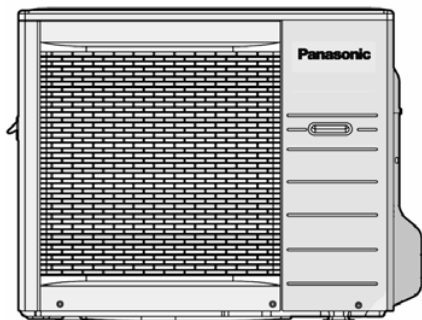
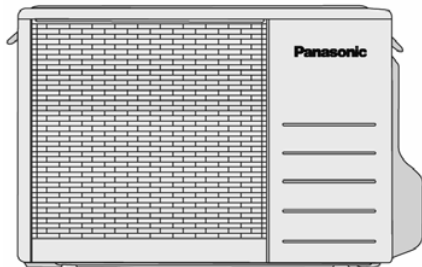
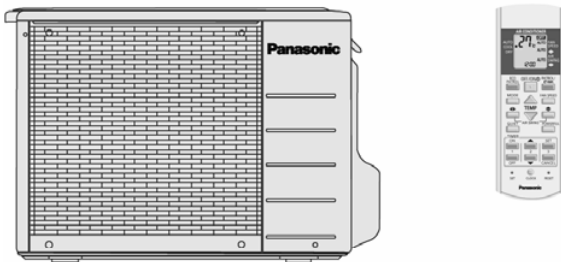


# Service Manual

## Air Conditioner



**Indoor Unit**  
**CS-C9KKV**  
**CS-C12KKV**  
**CS-C18KKV**  
**CS-C24KKV**  
**CS-C28KKV**

**Outdoor Unit**  
**CU-C9KKV**  
**CU-C12KKV**  
**CU-C18KKV**  
**CU-C24KKV**  
**CU-C28KKV**

### **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.

# 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.

 <b>WARNING</b>	This indication shows the possibility of causing death or serious injury.
 <b>CAUTION</b>	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.
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- 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.

 <b>WARNING</b>	
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.)	
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.)	

 **WARNING**

- |   |   |
|---|---|
| 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.   |   |

 **CAUTION**

- |  |   |
|--|---|
| 1. Do not install the unit at place where leakage of flammable gas may occur. In case gas leaks and accumulates at surrounding of the unit, it may cause fire.   |    |
| 2. Carry out drainage piping as mentioned in installation instructions. If drainage is not perfect, water may enter the room and damage the furniture.   |   |
| 3. Tighten the flare nut with torque wrench according to specified method. If the flare nut is over-tightened, after a long period, the flare may break and cause refrigerant gas leakage.   |   |
| 4. Do not touch outdoor unit air inlet and aluminium fin. It may cause injury.   |    |
| 5. Select an installation location which is easy for maintenance.  |   |
| 6. Pb free solder has a higher melting point than standard solder; typically the melting point is 50°F – 70°F (30°C – 40°C) higher. Please use a high temperature solder iron. In case of the soldering iron with temperature control, please set it to 700 ± 20°F (370 ± 10°C). Pb free solder will tend to splash when heated too high (about 1100°F / 600°C).   |   |
| 7. Power supply connection to the air conditioner. Connect the power supply cord of the air conditioner to the mains using one of the following methods.<br>Power supply point shall be the place where there is ease for access for the power disconnection in case of emergency. In some countries, permanent connection of this room air conditioner to the power supply is prohibited.<br>i. Power supply connection to the receptacle using a power plug. Use an approved 15/16A (3/4~1.5HP) or 16A (2.0HP) or 20A (2.5HP) or 25A (3.0HP) power plug with earth pin for the connection to the socket.<br>ii. Power supply connection to a circuit breaker for the permanent component. Use an approved 16A (3/4~2.0HP) or 20A (2.5HP) or 25A (3.0HP) circuit breaker for the permanent connection. It must be a double pole switch with a minimum 3.0 mm contact gap. |   |
| 8. 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.  |  |
| 9. Installation or servicing work: It may need two people to carry out the installation or servicing work.   |   |
| 10. Do not install this appliance in a laundry room or other location where water may drip from the ceiling, etc.  |  |
| 11. Do not sit or step on the unit, you may fall down accidentally.  |  |
| 12. Do not touch the sharp aluminium fin, sharp parts may cause injury.  |  |

## 2. Specification

Model		Indoor	CS-C9KKV		CS-C12KKV		
		Outdoor	CU-C9KKV		CU-C12KKV		
Performance Test Condition			NEW JIS		NEW JIS		
Power Supply		Phase, Hz	Single, 60		Single, 60		
		V	220		220		
Cooling	Capacity		kW	2.65		3.56	
			BTU/h	9040		12140	
			kJ/h	9540		12820	
	Running Current		A	3.9		5.3	
	Input Power		W	830		1.11k	
	EER		W/W	3.19		3.21	
			BTU/hW	10.9		10.9	
	Power Factor		%	93		95	
	Indoor Noise (H / L)		dB-A	36 / 26		39 / 29	
			Power Level dB	49 / -		52 / -	
Outdoor Noise (H / L)		dB-A	48 / -		48 / -		
		Power Level dB	63		63		
Max Current (A) / Max Input Power (W)			4.6 / 990		6.5 / 1.35k		
Starting Current (A)			23.0		33.0		
Compressor	Type		Hermetic Motor		Hermetic Motor		
	Motor Type		Induction (2-poles)		Induction (2-poles)		
	Output Power		W	600		850	
Indoor Fan	Type		Cross-Flow Fan		Cross-Flow Fan		
	Material		ASG20K1		ASG20K1		
	Motor Type		Induction (4-poles)		Induction (4-poles)		
	Input Power		W	51.3		53.2	
	Output Power		W	22		22	
	Speed	QLo	rpm	580		680	
		Lo	rpm	650		750	
		Me	rpm	850		930	
Hi		rpm	1030		1110		
Outdoor Fan	Type		Propeller Fan		Propeller Fan		
	Material		PP Resin		PP Resin		
	Motor Type		Induction (6-poles)		Induction (6-poles)		
	Input Power		W	68.2		74.0	
	Output Power		W	30		30	
	Speed	Hi	rpm	800		800	
Moisture Removal			L/h (Pt/h)	1.6 (3.4)		2.1 (4.4)	
Indoor Airflow	QLo	m <sup>3</sup> /min (ft <sup>3</sup> /min)	5.3 (189)		6.4 (225)		
	Lo	m <sup>3</sup> /min (ft <sup>3</sup> /min)	6.0 (212)		7.0 (248)		
	Me	m <sup>3</sup> /min (ft <sup>3</sup> /min)	7.8 (277)		8.7 (308)		
	Hi	m <sup>3</sup> /min (ft <sup>3</sup> /min)	9.5 (335)		10.4 (367)		
	SHi	m <sup>3</sup> /min (ft <sup>3</sup> /min)	10.4 (368)		10.6 (374)		
Outdoor Airflow	Hi	m <sup>3</sup> /min (ft <sup>3</sup> /min)	29.2 (1030)		32.4 (1140)		
Refrigeration Cycle	Control Device		Capillary Tube		Capillary Tube		
	Refrigerant Oil		cm <sup>3</sup>	ATMOS M60 or SUNISO 4GDID (290)		ATMOS M60 or SUNISO 4GDID (350)	
	Refrigerant Type		g (oz)	R22, 590 (20.8)		R22, 770 (27.2)	
Dimension	Height(I/D / O/D)	mm (inch)	290 (11-7/16)	510 (20-3/32)	290 (11-7/16)	540 (21-9/32)	
	Width(I/D / O/D)	mm (inch)	870 (34-9/32)	650 (25-19/32)	870 (34-9/32)	780 (30-23/32)	
	Depth(I/D / O/D)	mm (inch)	204 (8-1/16)	230 (9-1/16)	204 (8-1/16)	289 (11-13/32)	
Weight	Net(I/D / O/D)	kg (lb)	9 (20)	23 (51)	9 (20)	29 (64)	

Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 9.52 (3/8)		6.35 (1/4) / 12.70 (1/2)	
	Standard length	m (ft)	7.5 (24.6)		7.5 (24.6)	
	Length range (min – max)	m (ft)	3 (9.8) ~ 10 (32.8)		3 (9.8) ~ 15 (49.2)	
	I/D & O/D Height different	m (ft)	5 (16.4)		5 (16.4)	
	Additional Gas Amount	g/m (oz/ft)	10 (0.1)		10 (0.1)	
	Length for Additional Gas	m (ft)	7.5 (24.6)		7.5 (24.6)	
Drain Hose	Inner Diameter	mm	16		16	
	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 x15 x21		2 x15 x21	
	Size (W x H x L)	mm	610 x 315 x 25.4		610 x 315 x 25.4	
Outdoor Heat Exchanger	Fin Material		Blue Coated		Blue Coated	
	Fin Type		Slit Fin		Slit Fin	
	Row x Stage x FPI		1 x 19 x 17		1 x 20 x 17	
	Size (W x H x L)	mm	22 x 482.6 x 567.4		22 x 508 x 814.4	
Air Filter	Material		Polypropelene		Polypropelene	
	Type		One-touch		One-touch	
Power Supply			Indoor		Indoor	
Power Supply Cord		A	10		10	
Thermostat			-		-	
Protection Device			2-Stage Overload Protector		2-Stage Overload Protector	
			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		43	26	43	26
	Minimum		16	11	16	11

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

Model		Indoor	CS-C18KKV		CU-C24KKV	
		Outdoor	CU-C18KKV		CU-C24KKV	
Performance Test Condition			NEW JIS		NEW JIS	
Power Supply		Phase, Hz	Single, 60		Single, 60	
		V	220		220	
Cooling	Capacity		kW	5.30	7.03	
			BTU/h	18100	24000	
			kJ/h	19100	25300	
	Running Current		A	8.0	12.0	
	Input Power		W	1.72k	2.55k	
	EER		W/W	3.08	2.76	
			BTU/hW	10.52	9.41	
	Power Factor		%	98	97	
	Indoor Noise (H / L)		dB-A	42 / 37	46 / 40	
			Power Level dB	-	-	
Outdoor Noise (H / L)		dB-A	54 / -	55 / -		
		Power Level dB	-	-		
Max Current (A) / Max Input Power (W)			9.06 / 2.07k		14.3 / 2.87k	
Starting Current (A)			38.0		63.0	
Compressor	Type		Hermetic Motor		Hermetic Motor	
	Motor Type		Induction (2-poles)		Induction (2-poles)	
	Output Power		W	1.2k	1.8k	
Indoor Fan	Type		Cross-Flow Fan		Cross-Flow Fan	
	Material		ASG30K1		ASG30K1	
	Motor Type		Transistor (8-poles)		Transistor (8-poles)	
	Input Power		W	94.8	94.8	
	Output Power		W	40	40	
	Speed	QLo	rpm	930	960	
		Lo	rpm	1020	1110	
		Me	rpm	1110	1230	
		Hi	rpm	1200	1350	
SHi		rpm	1370	1500		
Outdoor Fan	Type		Propeller Fan		Propeller Fan	
	Material		PP Resin		PP Resin	
	Motor Type		Induction (6-poles)		Induction (6-poles)	
	Input Power		W	151.8	148.4	
	Output Power		W	69	72	
	Speed	Lo	rpm	-	490	
		Hi	rpm	850	850	
Moisture Removal			L/h (Pt/h)		2.9 (6.1) 4.0 (8.5)	
Indoor Airflow	QLo	m <sup>3</sup> /min (ft <sup>3</sup> /min)	12.2 (432)	12.9 (457)		
	Lo	m <sup>3</sup> /min (ft <sup>3</sup> /min)	13.4 (474)	15.0 (528)		
	Me	m <sup>3</sup> /min (ft <sup>3</sup> /min)	14.6 (516)	16.6 (586)		
	Hi	m <sup>3</sup> /min (ft <sup>3</sup> /min)	15.8 (558)	18.2 (642)		
	SHi	m <sup>3</sup> /min (ft <sup>3</sup> /min)	18.0 (637)	20.2 (714)		
Outdoor Airflow		Hi	m <sup>3</sup> /min (ft <sup>3</sup> /min)	51.0 (1800)	51.0 (1800)	
Refrigeration Cycle	Control Device		Capillary Tube		Capillary Tube	
	Refrigerant Oil		cm <sup>3</sup>	ATMOS NM56M or SUNISO 4GDID (650)	ATMOS M60 or SUNISO 4GDID (1130)	
	Refrigerant Type		g (oz)	R22, 1.33k (46.9)	R22, 1.41k (49.8)	
Dimension	Height(I/D / O/D)	mm (inch)	290 (11-7/16)	750 (29-17/32)	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)	235 (9-9/32)	345 (13-19/32)	235 (9-9/32)	345 (13-19/32)
Weight	Net (I/D / O/D)	kg (lb)	12 (26)	47 (104)	12 (26)	56 (123)

Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 12.70 (1/2)		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) ~ 25 (82.0)	
	I/D & O/D Height different	m (ft)	20 (65.6)		20 (65.6)	
	Additional Gas Amount	g/m (oz/ft)	20 (0.2)		30 (0.3)	
	Length for Additional Gas	m (ft)	7.5 (24.6)		7.5 (24.6)	
Drain Hose	Inner Diameter	mm	16		16	
	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 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		Slit Fin	
	Row x Stage x FPI		2 x 34 x 17		2 x 34 x 17	
	Size (W x H x L)	mm	25.4 x 714 x 806.2:826.2		25.4 x 714 x 806.2:826.2	
Air Filter	Material		Polypropelene		Polypropelene	
	Type		One-touch		One-touch	
Power Supply			Indoor		Indoor	
Power Supply Cord		A	16		20	
Thermostat			-		Mechanical	
Protection Device			2-Stage Overload Protector		-	
			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		43	26	43	26
	Minimum		16	11	16	11

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



Model		Indoor	CS-C28KKV	
		Outdoor	CU-C28KKV	
Performance Test Condition			NEW JIS	
Power Supply		Phase, Hz	Single, 60	
		V	220	
Cooling	Capacity		kW	8.40
			BTU/h	28600
			kJ/h	30240
	Running Current		A	15.9
	Input Power		W	3.42k
	EER		W/W	2.46
			BTU/hW	8.36
	Power Factor		%	98
	Indoor Noise (H / L)		dB-A	46 / 44
			Power Level dB	-
Outdoor Noise (H / L)		dB-A	55 / -	
		Power Level dB	-	
Max Current (A) / Max Input Power (W)			19.3 / 4.00k	
Starting Current (A)			87.0	
Compressor	Type		Hermetic Motor	
	Motor Type		Induction (2-poles)	
	Output Power	W	2.4k	
Indoor Fan	Type		Cross-Flow Fan	
	Material		ASG30K1	
	Motor Type		Transistor (8-poles)	
	Input Power		W	94.8
	Output Power		W	40
	Speed	QLo	rpm	1160
		Lo	rpm	1250
		Me	rpm	1400
Hi		rpm	1490	
SHi		rpm	1530	
Outdoor Fan	Type		Propeller Fan	
	Material		PP Resin	
	Motor Type		Induction (6-poles)	
	Input Power		W	160.1
	Output Power		W	75
	Speed	Lo	rpm	540
Hi		rpm	870	
Moisture Removal			L/h (Pt/h)	5.0 (10.6)
Indoor Airflow	QLo	m <sup>3</sup> /min (ft <sup>3</sup> /min)	15.7 (555)	
	Lo	m <sup>3</sup> /min (ft <sup>3</sup> /min)	16.9 (598)	
	Me	m <sup>3</sup> /min (ft <sup>3</sup> /min)	19.0 (670)	
	Hi	m <sup>3</sup> /min (ft <sup>3</sup> /min)	20.2 (713)	
	SHi	m <sup>3</sup> /min (ft <sup>3</sup> /min)	20.7 (733)	
Outdoor Airflow	Hi	m <sup>3</sup> /min (ft <sup>3</sup> /min)	53.5 (1890)	
Refrigeration Cycle	Control Device	Capillary Tube		
	Refrigerant Oil	cm <sup>3</sup>	ATMOS NM56M or SUNISO 4GDID (900)	
	Refrigerant Type	g (oz)	R22, 1.96k (69.2)	
Dimension	Height(I/D / O/D)	mm (inch)	290 (11-7/16)	750 (29-17/32)
	Width (I/D / O/D)	mm (inch)	1070 (42-5/32)	875 (34-15/32)
	Depth (I/D / O/D)	mm (inch)	235 (9-9/32)	345 (13-19/32)
Weight	Net (I/D / O/D)	kg (lb)	12 (26)	63 (139)

Piping	Pipe Diameter (Liquid / Gas)	mm (inch)	6.35 (1/4) / 15.88 (5/8)	
	Standard length	m (ft)	5.0 (16.4)	
	Length range (min – max)	m (ft)	3 (9.8) ~ 30 (98.4)	
	I/D & O/D Height different	m (ft)	20 (65.6)	
	Additional Gas Amount	g/m (oz/ft)	30 (0.3)	
	Length for Additional Gas	m (ft)	7.5 (24.6)	
Drain Hose	Inner Diameter	mm	16	
	Length	mm	650	
Indoor Heat Exchanger	Fin Material		Pre Coat	
	Fin Type		Slit Fin	
	Row x Stage x FPI		2 x 15 x 21	
	Size (W x H x L)	mm	810 x 315 x 25.4	
Outdoor Heat Exchanger	Fin Material		Blue Coated	
	Fin Type		Slit Fin	
	Row x Stage x FPI		2 x 28 x 17	
	Size (W x H x L)	mm	44 x 711.2 x 787.4:821.4	
Air Filter	Material		Polypropelene	
	Type		One-touch	
Power Supply			Outdoor	
Power Supply Cord		A	20	
Thermostat			Mechanical	
Protection Device			-	
			Dry Bulb	Wet Bulb
Indoor Operation Range	Maximum		32	23
	Minimum		16	11
Outdoor Operation Range	Maximum		43	26
	Minimum		16	11

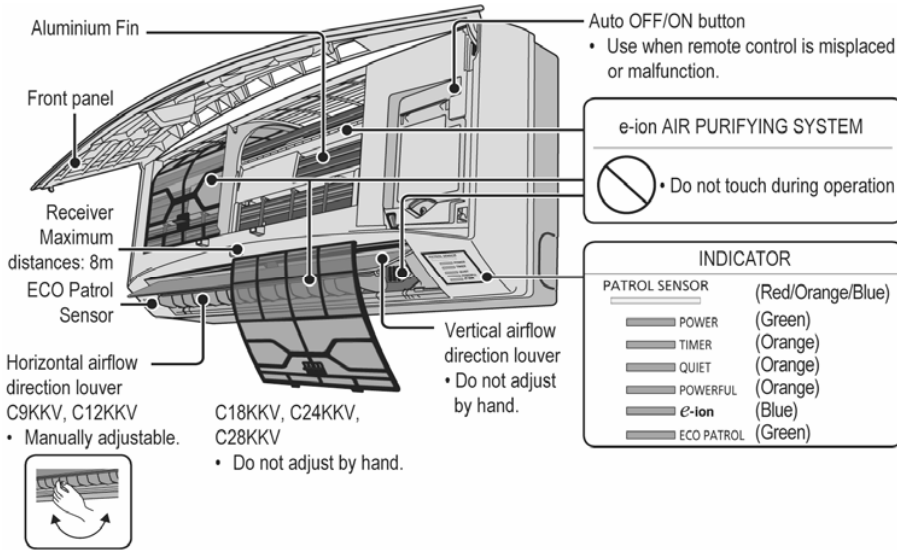
- Cooling capacities are based on indoor temperature of 27°C Dry Bulb (80.6°F Dry Bulb), 19.0°C Wet Bulb (66.2°F Wet Bulb) and outdoor air temperature of 35°C Dry Bulb (95°F Dry Bulb), 24°C Wet Bulb (75.2°F Wet Bulb)
- Specifications are subjected to change without prior notice for further improvement.

### 3. Features

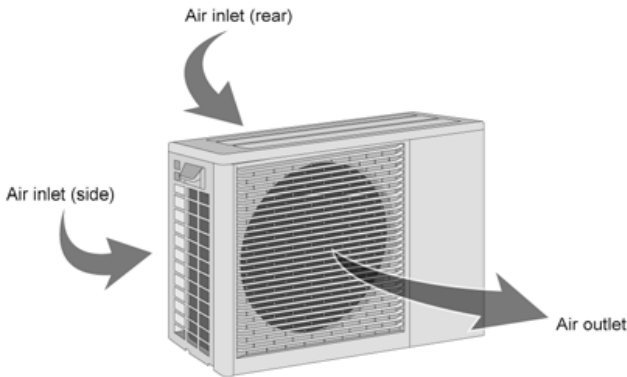
- E-ion Air Purifying System with Patrol Sensor
  - Active e-ions are released to catch dust particles and bring them back the large positively charged filter.
  - Patrol Sensor color changes to indicate the dirt level in the air
- Long Installation Piping
  - CS/CU-C9KK, long piping up to 10 meters.
  - CS/CU-C12KK, long piping up to 15 meters.
  - CS/CU-C18KK, CS/CU-C24KK, long piping up to 25 meters.
  - CS/CU-C28KK, 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

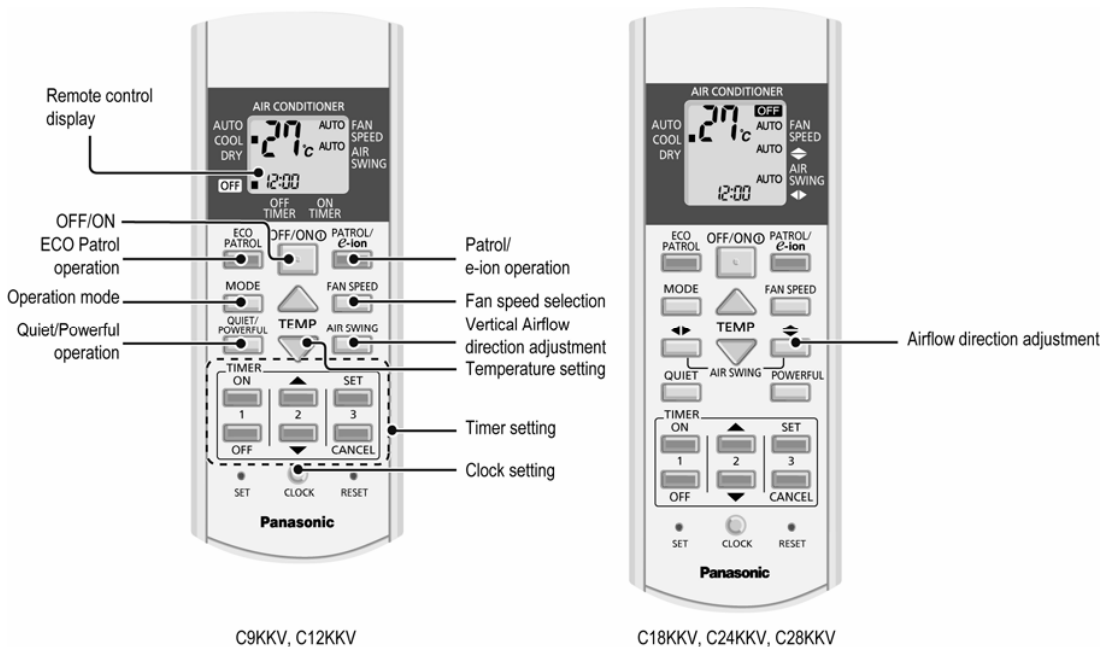
## 4.1 Indoor Unit



## 4.2 Outdoor Unit



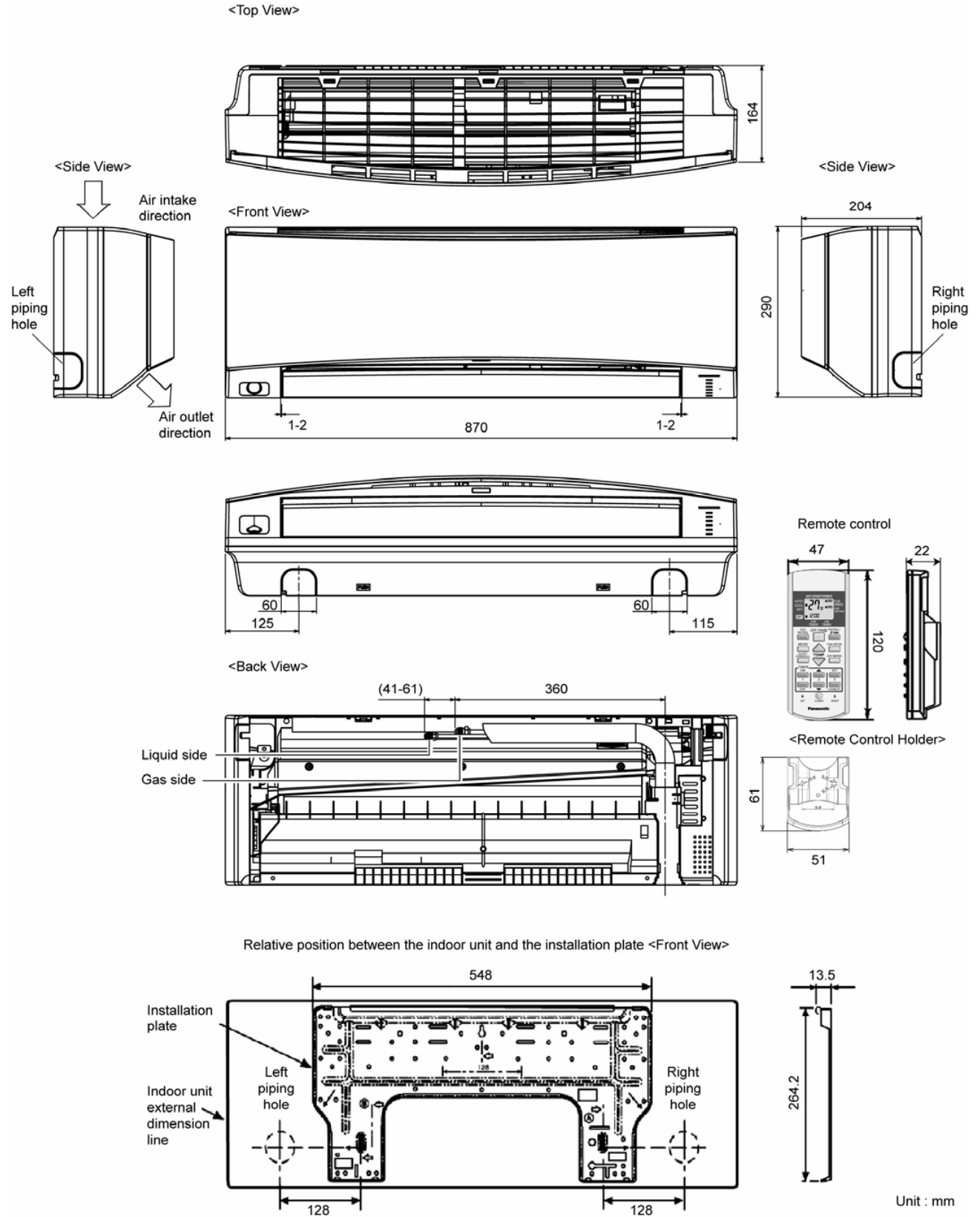
## 4.3 Remote Control



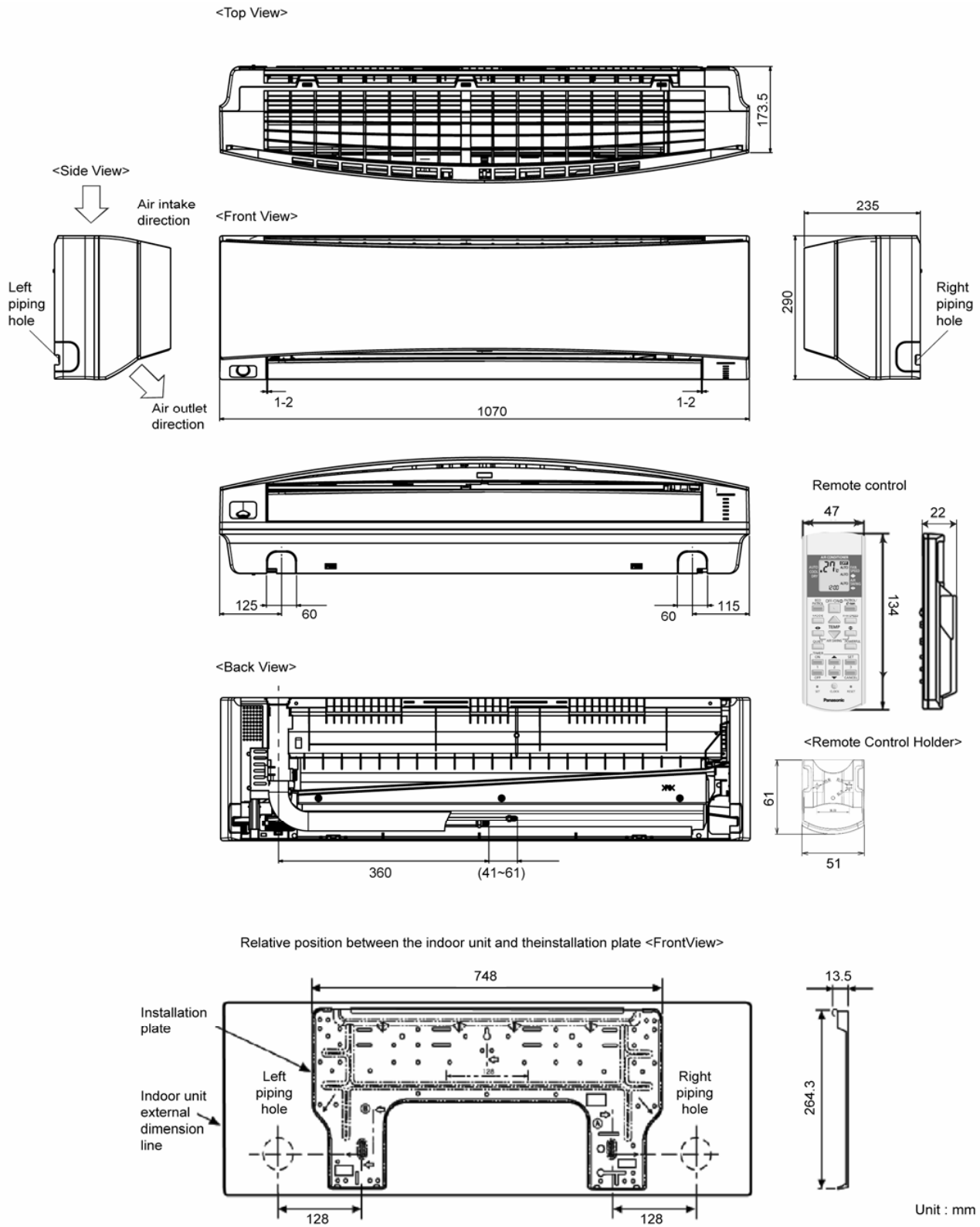
# 5. Dimensions

## 5.1 Indoor Unit

### 5.1.1 CS-C9KKV CS-C12KKV

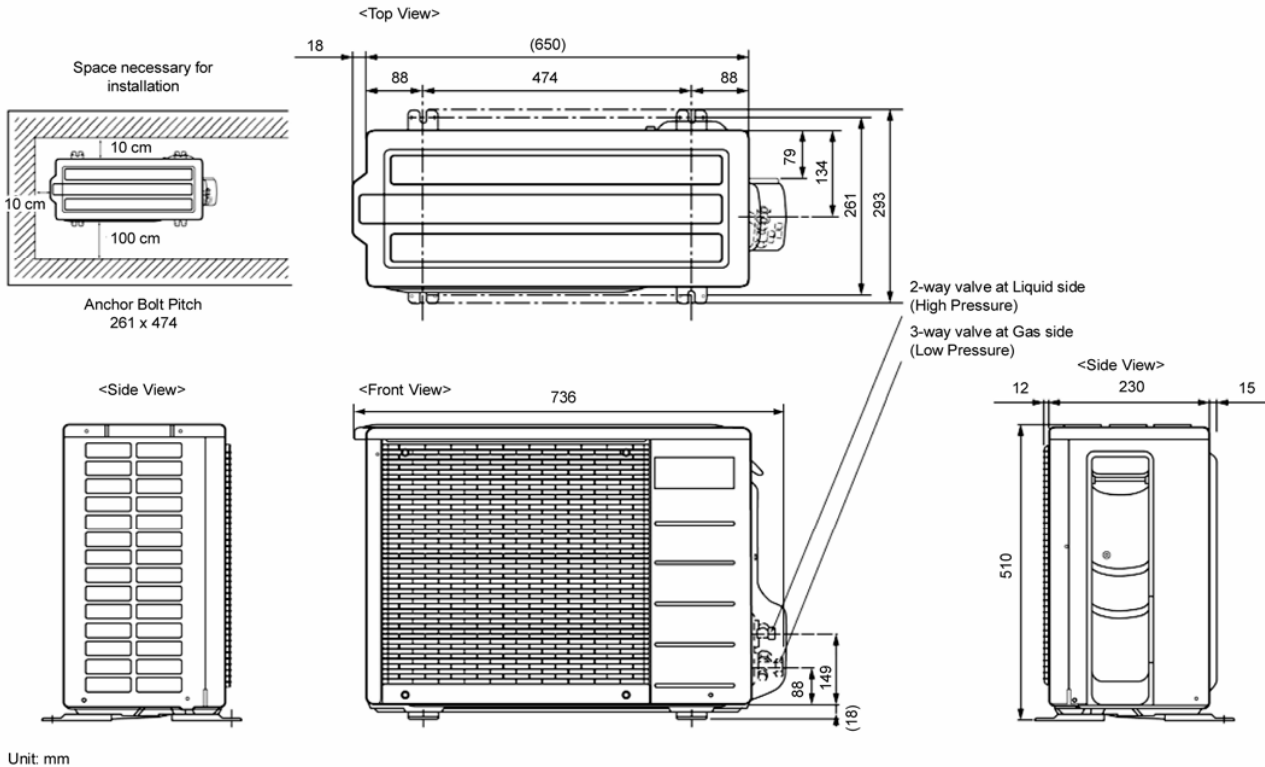


## 5.1.2 CS-C18KKV CS-C24KKV CS-C28KKV

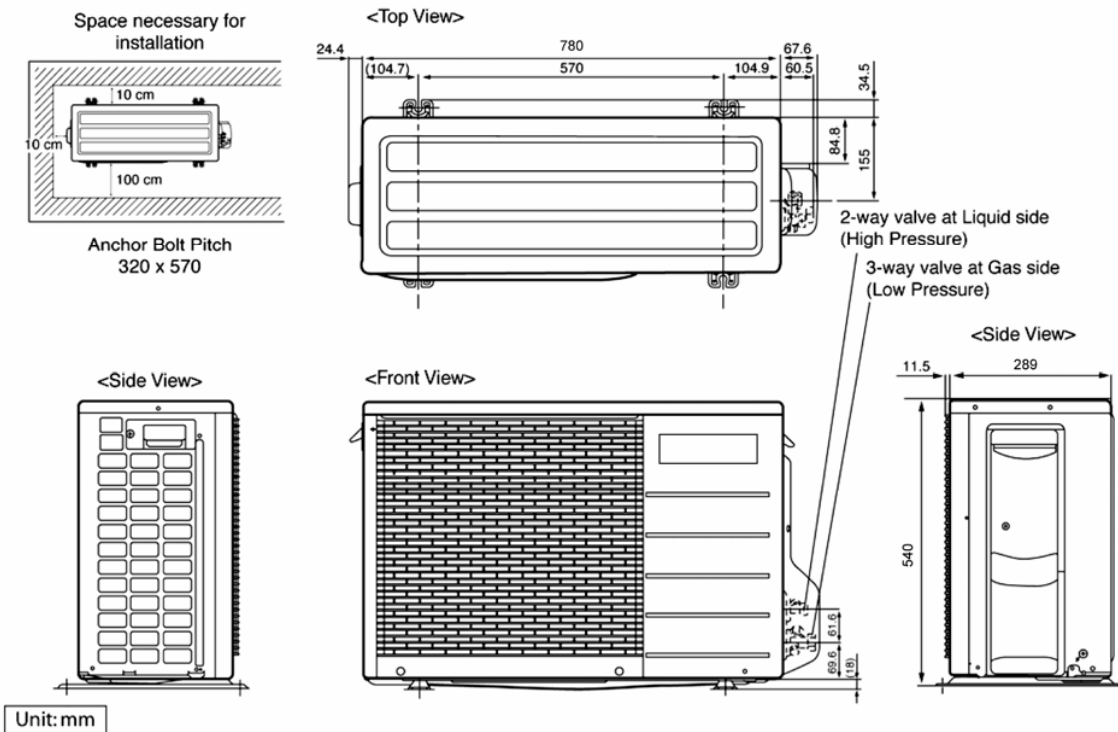


## 5.2 Outdoor Unit

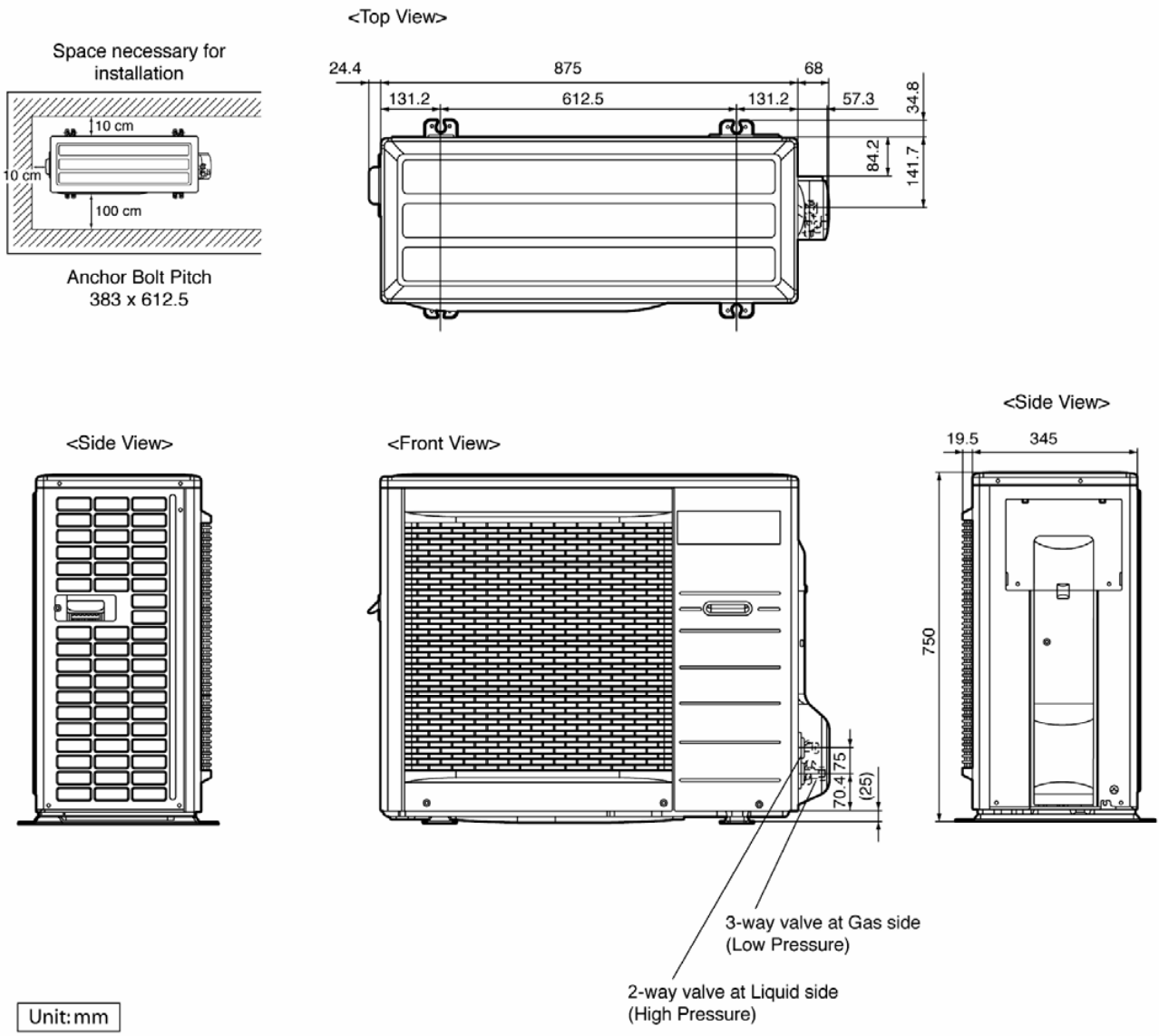
### 5.2.1 CU-C9KKV



### 5.2.2 CU-C12KKV

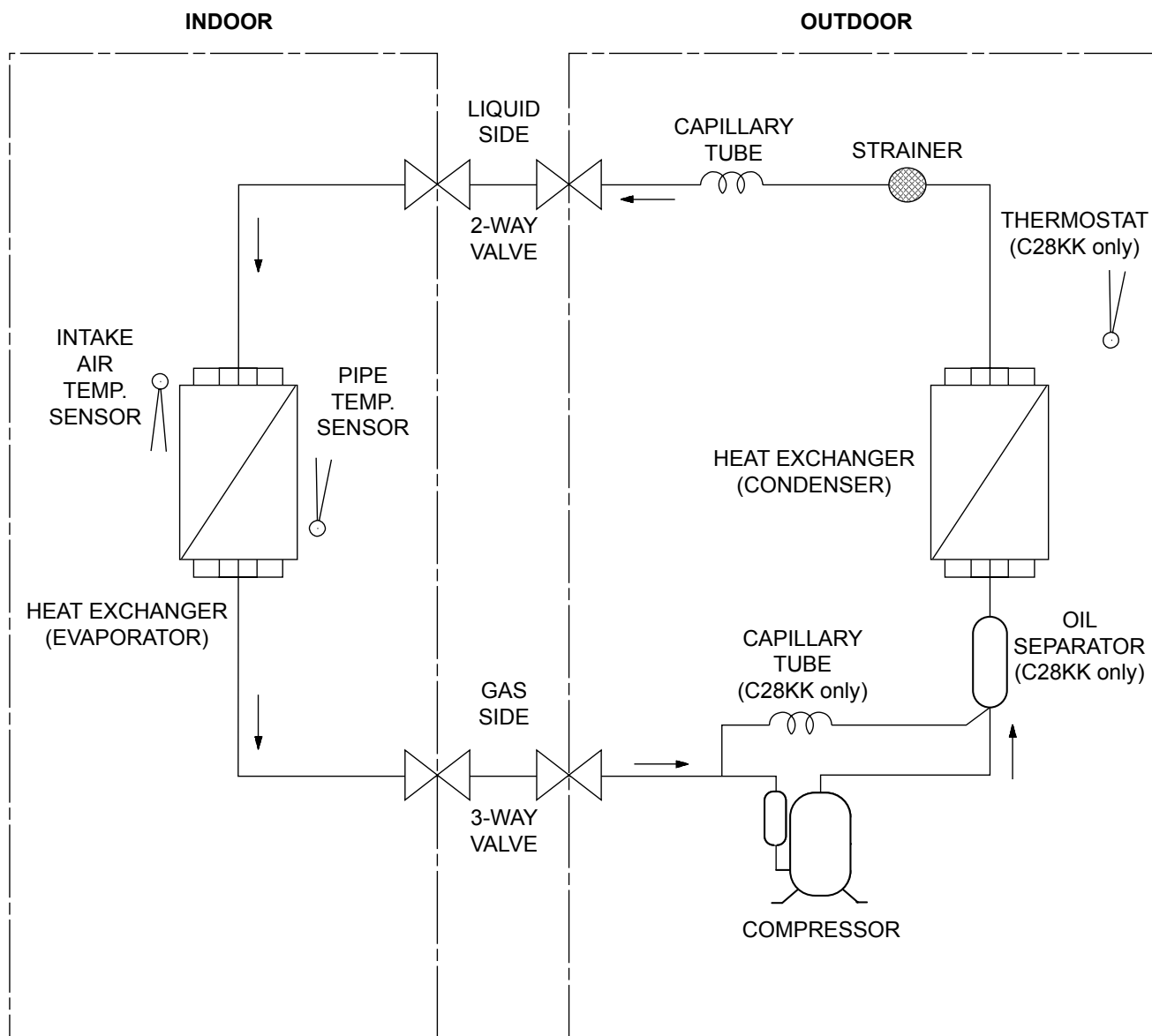


### 5.2.3 CU-C18KKV CU-C24KKV CU-C28KKV



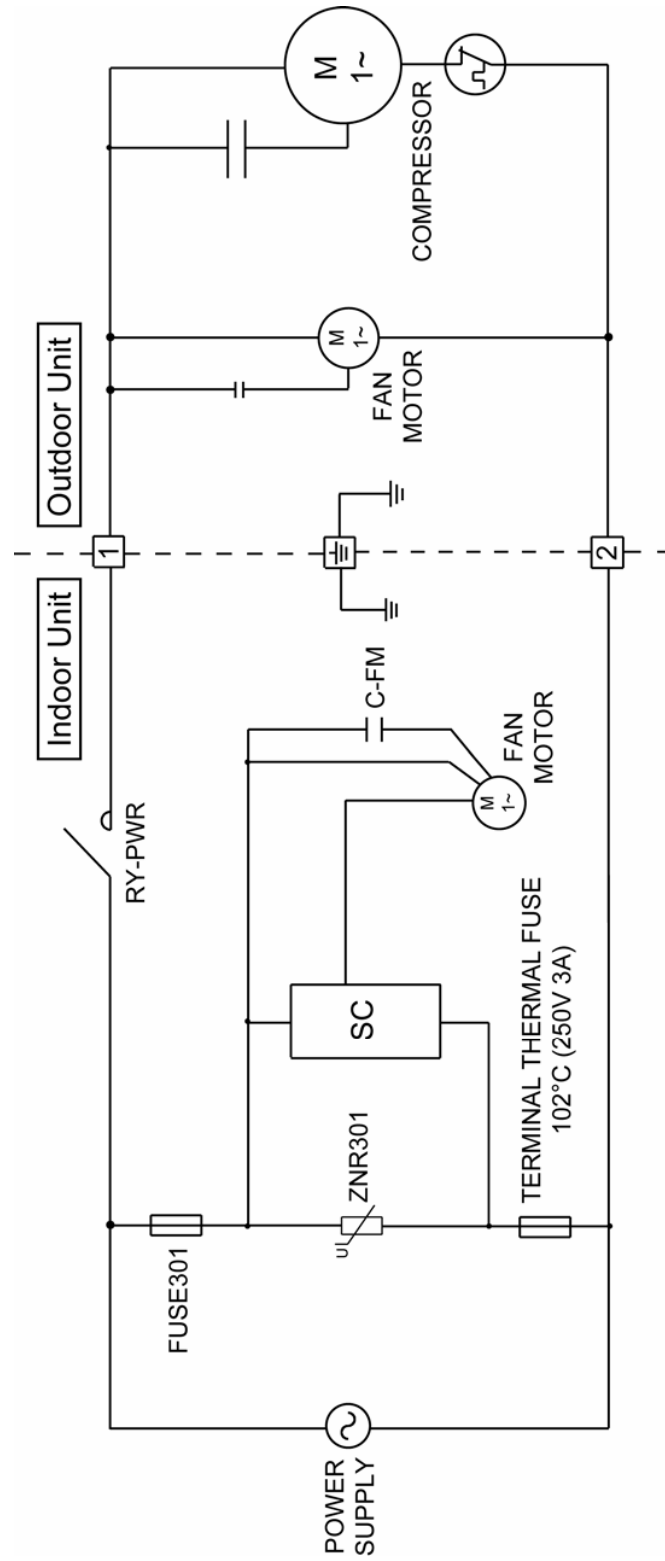


## 6. Refrigeration Cycle Diagram

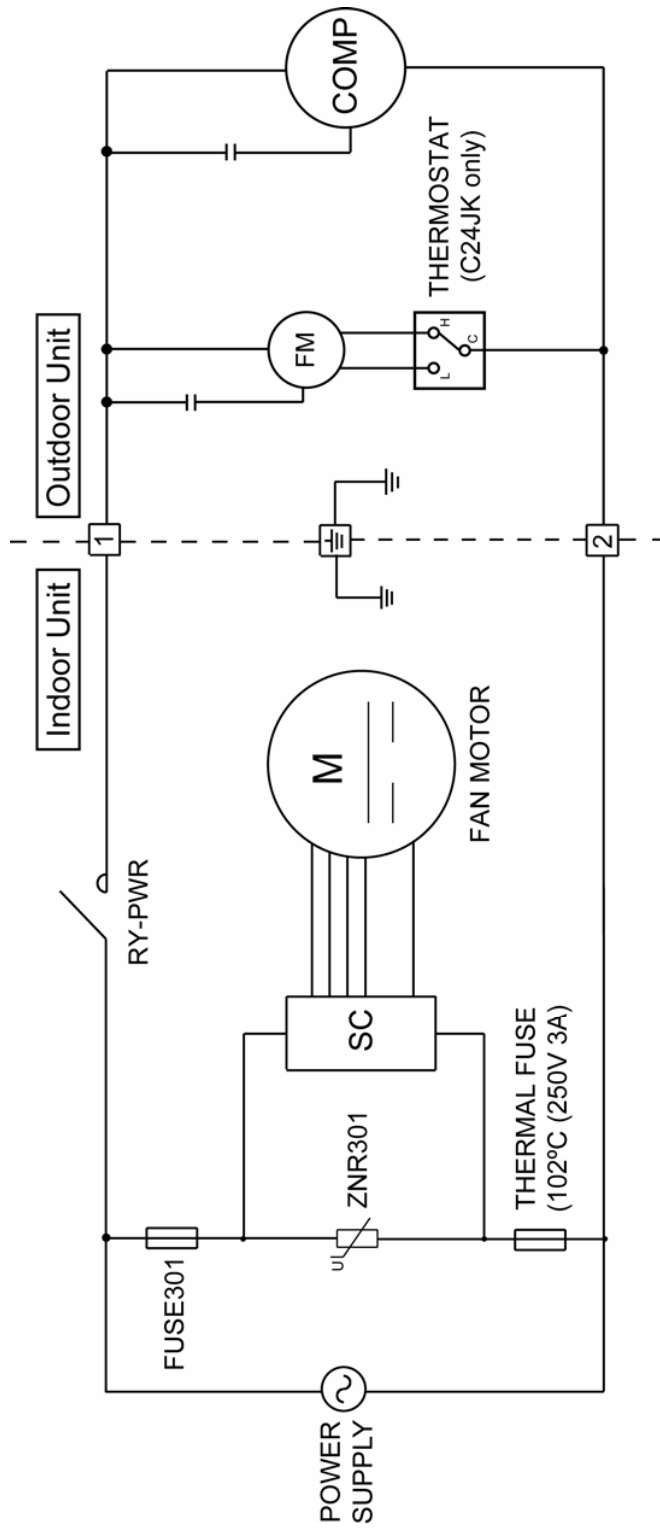


## 7. Block Diagram

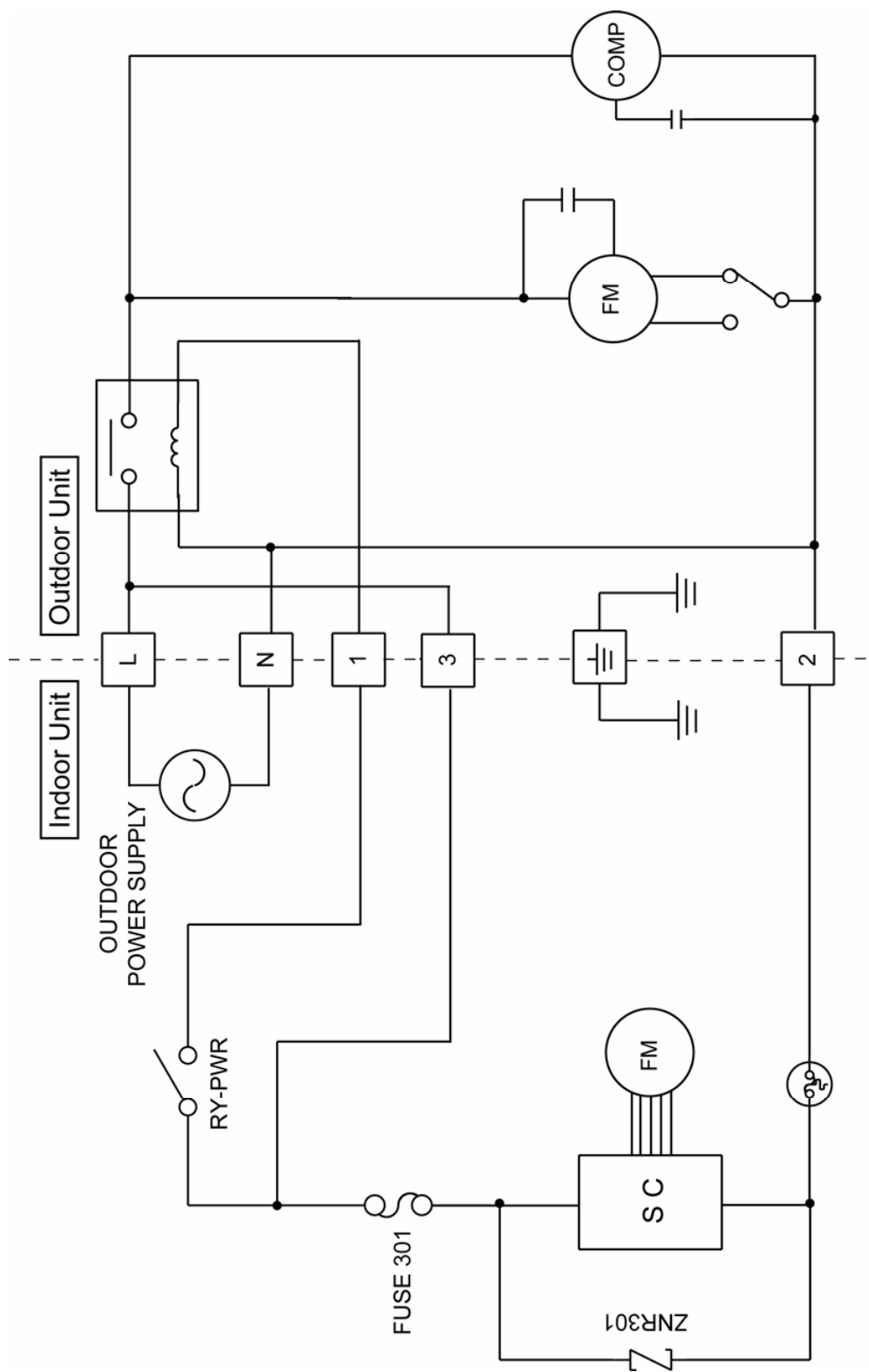
### 7.1.1 CS-C9KKV CU-C9KKV CS-C12KKV CU-C12KKV



7.1.2 CS-C18KKV CU-C18KKV CS-C24KKV CU-C24KKV

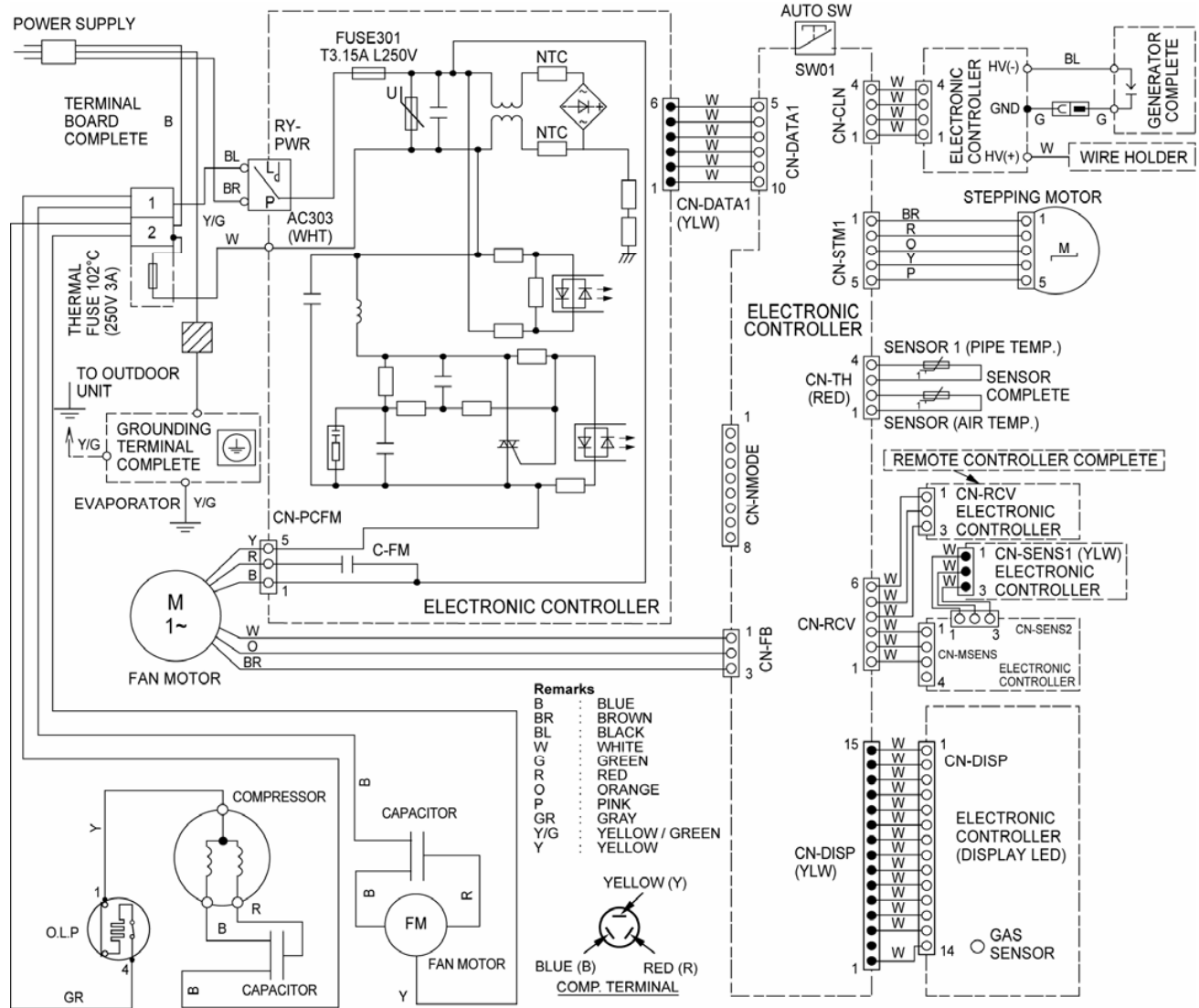


7.1.3 CS-C28KKV CU-C28KKV



# 8. Wiring Connection Diagram

## 8.1 CS-C9KKV CU-C9KKV



Resistance of Indoor Fan Motor Windings

MODEL	CS-C9KKV
CONNECTION	CWA921420
BLUE-YELLOW	192Ω
YELLOW-RED	226Ω

Note: Resistance at 25°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-C9KKV
CONNECTION	2R13C236BSC
C-R	3.298Ω
C-S	5.500Ω

Note: Resistance at 20°C of ambient temperature.

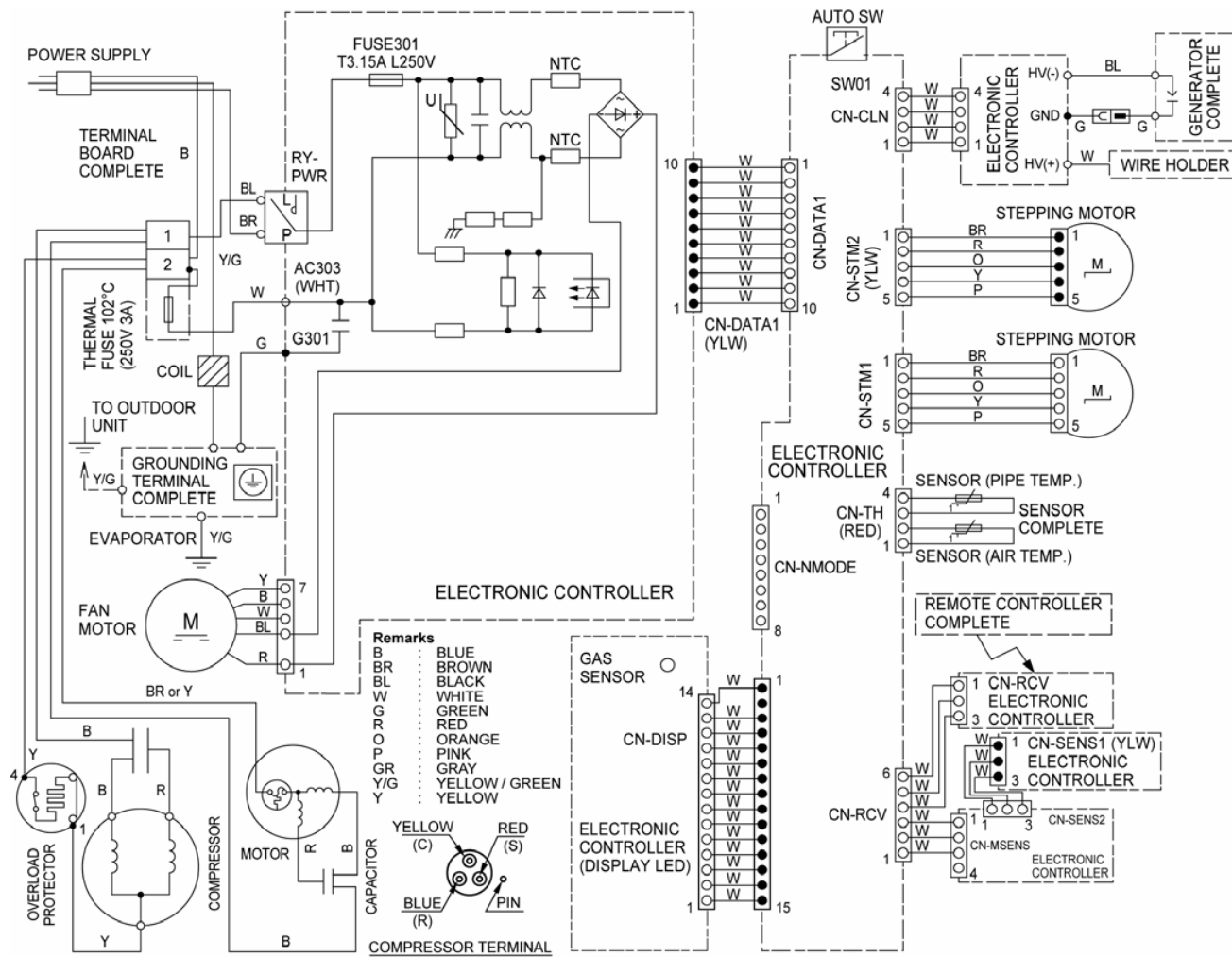
Resistance of Outdoor Fan Motor Windings

MODEL	CU-C9KKV
CONNECTION	CWA951562
BLUE-YELLOW	307.4Ω
YELLOW-RED	202.4Ω

Note: Resistance at 20°C of ambient temperature.



### 8.3 CS-C18KKV CU-C18KKV



Resistance of Outdoor Fan Motor Windings

MODEL	CU-C18KK
CONNECTION	CWA951401J
BLUE-YELLOW	59.47Ω
YELLOW-RED	60.95Ω

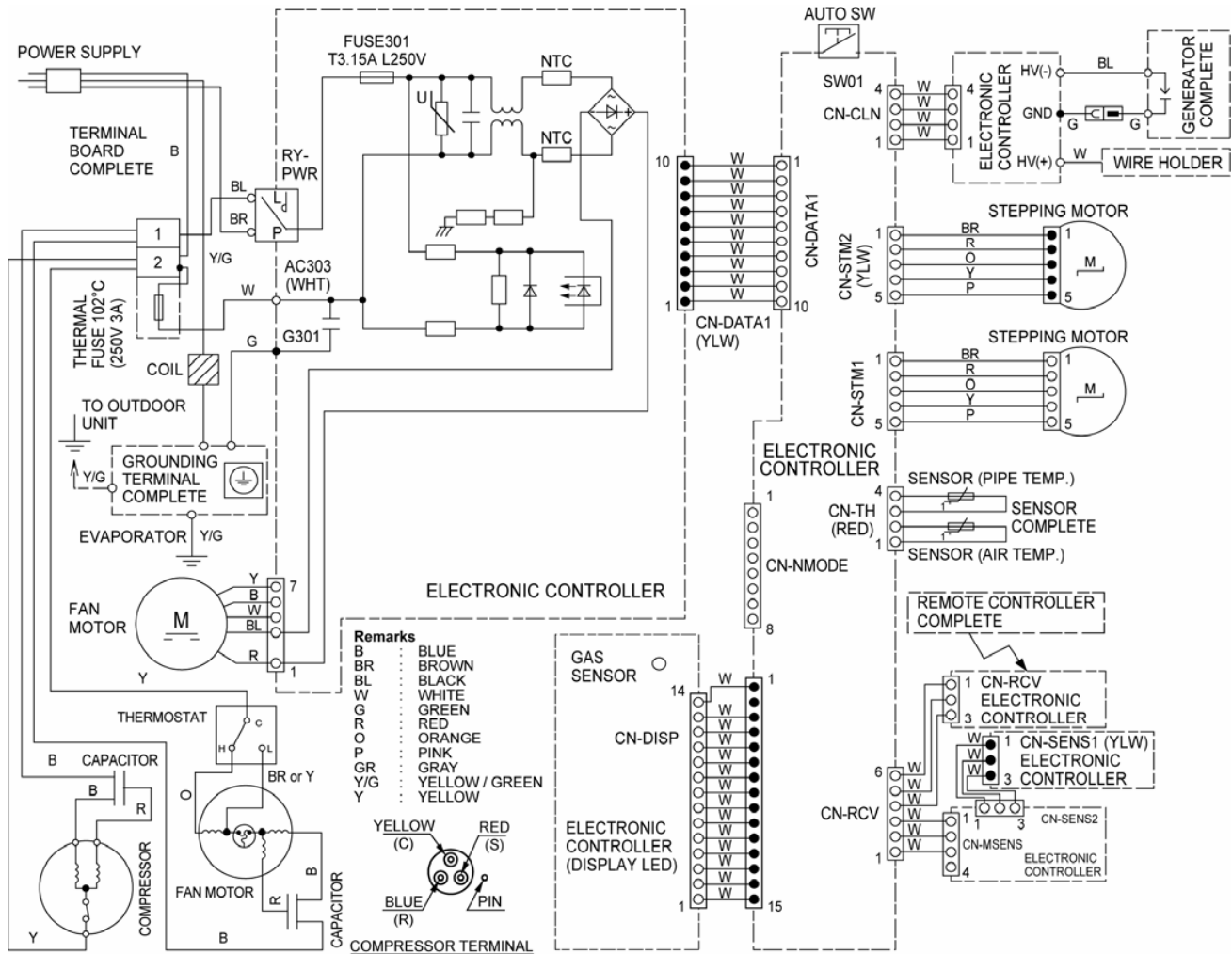
Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

MODEL	CU-C18KK
CONNECTION	2KS252F5AA04
C-R	1.959Ω
C-S	3.083Ω

Note: Resistance at 20°C of ambient temperature.

## 8.4 CS-C24KKV CU-C24KKV



Resistance of Outdoor Fan Motor Windings

MODEL	CU-C24KK
CONNECTION	CWA951399J
BLUE-YELLOW	59.47Ω
YELLOW-RED	60.95Ω
YELLOW-ORANGE	80.58Ω

Note: Resistance at 20°C of ambient temperature.

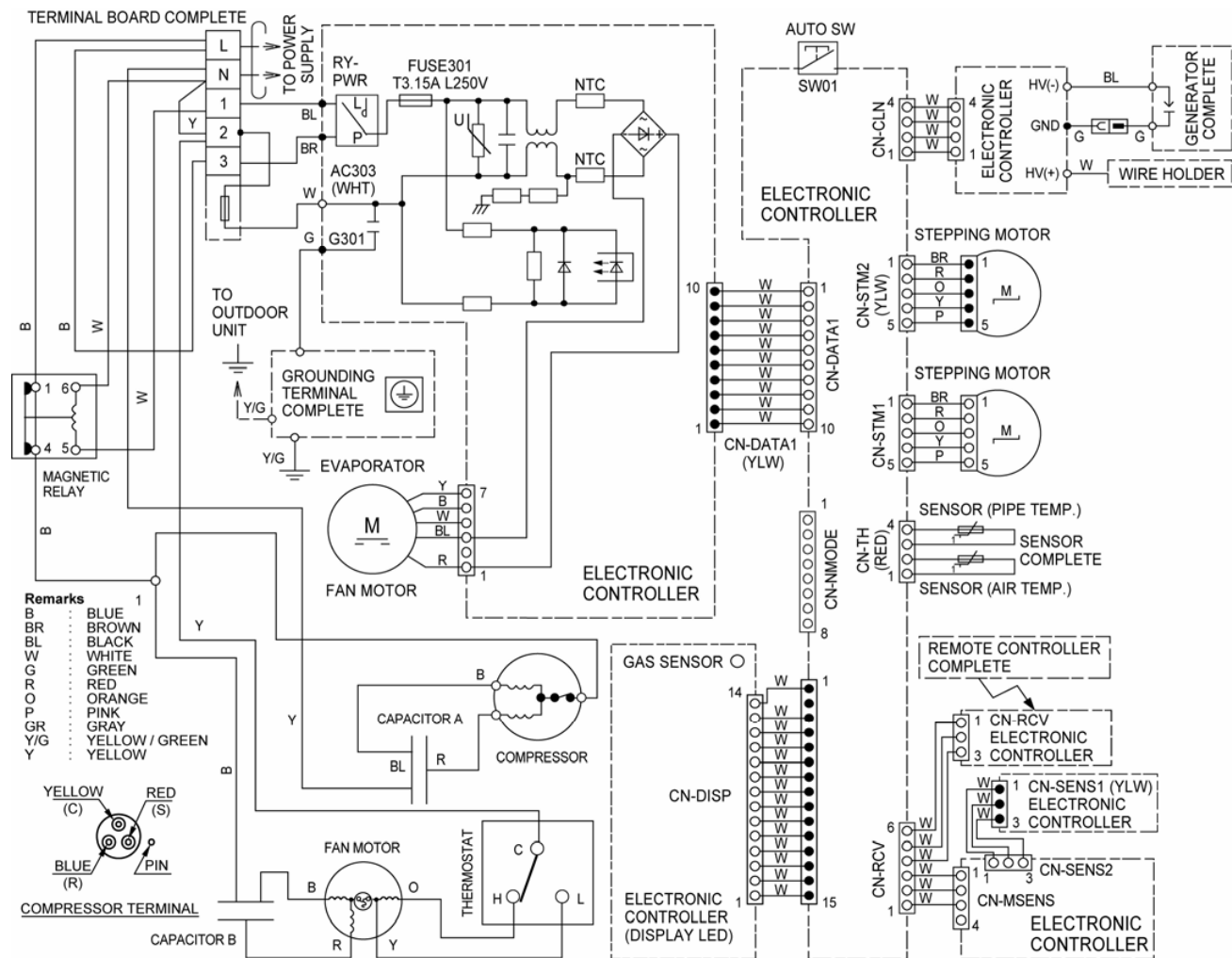
Resistance of Compressor Windings

MODEL	CU-C24KK
CONNECTION	2J39S236A1A
C-R	0.933Ω
C-S	1.584Ω

Note: Resistance at 20°C of ambient temperature.



## 8.5 CS-C28KKV CU-C28KKV



Resistance of Outdoor Fan Motor Windings

MODEL	CU-C28KK
CONNECTION	CWA951357
YELLOW-BLUE	59.8Ω
YELLOW-ORANGE	68.6Ω
YELLOW-RED	66.9Ω

Note: Resistance at 20°C of ambient temperature.

Resistance of Compressor Windings

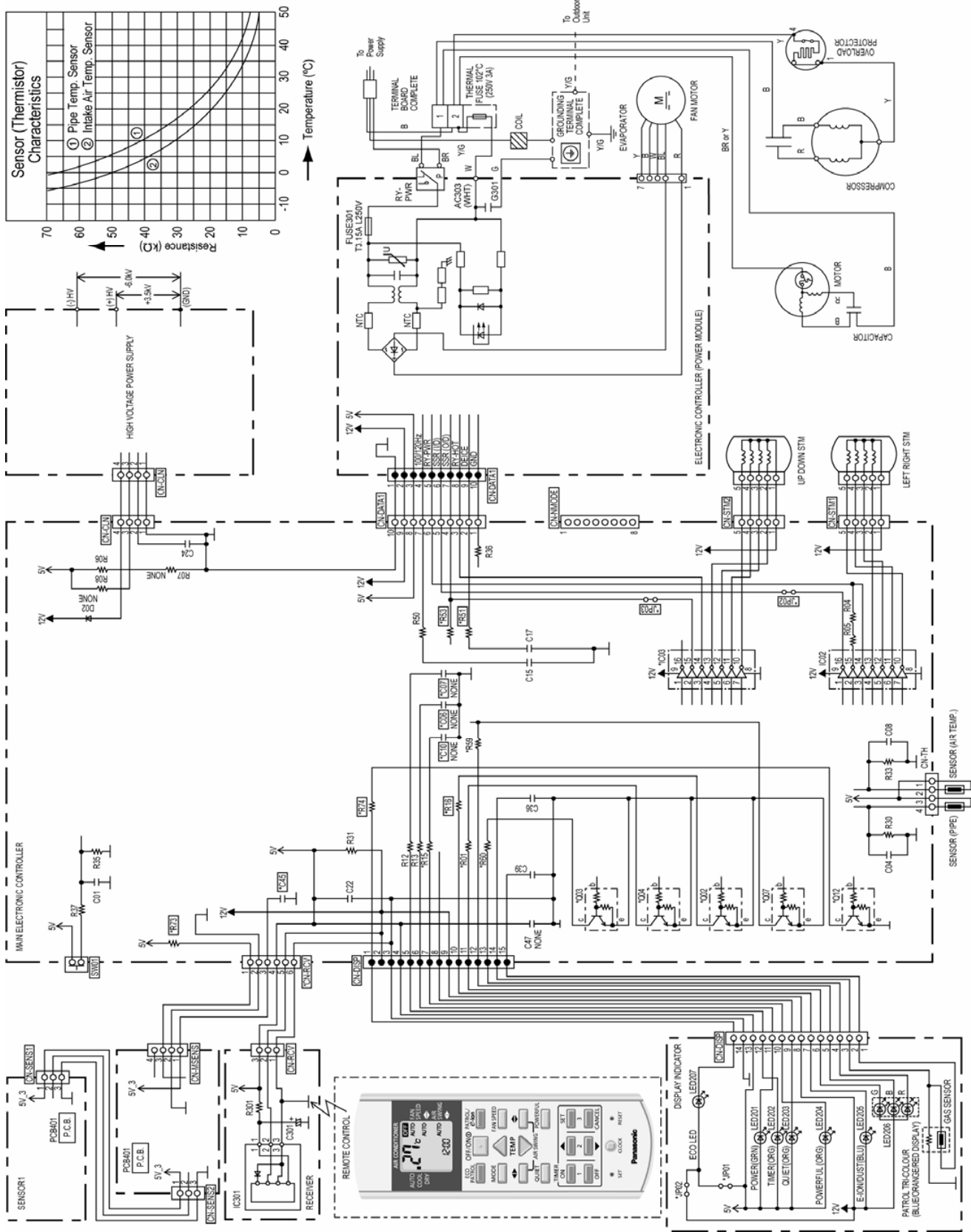
MODEL	CU-C28KK
CONNECTION	2JD488H3AA03
C-R	0.624Ω
C-S	1.821Ω

Note: Resistance at 20°C of ambient temperature.

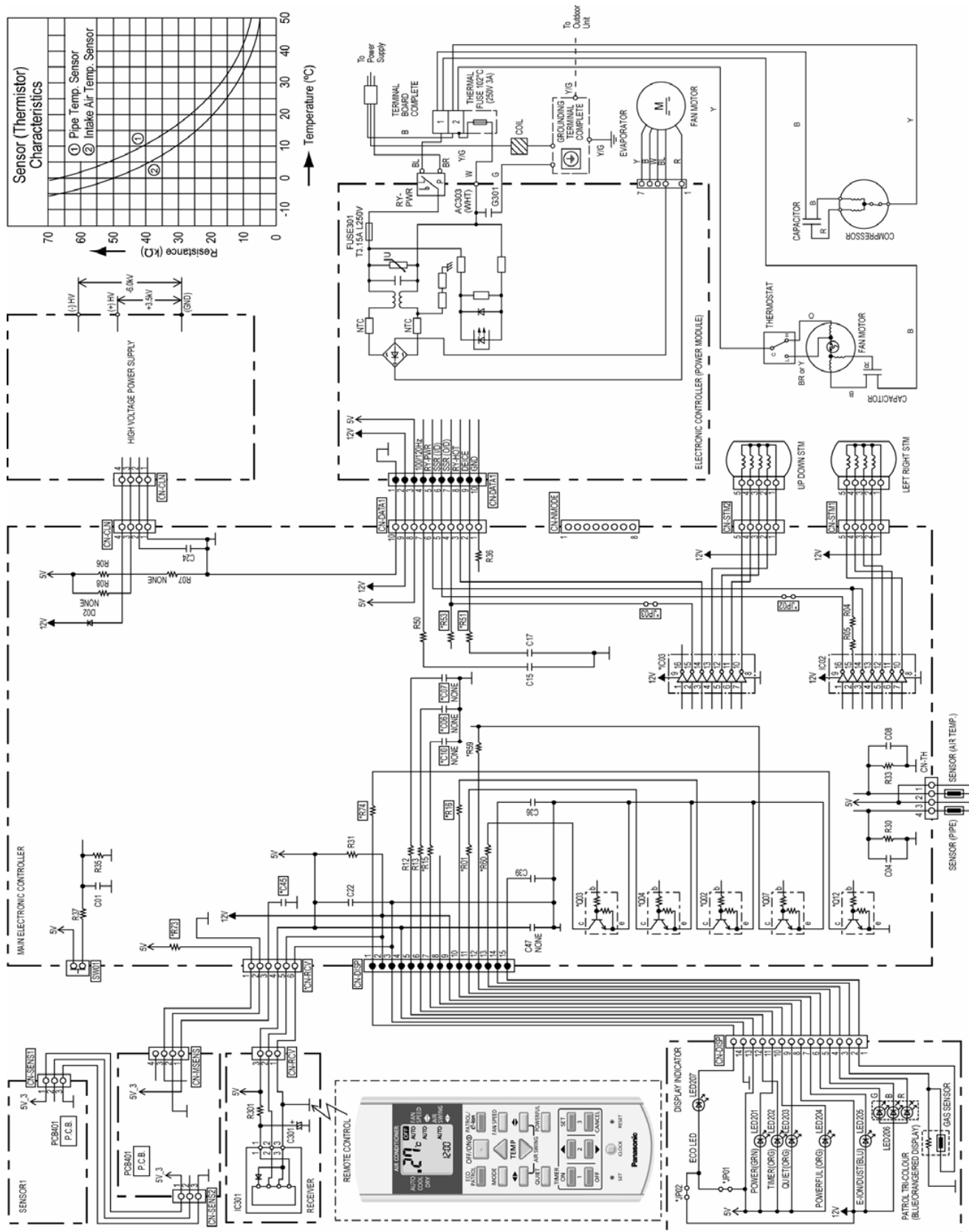




### 9.3 CS-C18KKV CU-C18KKV



## 9.4 CS-C24KKV CU-C24KKV

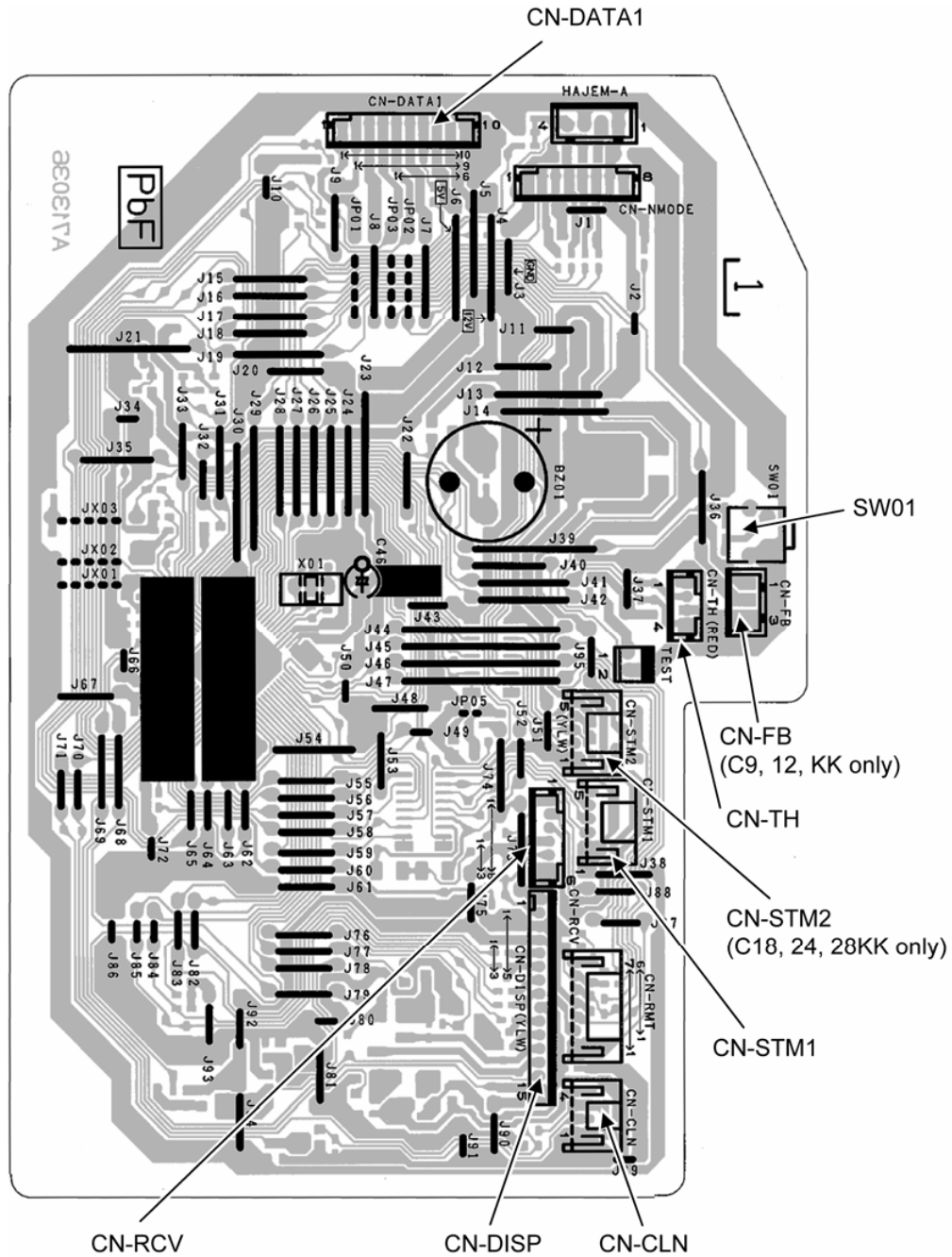




# 10. Printed Circuit Board

## 10.1 Indoor Unit

### 10.1.1 Main Printed Circuit Board

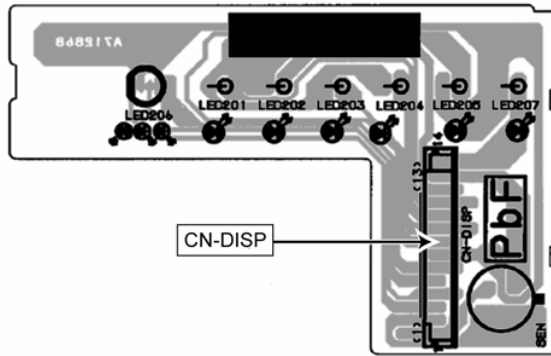




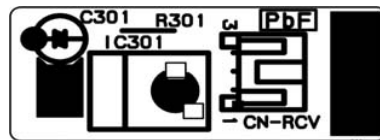




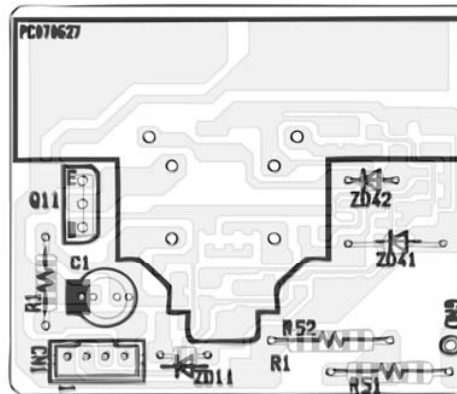
### 10.1.3 Indicator Printed Circuit Board



### 10.1.4 Receiver Printed Circuit Board



### 10.1.5 High Voltage Power Supply Printed Circuit Board



# 11. Installation Instruction

## 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

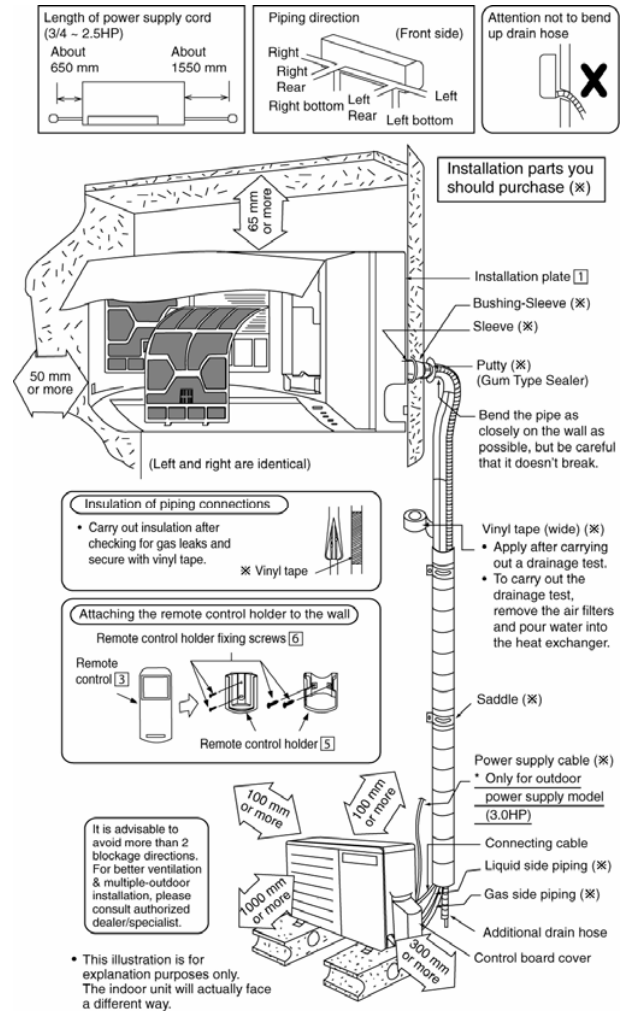
- If an awning is built over the unit to prevent direct sunlight or rain, be careful that heat radiation from the condenser is not obstructed.
- There should not be any animal or plant which could be affected by hot air discharged.
- Keep the spaces indicated by arrows from wall, ceiling, fence or other 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***	1.0~1.5HP	3/8"	1/4"	7.5	5	3	10	10	7.5
C12***	1.5HP				5	3	15	10	7.5
C18***	2.0HP	1/2"	1/4"	5	20	3	25	20	7.5
C24***	2.5HP				20	3	25	30	7.5
C28***	3.0HP	5/8"			20	3	30	30	7.5

Example: For C18\*\*\*

If the unit is installed at 10 m distance, the quantity of additional refrigerant should be 50 g ....  $(10-7.5) \text{ m} \times 20 \text{ g/m} = 50 \text{ g}$ .

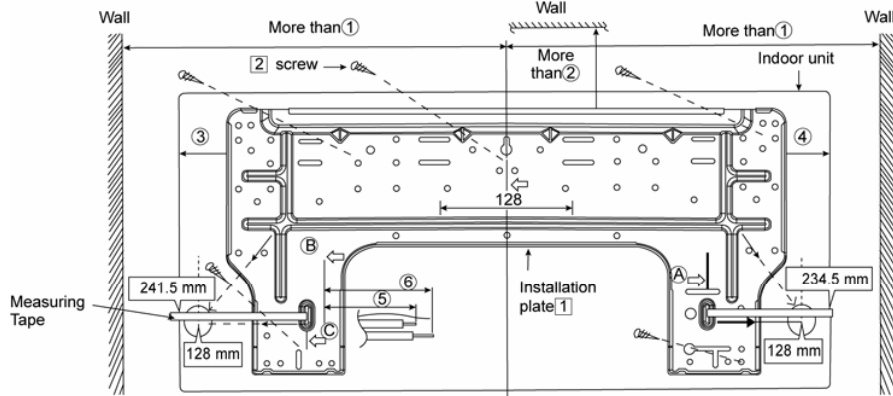
### 11.1.3 Indoor/Outdoor Unit Installation Diagram



## 11.2 Indoor Unit

### 11.2.1 How to Fix Installation Plate

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



Model	Dimension					
	①	②	③	④	⑤	⑥
C9***, C12***	485 mm	82 mm	165 mm	158 mm	43 mm	95 mm
C18***, C24***, C28***	585 mm	82 mm	165 mm	158 mm	169 mm	219 mm

The centre 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.

- 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.
- Drill the piping plate hole with  $\varnothing 70$ 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 3)

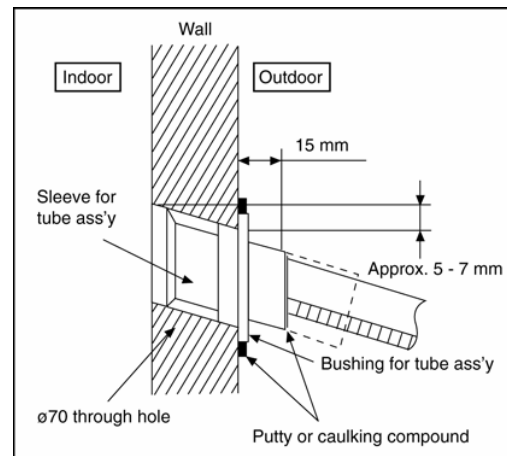
### 11.2.2 To Drill a Hole in the Wall and Install a Sleeve of Piping

- Insert the piping sleeve to the hole.
- Fix the busing to the sleeve.
- Cut the sleeve until it extrudes about 15mm from the wall.

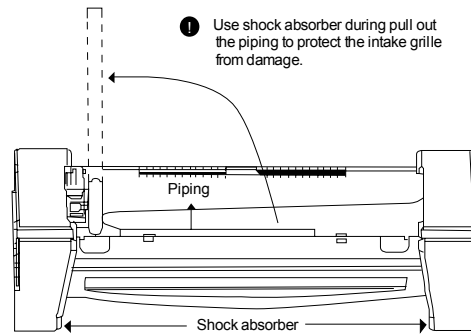
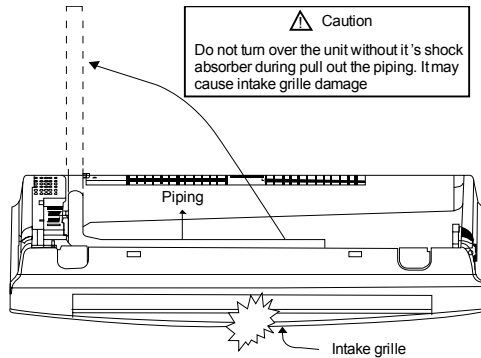
#### ⚠ Caution

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

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



## 11.2.3 Indoor Unit Installation



### 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
  - If indoor power supply, excess length of power supply must arrange accordingly, please refer "Power supply cord arrangement" before secure the indoor unit.
- Step-4** Insert the connecting cable

### 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 connecting cable
- Step-4** Secure the Indoor Unit
  - If indoor power supply, excess length of power supply must arrange accordingly, please refer "Power supply cord arrangement" before 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 connecting cable into Indoor Unit
  - The inside and outside connecting 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 "Piping and finishing" column of outdoor section and "Insulation of piping connection" column as mentioned in indoor/outdoor unit installation.
- Step-8** Secure the Indoor Unit

**Right Rear piping**

Tape it with piping in a position as mentioned in Fig. below.

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

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

**Right and Right Bottom piping**

Tape it with piping in a position as mentioned in Fig. below.

**Install the indoor unit**

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

**Secure the Indoor Unit**

- Power supply cord arrangement**  
Excess length of power supply cord should be arranged behind the chassis at piping keeping area as shown in the diagram without tying up in a bundle. Ensure that the power supply cord is not clamped in between unit's hook (2 position) and installation plate. Ensure that the power supply cord is not stretched between chassis back and installation plate. It may create squeak sound.

**WARNING**

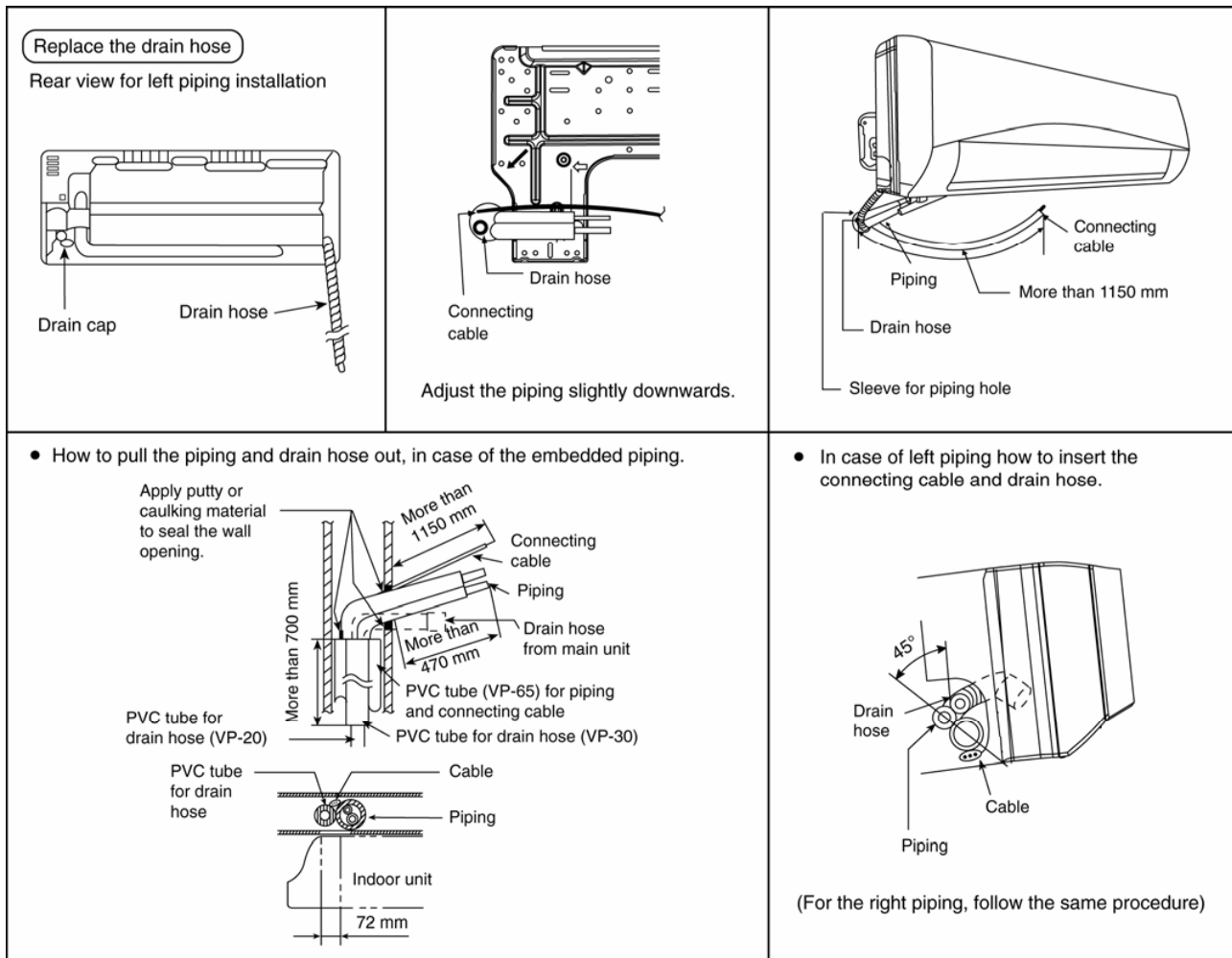
Do not tie up power supply cord into a bundle by band. It may generate heat and cause fire.

- Press the lower left and right side of the unit against the installation plate until hooks engages with their slot (sound click).

**Insert the connecting cable**

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

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

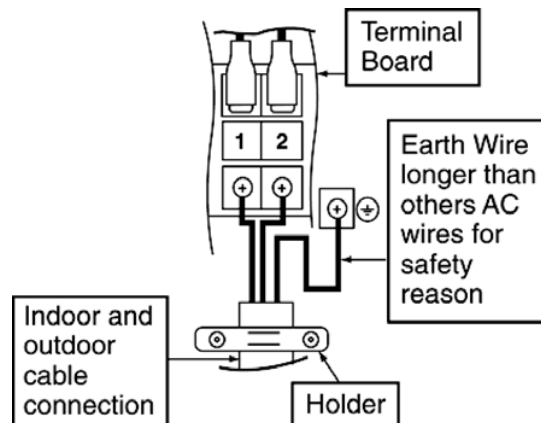


## 11.2.4 Connect the Cable to the Indoor Unit

### a) INDOOR POWER SUPPLY MODEL (1.0 ~ 2.5HP)

Connecting cable between indoor unit and outdoor unit shall be approved polychloroprene sheathed  $3 \times 1.5 \text{ mm}^2$  (1.0 ~ 1.5HP) or  $3 \times 2.5 \text{ mm}^2$  (2.0 ~ 2.5HP) flexible cord, type designation 245 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	
Colour of wires			
Terminals on the outdoor unit	1	2	

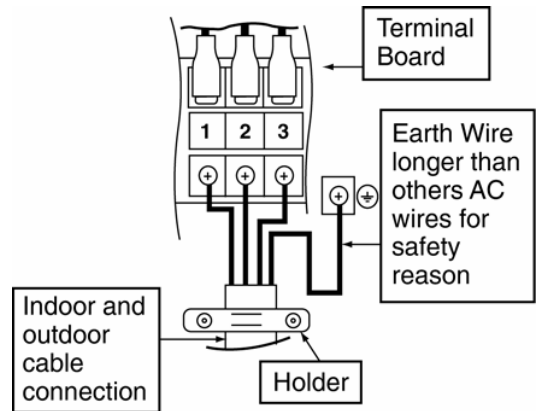


- Secure the connecting cable onto the control board with the holder.
- This equipment must be properly earthed.

**b) OUTDOOR POWER SUPPLY MODEL (3.0HP)**

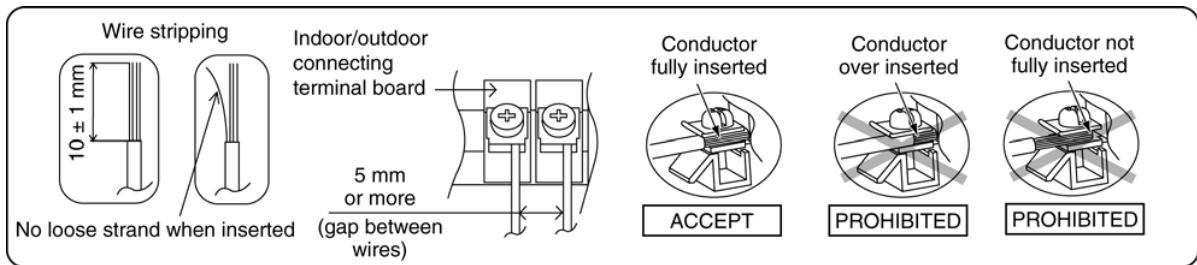
**Connecting cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4 x 1.5 mm<sup>2</sup> (1.0 ~ 3.0HP) flexible cord, type designation 245 IEC 57 or heavier cord. Do not use joint connection cable. Replace the wire if the existing wire (from concealed wiring, or otherwise) is too short.

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



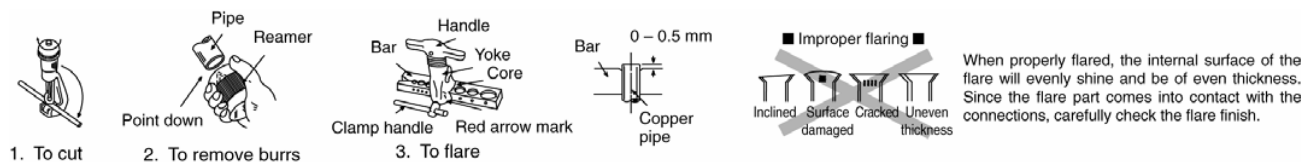
- Secure the connecting cable onto the control board with the holder.
- This equipment must be properly earthed.
- Ensure the colour of wires of outdoor unit and the terminal Nos. are the same to the indoor's respectively.
- Earth wire shall be Yellow/Green (Y/G) in colour and longer than the other AC wires for safety reason.

**11.2.5 Wire Stripping And Connecting Requirement**



**11.2.5.1 Cutting and flaring the piping**

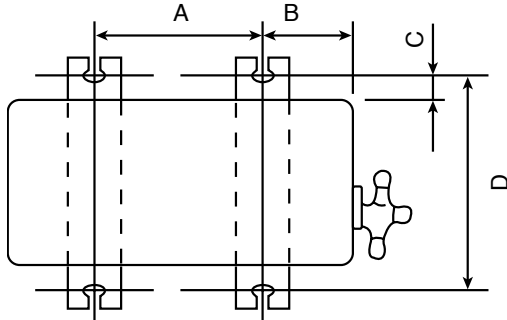
- 1 Please cut using pipe cutter and then remove the burrs.
- 2 Remove the burrs by using reamer. If burrs are not removed, gas leakage may be caused. Turn the piping end down to avoid the metal powder entering the pipe.
- 3 Please make flare after inserting the flare nut onto the copper pipes.



## 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.
  - Fix the unit on concrete or rigid frame firmly and horizontally by bolt nut ( $\phi 10\text{mm}$ ).
  - 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***	570 mm	105 mm	18.5 mm	320 mm
C18***, C24***, C28***	612.5 mm	131 mm	19 mm	383 mm

### 11.3.2 Connecting the Piping

#### 11.3.2.1 Connecting the piping to indoor unit

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

Connect the piping

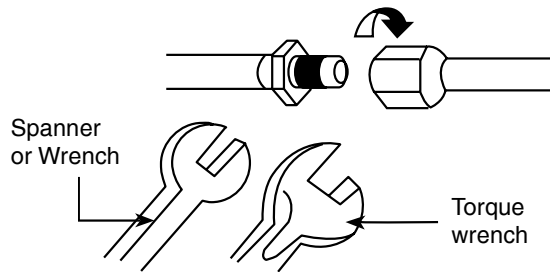
- Align the center of piping and sufficiently tighten the flare nut with fingers.
- Further tighten the flare nut with torque wrench in specified torque as stated in the table.


#### 11.3.2.2 Connecting the piping to outdoor unit

Decide piping length and then cut by using pipe cutter. Remove burrs from cut edge.

Make flare after inserting the flare nut (locate at valve) onto the copper pipe.

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

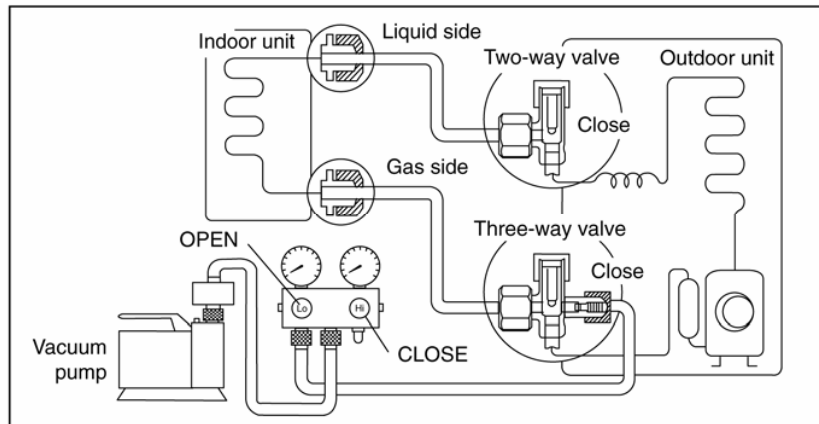


 CAUTION	
Do not overtighten, overtightening may cause gas leakage	
Piping size	Torque
1/4" (6.35 mm)	[18 N•m (1.8 kgf.m)]
3/8" (9.52 mm)	[42 N•m (4.3 kgf.m)]
1/2" (12.7 mm)	[55 N•m (5.6 kgf.m)]
5/8" (15.88 mm)	[65 N•m (6.6 kgf.m)]
3/4" (19.05 mm)	[100 N•m (10.2 kgf.m)]



### 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.
  - o 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 REFRIGERANT GAS LEAKAGE.
- 5 Disconnect the charging hose from the vacuum pump and from the service port of the 3-way valve.
- 6 Tighten the service port caps of the 3-way valve at a torque of 18 N•m with a torque wrench.
- 7 Remove the valve caps of both of the 2-way valve and 3-way valve. Position both of the valves to "OPEN" using a hexagonal wrench (4 mm).
- 8 Mount valve caps onto the 2-way valve and the 3-way valve.
  - o Be sure to check for gas leakage.

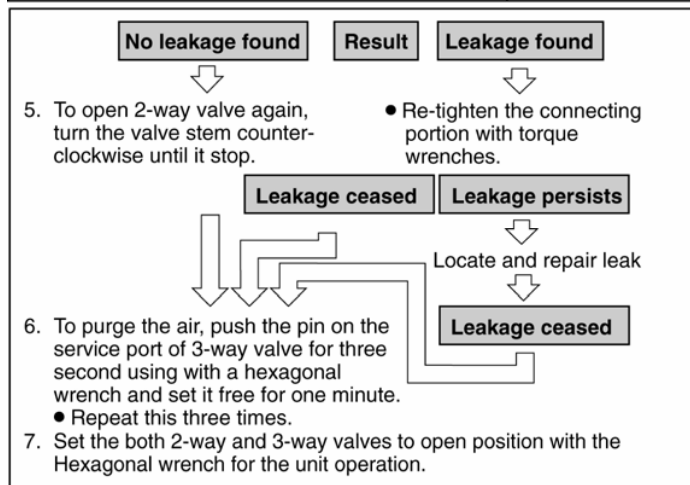
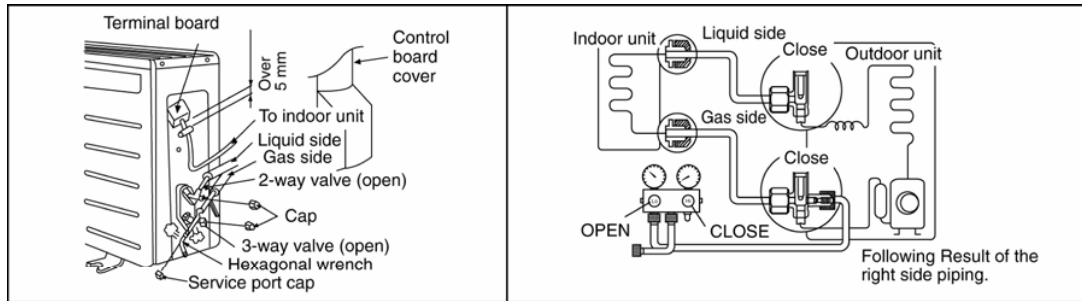
#### CAUTION

- If gauge needle does not move from 0 cmHg (0 MPa) to -76 cmHg (-0.1 MPa), in 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.

### 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.
  - o 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.

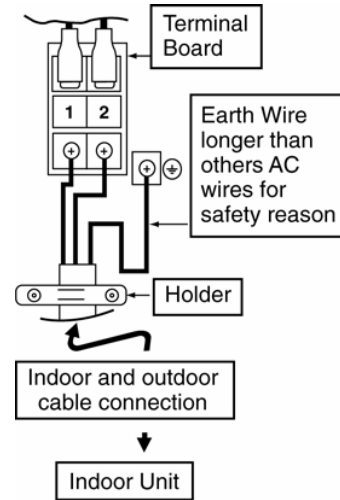
### 11.3.5 Connect the cable to the Outdoor Unit

#### a) INDOOR POWER SUPPLY MODEL (1.0 ~ 2.5HP)

- 1 Remove the control board cover from the unit by loosening the screw.
- 2 **Connecting cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 3 x 1.5mm<sup>2</sup> (1.0 ~ 1.5HP) or 3 x 2.5mm<sup>2</sup> (2.0 ~ 2.5HP) flexible cord, type designation 245 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	Grey	Grey	Black
Terminals on the indoor unit	1	2	⊕

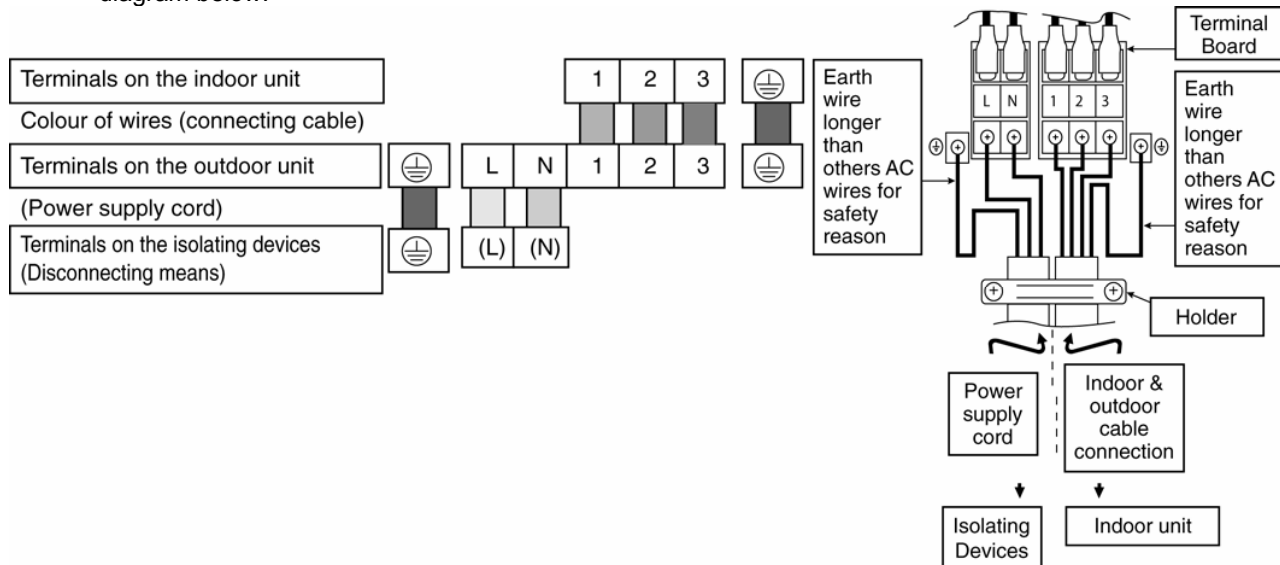
- 3 Secure the cable onto the control board with the holder.
- 4 Attach the control board cover back to the original position with the screw.
- 5 For wire stripping and connection requirement, refer to instruction ⑤ of the indoor unit.



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

#### b) OUTDOOR POWER SUPPLY MODEL (3.0HP)

- 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<sup>2</sup> (3.0HP) type designation 245 IEC 57 or heavier cord to the terminal board, and connect the other 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 (3.0HP). Wiring work to both socket and plug must follow to national wiring standard.
- 3 **Connecting cable** between indoor unit and outdoor unit shall be approved polychloroprene sheathed 4 x 1.5 mm<sup>2</sup> flexible cord, type designation 245 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 connecting cable between indoor unit and outdoor unit according to the diagram below.



- 5 Secure the power supply cord and connecting 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 ⑤ of the indoor unit.
- ⊕ This equipment must be properly earthed.
  - Isolating Devices (Disconnecting means) should have minimum 3.0mm contact gap.
  - Earth wire shall be Yellow/Green (Y/G) in colour and longer than other AC wires for safety reason.

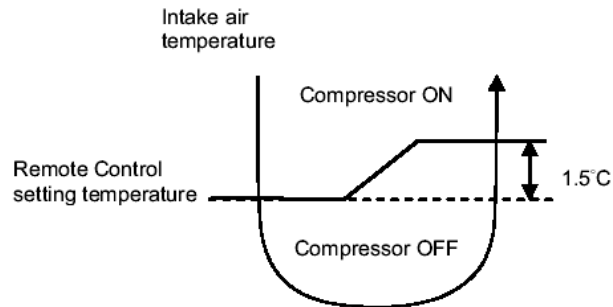
### **11.3.6 Pipe Insulation**

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

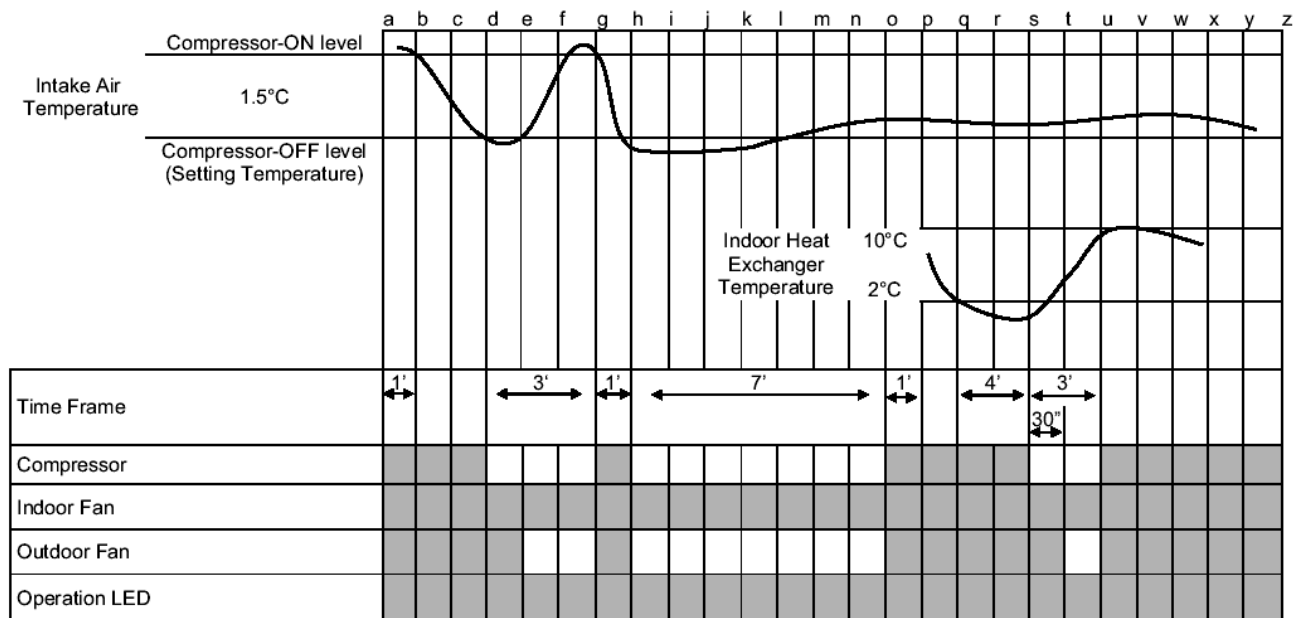
## 12. Operation Control

### 12.1 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:



#### 12.1.1 Cooling Operation Time Diagram (For CS-C9KK CU-C9KK and CS-C12KK CU-C12KK)

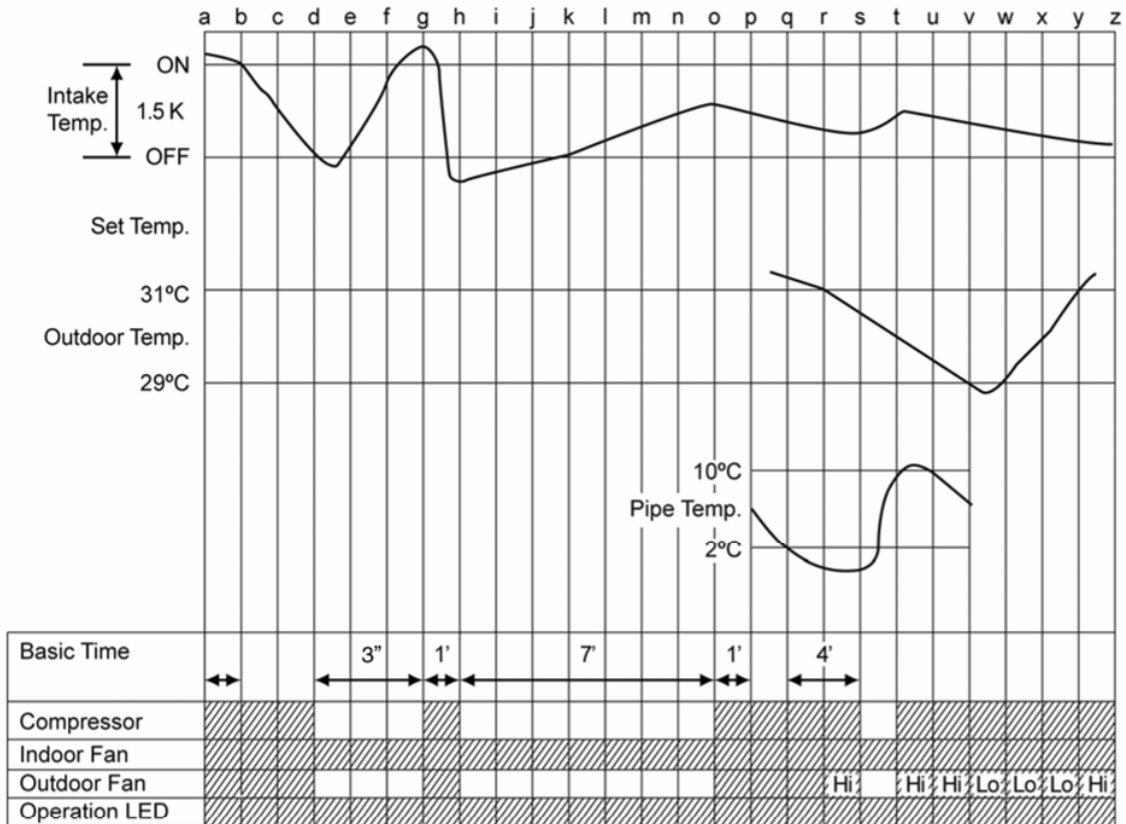


<Description of operation>

- 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

## 12.1.2 Cooling Operation Time Diagram (For CS-C18KK CU-C18KK, CS-C24KK CU-C24KK and CS-C28KK CU-C28KK)



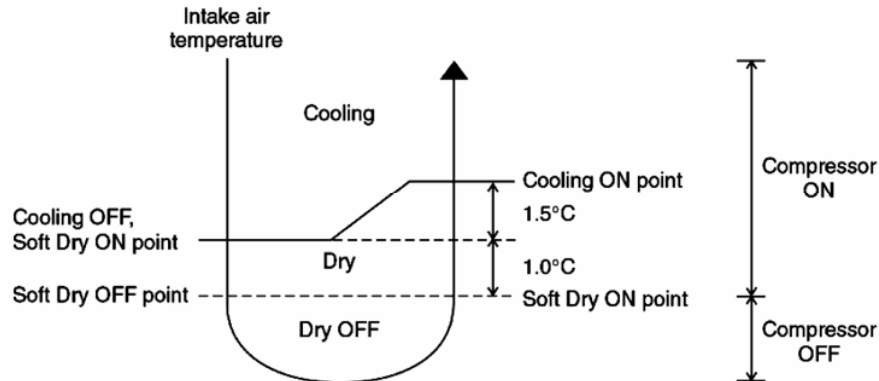
### <Description of operation>

- 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.

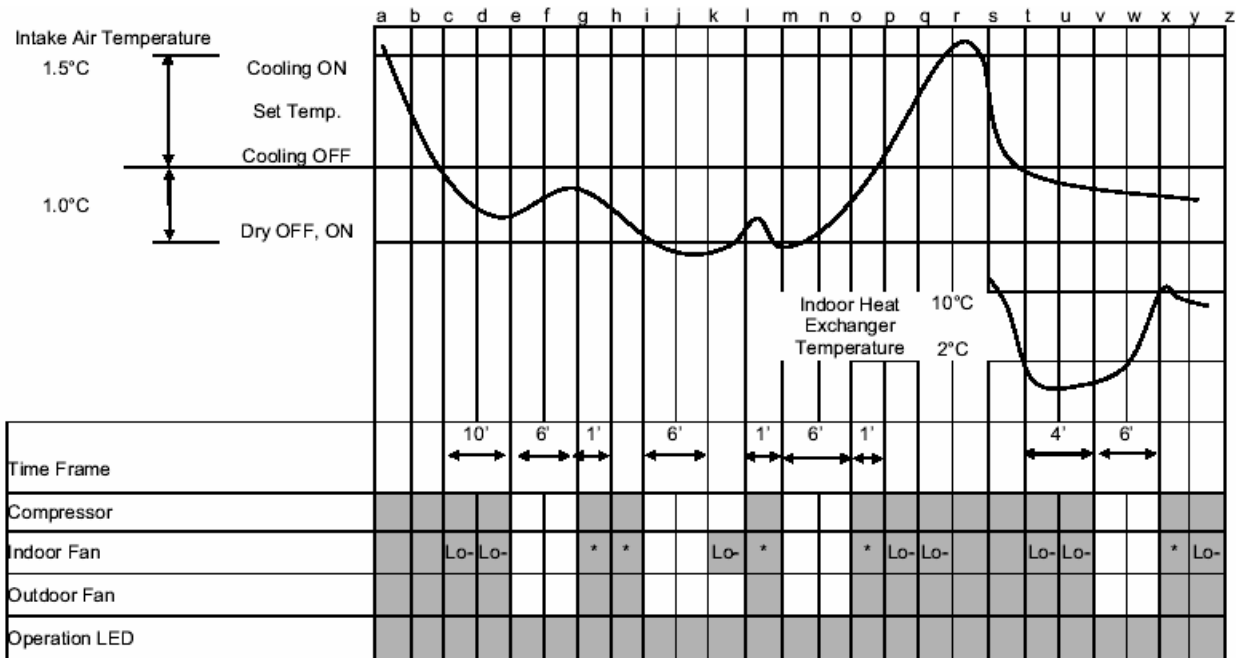


## 12.2 Soft Dry Operation

- Soft Dry operation can be set using remote control.
- Soft Dry operation is applied to dehumidify and to perform a gentle cooling to the room.
- This operation starts when the intake air temperature sensor reaches the setting temperature on the remote control.
- When operation begins, Soft Dry will be switched "ON" for a maximum 10 minutes, then Soft Dry operation will be 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.



### 12.2.1 Soft Dry Operation Time Diagram (For CS-C9KK CU-C9KK and CS-C12KK CU-C12KK)



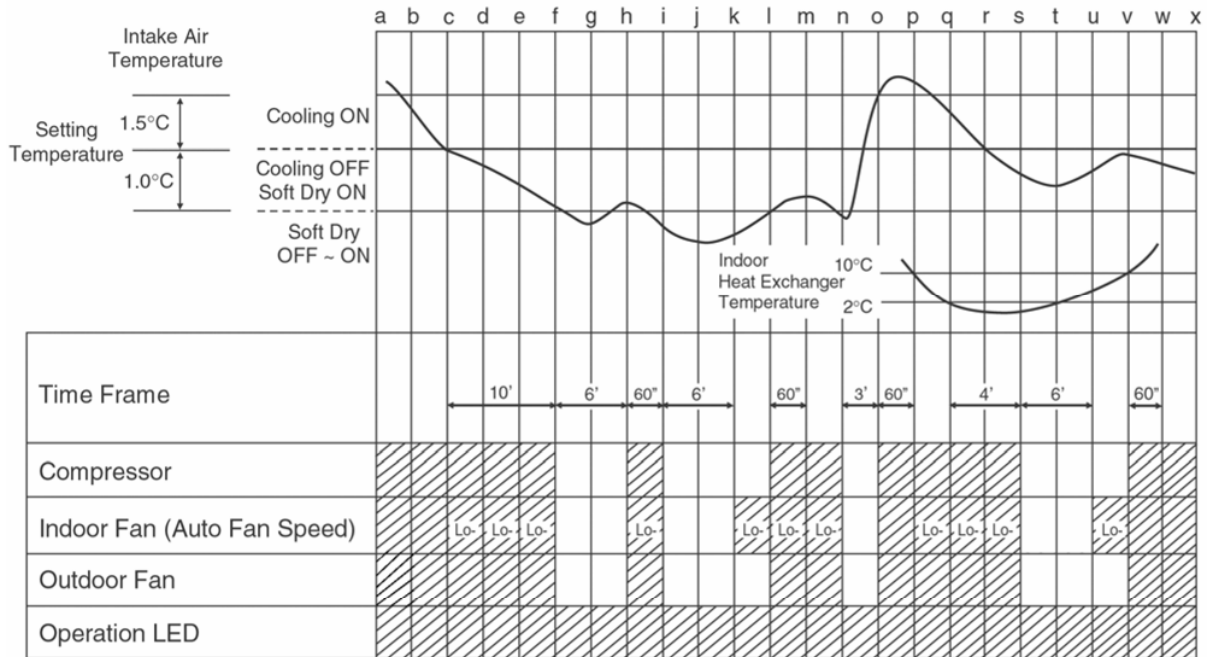
<Description of operation>

- 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

## 12.2.2 Soft Dry Operation Time Diagram (For CS-C18KK CU-C18KK, CS-C24KK CU-C24KK and CS-C28KK CU-C28KK)



<Description of operation>

h - i, l - m, o - p, v - w : Minimum 60 seconds forced 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

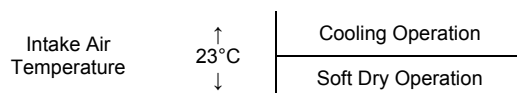
 Operation

 Stop



## 12.3 Automatic Operation

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



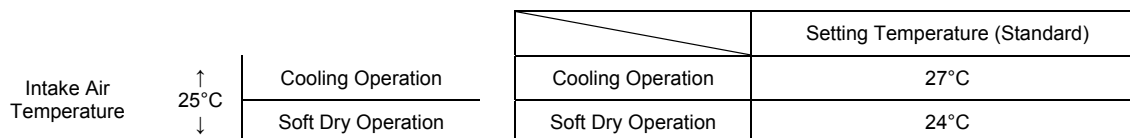
- Then, the unit starts to operate at determined operation mode, until it is switched off using remote control, with the setting temperature as shown in table below.

	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.



## 12.4 Indoor Fan Speed Control

- Indoor fan speed can be set using remote control.

### 12.4.1 Fan Speed Rotation Chart

Speed	Fan Speed (rpm)	
	CS-C9KKV	CS-C12KKV
Shi	1130	1130
Hi	1030	1110
Me	850	930
HLo	690	790
CLo	650	750
Lo-	610	710
SLo	590	690
Qhi	960	1040
QMe	780	860
QLo	580	680

Speed	Fan Speed (rpm)		
	CS-C18KKV	CS-C24KKV	CS-C28KKV
Shi	1390	1500	1530
Hi	1240	1350	1490
Me	1140	1230	1400
HLo	1130	1190	1330
CLo	1050	1110	1250
Lo-	850	970	1050
SLo	670	750	830
Qhi	1150	1150	1400
QMe	1050	1050	1310
QLo	960	960	1160

### 12.4.2 Automatic Fan Speed Control

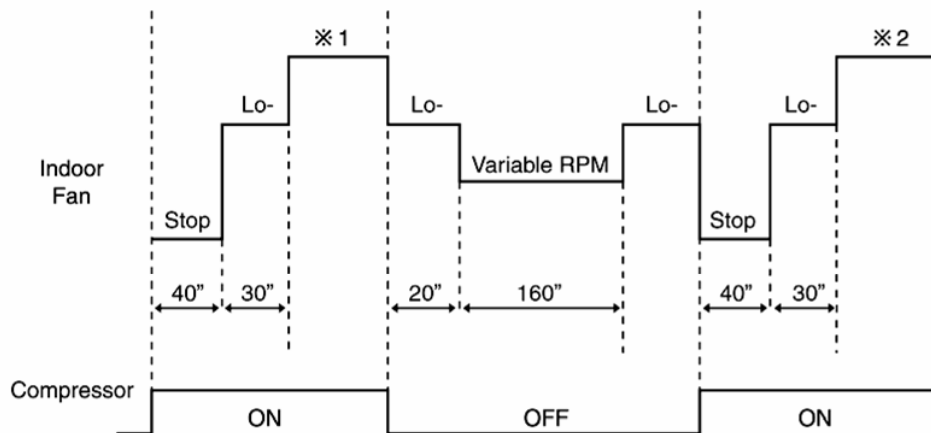
- When set to Auto Fan Speed, the fan speed is adjusted between maximum and minimum setting as shown in the table.
  - Fan speed rotates in the range of Hi and Me (For CS-C9KK and CS-C12KK).
  - Fan speed rotates in the range of Hi, Me and Lo- (For CS-C18KK, CS-C24KK and CS-C28KK).
  - Deodorizing Control will be activated.

For CS-C9KK and CS-C12KK

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

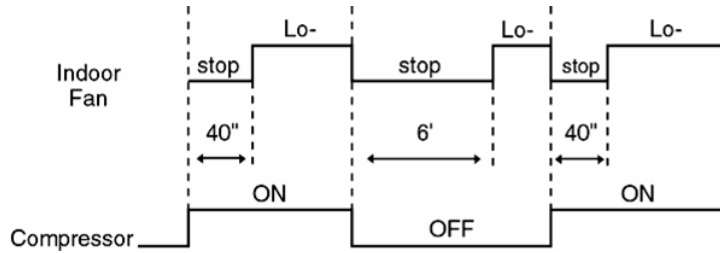
			SHi	Hi	Me	HLo	CLo	Lo-	SLo	Stop
Cooling	Normal	Manual	Hi		o					
			Me		o					
			Lo				o			
	Auto			o	o			o		o
	Quiet	Manual	QHi		Hi-90					
			QMe			Me-90				
			QLo					CLo-90		
Auto			Hi-100	Me-100			o		o	
Powerful	Manual	o								
	Auto	o								
Soft Dry	Normal	Manual						o		o
		Auto						o		o
	Quiet	Manual						o		o
		Auto						o		o

- Auto Fan Speed during cooling operation:
  - Indoor fan will rotate alternately between off and on as shown in below diagram.
  - At the beginning of each compressor starts operation, indoor fan speed increases gradually for deodorizing purpose.
  - 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.
  - 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.
  - 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.
  - 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.



### 12.4.3 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.

### 12.4.4 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  $\geq 2550$  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.

## 12.5 Outdoor Fan Speed Control

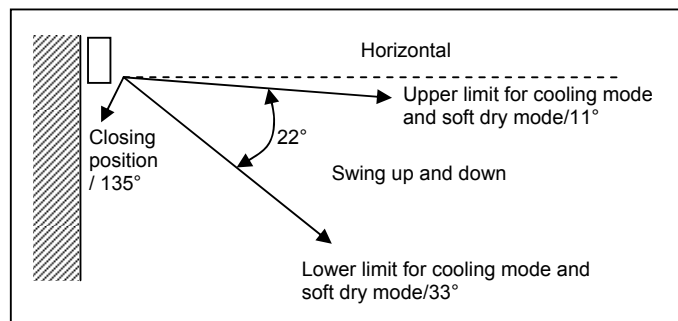
- There is only one speed for outdoor fan motor. (Applicable for CU-C9KK, CU-C12KK and CU-C18KK)
- There is 2 speeds for outdoor fan motor. Outdoor fan speed can be changed to Hi or Lo according to outdoor temperature. (Applicable for CU-C24KK and CU-C28KK).
- For Cooling and Soft Dry operation, when outdoor temperature reaches to  $31^{\circ}\text{C}$  (Hi-speed),  $29^{\circ}\text{C}$  (Lo-speed). (Applicable for CU-C24KK and CU-C28KK).
- 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.

## 12.6 Vertical Airflow Direction Control

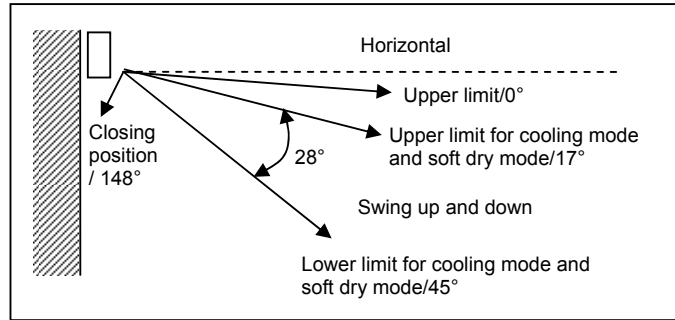
### 12.6.1 Auto Control

- 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-C9KK and CS-C12KK



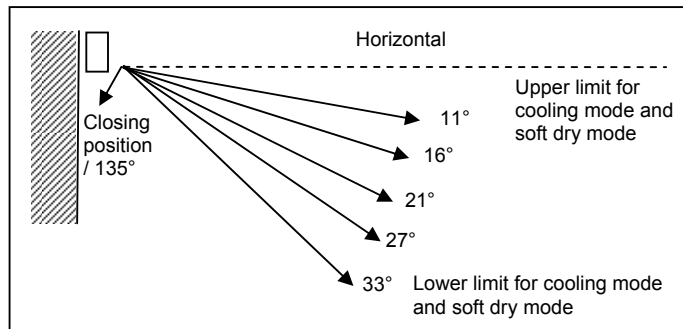
For CS-C18KK, CS-C24KK and CS-C28KK



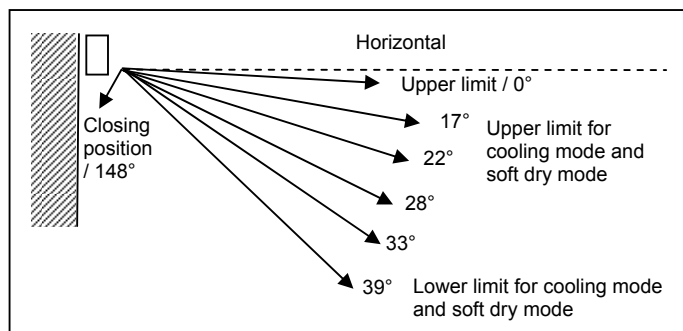
## 12.6.2 Manual Control

- 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-C9KK and CS-C12KK



For CS-C18KK, CS-C24KK and CS-C28KK

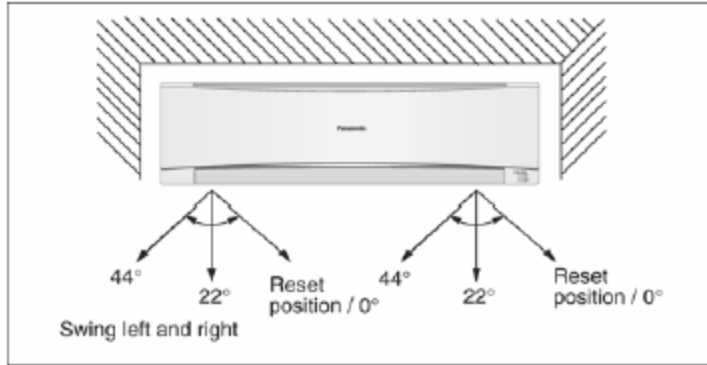


## 12.7 Horizontal Airflow Direction Control

For CS-C9KK and CS-C12KK, the horizontal airflow direction louver can be adjusted manually by hand.  
For CS-C18KK, CS-C24KK and CS-C28KK the horizontal airflow direction louver are as following.

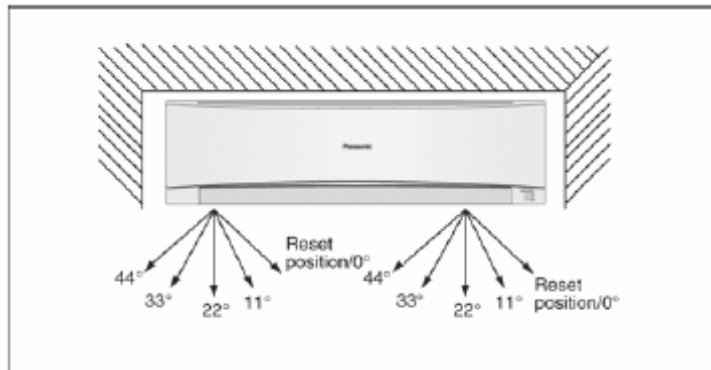
### 12.7.1 Auto Control

- 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 22° angle.



### 12.7.2 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.



## 12.8 Powerful Operation

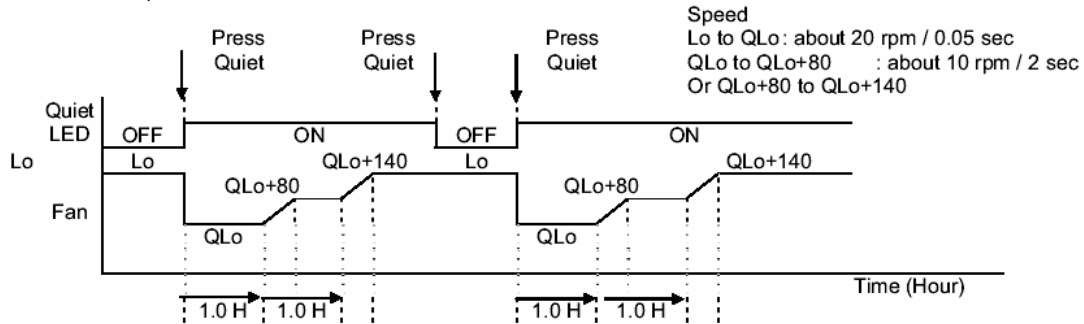
- To achieve the setting temperature quickly.
- When powerful operation is set, the setting temperature will be automatically decreased 3°C internally against the present setting temperature (Lower temperature limit: 16°C).
- This operation automatically running under Shi fan speed (Cooling), Lo- Fan Speed (Soft Dry) is applicable for C9KK and C12KK 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:
  - Quiet/Powerful button is pressed again
  - Powerful operation has operate for 15 minutes.
  - Stopped by OFF/ON operation button.
  - Timer OFF activates
  - Operation mode is changed

## 12.9 Quiet Operation

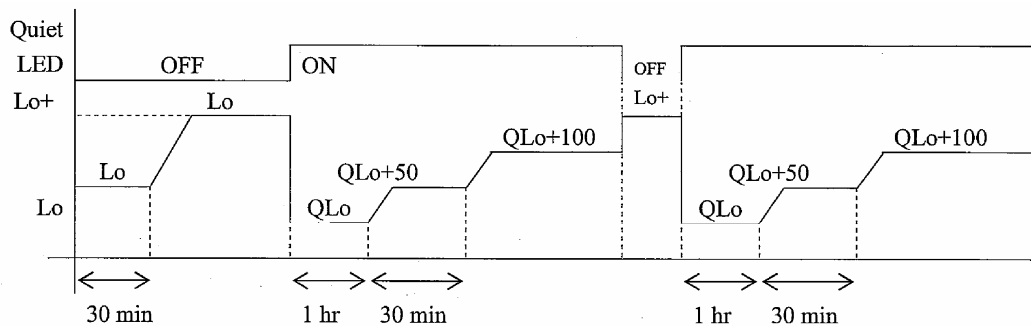
(For Cooling Operation or cooling region of Soft Dry Operation)

- To provide quiet cooling operation condition.
- Once the Quiet Operation is set at the remote control, the Quiet LED illuminated. 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 2 hours (1 hour QLo, 1 hour QLo + 80rpm)(for C9KK and C12KK) and Quiet Lo cool operated only 1 hour 30 minutes (1 hour QLo, 30 minutes QLo + 50 rpm) (for C18KK, C24KK and C28KK).
- Manual Airflow Direction:
  - RPM control during Lo cool

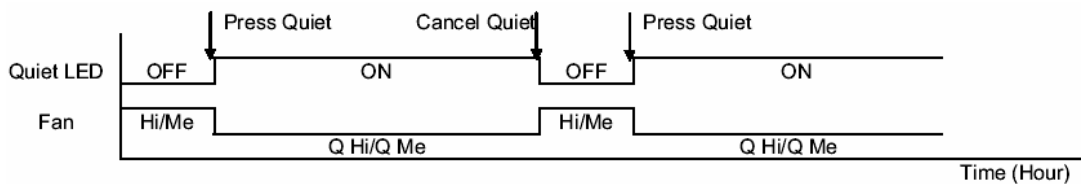
(For C9KK and C12KK)



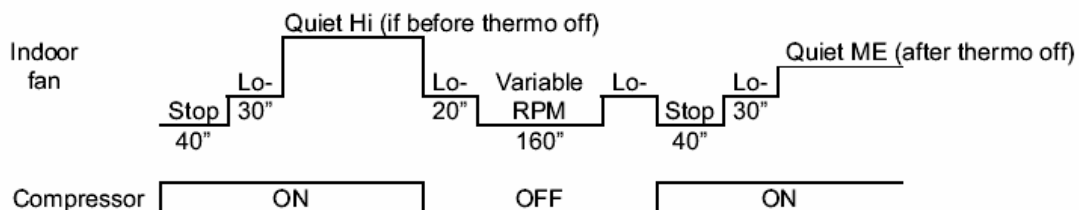
(For C18KK, C24KK and C28KK)



- RPM control during Hi & Me cool



- Auto Fan Speed



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

## **12.10 Timer Control**

### **12.10.1 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.

### **12.10.2 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.

## **12.11 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, fan speed and air swing louver position.
- This Random Auto Restart Control is not available when Timer is set.

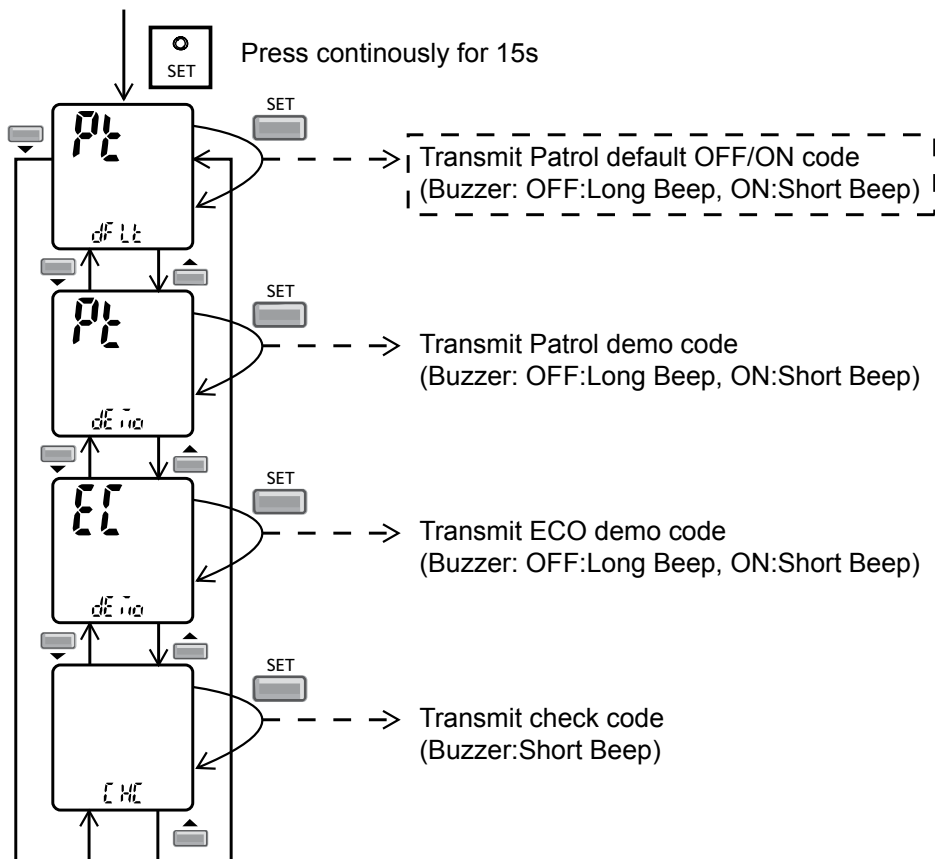
## **12.12 Remote Control Signal Receiving Sound**

- 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.

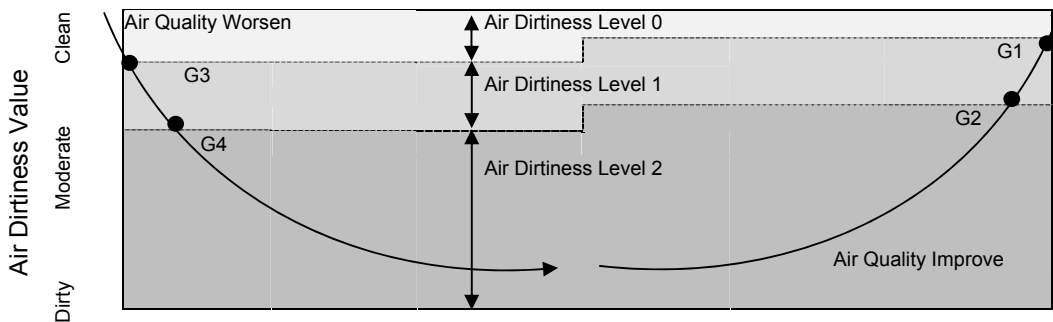


## 12.13 Patrol Operation

- To monitor air dirtiness level by using Patrol sensor and to maintain air freshness by activates e-ion operation
- Patrol operation starts condition
  - When the unit operation is started with “OFF/ON” button
  - When the unit stops, “Patrol” operation is selected, Patrol individual operation will start.
  - During cooling only operation, “Patrol” operation is selected.
- Patrol operation stops condition (when any of the following condition is fulfilled):
  - When “OFF/ON” button is selected.
  - During any operation with Patrol, “PATROL/e-ion” button is pressed.
  - When OFF Timer activates.
- To disable the Patrol Operation during unit starts (default) with “OFF/ON” button
  - Press “Set” button continuously for 15 seconds by using pointer during Air Conditioner is OFF condition to enter internal setting mode.
  - Press “Timer Decrement” button to select “Pt dFLt”.
  - Press “Timer Set” button to toggle Patrol operation default OFF/ON.
    - Long “beep”: Turn OFF Patrol operation default.
    - Short “beep”: Turn ON Patrol operation default.



- Patrol Sensor Control
  - First 2 minutes from Patrol function activates is stabilization time, during stabilization time, no air dirtiness level is monitored. The Air Dirtiness level is set to Clean, Patrol LED turns blue color.
  - After that, Patrol sensor starts to record the resistance value at fixed interval. Higher resistance value indicates cleaner air.
  - The air dirtiness level is monitored by comparing the current resistance value with maximum resistance value from time to time to get the Air Dirtiness Value.
  - There are 3 air dirtiness level, based on the Air Dirtiness Value:
    - Air Dirtiness level 0: Clean – Patrol LED = blue color
    - Air Dirtiness level 1: Moderate – Patrol LED = orange color
    - Air Dirtiness level 2: Contaminated – Patrol LED = red color



- Dirtiness level sensitivity adjustment
 

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

  - 1 Press and release “SET” button.
  - 2 Press Timer ▲ / Timer ▼ button to select sensitivity.  
(Air 1 “Low Sensitivity” ↔ Air 2 “Standard” (Default) ↔ Air 3 “High Sensitivity”)
  - 3 Confirm setting by pressing “Timer Set” button. LCD returned to original display after 2 seconds.
  - 4 LCD returned to original display if remote control does not operate for 30 seconds

- e-ion Control
  - e-ion operation starts condition
    - When dirtiness at level 2 (Patrol LED turns red).
    - 2 minutes after stabilization time (Patrol LED turns red).
    - 4 hours at level 0 (Patrol LED turns red).
  - e-ion operation time
    - If dirtiness level improves from level 2 to level 1 (Patrol LED from red to orange), the unit carries out level change after 60 seconds.
    - When dirtiness level returns to level 0 (Patrol LED turns blue) continuously for 11 minutes or more, e-ion operation stops.

- Dirtiness Level and fan speed
  - When e-ion operation starts, the fan speed increases based on dirtiness level:

	Dirtiness level	rpm shift		
		Patrol individual operation	Combine operation	
			Auto	Manual
e-ion ON	Dirtiness level 0	No change	No change	No change
	Dirtiness level 1	Me -	+ 20	+1 fan tap (max - Hi)
	Dirtiness level 2	Me	+ 40	+2 fan tap (max - Hi)

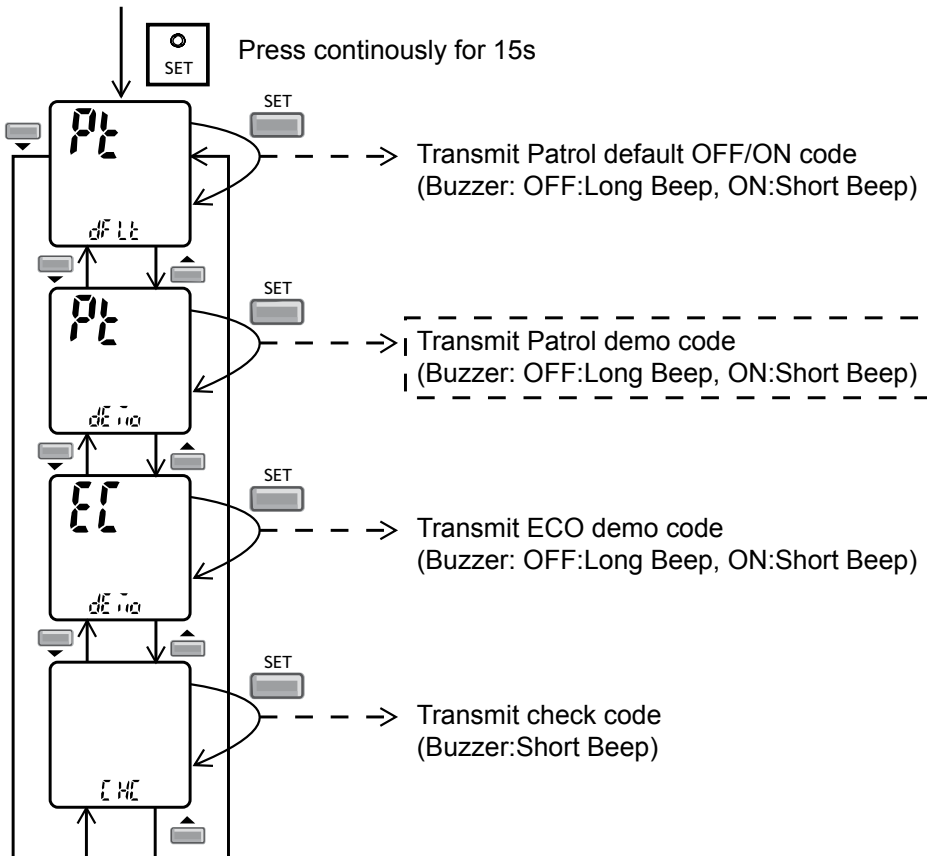
- Indoor Fan Control
  - During any operation mode combines with Patrol operation, fan speed follows respective operation mode.
  - During Patrol individual operation if e-ion starts, only Auto Fan Speed and no Powerful operation is allowed. Even if “Fan Speed” button is pressed, no signal is sent to air conditioner, and no change on LCD display.
  - During Patrol individual operation if e-ion stops, Indoor Fan stop operation.

- Airflow direction (Horizontal, Vertical) Control
  - During any operation mode combines with Patrol operation, airflow direction follows respective operation mode.
  - During Patrol individual operation if e-ion starts, only Auto Air Swing is allowed. Even if “Air Swing” button is pressed, no signal is sent to air conditioner, and no change on LCD display.
  - During Patrol individual operation if e-ion stops, Airflow direction louver closed.
- LED display (**Applicable to all models except KKD models**)
  - When Patrol operation is selected, Patrol LED illuminates.
  - During Patrol individual operation, only Patrol LED illuminates. When e-ion air purifying operation starts based on dirtiness level, Power LED, Patrol LED and e-ion LED illuminates.

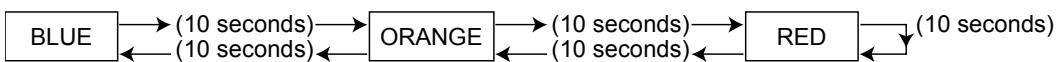
No	Description	PATROL LED			E-ION	TIMER	
		BLUE	ORANGE	RED	BLUE	ORANGE	
1	When patrol function is not selected	OFF	OFF	OFF	-	-	
2	During gas sensor error detection control	OFF	OFF	Blinking	OFF	OFF	
3	During E-ion abnormal discharge error	OFF	OFF	OFF	Blinking	OFF	
4	During E-ion breakdown error	OFF	OFF	OFF	Blinking	Blinking	
5	During Test Mode	OFF	OFF	OFF	OFF	OFF	
6	During stop	OFF	OFF	OFF	OFF	OFF	
7	2 minutes gas sensor initial stabilization time (Level 0)	ON	OFF	OFF	OFF	OFF	
8	During operation During patrol	a. Dirtiness level 0*	ON	OFF	OFF	OFF	OFF
		b. Dirtiness level 1	OFF	ON	OFF	OFF	OFF
		c. Dirtiness level 1*	OFF	ON	OFF	ON	OFF
		d. Dirtiness level 2	OFF	OFF	ON	ON	OFF

- Remote Control Receiving Sound
  - Normal Operation → Patrol Mode : Beep
  - Patrol Mode → Stop : Long Beep
  - Patrol Mode → Normal Operation : Beep
  - Stop → Patrol : Beep
- Timer Control
  - When ON timer activates when unit stops, previous operation resumes and restored last saved Patrol operation status.
  - When ON timer activates during any operation, no change and carry on current operation.
  - When OFF timer activates during any operation, all operation stops and the latest Patrol operation status is saved.
- Power Failure Control
  - During Patrol individual operation, if power failure occurs, after power resumes, Patrol individual operation resumes immediately.
  - During combination operation, if power failure occurs, after power resumes combination operation resume immediately.

- Patrol Operation Demo Mode
  - Patrol Operation Demo Mode start condition
    - Press "Set" button continuously for 15 seconds by using pointer during Air Conditioner is OFF condition to enter internal setting mode.
    - Press "Timer Decrement" button to select "Pt demo".
    - Press "Timer Set" button to toggle Patrol operation demo mode.
      - Long "beep": Turn OFF Patrol operation demo mode.
      - Short "beep": Turn ON Patrol operation demo mode.



- The Patrol indicator change color every 10 seconds follows the pattern below for demo purpose:



- During demo, all operation stops, remote control buttons and auto OFF/ON button are ignored.
- Patrol Operation Demo Mode stop condition
  - Power supply reset.

## 12.14 E-ion operation

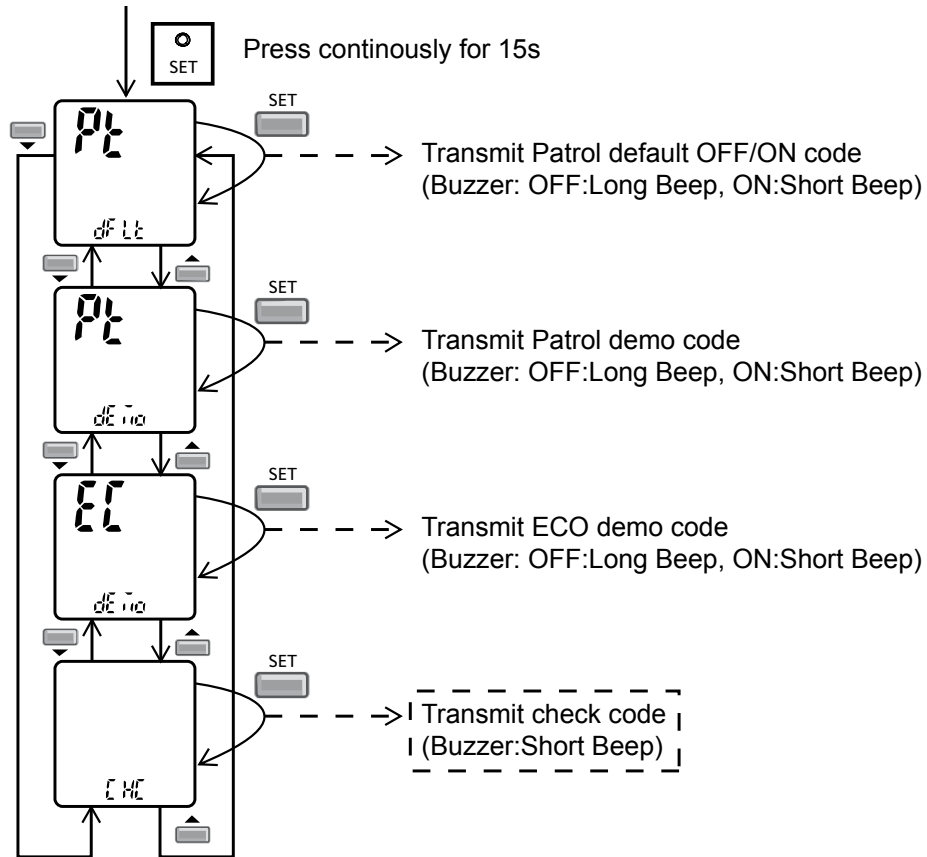
- This operation provides clean air by producing negative ions to attract dust captured at the positively charged active e-ion filters.
- e-ion operation start condition
  - During unit running at any operation mode, if “e-ion” operation is selected, combination operation (operation mode + e-ion operation) starts.
  - During unit is OFF, if “e-ion” operation is selected, e-ion individual operation starts.
- e-ion operation stop condition
  - When “OFF/ON” button is pressed to stop the operation.
  - When “PATROL/e-ion” button is pressed.
  - When OFF Timer activates.
- e-ion operation pause condition
  - When indoor fan stop (during deice, odor cut control, thermostat off, etc.). e-ion operation resume after indoor fan restarts.
  - When indoor intake temperature  $\geq 40^{\circ}\text{C}$ . e-ion operation resume after indoor intake temperature  $< 40^{\circ}\text{C}$  continuously for 30 minutes.
- Indoor fan control
  - During any operation mode combines with e-ion operation, fan speed follows respective operation mode.
  - During e-ion individual operation – only Auto Fan Speed and no Powerful operation is allowed. Even if Fan Speed button is pressed, no signal is sent to air conditioner, and no change on LCD display.  
  
Auto Fan Speed for e-ion operation switches from SHi to Hi after 4 hours of operation.
- Airflow direction control
  - During any operation mode combines with e-ion operation, airflow direction follows respective operation mode.
  - During e-ion individual operation, only Auto Air Swing is allowed. Even if Air Swing button is pressed, no signal is sent to air conditioner, and no change on LCD display.
- Timer control
  - When ON timer activates when unit stops, previous operation resumes and restored last saved e-ion operation status.
  - When ON timer activates during any operation, no change and carry on current operation.
  - When OFF timer activates during any operation, all operation stops and the latest e-ion operation status is saved.
- Indicator
  - When e-ion operation starts, e-ion indicator ON.
- Remote Control Receiving Sound
  - Normal Operation → e-ion Operation : Beep
  - e-ion Operation → Normal Operation : Beep
  - Stop → e-ion individual Operation : Beep
  - e-ion individual Operation → Stop : Long Beep
- Power failure
  - During e-ion individual operation, if power failure occurs, after power resumes, e-ion individual operation resumes immediately.
  - During combination operation, if power failure occurs, after power resumes, combination operation resume immediately.
  - e-ion operation status is not memorized after OFF the unit. After OFF, when the operation is ON again, air conditioner operates without e-ion operation.

- e-ion Check Mode
  - e-ion abnormality check mode
  - Purpose is to improve sensor serviceability when sensor is malfunction.

(1) Control starting condition

When all of the conditions are formed

- Not in Patrol Demo mode.
- e-ion operation ON.
- When e-ion check mode signal is received; the procedure of selection is as shown:
  - Press “Set” button continuously for 15 seconds by using pointer to enter internal setting mode.
  - Press “Timer Decrement” button to select “CHC”.
  - Confirm setting by pressing “Timer Set” button, a “beep” sound will be heard.



- If abnormal discharge is detected at filter (short-circuited) due to water or dust adhesion, etc., the e-ion indicator blinks immediately.

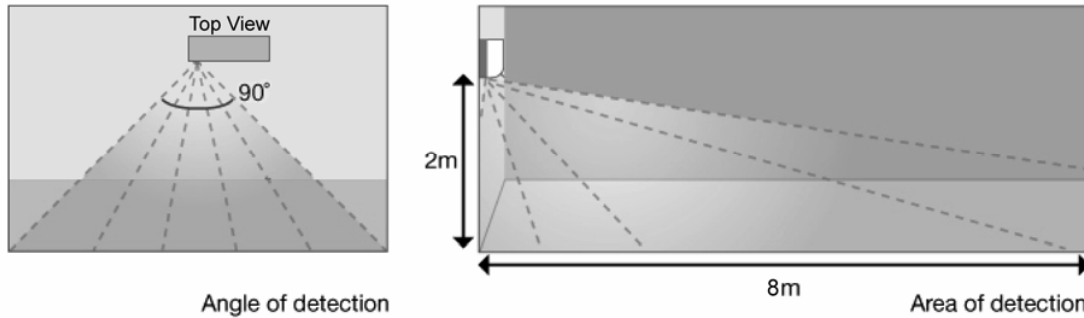
- Error Detection Control
 

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

  - Active e-ion Air Purifying system PCB main connector open:
    - Judgment Method
      - During e-ion operation (include during Patrol operation), Active e-ion Air Purifying system main connector to PCB is opened.
    - Troubleshooting Methods
      - Connect the connector or stop operation (include during Patrol operation) to cancel the blinking.
  - Abnormal Discharge error:
    - Judgment Method
      - During e-ion operation, feedback voltage is-L0 (at microcontroller) is detected, it is judged abnormal discharge and stops power supplies to the Active e-ion Air Purifying system.
      - Abnormal discharge is caused by ionizer or filter's high voltage power supply short-circuits due to water or dust adhesion, and so forth.
      - When abnormal discharge occurred, every 30 minutes the unit supplies power to the Active e-ion Air Purifying system.
      - When abnormal discharge occurs for 24 times continuously, e-ion indicator blinks (not applicable for e-ion Check Mode, where the error will shows immediately despite the 24 times counter)
    - Troubleshooting Method
      - Press "PATROL/e-ion" button or "OFF/ON" button to stop the operation and check the Active e-ion Air Purifying system main connector to PCB.
      - After that, press "e-ion" button again to confirm the e-ion indicator not blinking.
      - The 24 times counter will be clear after 10 minutes of normal operation or when operation stops.
    - Error Reset Method
      - Press "OFF/ON" button to OFF the operation.
      - Press AUTO OFF/ON button at indoor unit to OFF the operation.
      - OFF Timer activates
      - Power supply reset
  - Active e-ion Air Purifying system breakdown error:
    - Judgment Method
      - When hi-feedback voltage (at microcontroller) supplied to filter during e-ion stop, Active e-ion Air Purifying system breakdown error shows immediately.
      - It is due to indoor PCB or filter's high voltage power supply damage.
      - Operations except e-ion continue. Both Timer indicator and e-ion indicator blink.
    - Troubleshooting Method
      - Press "PATROL/e-ion" button or "OFF/ON" button to stop the operation.
      - Change main circuit board or filter's high voltage power supply.
      - When lo-feedback voltage supplied to Active e-ion Air Purifying system during e-ion operation, e-ion indicator and Timer indicator stop blinking.

## 12.15 ECO Patrol Operation

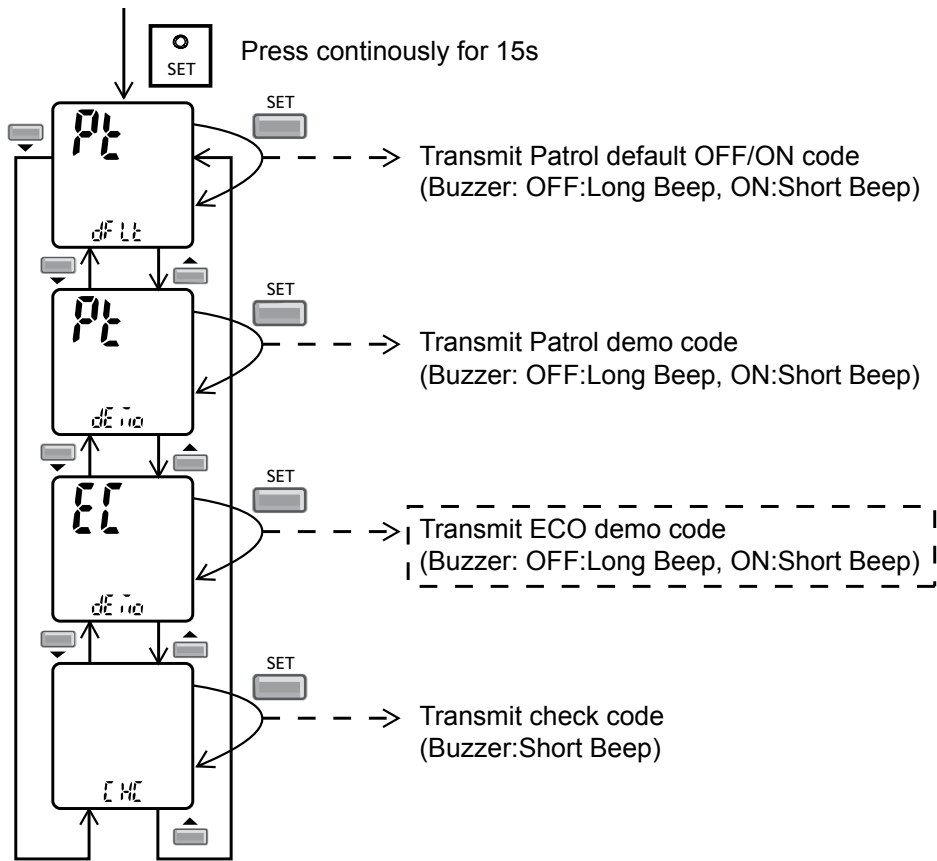
- A Pyoelectric infrared sensor is used to detect injection strength variation of infrared at setting area to determine the presence or absence of human and its activity level. Human detection area is shown in figure below:



- ECO Patrol operation – Human presence/absence detection outlined flow
  - Process infrared sensor output signal
  - Human detection (movement) every 3 seconds.
  - ▼
  - Human detection records
    - Records human detection (movement) result for 30 seconds and determine its activity level i.e. Hi/Lo.
    - ▼
  - Presence / absence detection
    - Compares current and previous human detection result every 30 seconds to determine the presence or absence of human.
    - ▼
  - Presence / absence determination
    - Based on human presence / absence detection, if human presence detection showed within 30 minutes, it is recognised that human is present. If human absence detection showed continuously for more than 30 minutes, it is recognised that no human is present.
- ECO Patrol Sensor abnormality detection
  - Connector pulled out (disconnected), Wire cut Abnormality (Fix Output at Hi)
    - Abnormal judgment start condition.
      - Start from ECO Patrol Sensor power ON, and end after 30 seconds.
    - Control content.
      - Judge ECO Patrol Sensor power level every 100ms.
    - Abnormal Judgment condition.
      - When ECO Patrol Sensor has continues for 25 seconds Hi level.
  - Circuit Abnormal (Fix Output Lo)
    - Abnormal judgment start condition.
      - After ECO Patrol Sensor unit power ON, and after pressed 70 seconds.
    - Control content.
      - Judge ECO Patrol Sensor power level every 100ms.
    - Abnormal Judgment condition.
      - When ECO Patrol Sensor has continues at Lo level for 25 seconds.
  - Abnormal treatment
    - Any one of the above self-diagnosis result is abnormal
      - Abnormal counter +1 and ECO Patrol Sensor power supply OFF.
      - After ECO Patrol Sensor unit power is OFF for 5 seconds, Retry the ECO Patrol operation.
    - When Abnormal counter reach 4 counts, ECO Patrol sensor abnormality is confirmed.
      - (Abnormal counter is cleared when sensor power ON and maintain normal for 120 seconds and above or Clear Anormal counter by power reset)
    - Save ECO Patrol Sensor Abnormality H59 (no Timer LED blinking).
    - ECO Patrol Sensor operation OFF, but ECO Patrol LED maintain ON.
    - The unit still operate as normal.
    - Sensor error counter can be cleared only after power supply reset or AC Reset button on the remote control is pressed.



- ECO Patrol Demo Mode
  - Press "Set" button continuously for 15 seconds by using pointer during Air Conditioner is OFF condition to enter internal setting mode.
  - Press "Timer Decrement" button to select "EC demo".
  - Press "Timer Set" button to toggle ECO Patrol Demo mode.
    - Short "beep": Turn ON ECO Patrol Demo mode.
    - Long "beep": Turn OFF ECO Patrol Demo mode.



Control details:

- During ECO Patrol Demo mode, operation LED ON and horizontal vane will set to Auto Swing.
- When Hi activity judge, Fan speed change to Hi Fan and ECO Patrol LED ON.
- When Lo activity judge, Fan speed change to Lo Fan and ECO Patrol LED OFF.
- No setting temperature adjustment.

- During ECO Patrol operation, the internal setting temperature and fan speed are adjusted in order to provide comfort and energy saving.
- ECO Patrol Start condition.
  - Press ECO Patrol button to select ECO1 and ECO2.
- ECO Patrol Stop condition.
  - Press ECO Patrol button again.
  - OFF Timer activates.
  - Press OFF/ON button to turn off the air conditioner.
  - Press AUTO OFF/ON button to turn off the air conditioner.
  - Press POWERFUL/QUIET button.
  - Press Mild Dry Cooling button.
- ECO Patrol operation could ON when any of the following conditions is fulfilled:
  - During forced cooling or forced heating operation.
  - During e-ion or individual patrol operation.
- Power Failure
  - ECO Patrol operation will be resuming after recovered from power failure.
- Timer Operation
  - When unit is turn on by ON Timer and ECO Patrol operation is ON during previous operation before OFF, ECO Patrol operation will not be ON automatically.
  - When unit is turn on by ON Timer and ECO Patrol operation is OFF during previous operation before OFF, ECO Patrol operation will not be ON automatically.
- Other Information
  - ECO Patrol, Powerful, Quiet and Mild Dry Cooling cannot be operated at the same time.
  - ECO Patrol sensor initialized time is 70 seconds from power supplied to ECO Patrol sensor, or 70 seconds from the operation start.
- ECO 1 Operation

Activity Level	Low	High	None
Set Temperature		-1°C	+2°C
Fan Speed	Set Speed	+1tap Up	Med Fan

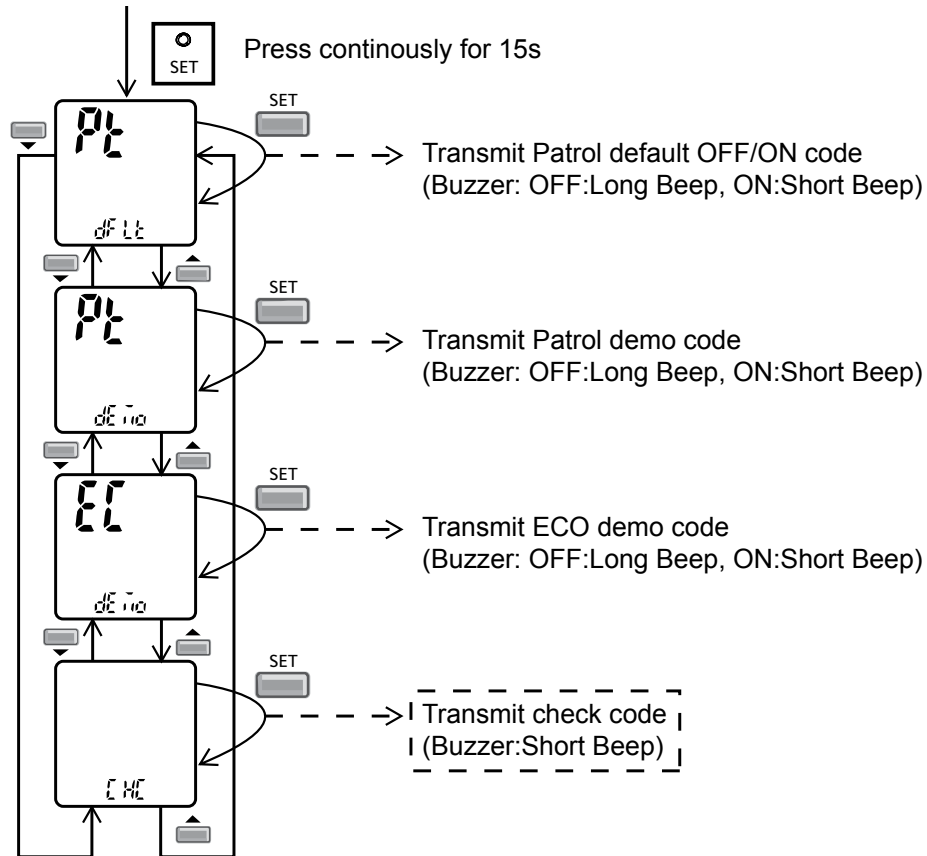
- ECO 2 Operation

L.America and etc

Activity Level	Low	High	None
Set Temperature		-1°C	+3°C
Fan Speed	Set Speed	+1tap Up	Med Fan

\* For first 15 minutes only

- ECO Patrol Sensor abnormality check mode
  - Purpose is to improve sensor serviceability when sensor is malfunction.
- (1) Control starting condition
- When all of the conditions are formed
- Not in ECO Patrol Demo mode.
  - ECO Patrol mode ON.
  - When ECO Patrol sensor check mode signal is received; the procedure of selection is as shown:
    - Press “Set” button continuously for 15 seconds by using pointer to enter internal setting mode.
    - Press “Timer Decrement” button to select “CHC”.
    - Confirm setting by pressing “Timer Set” button, a “beep” sound will be heard.



(2) Control ending condition.

When any of the conditions are formed

- Operation stops.
- “Timer Cancel” button pressed.
- When ECO Patrol sensor check mode signal is not received for more than 30 seconds.

(3) Control content.

- During ECO Patrol mode ON, when check signal is received, if (1) or (2) is detected. ECO Patrol LED start blinking (ECO Patrol sensor operation stops but the unit operates as normal) and ECO Patrol sensor abnormal code is memorized (the 4 times counter is ignored)
- The blinking of ECO Patrol LED can be cancelled by pressing ECO Patrol button again.
- Sensor error counter can be cleared only after power supply reset or “AC Reset” button on remote control is pressed.

However, if there is no ECO Patrol sensor abnormality happen, ECO Patrol sensor operation will continues as normal.

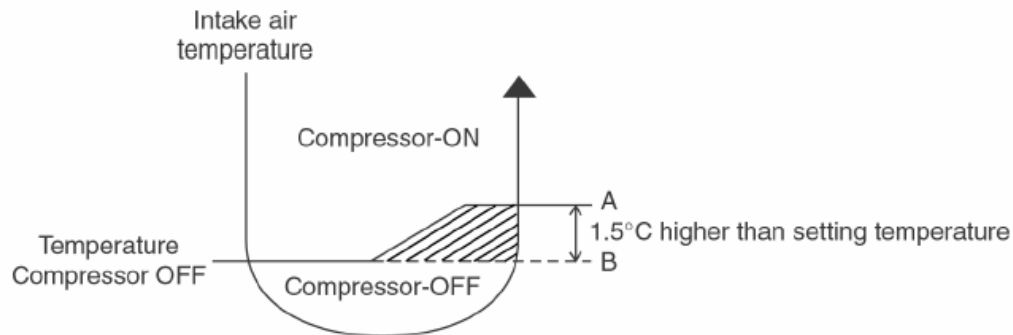
## 13. Protection Control

### 13.1 Restart Control (Time Delay Safety Control)

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

### 13.2 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.



### 13.3 60 Seconds Forced Operation

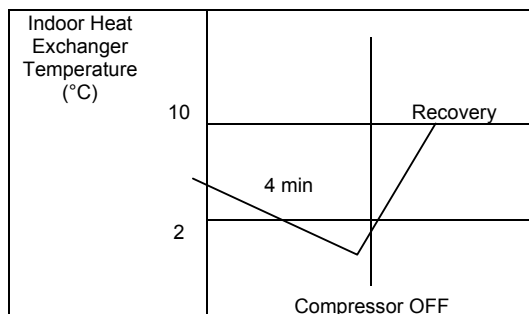
- Once the air conditioner is turned on, the compressor will not stop within 60 seconds in a normal operation although the intake air temperature has reached the thermo-off temperature. However, forced stop by pressing the OFF/ON operation button at the remote control is permitted.
- The reason for the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

### 13.4 Starting Current Control

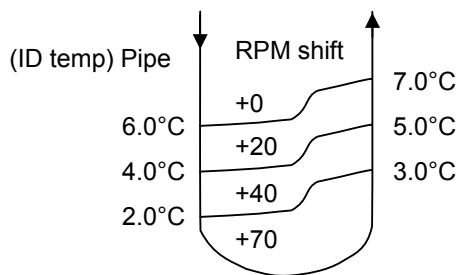
- When the compressor, outdoor fan motor and indoor fan motor are simultaneously started, the indoor fan motor will start to operate at 1.6 seconds later.
- The reason of the difference is to reduce the starting current flow.

### 13.5 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.



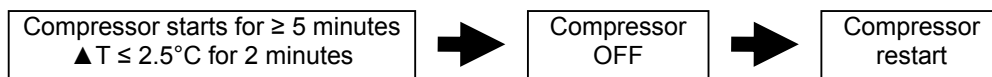
- The current fan speed will change to freeze prevention speed after 70 seconds compressor on. The fan speed will be increased according to the indoor pipe temperature as below figure: (Applicable for C9KKV and C12KKV ONLY)



- 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.

### 13.6 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

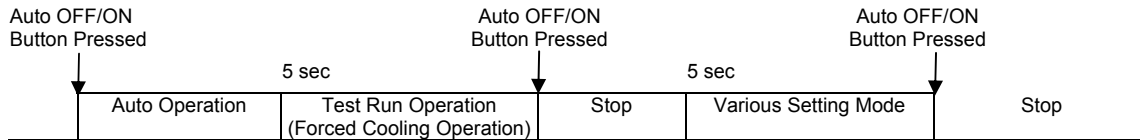
- This is to prevent compressor from rotate reversely when there is an instantaneous power failure.
- If this condition happens continuously for 5 times within 50 minutes, unit will turn OFF with TIMER LED blinks.
- The 5 Times counter can be reset when either one of the following condition happen:
  - 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.

### **13.7 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 ( $\pm 1^{\circ}\text{C}$ ) for 30 minutes.
  - Compressor is continuously running.
- Fan speed will be adjusted accordingly in this control.
  - Fan speed 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.

## 14. Servicing Mode

### 14.1 Auto OFF/ON Button



#### 1 AUTO OPERATION MODE

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

#### 2 TEST RUN OPERATION (FOR PUMP DOWN/SERVICING PURPOSE)

The Test Run Operation will be activated if the Auto OFF/ON button is pressed continuously for more than 5 seconds. A “beep” sound will 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 (J-A)	Jumper B (J-B)	Remote Control No.
	Short	Open	A (Default)
	Open	Open	B
	Short	Short	C
	Open	Short	D

- 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.

## 14.2 Remote Control Button

### 14.2.1 SET Button

- To check current remote control transmission code and store the transmission code to EEPROM:
  - Press “Set” button for more than 10 seconds
  - Press “Timer Set” button until a “beep” sound is heard as confirmation of transmission code change.
- To change the air quality sensor:
  - Press and release by using pointer
  - Press the Timer Decrement button to select sensitivity:
    1. Low sensitivity
    2. Standard (Default)
    3. Hi sensitivity
  - Confirm setting by pressing Timer Set button, a “beep” sound will be heard. LCD returns to original display after 2 seconds.
  - LCD returns to original display if remote control does not operate for 30 seconds.

### 14.2.2 CLOCK Button

- To change the remote control time format:
  - Press for more than 5 seconds

### 14.2.3 RESET (RC) Button

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

### 14.2.4 TIMER ▲

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

### 14.2.5 TIMER ▼

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



# 15. Troubleshooting Guide

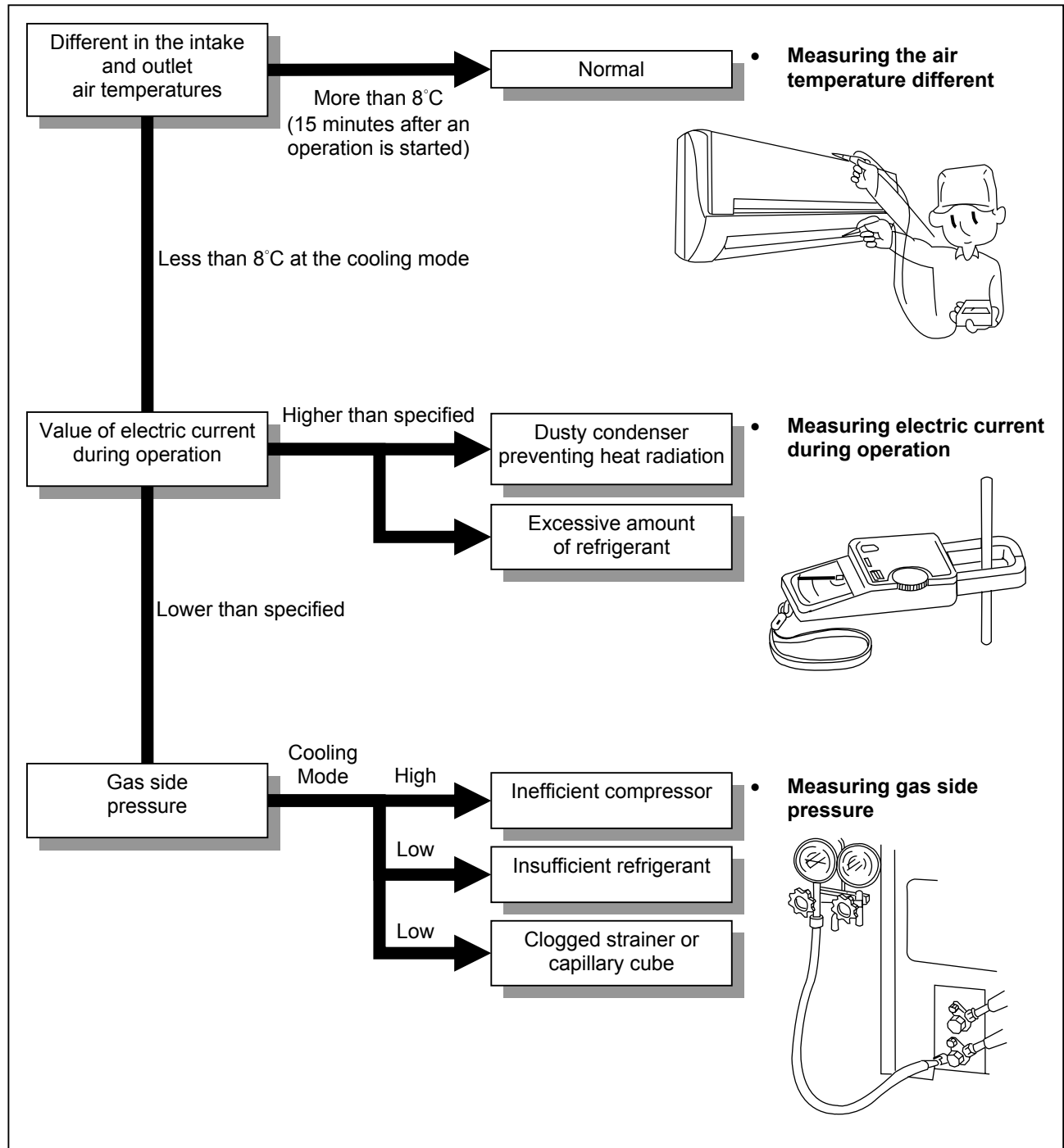
## 15.1 Refrigeration cycle system

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 <sup>2</sup> G)	Outlet air Temperature (°C)
Cooling Mode	0.4 ~ 0.6 (4 ~ 6)	12 ~ 16

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



### 15.1.1 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.

### 15.1.2 Diagnosis methods of a malfunction of a compressor

Nature of fault	Symptom
Insufficient compressing of a compressor	<ul style="list-style-type: none"> <li>• Electric current during operation becomes approximately 20% lower than the normal value.</li> <li>• The discharge tube of the compressor becomes abnormally hot (normally 70°C to 90°C).</li> <li>• The different between high pressure and low pressure becomes almost zero.</li> </ul>
Locked compressor	<ul style="list-style-type: none"> <li>• Electric current reaches a high level abnormally, and the value exceeds the limit of an ammeter. In some cases, a breaker turns off.</li> <li>• The compressor has a humming sound.</li> </ul>

## 16. Disassembly and Assembly Instructions



**WARNING**

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

### 16.1 CS-C9KKV CS-C12KKV

#### 16.1.1 Indoor Electronic Controllers, Cross Flow Fan and Indoor Fan Motor Removal Procedures

##### 16.1.1.1 To remove front grille

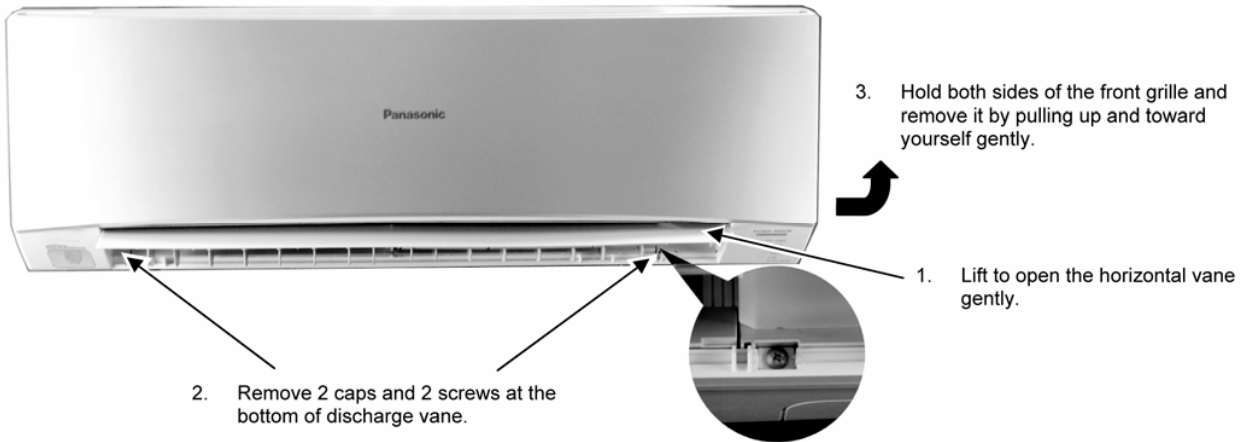


Figure 1

##### 16.1.1.2 To remove power electronic controller

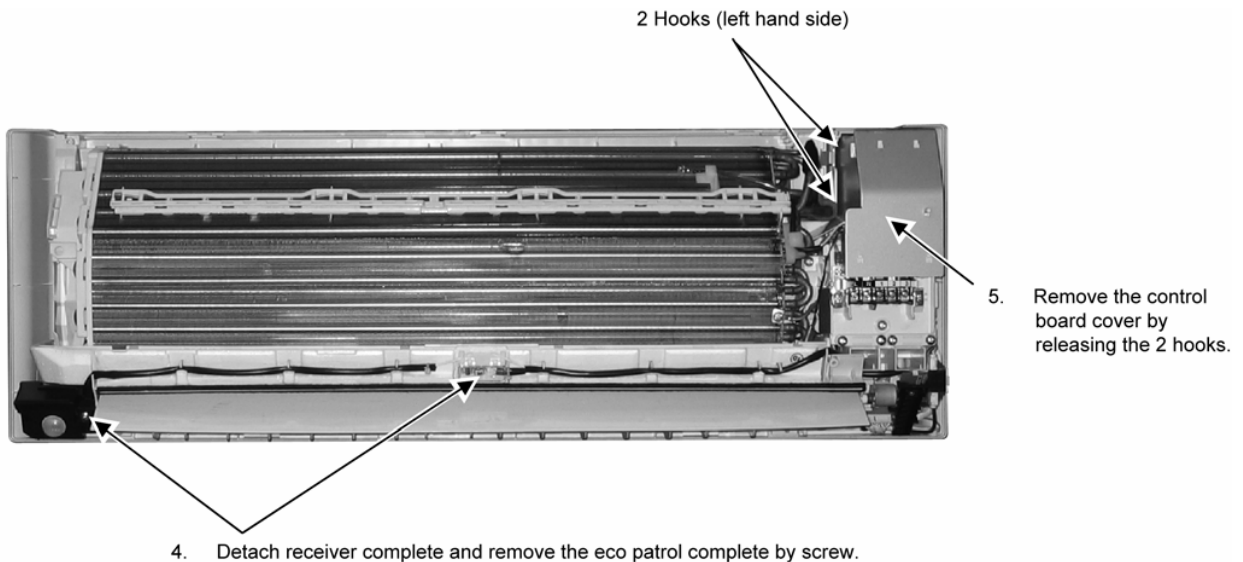


Figure 2

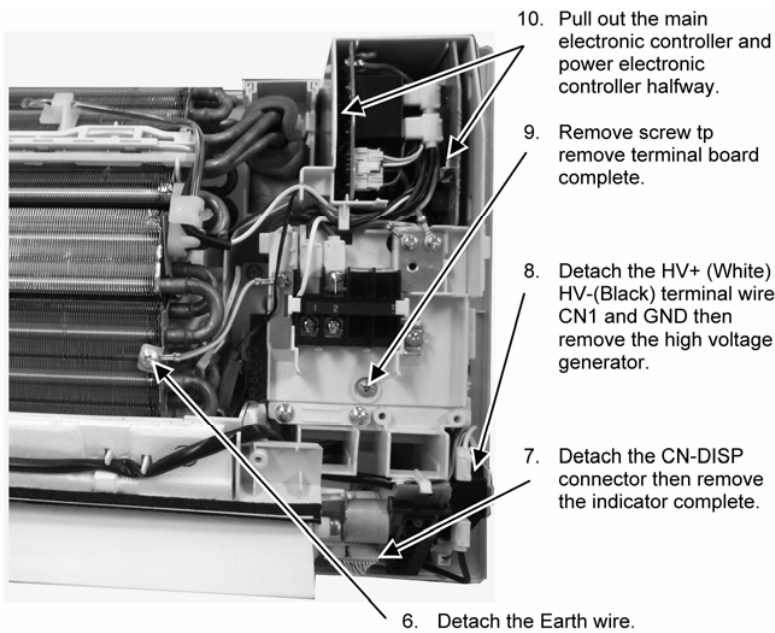


Figure 3

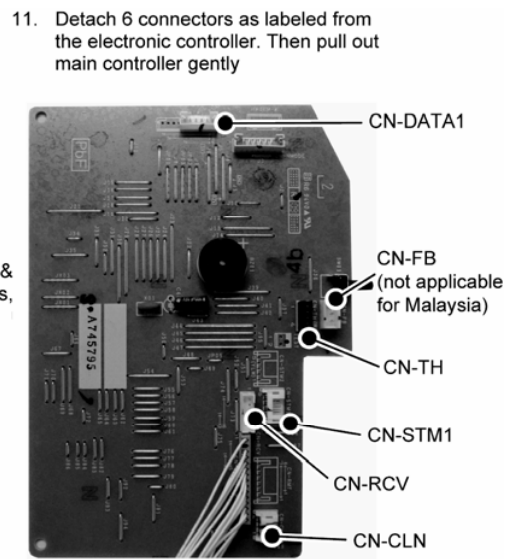


Figure 4

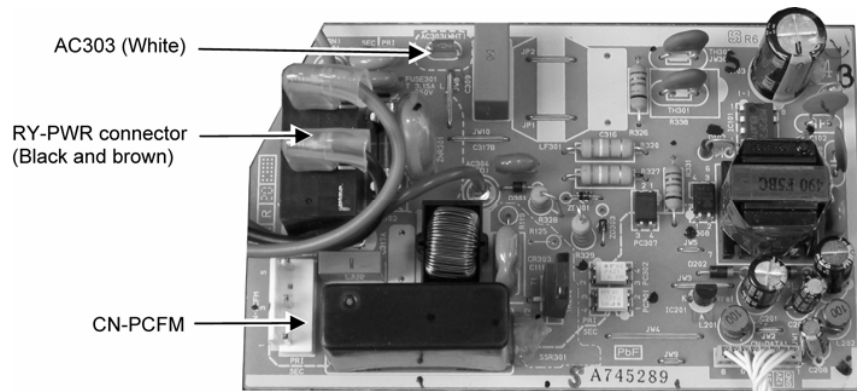


Figure 5

12. Detach the AC303, RY-PWR and CN-PCFM connectors from the electronic controller. Then pull out power electronic controller gently.

### 16.1.1.3 To remove discharge grille



Figure 6

#### 16.1.1.4 To remove control board

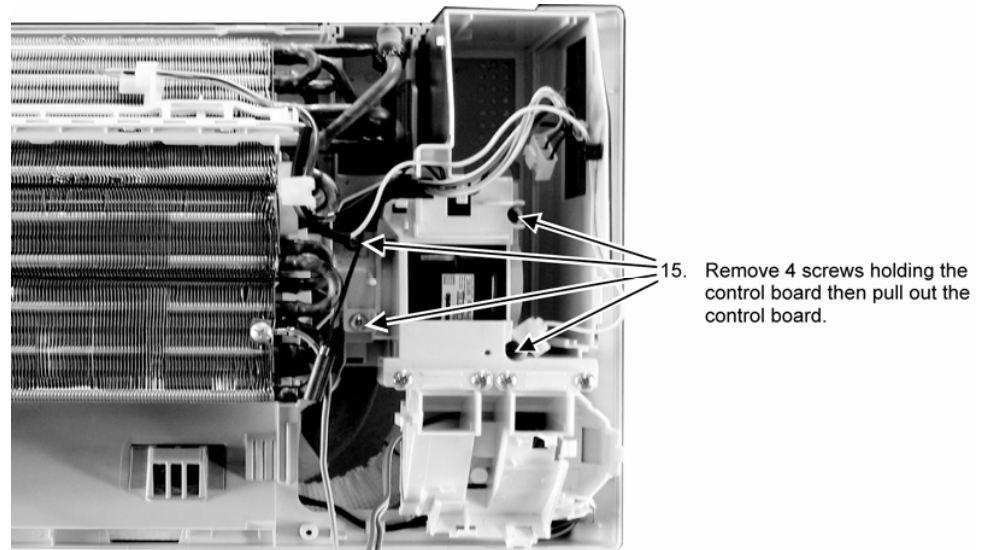


Figure 7

#### 16.1.1.5 To remove cross flow fan and indoor fan motor

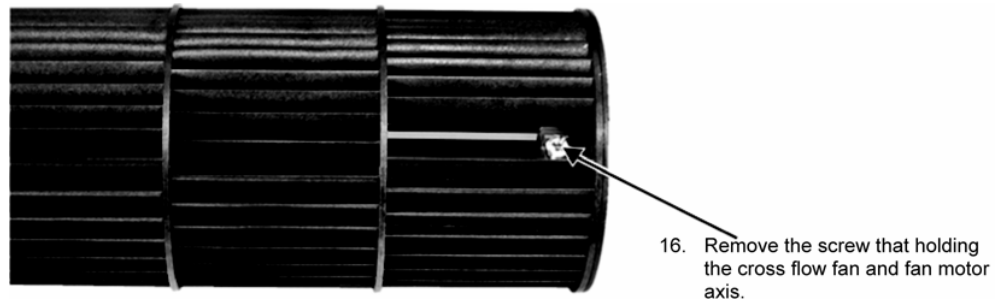


Figure 8

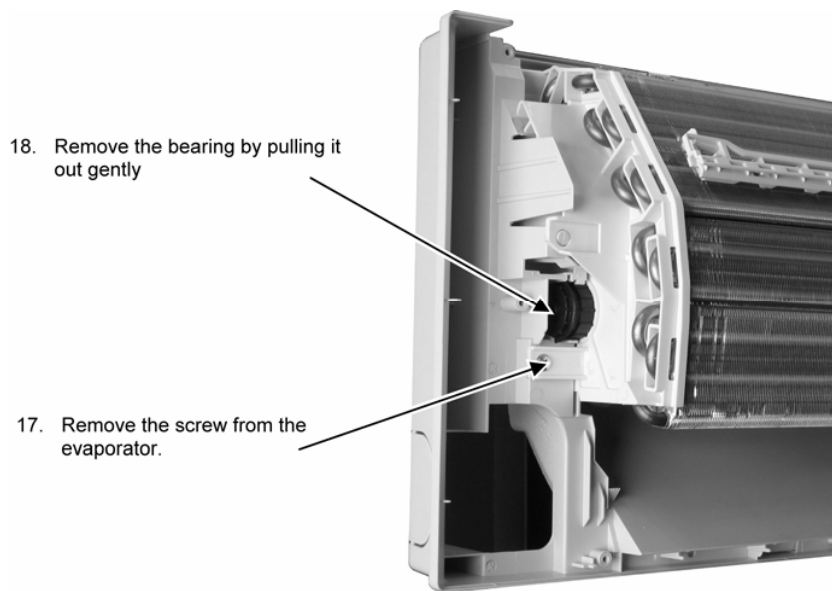


Figure 9

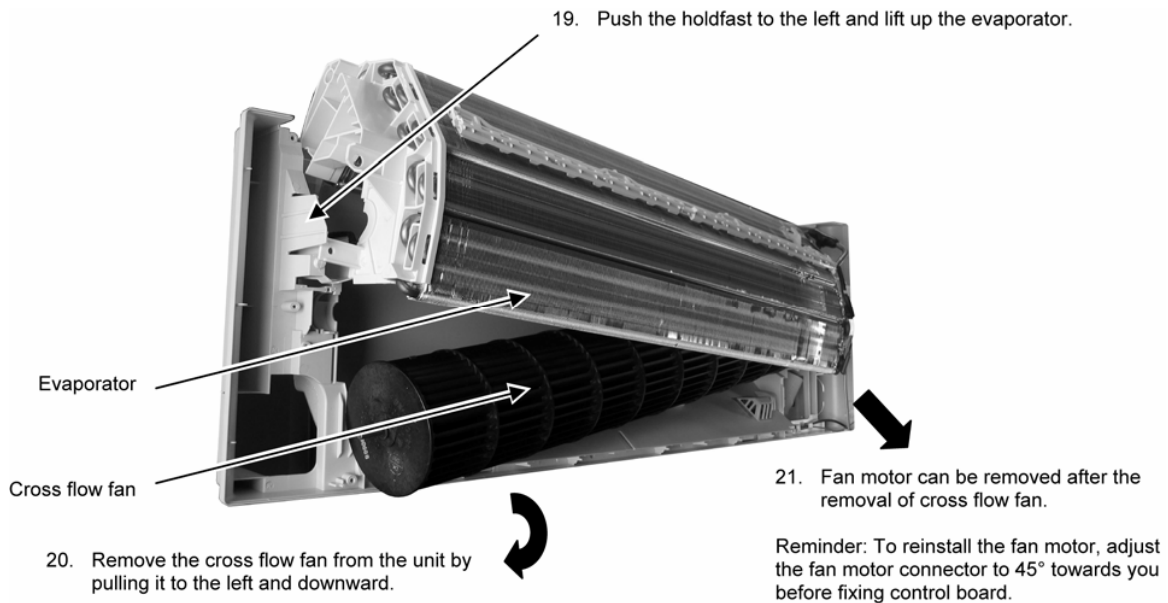


Figure 10

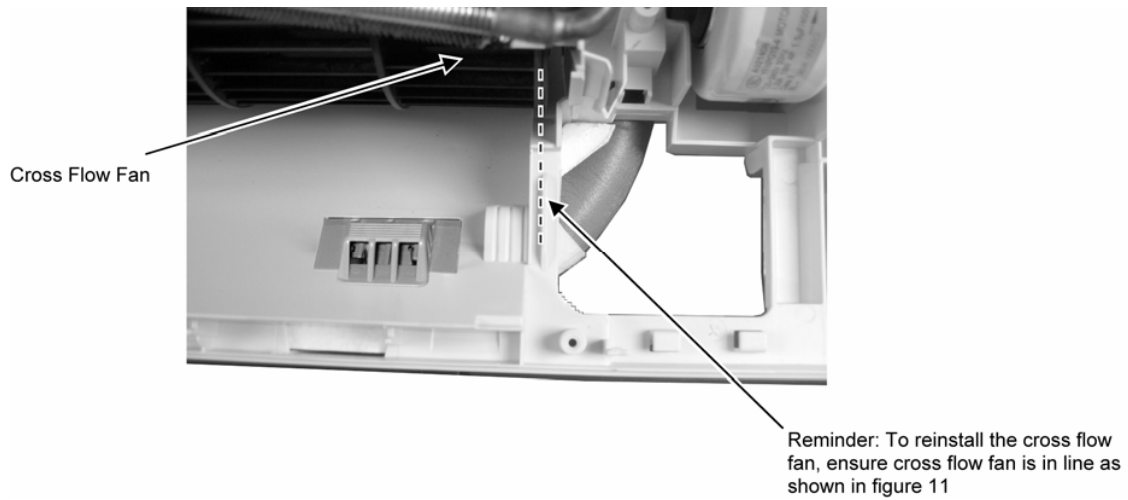


Figure 11

 **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.

## 16.2 CS-C18KKV CS-C24KKV

### 16.2.1 Indoor Electronic Controllers, Cross Flow Fan and Indoor Fan Motor Removal Procedures

#### 16.2.1.1 To remove front grille

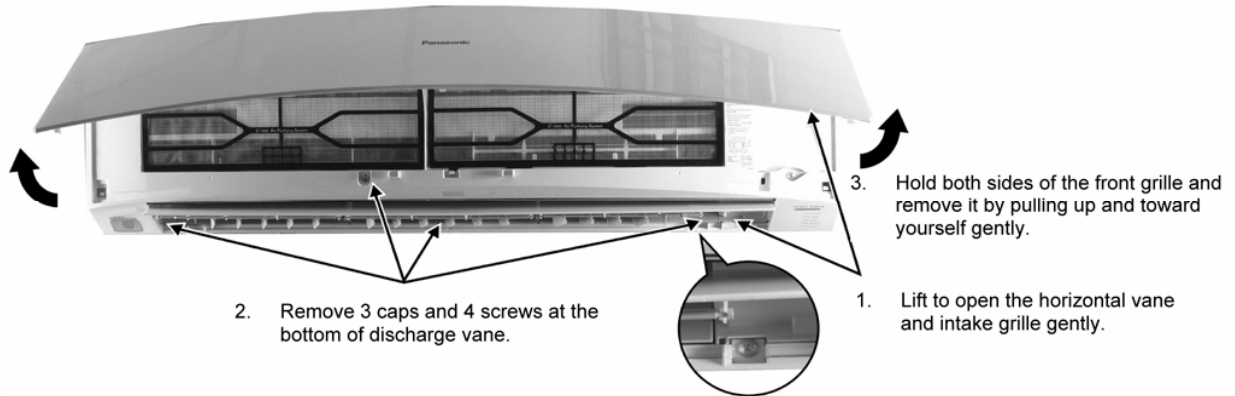


Figure 12

#### 16.2.1.2 To remove horizontal vane

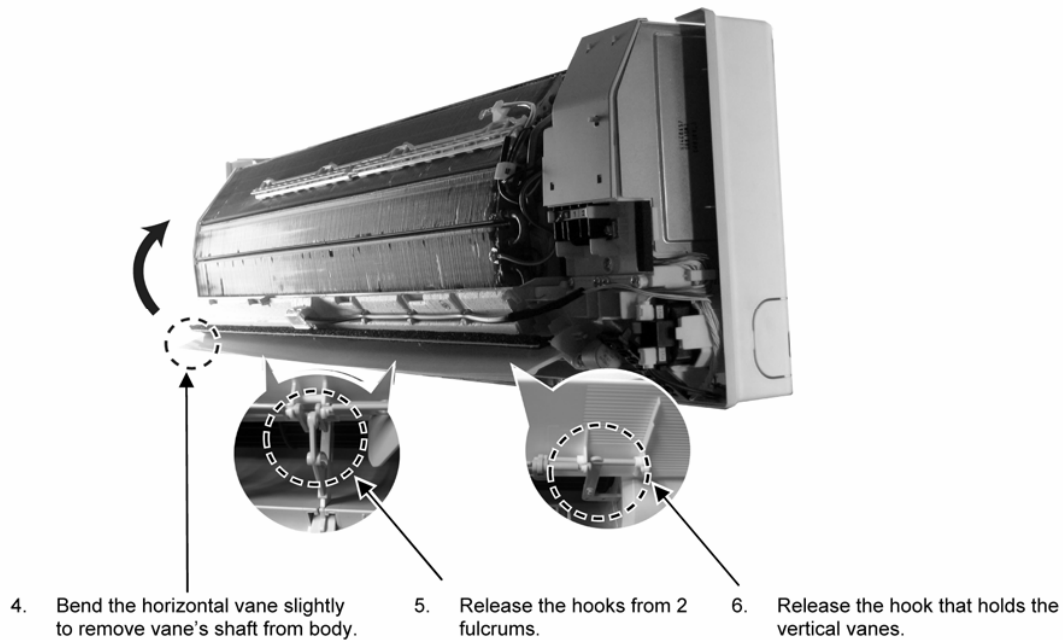


Figure 13

### 16.2.1.3 To remove power electronic controller

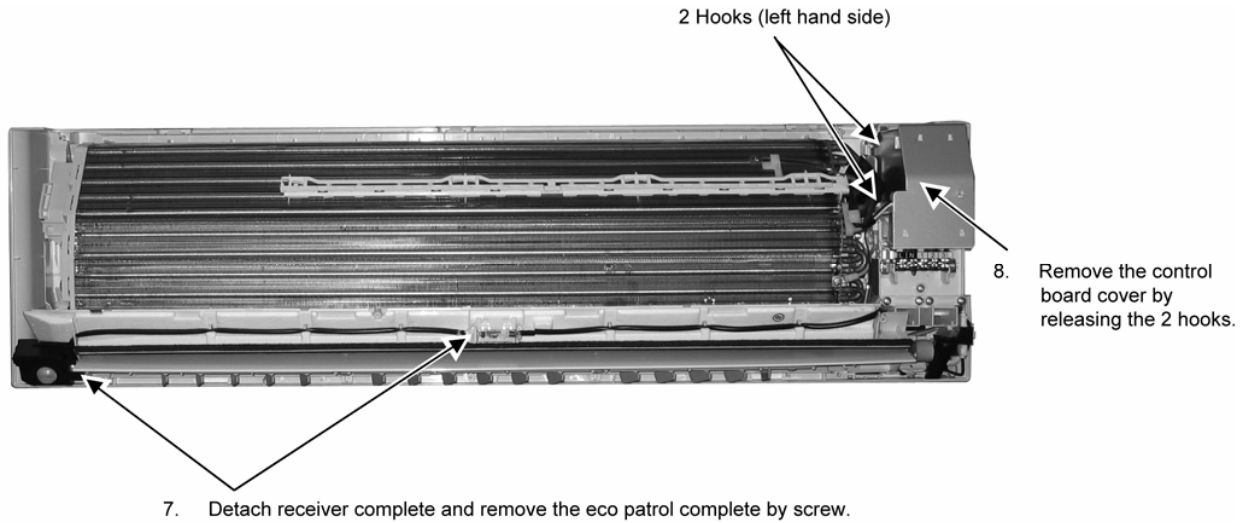


Figure 14

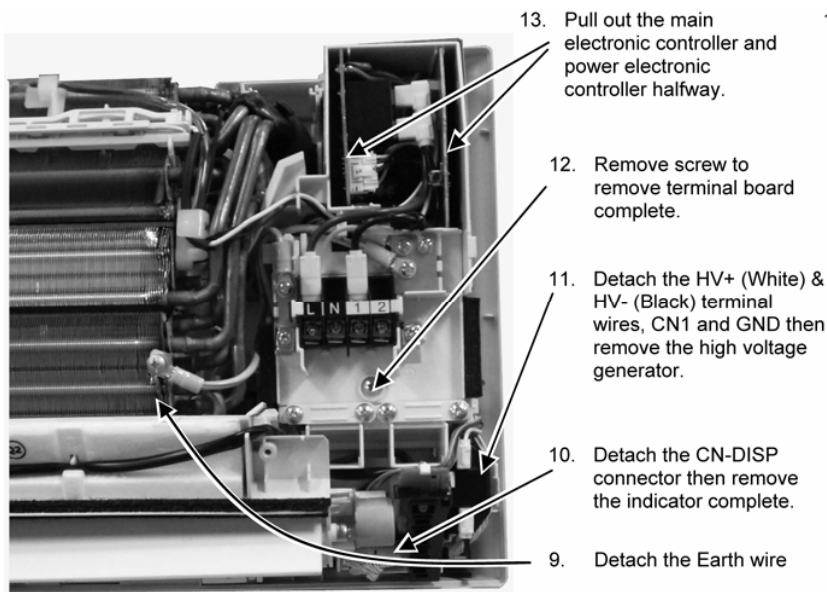


Figure 15

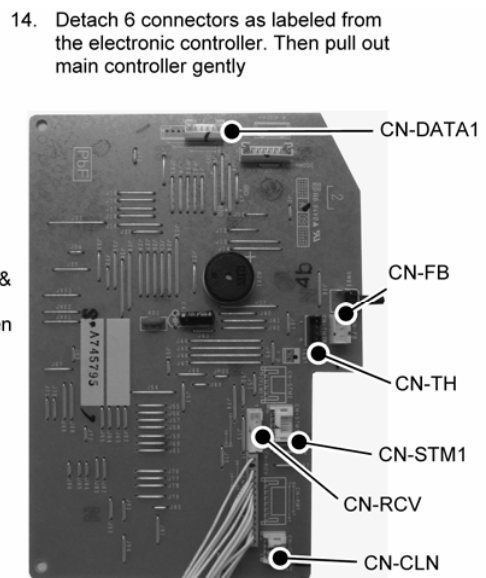


Figure 16

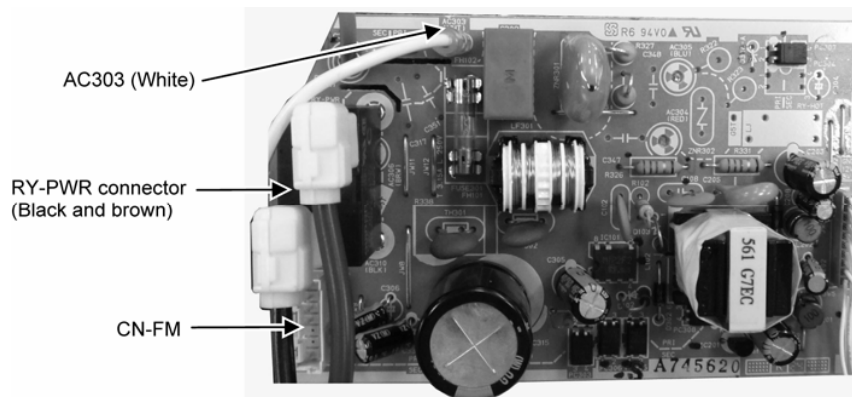


Figure 17

15. Detach the earth wire from the terminal board then detach the AC303, RY-PWR and CN-FM connectors from the electronic controller. Then pull out power electronic controller gently.



#### 16.2.1.4 To remove discharge grille

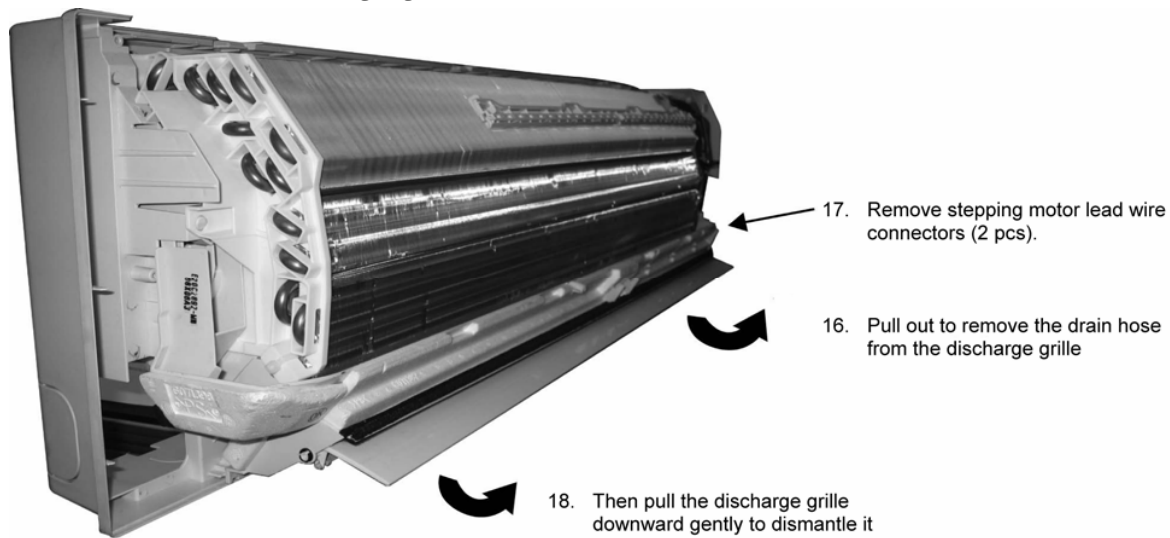


Figure 18

#### 16.2.1.5 To remove control board

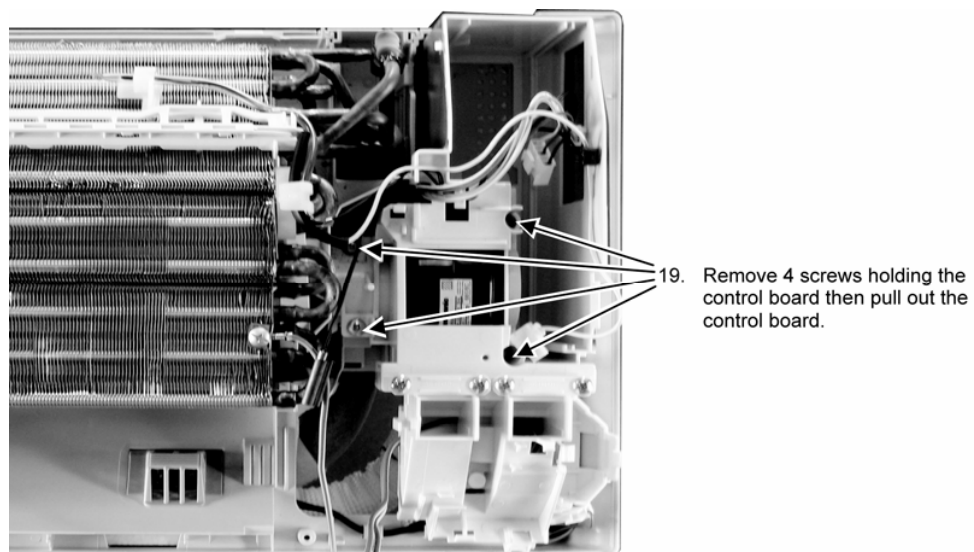


Figure 19

#### 16.2.1.6 To remove cross flow fan and indoor fan motor

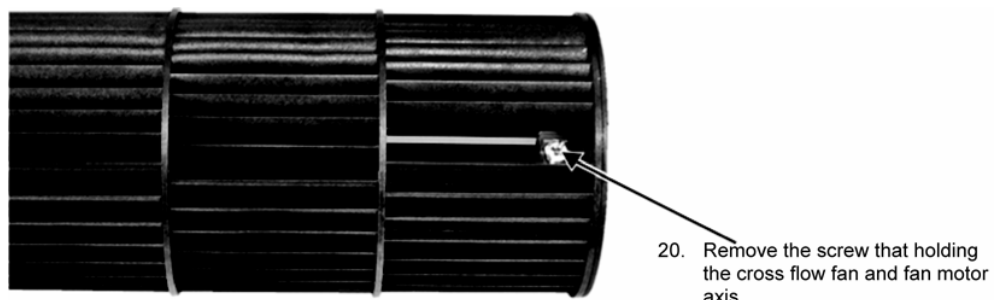


Figure 20

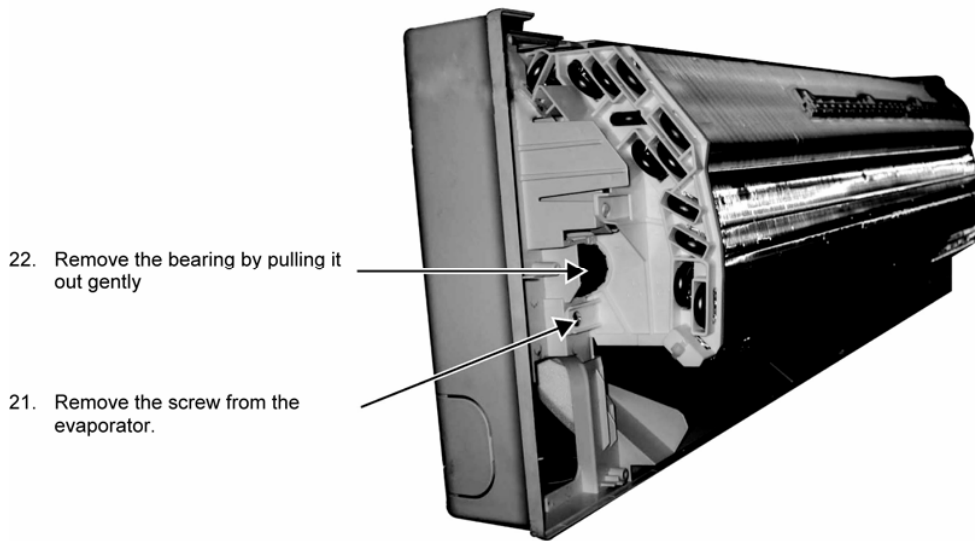
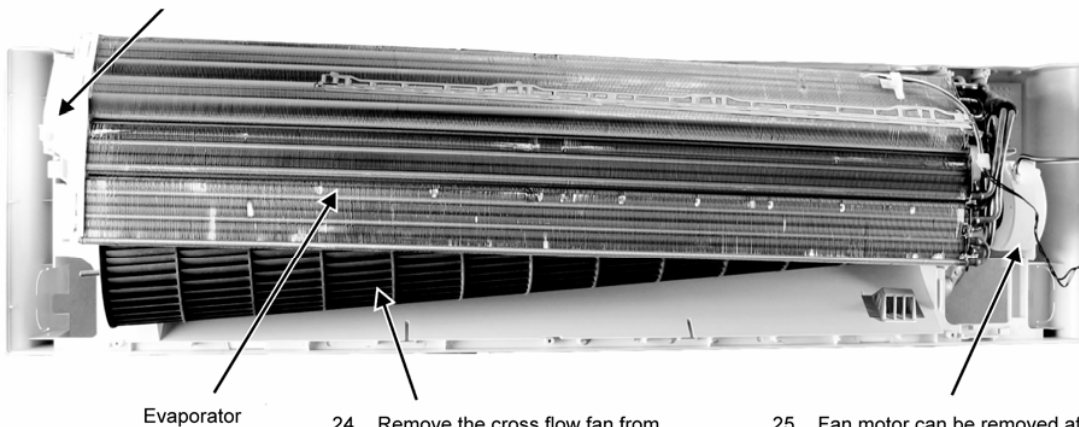


Figure 21

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



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

Figure 22

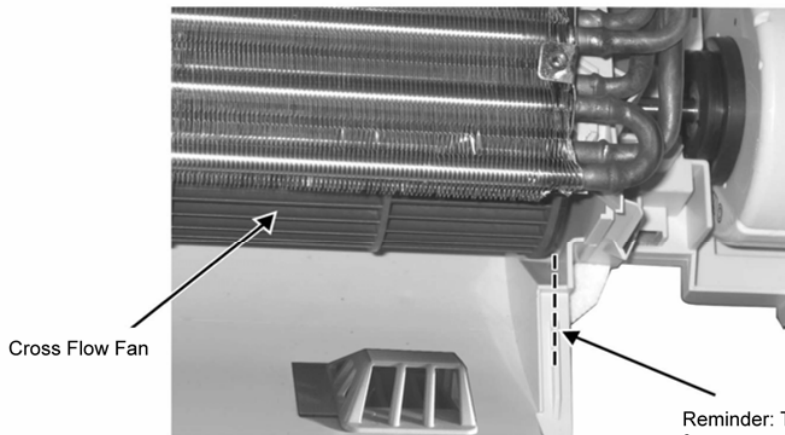


Figure 23

**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.

## 16.3 CS-C28KKV

### 16.3.1 Indoor Electronic Controllers, Cross Flow Fan and Indoor Fan Motor Removal Procedures

#### 16.3.1.1 To remove front grille

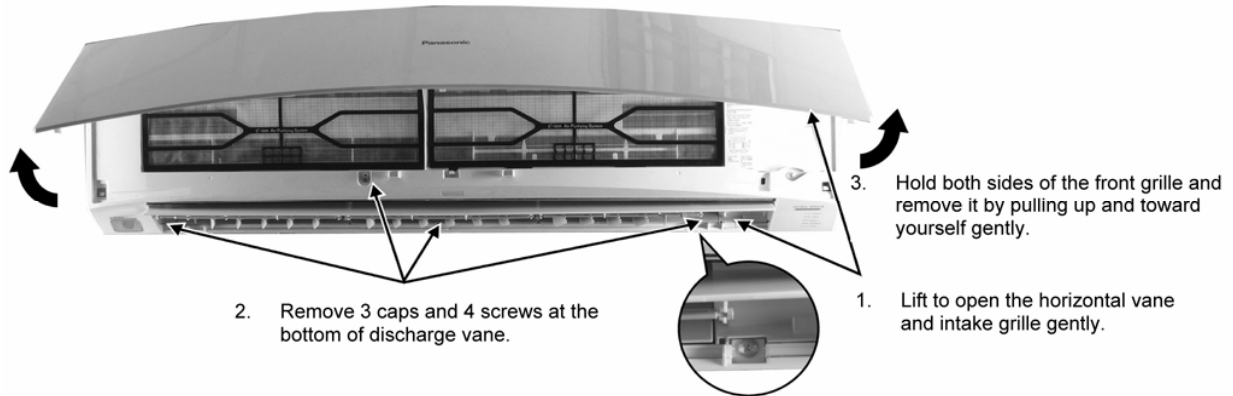


Figure 24

#### 16.3.1.2 To remove horizontal vane

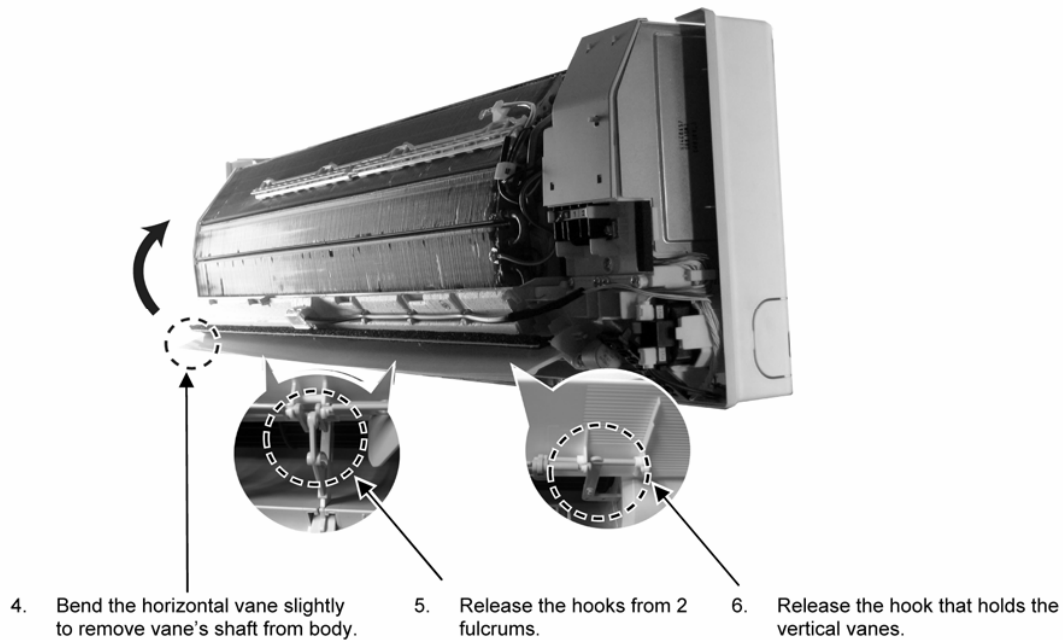


Figure 25

### 16.3.1.3 To remove power electronic controller

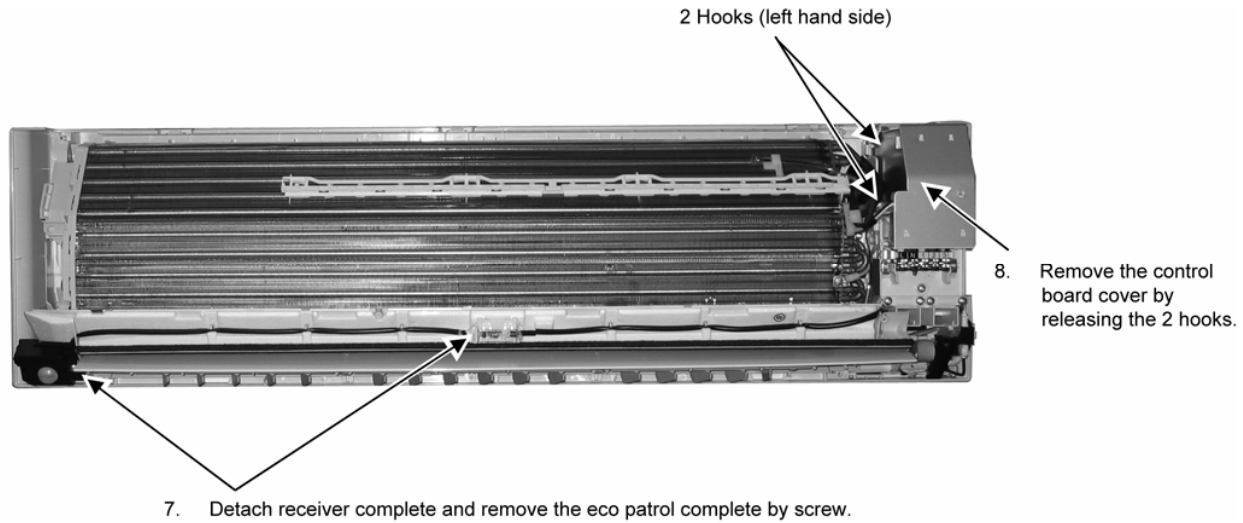


Figure 26

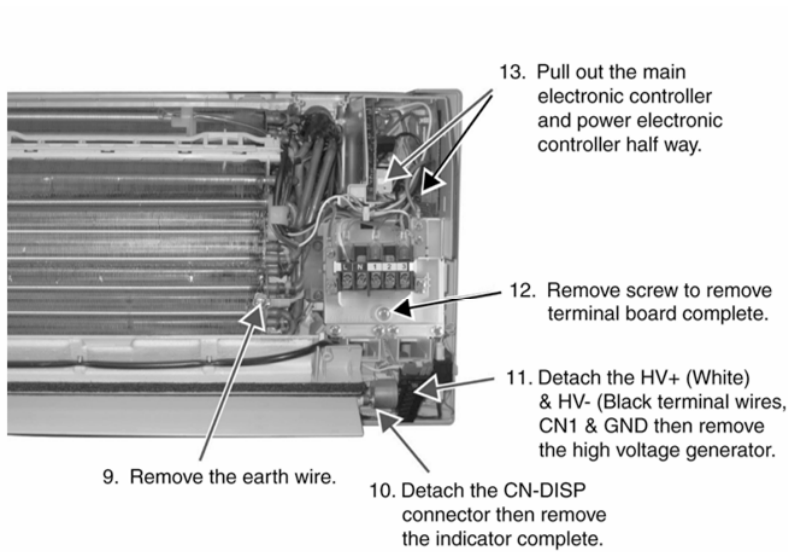


Figure 24

14. Detach 6 connectors as labeled from the electronic controller. Then pull out main controller gently

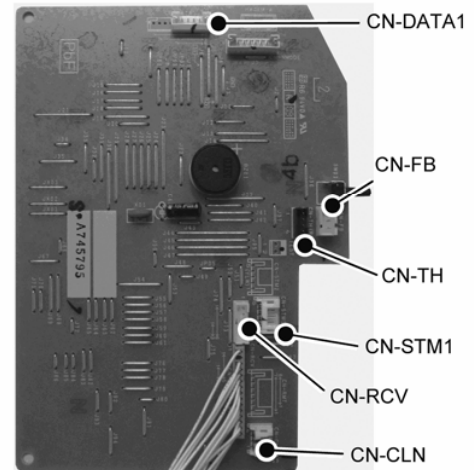


Figure 25

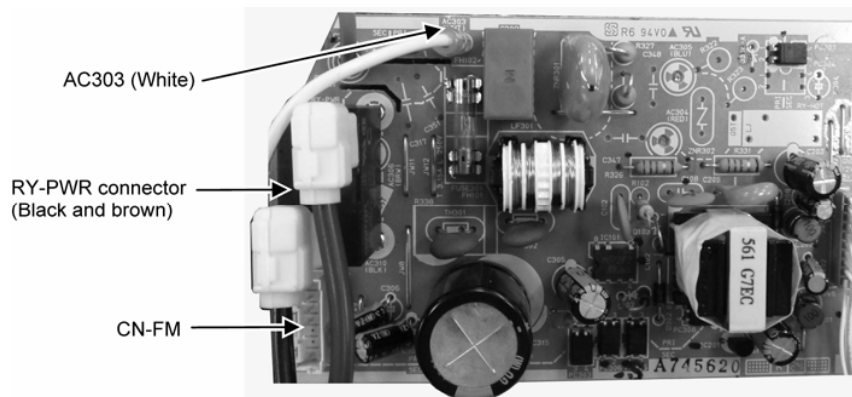


Figure 27

15. Detach the earth wire from the terminal board then detach the AC303, RY-PWR and CN-FM connectors from the electronic controller. Then pull out power electronic controller gently.

#### 16.3.1.4 To remove discharge grille

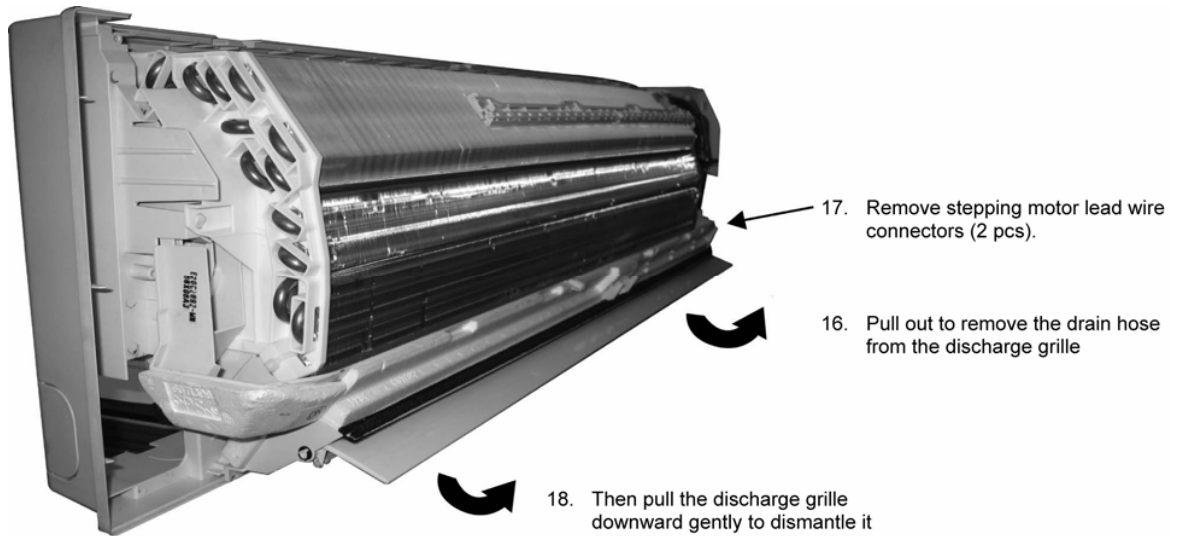


Figure 28

#### 16.3.1.5 To remove control board

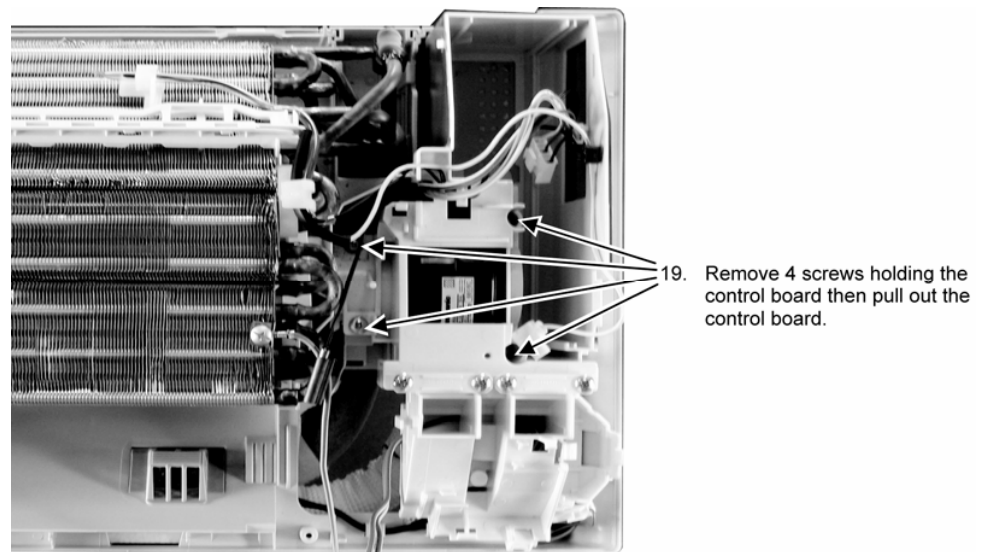


Figure 29

#### 16.3.1.6 To remove cross flow fan and indoor fan motor

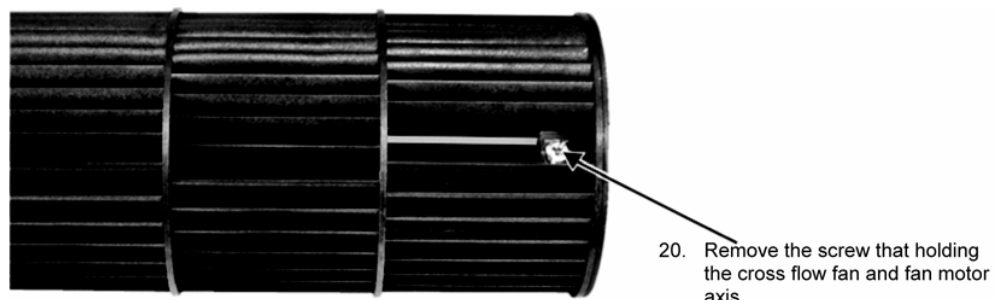
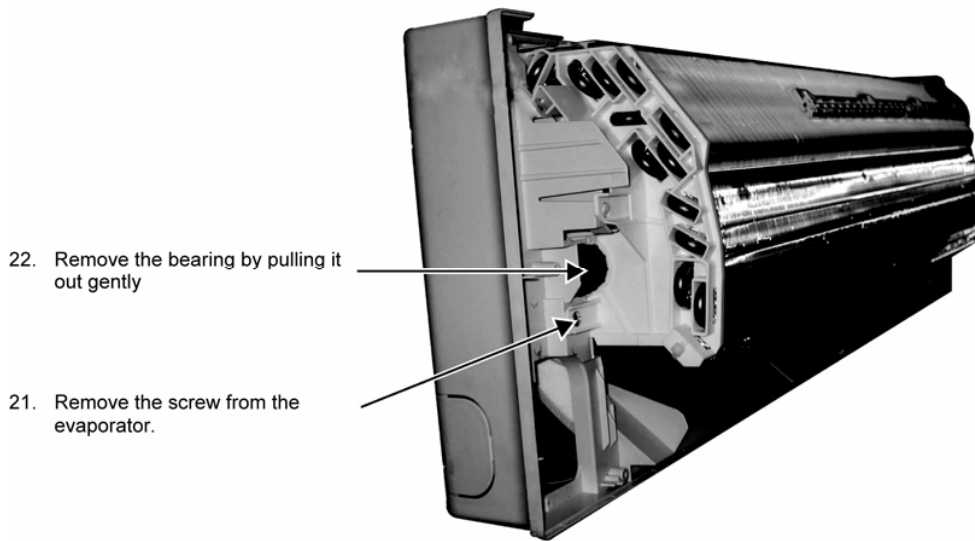


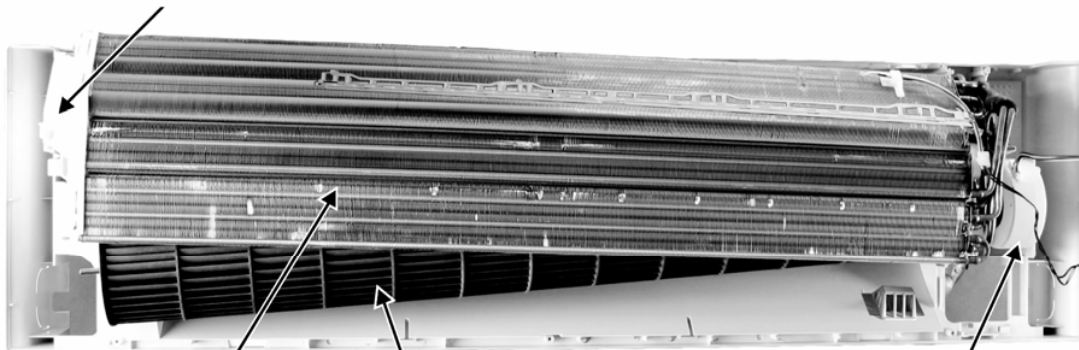
Figure 30



- 22. Remove the bearing by pulling it out gently
- 21. Remove the screw from the evaporator.

Figure 31

- 23. Push the holdfast to the left and lift up the evaporator.



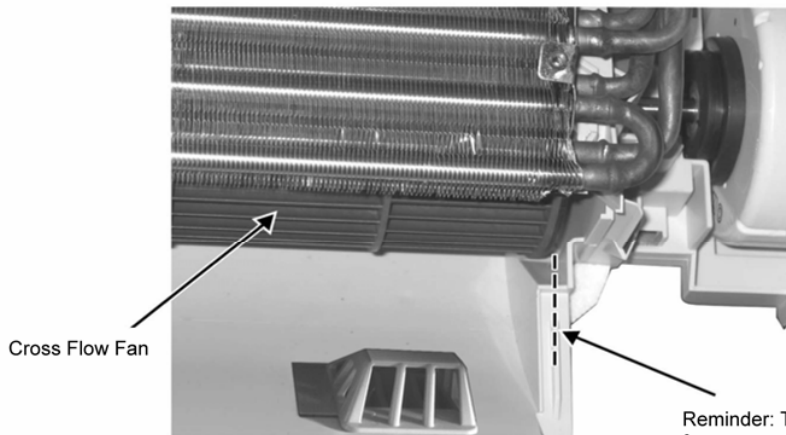
Evaporator

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

- 25. 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 32



Cross Flow Fan

Reminder: To reinstall the cross flow fan, ensure cross flow fan is in line as shown in figure 23.

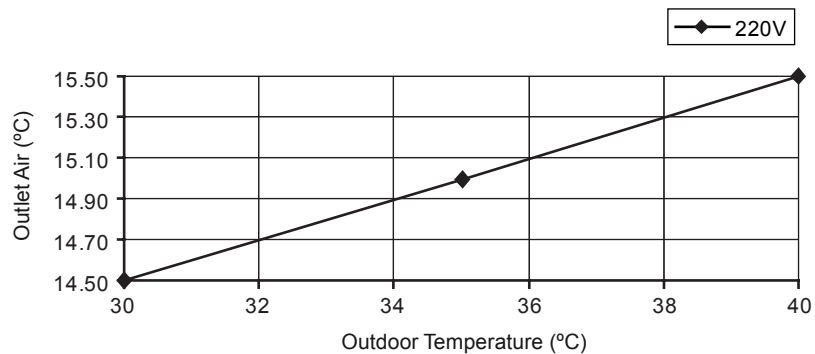
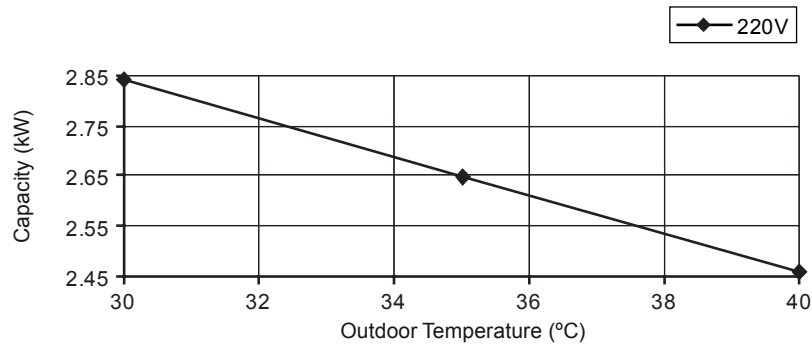
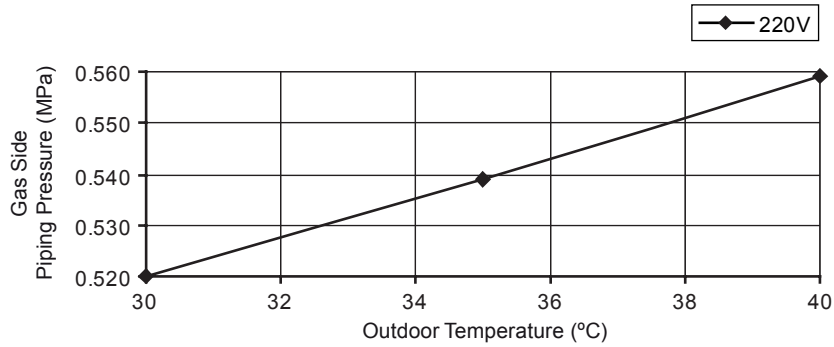
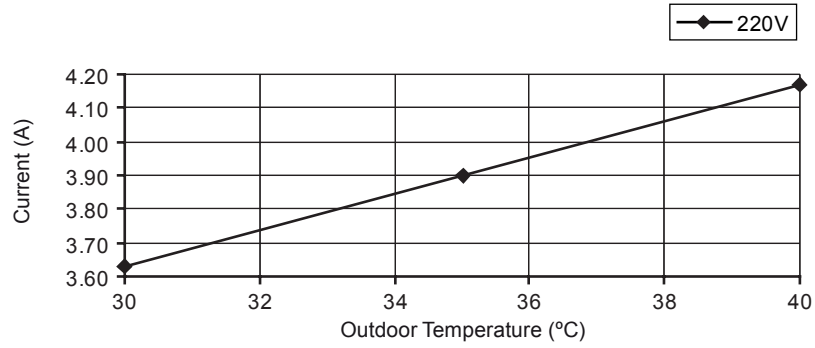
Figure 33

# 17. Technical Data

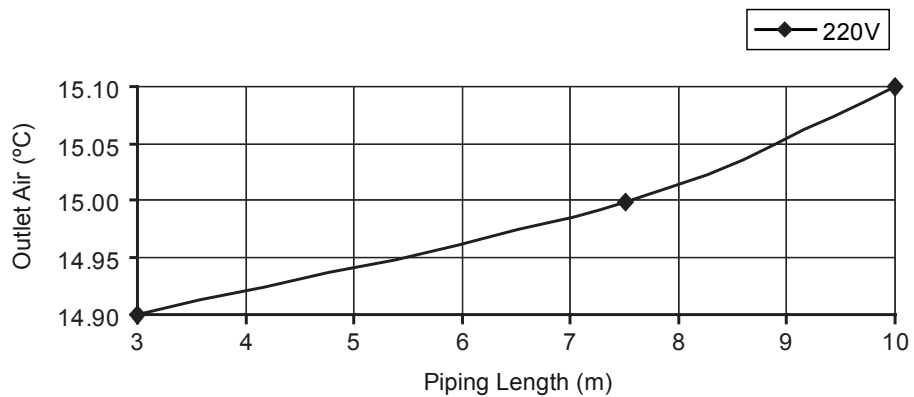
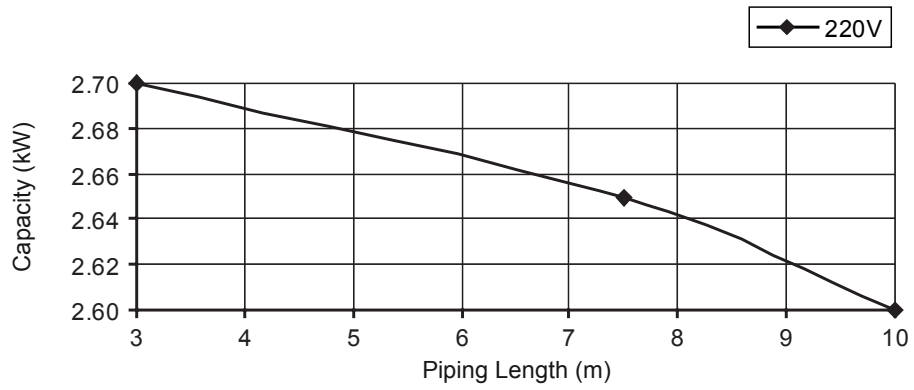
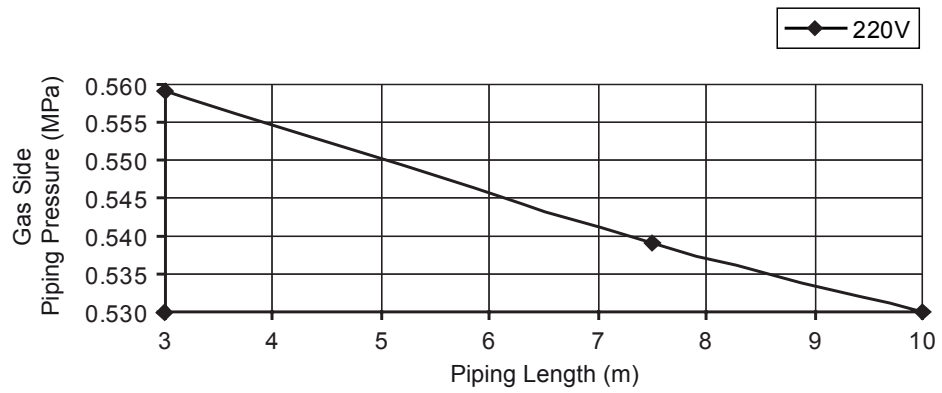
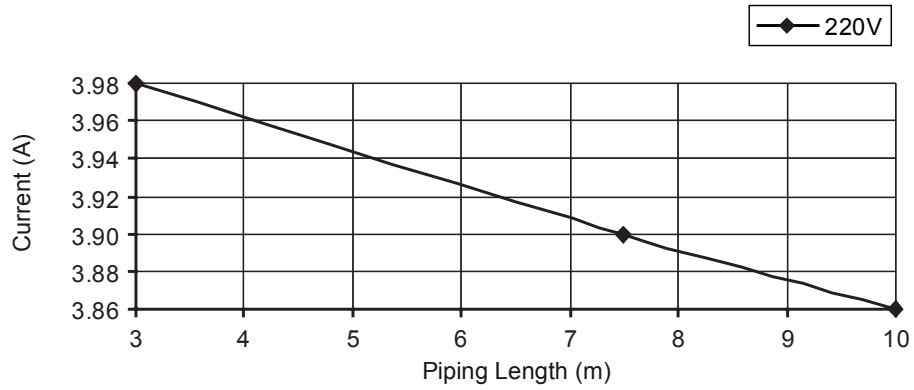
## 17.1 Operation Characteristics

### 17.1.1 CS-C9KKV CU-C9KKV

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



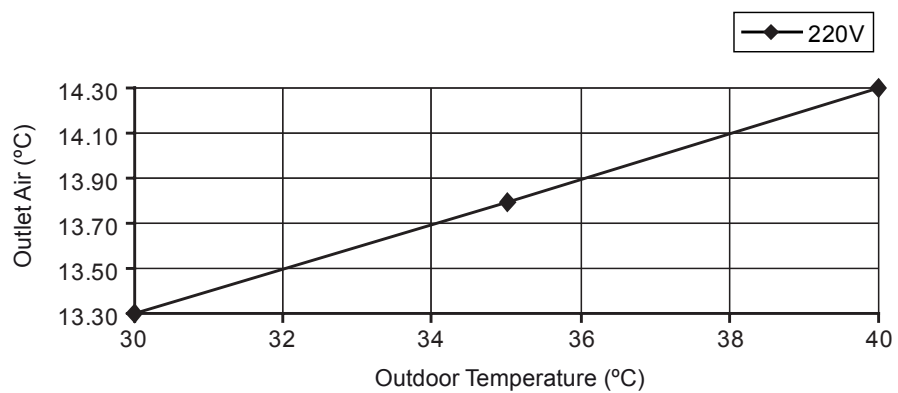
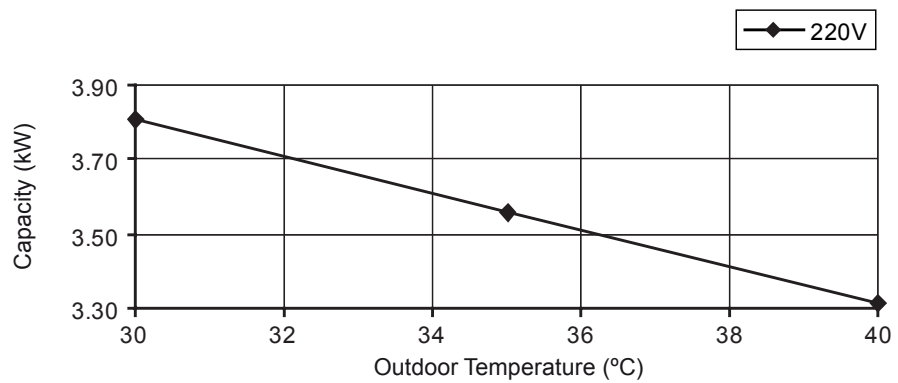
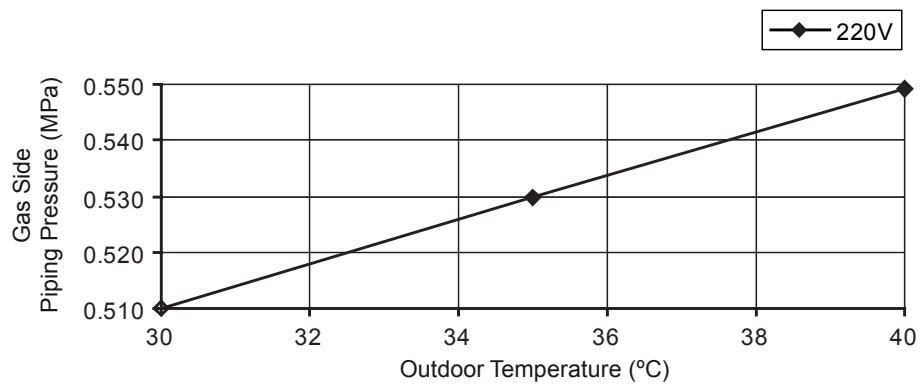
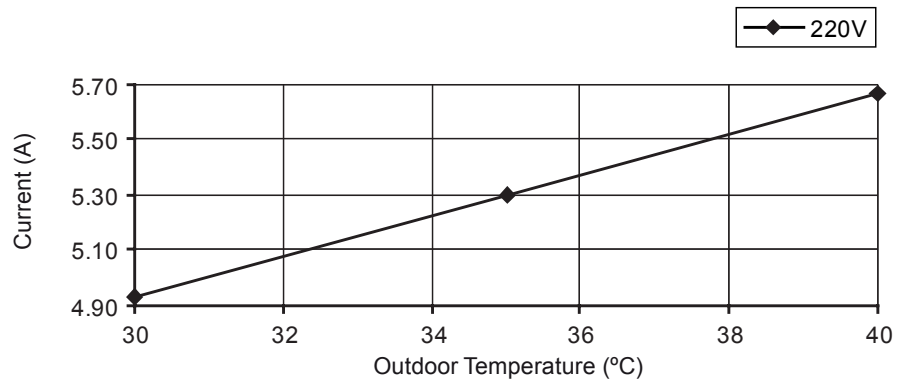
- Piping Length Characteristic
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 7.5m



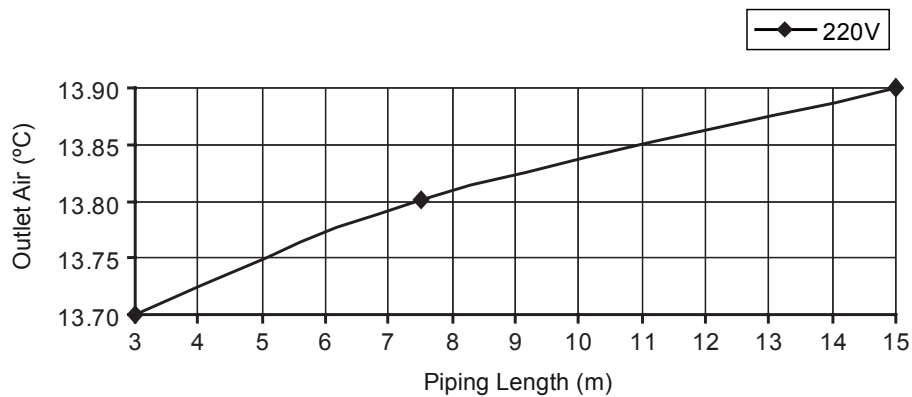
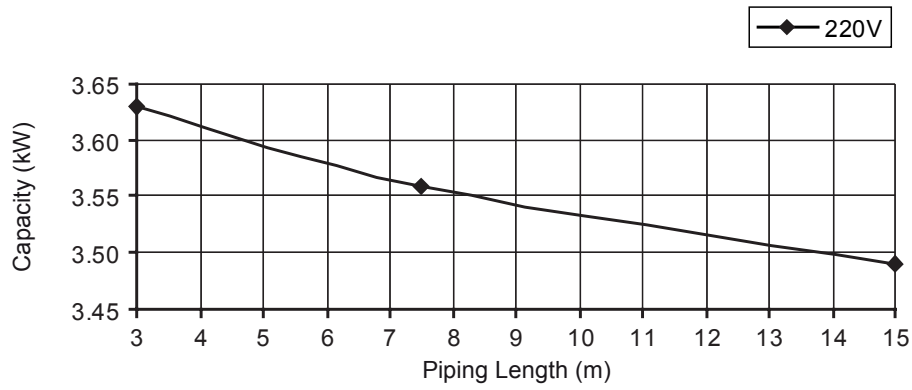
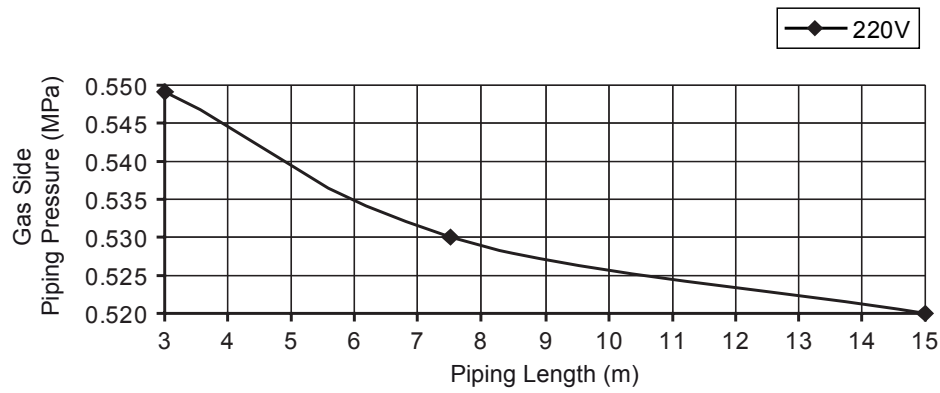
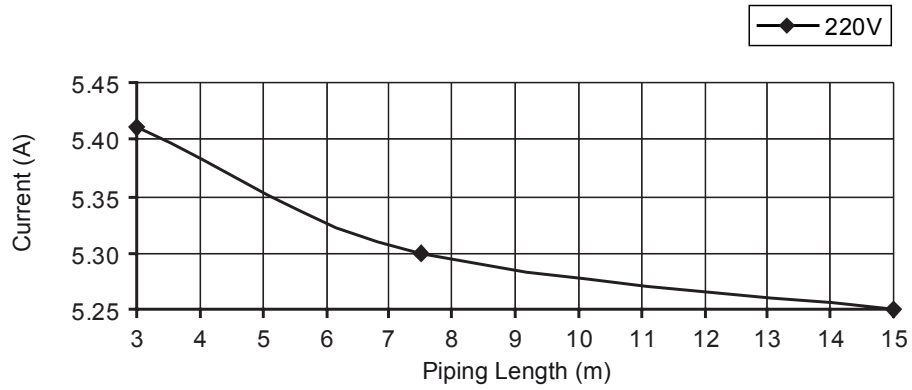


### 17.1.2 CS-C12KKV CU-C12KKV

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

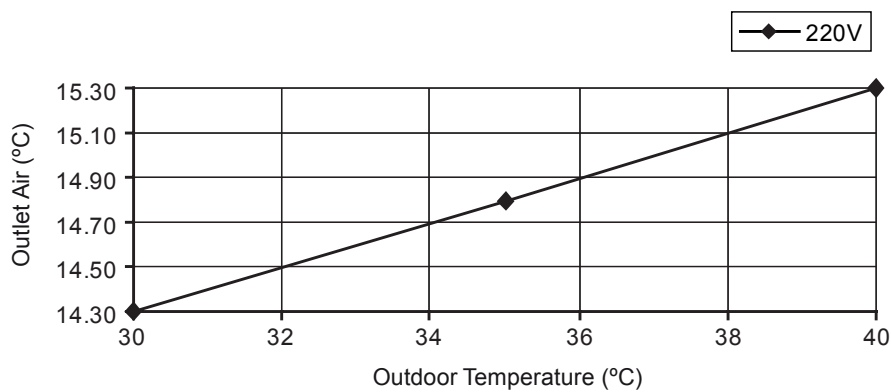
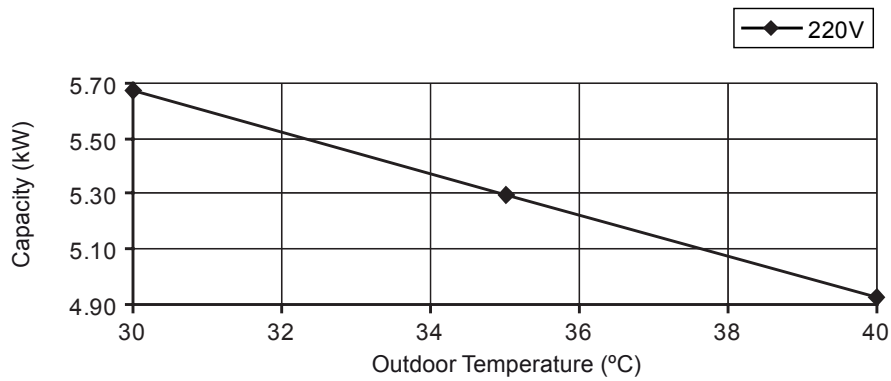
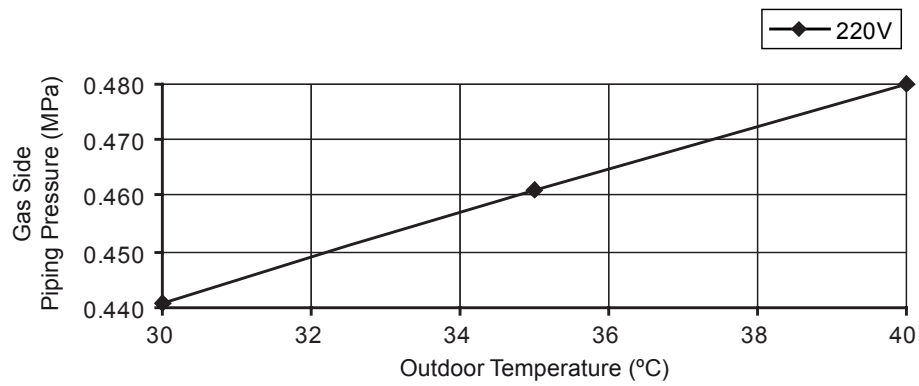
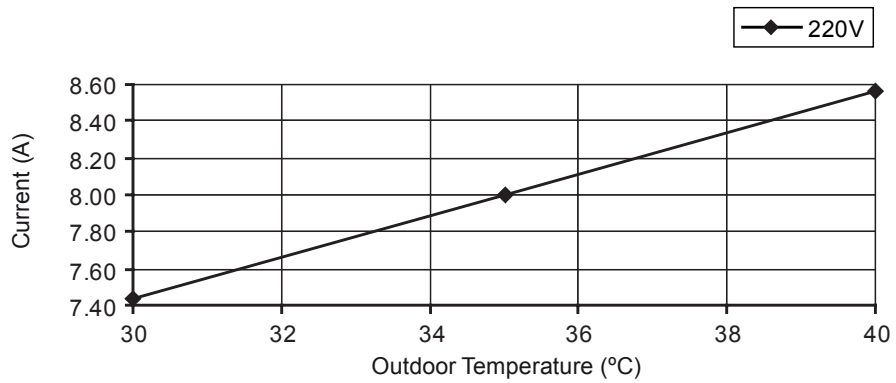


- Piping Length Characteristic
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 7.5m

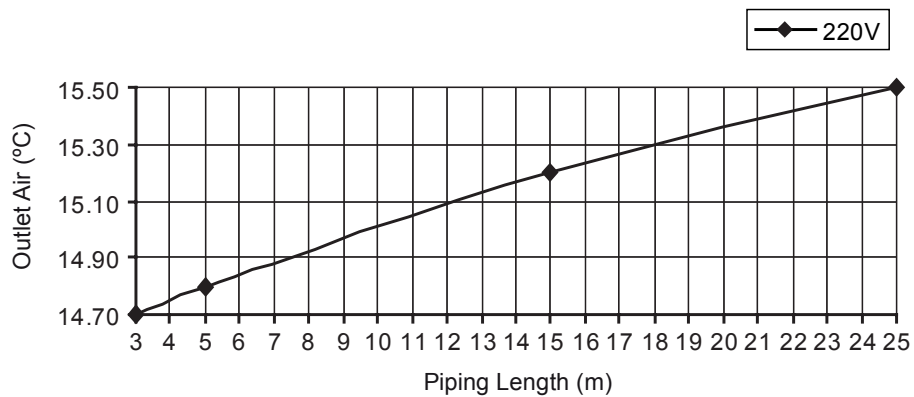
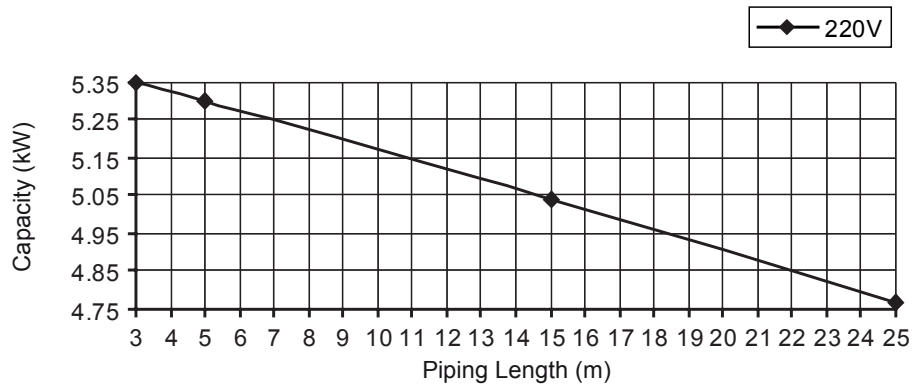
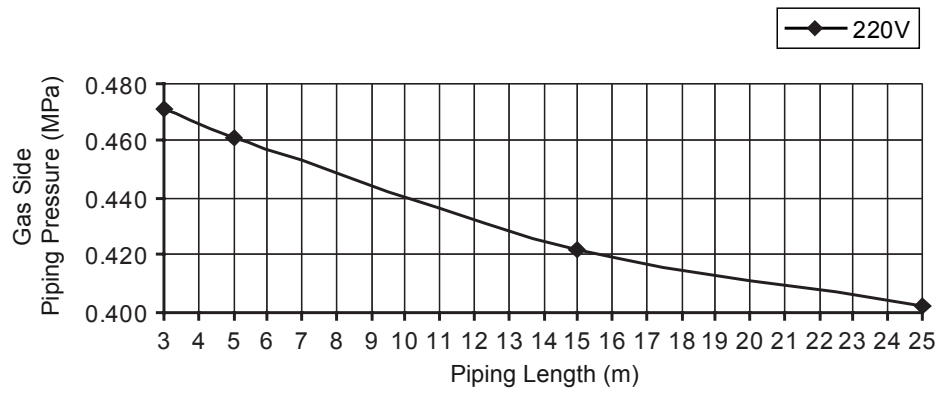
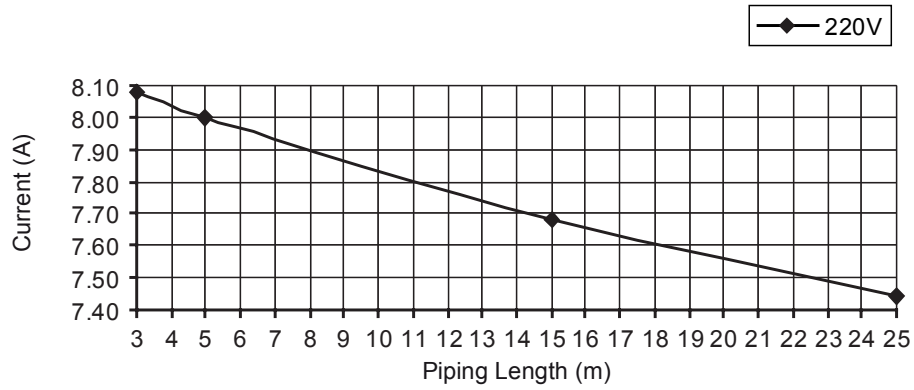


### 17.1.3 CS-C18KKV CU-C18KKV

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

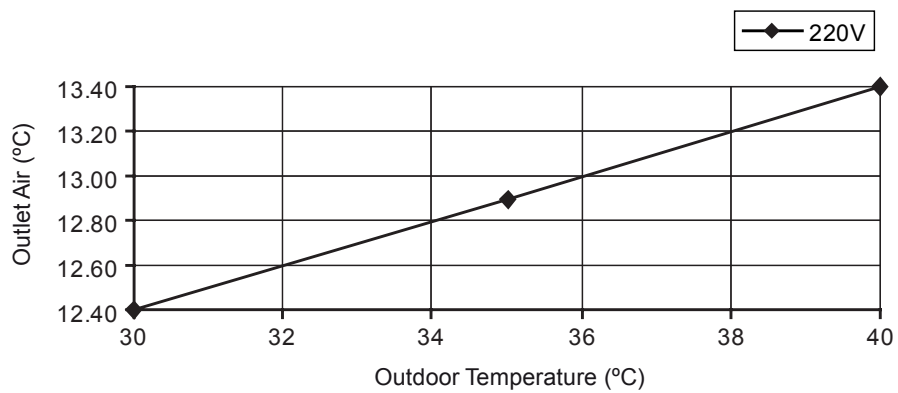
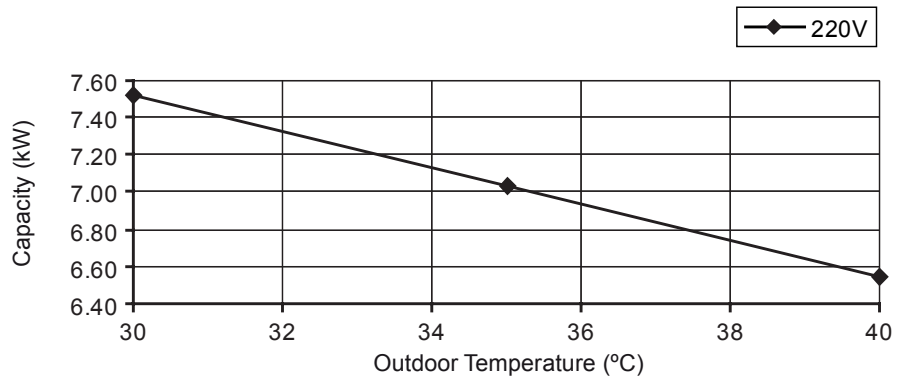
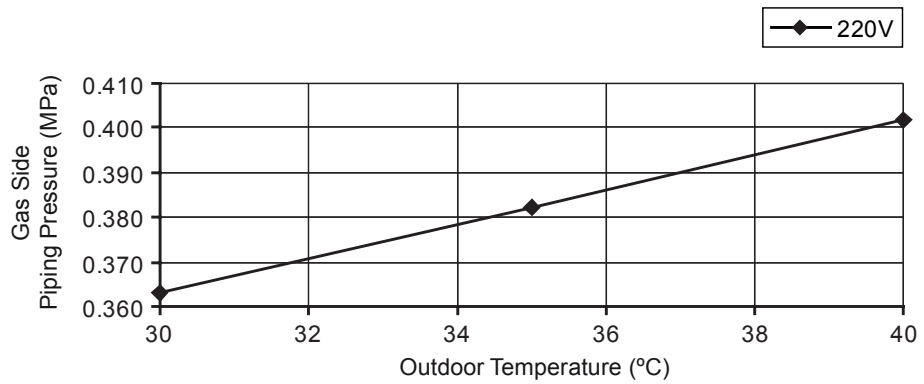
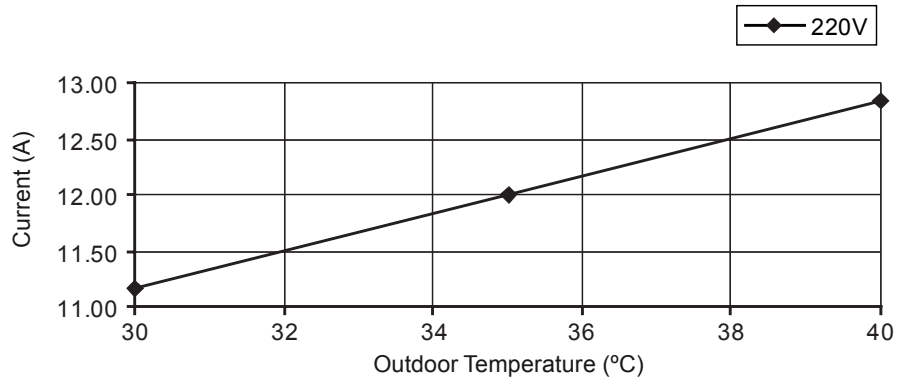


- Piping Length Characteristic
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 7.5m

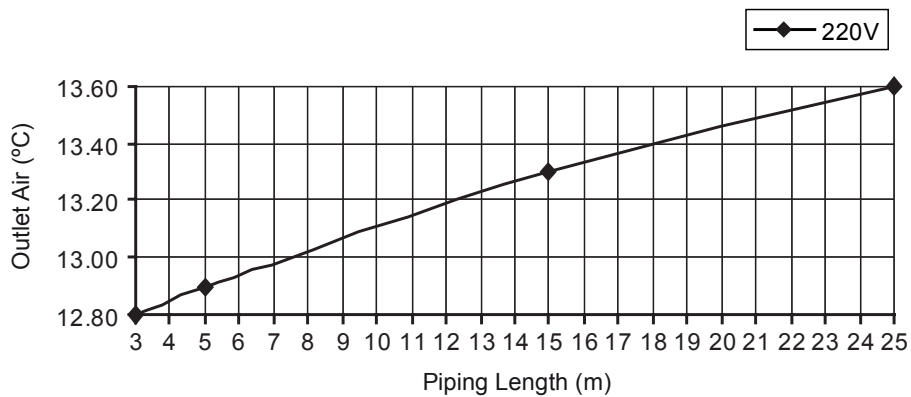
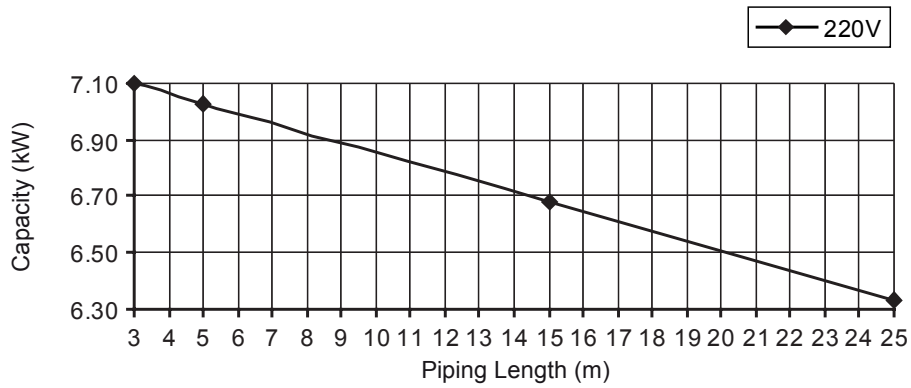
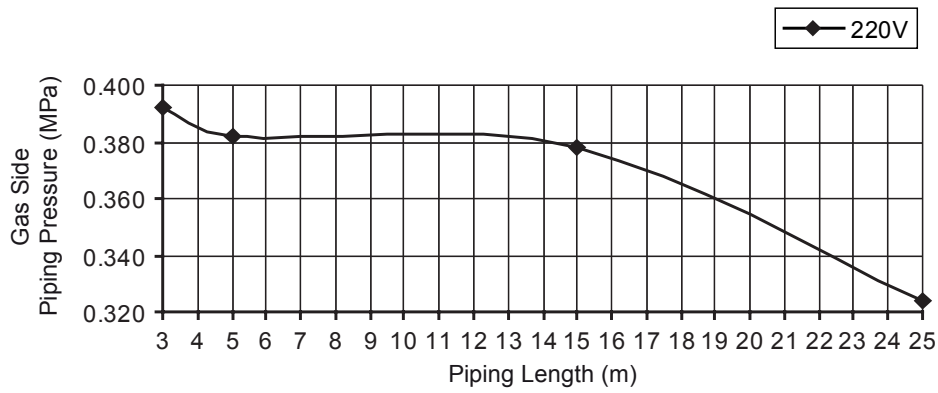
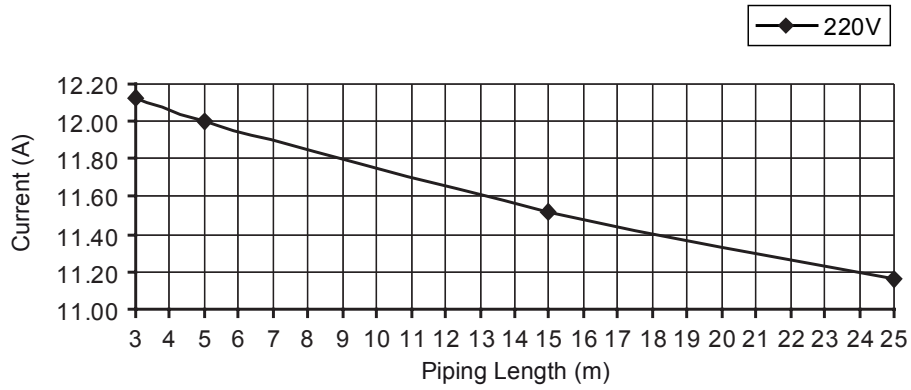


### 17.1.4 CS-C24KKV CU-C24KKV

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

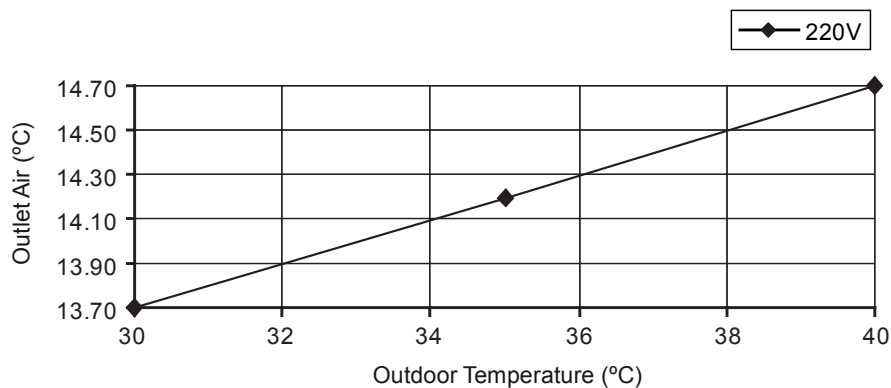
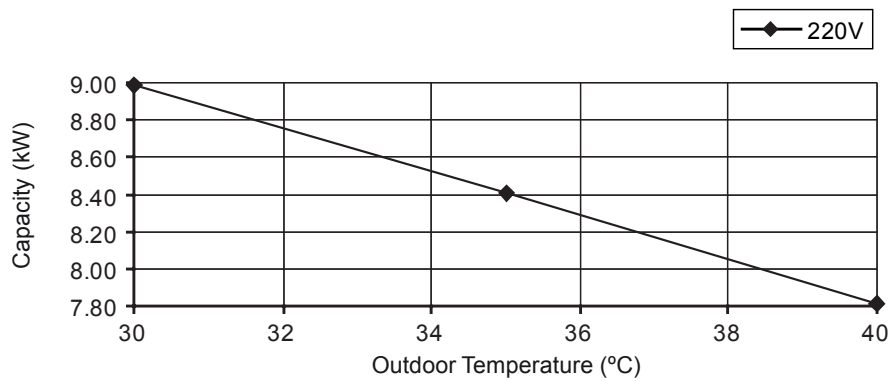
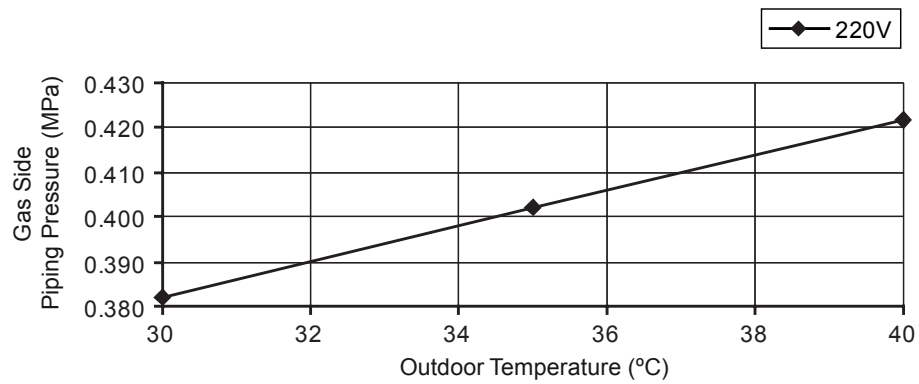
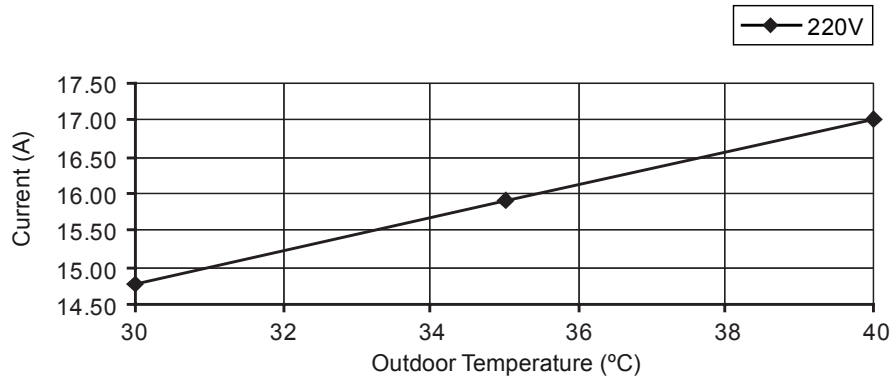


- Piping Length Characteristic
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 7.5m

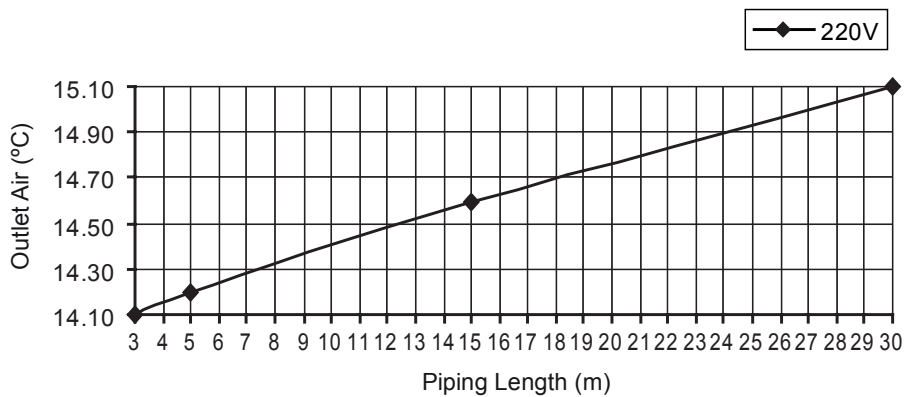
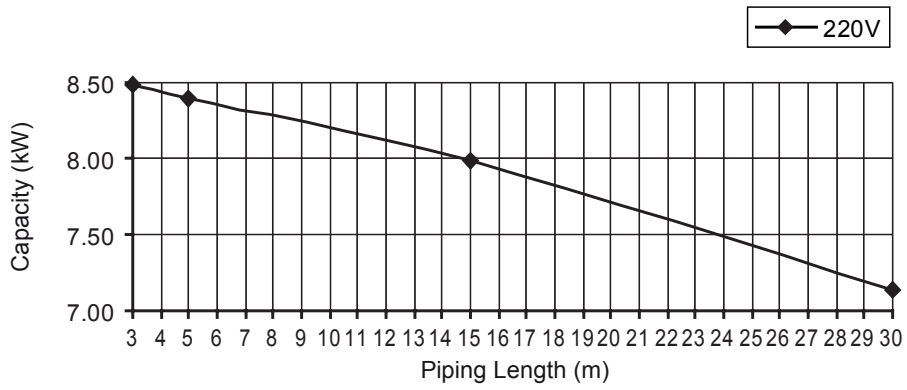
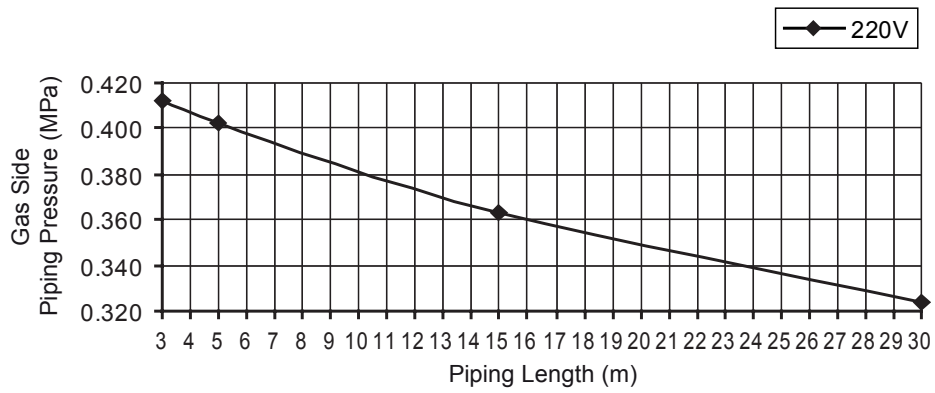
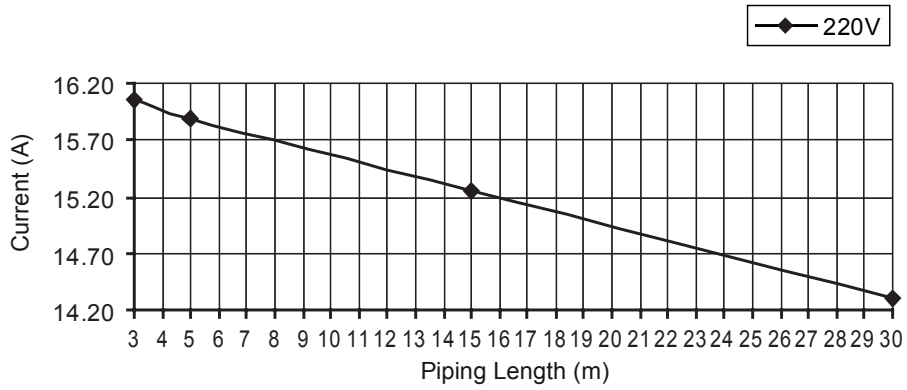


### 17.1.5 CS-C28KKV CU-C28KKV

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



- Piping Length Characteristic
  - Outdoor temperature: 35°C (DBT), 24°C (WBT)
  - Operation condition: High fan speed
  - Piping length: 7.5m

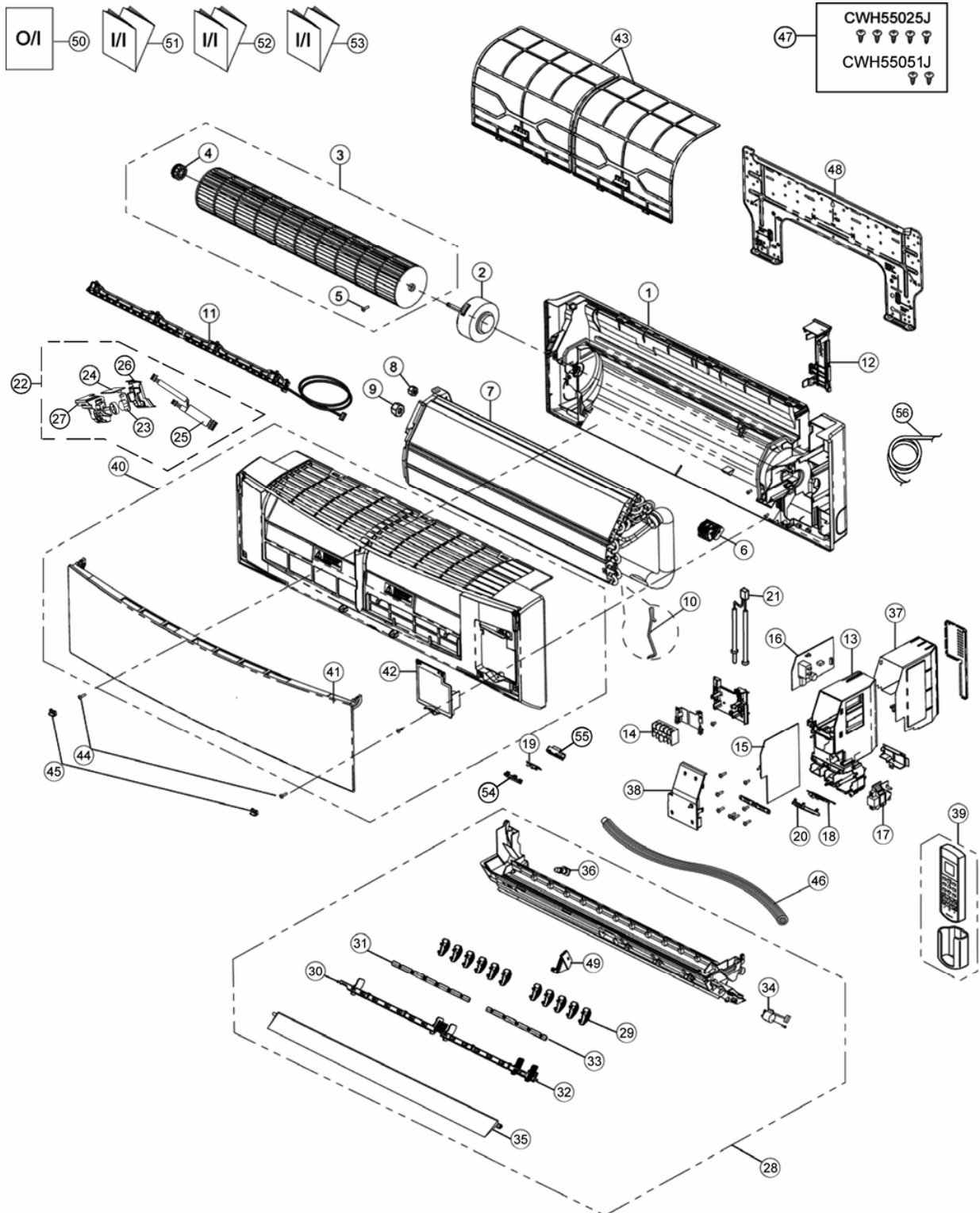




# 18. Exploded View and Replacement Parts List

## 18.1 Indoor Unit

### 18.1.1 CS-C9KKV CS-C12KKV



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

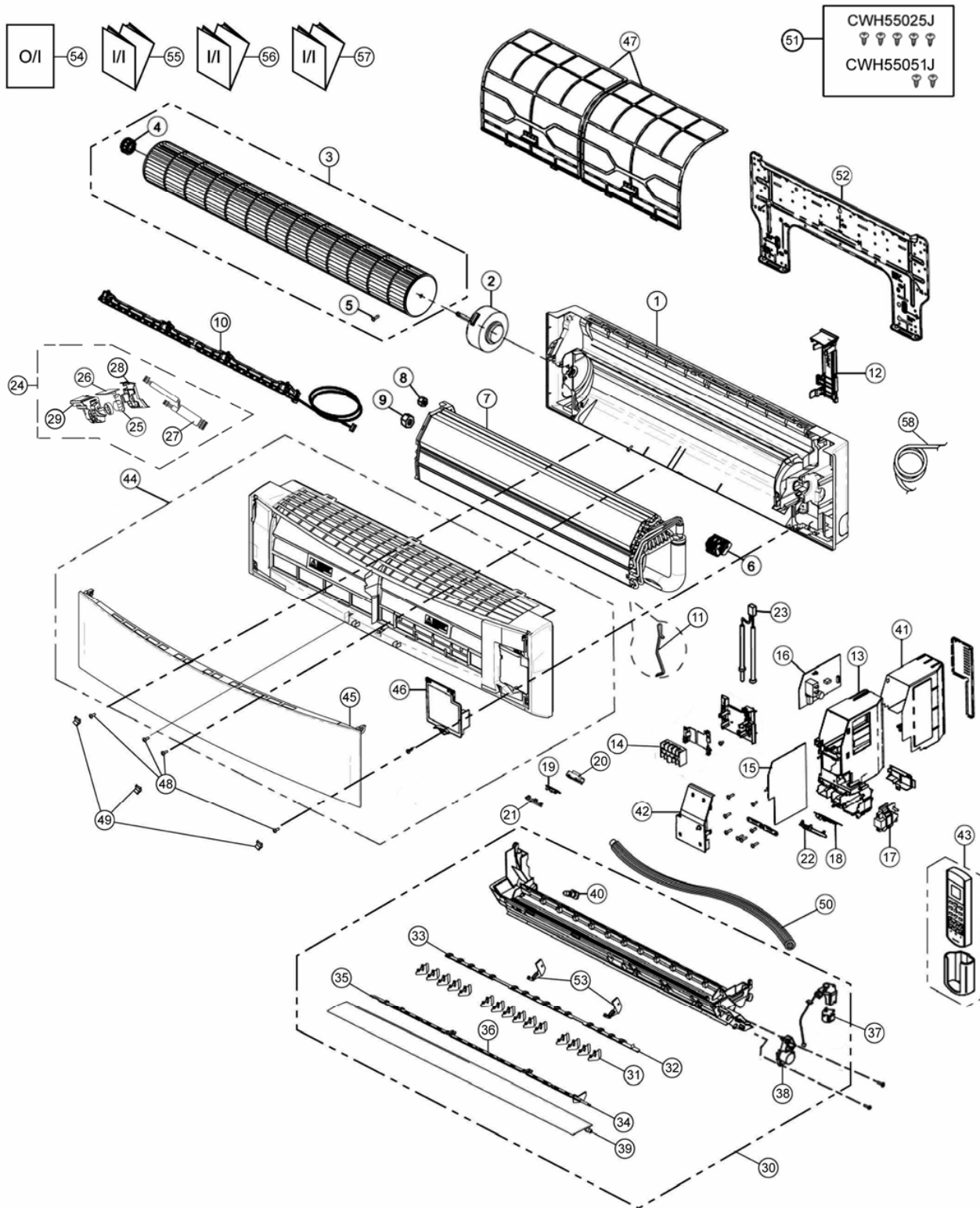
REF. NO.	PART NAME & DESCRIPTION	QTY	CS-C9KKV	CS-C12KKV	REMARK
1	CHASSY COMPLETE	1	CWD50C1653	←	
2	FAN MOTOR	1	CWA921420	←	O
3	CROSS FLOW FAN COMPLETE	1	CWH02C1076	←	
4	BEARING ASS'Y	1	CWH64K007	←	
5	SCREW - CROSS FLOW FAN	1	CWH551146	←	
6	GENERATOR COMPLETE	1	CWH94C0028	←	
7	EVAPORATOR	1	CWB30C2969	CWB30C2850	
8	FLARE NUT (LIQUID)	1	CWT251026	←	
9	FLARE NUT (GAS)	1	CWT251061	CWT251062	
10	HOLDER SENSOR	1	CWH32143	←	
11	PARTICULAR PIECE-COMPLETE	1	CWD93C1090	←	
12	BACK COVER CHASSIS	1	CWD933019	←	
13	CONTROL BOARD CASING	1	CWH102370	←	
14	TERMINAL BOARD COMPLETE	1	CWA28C2356	←	O
15	ELECTRONIC CONTROLLER - MAIN	1	CWA73C4162	CWA73C4153	O
16	ELECTRONIC CONTROLLER - POWER	1	CWA745284	←	O
17	ELECTRONIC CONTROLLER-HVU	1	CWA745348	←	O
18	ELECTRONIC CONTROLLER-INDICATOR	1	CWA745820	←	O
19	ELECTRONIC CONTROLLER-RECEIVER	1	CWA745288	←	O
20	INDICATOR HOLDER	1	CWD933021	←	
21	SENSOR COMPLETE	1	CWA50C2401	←	O
22	SENSOR COMPLETE(ECO)	1	CWA50C2708	←	O
23	ELECTRONIC CONTROLLER(ECO SENSOR)	1	CWA745791	←	O
24	ELECTRONIC CONTROLLER(COMPARATOR)	1	CWA745790	←	O
25	LEAD WIRE - PCB ECO	1	CWA67C8483	←	
26	COVER FOR PCB ECO(BOTTOM)	1	CWD933193	←	
27	COVER FOR PCB ECO(UPPER)	1	CWD933192	←	
28	DISCHARGE GRILLE COMPLETE	1	CWE20C3084	←	
29	VERTICAL VANE	11	CWE241287	←	
30	CONNECTING BAR	1	CWE261152	←	
31	CONNECTING BAR	1	CWE261153	←	
32	CONNECTING BAR	1	CWE261154	←	
33	CONNECTING BAR	1	CWE261155	←	
34	AIR SWING MOTOR	1	CWA981240	←	O
35	HORIZONTAL VANE	1	CWE24C1268	←	
36	CAP - DRAIN TRAY	1	CWH521096	←	
37	CONTROL BOARD TOP COVER	1	CWH131350	←	
38	CONTROL BOARD FRONT COVER	1	CWH13C1183	←	
39	REMOTE CONTROL COMPLETE	1	CWA75C3568	←	O
40	FRONT GRILLE COMPLETE	1	CWE11C4411	←	O
41	INTAKE GRILLE COMPLETE	1	CWE22C1507	←	O
42	GRILLE DOOR	1	CWE14C1029	←	
43	E-ION FILTER	2	CWD00K1016	←	
44	SCREW - FRONT GRILLE	2	XTT4+16CFJ	←	
45	CAP - FRONT GRILLE	2	CWH521194	←	
46	DRAIN HOSE	1	CWH851173	←	
47	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	←	
48	INSTALLATION PLATE	1	CWH361097	←	
49	FULCRUM	1	CWH621102	←	

50	OPERATING INSTRUCTION	1	CWF567101	←	
51	INSTALLATION INSTRUCTION	1	CWF614310	←	
52	INSTALLATION INSTRUCTION	1	CWF614311	←	
53	INSTALLATION INSTRUCTION	1	CWF614312	←	
54	COVER FOR RECEIVER(BOTTOM)	1	CWD933209	←	
55	COVER FOR RECEIVER(UPPER)	1	CWD933022	←	
56	P.S. CORD CO.	1	CWA20C2827	←	

(Note)

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

## 18.1.2 CS-C18KKV CS-C24KKV CS-C28KKV



### Note

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

REF. NO.	PART NAME & DESCRIPTION	QTY	CS-C18KKV	CS-C24KKV	REMARK
1	CHASSY COMPLETE	1	CWD50C1654	←	
2	FAN MOTOR	1	L6CBYYYL0037	L6CBYYYL0039	O
3	CROSS FLOW FAN COMPLETE	1	CWH02C1077	←	
4	BEARING ASS'Y	1	CWH64K007	←	
5	SCREW - CROSS FLOW FAN	1	CWH551146	←	
6	ION GENERATOR	1	CWH94C0028	←	
7	EVAPORATOR	1	CWB30C2772	CWB30C2774	
8	FLARE NUT (LIQUID)	1	CWT251026	←	
9	FLARE NUT (GAS)	1	CWT251062	CWT251036	
10	E-ION AIR PURIFYING SYSTEM	1	CWD93C1090	←	
11	HOLDER SENSOR	1	CWH32143	←	
12	BACK COVER CHASSIS	1	CWD933031	←	
13	CONTROL BOARD CASING	1	CWH102370	←	
14	TERMINAL BOARD COMPLETE	1	CWA28C2356	←	O
15	ELECTRONIC CONTROLLER - MAIN	1	CWA73C4193	←	O
16	ELECTRONIC CONTROLLER - POWER	1	CWA745303	CWA745620	O
17	ELECTRONIC CONTROLLER-HVU	1	CWA745348	←	O
18	ELECTRONIC CONTROLLER-INDICATOR	1	CWA745820	←	O
19	ELECTRONIC CONTROLLER-RECEIVER	1	CWA745288	←	O
20	COVER FOR RECEIVER(BOTTOM)	1	CWD933209	←	
21	COVER FOR RECEIVER(UPPER)	1	CWD933022	←	
22	INDICATOR HOLDER	1	CWD933021	←	
23	SENSOR COMPLETE	1	CWA50C2401	←	O
24	SENSOR COMPLETE(ECO)	1	CWA50C2709	←	O
25	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA745791	←	O
26	ELECTRONIC CONTROLLER (COMPARATOR)	1	CWA745790	←	O
27	LEAD WIRE - PCB ECO	1	CWA67C8484	←	
28	COVER FOR PCB ECO(BOTTOM)	1	CWD933193	←	
29	COVER FOR PCB ECO(UPPER)	1	CWD933192	←	
30	DISCHARGE GRILLE COMPLETE	1	CWE20C3007	←	
31	VERTICAL VANE	15	CWE241289	←	
32	CONNECTING BAR	1	CWE261156	←	
33	CONNECTING BAR	1	CWE261158	←	
34	CONNECTING BAR	1	CWE261157	←	
35	CONNECTING BAR	1	CWE261159	←	
36	CONNECTING BAR	1	CWE261160	←	
37	A.S.MOTOR,DC SINGLE 12V 300OHM	1	CWA981241	←	O
38	A.S MOTOR,DC SINGLE 12V300 OHM	1	CWA98K1014	←	O
39	HORIZONTAL VANE	1	CWE24C1295	←	
40	CAP - DRAIN TRAY	1	CWH521096	←	
41	CONTROL BOARD TOP COVER	1	CWH131350	←	
42	CONTROL BOARD FRONT COVER	1	CWH13C1183	←	
43	REMOTE CONTROL COMPLETE	1	CWA75C3560	←	O
44	FRONT GRILLE COMPLETE	1	CWE11C4422	←	O
45	INTAKE GRILLE COMPLETE	1	CWE22C1483	←	O
46	GRILLE DOOR	1	CWE14C1029	←	
47	E-ION FILTER	2	CWD00K1017	←	
48	SCREW - FRONT GRILLE	4	XTT4+16CFJ	←	
49	CAP - FRONT GRILLE	3	CWH521194	←	

50	DRAIN HOSE	1	CWH851173	←	
51	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	←	
52	INSTALLATION PLATE	1	CWH361098	←	
53	FULCRUM	2	CWH621103	←	
54	OPERATING INSTRUCTION	1	CWF567101	←	
55	INSTALLATION INSTRUCTION	1	CWF614310	←	
56	INSTALLATION INSTRUCTION	1	CWF614311	←	
57	INSTALLATION INSTRUCTION	1	CWF614312	←	
58	POWER SUPPLY CORD-COMPLETE	1	CWA20C2829	CWA20C2836	

(Note)

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

REF. NO.	PART NAME & DESCRIPTION	QTY	CS-C28KKV	REMARK
1	CHASSY COMPLETE	1	CWD50C1654	
2	FAN MOTOR	1	L6CBYYYL0039	O
3	CROSS FLOW FAN COMPLETE	1	CWH02C1077	
4	BEARING ASS'Y	1	CWH64K007	
5	SCREW - CROSS FLOW FAN	1	CWH551146	
6	ION GENERATOR	1	CWH94C0028	
7	EVAPORATOR	1	CWB30C2777	
8	FLARE NUT (LIQUID)	1	CWT251026	
9	FLARE NUT (GAS)	1	CWT251036	
10	E-ION AIR PURIFYING SYSTEM	1	CWD93C1090	
11	HOLDER SENSOR	1	CWH32143	
12	BACK COVER CHASSIS	1	CWD933031	
13	CONTROL BOARD CASING	1	CWH102370	
14	TERMINAL BOARD COMPLETE	1	CWA28C2357	O
15	ELECTRONIC CONTROLLER - MAIN	1	CWA73C4182	O
16	ELECTRONIC CONTROLLER - POWER	1	CWA745363	O
17	ELECTRONIC CONTROLLER-HVU	1	CWA745348	O
18	ELECTRONIC CONTROLLER-INDICATOR	1	CWA745820	O
19	ELECTRONIC CONTROLLER-RECEIVER	1	CWA745288	O
20	COVER FOR RECEIVER(BOTTOM)	1	CWD933209	
21	COVER FOR RECEIVER(UPPER)	1	CWD933022	
22	INDICATOR HOLDER	1	CWD933021	
23	SENSOR COMPLETE	1	CWA50C2401	O
24	SENSOR COMPLETE(ECO)	1	CWA50C2709	O
25	ELECTRONIC CONTROLLER (ECO SENSOR)	1	CWA745791	O
26	ELECTRONIC CONTROLLER (COMPARATOR)	1	CWA745790	O
27	LEAD WIRE - PCB ECO	1	CWA67C8484	
28	COVER FOR PCB ECO(BOTTOM)	1	CWD933193	
29	COVER FOR PCB ECO(UPPER)	1	CWD933192	
30	DISCHARGE GRILLE COMPLETE	1	CWE20C3007	
31	VERTICAL VANE	15	CWE241289	
32	CONNECTING BAR	1	CWE261156	
33	CONNECTING BAR	1	CWE261158	
34	CONNECTING BAR	1	CWE261157	
35	CONNECTING BAR	1	CWE261159	
36	CONNECTING BAR	1	CWE261160	
37	A.S.MOTOR,DC SINGLE 12V 300OHM	1	CWA981241	O
38	A.S MOTOR,DC SINGLE 12V300 OHM	1	CWA98K1014	O
39	HORIZONTAL VANE	1	CWE24C1295	
40	CAP - DRAIN TRAY	1	CWH521096	
41	CONTROL BOARD TOP COVER	1	CWH131350	
42	CONTROL BOARD FRONT COVER	1	CWH13C1183	
43	REMOTE CONTROL COMPLETE	1	CWA75C3560	O
44	FRONT GRILLE COMPLETE	1	CWE11C4416	O
45	INTAKE GRILLE COMPLETE	1	CWE22C1483	O
46	GRILLE DOOR	1	CWE14C1029	
47	E-ION FILTER	2	CWD00K1017	
48	SCREW - FRONT GRILLE	4	XTT4+16CFJ	
49	CAP - FRONT GRILLE	3	CWH521194	

50	DRAIN HOSE	1	CWH851173	
51	BAG COMPLETE - INSTALLATION SCREW	1	CWH82C1705	
52	INSTALLATION PLATE	1	CWH361098	
53	FULCRUM	2	CWH621103	
54	OPERATING INSTRUCTION	1	CWF567101	
55	INSTALLATION INSTRUCTION	1	CWF614310	
56	INSTALLATION INSTRUCTION	1	CWF614311	
57	INSTALLATION INSTRUCTION	1	CWF614312	
58	POWER SUPPLY CORD-COMPLETE	1	CWA20C2836	

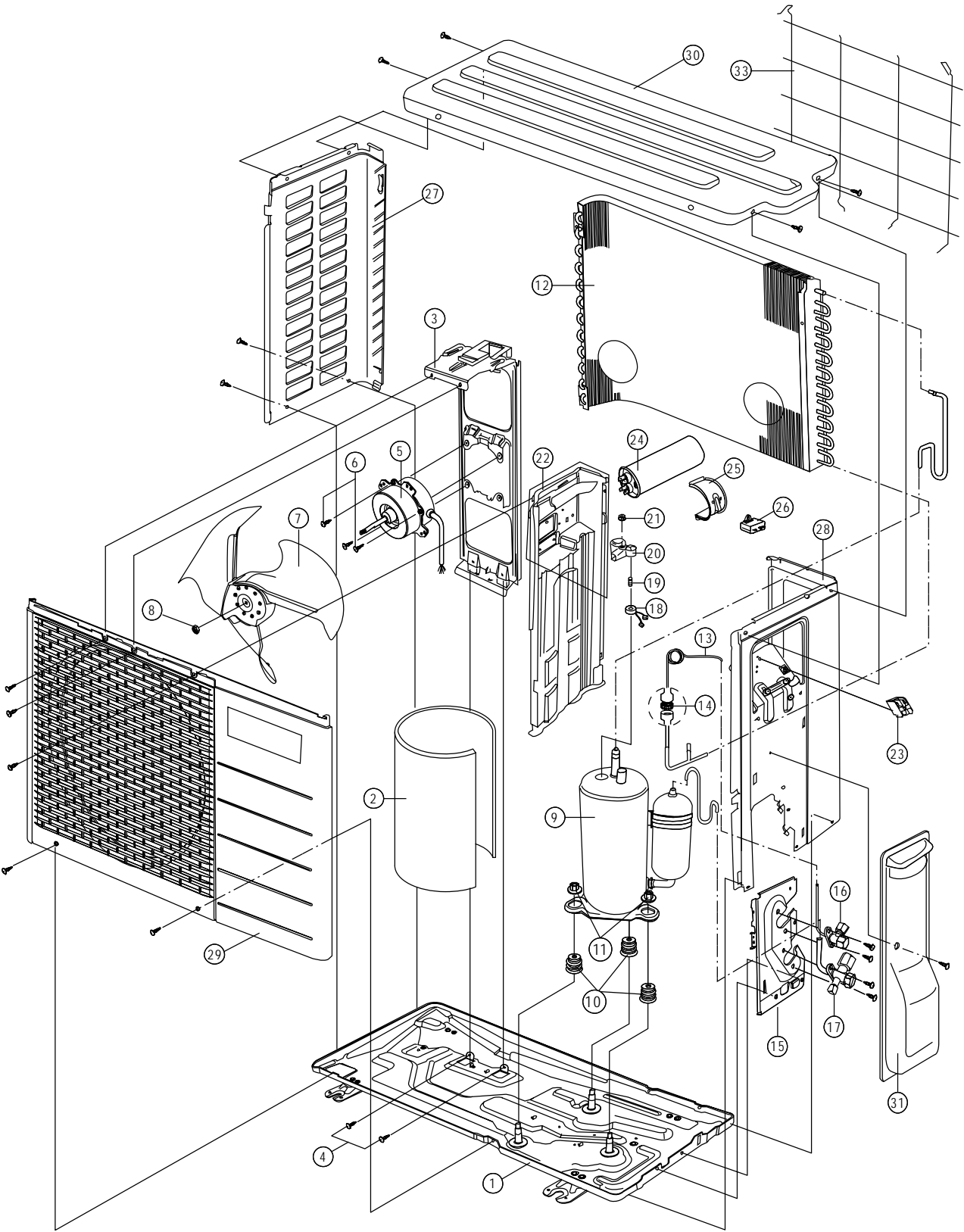
(Note)

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



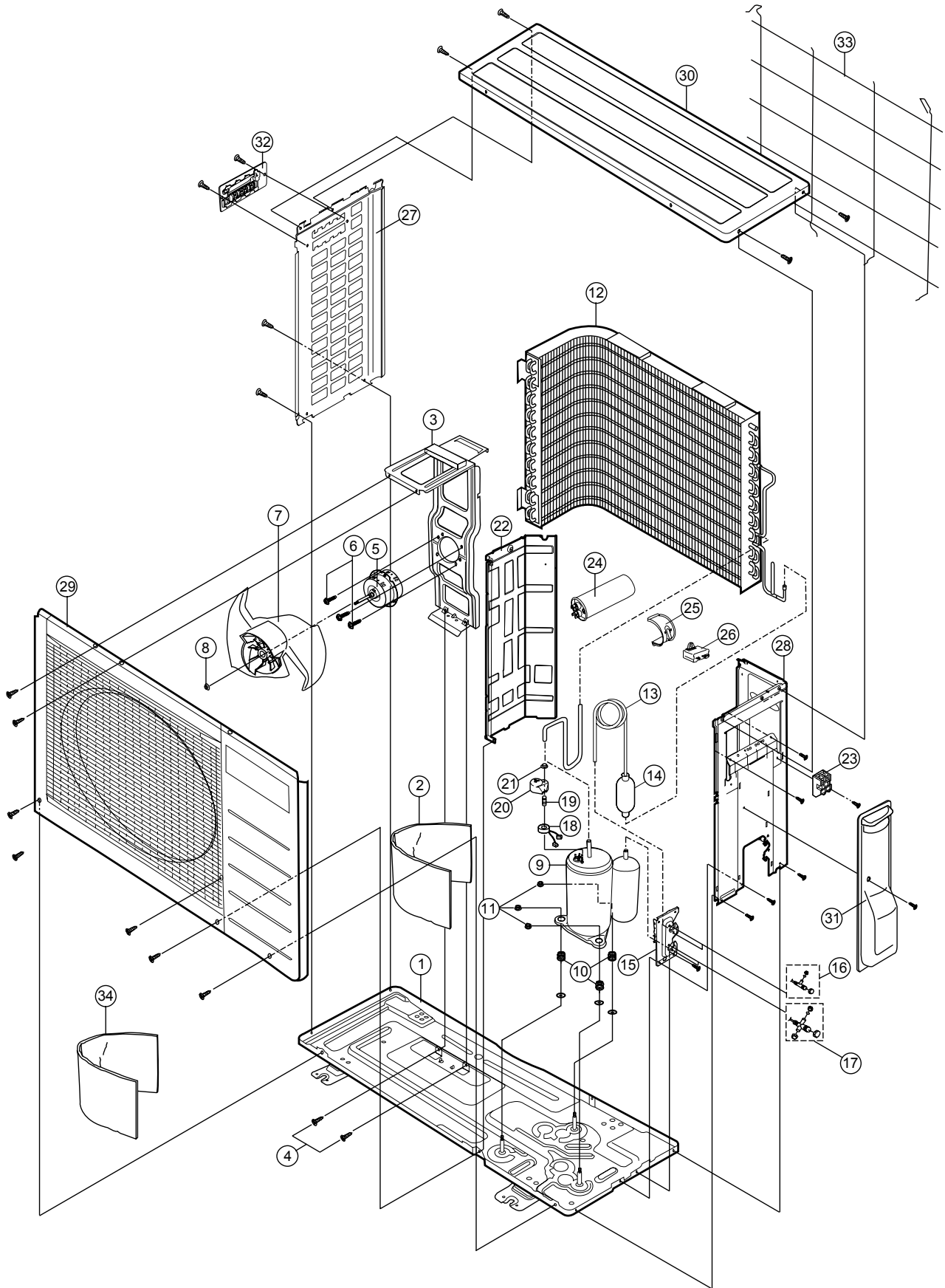
# 18.2 Outdoor Unit

## 18.2.1 CU-C9KKV



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.

## 18.2.2 CU-C12KKV



### Note

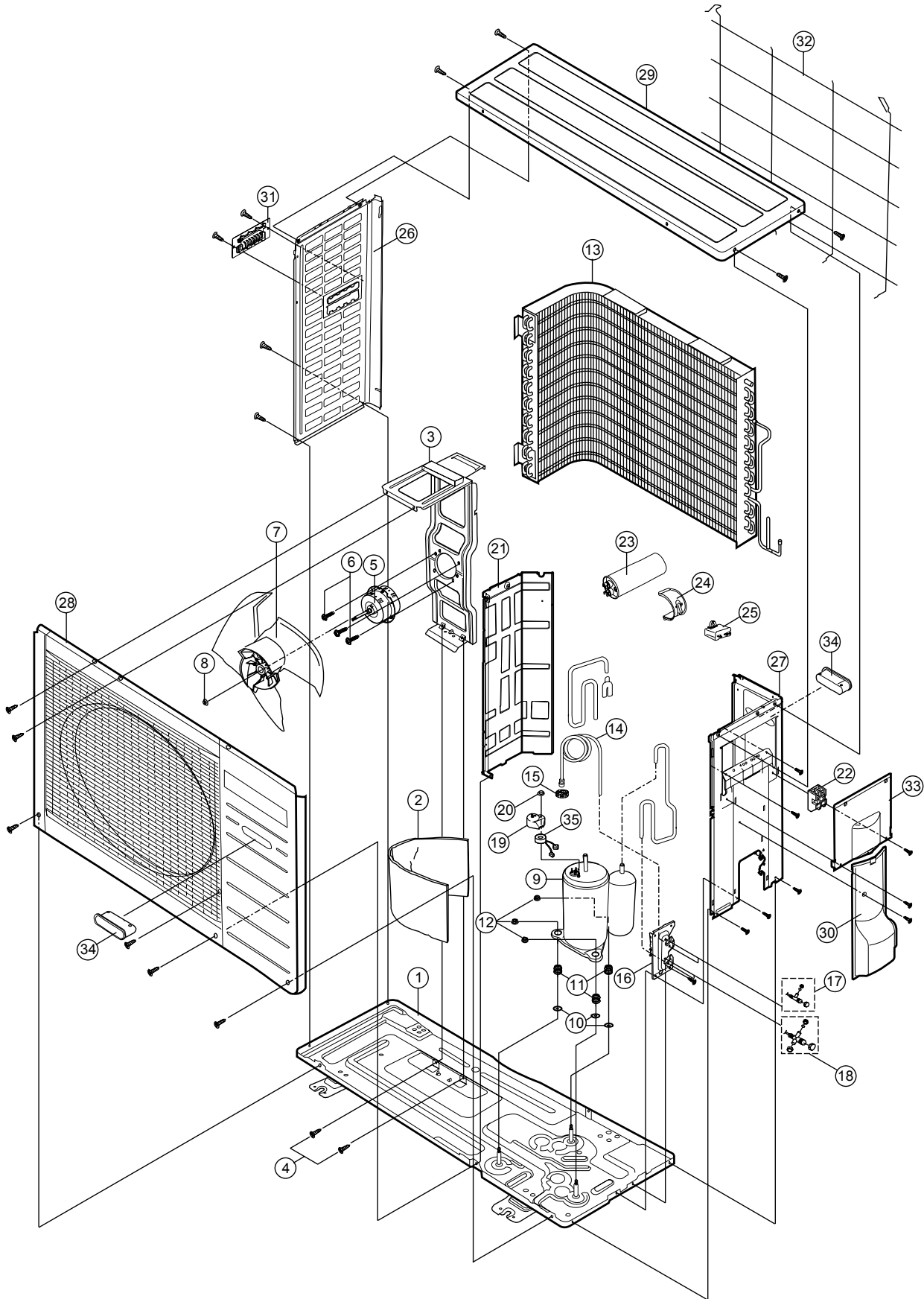
The above exploded view is for the purpose of parts disassembly and replacement.  
The non-numbered parts are not kept as standard service parts.

REF. NO.	PART NAME & DESCRIPTION	QTY	CU-C9KKV	CU-C12KKV	REMARK
1	CHASSY ASS'Y	1	CWD50K2107	CWD50K2071	
2	SOUND PROOF MATERIAL	1	CWG302254	CWG302110	
3	FAN MOTOR BRACKET	1	CWD541075	CWD541030	
4	SCREW - FAN MOTOR BRACKET	2	CWH551217	←	
5	FAN MOTOR	1	CWA951562	CWA951329J	O
6	SCREW - FAN MOTOR MOUNT	3	CWH55406J	←	
7	PROPELLER FAN ASS'Y	1	CWH03K1020	CWH03K1006	
8	NUT - PROPELLER FAN	1	CWH56053J	←	
9	COMPRESSOR (50HZ, 220/240V)	1	2R13C236BSC	2P19S236A1L	O
10	ANTI - VIBRATION BUSHING	3	CWH50077	←	
11	NUT - COMPRESSOR MOUNT	3	CWH56000J	←	
12	CONDENSER	1	CWB32C2798	CWB32C2796	
13	CAPILLARY TUBE ASS'Y	1	CWB15K1271	CWB15K1147	
14	STRAINER	1	CWB11025	CWB111011	
15	HOLDER COUPLING	1	CWH351047	CWH351023	
16	2-WAY VALVE (LIQUID)	1	CWB021217	CWB021362	O
17	3-WAY VALVE (GAS)	1	CWB011257	CWB011148	O
18	OVERLOAD PROTECTOR WITH WIRE	1	CWA67C5210	CWA67C7548	
19	HOLDER - O.L.P.	1	CWH7041200	←	
20	TERMINAL COVER	1	CWH171011	←	
21	NUT - TERMINAL COVER	1	CWH7080300J	←	
22	SOUND PROOF BOARD	1	CWH151074	CWH151022	
23	TERMINAL BOARD ASS'Y	1	CWA28K1064J	←	
24	CAPACITOR - COM.	1	DS371156CPNA	CWA312076	O
25	HOLDER CAPACITOR	1	CWH301038	CWH30057	
26	CAPACITOR - F.M	1	DS441205NPQA	←	O
27	CABINET SIDE PLATE	1	CWE041110A	CWE041248A	
28	CABINET SIDE PLATE COMPLETE	1	CWE04C1042	CWE04C1119	
29	CABINET FRONT PLATE ASS'Y	1	CWE06K1048	CWE06K1034	
30	CABINET TOP PLATE	1	CWE031041A	CWE031014A	
31	CONTROL BOARD COVER COMP	1	CWH13C1099	CWH13C1064	
32	HANDLE	1	-	CWE161010	
33	WIRE NET	1	CWD041057A	CWD041111A	
34	SOUND PROOF MATERIAL	1	-	CWG302126	

(Note)

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

## 18.2.3 CU-C18KKV



### Note

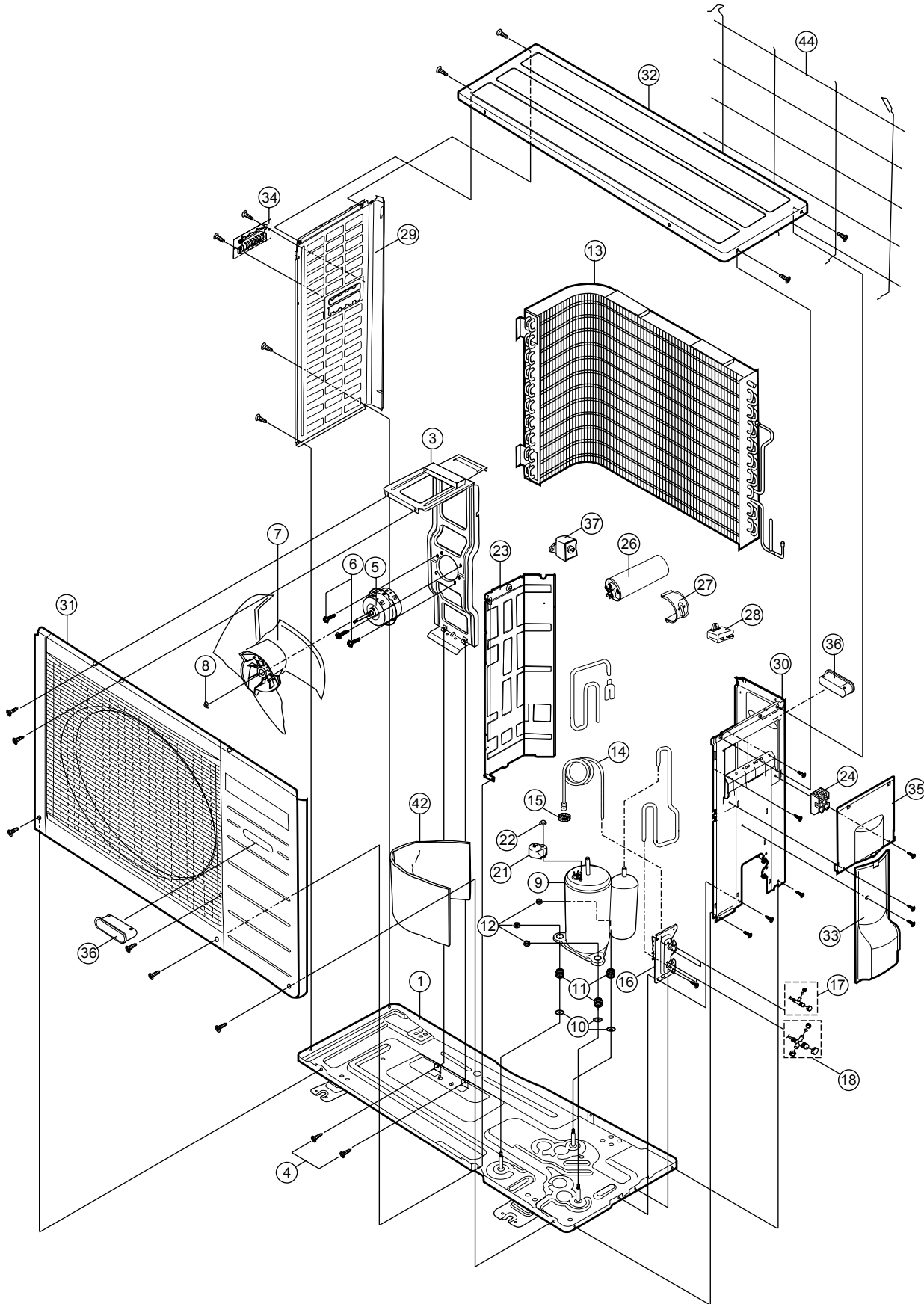
The above exploded view is for the purpose of parts disassembly and replacement.  
The non-numbered parts are not kept as standard service parts.

REF. NO.	PART NAME & DESCRIPTION	QTY	CU-C18KKV	REMARK
1	CHASSY ASS'Y	1	CWD50K2115	
2	SOUND PROOF MATERIAL	1	CWG302278	
3	FAN MOTOR BRACKET	1	CWD541065	
4	SCREW - FAN MOTOR BRACKET	2	CWH551217	
5	FAN MOTOR	1	CWA951401J	O
6	SCREW - FAN MOTOR MOUNT	4	CWH55252J	
7	PROPELLER FAN ASS'Y	1	CWH03K1017	
8	NUT - PROPELLER FAN	1	CWH561038J	
9	COMPRESSOR	1	2KS252F5AA04	O
10	PACKING	3	CWB81043	
11	ANTI - VIBRATION BUSHING	3	CWH50055	
12	NUT - COMPRESSOR MOUNT	3	CWH561049	
13	CONDENSER	1	CWB32C2691	
14	CAPILLARY TUBE ASS'Y	1	CWB15K1252	
15	STRAINER	1	CWB11025	
16	HOLDER COUPLING	1	CWH351036	
17	2-WAY VALVE (LIQUID)	1	CWB021175	O
18	3-WAY VALVE (GAS)	1	CWB011483	O
19	TERMINAL COVER	1	CWH171012	
20	NUT - TERMINAL COVER	1	CWH7080300J	
21	SOUND PROOF BOARD	1	CWH151051	
22	TERMINAL BOARD ASS'Y	1	CWA28K1064J	
23	CAPACITOR - COM.	1	CWA312078	O
24	HOLDER CAPACITOR	1	CWH30060	
25	CAPACITOR - F.M	1	DS441355NPQA	O
26	CABINET SIDE PLATE	1	CWE041255A	
27	CABINET SIDE PLATE COMPLETE	1	CWE04C1123	
28	CABINET FRONT PLATE ASS'Y	1	CWE06K1043	
29	CABINET TOP PLATE	1	CWE03K1009A	
30	CONTROL BOARD COVER COMP	1	CWH131168	
31	HANDLE	1	CWE161010	
32	WIRE NET	1	CWD041041A	
33	CONTROL BOARD COVER(RIGHT-TOP)	1	CWH131169A	
34	HANDLE	2	CWE16000E	
35	OVERLOAD PROTECTOR WITH WIRE	1	CWA67C7546	

(Note)

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

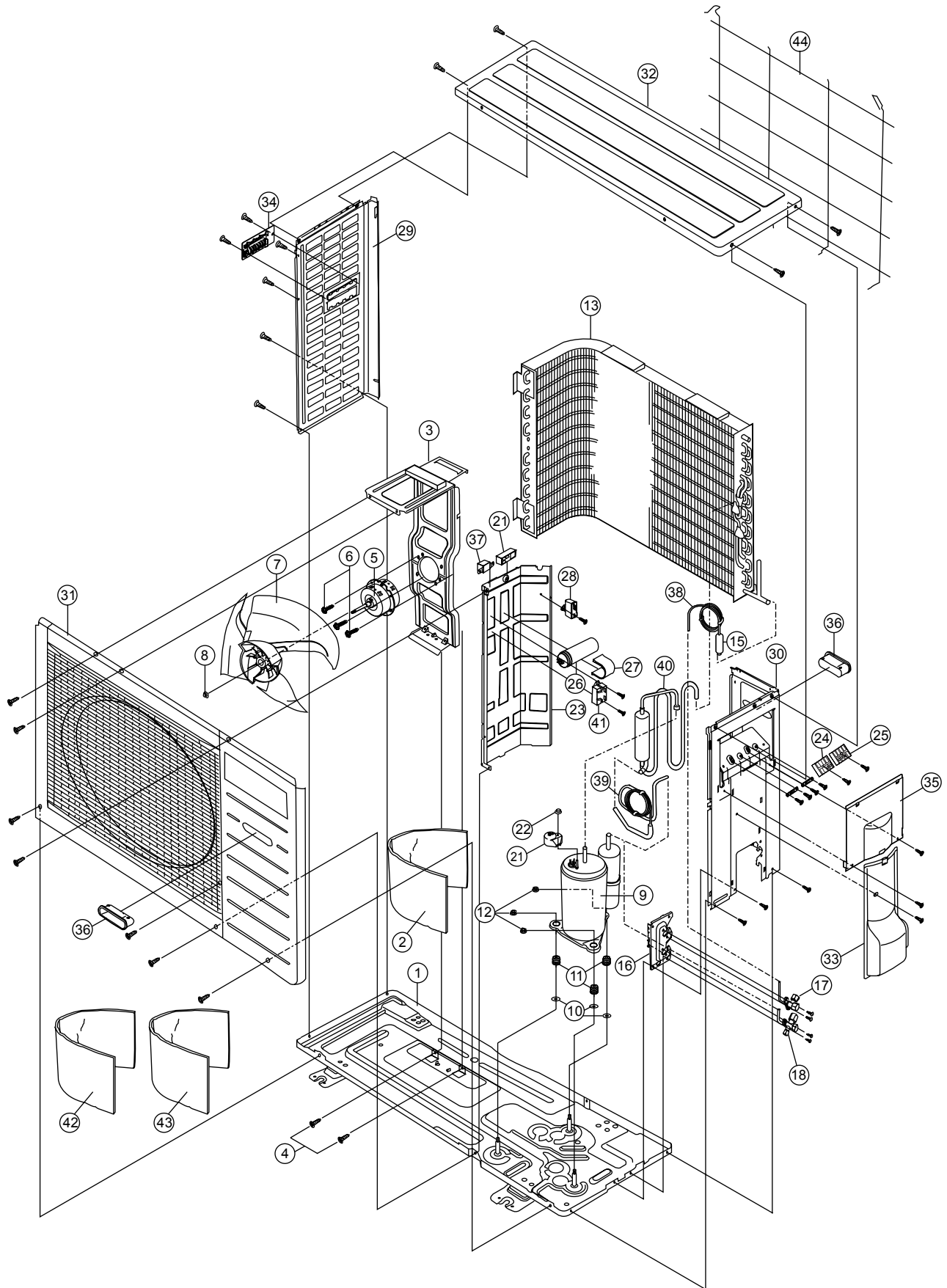
## 18.2.4 CU-C24KKV



### 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.

## 18.2.5 CU-C28KKV



### Note

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

REF. NO.	PART NAME & DESCRIPTION	QTY	CU-C24KKV	CU-C28KKV	REMARK
1	CHASSY ASS'Y	1	CWD50K2100	←	
2	SOUND PROOF MATERIAL	2	-	CWG302230	
3	FAN MOTOR BRACKET	1	CWD541065	CWD541055	
4	SCREW - FAN MOTOR BRACKET	2	CWH551217	←	
5	FAN MOTOR	1	CWA951399J	CWA951357J	O
6	SCREW - FAN MOTOR MOUNT	4	CWH55252J	←	
7	PROPELLER FAN ASS'Y	1	CWH03K1017	←	
8	NUT - PROPELLER FAN	1	CWH561038J	←	
9	COMPRESSOR	1	2J39S236A1A	2JD488H3AA03	O
10	PACKING	3	CWB81043	←	
11	ANTI - VIBRATION BUSHING	3	CWH50055	←	
12	NUT - COMPRESSOR MOUNT	3	CWH561049	←	
13	CONDENSER	1	CWB32C2692	CWB32C2677	
14	CAPILLARY TUBE ASS'Y	1	CWB15K1282	-	
15	STRAINER	1	CWB11025	CWB11004	
16	HOLDER COUPLING	1	CWH351036	←	
17	2-WAY VALVE (LIQUID)	1	CWB021175	←	O
18	3-WAY VALVE (GAS)	1	CWB011484	←	O
21	TERMINAL COVER	1	CWH171012	←	
22	NUT - TERMINAL COVER	1	CWH7080300J	←	
23	SOUND PROOF BOARD	1	CWH151051	CWH151056	
24	TERMINAL BOARD ASS'Y	1	CWA28K1064J	CWA28K224J	
25	TERMINAL BOARD ASS'Y	1	-	CWA28K1091J	
26	CAPACITOR - COM.	1	CWA312088	DS441606CPNA	O
27	HOLDER CAPACITOR	1	CWH30071	←	
28	CAPACITOR - F.M	1	DS441355NPQA	←	O
29	CABINET SIDE PLATE	1	CWE041255A	←	
30	CABINET SIDE PLATE COMPLETE	1	CWE04C1123	CWE04C1122	
31	CABINET FRONT PLATE ASS'Y	1	CWE06K1043	CWE06K1045	
32	CABINET TOP PLATE	1	CWE03K1009A	←	
33	CONTROL BOARD COVER COMP	1	CWH131168	←	
34	HANDLE	1	CWE161010	←	
35	CONTROL BOARD COVER(RIGHT-TOP)	1	CWH131169A	←	
36	HANDLE	2	CWE16000E	←	
37	THERMOSTAT	1	CWA151061	←	
38	TUBE ASSY(CAP.TUBE,STRAINER)	1	-	CWT023254	
39	TUBE ASSY(CAPILLARY TUBE)	1	-	CWT023148	
40	OIL SEPARATER ASS'Y	1	-	CWB16K1009	
41	ELECTRO MAGNETIC SWITCH	1	-	CWA00192	
42	SOUND PROOF MATERIAL	1	CWG302278	CWG302244	
43	SOUND PROOF MATERIAL	1	-	CWG302241	
44	WIRE NET	1	CWD041041A	←	

(Note)

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

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