	Heat exchanger sensor; Air filter dirty; Insufficient refrigerant.	X
F11	Cooling/heating cycle changeover abnormality	4 times occurrence within 30 minutes	4-way valve V-coil	X
F16	Air swing position indicating position abnormality	Air swing initial position not detected in 1 minute	Air swing locked	X
F20	Indoor unit intake sensor abnormality	Disconnect continuously for 5 seconds; or short for 2 minutes after 20 minutes	Indoor unit intake sensor or sensor connection,	x
F21	Indoor heat exchanger sensor abnormality	Continue for 5 sec	Open or short	X
F40	Outdoor (heat exchanger 1) sensor abnormality	Continue for 5 sec	Open or short	X
F90	PFC control	4 times occurrence within 10 minutes	Open circuit; Voltage and temperature at PFC	X
F91	Refrigeration cycle abnormality	2 times occurrence within 20 minutes	Refrigerant leakage; System blocked	X
F93	Compressor abnormality	4 times occurrence within 20 minutes	Compressor	X
F95	High pressure protection in cooling mode	4 times occurrence within 20 minutes	Outdoor pressure too high; Heat exchanger sensor	X
F96	IPM overheating protection	-	IPM overheating due to excessive refrigerant, improper heat radiation, etc.	X
F97	Outdoor compressor overheating protection	4 times occurrence within 10 minutes	Insufficient refrigerant; Compressor, Compressor temp. sensor, discharge temp. sensor.	X
F98	Total running current protection	3 times occurrence within 20 minutes	Excess refrigerant Improper radiation	X
F99	DC Peak Current Protection Control	Continue for 7 times	Outdoor PCB Compressor	X

16. Disassembly and Assembly Instructions

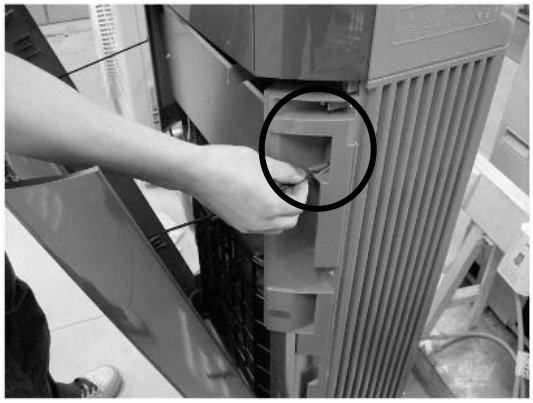
WARNING

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

Removal Procedure for Intake Grille

Open the intake panel by holding left top and right top of it. (Fig.1)
Release the two clamps of both sides from special pieces. (Fig.2)

（Fig.1）



(Fig.2)

Removal Procedure for Discharge Grille

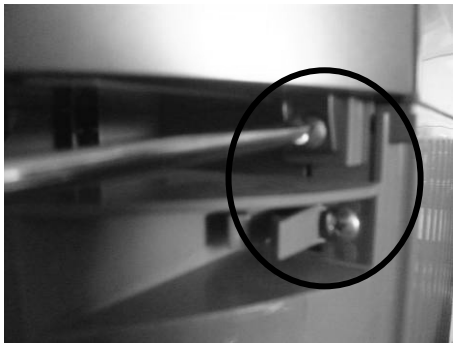
1. Put your hands against the removable panel, and push the panel upwards to remove it. (Fig.3)

(Fig.3)

2. Release the 7 screws as shown in fig.4.

(Fig.4)

3. Loose two screw on button of right side decoration panel. (Fig.5)
   Push the right side panel upwards to remove it. (Fig.6)
   The same procedure to remove the decoration panel on left side.



(Fig.5)

(Fig.6)

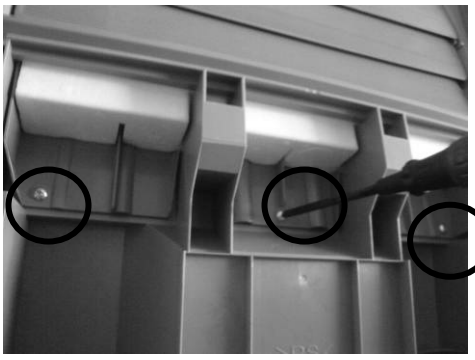
4. Loose the screws fixing on the front panel from both sides. Put your hands against the panel and push it upwards to remove it.（Fig.7）

(Fig.7)

5. Hold the vane on ends, slightly bend it. Carefully to drag it out from the fixing hole. (Fig.8)

(Fig.8)

6. Loose the three screws, disconnect the motor connecting wire, and hold the discharge grille up to disassemble it from the unit. (Fig.9 ,Fig.10,Fig.11)



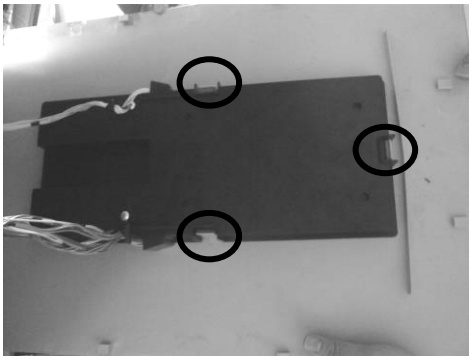
(Fig.9)

(Fig.10)

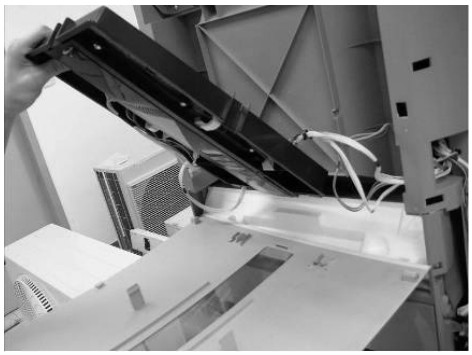
(Fig.11)

Removal Procedure of Display PCB

1. Remove the front panel. The display PCB casing can be seen fixing on the back of the panel. Pull the three hooks carefully to take away the display PCB with casing. (Fig.12, Fig.13)

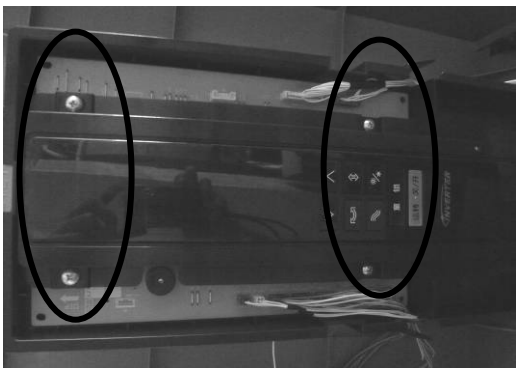


(Fig.12)

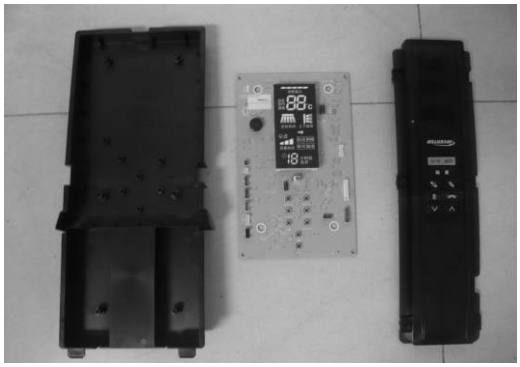


(Fig.13)

2. Loose the 4 screws as shown in Fig.14, disconnect wires from the display PCB connectors. And then the display PCB can be taken out from the casing. (Fig.14)



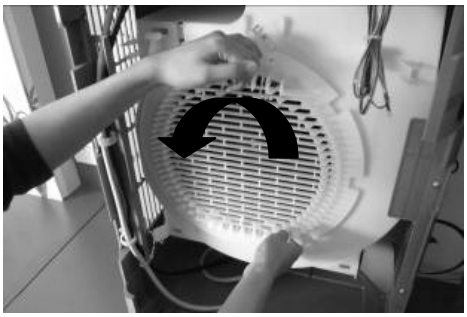
(Fig.14)



(Fig.15)

Removal procedure of Indoor Fan

After taking away the intake panel of indoor unit, turn the air discharge grille anticlockwise to remove the grille (Fig.16). And then to disassemble the indoor fan as shown in fig.17.



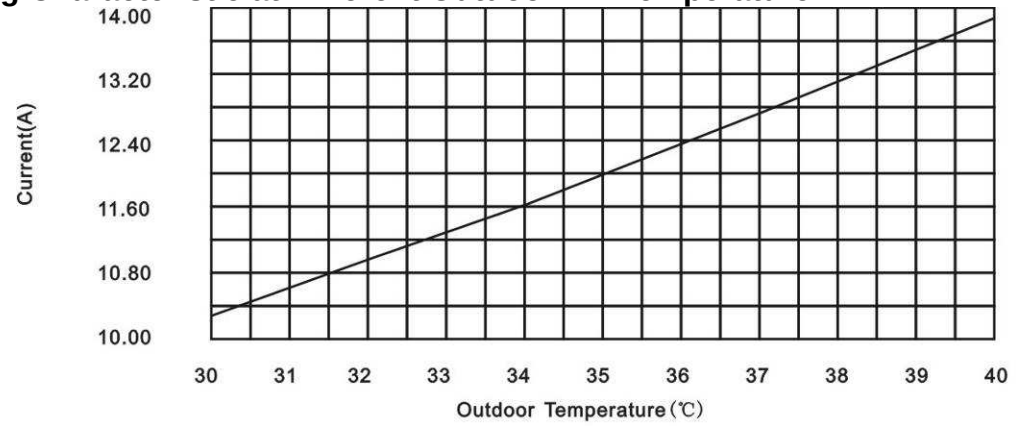
(Fig.16)

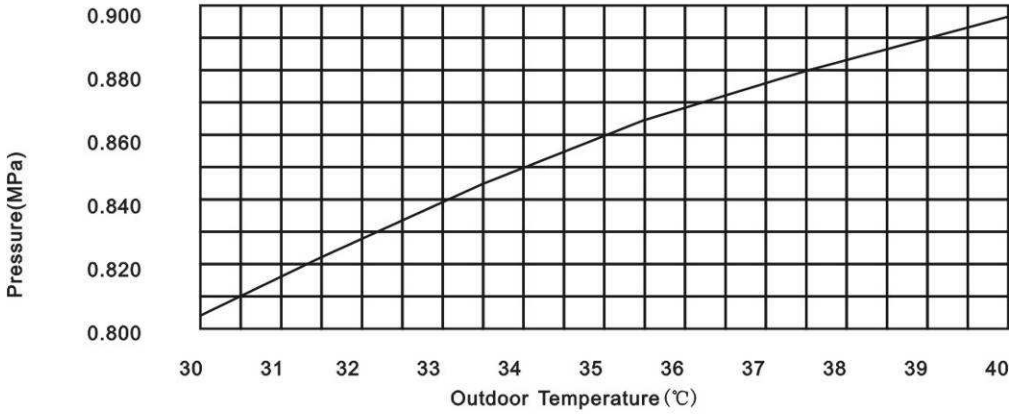
(Fig.17)

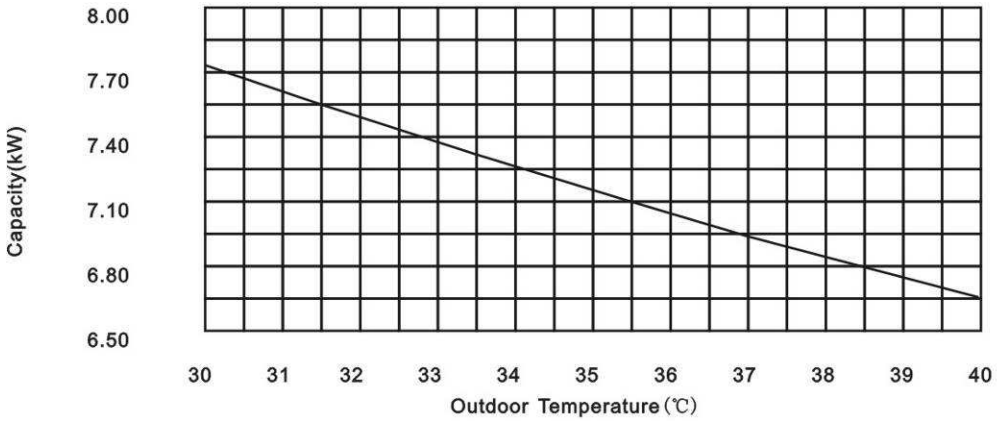
17. Technical Data

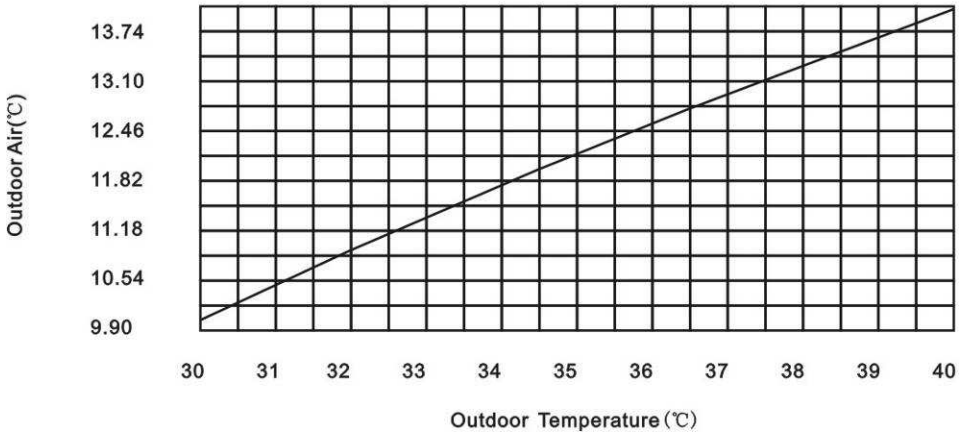
17.1 Operation Characteristics

Cooling Characteristic at Different Outdoor Air Temperature

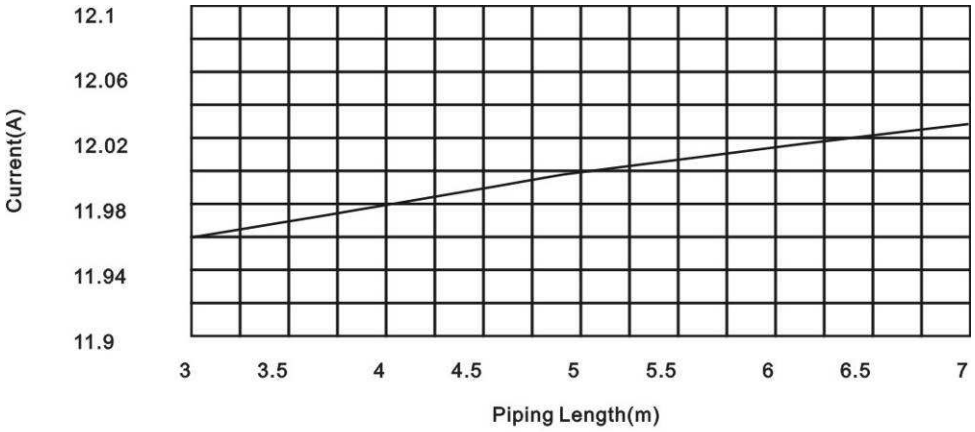


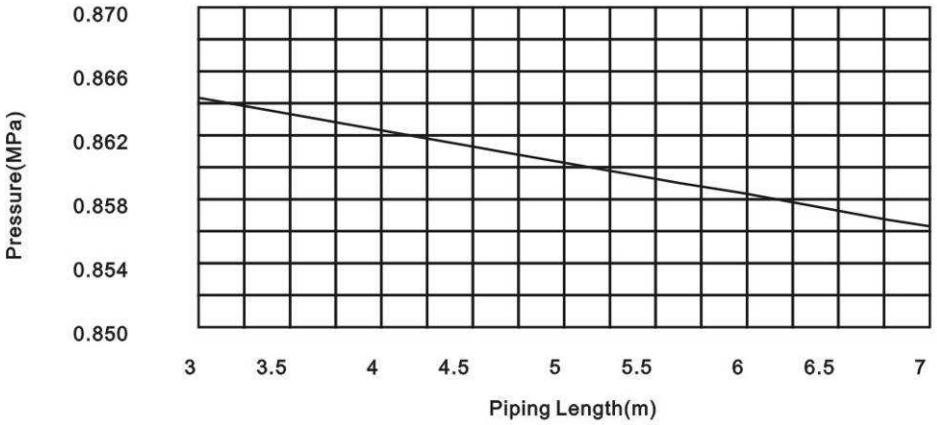


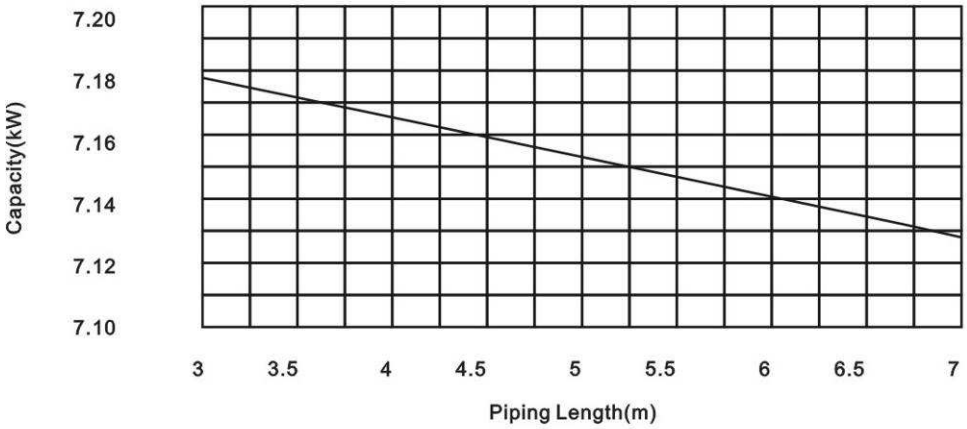


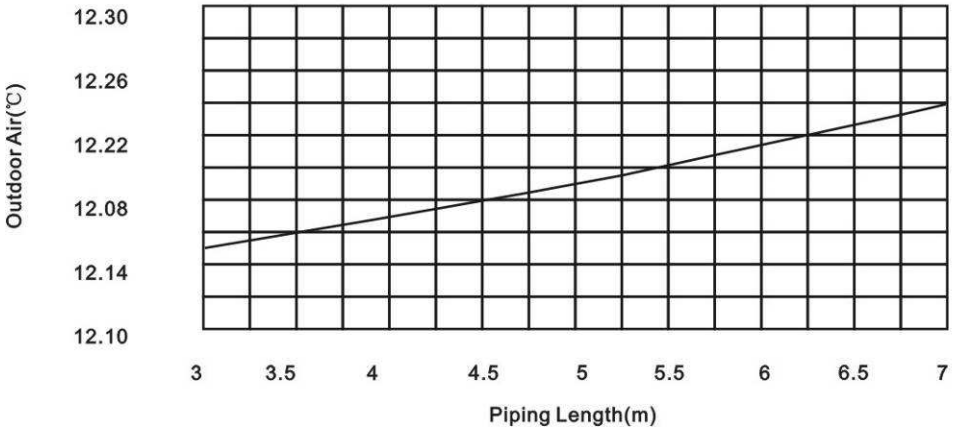


Cooling Characteristic at Different Piping Length

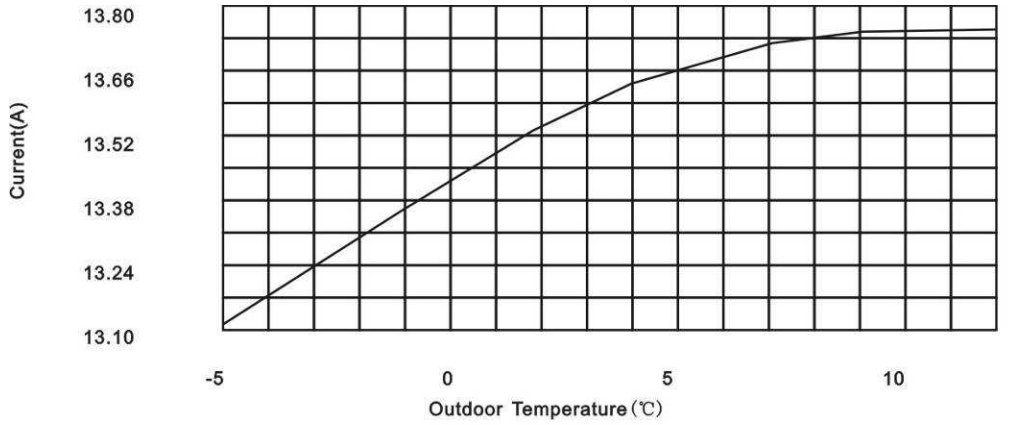


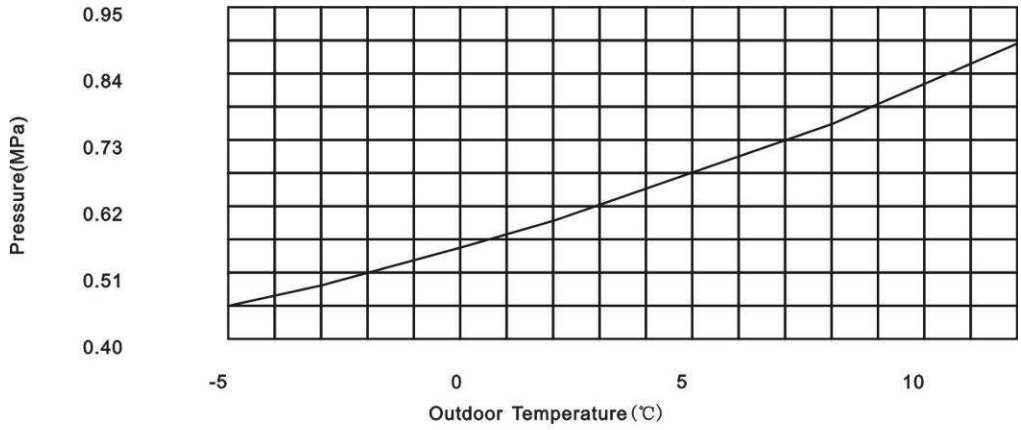


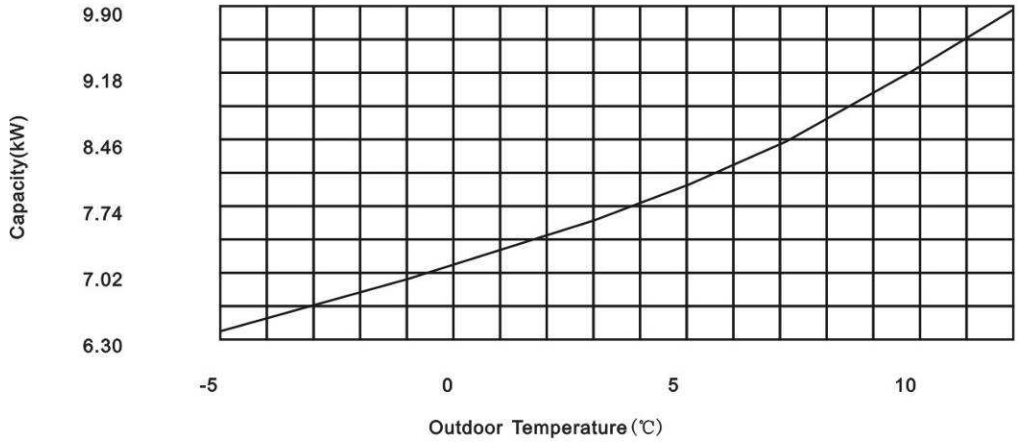


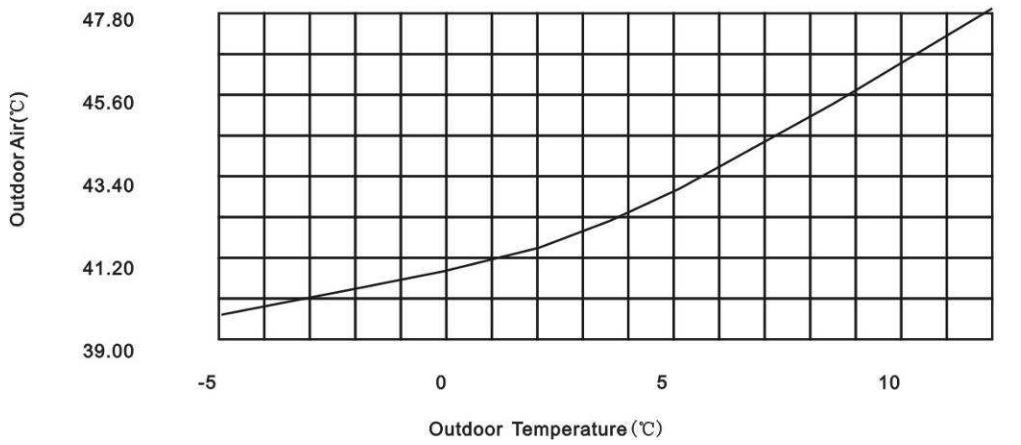


Heating Characteristic at Different Outdoor Air Temperature

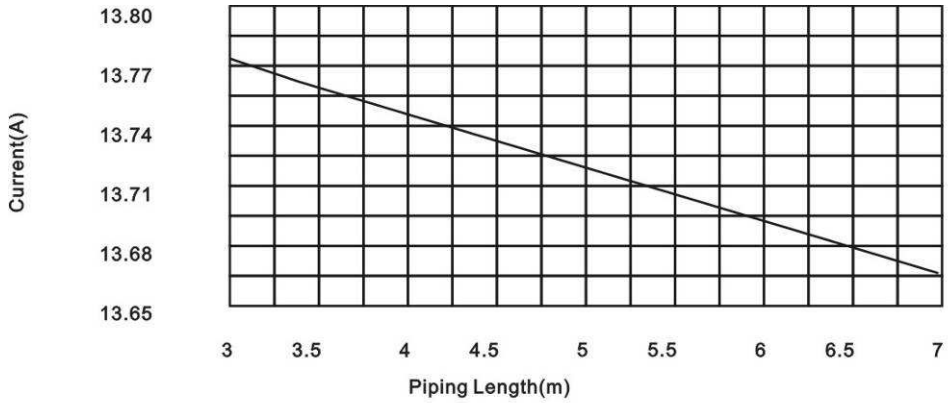


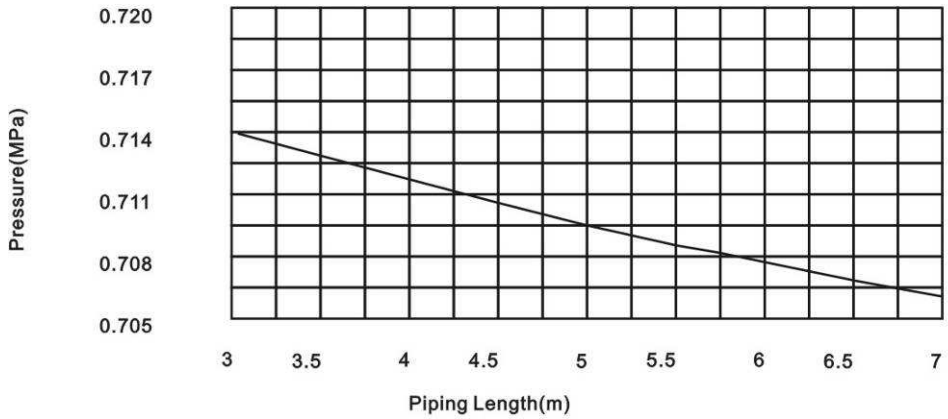


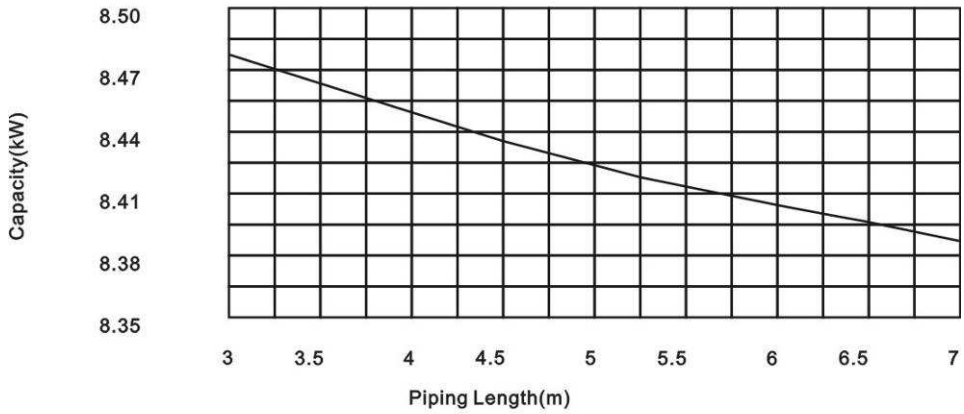


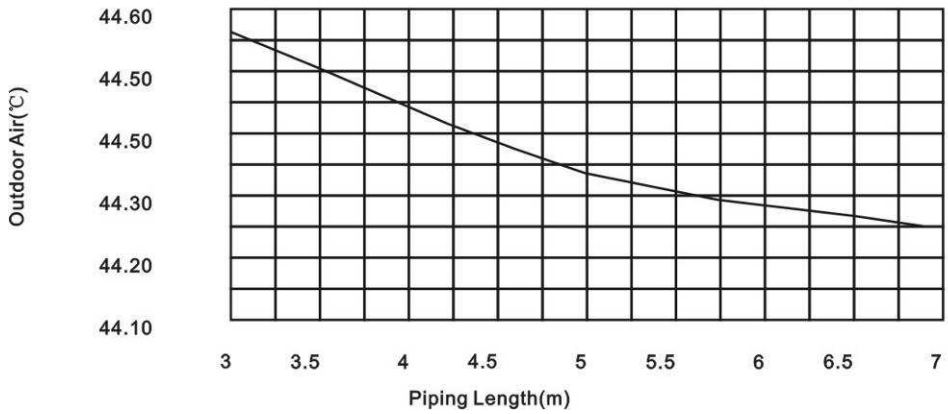


Heating Characteristic at Different Piping Length



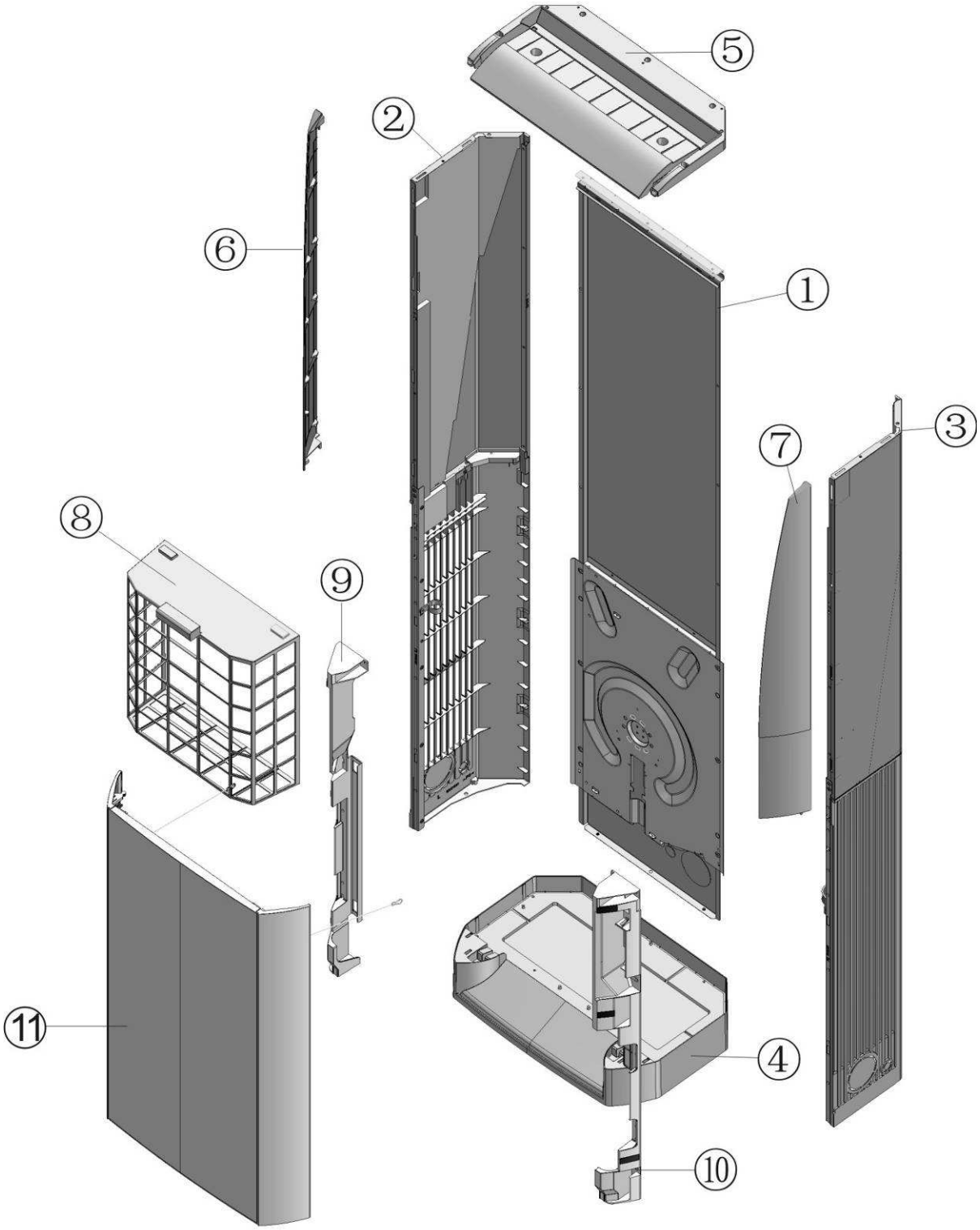


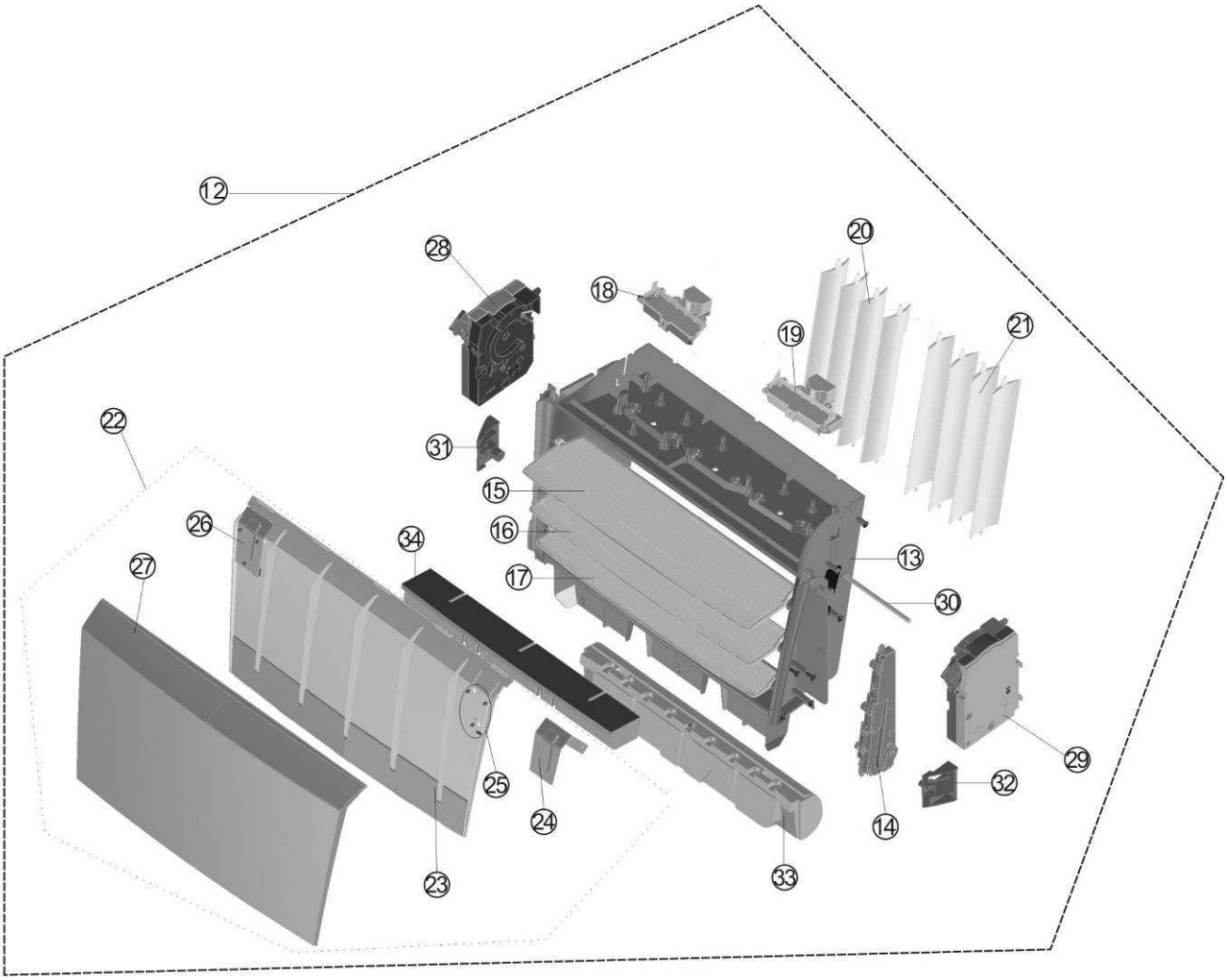




18. Exploded View and Replacement Pars List

18.1 Indoor Unit

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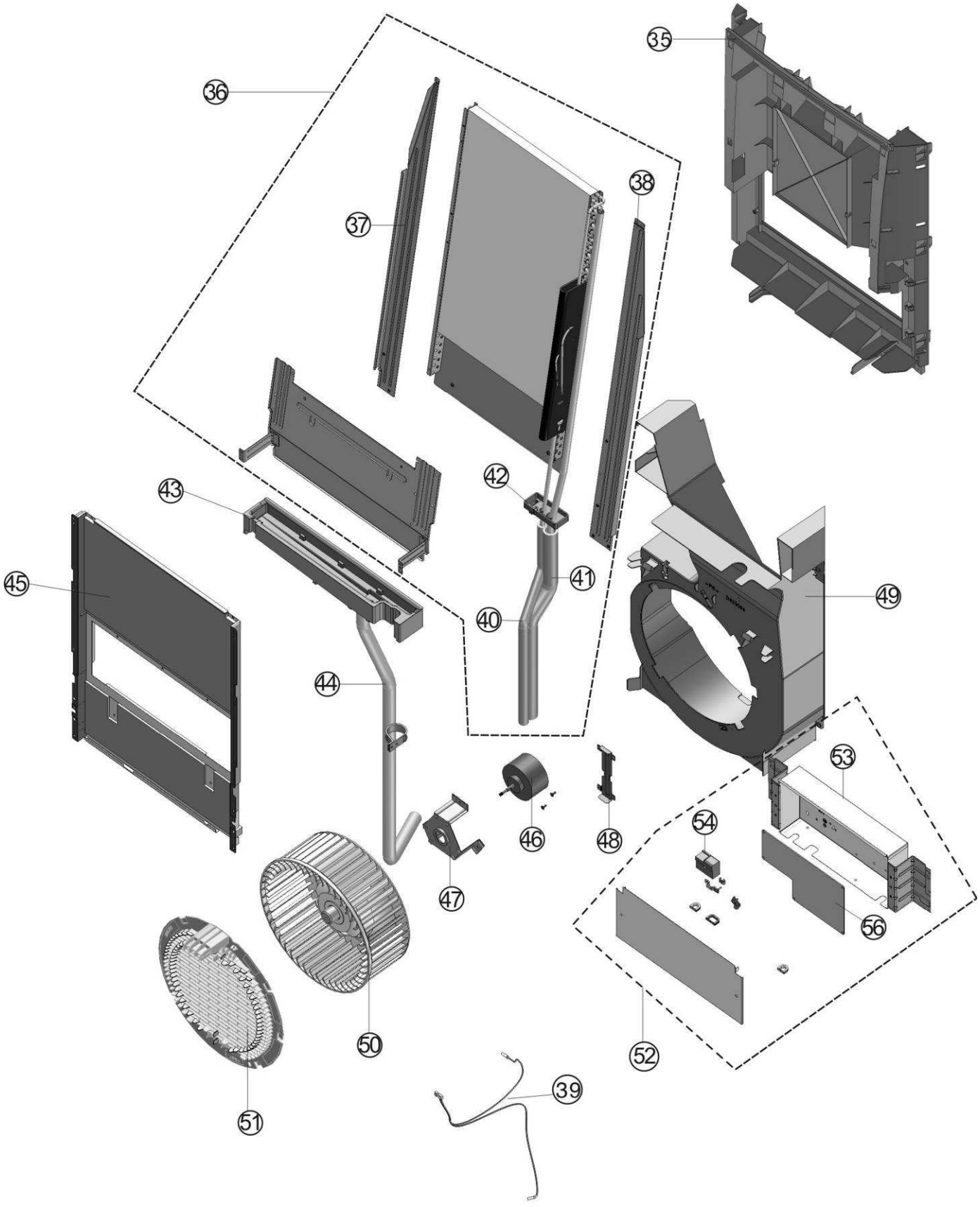
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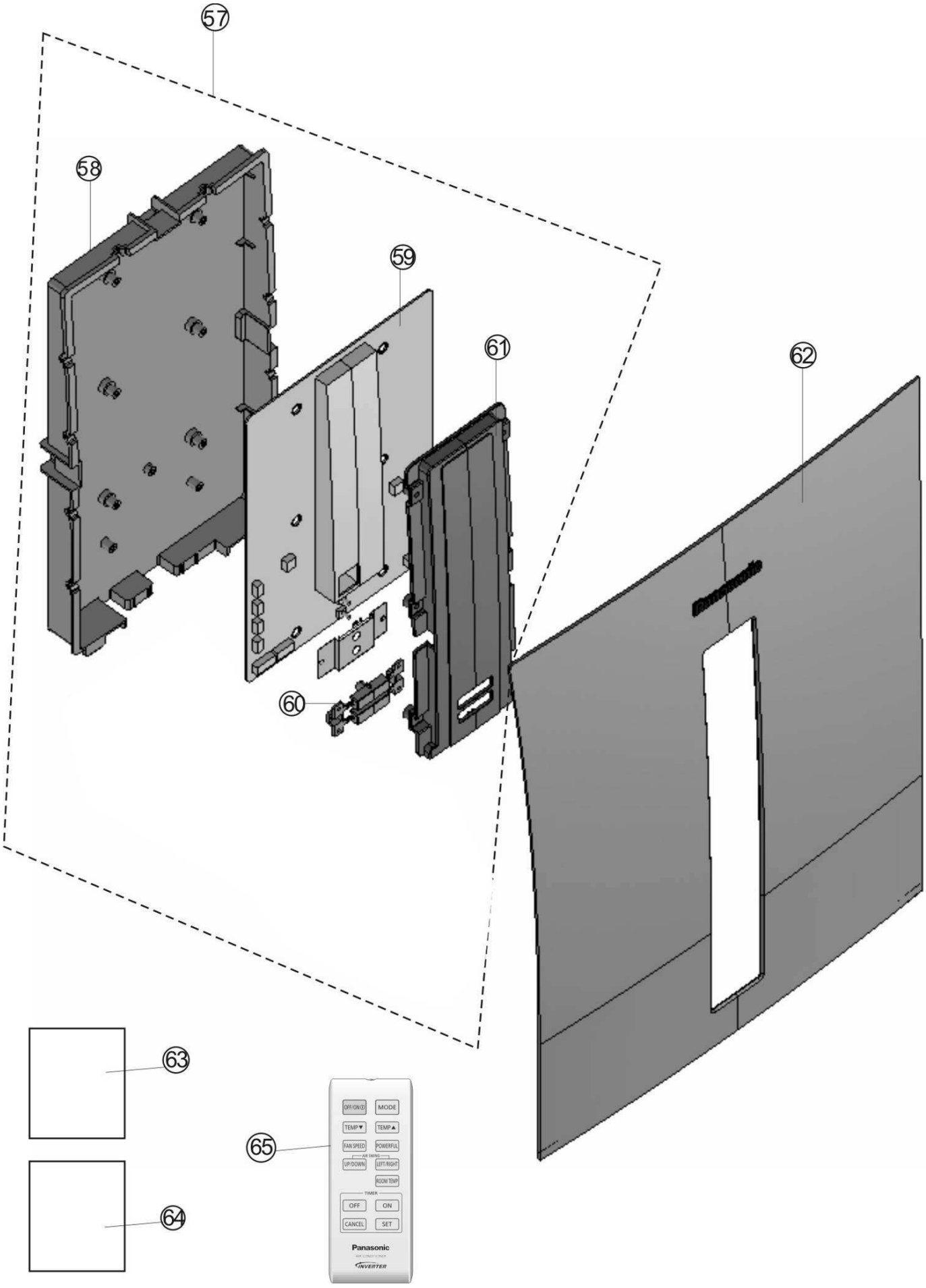

57
58
59
61
62
60
63
64
65
OFF/ON
MODE
TEMP▼
TEMP▲
FAN SPEED
POWERFUL
AIR SWING
UP/DOWN
LEFT/RIGHT
ROOM TEMP
TIMER
OFF
ON
CANCEL
SET
Panasonic
INVERTER

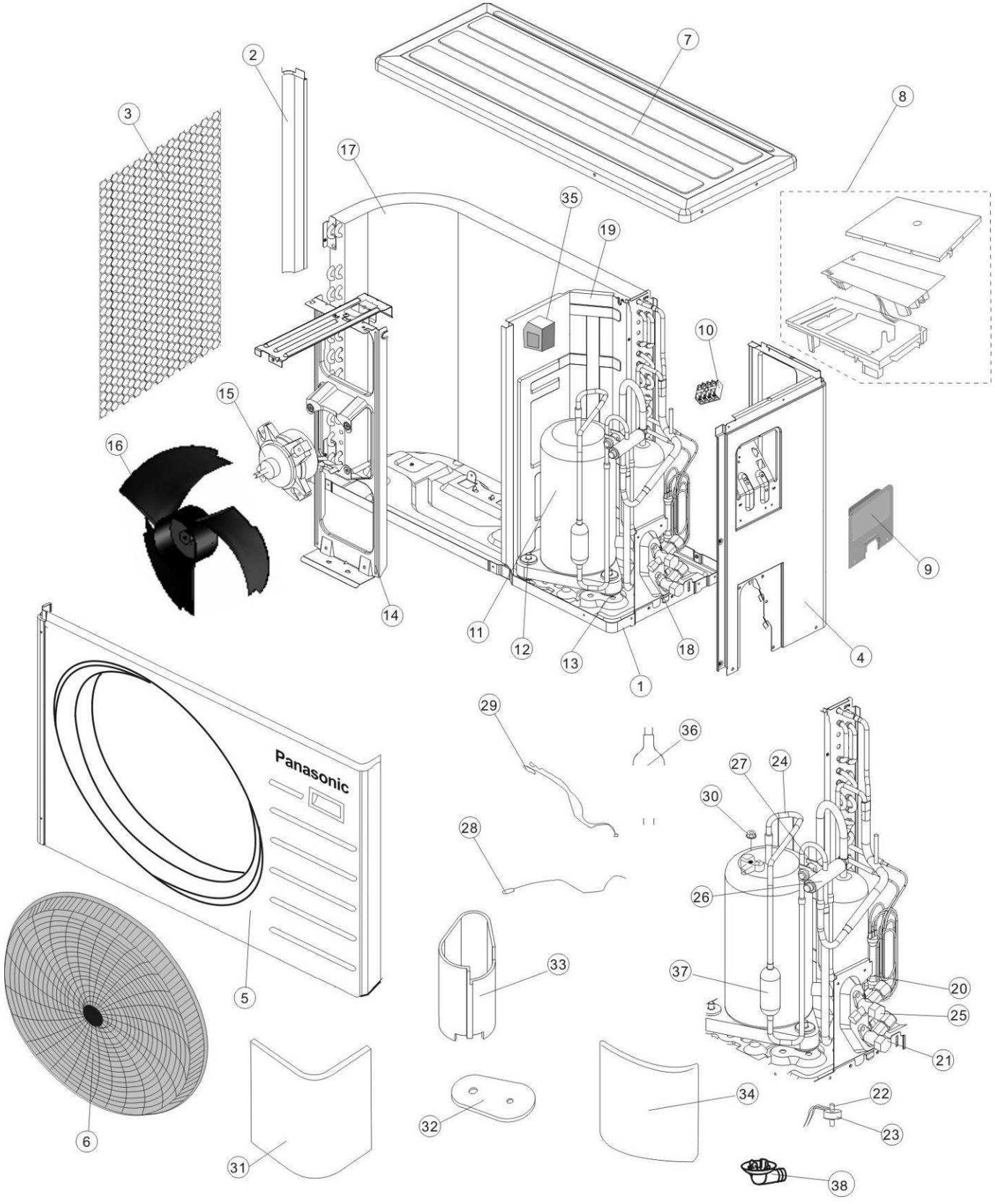
NO.	Parts Name	Qty.	CS-E28NFQ
1	REAR PLATE	1	CWE02K1014
2	SIDE PLATE (L)	1	CWE04C1217
3	SIDE PLAT (R)	1	CWE04C1219
4	CHASSIS ASS'Y	1	CWE051062
5	TOP PLATE	1	CWE03C1089
6	DECORATION SASH (L)	1	CWE34C1043
7	DECORATION SASH (R)	1	CWE34C1044
8	AIR FILTER	1	CWD001321
9	SPECIAL PIECE(L)	1	CWD933148
10	SPECIAL PIECE(R)	1	CWD933149
11	INTAKE GRILLE COMPLETE	1	CWE22C1700
12	DISCHARGE GRILLE COMPLETE	1	CWE20C3189
13	DISCHARGE GRILLE	1	CWE201216
14	A.S. MOTOR(VERTICAL AIRFLOW)(DC,12V,150OHM)	1	CWA98C1061
15	VERTICAL AIRFLOW VANE(UPPER)	1	CWE24C1380
16	VERTICAL AIRFLOW VANE(M)	1	CWE24C1381
17	VERTICAL AIRFLOW VANE(LOWER)	1	CWE24C1382
18	A.S. MOTOR (L)(DC,12V,200OHM)	1	CWA98C1063
19	A.S. MOTOR (R)(DC,12V,200OHM)	1	CWA98C1062
20	HORIZONTAL VANE(L)	4	CWE241366
21	HORIZONTAL VANE(R)	4	CWE241367
22	MOVABLE PANEL COMPLETE	1	CWE13C1115
23	MOVABLE PANEL(INNER)	1	CWE131042
24	SPECIAL PIECE (R)	1	CWD911955A
25	SCREW	6	CWXTT4+8CFJ
26	SPECIAL PIECE (L)	1	CWD911954A
27	MOVABLE PANEL(OUTER)	1	CWE13C1126
28	MOTOR-MOVABLE PANEL(L)(DC,14V,90OHM)	1	CWA98C1059
29	MOTOR-MOVABLE PANEL(R)(DC,14V,90OHM)	1	CWA98C1060
30	TRANSMISSION SHAFT	1	CWH631094
31	FIXING TOOL(L)	1	CWD933204
32	FIXING TOOL(R)	1	CWD933201
33	FOAM(BOTTOM)	1	CWG071535
34	FOAM(FRONT)	1	CWG071536
35	FIXING TOOL FOR DISCHARGE GEILL	1	CWE121232
36	EVAPORATOR	1	CWB303076
37	SPECIAL PIECE-EVAPORTOR(L)	1	CWD911960
38	SPECIAL PIECE-EVAPORTOR(R)	1	CWD911959
39	SENSOR	1	CWA50C2756
40	TUBE ASS'Y(LIQUID)	1	CWT028260
41	TUBE ASS'Y(GAS)	1	CWT027335
42	DRAIN PLATE	1	CWH401064
43	DRAIN PLATE	1	CWH40K1040
44	DRAIN HOSE	1	CWH851179
45	SPECIAL PIECE COMPLETE	1	CWD90K1043
46	FAN MOTOR(DC,280-340V,48W)	1	CWARW3202AC
47	SPECIAL PIECE	1	CWD932809
48	FIXING TOOL FOR MOTOR	1	CWD932940

49	INTAKE PASSAGE FOAM	1	CWD321094
50	FAN	1	CWH01K1024
51	PROTECTION GRILLE	1	CWD321095
52	CONTROL BOX COMPLETE	1	CWH14C9456
53	CONTROL BOARD CASING	1	CWH10K1139
54	TERMINAL BOARD	1	CWA28K1185
55	POWER SUPPLY CORD	1	CWA20C3082
56	MAIN PCB (POWER)	1	CWA73C6454
57	CONTROL BOX COMPLETE	1	CWH14C9455
58	CONTROL BOARD CASING	1	CWD661213
59	PCB(DISPLAY)	1	CWA73C6453
60	OPERATION BUTTONS	1	CWE17C1038
61	DECORATION PANEL	1	CWE351287
62	FRONT PANEL	1	CWE13C1111
63	OPERATING INSTRUCTIONS	1	CWF568489
64	INSTALLATION INSTRUCTIONS	1	CWF615281

(Note)

- All parts are supplied from PAPAGZ, China

18.2 Outdoor Unit



NO.	Parts Name	Qty.	CU-E28NFQ	REMARK
1	CHASSIS ASS'Y	1	CWD52K1254A	
2	CABINET SIDE PLATE (L)	1	CWE041525A	
3	COLOPHONY NET(L)	1	CWD041150	
4	CABINET SIDE PLATE (R)	1	CWE04C1211	
5	CABINET FRONT PLATE	1	CWE06C1353	
6	OUTLET GRILLE	1	CWE201212	
7	TOP PLATE	1	CWE03C1087	
8	CONTROL BOX COMPLETE	1	CWH14C9457	
9	TERMINAL COVER	1	CWH131238A	
10	TERMINAL BOARD ASS'Y	1	CWA28K1185	
11	COMPRESSOR	1	CWB092568	
12	ANTI-VIBRATION BUSHING	3	CWH50077	
13	NUT-COMP.MOUNT	3	CWH56000J	
14	HOLDER-FAN MOTOR	1	CWD54K1058	
15	FAN MOTOR(DC,280-340V,60W)	1	CWEHD80AAC	
16	PROPELLER FAN	1	CWH03K1041	
17	CONDENSER	1	CWB32C3126	
18	HOLDER-COUPLING	1	CWH35K1050	
19	SOUND PROOF PANEL	1	CWH15K1030	
20	TUBE ASS'Y	1	CWT027670	
21	2-WAY VALVE	1	CWB021530	
22	EXPANSION VALVE	1	CWB051030	
23	V-COIL-EXPANSION VALVE	1	CWA43C2435	
24	TUBE ASS'Y	1	CWT027315	
25	3-WAY VALVE	1	CWB011643	
26	4-WAY VALVE	1	CWB001077	
27	V-COIL COMPLETE	1	CWA43C2420	
28	SENSOR	1	CWA50C2563	
29	SENSOR(CN-TH)	1	CWA50C2792	
30	NUT FOR TERMIANL COVER	1	CW7080300J	
31	SOUND PROOF BOARD	1	CWG302694	
32	SOUND PROOF BOARD	1	CWG302695	
33	SOUND PROOF BOARD	1	CWG302696	
34	SOUND PROOF BOARD	1	CWG302343	
35	REACTOR	1	G0C402Z00004	
36	STRAINER	1	CWB11094	
37	MUFFLE	1	CWB121031	

(Note)

- All parts are supplied from PAPAGZ, China.

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