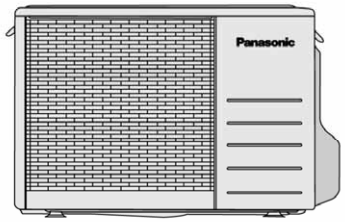
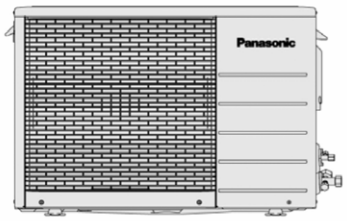
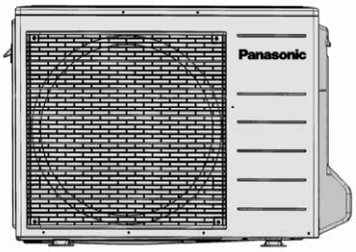
Order No: PAPAMY1301022CE

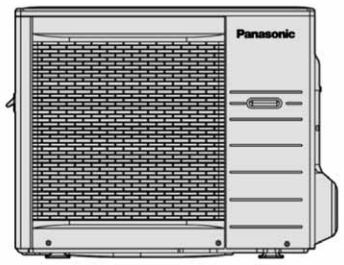
Service Manual

Air Conditioner









Indoor Unit	Outdoor Unit
CS-C12PKF	CU-C12PKF
CS-C18PKF	CU-C18PKF
CS-C24PKF	CU-C24PKF
CS-C28PKF	CU-C28PKF

Destination
Oman
Qatar
Kuwait
Nigeria
Middle East
Africa

⚠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.

IMPORTANT SAFETY NOTICE

There are special components used in this equipment which are important for safety. These parts are marked by ⚠ in the Schematic Diagrams, Circuit Board Diagrams, Exploded Views and Replacement Parts List. It is essential that these critical parts should be replaced with manufacturer's specified parts to prevent shock, fire or other hazards. Do not modify the original design without permission of manufacturer.

Panasonic®

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1. Safety Precautions

- Read the following “SAFETY PRECAUTIONS” carefully before perform any servicing.
- Electrical work must be installed or serviced by a licensed electrician. Be sure to use the correct rating of the power plug and main circuit for the model installed.
- The caution items stated here must be followed because these important contents are related to safety. The meaning of each indication used is as below. Incorrect installation or servicing due to ignoring of the instruction will cause harm or damage, and the seriousness is classified by the following indications.

⚠ **WARNING**	This indication shows the possibility of causing death or serious injury.
⚠ **CAUTION**	This indication shows the possibility of causing injury or damage to properties.

- The items to be followed are classified by the symbols:

⃠	This symbol denotes item that is PROHIBITED from doing.

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

⚠ **WARNING**	
1. Do not modify the machine, part, material during repairing service.	
2. If wiring unit is supplied as repairing part, do not repair or connect the wire even only partial wire break. Exchange the whole wiring unit.	
3. Do not wrench the fasten terminal. Pull it out or insert it straightly.	
4. Engage dealer or specialist for installation and servicing. If installation of servicing done by the user is defective, it will cause water leakage, electrical shock or fire.	
5. Install according to this installation instructions strictly. If installation is defective, it will cause water leakage, electric shock or fire.	
6. Use the attached accessories parts and specified parts for installation and servicing. Otherwise, it will cause the set to fall, water leakage, fire or electrical shock.	
7. Install at a strong and firm location which is able to withstand the set’s weight. If the strength is not enough or installation is not properly done, the set will drop and cause injury.	
8. For electrical work, follow the local national wiring standard, regulation and the installation instruction. An independent circuit and single outlet must be used. If electrical circuit capacity is not enough or defect found in electrical work, it will cause electrical shock or fire.	
9. This equipment is strongly recommended to install with Earth Leakage Circuit Breaker (ELCB) or Residual Current Device (RCD). Otherwise, it may cause electrical shock and fire in case equipment breakdown or insulation breakdown.	
10. Do not use joint cable for indoor / outdoor connection cable. Use the specified Indoor/Outdoor connection cable, refer to installation instruction CONNECT THE CABLE TO THE INDOOR UNIT and connect tightly for indoor / outdoor connection. Clamp the cable so that no external force will be acted on the terminal. If connecting or fixing is not perfect, it will cause heat up or fire at the connection.	
11. Wire routing must be properly arranged so that control board cover is fixed properly. If control board cover is not fixed perfectly, it will cause heat-up or fire at the connection point of terminal, fire or electrical shock.	
12. When install or relocate air conditioner, do not let any substance other than the specified refrigerant, eg. air etc. mix into refrigeration cycle (piping). (Mixing of air etc. will cause abnormal high pressure in refrigeration cycle and result in explosion, injury etc.).	
13. Do not install outdoor unit near handrail of veranda. When installing air-conditioner unit at veranda of high rise building, child may climb up to outdoor unit and cross over the handrail and causing accident.	
14. This equipment must be properly earthed. Earth line must not be connected to gas pipe, water pipe, earth of lightning rod and telephone. Otherwise, it may cause electric shock in case equipment breakdown or insulation breakdown.	⃠
15. Keep away from small children, the thin film may cling to nose and mouth and prevent breathing.	⃠
16. Do not use unspecified cord, modified cord, joint cord or extension cord for power supply cord. Do not share the single outlet with other electrical appliances. Poor contact, poor insulation or over current will cause electrical shock or fire.	⃠
17. Tighten the flare nut with torque wrench according to specified method. If the flare nut is over-tightened, after a long period, the flare may break and cause refrigerant gas leakage.	⃠
18. During pump down operation, stop the compressor before remove the refrigeration piping. (Removal of compressor while compressor is operating and valves are opened will cause suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc.)	⃠

⚠ WARNING

19. During installation, install the refrigerant piping properly before run the compressor. (Operation of compressor without fixing refrigeration piping and valves at opened condition will caused suck-in of air, abnormal high pressure in refrigeration cycle and result in explosion, injury etc).
20. After completion of installation or service, confirm there is no leakage or refrigerant gas. It may generate toxic gas when the refrigerant contacts with fire.
21. Ventilate if there is refrigerant gas leakage during operation. It may cause toxic gas when refrigerant contacts with fire.
22. Do not insert your fingers or other objects into the unit, high speed rotating fan may cause injury.
23. Must not use other parts except original parts described in catalog and manual.
24. Using of refrigerant other than the specified type may cause product damage, burst and injury etc.

⚠ 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. **CS/CU-C12/18/24PKF**
   Power supply connection to the room air conditioner.
   Use power supply cord 3 x 1.5 mm^2 (1.0~1.5HP) 3 x 2.5 mm^2 (2.0~2.5HP) type designation 60245 IEC 57 or heavier cord. 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.
   i. Power supply connection to the receptacle using power plug.
   Use an approved 15/16A (1.0~1.5HP) or 16A (2.0HP) or 20A (2.5HP) power plug with earth pin for the connection to the socket.
   ii. Power supply connection to a circuit breaker for the permanent connection.
   Use an approved 16A (1.0~2.0HP) or 20A (2.5HP) circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.0 mm contact gap.
8. **CS/CU-C28PKF**
   Power supply connection to the room air conditioner.
   Use power supply cord 3 x 4.0 mm^2 type designation 60245 IEC 57 or heavier cord.
   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.
   i. Power supply connection to the receptacle using power plug.
   Use an approved 25A power plug with earth pin for the connection to the socket.
   ii. 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 3.0 mm contact gap.
9. Do not release refrigerant during piping work for installation, servicing, reinstallation and during repairing a refrigerant parts. Take care of the liquid refrigerant, it may cause frostbite.
10. Installation or servicing work: It may need two people to carry out the installation or servicing work.
11. Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc.
12. Do not sit or step on the unit, you may fall down accidentally.
13. Do not touch the sharp aluminum fins or edges of metal parts.
    If you are required to handle sharp parts during installation or servicing, please wear hand glove.
    Sharp parts may cause injury.

2. Specification

Model			Indoor	CS-C12PKF		CS-C18PKF	
			Outdoor	CU-C12PKF		CU-C18PKF	
Performance Test Condition				AHAM		AHAM	
Power Supply			Phase, Hz	Single, 50		Single, 50	
			V	220	240	220	240
Cooling	Capacity		kW	3.58	3.60	5.28	5.28
			BTU/h	12200	12300	18000	18000
			kJ/h	12890	12960	19010	19010
	Running Current		A	5.3	5.1	8.8	8.9
	Input Power		W	1.13k	1.16k	1.90k	1.95k
	EER		W/W	3.17	3.10	2.78	2.71
			BTU/hW	10.80	10.60	9.47	9.23
	Power Factor		%	97	95	98	91
	Indoor Noise (H / L)		dB-A	39 / 29	39 / 29	44 / 39	44 / 39
			Power Level dB	52 / -	52 / -	57 / -	57 / -
	Outdoor Noise (H / L)		dB-A	50 / -	51 / -	55 / -	56 / -
			Power Level dB	65 / -	66 / -	70 / -	71 / -
Max Current (A) / Max Input Power (W)				8.1 / 1.75k		12.6 / 2.80k	
Starting Current (A)				30.0		44.0	
Compressor	Type			Hermetic Motor / Rotary		Hermetic Motor / Rotary	
	Motor Type			Induction (2-poles)		Induction (2-poles)	
	Output Power		W	1.0k		1.5k	
Indoor Fan	Type			Cross-Flow Fan		Cross-Flow Fan	
	Material			ASG20K1		ASG30K1	
	Motor Type			AC / Induction (4-poles)		DC / Transistor (8-poles)	
	Input Power		W	51 - 58		94.8 - 94.8	
	Output Power		W	24		40	
	Speed	QLo	rpm	710		950	
		Lo	rpm	780		1040	
		Me	rpm	910		1130	
		Hi	rpm	1090		1280	
		SHi	rpm	1120		1430	
Outdoor Fan	Type			Propeller Fan		Propeller Fan	
	Material			PP Resin		PP Resin	
	Motor Type			AC / Induction (6 - poles)		AC / Induction (6 - poles)	
	Input Power		W	80.3 - 89.1		80.3 - 89.1	
	Output Power		W	45		45	
	Speed	Hi	rpm	875 - 905		875 - 905	
Moisture Removal			L/h (Pt/h)	2.1 (4.4)		2.9 (6.1)	
Indoor Airflow		QLo	m^3/min (ft^3/min)	6.80 (239)		12.50 (443)	
		Lo	m^3/min (ft^3/min)	7.40 (263)		13.70 (485)	
		Me	m^3/min (ft^3/min)	8.70 (306)		14.90 (527)	
		Hi	m^3/min (ft^3/min)	10.40 (367)		16.90 (597)	
		SHi	m^3/min (ft^3/min)	10.70 (377)		18.90 (667)	
Outdoor Airflow		Hi	m^3/min (ft^3/min)	33.2 (1170) - 34.2 (1210)		31.6 (1120) - 32.6 (1150)	

Refrigeration Cycle	Control Device		Capillary tube		Capillary tube	
	Refrigerant Oil	cm^3	ATMOS NM56M or SUNISO 4GDID (430)		ATMOS NM56M or SUNISO 4GDID (450)	
	Refrigerant Type	g (oz)	R22, 870 (30.7)		R22, 1.01k (35.7)	
Dimension	Height(I/D / O/D)	mm (inch)	290 (11-7/16)	542 (21-11/32)	290 (11-7/16)	542 (21-11/32)
	Width (I/D / O/D)	mm (inch)	870 (34-9/32)	780 (30-23/32)	1070 (42-5/32)	780 (30-23/32)
	Depth (I/D / O/D)	mm (inch)	214 (8-7/16)	289 (11-13/32)	240 (9-15/32)	289 (11-13/32)
Weight	Net (I/D / O/D)	kg (lb)	9 (20)	34 (75)	12 (26)	37 (82)
Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 12.70 (1/2)		6.35 (1/4) / 12.70 (1/2)	
	Standard length	m (ft)	7.5 (24.6)		5.0 (16.4)	
	Length range (min – max)	m (ft)	3 (9.8) ~ 15 (49.2)		3 (9.8) ~ 25 (82.0)	
	I/D & O/D Height different	m (ft)	5 (16.4)		20 (65.6)	
	Additional Gas Amount	g/m (oz/ft)	10 (0.1)		20 (0.2)	
	Length for Additional Gas	m (ft)	7.5 (24.6)		7.5 (24.6)	
Drain Hose	Inner Diameter	mm	16.7		16.7	
	Length	mm	650		650	
Indoor Heat Exchanger	Fin Material		Pre Coat		Pre Coat	
	Fin Type		Slit Fin		Slit Fin	
	Row x Stage x FPI		2 X 15 X 21		2 x 15 x 17	
	Size (W x H x L)	mm	610 x 315 x 25.4		810 x 315 x 25.4	
Outdoor Heat Exchanger	Fin Material		Blue Coated		Blue Coated	
	Fin Type		Corrugate Fin		Slit Fin	
	Row x Stage x FPI		1 X 20 X 17		2 x 24 x 17	
	Size (W x H x L)	mm	22 X 508 X 708.4:720.4		25.4 x 504 x 693.4:713.4	
Air Filter	Material		Polypropelene		Polypropelene	
	Type		One-touch		One-touch	
Power Supply			Indoor		Indoor	
Power Supply Cord		A	15		16	
Thermostat			-		-	
Protection Device			-		-	
			Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb
Indoor Operation Range		Maximum	32	23	32	23
		Minimum	16	11	16	11
Outdoor Operation Range		Maximum	55	31	55	31
		Minimum	16	11	16	11

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

Model		Indoor	CS-C24PKF		CS-C28PKF	
		Outdoor	CU-C24PKF		CU-C28PKF	
Performance Test Condition			AHAM		AHAM	
Power Supply		Phase, Hz	Single, 50		Single, 50	
		V	220	240	220	240
Cooling	Capacity	kW	7.03	7.03	8.20	8.20
		BTU/h	24000	24000	28000	28000
		kJ/h	25310	25310	29520	29520
	Running Current	A	11.2	11.3	13.1	13.8
	Input Power	W	2.35k	2.47k	2.76k	2.92k
	EER	W/W	2.99	2.85	2.97	2.81
		BTU/hW	10.21	9.72	10.14	9.59
	Power Factor	%	95	91	96	88
	Indoor Noise (H / L)	dB-A	47 / 40	48 / 40	49 / 44	49 / 44
		Power Level dB	60 / -	61 / -	62 / -	62 / -
	Outdoor Noise (H / L)	dB-A	57 / -	58 / -	57 / -	58 / -
		Power Level dB	72 / -	73 / -	72 / -	73 / -
Max Current (A) / Max Input Power (W)			16.9 / 3.62k		20.5 / 4.40k	
Starting Current (A)			59.0		83.0	
Compressor	Type		Hermetic Motor / Rotary		Hermetic Motor / Rotary	
	Motor Type		Induction (2-poles)		Induction (2-poles)	
	Output Power	W	2.0k		2.4k	
Indoor Fan	Type		Cross-Flow Fan		Cross-Flow Fan	
	Material		ASG30K1		ASG30K1	
	Motor Type		DC / Transistor (8-poles)		DC / Transistor (8-poles)	
	Input Power	W	94.8 - 94.8		94.8 - 94.8	
	Output Power	W	40		40	
	Speed QLo	rpm	980		1110	
	Speed Lo	rpm	1070		1200	
	Speed Me	rpm	1190		1340	
	Speed Hi	rpm	1390		1490	
	Speed SHi	rpm	1500		1530	
Outdoor Fan	Type		Propeller Fan		Propeller Fan	
	Material		PP Resin		PP Resin	
	Motor Type		AC / Induction (6-poles)		AC / Induction (6-poles)	
	Input Power	W	157.3 - 173.8		157.3 - 173.8	
	Output Power	W	88		88	
	Speed Lo	rpm	440 - 500		440 - 500	
	Speed Hi	rpm	860 - 890		860 - 890	
Moisture Removal		L/h (Pt/h)	4.0 (8.5)		4.8 (10.1)	
Indoor Airflow	QLo	m^3/min (ft^3/min)	12.80 (451)		15.00 (531)	
	Lo	m^3/min (ft^3/min)	13.90 (492)		16.30 (575)	
	Me	m^3/min (ft^3/min)	15.50 (547)		18.20 (642)	
	Hi	m^3/min (ft^3/min)	18.10 (639)		20.20 (713)	
	SHi	m^3/min (ft^3/min)	19.50 (690)		20.70 (733)	
Outdoor Airflow	Hi	m^3/min (ft^3/min)	52.0 (1840) - 54.0 (1910)		48.5 (1710) - 50.5 (1780)	
Refrigeration Cycle	Control Device		Capillary tube		Capillary tube	
	Refrigerant Oil	cm^3	ATMOS NM56M or SUNISO 4GDID (700)		ATMOS M60 or SUNISO 4GDID (900)	
	Refrigerant Type	g (oz)	R22, 1.40k (49.4)		R22, 2.08k (73.4)	

Dimension	Height(I/D / O/D)	mm (inch)	290 (11-7/16)	695 (27-3/8)	290 (11-7/16)	750 (29-17/32)
	Width (I/D / O/D)	mm (inch)	1070 (42-5/32)	875 (34-15/32)	1070 (42-5/32)	875 (34-15/32)
	Depth (I/D / O/D)	mm (inch)	240 (9-15/32)	320 (12-5/8)	240 (9-15/32)	345 (13-19/32)
Weight	Net (I/D / O/D)	kg (lb)	12 (26)	53 (117)	12 (26)	64 (141)
Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 15.88 (5/8)		6.35 (1/4) / 15.88 (5/8)	
	Standard length	m (ft)	5.0 (16.4)		5.0 (16.4)	
	Length range (min – max)	m (ft)	3 (9.8) ~ 25 (82.0)		3 (9.8) ~ 30 (98.4)	
	I/D & O/D Height different	m (ft)	20 (65.6)		20 (65.6)	
	Additional Gas Amount	g/m (oz/ft)	30 (0.3)		30 (0.3)	
	Length for Additional Gas	m (ft)	7.5 (24.6)		7.5 (24.6)	
Drain Hose	Inner Diameter	mm	16.7		16.7	
	Length	mm	650		650	
Indoor Heat Exchanger	Fin Material		Pre Coat		Pre Coat	
	Fin Type		Slit Fin		Slit Fin	
	Row x Stage x FPI		2 x 15 x 17		2 x 15 x 21	
	Size (W x H x L)	mm	810 x 315 x 25.4		810 x 315 x 25.4	
Outdoor Heat Exchanger	Fin Material		Blue Coated		Blue Coated	
	Fin Type		Slit Fin		Corrugate Fin	
	Row x Stage x FPI		2 x 31 x 17		2 x 28 x 17	
	Size (W x H x L)	mm	25.4 x 651 x 846.6:866.6		44.0 x 711.2 x 802.4:836.9	
Air Filter	Material		Polypropelene		Polypropelene	
	Type		One-touch		One-touch	
Power Supply			Indoor		Outdoor	
Power Supply Cord		A	20		20	
Thermostat			Mechanical		Mechanical	
Protection Device			-		-	
			Dry Bulb	Wet Bulb	Dry Bulb	Wet Bulb
Indoor Operation Range		Maximum	32	23	32	23
		Minimum	16	11	16	11
Outdoor Operation Range		Maximum	55	31	55	31
		Minimum	16	11	16	11

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

3. Features

- Air Purifying System with nanoe-G
  - Deactivates and removes bacterial, viruses and mould.

- Long Installation Piping
  - CS/CU-C12PK, long piping up to 15 meters.
  - CS/CU-C18PK, CS/CU-C24PK, long piping up to 25 meters.
  - CS/CU-C28PK, long piping up to 30 meters.

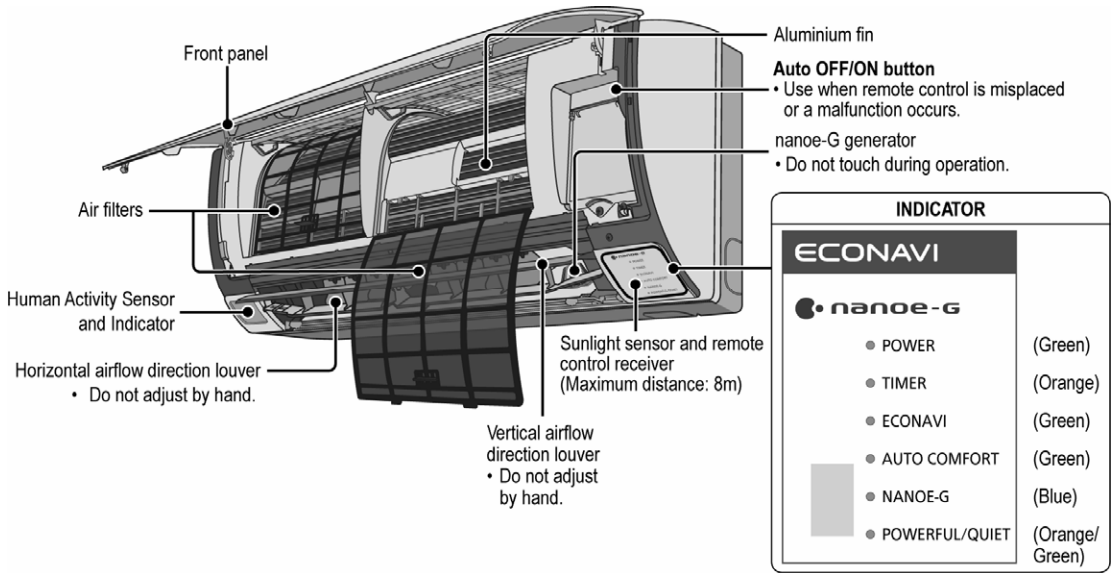
- Easy to use remote control

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

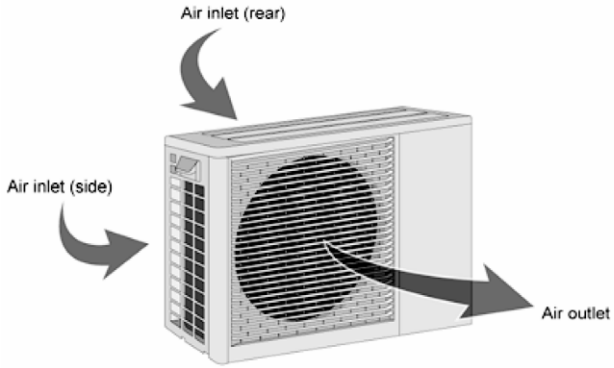
- Operation Improvement
  - Quiet mode to reduce the indoor unit operating sound
  - Powerful mode to reach the desired room temperature quickly
  - 24-hour timer setting

4. Location of Controls and Components

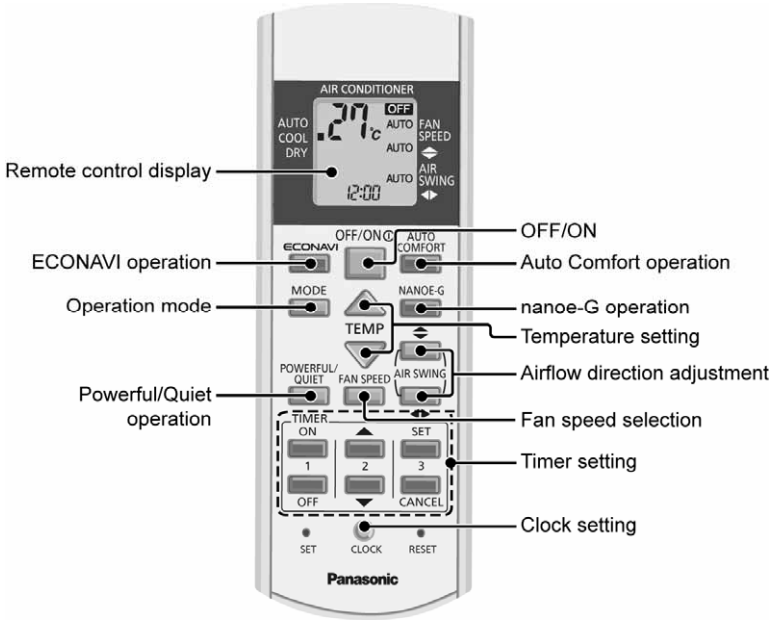
4.1 Indoor Unit



4.2 Outdoor Unit



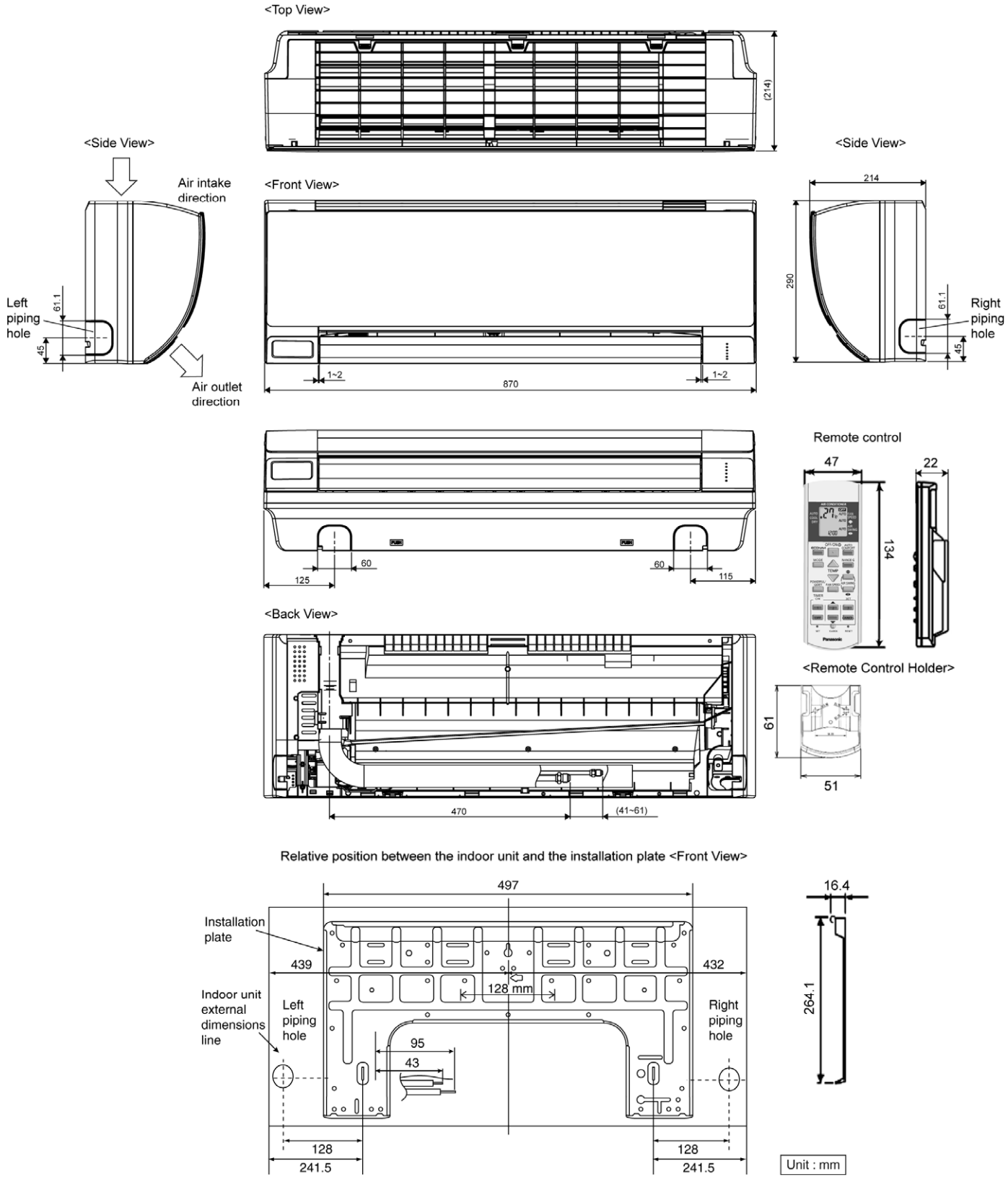
4.3 Remote Control



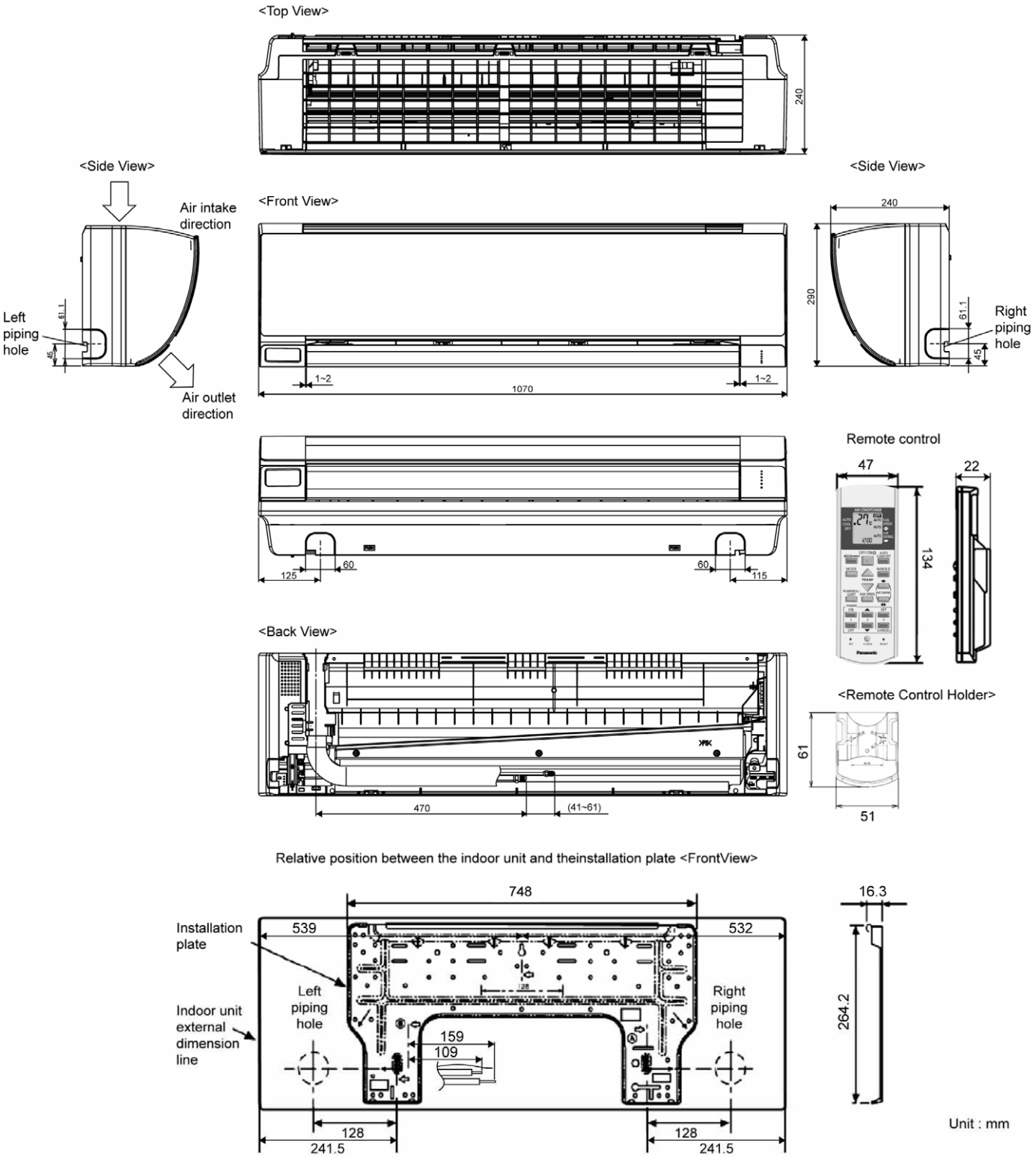
5. Dimensions

5.1 Indoor Unit

5.1.1 CS-C12PKF

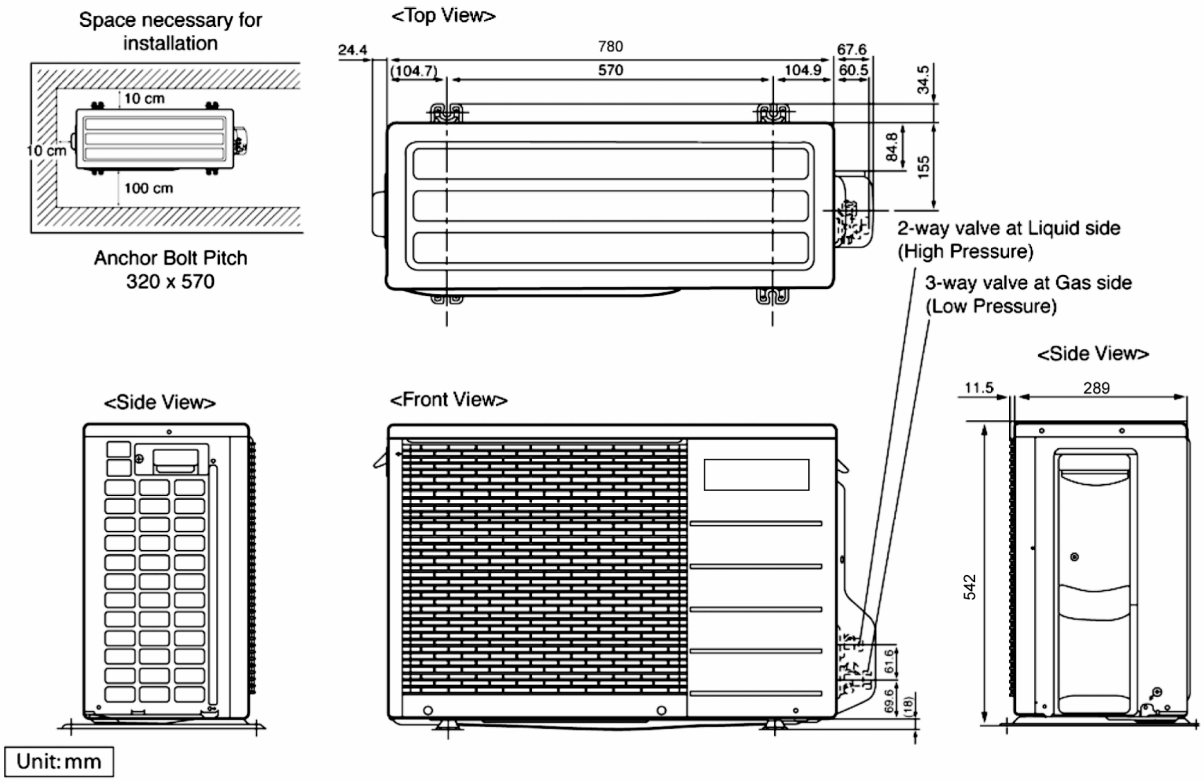


5.1.2 CS-C18PKF CS-C24PKF CS-C28PKF



5.2 Outdoor Unit

5.2.1 CU-C12PKF



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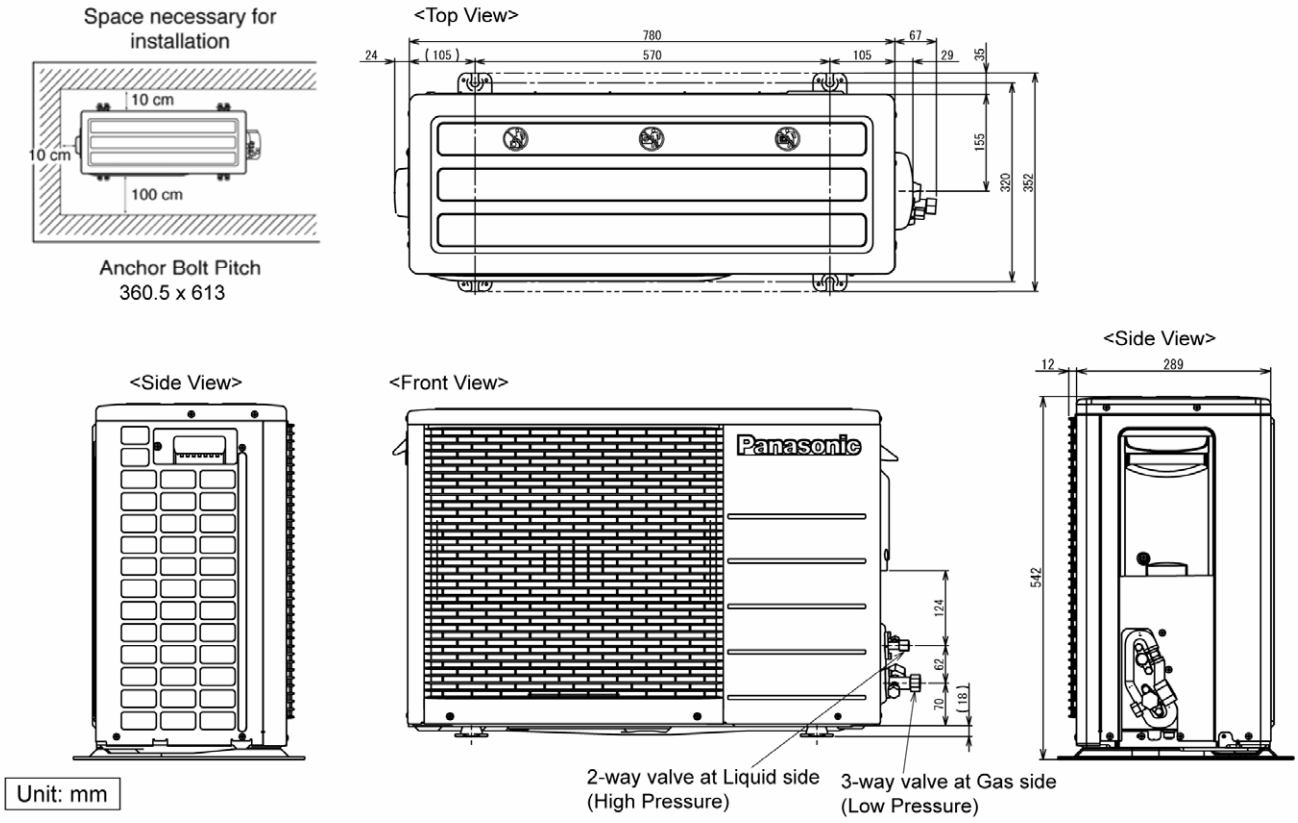

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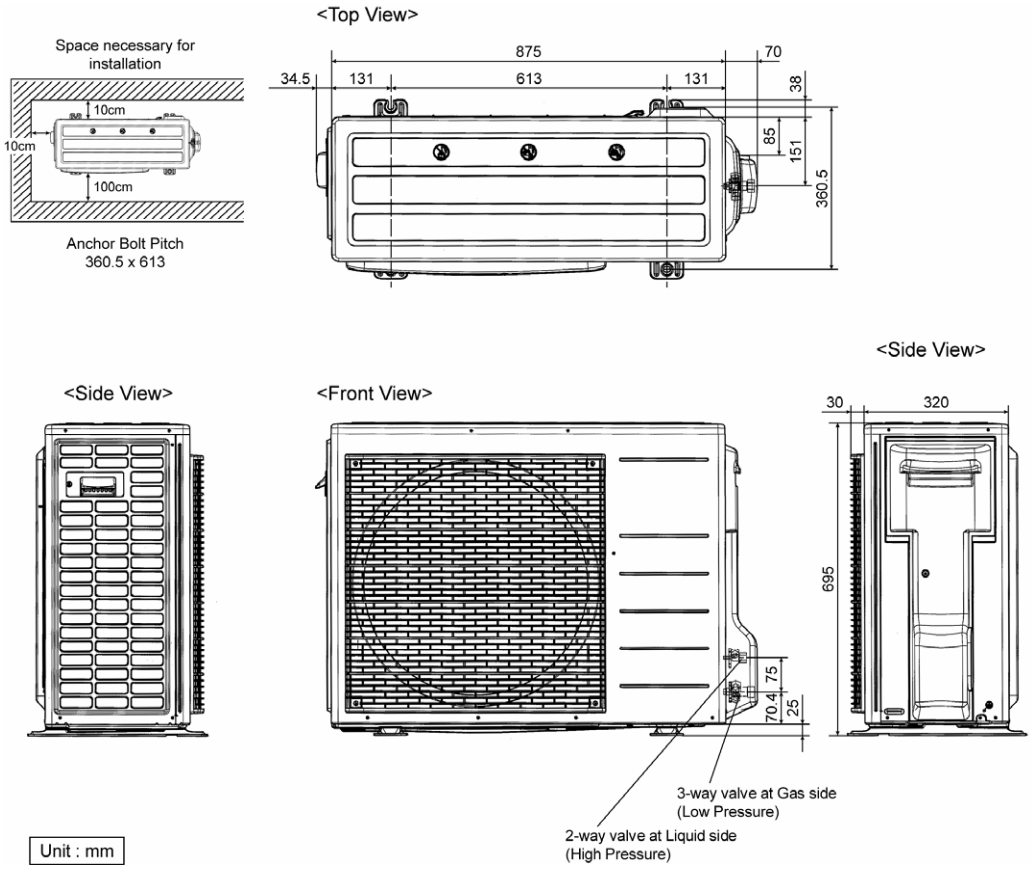
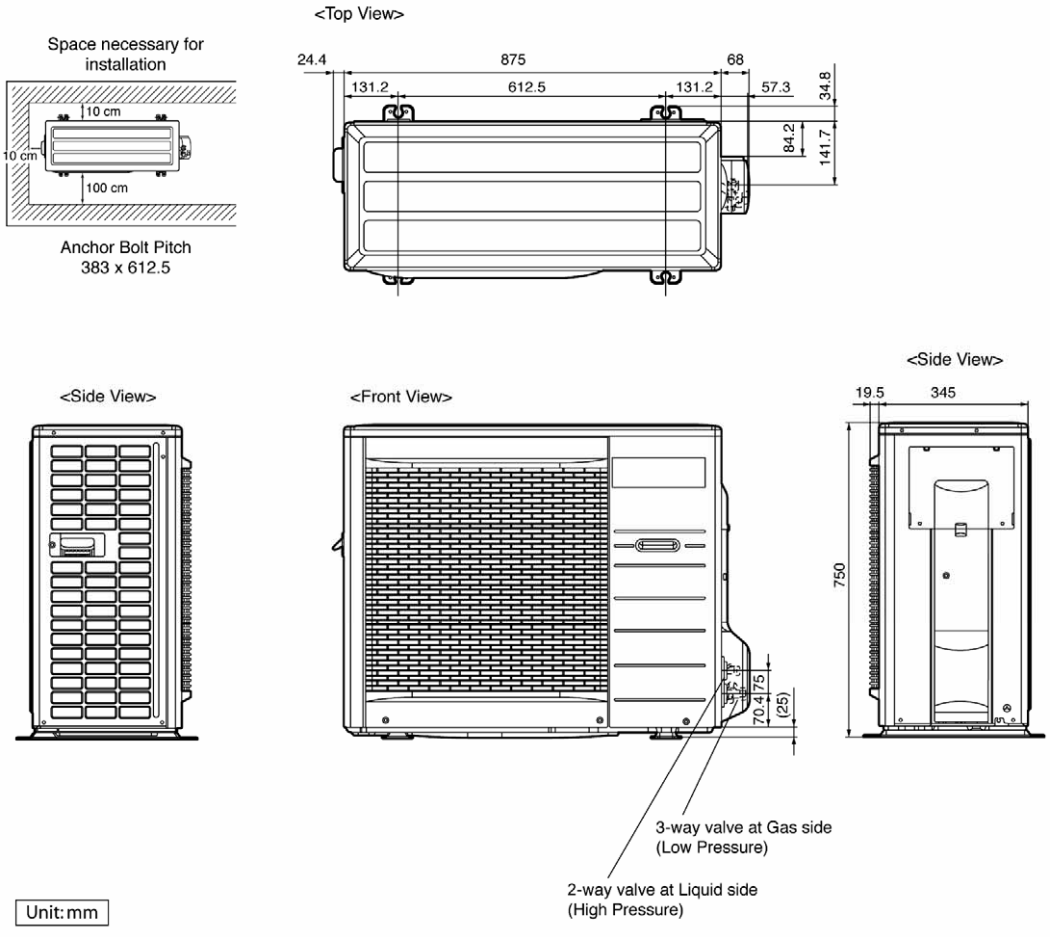
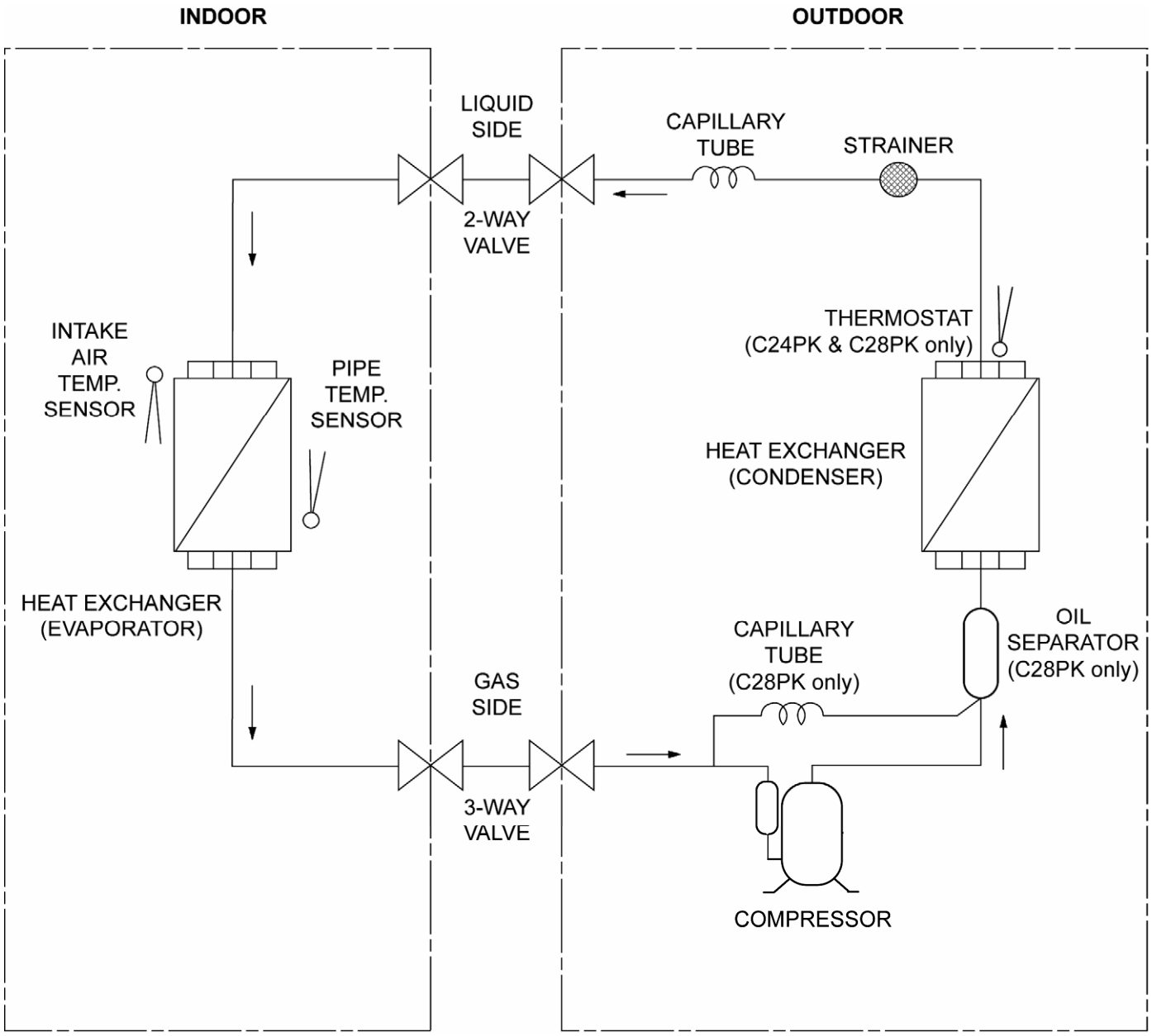


5.2.4 CU-C28PKF

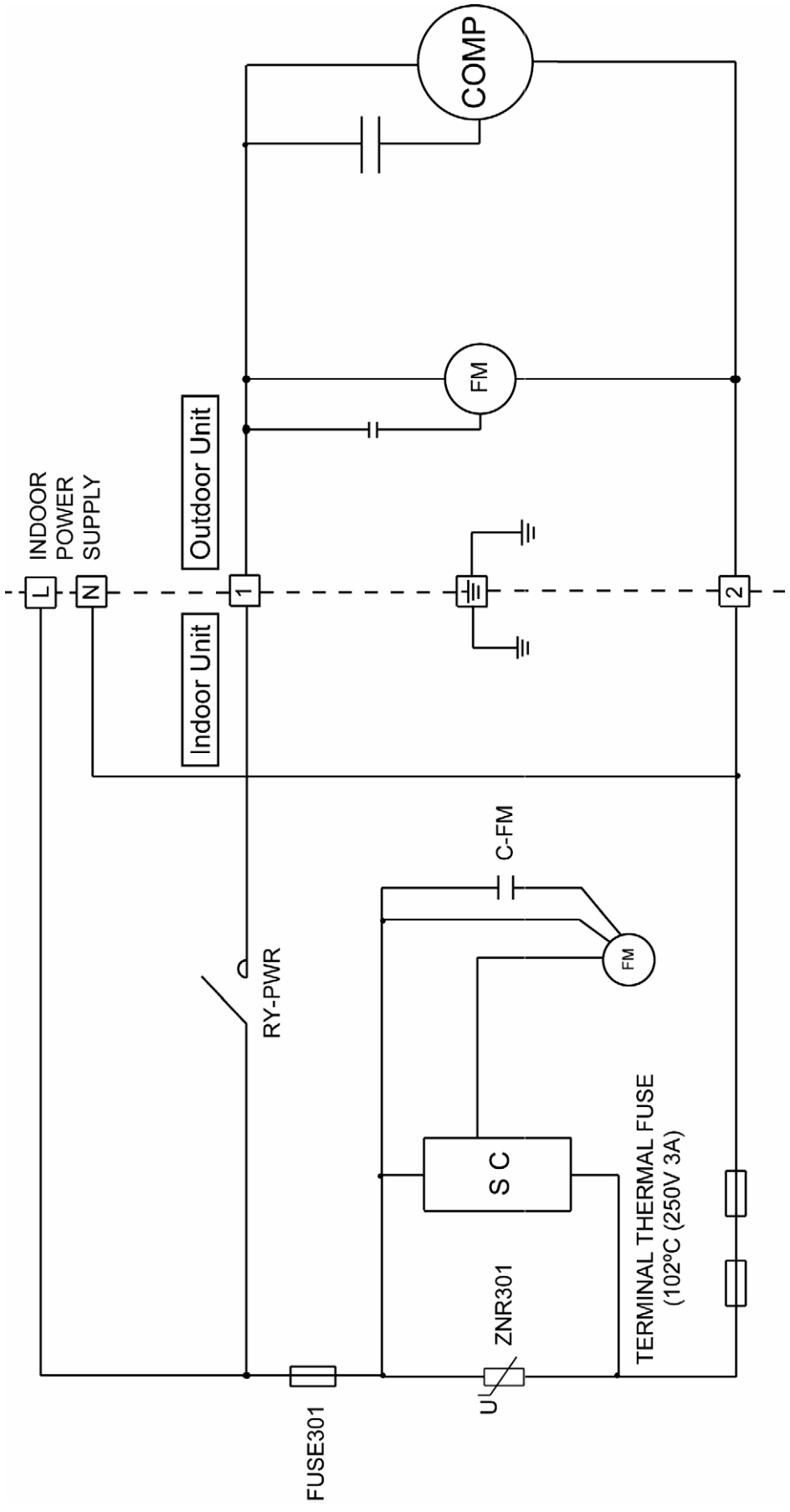


6. Refrigeration Cycle Diagram

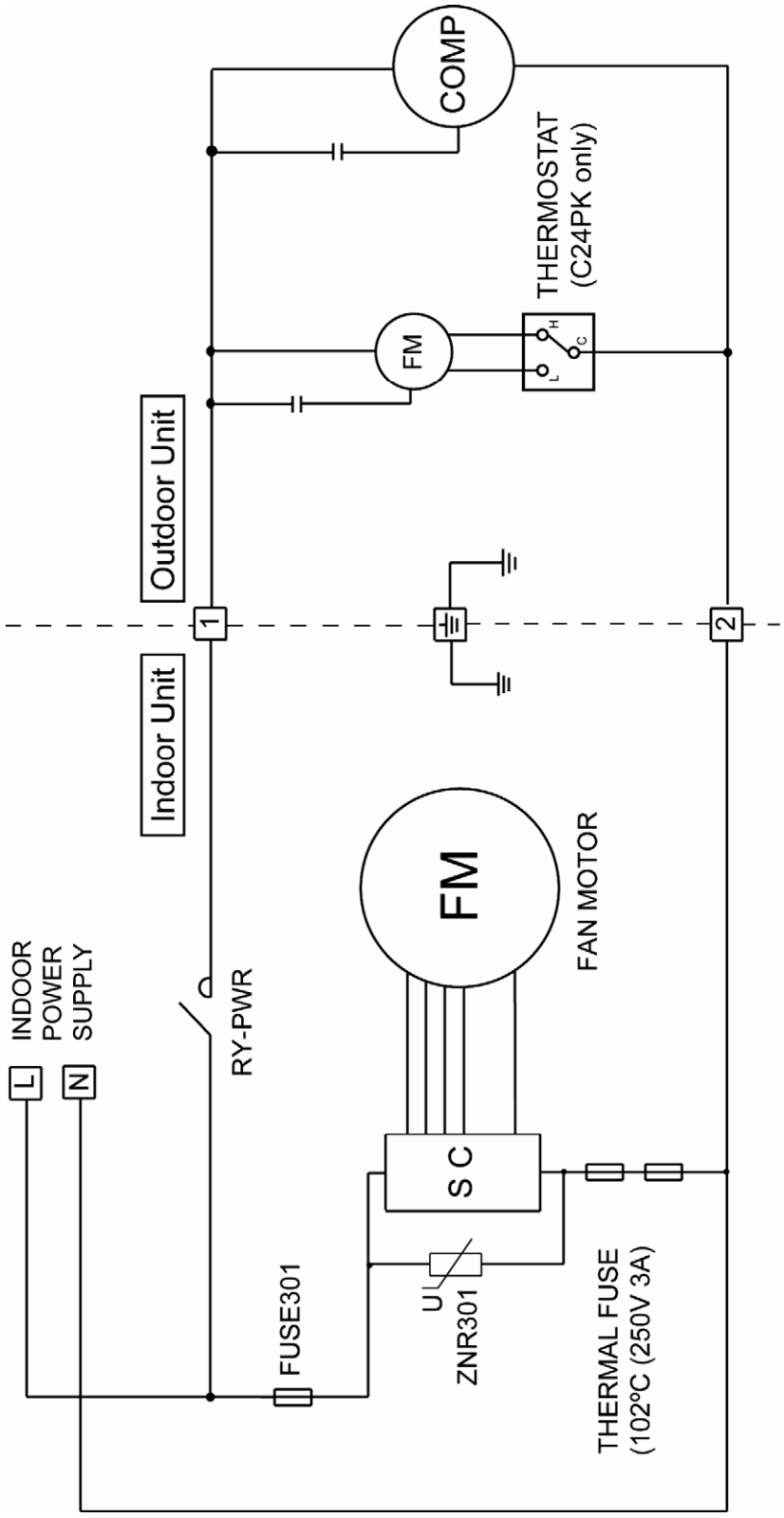


7. Block Diagram

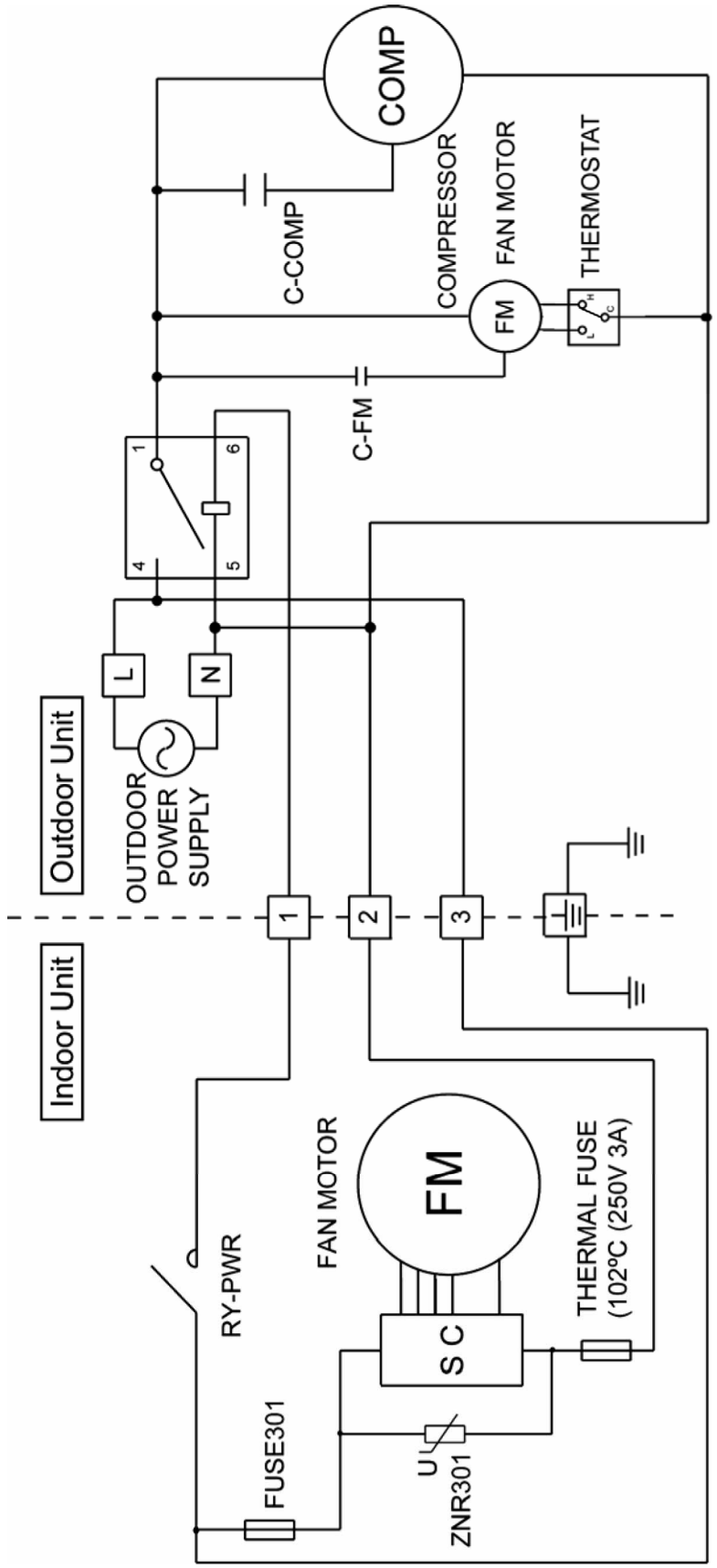
7.1.1 CS-C12PKF CU-C12PKF



7.1.2 CS-C18PKF CU-C18PKF CS-C24PKF CU-C24PKF

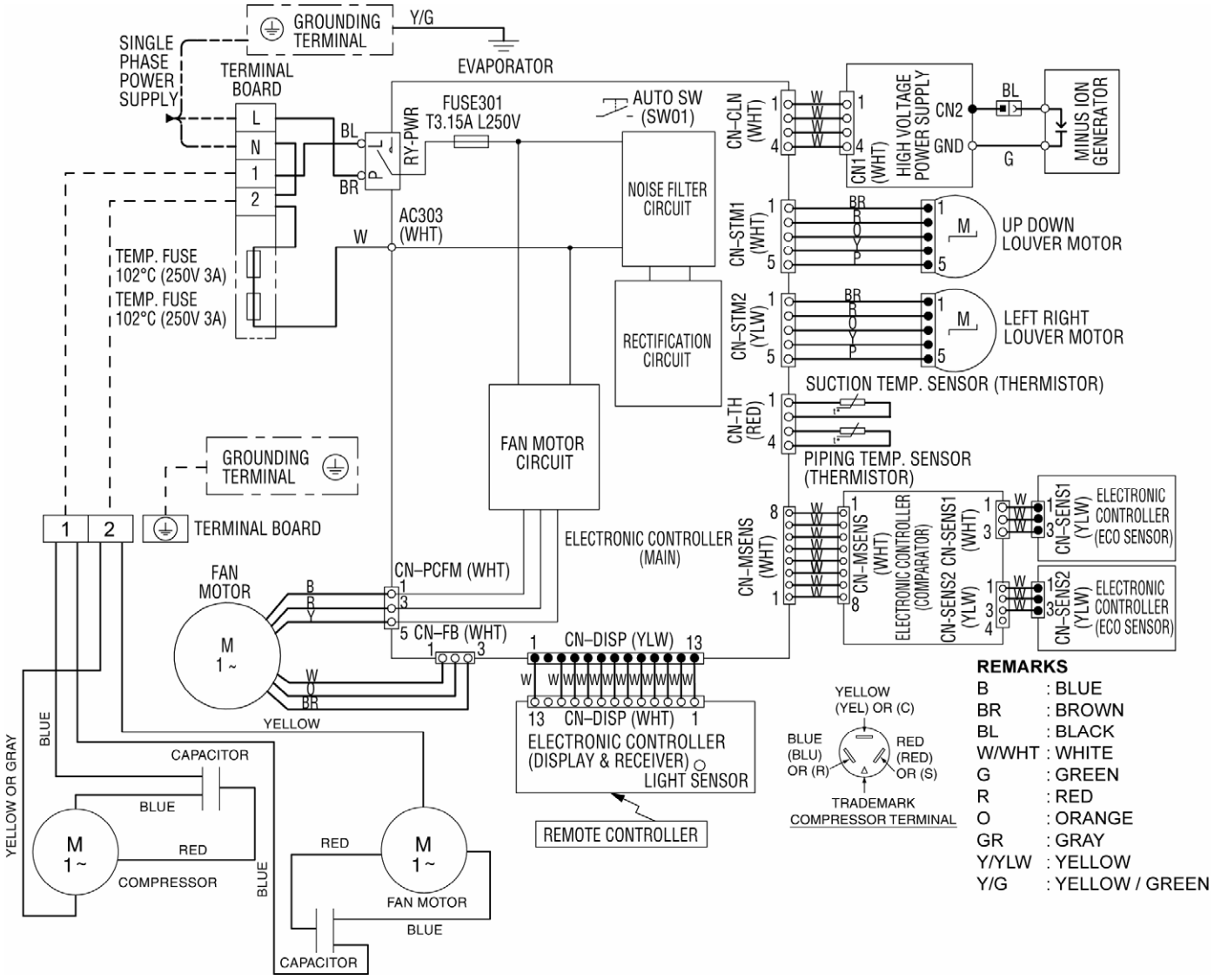


7.1.3 CS-C28PKF CU-C28PKF



8. Wiring Connection Diagram

8.1 CS-C12PKF CU-C12PKF



Resistance of Indoor Fan Motor Windings

MODEL	CS-C12PKF
CONNECTION	CWA921447
BLUE-YELLOW	336Ω
YELLOW-RED	306Ω

Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-C12PKF
CONNECTION	2KS210D5AA06
C-R	2.279Ω
C-S	3.526Ω

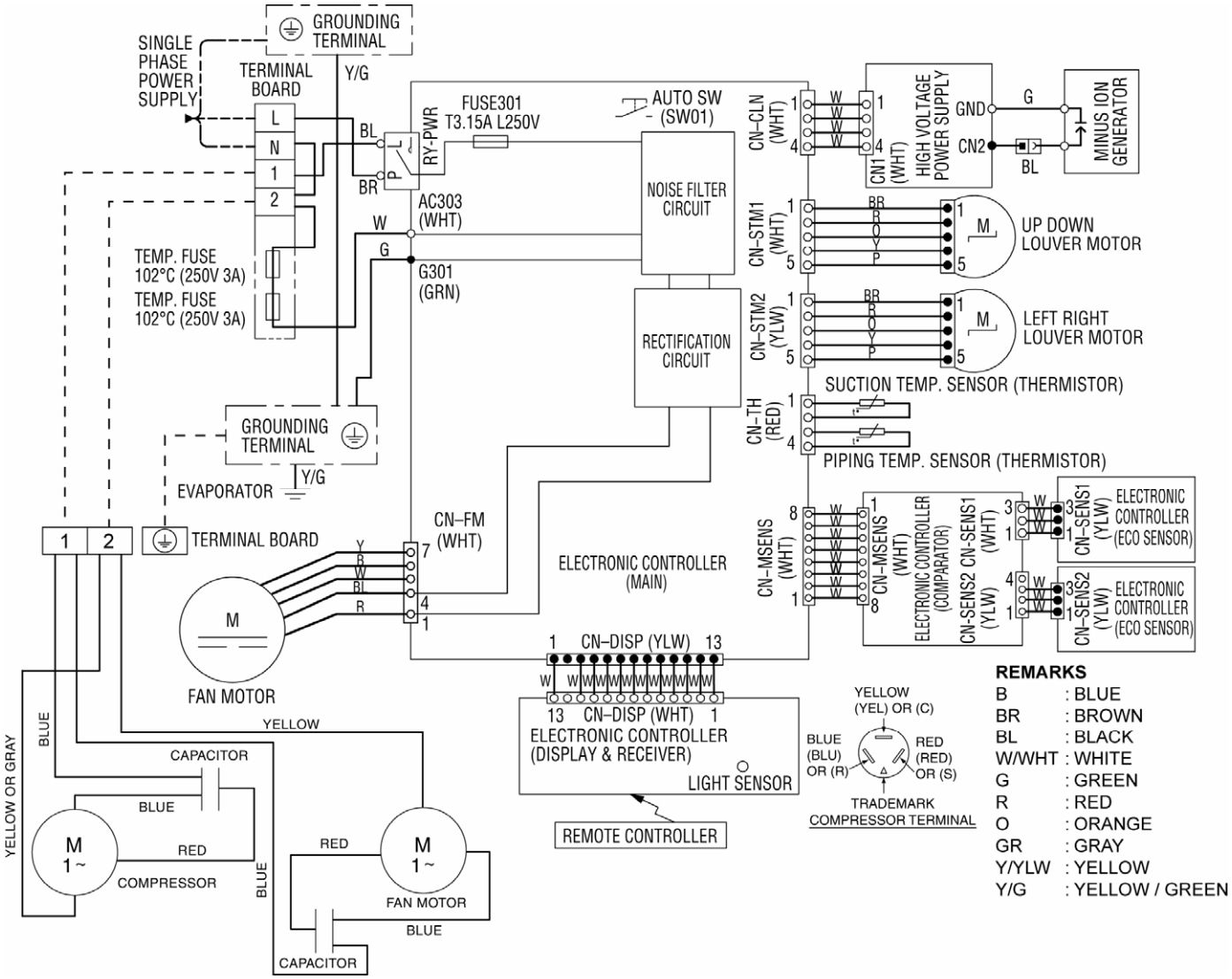
Note: Resistance at 20°C of ambient temperature.

Resistance of Outdoor Fan Motor Windings

MODEL	CU-C12PKF
CONNECTION	CWA951676
BLUE-YELLOW	198Ω
YELLOW-RED	293Ω

Note: Resistance at 20°C of ambient temperature.

8.2 CS-C18PKF CU-C18PKF



Resistance of Outdoor Fan Motor Windings

MODEL	CU-C18PKF
CONNECTION	CWA951676
BLUE-YELLOW	198Ω
YELLOW-RED	293Ω

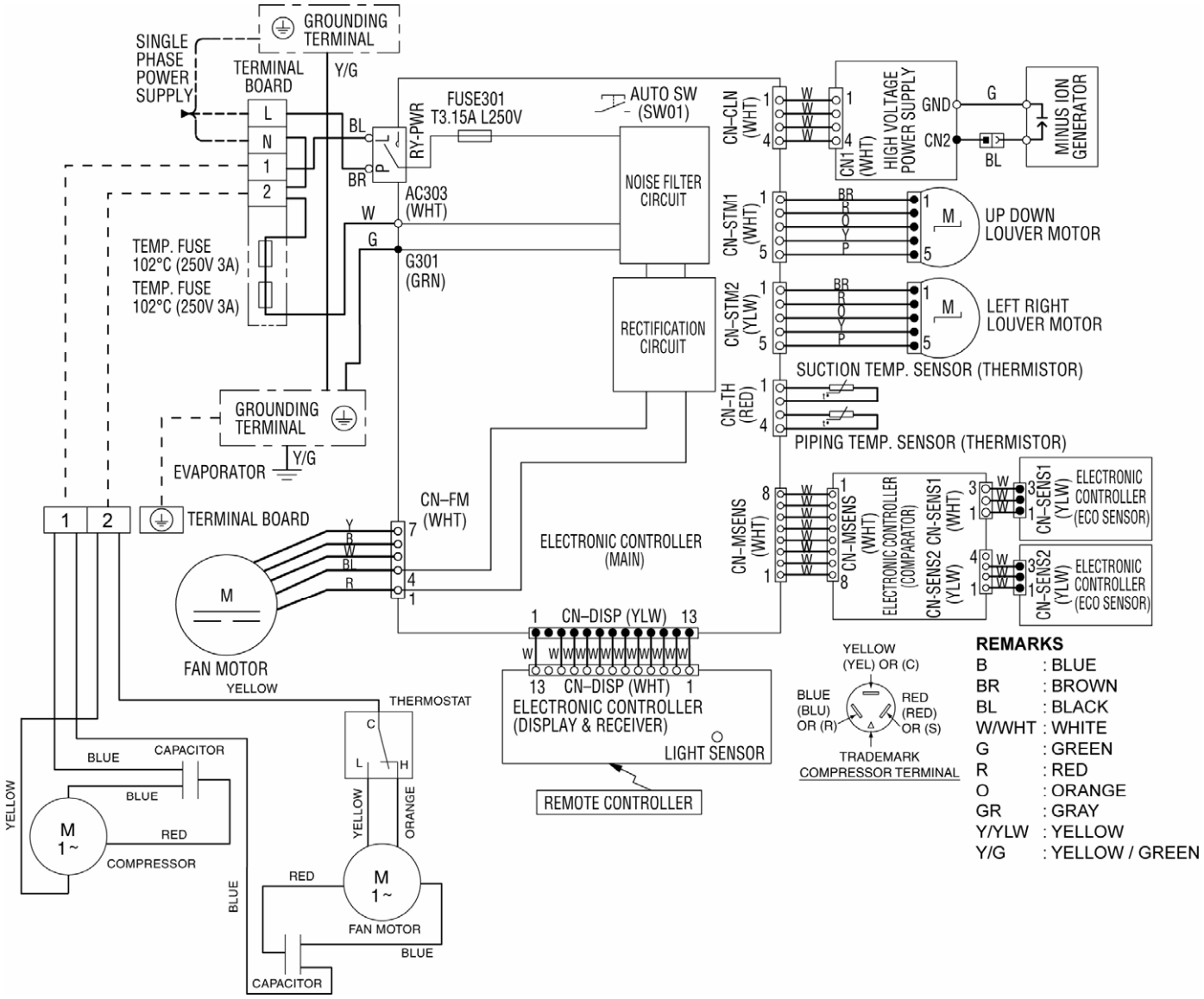
Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-C18PKF
CONNECTION	2KS324D5AB06
C-R	1.642Ω
C-S	4.316Ω

Note: Resistance at 20°C of ambient temperature.

8.3 CS-C24PKF CU-C24PKF



Resistance of Outdoor Fan Motor Windings

MODEL	CU-C24PKF
CONNECTION	CWA951689
BLUE-YELLOW	64Ω
YELLOW-ORANGE	55Ω
YELLOW-RED	90Ω

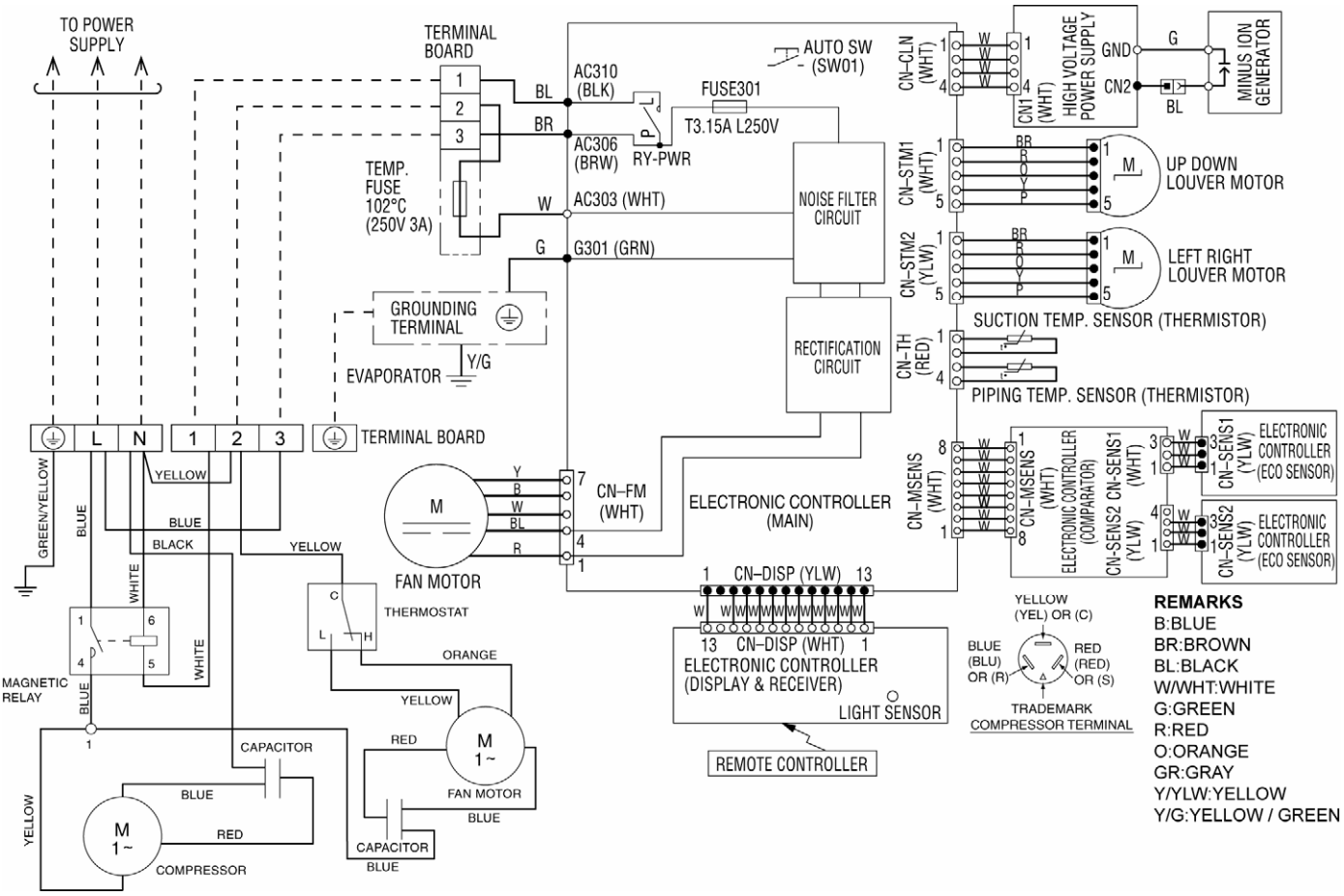
Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-C24PKF
CONNECTION	2JS438D3EA04
C-R	1.156Ω
C-S	2.997Ω

Note: Resistance at 20°C of ambient temperature.

8.4 CS-C28PKF CU-C28PKF



Resistance of Outdoor Fan Motor Windings

MODEL	CU-C28PKF
CONNECTION	CWA951689
BLUE-YELLOW	64Ω
YELLOW-ORANGE	55Ω
YELLOW-RED	90Ω

Note: Resistance at 20°C of ambient temperature.

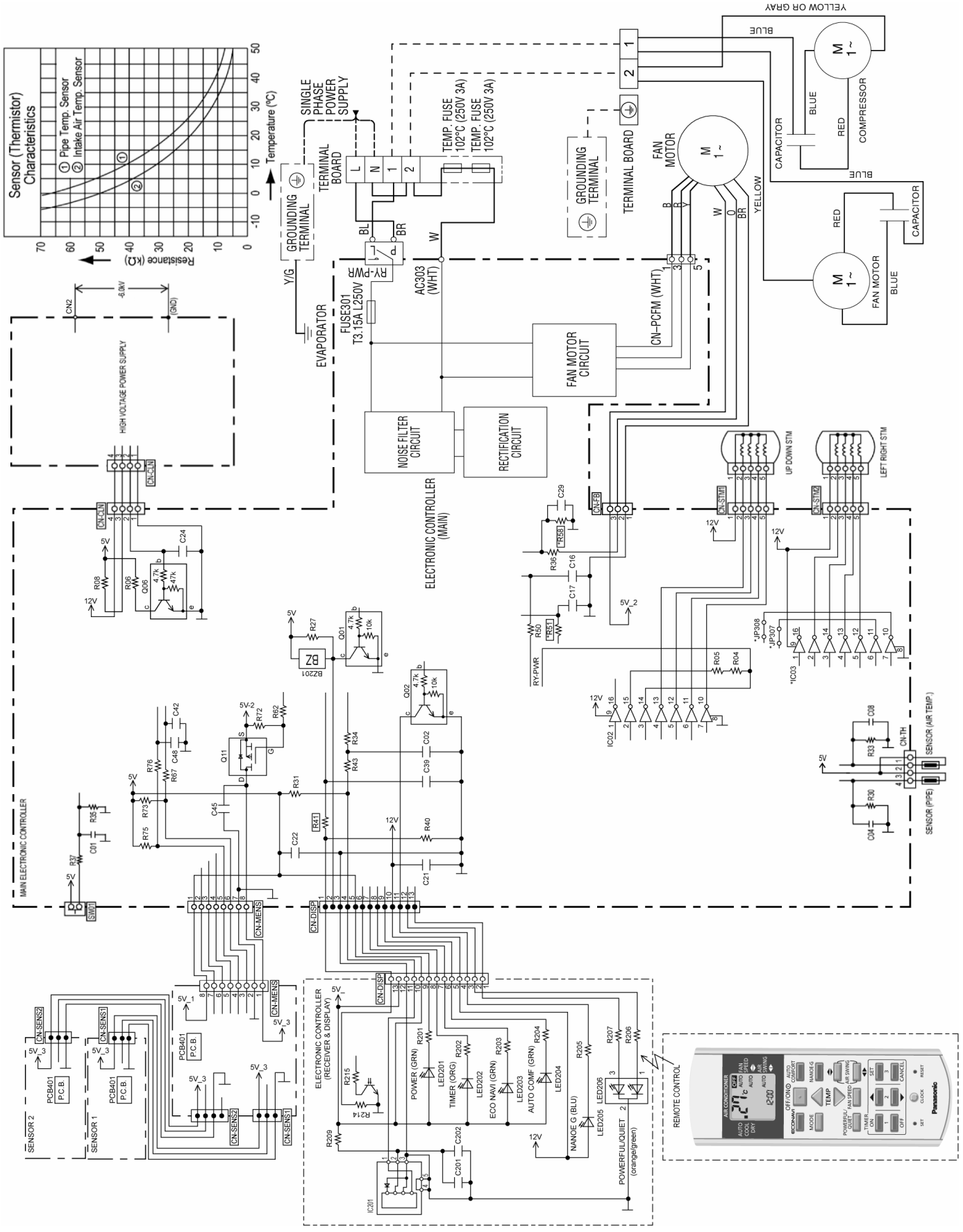
Resistance of Compressor Windings

MODEL	CU-C28PKF
CONNECTION	2JD514D3AA03
C-R	0.708Ω
C-S	1.995Ω

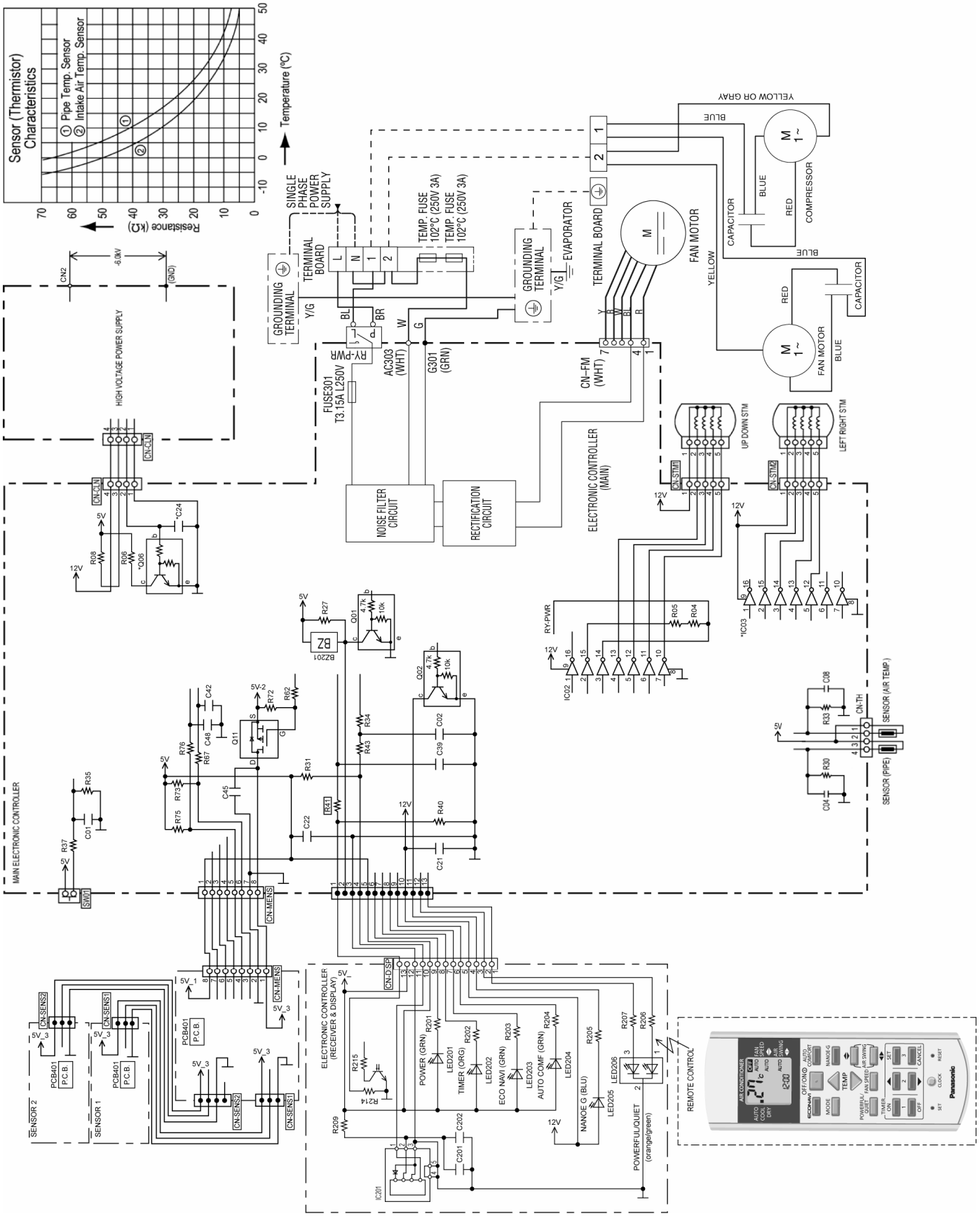
Note: Resistance at 20°C of ambient temperature.

9. Electronic Circuit Diagram

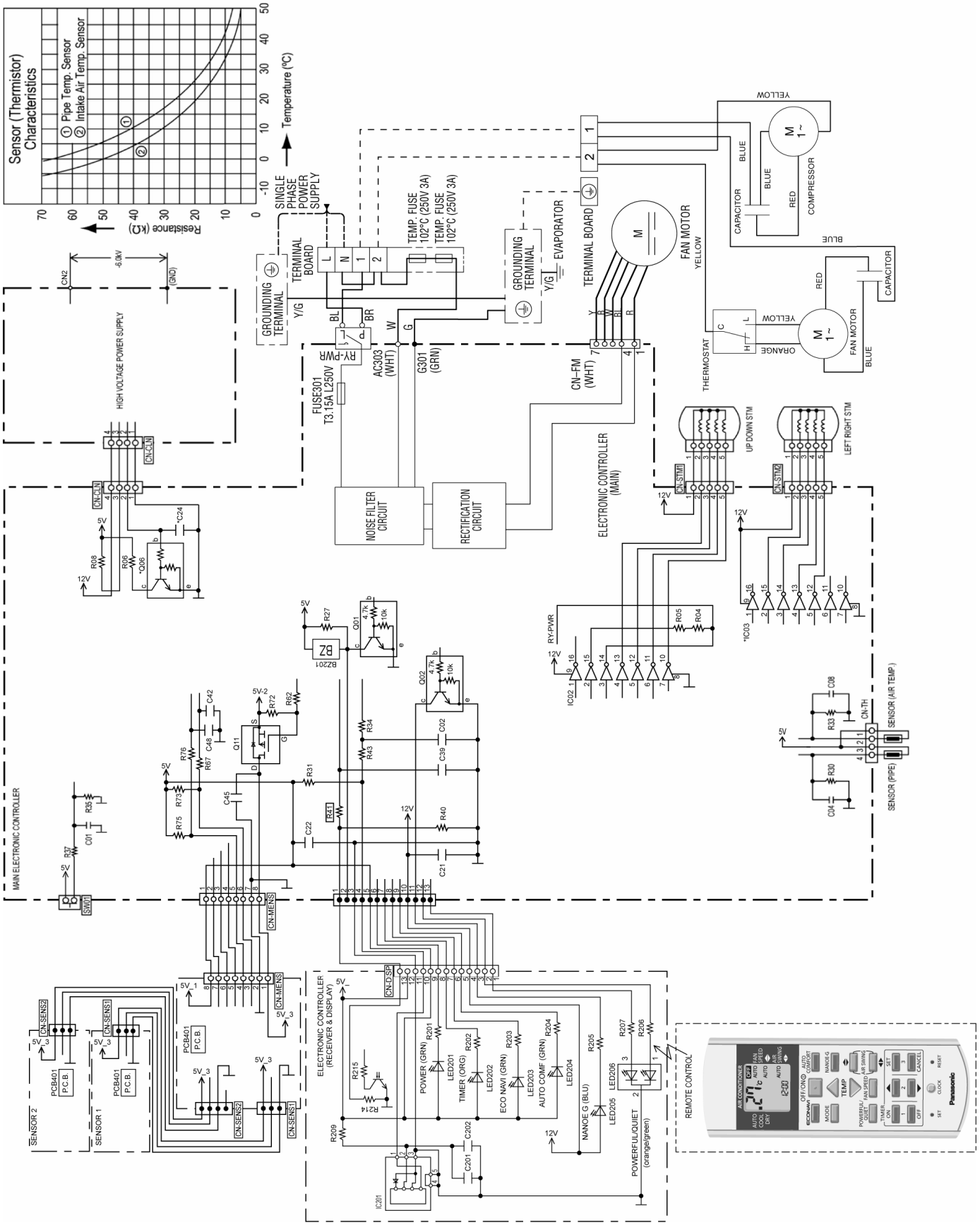
9.1 CS-C12PKF CU-C12PKF



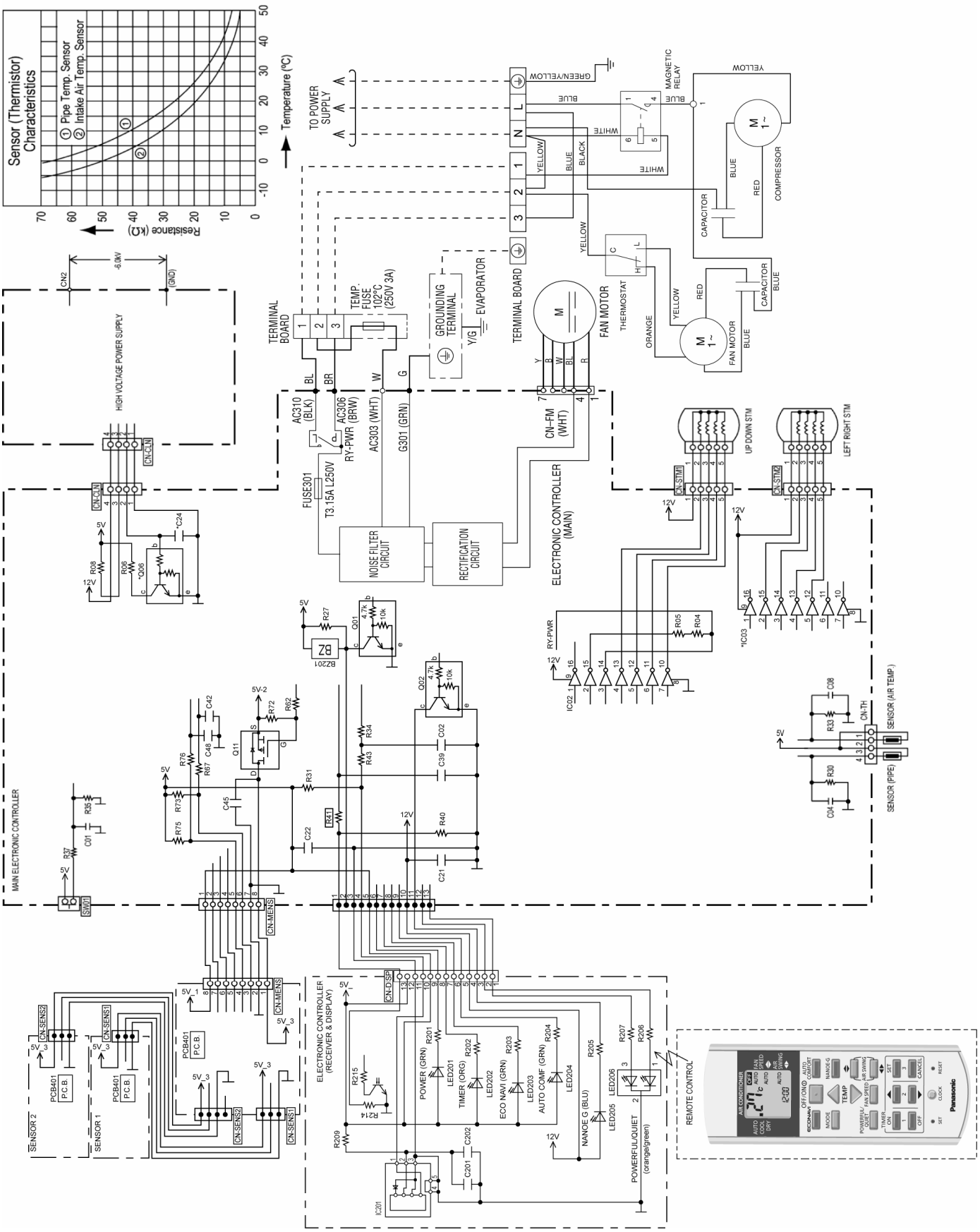
9.2 CS-C18PKF CU-C18PKF



9.3 CS-C24PKF CU-C24PKF



9.4 CS-C28PKF CU-C28PKF

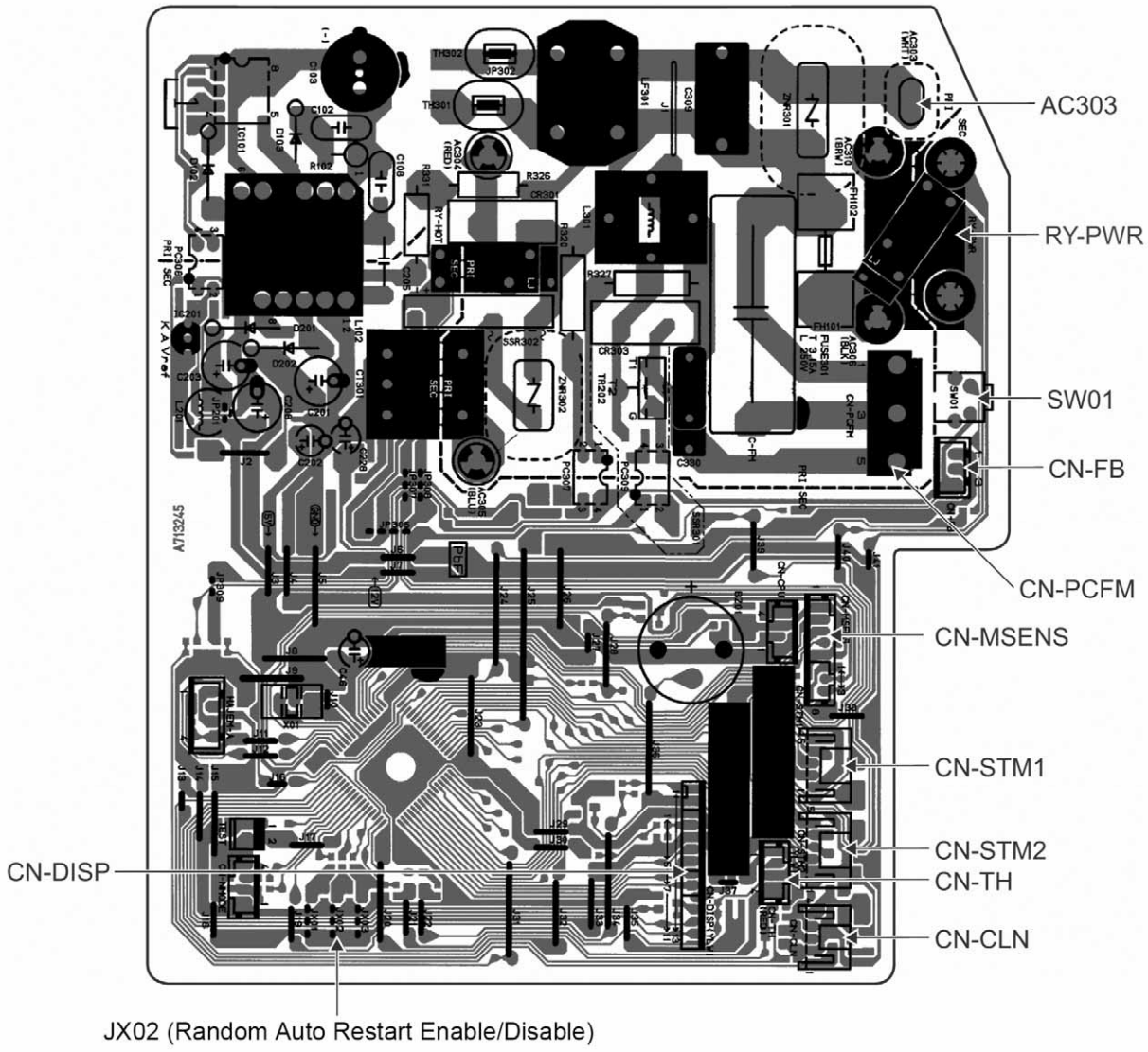


10. Printed Circuit Board

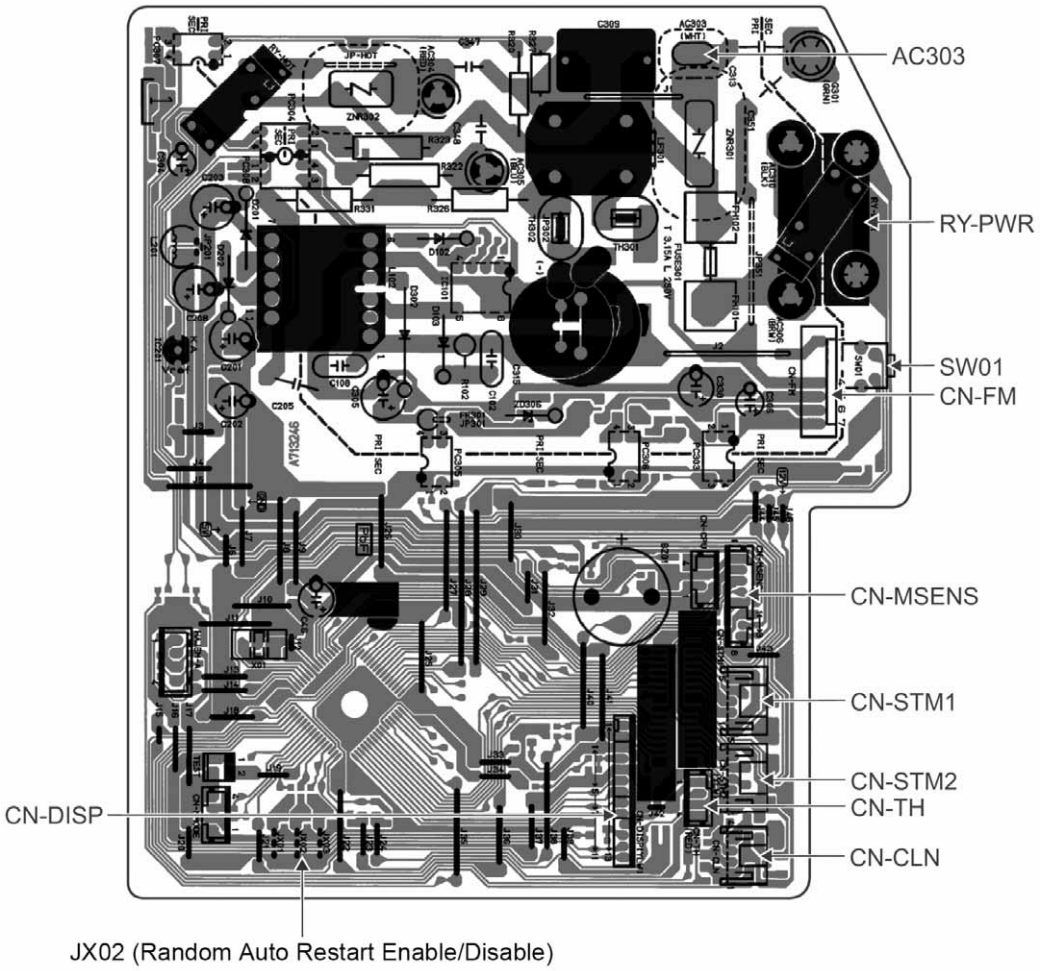
10.1 Indoor Unit

10.1.1 Main Printed Circuit Board

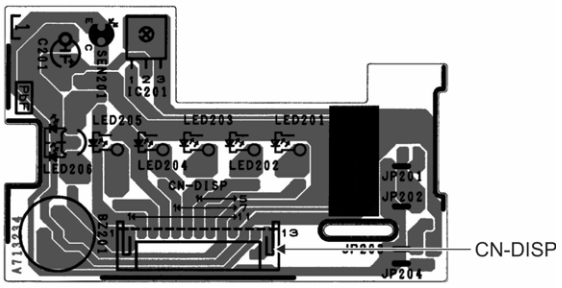
10.1.1.1 CS-C12PKF



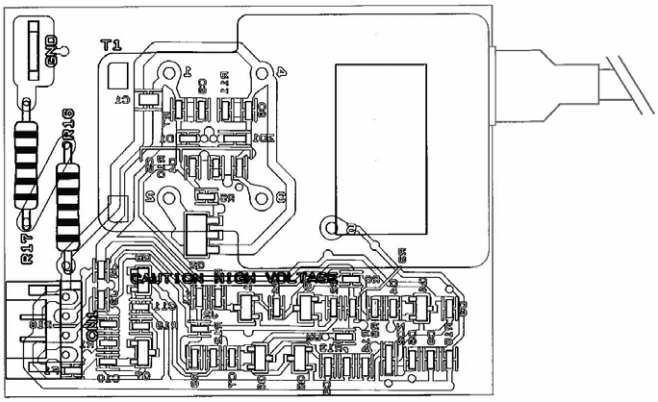
10.1.1.2 CS-C18PKF CS-C24PKF CS-C28PKF



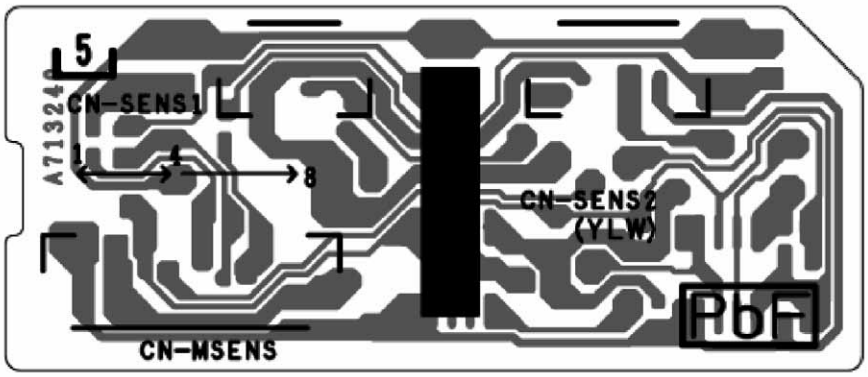
10.1.2 Indicator and Receiver Printed Circuit Board



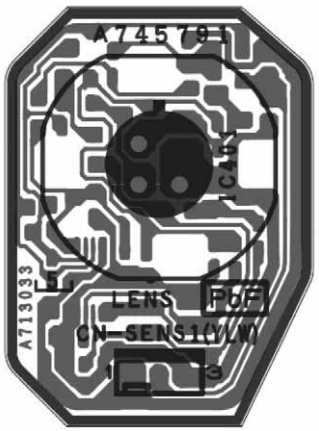
10.1.3 High Voltage Power Supply Printed Circuit Board

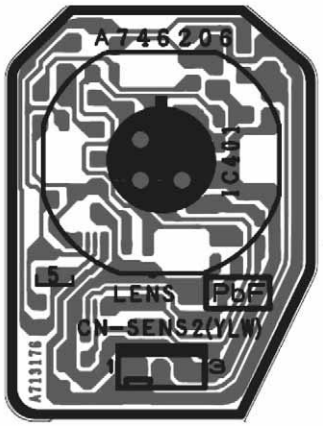


10.1.4 Comparator Printed Circuit Board



10.1.5 Human Activity Sensor Printed Circuit Board





11. Installation Instruction

(For C12/18/24PKF only)

11.1 Select the Best Location

11.1.1 Indoor Unit

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

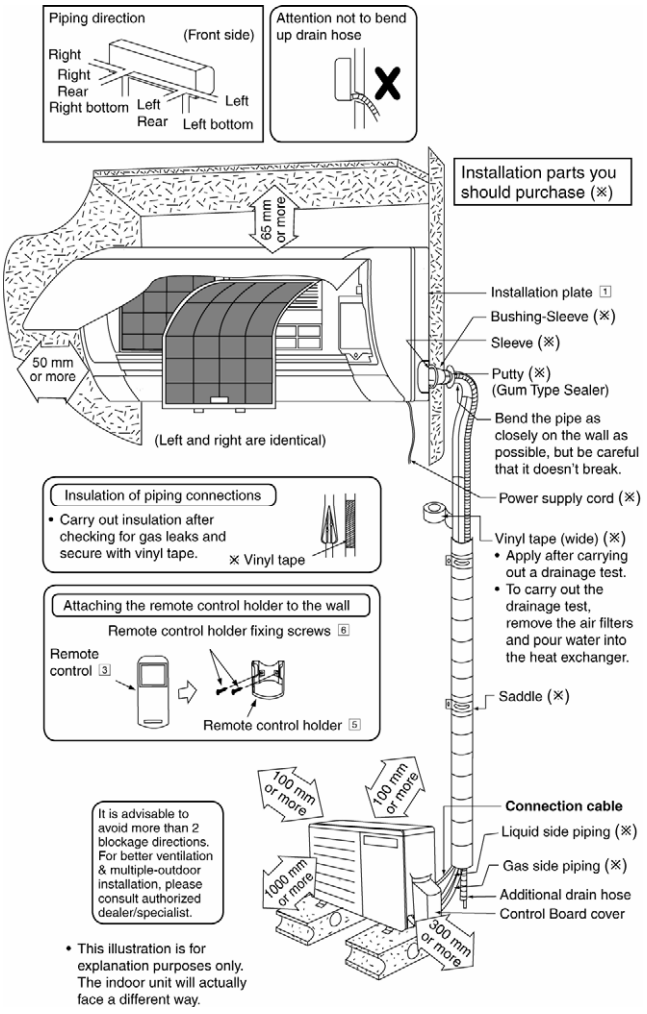
11.1.2 Outdoor Unit

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

Model	Horse Power (HP)	Piping size		Std. Length (m)	Max. Elevation (m)	Min. Piping Length (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)	Piping Length for add. gas (m)
		Gas	Liquid						
C9***	1.0HP	9.52 mm (3/8")	6.35 mm (1/4")	7.5	5	3	10	10	7.5
C12***	1.5HP	12.7 mm (1/2")		7.5	5	3	15	10	7.5
C18***	2.0HP			5	20	3	25	20	7.5
C24***	2.5HP	15.88 mm (5/8")			20	3	25	30	7.5

Example: For C12***
If the unit is installed at 10 m distance, the quantity of additional refrigerant should be 25 g….(10-7.5) m x 10 g/m = 25 g.

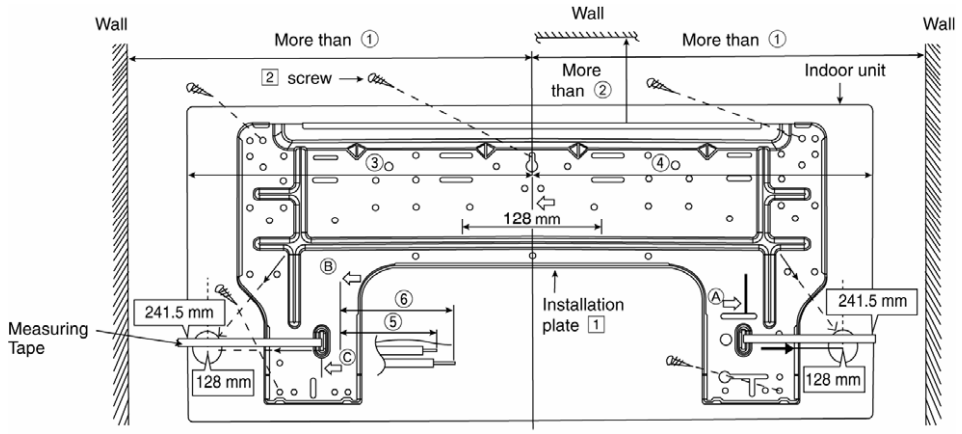
11.1.3 Indoor/Outdoor Unit Installation Diagram



11.2 Indoor Unit

11.2.1 How to Fix Installation Plate

The mounting wall shall be strong and solid enough to prevent if from the vibration.



Model	Dimension					
	①	②	③	④	⑤	⑥
C9***, C12***	490 mm	82 mm	439 mm	432 mm	43 mm	95 mm
C18***, C24***	590 mm	82 mm	539 mm	532 mm	109 mm	159 mm

The center of installation plate should be at more than ① at right and left of the wall.
The distance from installation plate edge to ceiling should more than ②.
From installation plate left edge to unit's left side is ③.
From installation plate right edge to unit's right side is ④.

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

1 Mount the installation plate on the wall with 5 screws or more (at least 5 screws).
(If mounting the unit on the concrete wall, consider using anchor bolts.)
   - Always mount the installation plate horizontally by aligning the marking-off line with the thread and using a level gauge.

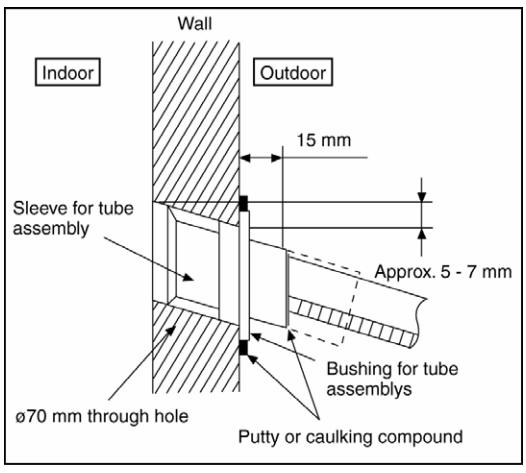
2 Drill the piping plate hole with ø70 mm hole-core drill.
   - Putting measuring tape at position as shown in the diagram above.
     The hole center is obtained by measuring the distance namely 128 mm for left and right hole respectively. Another method is intersection point of arrow mark extension.
     The meeting point of the extension arrow mark is the hole center position.
   - Drill the piping hole at either the right or the left and the hole should be slightly slanting to the outdoor side. (refer to step 11.2.2)

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

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

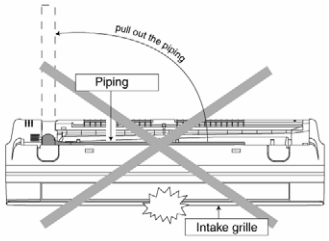
⚠ CAUTION
❗ When the wall is hollow, please be sure to use the sleeve for tube assembly to prevent dangers caused by mice biting the connection cable.

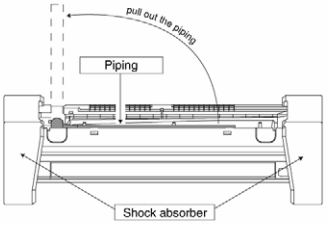
4 Finish by sealing the sleeve with putty or caulking compound at the final stage.



11.2.3 Indoor Unit Installation

- Do not turn over the unit without it's shock absorber during pull out the piping. It may cause intake grille damage.
- Use shock absorber during pull out the piping to protect the intake grille from damage.





11.2.3.1 For the Right Rear Piping

Step-1	Pull out the Indoor piping
Step-2	Install the Indoor Unit
Step-3	Secure the Indoor Unit
Step-4	Insert the power supply cord and connection cable

- Insert the cables from bottom of the unit through the control board hole until terminal board area.

11.2.3.2 For the Right and Right Bottom Piping

Step-1	Pull out the Indoor piping
Step-2	Install the Indoor Unit
Step-3	Insert the power supply cord and connection cable

- Insert the cables from bottom of the unit through the control board hole until terminal board area.

Step-4	Secure the Indoor Unit

11.2.3.3 For the Embedded Piping

Step-1	Replace the drain hose
Step-2	Bend the embedded piping

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

Step-3	Pull the connection cable into Indoor Unit

- The power supply cord and indoor unit and outdoor unit connection cable can be connected without removing the front grille.

Step-4	Cut and flare the embedded piping

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

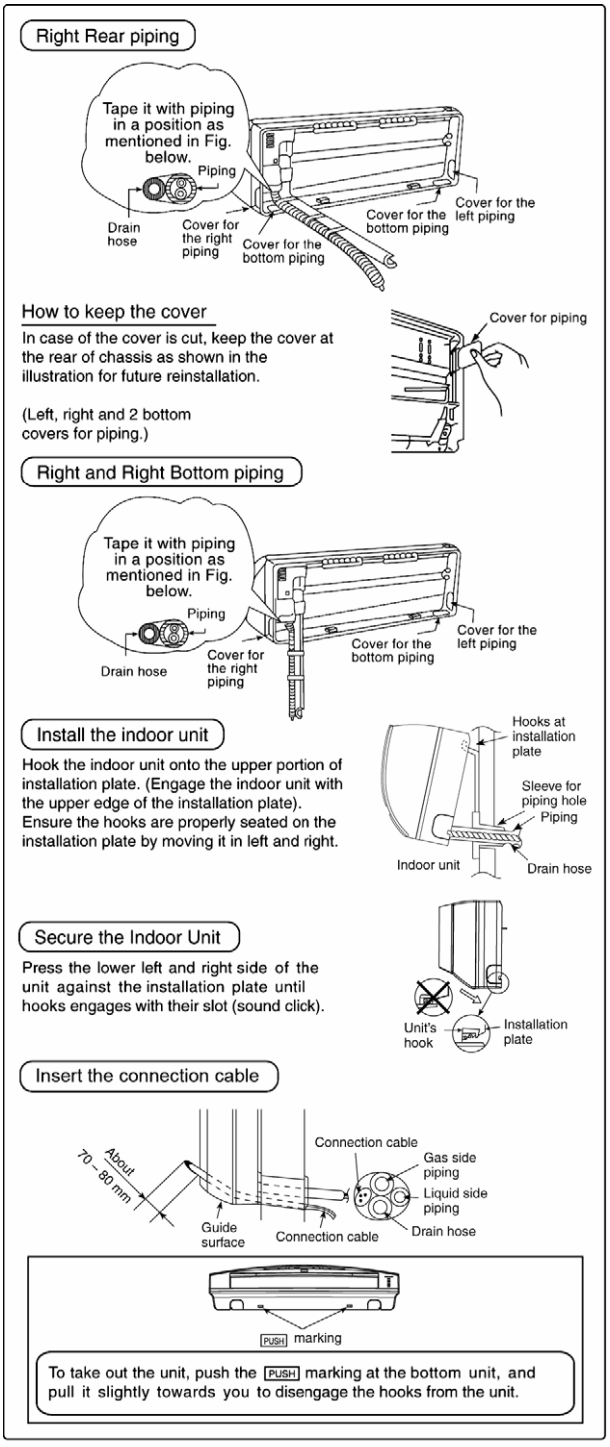
Step-5	Install the Indoor Unit
Step-6	Connect the piping

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

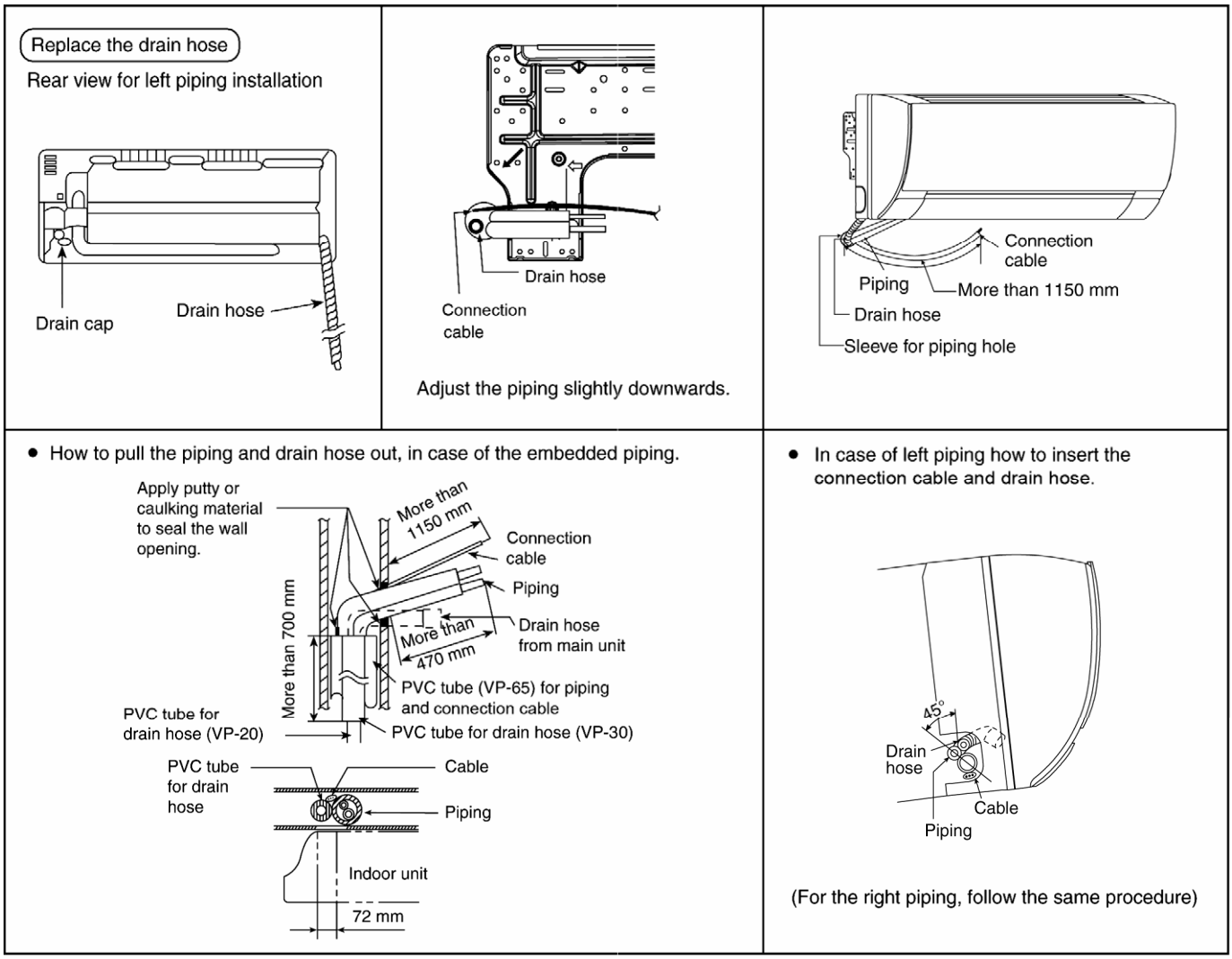
Step-7	Insulate and finish the piping

- Please refer to "Insulation of piping connection" column as mentioned in indoor/outdoor unit installation.

Step-8	Secure the Indoor Unit



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

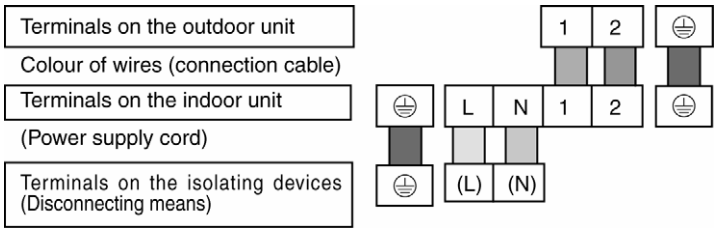


11.2.4 Connect the Cable to the Indoor Unit

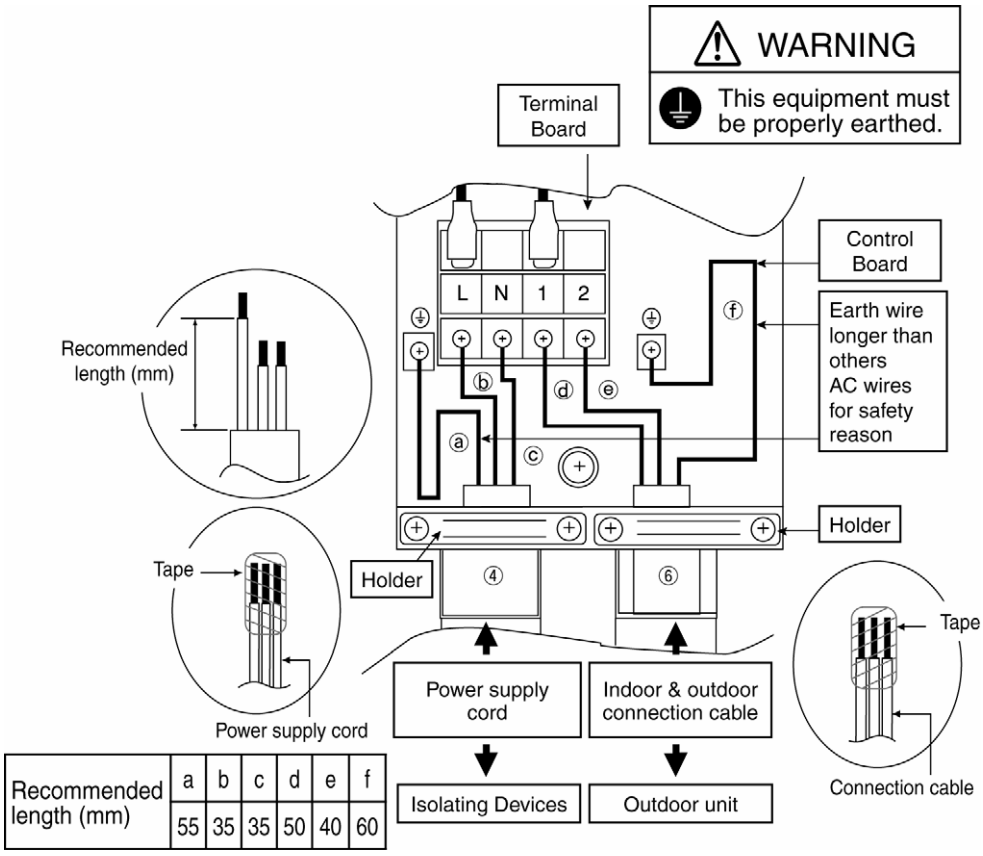
The power supply cord, indoor and outdoor unit connection cable can be connected without removing the front grille.

1 Install the indoor unit on the installation holder that mounted on the wall.
2 Open the front panel and grille door by loosening the screw.
3 Cable connection to the power supply through Isolating Devices (Disconnecting means).
   - Connect the approved polychloroprene sheathed **power supply cord** 3 x 1.5 mm^2 (1.0~1.5HP) or 3 x 2.5 mm^2 (2.0~2.5HP), type designation 60245 IEC 57 or heavier cord to the terminal board, and connect the other end of the cable to Isolating Devices (Disconnecting means).
   - Do not use joint power supply cord. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.
   - In unavoidable case, joining of power supply cord between isolating devices and terminal board of air conditioner shall be done by using approved socket and plug 15/16A (1.5HP) or 16A (2.0HP) or 20A (2.5HP). Wiring work to both socket and plug must follow to national wiring standard.
4 Bind all the power supply cord lead wire with tape and route the power supply cord via the left escapement.
5 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 3 x 1.5 mm^2 (1.5HP) or 3 x 2.5 mm^2 (2.0 ~ 2.5HP) flexible cord, type designation 60245 IEC 57 or heavier cord. Do not use joint connection cable. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.
6 Bind all the indoor and outdoor connecting cable with tape and route the connection cable via the right escapement.

7 Remove the tapes and connect the power supply cord and connection cable between indoor unit and outdoor unit according to the diagram below.



8 Secure the power supply cord and connection cable onto the control board with the holder.
9 Close grille door by tighten with screw and close the front panel.

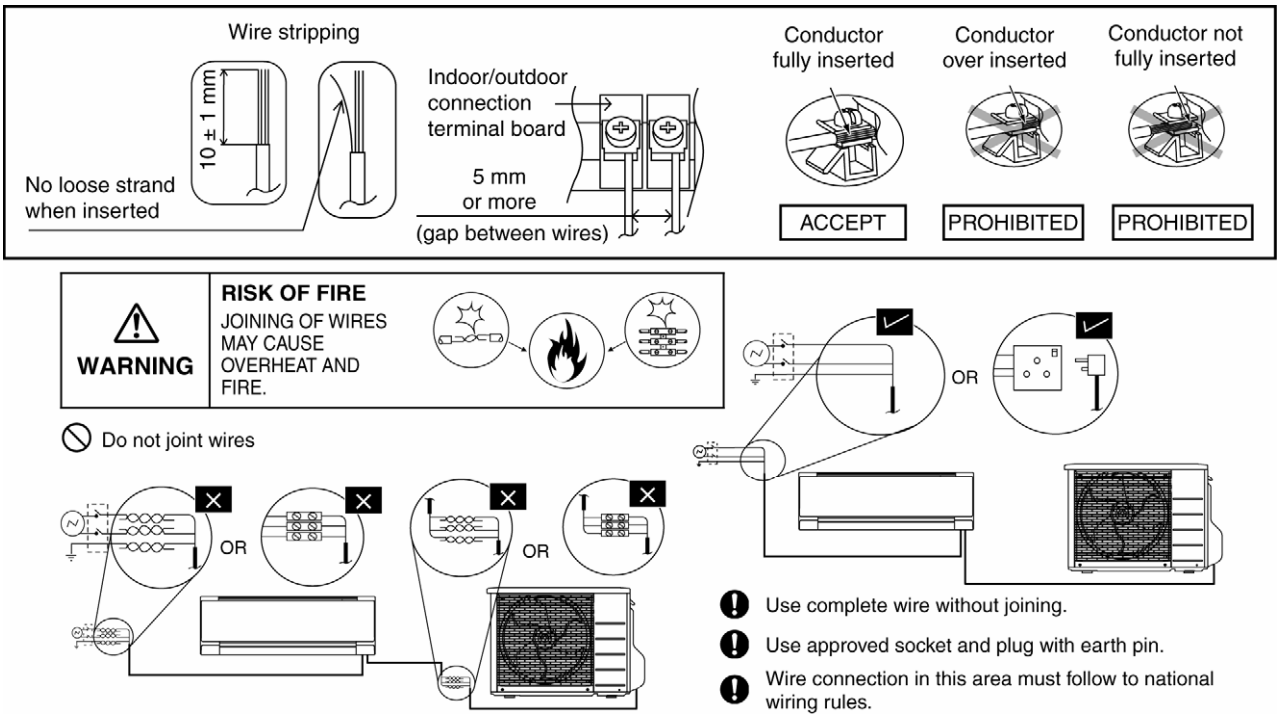


Recommended length (mm)	a	b	c	d	e	f
	55	35	35	50	40	60

Note:

- Isolating Devices (Disconnecting means) should have minimum 3.0 mm contact gap.
- Ensure the colour of wires of outdoor unit and the terminal Nos. are the same to the indoor's respectively.
- Earth wire shall be Yellow/Green (Y/G) in colour and longer than the other AC wires as shown in the figure for the electrical safety in case of the slipping out of the cord from the anchorage.

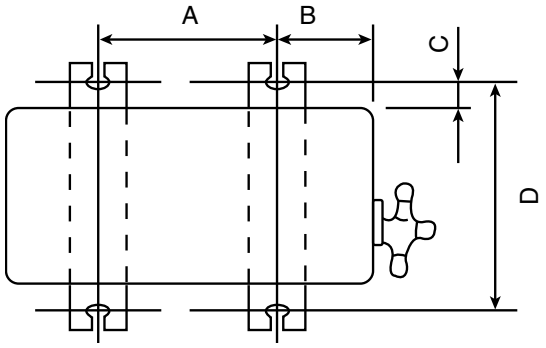
11.2.5 Wire Stripping And Connecting Requirement



11.3 Outdoor Unit

11.3.1 Install the Outdoor Unit

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



Model	A	B	C	D
C9***	474 mm	87 mm	18.5 mm	261 mm
C12***, C18***	570 mm	105 mm	18.5 mm	320 mm
C24***	613 mm	131 mm	16 mm	360.5 mm

11.3.2 Connect the Piping

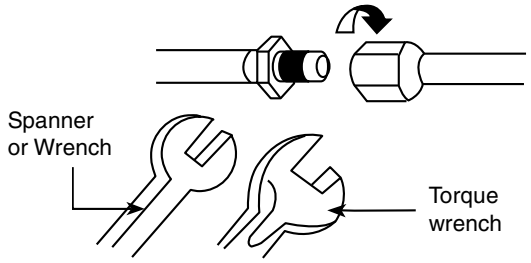
11.3.2.1 Connecting the piping to indoor

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

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

11.3.2.2 Connecting the piping to outdoor

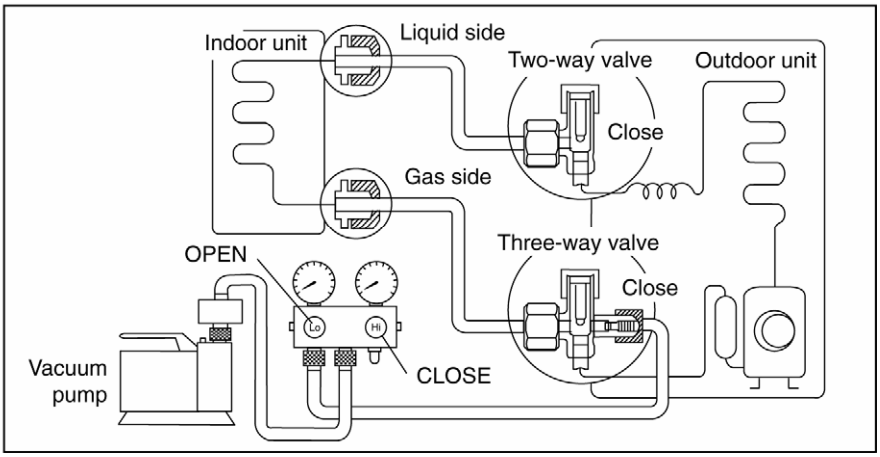
Decide piping length and then cut by using pipe cutter. Remove burrs from cut edge.
Make flare after inserting the flare nut (locate at valve) onto the copper pipe.
Align center of piping to valves and then tighten with torque wrench to the specified torque as stated in the table.



Do not overtighten, overtightening may cause gas leakage	
Piping size	Torque
6.35 mm (1/4”)	[18 N•m (1.8 kgf.m)]
9.52 mm (3/8”)	[42 N•m (4.3 kgf.m)]
12.70 mm (1/2”)	[55 N•m (5.6 kgf.m)]
15.88 mm (5/8”)	[65 N•m (6.6 kgf.m)]
19.05 mm (3/4”)	[100 N•m (10.2 kgf.m)]

11.3.3 Evacuation of the Equipment

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



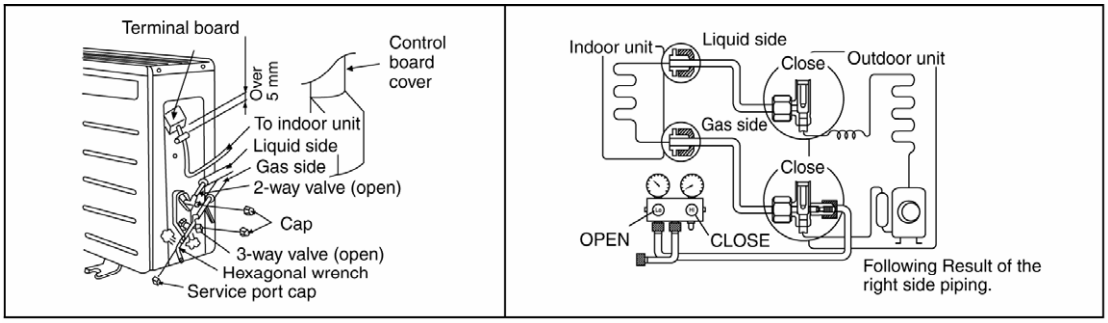
1 Connect a charging hose with a push pin to the Low side of a charging set and the service port of the 3-way valve.
   - Be sure to connect the end of the charging hose with the push pin to the service port.
2 Connect the center hose of the charging set to a vacuum pump.
3 Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa). Then evacuate the air approximately ten minutes.
4 Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.
   Note: BE SURE TO TAKE THIS PROCEDURE IN ORDER TO AVOID REFRIGERENT GAS LEAKAGE.
5 Disconnect the charging hose from the vacuum pump and 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.

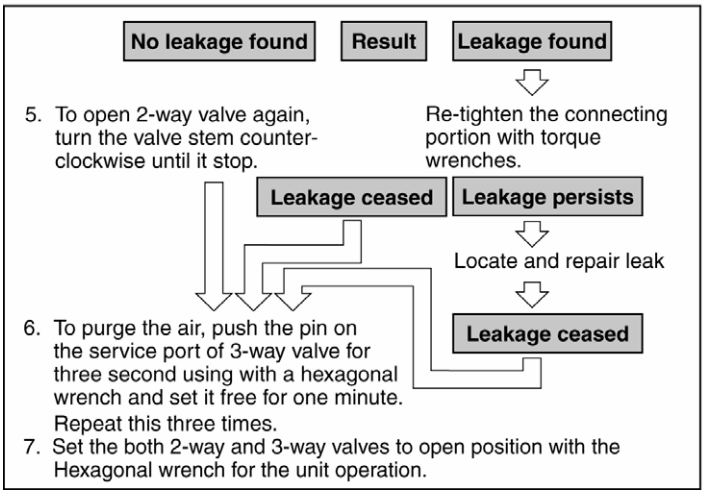
- If gauge needle does not move from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa), in step ③ above take the following measure:
- If the leak stops when the piping connections are tightened further, continue working from step③.
- If the leak does not stop when the connections are retightened, repair location of leak.
- Do not release refrigerant during piping work for installation and reinstallation.
- Take care of the liquid refrigerant, it may cause frostbite.

11.3.4 Air Purging of the Piping and Indoor

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

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





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

11.3.5 Connect the cable to the Outdoor Unit

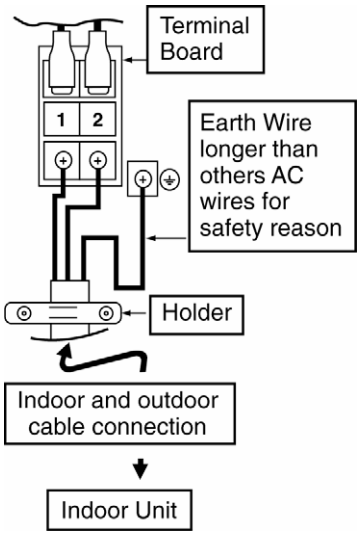
1 Remove the control board cover from the unit by loosening the screw.
2 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 3 x 1.5 mm^2 (1.0~1.5HP) or 3 x 2.5 mm^2 (2.0 ~ 2.5HP) flexible cord, type designation 60245 IEC 57 or heavier cord. Do not use joint connection cable. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.

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

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

⚠ WARNING
⏚ This equipment must be properly earthed.

5 For wire stripping and connection requirement, refer to instruction 11.2.4 of the indoor unit.



- Earth wire shall be Yellow/Green (Y/G) in colour and longer than the other AC wires for safety reason.

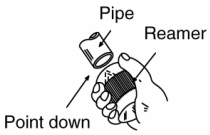
11.3.6 Piping Insulation

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

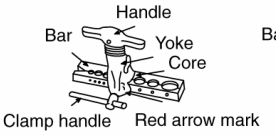
11.3.6.1 Cutting and flaring the piping

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

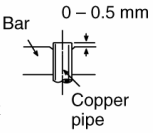
1. To cut

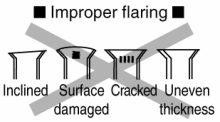


2. To remove burrs



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.

12. Installation Instruction

(For C28PKF only)

12.1 Select the Best Location

12.1.1 Indoor Unit

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

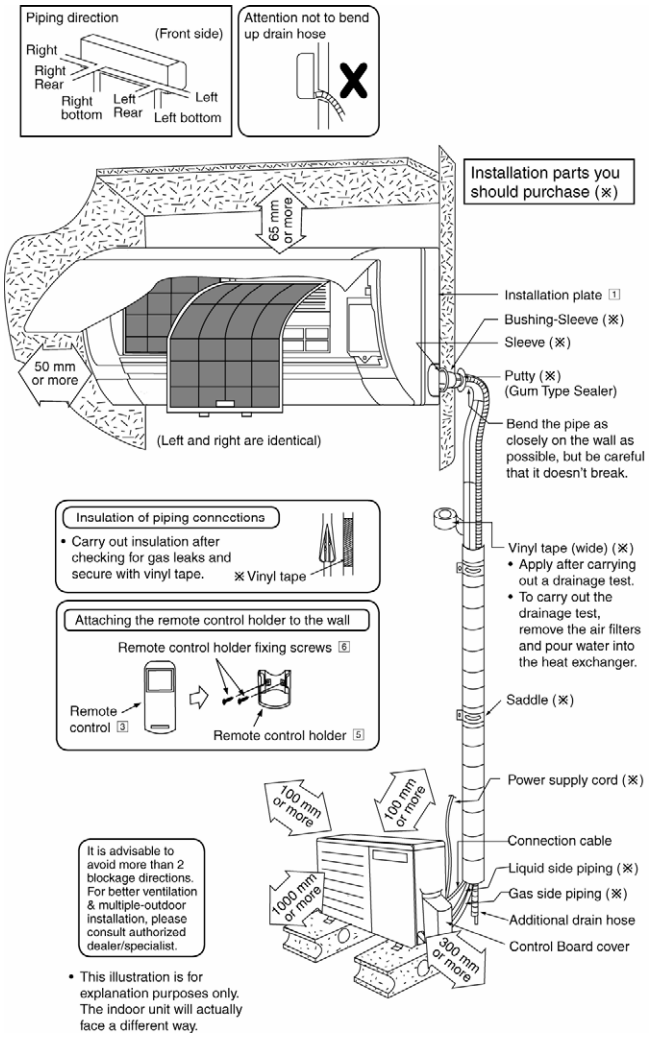
12.1.2 Outdoor Unit

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

Model	Horse Power (HP)	Piping size		Std. Length (m)	Max. Elevation (m)	Min. Piping Length (m)	Max. Piping Length (m)	Additional Refrigerant (g/m)	Piping Length for add. gas (m)
		Gas	Liquid						
C28***	3.0HP	15.88mm (5/8")	6.35mm (1/4")	5	20	3	30	30	7.5

Example: For C28***
If the unit is installed at 10 m distance, the quantity of additional refrigerant should be 75 g .... (10-7.5) m x 30 g/m = 75 g.

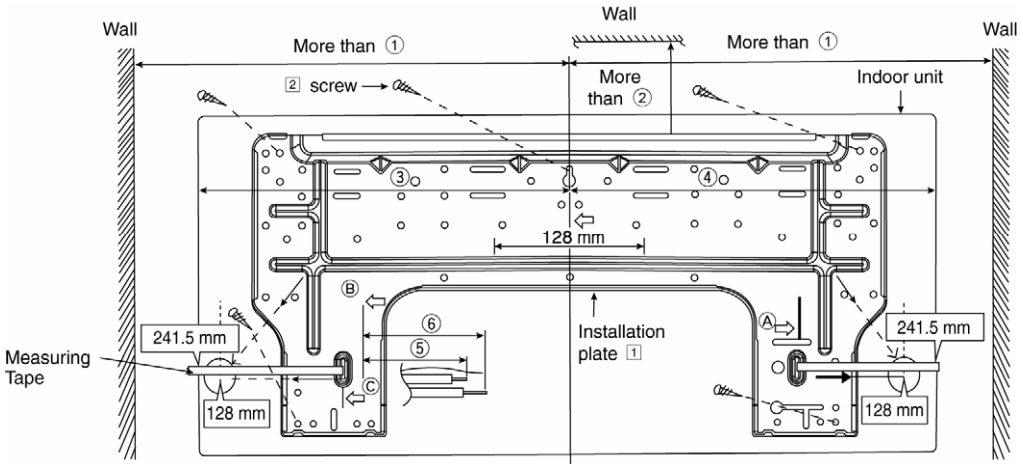
12.1.3 Indoor/Outdoor Unit Installation Diagram



12.2 Indoor Unit

12.2.1 How to Fix Installation Plate

The mounting wall shall be strong and solid enough to prevent if from the vibration.



Model	Dimension					
	①	②	③	④	⑤	⑥
C28***	590 mm	82 mm	539 mm	532 mm	109 mm	159 mm

The center of installation plate should be at more than ① at right and left of the wall.
The distance from installation plate edge to ceiling should more than ②.
From installation plate left edge to unit's left side is ③.
From installation plate right edge to unit's right side is ④.

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

1 Mount the installation plate on the wall with 5 screws or more (at least 5 screws).
(If mounting the unit on the concrete wall, consider using anchor bolts.)
- Always mount the installation plate horizontally by aligning the marking-off line with the thread and using a level gauge.

2 Drill the piping plate hole with ø70 mm hole-core drill.
- Putting measuring tape at position as shown in the diagram above.
The hole centre is obtained by measuring the distance namely 128 mm for left and right hole respectively. Another method is intersection point of arrow mark extension.
The meeting point of the extension arrow mark is the hole center position.
- Drill the piping hole at either the right or the left and the hole should be slightly slanting to the outdoor side. (refer to step 12.2.2)

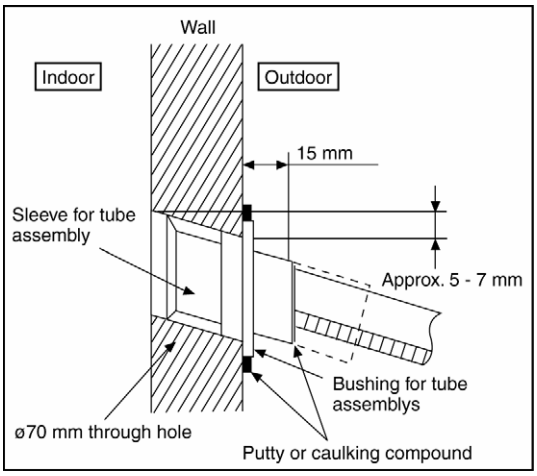
12.2.2 To Drill a Hole in the Wall and Install a Sleeve of Piping

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

⚠ CAUTION

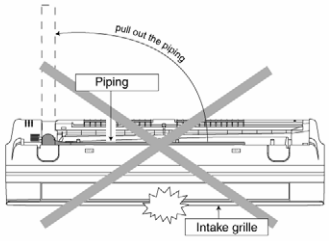
❗ When the wall is hollow, please be sure to use the sleeve for tube assembly to prevent dangers caused by mice biting the connecting cable.

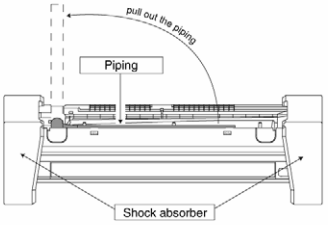
4 Finish by sealing the sleeve with putty or caulking compound at the final stage.



12.2.3 Indoor Unit Installation

- Do not turn over the unit without it's shock absorber during pull out the piping. It may cause intake grille damage.
- Use shock absorber during pull out the piping to protect the intake grille from damage.





12.2.3.1 For the Right Rear Piping

Step-1	Pull out the Indoor piping
Step-2	Install the Indoor Unit
Step-3	Secure the Indoor Unit
Step-4	Insert the power supply cord and connection cable

- Insert the cables from bottom of the unit through the control board hole until terminal board area.

12.2.3.2 For the Right and Right Bottom Piping

Step-1	Pull out the Indoor piping
Step-2	Install the Indoor Unit
Step-3	Insert the power supply cord and connection cable

- Insert the cables from bottom of the unit through the control board hole until terminal board area.

Step-4	Secure the Indoor Unit

12.2.3.3 For the Embedded Piping

Step-1	Replace the drain hose
Step-2	Bend the embedded piping

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

Step-3	Pull the connection cable into Indoor Unit

- The power supply cord and indoor unit and outdoor unit connection cable can be connected without removing the front grille.

Step-4	Cut and flare the embedded piping

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

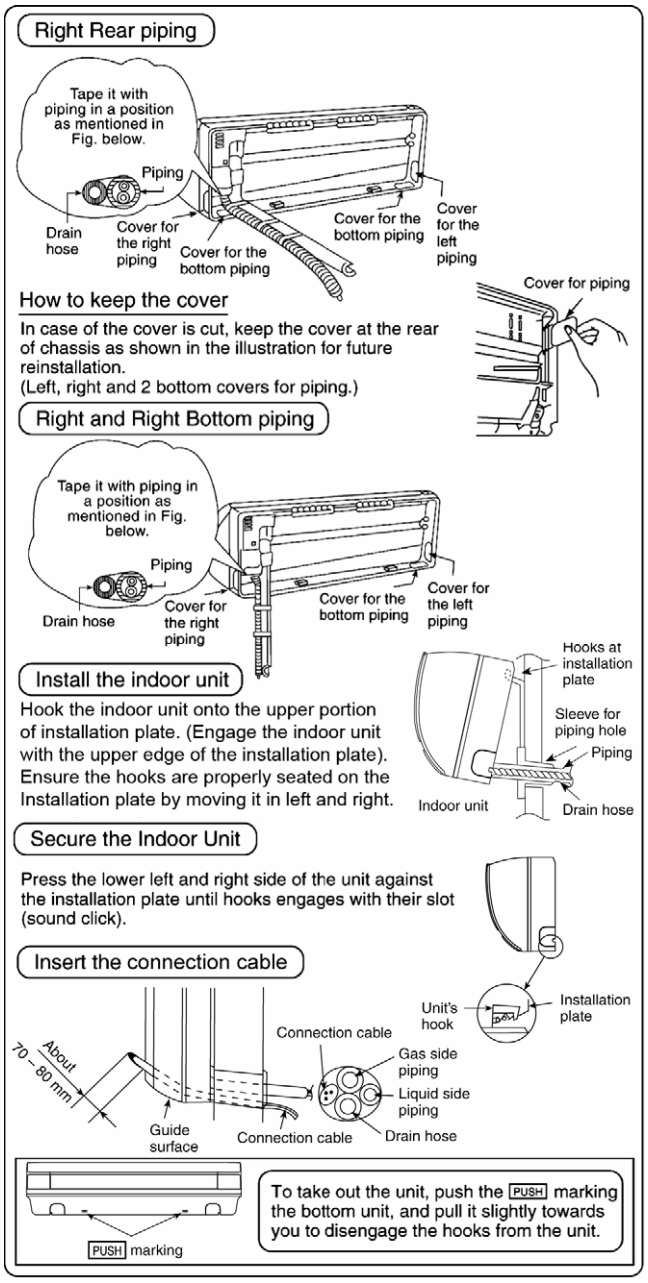
Step-5	Install the Indoor Unit
Step-6	Connect the piping

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

Step-7	Insulate and finish the piping

- Please refer to "Insulation of piping connection" column as mentioned in indoor/outdoor unit installation.

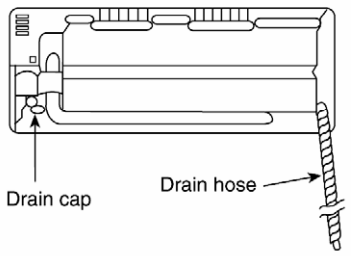
Step-8	Secure the Indoor Unit

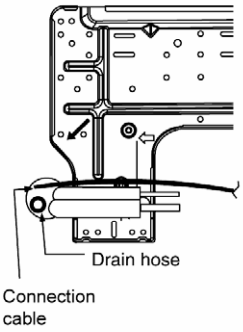


(This can be used for left rear piping and bottom piping also.)

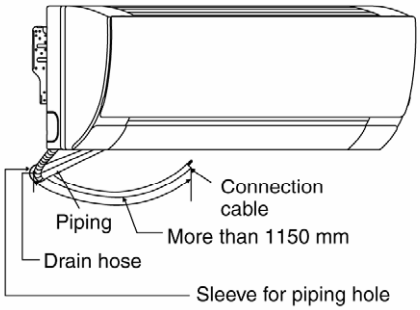
Replace the drain hose

Rear view for left piping installation

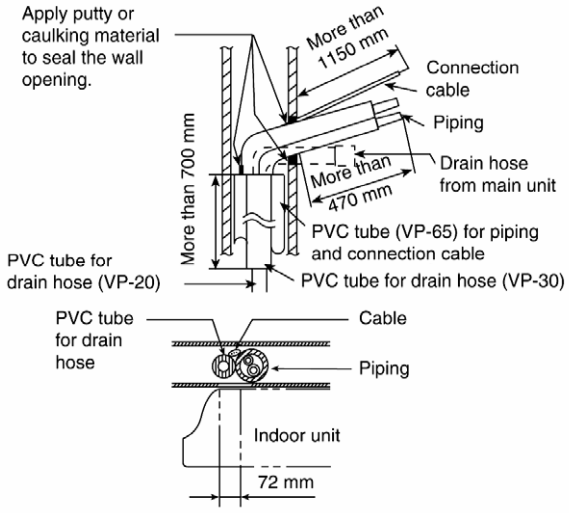




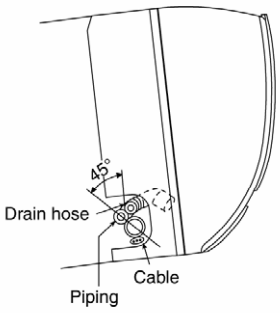
Adjust the piping slightly downwards.



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



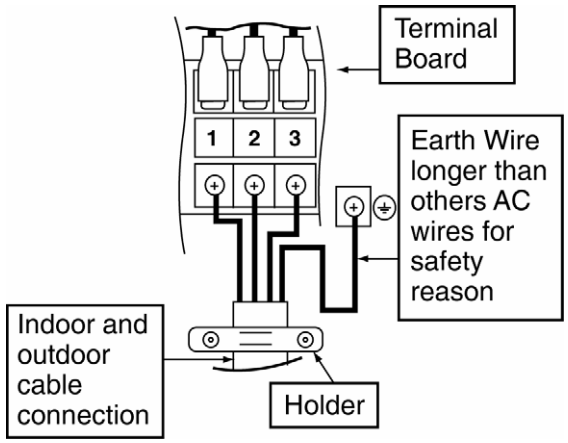
- In case of left piping how to insert the connection cable and drain hose.



(For the right piping, follow the same procedure)

12.2.4 Connect the Cable to the Indoor Unit

1. The inside and outside connection cable can be connected without removing the front grille.
2. **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4 x 1.5 mm^2 flexible cord, type designation 60245 IEC 57 or heavier cord. Do not use joint connection cable. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.



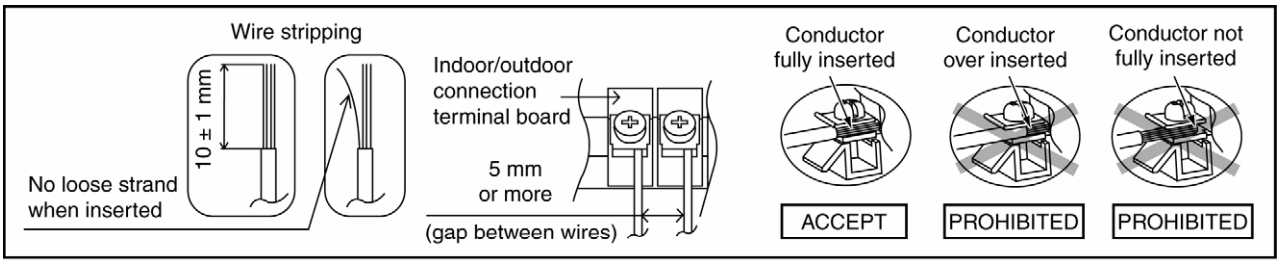
Terminals on the indoor unit	1	2	3	⏚
Colour of wires				
Terminals on the outdoor unit	1	2	3	⏚

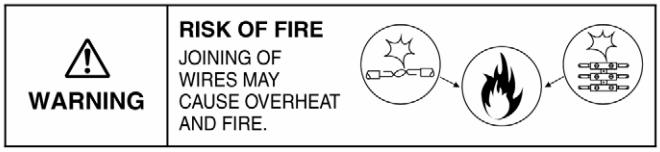
- Secure the connecting cable onto the control board with the holder.

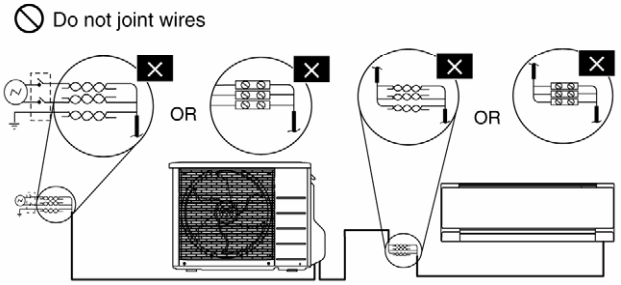
⚠ WARNING
⏚ This equipment must be properly earthed.

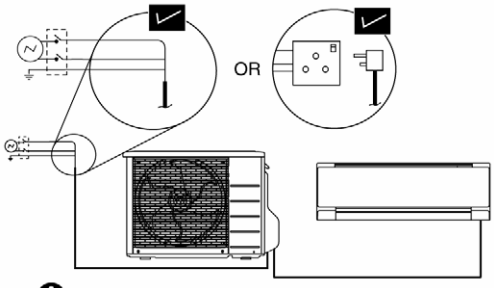
Note:
- Isolating Devices (Disconnecting means) should have minimum 3.0 mm contact gap.
- Ensure the colour of wires of outdoor unit and the terminal Nos. are the same to the indoor's respectively.
- Earth wire shall be Yellow/Green (Y/G) in colour and longer than other AC wires as shown in the figure for the electrical safety in case of the slipping out of the cord from the anchorage.

12.2.5 Wire Stripping And Connecting Requirement









Use complete wire without joining.

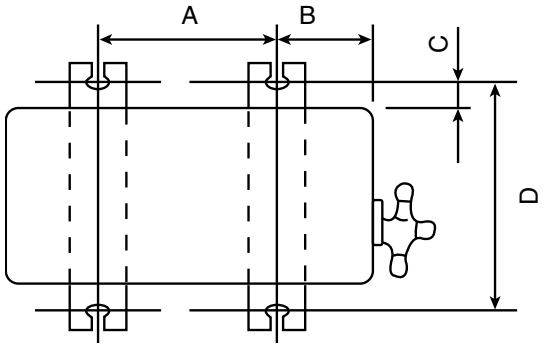
Use approved socket and plug with earth pin.

Wire connection in this area must follow to national wiring rules.

12.3 Outdoor Unit

12.3.1 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 (ø10mm).
  2 When installing at roof, please consider strong wind and earthquake.
  Please fasten the installation stand firmly with bolt or nails.



Model	A	B	C	D
C28***	612.5 mm	131 mm	19 mm	383 mm

12.3.2 Connecting the Piping

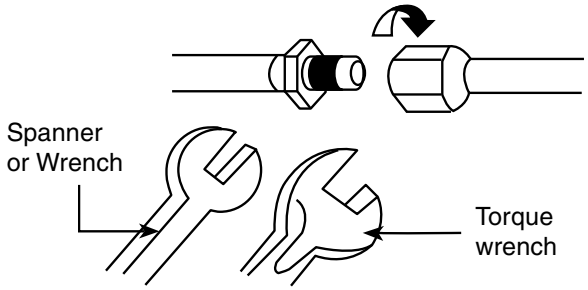
12.3.2.1 Connecting the piping to indoor

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.

12.3.2.2 Connecting the piping to outdoor

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.

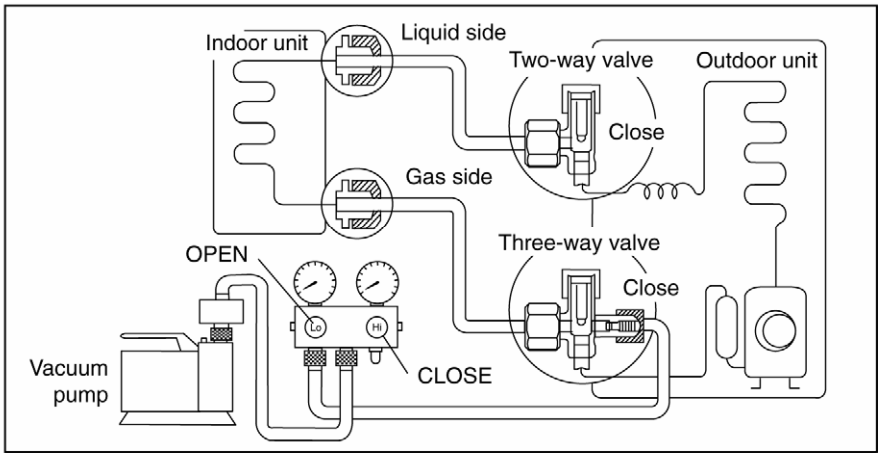


Do not overtighten, overtightening may cause gas leakage	
Piping size	Torque
1/4” (6.35 mm)	[18 N•m (1.8 kgf.m)]
3/8” (9.52 mm)	[42 N•m (4.3 kgf.m)]
1/2” (12.7 mm)	[55 N•m (5.6 kgf.m)]
5/8” (15.88 mm)	[65 N•m (6.6 kgf.m)]
3/4” (19.05 mm)	[100 N•m (10.2 kgf.m)]

FOR ENVIRONMENT PROTECTION, MANUFACTURER STRONGLY RECOMMENDS TO USE EVACUATION METHOD.

12.3.3 Evacuation of the Equipment

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



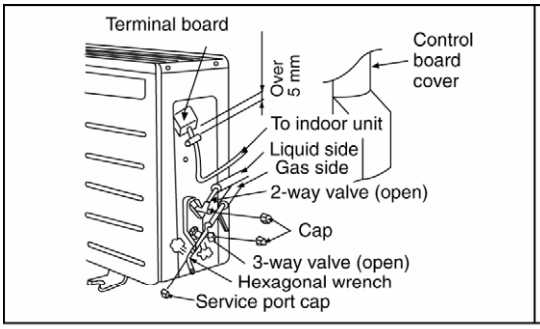
1 Connect a charging hose with a push pin to the Low side of a charging set and the service port of the 3-way valve.
   - Be sure to connect the end of the charging hose with the push pin to the service port.
2 Connect the center hose of the charging set to a vacuum pump.
3 Turn on the power switch of the vacuum pump and make sure that the needle in the gauge moves from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa). Then evacuate the air approximately ten minutes.
4 Close the Low side valve of the charging set and turn off the vacuum pump. Make sure that the needle in the gauge does not move after approximately five minutes.
   Note: BE SURE TO TAKE THIS PROCEDURE IN ORDER TO AVOID REFRIGERENT GAS LEAKAGE.
5 Disconnect the charging hose from the vacuum pump and 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.

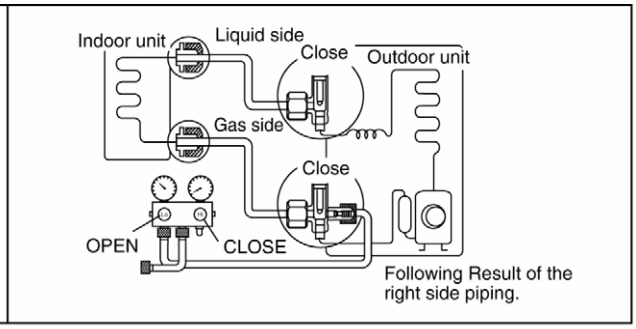
- If gauge needle does not move from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa), in the step ③ above take the following measure:
- If the leak stops when the piping connections are tightened further, continue working from step ③.
- If the leak does not stop when the connections are retightened, repair location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

12.3.4 Air Purging of the Piping and Indoor

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

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





No leakage found | **Result** | **Leakage found**

5. To open 2-way valve again, turn the valve stem counter-clockwise until it stop.
   - Re-tighten the connecting portion with torque wrenches.

Leakage ceased | **Leakage persists**

Locate and repair leak

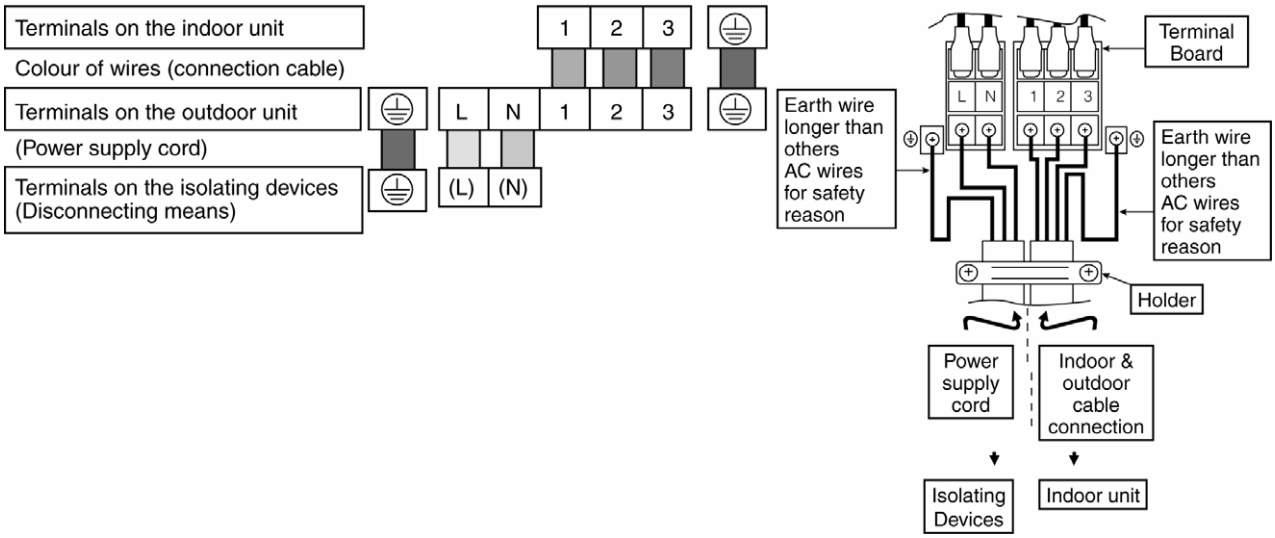
Leakage ceased

6. To purge the air, push the pin on the service port of 3-way valve for three second using with a hexagonal wrench and set it free for one minute.
   - Repeat this three times.
7. Set the both 2-way and 3-way valves to open position with the Hexagonal wrench for the unit operation.

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

12.3.5 Connect the cable to the Outdoor Unit

1 Remove the control board cover from the unit by loosening the screw.
2 Cable connection to the power supply through Isolating Devices (Disconnecting means).
   - Connect the approved polychloroprene sheathed **power supply cord** 3 x 4.0 mm^2, type designation 60245 IEC 57 or heavier cord to the terminal board, and connect the others end of the cord to Isolating Devices (Disconnecting means).
   - Do not use joint power supply cord. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.
   - In unavoidable case, joining of power supply cord between isolating devices and terminal board of air conditioner shall be done by using approved socket and plug rated 25A. Wiring work to both socket and plug must follow to national wiring standard.
3 **Connection cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4 x 1.5 mm^2 flexible cord, type designation 60245 IEC 57 or heavier cord. Do not use joint connection cable. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.
4 Connect the power supply cord and connection cable between indoor unit and outdoor unit according to the diagram below.



5 Secure the power supply cord and connection cable onto the control board with the holder.
6 Attach the control board cover back to the original position with screw.
7 For wire stripping and connection requirement, refer to instruction 12.2.4 of the indoor unit.

⚠ WARNING
⏚ This equipment must be properly earthed.

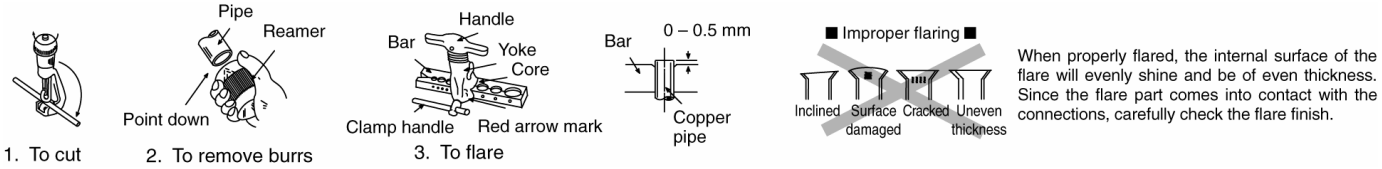
- Isolating Devices (Disconnecting means) should have minimum 3.0 mm contact gap.
- Earth wire shall be Yellow/Green (Y/G) in colour and longer than other AC wires for safety reason.

12.3.6 Piping Insulation

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

12.3.6.1 Cutting and flaring the piping

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



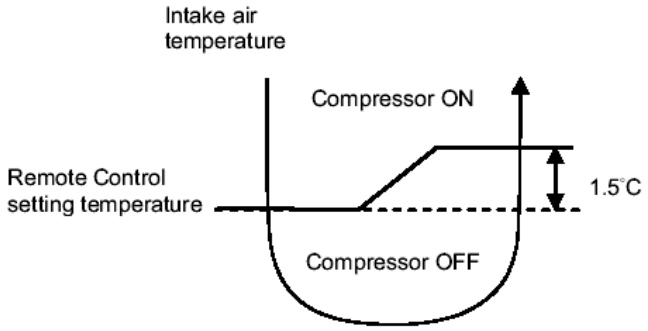
1. To cut
2. To remove burrs
3. To flare

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.

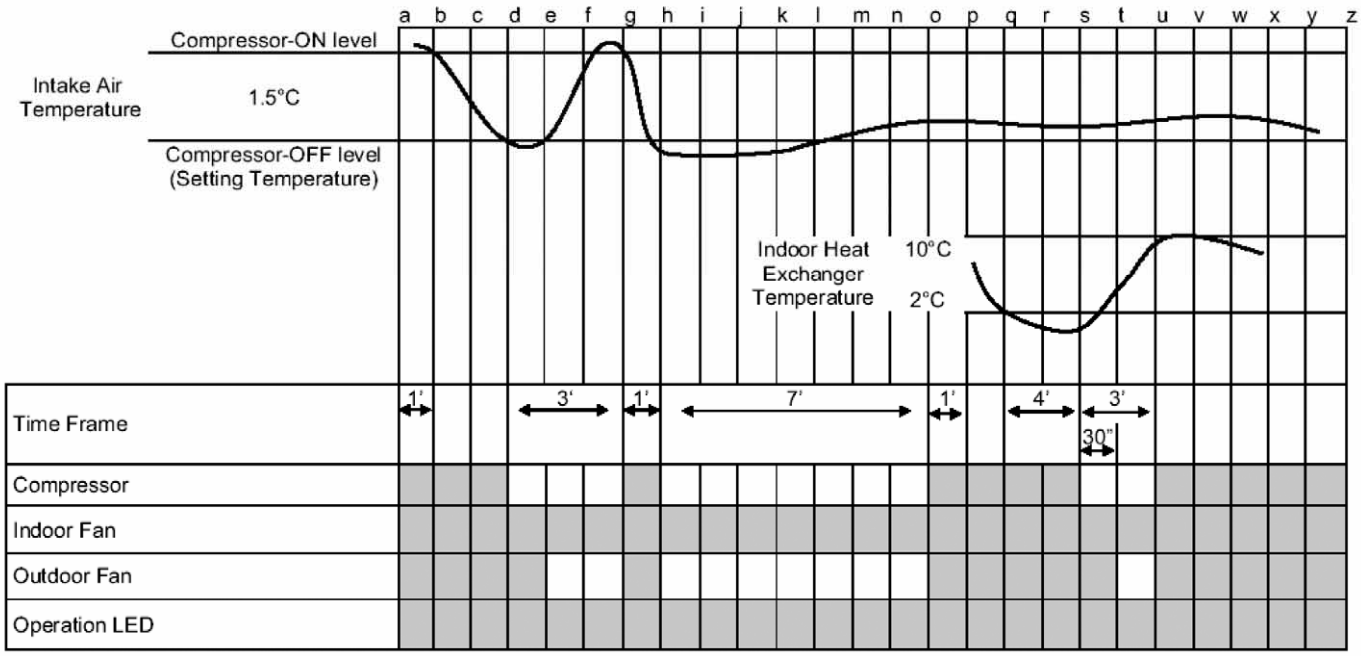
13. Operation Control

13.1 Cooling Operation

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



13.1.1 Cooling Operation Time Diagram (For CS-C12PK CU-C12PK)

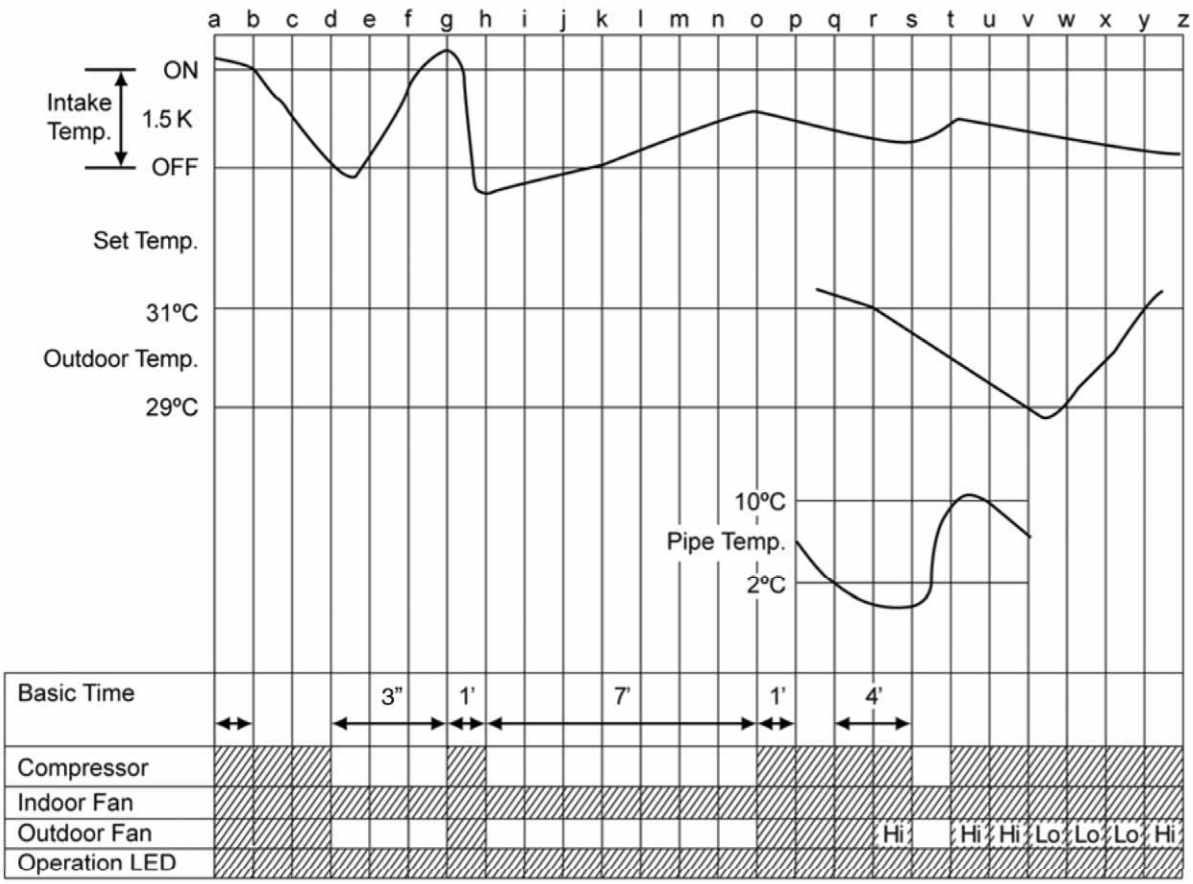


<Description of operation>

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

Operation
Stop

13.1.2 Cooling Operation Time Diagram (For CS-C18PK CU-C18PK, CS-C24PK CU-C24PK and CS-C28PK CU-C28PK)



<Description of operation>

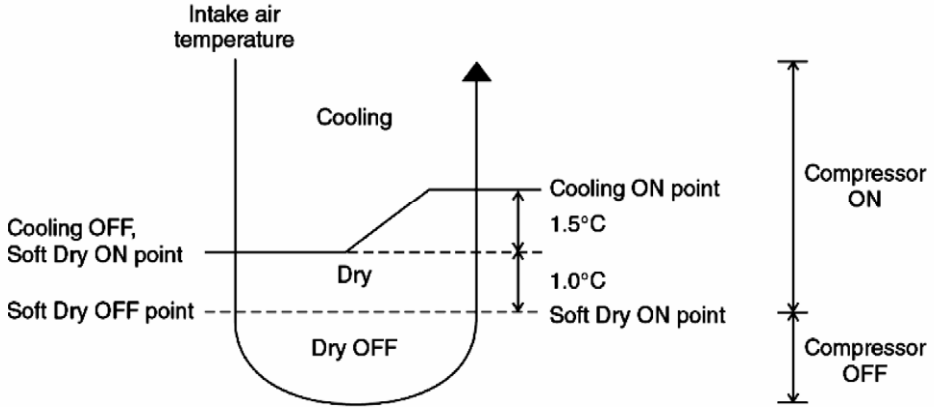
d – g	: restart control (waiting for 3 min.)
a – b, g – h, o – p	: 60 sec. Forcible operation.
h – o	: 7 min. time save control.
q – t	: freeze prevention control.
v – y	: outdoor fan control.

Operation

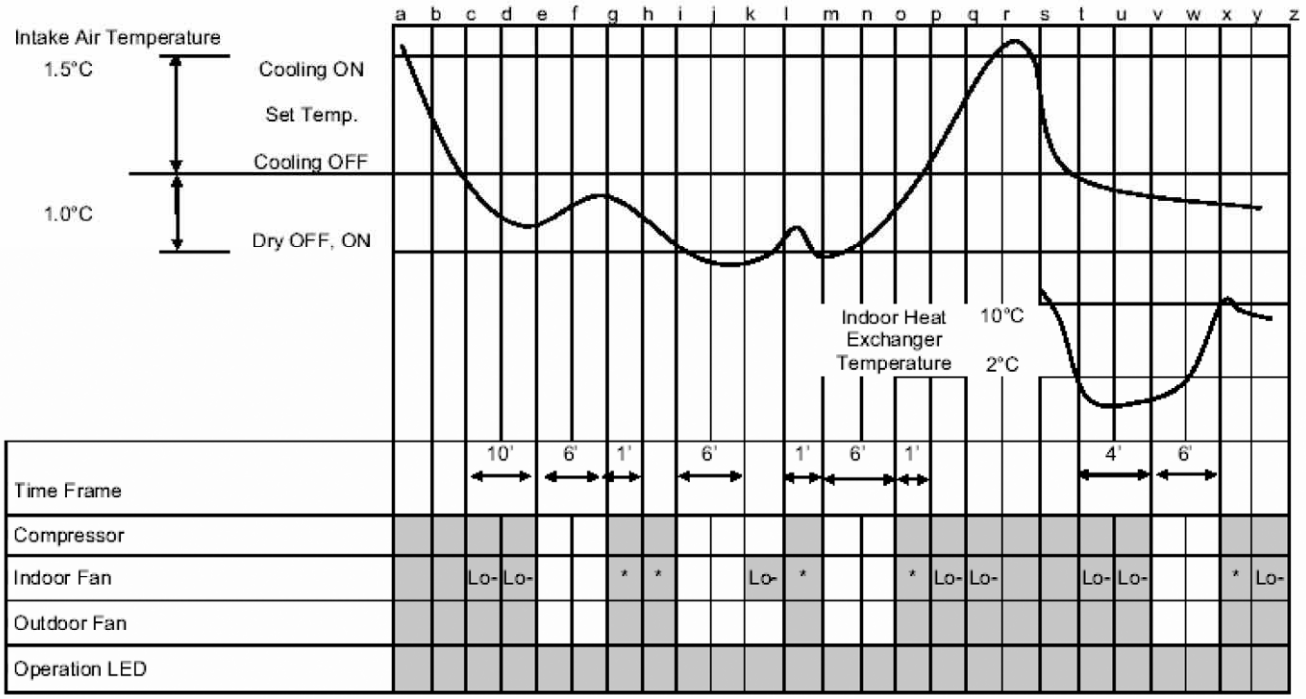
Stop

13.2 Soft Dry Operation

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



13.2.1 Soft Dry Operation Time Diagram (For CS-C12PK CU-C12PK)

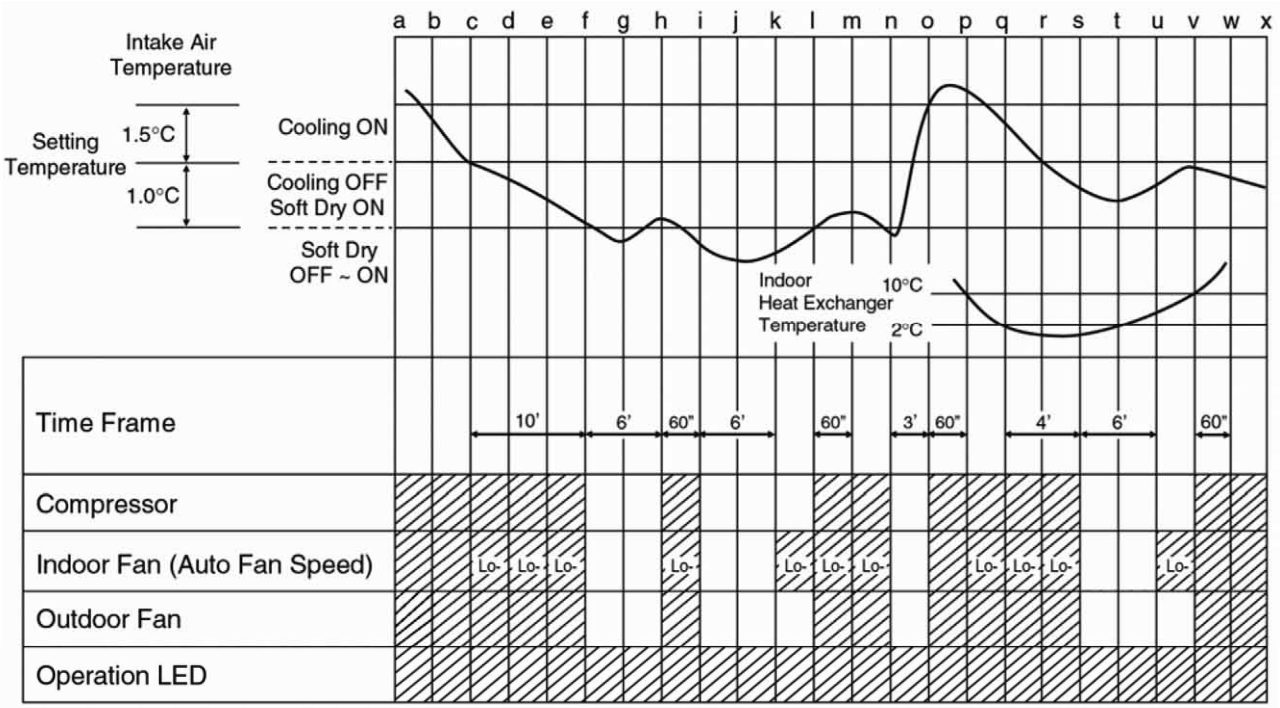


<Description of operation>

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

Operation
Stop

13.2.2 Soft Dry Operation Time Diagram (For CS-C18PK CU-C18PK, CS-C24PK CU-C24PK and CS-C28PK CU-C28PK)



<Description of operation>

Operation

Stop

h – i, l – m, o – p, v – w : Minimum 60 seconds foreced operation

n – o : Minimum 3 minutes restart control (Time Delay Safety Control) - Cooling operation

f – h, i – k, s – u : Minimum 6 minutes restart control (Time Delay Safety Control) - Soft dry operation

q – v : Freeze Prevention Control

13.3 Automatic Operation

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

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

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

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

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

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

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

Intake Air Temperature		
	↑ 25°C	Cooling Operation
	↓	Soft Dry Operation

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

13.4 Indoor Fan Speed Control

- Indoor fan speed can be set using remote control.

13.4.1 Fan Speed Rotation Chart

Speed	Fan Speed (rpm)			
	CS-C12PKF	CS-C18PKF	CS-C24PKF	CS-C28PKF
Shi	1120	1430	1500	1530
Hi	1090	1280	1390	1490
Me	910	1130	1190	1340
HLo	820	1100	1150	1280
CLo	780	1040	1070	1200
Lo-	740	820	940	1010
SLo	720	650	720	800
Qhi	1020	1190	1300	1400
QMe	840	1040	1100	1250
QLo	710	950	980	1110

13.4.2 Automatic Fan Speed Control

- When set to Auto Fan Speed, the fan speed is adjusted between maximum and minimum setting as shown in the table.
  - Fan speed rotates in the range of Hi and Me (For CS-C12PK).
  - Fan speed rotates in the range of Hi, Me and Lo- (For CS-C18PK, CS-C24PK and CS-C28PK).
  - Deodorizing Control will be activated.

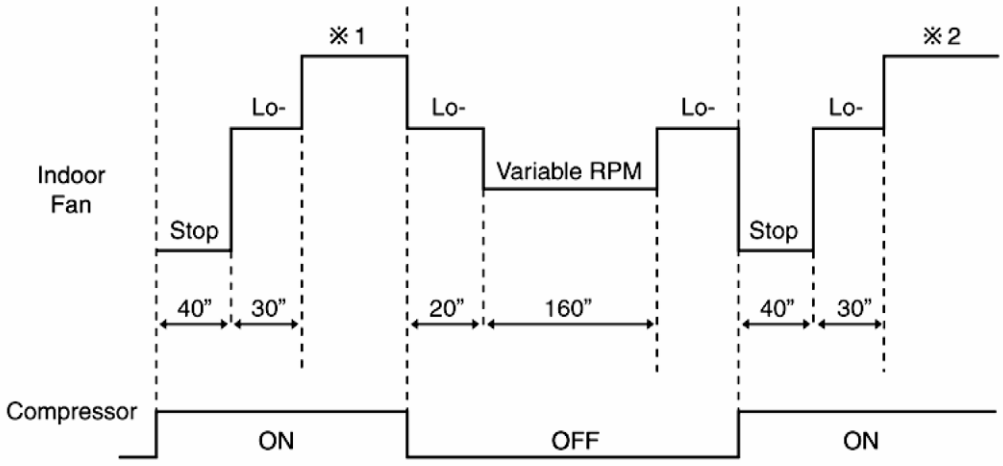
For CS-C12PK

				SHi	Hi	Me	HLo	CLo	Lo-	SLo	Variable rpm	Stop
Cooling	Normal	Manual	Hi		o							
			Me			o						
			Lo					o				
		Auto			o	o			o		o	o
	Quiet	Manual	QHi		Hi-70							
			QMe			Me-70						
			QLo					CLo-70				
		Auto			Hi-70	Me-70			o		o	o
	Powerful	Manual		o								
		Auto		o								
Soft Dry	Normal	Manual							o			o
		Auto							o			o
	Quiet	Manual							o			o
		Auto							o			o
	Powerful	Manual							o			o
		Auto							o			o

For CS-C18PK, CS-C24PK and CS-C28PK

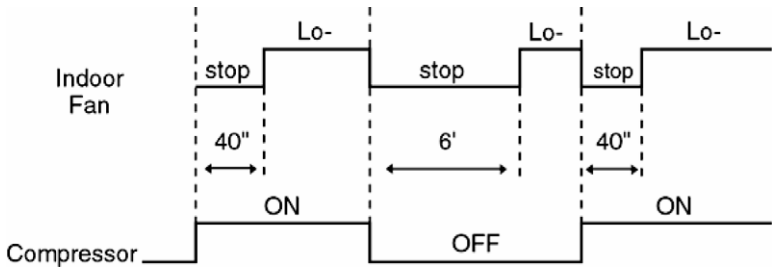
				SHi	Hi	Me	HLo	CLo	Lo-	SLo	Stop
Cooling	Normal	Manual	Hi		o						
			Me			o					
			Lo					o			
		Auto			o	o			o		o
	Quiet	Manual	QHi		Hi-90						
			QMe			Me-90					
			QLo					CLo-90			
		Auto			Hi-90	Me-90			o		o
	Powerful	Manual		o							
		Auto		o							
Soft Dry	Normal	Manual							o		o
		Auto							o		o
	Quiet	Manual							o		o
		Auto							o		o
	Powerful	Manual							o		o
		Auto							o		o

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



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

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



13.4.3 Manual Fan Speed Control

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

13.4.4 Indoor Fan Motor rpm Abnormal Control

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

13.5 Outdoor Fan Speed Control

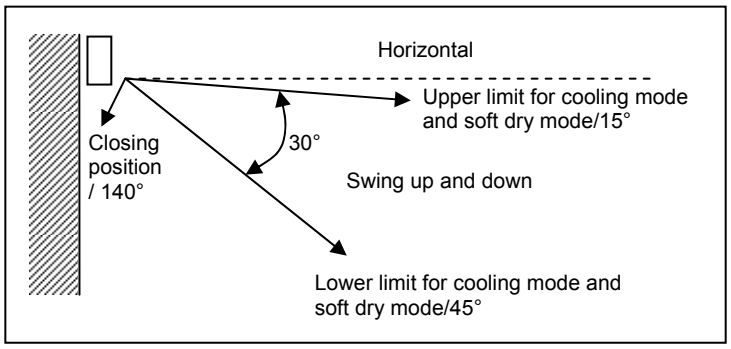
- There is only one speed for outdoor fan motor. (Applicable for CU-C12PK and CU-C18PK)
- There is 2 speeds for outdoor fan motor. Outdoor fan speed can be changed to Hi or Lo according to outdoor temperature. (Applicable for CU-C24PK and CU-C28PK).
- For Cooling and Soft Dry operation, when outdoor temperature reaches to 31°C (Hi-speed), 29°C (Lo-speed). (Applicable for CU-C24PK and CU-C28PK).
- When air conditioner is turned on, the compressor and the outdoor fan will operate simultaneously.
- Likewise, both compressor and outdoor fan will stop at the same time if the unit is turned off.

13.6 Vertical Airflow Direction Control

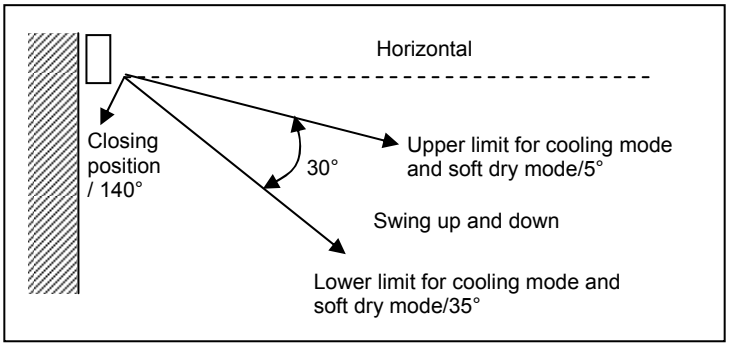
13.6.1 Auto Control

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

For CS-C12PK



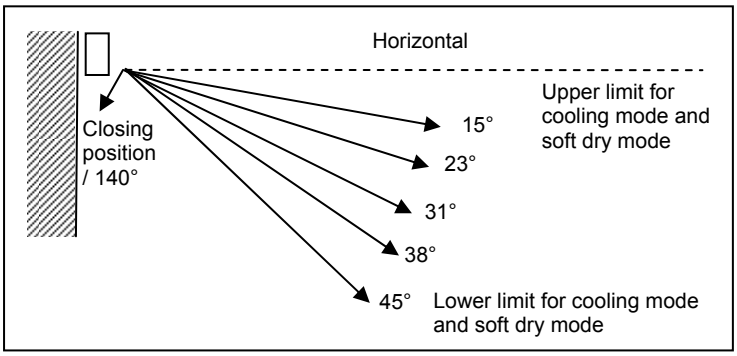
For CS-C18PK, CS-C24PK and CS-C28PK



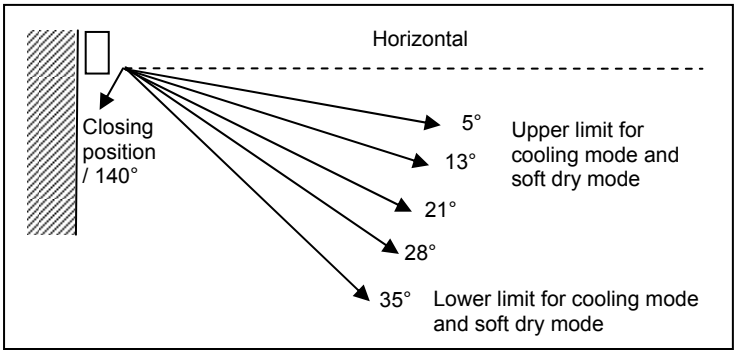
13.6.2 Manual Control

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

For CS-C12PK



For CS-C18PK, CS-C24PK and CS-C28PK

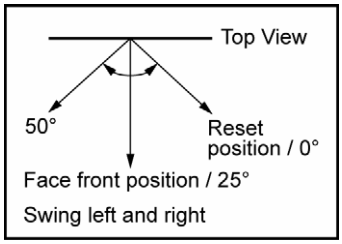


13.7 Horizontal Airflow Direction Control

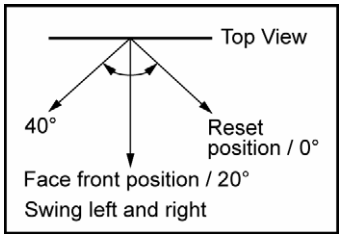
13.7.1 Auto Control

- When the horizontal airflow is set to Auto using the remote control, the vanes swings left and right as shown in the diagram.
- When stopped with remote control, the discharge vanes are reset and stop at the reset position.
- During Cooling operation or Soft Dry operation, indoor fan motor may stop to rotate at certain periods. At that condition, the vane will stop swinging and rest at face front position.

For CS-C12PK



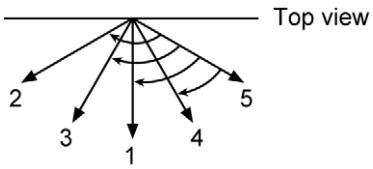
For CS-C18PK, CS-C24PK and CS-C28PK



13.7.2 Manual Control

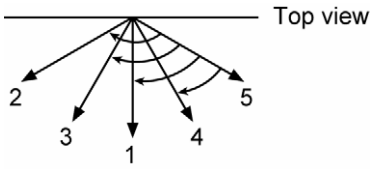
- When the horizontal airflow direction is set to Manual using the remote control, the automatic airflow is released and the airflow direction vane move left and right in the range shown in the diagram.
- The louver can be adjusted by pressing the button to the desired vane position.
- When stopped with remote control, the vanes is reset and stopped at reset position.

For CS-C12PK



Pattern	1	2	3	4	5
Airflow Direction Patterns of Remote Control					
Vane Angle (°)	25	50	37.5	12.5	0

For CS-C18PK, CS-C24PK and CS-C28PK



Pattern	1	2	3	4	5
Airflow Direction Patterns of Remote Control					
Vane Angle (°)	20	40	30	10	0

13.8 Powerful Operation

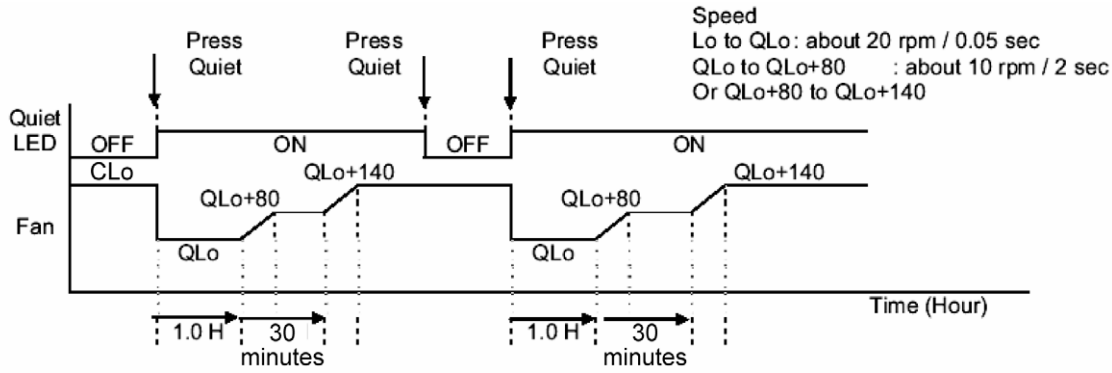
- To achieve the setting temperature quickly.
- When powerful operation is set, the setting temperature will be automatically decreased 3°C internally against the present setting temperature (Lower temperature limit: 16°C).
- This operation automatically running under Shi fan speed (Cooling), Lo- Fan Speed (Soft Dry) is applicable for C12PK only.
- Vertical Airflow Direction:
  - In “Manual” setting, the vane will automatically shift down 10° lower than previous setting.
  - In “Auto” setting, the vane will automatically swing up and down. However the lower limit will be shifted 10° downward.
- Powerful operation stops when:
  - Powerful/Quiet button is pressed again
  - Powerful operation has operate for 15 minutes
  - Stopped by OFF/ON operation button.
  - Timer OFF activates
  - Operation mode is changed

13.9 Quiet Operation

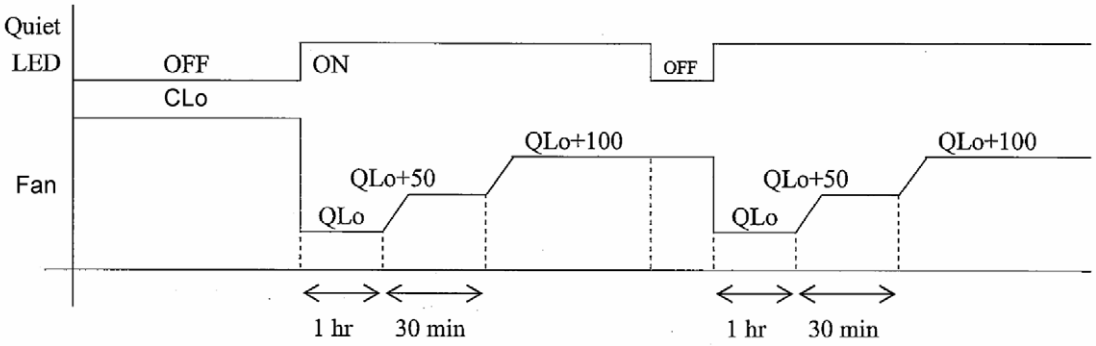
(For Cooling Operation or cooling region of Soft Dry Operation)

- To provide quiet cooling operation condition.
- Once the Quiet Operation is set at the remote control, the Quiet LED brightness will be dimmed. The sound level will reduce around 2dB(A) for Lo fan speed or 3dB(A) for Hi/Me fan speed against the present operation sound level.
- Dew formation become severe at Quite Lo Cool, therefore Quiet Lo cool operated only for 1 hour 30 minutes (1 hour QLo, 30 minutes QLo + 80rpm) (for C12PK) and Quiet Lo cool operated only 1 hour 30 minutes (1 hour QLo, 30 minutes QLo + 50 rpm) (for C18PK, C24PK and C28PK).
- Manual Airflow Direction:
  - RPM control during Lo cool

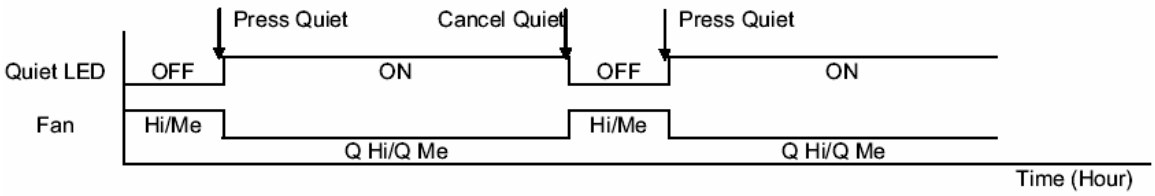
(For C12PK)



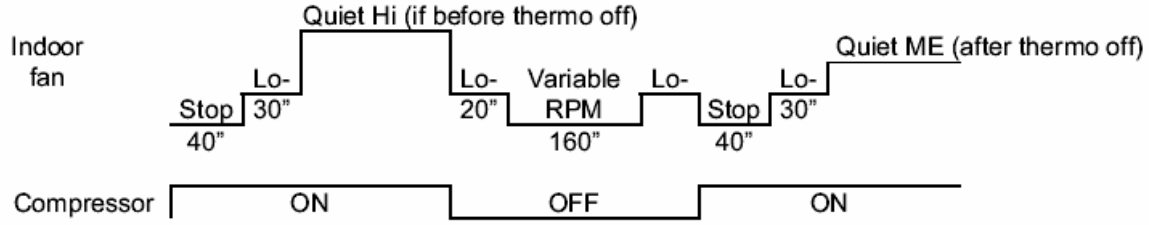
(For C18PK, C24PK and C28PK)



- RPM control during Hi & Me cool



- Auto Fan Speed



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

13.10 Timer Control

13.10.1 ON Timer

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

13.10.2 OFF Timer

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

13.11 Random Auto Restart Control

- If there is a power failure during operation, the air conditioner will automatically restart after 3 to 4 minutes when the power is resumed.
- It will start with previous operation mode and airflow direction.
- If there are more than one air conditioner unit in operation and power failure occur, restart time for each unit to operate will be decided randomly using 4 parameters:- intake air temperature, setting temperature, fan speed and air swing louver position.
- This Random Auto Restart Control is not available when Timer is set.
- This control can be omitted by open the circuit of JX02 at indoor unit printed circuit board.

13.12 Remote Control Signal Receiving Sound

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

13.13 nanoe-G Operation

- This operation provides clean air by producing great amount of negative ions and distribute through the discharge airflow to capture or deactivate molds, bacteria or viruses.

- nanoe-G operation start condition
  - During unit running at any operation mode, if nanoe-G operation is activated, combination operation (operation mode + nanoe-G operation) starts.
  - During unit is OFF, if nanoe-G operation is activated, nanoe-G individual operation starts.

- nanoe-G operation stop condition
  - When OFF/ON button is pressed to stop the operation.
  - When nanoe-G button is pressed.
  - When OFF Timer activates.

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

- Indoor fan control
  - During any operation mode combines with nanoe-G operation, fan speed follows respective operation mode. However, nanoe-G system enabled when fan speed ≥ 500rpm to ensure proper negative ion distribution, nanoe-G system disabled when fan speed < 500 rpm.
  - During nanoe-G individual operation, only Auto Fan Speed and no Powerful operation is allowed. Even if Fan Speed button is pressed, no signal is sent to the unit and no change on remote control display. Auto Fan Speed for nanoe-G operation changes from SHi to Hi after 4 hours of operation.

- Airflow direction control
  - During any operation mode combines with nanoe-G operation, airflow direction follows respective operation mode.
  - During nanoe-G individual operation, only Auto Air Swing is allowed. Even if Air Swing button is pressed, no signal is sent to the unit and no change on remote control display.

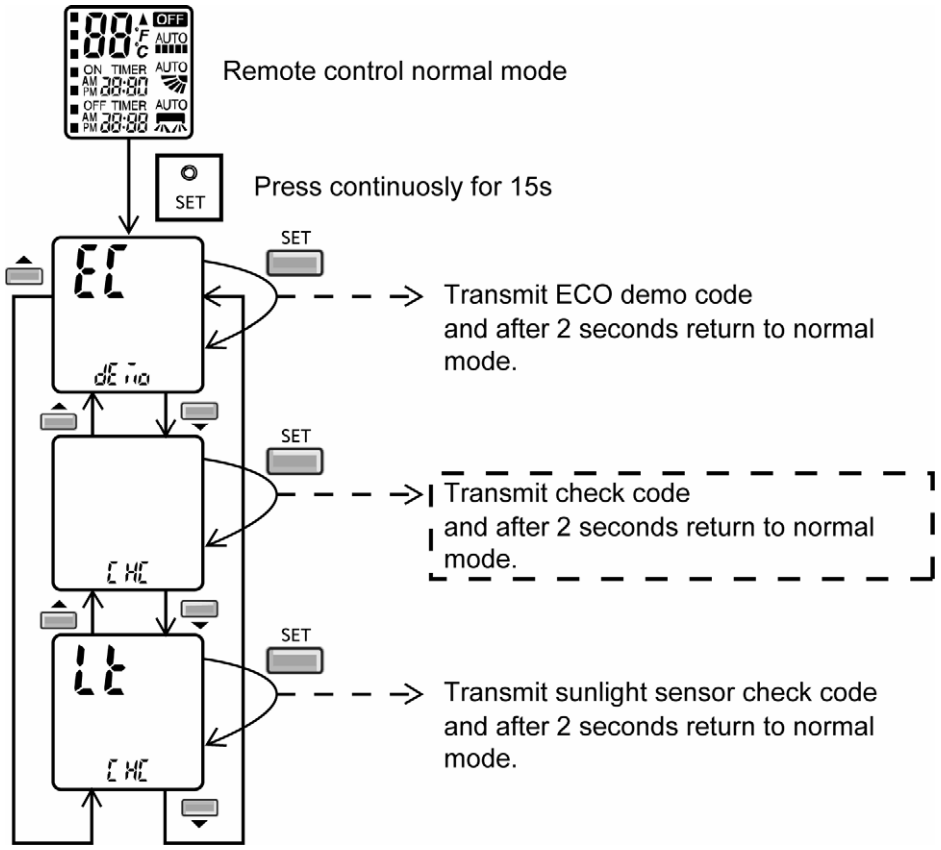
- Timer control
  - When ON Timer activates when unit stops, previous operation resumes and restored last saved nanoe-G operation status.
  - When ON Timer activates during any operation, no change on current operation.
  - When OFF Timer activates during any operation, all operation stops and the latest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

- Indicator
  - When nanoe-G starts, nanoe-G indicator ON.

- Remote Control Receiving Sound
  - Normal Operation ➔ nanoe-G Operation : Beep
  - Nanoe-G Operation ➔ Normal Operation : Beep
  - Stop ➔ nanoe-G individual Operation : Beep
  - Nanoe-G individual Operation ➔ Stop : Long Beep

- Power failure
  - During nanoe-G individual operation, if power failure occurs, after power resumes, nanoe-G individual operation resumes immediately.
  - During combination operation, if power failure occurs, after power resumes, combination operation resume immediately.

- nanoe-G check mode
  - To enable nanoe-G check mode, during nanoe-G operation ON:



  - If there is abnormal discharge, nanoe-G indicator blinks immediately.

- Error detection control
  When nanoe-G indicator blinks, it indicates error listed below:
  - nanoe-G connector at main PCB open
    - Judgment method
      - During nanoe-G operation, nanoe-G connector at main PCB is opened.
    - Troubleshooting method
      - Connect the connector or stop operation to cancel the blinking.
      - Switch off the power supply and unplug before cleaning.
      - Clean the dirty nanoe-G generator with cotton bud.
  - Abnormal discharge error
    - Judgment method
      - During nanoe-G operation, the nanoe-G system has abnormal discharge due to short-circuit caused by water or dust adhesion and so forth, with Lo-feedback voltage (at microcontroller).
      - When abnormal discharge occurred, every 30 minutes the unit supplies power to the nanoe-G system.
      - When abnormal discharge occurs for 24 times continuously, nanoe-G indicator blinks.
  - Troubleshooting method
    - Press nanoe-G button or OFF/ON button to stop the operation and check the nanoe-G connector at PCB.
    - After that, press nanoe-G button again to confirm the nanoe-G indicator do not blinks.
    - The 24 timer counter will be clear after 10 minutes of normal operation or when operation stops.
  - Error reset method
    - Press OFF/ON button to OFF the operation.
    - Press AUTO OFF/ON button at indoor unit to OFF the operation.
    - OFF Timer activates
    - Power supply reset.

- nanoe-G breakdown error
  - Judgment method
    - Hi-feedback voltage (at microcontroller) supplied to the nanoe-G system when nanoe-G operation is OFF; nanoe-G breakdown error show immediately.
    - It is due to indoor PCB or nanoe-G high voltage power supply damage.
    - Operations except nanoe-G continue. Both Timer indicator and nanoe-G indicator blink.
  - Troubleshooting method
    - Press nanoe-G button or OFF/ON button to stop the operation.
    - Change nanoe-G high voltage power supply or main PCB.
    - When Lo-feedback voltage supplied to nanoe-G system during nanoe-G operation ON, nanoe-G indicator and Timer indicator stop blinking.

13.14 In-filter Deactivation Operation

- This operation helps to deactivate virus and bacteria on filter after the unit turned off using nanoe-G generator.

- In-filter deactivation start condition
  - nanoe-G is in ON condition before the unit is turned off either by OFF/ON button or OFF Timer.
  - Elapsed time from previous in-filter deactivation operation is more than 24hrs.
  - Unit operation time before unit is turned off is more than 2 hours or accumulated unit operation time achieves 4hrs if unit operation time less than 2hours.

- In-filter deactivation stop condition
  - The unit is turned on.
  - nanoe-G generator operation time during in-filter deactivation operation has achieved 120 minutes.
  - The unit received disable signal from remote control.
  - Nanoe-G abnormality occurs.

- Control contents:
  - When the unit operate in Cool or Dry mode before turned off.
    1. The unit will operate fan operation, fan motor will operate at 500rpm for 30 minutes then stop.
    2. During fan operation, horizontal vane will fixed at 115° for 30 minutes then close.
    3. After 30 minutes the unit will continue with common control.
  - Common control.
    - nanoe-G generator will operate for 120 minutes.

- Timer control
  - When ON Timer activates during in filter deactivation operation, in-filter deactivation operation stops.
  - When OFF Timer activates during in filter deactivation operation, in-filter operation will continue.

- Indicator
  - nanoe-G indicator ON.
  - Power indicator OFF.

- Enable or disable selection
  - Press NANOE-G button continuously for 5 seconds to disable or enable in-filter deactivation operation.

- Remote control receiving sound
  - Enable in-filter deactivation operation : Beep
  - Disable in-filter deactivation operation : Long beep

- Power failure
  - During in-filter operation, if power failure occurs, after power resumes in-filter deactivation operation will not resume.

13.15 AUTO COMFORT and ECO NAVI Operation

- AUTO COMFORT start condition:
  - When AUTO COMF button is pressed.

- AUTO COMFORT stop conditions:
  - When AUTO COMF button is pressed again.
  - When unit is OFF by OFF/ON button.
  - When unit is OFF when OFF TIMER activates.
  - When unit is OFF by AUTO OFF/ON button at indoor unit.
  - When POWERFUL, QUIET operation activates.
  - When ◄► button is pressed.

- ECO NAVI start condition:
  - When ECO NAVI button is pressed.

- ECO NAVI stop conditions:
  - When ECO NAVI button is pressed again.
  - When unit is OFF by OFF/ON button.
  - When unit is OFF when OFF TIMER activates.
  - When unit is OFF by AUTO OFF/ON button at indoor unit.
  - When POWERFUL, QUIET operation activates.
  - When ◄► button is pressed.

13.15.1 Human Activity Sensor

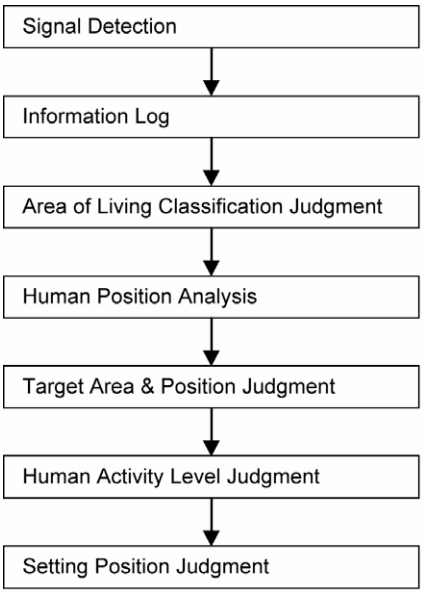
- Area of human availability, activity level and absent is judged based on pulses by using 2 infrared sensors. The internal setting temperature shift, fan speed and horizontal airflow direction are adjusted in order to provide comfort environment while maintain the energy saving level.

- AUTO COMFPRT / ECO NAVI initialization

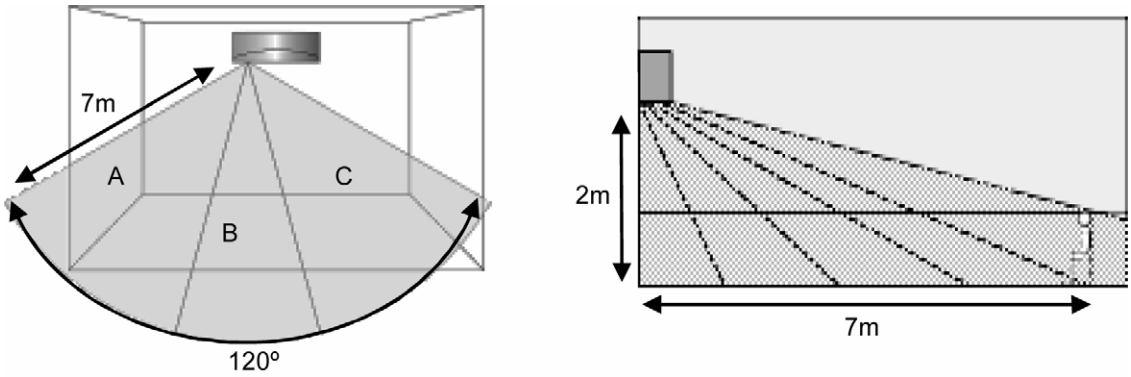
	Initialize indication	Human Activity Sensor			
1	0 – 2 seconds		□	□	□
2	2 – 3 seconds		■	■	■
3	3 – 70 seconds	I	■	□	■
		II	■	■	□
		III	■	□	■
		IV	□	■	■
		Repeat Step I to IV			

* □ Indicator ON, ■ Indicator OFF

- Human activity judgment is as following



13.15.1.1 Signal Detection



- Human Activity sensor will turns on according to infrared sensors signal detection.

Signal detection		Possible detected human position area	Human Activity Indicator		
Sensor 1	Sensor 2		Left	Center	Right
1	0	C	■	■	□
0	1	A	□	■	■
1	1	B	■	□	■
		A & C	■	□	■
		B & C	■	□	■
		A & C	■	□	■
		A, B & C	■	□	■
0	0	–	■	■	■

* □ Indicator ON, ■ Indicator OFF

- However, once the Human Activity Indicator is ON, it will maintain ON status for 5 seconds. If there is no signal detection from either infrared sensor, the final display condition will be kept until absence status.

13.15.1.2 Information Log

- The signal from Infrared sensors will be log to human activity database for further analysis.

13.15.1.3 Area of Living Classification Judgment

- The system is able to judge area of living according to human activity database, classified as following:
  - Living Area – In front of television, dining table, etc.
  - Walkway – Human detection is relatively less.
  - Non-Living Area – near windows, wall, etc.

13.15.1.4 Human Position Analysis

- According to Area of Living, frequency of activity and indoor unit intake temperature, the system will analyze the human position away from the indoor unit.

13.15.1.5 Target Area and Position Judgment

- The system will judge the indoor unit installation position according to human activity Non-Living Area:
  - Non-Living Area at Position A – Indoor unit installed at left side of the room.
  - Non-Living Area at Position C – Indoor unit installed at right side of the room.
  - Other than above – Indoor unit installed at center of the room.
- Every 4 hours, the Target Area and Position Judgment will restart.

13.15.1.6 Human Activity Level Judgment

- Human Activity Level is judged based on the frequency of pulses detected by the infrared sensors within a timeframe. The activity level will be categorized into High, Normal, Low level.
- When a pulse is detected within this timeframe, the status of human presence is judged.
- When there is no signal detection continues for 20 minutes or more, the status of human absence is judged.

13.15.1.7 Setting Position Judgment

- According to installation position when there is only one activity area detected, the horizontal airflow direction louver position is fixed according to chart below:

Target area	Horizontal airflow direction louver position		
	Left installation	Center installation	Right installation
A	3	2	2
B	1	1	1
C	5	5	4

- Louver position refer to horizontal airflow direction control.

- When 2 activity areas have been detected, according to Human Activity Level, the timing of horizontal airflow direction louver steps at the targeted activity areas is judged.

Operation mode	Activity level difference	Louver stop time
Cooling	1 level	Higher Activity level ≈ 60 seconds Lower Activity level ≈ 30 seconds
	2 levels	Higher Activity level ≈ 60 seconds Lower Activity level ≈ 8 seconds

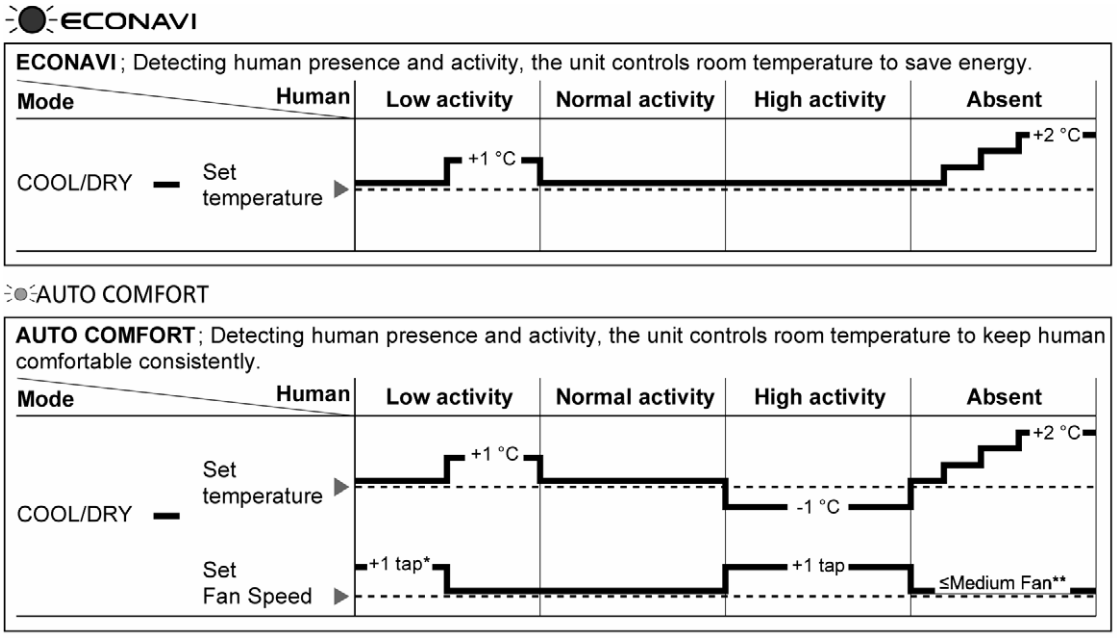
- When 3 activity areas have been detected, according to Human Activity Level the timing of horizontal airflow louver steps at the targeted activity areas is judged.

Operation mode	Activity level	Louver stop time
Cooling	Hi	≈ 45 seconds
	Me	≈ 30 seconds
	Lo	≈ 20 seconds

- When 3 activity areas have same activity level, the horizontal airflow direction louver will swing left and right.

13.15.1.8 Setting Temperature and Fan Speed Shift

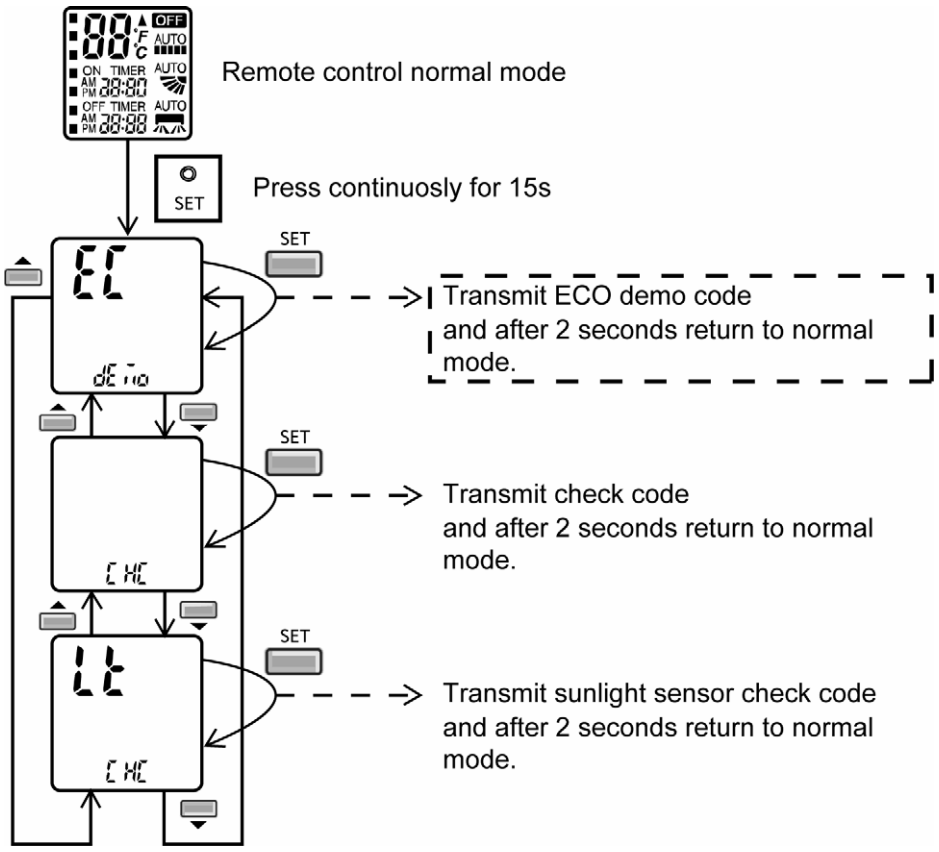
- Cooling Dual Sensor



* During low activity, fan speed 1 tap up for first 15 minutes or until set temperature is reached.
** During human absence, maximum fan speed for COOL/DRY mode is medium fan.

13.15.1.9 ECONAVI Demo Mode

- To enable ECO DEMO mode, during unit is OFF (power standby):



- To disable ECO Demo MODE:
  - Transmit ECO Demo signal again.

- Operation details

Infrared sensor		Human Activity Indicator			Vane position	Fan speed
Sensor 1	Sensor 2	Left	Center	Right		
1	0	■	■	□	5	HI
1	1	■	□	■	Auto Swing	HI
0	1	□	■	■	1	HI
0	0	■	■	■	Auto Swing	LO

- The target area will maintain for 5 seconds before changeover to next detection.
- If no activity detection, the last action will maintain for 30 seconds before changeover to human absence status.

13.15.1.10 Infrared Sensor Abnormality

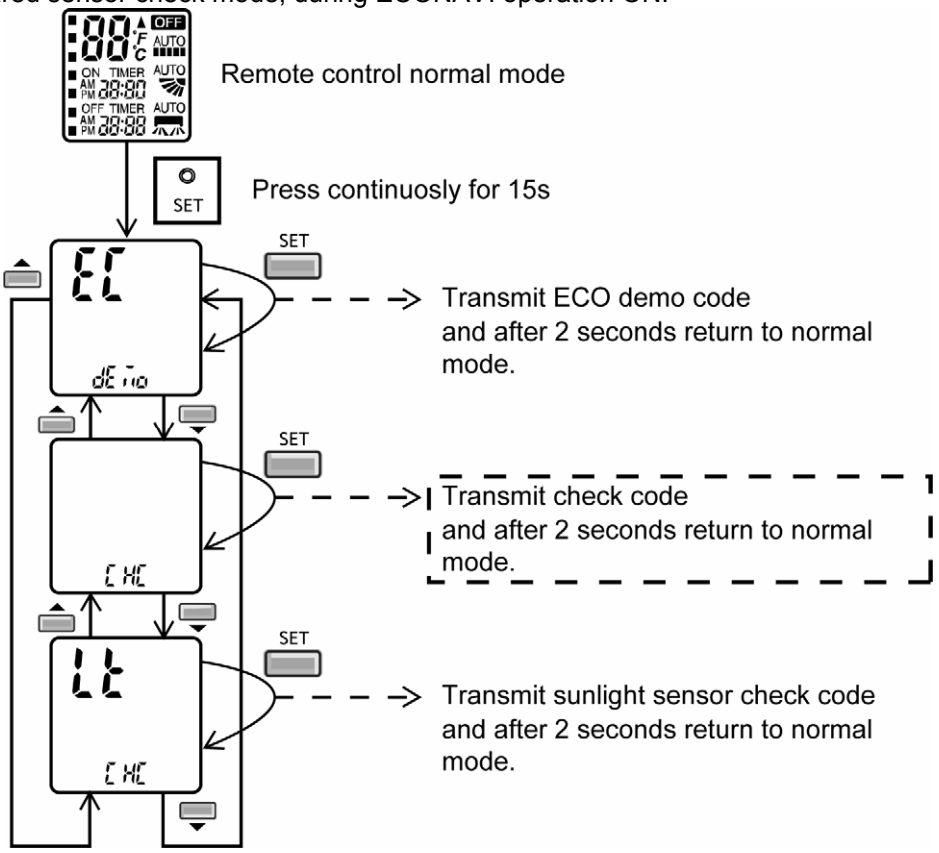
- Abnormality detection:
  - Connector disconnection / Wire cut abnormality
    - Sensor judge Hi level continuously for 25 seconds
  - Circuit abnormality
    - 70 seconds after power ON, if infrared sensor judge Lo level continuously for 25 seconds

- Error Code judgment
  - When abnormality happened, internal counter increase by 1 time.
  - Infrared sensor power OFF, retry after 5 seconds.
  - When the infrared sensor maintains normal condition for 120 seconds, the counter reset or AC reset.
  - When abnormality counter reached 4 times, No TIMER indicator blinking.

- When error code happened, the unit is able to operate without AUTO COMF / ECO NAVI.

13.15.1.11 Infrared Sensor Check Mode

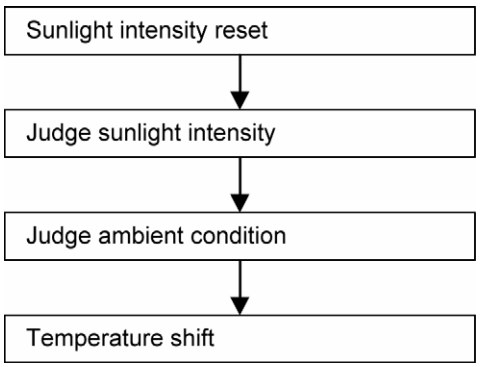
- To enable infrared sensor check mode, during ECONAVI operation ON:



- During ECO NAVI is ON, when CHECK signal received, if either sensors has abnormality, the 4 times abnormality counter is ignored, ECO NAVI Indicator will blink immediately and error code is memorized.
- The unit could operate without ECO NAVI or AUTO COMF.
- The ECO NAVI indicator blinking could be cancelled by pressing ECO NAVI button again.
- If the Infrared sensor has no abnormality, the CHECK process will end and continue with normal operation.

13.15.2 Sunlight Sensor

- During ECONAVI operation, the sunlight sensor detects sunlight intensity coming through windows and differentiates between sunny and cloudy or night to further optimize energy saving by adjusting the temperature.
- Sunlight judgment is as following

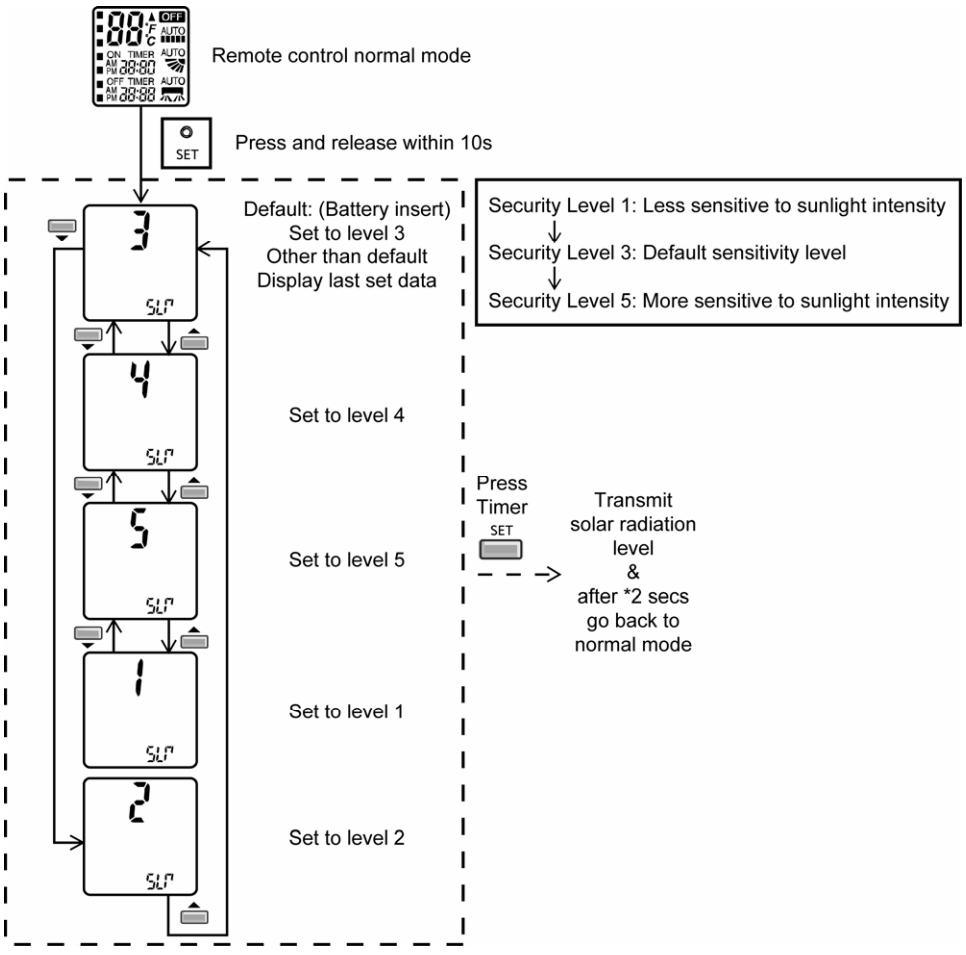


13.15.2.1 Sunlight intensity reset

- The sunlight intensity will to reset to zero (no sunlight condition) when
  - Each time ECONAVI is activated.
  - Setting temperature is changed.
  - Operation mode is changed.

13.15.2.2 Judge sunlight intensity

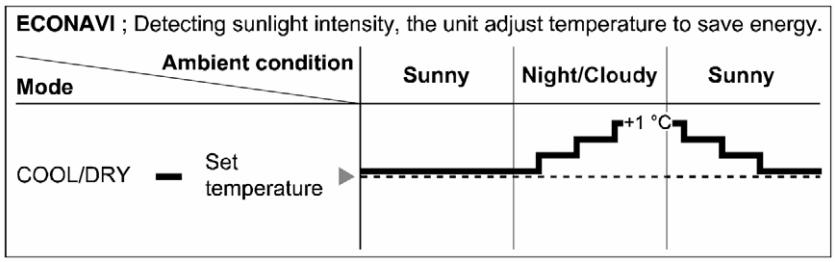
- Based on sunlight sensor output voltage, the sunlight intensity value will be computed and logged to sunlight intensity database.
- The sunlight sensor sensitivity could be adjusted:



13.15.2.3 Judge ambient condition

- According to sunlight intensity over a period of time, the system will analyze the ambient condition is sunny, cloudy or night.

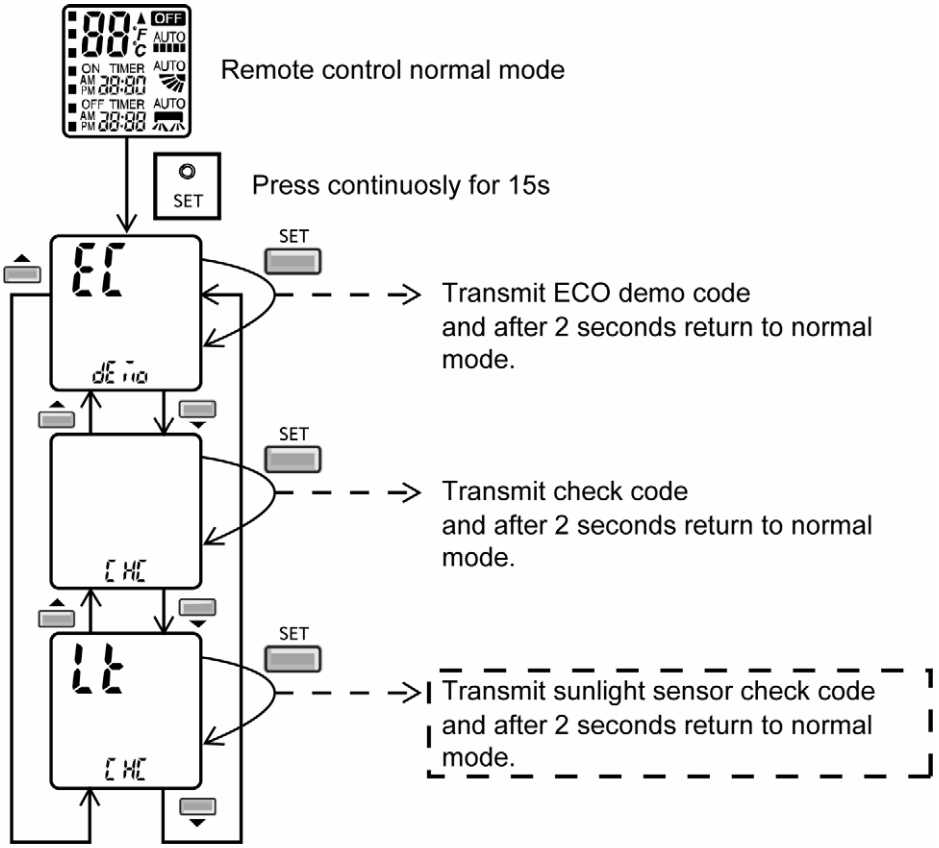
13.15.2.4 Temperature shift



- In a room without window or with thick curtain, the sunlight sensor will judge as cloudy/night.

13.15.2.5 Sunlight Sensor Check Mode

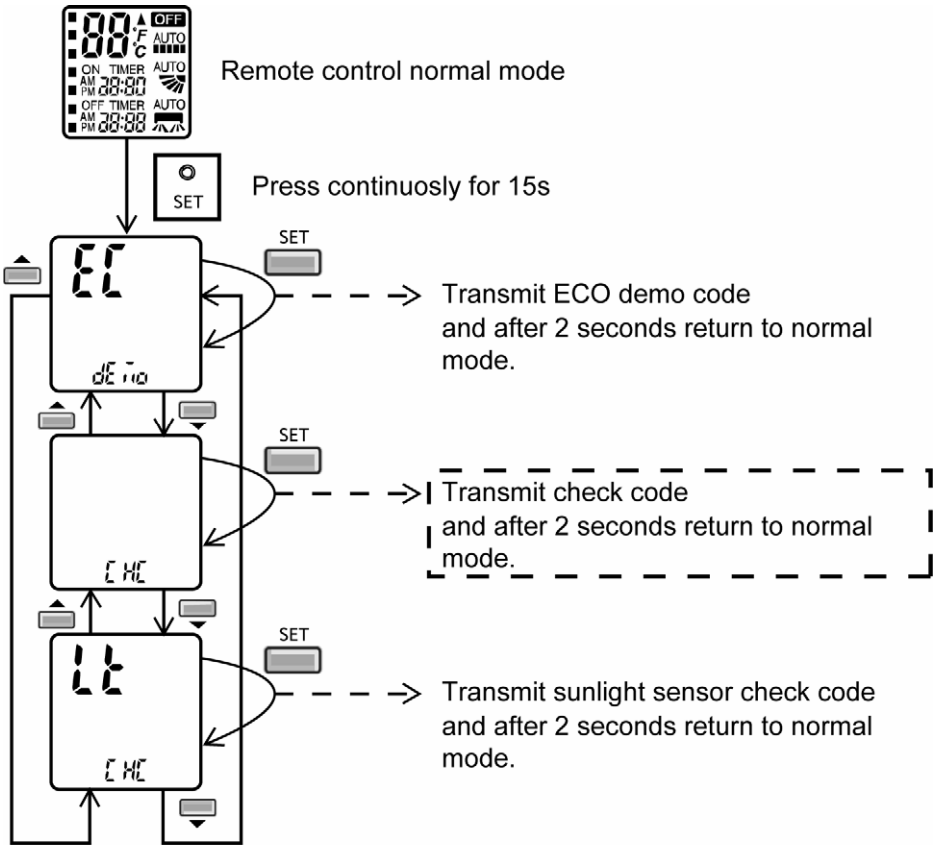
- To enable sunlight sensor check mode, during unit is OFF (power standby):



- Operation details
  - The sunlight sensor check mode will be operated for 5 minutes.
  - During check mode, the ON and OFF timer will be memorized but it operation be ignored.
  - During check mode, if the sunlight sensor check code is retransmitted, the 5 minutes counter will be reset.
  - During check mode, if sunlight sensor detected the sunlight intensity value above minimum level, the ECONAVI indicator turns ON. Else if sunlight sensor detected sunlight intensity value below minimum level, the ECONAVI indicator is OFF.
- To disable sunlight sensor check mode
  - After check mode is ended (5 minutes counter elapsed), press AUTO OFF/ON button at indoor unit.
  - If the sunlight sensor detected sunlight intensity is at abnormal range, the check mode will be ended.

13.15.2.6 Sunlight Sensor Abnormality

- Abnormality detection:
  - When ECONAVI is ON, if the sunlight intensity value below minimum level continuously for 24 hours, the sunlight sensor disconnection error counter will increase by 1 time. If the ECONAVI is OFF, the 24 hours timer will be reset, but the sunlight sensor disconnection error counter will not be reset.
- Error Code judgment
  - When sunlight sensor disconnection error counter reached 15 times, sunlight sensor is judged as abnormal.
  - No ECONAVI indicator blinks. Until ECO check code sent during ECONAVI operation ON, the ECONAVI indicator will blinks.



- When error code happened, the unit is able to operate without sunlight sensor.

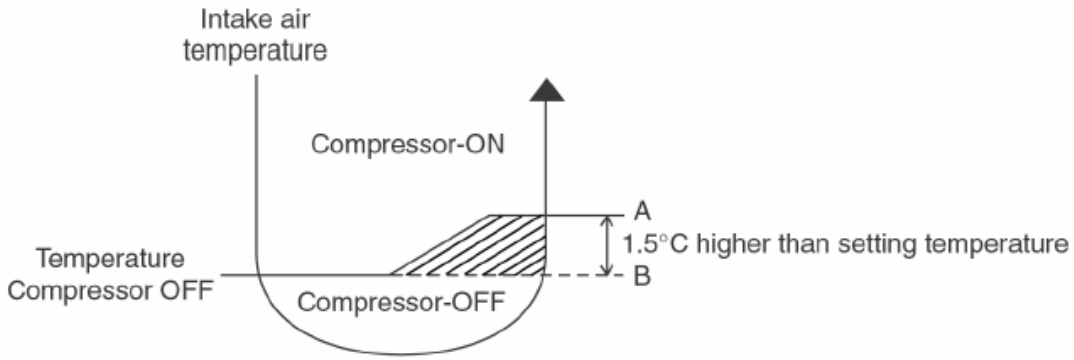
14. Protection Control

14.1 Restart Control (Time Delay Safety Control)

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

14.2 7 Minutes Time Save Control

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



14.3 60 Seconds Forced Operation

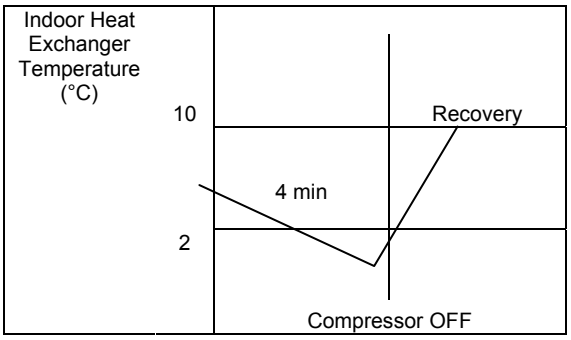
- Once the air conditioner is turned on, the compressor will not stop within 60 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, forced stop by pressing the OFF/ON operation button at the remote control is permitted.
- The reason for the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

14.4 Starting Current Control

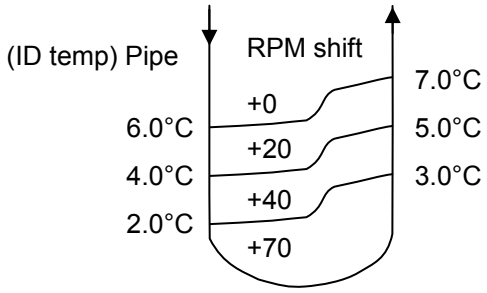
- When the compressor, outdoor fan motor and indoor fan motor are simultaneously started, the indoor fan motor will start to operate at 1.6 seconds later.
- The reason of the difference is to reduce the starting current flow.

14.5 Freeze Prevention Control

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



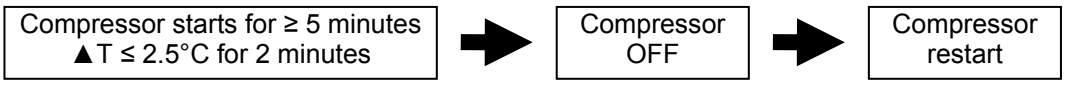
- The current fan speed will change to freeze prevention speed after 70 seconds compressor on. The fan speed will be increased according to the indoor pipe temperature as below figure: (Applicable for C9KKH and C12KKH ONLY)



- Compressor will restart again when the indoor heat exchanger temperature rises to 10°C (Recovery).
- Restart control (Time Delay Safety Control) will be applied in this control if the recovery time is too short.

14.6 Compressor Reverse Rotation Protection Control

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



▲ T = Intake air temperature – Indoor heat exchanger temperature

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

- The unit could be ON by pressing OFF/ON button at remote control but the TIMER LED will continue blinking.

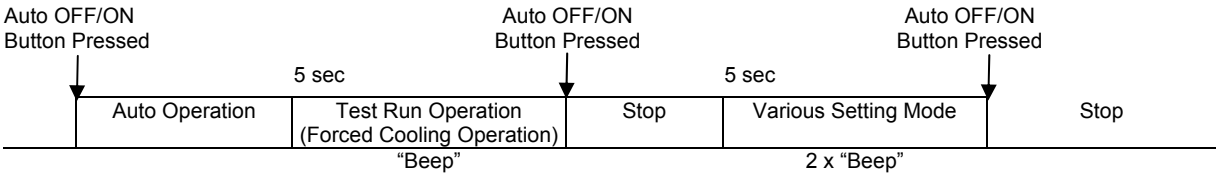
- TIMER LED blinking will be reset if:
  - Indoor intake temperature – Indoor piping temperature > 5°C for one minute or more.
  - Power supply reset.

14.7 Dew Prevention Control

- To prevent dew formation at indoor unit discharge area.
- This control starts if:
  - Cooling mode or Quiet mode is activated.
  - Remote Control setting temperature is less than 25°C.
  - Fan speed is at CLo or QLo.
  - Room temperature is constant (±1°C) for 30 minutes.
  - Compressor is continuously running.
- Fan speed will be adjusted accordingly in this control.
  - Fan sped will be increased slowly if the unit is in quiet mode and Lo fan speed.
- Dew prevention stop condition.
  - Remote control setting temperature is more than 25°C.
  - Fan speed is not at Lo or QLo.
  - Select Powerful operation.

15. Servicing Mode

15.1 Auto OFF/ON Button

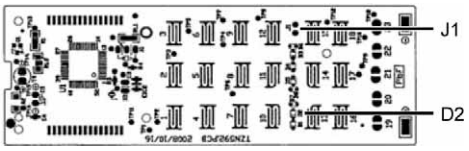


1 AUTO OPERATION MODE
The Auto Operation will be activated immediately once the Auto OFF/ON button is pressed. This operation can be used to operate air conditioner with limited function if remote control is misplaced or malfunction.

2 TEST RUN OPERATION (FOR PUMP DOWN/SERVICING PURPOSE)
The Test Run Operation will be activated if the Auto OFF/ON button is pressed continuously for more than 5 seconds. A "beep" sound will be heard at the fifth seconds, in order to identify the starting of this operation.

3 VARIOUS SETTING MODE
The Various Setting Mode will be activated if (within 20 seconds of Test Run Operation) the Auto OFF/ON button is pressed for more than 5 seconds. 2 "beep" sounds will be heard to identify the starting of this operation.
Under Various Setting Mode, user could perform the following operation:
i. Press Auto OFF/ON button to toggle remote control receiving sound.
- Short "beep": Turn ON remote control receiving sound.
- Long "beep": Turn OFF remote control receiving sound.

After Auto OFF/ON button is pressed, the 20 seconds counter for Remote Control Receiving Sound OFF/ON Mode is restarted.
ii. Remote Control Number Switch.
- There are 4 types of remote control transmission code could be selected and stored in EEPROM of indoor unit. The indoor unit will only operate when received signal with same transmission code from remote control. This could prevent signal interference when there are 2 or more indoor units installed nearby together.
- To change remote control transmission code, short or open jumpers at the remote control printed circuit board.



Remote Control Printed Circuit Board		
Jumper A (J1)	Jumper B (D2)	Remote Control No.
Short	Open	A (Default)
Open	Open	B
Short	* Short with diode	C
Open	* Short with diode	D

* Diode is field supplied. Part number: SOD-323 IN4148WS/LMDL914T1G

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

15.2 Remote Control Button

15.2.1 SET Button

- To check current remote control transmission code and store the transmission code to EEPROM:
  - Press “Set” button continuously for 10 seconds by using pointer
  - Press “Timer Set” button until a “beep” sound is heard as confirmation of transmission code change.

15.2.2 RESET

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

15.2.3 TIMER ▲

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

15.2.4 TIMER ▼

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

16. Troubleshooting Guide

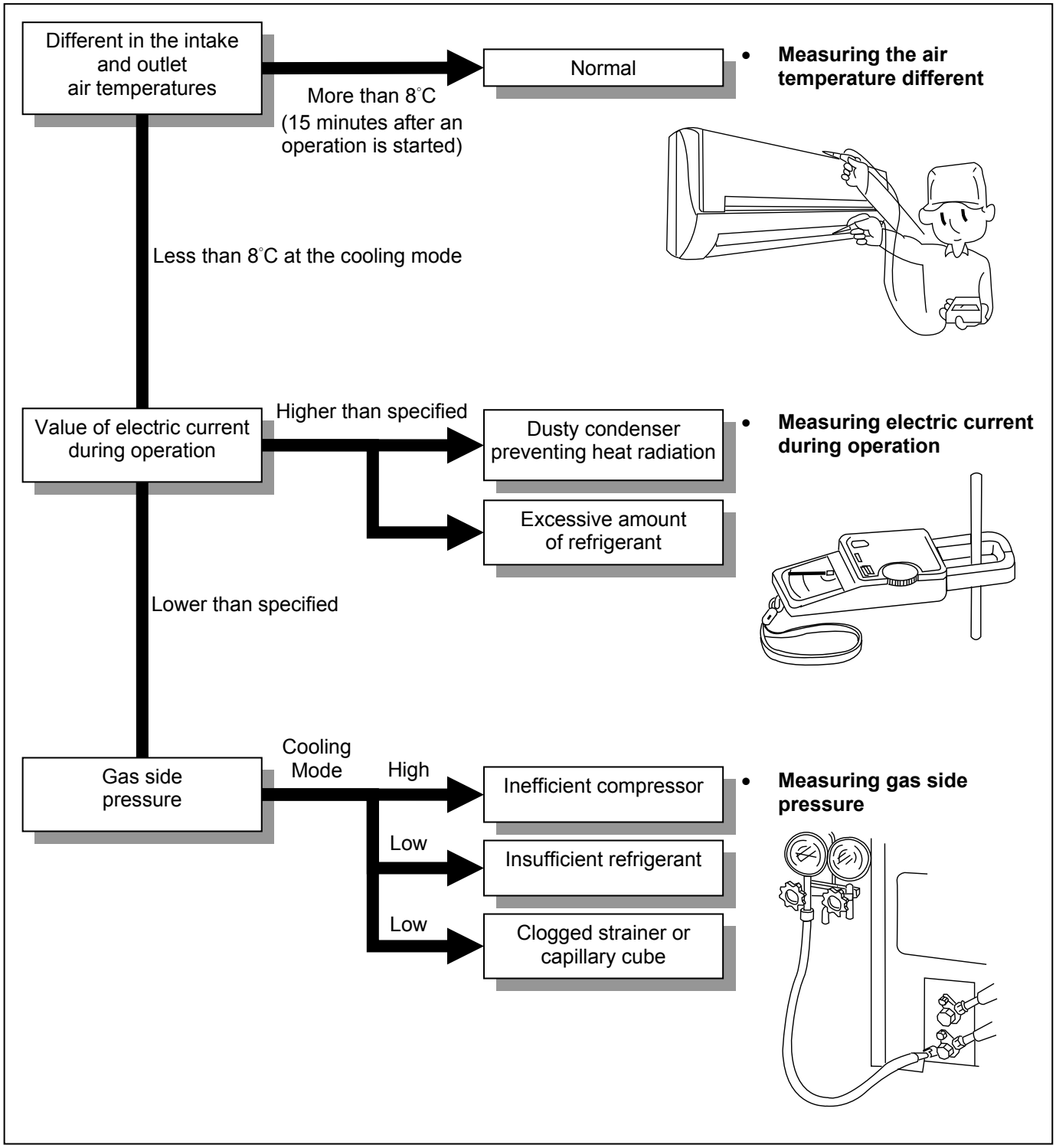
16.1 Refrigeration cycle system

In order to diagnose malfunctions, ensure the air conditioner is free from electrical problems before inspecting the refrigeration cycle. Such problems include insufficient insulation, problem with the power source, malfunction of a compressor and a fan. The normal outlet air temperature and pressure of the refrigeration cycle depends on various conditions, the standard values for them are shown in the table to the right.

Normal Pressure and Outlet Air Temperature (Standard)

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

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



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

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

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

16.1.2 Diagnosis methods of a malfunction of a compressor

Nature of fault	Symptom
Insufficient compressing of a compressor	• Electric current during operation becomes approximately 20% lower than the normal value. • The discharge tube of the compressor becomes abnormally hot (normally 70°C to 90°C). • The different between high pressure and low pressure becomes almost zero.
Locked compressor	• Electric current reaches a high level abnormally, and the value exceeds the limit of an ammeter. In some cases, a breaker turns off. • The compressor has a humming sound.

17. 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.

17.1 CS-C12PKF

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

17.1.1.1 To remove front grille

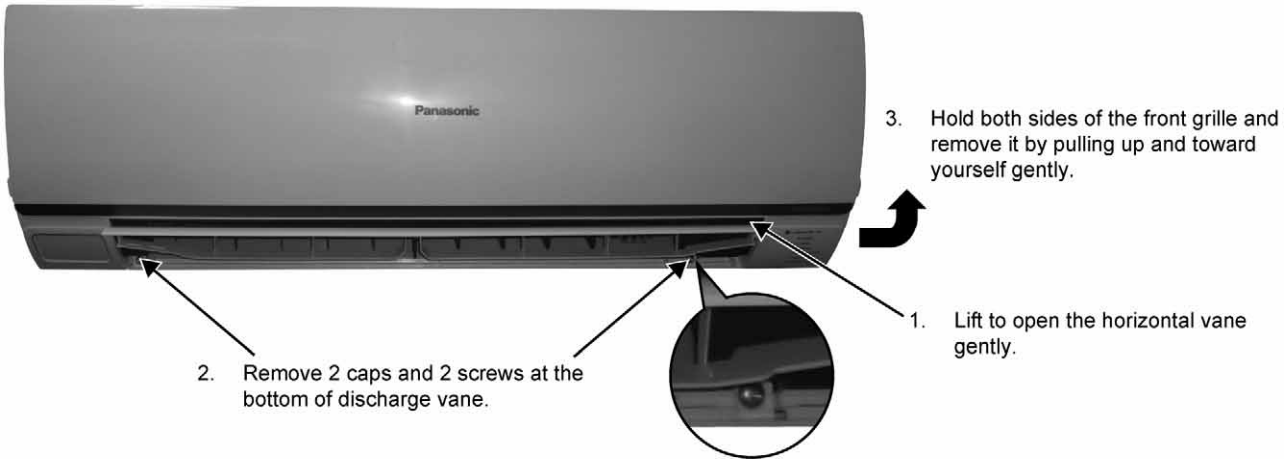


Figure 1

17.1.1.2 To remove electronic controller

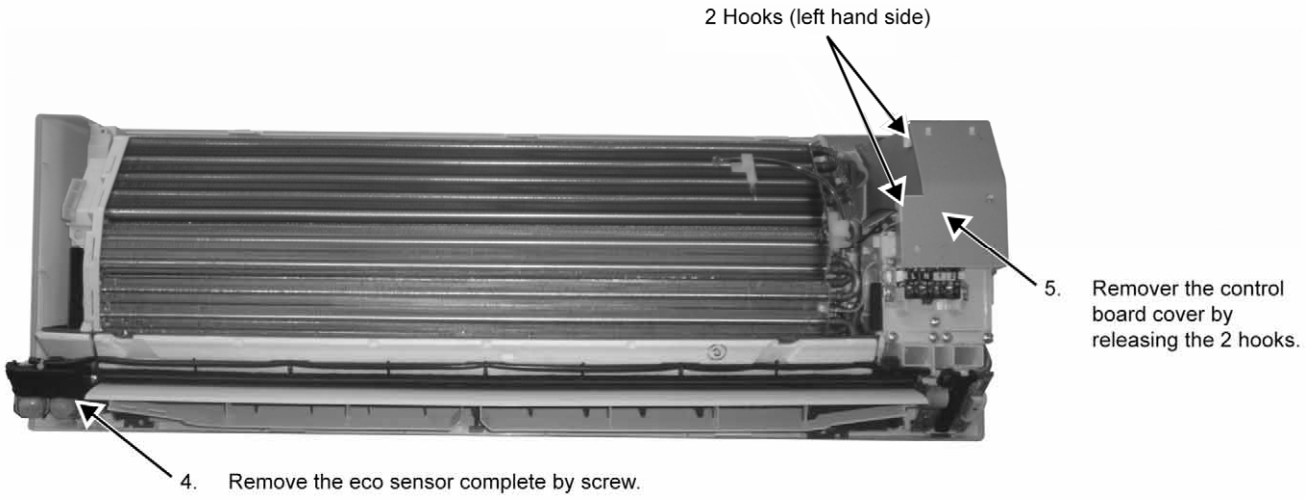


Figure 2

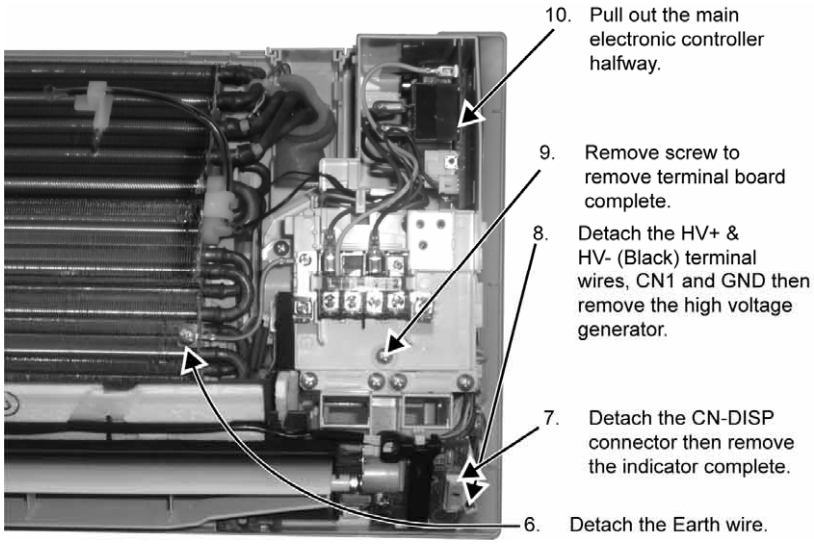


Figure 3

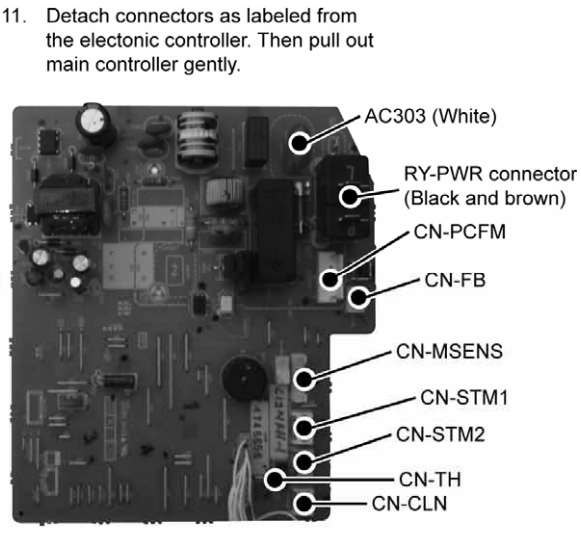


Figure 4

17.1.1.3 To remove discharge grille

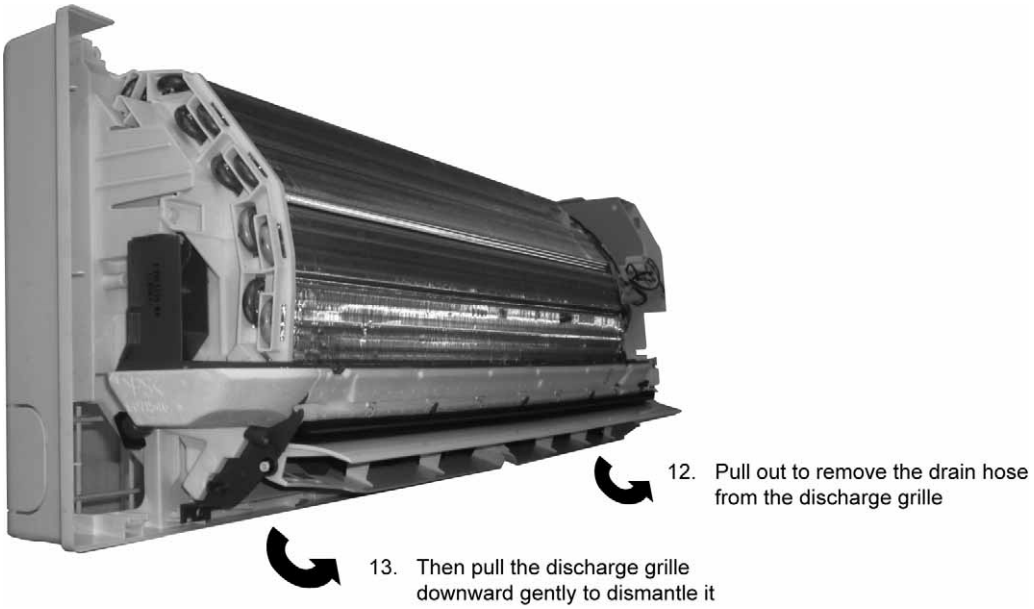
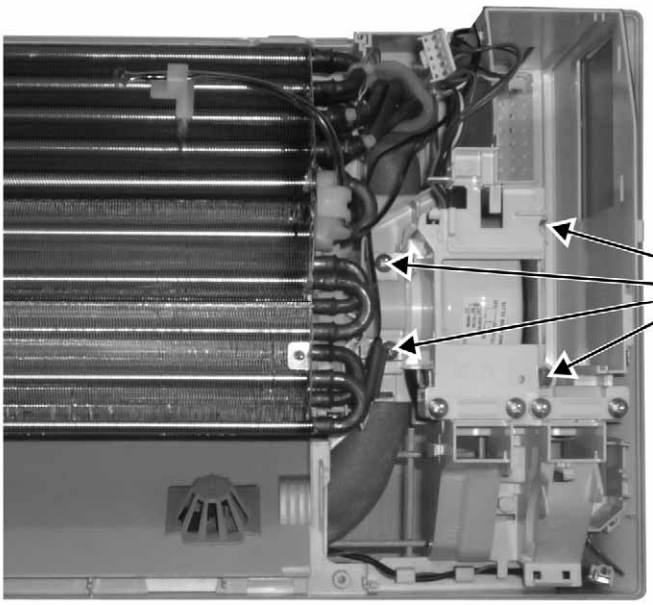


Figure 5

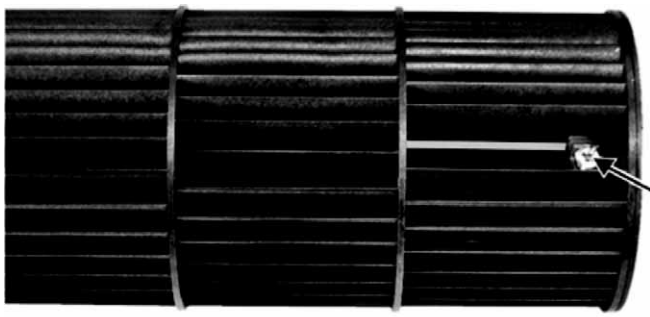
17.1.1.4 To remove control board



14. Remove the 4 screws holding the control board then pull out the control board.

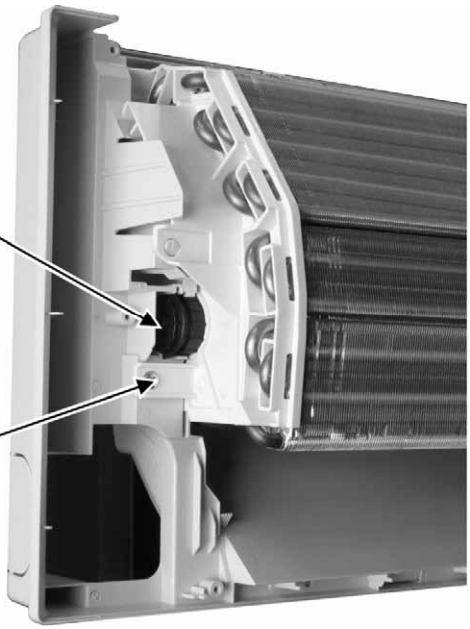
Figure 6

17.1.1.5 To remove cross flow fan and indoor fan motor



15. Remove the screw that holding the cross flow fan and fan motor axis.

Figure 7



17. Remove the bearing by pulling it out gently

16. Remove the screw from the evaporator.

Figure 8

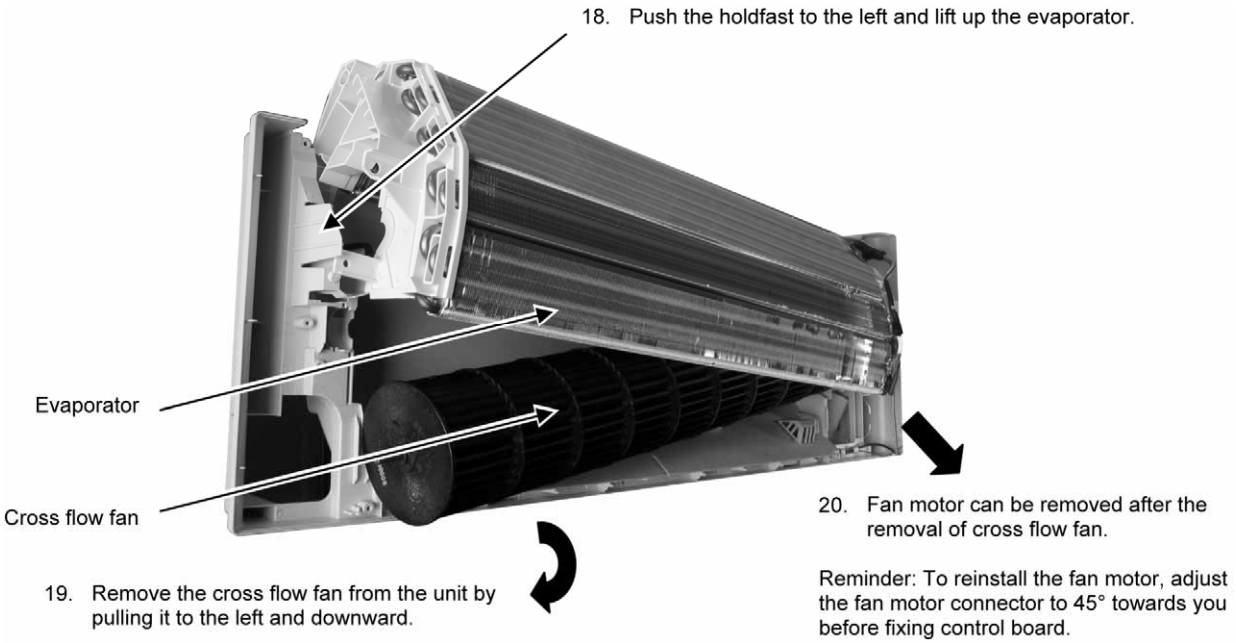


Figure 9

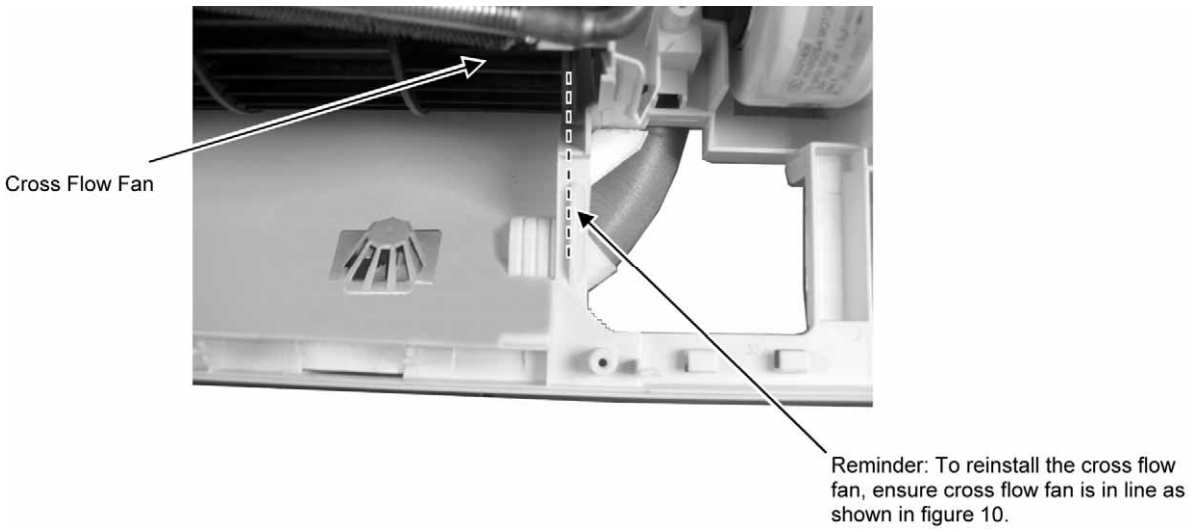


Figure 10

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.

17.2 CS-C18PKF CS-C24PKF CS-C28PKF

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

17.2.1.1 To remove front grille

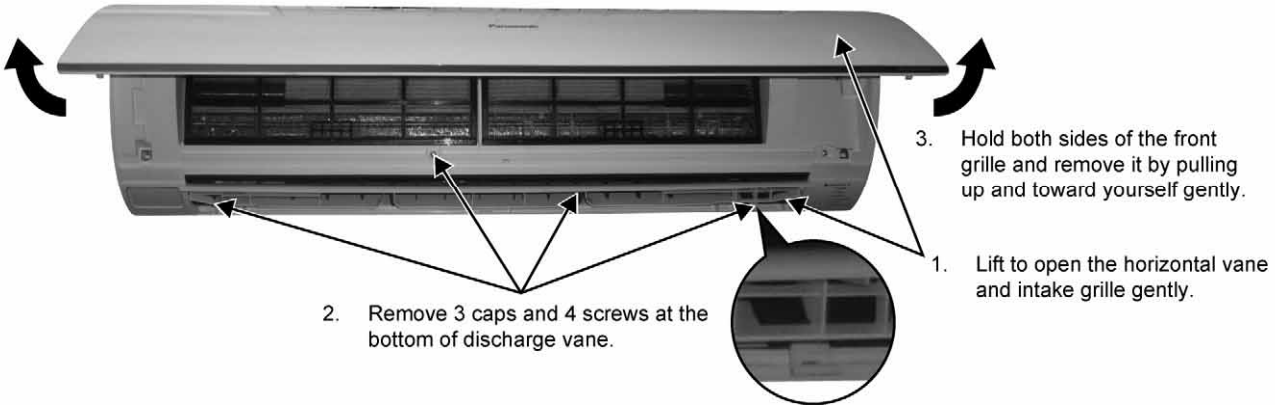


Figure 11

17.2.1.2 To remove horizontal vane

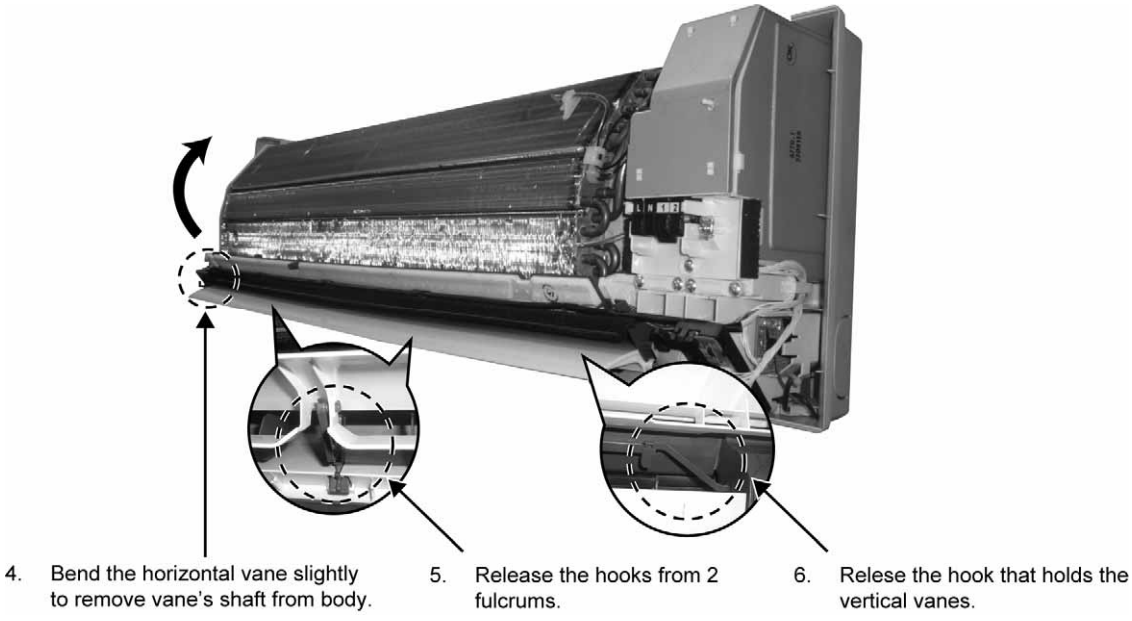


Figure 12

17.2.1.3 To remove electronic controller

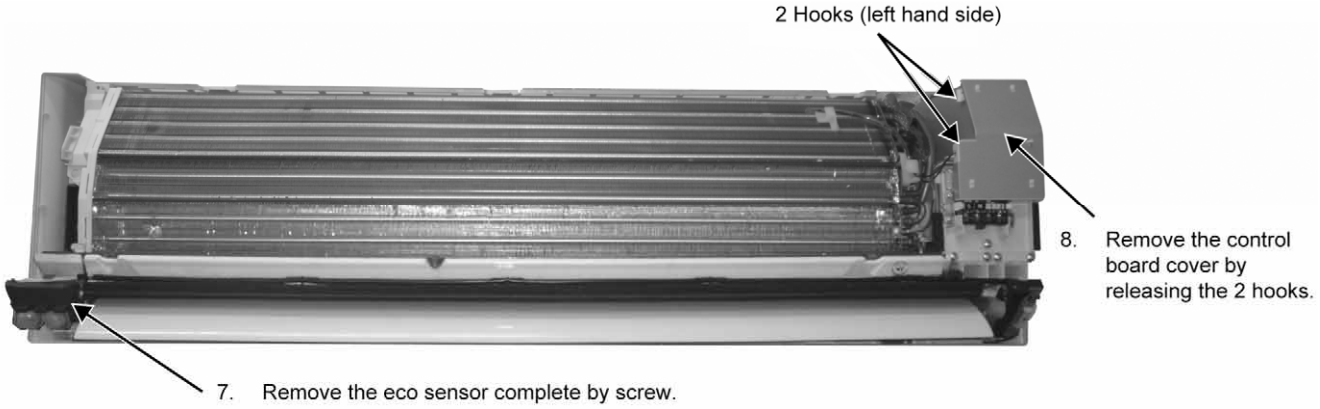


Figure 13

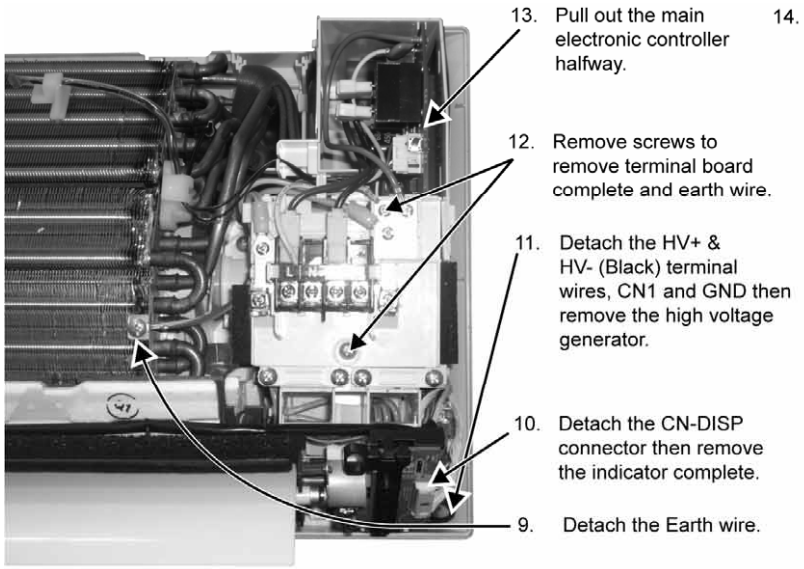


Figure 14

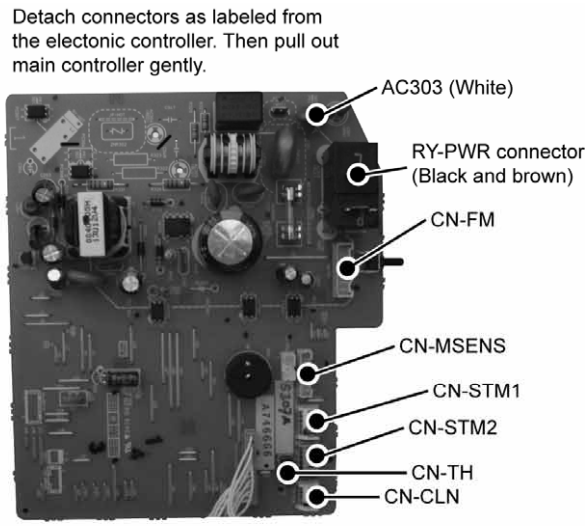


Figure 15

17.2.1.4 To remove discharge grille

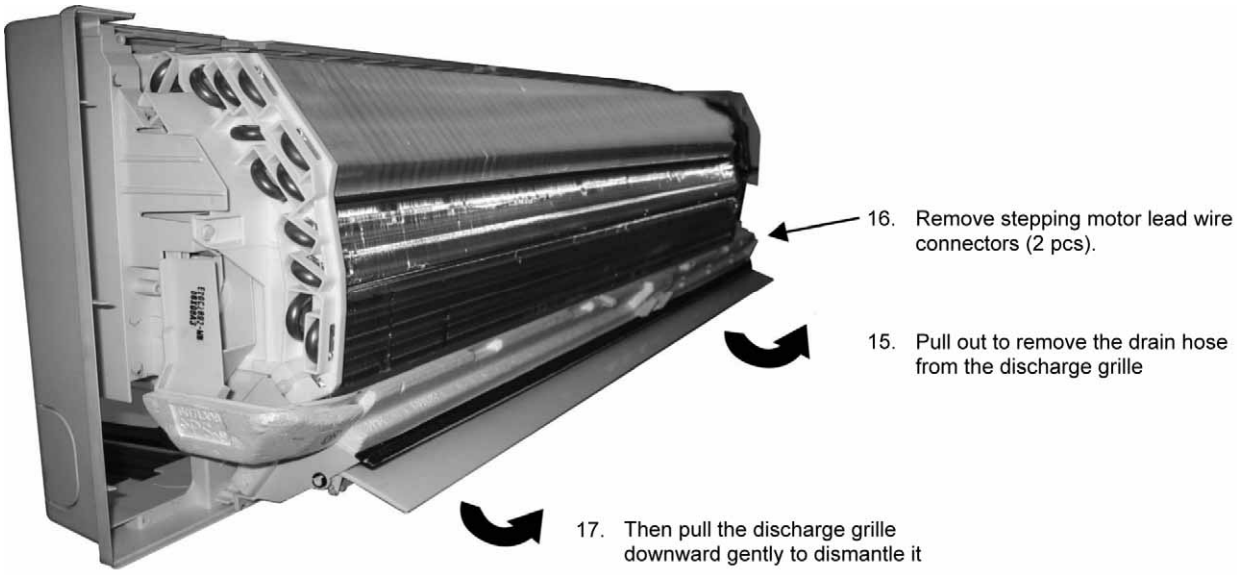


Figure 16

17.2.1.5 To remove control board

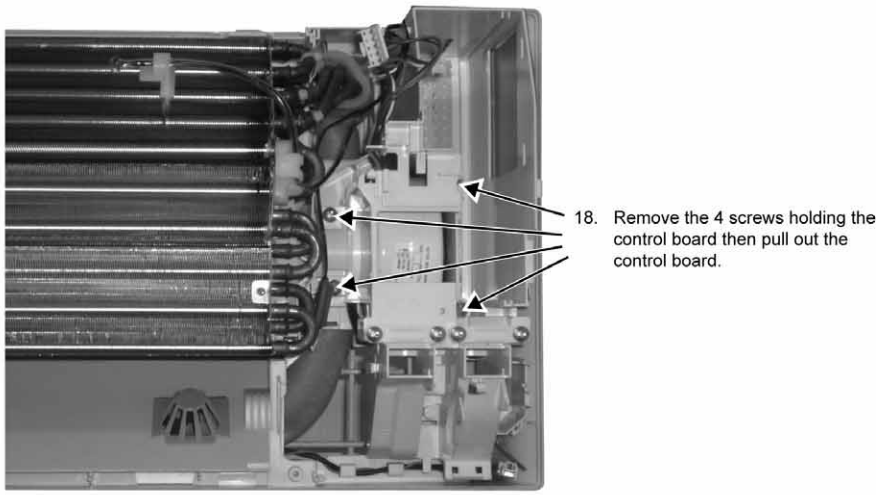


Figure 17

17.2.1.6 To remove cross flow fan and indoor fan motor

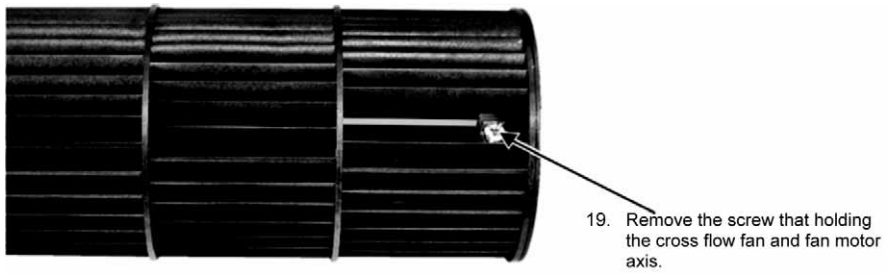


Figure 18

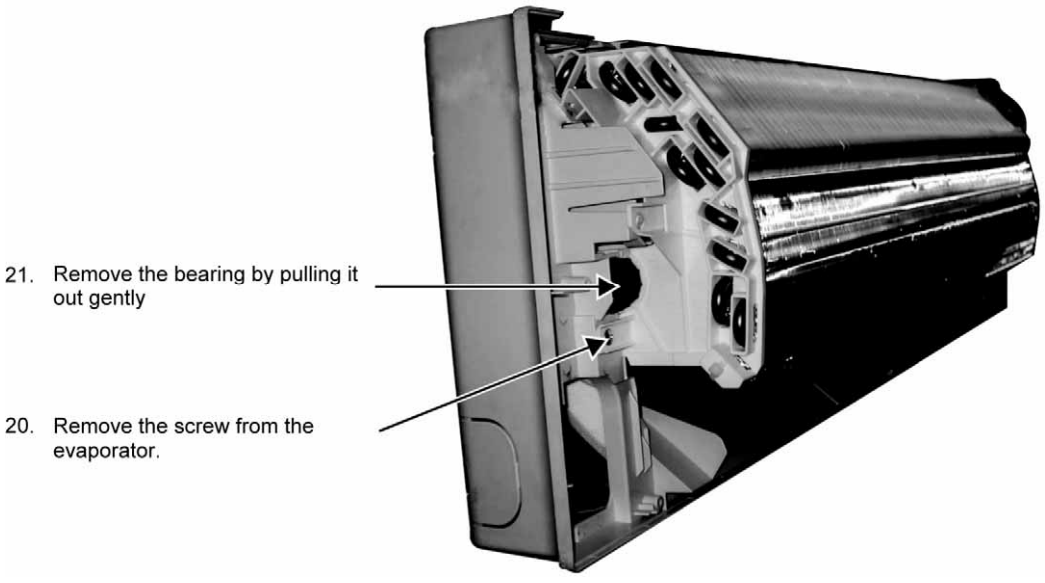
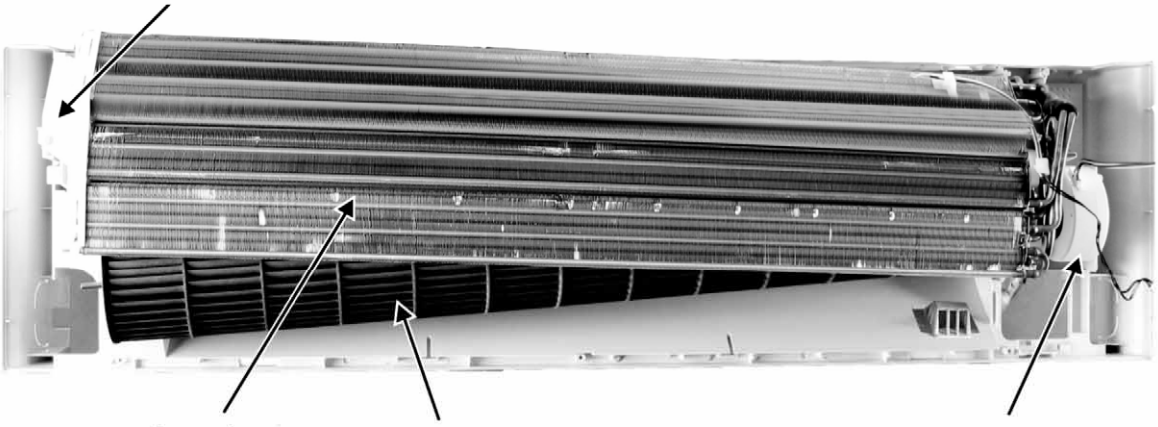


Figure 19

22. Push the holdfast to the left and lift up the evaporator.

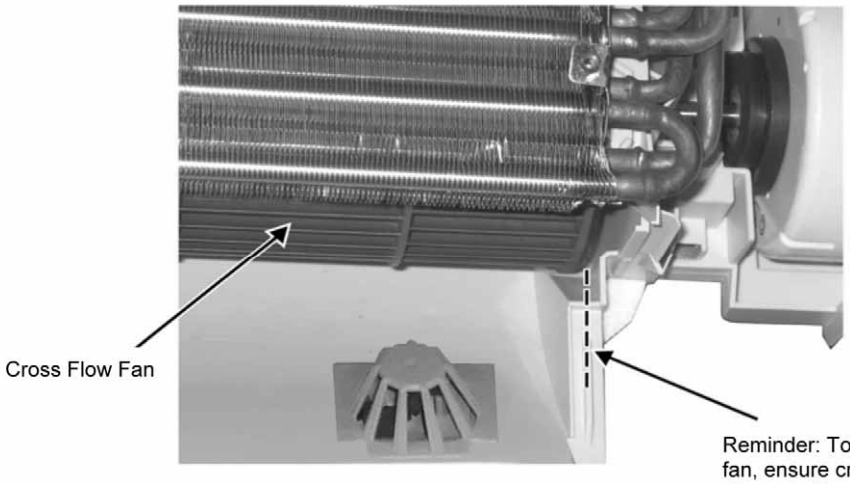


23. Remove the cross flow fan from the unit by pulling it to the left and downward.

24. Fan motor can be removed after the removal of cross flow fan.

Reminder: To reinstall the fan motor, adjust the fan motor connector to 45° towards you before fixing control board.

Figure 20



Reminder: To reinstall the cross flow fan, ensure cross flow fan is in line as shown in figure 21.

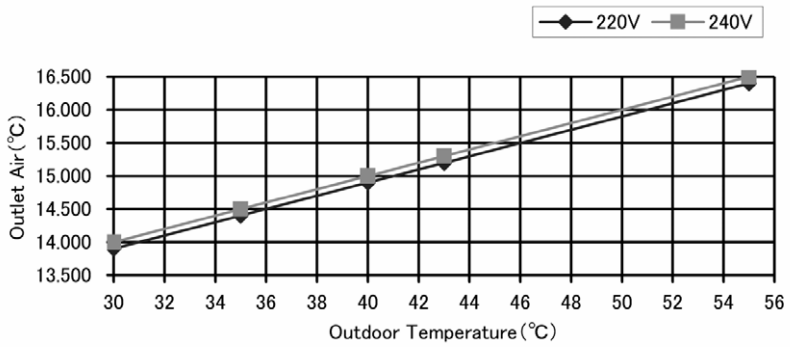
Figure 21

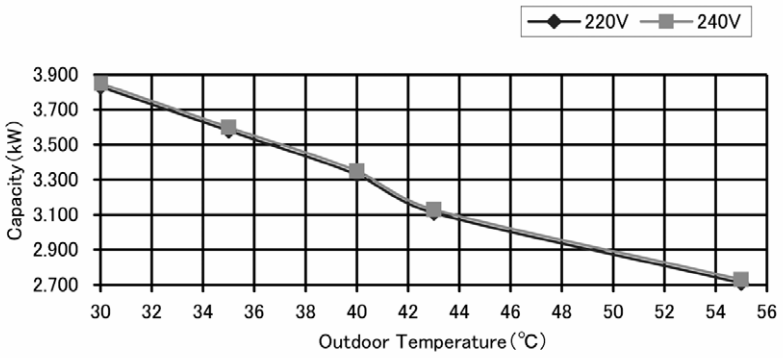
18. Technical Data

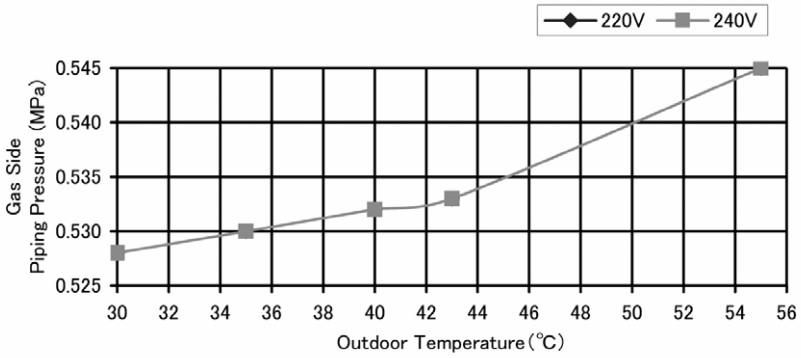
18.1 Operation Characteristics

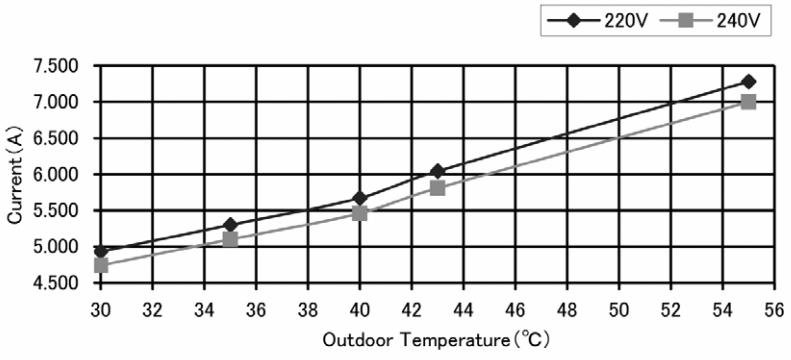
18.1.1 CS-C12PKF CU-C12PKF

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

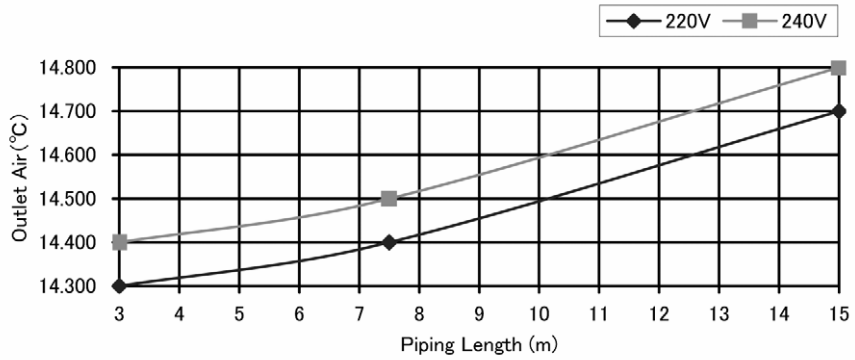


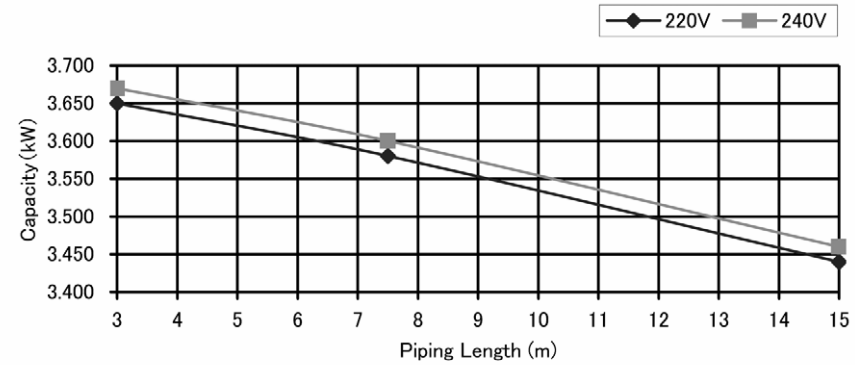


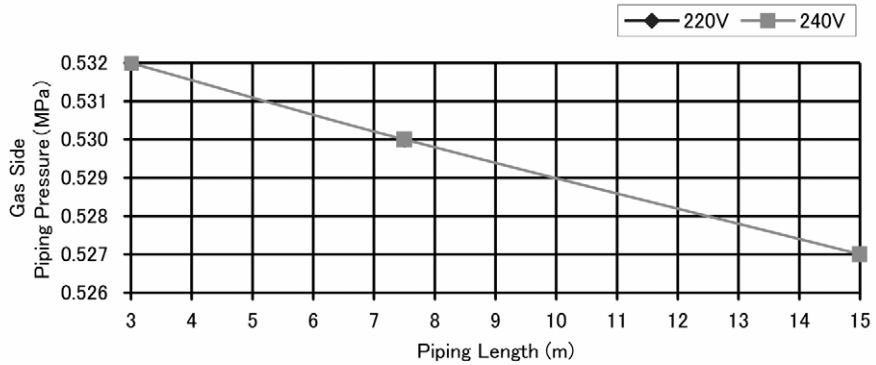


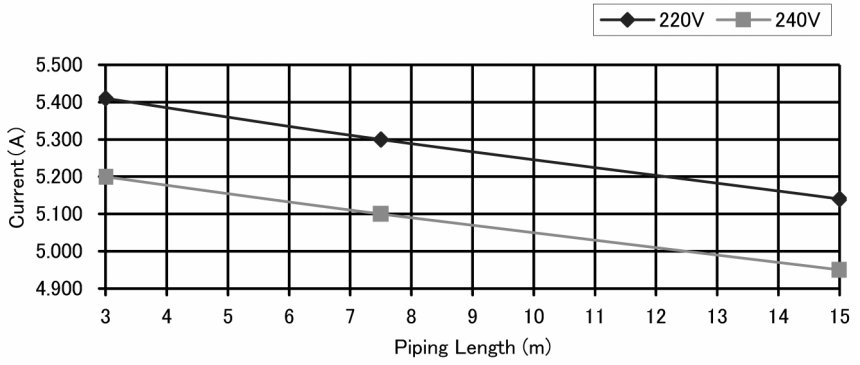


- Piping Length Characteristic Cooling
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed



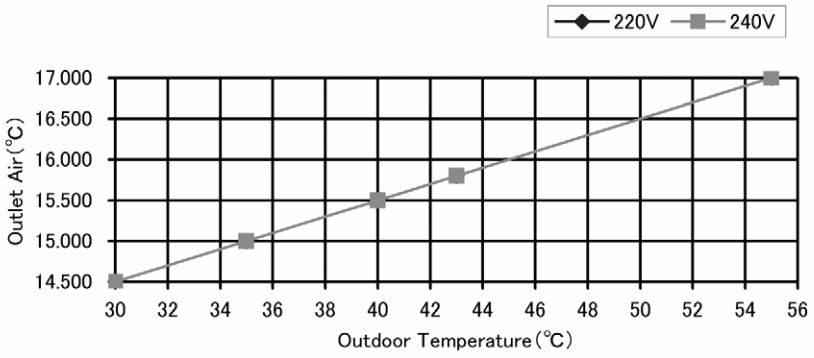


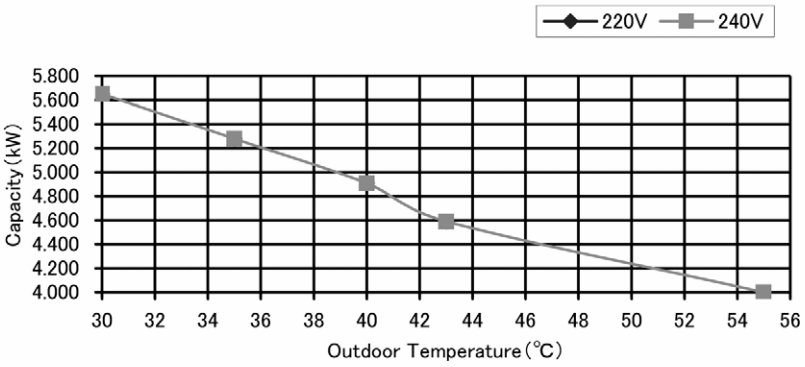


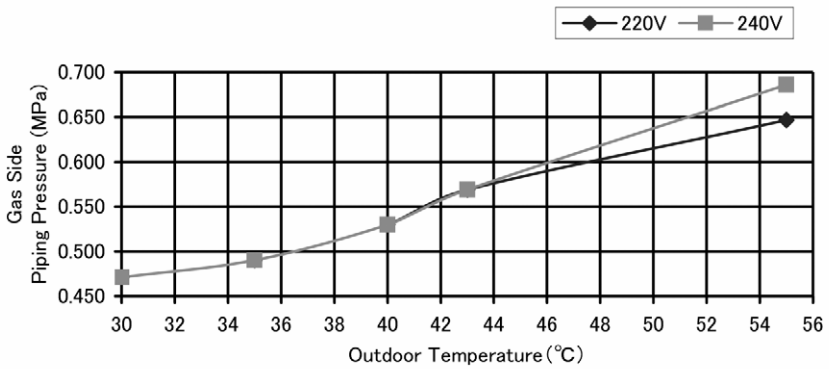


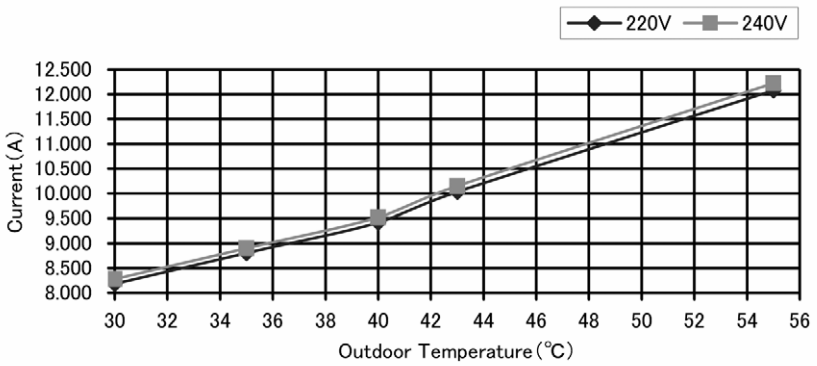
18.1.2 CS-C18PKF CU-C18PKF

- Cooling Characteristic
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 5.0m

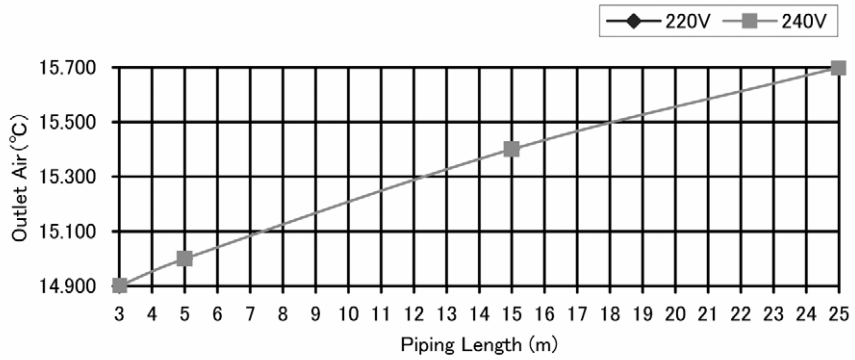


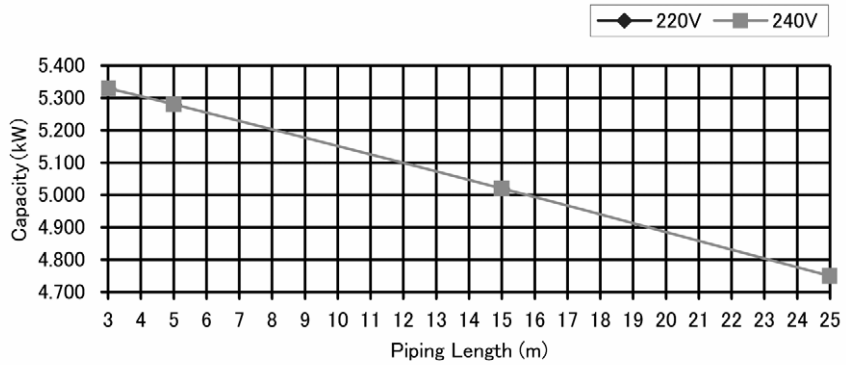


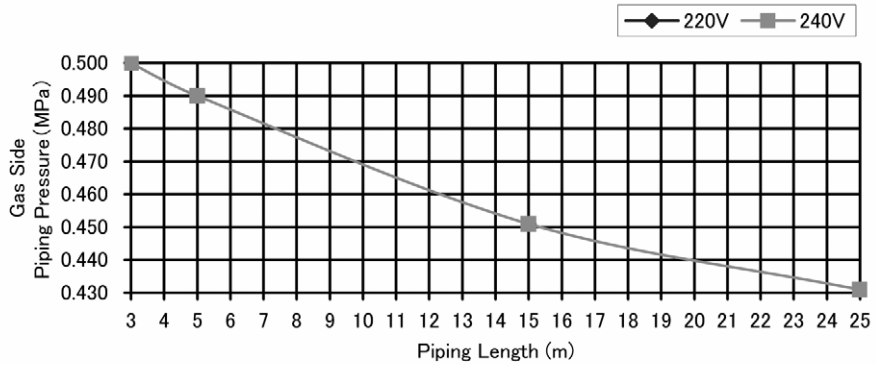


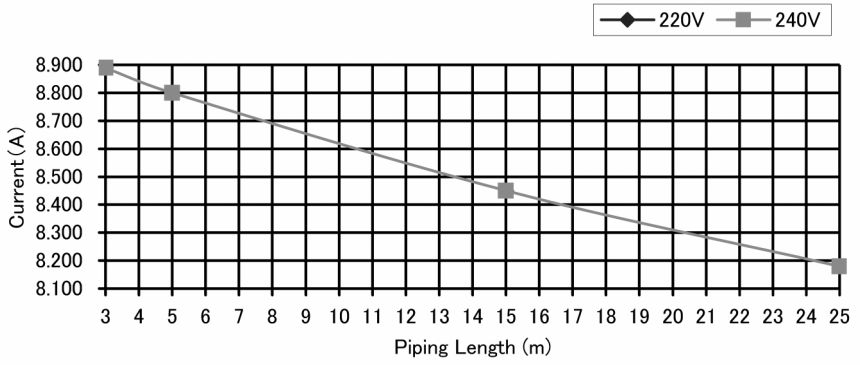


- Piping Length Characteristic Cooling
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed



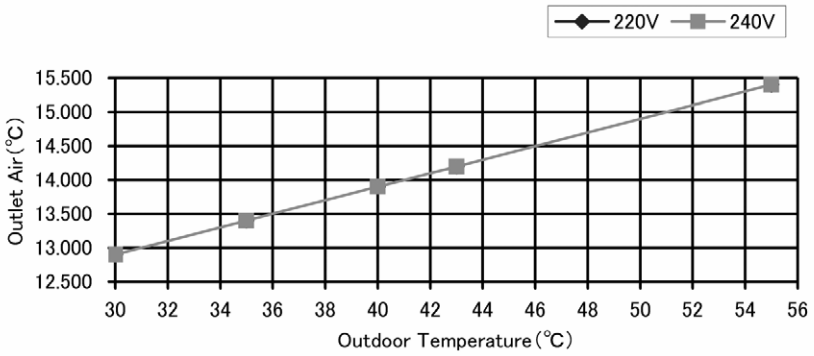


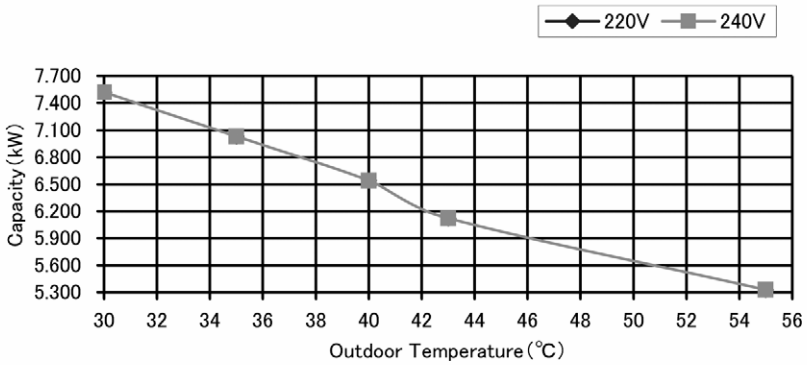


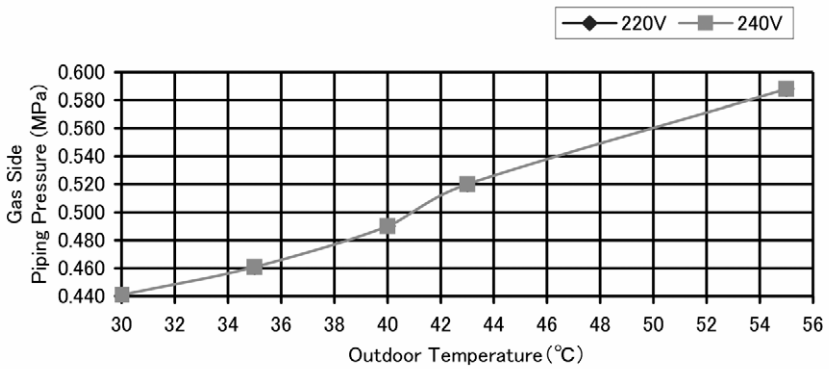


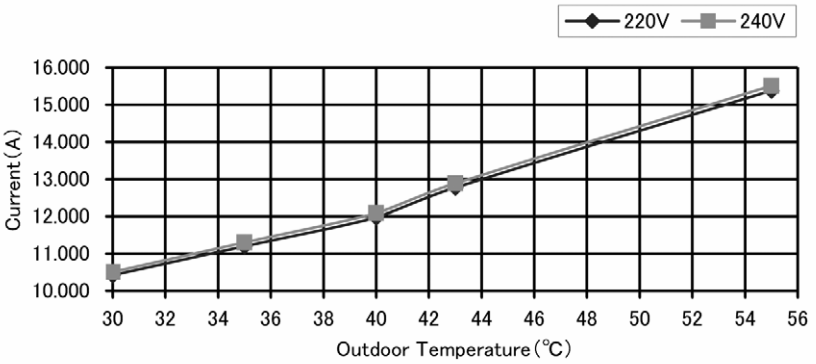
18.1.3 CS-C24PKF CU-C24PKF

- Cooling Characteristic
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 5.0m

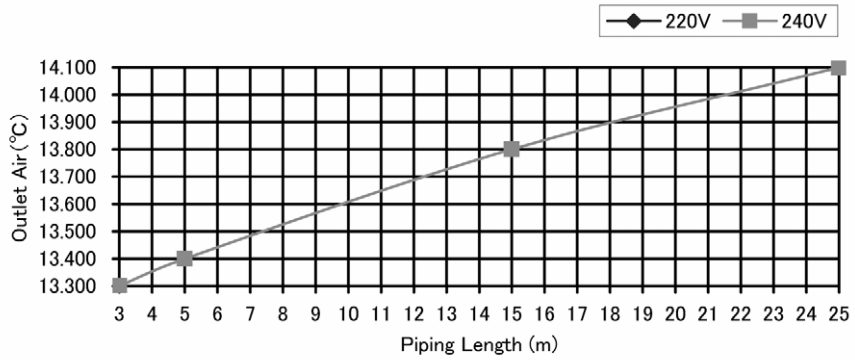


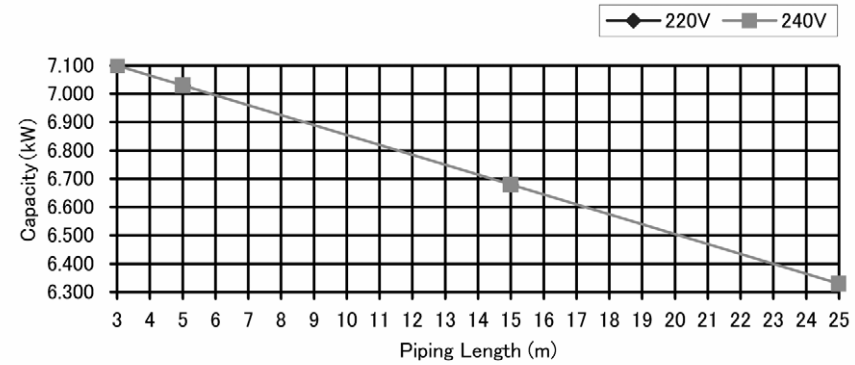


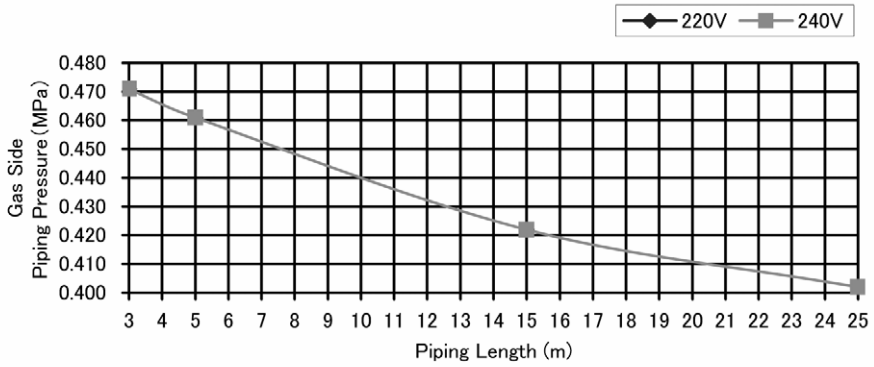


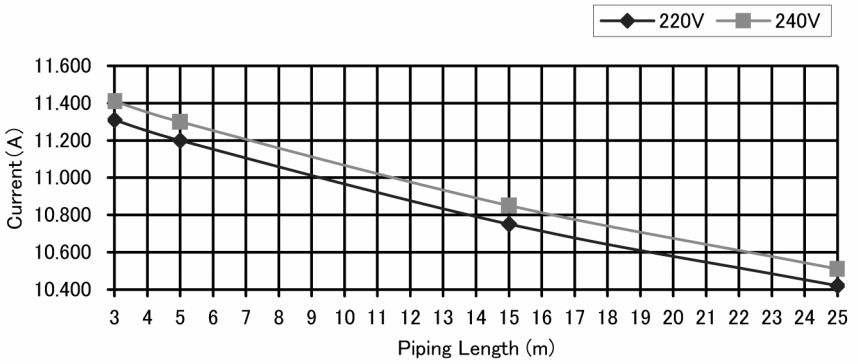


- Piping Length Characteristic Cooling
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed



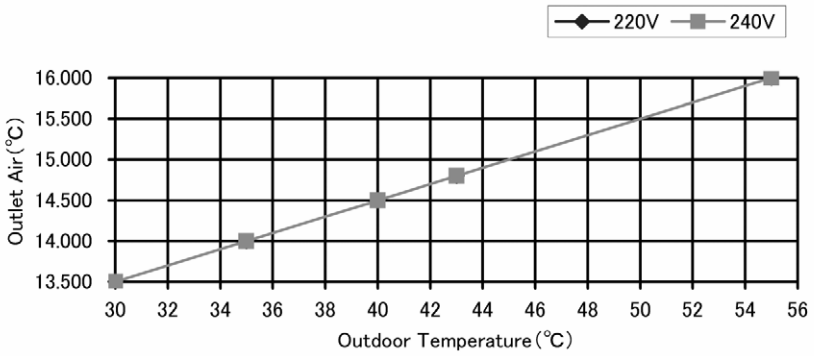


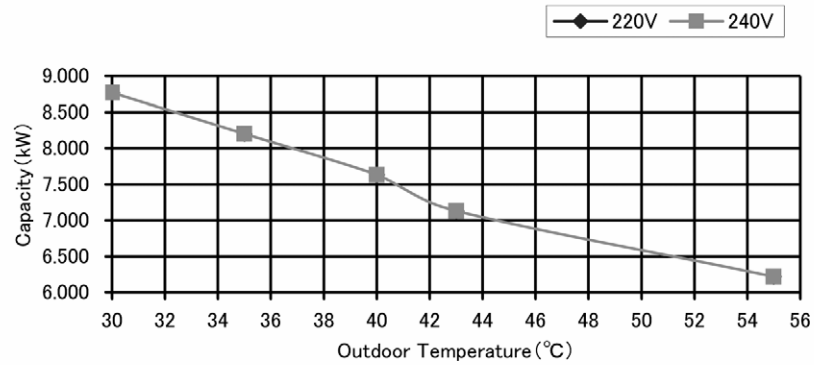


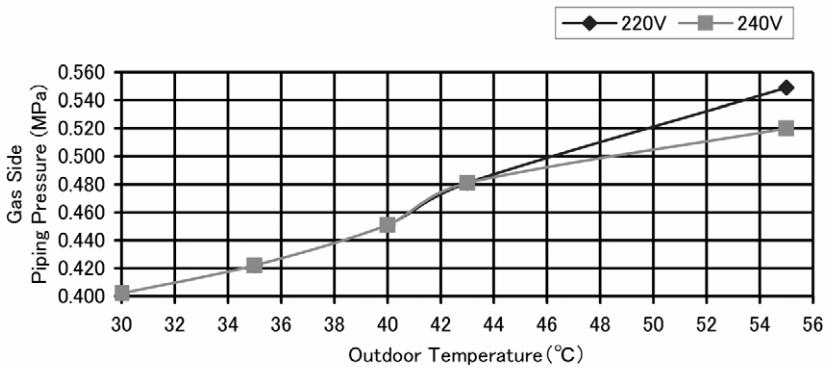


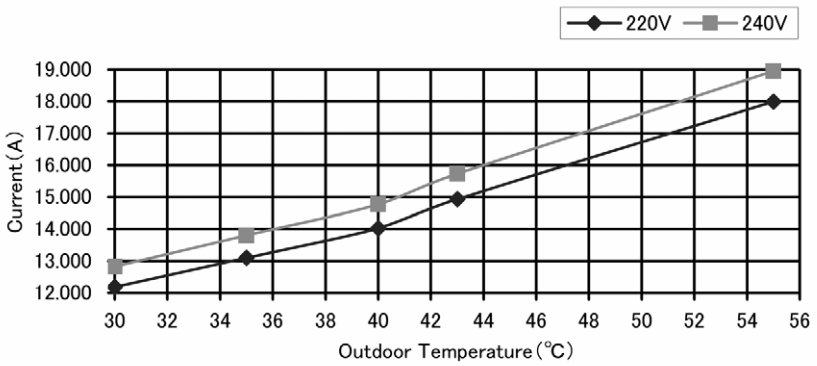
18.1.4 CS-C28PKF CU-C28PKF

- Cooling Characteristic
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 5.0m

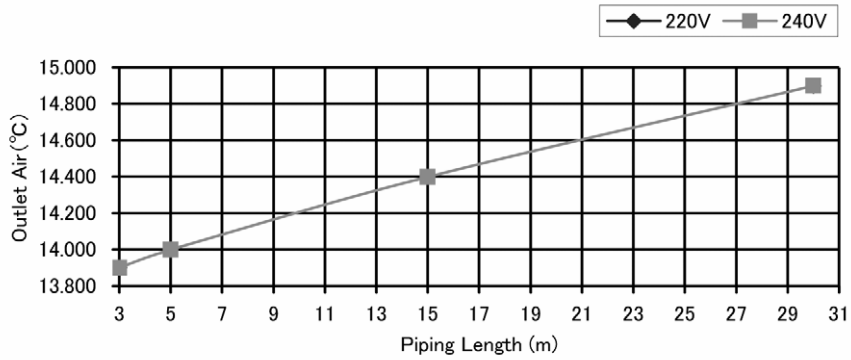


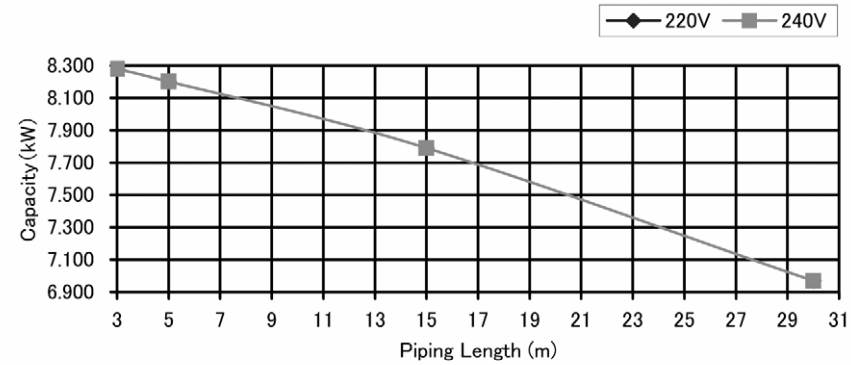


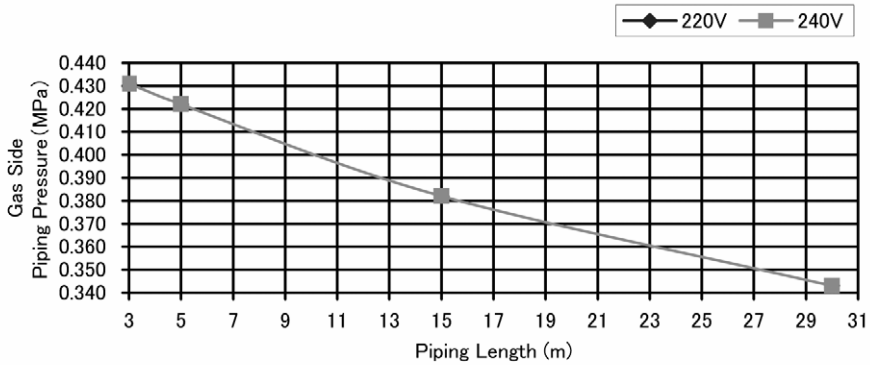


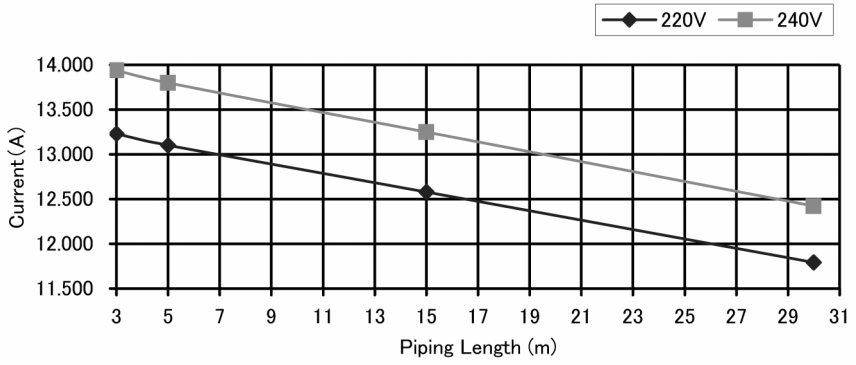


- Piping Length Characteristic Cooling
  - Room temperature: 27°C (DBT), 19°C (WBT)
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed





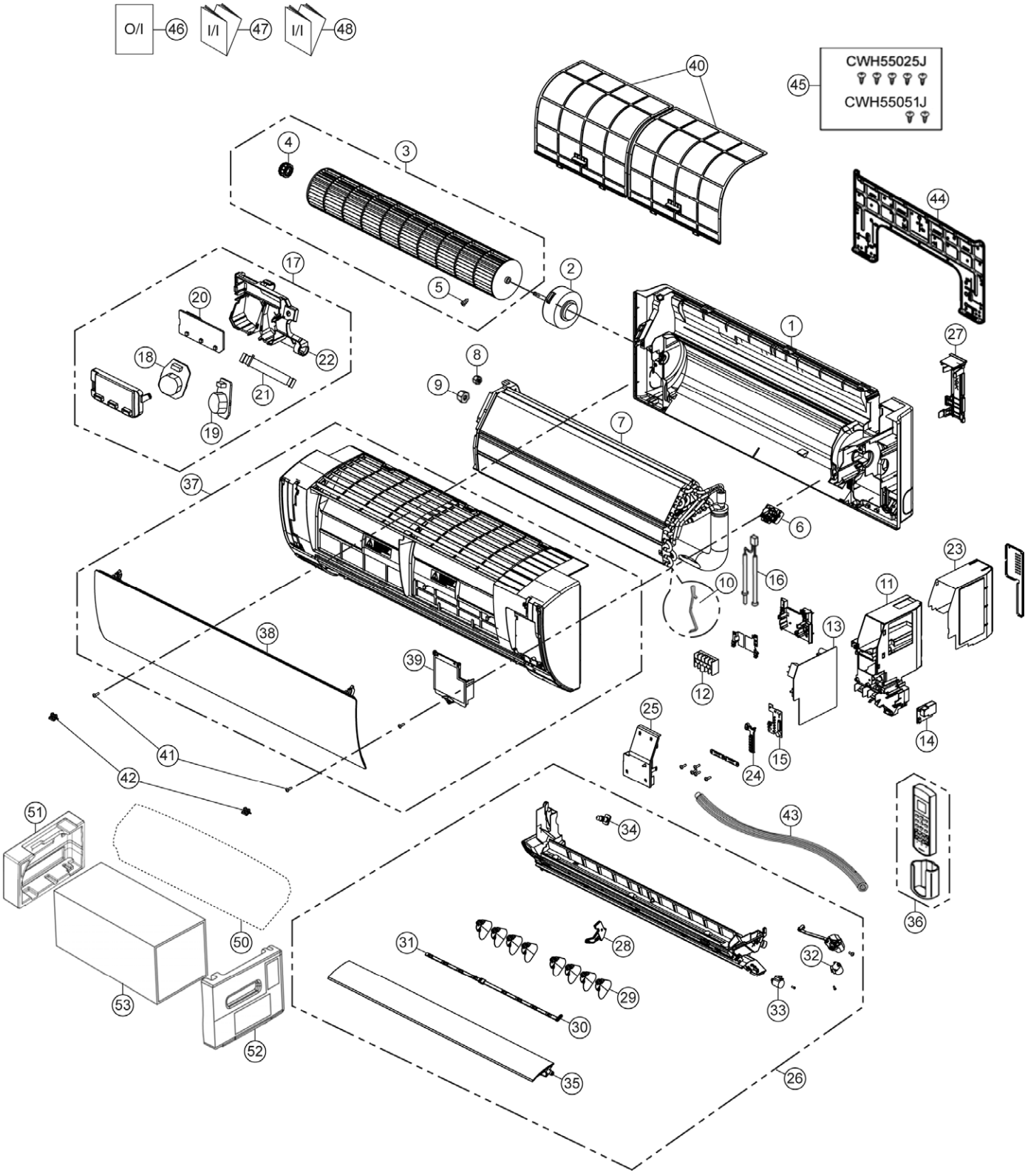




19. Exploded View and Replacement Parts List

19.1 Indoor Unit

19.1.1 CS-C12PKF



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.

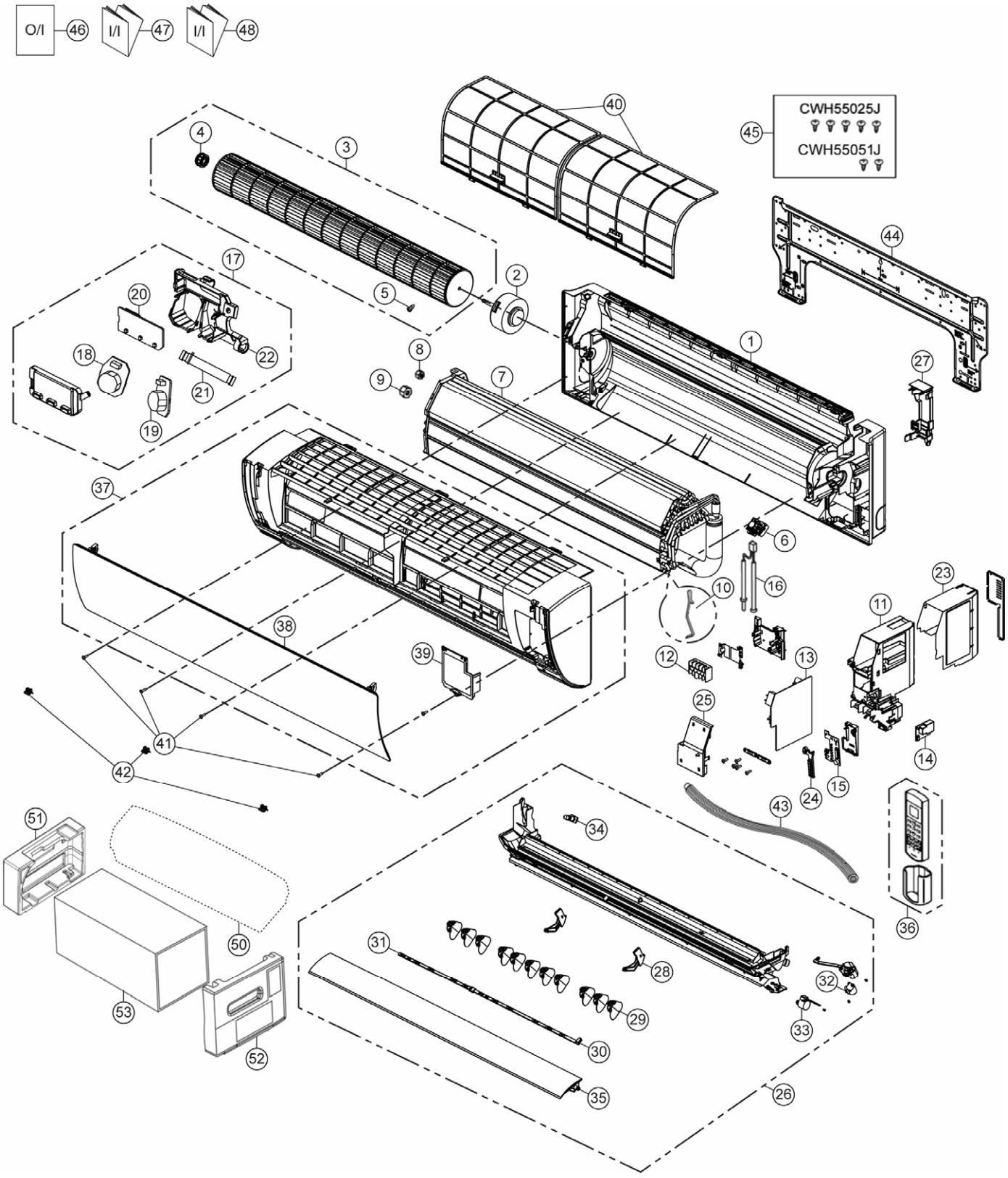
SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-C12PKF	REMARK
	1	CHASSIS COMPLETE	1	CWD50C1653	
⚠	2	FAN MOTOR	1	CWA921447	O
	3	CROSS FLOW FAN COMPLETE	1	CWH02C1149	
	4	BEARING ASS'Y	1	CWH64K007	
	5	SCREW - CROSS FLOW FAN	1	CWH551146	
	6	GENERATOR COMPLETE	1	CWH94C0043	
	7	EVAPORATOR	1	CWB30C4461	
	8	FLARE NUT (LIQUID)	1	CWT251026	
	9	FLARE NUT (GAS)	1	CWT251062	
	10	CLIP FOR SENSOR	1	CWH32142	
	11	CONTROL BOARD CASING	1	CWH102449	
⚠	12	TERMINAL BOARD COMPLETE	1	CWA28C2388	
⚠	13	ELECTRONIC CONTROLLER - MAIN	1	CWA73C7626	O
⚠	14	ELECTRONIC CONTROLLER - HVU	1	N0GE1F000002	O
⚠	15	ELECTRONIC CONTROLLER - INDICATOR	1	CWA746635	O
	16	SENSOR COMPLETE	1	CWA50C2122	
	17	SENSOR COMPLETE (ECO)	1	CWA50C2809	
⚠	18	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA745791	O
⚠	19	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA746206	O
⚠	20	ELECTRONIC CONTROLLER (COMPARATOR)	1	CWA746653	O
	21	LEAD WIRE - PCB ECO	1	CWA67C9785	
	22	CONTROL BOARD CASING FOR PCB ECO	1	CWD933407	
	23	CONTROL BOARD TOP COVER	1	CWH131467	
	24	INDICATOR HOLDER	1	CWD933406	
	25	CONTROL BOARD FRONT COVER CO.	1	CWH13C1247	
	26	DISCHARGE GRILLE COMPLETE	1	CWE20C3235	
	27	BACK COVER CHASSIS	1	CWD933233	
	28	FULCRUM	1	CWH621131	
	29	VERTICAL VANE	8	CWE241374	
	30	CONNECTING BAR	1	CWE261250	
	31	CONNECTING BAR	1	CWE261256	
	32	AIR SWING MOTOR	1	CWA98K1016	O
	33	AIR SWING MOTOR	1	CWA981264	O
	34	CAP - DRAIN TRAY	1	CWH521259	
	35	HORIZONTAL VANE COMPLETE	1	CWE24C1385	
	36	REMOTE CONTROL COMPLETE	1	CWA75C4199	O
	37	FRONT GRILLE COMPLETE	1	CWE11C5077	O
	38	INTAKE GRILLE COMPLETE	1	CWE22C1730	O
	39	GRILLE DOOR COMPLETE	1	CWE14C1090	
	40	E-ION FILTER	2	CWD001279	
	41	SCREW - FRONT GRILLE	2	XTT4+16CFJ	
	42	CAP - FRONT GRILLE	2	CWH521227	
	43	DRAIN HOSE	1	CWH851173	
	44	INSTALLATION PLATE	1	CWH361134	
	45	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	
	46	OPERATING INSTRUCTION	1	CWF568951	
	47	INSTALLATION INSTRUCTION	1	CWF615802	
	48	INSTALLATION INSTRUCTION	1	CWF615803	
	50	BAG	1	CWG861497	
	51	SHOCK ABSORBER	1	CWG713386	

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-C12PKF	REMARK
	52	SHOCK ABSORBER	1	CWG713387	
	53	C.C.CASE	1	CWG569032	

(Note)

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

19.1.2 CS-C18PKF CS-C24PKF CS-C28PKF



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.

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-C18PKF	CS-C24PKF	CS-C28PKF	REMARK
	1	CHASSIS COMPLETE	1	CWD50C1654	←	←	
⚠	2	FAN MOTOR	1	ARW7671AC	ARW7627AC	←	O
	3	CROSS FLOW FAN COMPLETE	1	CWH02C1150	←	←	
	4	BEARING ASS'Y	1	CWH64K007	←	←	
	5	SCREW - CROSS FLOW FAN	1	CWH551146	←	←	
	6	GENERATOR COMPLETE	1	CWH94C0043	←	←	
	7	EVAPORATOR	1	CWB30C4462	CWB30C4464	CWB30C4465	
	8	FLARE NUT (LIQUID)	1	CWT251026	←	←	
	9	FLARE NUT (GAS)	1	CWT251062	CWT251036	←	
	10	CLIP FOR SENSOR	1	CWH32142	←	←	
	11	CONTROL BOARD CASING	1	CWH102449	←	←	
⚠	12	TERMINAL BOARD COMPLETE	1	CWA28C2361	CWA28C2362	CWA28C2357	
⚠	13	ELECTRONIC CONTROLLER - MAIN	1	CWA73C7627	CWA73C7628	CWA73C7633	O
⚠	14	ELECTRONIC CONTROLLER - HVU	1	N0GE1F000002	←	←	O
⚠	15	ELECTRONIC CONTROLLER - INDICATOR	1	CWA746635	←	←	O
	16	SENSOR COMPLETE	1	CWA50C2122	CWA50C2782	←	
	17	SENSOR COMPLETE (ECO)	1	CWA50C2826	←	←	
⚠	18	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA745791	←	←	O
⚠	19	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA746206	←	←	O
⚠	20	ELECTRONIC CONTROLLER (COMPARATOR)	1	CWA746653	←	←	O
	21	LEAD WIRE - PCB ECO	1	CWA67C9934	←	←	
	22	CONTROL BOARD CASING FOR PCB ECO	1	CWD933407A	←	←	
	23	CONTROL BOARD TOP COVER	1	CWH131467	←	←	
	24	INDICATOR HOLDER	1	CWD933406	←	←	
	25	CONTROL BOARD FRONT COVER CO.	1	CWH13C1247	←	←	
	26	DISCHARGE GRILLE COMPLETE	1	CWE20C3242	←	←	
	27	BACK COVER CHASSIS	1	CWD933031	←	←	
	28	FULCRUM	2	CWH621138	←	←	
	29	VERTICAL VANE	11	CWE241374	←	←	
	30	CONNECTING BAR	1	CWE261257	←	←	
	31	CONNECTING BAR	1	CWE261258	←	←	
	32	AIR SWING MOTOR	1	CWA98K1018	←	←	O
	33	AIR SWING MOTOR	1	CWA981241	←	←	O
	34	CAP - DRAIN TRAY	1	CWH521259	←	←	
	35	HORIZONTAL VANE COMPLETE	1	CWE24C1392	←	←	
	36	REMOTE CONTROL COMPLETE	1	CWA75C4199	←	←	O
	37	FRONT GRILLE COMPLETE	1	CWE11C5158	CWE11C5159	←	O
	38	INTAKE GRILLE COMPLETE	1	CWE22C1741	←	←	O
	39	GRILLE DOOR COMPLETE	1	CWE14C1090	←	←	
	40	E-ION FILTER	2	CWD001283	←	←	
	41	SCREW - FRONT GRILLE	4	XTT4+16CFJ	←	←	
	42	CAP - FRONT GRILLE	3	CWH521227	←	←	
	43	DRAIN HOSE	1	CWH851173	←	←	
	44	INSTALLATION PLATE	1	CWH361098	←	←	
	45	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	←	←	

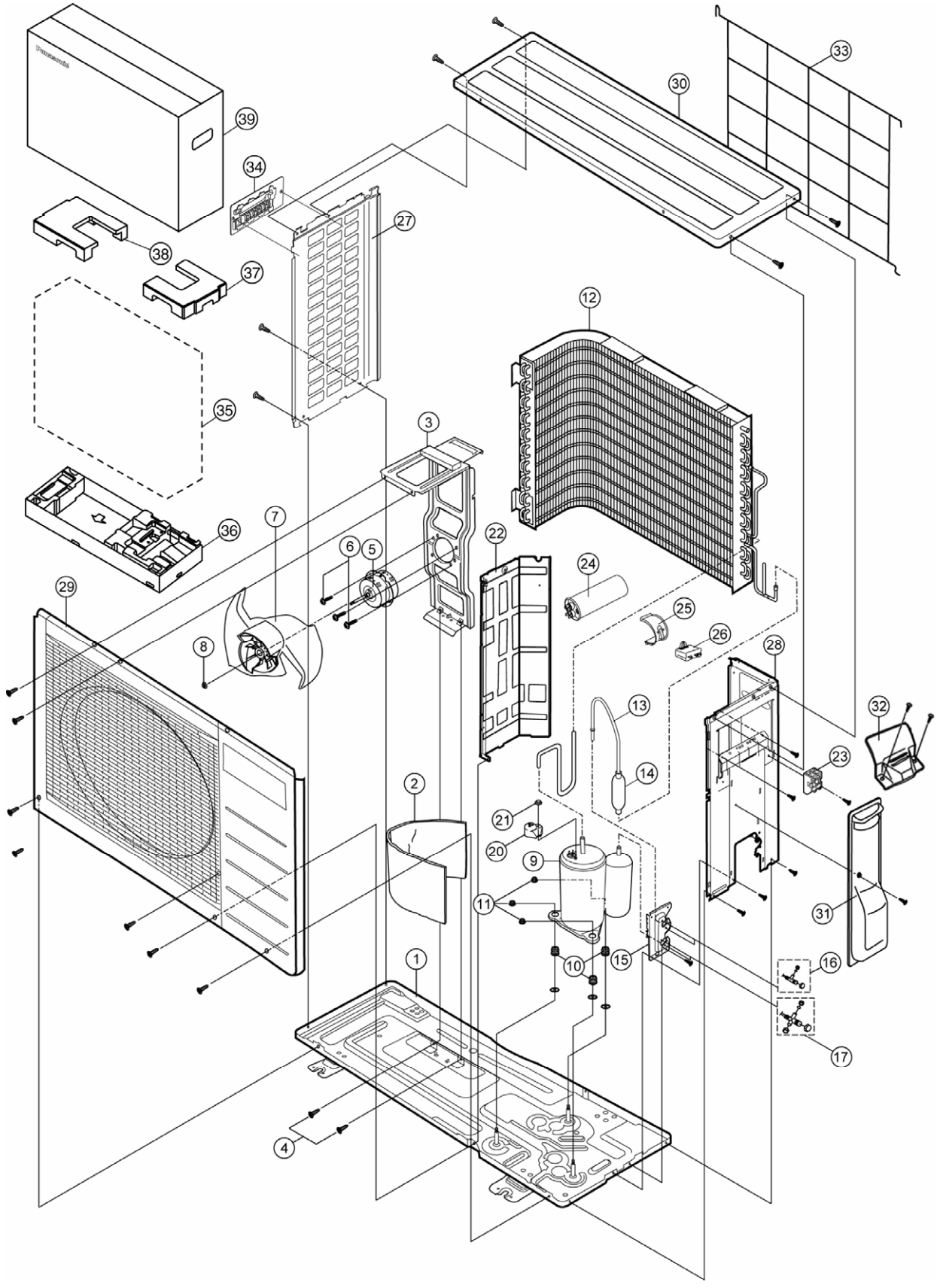
SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY.	CS-C18PKF	CS-C24PKF	CS-C28PKF	REMARK
	46	OPERATING INSTRUCTION	1	CWF568951	←	←	
	47	INSTALLATION INSTRUCTION	1	CWF615802	←	CWF615804	
	48	INSTALLATION INSTRUCTION	1	CWF615803	←	CWF615805	
	50	BAG	1	CWG861498	←	←	
	51	SHOCK ABSORBER	1	CWG713402	←	←	
	52	SHOCK ABSORBER	1	CWG713403	←	←	
	53	C.C.CASE	1	CWG569033	CWG569034	CWG569035	

(Note)

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

19.2 Outdoor Unit

19.2.1 CU-C12PKF



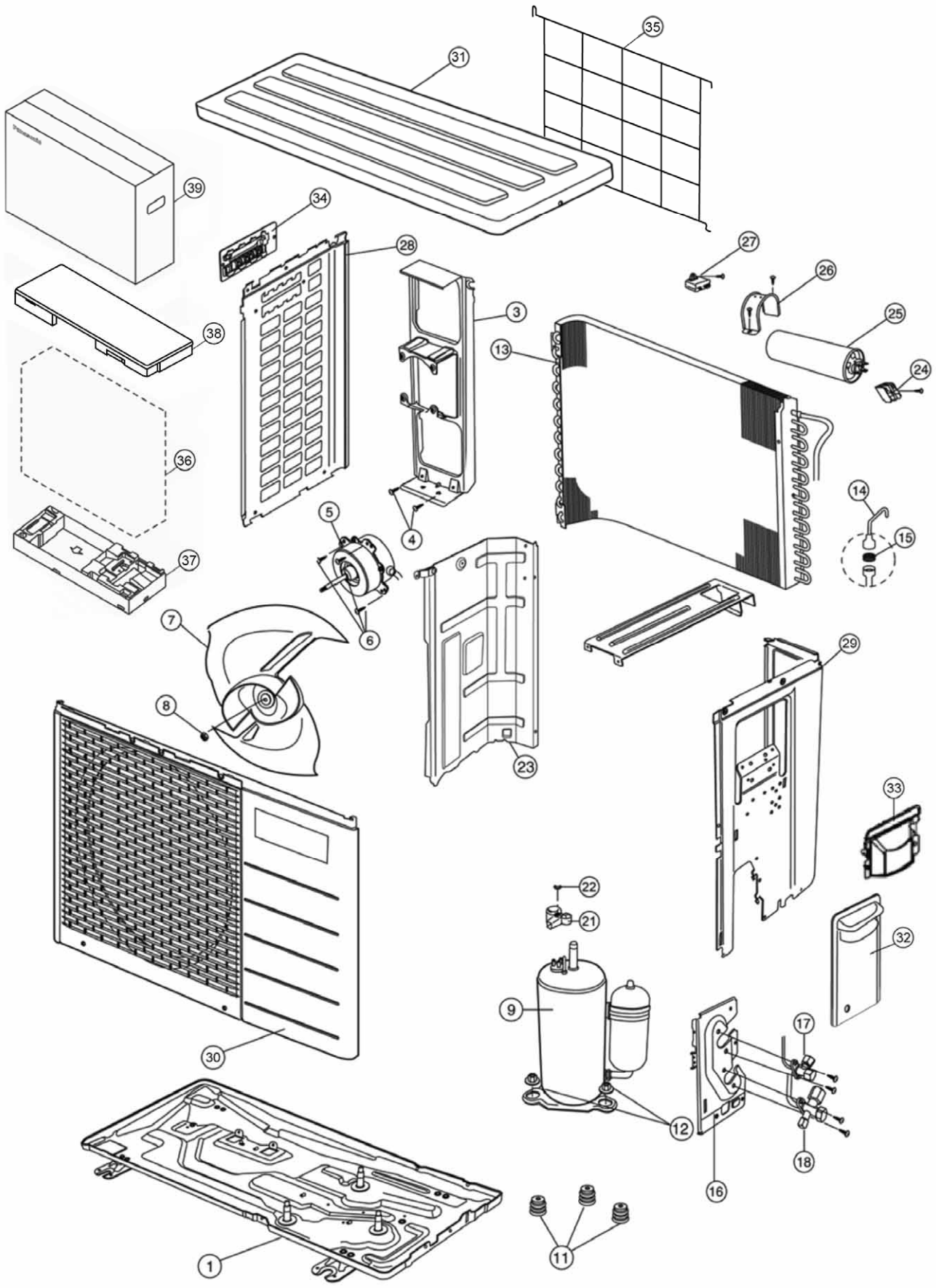
Note
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY	CU-C12PKF	REMARK
	1	CHASSIS ASS'Y	1	CWD50K2088	
	2	SOUND PROOF MATERIAL	1	CWG302673	
	3	FAN MOTOR BRACKET	1	CWD541030	
	4	SCREW - FAN MOTOR BRACKET	2	CWH551217	
⚠	5	FAN MOTOR	1	CWA951676	O
	6	SCREW - FAN MOTOR MOUNT	4	CWH55406J	
	7	PROPELLER FAN ASS'Y	1	CWH03K1010	
	8	NUT - PROPELLER FAN	1	CWH56053J	
⚠	9	COMPRESSOR	1	2KS210D5AA06	O
	10	ANTI - VIBRATION BUSHING	3	CWH50055	
	11	NUT - COMPRESSOR MOUNT	3	CWH561049	
	12	CONDENSER	1	CWB32C2821	
	13	CAPILLARY TUBE ASS'Y	1	CWB15K1165	
	14	STRAINER	1	CWB111011	
	15	HOLDER COUPLING	1	CWH351233	
	16	2-WAY VALVE (LIQUID)	1	CWB021362	O
	17	3-WAY VALVE (GAS)	1	CWB011482	O
	20	TERMINAL COVER	1	CWH171012	
	21	NUT - TERMINAL COVER	1	CWH7080300J	
	22	SOUND PROOF BOARD	1	CWH151023	
⚠	23	TERMINAL BOARD ASS'Y	1	CWA28K1064J	
⚠	24	CAPACITOR - COM.	1	F0GAH356A001	O
	25	HOLDER CAPACITOR	1	CWH30060	
⚠	26	CAPACITOR - F.M	1	DS441205NPQA	O
	27	CABINET SIDE PLATE	1	CWE041248A	
	28	CABINET SIDE PLATE COMPLETE	1	CWE04C1118	
	29	CABINET FRONT PLATE ASS'Y	1	CWE06K1034	
	30	CABINET TOP PLATE	1	CWE031014A	
	31	CONTROL BOARD COVER COMPLETE	1	CWH13C1064	
	32	PLATE – C.B.COVER TERMINAL	1	CWH131295	
	33	WIRE NET	1	CWD041111A	
	34	HANDLE	1	CWE161010	
	35	BAG	1	CWG861078	
	36	BASE BOARD-COMPLETE	1	CWG50C2577	
	37	SHOCK ABSORBER (TOP RIGHT)	1	CWG712397	
	38	SHOCK ABSORBER (TOP LEFT)	1	CWG712398	
	39	C.C.CASE	1	CWG568869	

(Note)

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

19.2.2 CU-C18PKF



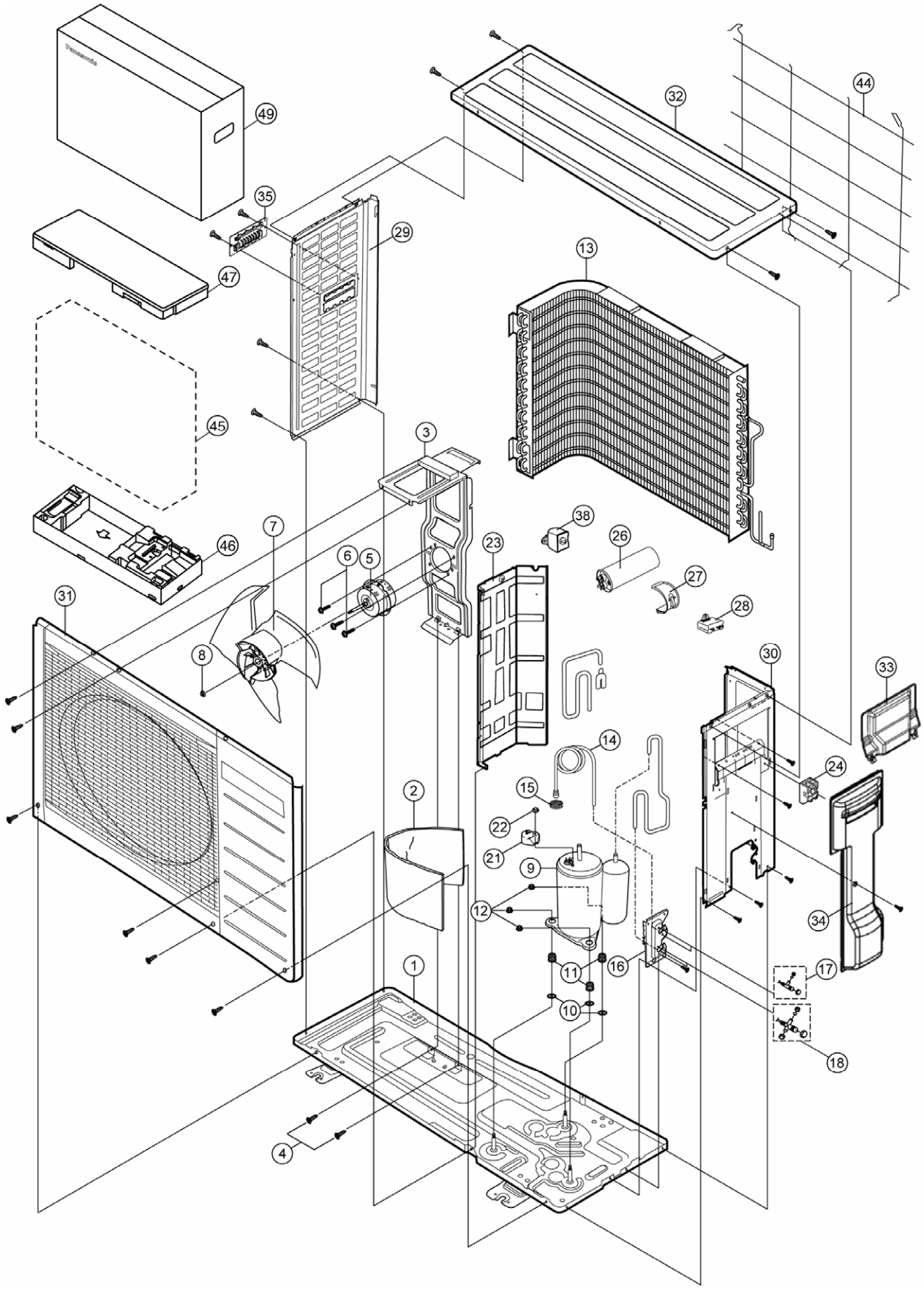
Note
The above exploded view is for the purpose of parts disassembly and replacement.
The non-numbered parts are not kept as standard service parts.

SAFETY.	REF. NO.	PART NAME & DESCRIPTION	QTY	CU-C18PKF	REMARK
	1	CHASSIS ASS'Y	1	CWD50K2088	
	3	FAN MOTOR BRACKET	1	CWD541030B	
	4	SCREW - FAN MOTOR BRACKET	2	CWH551217	
⚠	5	FAN MOTOR	1	CWA951676	O
	6	SCREW - FAN MOTOR MOUNT	4	CWH55406J	
	7	PROPELLER FAN ASS'Y	1	CWH03K1010	
	8	NUT - PROPELLER FAN	1	CWH56053J	
⚠	9	COMPRESSOR	1	2KS324D5AB06	O
	11	ANTI - VIBRATION BUSHING	3	CWH50055	
	12	NUT - COMPRESSOR MOUNT	3	CWH561049	
	13	CONDENSER	1	CWB32C3437	
	14	CAPILLARY TUBE ASS'Y	1	CWB15K1365	
	15	STRAINER	1	CWB11025	
	16	HOLDER COUPLING	1	CWH351220	
	17	2-WAY VALVE (LIQUID)	1	CWB021362	O
	18	3-WAY VALVE (GAS)	1	CWB011482	O
	21	TERMINAL COVER	1	CWH171012	
	22	NUT - TERMINAL COVER	1	CWH7080300J	
	23	SOUND PROOF BOARD	1	CWH151023	
⚠	24	TERMINAL BOARD ASS'Y	1	CWA28K1064J	O
⚠	25	CAPACITOR - COM.	1	DS441456CPND	O
	26	HOLDER CAPACITOR	1	CWH301054	
⚠	27	CAPACITOR - F.M	1	DS441205NPQA	O
	28	CABINET SIDE PLATE	1	CWE041248A	
	29	CABINET SIDE PLATE COMPLETE	1	CWE04C1120	
	30	CABINET FRONT PLATE ASS'Y	1	CWE06K1034	
	31	CABINET TOP PLATE	1	CWE031014A	
	32	CONTROL BOARD COVER COMPLETE	1	CWH13C1064	
	33	PLATE - C.B.COVER TERMINAL	1	CWH131295	
	34	HANDLE	1	CWE161010	
	35	WIRE NET	1	CWD041111A	
	36	BAG	1	CWG861078	
	37	BASE BOARD - COMPLETE	1	CWG50C2739	
	38	TOP BOARD COMPLETE	1	CWG60C1023	
	39	C.C.CASE	1	CWG568870	

(Note)

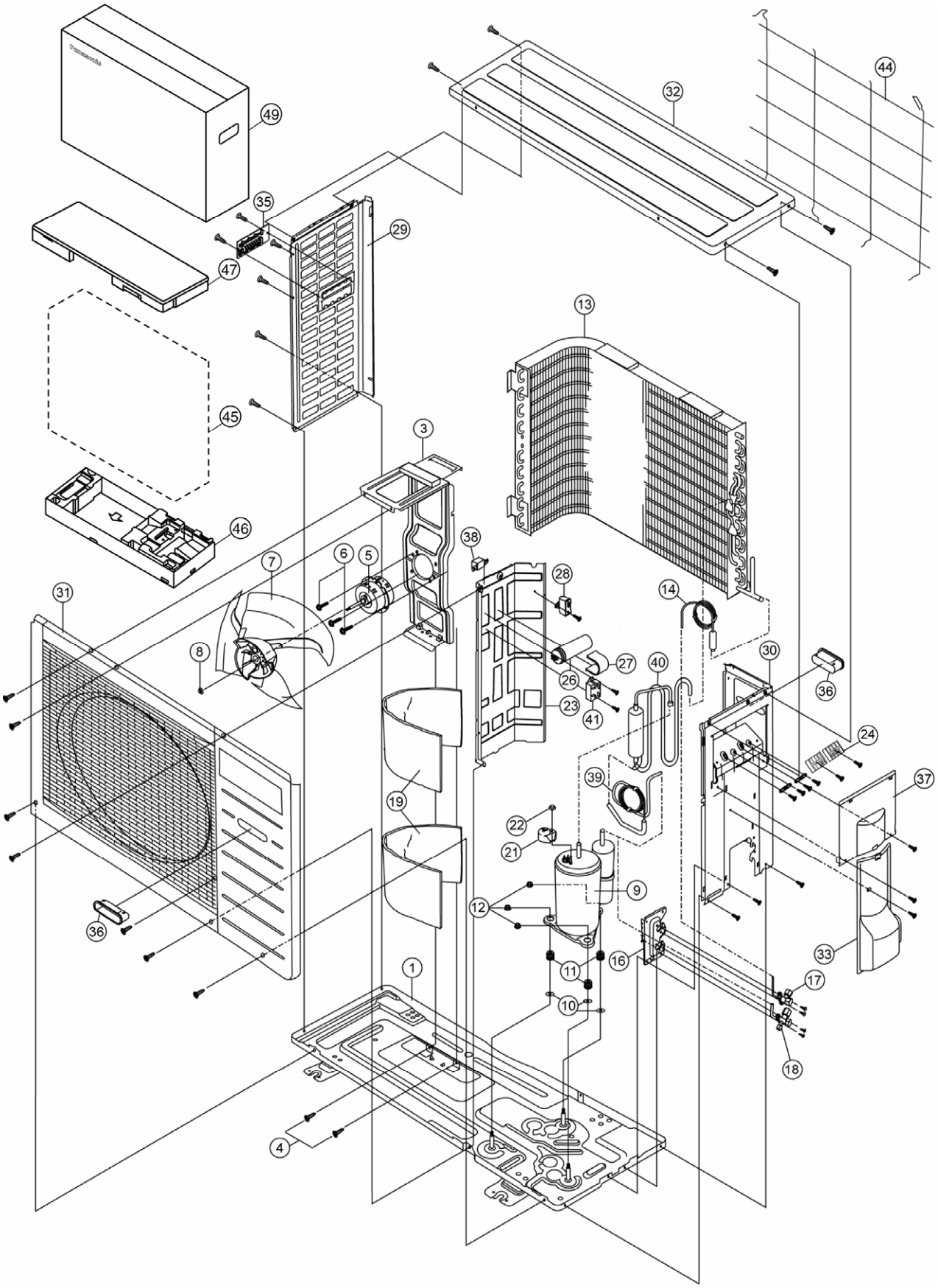
- All parts are supplied from PAPAMY, Malaysia (Vendor Code: 00029488).
- "O" marked parts are recommended to be kept in stock.

19.2.3 CU-C24PKF



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.

19.2.4 CU-C28PKF



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.

SAFETY	REF. NO.	PART NAME & DESCRIPTION	QTY	CU-C24PKF	CU-C28PKF	REMARK
	1	CHASSIS ASS'Y	1	CWD52K1248	CWD50K2100	
	2	SOUND PROOF MATERIAL	1	CWG302406	-	
	3	FAN MOTOR BRACKET	1	CWD541154	CWD541055	
	4	SCREW - FAN MOTOR BRACKET	3	CWH551217	←	
⚠	5	FAN MOTOR	1	CWA951689	←	O
	6	SCREW - FAN MOTOR MOUNT	3	CWH55252J	←	
	7	PROPELLER FAN ASS'Y	1	CWH03K1017	←	
	8	NUT - PROPELLER FAN	1	CWH561092	←	
⚠	9	COMPRESSOR	1	2JS438D3EA04	2JD514D3AA03	O
	10	PACKING	3	CWB81043	←	
	11	ANTI - VIBRATION BUSHING	3	CWH50055	←	
	12	NUT - COMPRESSOR MOUNT	3	CWH561049	←	
	13	CONDENSER	1	CWB32C3108	CWB32C2696	
	14	CAPILLARY TUBE ASS'Y	1	CWB15K1427	CWT023253	
	15	STRAINER	1	CWB11025	-	
	16	HOLDER COUPLING	1	CWH351225	←	
	17	2-WAY VALVE (LIQUID)	1	CWB021574	←	O
	18	3-WAY VALVE (GAS)	1	CWB011484	←	O
	19	SOUND PROOF MATERIAL	2	-	CWG302230	
	21	TERMINAL COVER	1	CWH171012	←	
	22	NUT - TERMINAL COVER	1	CWH7080300J	←	
	23	SOUND PROOF BOARD	1	CWH151237	CWH151056	
⚠	24	TERMINAL BOARD ASS'Y	1	CWA28K1064J	CWA28K1144	
⚠	26	CAPACITOR - COM.	1	DS441456CPNC	DS441606CPNA	O
	27	HOLDER CAPACITOR	1	CWH30060	CWH301055	
⚠	28	CAPACITOR - F.M	1	F0GAH505A009	←	O
	29	CABINET SIDE PLATE	1	CWE041520A	CWE041082A	
	30	CABINET SIDE PLATE COMPLETE	1	CWE04C1268	CWE04C1126	
	31	CABINET FRONT PLATE ASS'Y	1	CWE06K1077	CWE06K1045	
	32	CABINET TOP PLATE	1	CWE031145A	CWE03K1011A	
	33	CONTROL BOARD COVER	1	CWH131409A	CWH131168	
	34	CONTROL BOARD COVER COMPLETE	1	CWH13C1238	-	
	35	HANDLE	1	CWE161010	←	
	36	HANDLE	2	-	CWE16000E	
	37	CONTROL BOARD COVER (TOP)	1	-	CWH131169A	
	38	THERMOSTAT	1	CWA151061	←	
	39	TUBE ASSY(CAPILLARY TUBE)	1	-	CWT023148	
	40	OIL SEPARATER ASS'Y	1	-	CWB16K1009	
	41	ELECTRO MAGNETIC SWITCH	1	-	CWA00192	
	44	WIRE NET	1	CWD041160A	CWD041041A	
	45	BAG	1	CWG861461	CWG861154	
	46	BASE BOARD-COMPLETE	1	CWG62C1082	CWG62C1043	
	47	TOP BOARD COMPLETE	1	CWG60C1045	CWG60C1017	
	49	C.C.CASE	1	CWG568871	CWG568872	

(Note)

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

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